

Capacitors  
Resistors  
Inductors  
Circuit Protection  
Switches  
Encoders  
Fuses  
Wireless Modules  
Thermal Heat sink solution





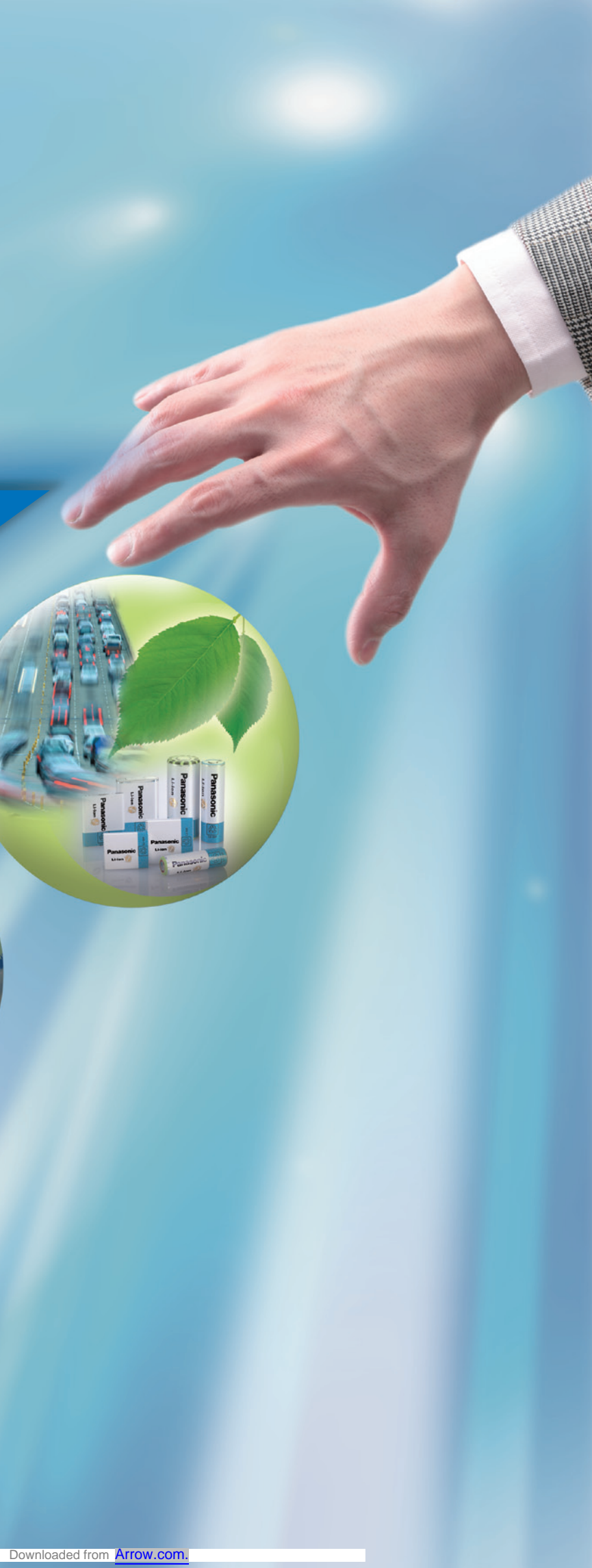
## INDEX

<b>Panasonic Industrial</b>		
The „Technostory“ concept		4
„Total Solution“ – Components & Devices		6
<b>Capacitors</b>		
Conductive Polymer Hybrid Capacitors	<b>NEW</b>	8
Aluminum Electrolytic Capacitors		9
Electric Double Layer Capacitors		11
Polymer Aluminum Capacitors		11
Film Capacitors		12
<b>Resistors</b>		
Thick Film Resistors		13
Thin Film Resistors		13
Shunt Resistors		14
High Power & Pulse Proof Resistors		15
Network & Array Resistors		16
Metal (Oxid) Film Resistors		16
Anti-Sulfrated Resistors		17
Trimmer Potentiometers		18
<b>Inductors</b>		
Chip Inductors		19
Choke Coils		19
Power Choke Coils		21
Voltage Step-up Coils		21
Multilayer Power Inductors	<b>NEW</b>	21
<b>Circuit Protection</b>		
Ferrite Bead Core		22
EMI Filters		23
ESD Suppressor		23
ZNR Transient/Surge Absorbers		23
Multilayer Varistors		23
Multilayer NTC Thermistors		23
<b>Switches</b>		
Light Touch Switches		24
Push Switches		26
Detector Switches		27
<b>Encoders</b>		
Rotary Potentiometers		28
Encoders		28
Center Space Encoders		30
<b>Thermal Heat Sink Solution</b>		
“PGS” Graphite Sheets		31
<b>Fuses</b>		
Thermal Cutoffs		32
Micro Chip Fuse		33
<b>Wireless Modules</b>		
Bluetooth		34
Industrial-Scientific-Medical Solutions		36
nanoLOC		36
IEEE 802.15.4 (Mesh Networking)		36
<b>Imprint</b>		
Sales Bases		38
Caution and warning		38

Another side of Panasonic has a line of devices and advanced technologies for industry

# Technostory





One of the large pillars of Panasonic's business is supporting manufacturing, which means we deliver key devices to manufacturing sites all over the world.

We have a large organization and network, specific product lineups manufacturers need, and unique technologies and know-how.

We refine and apply all of these to the devices we make, and they in turn contribute to your business development.

Sharing our common dreams, we want to create a new value - „Technostory“ is how we identify our business concept.

## **The „Technostory“ concept**

Offering optimum solutions as we share the vision — customers' needs and

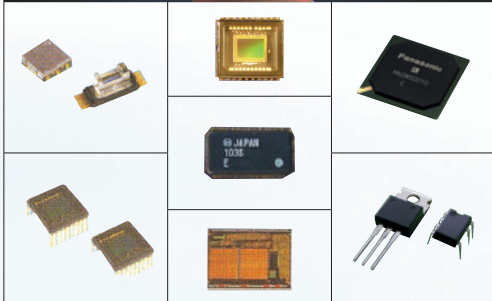
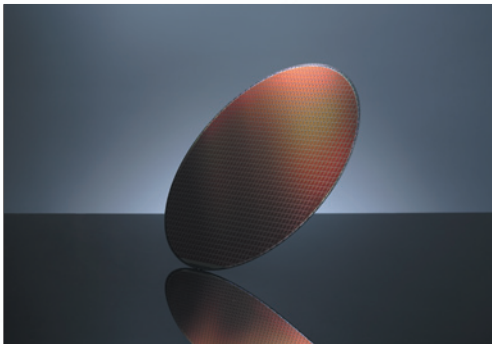
Panasonic Group's seeds are combined.

Our „Technostory“ is to envision the dreams for future together in a powerful „win-win partnership“.

# Panasonic provides „Total Solutions“ through various components and devices.

Panasonic delivers a wide range of products used in production, from semiconductors and devices to complete FA solutions. We contribute to your business development using our „One Stop Shopping“ or even our „One Windows“ global sales platform.

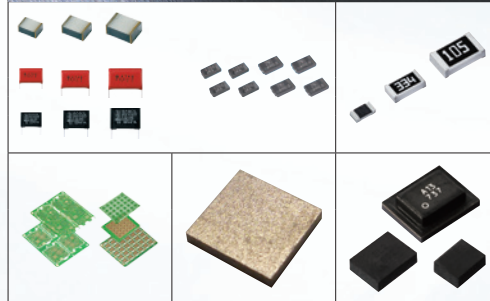
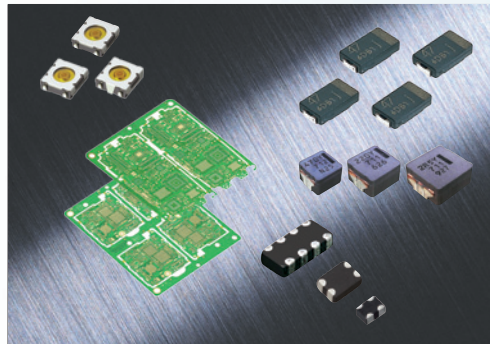
## Semiconductors



### Semiconductor

- Microcomputers
- Image Pickup Devices
- Application-Specific Standard-Product Ics
- Magnetic Field Sensors
- Multi Chip Discret Devices
- Transistors
- Diodes
- Gallium Arsenide Devices
- Opto Electronic Devices
- Fuses (Circuit Protector Elements)

## Industrial Products (Electronic Components and Devices)



### Passive & Electromechanic

- Resistors
- Capacitors
- Inductors
- Switches
- Encoders
- Filters
- RF/ Network Units
- EMC Components
- Fuses
- Thermistors



### Batteries Power Supplies

- OEM Batteries
- Power Supply Units
- Power Circuit Components

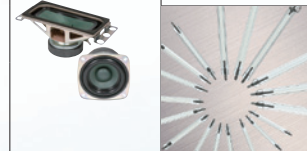
# Components & Devices

## Factory Automation



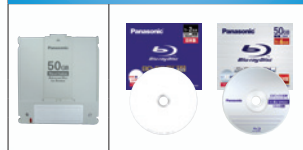
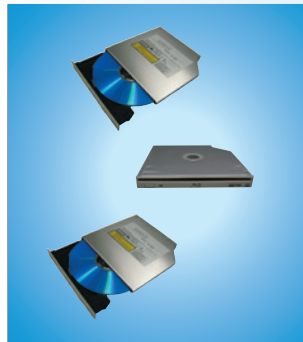
### Motors, Fans, Compressors

- Motors
- Compressors
- Micro & Precision Motor Pumps



### Optics, Sensors, Displays, Speakers

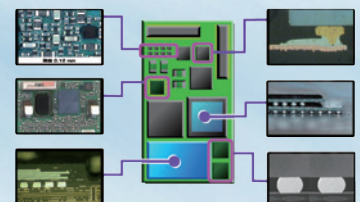
- Display Devices
- Tuners
- Input/ Output Units
- Sensors
- Optics Components
- Cameras
- Acoustic Components



### Storages

- Driver Units
- Media

Production technology and mounting know-how built up from the manufacture of finished products. FA systems and other production equipment to manufacturing workplaces. They are Panasonic's expertise. Knowing the manufacturing process from A to Z, Panasonic offers unique solutions.




# Conductive Polymer Hybrid Capacitors

**NEW**

Capacitors

The Panasonic newly developed hybrid technology (introduced as V-ZA & V-ZC series) brings together low ESR characteristics of the conductive polymer capacitor and the low leakage current of aluminum electrolytic capacitors. The V-ZA & V-ZC series shows a compact design, high reliability of the conductive polymer capacitor and the safety of the aluminum electrolytic capacitor.

## Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

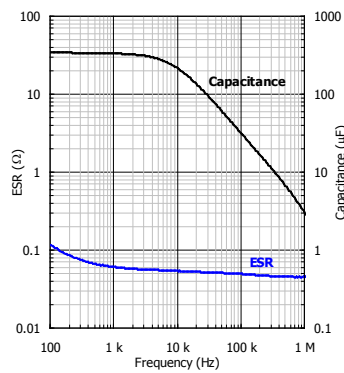
Series / Type	Temperature	Endurance	Rated W.V.	Capacity	Features	Part No.
	Type V - Series ZA	-55 to +105 °C	10.000 h	16 to 80 V	Equivalent to conductive polymer type Aluminum Electrolytic Capacitor	EEHZAxxxxxx
	Type V - Series ZC	-55 to +125 °C	4.000 h	16 to 63 V		EEHZCxxxxxx

Vibration-proof product is available upon request ( $\geq \varnothing 8$  mm diameter).

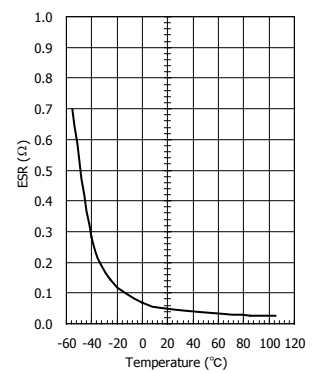
## Aluminum Electrolytic Capacitors

Item	Characteristics
Series	Type V Series FP
Part No.	EEEEFP1V331AP
Electrolyte	Liquid Electrolyte
Category Temp. Range	-55 to 105 °C
Endurance	2.000 h @ 105°C
Case size	$\varnothing 10.0 \times 10.2$ mm
Rated W.V.	35 V
DC Leakage Current	0.01CV max.
Capacitance	330 $\mu\text{F} \pm 20\%$ @ 120 Hz
	11 $\mu\text{F} \pm 20\%$ @ 300 kHz
ESR (at 100 kHz, 20 °C)	60 m $\Omega$
Ripple Current (at 100 kHz, 105 °C)	1190 mArms max.

Frequency Behaviour



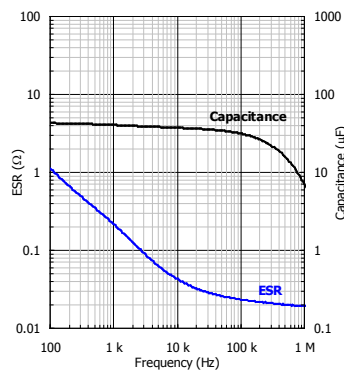
Temperature Behaviour



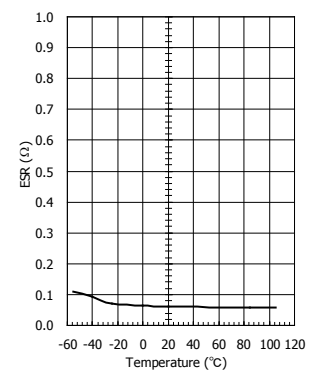
## Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Item	Characteristics
Series	Type V Series ZA
Part No.	EEHZA1V470P
Electrolyte	Liquid Electrolyte + Conductive Polymer
Category Temp. Range	-55 to 105 °C
Endurance	10.000 h @ 105 °C
Case size	$\varnothing 6.3 \times 5.8$ mm
Rated W.V.	35 V
DC Leakage Current	0.01CV max.
Capacitance	47 $\mu\text{F} \pm 20\%$ @ 120 Hz
	22 $\mu\text{F} \pm 20\%$ @ 300 kHz
ESR (at 100 kHz, 20 °C)	60 m $\Omega$
Ripple Current (at 100 kHz, 105 °C)	1300 mArms max.

Frequency Behaviour




Temperature Behaviour





# Capacitors



## Aluminum Electrolytic Capacitors – Surface Mount Type

Series / Type	Temperature	Endurance	Rated W.V.	Capacity	Features	Part No.
 Type V - Series S High temp. reflow  Type V - Series S	-40 to +85 °C	2.000 h	6,3 to 50 V	0,1 to 1.500 µF	5,5 mm height Dia. ≤ 6,3 mm	EEEExxAxxxxAx
			4 to 100 V	0,1 to 1.500 µF		EEEExxAxxxxNx EEEExxAxxxxSx EEEExxSxxxxSx
Type V - Series HA High temp. reflow  Type V - Series HA	-40 to +105 °C	1.000 h	6,3 to 50 V	0,1 to 1.500 µF	5,5 mm height	EEEHAXxxxxAx
			6,3 to 100 V			EEEHAXxxxxP EEEHAXxxxxR
Type V - Series HB High temp. reflow  Type V - Series HB		2.000 h	6,3 to 50 V	0,1 to 470 µF	6,1 mm height Dia. ≤ 6,3 mm	EEEBHxxxxAx
			4 to 50 V			EEEBHxxxxP EEEBHxxxxR EEEBHxxxxSx
Type V - Series HC		3.000 h	6,3 to 50 V	0,1 to 1.000 µF	Dia. 8-10: 5.000h	EEEHcxxxxxx
Type V - Series HD High temp. reflow		5.000 h	6,3 to 100 V	0,47 to 1.000 µF	Long life	EEEHdxxxxxx EEEHdxxxxAx
Type V - Series HD High temp. reflow Medium-size	-55 to +105 °C		6,3 to 35 V	680 to 7.500 µF		EEEHdxxxxAM EEEHdxxxxAQ
Type V - Series FC High temp. reflow	-40 to +105 °C	1.000 h	6,3 to 50 V	1 to 1.500 µF	Low impedance (50% less than HA series)	EEEFcxxxxAx
Type V - Series FC						EEEFcxxxxP EEEFcxxxxR
Type V - Series FK High temp. reflow	-55 to +105 °C	2.000 h	6,3 to 35 V	4,7 to 1.500 µF	Low impedance	EEEFKxxxxxAP EEEFKxxxxxAR
Type V - Series FK High temp. reflow Medium-size		5.000 h	6,3 to 100 V	47 to 6.800 µF	105 °C 5.000 h	EEEFKxxxxxAM EEEFKxxxxxAQ
Type V - Series FK		2.000 to 5.000 h		3,3 to 1.500 µF	Low impedance (40% to 60% less than FC series)	EEEFKxxxxxR EEEFKxxxxxP EEVFKxxxxxM EEVFKxxxxxQ
Type V - Series FP High temp. reflow		2.000 h	6,3 to 50 V	10 to 1.800 µF	Low ESR (30% to 50% less than FK series)	EEEFpxxxxxx
Type V - Series FT High temp. reflow			6,3 to 50 V	10 to 2.200 µF	Low impedance	EEEFtxxxxxAP EEEFtxxxxxAR
Type V - Series TG	-40 to +125 °C	1.000 h 2.000 h	10 to 100 V	10 to 4.700 µF	40% smaller than TA series	EEETGxxxxxx EEVTGxxxxxx
Type V - Series TK High temp. reflow Medium-size		2.000 h				47 to 4.700 µF
Type V - Series TK		3.000 h	10 to 35 V	47 to 470 µF	Low ESR at -40 °C (50% lower than TG series)	EEETKxxxxP EEETKxxxxUP
		Type V - Series TP High temp. reflow	3.000 h (D8: 2.000 h)		Low ESR	EEETPxxxxAx
Type V - Series TQ High temp. reflow		2.000 h	35 V	47 to 100 µF	Low ESR than TP series	EEETQxxxxxxx
Type V - Series EB	-25 to +105 °C	3.000 to 5.000 h	160 to 450	2,2 to 100 µF	Dia, 10 to 18mm	EEVEBxxxxxx


Vibration-proof product is available upon request (≥ ø 8 mm diameter).

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.


## Aluminum Electrolytic Capacitors – Radial Lead Type

Series / Type	Temperature	Endurance	Rated W.V.	Capacity	Features	Part No.
 Type A - Series FC	-55 to +105 °C	1.000 to 5.000 h	6,3 to 100 V	1 to 15.000 µF	Low impedance	EEAFCxxxxxxx EEUFCxxxxxxx
		3.000 to 5.000 h	6,3 to 35 V	180 to 12.000 µF	Low impedance (10 to 30% less than FC series)	EEUFCxxxxxxx
Type A - Series FM	-40 to +105 °C	2.000 to 7.000 h	6,3 to 50 V	22 to 6.800 µF	Low Impedance	EEUFMxxxxxxx
Type A - Series FR 		5.000 to 10.000 h		4,7 to 8.200 µF	Low ESR	EEUFRxxxxxxx
Type A - Series ED	-25 to +105 °C	8.000 to 10.000 h	160 to 450 V	10 to 330 µF	High ripple current (at high frequency)	EEUEDxxxxxxx
Type A - Series EB	-40 (-25) to +105 °C	5.000 to 10.000 h	10 to 450 V	0,47 to 3.300 µF	Long life Low profile	EEUEBxxxxxxx
Type A - Series EE	-25 to +105 °C	8.000 to 10.000 h	160 to 450 V	10 to 330 µF	High ripple	EEUEExxxxxxx
Type A - Series TA	-40 to +125 °C	2.000 h	10 to 63 V	1 to 4.700 µF	1000 Heat cycle Polyester sleeve	EEUTAxxxxxxx
Type A - Series TP	-40 to +135 °C	1.000 to 5.000 h	25 to 35 V	100 to 5.1000 µF	High Ripple (20 to 40% higher than TA series)	EEUTPxxxxxxx
Type A - Series NHG	-55 (-25) to +105 °C	1.000 2.000 h	6,3 to 450 V	0,1 to 22.000 µF	+105 Cel 1000h;2000h	ECAxxHGxxxxx
Type A - Series GA	-55 to +105 °C	1.000 h	10 to 50 V	0,1 to 220 µF	7mm height	EEAGAxxxxxxx
Type A - Series GA Bi-polar	-40 to +105 °C	1.000 2.000 h	6,3 to 50 V	0,47 to 330 µF	Bi-polar	ECAxxENxxxxx
Type A - Series M	-40 to +85 °C	2.000 h	6,3 to 450 V	0,1 to 22.000 µF	Smaller than SU series	ECAxxMxxxxx
Type A - Series SU Bi-polar				6,3 to 50 V	0,47 to 6.800 µF	Bi-polar
Type A - Series KA		1.000 h	4 to 50 V	0,1 to 470 µF	7 mm height	ECEAxxKAxxxx
Type A - Series KA Bi-polar					0,1 to 100 µF	ECEAxxKNxxxx
Type A - Series KS		2.000 h	200 to 400 V	56 to 1.500 µF	Miniaturized	EETLDxxxxxxx
Type A - Series KS Bi-polar					6,3 to 50 V	0,1 to 47 µF


## Aluminum Electrolytic Capacitors – Snap-in terminal type

Series / Type	Temperature	Endurance	Rated W.V.	Capacity	Features	Part No.
 Type TS - Series EE	-40 to +105 °C	3.000 h	200 to 450 V	75 to 1.800 µF	High ripple current	EETEExxxxxxx
	Type TS - Series ED			-25 to +105 °C		56 to 2.200 µF
Type TS - Series HC	-40 to +105 °C	2.000 h	10 to 450 V	39 to 100.000 µF	30% smaller than HB serie	EETHCxxxxxxx
Type TS - Series HD	-40 to +105 °C	3.000 h	400 to 450 V	120 to 680 µF	30% smaller than HC series	EETHDxxxxxxx
Type TS - Series XB	-40 to +105 °C	7.000 h	160 to 450 V	39 to 2.200 µF	+105 °C 7000 h	EETXBxxxxxxx
Type TS - Series MD		2.000 h	200 to 400 V	56 to 1.500 µF	Miniaturized	EETLDxxxxxxx
Type TS - Series UQ	-40 to +85 °C		16 to 450 V	82 to 100.000 µF		EETUQxxxxxxx

**Electric Double Layer Capacitors – Radial Lead Type**

Series / Type	Temperature	Endurance	Rated W.V.	Capacity	Features	Part No.
 Series HZ <b>UPDATE</b>	-25 to +70 °C	1.000 h	2,5 V	3,3 to 10 F	Miniaturized	EECHZxxxxxx
	-25 to +60 (+70) °C		2,1 V 2,3 V	22 to 70 F	Large Cap.	EECHWxxxxxx


**Electric Double Layer Capacitors – Stacked Coin Type**

Series / Type	Temperature	Endurance	Rated W.V.	Capacity	Features	Part No.
	-25 to +70 °C	1.000 h	5,5 V	0,022 to 0,33 F	Tabbed lead terminals	EECS0HDxxxxx
				0,47 to 1,5 F		EECS5R5xxxx
				0,022 to 0,22 F	5mm pitch lead taping	EECSE0Hxxxxx
				0,1 to 1,5 F	Flat type	EECF5R5Uxxxx
	-25 to +85 °C	2.000 h	3,6 V	0,033 to 1 F	85 °C Flat type	EECF5R5Hxxxx
	Series RG			0,22 to 1 F	2.000h at 85 °C	EECRGxxxxxx
	Series RF			0,1 to 0,68 F		EECRFxxxxxx



**Polymer Aluminum Capacitors**

Series / Type	Temperature	Endurance	Rated W.V.	Capacity	Features	Part No.
	-40 to +105 °C	1.000	4 to 6,3 V	68 to 120 µF	1,1mm height	EEFCSxxxxxx
				100 to 180 µF	1,4mm height	EEFCTxxxxxx
			2 to 2,5 V	180 to 220 µF	1,1mm height	EEFSSxxxxxx
				270 to 330 µF	1,4mm height	EEFSTxxxxxx
			180 to 220 µF	1,1mm height	EEFLSxxxxxx	
			270 to 330 µF	1,4mm height	EEFLTxxxxxx	
			2 to 12,5 V	15 to 68 µF	1,2mm height	EEFFDxxxxxx
			2 to 16 V	2,2 to 220 µF	1,9mm height	EEFCDxxxxxx
			2 to 6,3 V	100 to 470 µF	2,1mm height	EEFCXxxxxxx
			2 to 8 V	68 to 470 µF	3,0mm height	EEFUDxxxxxx
				100 to 560 µF	4,3mm height Low ESR	EEFUExxxxxx
			2 to 6,3 V	56 to 220 µF	Super Low-ESR	EEFSLxxxxxx
				82 to 560 µF	Super Low-ESR	EEFSXxxxxxx
			47 to 120 µF	Miniaturized	EEFMCxxxxxx	
			2 V	330 to 470 µF	Super Low-ESR	EEFGXxxxxxx
			2 to 2,5 V	330 to 560 µF	Super Low-ESR Low ESL	EEFLXxxxxxx

Film Capacitors – Surface Mount Type

Series / Type	Temperature	Rated W.V.	Capacity	Features	Dielectric material	Part No.	
	Series ECHU(X)	-55 to +125 °C	16 VDC 50 VDC	0,00010 to 0,22 µF	Tight capacitance tolerance	PPS	ECHUxxxxxxX5 ECHUxxxxxxX9
	Series ECHU(C)	-55 to +105 °C	100 VDC	0,010 to 0,22 µF			ECHUxxxxxxC9
	Series ECWU(X)			0,0010 to 0,010 µF	Small type	PEN	ECWUxxxxxxX5
	Series ECWU(C)	-55 to +125 °C	100 VDC 250 VDC 630 VDC	0,0010 to 1,0 µF	Wide rated voltage range		ECWUxxxxxxCx
	Series ECWU(V16)	-55 to +85 °C	250 VDC	0,001 to 0,12 µF	For xDSL DC-blocking		ECWU2xxxV16
	Series ECPU(A)	-40 to +85 °C	16 VDC	0,10 to 1,0 µF	High volumet- ric efficiency	Plastic resin	ECPUxxxxxxMA5

Film Capacitors – Radial Lead Type


Series / Type	Temperature	Rated W.V.	Capacity	Features	Dielectric material	Part No.	
	Series EZPE	-40 to +85 °C	500 VDC 800 VDC 1100 VDC 1300 VDC	10 to 100 µF	High safety Self-healing Self-protecting	PP	EZPExxxxxxTA
	Series ECQV(L)/(M)	-40 to +105 °C	50 VDC 63 VDC 100 VDC	0,010 to 2,2 µF	High volumetric efficiency	PET Coating	ECQVxxxxxxJL ECQVxxxxxxJM ECQVxxxxxxJM
	Series ECQE(F)	-40 to +105 °C 100 to 1250 VDC  -40 to +85 °C 125, 250 VAC	100 to 1250 VDC 125, 250 VAC	0,0010 to 10 µF	Wide rated voltage range	PET	ECQExxxxxxF ECQExxxxxxF
	Series ECQE(B)	-40 to +105 °C 250 VDC  -40 to +85 °C 125 VAC	250 VDC 125 VAC	0,010 to 4,7 µF	Small type		ECQExxxxxxB ECQExxxxxxB
	Series ECQE(T)	-40 to +105 °C 250 to 630 VDC  -40 to +85 °C 125, 250 VAC	250 to 630 VDC 125 VAC 250 VAC	0,010 to 10 µF	Wide rated voltage range		ECQExxxxxxT ECQExxxxxxT
	Series ECWF(L)	-40 to +105 °C	400 VDC 450 VDC 630 VDC	0,010 to 2,4 µF	High frequency	PP	ECWFxxxxxxL
	Series ECWF(A)		250 VDC 450 VDC 630 VDC	0,10 to 6,8 µF	Miniaturization of ECWF(L)		ECWFxxxxxxA
	Series ECWFD		450 VDC	0.47 to 2.2 µF	Low Hum Sound Noise		ECWFD2Wxxxx
	Series ECWH(V)	-25 to +105 °C °C	1000 to 2000 VDC	0.0010 to 0.10 µF	Low-loss Inherent Tem- perature rise		ECWHxxxxxxVx ECWHxxxxxxRxV
	Series ECWH(A)	-40 to +105 °C	800 VDC 1600 VDC	0,010 to 0,047 µF	High voltage and high frequency		ECWHxxxxxxHAx ECWHxxxxxxRHA ECWHA3Cxxxxxx
	Series ECWH(C)	-40 to +105 °C General resonance circuit  -40 to +85 °C Air cooling	630 VDC, 1250 VDC	0.10 to 0.33 µF	Low-loss		ECWH6xxxxHC ECWH6xxxxHCx ECWH6xxxxRHC ECWHC3BxxxxJA
	Series ECQUA	-40 to 110 °C	275 VAC	0.1 to 2.2 µF	Safety standard Class X2		ECQUAAFxxxx
	Series ECQUL	-40 to +100 °C	275 VAC (250 VAC)	0,0010 to 2,2 µF	Safety standard Class Y2 / X2	PET	ECQUxxxxxxL
	Series ECQUG		300 VAC (250 VAC)	0,010 to 1,0 µF	Safety standard Class X1		ECQUxxxxxxG

# Resistors




## Thick Film Resistors – Surface Mount Type

Series / Type	Power Rating	Resistance	Tolerance	Features	Size	Part No.
 Thick Film	0,031 to 1 W	1 to 10M Ω	±5% Jumper	Size: 01005 to 2512	01005	ERJXGNJxxxY
					0201	ERJ1GNJxxxC
					0402	ERJ2GEJxxxX
					0603	ERJ3GEYJxxxV
					0805	ERJ6GEYJxxxV
					1206	ERJ8GEYJxxxV
					1210	ERJ14YJxxxU
					1812	ERJ12YJxxxU
					2010	ERJ12ZYJxxxU
					2512	ERJ1TYJxxxU
Precision Thick Film	0,05 to 1W	10 to 2,2M Ω	±0,5% ±1%	Precision type	01005	ERJXGNFxxx(U/Y)
					0201	ERJ1GNFxxxX
					0201	ERJ1RxDxxxX
					0402	ERJ2RxxxxxxX
					0603	ERJ3EKFxxxV
					0603	ERJ3RxDxxxV
					0805	ERJ6ENFxxxV
					0805	ERJ6RxDxxxV
					1206	ERJ8ENFxxxV
					1210	ERJ14NFxxxU
					1812	ERJ12NFxxxU
					2010	ERJ12SFxxxU
2512	ERJ1TNFxxxU					




## Thin Film Resistors – Surface Mount Type

Series / Type	Power Rating	Resistance	Tolerance	T.C.R	Size	Part No.
 Metal Film High Reliability	0,063 to 0,25 W	1 to 1M Ω	±0,05% ±0,1% ±0,5%	±10 ppm ±15 ppm ±25 ppm ±50 ppm ±100 ppm	0402	ERA2AxxxxX
					0603	ERA3AxxxxV
					0805	ERA6AxxxxV
					1206	ERA8AxxxxV



## Shunt Resistors – Surface Mount Type

Series / Type	Power Rating	Resistance	Tolerance	Features	Size	Part No.
 <b>Thick Film Low Resistance</b>	0,1 to 1 W	0,1 to 9,1 Ω	±1% ±2% ±5%	Low Resistance Type	0603	ERJ3RxxxxxV
					0805	ERJ6RxxxxxV
					1206	ERJ8RxxxxxV
					1210	ERJ14RxxxxxU
					1812	ERJ12RxxxxxU
					2512	ERJ1TRxxxxxU
	0,125 to 0,5 W	0,1 to 9,1 Ω	±1% ±2% ±5%	Low Resistance Type High power type	0402	ERJ2BxxxxxX
					0603	ERJ3BxxxxxV
					0805	ERJ6BxxxxxV
					1206	ERJ8BxxxxxV
					1210	ERJ14BxxxxxU
	0,125 to 0,5 W	0,01 to 0,1 Ω	±1% ±2% ±5%	Low Resistance Type High power type Double-sided resistive elements structure	0402	ERJ2BWxxxxxX
					0603	ERJ3BWxxxxxV
					0805	ERJ6BWxxxxxV
					1206	ERJ8BWxxxxxV
	0,1 to 1 W	0,1 to 9,1 Ω	±1% ±2% ±5%	Standard	0603	ERJ3RxxxxxV
					0805	ERJ6RxxxxxV
					1206	ERJ8RxxxxxV
					1210	ERJ14RxxxxxU
					1812	ERJ12RxxxxxU
					2512	ERJ1TRxxxxxU
	0,125 to 0,5 W	0,1 to 9,1 Ω	±1% ±2% ±5%	High power type	0402	ERJ2BxxxxxX
					0603	ERJ3BxxxxxV
					0805	ERJ6BxxxxxV
1206					ERJ8BxxxxxV	
1210					ERJ14BxxxxxU	
0,125 to 0,5 W	0,01 to 0,1 Ω	±1% ±2% ±5%	High power type Double-sided resistive elements structure	0402	ERJ2BWxxxxxX	
				0603	ERJ3BWxxxxxV	
				0805	ERJ6BWxxxxxV	
				1206	ERJ8BWxxxxxV	
0,1 to 1 W	0,02 to 0,1 Ω	±1% ±5%	Low TCR type	0603	ERJL03xxxxxV	
				0805	ERJL06xxxxxV	
				1206	ERJL08xxxxxV	
				1210	ERJL14xxxxxU	
				1812	ERJL12xxxxxU	
				2010	ERJL1DxxxxxU	
				2512	ERJL1WxxxxxU	
 <b>Metal Plate</b>	0,25W 1W	1m; 1,5m; 2m; 3m; 4m; 5m; 6m; 10m; 15m; 20m Ω	±1% ±5%	Low resistance values and high precision	0603	ERJM03NxxxxV
					2512	ERJM1WSxxxxU
					2512	ERJM1WTxxxxU
 <b>High Power Wide Terminal Type</b>	0,5 to 2 W	5 m to 1M Ω	±1% ±2% ±5%	Superior solder-joint reliability by wide terminal structure	0805	ERJB3xxxxxV
					1206	ERJB2xxxxxV
					2010	ERJB1xxxxxU
					2512	ERJA1xxxxxU


## High Power &amp; Pulse Proof Resistors – Surface Mount Type

Series / Type	Power Rating	Resistance	Tolerance	Features	Size	Part No.
 High Power Wide Terminal Type	0,33 to 1,33 W	5 m to 1M $\Omega$	$\pm 1\%$ $\pm 2\%$ $\pm 5\%$	Superior solder-joint reliability by wide terminal structure	0805	ERJB3xxxxxV
					1206	ERJB2xxxxxV
					2010	ERJB1xxxxxU
					2512	ERJA1xxxxxU
 Anti-Surge Type	0,2 to 0,5 W	1 to 3,3M $\Omega$	$\pm 0,5\%$ $\pm 1\%$ $\pm 5\%$	Anti-Surge & High voltage Characteristic	0603	ERJP03xxxxxV
					0805	ERJP06xxxxxV
					1206	ERJP08xxxxxV
					1210	ERJP14xxxxxU
	0,5 W	1 to 10M $\Omega$	$\pm 1\%$ $\pm 5\%$	Double-sided resistive elements structure	0805	ERJP6WxxxxxV
 Anti-Pulse Type	0,25 to 0,5 W	1 to 1M $\Omega$	$\pm 5\%$	Anti-Pulse Characteristic	0805	ERJT06xxxxxV
					1206	ERJT08xxxxxV
					1210	ERJT14xxxxxU

## Network & Array Resistors - Surface Mount Type

Series / Type	Power Rating	Resistance	Tolerance	Features	Size	Part No.
 Resistor Array	0,031 to 0,1 W per element	10 to 1M $\Omega$	$\pm 5\%$	Placement efficiency of chip resistor array is 2 / 4 / 8 times of the flat type chip resistor	0201 x 2R	EXB14VxxxJX
					0201 x 4R	EXB18VxxxJX
					0402 x 2R	EXB24VxxxJX
					0402 x 4R	EXB28VxxxJX
					0402 x 8R	EXB2HVxxxJV
					0603 x 2R	EXB34VxxxJV
					0603 x 4R	EXB38VxxxJV
					0402 x 4R	EXBN8VxxxJX
					0805 x 4R	EXBS8VxxxJ
					0603 x 2R	EXBV4VxxxJV
					0603 x 4R	EXBV8VxxxJV
 Resistor Networks	0,025 to 0,063 per element	47 to 1M $\Omega$	$\pm 5\%$	High density placing for digital signal circuits	2512	EXBAxxxxxxxx
					1206	EXBDxxxxxxxx
					1608	EXBExxxxxxxx
					1506	EXBQxxxxxxxx


## Metal (Oxide) Film Resistors – Radial Lead Type

Series / Type	Power Rating	Resistance	Tolerance	Features	Size (mm)	Part No.
 Small size	0,5 to 5 W	0,1 to 9,1 $\Omega$	$\pm 2\%$ $\pm 5\%$	Non flammable coating Small size	6,35 x 2,3	ERX12Sxxxxxxxx
					9 x 2,8	ERX1Sxxxxxxxx
					12 x 4	ERX2Sxxxxxxxx
					15 x 5,5	ERX3Sxxxxxxxx
					24 x 8	ERX5Sxxxxxxxx
		10 to 100k $\Omega$			6,35 x 2,3	ERG12Sxxxxxxxx
					9 x 2,8	ERG1Sxxxxxxxx
					12 x 4	ERG2Sxxxxxxxx
					15 x 5,5	ERG3Sxxxxxxxx
					24 x 8	ERG5Sxxxxxxxx
Small size Anti-heat conducting type	0,5 to 5 W	0,1 to 9,1 $\Omega$	$\pm 2\%$ $\pm 5\%$	Non flammable coating Small size	9 x 2,8	ERX1Fxxxxxxxx
					12 x 4	ERX2Fxxxxxxxx
					15 x 5,5	ERX3Fxxxxxxxx
					24 x 8	ERX5Fxxxxxxxx
					10 to 100k $\Omega$	9 x 2,8
		12 x 4				ERG2Fxxxxxxxx
		15 x 5,5				ERG3Fxxxxxxxx
		24 x 8				ERG5Fxxxxxxxx




# Anti-Sulfurated Resistors

## Anti-Sulfurated Resistors – Surface Mount Type


Series / Type	Power Rating	Resistance	Tolerance	Features	Size	Part No.
 Thick Film Anti-Sulfurated Au-based inner electrode	0,1 to 1 W	1 to 1M $\Omega$	$\pm 1\%$ $\pm 5\%$	Special construction to avoid open failure due to the presence of sulfur	0402	ERJS02xxxxX
					0603	ERJS03xxxxV
					0805	ERJS06xxxxV
					1206	ERJS08xxxxV
					1812	ERJS12xxxxU
					1210	ERJS14xxxxU
					2010	ERJS1DxxxxU
					2512	ERJS1TxxxxU
Thick Film Anti-Sulfurated <b>NEW</b> Ag-Pd-based inner electrode	0.25 W	0.1 to 0.2 $\Omega$	$\pm 1\%$ $\pm 2\%$	Special construction to avoid open failure due to the presence of sulfur	0805	ERJS6S
		0.22 to 1 $\Omega$	$\pm 5\%$			ERJS6Q
	0,05 to 1 W	1 to 1M $\Omega$	$\pm 1\%$ $\pm 5\%$	Special construction to avoid open failure due to the presence of sulfur	0201	ERJU01xxxxC
					0402	ERJU02xxxxX
					0603	ERJU03xxxxV
					0805	ERJU06xxxxV
					1206	ERJU08xxxxV
					1812	ERJU12xxxxU
					1210	ERJU14xxxxU
					2010	ERJU1DxxxxU
2512	ERJU1TxxxxU					

## Anti-Sulfurated Network & Array Resistors - Surface Mount Type

Series / Type	Power Rating	Resistance	Tolerance	Features	Size	Part No.
 Resistor Array Anti-Sulfurated	0,031 to 0,1 W per element	10 to 1M $\Omega$	$\pm 5\%$	Placement efficiency of chip resistor array is 2 / 4 / 8 times of the flat type chip resistor	0402 $\times$ 2R	EXBU24xxxxX
					0402 $\times$ 4R	EXBU28xxxxX
					0402 $\times$ 8R	EXBU2HxxxxV
					0603 $\times$ 2R	EXBU34xxxxV
					0603 $\times$ 4R	EXBU38xxxxU


# Trimmer Potentiometers

## Trimmer Potentiometers - Surface Mount Type

Series / Type	Power Rating	Resistance	Tolerance	Features	Part No.
 Cermet 2 mm Square Open  Cermet 3 mm Square Open  Cermet 3 mm Square Open  Cermet 3 mm Square Open  Cermet 4 mm Square Open	0,15 W	100 to 1M $\Omega$	$\pm 25\%$	Low-profile 0,7 mm (EVM2T) 0,81 mm (EVM2N) 1,05 mm (EVM2W)	EVM2NSX80Bxx
					EVM2TSX80Bxx
					EVM2WSX80Bxx
				Auto, Adjust (EVM3Y) Both Sides Adjust (EVM3S) Back Sides Adjust (EVM3R)	EVM3RSX50Bxx
					EVM3SSX50Bxx
	EVM3YSX50Bxx				
	Low-profile 0,95 mm			EVM3WSX80Bxx	
	Rotation stopper Automatic adjustment type			EVM3VSX50Bxx	
	4 mm square series for reflow soldering			0,2 W	EVM1DSX30Bxx
					EVM1ESX30Bxx
EVM1USX30Bxx					

# Inductors



## Chip Inductors – Surface Mount Type

Series / Type	Inductance	DC current	Size	Part No.
 High Frequency Non magnetic	47 to 8.200 nH	450 to 60 mA	1210 (3225)	ELJNAxxxxF
	10 to 820 nH	280 to 100 mA	1008 (2520)	ELJNCxxxxF
	10 to 1.000 nH	540 to 120 mA	0805 (2012)	ELJNDxxxxF
	1 to 220 nH	500 to 70 mA	0603 (1608)	ELJRExxxxFA
	1 to 100 nH	400 to 90 mA	0402 (1005)	ELJRFxxxxFB
High Frequency High-Q Non Magnetic core	1 to 39 nH	400 to 150 mA		ELJQFxxxxF
	2,2 to 56 nH	970 to 180 mA		ELJQExxxxFA
General use	0,22 to 220 µH	360 to 45 mA	1210 (3225)	ELJFAxxxxFx
	0,22 to 1.000 µH	700 to 40 mA	1812 (4532)	ELJFBxxxxFx
	0,22 to 100 µH	190 to 60 mA	1008 (2520)	ELJFCxxxxFx
High Power Type	1 to 330 µH	600 to 50 mA	1210 (3225)	ELJPAxxxxF
	2,2 to 220 µH	800 to 85 mA		ELJPAxxxxF2
	2.2 to 100 µH	740 to 110 mA		ELJLAxxxxKF
	10 to 220 µH	360 to 90 mA	1812 (4532)	ELJPBxxxxF
	1 to 33 µH	475 to 120 mA	1008 (2520)	ELJPCxxxxF
	2.2 to 10 µH	520 to 240 mA		ELJLCxxxxF
	2,2 to 22 µH	2.100 to 700 mA	0603 (1608)	ELJPExxxxFx
	2,2 to 10 nH	1.900 to 750 mA	0402 (1005)	ELJPFxxxxFx
Shielded Type	10 to 270 µH	18 to 5 mA	1210 (3225)	ELJSAxxxxFx
	27 to 100 µH	18 to 10 mA	1008 (2520)	ELJSCxxxxFx
Low DC Resistance	1 to 330 µH	500 to 30 mA	1210 (3225)	ELJEAxxxxF
Signal Processing Low distortion type	39 to 100 µH	110 to 70 mA		ELJDAxxxxJF
		105 to 70 mA		ELJFAxxxxJFD






NEW

NEW


## Choke Coils

Series / Type	Inductance	Allowable Idc	Size (D x H)	Part No.
 General type	2,2 to 3.900 µH	7,2 to 0,14 mA	10 x 13 mm	ELC08DxxxxE
	2,2 to 10.000 µH	3,5 to 0,08 mA	9,5 x 8,9 mm	ELC09DxxxxF
	2,2 to 10.000 µH	5,3 to 0,16 mA	11,5 x 13,9 mm	ELC11DxxxxF
	100 to 10.000 µH	1,9 to 0,27 mA	12,5 x 16,5 mm	ELC12DxxxE
	3,3 to 10.000 µH	8,5 to 0,26 mA	16 x 23 mm	ELC16BxxxL
	3,3 to 10.000 µH	8,5 to 0,36 mA	20 x 27 mm	ELC18BxxxL
 Magnetic shield type	3,9 to 8.200 µH	2,9 to 0,10 mA	10 x 13 mm	ELC10ExxxL
	4,7 to 10.000 µH	4,4 to 0,13 mA	13 x 18,5 mm	ELC12ExxxL
	5,6 to 10.000 µH	6,8 to 0,3 mA	16 x 22 mm	ELC15ExxxL
	5,6 to 10.000 µH	6,7 to 0,33 mA	19 x 25,1 mm	ELC18ExxxL

## Choke Coils – Magnetic shielded – Surface Mount Type

Type	Series	Inductance	Saturation Rated Current	Size (D x H)	Part No.
 Miniaturized Low DCR Type	VEG	1 to 68 $\mu$ H	1.900 to 180 mA	3 x 1 mm	ELLVEGxxxx
	VFG-C	1 to 33 $\mu$ H	1.500 to 280 mA	3 x 1,2 mm	ELLVFGxxxxC
	VGG	1 to 47 $\mu$ H	2.200 to 350 mA	3 x 1,5 mm	ELLVGGxxxx
	VGG-C <b>NEW</b>	1 to 100H	1.400 to 180 mA	3 x 1,5 mm	ELLVGGxxxxC
	PFG	1 to 68 $\mu$ H	1.700 to 240 mA	3,6 x 1,2 mm	ELLPFGxxxx
	4FG-A	1 to 150 $\mu$ H	1.950 to 290 mA	3,8 x 1,2 mm	ELL4FGxxxxA
	4GG	1,2 to 100 $\mu$ H	2.400 to 250 mA	3,8 x 1,4 mm	ELL4GGxxxx
	4LG-A	1 to 150 $\mu$ H	1.900 to 220 mA	3,8 x 1,8 mm	ELL4LGxxxxA
	SFG-A	1 to 470 $\mu$ H	1.800 to 100 mA	4 x 1,2 mm	ELLSFGxxxxA
	5PR	0,47 to 10 $\mu$ H	5.000 to 1.400 mA	5 x 1,85 mm	ELL5PRxxxMx
	6GG	1 to 100 $\mu$ H	2.500 to 350 mA	6 x 1,6 mm	ELL6GGxxxx
	6PG	0,8 to 100 $\mu$ H	2.800 to 400 mA	6 x 2 mm	ELL6PGxxxx
 General Use	6RH	1 to 180 $\mu$ H	3.000 to 230 mA	6 x 2,8 mm	ELL6RHxxxx
	6SH		3.400 to 300 mA	6 x 3,3 mm	ELL6SHxxxx
	6UH	10 to 1.000 H	1.800 to 180 mA	6 x 5 mm	ELL6UHxxxx
 Low DCR Large Current	5PS	1,2 to 560 $\mu$ H	2.500 to 150 mA	5 x 2 mm	ELL5PSxxxx
	8TP <b>NEW</b>	0,8 to 1.000 $\mu$ H	9.500 to 250 mA	8 x 4,7 mm	ELL8TPxxxxB
	ATP <b>NEW</b>	1 to 1.000 $\mu$ H	9.000 to 310 mA	10 x 4,2 mm	ELLATPxxxxB
	CTP <b>NEW</b>	1,2 to 1.000 $\mu$ H	11.000 to 400 mA	12 x 4,2 mm	ELLCTPxxxx
 High Performance	3FU	1 to 10 $\mu$ H	2.300 to 650 mA	3 x 1,5 mm	ELL3FUxxxx
 Large Current	ATV	1,5 to 1.000 $\mu$ H	6.700 to 320 mA	10 x 4,5 mm	ELLATVxxxx
	CTV	1,2 to 1.000 $\mu$ H	6.500 to 410 mA	12 x 4,5 mm	ELLCTVxxxx


## Choke Coils – Nn-shielded – Surface Mount Type

Type	Series	Inductance	Saturation Rated Current	Size (D x H)	Part No.
 Low DCR Large Current	SFN-A <b>NEW</b>	1 to 22 $\mu$ H	2.750 to 650 mA	4 x 1,2 mm	ELCSFNxxxxA


## Power Choke Coil – Surface Mount Type

Type / Series	Inductance	Rated Current	Size (L x W x H)	Part No.
 PCC-M0754M	4,7 to 48 µH	6,3 to 2,3 A	7,5 x 7 x 5,4 mm	ETQP5MxxxYFM
PCC-M0854M	2,5 to 48 µH	11,9 to 2,9 A	8,5 x 8 x 5,4 mm	ETQP5MxxxYFK
PCC-M0850M <b>NEW</b>	100 µH	1,7 A	8,5 x 8 x 5,4 mm	ETQP5MxxxYGK
PCC-M1054M <b>UPDATE</b>	2,5 to 22 µH	15,1 to 5,2 A	10,7 x 10 x 5,4 mm	ETQP5MxxxYFC
PCC-M1050M	97 µH	2,2 A	10,7 x 10 x 5 mm	ETQP5MxxxYGC
PCC-M1050ML <b>NEW</b>	0,68 to 1,50 µH	26,3 A	10,9 x 10 x 5 mm	ETQP5MxxxYLC
PCC-M1060ML <b>NEW</b>	2,5 µH	16,3 A	10,9 x 10 x 6 mm	ETQP6MxxxYLC
PCC-M0630L	0,33 µH	17 A	7,5 x 6,5 x 3 mm	ETQP3LxxxXFN
PCC-M0630M <b>UPDATE</b>	0,68 to 1,5 µH	7,4 to 5,6 A	6,5 x 6 x 3 mm	ETQP3MxxxYFN
PCC-M0630W	1 to 4,7 µH	8,1 to 3,8 A	7 x 6,6 x 3 mm	ETQP3WxxxWFN
PCC-M104L <b>UPDATE</b>	0,20 to 0,6 µH	28 to 21 A	11,5 x 10 x 4 mm	ETQP4LxxxFC
PCC-M125L	0,5 to 0,6 µH	30 to 27 A	14,5 x 12,5 x 5 mm	ETQP5LxxxXFA
PCC-D126F (N6B) <b>NEW</b>	0,58 to 3,32 µH	19 to 10 A	12,5 x 12,5 x 6 mm	ETQP6FxxxBFA
PCC-F126F Type HL <b>NEW</b>	2,3 to 12,5 µH	14,3 to 4,7 A	12,5 x 12,5 x 3 mm	ETQP6FxxxHFA
PCC-F126F Type LB <b>NEW</b>	1,8 to 5 µH	25,2 to 12 A	12,5 x 12,5 x 3 mm	ETQP6FxxxLFA
PCC-F126F Type SP <b>NEW</b>	1,9 to 4,9 µH	19,4 to 9,5 A	12,5 x 12,5 x 3 mm	ETQP6FxxxSFA


## Power Choke Coil – Low DCR Type – Surface Mount Type

Type / Series	Inductance	Rated Current	Size (L x W x H)	Part No.
 PCC-M104L	0,36; 0,68 µH	30 to 21 A	11,7 x 10 x 4 mm	ETQP4LxxxFC
PCC-M074L	0,24 to 0,42 µH	24 to 17 mA	8,7 x 7 x 4 mm	ETQP4LxxxAFM

## Voltage Step-up Coils – Surface Mount Type





Type / Series	Inductance	Saturation Rated Current	Magnetic Composition	Size (D x H)	Part No.
 3KN	0,33 to 7,5 mH	60 to 10 mA	Brass ring	3,3 x 1,1 mm to 3,3 x 2,0 mm	ELT3KNxxxx
	10 to 50 mH	10 to 1,5 mA	Permalloy ring		
	1,1 mH	25 mA	Ring less		



## Multilayer Power Inductors – Surface Mount Type



Type / Series	Inductance	DC Resistance	Rated Current	Size	Part No.
 ELGTEA <b>NEW</b>	0,47 µH	0,10 Ω	1,2 A	0805	ELGTEAR47NA
	1,0 µH	0,15 Ω	1,0 A		ELGTEA1R0NA
	1,5 µH	0,18 Ω	1,0 A		ELGTEA1R5NA
	2,2 µH	0,20 Ω	0,8 A		ELGTEA2R2NA
	3,3 µH	0,25 Ω	0,8 A		ELGTEA3R3NA
	4,7 µH	0,30 Ω	0,8 A		ELGTEA4R7NA




# Circuit Protection


## Ferrite Bead Core – Surface Mount Type


Series / Type	Components	Impedance	Rated Current	DC Resistance	Part No.
	Noise Filters (0302 small size) <b>UPDATE</b>	1 lines 43 Ω ±25% 65 Ω ±20% 90 Ω ±20%	100 mA 130 mA 130 mA	2,7 Ω 2,5 Ω 2,5 Ω	EXC14CG430U EXC14CE650U EXC14CE900U
	Noise Filters (for Gbps)	50 Ω ±25% 90 Ω ±20%	160 mA 130 mA	1,5 Ω 2,5 Ω	EXC24CH500U EXC24CH900U
	Noise Filters (for Gbps)	24 Ω ±25% 90 Ω ±25%	160 mA 100 mA	1,5 Ω 3,0 Ω	EXC24CG240U EXC24CG900U
	Noise Filters (for Mbps)	36 Ω ±25% 90 Ω ±25% 120 Ω ±25% 200 Ω ±25% 90 Ω ±25%	200 mA 160 mA 140 mA 130 mA 130 mA	1,00 Ω 1,75 Ω 2,20 Ω 2,70 Ω 2,50 Ω	EXC24CE360UP EXC24CE900U EXC24CE121U EXC24CE201U EXC24CF900U
	Noise Filters (0805small size) <b>NEW</b>	67 Ω ±25% 90 Ω ±25% 120 Ω ±25% 200 Ω ±25% 90 Ω ±25%	250 mA 250 mA 200 mA 200 mA 100 mA	0,8 Ω 0,8 Ω 1,0 Ω 1,0 Ω 3,0 Ω	EXC34CE670P EXC34CE900U EXC34CE121U EXC34CE201U EXC34CG900U
	Noise Filter Array (0603 small size) <b>UPDATE</b>	2 lines 43 Ω ±20% 65 Ω ±20% 90 Ω ±20% 200 Ω ±20%	100 mA 140 mA 130 mA 100 mA	2,7 Ω 1,8 Ω 2,0 Ω 3,5 Ω	EXC18CG430U EXC18CE650U EXC18CE900U EXC18CE201U
	Noise Filter Array (for Gbps)	50 Ω ±25% 90 Ω ±20%	160 mA 130 mA	1,5 Ω 2,5 Ω	EXC28CH500U EXC28CH900U
	Noise Filter Array (for Gbps)	24 Ω ±25% 90 Ω ±25%	160 mA 100 mA	1,5 Ω 3,0 Ω	EXC28CG240U EXC28CG900U
	Noise Filter Array (for Mbps) <b>UPDATE</b>	90 Ω ±25% 120 Ω ±25% 200 Ω ±25% 300 Ω ±25%	160 mA 140 mA 130 mA 80 mA	1,5 Ω 2,0 Ω 2,5 Ω 5,0 Ω	EXC28CE900U EXC28CE121U EXC28CE201U EXC28CE301U
	2 mode Noise Filters	1 lines 120 Ω ±25% 220 Ω ±25% 220 Ω ±25% 1.000 Ω ±25% 600 Ω ±25%	500 mA 350 mA 100 mA 50 mA 200 mA	0,3 Ω 0,4 Ω 0,7 Ω 1,5 Ω 0,9 Ω	EXC24CP121U EXC24CP221U EXC24CB221U EXC24CB102U EXC24CN601X
	Chip Bead Cores	115 Ω ±25% 45 Ω ±25% 25 Ω ±25% 91 Ω ±25% 68 Ω ±25% 39 Ω ±25% 27 Ω ±25% 60 Ω ±25% 120 Ω ±25% 220 Ω ±25% 600 Ω ±25% 1000 Ω ±25%	2.000 mA 2.000 mA 2.000 mA 3.000 mA 3.000 mA 4.000 mA 4.000 mA 1.000 mA 500 mA 200 mA 100 mA 50 mA	0,1 Ω 0,05 Ω 0,05 Ω 0,016 Ω 0,012 Ω 0,008 Ω 0,006 Ω 0,07 Ω 0,1 Ω 0,3 Ω 0,8 Ω 1 Ω	EXCCL4532U1 EXCCL3225U1 EXCCL3216U1 EXCML45A910H EXCML32A680U EXCML20A390U EXCML16A270U EXC3BP600H EXC3BP121H EXC3BB221H EXC3BB601H EXC3BB102H
	Chip Bead Array	4 lines 120 Ω ±25% 220 Ω ±25% 120 Ω ±25% 220 Ω ±25%	100 mA	0,5 Ω 0,7 Ω 0,5 Ω 0,7 Ω	EXC28BA121U EXC28BA221U EXC28BB121U EXC28BB221U

EMI Filters						
Series / Type	Capacitance	Rated Voltage	Rated Current	DC Resistance	25 dB Attenuate Frequency (MHz)	Part No.
 Chip Type	22 pF	50 VDC	2 A.DC	50 mΩ max.	800 to 1000	EXCCET220U
	47 pF				450 to 550	EXCCET470U
	100 pF				300 to 450	EXCCET101U
	270 pF				200 to 300	EXCCET271U
	470 pF				100 to 220	EXCCET471U
	1.000 pF				65 to 200	EXCCET102U
	2.200 pF				35 to 180	EXCCET222U
	10.000 pF				15 to 120	EXCCET103U
 Coil type	10 - 33.000 pF	12 - 50 V	2 - 6 A.DC	—	—	ELKExxxFA ELKEAxxxFA ELKEVxxxFx

ESD Suppressor – Surface Mount Type						
Series / Type	Rated voltage	Capacitance	Peak voltage	Clamping Volt.	Size	Part No.
 ESD Suppressor	30 V	0,04 pF	500 V max. (350 V typ.)	100 V max.	0201	EZAEG1A50AC
		0,05 pF			0402	EZAEG2A50AX
		0,10 pF			0603	EZAEG3A50AV
ESD Suppressor Electrostatic whitstand voltage <b>NEW</b>		0,05 pF				EZAEG2N50AV
 ESD Suppressor Array	15 V	0,25 pF			0805	EZAEGCA50AV

ZNR Transient/Surge Absorbers			
Series / Type	Varistor Voltage	Maximum Peak Current	Part No.
 Series D - Type V	18 to 1.800 V (ø 5 - ø 20 mm)	125 to 7.000 A	ERZVxxxxxxxx
 Series D - Type E <b>NEW</b>	200 to 1.100V (ø 5 - ø 14 mm)	2.500 to 7.000 A	ERZExxxxxxxx
 Series HF	27 V	—	ERZHF2M270
Series VF	22 to 470 V	125 to 600 A	ERZVFxMxxx

Multilayer Varistors – Surface Mount Type			
Series / Type	Varistor Voltage	Maximum Peak Current	Part No.
 Voltage/Signal lines	6,8 to 170 V	1 to 20 A Contact discharge: 8k V	EZJPxxxxxxxx
			EZJZxxxxxxxx
2 Array Type for Signal lines	12 to 170 V	3 to 5 A Contact discharge: 8k V	EZJSxxxxxx
ESD pulse	12 to 50 V	Contact discharge: 30k V	EZJSxxxxxx

Multilayer NTC Thermistors – Surface Mount Type					
Series / Type	Size	Resistance	B Value	Rated Maximum Power Dissipation	Part No.
 Series ERTJ	0201	2 to 100k Ω	3.375 to 4.700 K	2750 to 4700	ERTJZxxxxxxxx
	0402	22 to 100k Ω		2750 to 4700	ERTJ0xxxxxxxx
	0603	22 to 150k Ω		2750 to 4700	ERTJ1xxxxxxxx






# Switches

## Light Touch Switches – Surface Mount Type











Series / Type	Dimensions L x W x H (mm)	Operating Force	Operating Cycles	Travel	Part No.
 4 mm Square	4,1 x 4,1 x 0,35 4,1 x 4,1 x 0,43 4,1 x 4,1 x 0,58	1,0 N 1,6 N 2,4 N	200.000 500.000 1.000.000	0,25 mm	EVQ6P6xxx EVQ7P6xxx EVQ9P6xxx EVQP6xxxx
 4.5mm Square	4,5 x 4,5 x 0,55	1,6 N 2,4 N	200.000	0,20 mm	EVQPQxxxx
 4.9 mm Square	4,9 x 4,9 x 0,8 4,9 x 4,9 x 1,5	1,0 N 1,6 N 2,6 N	200.000 500.000	0,25 mm	EVQPLxxxx
 6 mm Square Thin Type	6,5 x 6,0 x 2,0 6,5 x 6,0 x 2,5, 6,5 x 6,0 x 3,1	0,5 N 0,6 N 1,0 N 1,3 N 1,6 N 2,6 N 3,5 N	100.000 200.000 1.000.000 2.000.000	0,25 mm 0,35 mm	EVQP0xxxx EVQQ2xxxx
 3.0 x 2.6 mm	3,0 x 2,6 x 0,65	1,6 N	100.000	0,15 mm	EVPAFxxxx
 3.5 x 2.9 mm	3,5 x 2,9 x 1,7	1,0 N 1,6 N 2,4 N 3,5 N 5,0 N	200.000 1.000.000		EVPAAxxxxx
 4.7 x 3.5 mm	4,7 x 3,5 x 2,1 4,7 x 3,5 x 2,5	1,0 N 1,6 N 2,4 N 2,5 N 3,5 N 5,0 N	200.000 500.000 1.000.000	0,25 mm 0,70 mm	EVQ3P2xxx EVQP2xxxx EVQP9xxxx
 3.5 x 2.9 mm Side-operation Type	3,5 x 2,9 x 1,35	1,6 N 2,2 N	100.000	0,20 mm	EVQ9P7xxx EVQP3xxxx EVQP7xxxx
 4.7 x 3.5 mm Side-operation Type	4,7 x 3,5 x 1,65			0,30 mm	EVQPUxxxx
 4.5 x 2.2 mm Side-operation Type Edge Mount	4,5 x 2,2 x 2,9	1,6 N	200.000	0,15 mm	EVPAExxxxx
 6.2 x 2.5 mm Side-operation Type Edge Mount	6,2 x 2,55 x 3,5	1,0 N 1,6 N 2,4 N 2,5 N 3,5 N 5,0 N	200.000 500.000 1.000.000	0,25 mm 0,70 mm	EVQP4xxxx EVQP8xxxx
 6.1 x 4.0 mm Side-operation Type	6,1 x 4,0 x 1,8	1,6 N 2,2 N	100.000	0,30 mm	EVQPSxxxx
 3.5 x 2.9 mm Side-operation Type Half Dive	3,5 x 2,9 x 1,2			0,20 mm	EVPANxxxx
 6.0 X 3.5mm	6,0 x 3,5 x 4,3 6,0 x 3,5 x 5,0	1,0 N 1,6 N 2,4 N	30.000 50.000	0,25 mm	EVQ5Pxxxx EVQPE1xxx EVQPNxxxx
 4 mm Square Double-action	4,0 x 4,1 x 0,59	0,8 N / 1,6 N 0,9 N / 2,0 N 1,0 N / 2,6 N	30.000 100.000	0,15 / 0,3 mm	EVPAHxxxx
 6 mm Square Double-action Thin Type	6,0 x 6,0 x 0,9 6,0 x 6,0 x 0,95	0,7 N / 2,6 N 1,0 N / 2,6 N	30.000	0,4 mm / 0,5 mm	EVQ3PRxxx EVQPRxxxx EVQQ0xxxx




## Light Touch Switches – Surface Mount Type

Series / Type	Dimensions L x W x H (mm)	Operating Force	Operating Cycles	Travel	Part No.
 7 x 3.5 mm Double-action Side-operational	4,7 x 3,5 x 1,2	1,6 N / 2,6 N	100.000	0,15 mm / 0,4 mm	EVPAJxxxx
 6.2 x 3.7 mm Double-action Side-operational Edge Mount	6,2 x 3,75 x 3,5	0,4 N / 0,5 N	30.000 200.000	0,4 mm / 0,5 mm	EVQQ0xxxx
 6 mm Square Long Travel	6,0 x 6,1 x 5,0	1,6 N 2,0 N 2,2 N 2,5 N 3,5 N	30.000 100.000	1,0 mm 1,3 mm	EVQ9Pxxxx EVQP19xxxx EVQP1Bxxx EVQP1Dxxx EVQP1Fxxx EVQP1Kxxx
 8 mm Square Long Travel	8,5 x 8,5 x 6,5	4,0 N 5,0 N	100.000	1,0 mm	EVQQ1xxxx
 10 mm Square Center Space Long Travel	9,8 x 9,8 x 4,6	4,0 N			EVPADxxxx







## Light Touch Switches – Radial Lead Type










Series / Type	Dimensions L x W x H (mm)	Operating Force	Operating Cycles	Travel	Part No.
 5N	6,0 x 6,0 x 4,3 6,0 x 6,0 x 5,0 6,0 x 6,0 x 7,0 6,0 x 6,0 x 9,5	1,0 N 1,3 N 1,6 N 2,6 N	50.000 100.000	0,25 mm	EVQPAxxxx EVQPBxxxx
 5N Side-operation Type	7,5 x 7,1 x 7,15 7,5 x 7,1 x 7,85 7,5 x 7,1 x 9,85 7,5 x 7,1 x 12,35				EVQPFxxxx
 5N Type 2R	6,0 x 6,0 x 4,3 6,0 x 6,0 x 5,0 6,0 x 6,0 x 7,0 6,0 x 6,0 x 9,5				EVQ2xxxx
 5N Type 4R Side-operation Type	7,5 x 7,1 x 9,25				EVQPCxxxx
 Type 2R Round Type	6,0 x 6,0 x 4,3 6,0 x 6,0 x 5,0 6,0 x 6,0 x 7,0 6,0 x 6,0 x 9,5				EVQ11xxxx
 6.0 x 3.5 mm	6,0 x 3,5 x 4,3 6,0 x 3,5 x 5,0	1,0 N 1,6 N 2,4 N	30.000 50.000		EVQPExxxx
 6.0 x 3.5 mm 2R					EVQPJxxxx
 Over Travel	6,2 x 6,2 x 7,45	0,74 N 1,3 N	1.000.000 5.000.000	0,2 mm	EVQP0xxxx
 6 mm Square 2R Long Travel	6,0 x 6,1 x 5,0	1,6 N 2,0 N 2,2 N 2,5 N 3,5 N	30.000 100.000	1,0 1,3 mm	EVQPVxxxx
 8 mm Square 2R Long Travel	8,0 x 8,0 x 5,0 8,0 x 8,0 x 5,5 8,0 x 8,0 x 6,1	0,8 N 1,3 N 2,5 N 3,0 N	100.000 1.000.000	1,0 mm 1,2 mm 1,75 mm	EVQQJxxxx

## Push Switches – Surface Mount Type

Series / Type	Dimensions L x W x H (mm)	Lock Travel	Full Travel	Operating Force	Part No.
	8,9 x 10,0 x 20,5	1,5 mm 2,5 mm	2,5 mm 3,5 mm	2,0 N 3,5 N	ESB30xxxx


## Push Switches – Radial Lead Type

Series / Type	Dimensions L x W x H (mm)	Lock Travel	Full Travel	Operating Force	Part No.
	8,5 x 8,5 x 13,5	1,5 mm	2,5 mm	2,94 N	ESB64xx
	10,0 x 7,75 x 12,5		2,3 mm	3,0 N	ESB33xxx
	8,9 x 10,0 x 20,5	1,5 mm 2,5 mm	2,5 mm 3,5 mm	2,0 N 3,5 N	ESB30xxxxx
	7,8 x 7,9 x 17,5	–	2,5 mm	2,0 N 4,0 N	ESE20C4xx ESE20D4xx
	7,8 x 7,9 x 12,5				ESE20C3xx ESE20D3xx
	12,4 x 11,0 x 23,0 12,4 x 11,0 x 25,0	2,45 mm 2,8 mm	4,5 mm	3,5 N 5,0 N	ESB32xxxx


Detector Switches					
Series / Type	Dimensions L x W x H (mm)	Travel	Operating Force	Rating	Part No.
 09HL	3,0 x 3,5 x 0,9	1,4 mm 2,1 mm	300 mN	50 $\mu$ A 3 VDC to 10 $\mu$ A 5 VDC	ESE58xxxx
 1VR	2,2 x 3,35 x 1,5	1,5 mm	250 mN		ESE16xxxx
 1VL	4,2 x 3,6 x 1,2	2,15 mm 3,05 mm	300 mN		ESE13xxxx
 1HL	4,0 x 4,4 x 1,2	1,4 mm 2,1 mm			ESE18xxxx
 2HL	5,4 x 5,75 x 1,7	3,2 mm	390 mN		ESE31xxxx
 2N	Wide Variation	0,6 mm 1,2 mm 1,45 mm 2,20 mm 4,25 mm	300 mN		ESE22xxxx
 5N		Wide Variation	350 mN		ESE11xxxx
 1HW	5,0 x 4,4 x 1,5	1,0 mm 2,2 mm	300 mN		ESE23xxxx
 2W	7,5 x 3,0 x 5,6 7,5 x 4,65 x 5,6	Wide Variation	350 mN		ESE24xxxx

# Encoders & Potentiometers


## Rotary Potentiometers – Vertical Type – Surface Mount Type

Series / Type	Pulse	Detents	Rotation Torque	Height of body	Endurance (Cycles)	Part No.
 10mm GS	333,3°	–	3 mNm	2,0 mm	100.000	EVWAE4001B14



## Encoders – Vertical Type – Surface Mount Type

Series / Type	Pulse	Detents	Rotation Torque	Height of body	Endurance (Cycles)	Part No.
 10mm GS	3	–	2 mNm	2,0 mm	70.000	EVQVVD00203B

## Encoders – Horizontal Type – Radial Lead Type

Series / Type	Pulse	Detents	Rotation Torque	Height from PCB to shaft	Endurance (Cycles)	Part No.
 10mm GS	12	24	5 mNm	7,0 mm	100.000	EVQVXM00112B
				9,0 mm		EVQVXD00112B
				11,0 mm		EVQVXC00112B



## Encoders – Surface Mount Type

Series / Type	Bushing	Pulse	Detents	Rotation Torque	Switch Push Force / Stroke	Height (mm)	Endurance (Cycles)	Part No.
 11 mm Square GS serration-shaft  Komuso Junior (shaft wobble reduced), with Switch Push Funct.	–	8	16	8 mNm	6 N / 0,4 mm	17,5	30.000	EVEUPAAH508B
		12	24	8 mNm				EVEUPAAH512B
		16	32	8 mNm				EVEUPAAH516B
		8	16	14 mNm				EVEUPCAH508B
		12	24	14 mNm				EVEUPCAH512B
		16	32	14 mNm				EVEUPCAH516B
		8	16	8 mNm	4 N / 1,5 mm			EVEUBAAH508B
		12	24	8 mNm				EVEUBAAH512B
		16	32	8 mNm				EVEUBAAH516B
		8	16	14 mNm				EVEUBCAH508B
		12	24	14 mNm				EVEUBCAH512B
		16	32	14 mNm				EVEUBCAH516B
 11 mm Square GS D-shaft  Komuso Junior (shaft wobble reduced), with Switch Push Funct.	–	8	16	8 mNm	6 N / 0,4 mm	20,0		EVEUPACL008B
		12	24	8 mNm				EVEUPACL012B
		16	32	8 mNm				EVEUPACL016B
		8	16	14 mNm				EVEUPCCL008B
		12	24	14 mNm				EVEUPCCL012B
		16	32	14 mNm				EVEUPCCL016B
		8	16	8 mNm	4 N / 1,5 mm			Need shaft tooling
		12	24	8 mNm				
		16	32	8 mNm				
		8	16	14 mNm				
		12	24	14 mNm				
		16	32	14 mNm				



## Encoders – Radial Lead Type

Series / Type	Bushing	Pulse	Detents	Rotation Torque	Switch Push Force / Stroke	Height (mm)	Endurance (Cycles)	Part No.
 <p>11 mm Square GS serration-shaft</p> <p>Komuso Junior (shaft wobble reduced), with Switch Push Funct.</p>	—	8	16	8 mNm	6 N / 0,4 mm	18,0	30.000	EVEYPAAJ008B
		12	24	8 mNm				EVEYPAAJ012B
		16	32	8 mNm				EVEYPAAJ016B
		8	16	14 mNm				EVEYPCAJ008B
		12	24	14 mNm				EVEYPCAJ012B
		16	32	14 mNm				EVEYPCAJ016B
		8	16	8 mNm	4 N / 1,5 mm			EVEYBAAJ008B
		12	24	8 mNm				EVEYBAAJ012B
		16	32	8 mNm				EVEYBAAJ016B
		8	16	14 mNm				EVEYBCAJ008B
		12	24	14 mNm				EVEYBCAJ012B
		16	32	14 mNm				EVEYBCAJ016B
 <p>11 mm Square GS D-shaft</p> <p>Komuso Junior (shaft wobble reduced), with Switch Push Funct.</p>	—	8	16	8 mNm	6 N / 0,4 mm	20,5	30.000	EVEYPACL508B
		12	24	8 mNm				EVEYPACL512B
		16	32	8 mNm				EVEYPACL516B
		8	16	14 mNm				EVEYPCCL508B
		12	24	14 mNm				EVEYPCCL512B
		16	32	14 mNm				EVEYPCCL516B
		8	16	8 mNm	4 N / 1,5 mm			Need shaft tooling
		12	24	8 mNm				
		16	32	8 mNm				
		8	16	14 mNm				
		12	24	14 mNm				
		16	32	14 mNm				
 <p>12 mm Square GS no Switch Push D-shaft</p>	Barling (5.0 mm)	12	12	3~20 mNm	—	20	30.000	EVEGA1F2012M
		12	12	3~20 mNm		30		EVEGA1F3012M
		24	24	3~20 mNm		17,5		EVEGA1F1724M
		24	24	3~20 mNm		20		EVEGA1F2024M
		24	24	3~20 mNm		22,5		EVEGA1F2224M
		24	24	3~20 mNm		25		EVEGA1F2524M
	Plastic (7.0 mm)	12	12	3~20 mNm		20		EVEGE1F2012M
		12	12	3~20 mNm		25		EVEGE1F2512M
		12	12	3~20 mNm		30		EVEGE1F3012M
		24	24	3~20 mNm		22,5		EVEGC1F2224M
		24	24	3~20 mNm		25		EVEGC1F2524M
	Die-cast (7.0 mm)	12	12	3~20 mNm		20		EVEGC1F2012M
		12	12	3~20 mNm		25		EVEGC1F2512M
		24	24	3~20 mNm		20		EVEGC1F2024M
		24	24	3~20 mNm		22,5		EVEGC1F2224M
		24	24	3~20 mNm		25		EVEGC1F2524M

## Encoders – Radial Lead Type


Series / Type	Bushing	Pulse	Detents	Rotation Torque	Switch Push Force / Stroke	Height (mm)	Endurance (Cycles)	Part No.
 12 mm Square GS with Switch Push D-shaft	Die-cast (7 & 9 mm)	20	20	3~20 mNm	3N / 0,4 mm	20	30.000	EVEJBBF2020B
		20	20			25		EVEJBBF2520B
 16 mm Square GS Komuso Senior High torque with switch push func.	—	16	32	25 mNm	6 N / 0,5 mm	21,5		EVEQDBRG516B
		8	16	25 mNm				EVEPDBRG508B

## Center Space Encoders – Radial Lead Type


Series / Type	Pulse	Detents	Rotation Torque	Endurance	Part No.
 20/12 mm	9	18	6 mNm	30.000	EVQV6B00909B
	9	18	7 mNm		EVQV6A00609B
	9	18	9 mNm		EVQV5A00109B
 27/18 mm	9	18	9 mNm		EVQV5N00409B
	9	18	13,5 mNm		EVQV5D00309B
	9	18	18 mNm		EVQV5G00209B
	15	30	9 mNm		EVQV5L00415B
	15	30	13,5 mNm		EVQV5C00315B
	15	30	18 mNm		EVQV5B00215B
	15	30	25 mNm	EVQV5K00715B	

# Thermal Heat Sink Solution


## “PGS” Graphite Sheets – 0.025 mm Type

Series / Type	Thickness	Thermal conductivity	Whith-stand temp.	Size (L x W) [mm]	Part No.
 PGS only	0,025 mm	1.500 to 1.700 W/(m·K)	400 °C	115 x 180	EYGS121803
Insulating film type	0,055 mm	650 to 800 W/(m·K)	100 °C	115 x 180	EYGA121803P
This insulating film type	0,035 mm	1.100 to 1.250 W/(m·K)	100 °C	115 x 180	EYGA121803S
Strong adhesion type	0,055 mm	650 to 800 W/(m·K)	100 °C	115 x 180	EYGA121803A
Thin adhesion type	0,035 mm	110 to 1.250 W/(m·K)	100 °C	115 x 180	EYGA121803M
High heat-resistance insulation film type	0,055 mm	650 to 800 W/(m·K)	180 °C	115 x 180	EYGA121803K
High heat-resistance adhesion type	0,055 mm	650 to 800 W/(m·K)	150 °C	115 x 180	EYGA121803T

## “PGS” Graphite Sheets – 0.07 mm Type



Series / Type	Thickness	Thermal conductivity	Whith-stand temp.	Size (L x W) [mm]	Part No.
 PGS only	0,07 mm	750 to 950 W/(m·K)	400 °C	180 x 230	EYGS182307
Insulating film type	0,10 mm	550 to 700 W/(m·K)	100 °C	115 x 180	EYGA121807P
This insulating film type	0,08 mm	650 to 800 W/(m·K)	100 °C	115 x 180	EYGA121807S
Strong adhesion type	0,10 mm	550 to 700 W/(m·K)	100 °C	115 x 180	EYGA121807A
Thin adhesion type	0,08 mm	650 to 800 W/(m·K)	100 °C	115 x 180	EYGA121807M
High heat-resistance insulation film type	0,10 mm	550 to 700 W/(m·K)	180 °C	115 x 180	EYGA121807K

## “PGS” Graphite Sheets – 0.1 mm Type

Series / Type	Thickness	Thermal conductivity	Whith-stand temperature	Size (L x W) [mm]	Part No.
 PGS only	0,10 mm	600 to 800 W/(m·K)	400 °C	180 x 230	EYGS182310
Insulating film type	0,13 mm	500 to 600 W/(m·K)	100 °C	115 x 180	EYGA121810P
Thin insulating film type	0,11 mm	550 to 650 W/(m·K)	100 °C	115 x 180	EYGA121810S
Strong adhesion type	0,13 mm	500 to 600 W/(m·K)	100 °C	115 x 180	EYGA121810A
Thin adhesion type	0,11 mm	550 to 650 W/(m·K)	100 °C	115 x 180	EYGA121810M
High heat-resistance insulation type	0,13 mm	500 to 600 W/(m·K)	180 °C	115 x 180	EYGA121810K
High heat-resistance adhesion type	0,13 mm	500 to 600 W/(m·K)	150 °C	115 x 180	EYGA121810T
Low thermal resistance type	0,11 mm	550 to 650 W/(m·K)	85 °C	115 x 180	EYGA121810C
Multilayered type (One-side)	0,20 mm	250 to 350 W/(m·K)	180 °C	115 x 180	EYGM121810SS
Multilayered type (Double-side)	0,30 mm	200 to 300 W/(m·K)	180 °C	115 x 180	EYGM121810SW





# Fuses

## Thermal Cutoffs – Radial Lead Type

Series / Type	Rated Temp.	Functioning Temp.	Electrical Rating			Maximum Operating Temp.	Holding Temp.	Maximum Temp. Limit : Tm	Part No.	
			AC/DC	Volt	Amp.					
 Series N	86 °C	82 °C	AC	250	2	60 °C	60 °C	200 °C	EYP2BN082	
			AC	125	3	52 °C	56 °C			
			DC	50	4	45 °C	50 °C			
	102 °C	98 °C	AC	250	2	65 °C	75 °C	200 °C	EYP2BN099	
			AC	125	3	60 °C	70 °C			
			DC	50	4	55 °C	65 °C			
	114 °C	110 °C	AC	250	2	80 °C	90 °C	200 °C	EYP2BN109	
			AC	125	3	76 °C	86 °C			
			DC	50	5	65 °C	74 °C			
	115 °C	110 °C	AC	250	2	80 °C	90 °C	200 °C	EYP2BN110	
			AC	125	3	76 °C	86 °C			
			DC	50	5	65 °C	74 °C			
	134 °C	129 °C	AC	250	2	90 °C	100 °C	200 °C	EYP2BN127	
			AC	125	3	75 °C	90 °C			
			DC	50	4	65 °C	80 °C			
	139 °C	135 °C	AC	250	2	100 °C	110 °C	200 °C	EYP2BN134	
			AC	125	3	85 °C	100 °C			
			DC	50	6	60 °C	70 °C			
	145 °C	141 °C	AC	250	2	110 °C	120 °C	200 °C	EYP2BN143	
			AC	125	3	105 °C	115 °C			
			DC	50	6	80 °C	90 °C			
	 Series F	102 °C	98 °C	AC	250	1	65 °C	75 °C	200 °C	EYP1BF101
				AC	125	2	60 °C	70 °C		
				DC	50	3.5	55 °C	65 °C		
115 °C		110 °C	AC	250	1	80 °C	90 °C	200 °C	EYP1BF115	
			AC	125	2	76 °C	90 °C			
			DC	50	4	70 °C	80 °C			
134 °C		129 °C	AC	250	1	90 °C	105 °C	200 °C	EYP1BF134	
			AC	125	2	85 °C	100 °C			
			DC	50	4	65 °C	80 °C			
139 °C		135 °C	AC	250	1	100 °C	110 °C	200 °C	EYP1BF138	
			AC	125	2	90 °C	105 °C			
			DC	50	5	65 °C	70 °C			
145 °C		141 °C	AC	250	1	110 °C	125 °C	200 °C	EYP1BF145	
			AC	125	2	110 °C	125 °C			
			DC	50	5	80 °C	95 °C			



## Thermal Cutoffs – Radial Lead Type








Series / Type	Rated Temp.	Functioning Temp.	Electrical Rating			Maximum Operating Temp.	Holding Temp.	Maximum Temp. Limit : Tm	Part No.
			AC/DC	Volt	Amp.				
	102 °C	98 °C	AC	250	0.5	65 °C	75 °C	200 °C	EYP05BE101
			AC	125	1.5	60 °C	70 °C		
			DC	50	3	55 °C	65 °C		
	115 °C	110 °C	AC	250	0.5	80 °C	95 °C	200 °C	EYP05BE115
			AC	125	1.5	76 °C	93 °C		
			DC	50	3	70 °C	84 °C		
	134 °C	129 °C	AC	250	0.5	90 °C	105 °C	200 °C	EYP05BE134
			AC	125	1.5	85 °C	100 °C		
			DC	50	3	70 °C	85 °C		
	139 °C	135 °C	AC	250	0.5	100 °C	115 °C	200 °C	EYP05BE138
			AC	125	1.5	95 °C	110 °C		
			DC	50	4	65 °C	80 °C		
	145 °C	141 °C	AC	250	0.5	110 °C	125 °C	200 °C	EYP05BE145
			AC	125	1.5	105 °C	125 °C		
			DC	50	5	80 °C	95 °C		
	102 °C	98 °C	AC	250	2	65 °C	75 °C	200 °C	EYP2BH101
			AC	125	3	60 °C	70 °C		
			DC	50	3.5	55 °C	65 °C		
	115 °C	110 °C	AC	250	2	80 °C	90 °C	200 °C	EYP2BH115
			AC	125	3	76 °C	86 °C		
			DC	50	3.5	74 °C	84 °C		
	134 °C	129 °C	AC	250	2	90 °C	95 °C	200 °C	EYP2BH134
			AC	125	3	70 °C	85 °C		
			DC	50	3.5	65 °C	80 °C		
	139 °C	135 °C	AC	250	2	100 °C	105 °C	200 °C	EYP2BH138
			AC	125	3	80 °C	95 °C		
			DC	50	3.5	75 °C	90 °C		
	145 °C	141 °C	AC	250	2	110 °C	125 °C	200 °C	EYP2BH145
			AC	125	3	100 °C	115 °C		
			DC	50	4.5	85 °C	100 °C		
	92 °C	88 °C	DC	32	2	55 °C	60 °C	135 °C	EYP2MP092AFT
	98 °C	94 °C	DC	32	2	60 °C	65 °C	135 °C	EYP2MP098AFT
	92 °C	89 °C	DC	32	4	55 °C	55 °C	135 °C	EYP4MU092GFD

## Thermal Cutoffs – Surface Mount Type



Series / Type	Rated Current	Rated Voltage	Size	Part No.
	0,315 A - 3,0 A	32 VDC	0402	ERBRDxRxxX
	0,5 A - 5,0 A		0603	ERBRExRxxV
	0,5 A - 4,0 A	63 VDC (0,5A to 2,0A) 32 VDC (2,5A to 4,0A)	1206	ERBRGxRxxV

# Wireless Modules



## Bluetooth

Series / Type	BT Standard Profiles	Size	Used ICs	Rx Sensitivity	Tx Power (max.)	Power Supply
 PAN1315A	2.1 EDR HCI	9,0 x 6,5 x 1,7 mm	CC2560	-93 dBm @ BER 10 <sup>-3</sup>	+10,5 dBm	1,8 to 4,8 V
 PAN1325A (with Antenna)		9,0 x 9,5 x 1,7 mm				
 PAN1310		11,6 x 8,7 x 1,8 mm	PMB8763			
 PAN1320 (with Antenna)		15,6 x 8,7 x 2,8 mm				
 PAN1311	2.0 EDR SPP	11,6 x 8,7 x 1,8 mm	PMB8753 / 2			
 PAN1321 (with Antenna)		15,6 x 8,7 x 2,8 mm				
 PAN1322 (with Antenna) <b>NEW</b>	2.1 EDR SPP	11,6 x 8,7 x 1,8 mm	PMB8754			2,9 to 4,1 V




## Bluetooth EDR Modem

Series / Type	BT Standard Profiles	Size	Used ICs	Rx Sensitivity	Tx Power (max.)	Power Supply
 PAN1455	3.0 EDR SPP, HID, HDP,...	18,8 x 13,5 x 2,5 mm	BC6 / STM32F103	-86 dBm @ BER 10 <sup>-3</sup>	+4 dBm	2,7 to 3,6 V
 PAN1555 (with Antenna)		22,8 x 13,5 x 2,5 mm				

## Bluetooth Low Energy

Series / Type	BT Standard Profiles	Size	Used ICs	Rx Sensitivity	Tx Power (max.)	Power Supply
 PAN1720 (with Antenna)	4.0 BT Low Energy Embedded smart	15,6 x 8,7 x 1,8 mm	CC2540	-94 dBm @ BER 1%	+3 dBm	2,0 to 3,6 V
 PAN1721 (with Antenna)			CC2541			

## Bluetooth Dual Mode

Series / Type	BT Standard Profiles	Size	Used ICs	Rx Sensitivity	Tx Power (max.)	Power Supply
 PAN1316	Dual Mode BT classic & Low Energy 2.1 EDR HCI smart ready	9,0 x 6,5 x 1,7 mm	CC2564	-93 dBm @ BER 10 <sup>-3</sup>	+10,5 dBm	1,8 to 4,8 V
 PAN1326 (with Antenna)		9,0 x 9,5 x 1,7 mm				
 PAN1026 (with Antenna) <b>NEW</b>	4.0 BT Low Energy 2.1 EDR SPP smart ready	15,6 x 8,7 x 1,8 mm	TC35661	-88 dBm @ BER 10 <sup>-3</sup>	+4 dBm	1,8 or 3,0 V



Current Consumption	Frequency Range	Number of GPIOs	Interfaces	Data Rate (max. air)	Status	Part No.
135 $\mu$ A (sleep) 40 mA (Tx, EDR)	2,4 GHz	2	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• PCM</li> <li>• UART</li> </ul>	3 MBit/s (gross)	Mass Production	PAN1315A
						PAN1325A
80 $\mu$ A (sleep) 40 mA (Tx, EDR)	2,4 GHz	> 15	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• PCM</li> <li>• UART</li> <li>• JTAG</li> </ul>	3 MBit/s (gross) 2.170 kBit/s (net)	Mass Production	PAN1310
						PAN1320
			<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART</li> <li>• JTAG</li> </ul>	3 MBit/s (gross) 190 kBit/s (net)		PAN1311
						PAN1321
Pre-Production	PAN1322					

Current Consumption	Frequency Range	Number of GPIOs	Interfaces	Data Rate (max. air)	Status	Part No.
<100 $\mu$ A (sleep) 47 mA (ACL; DH1)	2,4 GHz	18	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART</li> <li>• I<sup>2</sup>C</li> <li>• SPI</li> <li>• ADC</li> </ul>	3 MBit/s (gross) ~500 kBit/s (net)	Mass Production	PAN1455
						PAN1555


Current Consumption	Frequency Range	Number of GPIOs	Interfaces	Data Rate (max. air)	Status	Part No.
Tx: 23 mA @ -6 dBm Rx: 18 mA Sleep Mode: < 1 $\mu$ A	2,4 GHz	19	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART</li> <li>• USB</li> </ul>	1 MBit/s (gross)	Mass Production	PAN1720
			<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART</li> </ul>			PAN1721

Current Consumption	Frequency Range	Number of GPIOs	Interfaces	Data Rate (max. air)	Status	Part No.
135 $\mu$ A (sleep) 40 mA (Tx, EDR)	2,4 GHz	2	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• PCM</li> <li>• UART</li> </ul>	3 MBit/s (gross)	Mass Production	PAN1316
						PAN1326
< 100 $\mu$ A (sleep) 47 mA (ACL; DH1)			<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART</li> </ul>		Engineering Samples	PAN1026







## Bluetooth &amp; ANT

Series / Type	BT Standard Profiles	Size	Used ICs	Rx Sensitivity	Tx Power (max.)	Power Supply
 PAN1317	Dual Mode BT classic & ANT 2.1 EDR HCI	9,0 x 6,5 x 1,7 mm	CC2567	-93 dBm @ BER 10 <sup>-3</sup>	+10,5 dBm	1,8 to 4,8 V
 PAN1327 (with Antenna)		9,0 x 9,5 x 1,7 mm				





## Bluetooth Triple Mode

Series / Type	BT Standard Profiles	Size	Used ICs	Rx Sensitivity	Tx Power (max.)	Power Supply
 PAN1323 <b>NEW</b>	BT classic & ANT & Low Energy 2.1 EDR HCI smart ready	9,0 x 9,5 x 1,7 mm	CC2569	-93 dBm @ BER 10 <sup>-3</sup>	+10,5 dBm	1,8 - 4,8 V

## ISM (Market for Industrial-Scientific-Medical Solutions)

Series / Type	Description	Size	Used ICs	Rx Sensitivity	Tx Power (max.)	Power Supply
 PAN7550	Wireless M-Bus AT Command Set	32,0 x 13,7 x 2,9 mm	MSP430 / CC1101	-109 dBm @ 1,2 kBit/s	+10 dBm	1,8 to 3,6 V
 PAN7580 <b>NEW</b>		29,8 x 19,0 x 2,6 mm	SiLabs SI1002	-102 dBm @ 100 kBit/s	+13 dBm	2,7 to 3,6 V
 PAN2580	Mesh Software	29,0 x 19,0 x 2,9 mm	SiLabs SI100x	-106 @ 2.0 kBit/s	+11 / +17 dBm	1,8 (2,7) to 3,6 V
 PAN2355  PAN2357	<1 GHz Trans- ceiver Module	8,0 x 8,2 x 1,9 mm	CC1101	-104 dBm @ 2,4 kBit/s	+10 dBm	1,8 to 3,6 V
 PAN2365	2.4 GHz Trans- ceiver Module	8,0 x 8,2 x 1,9 mm	CC2500	-104 dBm @ 2,4 kBit/s	0 dBm	

## IEEE 802.15.4 (Mesh Networking)

Series / Type	Description	Size	Used ICs	Rx Sensitivity	Tx Power (max.)	Power Supply
 PAN4555	AT Command Set & Mesh Software	16,4 x 12,2 x 2,2 mm	MC1321x	-92 dBm	0 dBm	2,0 to 3,4 V
 PAN4561 H / M / L	AT Command Set & Mesh Software	35,0 x 15,0 x 3,8 mm	MC1321x / CC259x	-102 / -102 / -92 dBm	+18,5 / +10 / 0 dBm	2,0 to 3,4 V
 PAN4580	AT Command Set & Mesh Software	29,0 x 19,0 x 2,9 mm	ATmega128RFA1	-100 @ 250 kBit/s	+3,0 dBm	1,8 to 3,6 V
 PAN4720	2.4 GHz Modem TI SW Stack	15,6 x 8,7 x 1,8 mm	CC2530 / 31	-93 @ 250 kBit/s	+2 dBm	2,0 to 3,6 V

Current Consumption	Frequency Range	Number of GPIOs	Interfaces	Data Rate (max. air)	Status	Part No.
135 µA (sleep) 40 mA (Tx, EDR)	2,4 GHz	2	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• PCM</li> <li>• UART</li> </ul>	3 MBit/s (gross)	Mass Production	PAN1317
						PAN1327

Current Consumption	Frequency Range	Number of GPIOs	Interfaces	Data Rate (max. air)	Status	Part No.
135 µA (sleep) 40 mA (Tx, EDR)	2,4 GHz	2	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• PCM</li> <li>• UART</li> </ul>	3 MBit/s (gross)	Mass Production	PAN1323

Current Consumption	Frequency Range	Number of GPIOs	Interfaces	Data Rate (max. air)	Status	Part No.
Tx: 30 mA @ +10 dBm Rx: 17 mA Sleep Mode: <1 µA	863 to 928 MHz	27	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART</li> <li>• SPI</li> <li>• JTAG</li> </ul>	500 kBit/s (gross)	Mass Production	PAN7550
Tx: 46 mA Rx: 24 mA Sleep Mode: <1 µA	868 MHz	18	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART</li> <li>• SPI</li> <li>• I<sup>2</sup>C</li> <li>• ADC</li> </ul>	256 kBit/s (gross)		PAN7580
Tx: 30 / 85 mA Rx: 18,5 mA Sleep Mode: <1 µA	863 to 928 MHz			256 kBit/s (gross)		PAN2580
<1 µA (sleep) 17 mA (Tx, 0 dBm)	863 to 928 MHz	2 Output	<ul style="list-style-type: none"> <li>• GPO</li> <li>• SPI</li> </ul>	500 kBit/s (gross)		PAN2355
	433 MHz					PAN2357
<1 µA (sleep) 21 mA (Tx, 0 dBm)	2,4 GHz				PAN2365	

Current Consumption	Frequency Range	Number of GPIOs	Interfaces	Data Rate (max. air)	Status	Part No.
< 1 µA (off mode) 30 mA (Tx, -4 dBm)	2,4 GHz	19	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART</li> <li>• SPI</li> </ul>	250 kBit/s (gross)	Mass Production	PAN4555
< 1 / 2 µA (off mode) 30 / 210 mA (Tx, -4 / +20 dBm)	2,4 GHz	33	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART</li> <li>• I<sup>2</sup>C</li> <li>• BDM</li> </ul>			PAN4561 H / M / L
Tx: 20,0 mA @ 0 dBm Rx: 17,0 mA Sleep Mode: <1 µA	2,4 GHz	33	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART (2 times)</li> <li>• SPI</li> <li>• ADC</li> <li>• wire serial (2 times)</li> </ul>	2 MBit/s (gross)		PAN4580
Tx: 39,0 mA @ 0 dBm Rx: 29,0 mA Sleep Mode: <1 µA	2,4 GHz	19	<ul style="list-style-type: none"> <li>• GPIO</li> <li>• UART</li> <li>• (USB)</li> </ul>	250 kBit/s (gross)	Engineering Samples	PAN4720

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