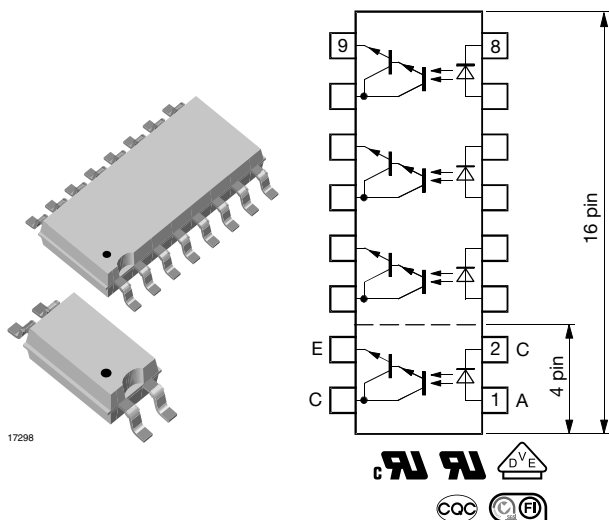


Optocoupler, Photodarlington Output, High Gain, Single / Quad Channel, Half Pitch Mini-Flat Package



LINKS TO ADDITIONAL RESOURCES



DESCRIPTION

The TCMD1000, TCMD4000 consist of a photodarlington optically coupled to a gallium arsenide infrared-emitting diodes in either a 4 pin or 16 pin miniflat package.

The elements provide a fixed distance between input and output for highest safety requirements.

FEATURES

- Low profile package (half pitch)
- AC isolation test voltage 3750 V_{RMS}
- Low coupling capacitance of typical 0.3 pF
- Low temperature coefficient of CTR
- Wide ambient temperature range
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Programmable logic
- Modems
- Answering machines
- General applications

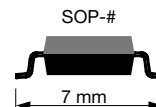
AGENCY APPROVALS

- [UL 1577](#)
- [cUL](#)
- [DIN EN 60747-5-5 \(VDA 0884-5\)](#)
- [CQC](#)
- [BSI](#)
- [FIMKO](#)

ORDERING INFORMATION

T C M D # 0 0 0

PART NUMBER



AGENCY CERTIFIED / PACKAGE	CTR (%)
UL, cUL, FIMKO, BSI, VDE	> 600
SOP-4	TCMD1000
SOP-16, quad channel	TCMD4000

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	6	V
Forward current		I_F	60	mA
Forward surge current	$t_p \leq 10 \mu s$	I_{FSM}	1.5	A
Power dissipation		P_{diss}	100	mW
Junction temperature		T_j	125	$^{\circ}C$



ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
OUTPUT				
Collector emitter voltage		V_{CEO}	35	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	80	mA
Collector peak current	$t_p/T = 0.5$, $t_p \leq 10\text{ ms}$	I_{CM}	100	mA
Power dissipation		P_{diss}	150	mW
Junction temperature		T_j	125	$^{\circ}\text{C}$
COUPLER				
AC isolation test voltage (RMS)		$V_{ISO}^{(1)}$	3750	V_{RMS}
Total power dissipation		P_{tot}	250	mW
Operating ambient temperature range		T_{amb}	- 40 to + 100	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	- 40 to + 125	$^{\circ}\text{C}$
Soldering temperature ⁽²⁾		T_{sld}	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) Related to standard climate 23/50 DIN 50014.

(2) Wave soldering three cycles are allowed. Also refer to "Assembly Instruction" (www.vishay.com/doc?80054).

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
input						
Forward voltage	$I_F = 50\text{ mA}$	V_F	-	1.25	1.6	V
Junction capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$	C_j	-	50	-	pF
output						
Collector emitter voltage	$I_C = 100\text{ }\mu\text{A}$	V_{CEO}	35	-	-	V
Emitter collector voltage	$I_E = 100\text{ }\mu\text{A}$	V_{ECO}	7	-	-	V
Collector dark current	$V_{CE} = 10\text{ V}$, $I_F = 0$, $E = 0$	I_{CEO}	-	-	100	nA
coupler						
Collector emitter saturation voltage	$I_F = 20\text{ mA}$, $I_C = 5\text{ mA}$	V_{CEsat}	-	-	1	V
Cut-off frequency	$I_F = 10\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_L = 100\text{ }\Omega$	f_c	-	10	-	kHz
Coupling capacitance	$f = 1\text{ MHz}$	C_k	-	0.3	-	pF

Note

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I_C/I_F	$V_{CE} = 2\text{ V}$, $I_F = 1\text{ mA}$	TCMD1000	CTR	600	800	-	%
		TCMD4000	CTR	600	800	-	%

SWITCHING CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Rise time	$V_{CE} = 2\text{ V}$, $I_C = 10\text{ mA}$, $R_L = 100\text{ }\Omega$ (see Fig. 1)	t_r	-	300	-	μs
Turn-off time	$V_{CE} = 2\text{ V}$, $I_C = 10\text{ mA}$, $R_L = 100\text{ }\Omega$ (see Fig. 1)	t_{off}	-	250	-	μs

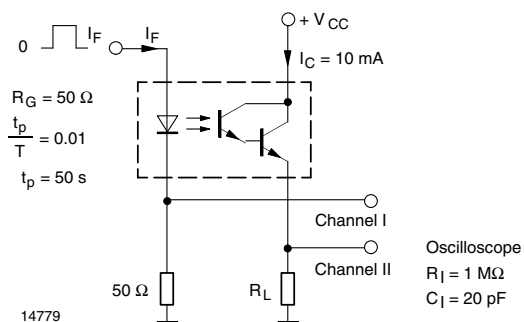


Fig. 1 - Test Circuit, Non-Saturated Operation

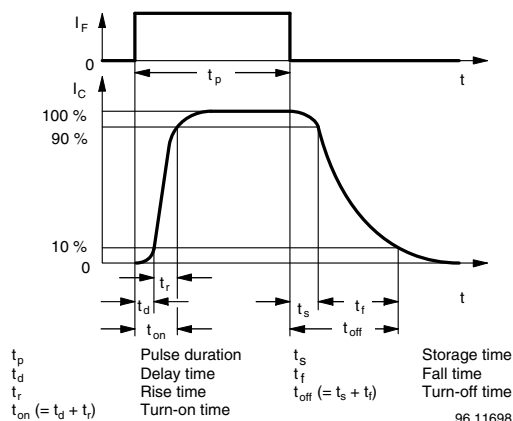


Fig. 2 - Switching Times

SAFETY AND INSULATION RATINGS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Climatic classification	IEC 68 part 1		-	40 / 110 / 21	-	
Comparative tracking index		CTI	175	-	399	
V _{IOTM}			6000	-	-	V
V _{IORM}			707	-	-	V
P _{SO}			-	-	265	mW
I _{SI}			-	-	130	mA
T _{SI}			-	-	150	°C
Creepage distance			5	-	-	mm
Clearance distance			5	-	-	mm
Insulation thickness, reinforce rated	per IEC 60950 2.10.5.1		0.4	-	-	mm

Note

- As per IEC 60747-5-2, § 7.4.3.8.1, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

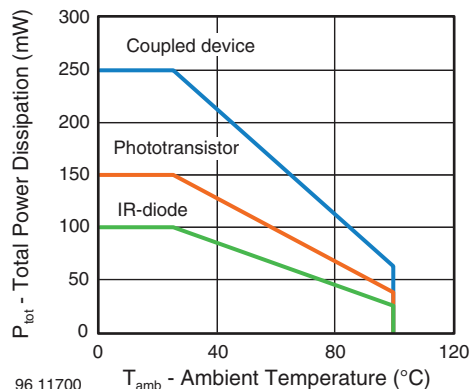
TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)


Fig. 3 - Forward Voltage vs. Ambient Temperature

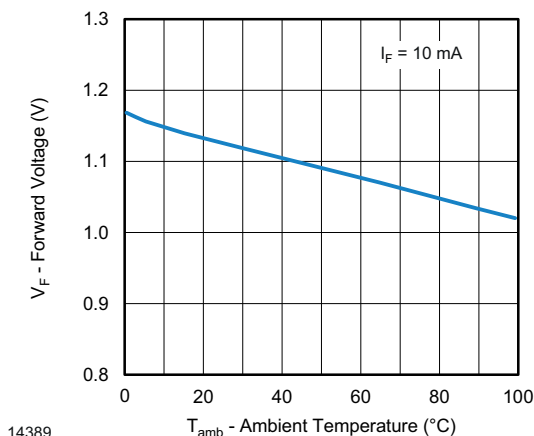


Fig. 4 - Forward Voltage vs. Ambient Temperature

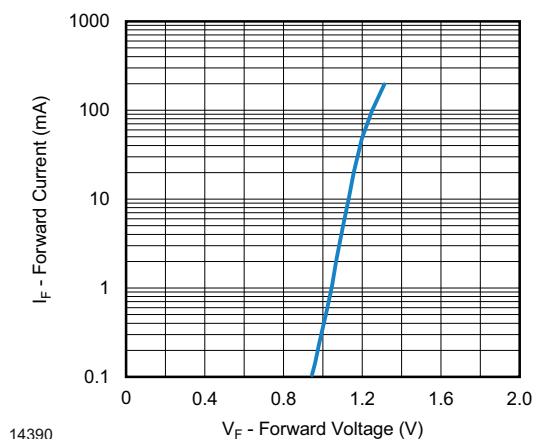


Fig. 5 - Forward Current vs. Forward Voltage

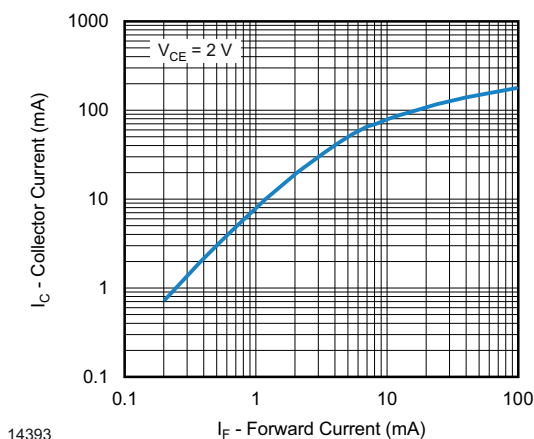


Fig. 8 - Collector Current vs. Forward Current

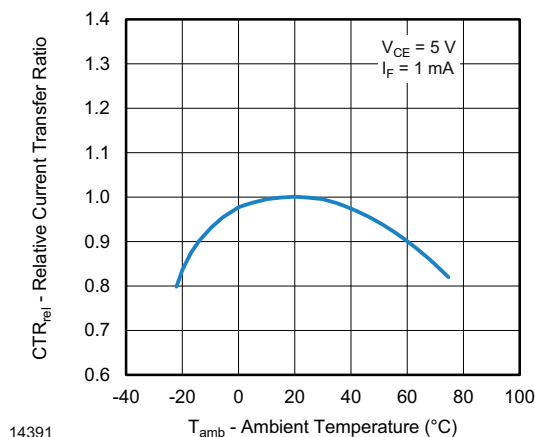


Fig. 6 - Relative Current Transfer Ratio vs. Ambient Temperature

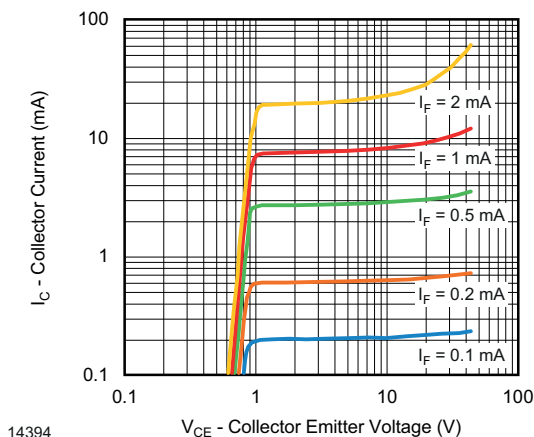


Fig. 9 - Collector Current vs. Collector Emitter Voltage

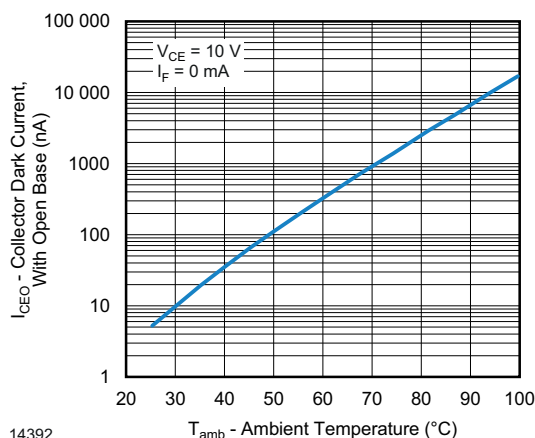


Fig. 7 - Collector Dark Current vs. Ambient Temperature

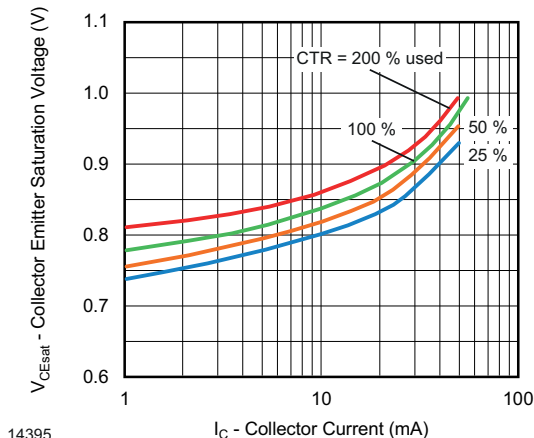


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

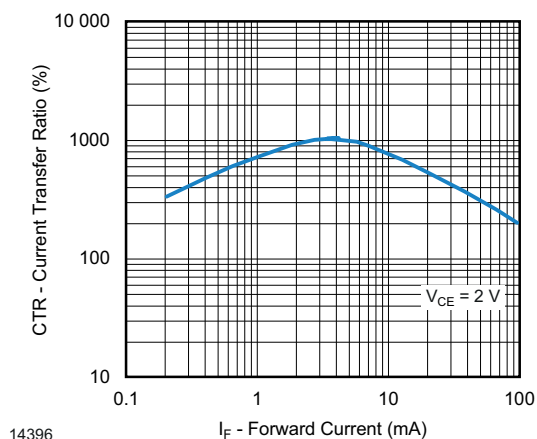
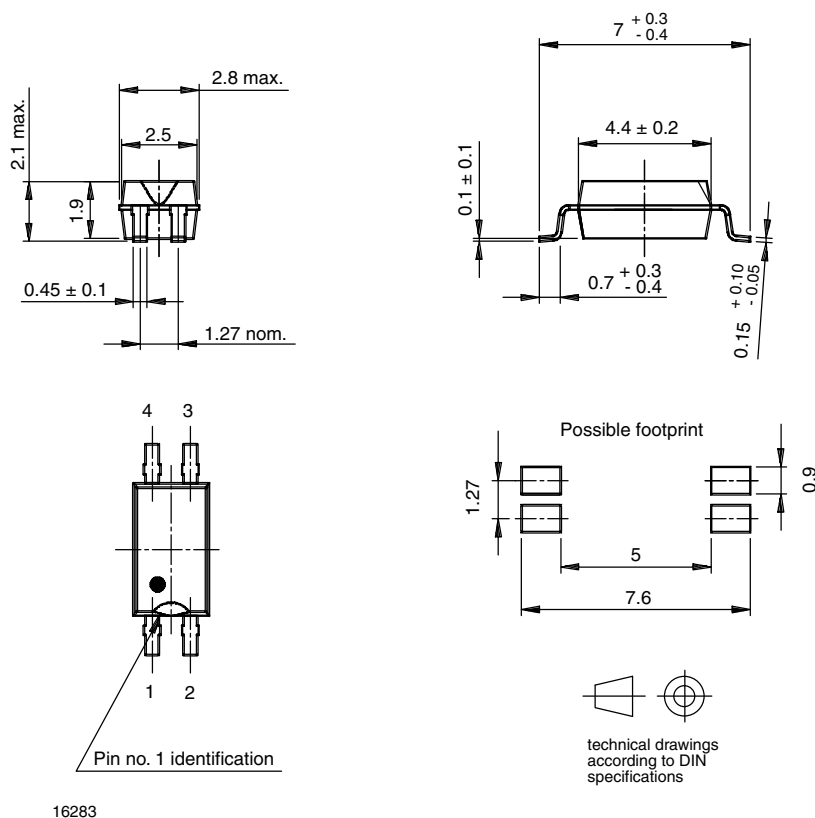
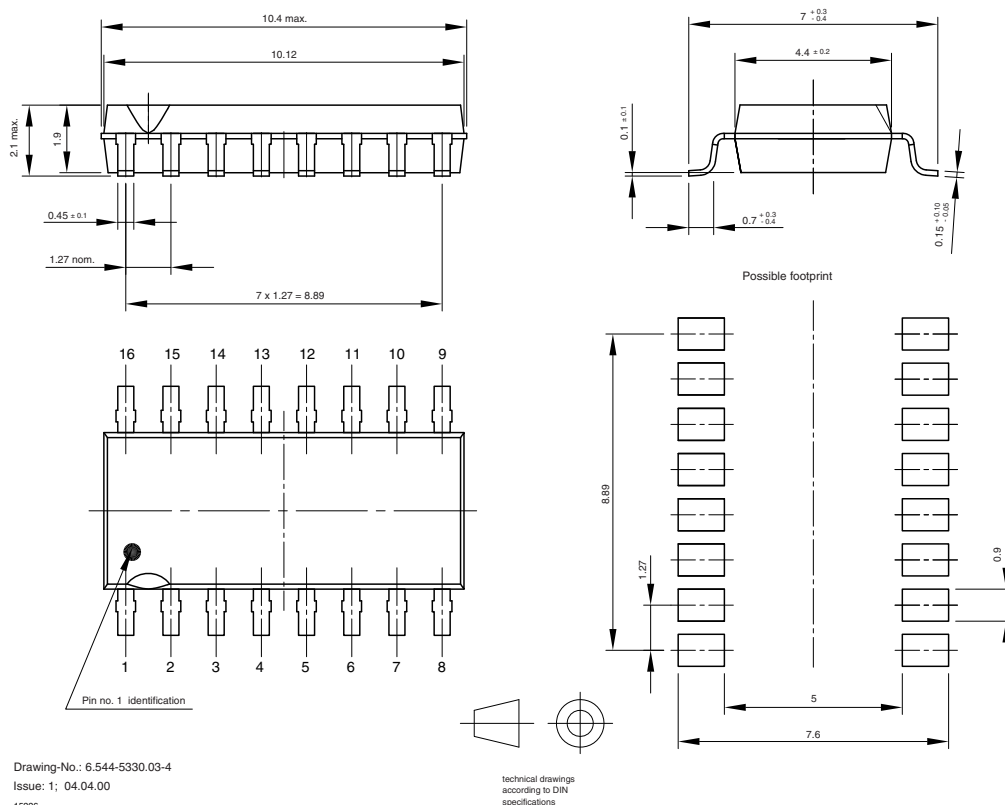
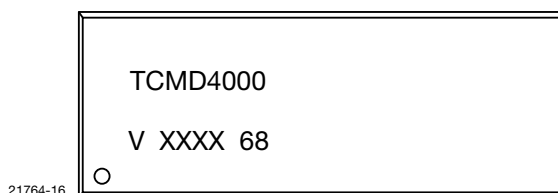
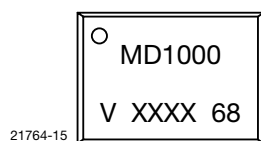


Fig. 11 - Current Transfer Ratio vs. Forward Current

PACKAGE DIMENSIONS in millimeters




PACKAGE MARKING



Note

- XXXX = LMC (lot marking code)



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