



# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023

## 250V/400V Random Phase 6-Pin Phototriac Optocoupler

### Features

- High isolation 5000 VRMS
- Peak Breakdown Voltage
  - 250V – CT3010,3011,3012
  - 400V – CT3020,3021,3022,3023
- Temperature range - 55 °C to 100 °C
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

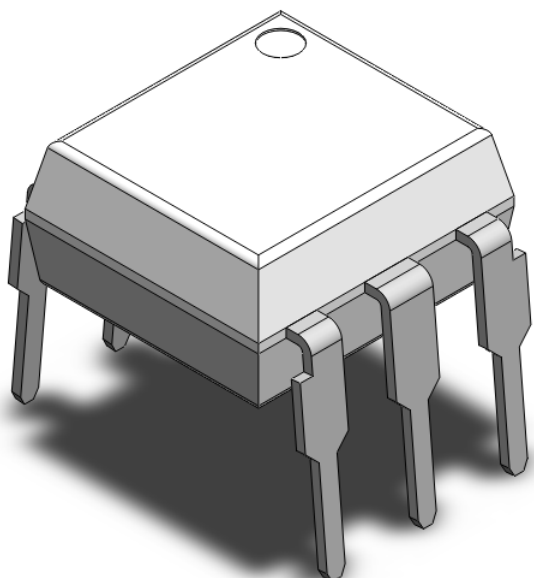
### Applications

- Motor Controls
- Lamp ballasts
- Static AC Power Switch
- Solenoid/ Valve Control

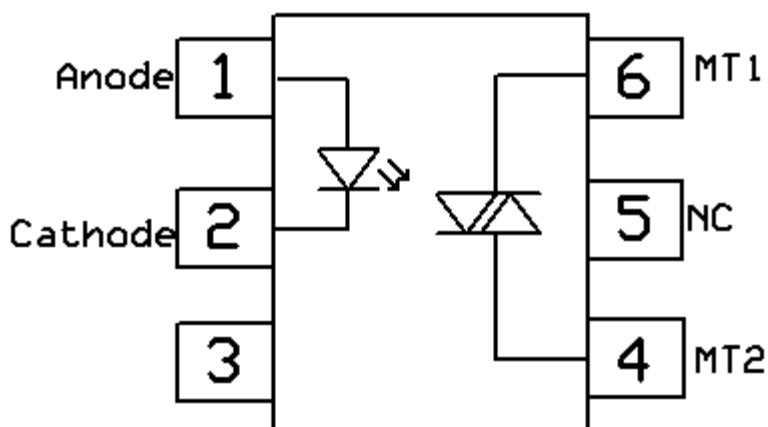
### Description

The CT3010, CT3011, CT3012, CT3020, CT3021, CT3022 and CT3023 consists of a Random Phase Photo Triac optically coupled to a gallium arsenide Infrared-emitting diode in a 6-lead DIP package with different lead forming options.

### Package Outline



### Schematic



Note: Different lead forming options available. See package dimension.



**CT3010, CT3011, CT3012**  
**CT3020, CT3021, CT3022, CT3023**  
**250V/400V Random Phase 6-Pin Phototriac Optocoupler**

---

**Absolute Maximum Rating at 25°C**

<b>Symbol</b>	<b>Parameters</b>	<b>Ratings</b>	<b>Units</b>	<b>Notes</b>
V <sub>ISO</sub>	Isolation voltage	5000	V <sub>RMS</sub>	
T <sub>OPR</sub>	Operating temperature	-55 ~ +100	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +150	°C	
T <sub>SOL</sub>	Soldering temperature	260	°C	
<b>Emitter</b>				
I <sub>F</sub>	Forward current	60	mA	
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W,300pps)	1	A	
V <sub>R</sub>	Reverse voltage	6	V	
P <sub>D</sub>	Power dissipation	100	mW	
<b>Detector</b>				
P <sub>D</sub>	Power dissipation	300	mW	
V <sub>DRM</sub>	Off-State Output Terminal Voltage	CT3010,3011,3012	250	V
		CT3020,3021,3022,3023	400	V
I <sub>TSM</sub>	Peak Repetitive Surge Current	1	A	



# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023

## 250V/400V Random Phase 6-Pin Phototriac Optocoupler

### Electrical Characteristics $T_A = 25^\circ\text{C}$ (unless otherwise specified)

#### Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$V_F$	Forward voltage	$I_F = 10\text{mA}$	-	-	1.5	V	
$I_R$	Reverse Current	$V_R = 6\text{V}$	-	-	5	$\mu\text{A}$	
$C_{IN}$	Input Capacitance	$f = 1\text{MHz}$	-	45	-	pF	

#### Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$I_{DRM}$	Peak Blocking Current	$I_F = 0\text{mA}$ , $V_{DRM} = \text{Rated } V_{DRM}$	-	-	100	nA	
$V_{TM}$	Peak On-State Voltage	$I_F = \text{Rated } I_{FT}$ , $I_{TM} = 100\text{mA}$	-	-	2.5	V	
$dv/dt$	Critical Rate of Rise off-State Voltage	$V_{PEAK} = \text{Rated } V_{DRM}$	-	100	-	$\text{V}/\mu\text{s}$	

#### Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$I_{FT}$	Input Trigger Current	CT3020	Terminal Voltage = 3V	-	-	30	mA
		CT3010, CT3021		-	-	15	
		CT3011, CT3022		-	-	10	
		CT3012, CT3023		-	-	5	
$I_H$	Holding Current		-	250	-	$\mu\text{A}$	
$R_{IO}$	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	$1 \times 10^{11}$	-	-		
$C_{IO}$	Isolation Capacitance	$f = 1\text{MHz}$	-	0.25	-	pF	



# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023 250V/400V Random Phase 6-Pin Phototriac Optocoupler

## Typical Characteristic Curve

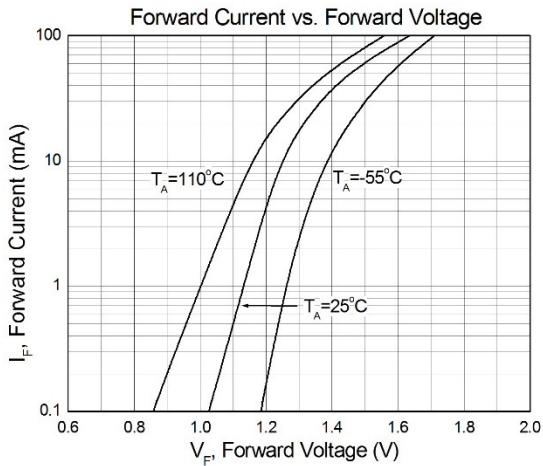


Figure 1

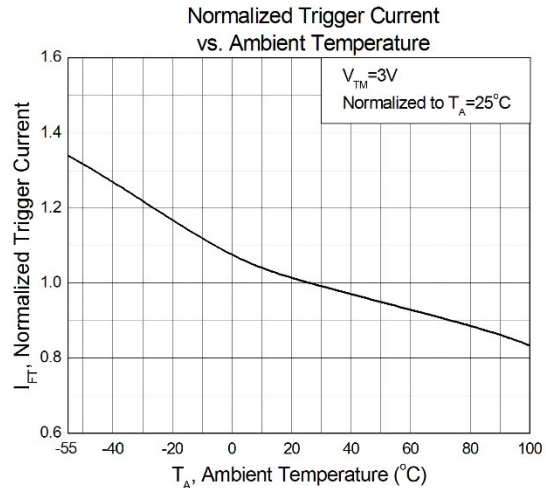


Figure 2

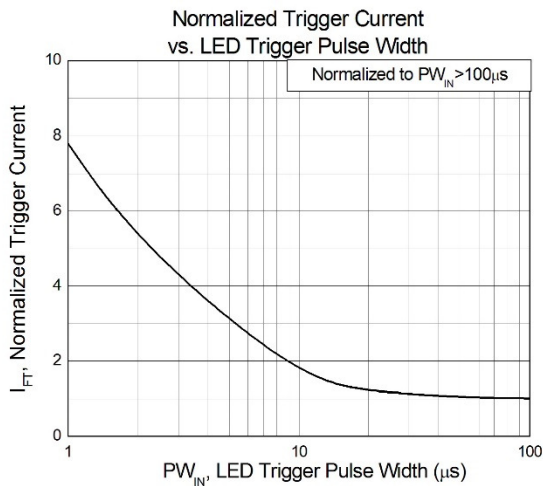


Figure 3

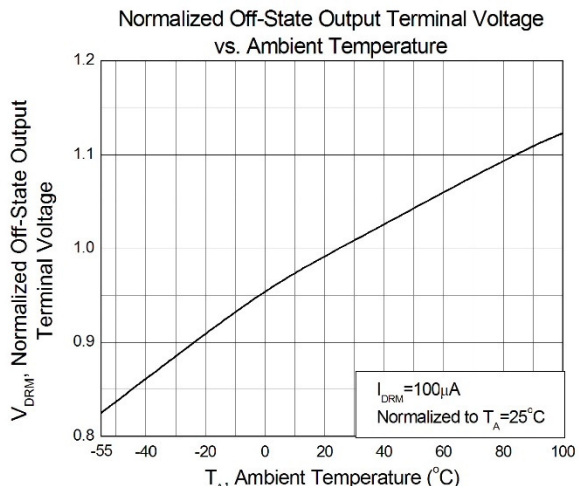


Figure 4

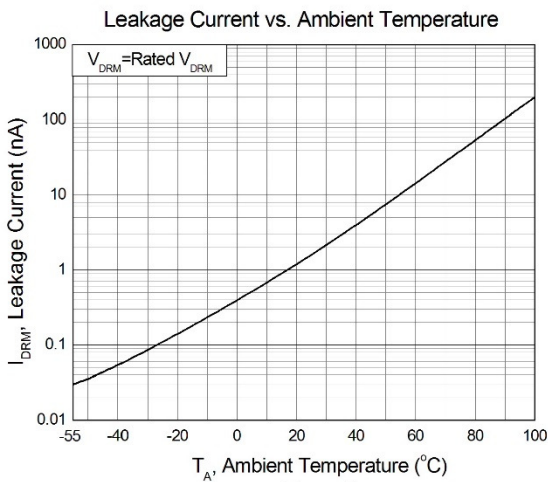


Figure 5

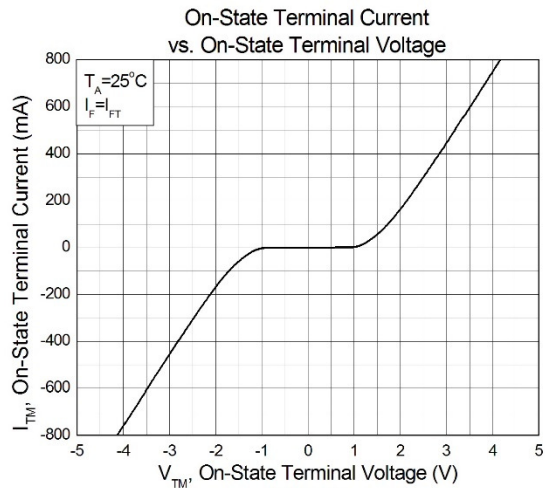
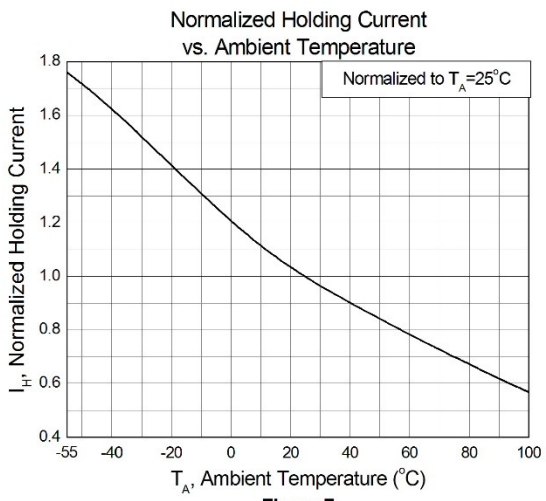


Figure 6



# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023 250V/400V Random Phase 6-Pin Phototriac Optocoupler



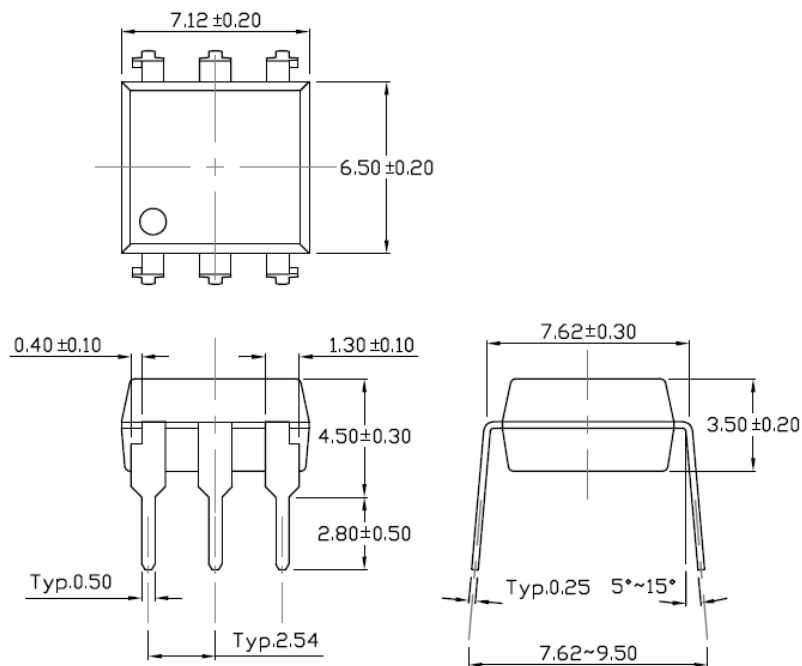


# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023

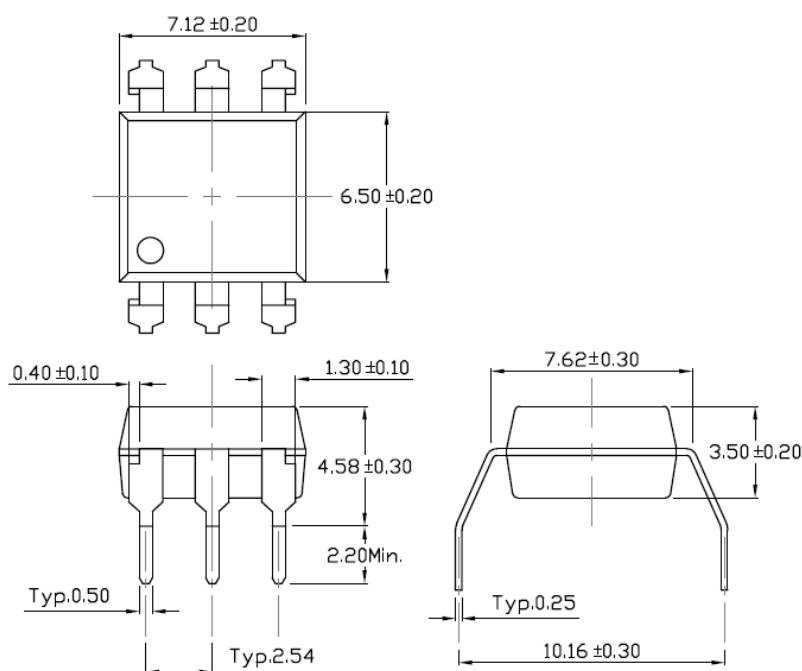
## 250V/400V Random Phase 6-Pin Phototriac Optocoupler

### Package Dimension *Dimensions in mm unless otherwise stated*

#### Standard DIP – Through Hole



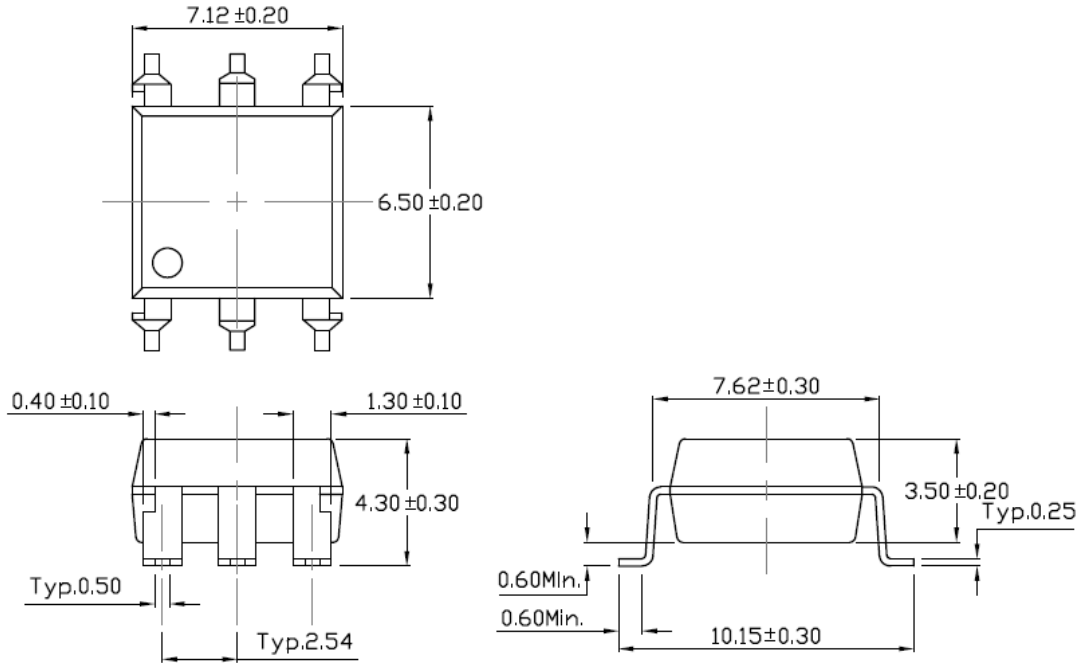
#### Wide Lead Forming – Through Hole (M Type)



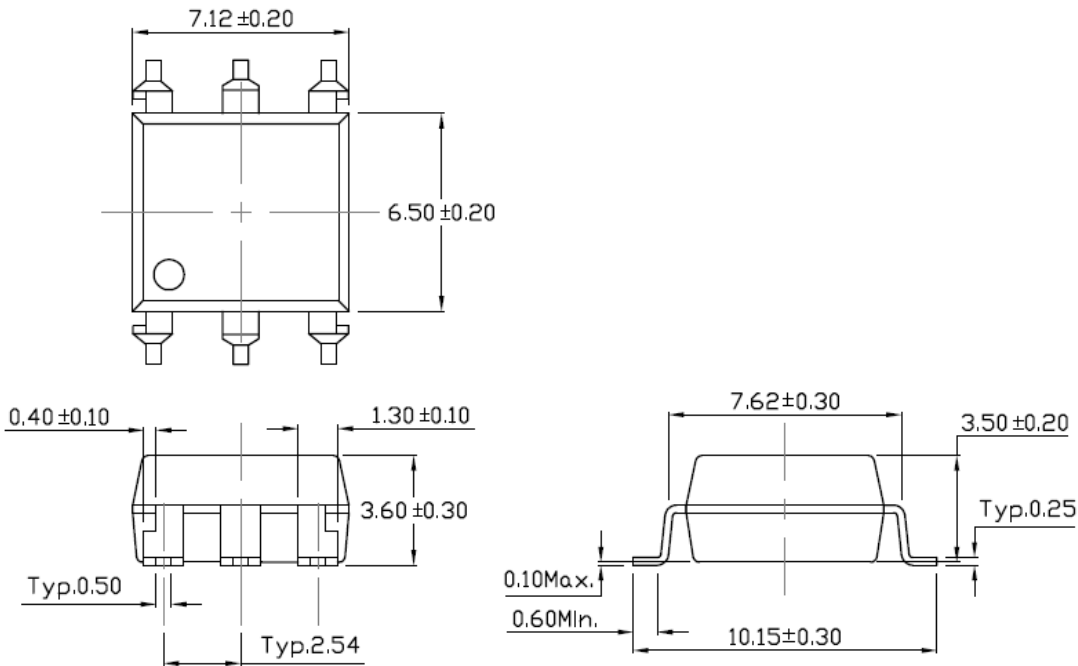


**CT3010, CT3011, CT3012**  
**CT3020, CT3021, CT3022, CT3023**  
**250V/400V Random Phase 6-Pin Phototriac Optocoupler**

**Surface Mount Forming (S Type)**



**Surface Mount Forming (Low Profile) (SL Type)**

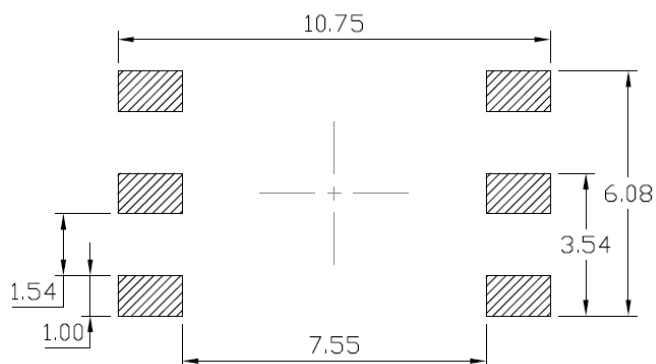




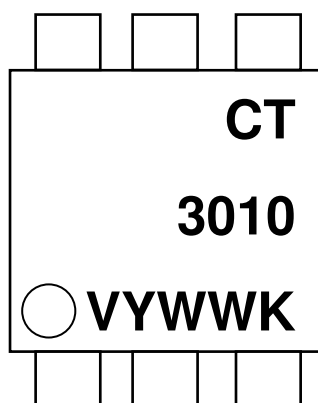
# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023

## 250V/400V Random Phase 6-Pin Phototriac Optocoupler

### Recommended Solder Mask *Dimensions in mm unless otherwise stated*



### Marking Information



#### Note:

- CT : Denotes "CT Micro"
- 3010 : Part Number
- V : VDE Option
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code





**CT3010, CT3011, CT3012**  
**CT3020, CT3021, CT3022, CT3023**  
**250V/400V Random Phase 6-Pin Phototriac Optocoupler**

---

## Ordering Information

CT301X(Y)(Z)-G, CT302X(Y)(Z)-G

X = Part No. (CT301X:0,1,2), (CT302X : 0,1,2,3)

Y = Lead form option (S, SL, M or none)

Z = Tape and reel option (T1, T2 or none)

G= Material option (G: Green, None: Non-green)

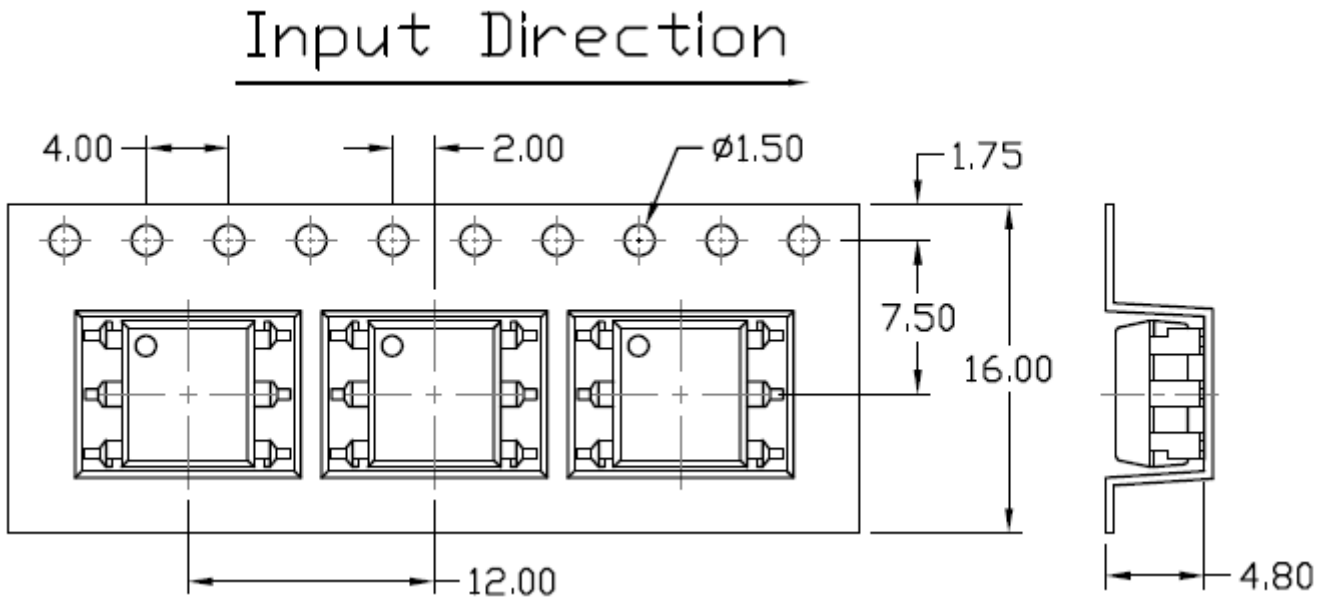
<b>Option</b>	<b>Description</b>	<b>Quantity</b>
None	Standard 6 Pin Dip	50Units/Tube
M	Gullwing (400mil) Lead Forming	50Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming – With Option 1 Taping	1000 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1000 Units/Reel



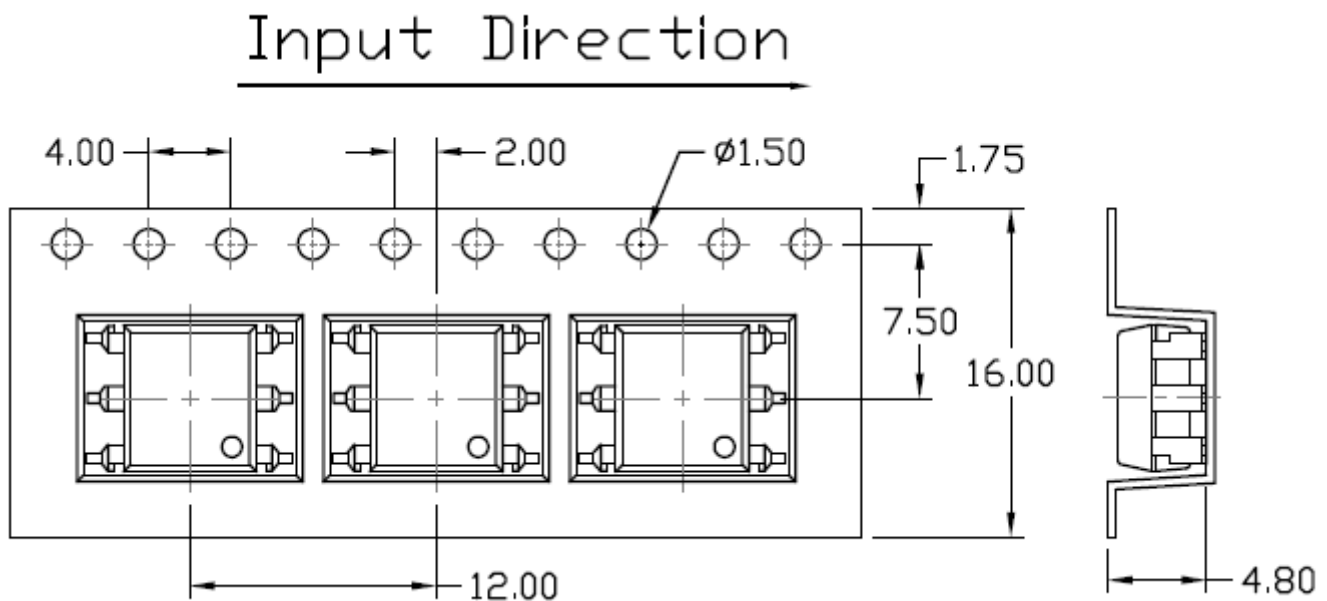
**CT3010, CT3011, CT3012**  
**CT3020, CT3021, CT3022, CT3023**  
**250V/400V Random Phase 6-Pin Phototriac Optocoupler**

**Carrier Tape Specifications** *Dimensions in mm unless otherwise stated*

**Option S(T1) & SL(T1)**



**Option S(T2) & SL(T2)**

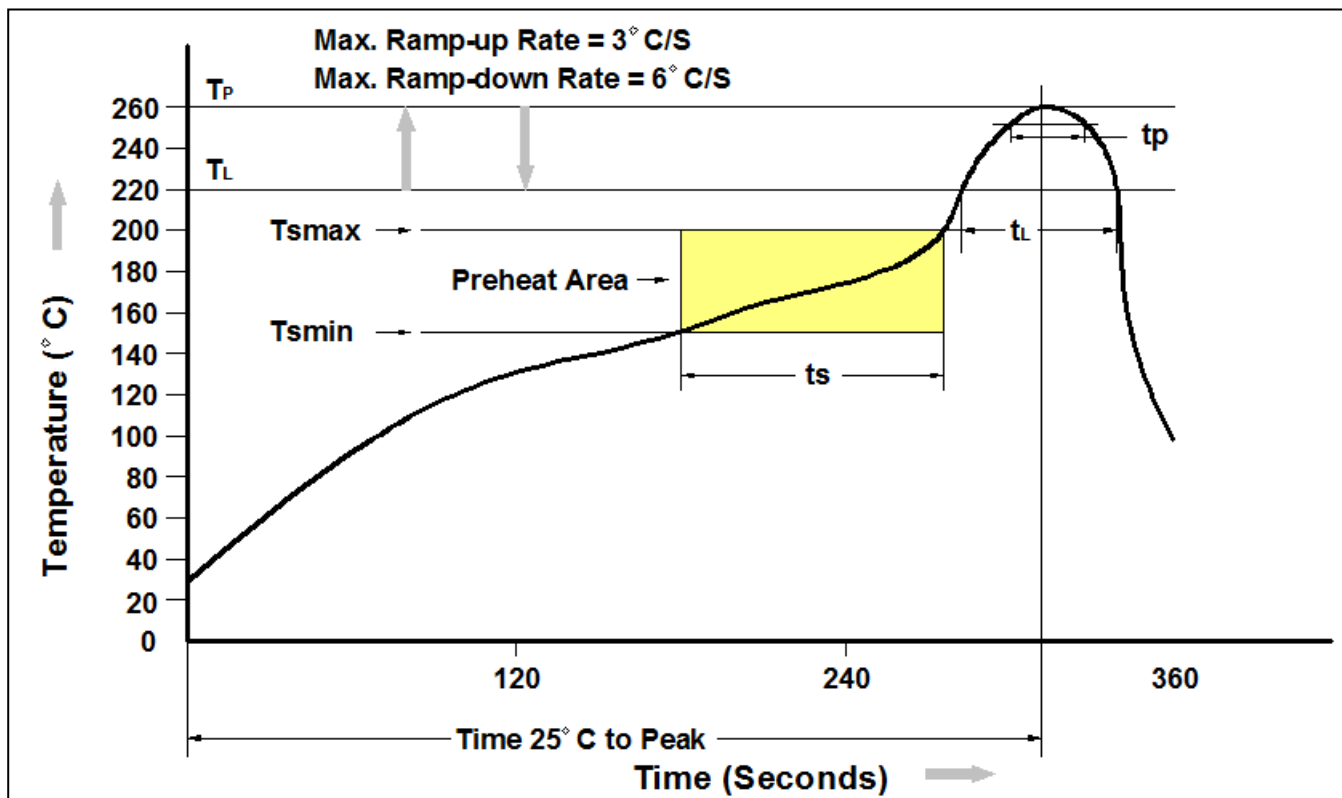




# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023

## 250V/400V Random Phase 6-Pin Phototriac Optocoupler

### Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	150 °C
Temperature Max. (T <sub>smax</sub> )	200 °C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds
Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	217 °C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60 – 150 seconds
Peak Body Package Temperature	260 °C +0 °C / -5 °C
Time (t <sub>P</sub> ) within 5 °C of 260 °C	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	6°C/second max
Time 25 °C to Peak Temperature	8 minutes max.



**CT3010, CT3011, CT3012  
CT3020, CT3021, CT3022, CT3023  
250V/400V Random Phase 6-Pin Phototriac Optocoupler**

---

**DISCLAIMER**

**CT MICRO RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. CT MICRO DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.**

---

**DISCOLORATION MIGHT OCCUR ON THE PACKAGE SURFACE AFTER SOLDERING, REFLOW OR LONG TERM USE. THIS DOES NOT IMPACT THE PRODUCT PERFORMANCE NOR THE PRODUCT RELIABILITY.**

---

**CT MICRO ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT EXPRESS WRITTEN APPROVAL OF CT MICRO INTERNATIONAL CORPORATION.**

- 1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instruction for use provided in the labelling, can be reasonably expected to result in significant injury to the user.*
- 2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.*