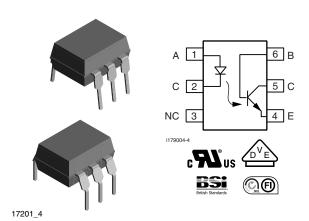




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Vishay Semiconductors

Optocoupler, Phototransistor Output, with Base Connection



DESCRIPTION

The CNY17 is an optically coupled pair consisting of a gallium arsenide infrared emitting diode optically coupled to a silicon NPN phototransitor.

Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output.

The CNY17 can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CRT modulation.

FEATURES

- Isolation test voltage 5000 V_{RMS}
- · Long term stability
- Industry standard dual-in-line package
- V_{IORM} = 850 V

Material categorization:
 For definitions of compliance please see www.vishay.com/doc?99912







AGENCY APPROVALS

- UL file no. E52744
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-5 (0884-5) available with option 1
- BSI IEC 60950-1:2006 IEC 60065
- FIMKO
- CQC

ORDERING I	INFORMATI	ON							
С	N	Υ	1 PART NUMBER	7	-	#		2 mm	DIP-6, 400 mil
AGENCY CERTIFIED/PACKAGE					CTF	ર (%)			
cUL, VDE, BSI, FIMKO, CQC			40 to 80	63 to	125	100	100 to 200		60 to 320
DIP-6			CNY17-1.	CNY17-2. CNY17-3.		Y17-3.	CNY17-4.		
DIP-6, 400 mil			CNY17G-1	CNY1	17G-2	CN'	Y17G-3	CI	NY17G-4

ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)									
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT					
INPUT									
Reverse voltage		V _R	5	V					
Forward current		I _F	60	mA					
Surge current	t ≤ 10 μs	I _{FSM}	3	Α					
Power dissipation		P _{diss}	100	mW					
OUTPUT	·								
Collector emitter breakdown voltage		BV _{CEO}	70	V					
Emitter base breakdown voltage		BV _{EBO}	7	V					
Collector current		Ic	50	mA					
Collector current	t < 1 ms	Ic	100	mA					
Power dissipation		P _{diss}	150	mW					



CNY17., CNY17G

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ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)								
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT				
COUPLER								
Isolation test voltage between emitter and detector referred to climate DIN 50014, part 2, Nov. 74	t = 1 min	V_{ISO}	5000	V_{RMS}				
Creepage distance (CNY17.)			≥ 7	mm				
Clearance distance (CNY17.)			≥ 7	mm				
Creepage distance (CNY17G)			≥ 8	mm				
Clearance distance (CNY17G)			≥ 8	mm				
Isolation thickness between emitter and detector			≥ 0.4	mm				
Comparative tracking index per DIN IEC 112/VDE 0303, part 1			250					
Isolation resistance	V _{IO} = 500 V, T _{amb} = 25 °C	R _{IO}	≥ 10 ¹²	Ω				
Isolation resistance	V _{IO} = 500 V, T _{amb} = 100 °C	R _{IO}	≥ 10 ¹¹	Ω				
Storage temperature		T _{stg}	- 55 to + 125	°C				
Operating temperature		T _{amb}	- 55 to + 100	°C				
Soldering temperature (1)	max. 10 s, dip soldering: distance to seating plane ≥ 1.5 mm	T _{sld}	260	°C				

Notes

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not
 implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute
 maximum ratings for extended periods of the time can adversely affect reliability.
- (1) Refer to wave profile for soldering conditions for through hole devices.

ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)									
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT		
INPUT									
Forward voltage	$I_F = 60 \text{ mA}$		V _F		1.25	1.65	V		
Breakdown voltage	I _R = 10 μA		V_{BR}	6			V		
Reverse current	V _R = 6 V		I _R		0.01	10	μA		
Capacitance	V _R = 0 V, f = 1 MHz		Co		25		pF		
Thermal resistance			R _{th}		750		K/W		
OUTPUT									
Collector emitter capacitance	V _{CE} = 5 V, f = 1 MHz		C _{CE}		5.2		pF		
Collector base capacitance	V _{CB} = 5 V, f = 1 MHz		C _{CB}		6.5		pF		
Emitter base capacitance	V _{EB} = 5 V, f = 1 MHz		C _{EB}		7.5		pF		
Thermal resistance			R _{th}		500		K/W		
COUPLER									
Collector emitter, saturation voltage	$I_F = 10 \text{ mA}, I_C = 2.5 \text{ mA}$		V _{CEsat}		0.25	0.4	V		
Coupling capacitance			C _C		0.6		pF		
	V _{CE} = 10 V	CNY17-1	I _{CEO}		2	50	nA		
Collector oppitter lookege or		CNY17-2	I _{CEO}		2	50	nA		
Collector emitter, leakage current		CNY17-3	I _{CEO}		5	100	nA		
		CNY17-4	I _{CEO}		5	100	nA		

Note

Minimum and maximum values were tested requierements. Typical values are characteristics of the device and are the result of engineering
evaluations. Typical values are for information only and are not part of the testing requirements.



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CNY17., CNY17G

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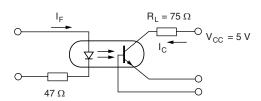
CURRENT TRANSFER RATIO									
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT		
		CNY17-1	CTR	40		80	%		
	V - 5 V L - 10 mA	CNY17-2	CTR	63		125	%		
I _C /I _F	$V_{CE} = 5 \text{ V}, I_F = 10 \text{ mA}$	CNY17-3	CTR	100		200	%		
		CNY17-4	CTR	160		320	%		
		CNY17-1	CTR	13	30		%		
	V 5 V 1 1 m A	CNY17-2	CTR	22	45		%		
	$V_{CE} = 5 \text{ V}, I_{F} = 1 \text{ mA}$	CNY17-3	CTR	34	70		%		
		CNY17-4	CTR	56	90		%		

Note

Current transfer ratio and collector-emitter leakage current by dash number (T_{amb} °C).

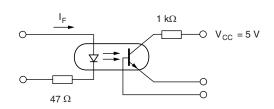
SWITCHING CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)									
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT		
LINEAR OPERATION (WITH	HOUT SATURATION)								
Turn-on time	$I_F = 10$ mA, $V_{CC} = 5$ V, $R_L = 75$ Ω		t _{on}		3		μs		
Rise time	I_F = 10 mA, V_{CC} = 5 V, R_L = 75 Ω		t _r		2		μs		
Turn-off time	$I_F = 10$ mA, $V_{CC} = 5$ V, $R_L = 75$ Ω		t _{off}		2.3		μs		
Fall time	$I_F = 10$ mA, $V_{CC} = 5$ V, $R_L = 75$ Ω		t _f		2		μs		
Cut-off frequency	I_F = 10 mA, V_{CC} = 5 V, R_L = 75 Ω		f _{CO}		250		kHz		
SWITCHING OPERATION (WITH SATURATION)								
	I _F = 20 mA	CNY17-1	t _{on}		3		μs		
Turn-on time	10 1	CNY17-2	t _{on}		4.2		μs		
	I _F = 10 mA	CNY17-3	t _{on}		4.2		μs		
	I _F = 5 mA	CNY17-4	t _{on}		2.3 2 250 3 4.2 4.2 4.2 6 2 3 3 4.6 18 23 23	μs			
	I _F = 20 mA	CNY17-1	t _r		2		μs		
Rise time	I _E = 10 mA	CNY17-2	t _r		3		μs		
nise time	IF = 10 IIIA	CNY17-3	t _r		3		μs		
	I _F = 5 mA	CNY17-4	t _r		4.6		μs		
	I _F = 20 mA	CNY17-1	t _{off}		18		μs		
Turn-off time	10 ~	CNY17-2	t _{off}		23		μs		
Turn-off time	I _F = 10 mA	CNY17-3	t _{off}		23		μs		
	I _F = 5 mA	CNY17-4	t _{off}		25		μs		
	I _F = 20 mA	CNY17-1	t _f		11		μs		
Fall time	1. 10 mA	CNY17-2	t _f		14		μs		
raii uiiie	I _F = 10 mA	CNY17-3	t _f		14		μs		
	I _F = 5 mA	CNY17-4	t _f		15		μs		

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)



icny17_01

Fig. 1 - Linear Operation (without Saturation)



icny17_02

Fig. 1 - Switching Operation (with Saturation)

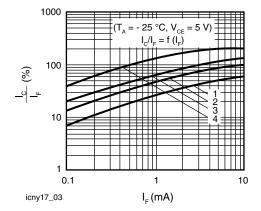


Fig. 2 - Current Transfer Ratio vs. Diode Current

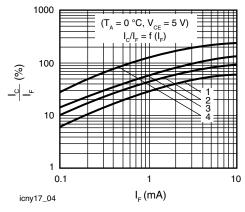


Fig. 3 - Current Transfer Ratio vs. Diode Current

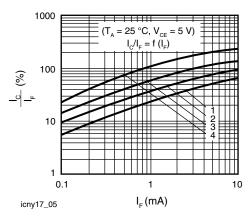


Fig. 4 - Current Transfer Ratio vs. Diode Current

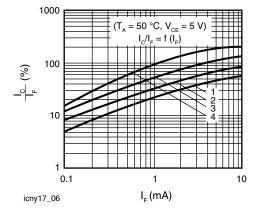


Fig. 5 - Current Transfer Ratio vs. Diode Current

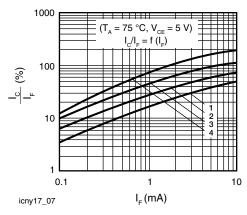


Fig. 6 - Current Transfer Ratio vs. Diode Current

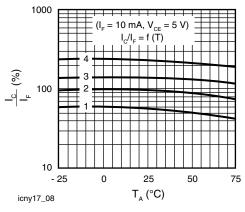


Fig. 7 - Current Transfer Ratio (CTR) vs. Temperature

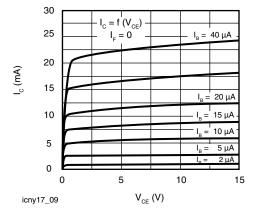


Fig. 8 - Transistor Characteristics

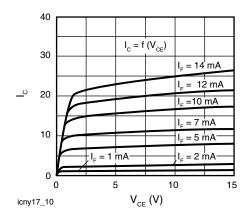


Fig. 9 - Output Characteristics

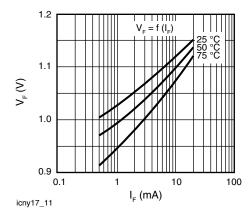


Fig. 10 - Forward Voltage vs. Forward Current

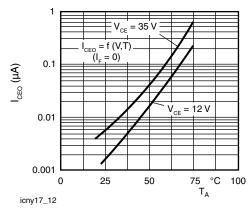


Fig. 11 - Leakage Current vs. Ambient Temperature



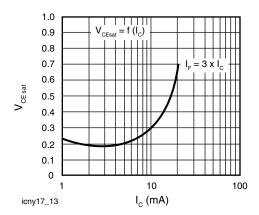


Fig. 12 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-1

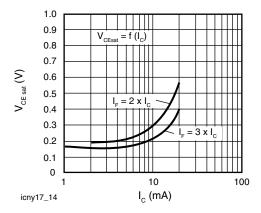


Fig. 13 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-2

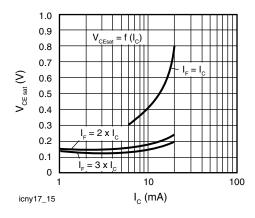


Fig. 14 - Saturation Voltage vs.
Collector Current and Modulation Depth CNY17-3

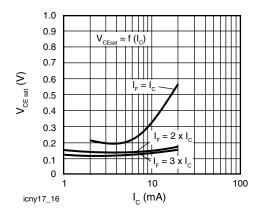


Fig. 15 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-4

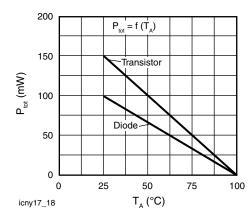
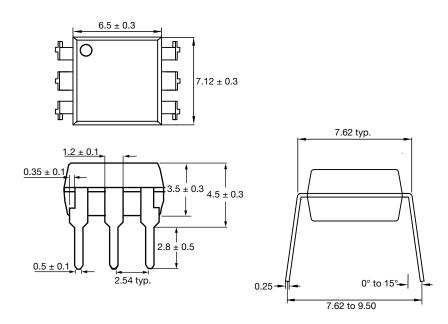


Fig. 16 - Permissible Power Dissipation for Transistor and Diode

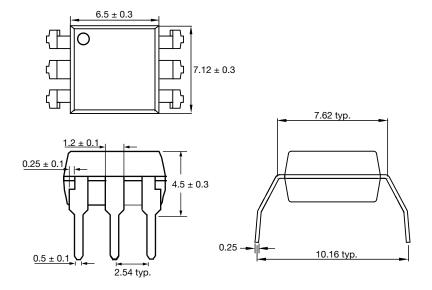


PACKAGE DIMENSIONS in millimeters

DIP-6



DIP-6, 400 mil



PACKAGE MARKING



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