

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

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
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Agency Approvals

- UL1577, File No. E76222 System Code M, Double Protection
- CSA 22.2 bulletin 5A, Double Protection

Applications

Programmable logic

Modems

Answering machines

General applications

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.

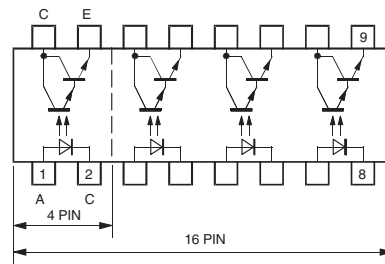
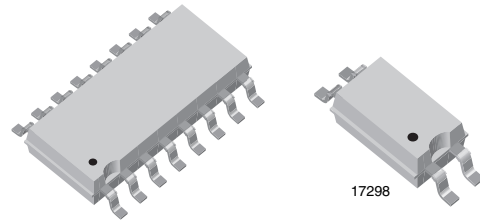
Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

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 Rating for extended periods of the time can adversely affect reliability.

Input

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V _R	6	V
Forward current		I _F	60	mA
Forward surge current	t _p ≤ 10 μs	I _{FSM}	1.5	A
Power dissipation		P _{diss}	100	mW
Junction temperature		T _j	125	°C



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

Order Information

Part	Remarks
TCMD1000	CTR > 600 %, SMD-4
TCMD4000	CTR > 600 %, SMD-16

Output

Parameter	Test condition	Symbol	Value	Unit
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	°C

Coupler

Parameter	Test condition	Symbol	Value	Unit
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	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature		T_{slid}	240	°C

¹⁾ Related to standard climate 23/50 DIN 50014

Electrical Characteristics

$T_{amb} = 25 \text{ °C}$, unless otherwise specified

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.

Input

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector emitter saturation voltage	$I_F = 10 \text{ mA}, I_C = 1 \text{ mA}$	V_{CEsat}			0.3	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

Current Transfer Ratio

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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Rise time	$V_{CE} = 2\text{ V}$, $I_C = 10\text{ mA}$, $R_L = 100\ \Omega$ (see figure 1)	t_r		300		μs
Turn-off time	$V_{CE} = 2\text{ V}$, $I_C = 10\text{ mA}$, $R_L = 100\ \Omega$ (see figure 1)	t_{off}		250		μs

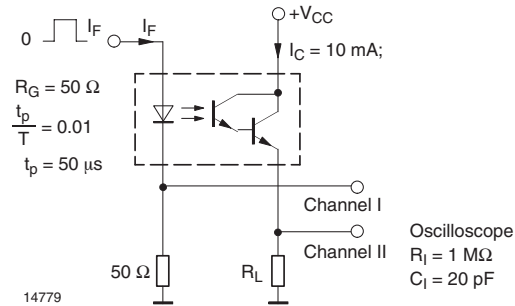


Figure 1. Test circuit, non-saturated operation

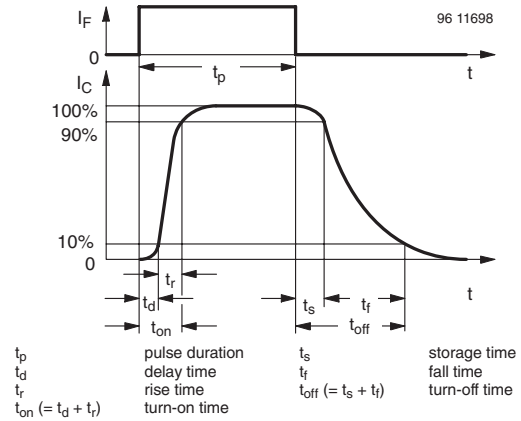


Figure 2. Switching Times

Typical Characteristics ($T_{amb} = 25\text{ }^\circ\text{C}$ unless otherwise specified)

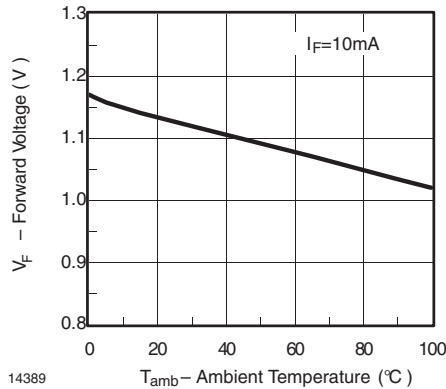


Figure 3. Forward Voltage vs. Ambient Temperature

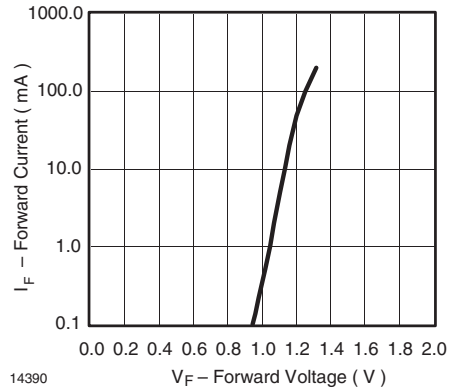


Figure 4. Forward Current vs. Forward Voltage

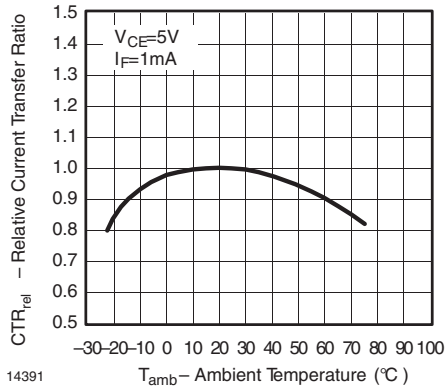


Figure 5. Relative Current Transfer Ratio vs. Ambient Temperature

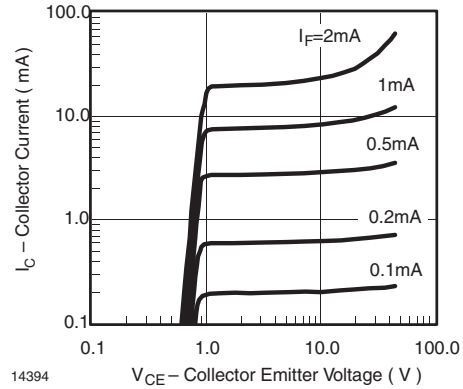


Figure 8. Collector Current vs. Collector Emitter Voltage

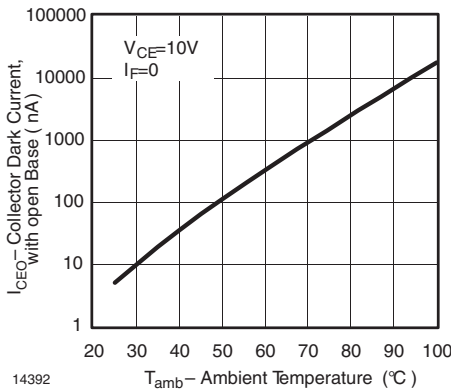


Figure 6. Collector Dark Current vs. Ambient Temperature

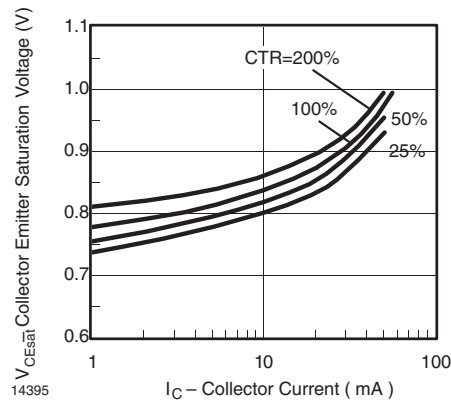


Figure 9. Collector Emitter Saturation Voltage vs. Collector Current

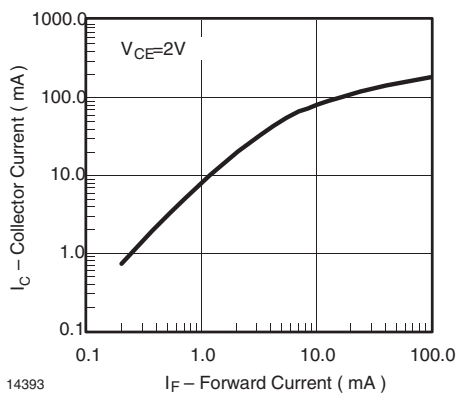


Figure 7. Collector Current vs. Forward Current

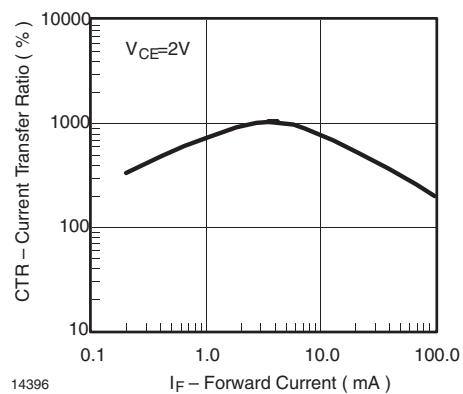
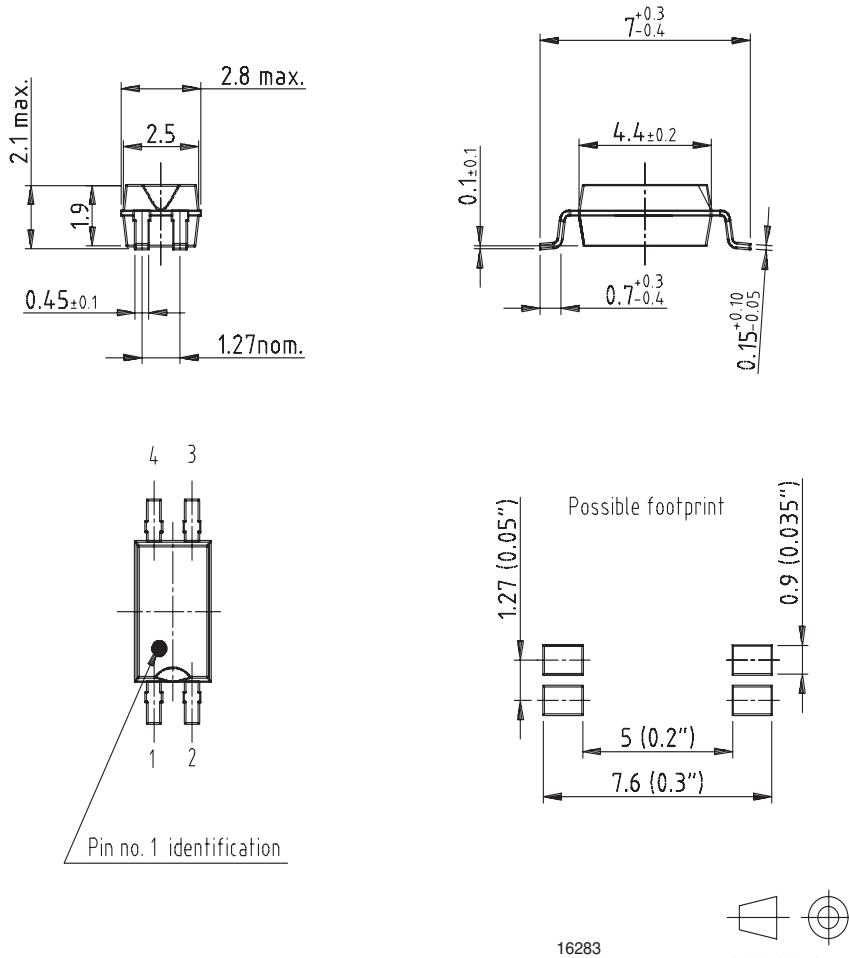


Figure 10. Current Transfer Ratio vs. Forward Current

Package Dimensions in mm

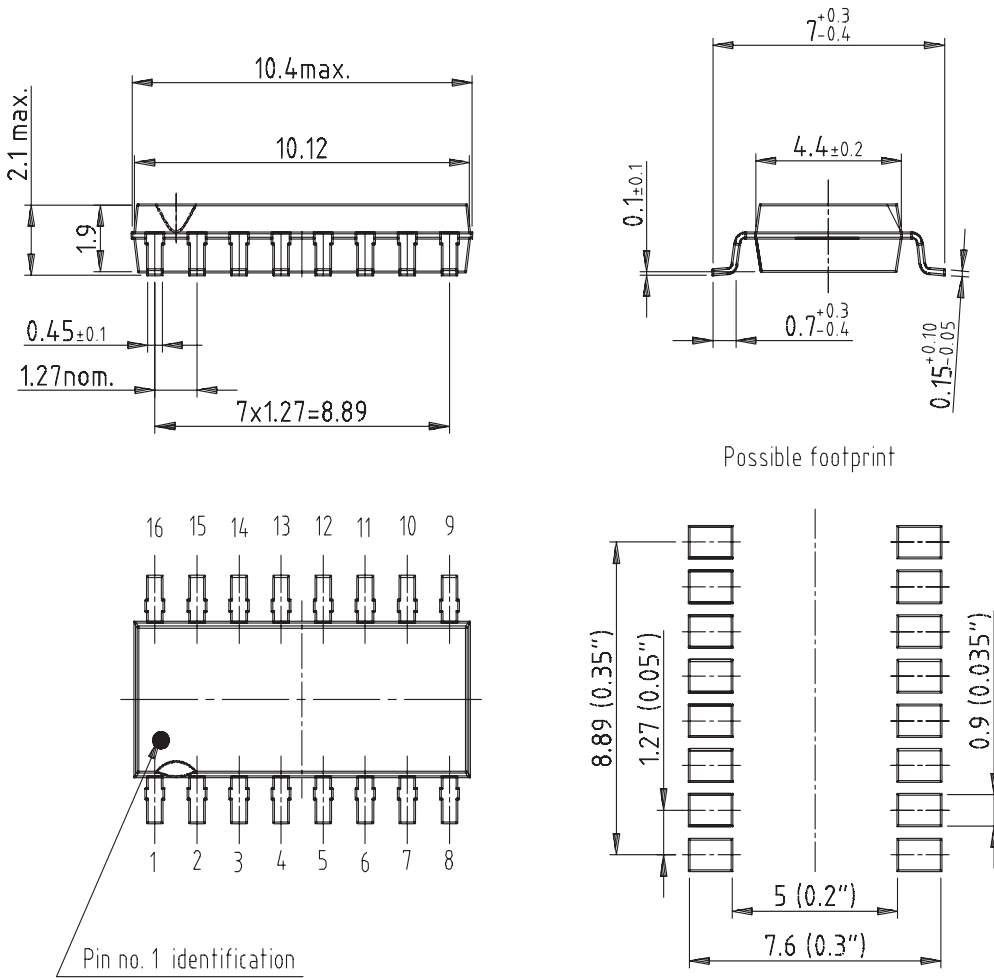


TCMD1000 / TCMD4000



Vishay Semiconductors

Package Dimensions in mm



Drawing-No.: 6.544-5330.03-4
Issue: 1; 04.04.00

technical drawings
according to DIN
specifications

15226



Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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