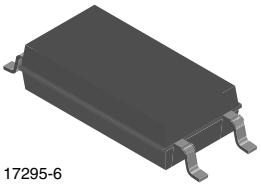
Optocoupler, Phototransistor Output, Low Input Current, SOP-4L, Long Mini-Flat Package



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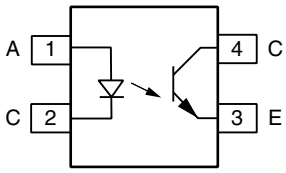


FEATURES

- Low profile package
- High collector emitter voltage, V_{CEO} = 80 V
- Isolation test voltage, 5000 V_{RMS}
- Isolation voltage V_{IROM} = 1050 V_{peak}
- Low coupling capacitance
- High common mode transient immunity
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

GREEN (5-2008)**

Note

** Please see document “Vishay Material Category Policy”: www.vishay.com/doc?99902

DESCRIPTION

The VOL618A has a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a SOP-4 pin wide body package.

It features a high current transfer ratio, low coupling capacitance, and high isolation voltage.

The coupling device is designed for signal transmission between two electrically separated circuits.

APPLICATIONS

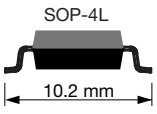
- Telecom
- Industrial controls
- Battery powered equipment
- Office machines
- Programmable controllers

AGENCY APPROVALS

- UL1577, file no. E76222
- cUL CSA 22.2 bulletin 5A, double protection
- DIN EN 60747-5-2 (VDE 0884)/DIN EN 60747-5-5 (pending), available with option 1
- BSI: EN 60065:2002, EN 60950-1:2006
- FIMKO

ORDERING INFORMATION

V	O	L	6	1	8	A	-	#	X	0	0	1	T
PART NUMBER								CTR BIN	PACKAGE OPTION				TAPE AND REEL



AGENCY CERTIFIED/PACKAGE	CTR (%)		
	1 mA		
UL, cUL, BSI, FIMKO	**63 to 125**	**100 to 200**	**160 to 320**
SOP-4L, mini-flat, long	VOL618A-2T	VOL618A-3T	VOL618A-4T
VDE, UL, cUL, BSI, FIMKO	**63 to 125**	**100 to 200**	**160 to 320**
SOP-4L, mini-flat, long	VOL618A-2X001T	VOL618A-3X001T	VOL618A-4X001T

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Power dissipation		P_{diss}	100	mW
Forward current		I_F	60	mA
OUTPUT				
Collector emitter voltage		V_{CEO}	80	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
	t_p/T = 0.5, t_p < 10 ms	I_C	100	mA
Power dissipation		P_{diss}	150	mW
COUPLER				
Isolation test voltage between emitter and detector		V_{ISO}	5000	V_{RMS}
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	≥ 10^{12}	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	≥ 10^{11}	Ω
Storage temperature range		T_{stg}	- 55 to + 125	°C
Ambient temperature range		T_{amb}	- 55 to + 100	°C
Soldering temperature [1]	max. 10 s, dip soldering distance to seating plane ≥ 1.5 mm	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 reflow profile for soldering conditions for surface mounted devices.

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT							
Forward voltage	I_F = 5 mA		V_F		1.16	1.5	V
Capacitance	V_R = 0 V, f = 1 MHz		C_O		45		pF
OUTPUT							
Collector emitter leakage current	V_{CE} = 10 V, I_F = 0 A		I_{CEO}		10	200	nA
Collector emitter capacitance	V_{CE} = 5 V, f = 1 MHz		C_{CE}		7		pF
COUPLER							
Collector emitter saturation voltage	I_C = 0.32 mA, I_F = 1 mA	VOL618A-2	V_{CEsat}		0.25	0.4	V
	I_C = 0.5 mA, I_F = 1 mA	VOL618A-3	V_{CEsat}		0.25	0.4	V
	I_C = 0.8 mA, I_F = 1 mA	VOL618A-4	V_{CEsat}		0.25	0.4	V
Coupling capacitance	f = 1 MHz		C_C		0.25		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	I_F = 1 mA, V_{CE} = 5 V	VOL618A-2	CTR	63		125	%
		VOL618A-3	CTR	100		200	%
		VOL618A-4	CTR	160		320	%

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Turn on time	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_{on}		6		µs
Rise time	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_r		3.5		µs
Turn off time	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_{off}		5.5		µs
Fall time	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_f		5		µs

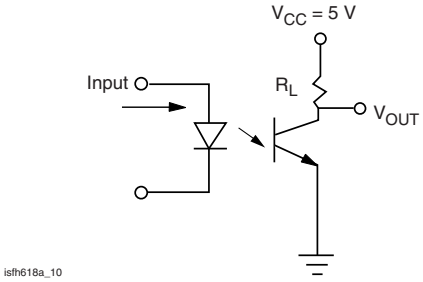


Fig. 1 - Test Circuit

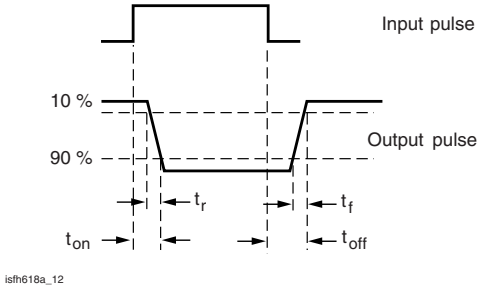


Fig. 2 - Test Circuit and Waveforms

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			kV
Partial discharge test voltage - lot test (sample test)	t_{Tr} = 60 s, t_{test} = 10 s, (see figure 4)	V_{IOTM}	8			kV
		V_{pd}	1.68			kV
Insulation voltage	For lifetime	V_{IROM}			1050	V_{peak}
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			8.00			mm
Creepage distance			8.00			mm
Insulation distance (internal)			0.40			mm

Note

- According to DIN EN 60747-5-2 (VDE 0884) (see figure 4). 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.

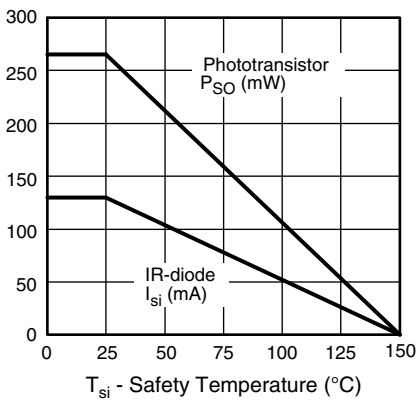


Fig. 3 - Derating Diagram

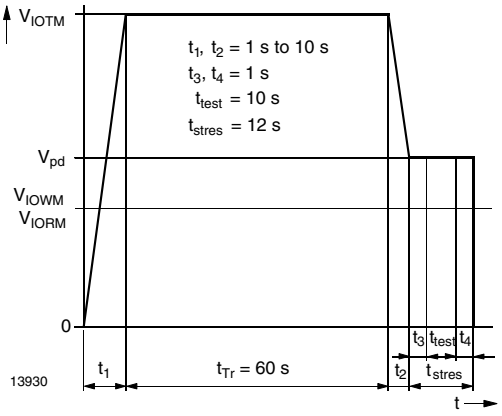
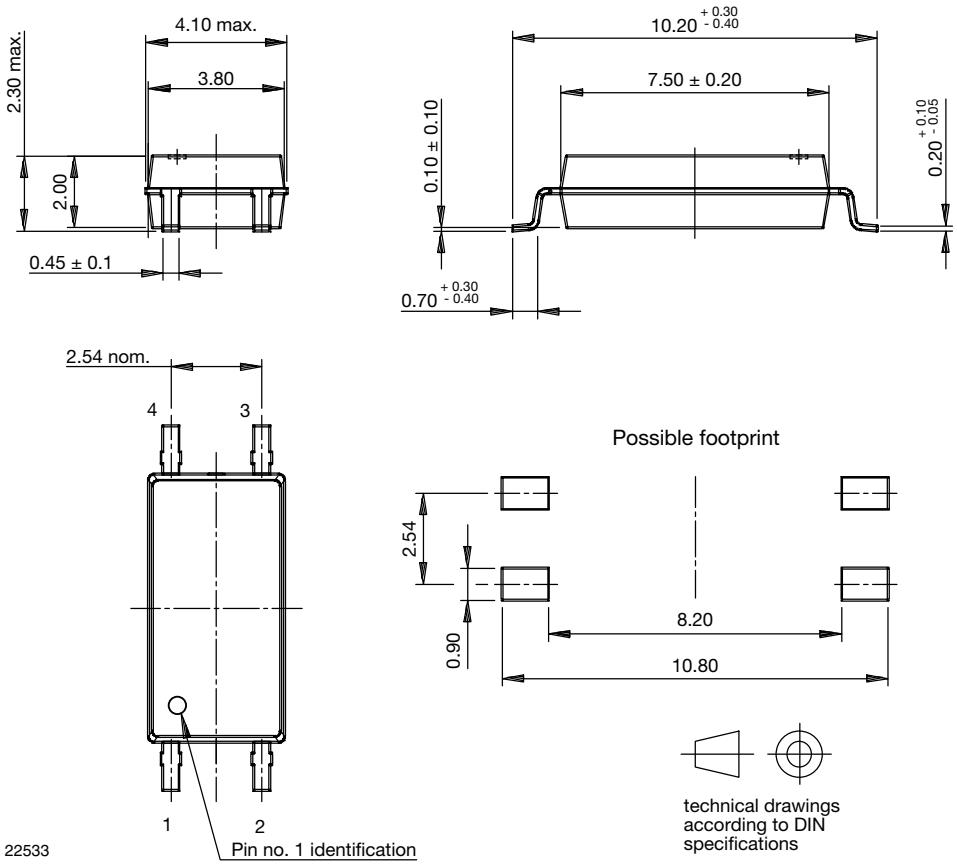
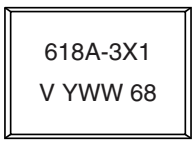


Fig. 4 - Test Pulse Diagram for Sample Test according to DIN EN 60747-5-2; IEC60747-5-5

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



Notes

- Only option 1 is reflected in the package marking with the characters “X1”.
- Tape and reel suffix (T) is not part of the package marking.

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