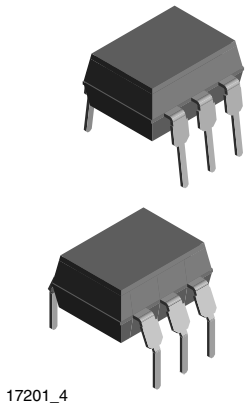
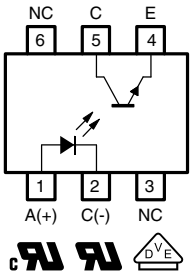
Optocoupler, Phototransistor Output



17201_4



FEATURES

- Isolation test voltage 5000 V_{RMS}
- High common mode rejection
- No base terminal connection for improved noise immunity
- CTR offered in 4 groups
- Thickness through insulation ≥ 0.4 mm
- Creepage current resistance according to VDE0303/ IEC 60112 comparative tracking index: CTI ≥ 250
- V_{IORM} = 850 V
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

DESCRIPTION

The TCDT1100, TCDT1100G series consists of a phototransistor optically coupled to a gallium arsenide infrared-emitting diode in a 6 pin plastic dual inline package. The base of the phototransistor is not connected providing noise immunity.

APPLICATIONS

- Switch-mode power supplies
- Line receiver
- Computer peripheral interface
- Microprocessor system interface
- Circuits for safe protective separation against electrical shock according to safety class II (reinforced isolation):
  - for application class I to IV at mains voltage ≤ 300 V
  - for application class I to III at mains voltage ≤ 600 V according to DIN EN 60747-5-5

AGENCY APPROVALS

- UL / cUL 1577
- DIN EN 60747-5-5 (VDE 0884)
- CQC

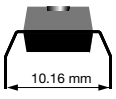
ORDERING INFORMATION

T	C	D	T	1	1	0	#	#

PART NUMBER



DIP-6



DIP-6, 400 mil

AGENCY CERTIFIED / PACKAGE	CTR (%)			
UL, cUL, VDE, CQC	≥ 40	40 to 80	63 to 125	100 to 200
DIP-6	-	TCDT1101	TCDT1102	TCDT1103
DIP-6, 400 mil	TCDT1100G	TCDT1101G	TCDT1102G	TCDT1103G

Note

- G = leadform 10.16 mm; G is not marked on the body

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Reverse voltage		V_R	5	V
Forward current		I_F	60	mA
Forward surge current	$t_p \leq 10$ µs	I_{FSM}	3	A
Power dissipation		P_{diss}	70	mW
Junction temperature		T_j	125	°C
OUTPUT				
Collector emitter voltage		V_{CEO}	32	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
Collector peak current	$t_p/T = 0.5$, $t_p \leq 10$ ms	I_{CM}	100	mA
Power dissipation		P_{diss}	70	mW
Junction temperature		T_j	125	°C
COUPLER				
Total power dissipation		P_{tot}	200	mW
Ambient temperature range		T_{amb}	-55 to +110	°C
Storage temperature range		T_{stg}	-55 to +125	°C
Soldering temperature [1]	2 mm from case, t ≤ 10 s	T_{sld}	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

(1) Refer to wave profile for soldering conditions for through hole devices

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, f = 1 MHz	C_j	-	50	-	pF
OUTPUT						
Collector emitter voltage	I_C = 1 mA	V_{CEO}	32	-	-	V
Emitter collector voltage	I_E = 100 µA	V_{ECO}	7	-	-	V
Collector emitter cut-off current	V_{CE} = 20 V, I_F = 0 A, E = 0	I_{CEO}	-	200	-	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	-	110	-	kHz
Coupling capacitance	f = 1 MHz	C_k	-	0.6	-	pF

Note

- Minimum and maximum values are testing 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

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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 = 10 mA	TCDT1100G	CTR	40	-	-	%
		TCDT1101	CTR	40	-	80	%
		TCDT1101G	CTR				%
		TCDT1102	CTR	63	-	125	%
		TCDT1102G	CTR				%
		TCDT1103	CTR	100	-	200	%
		TCDT1103G	CTR				%

SAFETY AND INSULATION RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Climatic classification	According to IEC 68 part 1		55 / 110 / 21	
Pollution degree	According to DIN VDE 0109		2	
Comparative tracking index	Insulation group IIIa	CTI	175	
Maximum rated withstanding isolation voltage	According to UL1577, t = 1 min	V_{ISO}	5000	V_{RMS}
Tested withstanding isolation voltage	According to UL1577, t = 1 s	V_{ISO}	6000	V_{RMS}
Maximum transient isolation voltage	According to DIN EN 60747-5-5	V_{IOTM}	6000	V_{peak}
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	V_{IORM}	850	V_{peak}
Isolation resistance	T_{amb} = 25 °C, V_{IO} = 500 V	R_{IO}	≥ 10^{12}	Ω
	T_{amb} = 100 °C, V_{IO} = 500 V	R_{IO}	≥ 10^{11}	Ω
	T_{amb} = T_S, V_{IO} = 500 V	R_{IO}	≥ 10^9	Ω
Output safety power		P_{SO}	265	mW
Input safety current		I_{SI}	130	mA
Input safety temperature		T_S	150	°C
Creepage distance (standard 300 mil lead spread)			≥ 7	mm
Clearance distance (standard 300 mil lead spread)			≥ 7	mm
Creepage distance (400 mil lead spread)			≥ 8	mm
Clearance distance (400 mil lead spread)			≥ 8	mm
Input to output test voltage, method B	V_{IORM} x 1.875 = V_{PR}, 100 % production test with t_M = 1 s, partial discharge < 5 pC	V_{PR}	1600	V_{peak}
Input to output test voltage, method A	V_{IORM} x 1.6 = V_{PR}, 100 % sample test with t_M = 10 s, partial discharge < 5 pC	V_{PR}	1360	V_{peak}

Note

- According to DIN EN 60747-5-2. This optocoupler is suitable for safe electrical isolation only within the safety ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits

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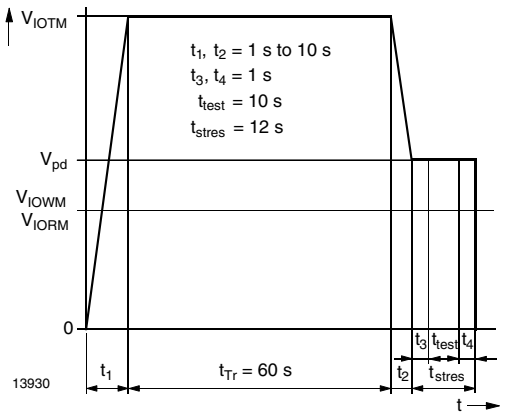


Fig. 1 - Test Pulse Diagram for Sample Test According to DIN EN 60747-5-2 (VDE 0884) / IEC60747-5-5

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Delay time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see Fig. 2)	t_d	-	4	-	µs
Rise time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see Fig. 2)	t_r	-	7	-	µs
Fall time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see Fig. 2)	t_f	-	6.7	-	µs
Storage time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see Fig. 2)	t_s	-	0.3	-	µs
Turn-on time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see Fig. 2)	t_{on}	-	11	-	µs
Turn-off time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see Fig. 2)	t_{off}	-	7	-	µs
Turn-on time	V_S = 5 V, I_C = 10 mA, R_L = 1 kΩ, (see Fig. 3)	t_{on}	-	25	-	µs
Turn-off time	V_S = 5 V, I_C = 10 mA, R_L = 1 kΩ, (see Fig. 3)	t_{off}	-	42.5	-	µs

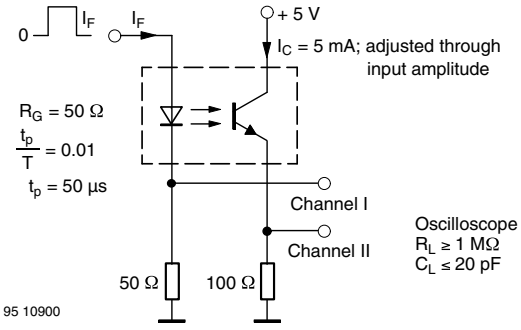


Fig. 2 - Test Circuit, Non-Saturated Operation

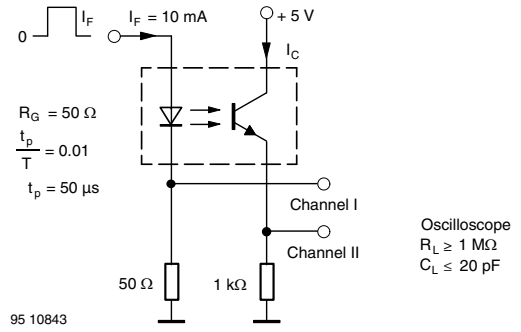


Fig. 3 - Test Circuit, Saturated Operation

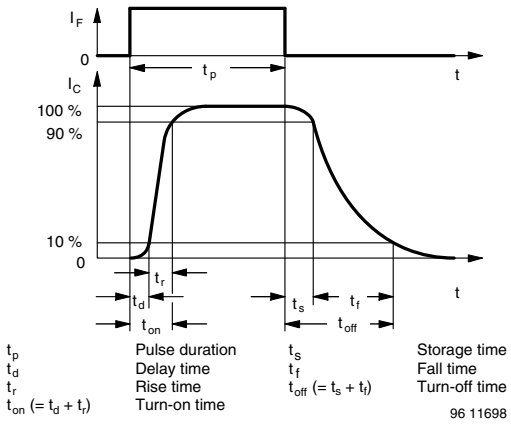


Fig. 4 - Switching Times

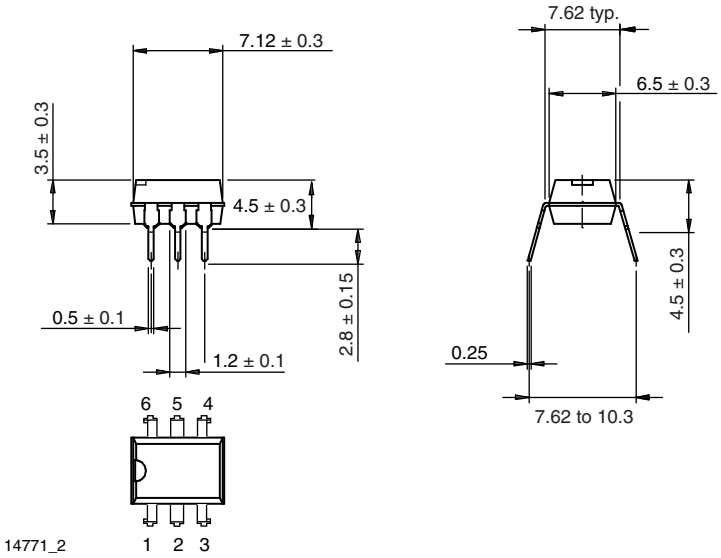
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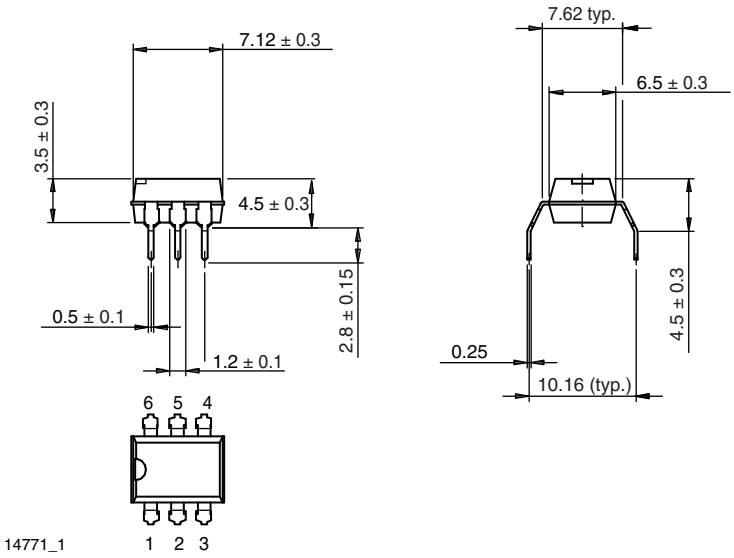
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PACKAGE DIMENSIONS (in millimeters)

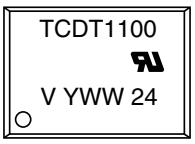
DIP-6



DIP-6, 400 mil



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SOLDER PROFILES

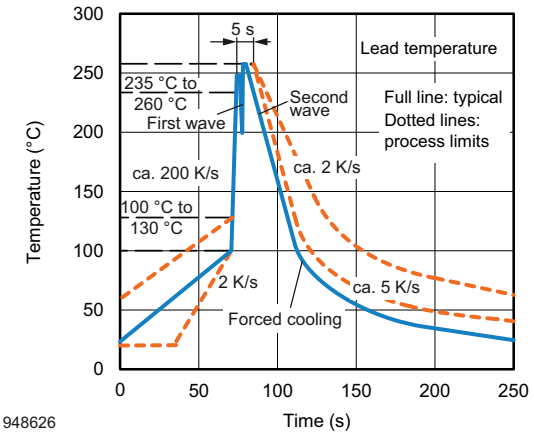


Fig. 5 - Wave Soldering Double Wave Profile According to J-STD-020 for DIP Devices

HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2

Floor life: unlimited

Conditions: T_{amb} < 30 °C, RH < 85 %

Moisture sensitivity level 1, according to J-STD-020

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