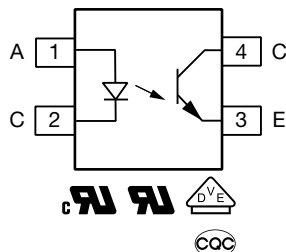
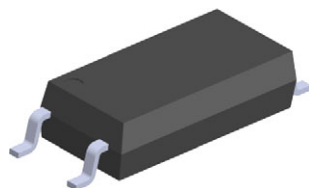


## Optocoupler, Phototransistor Output, 4 Pin LSOP, Long Creepage, Low Profile Package



### DESCRIPTION

The VOL619A series has an infrared emitting diode, which is optically coupled to a phototransistor detector, and is incorporated in a green 4-pin LSOP low profile package.

It features a high current transfer ratio at low input current with enhanced linearity over temperature. The coupling device is designed for signal transmission between two electrically separated circuits.

### FEATURES

- Low profile package
- High CTR at low forward current
- High collector emitter voltage,  $V_{CE0} = 80\text{ V}$
- High isolation voltage,  $V_{ISO} = 5000\text{ V}_{RMS}$
- Enhanced CTR linearity over temperature and forward current
- Operating temperature up to  $125\text{ }^{\circ}\text{C}$
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### APPLICATIONS

- DC/DC converters
- Programmable controllers
- Power supplies
- Signal transmission with galvanic and noise isolation

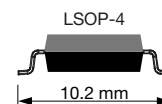
### AGENCY APPROVALS

(All parts are certified under base model VOL619A)

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

### ORDERING INFORMATION

V	O	L	6	1	9	A	-	#	X	0	0	1	T
PART NUMBER								CTR BIN	PACKAGE OPTION			TAPE AND REEL	



AGENCY CERTIFIED / PACKAGE	CTR (%)		
	0.5 mA		
UL, cUL, CQC, VDE	100 to 250	160 to 320	200 to 400
LSOP-4	VOL619A-3X001T	VOL619A-4X001T	VOL619A-9X001T

#### Note

- Additional options may be possible, please contact sales office.



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Reverse voltage		$V_R$	5	V
Power dissipation		$P_{diss}$	50	mW
Forward current		$I_F$	30	mA
Surge forward current	$t_p \leq 1\text{ }\mu\text{s}$	$I_{FSM}$	1.0	A
Junction temperature		$T_J$	135	$^{\circ}\text{C}$
<b>OUTPUT</b>				
Collector emitter voltage		$V_{CEO}$	80	V
Emitter collector voltage		$V_{ECO}$	7	V
Collector current		$I_C$	30	mA
Power dissipation		$P_{diss}$	200	mW
Junction temperature		$T_J$	135	$^{\circ}\text{C}$
<b>COUPLER</b>				
Total power dissipation		$P_{tot}$	200	mW
Storage temperature range		$T_{stg}$	-55 to +125	$^{\circ}\text{C}$
Ambient temperature range		$T_{amb}$	-55 to +125	$^{\circ}\text{C}$
Soldering temperature <sup>(1)</sup>	$t = 10\text{ s}$	$T_{sld}$	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.

<sup>(1)</sup> Refer to reflow profile for soldering conditions for surface mounted devices.

<b>RECOMMENDED OPERATING CONDITIONS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Forward current	$I_F$	0.5	10	mA

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	$I_F = 10\text{ mA}$	$V_F$	-	-	1.6	V
Capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ kHz}$	$C_O$	-	30	-	pF
Reverse current	$V_R = 5\text{ V}$	$I_R$	-	-	5	$\mu\text{A}$
<b>OUTPUT</b>						
Collector emitter dark current	$V_{CE} = 20\text{ V}$ , $I_F = 0\text{ A}$	$I_{CEO}$	-	-	200	nA
Collector emitter breakdown voltage	$I_C = 0.5\text{ mA}$	$BV_{CEO}$	80	-	-	
Emitter-Collector breakdown voltage	$I_E = 0.1\text{ mA}$	$BV_{ECO}$	7	-	-	
<b>COUPLER</b>						
Collector emitter saturation voltage	$I_C = 2.4\text{ mA}$ , $I_F = 8\text{ mA}$	$V_{CEsat}$	-	-	0.3	V
Floating capacitance	$f = 1\text{ MHz}$	$C_C$	-	0.8	-	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.

<b>CURRENT TRANSFER RATIO</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F$	$I_F = 0.5\text{ mA}$ , $V_{CE} = 5\text{ V}$	VOL619A-3	CTR	100	-	250	%
		VOL619A-4	CTR	160	-	320	%
		VOL619A-9	CTR	200	-	400	%

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Rise time	$V_{CE} = 2\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\text{ }\Omega$	$t_r$	-	6	18	$\mu\text{s}$
Fall time	$V_{CE} = 2\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\text{ }\Omega$	$t_f$	-	8	18	$\mu\text{s}$

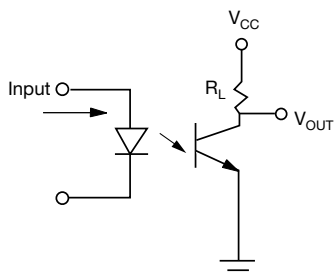


Fig. 1 - Test Circuit

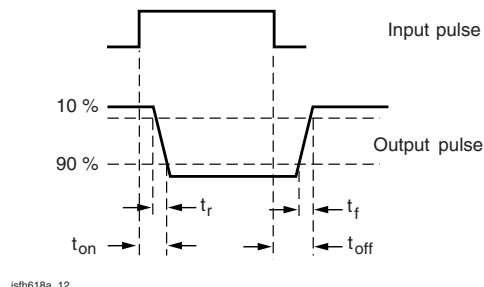


Fig. 2 - Test Circuit and Waveforms

**SAFETY AND INSULATION RATINGS**

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		55 / 125 / 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, $t = 1\text{ min}$	$V_{ISO}$	5000	$V_{RMS}$
Maximum transient isolation voltage	According to DIN EN 60747-5-5	$V_{IOTM}$	8000	$V_{peak}$
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	$V_{IORM}$	1500	$V_{peak}$
Isolation resistance	$T_{amb} = 25\text{ }^{\circ}\text{C}$ , $V_{IO} = 500\text{ V}$	$R_{IO}$	$\geq 5 \times 10^{10}$	$\Omega$
	$T_{amb} = T_S$ , $V_{IO} = 500\text{ V}$	$R_{IO}$	$\geq 10^9$	$\Omega$
Output safety power		$P_{SO}$	400	mW
Input safety current		$I_{SI}$	250	mA
Input safety temperature		$T_S$	150	$^{\circ}\text{C}$
Creepage distance			$\geq 8$	mm
Clearance distance			$\geq 8$	mm
Insulation thickness		DTI	$\geq 0.4$	mm

**Note**

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

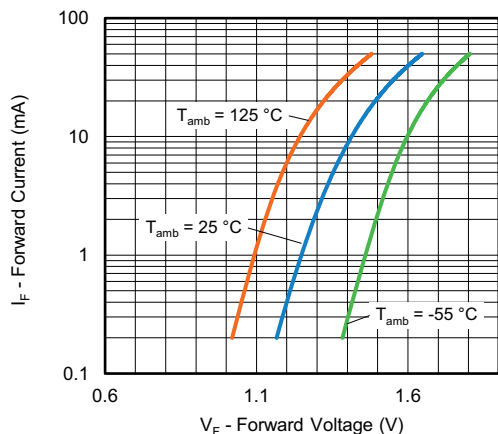
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

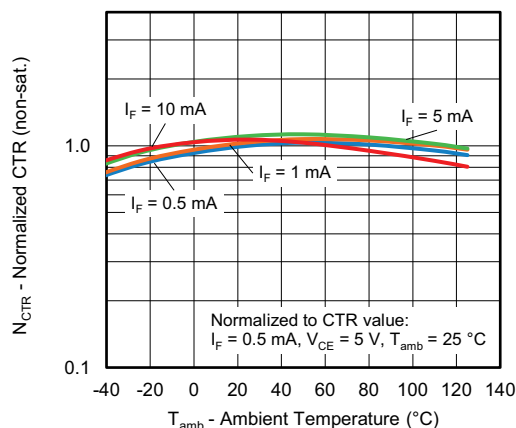


Fig. 6 - Normalized CTR vs. Ambient Temperature

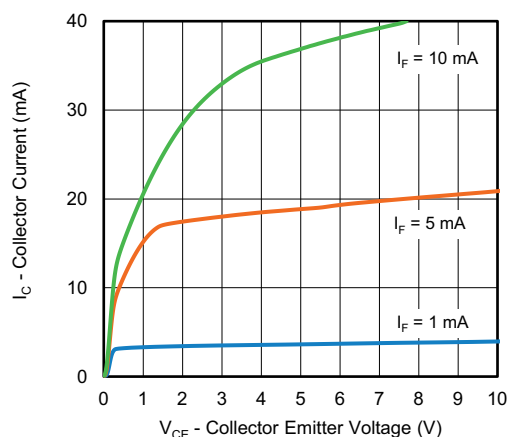


Fig. 4 - Collector Current vs. Collector Emitter Voltage (non-saturated)

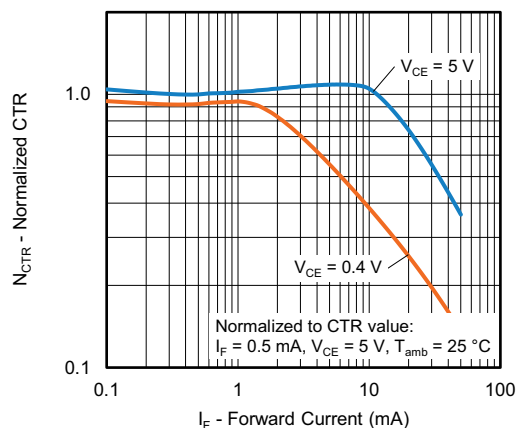


Fig. 7 - Normalized CTR vs. Forward Current

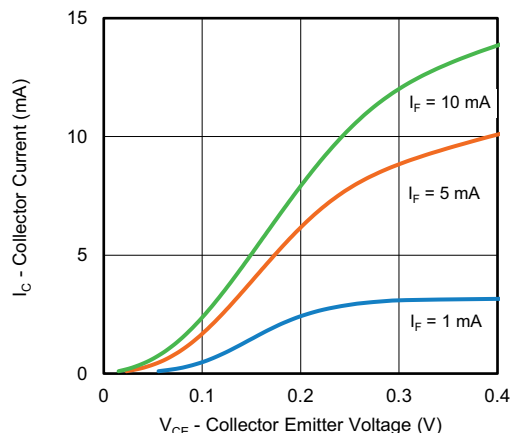


Fig. 5 - Collector Current vs. Collector Emitter Voltage (saturated)

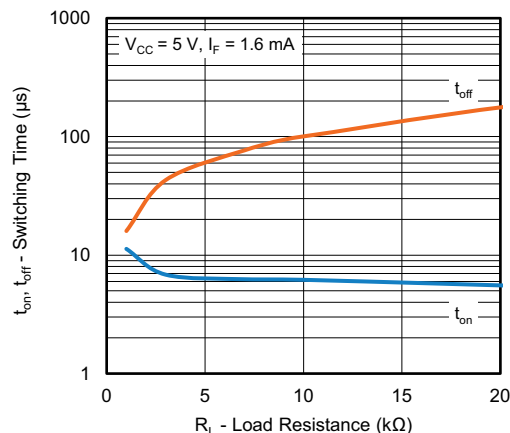


Fig. 8 - Switching Time vs. Load Resistance

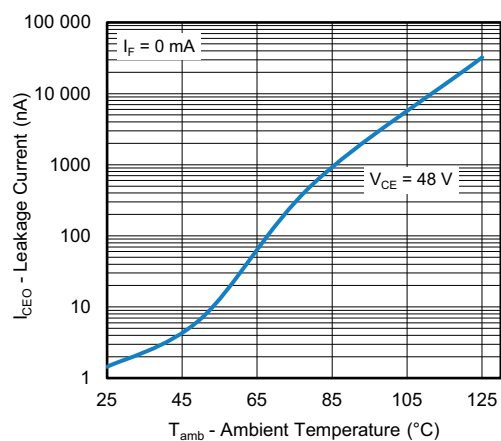
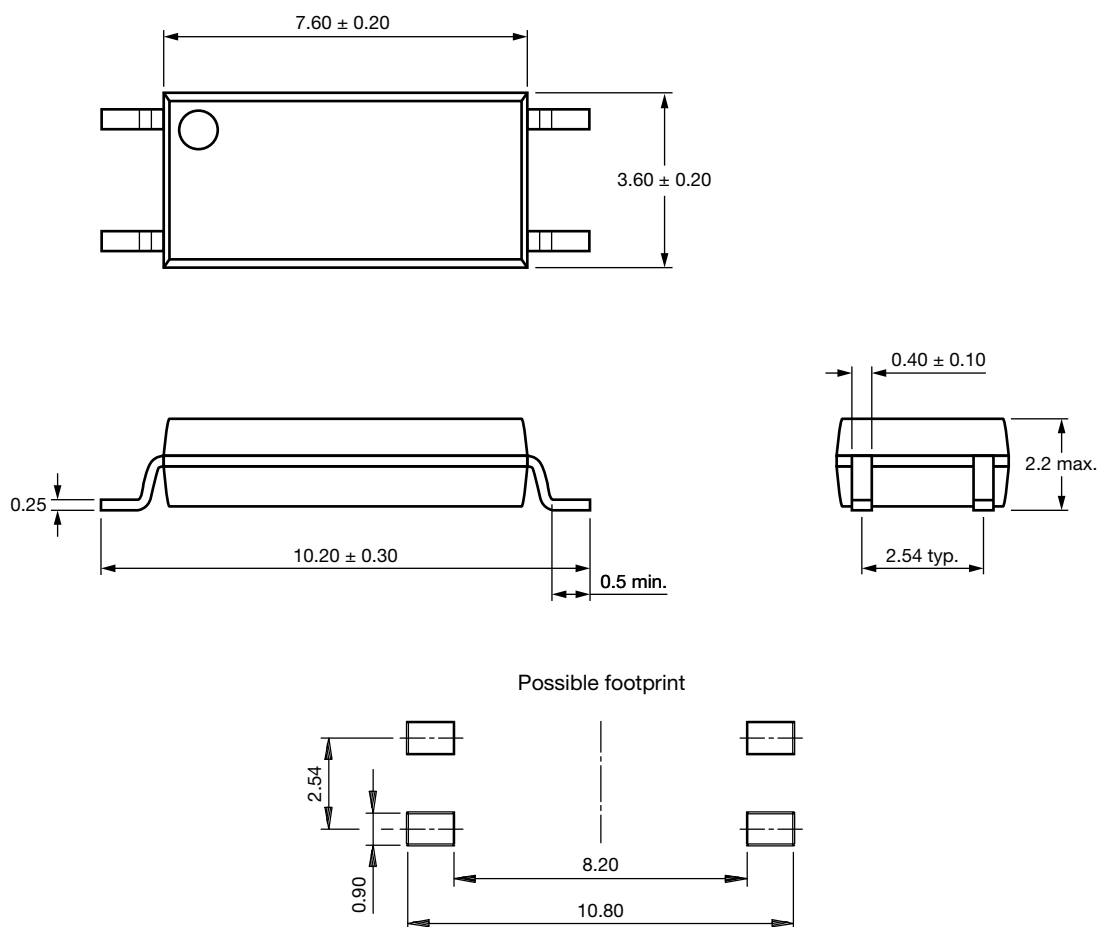
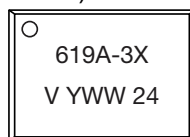


Fig. 9 - Leakage Current vs. Ambient Temperature

### PACKAGE DIMENSIONS (in millimeters)



**PACKAGE MARKING** (example of VOL619A-3X001T)

**Notes**

- Tape and reel suffix (T) is not part of the package marking
- YWW = date code

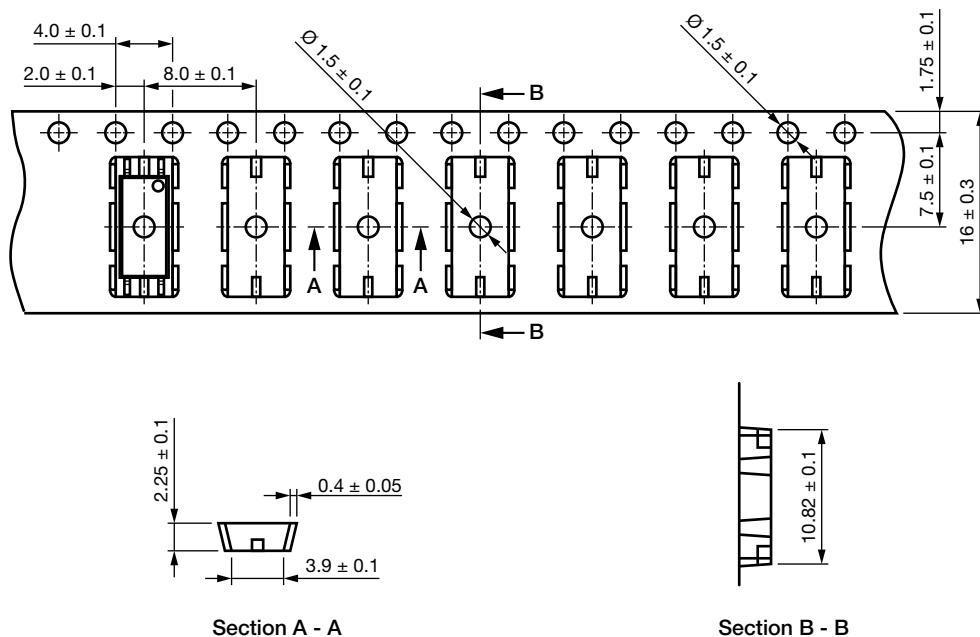
**TAPE AND REEL DIMENSIONS** (in millimeters)


Fig. 10 - Tape and Reel Packing

TAPE AND REEL PACKING	
TYPE	UNITS/REEL
LSOP-4	3500



## SOLDER PROFILE

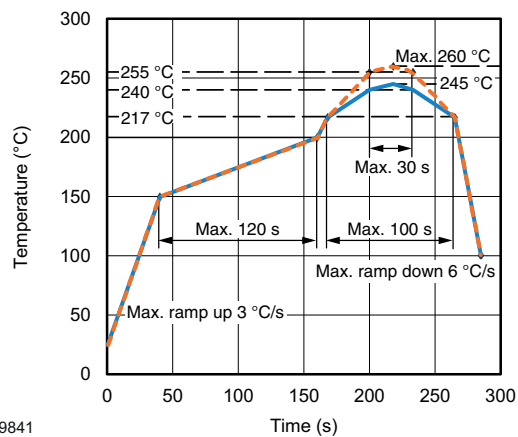


Fig. 11 - Lead (Pb)-free Reflow Solder Profile  
According to J-STD-020

## HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2

Floor life: unlimited

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

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

19841



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