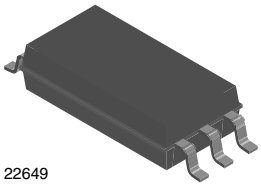
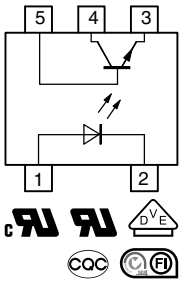
Optocoupler, Phototransistor Output, SOP-6L5, Half Pitch, Long Mini-Flat Package





FEATURES

- SMD low profile 5 pin package
- Isolation test voltage 5000 V_{RMS}
- CTR flexibility available see order information
- Special construction
- Extra low coupling capacitance
- Connected base
- DC input with transistor output
- Creepage distance > 8 mm
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

LINKS TO ADDITIONAL RESOURCES

Product Page | Related Documents | Ultra Librarian EDA / CAD

DESCRIPTION

The TCLT110. series consists of a phototransistor optically coupled to a gallium arsenide infrared-emitting diode in a 5-lead SOP-6L package.

APPLICATIONS

- Switchmode power supplies
- Computer peripheral interface
- Microprocessor system interface

AGENCY APPROVALS

- UL
- cUL
- DIN EN 60747-5-5 (VDE 0884-5)
- BSI
- FIMKO
- CQC GB4943.1
- CQC GB8898

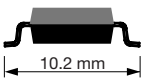
Note

- See the safety standard approval list “Agency Table” for more detailed information

ORDERING INFORMATION

T	C	L	T	1	1	0	#

PART NUMBER



AGENCY CERTIFIED / PACKAGE	CTR (%)								
	5 mA	10 mA			5 mA				
UL, cUL, VDE, BSI, FIMKO	50 to 600	63 to 125	100 to 200	160 to 320	50 to 150	100 to 300	80 to 160	130 to 260	200 to 400
SOP-6L5	TCLT1100	TCLT1102	TCLT1103	TCLT1104	TCLT1105	TCLT1106	TCLT1107	TCLT1108	TCLT1109

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °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	$t_P \leq 10$ µs	I_{FSM}	1.5	A
Power dissipation		P_{diss}	100	mW
Junction temperature		T_j	125	°C
OUTPUT				
Collector emitter voltage		V_{CEO}	80	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}	150	mW
Junction temperature		T_j	125	°C
COUPLER				
Isolation test voltage (RMS)		V_{ISO}	5000	V_{RMS}
Total power dissipation		P_{tot}	250	mW
Operating ambient temperature range		T_{amb}	-55 to +100	°C
Storage temperature range		T_{stg}	-55 to +125	°C
Soldering temperature [1]		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) Wave soldering three cycles are allowed. Also refer to “Assembly Instruction” (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	$I_F = \pm 50$ 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	$I_C = 1$ mA	V_{CEO}	70	-	-	V
Emitter collector voltage	$I_E = 100$ µA	V_{ECO}	7	-	-	V
Collector emitter leakage current	$V_{CE} = 20$ V, $I_F = 0$ A	I_{CEO}	-	10	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, $R_L = 100\ \Omega$	f_c	-	110	-	kHz
Coupling capacitance	f = 1 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.

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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 = 5 mA	TCLT1100	CTR	50	-	600	%
	V_{CE} = 5 V, I_F = 10 mA	TCLT1102	CTR	63	-	125	%
		TCLT1103	CTR	100	-	200	%
		TCLT1104	CTR	160	-	320	%
	V_{CE} = 5 V, I_F = 1 mA	TCLT1102	CTR	22	45	-	%
		TCLT1103	CTR	34	70	-	%
		TCLT1104	CTR	56	100	-	%
	V_{CE} = 5 V, I_F = 5 mA	TCLT1105	CTR	50	-	150	%
		TCLT1106	CTR	100	-	300	%
		TCLT1107	CTR	80	-	160	%
		TCLT1108	CTR	130	-	260	%
		TCLT1109	CTR	200	-	400	%

SAFETY AND INSULATION RATED PARAMETERS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Partial discharge test voltage - routine test	100 %, t_{test} = 1 s	V_{pd}	2.0	-	-	kV
Partial discharge test voltage - lot test (sample test)	t_{Tr} = 60 s, t_{test} = 10 s, (see Fig. 2)	V_{IOTM}	8	-	-	kV
		V_{pd}	1.68	-	-	kV
Insulation resistance	V_{IO} = 500 V	R_{IO}	10^{12}	-	-	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	10^{11}	-	-	Ω
	V_{IO} = 500 V, T_{amb} = 150 °C (construction test only)	R_{IO}	10^{9}	-	-	Ω
Forward current		I_{si}	130	-	-	mA
Power dissipation		P_{so}	265	-	-	mW
Rated impulse voltage		V_{IOTM}	8	-	-	kV
Safety temperature		T_{si}	150	-	-	°C
Clearance distance			8.0	-	-	mm
Creepage distance			8.0	-	-	mm
Insulation distance (internal)			0.40	-	-	mm

Note

- According to DIN EN 60747-5-2 (VDE 0884) (see Fig. 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.

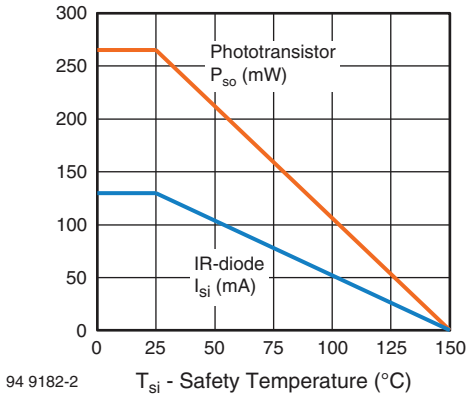


Fig. 1 - Derating Diagram

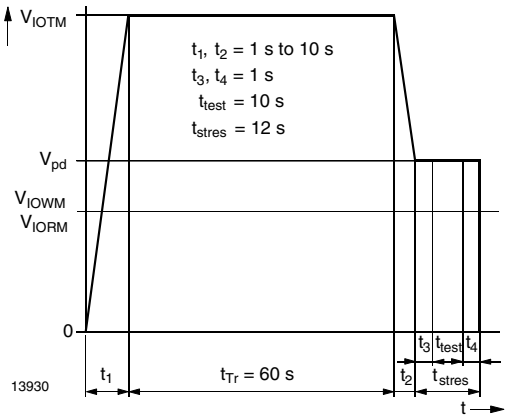


Fig. 2 - Test Pulse Diagram for Sample Test According to DIN EN 60747-5-2 (VDE 0884); IEC 60747-5-5

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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 = 2 mA, R_L = 100 Ω, (see Fig. 3)	t_d	-	3.0	-	µs
Rise time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω, (see Fig. 3)	t_r	-	3.0	-	µs
Turn-on time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω, (see Fig. 3)	t_{on}	-	6.0	-	µs
Storage time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω, (see Fig. 3)	t_s	-	0.3	-	µs
Fall time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω, (see Fig. 3)	t_f	-	4.7	-	µs
Turn-off time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω, (see Fig. 3)	t_{off}	-	5.0	-	µs
Turn-on time	V_S = 5 V, I_F = 10 mA, R_L = 1 kΩ, (see Fig. 4)	t_{on}	-	9.0	-	µs
Turn-off time	V_S = 5 V, I_F = 10 mA, R_L = 1 kΩ, (see Fig. 4)	t_{off}	-	10.0	-	µs

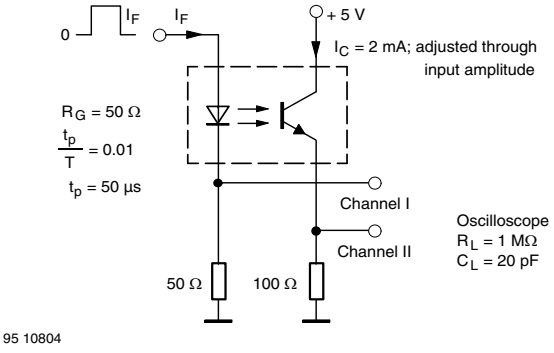


Fig. 3 - Test Circuit, Non-Saturated Operation

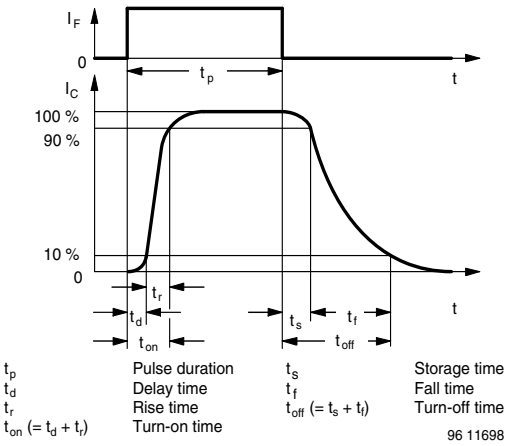


Fig. 5 - Switching Times

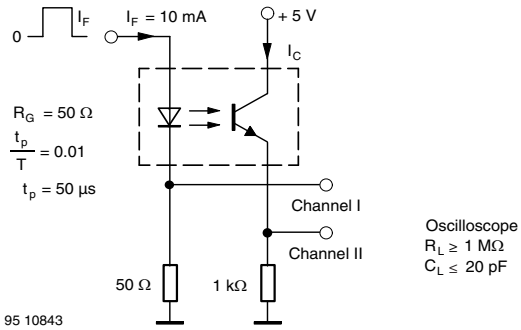
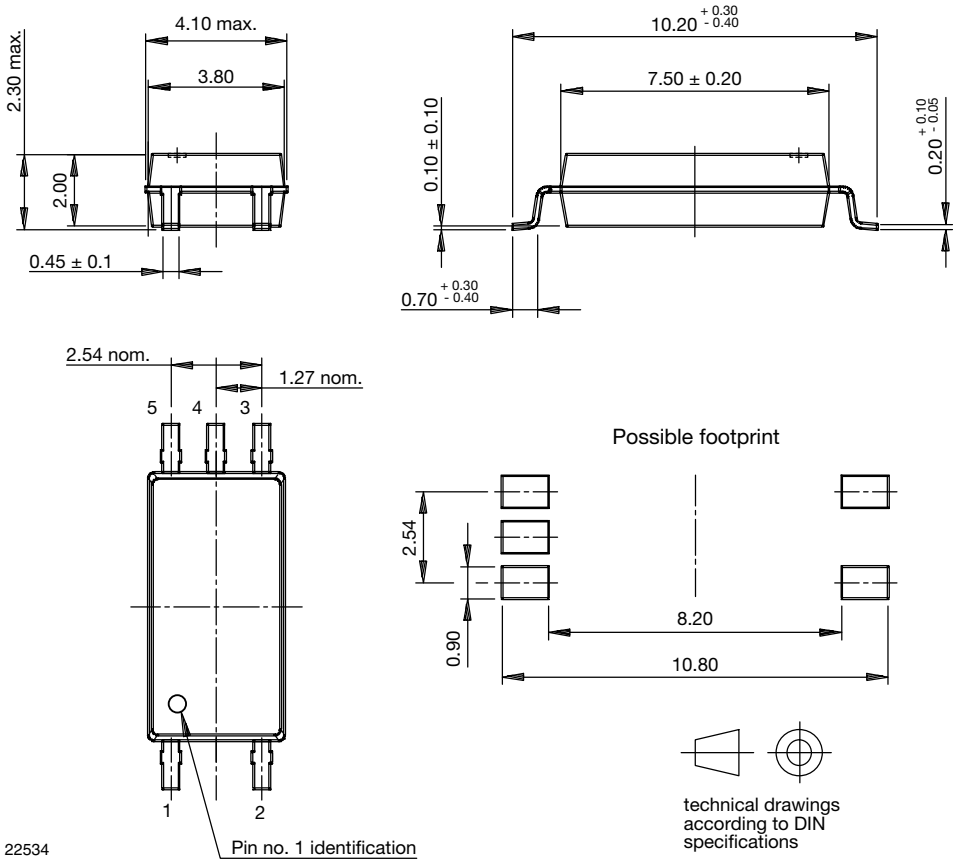


Fig. 4 - Test Circuit, Saturated Operation

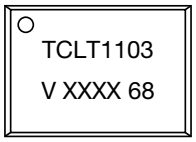
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PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



Note

- XXXX = LMC (lot marking code)

TAPE AND REEL DIMENSIONS in millimeters

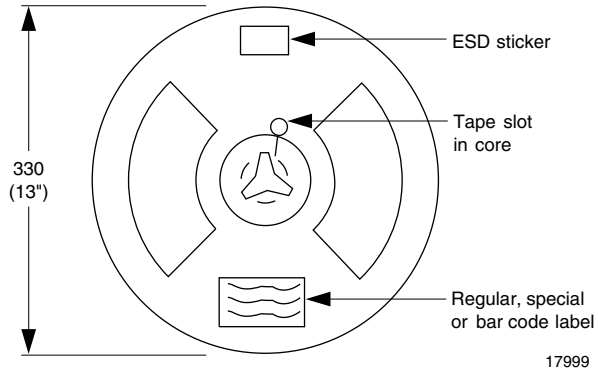


Fig. 6 - Reel Dimensions (3000 units per reel)

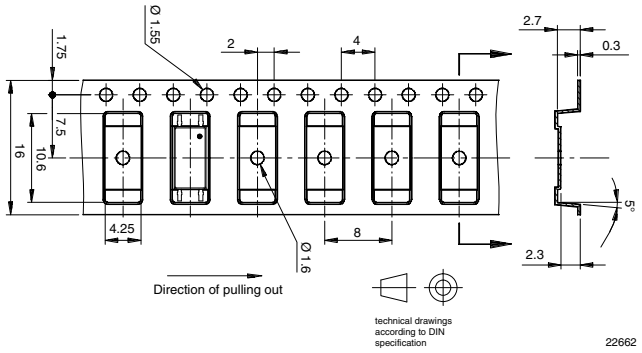


Fig. 7 - Tape Dimensions

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