



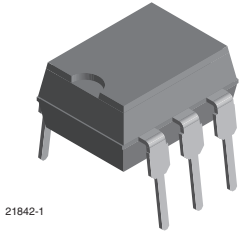
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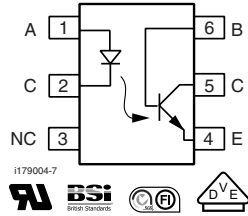
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Optocoupler, Phototransistor Output, with Base Connection



21842-1


FEATURES

- Isolation test voltage: 5300 V_{RMS}
- Long term stability
- Industry standard dual-in-line package
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC


RoHS
COMPLIANT

AGENCY APPROVALS

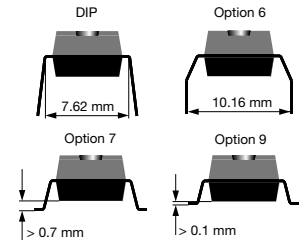
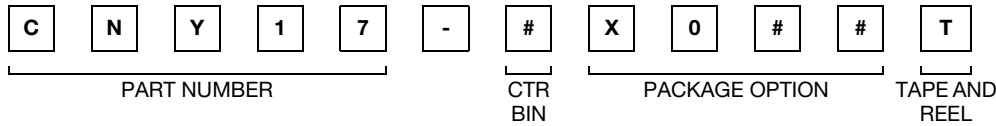
- Underwriters lab file no. E52744 system code H or J
- DIN EN 60747-5-2 (VDE 0884)
- BSI IEC 60950, IEC 60065
- FIMKO

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 (%)			
UL, BSI, FIMKO	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, option 6	CNY17-1X006	CNY17-2X006	CNY17-3X006	CNY17-4X006
SMD-6, option 7	CNY17-1X007T ⁽¹⁾	CNY17-2X007T ⁽¹⁾	CNY17-3X007T ⁽¹⁾	CNY17-4X007T ⁽¹⁾
SMD-6, option 9	CNY17-1X009T ⁽¹⁾	CNY17-2X009T ⁽¹⁾	CNY17-3X009T ⁽¹⁾	CNY17-4X009T ⁽¹⁾
VDE, UL, BSI, FIMKO	40 to 80	63 to 125	100 to 200	160 to 320
DIP-6	CNY17-1X001	CNY17-2X001	CNY17-3X001	CNY17-4X001
DIP-6, 400 mil, option 6	CNY17-1X016	CNY17-2X016	CNY17-3X016	CNY17-4X016
SMD-64, option 7	CNY17-1X017	CNY17-2X017T ⁽¹⁾	CNY17-3X017T ⁽¹⁾	CNY17-4X017T ⁽¹⁾
SMD-6, option 9	-	CNY17-2X019T ⁽¹⁾	-	-

Note

⁽¹⁾ Also available in tubes, do not put T on the end.

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V _R	6	V
Forward current		I _F	60	mA
Surge current	t ≤ 10 μs	I _{FSM}	2.5	A
Power dissipation		P _{diss}	100	mW

Vishay Semiconductors Optocoupler, Phototransistor Output,
with Base Connection

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
OUTPUT				
Collector emitter breakdown voltage		BV_{CEO}	70	V
Emitter base breakdown voltage		BV_{EBO}	7	V
Collector current		I_C	50	mA
	$t < 1\text{ ms}$	I_C	100	mA
Power dissipation		P_{diss}	150	mW
COUPLER				
Isolation test voltage between emitter and detector	$t = 1\text{ s}$	V_{ISO}	5300	V_{RMS}
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Isolation thickness between emitter and detector			≥ 0.4	mm
Comparative tracking index per DIN IEC 112/VDE 0303, part 1			175	
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 + 150	$^{\circ}\text{C}$
Operating temperature		T_{amb}	- 55 to + 100	$^{\circ}\text{C}$
Soldering temperature	max. 10 s, dip soldering: distance to seating plane $\geq 1.5\text{ mm}$	T_{slid}	260	$^{\circ}\text{C}$

Note

- 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.

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	$I_R = 10\text{ mA}$		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	$V_F = 10\text{ mA}, I_C = 2.5\text{ mA}$		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.



Optocoupler, Phototransistor Output, Vishay Semiconductors
with Base Connection

CURRENT TRANSFER RATIO							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I _C /I _F	V _{CE} = 5 V, I _F = 10 mA	CNY17-1	CTR	40		80	%
		CNY17-2	CTR	63		125	%
		CNY17-3	CTR	100		200	%
		CNY17-4	CTR	160		320	%
	V _{CE} = 5 V, I _F = 1 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							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
LINEAR OPERATION (without 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)							
Turn-on time	I _F = 20 mA	CNY17-1	t _{on}		3		μs
	I _F = 10 mA	CNY17-2	t _{on}		4.2		μs
		CNY17-3	t _{on}		4.2		μs
	I _F = 5 mA	CNY17-4	t _{on}		6		μs
Rise time	I _F = 20 mA	CNY17-1	t _r		2		μs
	I _F = 10 mA	CNY17-2	t _r		3		μs
		CNY17-3	t _r		3		μs
	I _F = 5 mA	CNY17-4	t _r		4.6		μs
Turn-off time	I _F = 20 mA	CNY17-1	t _{off}		18		μs
	I _F = 10 mA	CNY17-2	t _{off}		23		μs
		CNY17-3	t _{off}		23		μs
	I _F = 5 mA	CNY17-4	t _{off}		25		μs
Fall time	I _F = 20 mA	CNY17-1	t _f		11		μs
	I _F = 10 mA	CNY17-2	t _f		14		μs
		CNY17-3	t _f		14		μs
	I _F = 5 mA	CNY17-4	t _f		15		μs

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

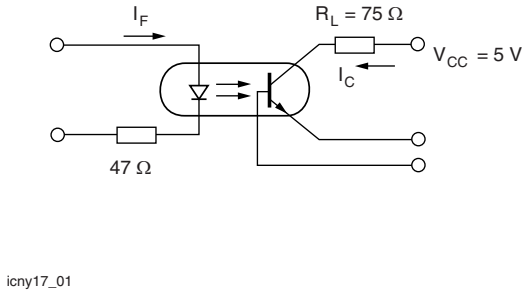


Fig. 1 - Linear Operation (without Saturation)

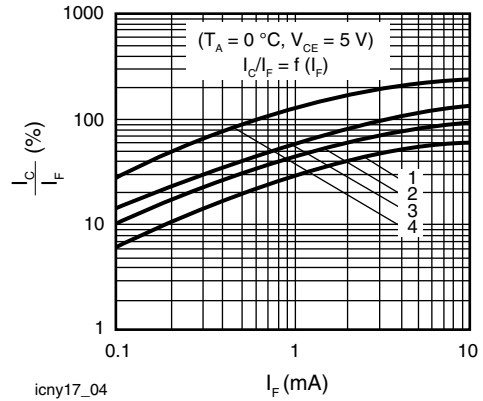


Fig. 4 - Current Transfer Ratio vs. Diode Current

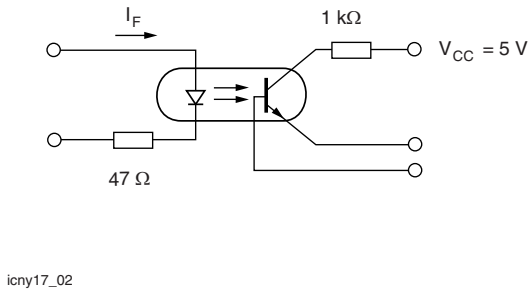


Fig. 2 - Switching Operation (with Saturation)

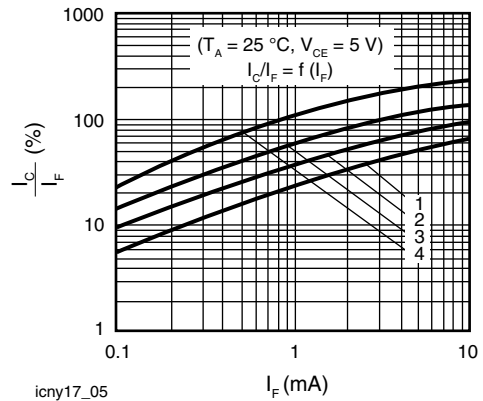


Fig. 5 - Current Transfer Ratio vs. Diode Current

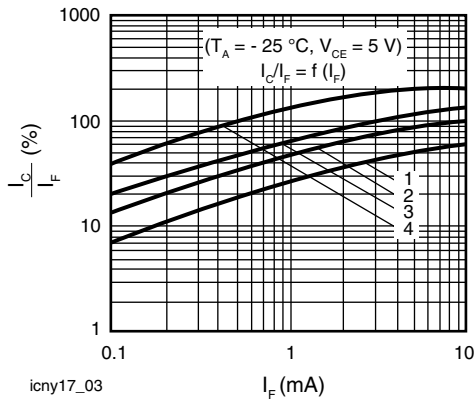


Fig. 3 - Current Transfer Ratio vs. Diode Current

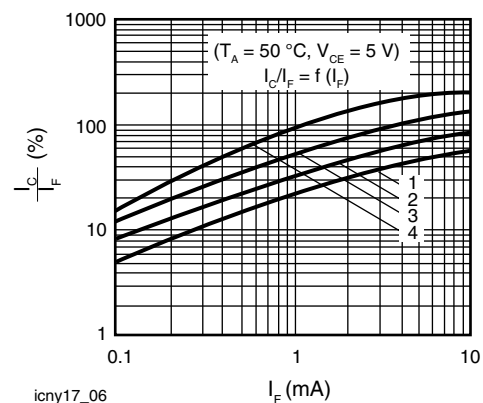
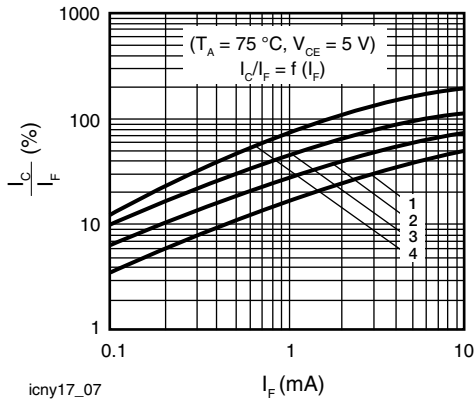
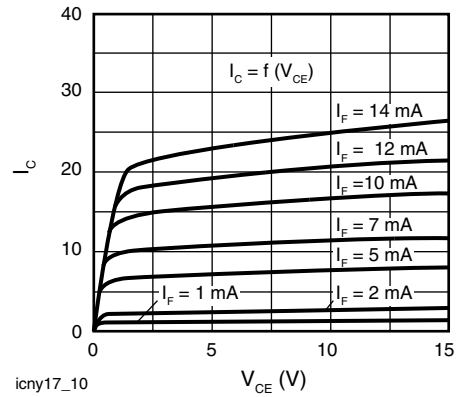


Fig. 6 - Current Transfer Ratio vs. Diode Current

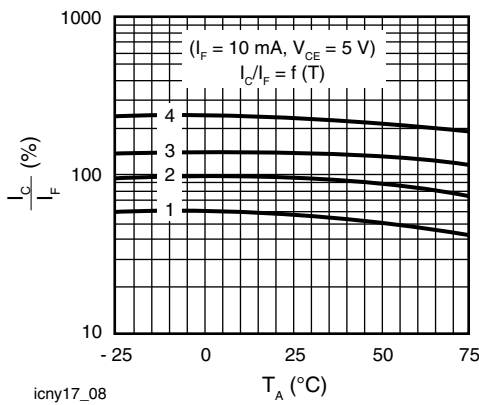
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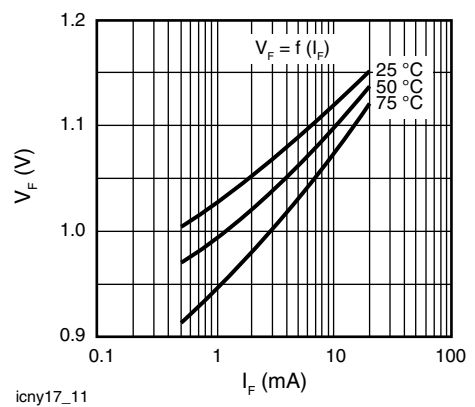
icny17_07
Fig. 7 - Current Transfer Ratio vs. Diode Current



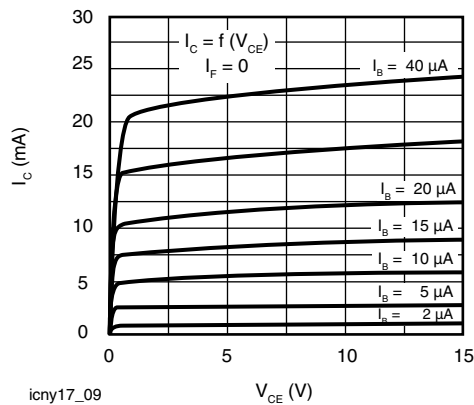
icny17_10
Fig. 10 - Output Characteristics



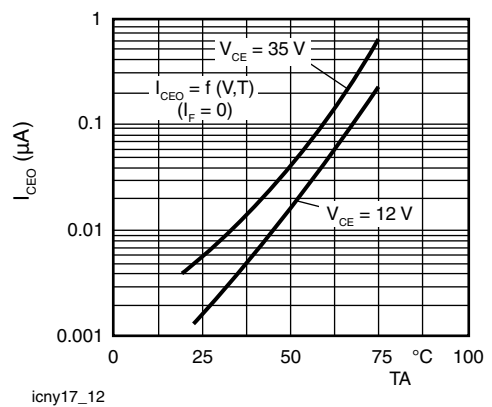
icny17_08
Fig. 8 - Current Transfer Ratio (CTR) vs. Temperature



icny17_11
Fig. 11 - Forward Voltage



icny17_09
Fig. 9 - Transistor Characteristics



icny17_12
Fig. 12 - Collector Emitter Off-state Current

Vishay Semiconductors Optocoupler, Phototransistor Output, with Base Connection

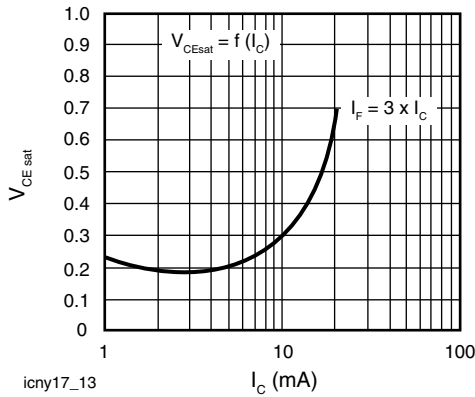


Fig. 13 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-1

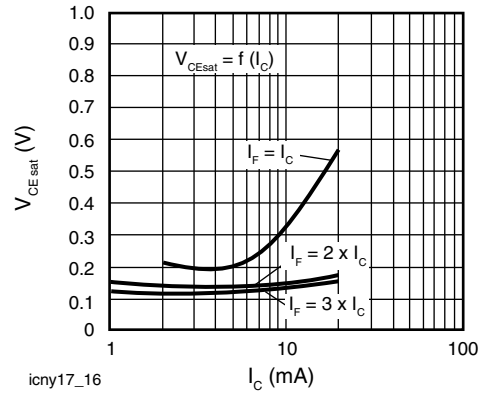


Fig. 16 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-4

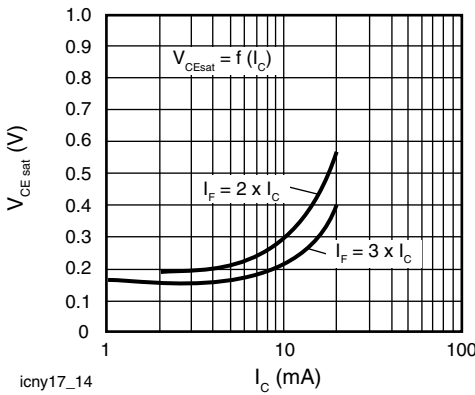


Fig. 14 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-2

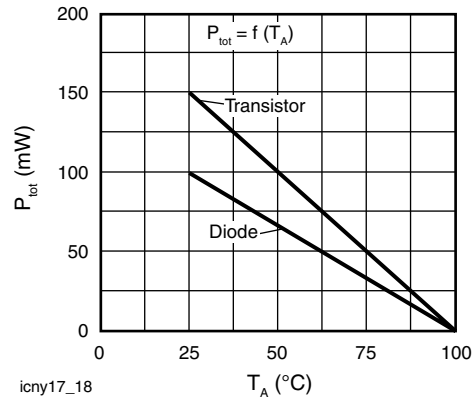


Fig. 17 - Permissible Power Dissipation for Transistor and Diode

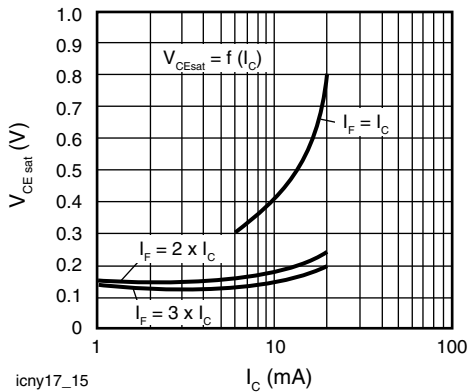
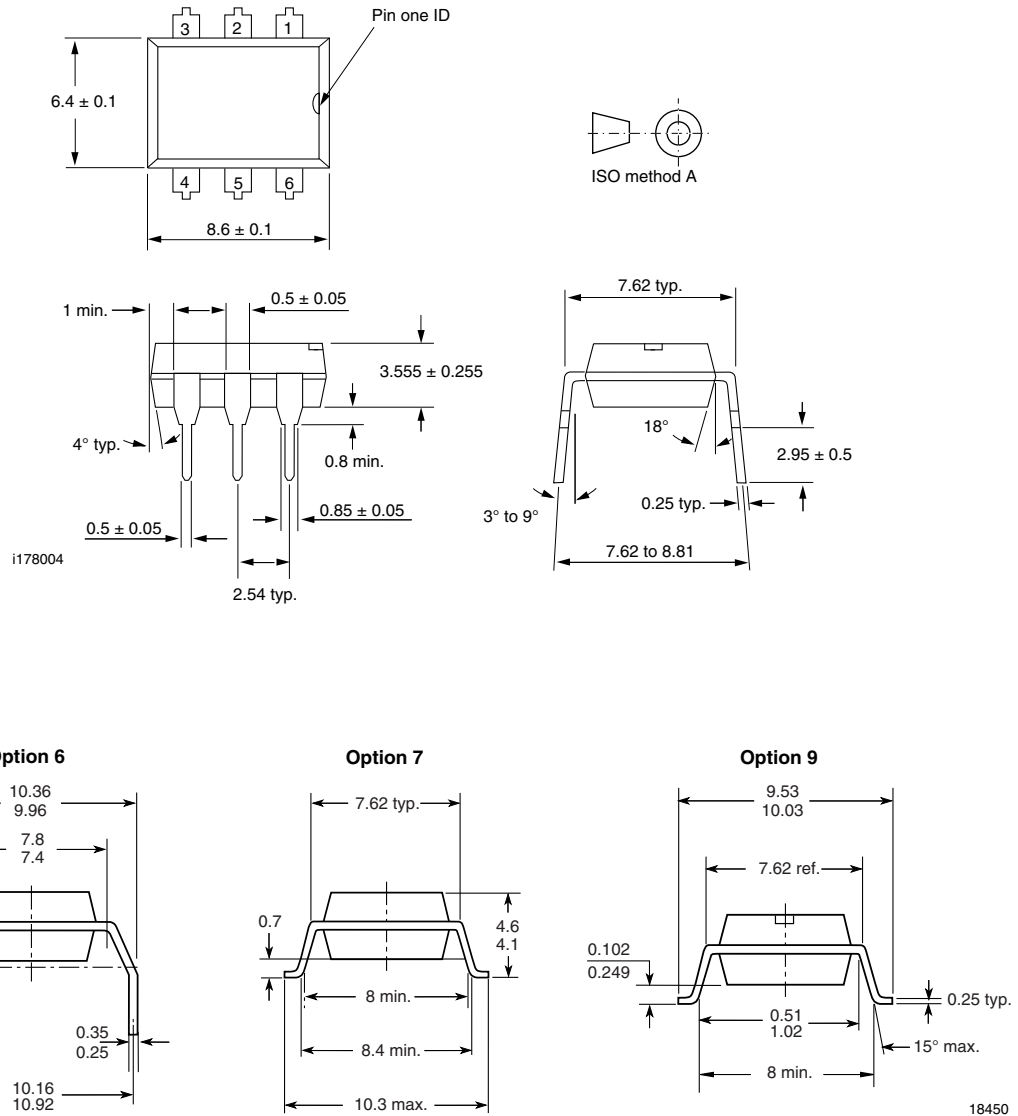


Fig. 15 - Saturation Voltage vs. Collector Current and Modulation Depth CNY17-3

Optocoupler, Phototransistor Output, Vishay Semiconductors with Base Connection

PACKAGE DIMENSIONS in millimeters




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