



Transformers for Switching Power Supplies

Pin terminal type (For multiple outputs)

ECO series

ECO20XXSEO(Vertical/Horizontal types)

ECO22XXSEO(Vertical/Horizontal types)

ECO24XXSEO(Vertical/Horizontal types)

ECO24XXSLD(Vertical/Horizontal types)

REMINDERS FOR USING THESE PRODUCTS

Before using these products, be sure to request the delivery specifications.

SAFETY REMINDERS

Please pay sufficient attention to the warnings for safe designing when using these products.

REMINDERS

- The storage period is less than 12 months. Be sure to follow the storage conditions (Temperature: 5 to 40°C, Humidity: 10 to 75% RH or less).
If the storage period elapses, the soldering of the terminal electrodes may deteriorate.
- Do not use or store in locations where there are conditions such as gas corrosion (salt, acid, alkali, etc.).
- Soldering corrections after mounting should be within the range of the conditions determined in the specifications.
If overheated, a short circuit, performance deterioration, or lifespan shortening may occur.
- Self heating (temperature increase) occurs when the power is turned ON, so the tolerance should be sufficient for the set thermal design.
- Use a wrist band to discharge static electricity in your body through the grounding wire.
- Do not expose the products to magnets or magnetic fields.
- Do not use for a purpose outside of the contents regulated in the delivery specifications.
- The products listed on this catalog are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.
The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property.
If you intend to use the products in the applications listed below or if you have special requirements exceeding the range or conditions set forth in the each catalog, please contact us.

- | | |
|---|--|
| (1) Aerospace/Aviation equipment | (8) Public information-processing equipment |
| (2) Transportation equipment (cars, electric trains, ships, etc.) | (9) Military equipment |
| (3) Medical equipment | (10) Electric heating apparatus, burning equipment |
| (4) Power-generation control equipment | (11) Disaster prevention/crime prevention equipment |
| (5) Atomic energy-related equipment | (12) Safety equipment |
| (6) Seabed equipment | (13) Other applications that are not considered general-purpose applications |
| (7) Transportation control equipment | |

When designing your equipment even for general-purpose applications, you are kindly requested to take into consideration securing protection circuit/device or providing backup circuits in your equipment.

Switching Power Supply Transformers

ECO Series

Conformity to RoHS Directive
Halogen-free
Compatible with lead-free solders

Overview of the ECO Series

Development Concept

The ECO series is compliant with worldwide safety standards*. It is a pin-compatible, newly developed transformer that can be downsized and thinned.

* Applicable as of April 2007: UL/IEC/J 60065 Ver.7 (TV, DVD, STB), UL/IEC/60950 Ver.3 (printer), UL/IEC 60335-1 Ver.4 (home appliance)

MATERIAL

Optimum materials and core shape have been developed. No insulation-supporting material is used, and this secures the insulating distance.

While optimizing materials, TDK has further improved its proprietary core shape to develop a new-type ECO core.
TDK has downsized the product considerably in order to securing the necessary creepage distance.

MANUFACTURING METHOD

Since the ECO Series supports automatic winding, the product is of a high quality and can be manufactured stably.

It is designed to support automatic winding, which enables a remarkable reduction in the loss generated to achieve a proficient in manual winding until stable production.

In addition, the characteristic variations of the winding wire and creepage tape have largely been removed, stabilizing the transformer's characteristics.

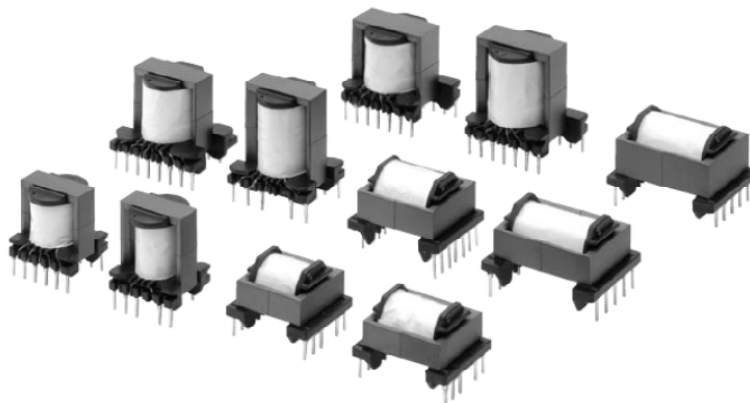
OPTIMIZATION DESIGN

Using design tools developed with TDK's comprehensive know-how, high-precision design has been achieved in a short period of time.

- 1) For optimization design and high-quality stable production, customers can use a specification request form.
If you provide the necessary information in the form, you will receive the optimization design in a short time.
- 2) We have prepared an individual specifications request document for the home appliance market.
- 3) TDK recommends design with a standard core gap (AL-value) for optimization and shorter trial and mass production lead time.
- 4) Plans for standard winding connection (patterns of recommended pin arrangement and winding structure) are available.
These help to speed up the design process, support automatic winding, and prevent deterioration in quality.

ENVIRONMENT

The ECO series is RoHS directive-compliant and halogen-free product.

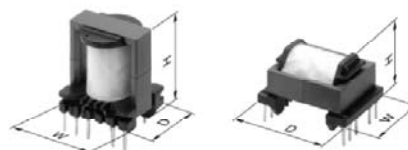


- Ferrite cores, bobbins, cases, etc. are not sold individually.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted ϕ Pr.

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Replacement Parts List

We have made a new lineup of replacement parts for products with different shapes that meet our customers' needs for smaller products. We can also provide different transformer shapes not shown in the catalog, so feel free to contact us.



REPLACEMENT PARTS LIST

General-purpose shaped core	Existing EGG ^{*1}	New ECO ^{*1}	Bobbin type ^{*2}	Maximum external size DxWxH (mm)max.	Reference output power ^{*3} (W)	Switching frequency fsw(kHz)	Cross-sectional center leg area Ae (mm ²)	Bobbin terminal			
								Pin pitch (mm)	Lead space F (mm)	Number of pins	
Vertical type											
EI22 EE25/19	EGG2017	ECO2017	VI	19.5x22.5x24.0	12	50	36.3	3.75	15.0	12	
		ECO2020	VI	19.5x22.5x27.0	20						
		EGG2420	ECO2023	VI	19.5x22.5x30.0						26
EED2820 EER28	EGG2420	ECO2219	VI	23.0x28.5x25.0	25	50	46.4	5.0	17.5	12	
			VII	23.0x24.0x25.0				4.0	17.5	12	
			VIII	23.0x30.0x25.0				3.75	17.5	14	
		ECO2225	VI	23.0x28.5x31.0	36	50	46.4	5.0	17.5	12	
			VII	23.0x24.0x31.0				4.0	17.5	12	
			VIII	23.0x30.0x31.0				3.75	17.5	14	
	EGG2425	ECO2230	VI	23.0x28.5x36.0	48	50	46.4	5.0	17.5	12	
			VII	23.0x24.0x36.0				4.0	17.5	12	
	EER28L	EGG2425	ECO2420	VI	24.0x28.5x26.5	35	50	63.8	5.0	17.5	12
				VII	25.0x31.5x26.5				4.0	20.0	14
EGG2430		ECO2425	VI	24.0x28.5x31.5	50	50	63.8	5.0	17.5	12	
			VII	25.0x35.5x31.5				4.0	20.0	16	
		ECO2430	VI	24.0x28.5x36.5	68	50	63.8	5.0	17.5	12	
			VII	25.0x35.5x36.5				4.0	20.0	16	
EER32	EGG2625	Under development ^{*4}	VI								
			VII								
		Under development ^{*4}	VI								
			VII								
EER35	EGG2833	Under development ^{*4}	VI								
			VII								
Horizontal type											
EE25/19	NEW	ECO2017	HI	24.5x23.5x20.0	5	50	36.3	3.75	20.0	12	
		ECO2020	HI	27.0x23.5x20.0	14			3.75	22.5	12	
		ECO2023	HI	29.5x23.5x20.0	20			3.75	25.0	12	
EER2820	NEW	ECO2219	HI	25.0x29.0x24.0	18	50	46.4	5.0	20.0	12	
			HII	25.0x26.0x24.0				4.0	20.0	12	
		ECO2225	HI	30.5x29.0x24.0	30	50	46.4	5.0	25.0	12	
			HII	30.5x26.0x24.0				4.0	25.0	12	
EER28	EGG2425	ECO2230	HI	35.5x29.0x24.0	42	50	46.4	5.0	30.0	12	
			HII	35.5x26.0x24.0				4.0	30.0	12	
		ECO2425	HI	30.5x30.0x25.0	41	50	63.8	5.0	25.0	12	
			HII	30.5x27.0x25.0				4.0	25.0	12	
EER28L	EGG2430	ECO2430	HI	36.0x30.0x25.0	59	50	63.8	5.0	30.0	12	
			HII	36.0x27.0x25.0				4.0	30.0	12	
EER35	EGG2833	Under development ^{*4}	HI								

^{*1} Ferrite cores, bobbin are not sold separately.

^{*2} The bobbin is made from phenol with a flame resistance grade of 94V-2 or higher.

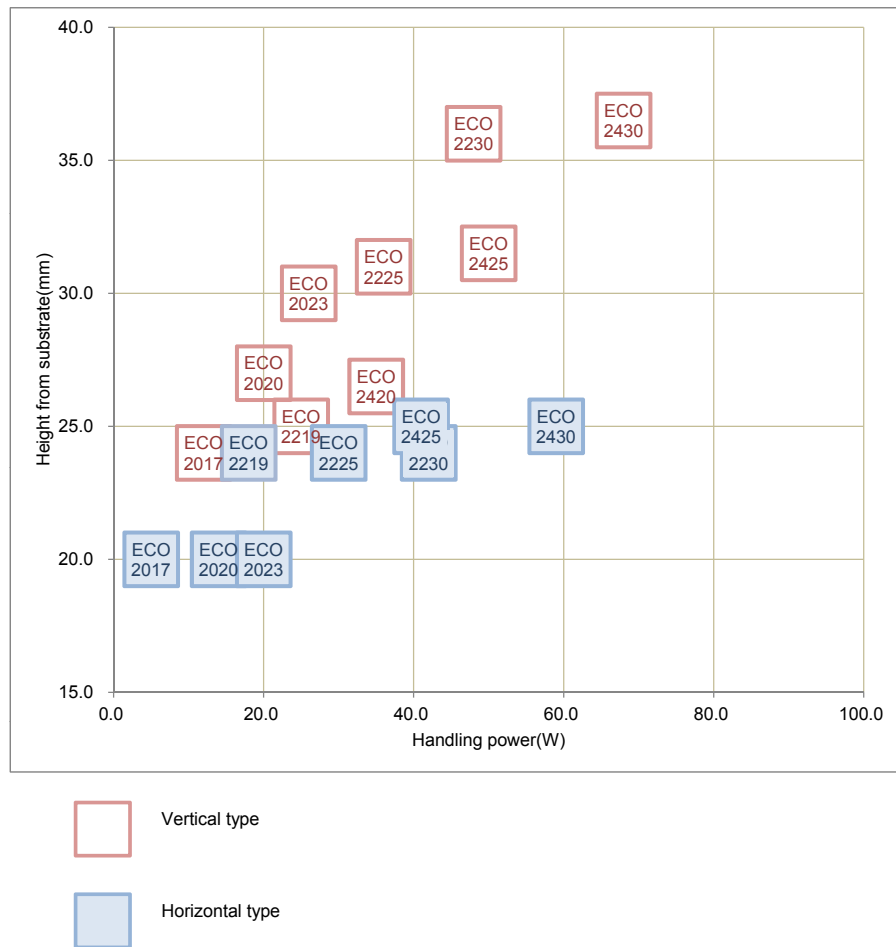
^{*3} The reference output was obtained under conditions where the frequency was 50kHz and creepage distance was 4mm. (See the relevant page for details of each shape.) The reference output differs depending on the switching device, switching frequency, transformer temperature, conditions, etc. Use this output for reference.

^{*4} Scheduled to be supported from April 2010 onwards (prior to that date, it is supported by the EGG type)

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Lineup of ECO Series



Composition of appellation for ECO Series

■ SCOPE

This standard applies insulation transformer for switching power supply and choke-coil for Power-factor circuit of the ECO series that Magnetics Business Group takes part in the design, production, and sales.

■ COMPOSITION OF APPELLATION FOR ECO SERIES

☐ Insulation transformer for switching power supply

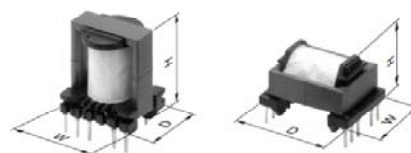
ECO

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1				2	3		4		5			6	7	8	9

 ex) ECO2225SEO-201V018

1. Core Size	ex) 2017, 2020, 2219, 2425 etc.
2. Usage	ex) Switching : S, PFC : P
3. Core Shape	ex) Core of ECO type : EO, Core of LQD type : LD, etc.
4. Number of Bobbin sections(Nothing if 1 section)	ex) 2, 5, 9 etc.
5. Serial number at each design site	Japan : 2xx, Taiwan : Txx, Xiamen : Xxx, Malaysia : Mxx, US : Uxx, Europe : Exx
6. Bobbin construction	Vertical type : V, Horizontal type : H, SMD type : S
7. Shielding method	Non : 0, Copper foil on the coil : 1, Wire shiled : 2, Copper foil on the core : 3
※Not include a shield winding	
8. Applicable Safety regulation	No : 0, Yes : 1
9. Number of windings	ex) 2, 5, 12 etc.

Product Line-Up



■ PRODUCT LINE-UP

TDK Part No.	Core Size	Vin	Switching frequency fsw(kHz)	Out1	Out2	Out3	Application
Vertical type		<div><div>50100150200250300350400</div></div>					
ECO2017SEO-D01V017	ECO2017	<div><div>75Vdc~326Vdc</div></div>	-	12.8V/0.6A	12V/0.09A	15.2V/0.05A	Air Con(Outdoor)
ECO2017SEO-D02V016		<div><div>110Vac</div></div>	100KHz PWM	12V/0.62A(1.6Ap)	-	-	Blu-Ray Player
ECO2017SEO-D03V014		<div><div>85Vac ~ 264Vac</div></div>	-	12V /1A typ/ 1.3A Max	-	-	Refrigerator
ECO2017SEO-D04V015		<div><div>160Vac ~ 288Vac</div></div>	100KHz PWM	12V/0.3A	-	-	Refrigerator
ECO2017SEO-D05V016		<div><div>169Vac ~ 312Vac</div></div>	-	5V/0.25A	15V/0.2A	-	Washing Machine
ECO2020SEO-D01V016	ECO2020	<div><div>70Vac ~ 265Vac</div></div>	50KHz PWM	12.5V/0.8A	15V/0.1A	-	Air Con(Indoor)
ECO2020SEO-D03V016		<div><div>85Vac~276Vac</div></div>	124KHz PWM	12V/0.85A	17V/0.15A	17V/0.1	Air Con(Outdoor)
ECO2020SEO-D09V015		<div><div>154Vac ~ 312Vac</div></div>	-	12V/0.5A	15/0.1A	-	Refrigerator
ECO2020SEO-D10V017		<div><div>96Vac ~ 276Vac</div></div>	-	15V/0.4A	18V/0.4A	5V/0.1A	Washing Machine
ECO2219SEO-D01V018	ECO2219	<div><div>85Vac~276Vac</div></div>	-	12V/0.32A	8V/0.3A	8V/0.3A	Air Con(Indoor)
ECO2219SEO-D02V016		<div><div>264Vdc~373Vdc</div></div>	100KHz PWM	12.4V/0.3A	5V/0.09A	19V/0.14	Air Con(Indoor)
ECO2219SEO-D03V017		<div><div>170Vdc~400Vdc</div></div>	-	12V/0.54A	5V/0.11A	19V/0.02	Air Con(Outdoor)
ECO2225SEO-D02V0112	ECO2225	<div><div>220Vac</div></div>	41KHz ~	12.3V/3.2A(5.0Ap)	-	-	Blu-Ray Recorder
ECO2420SEO-D01V019	ECO2420	<div><div>200Vdc~300Vdc</div></div>	-	12V/0.8A	17V/0.17A	17V/0.02A	Air Con(Outdoor)
ECO2420SEO-D02V019		<div><div>110Vac</div></div>	33KHz ~	12.3V/3.3A	-	-	Blu-Ray Recorder
ECO2420SEO-D03V018		<div><div>169Vac ~ 312Vac</div></div>	60KHz PWM	12V/2.7A	5V/0.3A	-	Refrigerator
ECO2420SEO-D04V0110		<div><div>214Vdc ~ 404Vdc</div></div>	-	12V/1.2A	14V/0.5A	7V/0.05A	Refrigerator
ECO2425SEO-D01V019	ECO2425	<div><div>264Vdc~373Vdc</div></div>	100KHz PWM	12.7V/1.18A	5V/0.14A	20V/0.07A	Air Con(Outdoor)
ECO2425SEO-D02V016		<div><div>96Vac ~ 276Vac</div></div>	-	20V/0.2A	18V/0.5A	3.3V/0.7A	Washing Machine
ECO2425SEO-D03V014		<div><div>170Vac ~ 230Vac</div></div>	30KHz ~	36.5V/0.9A Max	-	-	Washing Machine
ECO2425SEO-D04V017		<div><div>169Vac ~ 312Vac</div></div>	65KHz PWM	22.0V/1.5A typ/2.0Ap	15V/0.5A	7V/0.2A	Washing Machine
Horizontal type							
ECO2020SEO-D02H015	ECO2020	<div><div>75Vdc~326Vdc</div></div>	-	12.7V/0.6A	18.5V/0.06A	-	Air Con(Indoor)
ECO2020SEO-D04H015		<div><div>110Vac</div></div>	67KHz PWM	12V/1.5A(2.4Ap)	-	-	Blu-Ray Player
ECO2020SEO-D06H015		WW	80KHz ~	19.7V/0.267A(0.35Ap)	-	-	LED Lamp
ECO2020SEO-D07H016		WW	65KHz PWM	21.5V/0.465A(1.4Ap)	-	-	Printer
ECO2020SEO-D08H016		WW	65KHz PWM	30.0V/0.333A(1.0Ap)	-	-	Printer
ECO2023SEO-D01H016	ECO2023	WW	100KHz PWM	12V/1.3A(2.2Ap)	-	-	Blu-Ray Player
ECO2225SEO-D01H016	ECO2225	WW	67KHz PWM	12V/1.5A(2.4Ap)	-12V/50mA(70mAp)	-	Blu-Ray Player
ECO2430SEO-D01H0110	ECO2430	<div><div>390Vdc PFC</div></div>	100KHz PWM	12V/2.0A(2.75Ap)	17V/0.5A(1.74p)	-	Flat-TV
ECO2430SEO-D03H016		<div><div>220Vac</div></div>	67KHz PWM	5V/1A	24V/2A	-	Printer
ECO2425SLD-D01H017	LQD2425	<div><div>100Vdc~370Vdc</div></div>	-	12.7V/2.33A	16V/0.05A	-	Air Con(Indoor)
ECO2425SLD-D02H0111		WW	67KHz PWM	5V/2.2A(4.7Ap)	12V/0.2A(1.5Ap)	-	Blu-Ray Player

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General Specifications

■ OPERATING TEMPERATURE RANGE

Temperature Range	Operating	-30 to +120°C[including self-heating]
	Storage	-40 to +85°C
Humidity Range	Operating	10 to 95(%)RH[Maximum wet-bulb temperature 38°C, without dewing]
	Storage	10 to 95(%)RH[Maximum wet-bulb temperature 38°C, without dewing]

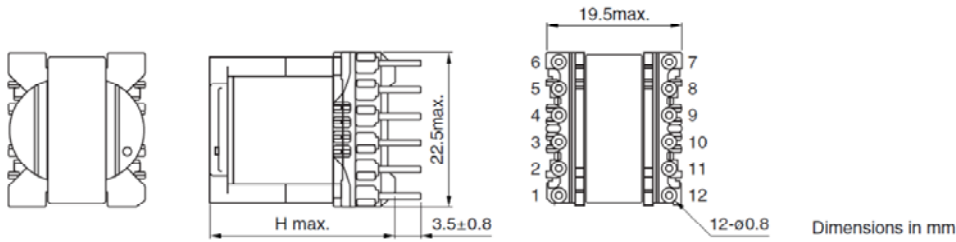
■ PACKAGE QUANTITY, PRODUCT WEIGHT

TDK Part No.	Core Size	Package quantity (pieces/box)	Individual weight (g)
Vertical type			
ECO2017SEO-D01V017	ECO2017	210	13.8
ECO2017SEO-D02V016		210	13.8
ECO2017SEO-D03V014		210	13.1
ECO2017SEO-D04V015		210	13.2
ECO2017SEO-D05V016		210	12.0
ECO2020SEO-D01V016	ECO2020	225	14.9
ECO2020SEO-D03V016		180	16.9
ECO2020SEO-D09V015		225	15.2
ECO2020SEO-D10V017		225	15.1
ECO2219SEO-D01V018	ECO2219	210	18.9
ECO2219SEO-D02V016		210	19.8
ECO2219SEO-D03V017		210	18.7
ECO2225SEO-D02V0112	ECO2225	150	32.0
ECO2420SEO-D01V019	ECO2420	150	28.2
ECO2420SEO-D02V019		150	26.6
ECO2420SEO-D03V018		120	26.5
ECO2420SEO-D04V0110		120	26.5
ECO2425SEO-D01V019	ECO2425	135	34.8
ECO2425SEO-D02V016		150	33.5
ECO2425SEO-D03V014		150	31.7
ECO2425SEO-D04V017		135	33.2
Horizontal type			
ECO2020SEO-D02H015	ECO2020	200	14.7
ECO2020SEO-D04H015		200	16.2
ECO2020SEO-D06H015		205	14.6
ECO2020SEO-D07H016		300	15.8
ECO2020SEO-D08H016		300	15.6
ECO2023SEO-D01H016	ECO2023	180	17.3
ECO2225SEO-D01H016	ECO2225	120	22.7
ECO2430SEO-D01H0110	ECO2430	90	35.4
ECO2430SEO-D03H016		90	37.8
ECO2425SLD-D01H017	LQD2425	192	23.9
ECO2425SLD-D02H0111		192	22.3

ECO20 Series for Multiple Outputs (Vertical Type)

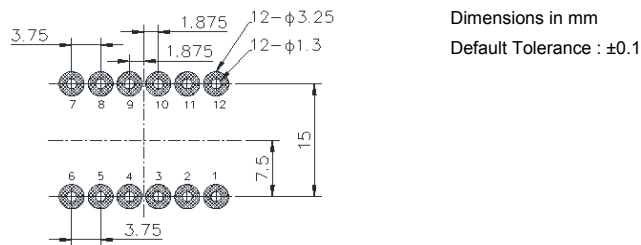
Compatible with lead-free solders

■ SHAPES AND DIMENSIONS (BOBBIN TYPE: V I)



Part No.	Bobbin type	H max.
ECO2017	VI	24.0
ECO2020	VI	27.0
ECO2023	VI	30.0

■ RECOMMENDED BASE MATERIAL OPENING SIZE



■ ITEMS APPLICABLE

Series	Bobbin Type	Part No.
ECO2017	VI	ECO2017SEO-D01V017
		ECO2017SEO-D02V016
		ECO2017SEO-D03V014
		ECO2017SEO-D04V015
		ECO2017SEO-D05V016
		ECO2020SEO-D01V016
ECO2020		ECO2020SEO-D03V016
		ECO2020SEO-D09V015
		ECO2020SEO-D10V017

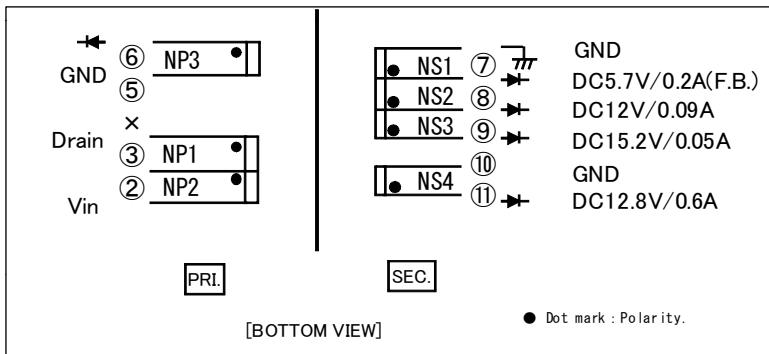
- Compatible ferrite materials for this product are the PC47 family.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted ϕ Ir.

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SPECIFICATIONS / ECO2017SEO-D01V017

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS	
Over Surface & Air Spacings	
PRI. - SEC.	2.5mm MIN.
PRI. - CORE	1.3mm MIN.
SEC. - CORE	1.3mm MIN.

■ WINDING SPECIFICATIONS

No.	Order	coil	terminal	turns	wire	note
1	1	N P1	3 - 2	30	UEW 0.16	NP1+NP2=91ts
2	2	N P3	6 - 5	11	UEW 0.23 ×2	
3	3	N S4	12 - 11	11	UEW 0.23 ×2	
4	4	N S3	10 - 9	2	UEW 0.26	
5	5	N S2	9 - 8	5	UEW 0.26	
6	6	N S1	8 - 7	6	UEW 0.26	
7	7	N P2	2 - 1	61	UEW 0.16	

SPECIFICATIONS / ECO2017SEO-D01V017

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions) (Temperature) : 25±10°C (Relative Humidity) : 25~75%RH					
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	3 - 1	1.49mH ± 10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	3 - 1 (6,5,SEC. short)	35.0 uH MAX		
4.3	DC. Resistance	2 - 1	2.238Ω ±15%		Milli ohm meter ADEX : AX-114N or Equivalent
		3 - 2	0.744Ω ±20%		
		6 - 5	74.5mΩ ±30%		
		8 - 7	79.3mΩ ±30%		
		9 - 8	65.3mΩ ±30%		
		10 - 9	30.1mΩ ±30%		
		12 - 11	81.1mΩ ±30%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:2mA	AC 1.5kVrms 1min	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.0kVrms 1min	
4.6	Impulse Test	3 - 1	Without Breakdown	Pulse 600Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X / 3 - 1	2 - 1	STD(0.6807)±2.0%	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		6 - 5	STD(0.1178)±5.5%		
		10 - 9	STD(0.0214)±15%		
		9 - 8	STD(0.0537)±10%		
		8 - 7	STD(0.0660)±10%		
		12 - 11	STD(0.1189)±5.5%		

SPECIFICATIONS / ECO2017SEO-D01V017

Compatible with lead-free solders

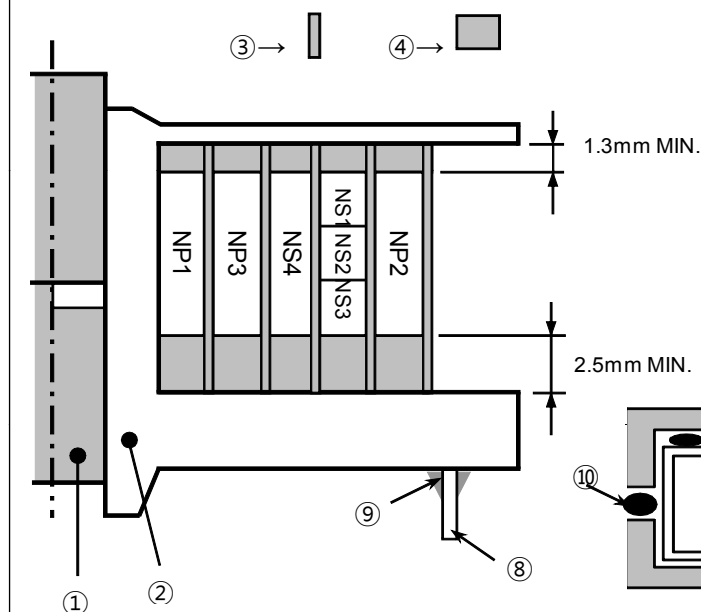
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 20.9mm x17.6mm x7.7mm		—	—	TDK Corporation	—
②	BOBBIN Phenol Resin PM-9820		0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester Color : YELLOW	1318 or 1350F	0.05 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44 or 44D or 44-18MIL or 673F or 673A	-	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
					TERAOKA SEISAKUSHO CO.,LTD.	E56086
⑤	WINDING WIRE Polyurethane Enameled Copper Wire 0.16 mm DIAx1 : NP1,NP2 0.23 mm DIAx2 : NP3		—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
					XIAMEN HUNG'S ENTERPRISE CO.,LTD.	E219154
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.26 mm DIAx1 : NS1,NS2,NS3 0.23 mm DIAx2 : NS4				HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E229341
					SHENZHEN FUJI FINE FACTORY	E303260
⑦	ADHESIVE Acrylic , Urethane or Epoxy				Optional	
⑧	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.				Optional	
⑨	SOLDER (For junction of a wire and aterminal) Lead-Free Sn-Ag-Cu				Optional	
⑩	ADHESIVE Polyestel, Urethane or Epoxy				Optional	

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

✘ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

☆BOBBIN UL94: 94V-0 ,CTI(IEC112): 175~250V (UL Level 3)



LAYERS OF INSULATION TAPE		
No.	Coil	Insulation
0	Inner Layer	-
1	NP1	2Ts
2	NP3	2Ts
3	NS4	2Ts
4	NS3	-
5	NS2	-
6	NS1	2Ts
7	NP2	2Ts

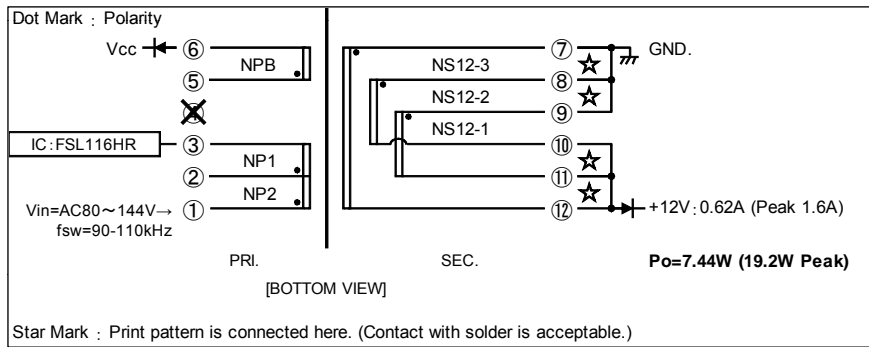
· All specifications are subject to change without notice.
Please read the precautions before using this catalog.

transformer dk1 eco en

SPECIFICATIONS / ECO2017SEO-D02V016

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS		
*UL60065-Ed.7, *IEC60065-Ed.7		
	Inside of Coil	Outside of Coil
Between Pri. and Sec.	4.8mm MIN.	8.0mm MIN.
Between Pri. and Core	2.4mm MIN.	4.0mm MIN.
Between Sec. and Core	2.4mm MIN.	4.0mm MIN.

■ WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
1	1	N S12-1	9 - 11	13	UEW 0.25	
2	2	N P1	2 - 3	42	UEW 0.23	NP1+NP2=71Ts.
3	3	N S12-2	8 - 10	13	UEW 0.25	
4	4	N P2	1 - 2	29	UEW 0.23	
5	5	N S12-3	7 - 12	13	UEW 0.25	
6	6	N PB	5 - 6	17	UEW 0.20	

SPECIFICATIONS / ECO2017SEO-D02V016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature		:	25±10°C
		Relative Humidity		:	25~75%RH
No	Parameter	Test Terminal	Specification	Condition _s	Test Instruments
4.1	Inductance	1 - 3	712 µH ± 10%.	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	1 - 3 (7~12 short)	15.0 µH MAX.	100 kHz 1Vrms	
4.3	DC. Resistance	1 - 3	1.12 Ω ± 20%.		Milli ohm meter ADEX : AX-114 or Equivalent
		5 - 6	0.462 Ω ± 20%.		
		9 - 11	0.149 Ω ± 20%.		
		8 - 10	0.184 Ω ± 20%.		
		7 - 12	0.217 Ω ± 20%.		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	1 - 3	Without Breakdown	Pulse 0.8kVo-p 3--5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/ 1 - 3	5 - 6	(0.2402)± 4.7%.	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		9 - 11	(0.1744)± 6.1%.		
		8 - 10	(0.1822)± 6.1%.		
		7 - 12	(0.1835)± 6.1%.		

SPECIFICATIONS / ECO2017SEO-D02V016

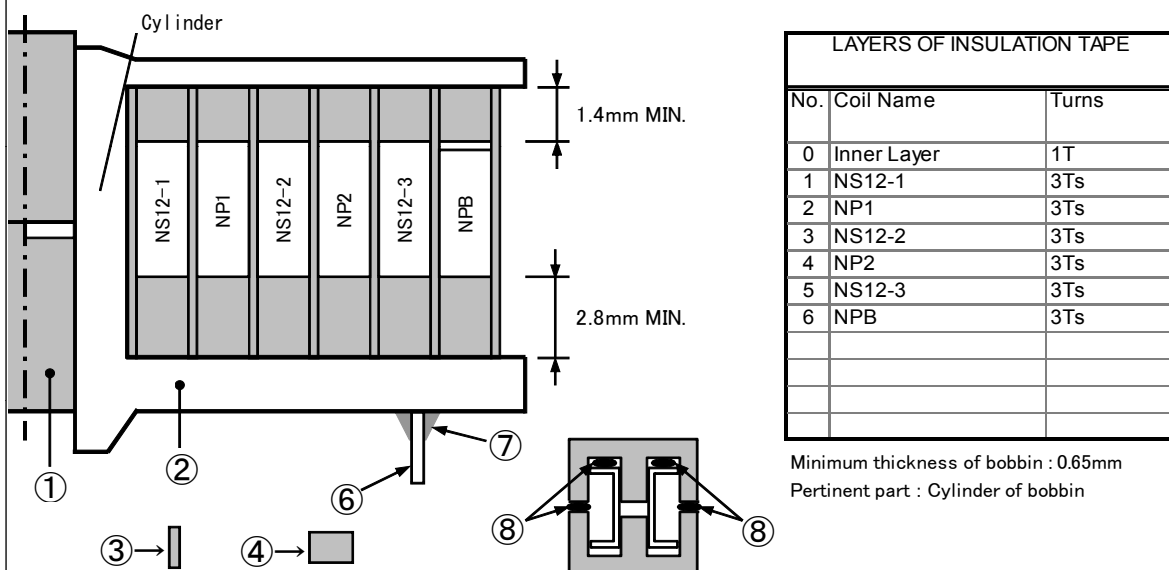
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL	MIN.THICKNESS OF 1 LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 20.9mmx17.6mmx7.7mm	—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin	PM-9820 T375J	0.65 mm	SUMITOMO BAKELITE CO.,LTD. CHANG CHUN PLASTICS CO.,LTD	E41429 E59481
③	INSULATION TAPE Polyester Material group II MIN. (400V<CTI≤600V MIN.)	1318-1 or 1350F-1	0.05 mm	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester Material group I (CTI≥600V)	44D-A or 44T-A 343BN@@ WF with suffixes	—	3M COMPANY ELECTRICAL MARKETS DIV (EMD) NITTO DENKO CORP. JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E34833 E165111
⑤	WINDING WIRE (Primary) Polyurethane Enameled Copper Wire 0.23 mm DIA : NP1, NP2 0.20 mm DIA : NPB WINDING WIRE (Secondary) Polyurethane Enameled Copper Wire 0.25 mm DIA : NS12-1,-2,-3	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO. HANGZHOU WEIFENG ELECTRONIC CO.,LTD. TAI ELECTRIC WIRE&CABLE CO LTD ZHUHAI WEIHAN WIRE CO LTD SHENZHEN FUJI FINE FACTORY HITACHI CABLE (JOHOR) SDN BHD THAI HITACHI ENAMEL WIRE CO LTD ELEKTRISOLA (MALAYSIA) SDN BHD	E196072 E229341 E85640 E339217 E303260 E215594 E137472 E143312
⑥	TERMINAL PIN Φ0.8 (Soldered) Copper Clad Steel Wire Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.	—	—	Optional	—
⑦	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu	—	—	Optional	—
⑧	ADHESIVE Acrylic, Urethane or Epoxy	—	—	Optional	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

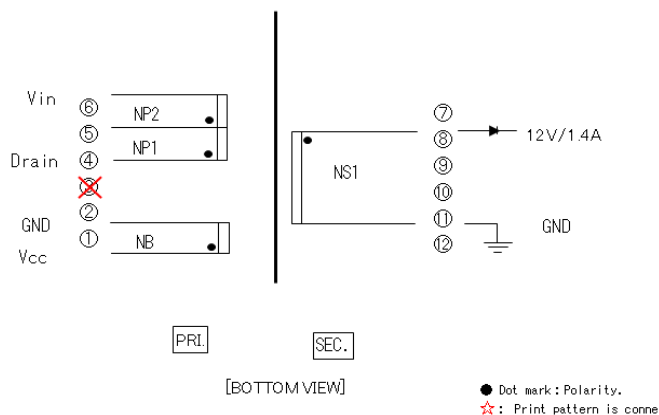
※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



SPECIFICATIONS / ECO2017SEO-D03V014

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS		
IEC60335-1 Ed.4		
Over Surface & Air Spacings		
PRI. - SEC.	4.0 mm MIN.(inside coil)	
PRI. - CORE	4.0 mm MIN.(outside coil)	
SEC. - CORE	4.0 mm MIN.(outside coil)	
REMOVE PIN	PIN No. 3	

■ WINDING SPECIFICATIONS

No.	order	coil	terminal	turns	wire	WINDING METHOD	note
0		600V \leq CTI					NP1+NP2=47ts
1	CW	N P1	4 - 5	24	2UEW 0.28	2Layer sol	
2	CW	N S1	8 - 11	6	2UEW 0.45	1Layer sol	
3	CCW	N B	2 - 1	7	2UEW 0.28	1Layer sol	
4	CW	N P2	5 - 6	23	2UEW 0.28	2Layer sol	

SPECIFICATIONS / ECO2017SEO-D03V014

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions)					
(Temperature)		:	25±10°C		
(Relative Humidity)		:	25~75%RH		
No	Parameter	Test Terminal	Specification	Condition _s	Test Instruments
4.1	Inductance	4 - 6	555uH ± 15%	1 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
				100 kHz 1Vrms	
				200 kHz 1Vrms	
4.2	Leakage Inductance	4 - 6 (1,2,SEC. short)	20 uH MAX	100 kHz 1Vrms	ADEX : AX-114N or Equivalent
4.3	DC. Resistance	4 - 5	0.218 ±20%		
		8 - 11	0.025 ±30%		
		1 - 2	0.084 ±30%		
		5 - 6	0.279 ±20%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
4.6	Impulse Test	4 - 6	Without Breakdown	Pulse 600Vo-p 3~5 pluse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio	4 - 5	0.5060 ±10%	f=10kHz	Ratio Meter or Equivalent
		8 - 11	0.1259 ±10%		
		1 - 2	0.1483 ±10%		
4.8	Inductance	4 - 5	144.8 ±25%	100 kHz 1Vrms	Agilent : 4263B or Equivalent
		8 - 11	9.0 ±25%		
		1 - 2	12.6 ±25%		
		5 - 6	137.6 ±25%		

SPECIFICATIONS / ECO2017SEO-D03V014

Compatible with lead-free solders

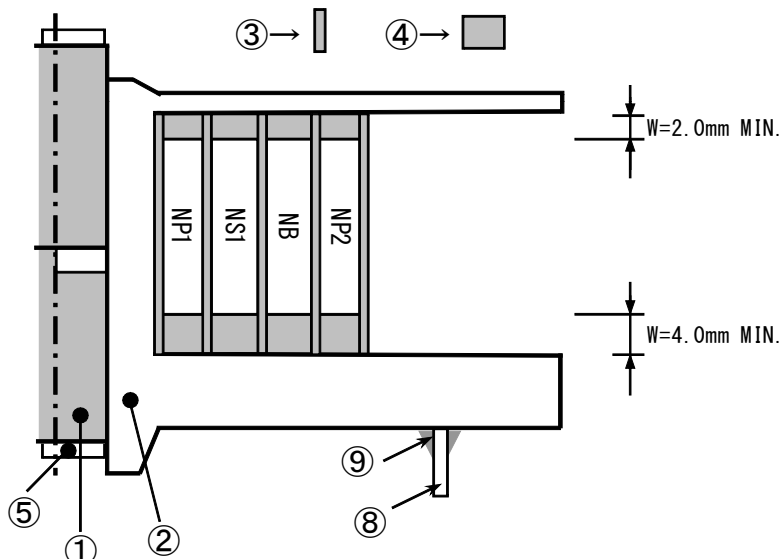
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No.	ITEM & MATERIAL		MIN.THICKNESS OF LAYER	UL T1 (°C)	MANUFACTURER	UL FILE NO.
①	CORE PCB47 ECO2017		—	—	TDK Corporation	—
②	BOBBIN	Phenol Resin PM-9820	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester	CT280	0.05 mm	130	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
		35660Y			SYMBIO INC	E50292
		1318-1			3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape)	44D-A	—	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
		35660Y			SYMBIO INC	E50292
		Polyester WF with suffixes			JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
⑤	FIXING TAPE FOR CORE Polyester	CT280	0.05 mm	130	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
		1318-1			3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
⑥	WINDING WIRE Polyurethane Enameled Copper Wire		—	130	TAI-I ELECTRIC WIRE & CABLE CO LTD	E85640
					PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
					XIAMEN HUNG'S ENTERPRISE CO.,LTD.	E219154
⑦	ADHESIVE Varnish TVB2024				KYOCERA CHEMICAL CORPORATION	E83702
⑧	TERMINAL PIN Copper Clad Steel Wire $\Phi 0.8$ (Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3 μ m or More.				Optional	
⑨	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu				Optional	
⑩	MARKING	Laser			LA MARK LP-V SERIES	

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

★BOBBIN UL94:94V-0 ,CTI(IEC112):175~250V (UL Level 3)



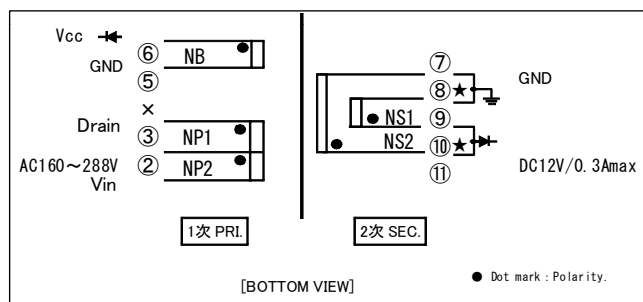
LAYERS OF INSULATION TAPE		
No.	Coil	Insulation
0	Inner Layer	1T
1	N P1	3Ts
2	N S1	3Ts
3	N B	2T
4	N P2	3Ts

· All specifications are subject to change without notice.
Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2017SEO-D04V015

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS	
IEC60335-1 Ed.4	
Over Surface & Air Spacings	
PRI. - SEC.	4.0mm MIN.
PRI. - CORE	4.0mm MIN.
SEC. - CORE	4.0mm MIN.

■ WINDING SPECIFICATIONS

No.	Order	coil	terminal	turns	wire	note
0	0	600 ≤ CTI				
1	1	N P1	3 - 2	69	UEW 0.12	NP1+NP2=120ts
2	2	N S1	10 - 9	26	UEW 0.18	
3	3	N P2	2 - 1	51	UEW 0.12	
4	4	N S2	11 - 8	26	UEW 0.18	
5	5	N B	6 - 5	26	UEW 0.18	

SPECIFICATIONS / ECO2017SEO-D04V015

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions)					
(Temperature)		:	25±10°C		
(Relative Humidity)		:	25~75%RH		
No	Parameter	Test Terminal	Specification	Condition _s	Test Instruments
4.1	Inductance	3 - 1	3.18mH ± 13%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	3 - 1 (SEC.short)	35 µH MAX	100 kHz 1Vrms	
4.3	DC. Resistance	3 - 2	3.06Ω ±15%		Milli ohm meter ADEX : AX-114N or Equivalent
		10 - 9	0.58Ω ±20%		
		11 - 8	0.70Ω ±20%		
		6 - 5	0.77Ω ±20%		
		2 - 1	2.80Ω ±15%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE	Sense:1mA	AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	3 - 1	Without Breakdown	Pulse 600Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X / 3 - 1	3 - 2	STD(0.5720) ±2.0%	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		10 - 9	STD(0.2166) ±3.0%		
		11 - 8	STD(0.2171) ±3.0%		
		6 - 5	STD(0.2165) ±3.0%		

SPECIFICATIONS / ECO2017SEO-D04V015

Compatible with lead-free solders

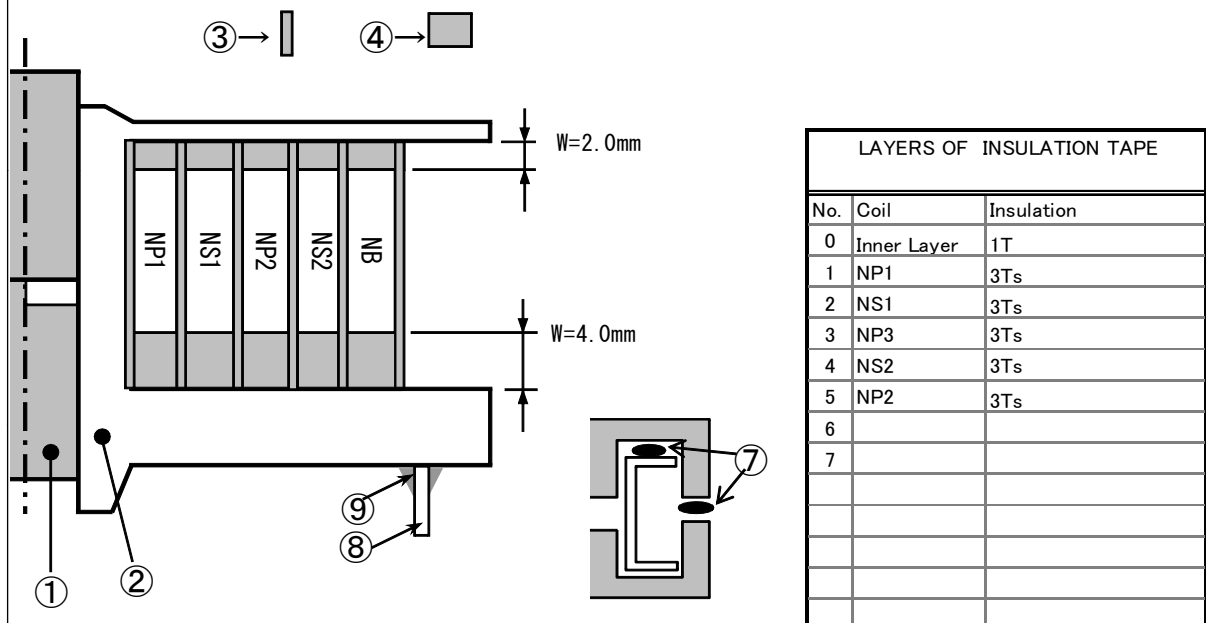
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No.	ITEM & MATERIAL	MIN.THICKNESS OF LAYER	UL T1 (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 20.9mm x17.6mm x7.7mm	—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin PM-9820	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester Color : WHITE	1318 0.05 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44 or 44D or 44-18MIL or 673F or 673A	—	3M COMPANY ELECTRICAL MARKETS DIV (EMD) TERAOKA SEISAKUSHO CO.,LTD.	E17385 E56086
⑤	WINDING WIRE Polyurethane Enameled Copper Wire 0.12 mm DIAx1 : NP1,NP2 0.18 mm DIAx1 : NB	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.18 mm DIAx1 : NS1,NS2	—	130	HANGZHOU WEIFENG ELECTRONIC CO.,LTD. TAI-I COPPER(GUANGZHOU) CO.,LTD Zhuhai Wei Han Wire Co., Ltd ELEKTRISOLA (MALAYSIA) SDN BHD	E229341 E85640 E339217 E143312
⑦	ADHESIVE Acrylic , Urethane or Epoxy	—	—	LOCTITE	—
⑧	TERMINAL PIN Copper Clad Steel Wire Φ 0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3 μ m or More.	—	—	XIAMEN KEXIN ELECTRON CO.,LTD.	—
⑨	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu	—	—	SENJU METAL Vendor::SOLNET METAL INDUSTRY CO.,LTD.	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

★BOBBIN UL94: 94V-0 ,CTI(IEC112): 175~250V (UL Level 3)



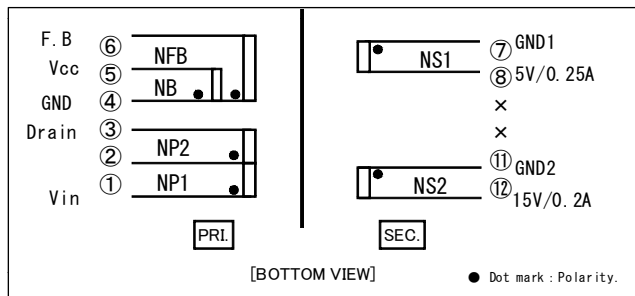
· All specifications are subject to change without notice.

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SPECIFICATIONS / ECO2017SEO-D05V016

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

SAFETY STANDARDS	
IEC60335-1 Ed.4	
Over Surface & Air Spacings	
PRI. - SEC.	4.0 mm MIN.(inside core)
PRI. - CORE	4.0 mm MIN.(outside core)
SEC. - CORE	4.0 mm MIN.(outside core)

WINDING SPECIFICATIONS

No.	order	coil	terminal	turns	wire	note
0	0	600V≤CTI				
1	1	N P2	2 – 3	44	UEW 0.16	NP1+NP2=95ts
2	2	N B	4 – 5	12	UEW 0.16	
3	3	N FB	4 – 6	5	UEW 0.16	
4	4	N S1	7 – 8	6	UEW 0.20	
5	5	N S2	11 – 12	16	UEW 0.20	
6	6	N P1	1 – 2	51	UEW 0.16	

* BARRIER TAPE & INSULATION TAPE SPECIFICATIONS										Insulation tape Color : Yellow	
No.	order	coil	terminal	Pin side	Core side	Ts	Insulation tape 17.5mm		note		
0	0			–	–	–	t=25u	1	ts		
1	1	N P2	2 – 3	4.0	2.0	2ts	t=25u	1	ts		
2	2	N B	4 – 5	4.0	2.0	1ts	t=25u	1	ts		
3	3	N FB	4 – 6	4.0	2.0	–	t=25u	3	ts		
4	4	N S1	7 – 8	4.0	2.0	1ts	t=25u	1	ts		
5	5	N S2	11 – 12	4.0	2.0	1ts	t=25u	3	ts		
6	6	N P1	1 – 2	4.0	2.0	3ts	t=25u	3	ts		

· All specifications are subject to change without notice.
Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2017SEO-D05V016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions)					
(Temperature)		:	25±10°C		
(Relative Humidity)		:	25~75%RH		
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	1 - 3	1.80mH ± 13%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	1 - 3 (4,5,6,SEC. short)	35.0uH MAX		
4.3	DC. Resistance	1 - 2	1.716Ω ±15%		Milli ohm meter ADEX : AX-114N or Equivalent
		2 - 3	1.129Ω ±15%		
		4 - 5	0.351Ω ±20%		
		4 - 6	0.164Ω ±20%		
		7 - 8	0.133Ω ±20%		
		11 - 12	0.336Ω ±20%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	1 - 3	Without Breakdown	Pulse 600Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X / 1 - 3	4 - 5	STD(0.1243) ±7.0%	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		7 - 8	STD(0.0632) ±9.9%		
		11 - 12	STD(0.1700) ±5.0%		
		4 - 6	STD(0.0529) ±9.9%		
4.8	Inductance	1 - 2	534.7uH ± 13%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
		2 - 3	380.7uH ± 13%		
		4 - 5	28.4uH ± 13%		
		4 - 6	5.3 uH ± 13%		
		7 - 8	7.3 uH ± 13%		
		11 - 12	52.0uH ± 13%		

SPECIFICATIONS / ECO2017SEO-D05V016

Compatible with lead-free solders

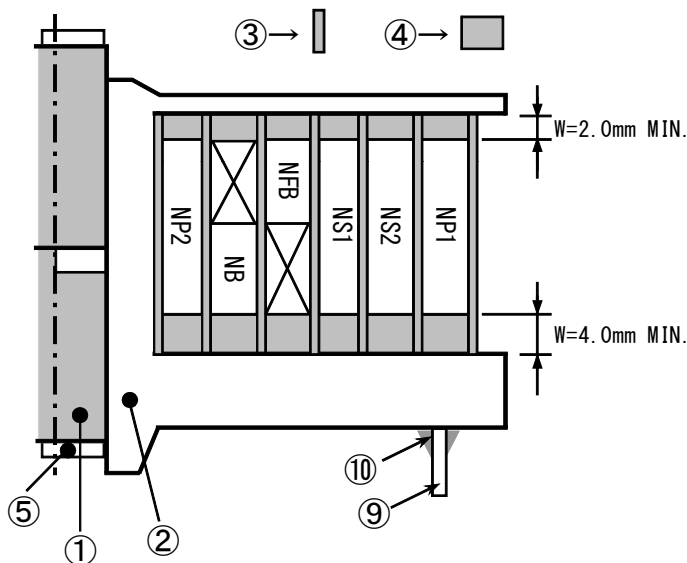
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No.	ITEM & MATERIAL	MIN.THICKNESS OF LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 20.9mm x17.6mm x7.7mm	—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin PM-9820	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester CT280	0.05 mm	130	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD 3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E165111
	Color : YELLOW 1318-1				E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester 44D-A or	—	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
	WF with suffixes				E165111
⑤	FIXING TAPE FOR CORE Polyester CT280	0.05 mm	130	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD 3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E165111
	Color : YELLOW 1318-1				E17385
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.16mm DIAx1 : NP1,NP2,NB NFB	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
				XIAMEN HUNG'S ENTERPRISE CO.,LTD.	E219154
				HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E229341
⑦	WINDING WIRE Polyurethane Enameled Copper Wire 0.20mm DIAx1 : NS1,NS2	—	—	—	—
⑧	IMPREGNATION Epoxy Varnish	—	—	Optional	—
⑨	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.	—	—	Optional	—
⑩	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu	—	—	Optional	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

☆ BOBBIN UL94 : 94V-0 ,CTI(IEC112) : 175~250V (UL Level 3)



LAYERS OF INSULATION TAPE		
No.	Coil	Insulation
0	Inner Layer	1T
1	NP2	1T
2	NB	1T
3	NFB	3Ts
4	NS1	1T
5	NS2	3Ts
6	NP1	3Ts
7		

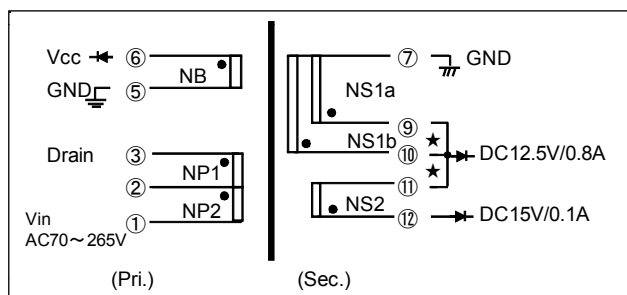
· All specifications are subject to change without notice.

Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2020SEO-D01V016

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

SAFETY STANDARD : IEC60335

* All products do not obtain the above standard approvals. But insulating construction and materials are designed to consider the above Standard.

WINDING SPECIFICATIONS

No		COIL	TERMINAL	TURNS	WIRE	WINDING METHOD
1		N P 1	3 - 2	28	1UEW 0.20	osculation
2		N S 1a	9 - 7	15	1UEW 0.30	osculation
3		N S 2	12 - 11	3	1UEW 0.30	equality
4		N B	6 - 5	25	1UEW 0.20	equality
5		N S 1b	10 - 7	15	1UEW 0.30	osculation
6		N P 2	2 - 1	28	1UEW 0.20	osculation

SPECIFICATIONS / ECO2020SEO-D01V016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

No.	ITEM	TERMINAL	SPECIFICATION	TEST INSTRUMENTS
1	INDUCTANCE	3--1	550uH ± 10%	HP 4284A PRECISION LCR METER orEQUIVALENT f=10kHz V=1Vrms
2	LEAKAGE INDUCTANCE	3--1 5~12 SHORT	9.5uH MAX	HP 4284A PRECISION LCR METER orEQUIVALENT f=10kHz V=1Vrms
3	DC. RESISTANCE	3--2	0.45Ω ± 20%	CHEN HWA502 AC OR AX-111A DIGITAL MILLIOHM METER orEQUIVALENT (Ta=20℃)
		9--7	0.12Ω ± 20%	
		12--11	32.2mΩ ± 30%	
		6--5	0.53Ω ± 20%	
		10--7	0.16Ω ± 20%	
		2--1	0.68Ω ± 20%	
4	WITHSTANDING VOLTAGE	P-----S	AC3.75kVrms 1min	PUNCTURE TESTER KIKUSUI:TOS8650 or EQUIVALENT SENSE: 2mA f=50 or 60Hz
		P--P;P,S--CORE	AC2.0kVrms 1min	
5	Insulation Resistance	PRI.-SEC.	100 MΩ MIN. DC 500V	Meg Ohm Meter Matsushita : VP2941 or Equivalent
		PRI.,SEC. --CORE		
6	POLARITY& TURNS RATIO :3---2	9--7	(0.5280Vrms ±5.5%)	IKEDEN RATIO TESTER MODEL IKD3053 f=10kHz
		12--11	(0.1063Vrms ±12%)	
		6--5	(0.8859Vrms ±3.5%)	ECG-KOKUSAI WINDING TESTER DWX-05 or EQUIVALENT
		10--7	(0.5276Vrms ±5.5%)	
		2--1	(0.9893Vrms ±3.0%)	
Outgoing inspection data (TDK format) must be attached for each lot.				

SPECIFICATIONS / ECO2020SEO-D01V016

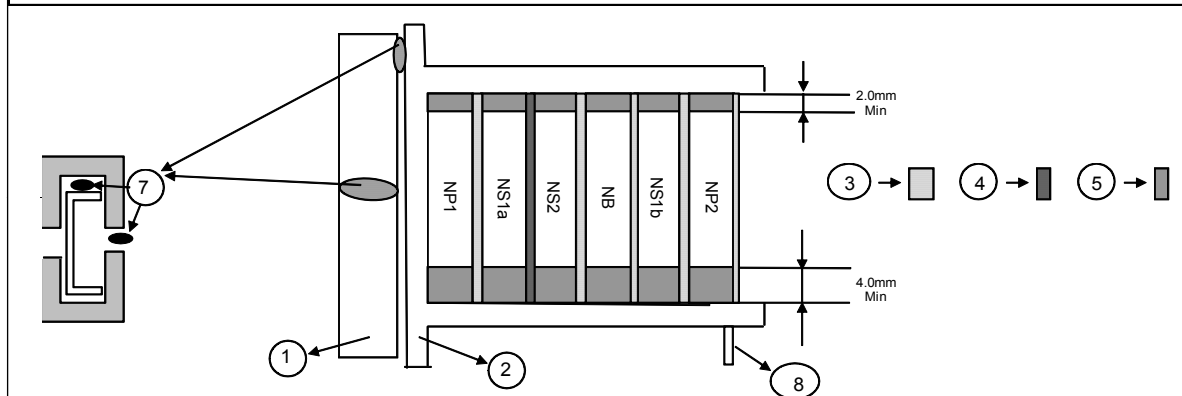
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

NO.	ITEM	MATERIAL&SPEC	MANUFACTURER	MIN.THICKNESS OF TOTALLY LAYER	U.L.T.	UL FILE
1	CORE	FERRITE CORE PCB47 ECO2020	TDK CORPORATION	—	—	—
2	BOBBIN	PHENOLIC RESIN T-357,T-375J	CHANG CHUN PLASTICS CO.,LTD.	—	150℃	E59481
		PM9820,PM9630	SUMITOMO BAKELITE CO.,LTD.		94V-0	E41429
3	INSULATION TAPE	POLYESTER TAPE No.1318-1,1350F-1	3M COMPANY (3M)	0.075mm (3 layers)	130℃	E17385
		(WRITE) No.CT286	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO., LTD.			E165111
		No.35660	SYMBIO INC			E50292
		400 > CTI ≥ 100				
4	INSULATION TAPE	SAME AS No.3	SAME AS No.3	0.050mm (2 layers)	130℃	SAME AS No.3
5	BARRIER TAPE	No.44T-A 44D-A	3M COMPANY (3M)	—	130℃	E17385
		No.WF2902	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO., LTD			E165111
		No.343BN	NITTO DENKO CORP.			E34833
		No.35661	SYMBIO INC			E56086
6	WINDING WIRE	POLYURETHANE ENAMELED COPPER WIRE	PROSPERITY ELECTRIC WIRE&CABLE CO.	—	130℃	E196072
		UEW φ0.20(NP1,NB,NP2)	XIAMEN HUNG'S ELECTRIC(XIAMEN)CO.,LTD.	—		E189722
		UEW φ0.30 (NS1a,b,NS2)	HANGZHOU WEIFENG ELECTRONIC CO.,LTD	—		E229431
			XIAMEN ZHICHENG ELECTRON CO.,LTD	—		E218438
			or other manufacturer	—		
7	ADHESIVE	ACRYLIC , URETHANE or EPOXY	HENKEL LOCTITE CORP.	—	—	
8	TERMINAL PIN	COPPER CLAD STEEL WIREφ0.8(SOLDERED)	OPTIONAL	—	—	
		UNDER COATING(COPPER)25% WEIGHT				
		RATIO.(REF) SURFACE PLATING (Sn100%)				
		3μm OR MORE.				

※ 1. TAPE MIN. THICKNESS SHOWS THE TOTAL VALUE. (TAPE BASE AND ADHESIVE)

※ 2. INSULATION TAPE WITH TWO LAYERS SHALL BE ABLE TO WITHSTAND FOR 1 MINUTE OF 3000 VOLTS(r.m.s) POTENTIAL.

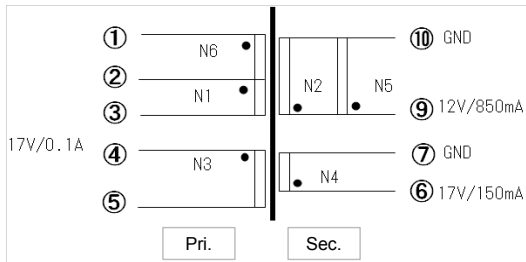


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SPECIFICATIONS / ECO2020SEO-D03V016

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

Safety Standards		
IEC60335-1		
	Inside of Coil	Outside of Coil
Pri. - Sec.	4.0 mm Min.	8.0 mm Min.
Pri. - Core	2.0 mm Min.	4.0 mm Min.
Sec. - Core	2.0 mm Min.	4.0 mm Min.

■ WINDING SPECIFICATIONS

No.	Terminal	Wire	Turns	Winding Method
N1	2--3	2UEW Φ 0.20	38TS	Solenoid+Spacing
N2	9--10	2UEW Φ 0.32*2P	10TS	Solenoid
N3	4--5	2UEW Φ 0.18*2P	16TS	Solenoid
N4	6--7	2UEW Φ 0.40	16TS	Solenoid
N5	10--9	2UEW Φ 0.32*2P	10TS	Solenoid
N6	1--2	2UEW Φ 0.20	37TS	Solenoid+Spacing

SPECIFICATIONS / ECO2020SEO-D03V016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

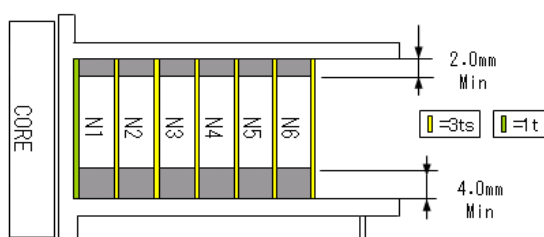
No.	Item	Terminal	Spec	Test Instruments
1	Inductance		764 μ H \pm 10%(f=100kHz V=1V)	HP4284A or EQUIV.
2	Leakage Inductance		Max 17 μ H(f=100kHz V=1V)	HP4284A or EQUIV.
3	DC Resistance	1--2	1.15 Ω Max.	AX-111A or EQUIV.
		2--3	0.7704 Ω Max.	
		10--9	30 m Ω Max.	
		4--5	0.3096 Ω Max.	
		6--7	158.6 m Ω Max.	
4	Insulation Resistance		Min 100 M Ω (500VDC)	
5	Withstanding Voltage	PRI-SEC	AC3.6KVrms 1s	Puncture Tester Kikusui : TOS8650 or Equiv.
		PRI-CORE	AC2.0KVrms 1s	
		SEC-CORE	AC2.0KVrms 1s	
6	Layer Short	3--1	AC0.8KVp-p	

SPECIFICATIONS / ECO2020SEO-D03V016

Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

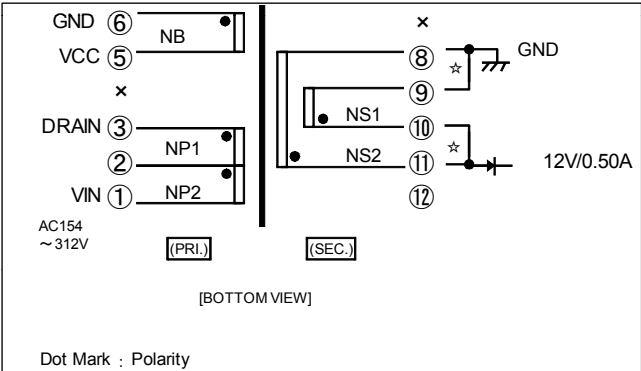
No.	Item	Material & Spec.	Manufacturers	UL file
1	BOBBIN	ECO2020 PM9820/T375J(10 PIN)		E41429
2	CORE	PCB47 ECO2020	TDK-EPC	-
3	INSULATION TAPE	CT, #1318, MY 130 °C	3M	E165111
4	TAPE	WF2902, #44, 35661	3M	E165111
5	WIRE	2UEW ϕ 0.20 130 °C		E85640
		2UEW ϕ 0.32 130 °C		
		2UEW ϕ 0.18 130 °C		
		2UEW ϕ 0.40 130 °C		
6	VANISH	TVB2024	KYOCERA	E83702



SPECIFICATIONS / ECO2020SEO-D09V015

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

SAFETY STANDARDS	
IEC60335-1 Ed.4	
	Creepage Distance
PRI. - SEC.	2.5mm MIN. (outside of coil)
PRI. - CORE.	2.5mm MIN. (inside of coil)
SEC. - CORE.	2.5mm MIN. (inside of coil)

WINDING SPECIFICATIONS

No.	coil	terminal	turns	wire	note
0	$600 \leq CTI$				
1	N P1	3 - 2	84	UEW 0.16	NP1 + NP2 = 200Ts.
2	N S1	10 - 9	18	UEW 0.23	
3	N B	6 - 5	12	UEW 0.16	
4	N S2	11 - 8	18	UEW 0.23	
5	N P2	2 - 1	116	UEW 0.16	
* Anti-clockwise direction is an order direction when see a transformer from the upper part.					

SPECIFICATIONS / ECO2020SEO-D09V015

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions) (Temperature) : 25±10°C (Relative Humidity) : 25~75%RH					
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	3 - 1	12.6 mH ± 20%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	3 - 1 (5,6,8,9,10,11 short)	72 µH MAX		
4.3	DC. Resistance	3 - 2	2.18Ω ±15%		Milli ohm meter ADEX : AX-114 or Equivalent
		10 - 9	258mΩ ±20%		
		6 - 5	0.390Ω ±20%		
		11 - 8	299mΩ ±20%		
		2 - 1	4.21Ω ±15%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 2.0kVrms 1min or AC 2.4kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.0kVrms 1min or AC 1.2kVrms 1s	
		PRI.-PRI.		AC 0.5kVrms 1min or AC 0.6kVrms 1s	
4.6	Impulse Test	3 - 1	Without Breakdown	Pulse 600Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/3-1	10 - 9	STD(0.0897) ±5.0%	f=10kHz	Ratio Meter Ryowa : TRD-09 or Equivalent
		6 - 5	STD(0.0601) ±5.5%		
		11 - 8	STD(0.0901) ±5.0%		

SPECIFICATIONS / ECO2020SEO-D09V015

Compatible with lead-free solders

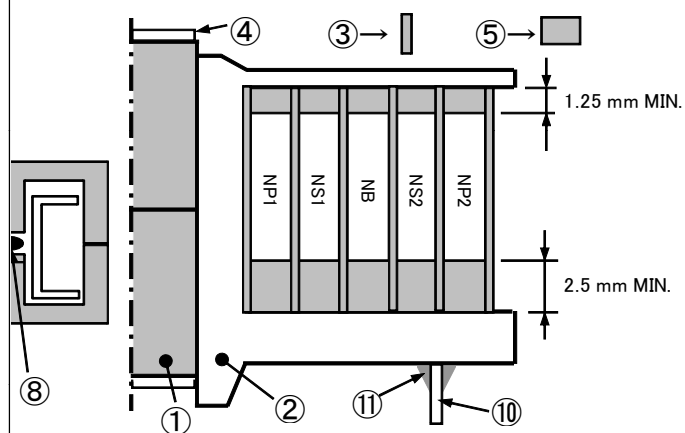
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No.	ITEM & MATERIAL	MIN.THICKNESS OF ONE LAYER	UL TI (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 20.9mmx20.6mmx7.7mm	—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin T375J	0.65 mm MIN.	150 94V-0	CHANG CHUN PLASTICS CO.,LTD.	E59481
③	FIXING TAPE FOR CORE Polyester Color : WHITE	1318-1 630F or 632S	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
				TERAOKA SEISAKUSHO CO.,LTD.	E56086
④	INSULATION TAPE Polyester Color : WHITE	1318-1 630F or 632S	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
				TERAOKA SEISAKUSHO CO.,LTD.	E56086
⑤	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44D WF with suffixes	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
				JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD.	E165111
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 016 mm DIAx1 : NP1,NP2,NB	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
				XIAMEN HUNG'S ENTERPRISE CO.,LTD.	E219154
⑦	WINDING WIRE Polyurethane Enameled Copper Wire 0.23 mm DIAx1 : NS1,NS2	—	—	—	—
⑧	ADHESIVE Polyester	—	—	DONGBU FINE CHEMICAL CO., LTD.	—
⑨	IMPREGNATION Epoxy Varnish	—	—	KYOCERA Chemical Corporation	—
⑩	TERMINAL PIN Copper Clad Steel Wire Φ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3 μm or More.	—	—	WELL FORE SPECIAL WIRE CORPORATION	—
⑪	SOLDER (For junction of a wire and aterminal) Lead-Free Sn-Ag-Cu	—	—	SENJU METAL INDUSTRY CO., LTD.	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 3 layers.

★BOBBIN UL94:94V-0 ,CTI(IEC112):175~250V (UL Level 3) / INSULATION TAPE CTI:600V Minimum.



LAYERS OF FIXING TAPE FOR WIRE (Barrier Tape) and INSULATION TAPE		
0	Inner Layer	1T
1	NP1	3Ts
2	NS1	3Ts
3	NB	3Ts
4	NS2	3Ts
5	NP2	3Ts

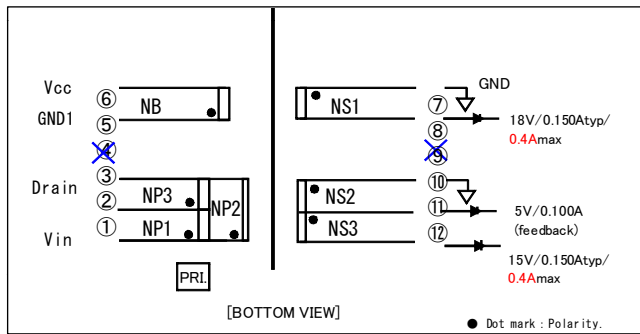
· All specifications are subject to change without notice.

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SPECIFICATIONS / ECO2020SEO-D10V017

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS	
IEC60335-1 Ed.4	
Over Surface & Air Spacings	
PRI. - SEC.	4.0 mm MIN.(inside coil)
PRI. - CORE	4.0 mm MIN.(outside coil)
SEC. - CORE	4.0 mm MIN.(outside coil)
REMOVE PIN	PIN No. 4 , 9

■ WINDING SPECIFICATIONS

No.	order	coil	terminal	turns	wire	WIDING METHOD	note
0	0	600V ≤ CTI					NP1+NP2=56ts
1	1	N P1	1 - 2	28	UEW 0.2	1Layer sol	
2	2	N S1	7 - 8	17	UEW 0.25	1Layer sol	
3	3	N S2	10 - 11	6	UEW 0.2	1Layer sol	
4	4	N S3	11 - 12	8	UEW 0.2	NS2 After Space	
5	5	N P2	1 - 3	56	UEW 0.2	2Layer sol	
6	6	N B(Vcc)	5 - 6	18	UEW 0.2	1Layer sol	
7	7	N P3	2 - 3	28	UEW 0.2	1Layer sol	

SPECIFICATIONS / ECO2020SEO-D10V017

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions) (Temperature) : 25±10°C (Relative Humidity) : 25~75%RH					
No	Parameter	Test Terminal	Specification	Condition _s	Test Instruments
4.1	Inductance	1 - 3	770uH ± 15%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	1 - 3 (5,6,SEC. short)	25.0 uH MAX		
4.3	DC. Resistance	1 - 3	0.594Ω ±20%		ADEX : AX-114N or Equivalent
		5 - 6	0.433Ω ±20%		
		7 - 8	0.206Ω ±20%		
		10 -11	0.126Ω ±20%		
		11 - 12	0.169Ω ±20%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	1 - 3	Without Breakdown	Pulse 600Vo-p 3~5 pluse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio	1 - 2	0.4934Vrms ± 5.0%	f=10kHz	Ratio Meter or Equivalent
		7 - 8	0.2985Vrms ± 6.5%		
		10 - 11	0.1051Vrms ±11.0%		
		11 - 12	0.1408Vrms ±10.0%		
		5 - 6	0.3214Vrms ± 7.0%		
4.8	Inductance	1 - 2	194.0uH ± 20%	10 kHz 1Vrms	Agilent : 4263B or Equivalent
		7 - 8	70.0uH ± 25%		
		10 - 11	9.0uH ± 25%		
		11 - 12	15.8uH ± 25%		
		5 - 6	81.0uH ± 25%		
		2 - 3	200.0uH ± 20%		

SPECIFICATIONS / ECO2020SEO-D10V017

Compatible with lead-free solders

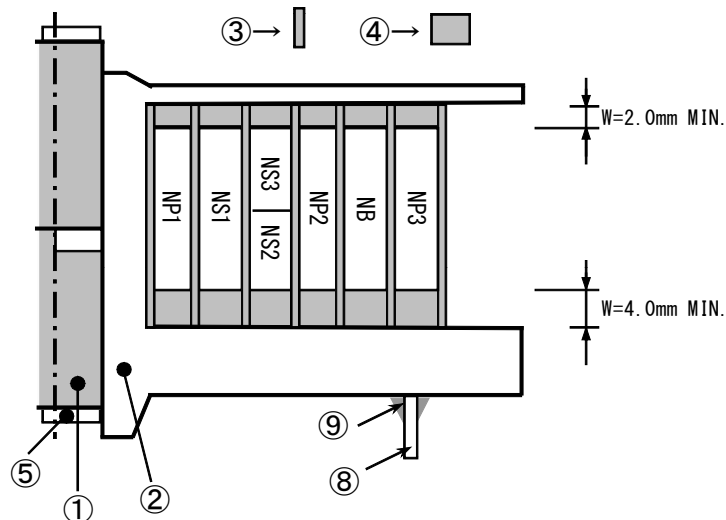
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No.	ITEM & MATERIAL	MIN.THICKNESS OF LAYER	UL T1 (°C)	MANUFACTURER	UL FILE NO.
①	CORE PCB47 ECO2020	—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin PM-9820 Phenol Resin T-375J	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD. CHANG CHUN PLASTICS CO.,LTD.	E41429 E59481
③	INSULATION TAPE Polyester Color : YELLOW	CT280 1318-1	0.05 mm	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD 3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E165111 E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44D-A or WF with suffixes	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD) JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E165111
⑤	FIXING TAPE FOR CORE Polyester	CT286 1318-1	0.05 mm	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD 3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E165111 E17385
⑥	WINDING WIRE Polyurethane Enameled Copper Wire	—	130	TAI-I ELECTRIC WIRE & CABLE CO LTD PROSPERITY ELECTRIC WIRE & CABLE CO. XIAMEN HUNG'S ENTERPRISE CO.,LTD.	E85640 E196072 E219154
⑦	ADHESIVE Varnish TVB2024			KYOCERA CHEMICAL CORPORATION	E83702
⑧	TERMINAL PIN Copper Clad Steel Wire $\Phi 0.8$ (Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3 μ m or More.			Optional	
⑨	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu			Optional	
⑩	MARKING Laser			LA MARK LP-V SERIES	

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s.) Potential with 2 layers.

★BOBBIN UL94:94V-0 ,CTI(IEC112):175~250V (UL Level 3)



LAYERS OF INSULATION TAPE		
No.	Coil	Insulation
0	Inner Layer	1T
1	N P1	3Ts
2	N S1	1T
3	N S2	—
4	N S3	3Ts
5	N P2	3Ts
6	N B(Vcc)	3Ts
7	N P3	3Ts

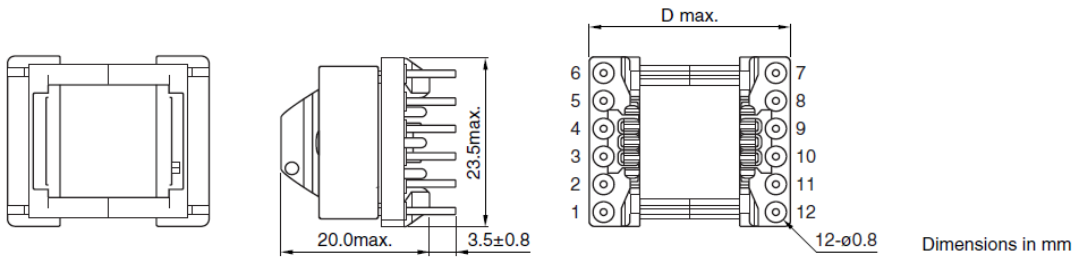
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ECO20 Series for Multiple Outputs (Horizontal Type)

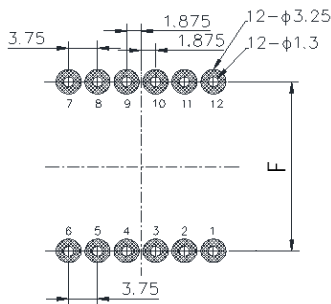
Compatible with lead-free solders

■ SHAPES AND DIMENSIONS (BOBBIN TYPE: HI)



Part No.	Bobbin type	D max.	F
ECO2017	HI	24.5	20.0
ECO2020	HI	27.0	22.5
ECO2023	HI	29.5	25.0

■ RECOMMENDED BASE MATERIAL OPENING SIZE



Dimensions in mm
Default Tolerance : ±0.1

■ ITEMS APPLICABLE

Series	Bobbin Type	Part No.
ECO2020	HI	ECO2020SEO-D02H015
		ECO2020SEO-D04H015
		ECO2020SEO-D06H015
		ECO2020SEO-D07H016
		ECO2020SEO-D08H016
ECO2023		ECO2023SEO-D01H016

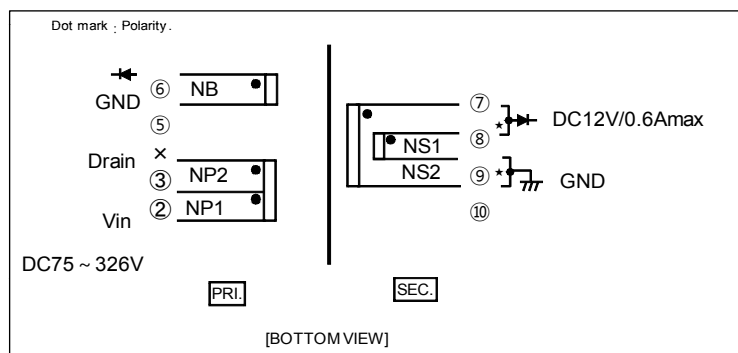
- Compatible ferrite materials for this product are the PC47 family.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted ϕ pr.

All specifications are subject to change without notice.
Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2020SEO-D02H015

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS	
Over Surface & Air Spacings	
PRI. - SEC.	2.5mm MIN.
PRI. - CORE	1.3mm MIN.
SEC. - CORE	1.3mm MIN.

■ WINDING SPECIFICATIONS

No.	Order	coil	terminal	turns	wire	note
1	1	N P1	3 - 2	25	UEW 0.23	NP1+NP2=66ts
2	2	N S1	9 - 10	18	UEW 0.28	
3	3	N B	6 - 5	27	UEW 0.20	
4	4	N S2	8 - 11	18	UEW 0.28	
5	5	N P2	2 - 1	41	UEW 0.23	

SPECIFICATIONS / ECO2020SEO-D02H015

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions)					
(Temperature)		:	25±10℃		
(Relative Humidity)		:	25~75%RH		
No	Parameter	Test Terminal	Specification	Condition _s	Test Instruments
4.1	Inductance	3 - 1	534 uH ± 10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	3 - 1 (6,5,SEC. short)	15.0 uH MAX	100 kHz 1Vrms	
		6 - 5 (SEC. short)	1.70 uH MAX		
4.3	DC. Resistance	2 - 1	0.682Ω ±20%		Milli ohm meter ADEX : AX-114N or Equivalent
		3 - 2	0.303Ω ±20%		
		6 - 5	0.524Ω ±20%		
		8 - 11	0.188Ω ±20%		
		9 - 10	0.162Ω ±20%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:2mA	AC 1.5kVrms 1min or AC 1.8kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.0kVrms 1min or AC 1.2kVrms 1s	
4.6	Impulse Test	3 - 1	Without Breakdown	Pulse 600Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X / 3 - 1	2 - 1	STD(0.6310) ±2.5%	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		9 - 10	STD(0.2684) ±4.5%		
		6 - 5	STD(0.4043) ±3.0%		
		8 - 11	STD(0.2736) ±4.5%		

SPECIFICATIONS / ECO2020SEO-D02H015

Compatible with lead-free solders

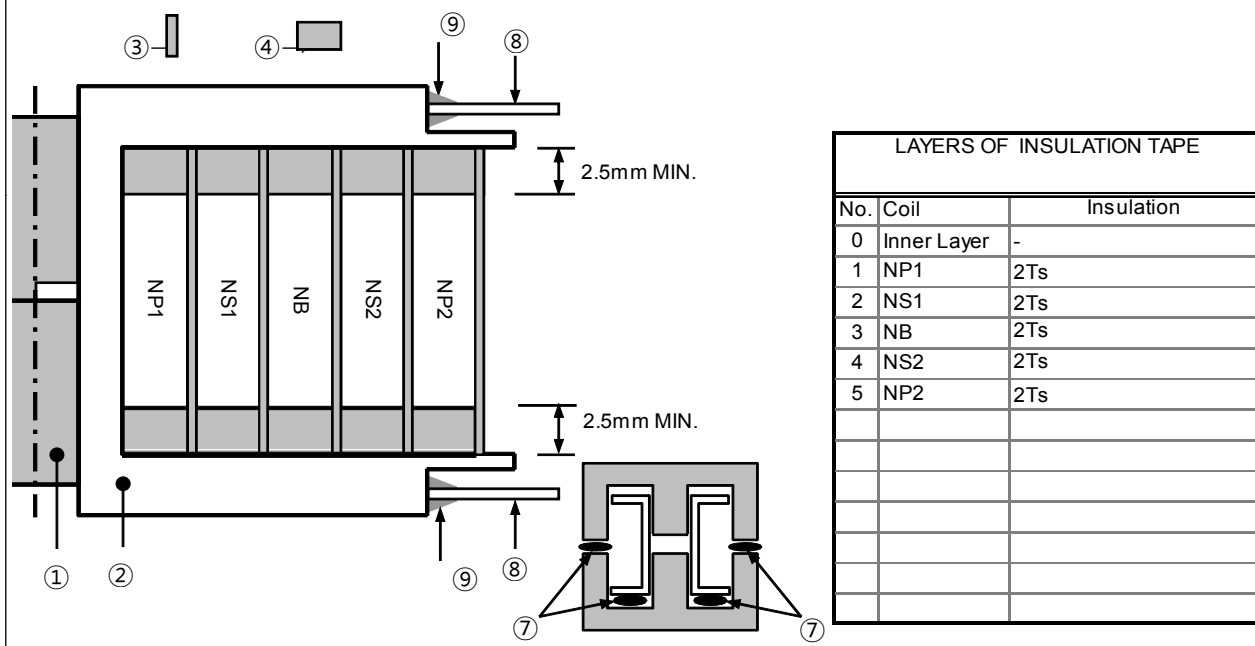
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 20.9mm x20.6mm x7.7mm		—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin PM-9820		0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester Color : WHITE	1318 or 1350F	0.05 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44 or 44D or 44-18MIL or	-	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
⑤	WINDING WIRE Polyurethane Enameled Copper Wire 0.23 mm DIAx1 : NP1,NP2 0.20 mm DIAx1 : NB		—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.28 mm DIAx1 : NS1,NS2				XIAMEN HUNG'S ENTERPRISE CO.,LTD.	E219154
					HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E229341
					SHENZHEN FUJI FINE FACTORY	E303260
⑦	ADHESIVE Acrylic , Urethane or Epoxy				Optional	
⑧	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.				Optional	
⑨	SOLDER (For junction of a wire and aterminal) Lead-Free Sn-Ag-Cu				Optional	

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

☆BOBBIN UL94:94V-0 ,CTI(IEC112):175~250V(UL Level 3)



· All specifications are subject to change without notice.

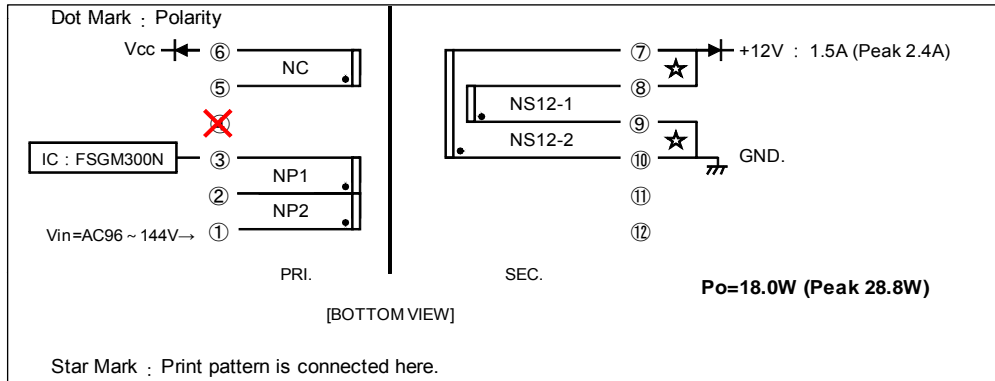
Please read the precautions before using this catalog.

transformer dk1 eco en

SPECIFICATIONS / ECO2020SEO-D04H015

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

SAFETY STANDARDS

*UL60065-Ed.7

	Inside of Coil	Outside of Coil
PRI. - SEC.	2.8mm MIN.	4.0mm MIN.
PRI. - CORE	1.4mm MIN.	2.0mm MIN.
SEC. - CORE	1.4mm MIN.	2.0mm MIN.

WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
1	1	N P1	2 - 3	48	UEW 0.26	NP1+NP2=88Ts.
2	2	N S12-1	9 - 8	11	UEW 0.40	
3	3	N P2	1 - 2	40	UEW 0.26	
4	4	N S12-2	10 - 7	11	UEW 0.40	
5	5	N C	5 - 6	16	UEW 0.23	

* Clockwise direction is an order direction when see a No.1 terminal pin side of transformer from the upper part.

SPECIFICATIONS / ECO2020SEO-D04H015

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature		:	25±10°C
		Relative Humidity		:	25~75%RH
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	1 - 3	867μH ± 10%.	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	1 - 3 (Sec.All short)	17.8 μH MAX (Std.=12.3μH : Ref.)	100 kHz 1Vrms	
4.3	DC. Resistance	1 - 3	1.01 Ω ±20%		Milli ohm meter ADEX : AX-114 or Equivalent
		5 - 6	0.33 Ω ±20%		
		9 - 8	57.5 mΩ ±30%		
		10 - 7	70.0 mΩ ±30%		
4.4	Insulation Resistance	PRI.-SEC.	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
		PRI.,SEC. -CORE			
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
		1 - 5 ★ 10 - 11 ★		AC 0.6kVrms 1s	
4.6	Impulse Test	1 - 3	Without Breakdown	Pulse 0.8kVo-p 3~5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio	5 - 6	(0.1838) ± 5.0%.	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		9 - 8	(0.1252) ± 7.2%.		
		10 - 7	(0.1269) ± 7.2%.		
	X-X/ 1 - 3	1 - 2 ★	(0.4545) ± 1.2%.		

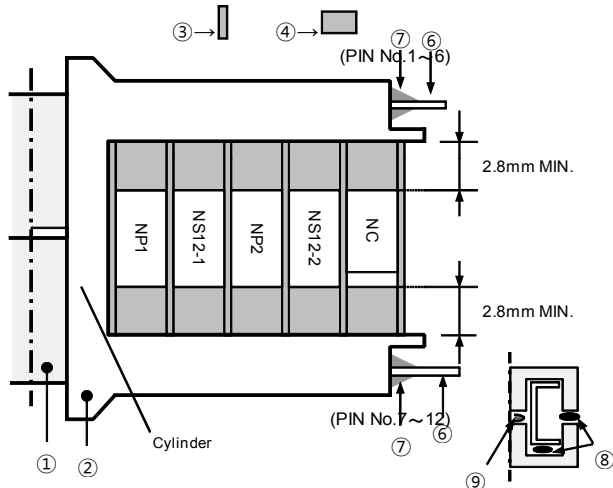
SPECIFICATIONS / ECO2020SEO-D04H015

Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No.	ITEM & MATERIAL	MIN. THICKNESS OF 1 LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 20.9mm x 20.6mm x 7.7mm	—	—	TDK-EPC Corporation	—
②	BOBBIN PM-9820 or PM-9823 Phenol Resin T375J	0.65 mm	150 94V-0	SUMITOMO BAKELITE CO.,LTD. CHANG CHUN PLASTICS CO.,LTD	E41429 E59481
③	INSULATION TAPE Polyester Color : Yellow 【Material group II MIN.】	1318-1 or 1350F-1	0.05 mm	130 3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) 44D-A or 44T-A 343BN@@ WF with suffixes 【Material group I】	—	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD) NITTO DENKO CORP. JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E34833 E165111
⑤	WINDING WIRE (Primary) Polyurethane Enameled Copper Wire 0.26 mm DIA : NP1, NP2 0.23 mm DIA : NC	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO. HANGZHOU WEIFENG ELECTRONIC CO.,LTD. TAI-HI ELECTRIC WIRE&CABLE CO LTD	E196072 E229341 E85640
	WINDING WIRE (Secondary) Polyurethane Enameled Copper Wire 0.40 mm DIA : NS12-1,2	—	130	ZHUHAI WEIHAN WIRE CO LTD SHENZHEN FUJI FINE FACTORY HITACHI CABLE (JOHOR) SDN BHD THAI HITACHI ENAMEL WIRE CO LTD ELEKTRISOLA (MALAYSIA) SDN BHD	E339217 E303260 E215594 E137472 E143312
⑥	TERMINAL PIN Φ0.8 (Soldered) Copper Clad Steel Wire Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.	—	—	Optional	—
⑦	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu	—	—	Optional	—
⑧	ADHESIVE Acrylic, Urethane or Epoxy	—	—	Optional	—
⑨	ADHESIVE Silicon	—	—	Optional	—

- ※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)
 ※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



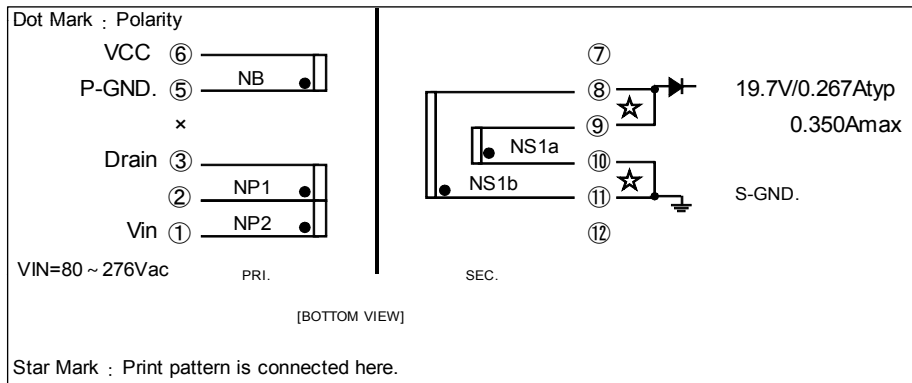
Layers of Insulation Tape		
No.	Coil Name	Insulation
0	Inner Layer	1T
1	NP1	3Ts
2	NS12-1	3Ts
3	NP2	3Ts
4	NS12-2	3Ts
5	NC	3Ts

Minimum thickness of bobbin : 0.65mm
 Pertinent part : Cylinder of bobbin

SPECIFICATIONS / ECO2020SEO-D06H015

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

SAFETY STANDARDS IEC60335-1 Ed.4 (Basic insulation)		
	Inside of Coil	Outside of Coil
PRI. - SEC.	2.8mm MIN.	4.0mm MIN.
PRI. - CORE	1.4mm MIN.	2.0mm MIN.
SEC. - CORE	1.4mm MIN.	2.0mm MIN.

WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
0	0	400 ≤ CTI				
1	1	N P1	2 - 3	52	1UEW 0.18	NP1+NP2=108ts
2	2	N S1a	10 - 9	25	1UEW 0.18	Reverse winding
3	3	N P2	1 - 2	62	1UEW 0.18	
4	4	N S1b	11 - 8	25	1UEW 0.18	Reverse winding
5	5	N B	5 - 6	22	1UEW 0.18	

* Clockwise direction is an order direction when see a No.1 terminal pin side of transformer from the upper part.

SPECIFICATIONS / ECO2020SEO-D06H015

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature		:	25±10°C
		Relative Humidity		:	25~75%RH
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	1 - 3	1.30 mH ±10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	1 - 3 (Sec. All short)	40.0 μH MAX. (Std.=24.9μH : Ref.参考)	10 kHz 1Vrms	
4.3	DC. Resistance	2 - 3	1.05Ω ±15%		Milli ohm meter ADEX : AX-114 or Equivalent
		10 - 9	0.565Ω ±20%		
		1 - 2	1.55Ω ±15%		
		11 - 8	0.685Ω ±20%		
		5 - 6	0.650Ω ±20%		
4.4	Insulation Resistance	PRI.-SEC.	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
		PRI.,SEC. -CORE			
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 1.5kVrms 1min or AC 1.8kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 0.8kVrms 1min or AC 0.9kVrms 1s	
4.6	Impulse Test	1 - 3	Without Breakdown	Pulse 1.0kVo-p 3--5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio	10 - 9	(0.2190) ± 3.5%.	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		11 - 8	(0.2220) ± 3.5%.		
		5 - 6	(0.1945) ± 3.5%.		
	X-X/ 1 - 3				

SPECIFICATIONS / ECO2020SEO-D06H015

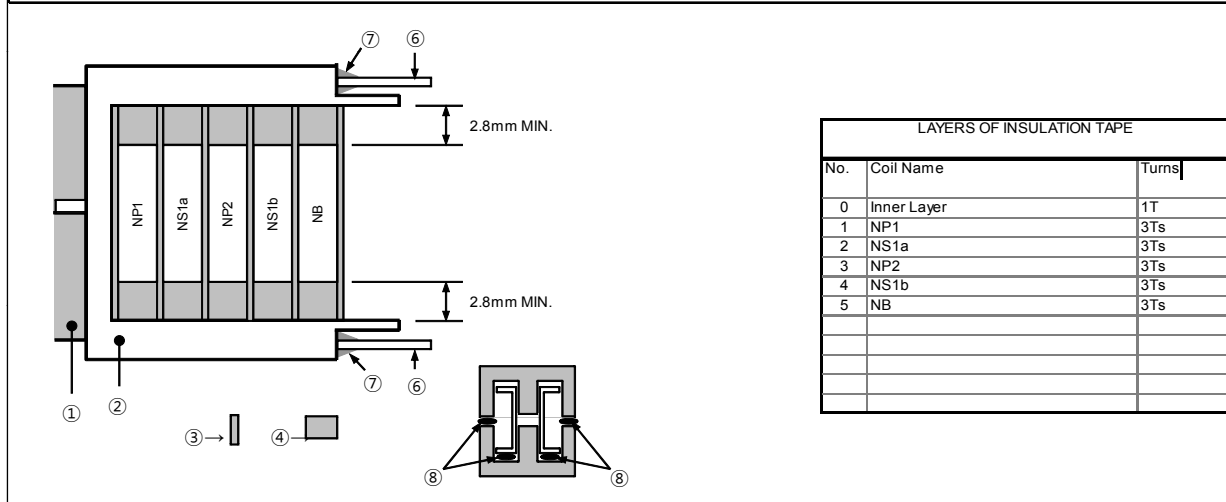
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF 1 LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 20.9mm x20.6mm x7.7mm		—	—	TDK-EPC Corporation	—
②	BOBBIN	PM-9820	0.65 mm	150	SUMITOMO BAKELITE CO.,LTD.	E41429
	Phenol Resin	T375J		94V-0	CHANG CHUN PLASTICS CO.,LTD	E59481
③	INSULATION TAPE Polyester or PET Color : WHITE CTI≥400V	1318-1	0.05 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
	INSULATION TAPE Polyester	1318-2	0.07 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester or PET CTI≥600V	44D-A or	0.28 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
		44T-A			NITTO DENKO CORP.	E34833
		343BN@@			JINGJIANG YAHUA PRESSURE	E165111
		WF with suffixes			SENSITIVE GLUE CO LTD	
⑤	WINDING WIRE (Primary) Polyurethane Enameled Copper Wire		—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
	0.18 mm DIA : NP1, NP2,NB				HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E229341
					TAI-I ELECTRIC WIRE&CABLE CO LTD	E85640
					ZHUHAI WEIHAN WIRE CO LTD	E339217
					SHENZHEN FUJI FINE FACTORY	E303260
					HITACHI CABLE (JOHOR) SDN BHD	E215594
					THAI HITACHI ENAMEL WIRE CO LTD	E137472
					ELEKTRISOLA (MALAYSIA) SDN BHD	E143312
⑥	TERMINAL PIN Φ0.8 (Soldered) Copper Clad Steel Wire Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.		—	—	WELL FORE SPECIAL WIRE CORPORATION	—
					SUMITOMO ELECTRIC INDUSTRIES LTD.	
⑦	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu		—	—	SENJU METAL INDUSTRY CO., LTD.	—
⑧	ADHESIVE Acrylic , Urethane or Epoxy		—		HENKEL LOCTITE(CHINA) CO.,LTD.	—
⑨	FIXING TAPE FOR CORE Polyester Same as No.③		0.05 mm (2~3Layers)	130	Same as No.③	Same as No.③
⑩	CASE PBT Resin 4130		0.75 mm	120 94V-0	CHANG CHUN PLASTICS CO.,LTD.	E59481
⑪	ADHESIVE Silicon		—		Optional	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s.) Potential with 2 layers.

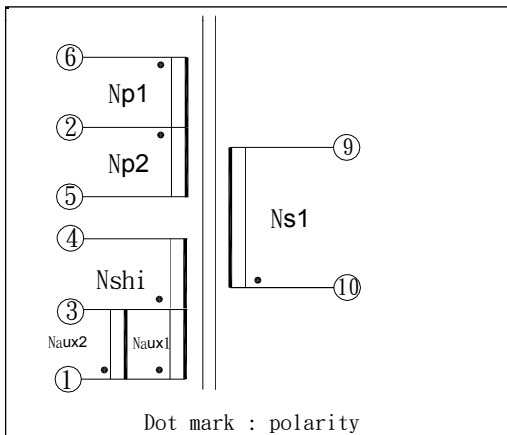


· All specifications are subject to change without notice.
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SPECIFICATIONS / ECO2020SEO-D07H016

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

Safety atandards		
UL60950		
	Creepage Distance	Air Clearance
Pri. - Sec.	5.2 mm Min.	5.2 mm Min.
Pri. - Core.	2.5 mm Min.	3.6 mm Min.
Sec. - Core.	2.5 mm Min.	3.6 mm Min.

■ WINDING SPECIFICATIONS

No.	COIL	TERMINAL	WIRE	TURNS	WINDING METHOD
1	Nshi	3 --- 4	1-UEW φ0.10	27 Ts	Solenoid(1Layer)
2	Np1	6 --- 2	2-UEW φ0.20	52 Ts	Solenoid
3	Ns1	10 --- 9	2-UEW φ0.28	35 Ts	Solenoid
4	Naux1	1 --- 3	2-UEW φ0.12	14 Ts	Solenoid(1Layer)
5	Np2	2 --- 5	2-UEW φ0.20	52 Ts	Solenoid
6	Naux2	1 --- 3	2-UEW φ0.12	14 Ts	Solenoid(1Layer)

SPECIFICATIONS / ECO2020SEO-D07H016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

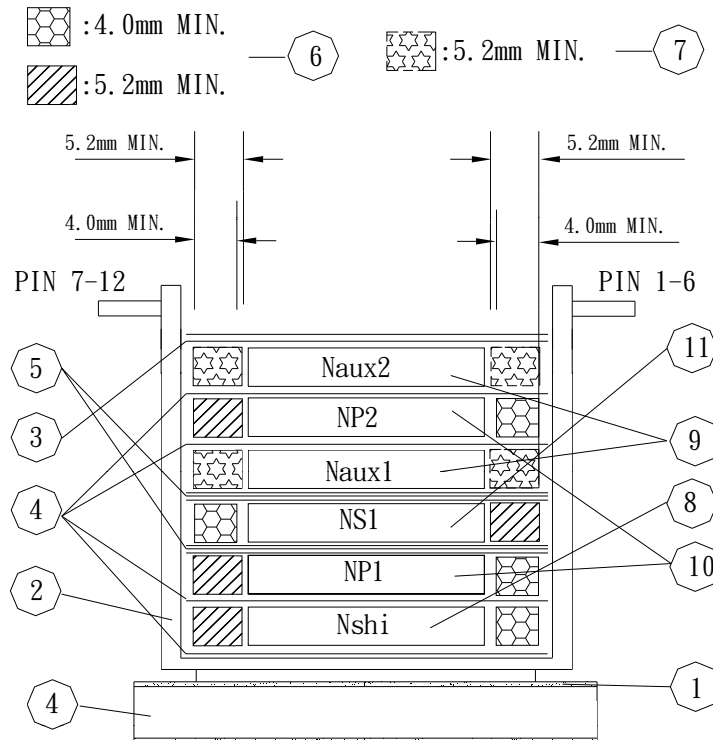
Item	Test Condition	Terminal	Spec	Test Instruments
Inductance	100 kHz	6 — 5	1300 μ H \pm 8 %	HP 4284A LCR METER @1.0Vrms NATIONAL VP-2941A
Leakage Inductance	100 kHz (S side short)	6 — 5	80 μ H Max.	
Cd	100 kHz (Cs-D)	9 — 3 (S side short)	13 pF Min.	
RDC		3 — 4	1.688 Ω \pm 25 %	NATIONAL AD-5812A DIGITAL MILLIOHM METER
		6 — 2	885 m Ω \pm 25 %	
		10 — 9	360 m Ω \pm 25 %	
		1 — 3	502 m Ω \pm 25 %	
		2 — 5	1.262 Ω \pm 25 %	
Insulation Resistance	DC 500V	P — S	100 M Ω Min	MEGOHM METER SM-5E
		P — CORE		
		S — CORE		
Withstand Voltage	AC 3.6kVrms	P — S	1 sec. Min	PT METER(f:60/50 Hz) KIKUSUI TOS8650 SENSE: 2mA
	AC 1.8kVrms	P — CORE		
		S — CORE		
	AC 4.0kVrms	P — S		
Polarity & Turns Ratio	INPUT: 6 — 5 (20kHz)	3 — 4	(0.2445 Vrms \pm 3.0%)	TURN RATIO METER TRD-09 or TRD-08
		10 — 9	(0.3338 Vrms \pm 2.5%)	
		1 — 3	(0.1378 Vrms \pm 5.5%)	
Layer Short		6 — 5	AC 1.2 kVo-p Without Breakdown	IMPULSETESTER ECG:DW-9505C
ARC	AC 3.6kVrms	P — S	1 sec. Min.	9071A SENSE: 5.5mA

SPECIFICATIONS / ECO2020SEO-D07H016

Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

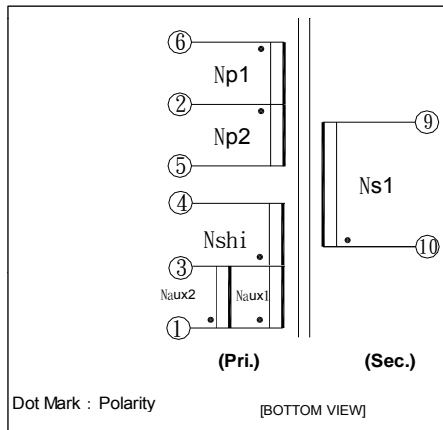
NO.	ITEM	MATERIAL	LAYERS	MINIMUM THICKNESS OF TOTAL LAYERS	UL FILE NO.	MANUFACTURER
1	CORE	FERRITE <i>PC47 ECO2020</i>				TDK CORPORATION
2	BOBBIN	PHENOLIC RESIN T375J			E59481	CHANG CHUN PLASTICS CO., LTD.
3	INSULATION TAPE	POLYESTER TAPE NO.1318-1(a)	2	0.050 mm	E17385	3M.COMPANY.
4	INSULATION TAPE	SAME AS NO.3	1	0.025 mm	SAME AS NO.3	
5	INSULATION TAPE	SAME AS NO.3	3	0.025 mm	SAME AS NO.3	
6	MARGIN TAPE	POLYESTER TAPE NO.44D-A(a) or 44T-A(a)			E17385	3M.COMPANY.
7	MARGIN TAPE: Naux1,Naux2	POLYESTER TAPE NO.44D-A(a) or 44T-A(a) or NO.1318-1(a)			E17385	3M.COMPANY.
					E17385	3M.COMPANY.
8	WIRE : Nshi	POLYURETHANE ENAMELLED COPPER WIRE 1 or 2-UEW φ0.10			E196072	PROSPERITY TRADING WIRE & CABLE CO.
9	WIRE : Naux1,Naux2	POLYURETHANE ENAMELLED COPPER WIRE 1 or 2-UEW φ0.12			E229341	HANGZHOU WEIFENG ELECTRONIC CO., LTD.
10	WIRE : NP1,NP2	POLYURETHANE ENAMELLED COPPER WIRE 1 or 2-UEW φ0.20			E85640	TAIJIANG CORP (GUANG ZHOU)CO.,LTD
11	WIRE : NS1	POLYURETHANE ENAMELLED COPPER WIRE 1 or 2-UEW φ0.28			E339217	ZHUHAI WEIHAN WIRE CO., LTD
12	ADHESIVE	EPOXY ADHESIVE NO.7247				LOCTITE CO.,LTD.
						LOCTITE CO.,LTD.
13	ADHESIVE	EPOXY ADHESIVE NO.3851 or NO.ME-5080LC or NO.C-4636BKLC				PELNOX CO.,LTD.
						RESINOUS KASEI CO.,LTD.
14	ADHESIVE	EPOXY ADHESIVE NO.#508				DONGBU FINE CHEMICAL CO., LTD.



SPECIFICATIONS / ECO2020SEO-D08H016

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

Safety standards		
IEC60950		
	Creepage Distance	Air Clearance
Pri. - Sec.	5.4 mm Min.	5.2 mm Min.
Pri. - Core.	3.6 mm Min.	2.6 mm Min.
Sec. - Core.	3.6 mm Min.	2.6 mm Min.

■ WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
1	1	Nshi	3 - 4	27	UEW 0.10	CLOSE
2	2	NP 1	6 - 2	52	UEW 0.21	CLOSE
3	3	NS 1	10 - 9	25	UEW 0.35	CLOSE
4	4	Naux 1	1 - 3	17	UEW 0.12	CLOSE
5	5	NP 2	2 - 5	52	UEW 0.21	CLOSE
6	6	Naux 2	1 - 3	17	UEW 0.12	CLOSE

* Clockwise direction is an order direction when see a No.1 terminal pin side of transformer from the upper part.

SPECIFICATIONS / ECO2020SEO-D08H016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature		:	25±10℃
		Relative Humidity		:	25~75%.RH
No.	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	6 - 5	1300μH± 5%	100 kHz 1Vrms	Digital LCR Meter HP : 4284A or Equivalent
4.2	Leakage Inductance	6 - 5 (Sec. short)	80 μH MAX.		
4.3	DC. Resistance	3 - 4	1.610 Ω± 25%		Digital Milli ohm meter National : AD-5812A or Equivalent
		6 - 2	782 mΩ± 25%		
		10 - 9	172 mΩ± 30%		
		1 - 3	612 mΩ± 25%		
		2 - 5	1.155 Ω± 25%		
4.4	Insulation Resistance	Pri.-Sec.	100 MΩ Min.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
		Pri. Sec. - Core			
4.5	Withstanding Voltage	Pri.-Sec.	Without Breakdown Sense:2mA f=50or60Hz	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS-8650 or Equivalent
		Pri. Sec. - Core		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Polarity & Turns Ratio X-X/ 6 - 5	3 - 4	STD (0.2435) ± 3.0%	f=10kHz	Ratio Meter Ineden : 3050HT or Equivalent
		10 - 9	STD (0.2387) ± 3.5%		
		1 - 3	STD (0.1675) ± 4.5%		

SPECIFICATIONS / ECO2020SEO-D08H016

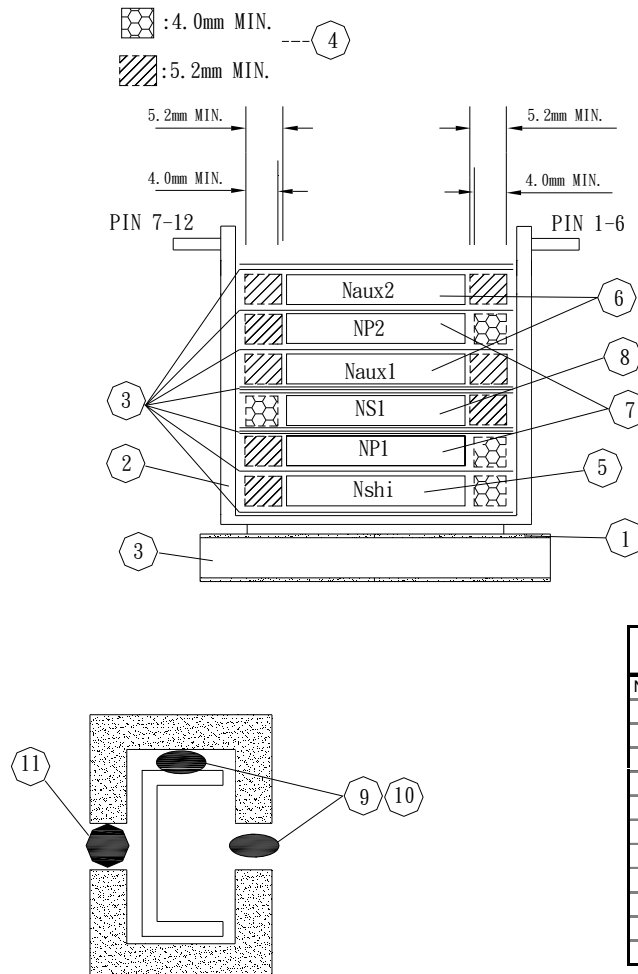
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

NO.	ITEM	MATERIAL	LAYERS	MINIMUM THICKNESS OF TOTAL LAYERS	UL FILE NO.	MANUFACTURER
1	CORE	FERRITE PC47 ECO2020				TDK-EPC CORPORATION
2	BOBBIN	PHENOLIC RESIN T375J			E59481	CHANG CHUN PLASTICS CO., LTD.
3	INSULATION TAPE (Color: WHITE)	POLYESTER TAPE NO.1318-1(a)	2	0.050 mm	E17385	3M.COMPANY.
4	MARGIN TAPE:	POLYESTER TAPE NO.44D-A(a) or 44T-A(a)			E17385	3M.COMPANY.
5	WIRE : Nshi	POLYURETHANE ENAMELLED COPPER WIRE 1 or 2-UEW φ0.10			E196072	PROSPERITY TRADING WIRE & CABLE CO.
6	WIRE : Naux1, Naux2	POLYURETHANE ENAMELLED COPPER WIRE 1 or 2-UEW φ0.12			E229341	HANGZHOU WEIFENG ELECTRONIC CO., LTD.
7	WIRE : NP1, NP2	POLYURETHANE ENAMELLED COPPER WIRE 1 or 2-UEW φ0.21			E85640	TAIJIANG CORP (GUANG ZHOU) CO., LTD.
8	WIRE : NS1	POLYURETHANE ENAMELLED COPPER WIRE 1 or 2-UEW φ0.35			E339217	ZHUHAI WEIHAN WIRE CO., LTD.
9	ADHESIVE	EPOXY ADHESIVE NO.7247				LOCTITE CO., LTD.
10	ADHESIVE	EPOXY ADHESIVE NO.3851				LOCTITE CO., LTD.
		or NO.ME-5080LC				PELNOX CO., LTD.
		or NO.C-4636BKL				RESINOUS KASEI CO., LTD.
11	ADHESIVE	EPOXY ADHESIVE NO.#508				DONGBU FINE CHEMICAL CO., LTD.
		or NO.8008				CHEMTECH CO., LTD.

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



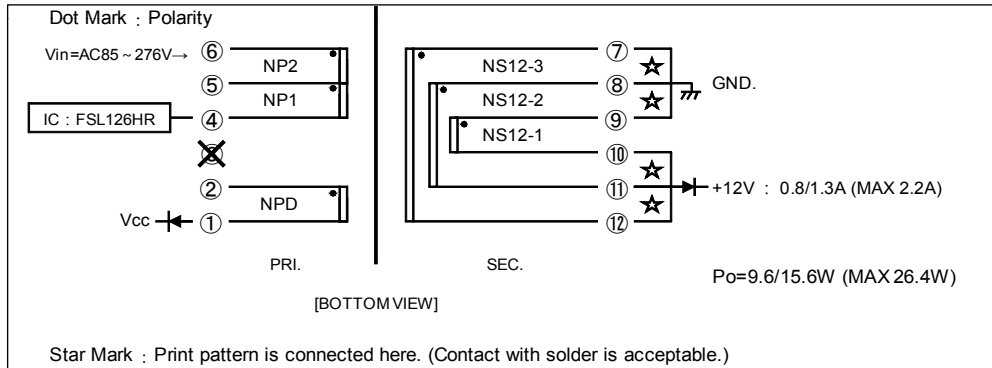
· All specifications are subject to change without notice.

Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2023SEO-D01H016

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS		
*UL60065 7th, *CSA E60065-03, *J60065(H20), *IEC60065 Ed.7, *EN60065:2002		
	Inside of Coil	Outside of Coil
PRI. - SEC.	4.8mm MIN.	8.0mm MIN.
PRI. - CORE	2.9mm MIN.	4.0mm MIN.
SEC. - CORE	2.9mm MIN.	4.0mm MIN.

■ WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
1	1	N P1	4 - 5	28	UEW 0.26	NP1+NP2=67Ts.
2	2	N S12-1	10 - 9	9	UEW 0.32	
3	3	N S12-2	11 - 8	9	UEW 0.32	
4	4	N P2	5 - 6	39	UEW 0.26	
5	5	N S12-3	7 - 12	9	UEW 0.32	Reverse Winding
6	6	N PD	2 - 1	12	UEW 0.26	Reverse Winding

* Clockwise direction is an order direction when see a No.1 terminal pin side of transformer from the upper part.

SPECIFICATIONS / ECO2023SEO-D01H016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

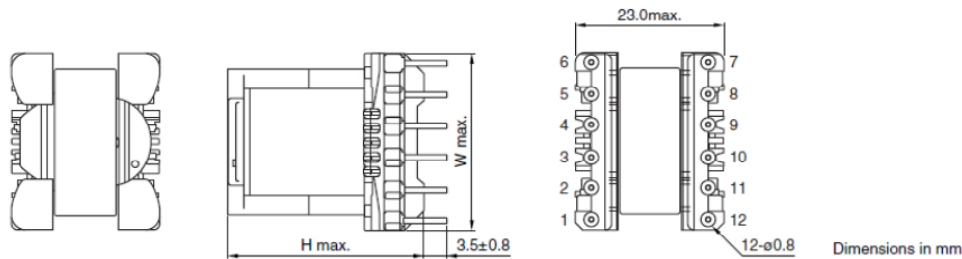
Test Conditions		Temperature		:	25±10°C
		Relative Humidity		:	25~75%RH
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	6 - 4	489 μ H \pm 10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	6 - 4 (Sec.All short)	11.0 μ H MAX.	100 kHz 1Vrms	
4.3	DC. Resistance	6 - 4	0.82 Ω \pm 20%		Milli ohm meter ADEX : AX-114 or Equivalent
		2 - 1	0.20 Ω \pm 20%		
		7 - 12	94.1 m Ω \pm 30%		
		8 - 11	77.2 m Ω \pm 30%		
		9 - 10	72.2 m Ω \pm 30%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 M Ω MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5 ※	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	6 - 4	Without Breakdown	Pulse 0.8kVo-p 3~5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/ 6 - 4			f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		2 - 1	(0.1821) \pm 6.6%		
		7 - 12	(0.1364) \pm 8.8%		
		8 - 11	(0.1338) \pm 8.8%		
		9 - 10	(0.1324) \pm 8.8%		

※.1min or 1s is the time when the prescribed voltage is applied.

ECO22 Series for Multiple Outputs (Vertical Type)

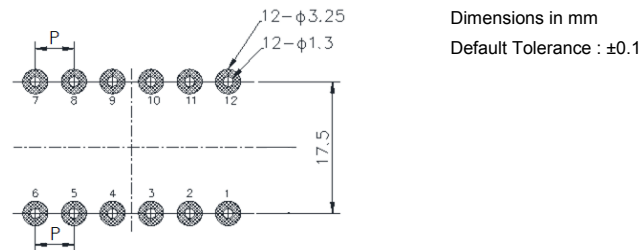
Compatible with lead-free solders

SHAPES AND DIMENSIONS(BOBBIN TYPE: V I , V I I)



Part No.	Bobbin type	W max.	H max.	P
ECO2219	VI	28.5	25.0	5.0
	VII	24.0	25.0	4.0
ECO2225	VI	28.5	31.0	5.0
	VII	24.0	31.0	4.0
ECO2230	VI	28.5	36.0	5.0
	VII	24.0	36.0	4.0

RECOMMENDED BASE MATERIAL OPENING SIZE



ITEMS APPLICABLE

Series	Bobbin Type	Part No.
ECO2219	VII	ECO2219SEO-D01V018
		ECO2219SEO-D02V016
		ECO2219SEO-D03V017
ECO2225	VI	ECO2225SEO-D02V0112

· Compatible ferrite materials for this product are the PC47 family.

· Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted ϕ pr.

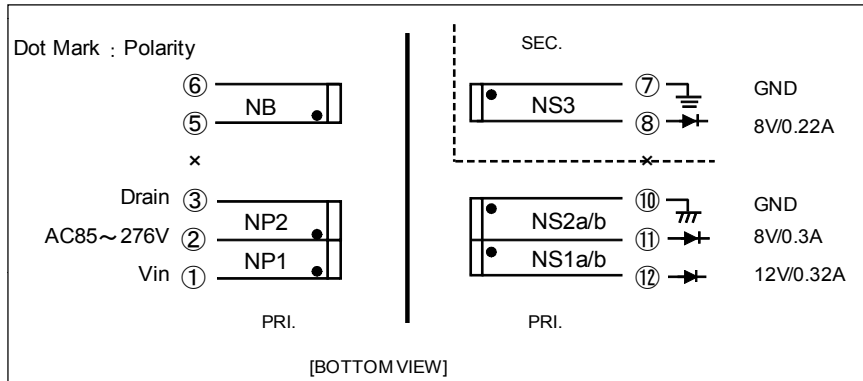
· All specifications are subject to change without notice.

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SPECIFICATIONS / ECO2219SEO-D01V018

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS IEC60335-1 Ed.4		
*Electrical Appliance and Material Safety Act		
	Inside of Coil	Outside of Coil
PRI. - SEC.	4.1mm MIN.	4.1mm MIN.
PRI. - CORE	2.1mm MIN.	2.1mm MIN.
SEC. - CORE	2.1mm MIN.	2.1mm MIN.

■ WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
1	1	N P2	2 - 3	27	UEW 0.28	NP1+NP2=54ts
2	2	N S2a	10 - 11	5	UEW 0.25×2	
3	3	N S1a	11 - 12	3	UEW 0.25×2	
4	4	N P1	1 - 2	27	UEW 0.28	
5	5	N S2b	10 - 11	5	UEW 0.25×2	
6	6	N S1b	11 - 12	3	UEW 0.25×2	
7	7	N S3	7 - 8	5	TEX-E 0.20	
8	8	N B	5 - 6	10	UEW 0.20	

* Clockwise direction is an order direction when see a transformer from the upper part.

SPECIFICATIONS / ECO2219SEO-D01V018

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature : 25±10°C		Relative Humidity : 25~75%RH	
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	1 - 3	816uH ±15%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	1 - 3 (7--12 short)	30 uH MAX.	10 kHz 1Vrms	
4.3	DC. Resistance	2 - 3	0.271Ω ±25%		Milli ohm meter ADEX : AX-114 or Equivalent
		10 - 11	21.0mΩ ±30%		
		11 - 12	14.1mΩ ±30%		
		1 - 2	0.330Ω ±25%		
		5 - 6	0.306Ω ±25%		
		7 - 8	0.142Ω ±25%		
4.4	Insulation Resistance	PRI.-SEC.	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
		PRI.,SEC. -CORE			
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 2.5kVrms 1min or AC 3.0kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.3kVrms 1min or AC 1.5kVrms 1s	
4.6	Impulse Test	1 - 3	Without Breakdown	Pulse 0.8kVo-p 3--5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/ 1 - 3	2 - 3	(0.4973) ± 3.0%.	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		10 - 11	(0.0914) ± 11.0%.		
		11 - 12	(0.0550) ± 13.0%.		
		5 - 6	(0.1829) ± 8.0%		
		7 - 8	(0.0920) ± 11.0%.		

SPECIFICATIONS / ECO2219SEO-D01V018

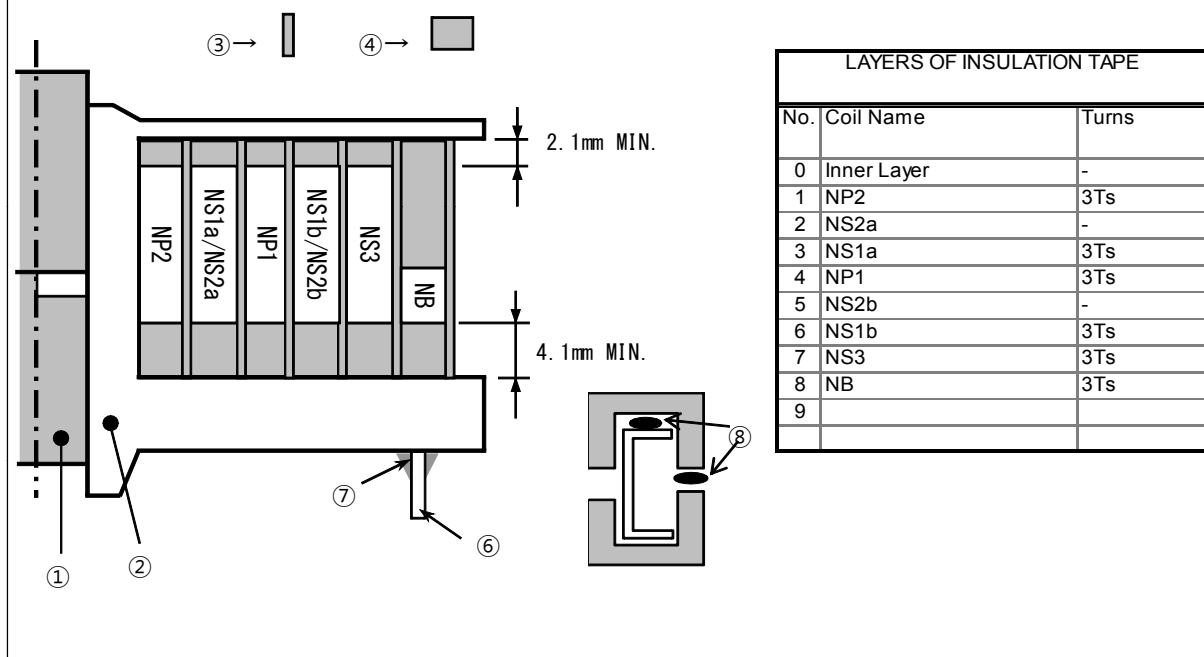
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL	MIN. THICKNESS OF 1 LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 23.2mm x19.7mm x9.2mm	—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin	PM-9820 T375J	0.65 mm 150 94V-0	SUMITOMO BAKELITE CO.,LTD. CHANG CHUN PLASTICS CO.,LTD	E41429 E59481
③	INSULATION TAPE Polyester Color : YELLOW	1318-1 or 1350F-1 CT with suffixes	0.05 mm 130	3M COMPANY ELECTRICAL MARKETS DIV (EMD) JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E165111
④	FIXING TAPE FOR WIRE (Barrier Tape)	44D-A or 44T-A 343BN@@ WF with suffixes	— 130	3M COMPANY ELECTRICAL MARKETS DIV (EMD) NITTO DENKO CORP. JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E34833 E165111
⑤	WINDING WIRE (Primary) Polyurethane Enameled Copper Wire 0.28 mm DIA : NP1, NP2 0.25 mm DIA : NS1a/b, NS2a/b 0.20 mm DIA : NB	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO. HANGZHOU WEIFENG ELECTRONIC CO.,LTD. TAI ELECTRIC WIRE&CABLE CO LTD ZHUHAI WEIHAN WIRE CO LTD SHENZHEN FUJI FINE FACTORY HITACHI CABLE (JOHOR) SDN BHD THAI HITACHI ENAMEL WIRE CO LTD ELEKTRISOLA (MALAYSIA) SDN BHD	E196072 E229341 E85640 E339217 E303260 E215594 E137472 E143312
⑥	TERMINAL PIN $\Phi 0.8$ (Soldered) Copper Clad Steel Wire Under Coating(Copper)25% Weight Ratio. (Ref) Surface Plating(Sn100%)3 μ m or More.	—	—	Optional	—
⑦	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu	—	—	Optional	—
⑧	ADHESIVE Acrylic, Urethane or Epoxy	—	—	Optional	—
⑨	WINDING WIRE (Secondary) Triple Insulating Winding Wire 0.20 mm DIA : NS3	—	—	FURUKAWA ELECTRIC CO., LTD	E206440

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



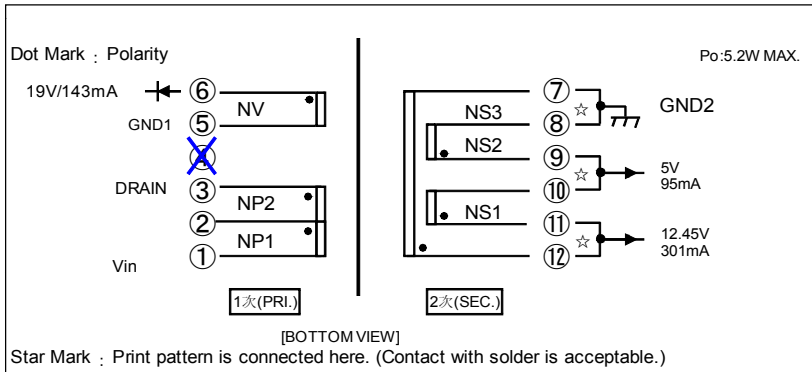
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Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2219SEO-D02V016

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS

*IEC60335-1 Ed.4 (Basic insulation)

	Inside of Coil	Outside of Coil
PRI. - SEC.	2.0mm MIN.	4.0mm MIN.
PRI. - CORE	1.0mm MIN.	2.0mm MIN.
SEC. - CORE	1.0mm MIN.	2.0mm MIN.

■ WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
0	0	TAPE : CTI \geq 600				
1	1	N P2	2 - 3	63	UEW 0.20	(NP1+NP2=125Ts.)
2	2	N S1	11 - 10	16	UEW 0.28	Reverse Winding
3	3	N V	6 - 5	40	UEW 0.20	Reverse Winding
4	4	N S2	9 - 8	11	UEW 0.2x2	Reverse Winding
5	5	N S3	12 - 7	27	UEW 0.18	Reverse Winding
6	6	N P1	1 - 2	62	UEW 0.20	

* Clockwise direction is an order direction when see a transformer from the upper part.

SPECIFICATIONS / ECO2219SEO-D02V016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature : 25±10°C		Relative Humidity : 25~75%RH	
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	3--1	3.22mH ±10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	3--1 (5,6,7,8,9,10, 11,12 short)	77uH MAX.	10kHz 1Vrms	
4.3	DC Resistance	3 - 2	1.24 Ω ±20%		Milli ohm meter ADEX : AX-114 or Equivalent
		11 - 10	0.192 Ω ±25%		
		6 - 5	0.958 Ω ±25%		
		9 - 8	147 mΩ ±30%		
		12 - 7	0.895 Ω ±25%		
		2 - 1	1.80 Ω ±20%		
4.4	Insulation Resistance	P - S	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
		P,S - CORE			
4.5	Withstanding Voltage	P - S	Without Breakdown Sense:1mA f=50or60Hz	AC 1.25kVrms 1min or AC 1.5kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		P - CORE S - CORE		AC 0.65kVrms 1min or AC 0.8kVrms 1s	
4.6	Impulse Test	3--1	Without Breakdown	Pulse 0.8kVo-p 3--5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/ 3--1			f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		11 - 10	(0.1265) ± 5.0%		
		6 - 5	(0.3198) ± 3.00%		
		9 - 8	(0.0881) ± 7.00%		
		12 - 7	(0.2175) ± 3.50%		

SPECIFICATIONS / ECO2219SEO-D02V016

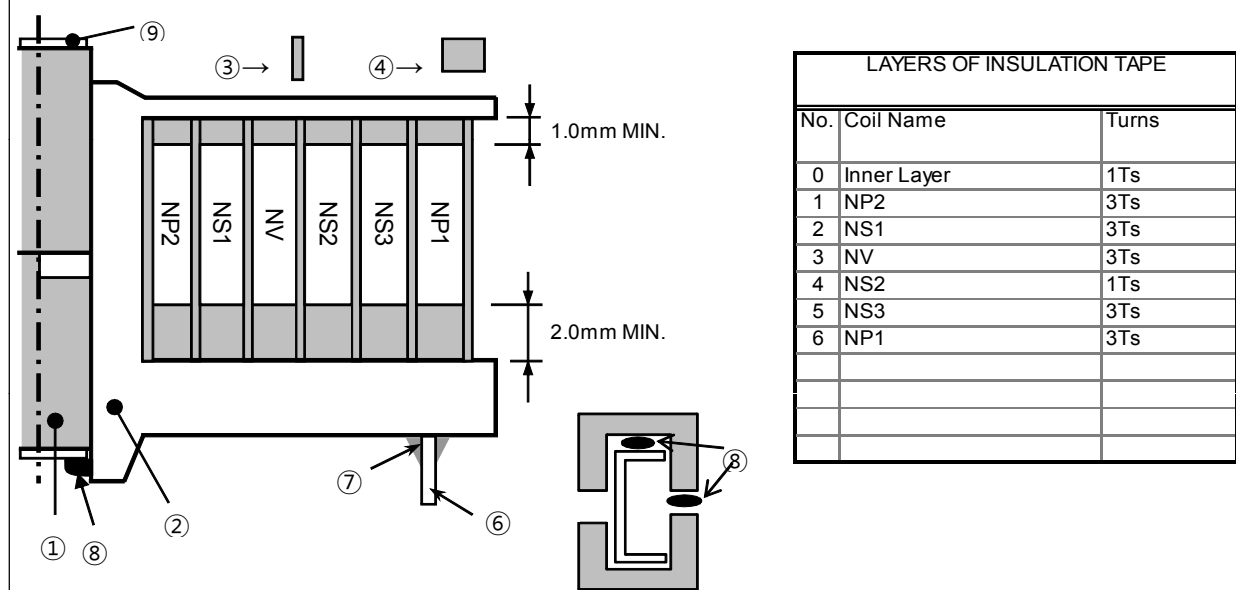
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF 1 LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite		—	—	TDK-EPC Corporation	—
②	BOBBIN	PM-9820 T375J	0.65 mm	150 94V-0	SUMITOMO BAKELITE CO.,LTD. CHANG CHUN PLASTICS CO.,LTD	E41429 E59481
③	INSULATION TAPE	1318-1	0.039 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
	Polyester or PET Color : Yellow CTI \geq 600V	CT with suffixes			JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester or PET CTI \geq 600V	44D-A or 44T-A WF with suffixes	—	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
					JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
⑤	WINDING WIRE (Primary) Polyurethane Enameled Copper Wire		—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
	0.20 mm DIA : NP1, NP2, NV				HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E229341
	WINDING WIRE (Secondary) Polyurethane Enameled Copper Wire				TAI-ELECTRIC WIRE&CABLE CO LTD	E85640
	0.18 mm DIA : NS3				ZHUHAI WEIHAN WIRE CO LTD	E339217
	0.20 mm DIA x2 : NS2				SHENZHEN FUJI FINE FACTORY	E303260
	0.28 mm DIA : NS1				HITACHI CABLE (JOHOR) SDN BHD	E215594
					THAI HITACHI ENAMEL WIRE CO LTD	E137472
					ELEKTRISOLA (MALAYSIA) SDN BHD	E143312
⑥	TERMINAL PIN Φ 0.8 (Soldered) Copper Clad Steel Wire Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3 μ m or More.		—	—	Optional	—
⑦	SOLDER (For junction of a wire and a terminal) Lead-Free		—	—	Optional	—
⑧	ADHESIVE Acrylic , Silicone , Urethane or Epoxy		—	—	Optional	—
⑨	FIXING TAPE FOR CORE Polyester or PET Color : Yellow	Same as No.③	0.039 mm	130	Same as No.③	Same as No.③

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



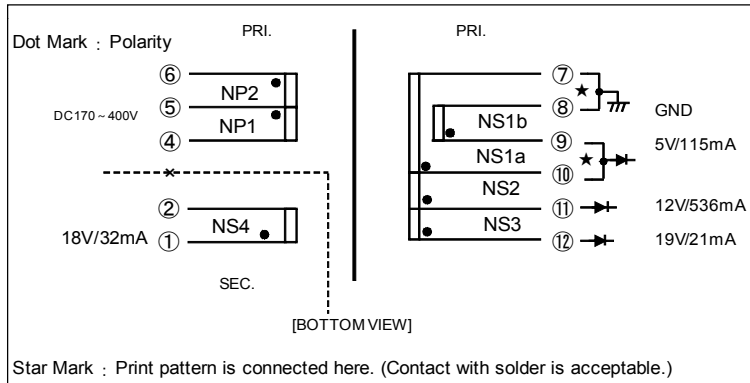
· All specifications are subject to change without notice.

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SPECIFICATIONS / ECO2219SEO-D03V017

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

SAFETY STANDARDS		
*Electrical Appliance and Material Safety Act		
	Inside of Coil	Outside of Coil
PRI. - SEC.	4.0mm MIN.	4.0mm MIN.
PRI. - CORE	2.0mm MIN.	2.0mm MIN.
SEC. - CORE	2.0mm MIN.	2.0mm MIN.

WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Tums	Wire	Note
1	1	N P1	5 - 4	40	UEW 0.18	Reverse winding NP1+NP2=75ts
2	2	N S1a	7 - 10	7	UEW 0.25×2	
3	3	N S3	12 - 11	10	UEW 0.23	Reverse winding
4	4	N S2	11 - 10	10	UEW 0.23	Reverse winding
5	5	N S4	1 - 2	24	TEX 0.20	Reverse winding
6	6	N S1b	9 - 8	7	UEW 0.25×2	Reverse winding
7	7	N P2	6 - 5	35	UEW 0.18	Reverse winding

* Clockwise direction is an order direction when see a transformer from the upper part.

SPECIFICATIONS / ECO2219SEO-D03V017

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature		:	25±10°C
		Relative Humidity		:	25~75%RH
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	6 - 4	1.77mH ±15%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	6 - 4 (7--12 short)	40 µH MAX.	10 kHz 1Vrms	
4.3	DC. Resistance	6 - 5	1.315Ω ±15%		Milli ohm meter ADEX : AX-114 or Equivalent
		7 - 10	49.2mΩ ±30%		
		12 - 11	0.177Ω ±20%		
		11 - 10	0.176Ω ±20%		
		1 - 2	0.567Ω ±20%		
		9 - 8	63.5mΩ ±30%		
		5 - 4	0.931Ω ±20%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 2.0kVrms 1min or AC 2.4kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.0kVrms 1min or AC 1.2kVrms 1s	
4.6	Impulse Test	6 - 4	Without Breakdown	Pulse 0.8kVo-p 3--5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/ 6 - 4	10 - 7	(0.0917) ± 12.0%.	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		12 - 11	(0.1300) ± 8.0%.		
		11 - 10	(0.1333) ± 8.0%.		
		1 - 2	(0.3187) ± 3.3%		
		9 - 8	(0.0932) ± 12.0%.		

SPECIFICATIONS / ECO2219SEO-D03V017

Compatible with lead-free solders

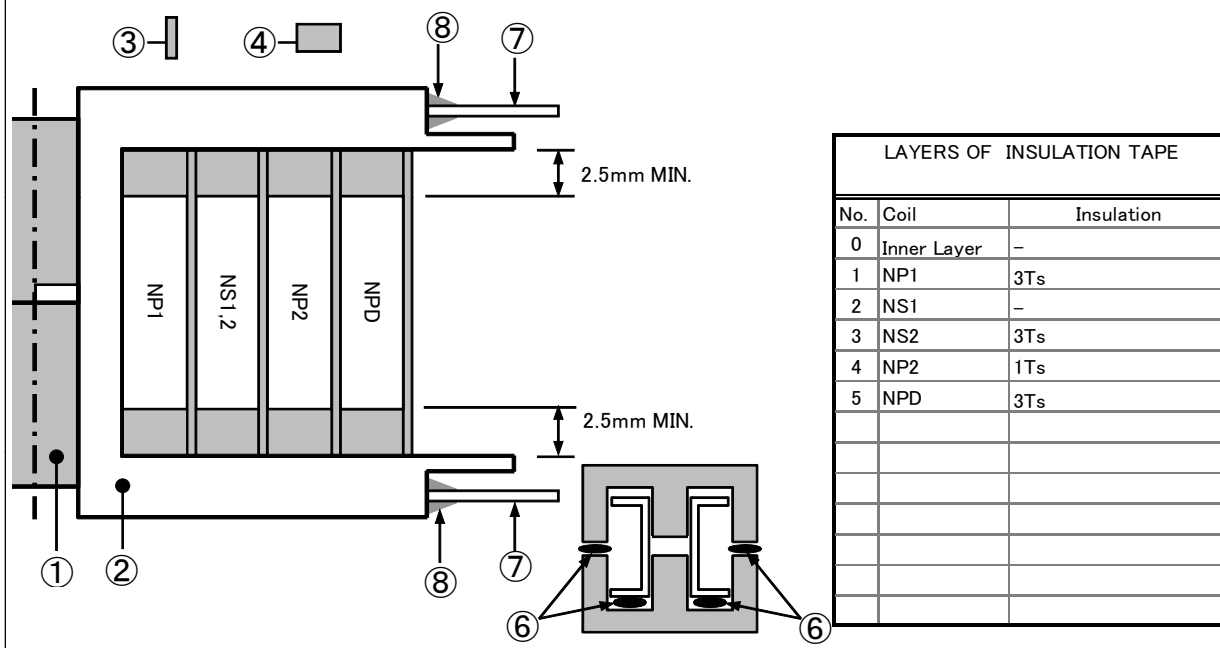
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No.	ITEM & MATERIAL		MIN.THICKNESS OF LAYER	UL T1 (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 20.9mm x20.6mm x7.7mm		—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin PM-9820		0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester Color : WHITE	1350F-1 630F#25	0.05 mm	130 FR	3M COMPANY ELECTRICAL MARKETS DIV (EMD) TERAOKA SEISAKUSHO CO.,LTD.	E17385 E56086
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	673F 0.5 or 673F 0.27 WF with suffixes	0.50 mm TYP. or 0.27 mm TYP. 0.42 mm TYP. or 0.28 mm TYP.	130 FR	TERAOKA SEISAKUSHO CO.,LTD. JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E56086 E165111
⑤	WINDING WIRE Polyurethane Enameled Copper Wire 0.26 mm DIAx1 : NP1,NP2 0.14 mm DIAx1 : NPD 0.40 mm DIAx1 : NS1,NS2	UEW UEW UEW or QA/130 xxUEW-LZ@	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO. XIAMEN HUNG'S ENTERPRISE CO.,LTD. HANGZHOU WEIFENG ELECTRONIC CO.,LTD. SHENZHEN FUJI FINE FACTORY	E196072 E219154 E229341 E303260
⑥	ADHESIVE Urethane	7247 3851			HENKEL LOCTITE(CHINA) CO.,LTD	
⑦	TERMINAL PIN Copper Clad Steel Wire Φ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3 μm or More.				WELL FORE SPECIAL WIRE CORPORATION HALO COSMOS CORPORATION JIANG MEN IL KWANG METAL CO.,LTD.	
⑧	SOLDER (For junction of a wire and aterminal) Lead-Free Sn-Ag-Cu				SENJU METAL INDUSTRY CO.,LTD.	

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

✖ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

☆BOBBIN UL94:94V-0 ,CTI(IEC112):175~250V (UL Level 3)



· All specifications are subject to change without notice.

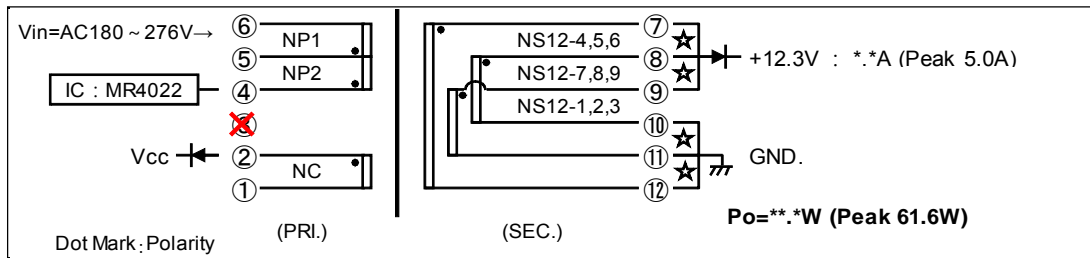
Please read the precautions before using this catalog.

transformer dk1 eco en

SPECIFICATIONS / ECO2225SEO-D02V0112

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

Safety Standard
IEC60065-Ed.7

Spacings
(Pri.-Sec.)
6.4 mm MIN.

■ WINDING SPECIFICATIONS

No.	COIL	TERMINAL	WIRE	TURNS	WINDING METHOD	
1	N S12-1	9 - 11	1 UEW ϕ 0.26	7	Normal Winding	Solenoid
2	N S12-2	11 - 9	1 UEW ϕ 0.26	7	Reverse Winding	NS12-1 Solenoid
3	N S12-3	9 - 11	1 UEW ϕ 0.26	7	Normal Winding	NS12-2 Spacing
4	N P2	4 - 5	1 UEW ϕ 0.23	67	Normal Winding	1,2 Solenoid + 3 Spacing
5	N S12-4	7 - 12	1 UEW ϕ 0.26	7	Normal Winding	Solenoid
6	N S12-5	12 - 7	1 UEW ϕ 0.26	7	Reverse Winding	NS12-4 Solenoid
7	N S12-6	7 - 12	1 UEW ϕ 0.26	7	Normal Winding	NS12-5 Spacing
8	N P1	5 - 6	1 UEW ϕ 0.26	42	Normal Winding	Solenoid(1.9)
9	N S12-7	8 - 10	1 UEW ϕ 0.26	7	Normal Winding	Solenoid
10	N S12-8	10 - 8	1 UEW ϕ 0.26	7	Reverse Winding	NS12-7 Solenoid
11	N S12-9	8 - 10	1 UEW ϕ 0.26	7	Normal Winding	NS12-8 Spacing
12	N C	2 - 1	1 UEW ϕ 0.23	9	Normal Winding	Solenoid
				Np1+Np2= 109	Ts.	

SPECIFICATIONS / ECO2225SEO-D02V0112

Compatible with lead-free solders

ELECTRICAL CHARACTERISTICS

Item	Test Condition	Terminal	Spec	Test Instruments
Inductance	10 kHz	4-6	1.33 mH ± 7%.	LCR METER 4284A V=1Vrms or Equiv.
	10 kHz	4-6	1.33 mH ± 10%.	
Leakage Inductance	100 kHz	4-6 (SEC.ALL SHORT)	μH Max. (STD.= μH)	
	100 kHz	4-6 (SEC.ALL SHORT)	31.0 μH Max.	
	100 kHz	2-1 (SEC.ALL SHORT)	μH Max. (STD.= μH)	
	100 kHz	2-1 (SEC.ALL SHORT)	1.3 μH Max.	
Insulation Resistance	DC 500 V	P---S	100 MΩ Min.	TOA SM-5E or SM-23GM or Equiv.
		P,S---CORE		
Withstand Voltage	AC 4.0 kVrms	2,4-7,8,9	2 sec. (ARC=5.5mA)	PT METER (f=50/60Hz) KIKUSUI TOS8650 SENSE : 1mA or Equiv.
	AC 1.8 kVrms	2,4,7,8,9-CORE	1 sec. Min..	
	AC 0.6 Vrms	2-4	During 1minute	
	AC 3.0 kVrms	P---S		
	AC 1.5 kVrms	P,S---CORE		
Impulse Test		4-6	Pulse 0.8kVo-p	IMPULSE TESTER ECG : DWS-05 or Equiv.
RDC		4-6	1.76 Ω ± 20%.	Milli ohm meter ADEX : AX-114 or Equiv.
		2-1	0.22 Ω ± 20%.	
		9-11	29.0 mΩ ± 30%.	
		8-10	42.4 mΩ ± 30%.	
		7-12	35.9 mΩ ± 30%.	
Polarity & Turns Ratio	INPUT : 4-6	2-1	(0.0814) ± 5.6%	TURN RATIO METER TRD-101A or TRD-08/09 or Equiv.
		9-11	(0.0609) ± 7.1%	
		8-10	(0.0642) ± 7.1%	
		7-12	(0.0635) ± 7.1%	
		5-6	(0.3912) ± 1.2%	
	INPUT : 4-6	2-1	(0.0814) ± 8.9%	TURN RATIO METER IKEDEN 3050HT or Equiv.
		9-11	(0.0609) ± 11%	
		8-10	(0.0642) ± 11%	
		7-12	(0.0635) ± 11%	

SPECIFICATIONS / ECO2225SEO-D02V0112

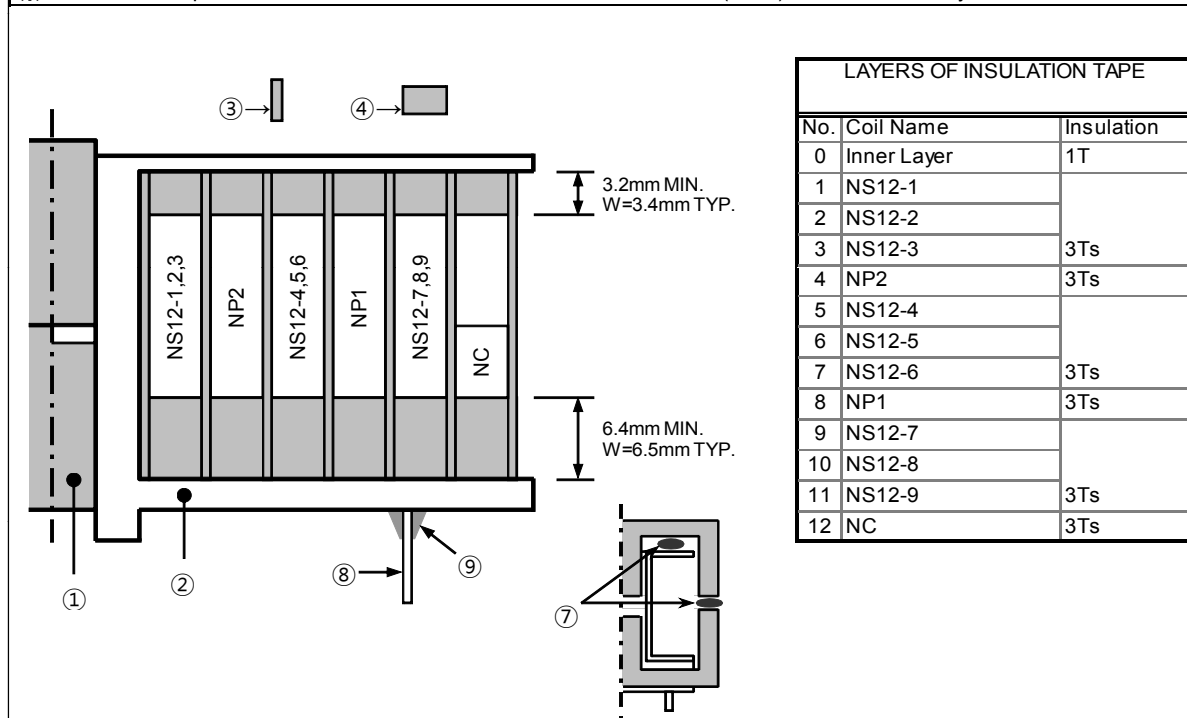
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 23.2mmx25.0mmx9.2mm		—	—	TDK Corporation	—
②	BOBBIN	PM-9820	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
	Phenol Resin					
③	INSULATION TAPE Polyester	1318-1 or 1350F-1	0.05 mm	130 FR	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44D-A or 44T-A	—	130 FR	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
		343BN@@			NITTO DENKO CORP.	E34833
		WF with suffixes			JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
⑤	WINDING WIRE Polyurethane Enameled Copper Wire 0.26 mm DIA : NP1 0.23 mm DIA : NP2, NC		—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.26 mm DIA : NS12-1,2,3,4,5,6,7,8,9	XIAMEN HUNG'S ENTERPRISE CO.,LTD.			E219154	
		HANGZHOU WEIFENG ELECTRONIC CO.,LTD.			E229341	
		XIAMEN ZHI CHENG ELECTRON CO.,LTD	E218438			
⑦	ADHESIVE Acrylic , Urethane or Epoxy		—	—	Optional	—
⑧	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.		—	—	Optional	—
⑨	SOLDER (For junction of a wire and aterminal) Lead-Free Sn-Ag-Cu		—	—	Optional	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



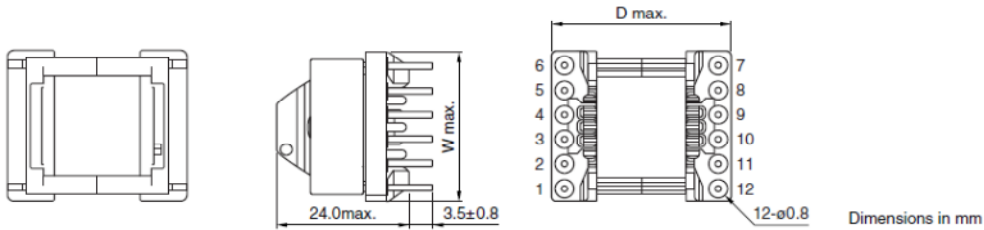
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ECO22 Series for Multiple Outputs (Horizontal Type)

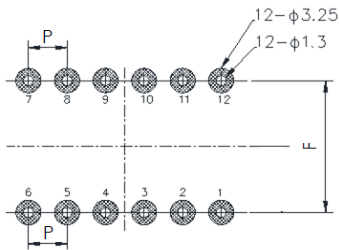
Compatible with lead-free solders

SHAPES AND DIMENSIONS (BOBBIN TYPE: HI, HII)



Part No.	Bobbin type	D max.	W max.	P	F
ECO2219	HI	25.0	29.0	5.0	20.0
	HII	25.0	26.0	4.0	20.0
ECO2225	HI	30.5	29.0	5.0	25.0
	HII	30.5	26.0	4.0	25.0
ECO2230	HI	35.5	29.0	5.0	30.0
	HII	35.5	26.0	4.0	30.0

RECOMMENDED BASE MATERIAL OPENING SIZE



Dimensions in mm

Default Tolerance : ±0.1

ITEMS APPLICABLE

Series	Bobbin Type	Part No.
ECO2225	HII	ECO2225SEO-D01H016

- Compatible ferrite materials for this product are the PC47 family.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted ϕ pr.

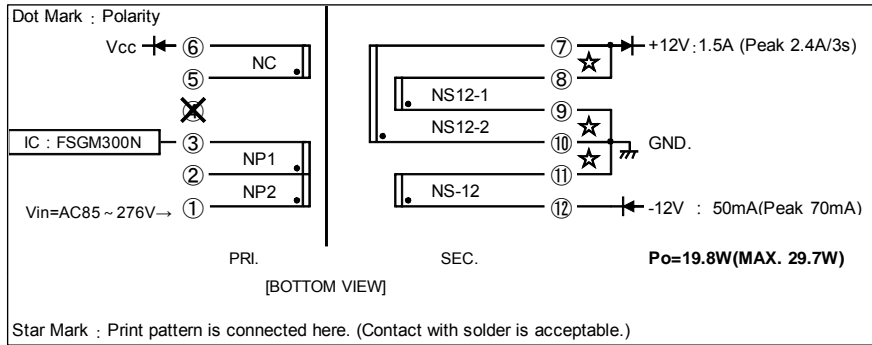
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SPECIFICATIONS / ECO2225SEO-D01H016

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS		
*UL60065-Ed.7, *IEC60065-Ed.7		
	Inside of Coil	Outside of Coil
Between Pri. and Sec.	4.8mm MIN.	8.0mm MIN.
Between Pri. and Core	2.4mm MIN.	4.0mm MIN.
Between Sec. and Core	2.4mm MIN.	4.0mm MIN.

■ WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
1	1	N P1	2 - 3	36	UEW 0.30	NP1+NP2=57Ts.
2	2	N S12-1	9 - 8	9	UEW 0.40	
3	3	N S-12	11 - 12	9	UEW 0.23	Reverse Winding
4	4	N P2	1 - 2	21	UEW 0.30	
5	5	N S12-2	10 - 7	9	UEW 0.40	
6	6	N PD	5 - 6	13	UEW 0.23	

* Clockwise direction is an order direction when see a No.1 terminal pin side of transformer from the upper part.

SPECIFICATIONS / ECO2225SEO-D01H016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature : 25±10°C		Relative Humidity : 25~75%RH	
No	Parameter	Test Terminal	Specification	Condition _s	Test Instruments
4.1	Inductance	1 - 3	567 µH ± 10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	1 - 3 (Sec.All short)	15.9 µH MAX.	100 kHz 1Vrms	
4.3	DC. Resistance	1 - 3	0.54 Ω ± 20%		Milli ohm meter ADEX : AX-114 or Equivalent
		5 - 6	0.29 Ω ± 20%		
		9 - 8	52.2 mΩ ± 30%		
		10 - 7	62.5 mΩ ± 30%		
		12 - 11	166 mΩ ± 20%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	1 - 3	Without Breakdown	Pulse 0.8kVo-p 3--5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/ 1 - 3	5 - 6	(0.2292) ± 6.1%	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		9 - 8	(0.1581) ± 8.8%		
		10 - 7	(0.1596) ± 8.8%		
		12 - 11	(0.1599) ± 8.8%		

SPECIFICATIONS / ECO2225SEO-D01H016

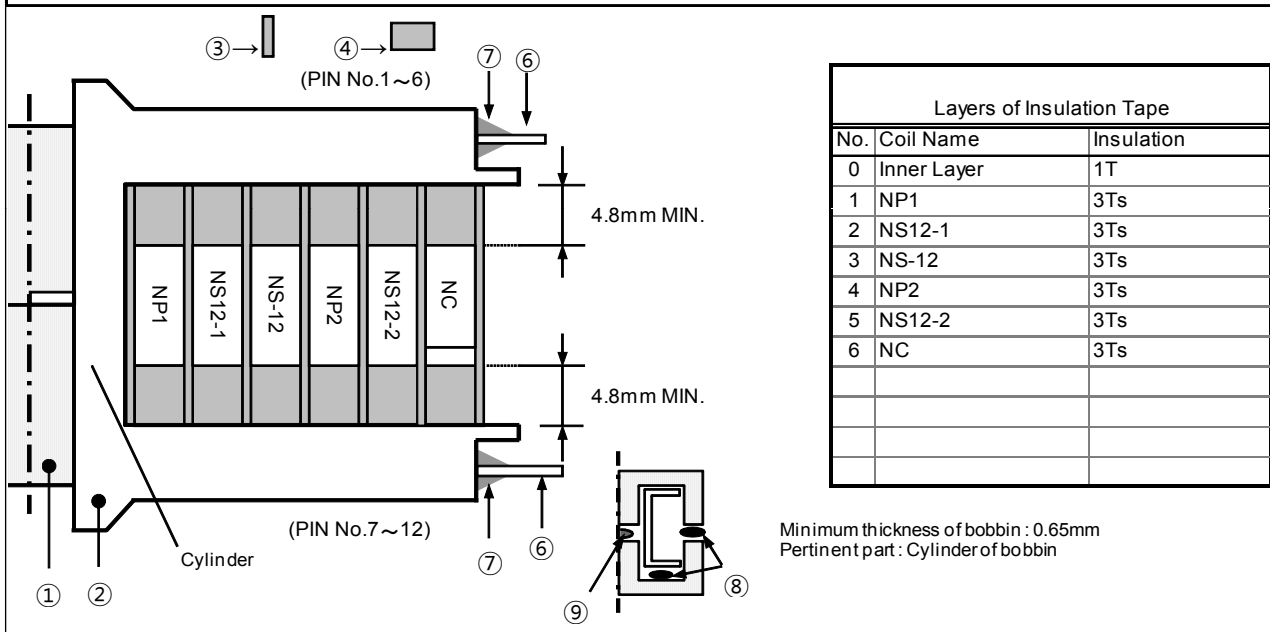
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL	MIN.THICKNESS OF 1 LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 23.2mm x 25.0mm x 9.2mm	—	—	TDK-EPC Corporation	—
②	BOBBIN PM-9820 or PM-9823	0.65 mm	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
	Phenol Resin T375J			CHANG CHUN PLASTICS CO.,LTD	E59481
③	INSULATION TAPE Polyester Color : Yellow 【Material group I】	0.05 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
	CT with suffixes			JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
④	FIXING TAPE FOR WIRE (Barrier Tape) 【Material group I】	—	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
				NITTO DENKO CORP.	E34833
				JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
⑤	WINDING WIRE (Primary) Polyurethane Enameled Copper Wire	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
	0.30 mm DIA : NP1, NP2			HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E229341
	0.23 mm DIA : NC			TAI-I ELECTRIC WIRE&CABLE CO LTD	E85640
	WINDING WIRE (Secondary) Polyurethane Enameled Copper Wire			ZHUHAI WEIHAN WIRE CO LTD	E339217
	0.40 mm DIA : NS12-1,2			SHENZHEN FUJI FINE FACTORY	E303260
	0.23 mm DIA : NS-12			HITACHI CABLE (JOHOR) SDN BHD	E215594
				THAI HITACHI ENAMEL WIRE CO LTD	E137472
				ELEKTRISOLA (MALAYSIA) SDN BHD	E143312
⑥	TERMINAL PIN $\Phi 0.8$ (Soldered) Copper Clad Steel Wire Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3 μ m or More.	—	—	Optional	—
⑦	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu	—	—	Optional	—
⑧	ADHESIVE Acrylic, Urethane or Epoxy	—	—	Optional	—
⑨	ADHESIVE Silicon	—	—	Optional	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



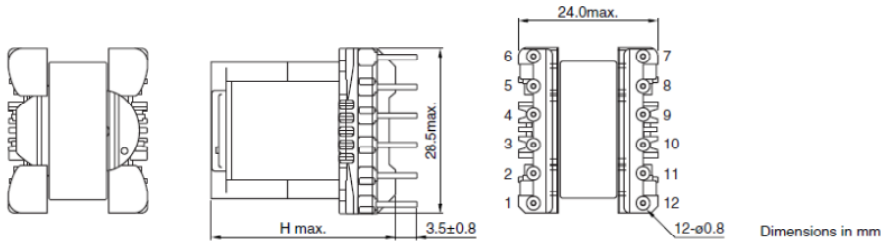
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ECO24 Series for Multiple Outputs (Vertical Type)

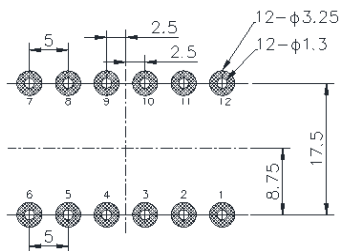
Compatible with lead-free solders

■ SHAPES AND DIMENSIONS (BOBBIN TYPE: V I)



Part No.	Bobbin type	H max.
ECO2420	VI	26.5
ECO2425	VI	31.5
ECO2430	VI	36.5

■ RECOMMENDED BASE MATERIAL OPENING SIZE



Dimensions in mm

Default Tolerance : ±0.1

■ ITEMS APPLICABLE

Series	Bobbin Type	Part No.
ECO2420	VI	ECO2420SEO-D01V019
		ECO2420SEO-D02V019
ECO2425		ECO2425SEO-D03V014
		ECO2425SEO-D02V016

- Compatible ferrite materials for this product are the PC47 family.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted ϕ pir.

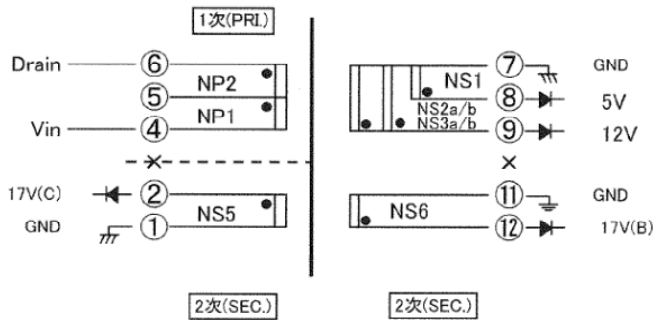
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SPECIFICATIONS / ECO2420SEO-D01V019

Compatible with lead-free solders

■ SCHEMATICS



[BOTTOM VIEW]

Dot Mark : Polarity

■ SAFETY STANDARDS

安全規格 SAFETY STANDARDS	
電気用品安全法(基礎絶縁)	
沿面空間距離 Creepage Distance & Air Clearance	
1次PRI. - 2次SEC.	2.5mm MIN.
1次PRI. - CORE.	1.3mm MIN.
2次SEC. - CORE.	1.3mm MIN.

■ WINDING SPECIFICATIONS

No.	巻順 Order	コイル Coil	端子 Terminal	巻数 Turns	線材 Wire	備考 Note
1	1	N P1	5 - 4	84	UEW 0.20	NP1+NP2=162ts
2	2	N S1	8 - 7	4	UEW 0.26 × 2	
3	3	N S2a	9 - 7	9	UEW 0.35	
4	4	N S2b	7 - 9	9	UEW 0.35	Reverse winding
5	5	N S5	1 - 2	11	UEW 0.26 × 2	Reverse winding
6	6	N S6	12 - 11	11	UEW 0.26 × 2	
7	7	N S3a	9 - 7	9	UEW 0.35	
8	8	N S3b	7 - 9	9	UEW 0.35	Reverse winding
9	9	N P2	6 - 5	78	UEW 0.20	

* 巻方向はトランスを上部から見て、時計回り方向を順方向とする。

* Clockwise direction is an order direction when see a transformer from the upper part.

SPECIFICATIONS / ECO2420SEO-D01V019

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

測定条件 (Test Conditions)

温度 (Temperature)

: 25±10°C

湿度 (Relative Humidity)

: 25~75% RH

No.	項目 Parameter	測定端子 Test Terminal	規格 Specification	条件 Conditions	測定器 Test Instruments
4.1	インダクタンス Inductance	6-4	4.72mH ± 13%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	リークage インダクタンス Leakage Inductance	6-4 (1,2,7,8,9 11,12short)	124 uH MAX		
4.3	直流抵抗 DC. Resistance	5-4	1.888 Ω ±20%		Ohm meter ADEX : AX114N or Equivalent
		8-7	33.7m Ω ±30%		
		9-7	22.7m Ω ±30%		
		1-2	94.7m Ω ±30%		
		12-11	99.4m Ω ±30%		
		6-5	2.592 Ω ±20%		
4.4	絶縁抵抗 Insulation Resistance	PRI-SEC. PRI,SEC. -CORE	100 M Ω MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	耐電圧 Withstanding Voltage	PRI-SEC.	異常なき事 Without Breakdown Sense:2mA f=50or60Hz	AC 2.0kVrms 1min or AC 2.4kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI-CORE SEC.-CORE		AC 1.0kVrms 1min or AC 1.2kVrms 1s	
4.6	インパルステスト Impulse Test	6-4	異常なき事 Without Breakdown	PULSE 600Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	極性及び巻数比 Polarity & Turns Ratio X-X/6-4	8-7	STD(0.0242) ±12%	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		9-7	STD(0.0555) ±8.8%		
		2-1	STD(0.0681) ±7.5%		
		12-11	STD(0.0681) ±7.5%		

SPECIFICATIONS / ECO2420SEO-D01V019

Compatible with lead-free solders

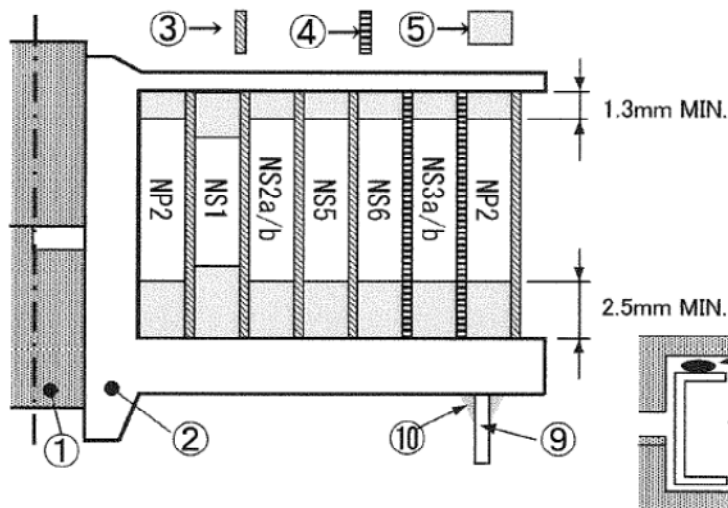
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No.	ITEM & MATERIAL		MIN.THICKNESS OF LAYER	UL T.I (°C)	MANUFACTURER	UL FILE No.
①	CORE Ferrite 25.3mm x20.3mm x11.7mm		—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin	PM-9820 or T375J	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD. CHANG CHUN PLASTICS CO.,LTD.	E41429 E59481
③	INSULATION TAPE Polyester Color : YELLOW	1318 -1 or 1350F-1 or CT with suffixes	0.05 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD) JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E165111
④	INSULATION TAPE Polyester Color : BLACK	1318 -2 or 1350F-2	0.08 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
⑤	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44-D or 44-T or 343BN@@ or WF with suffixes	—	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD) NITTO DENKO CORP. JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E34833 E165111
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.20 mm DIAx1 : NP1.NP2		—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
⑦	WINDING WIRE Polyurethane Enameled Copper Wire 0.26 mm DIAx2 : NS1,NS5,NS6 0.35 mm DIAx1 : NS2a/b,NS3a/b				XIAMEN HUNG'S ENTERPRISE CO.,LTD. SHENZHEN FUJI FINE FACTORY	E219154 E303260
⑧	ADHESIVE Acrylic , Urethane or Epoxy				Optional	
⑨	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3 μm or More.				Optional	
⑩	SOLDER (For junction of a wire and aterminal) Lead-Free Sn-Ag-Cu				Optional	

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

☆BOBBIN UL94:94V-0 ,CTI(IEC112):175~250V (UL Level 3)



LAYERS OF INSULATION TAPE		
No.	Turns	Insulation
0	Inner Layer	—
1	NP1	2Ts
2	NS1	1Ts
3	NS2a	—
4	NS2b	1Ts
5	NS5	1Ts
6	NS6	1Ts
7	NS3a	—
8	NS3b	2Ts
9	NP2	2Ts

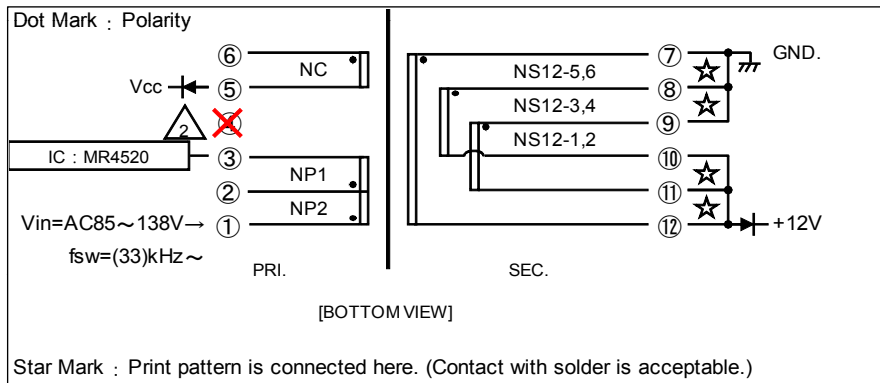
· All specifications are subject to change without notice.

Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2420SEO-D02V019

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

SAFETY STANDARDS		
*UL60065-Ed.7, *CSA 22.2 E60065		
	Inside of Coil	Outside of Coil
PRI. - SEC.	3.2mm MIN.	4.0mm MIN.
PRI. - CORE	1.6mm MIN.	2.0mm MIN.
SEC. - CORE	1.6mm MIN.	2.0mm MIN.

WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
1	1-1	N S12-1	9 - 11	7	UEW 0.32	
2	1-2	N S12-2	11 - 9	7	UEW 0.32	Reverse winding
3	2	N P1	2 - 3	22	UEW 0.40	NP1+NP2=44Ts.
4	3-1	N S12-3	8 - 10	7	UEW 0.32	
5	3-2	N S12-4	10 - 8	7	UEW 0.32	Reverse winding
6	4	N P2	1 - 2	22	UEW 0.40	
7	5-1	N S12-5	7 - 12	7	UEW 0.32	
8	5-2	N S12-6	12 - 7	7	UEW 0.32	Reverse winding
9	6	N C	5 - 6	8	UEW 0.23	Reverse winding

* Clockwise direction is an order direction when see a transformer from the upper part.

SPECIFICATIONS / ECO2420SEO-D02V019

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature		:	25±10°C
		Relative Humidity		:	25~75%RH
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	1 - 3	278μH ± 10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	1 - 3 (Sec. All short)	8.0 μH MAX.	100 kHz 1Vrms	
4.3	DC. Resistance	1 - 3	0.31 Ω ± ±20%		Milli ohm meter ADEX : AX-114 or Equivalent
		6 - 5	0.22 Ω ± ±20%		
		9 - 11	34.2 mΩ ± ±30%		
		8 - 10	41.3 mΩ ± ±30%		
		7 - 12	47.9 mΩ ± ±30%		
4.4	Insulation Resistance	PRI.-SEC.	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
		PRI.,SEC. -CORE			
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	1 - 3	Without Breakdown	Pulse 0.8kVo-p 3--5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/ 1 - 3	6 - 5	(0.1809) ± 10%.	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		9 - 11	(0.1491) ± 11%.		
		8 - 10	(0.1572) ± 11%.		
		7 - 12	(0.1592) ± 11%.		

SPECIFICATIONS / ECO2420SEO-D02V019

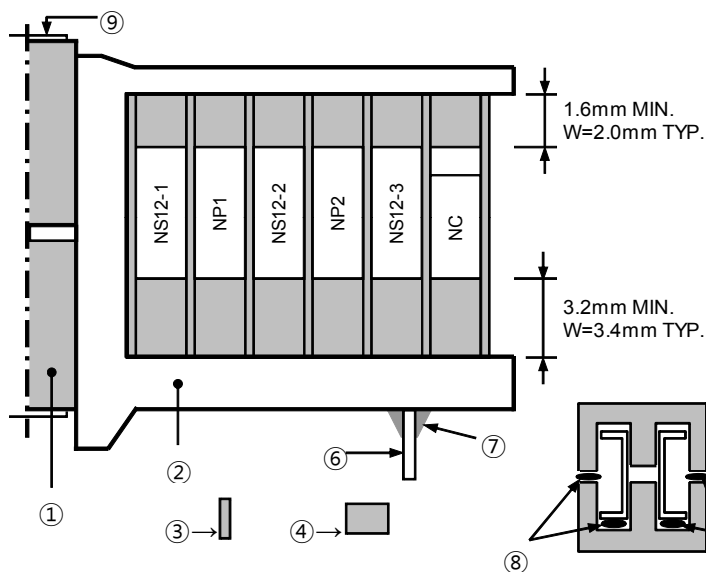
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF 1 LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 25.3mmx20.3mmx11.7mm		—	—	TDK-EPC Corporation	—
②	BOBBIN	PM-9820	0.65 mm	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
	Phenol Resin	T375J			CHANG CHUN PLASTICS CO.,LTD	E59481
③	INSULATION TAPE Polyester	1318-1 or 1350F-1	0.05 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape)	44D-A or 44T-A	—	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
		343BN@@			NITTO DENKO CORP.	E34833
		WF with suffixes			JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
⑤	WINDING WIRE (Primary) Polyurethane Enameled Copper Wire 0.40 mm DIA : NP1, NP2 0.23 mm DIA : NC		130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072	
				HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E229341	
				TAIHI ELECTRIC WIRE&CABLE CO LTD	E85640	
	WINDING WIRE (Secondary) Polyurethane Enameled Copper Wire 0.32 mm DIA : NS12-1,2,3,4,5,6			ZHUHAI WEIHAN WIRE CO LTD	E339217	
	SHENZHEN FUJI FINE FACTORY			E303260		
	HITACHI CABLE (JOHOR) SDN BHD			E215594		
	THAI HITACHI ENAMEL WIRE CO LTD			E137472		
	ELEKTRISOLA (MALAYSIA) SDN BHD			E143312		
⑥	TERMINAL PIN φ0.8 (Soldered) Copper Clad Steel Wire Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.	—	—	Optional	—	
⑦	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu	—	—	Optional	—	
⑧	ADHESIVE Acrylic , Urethane or Epoxy	—	—	Optional	—	
⑨	FIXING TAPE FOR CORE Polyester Same as No.③	0.05 mm (2~3Layers)	130	Same as No.③	Same as No.③	

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



LAYERS OF INSULATION TAPE		
No.	Coil Name	Turns
0	Inner Layer	1T
1	NS12-1	
2	NS12-2	3Ts
3	NP1	3Ts
4	NS12-3	
5	NS12-4	3Ts
6	NP2	3Ts
7	NS12-5	
8	NS12-6	3Ts
9	NC	3Ts

【Cleepage Distance & Clearance】

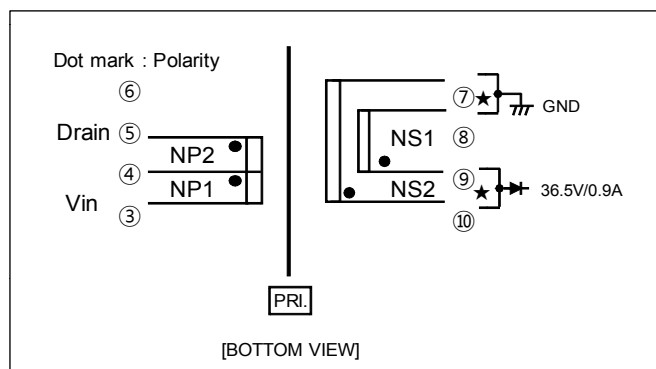
	Inside of Coil	Outside of Coil
P-S	3.2mm MIN.	4.0mm MIN.
P,S-C	1.6mm MIN.	2.0mm MIN.

※Design value

SPECIFICATIONS / ECO2425SEO-D03V014

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS
N/A
Over Surface & Air Spacings

■ WINDING SPECIFICATIONS

No.	order	coil	terminal	turns	wire	note
1	1	N P2	4 - 3	85	UEW 0.26	NP1+NP2=167ts
2	2	N S1	10 - 8	42	UEW 0.26	
3	3	N P1	3 - 2	82	UEW 0.26	
4	4	N S2	11 - 7	42	UEW 0.26	

SPECIFICATIONS / ECO2425SEO-D03V014

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions) (Temperature) : 25±10°C (Relative Humidity) : 25~75%RH					
No	Parameter	Test Terminal	Specification	Condition _s	Test Instruments
4.1	Inductance	4 - 2	2.80mH ± 10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	4 - 2 (NS,short)	37 uH MAX		
4.3	DC. Resistance	4 - 3	1.178Ω ±20%		Milli ohm meter ADEX : AX-114N or Equivalent
		3 - 2	1.328Ω ±20%		
		10 - 8	0.597Ω ±20%		
		11 - 7	0.691Ω ±20%		
4.4	Insulation Resistance	NP-NS NP,NS -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	NP-NS	Without Breakdown	AC 1.5kVrms 1min or AC 1.8kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		NP-CORE NS-CORE	Sense:1mA	AC 1.0kVrms 1min or AC 1.0kVrms 1s	
4.6	Impulse Test	4 - 2	Without Breakdown	Pulse 600Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X / 4 - 2	10 - 8	STD(0.2516)±2.5%	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		11 - 7	STD(0.2543)±2.5%		

SPECIFICATIONS / ECO2425SEO-D03V014

Compatible with lead-free solders

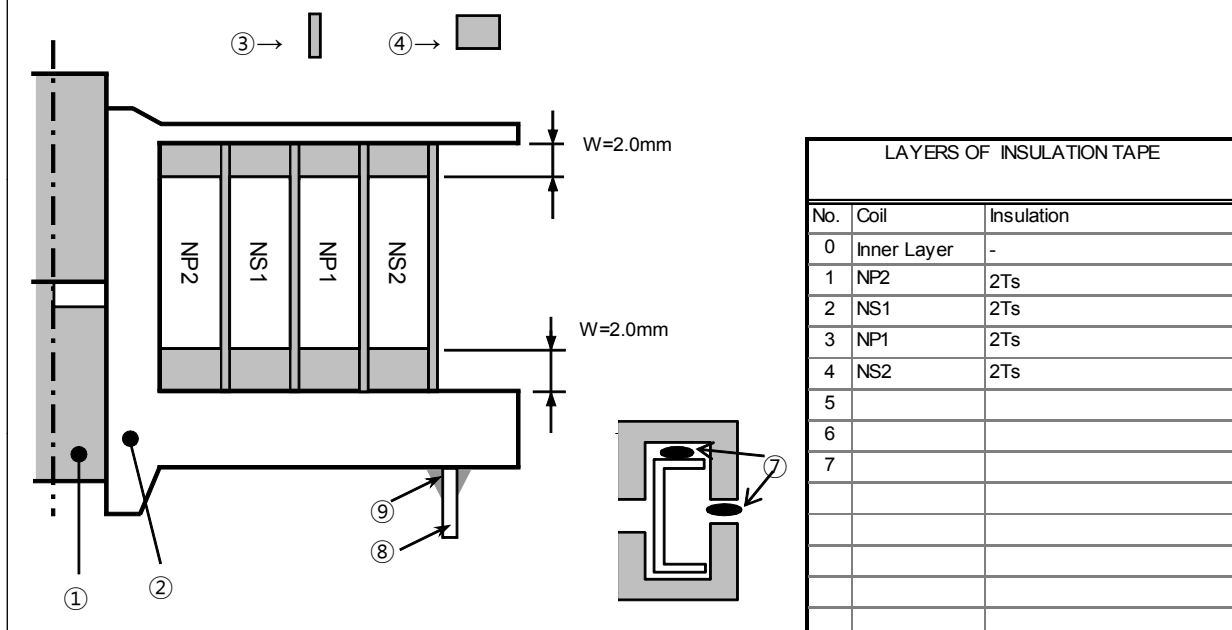
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 25.3mm x25.3mm x11.7mm		—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin	PIM-9820	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester Color : YELLOW	1318 or 1350F-1	0.05 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44D-A or 44T-A or	-	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
		WF with suffixes			JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
⑤	WINDING WIRE Polyurethane Enameled Copper Wire 0.26 mm DIAx1 : NP1,NP2		—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.26 mm DIAx1 : NS1,NS2				XIAMEN HUNG'S ENTERPRISE CO.,LTD.	E219154
					HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E229341
⑦	ADHESIVE Acrylic , Urethane or Epoxy				Optional	
⑧	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.				Optional	
⑨	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu				Optional	

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

✖ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

☆BOBBIN UL94: 94V-0 ,CTI(IEC112): 175~250V (UL Level 3)



· All specifications are subject to change without notice.

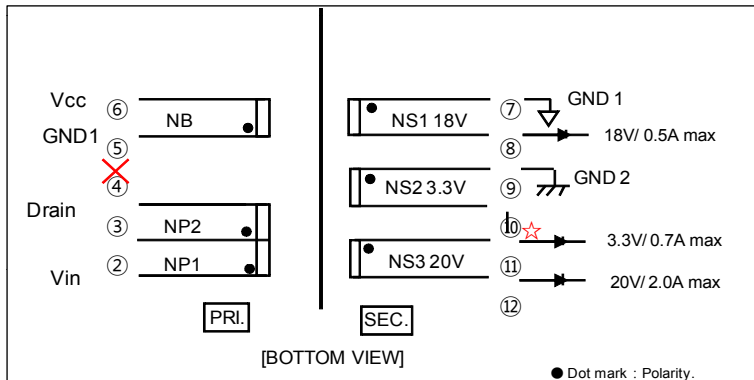
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transformer dk1 eco en

SPECIFICATIONS / ECO2425SEO-D02V016

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

SAFETY STANDARDS	
IEC60335-1 Ed.4	
Over Surface & Air Spacings	
PRI. - SEC.	4.0 mm MIN.(inside coil)
PRI. - CORE	4.0 mm MIN.(outside coil)
SEC. - CORE	4.0 mm MIN.(outside coil)
REMOVE PIN	PIN No. 4 , 9

WINDING SPECIFICATIONS

No.	order	coil	terminal	turns	wire	WIDING METHOD	note
0	0	$600V \leq CTI$					NP1+NP2=84ts
1	1	N P1	1 - 2	42	2UEW 0.35	2Layer sol	
2	2	N S2	9 - 10	4	2UEW 0.4 X 2	1Lyer space	3.3V
3	3	N S3	11 - 12	16	2UEW 0.4 X 2	2Layer sol	20V
4	4	N B	5 - 6	16	2UEW 0.25	1Layer sol	
5	5	N S1	7 - 8	18	2UEW 0.30	1Layer sol	18V
6	6	N P2	2 - 3	42	2UEW 0.35	2Layer sol	

SPECIFICATIONS / ECO2425SEO-D02V016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions) (Temperature) : 25±10°C (Relative Humidity) : 25~75%RH					
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	1 - 3	700uH ± 15%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	1 - 3 (7-12, SEC. short)	38 uH MAX		
4.3	DC. Resistance	1 - 3	0.792Ω ±20%		ADEX : AX-114N or Equivalent
		9 - 10	0.015Ω ±30%		
		11 - 12	0.056Ω ±30%		
		5 - 6	0.300Ω ±20%		
		7 - 8	0.257Ω ±20%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	1 - 3	Without Breakdown	Pulse 600Vo-p 3~5 pluse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio	1 - 2	0.4770Vrms ± 7.0%	f=10kHz	Ratio Meter or Equivalent
		9 - 10	0.0460Vrms ±15.0%		
		11 - 12	0.1887Vrms ±10.0%		
		5 - 6	0.1915Vrms ±10.0%		
		7 - 8	0.2190Vrms ±10.0%		
		2 - 3	0.5230Vrms ± 7.0%		
4.8	Inductance	1 - 2	167.0uH ± 20%	10 kHz 1Vrms	Agilent : 4263B or Equivalent
		9 - 10	1.64uH ± 25%		
		11 - 12	26.3uH ± 25%		
		5 - 6	28.1uH ± 25%		
		7 - 8	36.0uH ± 25%		
		2 - 3	200.2uH ± 20%		

SPECIFICATIONS / ECO2425SEO-D02V016

Compatible with lead-free solders

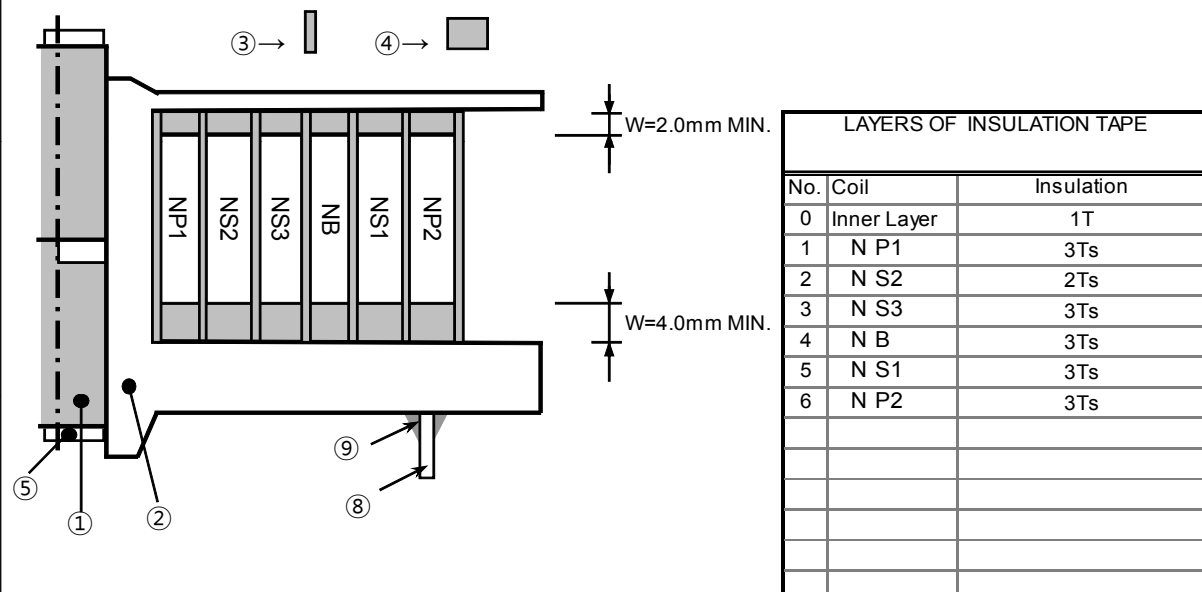
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF LAYER	UL T.I (°c)	MANUFACTURER	UL FILE NO.
①	CORE PCB47 ECO2425		—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin Phenol Resin	PM-9820 T-375J	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD. CHANG CHUN PLASTICS CO.,LTD.	E41429 E59481
③	INSULATION TAPE Polyester Color : YELLOW	CT280	0.05 mm	130	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
		1318-1			3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44D-A or	-	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
		WF with suffixes			JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
⑤	FIXING TAPE FOR CORE Polyester Color : YELLOW	CT280	0.05 mm	130	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
		1318-1			3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
⑥	WINDING WIRE Polyurethane Enameled Copper Wire		—	130	TAI-I ELECTRIC WIRE & CABLE CO LTD	E85640
					PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
					XIAMEN HUNG'S ENTERPRISE CO.,LTD.	E219154
⑦	ADHESIVE Varnish TVB2024				KYOCERA CHEMICAL CORPORATION	E83702
⑧	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.				Optional	
⑨	SOLDER (For junction of a wire and aterminal) Lead-Free Sn-Ag-Cu				Optional	
⑩	MARKING	Laser INK BLACK UV400			LA MARK LP-V SERIES T&K TOKA CO., LTD.	

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

✖ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

☆BOBBIN UL94: 94V-0 ,CTI(IEC112): 175~250V (UL Level 3)



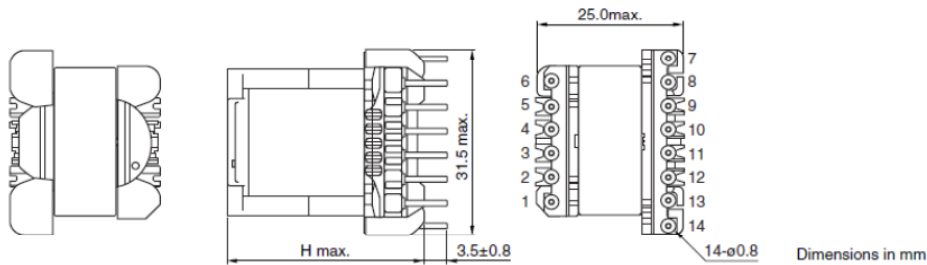
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transformer dk1 eco en

ECO24 Series for Multiple Outputs (Vertical Type)

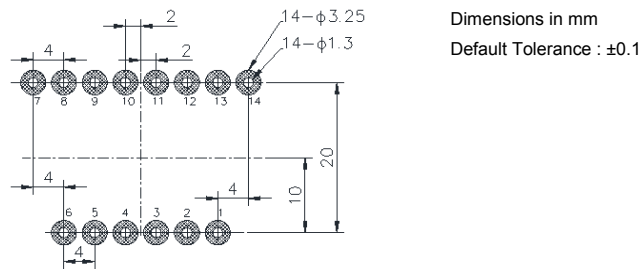
Compatible with lead-free solders

SHAPES AND DIMENSIONS(BOBBIN TYPE: V I I)



Part No.	Bobbin type	H max.
ECO2420	VII	26.5

RECOMMENDED BASE MATERIAL OPENING SIZE



ITEMS APPLICABLE

Series	Bobbin Type	Part No.
ECO2420	VII	ECO2420SEO-D03V018
		ECO2420SEO-D04V0110

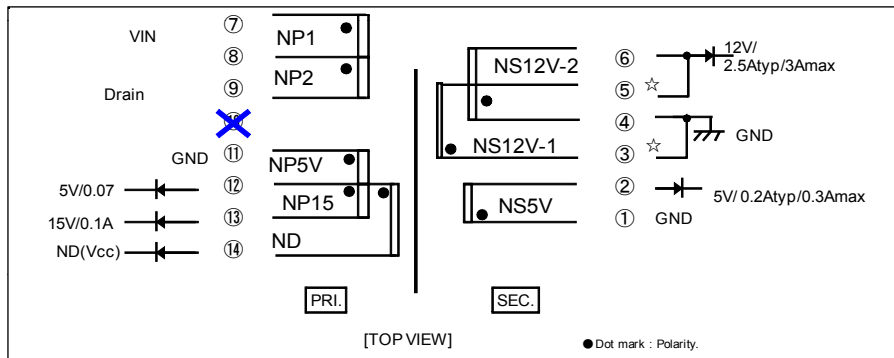
- Compatible ferrite materials for this product are the PC47 family.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted ópir.

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SPECIFICATIONS / ECO2420SEO-D03V018

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS	
IEC60335-1 Ed.4	
Over Surface & Air Spacings	
PRI. - SEC.	4.0 mm MIN.(inside coil)
PRI. - CORE	4.0 mm MIN.(outside coil)
SEC. - CORE	4.0 mm MIN.(outside coil)
REMOVE PIN	PIN NO. 10

■ WINDING SPECIFICATIONS

No.	order	coil	terminal	turns	wire	WINDING METHOD	note	
0	0	600V \leq CTI						
1	1	NP1	7 - 8	27	2UEW 0.35	FIT		
2	2	NS5V	1 - 2	4	2UEW 0.2	SPACE		
3	3	NS12V-1	3 - 5	7	2UEW 0.32*2	FIT		
4	4	NS12V-2	4 - 6	7	2UEW 0.32*2	FIT		
5	5	NP2	8 - 9	27	2UEW 0.35	FIT		
6	6	NP5V	11 - 12	5	2UEW 0.2	FIT		
7	6	NP15V	12 - 13	5	2UEW 0.2	SPACE After No.6		
8	7	ND	12 - 14	5	2UEW 0.2	SPACE		
* BARRIER TAPE & INSULATION TAPE SPECIFICATIONS								
						Insulation tape Color : Yellow		
No.	order	coil	terminal	Pin side	Core side	Ts	Insulation tape 12.5mm	note
0	0			-	-	-	t=25u 1 t	
1	1	NP1	7 - 8	4.0	2.0	3ts	t=25u 4 ts	
2	2	NS5V	1 - 2	4.0	2.0	1t	t=25u 1 t	
3	3	NS12V-1	3 - 5	4.0	2.0	1ts	t=25u 1 t	
4	4	NS12V-2	4 - 6	4.0	2.0	1ts	t=25u 4 ts	
5	5	NP2	8 - 9	4.0	2.0	3ts	t=25u 3 ts	
6	6	NP5V	11 - 12	4.0	2.0	1ts	t=25u -	
7	6	NP15V	12 - 13	-	-		t=25u 1 ts	
8	7	ND	12 - 14	4.0	2.0	1ts	t=25u 3 ts	

· All specifications are subject to change without notice.
Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2420SEO-D03V018

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions) (Temperature) : 25±10°C (Relative Humidity) : 25~75%RH					
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	7 - 9	750uH ± 15%	1 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
			750uH ± 15%	100 kHz 1Vrms	
			750uH ± 15%	200 kHz 1Vrms	
4.2	Leakage Inductance	7 - 9 (1,2,3,4,5,6 short)	22uH MAX	100 kHz 1Vrms	
4.3	DC. Resistance	7 - 9	0.473 Ω ± 20%		Milli ohm meter ADEX : AX-114N or Equivalent 10kHz/1V
		7 - 8	0.200 Ω ± 20%		
		1 - 2	0.117 Ω ± 25%		
		3 - 5	0.037 Ω ± 30%		
		4 - 6	0.041 Ω ± 30%		
		8 - 9	0.265 Ω ± 20%		
		11 - 12	0.178 Ω ± 25%		
		12 - 13	0.181 Ω ± 25%		
		12 - 14	0.187 Ω ± 25%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	7 - 9	Without Breakdown	Pulse 800Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X / 7 - 9	1 - 2	0.0731Vrms ± 14.0%	f=10kHz	Ratio Meter Ryowa : TRM-101A
		3 - 5	0.1286Vrms ± 12.0%		
		4 - 6	0.1296Vrms ± 12.0%		
		11 - 12	0.0920Vrms ± 14.0%		
		12 - 13	0.0933Vrms ± 12.0%		
		12 - 14	0.0928Vrms ± 12.0%		
4.8	Inductance	7 - 8	186.5uH ± 25%	1 kHz 1Vrms 100 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
		1 - 2	4.3 uH ± 25%		
		3 - 5	12.9 uH ± 25%		
		4 - 6	13.1 uH ± 25%		
		8 - 9	197.0uH ± 25%		
		11 - 12	7.2 uH ± 25%		
		12 - 13	7.0 uH ± 25%		
		12 - 14	7.0 uH ± 25%		

SPECIFICATIONS / ECO2420SEO-D03V018

Compatible with lead-free solders

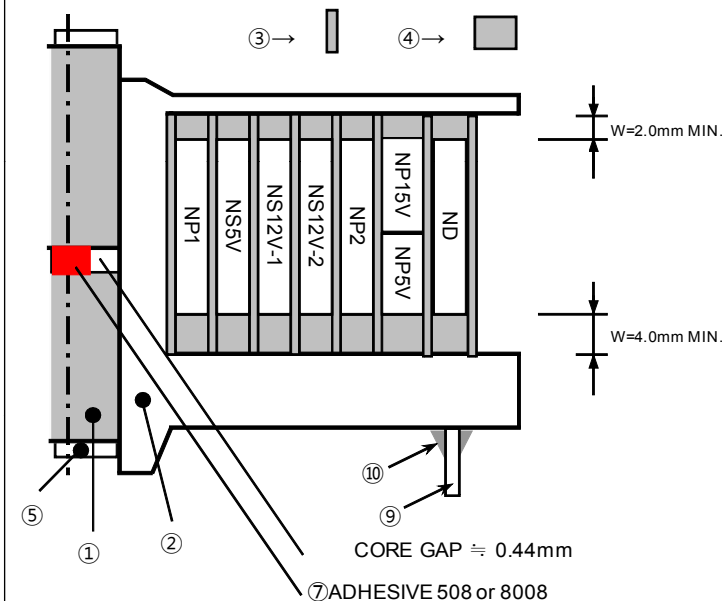
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL	MIN.THICKNESS OF LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	FERRITE CORE ECO 2420	—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin PM-9820	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester Color : YELLOW	CT280 or 1318-1	130	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD 3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E165111 E17385
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44D-A WF with suffixes	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD) JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E165111
⑤	FIXING TAPE FOR CORE Polyester Color : YELLOW	CT280 or 1318-1	130	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD 3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E165111 E17385
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.2mm , 0.32mm , 0.35mm	—	130	TAI-H ELECTRIC WIRE & CABLE CO LTD	E85640
⑦	ADHESIVE 508 NO.8008			DONGBU FINE CHEMICAL CO., CEMEDINE CO., LTD.	
⑧	VARNISH EPOXY VARNISH TVB-2024			KYOCERA CHEMICAL CORPORATION	
⑨	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.			Optional	
⑩	SOLDER SOLDER Sn-3Ag-0.5Cu			Optional SENJYU METAL CO., LTD.	

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

☆BOBBIN UL94: 94V-0 ,CTI(IEC112): 175~250V (UL Level 3)



LAYERS OF INSULATION TAPE		
No.	Coil	Insulation
0	Inner Layer	1T
1	NP1	4Ts
2	NS5V	1T
3	NS12V-1	1T
4	NS12V-2	4Ts
5	NP2	3Ts
6	NP5V	-
7	NP15V	1Ts
8	ND	3Ts

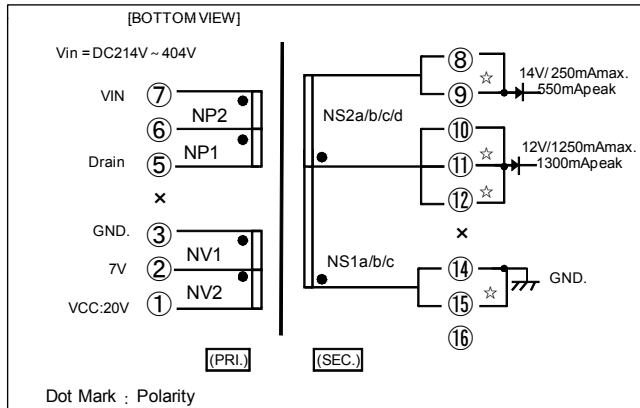
· All specifications are subject to change without notice.

Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2420SEO-D04V0110

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

SAFETY STANDARDS	
Creepage Distance & Air Clearance	
PRI. - SEC.	2.50mm MIN.
PRI. - CORE	1.25mm MIN.
SEC. - CORE	1.25mm MIN.

WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
1	1	N P1	6 - 5	53	UEW 0.20	
2	2	N S1a	12 - 14	13	UEW 0.20 x 2	Reverse Winding
3	3-1	N V2	1 - 2	12	UEW 0.20	Reverse Winding
4	3-2	N V1	2 - 3	12	UEW 0.20	Reverse Winding
5	4	N S1b	15 - 10	13	UEW 0.20 x 2	
6	5-1	N S2a	8 - 11	2	UEW 0.23 x 2	Reverse Winding
7	5-2	N S2b	11 - 9	2	UEW 0.23 x 2	
8	5-3	N S2c	9 - 10	2	UEW 0.23 x 2	Reverse Winding
9	5-4	N S2d	10 - 8	2	UEW 0.23 x 2	
10	6	N S1c	14 - 11	13	UEW 0.20 x 2	
11	7	N P2	7 - 6	52	UEW 0.20	

* Counter clockwise direction is an order direction when see a transformer from the upper part.

SPECIFICATIONS / ECO2420SEO-D04V0110

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions) (Temperature) : 25±10°C (Relative Humidity) : 25~75%RH					
No	Parameter	Test Terminal	Specification	Condition _s	Test Instruments
4.1	Inductance	7 - 5	1.54 mH ± 10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	7 - 5 (8,9,10,11,12 ,14,15 short)	39.5 µH MAX		
4.3	DC. Resistance	15 - 10	(0.180Ω) ±20%		Milli ohm meter ADEX : AX-114 or Equivalent
		7 - 6	(1.722Ω) ±20%		
		14 - 11	(96.7mΩ) ±30%		
		10 - 8	(19.2mΩ) ±30%		
		9 - 10	(19.6mΩ) ±30%		
		11 - 9	(18.7mΩ) ±30%		
		8 - 11	(18.7mΩ) ±30%		
		2 - 3	(0.324Ω) ±20%		
		1 - 2	(0.324Ω) ±20%		
		12 - 14	(94.1mΩ) ±30%		
		6 - 5	(1.139Ω) ±20%		
4.4	Insulation Resistance	PRI.-SEC.	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
		PRI.,SEC.-CORE			
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 1.5kVrms 1min or AC 1.8kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 0.8kVrms 1min or AC 1.0kVrms 1s	
4.6	Impulse Test	7 - 5	Without Breakdown	Pulse 800Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X:X/7-5	15 - 10	STD(0.1219)±7.0%	f=10kHz	Ratio Meter Ryowa : TRD-09 or Equivalent
		14 - 11	STD(0.1221)±7.0%		
		10 - 8	STD(0.0188)±4.5%		
		9 - 10	STD(0.0189)±4.5%		
		11 - 9	STD(0.0189)±4.5%		
		8 - 11	STD(0.0188)±4.5%		
		2 - 3	STD(0.1137)±7.5%		
		1 - 2	STD(0.1081)±7.5%		
		12 - 14	STD(0.1228)±7.0%		

SPECIFICATIONS / ECO2420SEO-D04V0110

Compatible with lead-free solders

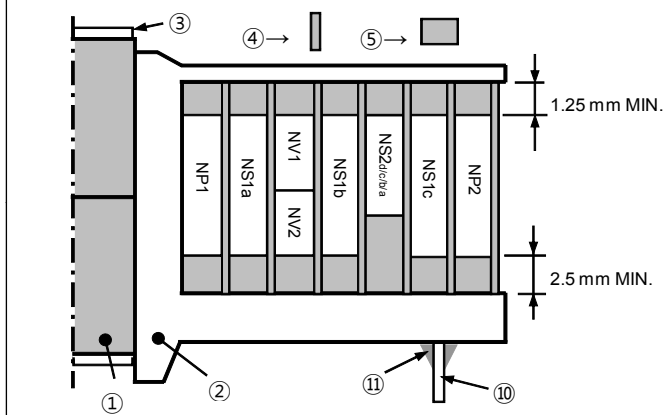
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL	MIN.THICKNESS OF ONE LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 25.3mmx20.3mmx11.7mm	—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin T375J	0.65 mm MIN.	150 94V-0	CHANG CHUN PLASTICS CO.,LTD.	E59481
③	FIXING TAPE FOR CORE Polyester Color : WHITE	1318-1 1350F-1 CT with suffixes	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
				JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO.LTD.	E165111
④	INSULATION TAPE Polyester Color : WHITE	1318-1 1350F-1 CT with suffixes	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
				JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO.LTD.	E165111
⑤	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44D WF with suffixes	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
				JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO.LTD.	E165111
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.20 mm DIAx1 : NP1,NP2,NV1,V2	-	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
⑦	WINDING WIRE Polyurethane Enameled Copper Wire 0.20 mm DIAx2 : NS1a/b/c 0.23 mm DIAx2 : NS2a/b/c/d			XIAMEN HUNG'S ENTERPRISE CO.,LTD.	E219154
⑨	IMPREGNATION Epoxy Varnish	-	-	Optional	—
⑩	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.	-	-	Optional	—
⑪	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-Ag-Cu	-	-	Optional	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 3 layers.

☆BOBBIN UL94: 94V-0, CTI(IEC112): 175~250V (UL Level 3) / INSULATION TAPE CTI:250~400V.



LAYERS OF FIXING TAPE FOR WIRE (Barrier Tape) and INSULATION TAPE		
0	Inner Layer	-
1	NP1	2Ts
2	NS1a	2Ts
3	NV1/NV2	2Ts
4	NS1b	1T
5	NS2a/b/c/d	2Ts
6	NS1c	2Ts
7	NP2	2Ts

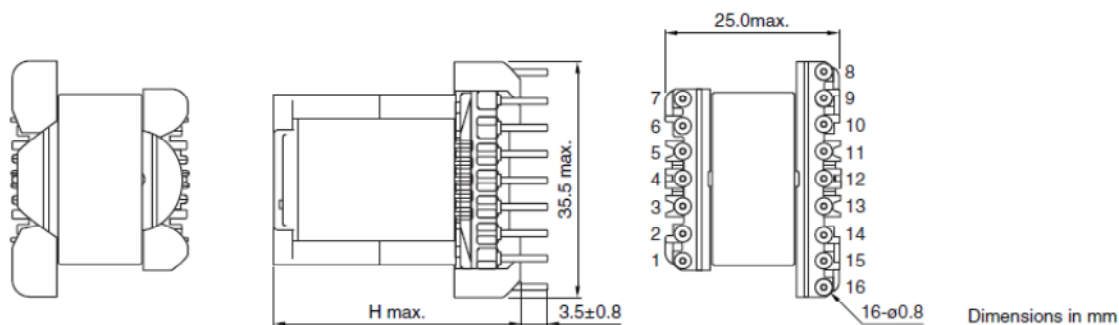
· All specifications are subject to change without notice.

Please read the precautions before using this catalog.

ECO24 Series for Multiple Outputs (Vertical Type)

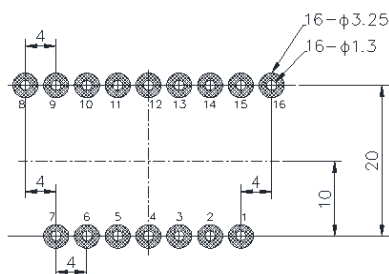
Compatible with lead-free solders

■ SHAPES AND DIMENSIONS (BOBBIN TYPE: V I I)



Part No.	Bobbin type	H max.
ECO2425	VII	31.5
ECO2430	VII	36.5

■ RECOMMENDED BASE MATERIAL OPENING SIZE



Dimensions in mm
Default Tolerance : ± 0.1

■ ITEMS APPLICABLE

Series	Bobbin Type	Part No.
ECO2425	VII	ECO2425SEO-D01V019
		ECO2425SEO-D04V017

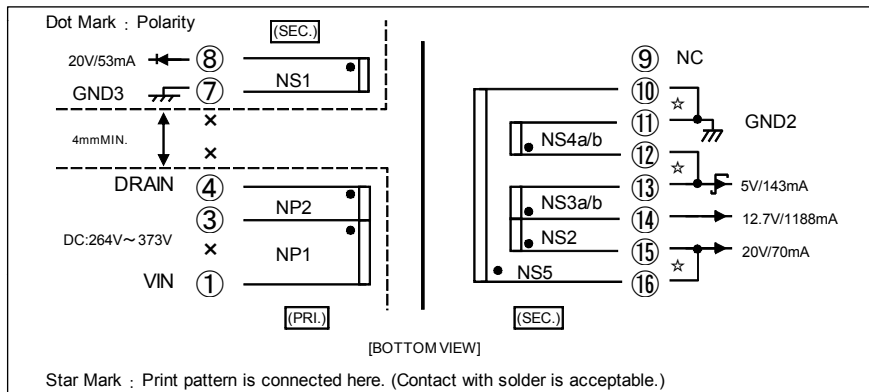
- Compatible ferrite materials for this product are the PC47 family.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted ϕ pir.

All specifications are subject to change without notice.
Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2425SEO-D01V019

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS			
*IEC60335-1 Ed.4 (Function Insulation)			
		Inside of Coil	Outside of Coil
PRI. - SEC.	<Other than NS1>	1.6mm MIN.	3.2mm MIN.
PRI. - CORE	<Other than NS1>	1.3mm MIN.	1.6mm MIN.
SEC. - CORE	<Other than NS1>	1.3mm MIN.	1.6mm MIN.
PRI. -SEC.	<Only in NS1>	2.0mm MIN.	4.0mm MIN.

■ WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
0	0	TAPE : CTI \geq 600				
1	1	N P2	4 - 3	41	UEW 0.40	Reverse Winding (NP1+NP2=81Ts.)
2	2	N S4a	12 - 11	7	UEW 0.30x2	Reverse Winding
3	3	N S4b	11 - 12	7	UEW 0.30x2	
4	4	N S3a	14 - 13	10	UEW 0.40	Reverse Winding
5	5	N S3b	13 - 14	10	UEW 0.40	
6	6	N S2	15 - 14	10	UEW 0.20	Reverse Winding
7	7	N S1	8 - 7	26	TEX-E 0.20 ※1	Reverse Winding
8	8	N S5	16 - 10	27	UEW 0.20	Reverse Winding
9	9	N P1	3 - 1	40	UEW 0.40	Reverse Winding

※1: See page 8 [5] MATERIAL LIST & INSULATING CONSTRUCTION No. ⑩

* Clockwise direction is an order direction when see a transformer from the upper part.

SPECIFICATIONS / ECO2425SEO-D01V019

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature : 25±10°C		Relative Humidity : 25~75%RH	
No	Parameter	Test Terminal	Specification	Condition _s	Test Instruments
4.1	Inductance	4 - 1	1.06 mH ±10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	4 - 1 (7,8,10,11,12,13, 14,15,16 short)	23 uH MAX.	10 kHz 1Vrms	
4.3	DC. Resistance	4 - 3	0.245 Ω ±25%		Milli ohm meter ADEX : AX-114 or Equivalent
		12 - 11	22.1 mΩ ±30%		
		14 - 13	37.5 mΩ ±30%		
		15 - 14	0.312 Ω ±25%		
		8 - 7	0.782 Ω ±25%		
		16 - 10	0.910 Ω ±25%		
		3 - 1	0.355 Ω ±25%		
4.4	Insulation Resistance	P - S	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
		P,S - CORE			
4.5	Withstanding Voltage	P - S	Without Breakdown Sense:1mA f=50or60Hz	AC 1.25kVrms 1min or AC 1.5kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		P - CORE		AC 0.65kVrms 1min	
		S - CORE		or AC 0.8kVrms 1s	
4.6	Impulse Test	4 - 1	Without Breakdown	Pulse 1.2kVo-p 3~5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/ 4 - 1			f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		12 - 11	(0.0850) ± 10%		
		14 - 13	(0.1225) ± 8.0%		
		15 - 14	(0.1236) ± 8.0%		
		8 - 7	(0.3234) ± 3.5%		
		16 - 10	(0.3379) ± 3.5%		

SPECIFICATIONS / ECO2425SEO-D01V019

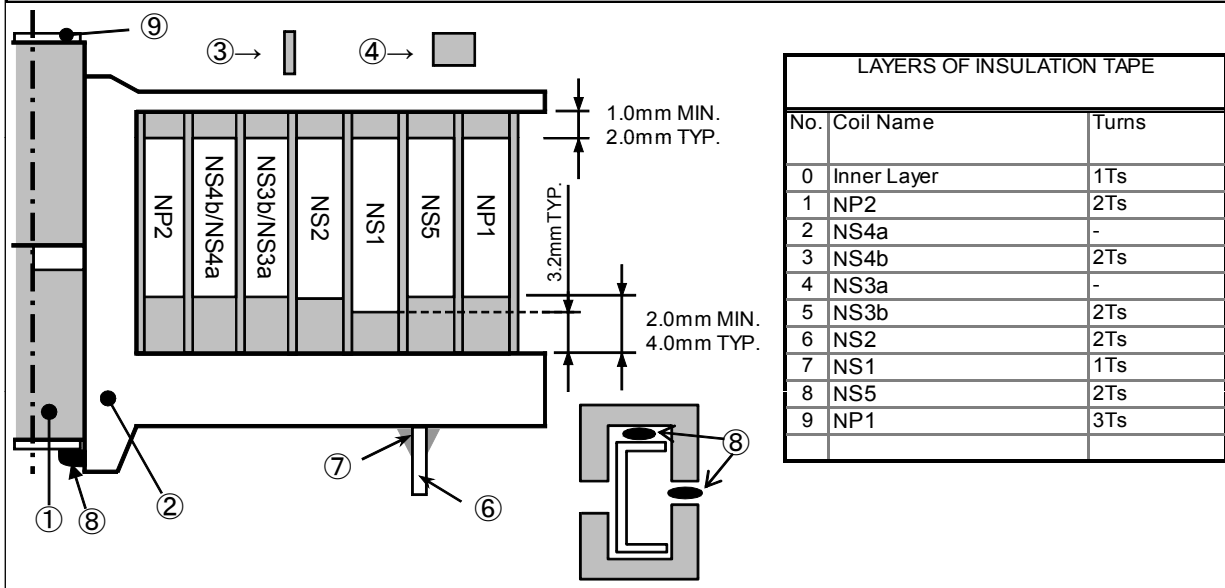
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF 1 LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite		—	—	TDK-EPC Corporation	—
②	BOBBIN	PM-9820 T375J	0.65 mm	150 94V-0	SUMITOMO BAKELITE CO.,LTD. CHANG CHUN PLASTICS CO.,LTD	E41429 E59481
③	INSULATION TAPE	1318-1	0.05 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
	Polyester or PET Color : Yellow CTI \geq 600V	CT with suffixes			JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
④	FIXING TAPE FOR WIRE (Barrier Tape)	44D-A or 44T-A	—	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
	Polyester or PET CTI \geq 600V	WF with suffixes			JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
⑤	WINDING WIRE (Primary) Polyurethane Enameled Copper Wire		—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
	0.40 mm DIA : NP1, NP2				HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E229341
	WINDING WIRE (Secondary) Polyurethane Enameled Copper Wire				TAI-I ELECTRIC WIRE&CABLE CO LTD	E85640
	0.20 mm DIA : NS2, NS5				ZHUHAI WEIHAN WIRE CO LTD	E339217
	0.30 mm DIA x 2 : NS4a, NS4b				SHENZHEN FUJI FINE FACTORY	E303260
	0.40 mm DIA : NS3a, NS3b				HITACHI CABLE (JOHOR) SDN BHD	E215594
					THAI HITACHI ENAMEL WIRE CO LTD	E137472
					ELEKTRISOLA (MALAYSIA) SDN BHD	E143312
⑥	TERMINAL PIN Φ 0.8 (Soldered) Copper Clad Steel Wire Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3 μ m or More.		—	—		—
⑦	SOLDER (For junction of a wire and a terminal) Lead-Free		—	—		—
⑧	ADHESIVE Acrylic, Silicone, Urethane or Epoxy		—	—		—
⑨	FIXING TAPE FOR CORE Polyester or PET Color : Yellow	Same as No.③	0.05 mm	130	Same as No.③	Same as No.③
⑩	WINDING WIRE (Secondary) Triple Insulating Winding Wire	TLW-B or TEX-E	—	130	DAH JIN TECHNOLOGY CO., LTD. FURUKAWA ELECTRIC CO., LTD.	E236542 E206440
	0.20 mm DIAx1 : NS1					

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



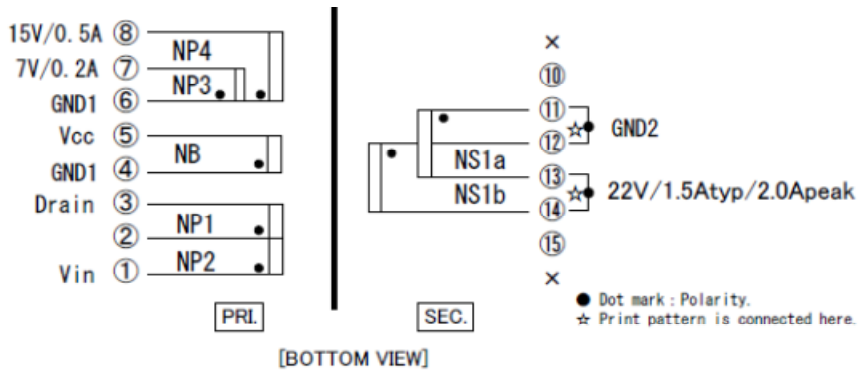
· All specifications are subject to change without notice.

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SPECIFICATIONS / ECO2425SEO-D04V017

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS	
IEC600335-1 Ed.4	
Over Surface & Air Spacings	
PRL. - SEC.	4.0 mm MIN.(inside core)
PRL. - CORE	4.0 mm MIN.(outside core)
SEC. - CORE	4.0 mm MIN.(outside core)

■ WINDING SPECIFICATIONS

No.	order	coil	terminal	turns	wire	note
0	0	600V ≤ CTI				
1	1	N P1	2 - 3	24	UEW 0.35	NP1+NP2=55ts
2	2	N S1a	11 - 13	17	UEW 0.40	
3	3	N B	4 - 5	14	UEW 0.35	
4	4	N P3	7 - 6	8	UEW 0.35	Reverse winding
5	5	N P4	6 - 8	12	UEW 0.35	
6	6	N P2	1 - 2	31	UEW 0.35	
7	7	N S1b	12 - 14	17	UEW 0.40	

SPECIFICATIONS / ECO2425SEO-D04V017

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions)

(Temperature)

: 25±10°C

(Relative Humidity)

: 25~75% RH

No.	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	1 - 3	428uH ± 10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	1 - 3 (4-8, SEC. short)	5.5 uH MAX		
4.3	DC. Resistance	2 - 3	0.174 Ω ± 20%		Milli ohm meter ADEX : AX-114N or Equivalent
		11 - 13	0.106 Ω ± 20%		
		4 - 5	0.123 Ω ± 20%		
		6 - 7	75.9m Ω ± 30%		
		6 - 8	0.113 Ω ± 20%		
		12 - 14	0.142 Ω ± 20%		
		1 - 2	0.301 Ω ± 20%		
4.4	Insulation Resistance	PRI.-SEC. PRI.-SEC. -CORE	100 M Ω MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC. PRI.-CORE SEC.-CORE	Without Breakdown Sense:1mA	AC 3.0kVrms 1min or AC 3.6kVrms 1s AC 1.5kVrms 1min or AC 1.8kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
4.6	Impulse Test	1 - 3	Without Breakdown	Pulse 1000Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X / 1 - 3	2 - 3	STD (0.4248) ± 3.5%	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		11 - 13	STD (0.3042) ± 4.5%		
		4 - 5	STD (0.2532) ± 5.5%		
		6 - 7	STD (0.1415) ± 9.9%		
		6 - 8	STD (0.2239) ± 6.6%		
4.8	Inductance	12 - 14	STD (0.3141) ± 4.5%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
		1 - 2	142.3uH ± 10%		
		2 - 3	78.3uH ± 10%		
		11 - 13	40.4uH ± 10%		
		4 - 5	28.1uH ± 10%		
		6 - 7	9.9uH ± 10%		
		6 - 8	21.9uH ± 10%		
		12 - 14	43.9uH ± 10%		

SPECIFICATIONS / ECO2425SEO-D04V017

Compatible with lead-free solders

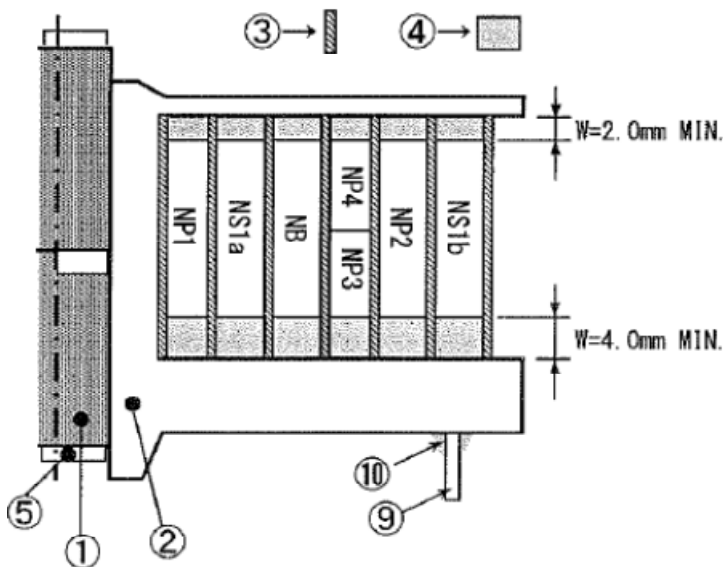
■ MATERIAL LIST AND INSULATING CONSTRUCTION

No.	ITEM & MATERIAL	MIN.THICKNESS OF LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 25.3mm x25.3mm x11.7mm	—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin PM-9820	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester CT280 Color : YELLOW	0.05 mm	130	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester 44D-A or WF with suffixes	—	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD) JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E165111
⑤	FIXING TAPE FOR CORE Polyester CT280 Color : YELLOW	0.05 mm	130	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.35 mm DIAx1 : NP1,NP2,NP3 NP4,NB	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO. XIAMEN HUNG'S ENTERPRISE CO.,LTD. HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E196072 E219154 E229341
⑦	WINDING WIRE Polyurethane Enameled Copper Wire 0.40 mm DIAx1 : NS1a,NS1b	—	—	—	—
⑧	ADHESIVE Acrylic , Urethane or Epoxy	—	—	Optional	—
⑨	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3 μm or More.	—	—	Optional	—
⑩	SOLDER (For junction of a wire and aterminal) Lead-Free Sn-Ag-Cu	—	—	Optional	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.

★BOBBIN UL94: 94V-0 ,CTI(IEC112): 175~250V (UL Level 3)



LAYERS OF INSULATION TAPE		
No.	Coil	Insulation
0	Inner Layer	1T
1	NP1	3Ts
2	NS1a	3Ts
3	NB	1T
4	NP3	—
5	NP4	1T
6	NP2	3Ts
7	NS1b	3Ts

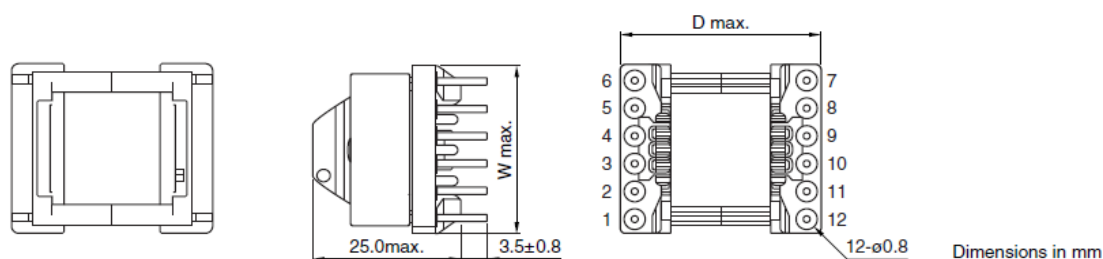
· All specifications are subject to change without notice.

Please read the precautions before using this catalog.

ECO24 Series for Multiple Outputs (Horizontal Type)

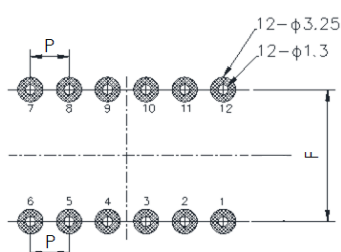
Compatible with lead-free solders

■ SHAPES AND DIMENSIONS (BOBBIN TYPE: H I , H I I)



Part No.	Bobbin type	D max.	W max.	P	F
ECO2425	HI	30.5	30.0	5.0	25.0
	HI	30.5	27.0	4.0	25.0
ECO2430	HI	36.0	30.0	5.0	30.0
	HI	36.0	27.0	4.0	30.0

■ RECOMMENDED BASE MATERIAL OPENING SIZE



Dimensions in mm

Default Tolerance : ±0.1

■ ITEMS APPLICABLE

Series	Bobbin Type	Part No.
ECO2430	HI	ECO2430SEO-D01H0110
		ECO2430SEO-D03H016

- Compatible ferrite materials for this product are the PC47 family.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted ϕ pr.

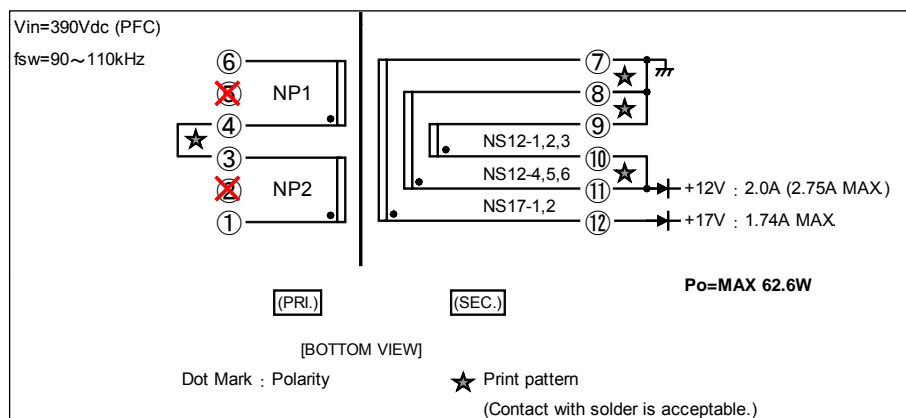
· All specifications are subject to change without notice.

Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2430SEO-D01H0110

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

Over Surface & Air Spacings		
	Inside of coil	Outside of coil
PRI. - SEC.	5.6mm MIN.	8.0mm MIN.
PRI. - CORE.	2.8mm MIN.	4.0mm MIN.
SEC. - CORE.	2.8mm MIN.	4.0mm MIN.

WINDING SPECIFICATIONS

No.	order	coil	terminal	turns	wire	note
1	1	N P1	4 - 6	21	1UEW 0.10/15	NP1+NP2=48ts
2	2-1	N S12-1	10 - 9	6	1UEW 0.35	
3	2-2	N S12-2	9 - 10	6	1UEW 0.35	Reverse Winding
4	2-3	N S12-3	10 - 9	6	1UEW 0.35	
5	3-1	N S12-4	11 - 8	6	1UEW 0.35	
6	3-2	N S12-5	8 - 11	6	1UEW 0.35	Reverse Winding
7	3-3	N S12-6	11 - 8	6	1UEW 0.35	
8	4-1	N S17-1	12 - 7	8	1UEW 0.40	
9	4-2	N S17-2	7 - 12	8	1UEW 0.40	Reverse Winding
10	5	N P2	3 - 1	27	1UEW 0.20/4	Reverse Winding
* Clockwise direction is an order direction when see a transformer from the No.1~6 terminal pin side.						

SPECIFICATIONS / ECO2430SEO-D01H0110

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions) (Temperature) : 25±10°C (Relative Humidity) : 25~75%RH					
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	1 - 6 (3,4 short)	450 µH ± 10%	10 kHz 1Vrms	LCR Meter YHP : 4263A or Equivalent
4.2	Leakage Inductance	1 - 6 (3,4 short) (11,10,9,8 short)	12.0 µH MAX	100 kHz 1Vrms	
4.3	DC. Resistance	1 - 3	0.21Ω ±20%		Milli ohm meter Matsushita : VP2941 or Equivalent
		4 - 6	0.12Ω ±20%		
		10 - 9	17.3mΩ ±30%		
		11 - 8	18.7mΩ ±30%		
		12 - 7	30.0mΩ ±30%		
4.4	Insulation Resistance	PRI.-SEC.	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
		PRI.,SEC. -CORE			
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE. SEC.-CORE.		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	1 - 6 (3,4 short)	Without Breakdown	Pulse 800Vo-p 1s	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/ 1 - 6 (3,4 short)	10 - 9	STD (0.1226) ±15%	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		11 - 8	STD (0.1233) ±15%		
		12 - 7	STD (0.1656) ±8.0%		

SPECIFICATIONS / ECO2430SEO-D01H0110

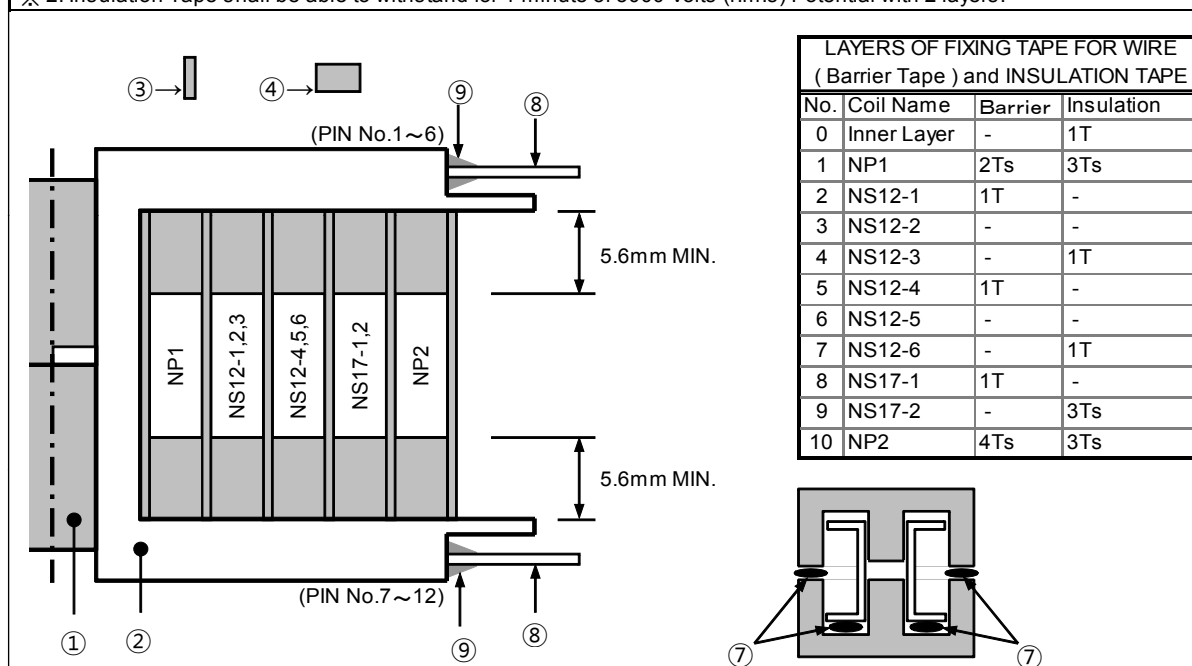
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL	MIN.THICKNESS OF LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE PCB47 Ferrite 25.3mm x30.3mm x11.7mm	—	—	TDK Corporation	—
②	BOBBIN Phenol Resin PM-9820	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester CTI Grade II MIN.	1350F-1	130 FR	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
		630F #25		TERAOKA SEISAKUSHO CO.,LTD.	E56086
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester CTI Grade II MIN.	WF with suffixes	130 FR	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
		673F 0.5 or 673F 0.27		TERAOKA SEISAKUSHO CO.,LTD.	E56086
⑤	WINDING WIRE Polyurethane Enameled Copper Wire 1UEW 15/0.10 mm DIAx1 : NP1 4/0.20 mm DIAx1 : NP2	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
				XIAMEN HUNG'S ENTERPRISE CO.,LTD.	E219154
				HANGZHOU WEIFENG ELECTRONIC CO.,LTD.	E229341
				XIAMEN ZHI CHENG ELECTRON CO.,LTD	E218438
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 1UEW 0.35 mm DIAx1 : NS12-1,2,3,4,5,6 0.40 mm DIAx1 : NS17-1,2	—	130	SHENZHEN FUJI FINE FACTORY	E303260
⑦	ADHESIVE ACRYLIC 3851 ACCELERATOR 7247	—	—	HENKEL LOCTITE(CHINA) CO.,LTD.	—
⑧	TERMINAL PIN Copper Clad Steel WireΦ0.8(Soldered) Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.	—	—	WELL FORE SPECIAL WIRE CORPORATION	—
				HALO COSMOS CORPORATION	—
				JIANG MEN IL KWANG METAL CO.,LTD.	—
⑨	SOLDER (For junction of a wire and aterminal) Lead-Free Sn-Ag-Cu	—	—	SENJU METAL INDUSTRY CO.,LTD.	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



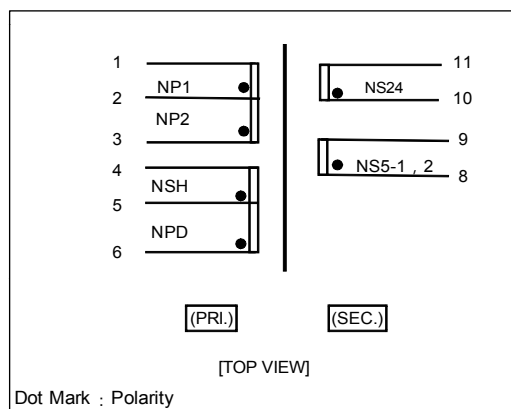
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Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2430SEO-D03H016

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

Over Surface & Air Spacing	
PRI. - SEC.	4.3mm MIN.
PRI. - CORE.	2.0mm MIN.
SEC. - CORE.	2.0mm MIN.

■ WINDING SPECIFICATIONS

No.	order	coil name	terminal	turns	wire	note
1	1	N P1	2 - 1	35	UEW 0.32	NP1+NP2=66ts
2	2	N SH	5 - 4	32	UEW 0.32	
3	3	N S5-1	8 - 9	5	UEW 0.32	
4	4	N S24	10 - 11	22	UEW 0.1/40	
5	5	N PD	6 - 5	13	UEW 0.32	
6	6	N S5-2	8 - 9	5	UEW 0.32	
7	7	N P2	3 - 2	31	UEW 0.32	

SPECIFICATIONS / ECO2430SEO-D03H016

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

(Test Conditions) (Temperature) : 25±10°C (Relative Humidity) : 25~75%RH					
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	3 - 1	680 μ H \pm 10%	10 kHz 1Vrms	LCR Meter HP: 4284A or Equivalent
4.2	Leakage Inductance	3 - 1 (Sec shorted)	30 μ H MAX		
4.3	DC. Resistance	2-1	300m Ω \pm 20%		Milli ohm meter ZENTECH: 502 AC or Equivalent
		8 - 9	31m Ω \pm 30%		
		10 - 11	62m Ω \pm 30%		
		6 - 5	167m Ω \pm 20%		
		3 - 2	433m Ω \pm 20%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 M Ω MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:2.0mA f=50 or 60Hz	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui :TOS5101 or Equivalent
		PRI.-CORE. SEC.-CORE.		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
		PRI.-PRI. SEC.-SEC.		AC 0.5kVrms 1min or AC 0.6kVrms 1s	
4.6	Impulse Test	3 - 1	Without Breakdown	AC1.0KVo-p 5 PULSES	Impulse Tester ECG: DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X:X/2-1	8 - 9	STD(0.1421) \pm 10%	f=10kHz	Ratio Meter IKD: 3053 or Equivalent
		10 - 11	STD(0.6259) \pm 5%		
		6 - 5	STD(0.3700) \pm 6%		
		3 - 2	STD(0.8787) \pm 3%		

SPECIFICATIONS / ECO2430SEO-D03H016

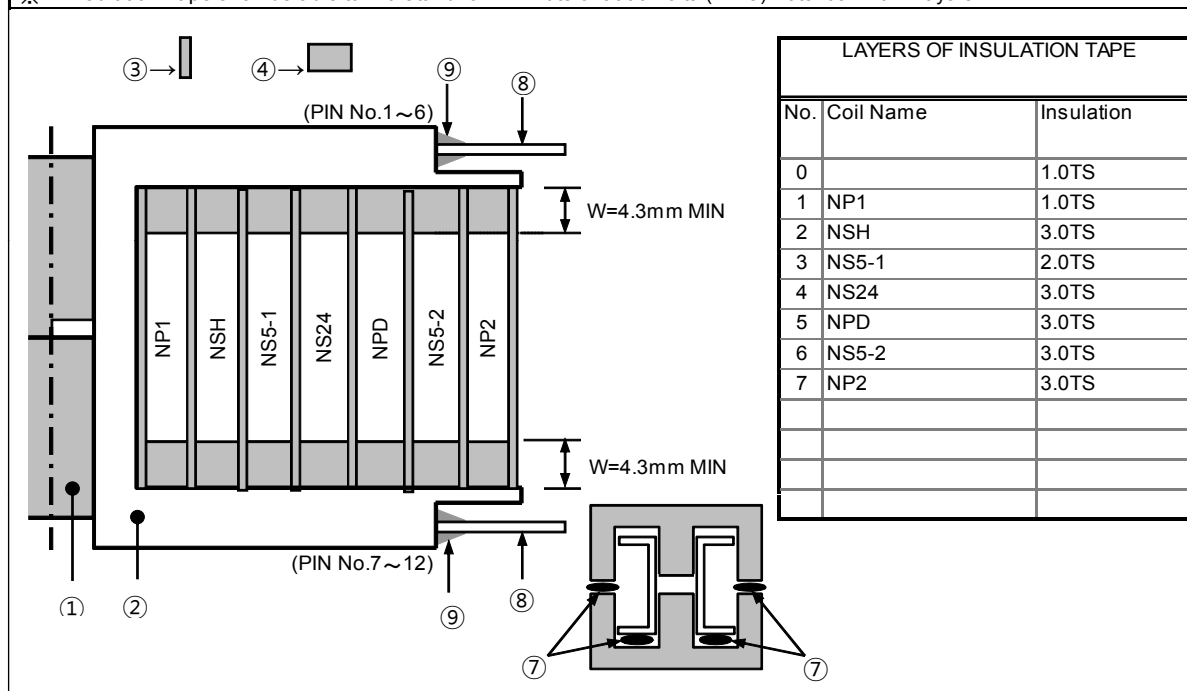
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite		—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin	PM-9820	0.65 mm MIN.	150 94V-0	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester	1318-1 or	0.05 mm	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
		suffixes			SENSITIVE GLUE CO LTD	
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester	44D-A or 44T-A	—	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	E17385
		35661			SYMBIO INC	E50292
		WF with suffixes			JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
⑤	WINDING WIRE Polyurethane Enameled Copper Wire 0.32 mm DIA ; NP1,NP2,NPD,NS5-1,2,NSH		—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
⑥	WINDING WIRE Polyurethane Enameled Copper Wire 0.10 mm DIA *40 ; NS24	ZHUHAI WEIHAN WIRE CO LTD			E339217	
		HANGZHOU WEIFENG ELECTRONIC CO.,LTD.			E229341	
		SHENZHEN FUJI FINE FACTORY			E303260	
		TAI-I COPPER.(GUANGZHOU) CO.,LTD.	E85640			
⑦	ADHESIVE Acrylic , Urethane or Epoxy		—	—	Optional	—
⑧	TERMINAL PIN		—	—	Optional	—
⑨	SOLDER (For junction of a wire and terminal) Lead-Free		—	—	Optional	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



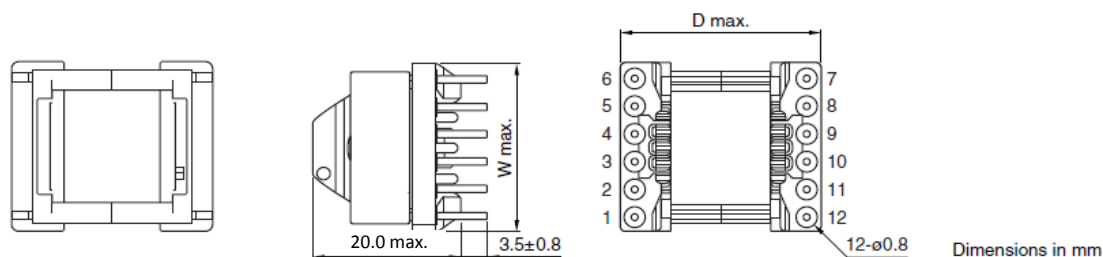
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ECO24XXSLD Series for Multiple Outputs (Horizontal Type)

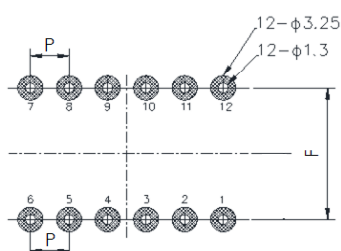
Compatible with lead-free solders

SHAPES AND DIMENSIONS



Part No.	D max.	W max.	P	F
ECO2425SLD-D01H017	30.0	26.0	4.0	25.0
ECO2425SLD-D02H0111				

RECOMMENDED BASE MATERIAL OPENING SIZE



Dimensions in mm
Default Tolerance : ±0.1

ITEMS APPLICABLE

Series	Part No.
LQD2425	ECO2425SLD-D01H017
	ECO2425SLD-D02H0111

- Compatible ferrite materials for this product are the PC47 family.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted ϕ pir.

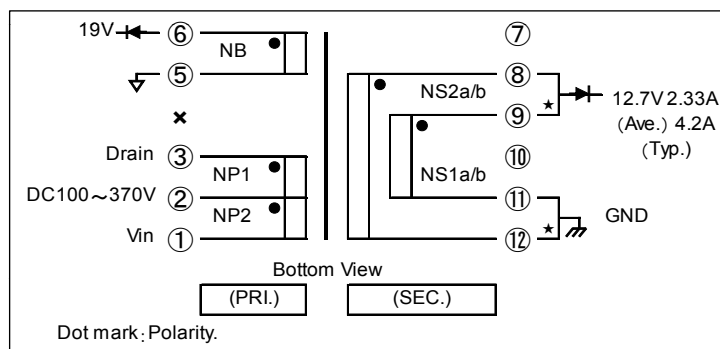
All specifications are subject to change without notice.

Please read the precautions before using this catalog.

SPECIFICATIONS / ECO2425SLD-D01H017

Compatible with lead-free solders

■ SCHEMATICS



■ SAFETY STANDARDS

SAFETY STANDARDS	
IEC60335-1 Ed.4	
Over Surface & Air Spacings	
PRI.-SEC.	3.2 mm MINIMUM (Inside of coil)
PRI.-CORE	3.2 mm MINIMUM (Outside of coil)
SEC.-CORE	3.2 mm MINIMUM (Outside of coil)

■ WINDING SPECIFICATIONS

No	COIL	W.Dir	TERMINAL	TURNS	2UEW	WINDING METHOD
0	$600 \leq CTI$					
1	N P1	-	3 - 2	38	0.35	Solenoid+Spacing($\cong 23+15t_s$)
2	N S1a	-	9 - 11	13	0.30	PIN side Solenoid
3	N S1b	Reverse	11 - 9	13	0.30	NS1a Solenoid
4	N B	-	6 - 5	19	0.20	PIN side Solenoid
5	N S2a	-	8 - 12	13	0.30	PIN side Solenoid
6	N S2b	Reverse	12 - 8	13	0.30	NS2a Solenoid
7	N P2	-	2 - 1	38	0.35	Solenoid+Spacing($\cong 21+17t_s$)

SPECIFICATIONS / ECO2425SLD-D01H017

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature : 25±10°C		Relative Humidity : 25~75%RH	
No	Parameter	Test Terminal	Specification	Conditions	Test Instruments
4.1	Inductance	3 - 1	722 μ H \pm 10%	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	3 - 1 (SEC. short)	15.0 μ H MAX.	10 kHz 1Vrms	
4.3	DC. Resistance	3 - 2	0.240 Ω \pm 25%		Milli ohm meter ADEX : AX-114 or Equivalent
		9 - 11	65.0m Ω \pm 30%		
		6 - 5	0.460 Ω \pm 25%		
		8 - 12	77.0m Ω \pm 30%		
		2 - 1	0.355 Ω \pm 25%		
4.4	Insulation Resistance	PRI.-SEC. PRI.,SEC. -CORE	100 M Ω MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	3 - 1	Without Breakdown	Pulse 0.8kVo-p 3~5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio X-X/ 3 - 1			f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		9 - 11	(0.1670) \pm 6.2%.		
		6 - 5	(0.2510) \pm 4.2%.		
		8 - 12	(0.1730) \pm 6.2%.		
		2 - 1	(0.5130) \pm 2.5%.		

SPECIFICATIONS / ECO2425SLD-D01H017

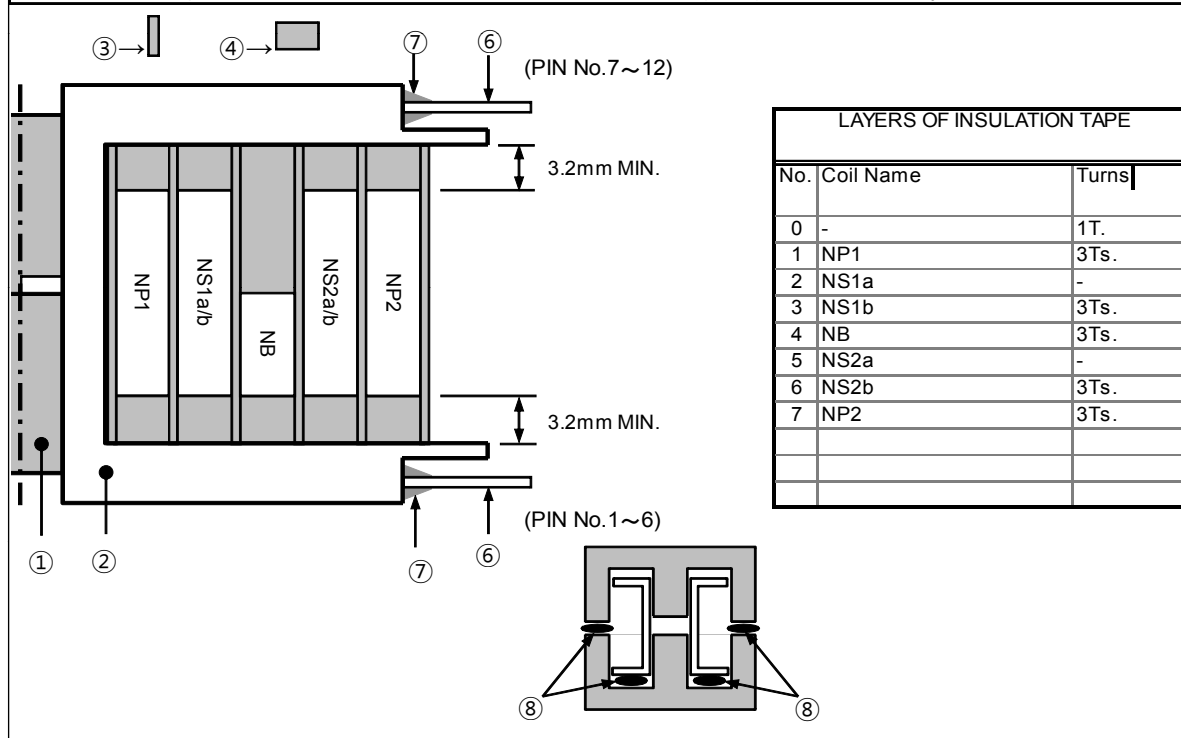
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL		MIN.THICKNESS OF 1 LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 24.7mmx25.6mmx8.1mm		—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin	PM-9820	0.65 mm	150	SUMITOMO BAKELITE CO.,LTD.	E41429
③	INSULATION TAPE Polyester or PET Color : Yellow CTI ≥600V	CT with suffixes	0.05 mm	130 FR	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
		630F			TERAOKA SEISAKUSHO CO.,LTD.	E56086
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester or PET CTI ≥600V	WF with suffixes	—	130 FR	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E165111
		673F			TERAOKA SEISAKUSHO CO.,LTD.	E56086
⑤	WINDING WIRE (Primary) Polyurethane Enameled Copper Wire 0.20 mm DIA : NB 0.35 mm DIA : NP1, NP2		—	130	PROSPERITY ELECTRIC WIRE & CABLE CO.	E196072
					TAI- ELECTRIC WIRE&CABLE CO LTD	E85640
	WINDING WIRE (Secondary) Polyurethane Enameled Copper Wire 0.30 mm DIA : NS1a/b, NS2a/b				SHENZHEN FUJI FINE FACTORY	E303260
					HITACHI CABLE (JOHOR) SDN BHD	E215594
					THAI HITACHI ENAMEL WIRE CO LTD	E137472
⑥	TERMINAL PIN Φ0.8 (Soldered) Copper Clad Steel Wire Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.		—	—	Optional	—
⑦	SOLDER (For junction of a wire and a terminal) Lead-Free Sn-0.3Ag-0.7Cu		—	—	Optional	—
⑧	ADHESIVE Acrylic , Urethane or Epoxy		—		Optional	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



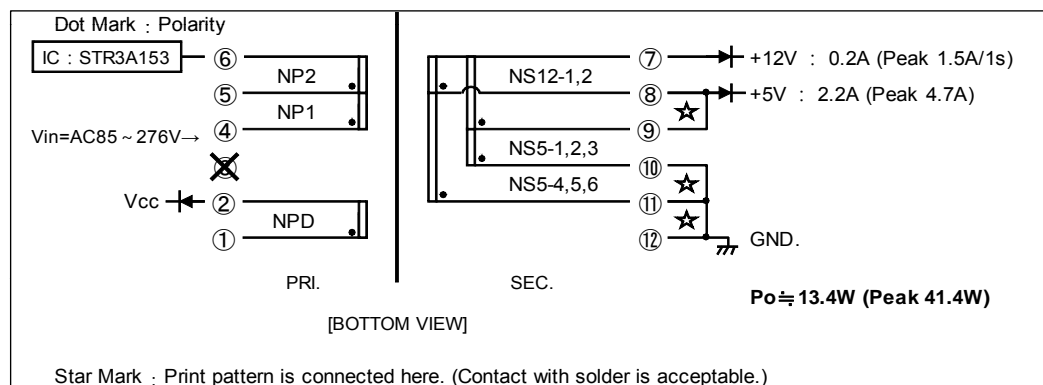
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SPECIFICATIONS / ECO2425SLD-D02H0111

Compatible with lead-free solders

SCHEMATICS



SAFETY STANDARDS

SAFETY STANDARDS

*IEC60065-Ed.7, *EN60065-Ed.7, GB, *E.A.M.S.Act, *UL60065-Ed.7, *CSA 22.2 No.60065

	Inside of Coil	Outside of Coil
PRI. - SEC.	4.8mm MIN.	8.0mm MIN.
PRI. - CORE	2.4mm MIN.	4.0mm MIN.
SEC. - CORE	2.4mm MIN.	4.0mm MIN.

WINDING SPECIFICATIONS

No.	Order	Coil	Terminal	Turns	Wire	Note
1	1	N P1	4 - 5	34	UEW 0.26	NP1+NP2=64Ts.
2	2-1	N S5-1	10 - 9	5	UEW 0.30	
3	2-2	N S5-2	9 - 10	5	UEW 0.30	Reverse Winding
4	2-3	N S5-3	10 - 9	5	UEW 0.30	
5	3-1	N S12-1	9 - 7	6	UEW 0.23	
6	3-2	N S12-2	7 - 8	6	UEW 0.23	Reverse Winding
7	4-1	N S5-4	11 - 8	5	UEW 0.30	
8	4-2	N S5-5	8 - 11	5	UEW 0.30	Reverse Winding
9	4-3	N S5-6	11 - 8	5	UEW 0.30	
10	5	N P2	5 - 6	30	UEW 0.26	
11	6	N PD	2 - 1	17	UEW 0.23	Reverse Winding

* Clockwise direction is an order direction when see a No.1 terminal pin side of transformer from the upper part.

SPECIFICATIONS / ECO2425SLD-D02H0111

Compatible with lead-free solders

■ ELECTRICAL CHARACTERISTICS

Test Conditions		Temperature		:	25±10°C
		Relative Humidity		:	25~75%RH
No	Parameter	Test Terminal	Specification	Condition _s	Test Instruments
4.1	Inductance	4 - 6	446 µH ± 10%.	10 kHz 1Vrms	LCR Meter Agilent : 4263B or Equivalent
4.2	Leakage Inductance	4 - 6 (Sec.All short)	15.7 µH MAX.	100 kHz 1Vrms	
4.3	DC. Resistance	1 - 2	0.390 Ω ±20%.		Milli ohm meter ADEX : AX-114 or Equivalent
		4 - 5	0.385 Ω ±20%.		
		5 - 6	0.478 Ω ±20%.		
		10 - 9	17.7 mΩ ±30%.		
		11 - 8	19.8 mΩ ±30%.		
		9 - 7	109.3 mΩ ±20%.		
		8 - 7	110.4 mΩ ±20%.		
4.4	Insulation Resistance	PRI.-SEC.	100 MΩ MIN.	DC 500V	Meg Ohm Meter Toa : SM-5E or Equivalent
		PRI.,SEC. -CORE			
4.5	Withstanding Voltage	PRI.-SEC.	Without Breakdown Sense:1mA f=50or60Hz	AC 3.0kVrms 1min or AC 3.6kVrms 1s	Puncture Tester Kikusui : TOS8650 or Equivalent
		PRI.-CORE SEC.-CORE		AC 1.5kVrms 1min or AC 1.8kVrms 1s	
4.6	Impulse Test	4 - 6 (11,10 short)	Without Breakdown	Pulse 0.8kVo-p 3--5 Pulse	Impulse Tester ECG : DWS-05 or Equivalent
4.7	Polarity & Turns Ratio	1 - 2	(0.2730) ± 4.7%.	f=10kHz	Ratio Meter Ryowa : TRM-101A or Equivalent
		4 - 5	(0.5149) ± 2.4%.		
	X-X/ 4 - 6	10 - 9	(0.0772) ± 16%.		
		11 - 8	(0.0788) ± 16%.		
		9 - 7	(0.0941) ± 13%.		
		8 - 7	(0.0933) ± 13%.		

SPECIFICATIONS / ECO2425SLD-D02H0111

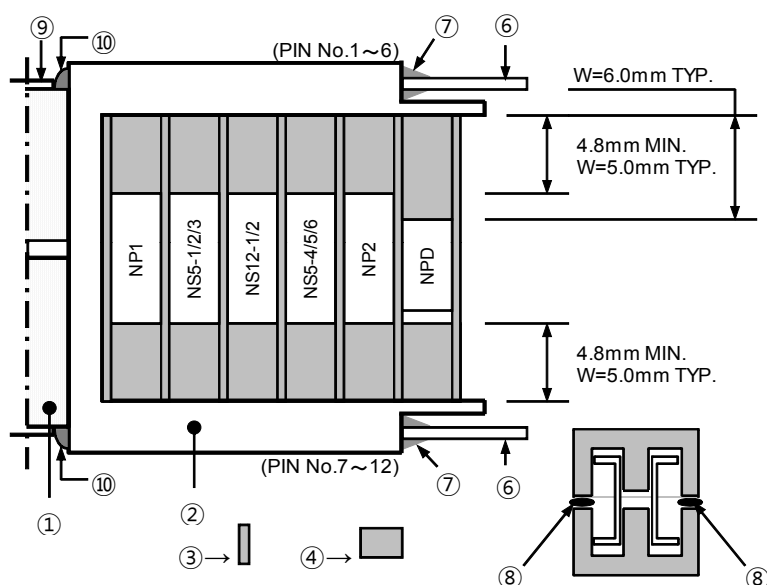
Compatible with lead-free solders

■ MATERIAL LIST AND INSULATING CONSTRUCTION

No	ITEM & MATERIAL	MIN. THICKNESS OF 1 LAYER	UL T.I (°C)	MANUFACTURER	UL FILE NO.
①	CORE Ferrite 24.7mmx25.6mmx8.1mm	—	—	TDK-EPC Corporation	—
②	BOBBIN Phenol Resin	PM-9820 T375J	150 94V-0	SUMITOMO BAKELITE CO.,LTD. CHANG CHUN PLASTICS CO.,LTD	E41429 E59481
③	INSULATION TAPE Polyester Material group I (CTI≥600V) (Yellow)	1318-1 CT with suffixes	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD) JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E165111
④	FIXING TAPE FOR WIRE (Barrier Tape) Polyester or PET Material group I (CTI≥600V)	44D-A or 44T-A 343BN@@ WF with suffixes	130	3M COMPANY ELECTRICAL MARKETS DIV (EMD) NITTO DENKO CORP. JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E34833 E165111
⑤	WINDING WIRE Polyurethane Enameled Copper Wire 0.26 mm DIA : NP1, NP2 0.23 mm DIA : NPD WINDING WIRE Polyurethane Enameled Copper Wire 0.30 mm DIA : NS5-1/2/3/4/5/6 0.23 mm DIA : NS12-1/2	—	130	PROSPERITY ELECTRIC WIRE & CABLE CO. HANGZHOU WEIFENG ELECTRONIC CO.,LTD. TAI H ELECTRIC WIRE&CABLE CO LTD ZHUHAI WEIHAN WIRE CO LTD SHENZHEN FUJI FINE FACTORY HITACHI CABLE (JOHOR) SDN BHD THAI HITACHI ENAMEL WIRE CO LTD ELEKTRISOLA (MALAYSIA) SDN BHD	E196072 E229341 E85640 E339217 E303260 E215594 E137472 E143312
⑥	TERMINAL PIN Φ0.8 (Soldered) Copper Clad Steel Wire Under Coating(Copper)25% Weight Ratio. (Ref)Surface Plating(Sn100%)3μm or More.	—	—	Optional	—
⑦	SOLDER (For junction of a wire and a terminal) Lead-Free	—	—	Optional	—
⑧	ADHESIVE Acrylic, Urethane or Epoxy	—	—	Optional	—
⑨	FIXING TAPE FOR CORE Polyester (White)	1318-1 or 1350F-1 CT with suffixes	130 (2~3Layers)	3M COMPANY ELECTRICAL MARKETS DIV (EMD) JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	E17385 E165111
⑩	ADHESIVE Silicon	—	—	Optional	—

※ 1. Tape Min. Thickness shows the total value. (Tape Base and Adhesive)

※ 2. Insulation Tape shall be able to withstand for 1 minute of 3000 Volts (r.m.s) Potential with 2 layers.



LAYERS OF INSULATION TAPE

No.	Coil Name	Turns
0	Inner Layer	1T
1	NP1	3Ts
2	NS5-1	—
3	NS5-2	—
4	NS5-3	2Ts
5	NS12-1	—
6	NS12-2	2Ts
7	NS5-4	—
8	NS5-5	—
9	NS5-6	3Ts
10	NP2	3Ts
11	NPD	3Ts

【Clepage Distance & Clearance】

	Inside of Coil	Outside of Coil
P-S	4.8mm MIN.	8.0mm MIN.
P,S-C	2.4mm MIN.	4.0mm MIN.

※Design value