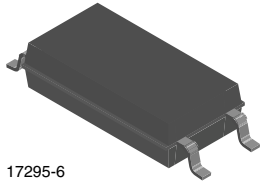
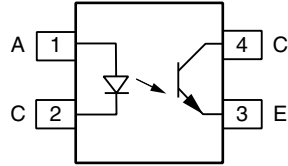


# Optocoupler, Phototransistor Output, Low Input Current, SOP-4L, Long Mini-Flat Package



17295-6



## 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.

## FEATURES

- Low profile package
- High collector emitter voltage,  $V_{CE0} = 80\text{ V}$
- Isolation test voltage,  $5000\text{ V}_{RMS}$
- Isolation voltage  $V_{IROM} = 1050\text{ V}_{peak}$
- Low coupling capacitance
- High common mode transient immunity
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



## Note

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

## 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			
<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">V</div> <div style="border: 1px solid black; padding: 2px;">O</div> <div style="border: 1px solid black; padding: 2px;">L</div> <div style="border: 1px solid black; padding: 2px;">6</div> <div style="border: 1px solid black; padding: 2px;">1</div> <div style="border: 1px solid black; padding: 2px;">8</div> <div style="border: 1px solid black; padding: 2px;">A</div> <div style="border: 1px solid black; padding: 2px;">-</div> <div style="border: 1px solid black; padding: 2px;">#</div> <div style="border: 1px solid black; padding: 2px;">X</div> <div style="border: 1px solid black; padding: 2px;">0</div> <div style="border: 1px solid black; padding: 2px;">0</div> <div style="border: 1px solid black; padding: 2px;">1</div> <div style="border: 1px solid black; padding: 2px;">T</div> </div>	CTR BIN	PACKAGE OPTION	TAPE AND REEL
PART NUMBER			
		SOP-4L 	
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 ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Power dissipation		$P_{diss}$	100	mW
Forward current		$I_F$	60	mA
<b>OUTPUT</b>				
Collector emitter voltage		$V_{CEO}$	80	V
Emitter collector voltage		$V_{ECO}$	7	V
Collector current		$I_C$	50	mA
	$t_p/T = 0.5$ , $t_p < 10\text{ ms}$	$I_C$	100	mA
Power dissipation		$P_{diss}$	150	mW
<b>COUPLER</b>				
Isolation test voltage between emitter and detector		$V_{ISO}$	5000	$V_{RMS}$
Isolation resistance	$V_{IO} = 500\text{ V}$ , $T_{amb} = 25\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$V_{IO} = 500\text{ V}$ , $T_{amb} = 100\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{11}$	$\Omega$
Storage temperature range		$T_{stg}$	- 55 to + 125	$^{\circ}\text{C}$
Ambient temperature range		$T_{amb}$	- 55 to + 100	$^{\circ}\text{C}$
Soldering temperature <sup>(1)</sup>	max. 10 s, dip soldering distance to seating plane $\geq 1.5\text{ mm}$	$T_{sld}$	260	$^{\circ}\text{C}$

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

<b>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn on time	$V_{CC} = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$	$t_{on}$		6		$\mu\text{s}$
Rise time	$V_{CC} = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$	$t_r$		3.5		$\mu\text{s}$
Turn off time	$V_{CC} = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$	$t_{off}$		5.5		$\mu\text{s}$
Fall time	$V_{CC} = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$	$t_f$		5		$\mu\text{s}$

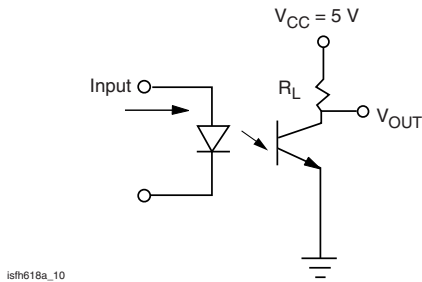


Fig. 1 - Test Circuit

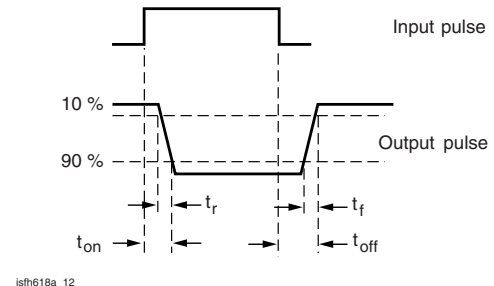


Fig. 2 - Test Circuit and Waveforms

<b>SAFETY AND INSULATION RATED PARAMETERS</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Partial discharge test voltage - routine test	100 %, $t_{test} = 1\text{ s}$	$V_{pd}$	2			kV
Partial discharge test voltage - lot test (sample test)	$t_{Tr} = 60\text{ s}$ , $t_{test} = 10\text{ s}$ , (see figure 4)	$V_{IOTM}$	8			kV
		$V_{pd}$	1.68			kV
Insulation voltage	For lifetime	$V_{IROM}$			1050	$V_{peak}$
Insulation resistance	$V_{IO} = 500\text{ V}$	$R_{IO}$	$10^{12}$			$\Omega$
	$V_{IO} = 500\text{ V}$ , $T_{amb} = 100\text{ }^{\circ}\text{C}$	$R_{IO}$	$10^{11}$			$\Omega$
	$V_{IO} = 500\text{ V}$ , $T_{amb} = 150\text{ }^{\circ}\text{C}$ (construction test only)	$R_{IO}$	$10^9$			$\Omega$
Forward current		$I_{si}$			130	mA
Power dissipation		$P_{SO}$			265	mW
Rated impulse voltage		$V_{IOTM}$			8	kV
Safety temperature		$T_{si}$			150	$^{\circ}\text{C}$
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.

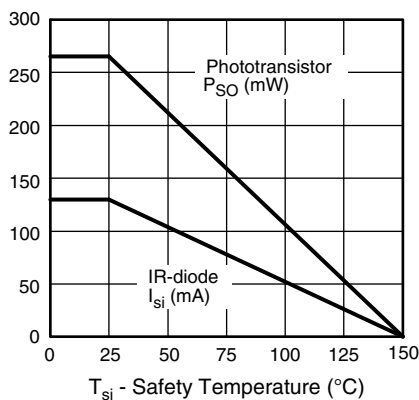


Fig. 3 - Derating Diagram

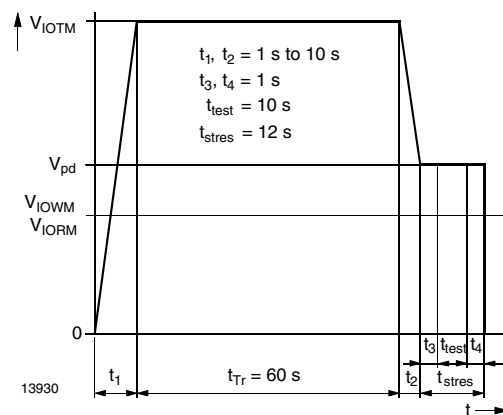
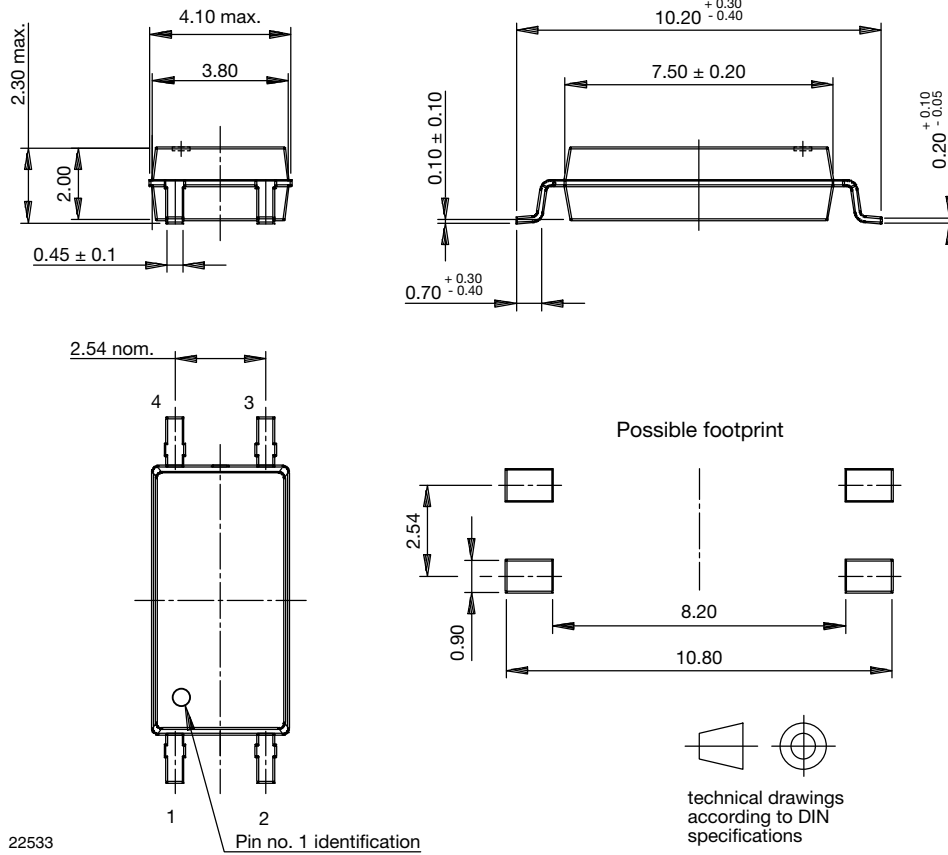
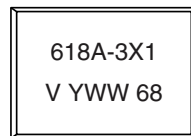


Fig. 4 - Test Pulse Diagram for Sample Test according to DIN EN 60747-5-2; IEC60747-5-5

**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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