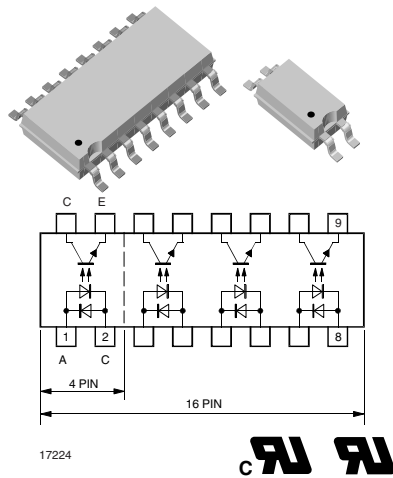


Optocoupler, Phototransistor Output, AC Input, Single/Quad Channel, Half Pitch Mini-Flat Package



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
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



RoHS
COMPLIANT

APPLICATIONS

- Programmable logic controllers

AGENCY APPROVALS

- UL1577, file no. E76222 system code M, double protection
- C-UL CSA 22.2 bulletin 5A

DESCRIPTION

The low profile miniflat package includes an optocoupler with AC Input and transistor output. It is available in single channel (4 pin) TCMT1600 or quad channel (16 pin) TCMT4600.

ORDER INFORMATION

PART	REMARKS
TCMT1600	CTR 80 % to 300 %, single channel, SOP-4
TCMT1600T3 ⁽¹⁾	CTR 80 % to 300 %, single channel, SOP-4
TCMT4600	CTR 80 % to 300 %, quad channel, SOP-16
TCMT4600T0 ⁽¹⁾	CTR 80 % to 300 %, quad channel, SOP-16
TCMT4606	CTR 100 % to 300 %, quad channel, SOP-16

Notes

Available only on tape and reel.

⁽¹⁾ Product is rotated 180° in tape and reel cavity.

ABSOLUTE MAXIMUM RATINGS ⁽¹⁾

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
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
OUTPUT				
Collector emitter voltage		V _{CEO}	70	V
Emitter collector voltage		V _{ECO}	7	V
Collector current		I _C	50	mA
Collector peak current	t _p /T = 0.5, t _p ≤ 10 ms	I _{CM}	100	mA
Power dissipation		P _{diss}	150	mW
Junction temperature		T _j	125	°C

TCMT1600, TCMT4600 Series



Vishay Semiconductors Optocoupler, Phototransistor Output,
AC Input, Single/Quad Channel, Half
Pitch Mini-Flat Package

ABSOLUTE MAXIMUM RATINGS ⁽¹⁾				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
AC isolation test voltage (RMS)		V_{ISO}	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 ⁽²⁾		T_{sld}	260	°C

Notes

⁽¹⁾ $T_{amb} = 25\text{ °C}$, 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 ratings for extended periods of the time can adversely affect reliability.

⁽²⁾ Refer to reflow profile for soldering conditions for surface mounted devices.

ELECTRICAL CHARACTERISTICS						
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}	70			V
Emitter collector voltage	$I_E = 100\text{ }\mu\text{A}$	V_{ECO}	7			V
Collector dark current	$V_{CE} = 20\text{ V}$, $I_F = 0$, $E = 0$	I_{CEO}			100	nA
COUPLER						
Collector emitter saturation voltage	$I_F = 10\text{ mA}$, $I_C = 1\text{ mA}$	V_{CEsat}			0.3	V
Cut-off frequency	$V_{CE} = 5\text{ V}$, $I_F = 10\text{ mA}$, $R_L = 100\text{ }\Omega$	f_c		100		kHz
Capacitance (input to output)	$f = 1\text{ MHz}$	C_{IO}		0.3		pF

Note

$T_{amb} = 25\text{ °C}$, 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.

CURRENT TRANSFER RATIO							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I_C/I_F	$V_{CE} = 5\text{ V}$, $I_F = 5\text{ mA}$	TCMT1600	CTR	80		300	%
		TCMT4600	CTR	80		300	%
		TCMT4606	CTR	100		300	%

SWITCHING CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Delay time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$ (see figure 1)	t_d		3		μs
Rise time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$ (see figure 1)	t_r		3		μs
Fall time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$ (see figure 1)	t_f		4.7		μs
Storage time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$ (see figure 1)	t_s		0.3		μs
Turn-on time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$ (see figure 1)	t_{on}		6		μs
Turn-off time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$ (see figure 1)	t_{off}		5		μs

SWITCHING CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$V_S = 5\text{ V}$, $I_F = 10\text{ mA}$, $R_L = 1\text{ k}\Omega$ (see figure 2)	t_{on}		9		μs
Turn-off time	$V_S = 5\text{ V}$, $I_F = 10\text{ mA}$, $R_L = 1\text{ k}\Omega$ (see figure 2)	t_{off}		18		μs

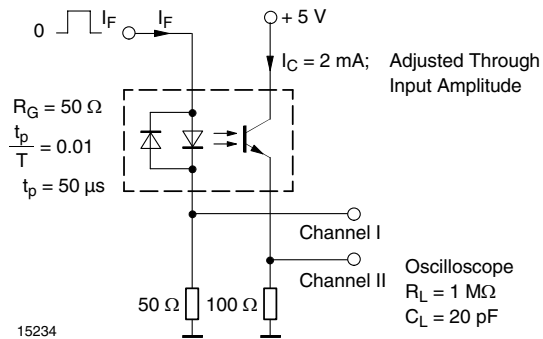


Fig. 1 - Test Circuit, Non-Saturated Operation

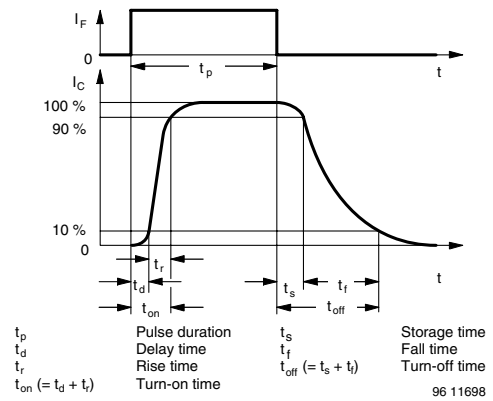


Fig. 3 - Switching Times

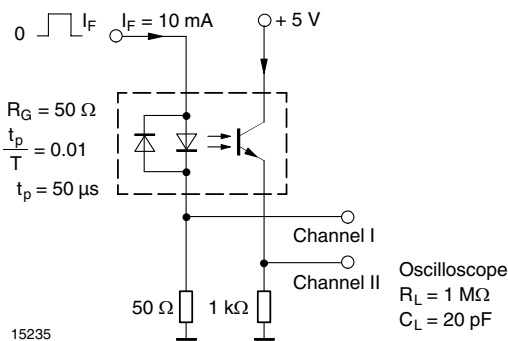


Fig. 2 - Test Circuit, Saturated Operation

TYPICAL CHARACTERISTICS

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

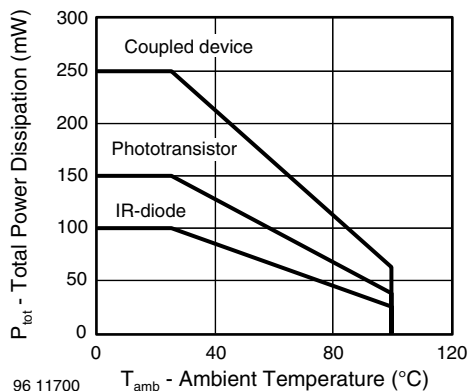


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

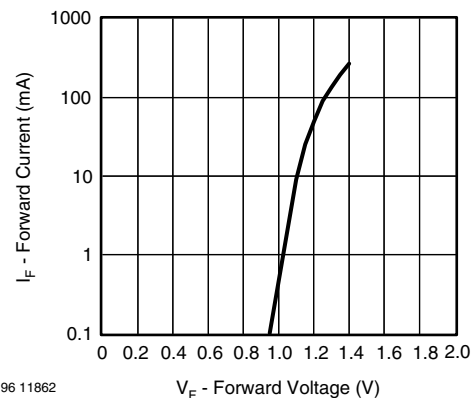


Fig. 5 - Forward Current vs. Forward Voltage

TCMT1600, TCMT4600 Series



Vishay Semiconductors Optocoupler, Phototransistor Output,
AC Input, Single/Quad Channel, Half
Pitch Mini-Flat Package

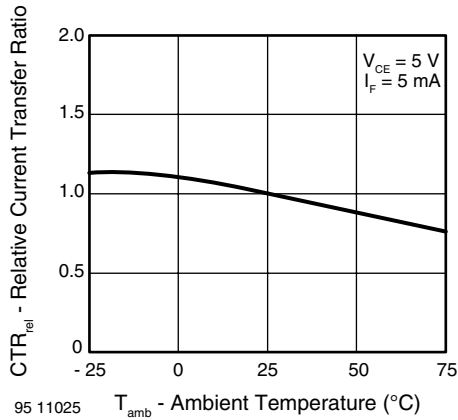


Fig. 6 - Relative Current Transfer Ratio vs. Ambient Temperature

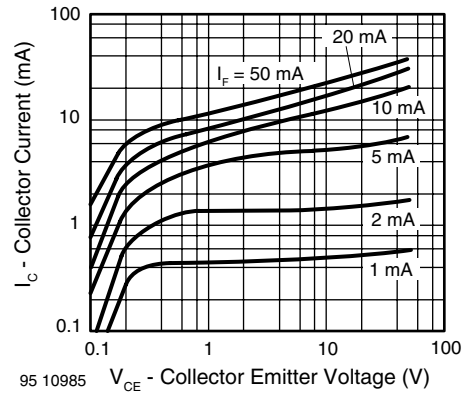


Fig. 9 - Collector Current vs. Collector Emitter Voltage

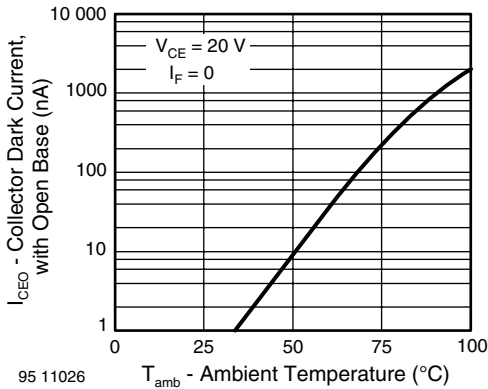


Fig. 7 - Collector Dark Current vs. Ambient Temperature

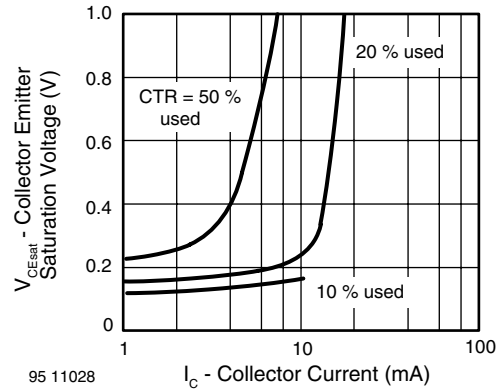


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

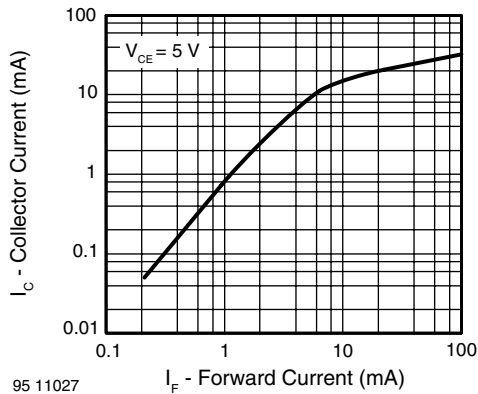


Fig. 8 - Collector Current vs. Forward Current

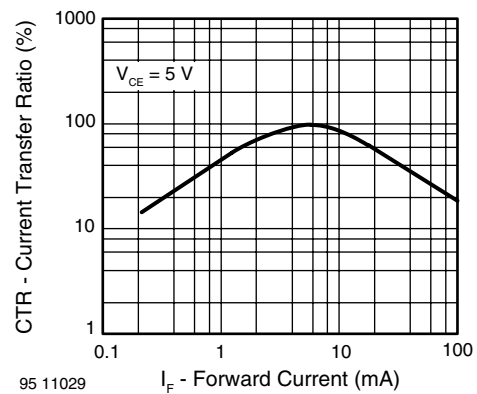


Fig. 11 - Current Transfer Ratio vs. Forward Current



TCMT1600, TCMT4600 Series

Optocoupler, Phototransistor Output, Vishay Semiconductors
 AC Input, Single/Quad Channel, Half
 Pitch Mini-Flat Package

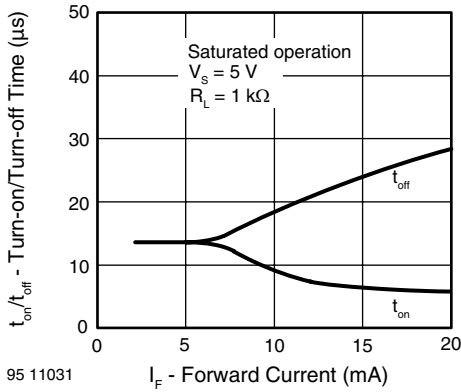


Fig. 12 - Turn-on/turn-off Time vs. Forward Current

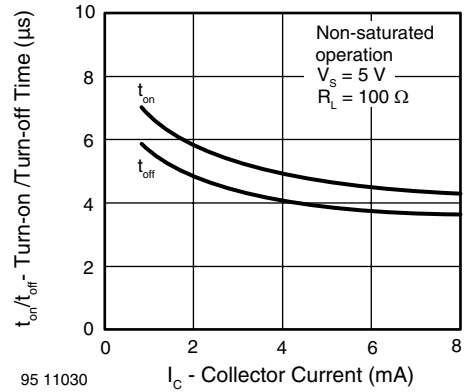
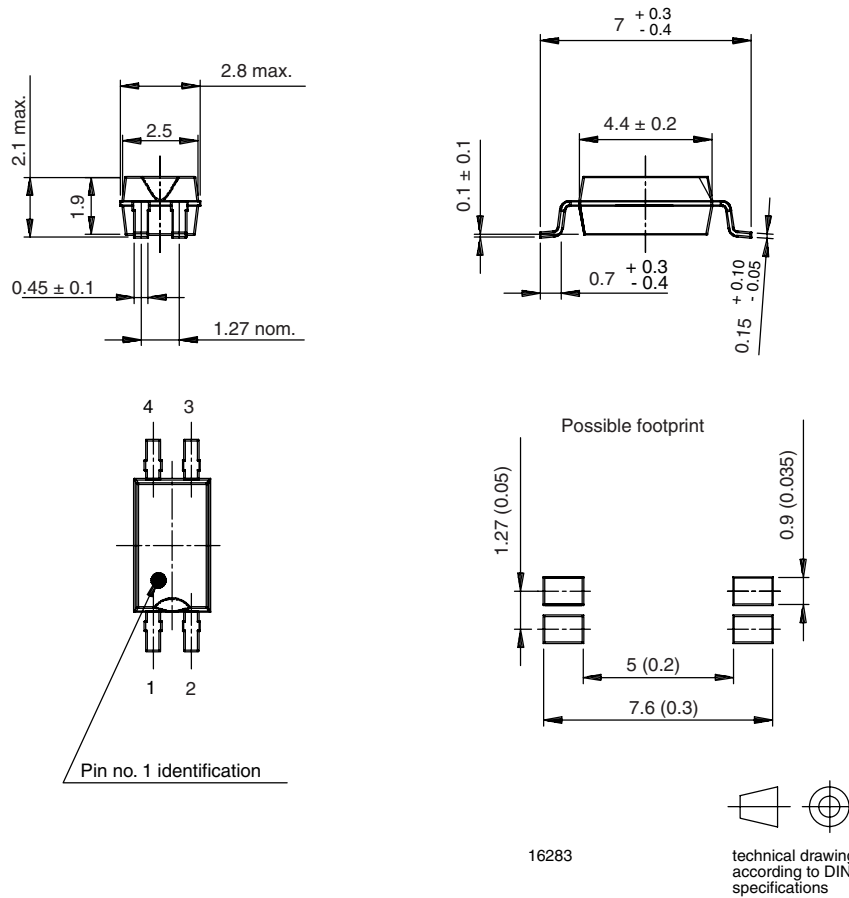


Fig. 13 - Turn-on/turn-off Time vs. Collector Current

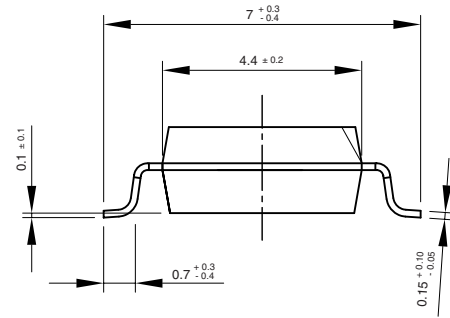
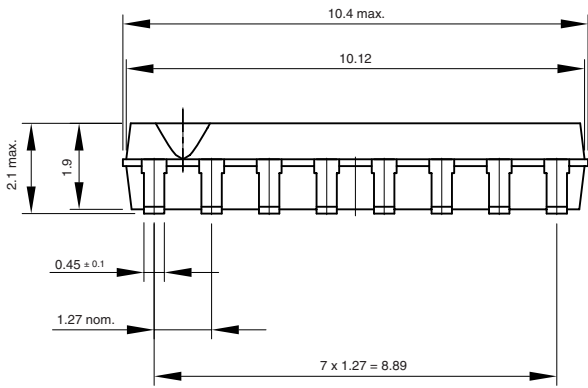
PACKAGE DIMENSIONS in millimeters (inches)



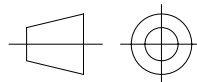
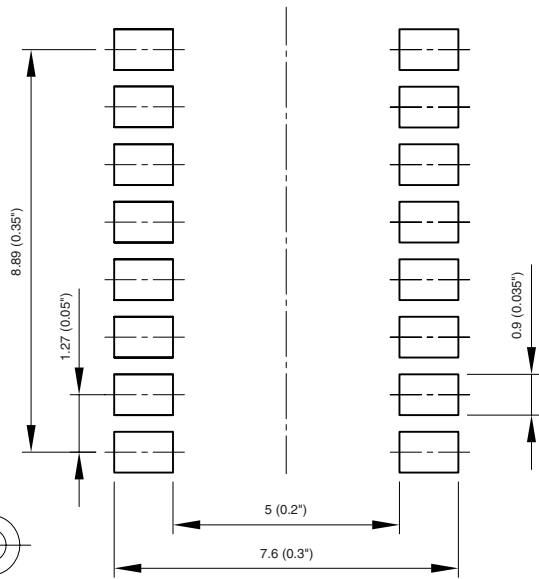
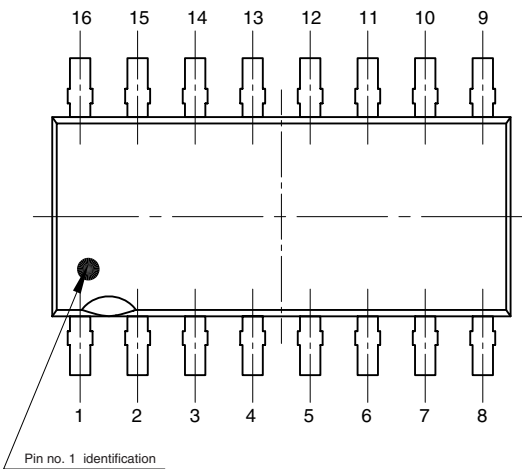
TCMT1600, TCMT4600 Series



Vishay Semiconductors Optocoupler, Phototransistor Output,
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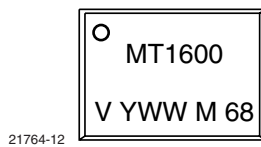
Possible footprint



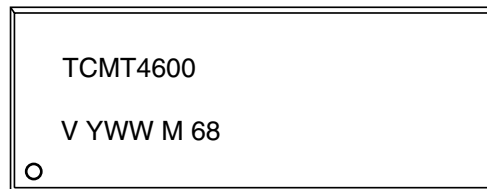
technical drawings
according to DIN
specifications

Drawing-No.: 6.544-5330.03-4
Issue: 1; 04.04.00
15226

PACKAGE MARKING



21764-12



21764-13



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