CT3010-4L, CT3011-4L, CT3012-4L
CT3020-4L, CT3021-4L, CT3022-4L, CT3023-4L
250V/400V Random Phase 4-Pin Phototriac Optocoupler

Features

- High isolation 5000 VRMS
- Peak Breakdown Voltage
  - 250V – CT3010-4L,CT3011-4L,CT3012-4L
  - 400V – CT3020-4L,3021-4L,3022-4L,3023-4L
- Temperature range - 55 °C to 100 °C
- RoHS compliance
- REACH compliance
- Halogen compliance
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

Description

The CT3010-4L, CT3011-4L, CT3012-4L, CT3020-4L, CT3021-4L, CT3022-4L and CT3023-4L consists of a Random Phase Photo Triac optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead DIP package

Applications

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

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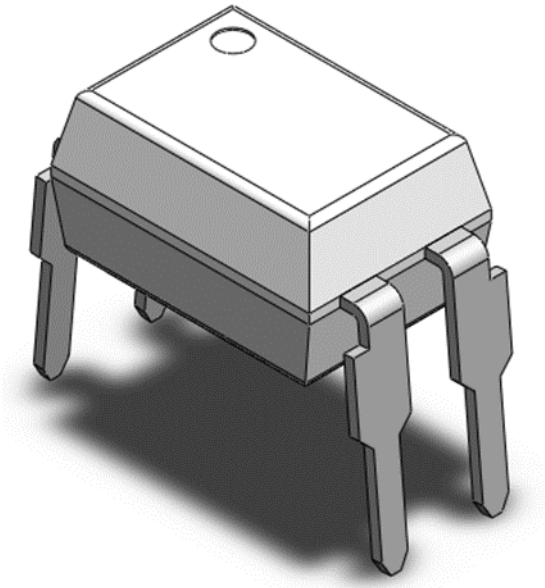
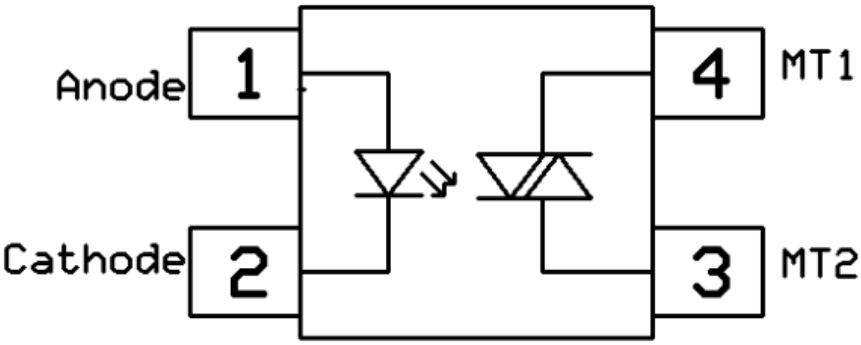
Package Outline



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

Schematic



Absolute Maximum Rating at 25°C

Symbol	*Parameters*		*Ratings*	*Units*	*Notes*
V_{ISO}	Isolation voltage		5000	V_{RMS}	
T_{OPR}	Operating temperature		-55 ~ +100	°C	
T_{STG}	Storage temperature		-55 ~ +150	°C	
T_{SOL}	Soldering temperature		260	°C	
Emitter					
I_F	Forward current		60	mA	
$I_{F(TRANS)}$	Peak transient current (≤1μs P.W,300pps)		1	A	
V_R	Reverse voltage		6	V	
P_D	Power dissipation		100	mW	
Detector					
P_D	Power dissipation		300	mW	
V_{DRM}	Off-State Output Terminal Voltage	CT3010-4L,3012-4L,3022-4L	250	V	
		CT3020-4L,3021-4L,3022-4L,3023-4L	400	V	
I_{TSM}	Peak Repetitive Surge Current		1	A	

Electrical Characteristics T_A = 25°C (unless otherwise specified)

Emitter Characteristics

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

Detector Characteristics

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

Transfer Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
I_{FT}	Input Trigger Current	CT3020-4L	Terminal Voltage = 3V I_{TM}=100mA	-	-	30	mA	
		CT3010-4L, CT3021-4L		-	-	15		
		CT3011-4L, CT3022-4L		-	-	10		
		CT3012-4L, CT3023-4L		-	-	5		
I_H	Holding Current			-	250	-	μA	
R_{IO}	Isolation Resistance		V_{IO}= 500V_{DC}	$1x10^{11}$	-	-	Ω	
C_{IO}	Isolation Capacitance		f= 1MHz	-	0.25	-	pF	

Typical Characteristic Curve

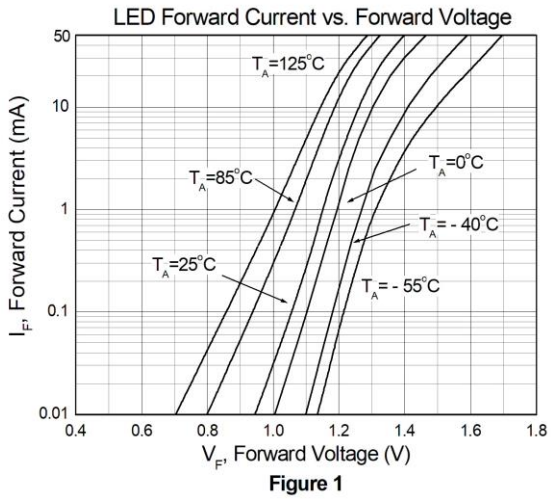


Figure 1

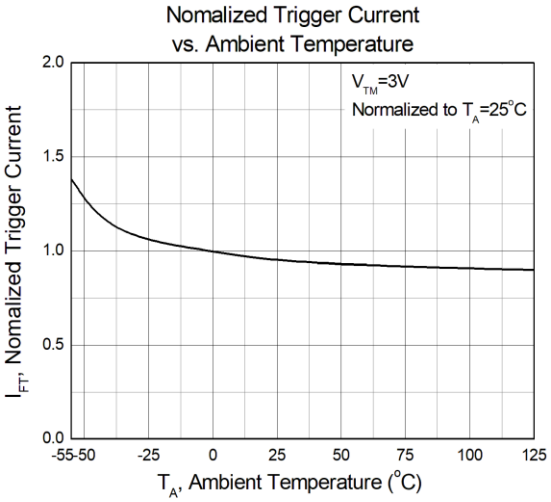


Figure 2

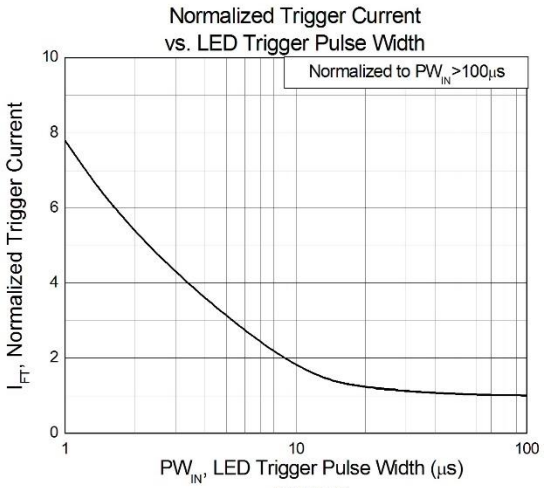


Figure 3

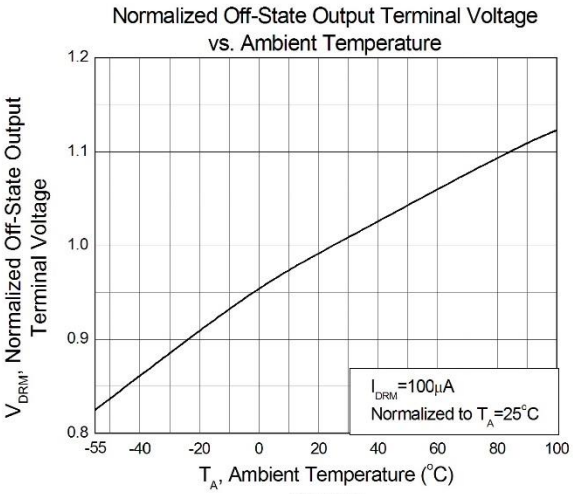


Figure 4

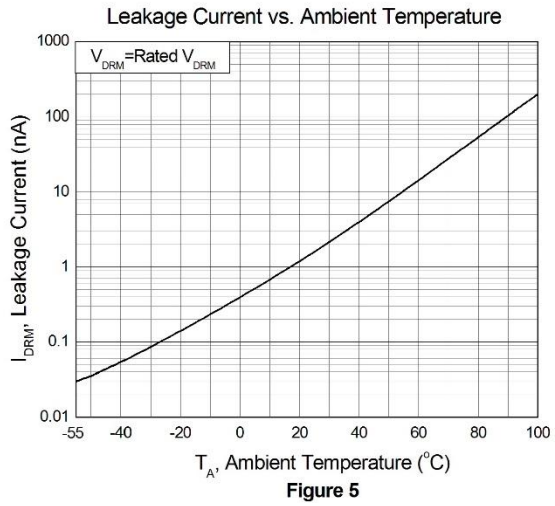


Figure 5

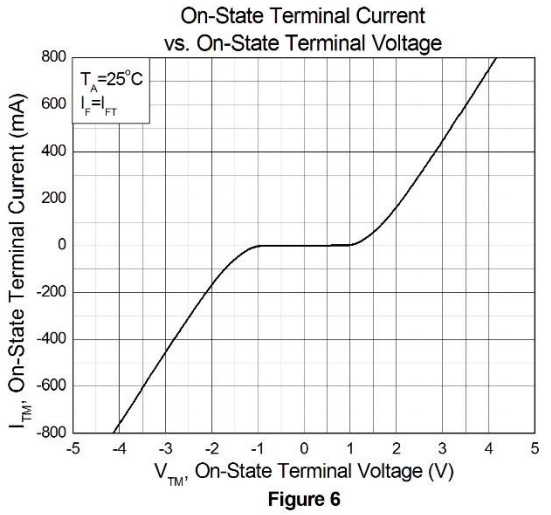


Figure 6

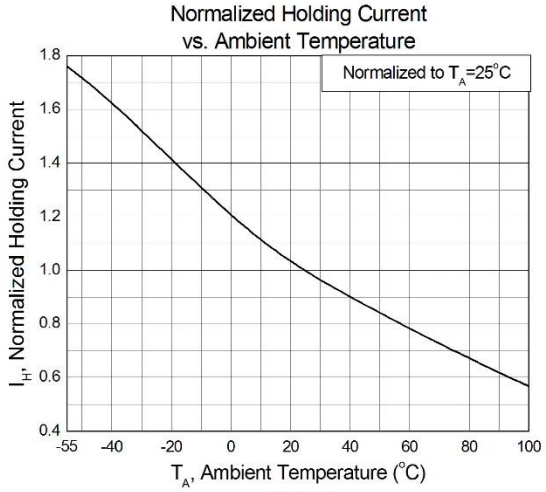
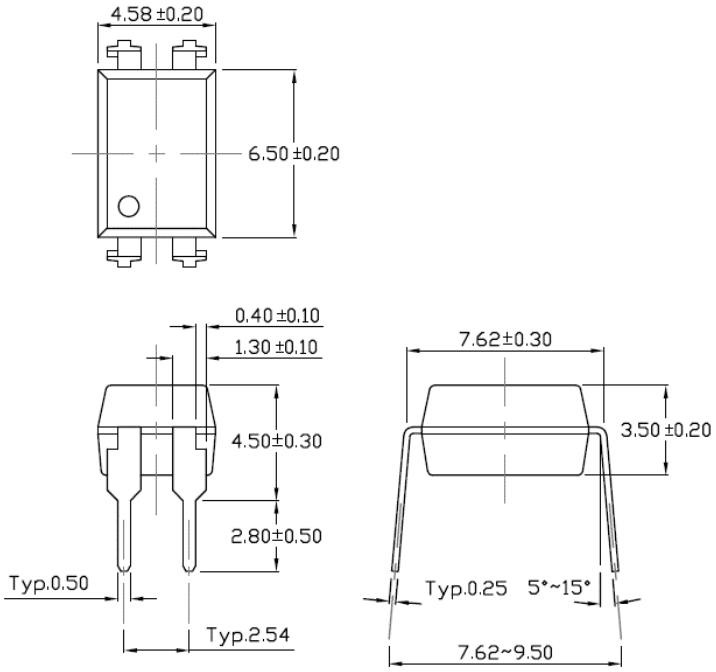

Normalized Holding Current
vs. Ambient Temperature
Normalized to T_A=25°C
I_H, Normalized Holding Current
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
-55
-40
-20
0
20
40
60
80
100
T_A, Ambient Temperature (°C)

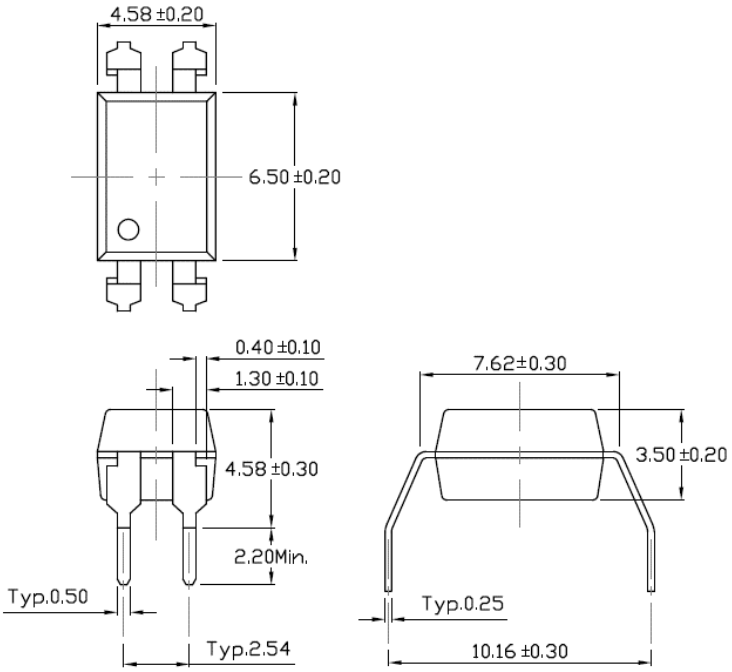
Figure 7

Package Dimension *Dimensions in mm unless otherwise stated*

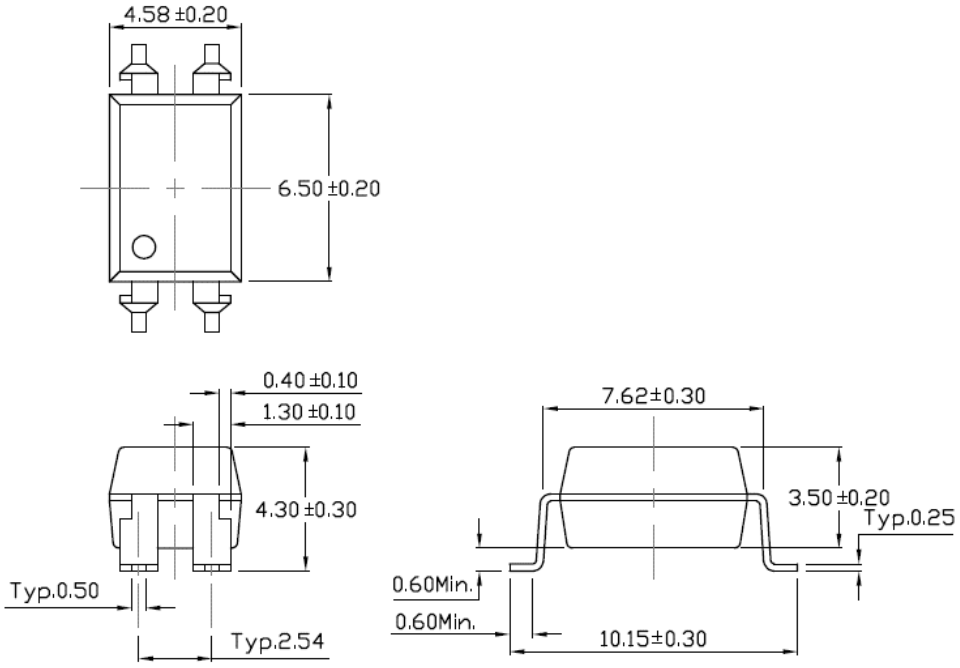
Standard DIP – Through Hole



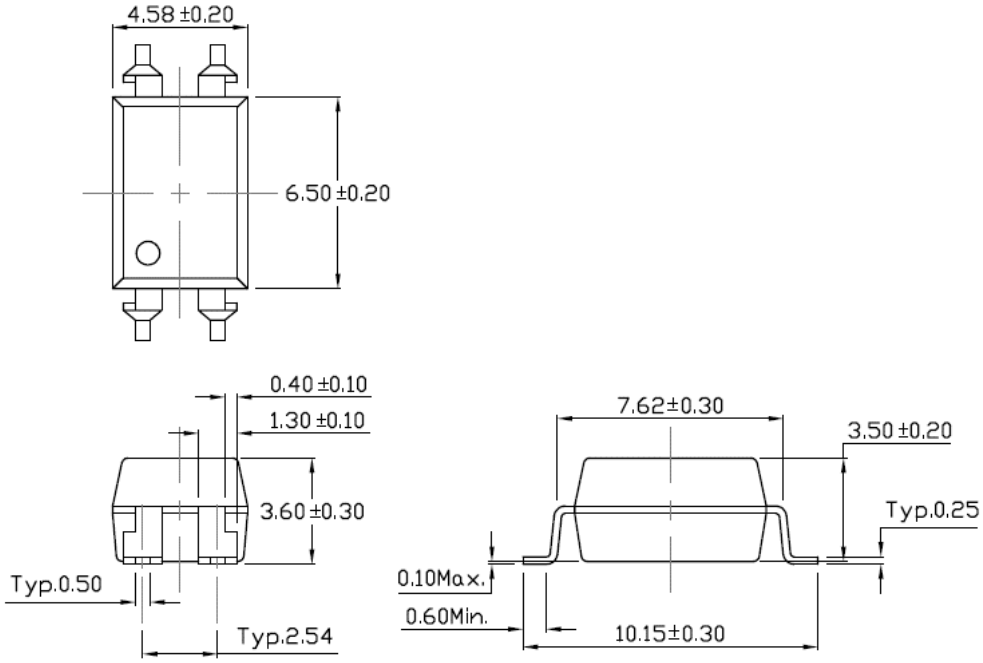
Gullwing (400mil) Lead Forming – Through Hole (M Type)



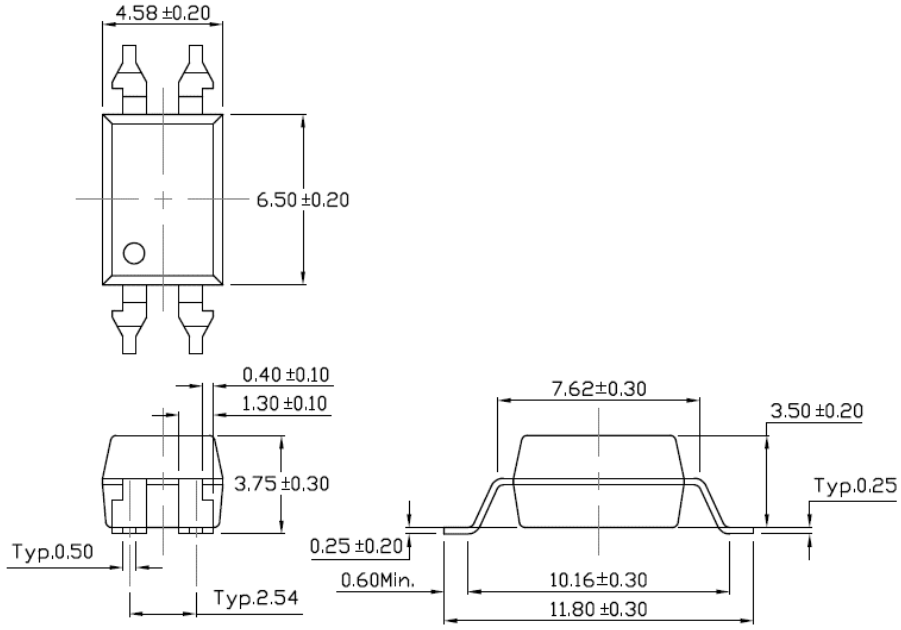
Surface Mount Lead Forming (S Type)



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

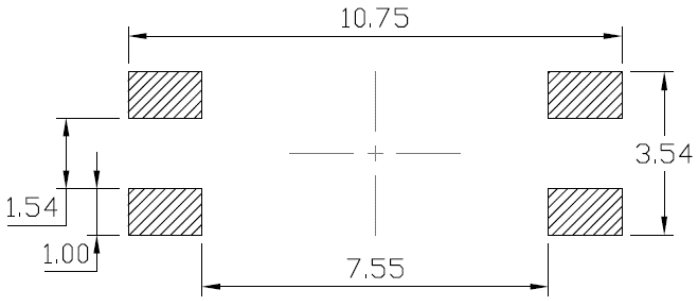


Surface Mount (Gullwing) Lead Forming (SLM Type)

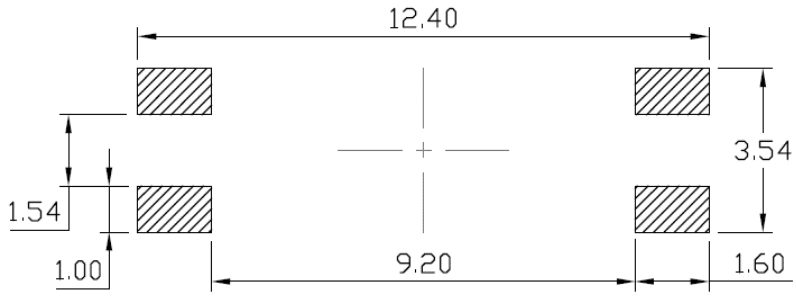


Recommended Solder Mask *Dimensions in mm unless otherwise stated*

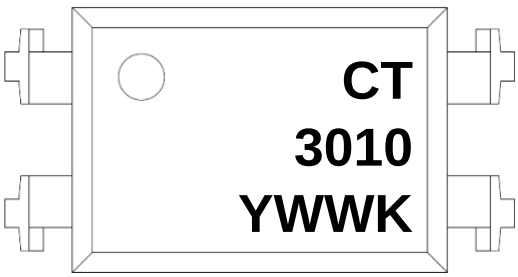
Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming



Surface Mount (Gullwing) Lead Forming



Marking Information



Note:

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

Ordering Information

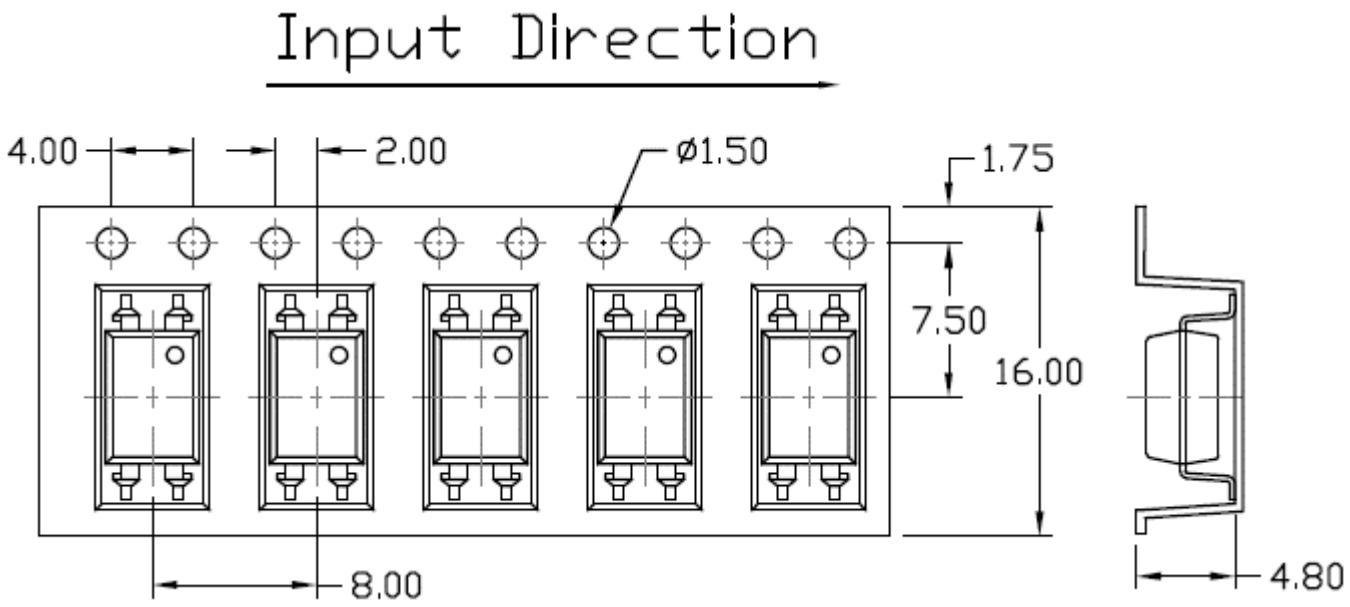
CT301X-4L(Y)(Z), CT302X-4L(Y)(Z)

CT = Denotes “CT Micro”
301X = Part Numbers (Current Ration Option X=0, 1 or 2)
302X = Part Numbers (Current Ration Option X=0, 1, 2 or 3)
4L = 4-Lead DIP Package
V = VDE Option (V or None)
Y = Lead form option (S, SL, M, SLM or none)
Z = Tape and reel option (T1 or T2)

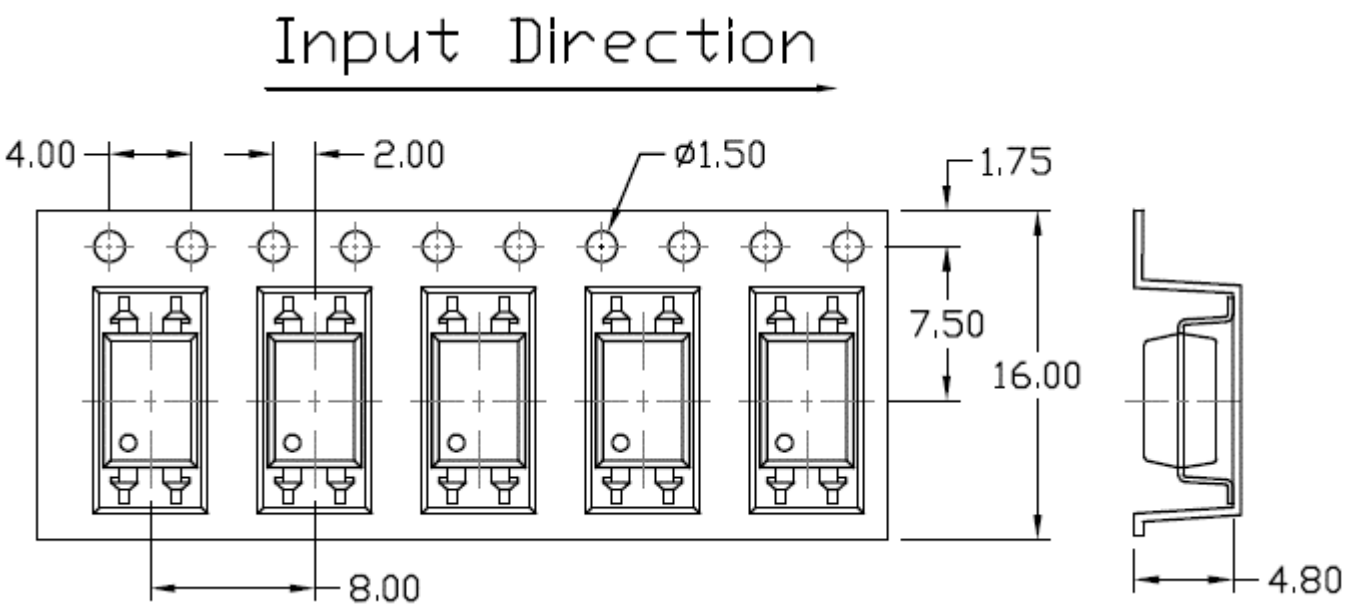
Option	***Description***	***Quantity***
None	Standard 4 Pin DIP	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1500 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1500 Units/Reel
SLM(T1)	Surface Mount (Gullwing) Lead Forming– With Option 1 Taping	1500 Units/Reel
SLM(T2)	Surface Mount (Gullwing) Lead Forming – With Option 2 Taping	1500 Units/Reel

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

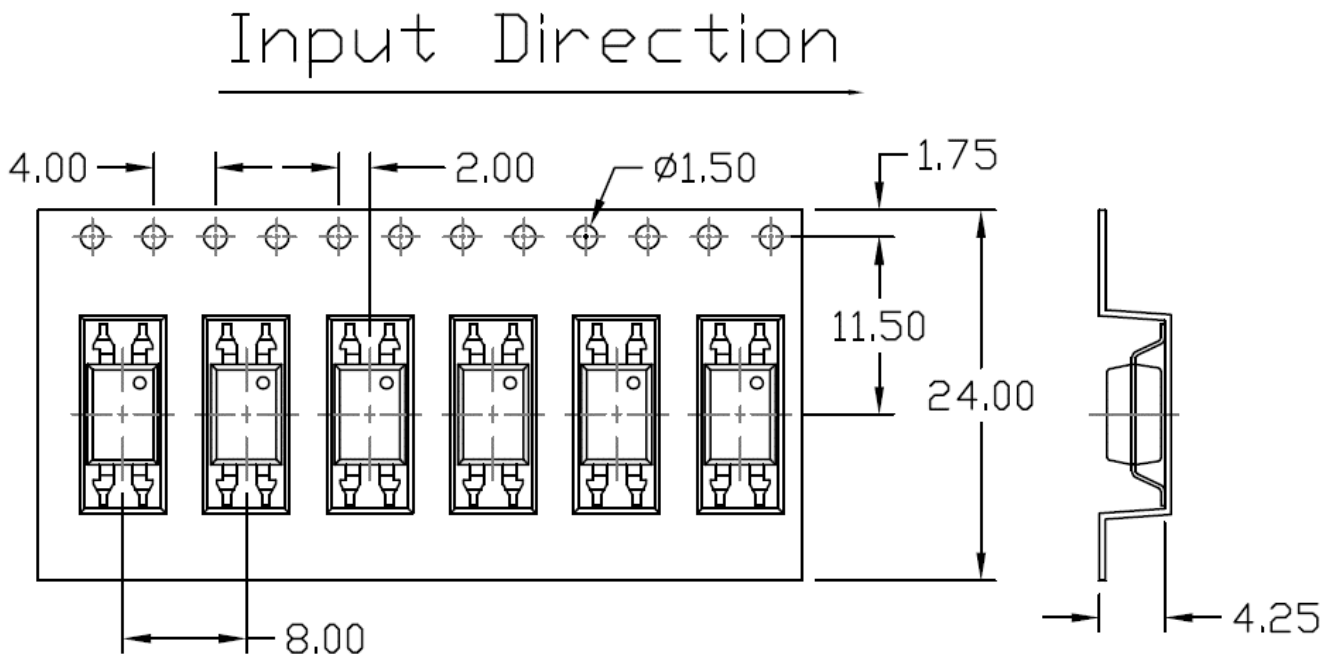
Option S(T1) & SL(T1)



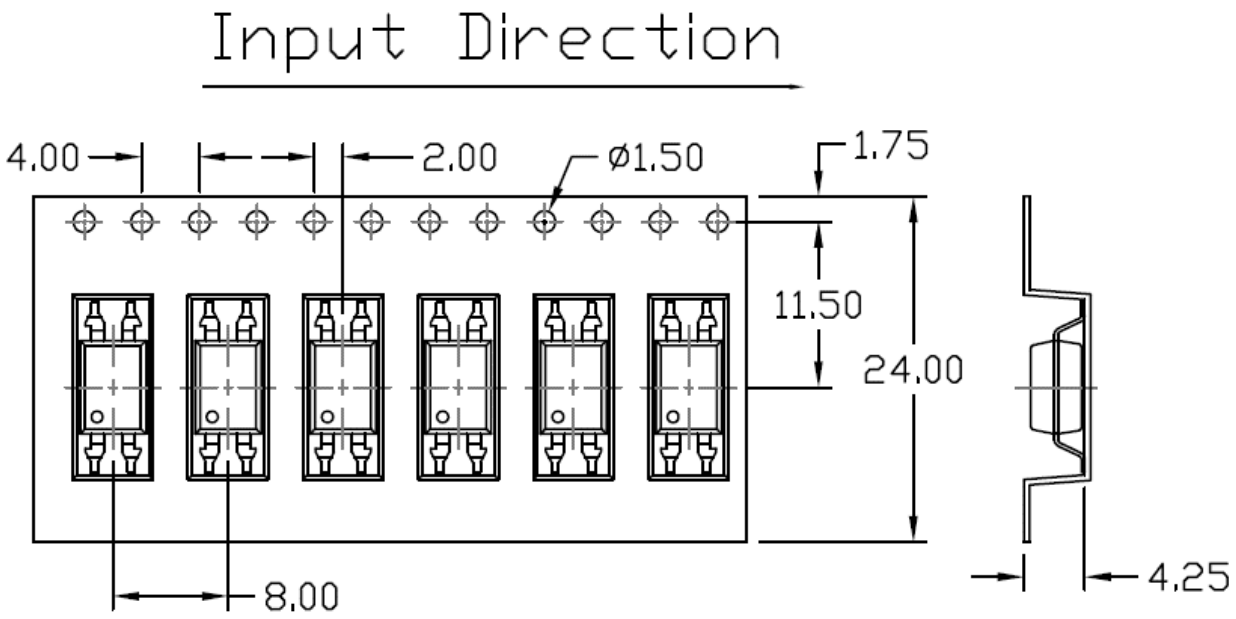
Option S(T2) & SL(T2)



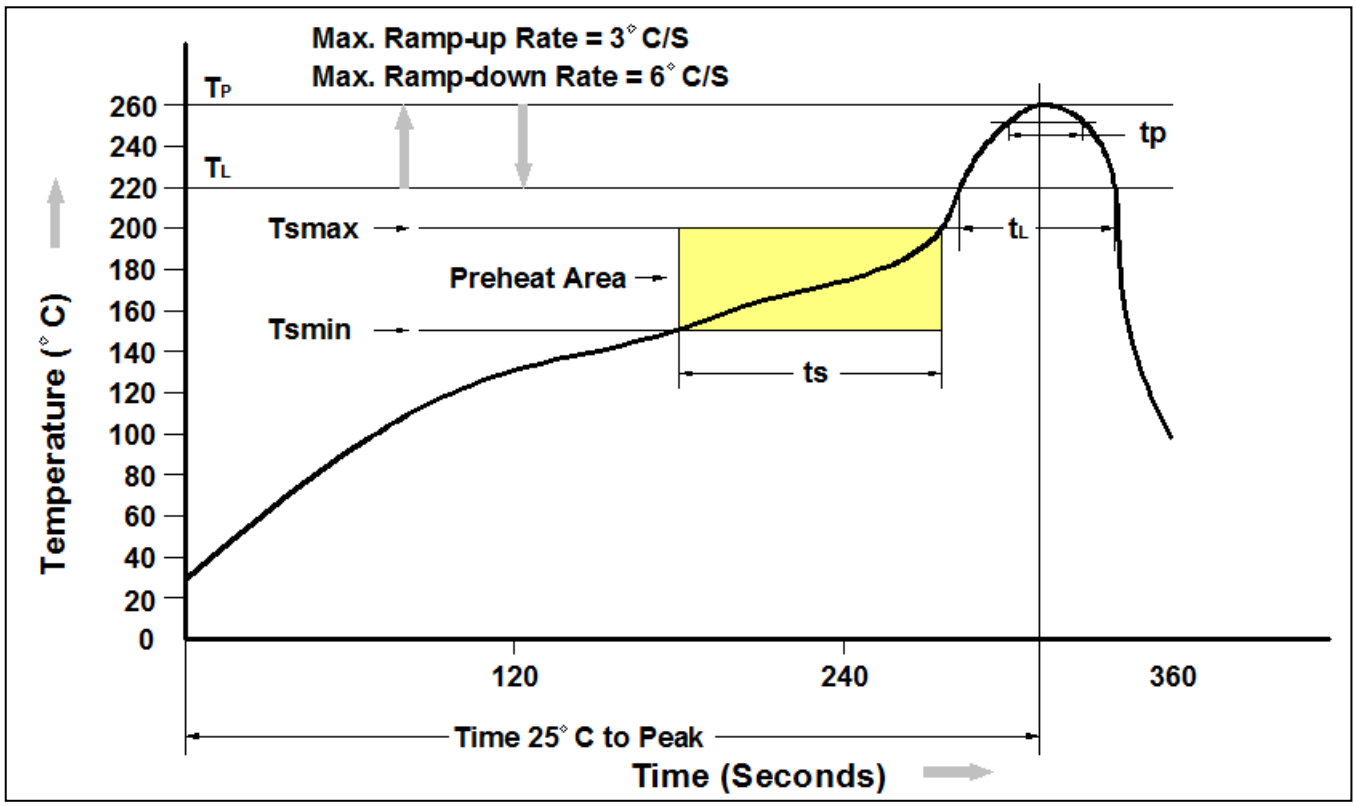
Option SLM(T1)



Option SLM(T2)



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Ramp-up Rate (t_L to t_P)	3°C/second max.
Liquidous Temperature (T_L)	217°C
Time (t_L) Maintained Above (T_L)	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time (t_P) within 5°C of 260°C	30 seconds
Ramp-down Rate (T_P to T_L)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

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