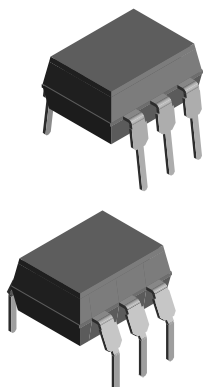
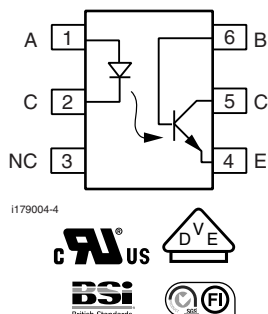




Optocoupler, Phototransistor Output, with Base Connection



17201_4



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

**RoHS**
COMPLIANT

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

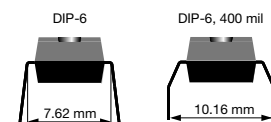
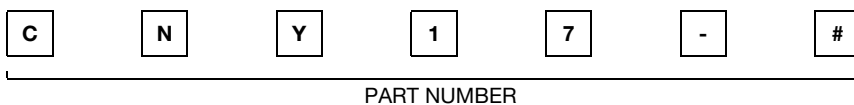
DESCRIPTION

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

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.

ORDERING INFORMATION



AGENCY CERTIFIED/PACKAGE	CTR (%)			
cUL, VDE, BSI, FIMKO, CQC	40 to 80	63 to 125	100 to 200	160 to 320
DIP-6	CNY17-1.	CNY17-2.	CNY17-3.	CNY17-4.
DIP-6, 400 mil	CNY17G-1	CNY17G-2	CNY17G-3	CNY17G-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	A
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		I _C	50	mA
	t < 1 ms	I _C	100	mA
Power dissipation		P _{diss}	150	mW



ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, 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	$t = 1\text{ min}$	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	$V_{IO} = 500\text{ V}, T_{amb} = 25\text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{12}$	Ω
	$V_{IO} = 500\text{ V}, T_{amb} = 100\text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{11}$	Ω
Storage temperature		T_{stg}	- 55 to + 125	$^{\circ}\text{C}$
Operating temperature		T_{amb}	- 55 to + 100	$^{\circ}\text{C}$
Soldering temperature ⁽¹⁾	max. 10 s, dip soldering: distance to seating plane $\geq 1.5\text{ mm}$	T_{slid}	260	$^{\circ}\text{C}$

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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, 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	$I_R = 10\text{ }\mu\text{A}$		V_{BR}	6			V
Reverse current	$V_R = 6\text{ V}$		I_R		0.01	10	μA
Capacitance	$V_R = 0\text{ V}, f = 1\text{ MHz}$		C_O		25		pF
Thermal resistance			R_{th}		750		K/W
OUTPUT							
Collector emitter capacitance	$V_{CE} = 5\text{ V}, f = 1\text{ MHz}$		C_{CE}		5.2		pF
Collector base capacitance	$V_{CB} = 5\text{ V}, f = 1\text{ MHz}$		C_{CB}		6.5		pF
Emitter base capacitance	$V_{EB} = 5\text{ V}, f = 1\text{ MHz}$		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
Collector emitter, leakage current	$V_{CE} = 10\text{ V}$	CNY17-1	I_{CEO}		2	50	nA
		CNY17-2	I_{CEO}		2	50	nA
		CNY17-3	I_{CEO}		5	100	nA
		CNY17-4	I_{CEO}		5	100	nA

Note

- Minimum and maximum values were tested requirements. 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.



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

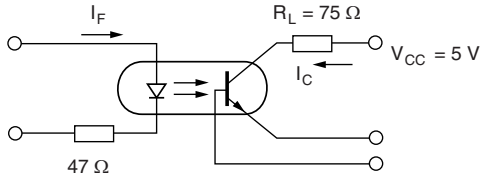
Note

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

SWITCHING CHARACTERISTICS ($T_{amb} = 25\text{ °C}$, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
LINEAR OPERATION (WITHOUT SATURATION)							
Turn-on time	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\ \Omega$		t_{on}		3		μs
Rise time	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\ \Omega$		t_r		2		μs
Turn-off time	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\ \Omega$		t_{off}		2.3		μs
Fall time	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\ \Omega$		t_f		2		μs
Cut-off frequency	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\ \Omega$		f_{CO}		250		kHz
SWITCHING OPERATION (WITH SATURATION)							
Turn-on time	$I_F = 20\text{ mA}$	CNY17-1	t_{on}		3		μs
	$I_F = 10\text{ mA}$	CNY17-2	t_{on}		4.2		μs
		CNY17-3	t_{on}		4.2		μs
	$I_F = 5\text{ mA}$	CNY17-4	t_{on}		6		μs
Rise time	$I_F = 20\text{ mA}$	CNY17-1	t_r		2		μs
	$I_F = 10\text{ mA}$	CNY17-2	t_r		3		μs
		CNY17-3	t_r		3		μs
	$I_F = 5\text{ mA}$	CNY17-4	t_r		4.6		μs
Turn-off time	$I_F = 20\text{ mA}$	CNY17-1	t_{off}		18		μs
	$I_F = 10\text{ mA}$	CNY17-2	t_{off}		23		μs
		CNY17-3	t_{off}		23		μs
	$I_F = 5\text{ mA}$	CNY17-4	t_{off}		25		μs
Fall time	$I_F = 20\text{ mA}$	CNY17-1	t_f		11		μs
	$I_F = 10\text{ mA}$	CNY17-2	t_f		14		μs
		CNY17-3	t_f		14		μs
	$I_F = 5\text{ mA}$	CNY17-4	t_f		15		μs

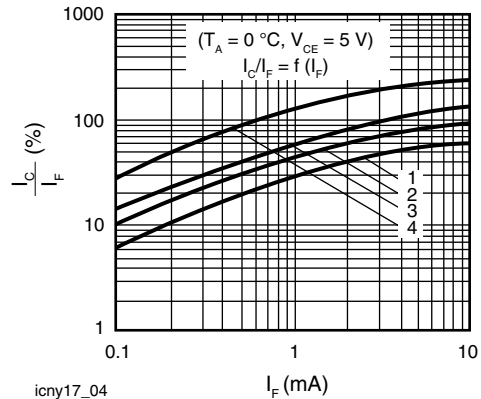


TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)



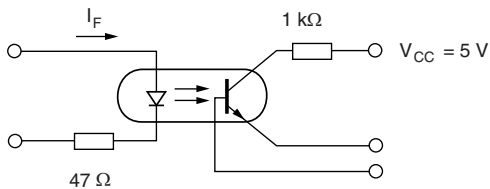
icny17_01

Fig. 1 - Linear Operation (without Saturation)



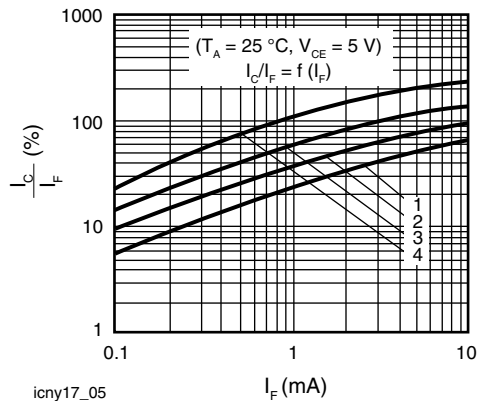
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Fig. 3 - Current Transfer Ratio vs. Diode Current



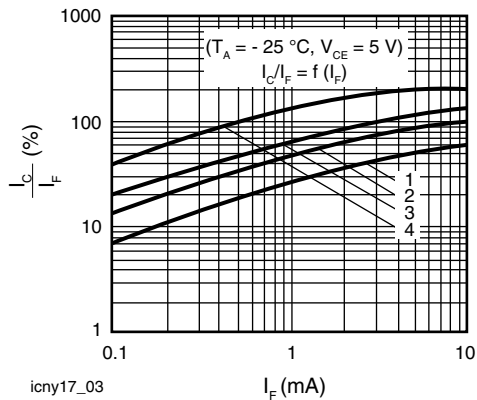
icny17_02

Fig. 1 - Switching Operation (with Saturation)



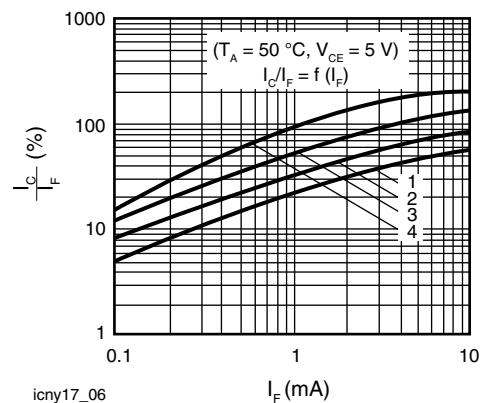
icny17_05

Fig. 4 - Current Transfer Ratio vs. Diode Current



icny17_03

Fig. 2 - Current Transfer Ratio vs. Diode Current



icny17_06

Fig. 5 - Current Transfer Ratio vs. Diode Current

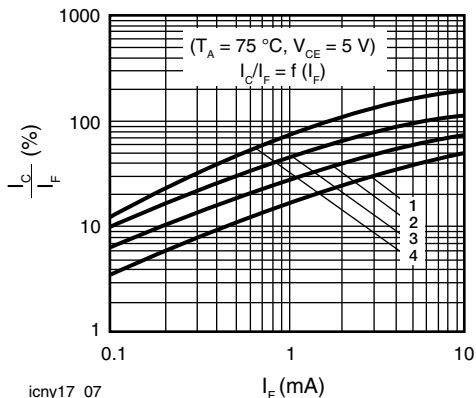


Fig. 6 - Current Transfer Ratio vs. Diode Current

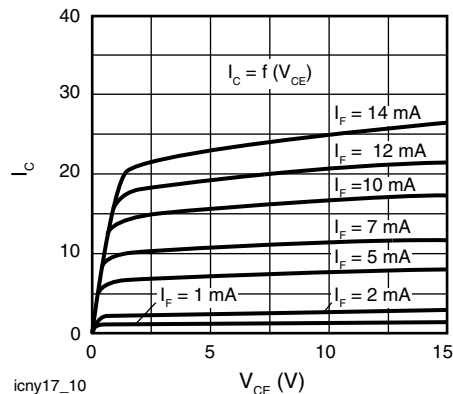


Fig. 9 - Output Characteristics

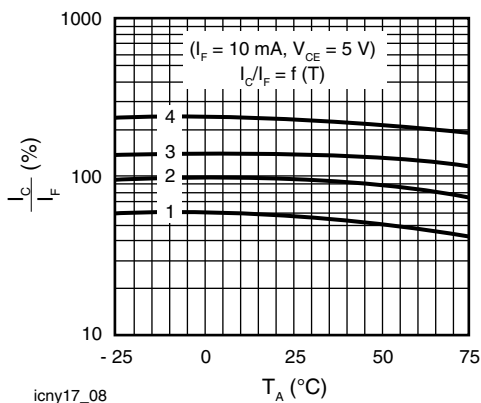


Fig. 7 - Current Transfer Ratio (CTR) vs. Temperature

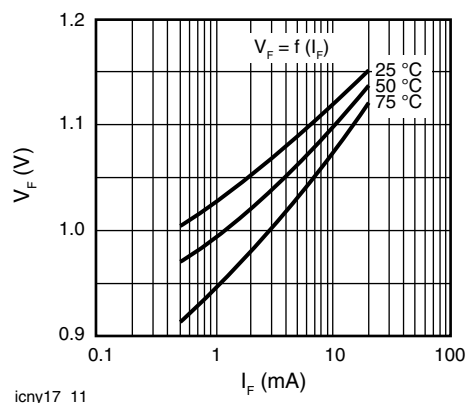


Fig. 10 - Forward Voltage vs. Forward Current

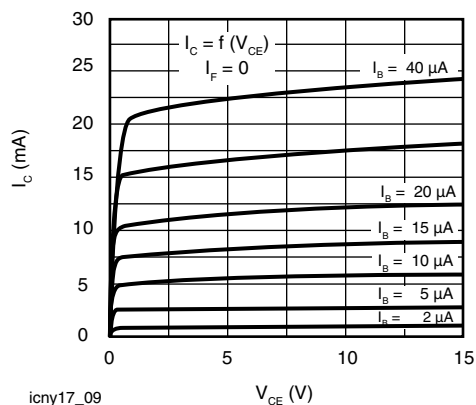


Fig. 8 - Transistor Characteristics

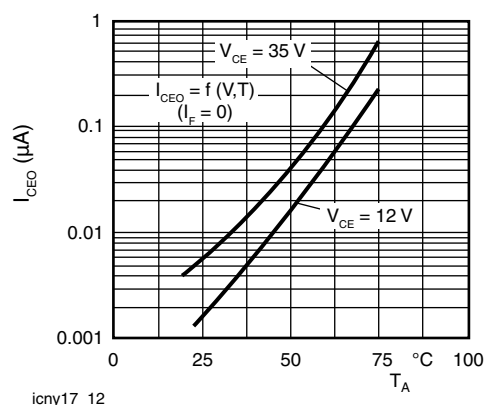


Fig. 11 - Leakage Current vs. Ambient Temperature

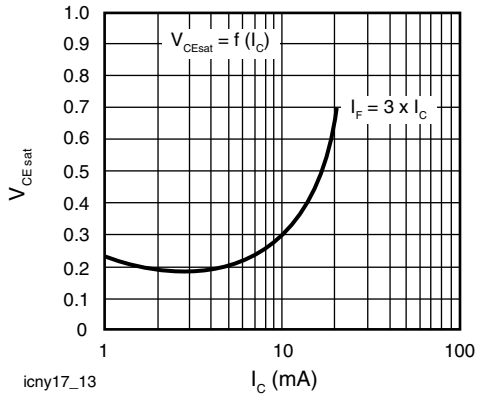


Fig. 12 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-1

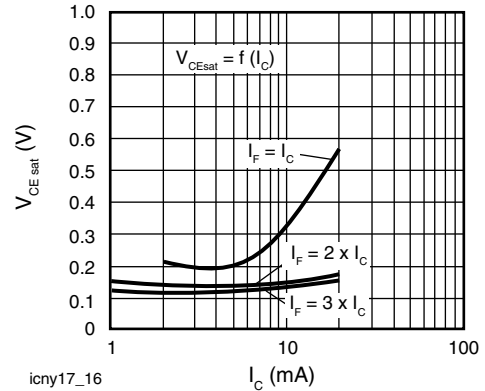


Fig. 15 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-4

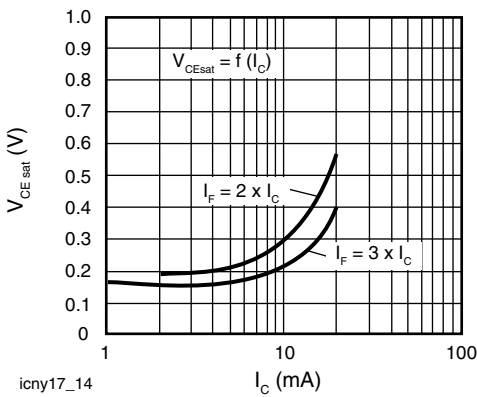


Fig. 13 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-2

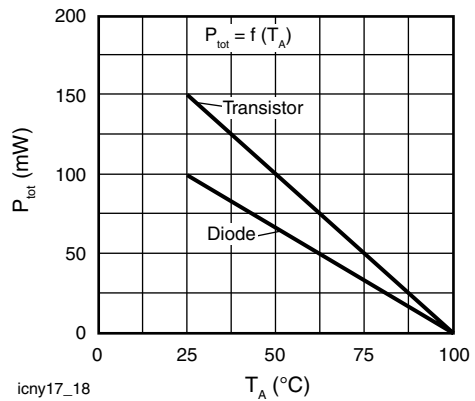


Fig. 16 - Permissible Power Dissipation for Transistor and Diode

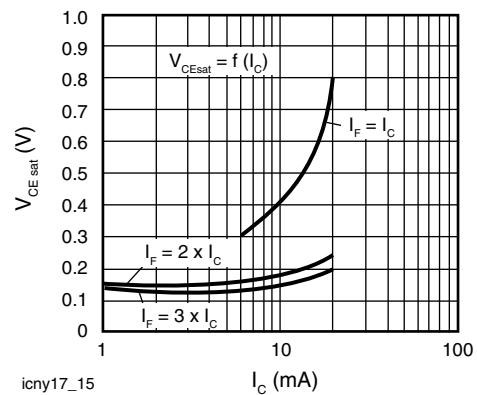
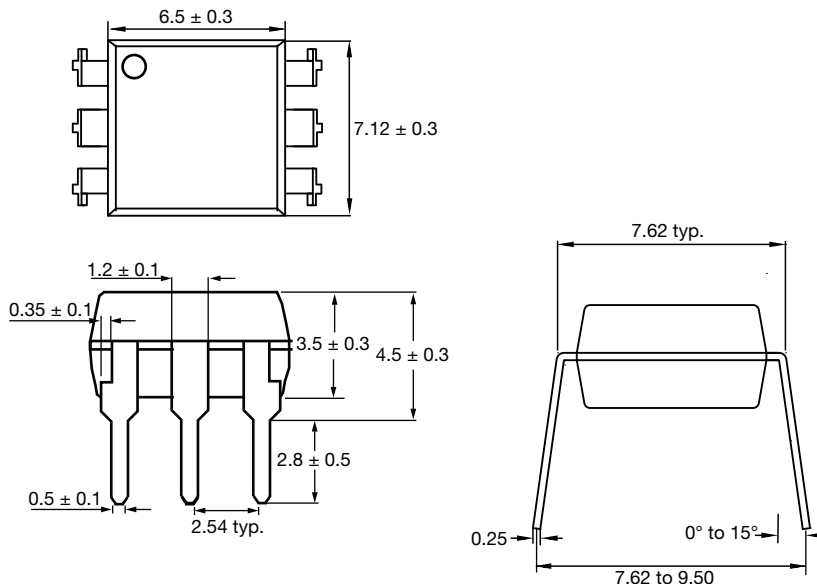


Fig. 14 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-3

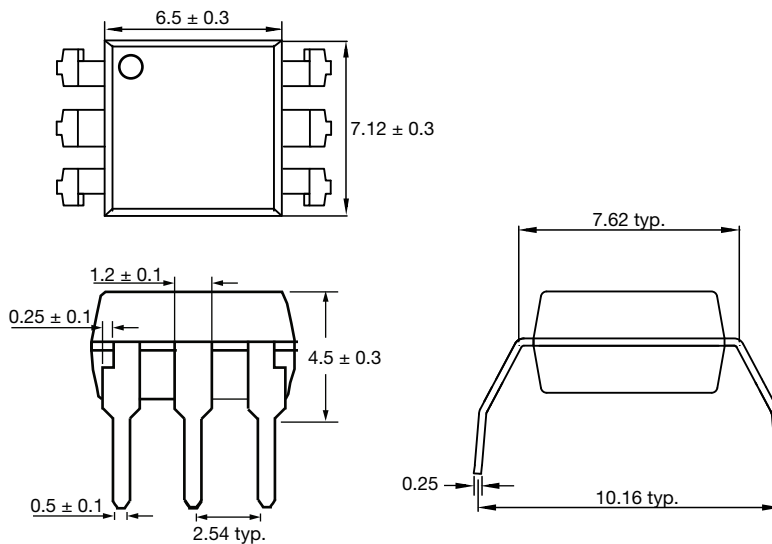


PACKAGE DIMENSIONS in millimeters

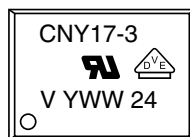
DIP-6



DIP-6, 400 mil



PACKAGE MARKING





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