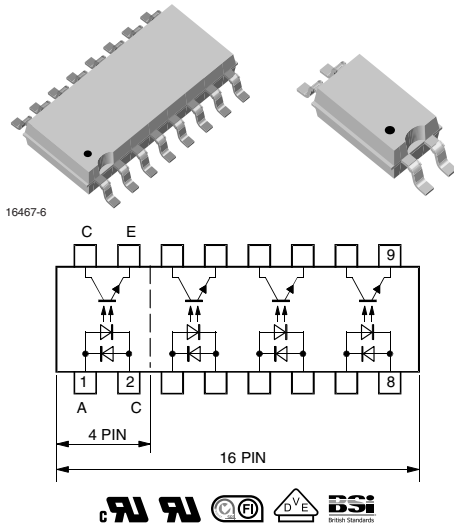


Optocoupler, Phototransistor Output, AC Input, Single/Quad Channel, Half Pitch Mini-Flat Package



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.

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
- cUL CSA 22.2 bulletin 5A
- DIN EN 60747-5-2 (VDA 0884)
DIN EN 60747-5-5 (pending)
- FIMKO: FI EN 60950-1:2006
- BSI: BS EN60065:2002
BS EN60950-1:2006

ORDERING INFORMATION								
T	C	M	T	#	6	0	#	SOP-#
PART NUMBER								
AGENCY CERTIFIED/PACKAGE	CTR (%)							
	SINGLE CHANNEL	QUAD CHANNEL						
UL, cUL, FIMKO, BSI, VDE	80 to 300	80 to 300	100 to 300					
SOP-4	TCMT1600	-	-					
SOP-4	TCMT1600T3 ⁽¹⁾	-	-					
SOP-16	-	TCMT4600	TCMT4606					
SOP-16	-	TCMT4600T0 ⁽¹⁾	-					

Notes

- Available only on tape and reel.
- ⁽¹⁾ Product is rotated 180° in tape and reel cavity.

ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
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



ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
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
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 + 125	°C
Soldering temperature ⁽¹⁾		T _{slid}	260	°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.
- ⁽²⁾ Wave soldering three cycles are allowed. Also refer to "Assembly Instructions" (www.vishay.com/doc?80054).

ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	I _F = ± 50 mA	V _F		1.25	1.6	V
Junction capacitance	V _R = 0 V, f = 1 MHz	C _j		50		pF
OUTPUT						
Collector emitter voltage	I _C = 100 μA	V _{CEO}	70			V
Emitter collector voltage	I _E = 100 μA	V _{ECO}	7			V
Collector dark current	V _{CE} = 20 V, I _F = 0	I _{CEO}			100	nA
COUPLER						
Collector emitter saturation voltage	I _F = ± 10 mA, I _C = 1 mA	V _{CEsat}			0.3	V
Cut-off frequency	V _{CE} = 5 V, I _F = ± 10 mA, R _L = 100 Ω	f _c		100		kHz
Capacitance (input to output)	f = 1 MHz	C _{IO}		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 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I _C /I _F	V _{CE} = 5 V, I _F = ± 5 mA	TCMT1600	CTR	80		300	%
		TCMT4600	CTR	80		300	%
		TCMT4606	CTR	100		300	%

SWITCHING CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Delay time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\ \Omega$ (see figure 1)	t_d		3		μs
Rise time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\ \Omega$ (see figure 1)	t_r		3		μs
Fall time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\ \Omega$ (see figure 1)	t_f		4.7		μs
Storage time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\ \Omega$ (see figure 1)	t_s		0.3		μs
Turn-on time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\ \Omega$ (see figure 1)	t_{on}		6		μs
Turn-off time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\ \Omega$ (see figure 1)	t_{off}		5		μs
Turn-on time	$V_S = 5\text{ V}$, $I_F = \pm 10\text{ mA}$, $R_L = 1\text{ k}\Omega$ (see figure 2)	t_{on}		9		μs
Turn-off time	$V_S = 5\text{ V}$, $I_F = \pm 10\text{ mA}$, $R_L = 1\text{ k}\Omega$ (see figure 2)	t_{off}		18		μs

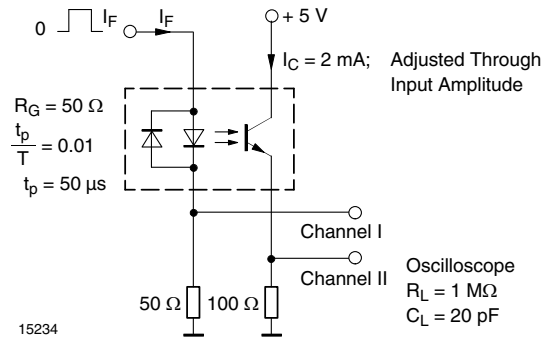


Fig. 1 - Test Circuit, Non-Saturated Operation

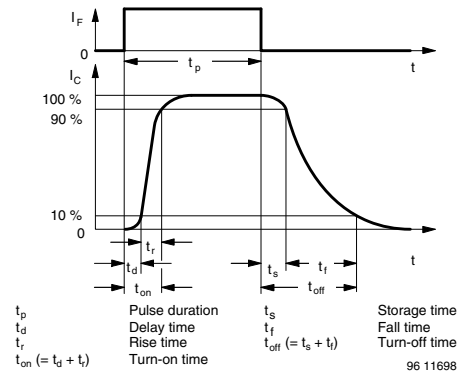


Fig. 3 - Switching Times

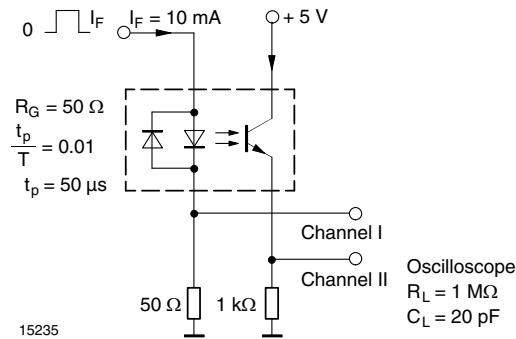


Fig. 2 - Test Circuit, Saturated Operation



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

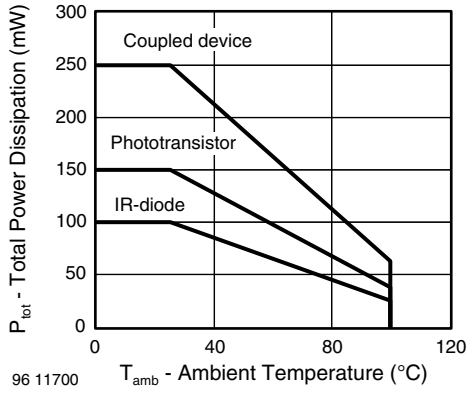


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

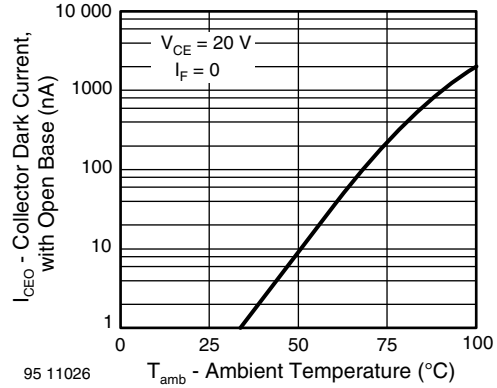
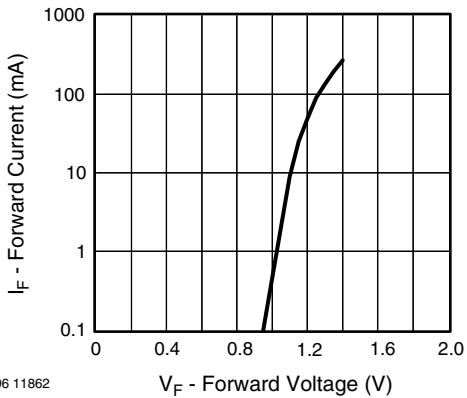
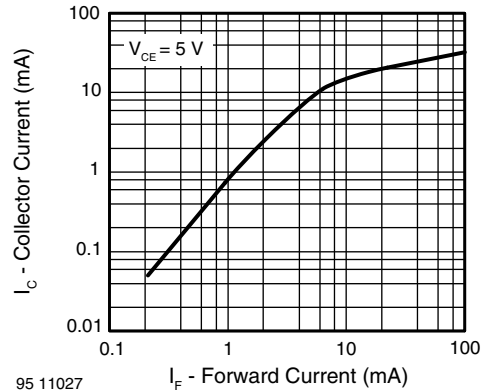


Fig. 7 - Collector Dark Current vs. Ambient Temperature



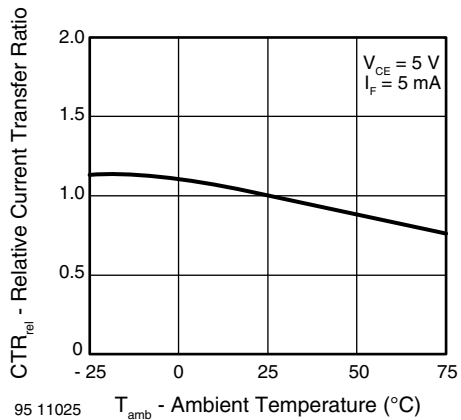
96 11862

Fig. 5 - Forward Current vs. Forward Voltage



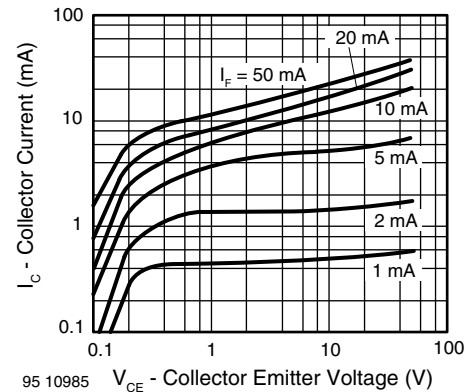
95 11027

Fig. 8 - Collector Current vs. Forward Current



95 11025

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



95 10985

Fig. 9 - Collector Current vs. Collector Emitter Voltage

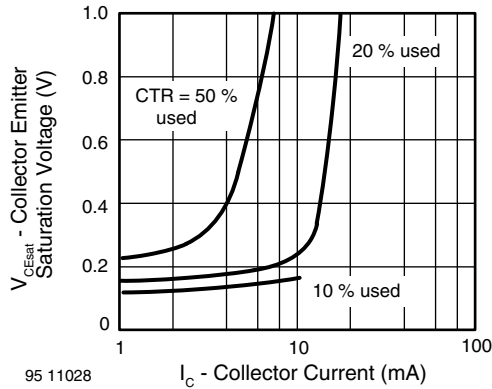


Fig. 10 - Collector-Emitter Saturation Voltage vs. Collector Current

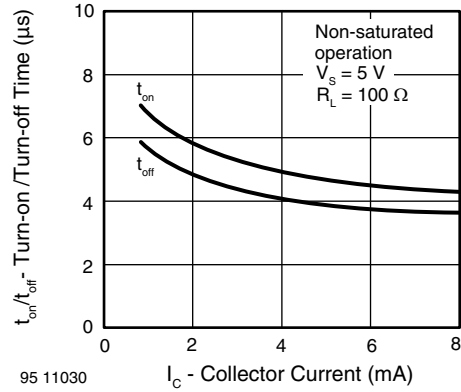


Fig. 13 - Turn-on/Off Time vs. Collector Current

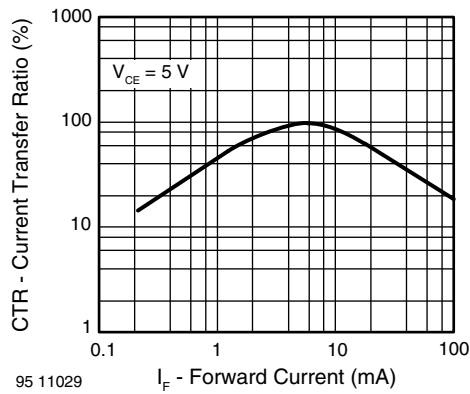


Fig. 11 - Current Transfer Ratio vs. Forward Current

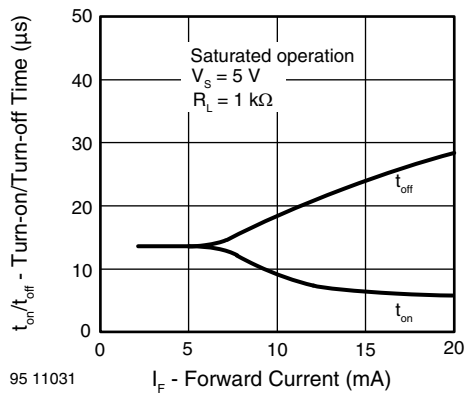
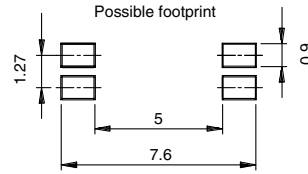
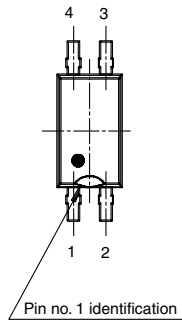
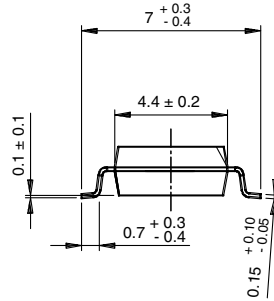
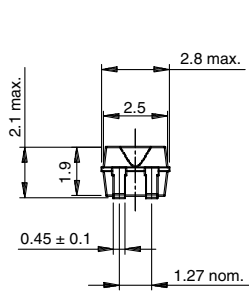


Fig. 12 - Turn-on/Off Time vs. Forward Current

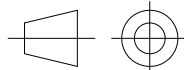
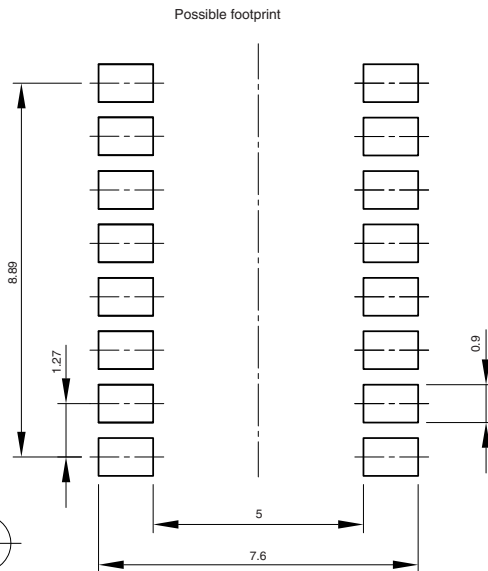
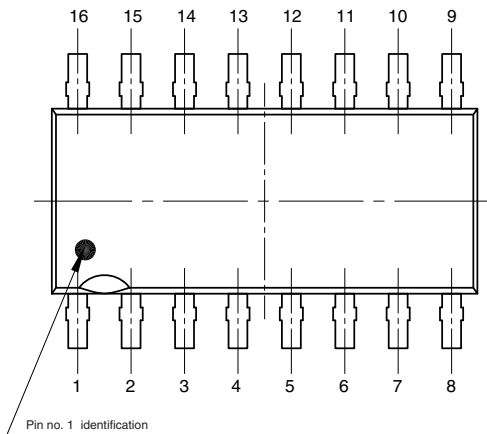
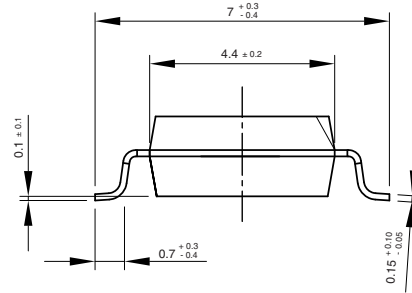
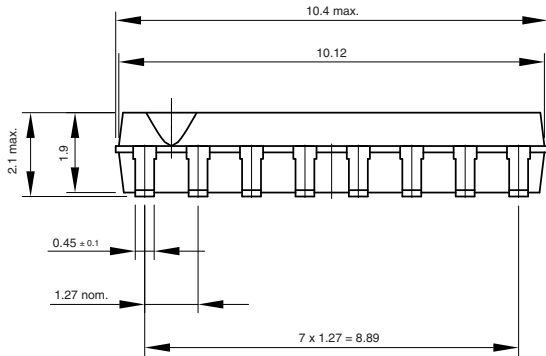


PACKAGE DIMENSIONS in millimeters



technical drawings according to DIN specifications

16283



technical drawings according to DIN specifications

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



PACKAGE MARKING

○ MT1600
V YWW M 68

TCMT4600
○ V YWW M 68



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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

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