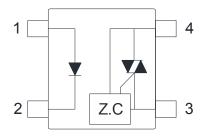


### 4PIN MINI-FLAT ZERO-CROSS TRIAC DRIVER PHOTOCOUPLER

#### Description

The KTLP166J series consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon detector performing the function of a zero voltage crossing bilateral TRIAC driver. They are designed for use with a TRIAC in the interface of logic systems to equipment powered from 115/240 VAC lines, such as solid-state relays, industrial controls, motors, solenoids and consumer appliances, etc.

#### Schematic



- 1. Anode
- 2. Cathode
- 3. Main terminal
- 4. Main terminal

#### Features

- 1. Pb free and RoHS compliant
- 2. 600V peak blocking voltage
- 3. Subminiature type (The volume is smaller than that of our conventional DIP type by as far as 30%)
- 4. Simplifies logic control of 115/240 VAC power
- 5. Zero voltage crossing
- 6. Isolation voltage between input and output (Viso: 3750Vms)
- 7. MSL class 1
- 8. Agency Approvals:
  - UL Approved (No. E169586): UL1577
  - c-UL Approved (No. E169586)
  - VDE Approved (No. 40009235): DIN EN60747-5-5
  - CQC Approved: GB8898-2011, GB4943.1-2011

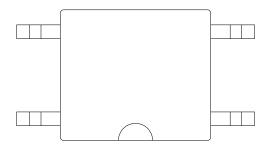
### Applications

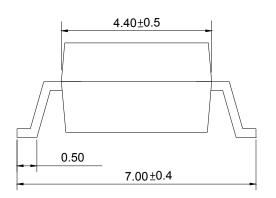
- Solenoid/Valve controls
- · Lighting controls
- · Static power switches
- AC motor drives
- Temperature controls
- E.M contactors
- · AC motor contactors
- · Solid state relay
- Programmable controllers

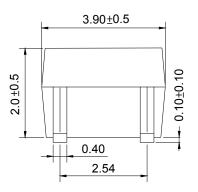
4PIN MINI-FLAT ZERO-CROSS TRIAC DRIVER PHOTOCOUPLER

#### Outside Dimension

Unit: mm







TOLERANCE: ±0.2mm

### Device Marking



Notes:

cosmo 166J

YWW Y: Year code / W: Week code



4PIN MINI-FLAT ZERO-CROSS TRIAC DRIVER PHOTOCOUPLER

### Absolute Maximum Ratings

(Ta=25°ℂ)

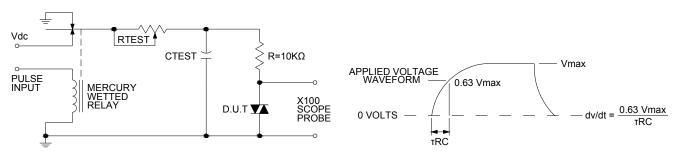
Parameter			Rating	Unit
Input	Forward current	I <sub>F</sub>	50	mA
	Peak forward current	I <sub>FM</sub>	1	Α
	Reverse voltage	$V_R$	6	V
	Power dissipation	P <sub>D</sub>	70	mW
	Off-state output terminal voltage	$V_{DRM}$	600	$V_{PEAK}$
Output	On-state R.M.S. current	I <sub>T(RMS)</sub>	70	mA
	Peak repetitive surge current (PW=10ms.DC 10%)	I <sub>TSM</sub>	1	Α
	Power dissipation	P <sub>D</sub>	150	mW
Total power dissipation		P <sub>tot</sub>	200	mW
Isolation voltage 1 minute		V <sub>iso</sub>	3750	Vrms
Operating temperature		T <sub>opr</sub>	-40 to +115	$^{\circ}\!\mathbb{C}$
Storage temperature		T <sub>stg</sub>	-50 to +125	$^{\circ}\!\mathbb{C}$
Soldering temperature 10 seconds		T <sub>sol</sub>	260	$^{\circ}\!\mathbb{C}$

#### Electro-optical Characteristics

(Ta=25°C)

	Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit
Input	Forward voltage	$V_{F}$	I <sub>F</sub> =10mA	-	1.2	1.4	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =4V	-	-	10	μA
Output	Peak blocking current	I <sub>DRM</sub>	V <sub>DRM</sub> Rated	-	-	1	μΑ
	On-state voltage	$V_{TM}$	I <sub>TM</sub> =70mA	-	1.8	3	V
Transfer characteristics	Holding current	I <sub>H</sub>		-	0.1	-	mA
	Critical rate of rise of off-state voltage	dv/dt	$V_{DRM}=(1/\sqrt{2})*Rated$	1000	-	-	V/µs
	Inhibit Voltage (MT1-MT2 Voltage above which device will not trigger)	V <sub>INH</sub>	I <sub>F</sub> = Rated I <sub>FT</sub>	-	-	20	٧
	Leakage in inhibited state	I <sub>DRM2</sub>	I <sub>F</sub> =Rated I <sub>FT</sub> , Rated V <sub>DRM</sub> ,	-	-	600	μA
	Isolation resistance	R <sub>iso</sub>	DC500V	5x10 <sup>10</sup>	10 <sup>11</sup>	_	Ω
	Minimum trigger current	I <sub>FT</sub>	Main terminal voltage=3V	-	_	10	mA

### Static dv/dt Test Circuit





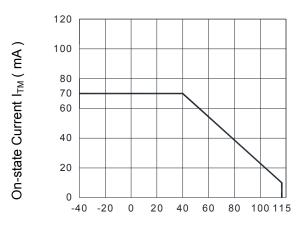
4PIN MINI-FLAT ZERO-CROSS TRIAC DRIVER PHOTOCOUPLER

Fig.1 Forward Current vs. Ambient Temperature

Oward Current 40
30
20
10
-40 -20 0 20 40 60 80 100 115

Ambient Temperature Ta (°C)

Fig.3 On-state R.M.S. Current vs. Ambient Temperature



Ambient Temperature Ta (°C)

Fig.5 Peak Forward Current vs. Duty Ratio

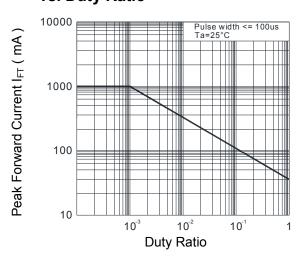


Fig.2 Diode Power Dissipation vs. Ambient Temperature

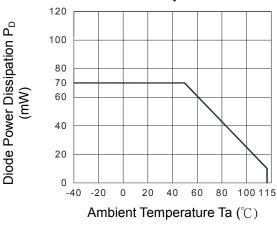
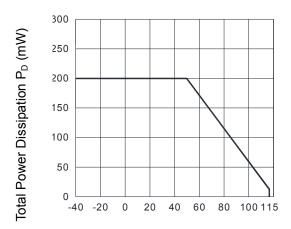
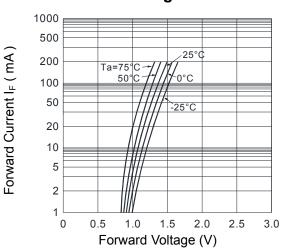


Fig.4 Total Power Dissipation vs. Ambient Temperature



Ambient Temperature Ta (°C)

Fig.6 Forward Current vs. Forward Voltage



4PIN MINI-FLAT ZERO-CROSS TRIAC DRIVER PHOTOCOUPLER

Fig.7 On-state Characteristics

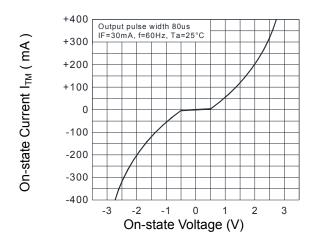


Fig.9 Leakage with LED off vs. Ambient Temperature

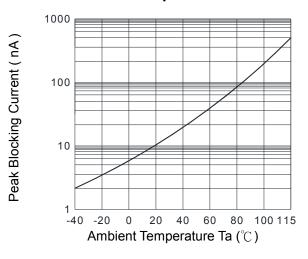


Fig.11 Trigger Current vs. Ambient Temperature

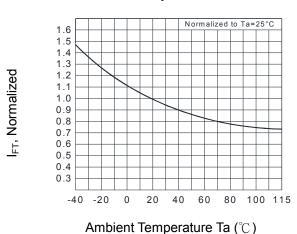


Fig.8 Inhibit Voltage vs. Ambient Temperature

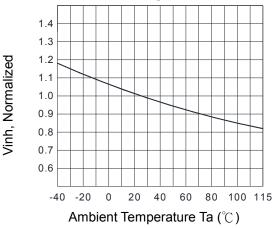
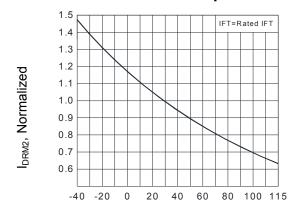


Fig.10 I<sub>DRM2</sub> ,Leakage in Inhibited State vs. Ambient Temperature



Ambient Temperature Ta (°C)



### 4PIN MINI-FLAT ZERO-CROSS TRIAC DRIVER PHOTOCOUPLER

#### Recommended Soldering Conditions

(a) Infrared reflow soldering:

■ Peak reflow soldering : 260°C or below (package surface temperature)

■ Time of peak reflow temperature : 10 sec
 ■ Time of temperature higher than 230°C : 30-60 sec
 ■ Time to preheat temperature from 180~190°C : 60-120 sec

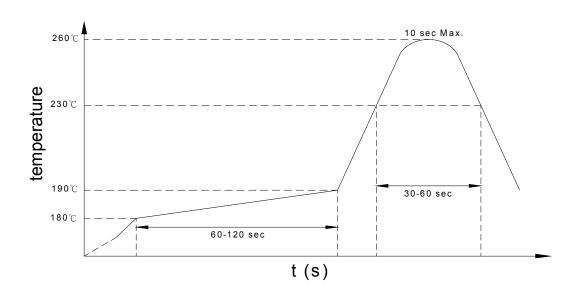
■ Time(s) of reflow: Two

■ Flux : Rosin flux containing small amount of chlorine (The

flux with a maximum chlorine content of 0.2 Wt% is

recommended.)

#### Recommended Temperature Profile of Infrared Reflow



#### (b) Wave soldering:

■ Temperature : 260°C or below (molten solder temperature)

■ Time : 10 seconds or less

■ Preheating conditions : 120°C or below (package surface temperature)

■ Time(s) of reflow : One

■ Flux : Rosin flux containing small amount of chlorine (The flux with a maximum

chlorine content of 0.2 Wt% is recommended.)

(c) Cautions:

■ Fluxes : Avoid removing the residual flux with freon-based and chlorine-based

cleaning solvent.

Avoid shorting between portion of frame and leads.

4PIN MINI-FLAT ZERO-CROSS TRIAC DRIVER PHOTOCOUPLER

### Numbering System

# **KTLP166J (X)**

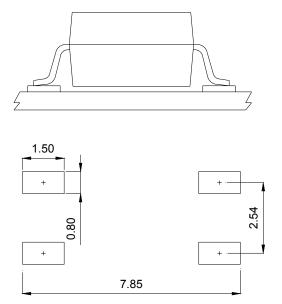
#### Notes:

KTLP166J = Part No.

X = Tape and reel option (TLD · TRU)

Option	Description	Packing quantity		
TLD	surface mount type package + TLD tape & reel option	3000 units per reel		
TRU	surface mount type package + TRU tape & reel option	3000 units per reel		

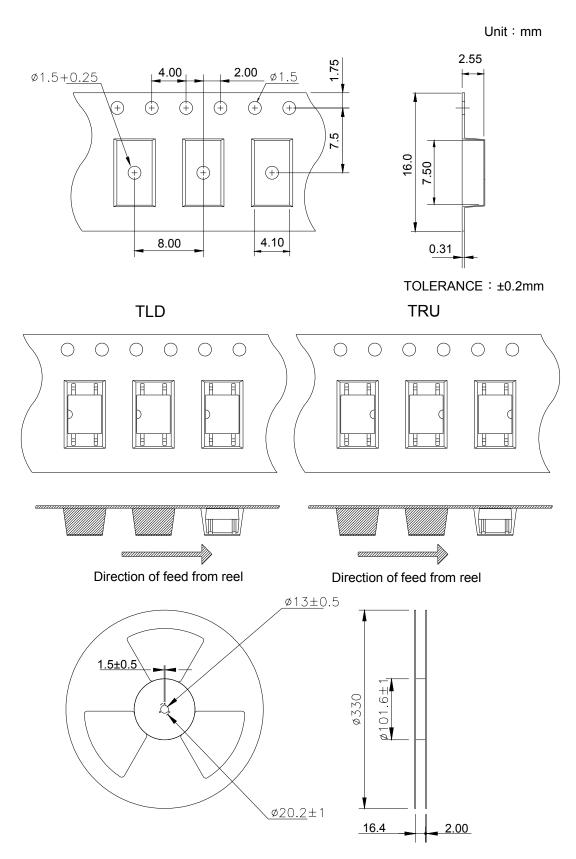
### • Recommended Pad Layout for Surface Mount Lead Form



Unit: mm

4PIN MINI-FLAT ZERO-CROSS TRIAC DRIVER PHOTOCOUPLER

### • 4-pin Mini-Flat TLD/TRU Carrier Tape & Reel





### 4PIN MINI-FLAT ZERO-CROSS TRIAC DRIVER PHOTOCOUPLER

#### Application Notice

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- c. Audio / Video
- d. Instrumentation
- e. Electrical application
- f. Measurement equipment
- g. Consumer electronics
- h. Telecommunication

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- d. Nuclear power control
- e. Equipment used for automotive vehicles, trains, ships...etc.

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