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CT814 Series
AC Input 4-Pin DMC-Isolator® Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- Patented coplanar structure DMC-Isolator®
- Various CTR selection available
- AC input with transistor output
- Operating Temperature range - 55 °C to 110 °C
- External creepage distance ≥ 7.0mm
- Distance Through Isolation ≥ 0.4mm
- Clearances Distance ≥ 7.5mm (S/SL Type)
- Clearances Distance ≥ 8.0mm (M/SLM Type)
- RoHS and REACH compliance
- Halogen Free compliance (Optional)
- MSL class 1
- Regulatory Approvals
  - ✓ UL - UL1577 (E364000)
  - ✓ VDE - EN60747-5-5(VDE0884-5)
  - ✓ CQC – GB4943.1, GB8898 (14001104781)
  - ✓ IEC62368 (FI/41119)

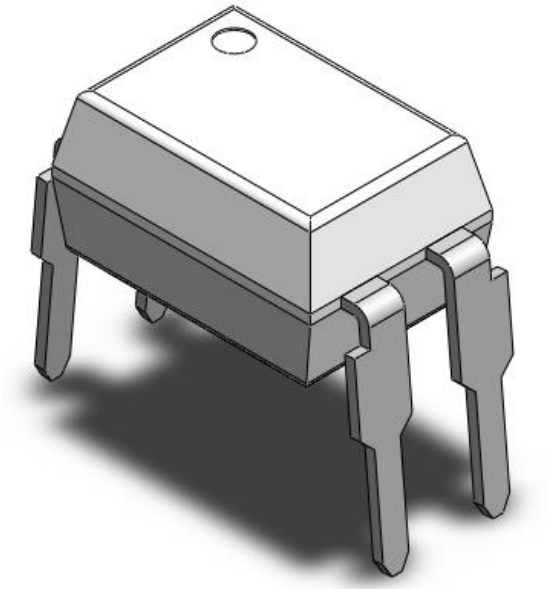
Description

The CT814 series consists of a phototransistor optically coupled to two Infrared-emitting diodes, connected in inverse parallel, in a 4-lead DIP DMC-Isolator® package with different lead forming options.

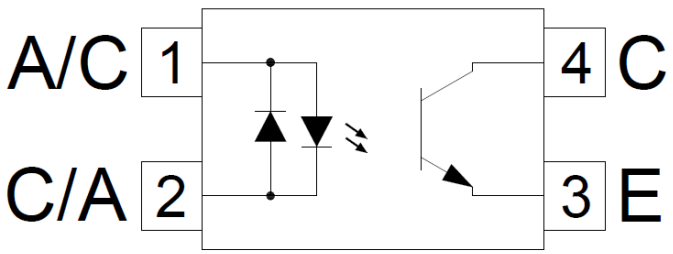
Applications

- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

Package Outline



Schematic



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

Absolute Maximum Ratings T_A = 25°C, unless otherwise specified

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. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameters	Ratings	Units	Notes
V_{ISO}	Isolation voltage (AC, 1 minute, 40 ~ 60% R.H.)	5000	V_{RMS}	
P_{TOT}	Total power dissipation	200	mW	
T_{OPR}	Operating temperature	-55 ~ +110	°C	
T_{STG}	Storage temperature	-55 ~ +150	°C	
T_{SOL}	Soldering temperature (For 10 seconds)	260	°C	
Emitter				
I_F	Forward current	±60	mA	
$I_{F(TRANS)}$	Peak transient current (≤1μs P.W,300pps)	1	A	
P_D	Emitter power dissipation	100	mW	
Detector				
P_D	Detector power dissipation	150	mW	
B_{VCEO}	Collector-Emitter Breakdown Voltage	80	V	
B_{VECO}	Emitter-Collector Breakdown Voltage	6	V	
I_C	Collector Current	50	mA	

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	-	1.24	1.4	V	
C_{IN}	Input Capacitance	f= 1MHz	-	30	-	pF	

Detector Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
B_{VCEO}	Collector-Emitter Breakdown	I_C= 100μA	80	-	-	V	
B_{VECO}	Emitter-Collector Breakdown	I_E= 100μA	6	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	V_{CE}= 20V, I_F=0mA	-	-	100	nA	

Transfer Characteristics

Symbol	*Parameters*		*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
CTR	Current Transfer Ratio	CT814	I_F= ±1mA, V_{CE}= 5V	20	-	300	%	
		CT814A		50	-	150		
		CT814B		100	-	300		
	CTR Symmetry		I_F= ±1mA, V_{CE}= 5V	0.7	-	1.3		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage		I_F= ±20mA, I_C= 1mA	-	0.04	0.2	V	
R_{IO}	Isolation Resistance		V_{IO}= 500V_{DC}	$5x10^{10}$	-	-	Ω	
C_{IO}	Isolation Capacitance		f= 1MHz	-	0.5	1	pF	

Switching Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
t_r	Rise Time	I_C= 2mA, V_{CE}= 2V, R_L= 100Ω	-	6	-	μs	
t_f	Fall Time		-	8	-		

Typical Characteristic Curves *T_A = 25°C, unless otherwise specified*

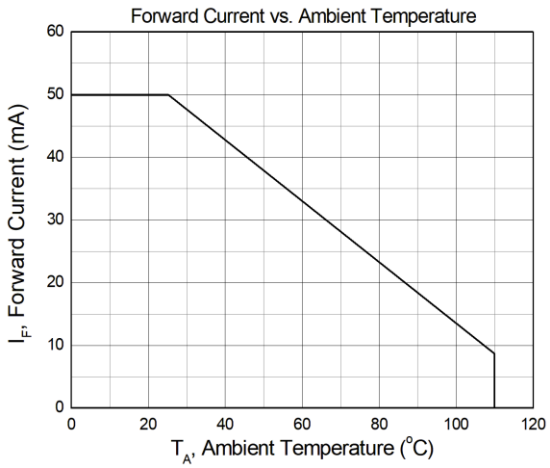


Figure 1

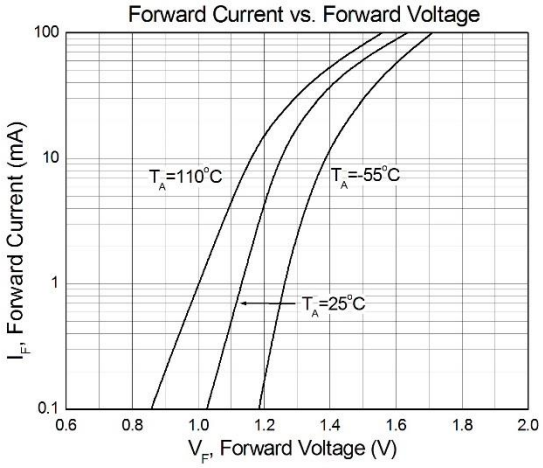


Figure 2

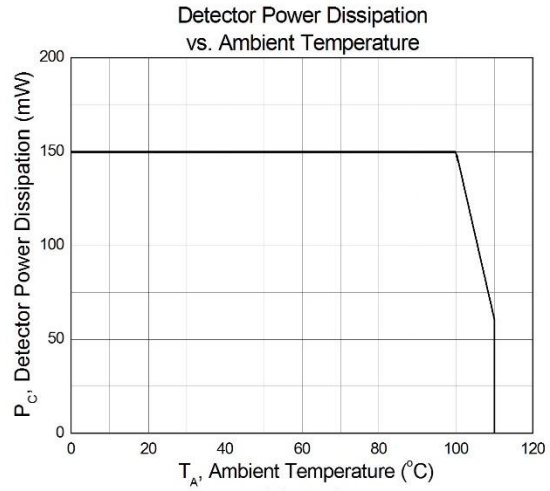


Figure 3

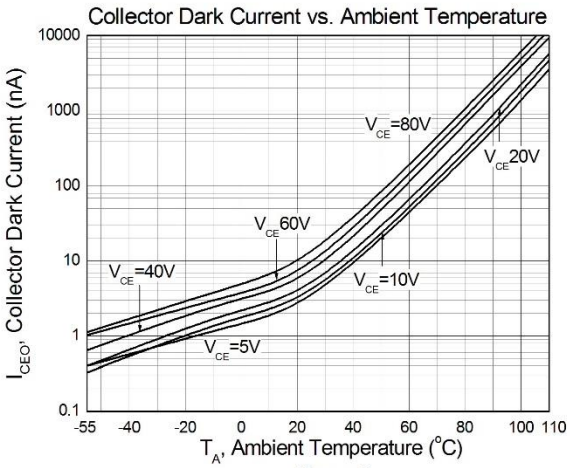


Figure 4

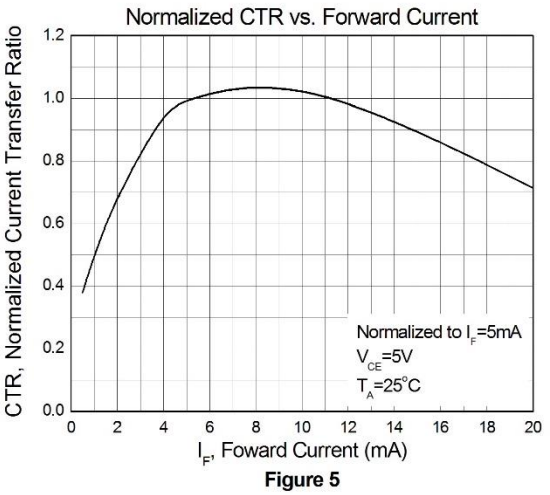


Figure 5

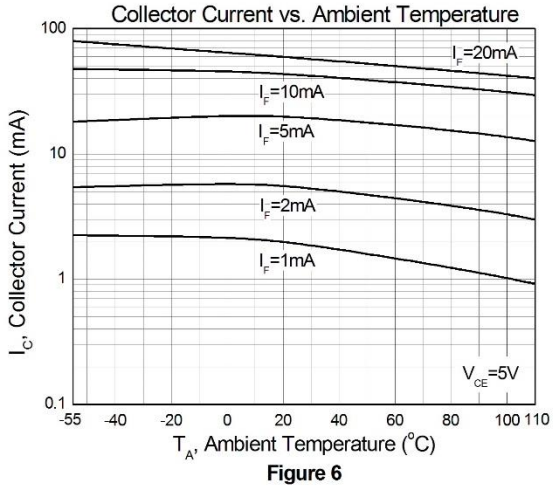


Figure 6

Typical Characteristic Curves *T_A = 25°C, unless otherwise specified (Continued)*

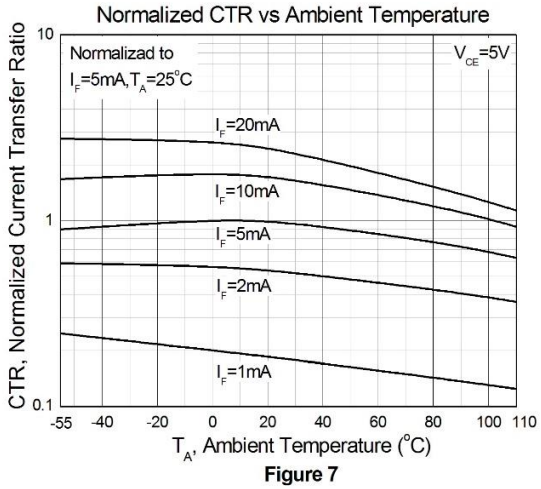


Figure 7

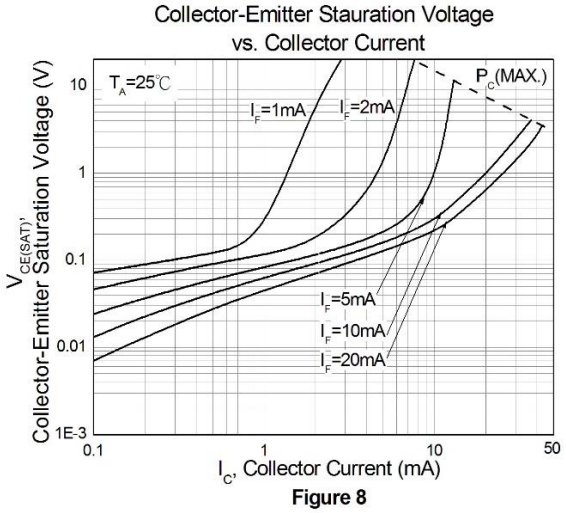


Figure 8

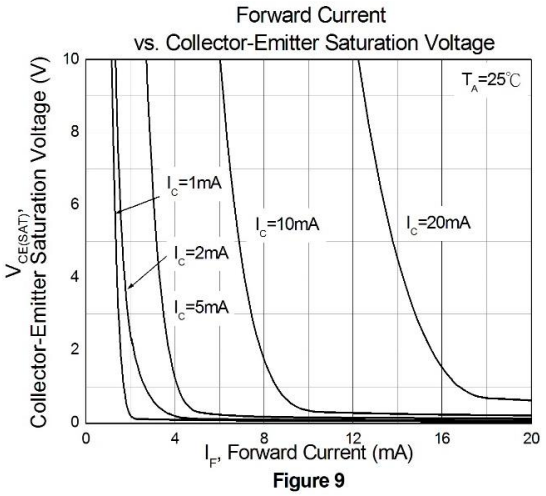


Figure 9

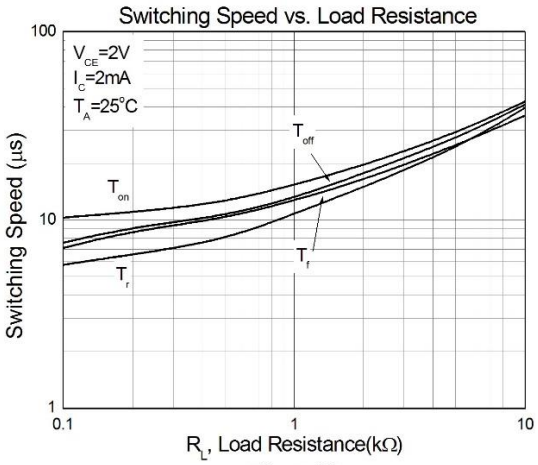


Figure 10

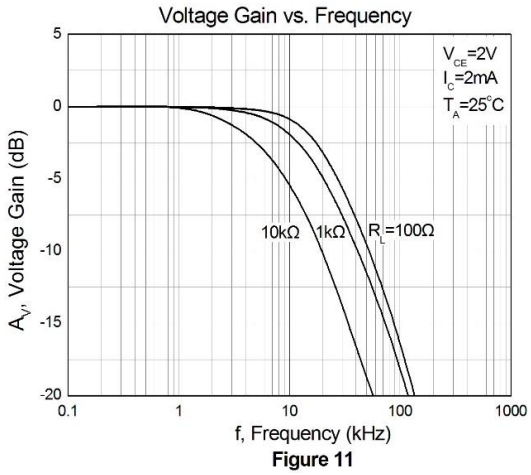


Figure 11

Test Circuit

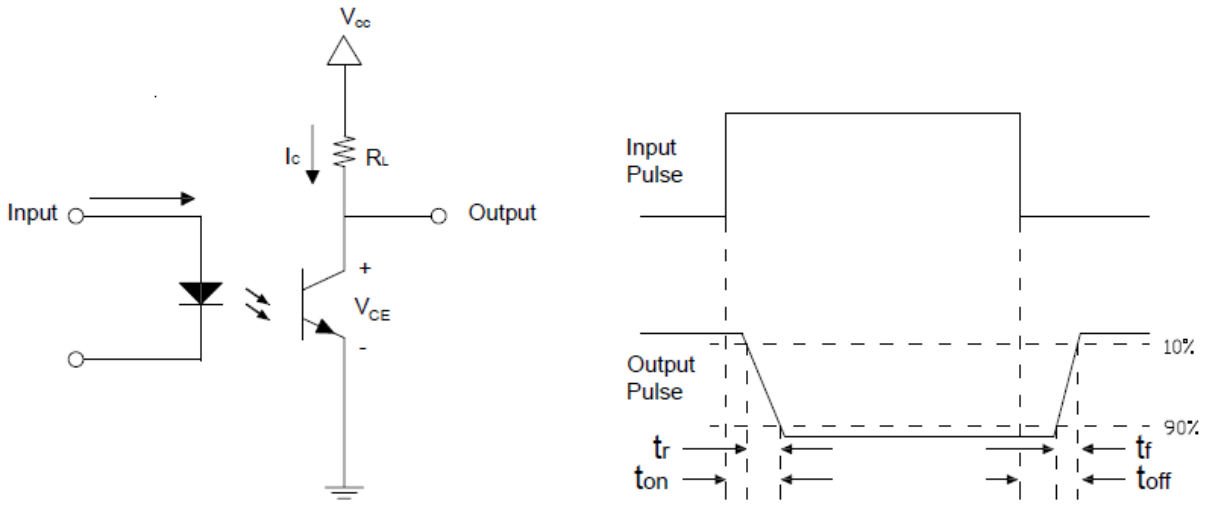
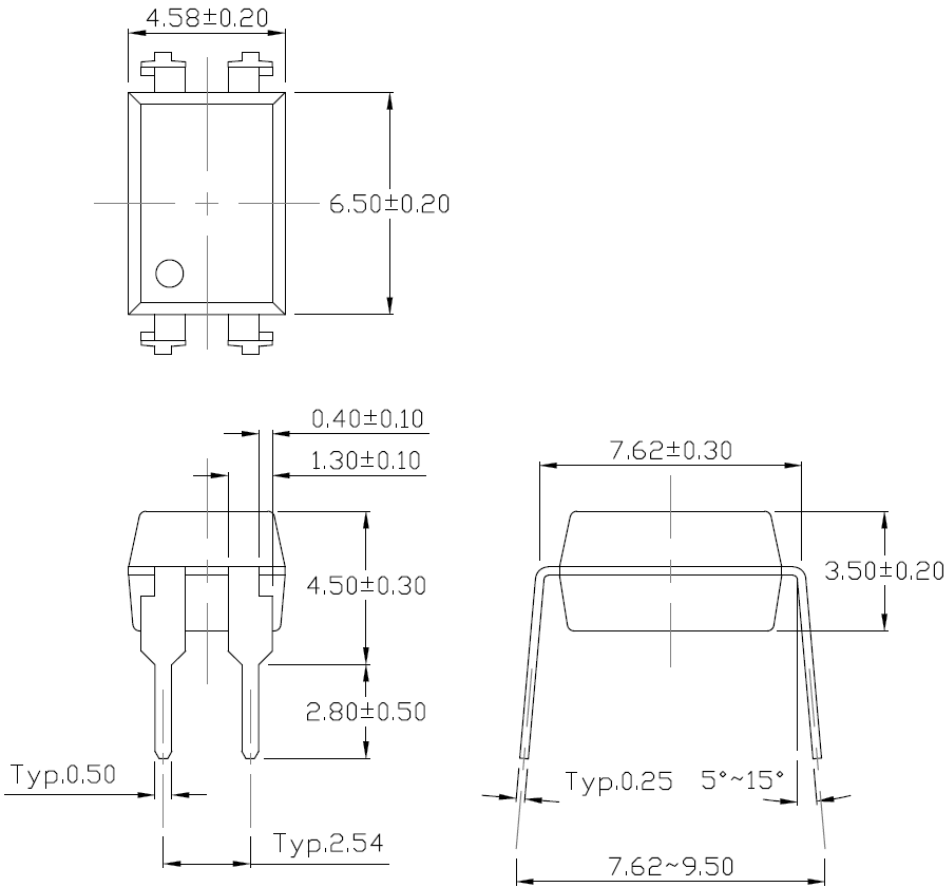


Figure 12: Switching Time Test Circuits

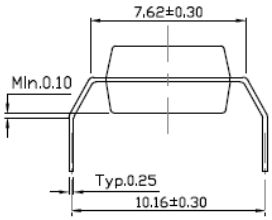
Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole

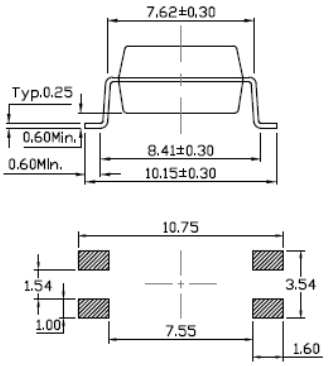


Forming Option

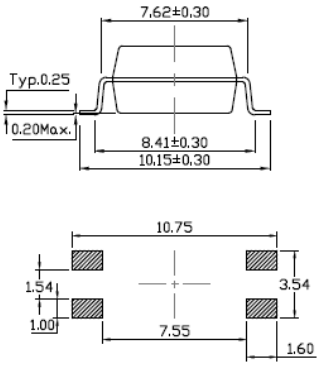
M Type



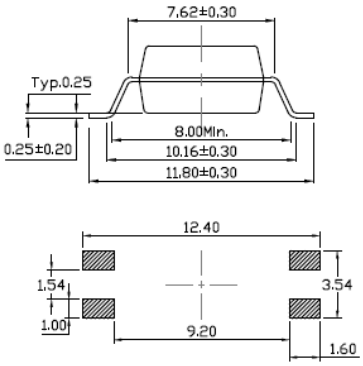
S Type



SL Type



SLM Type



Marking Information

Note:

CT : Denotes “CT Micro”
814 : Part Number
V : VDE Safety Mark Option(Blank, V)
Y : One Digit Year Code
WW : Two Digit Work Week
K : Manufacturing Code

Ordering Information

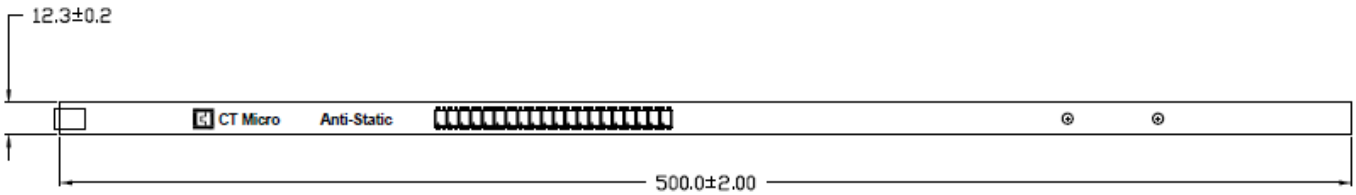
CT814X(V)(Y)(Z)-G

CT = Denotes “CT Micro”
814 = Part Number
Y = Lead Form Option (Blank, S, SL, M or SLM)
Z = Tape and Reel Option (Blank, T1 or T2)
G = Material Option (G: Halogen Free, Blank: Non-Halogen Free)

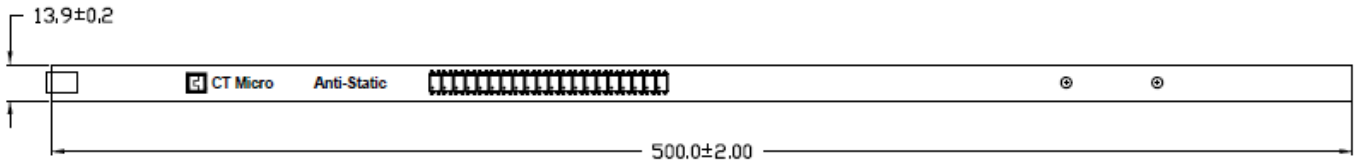
Option	***Description***	***Quantity***
None	Standard 4 Pin DIP	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T1)	Surface Mount (Low Profile)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

Tube Option Standard DIP

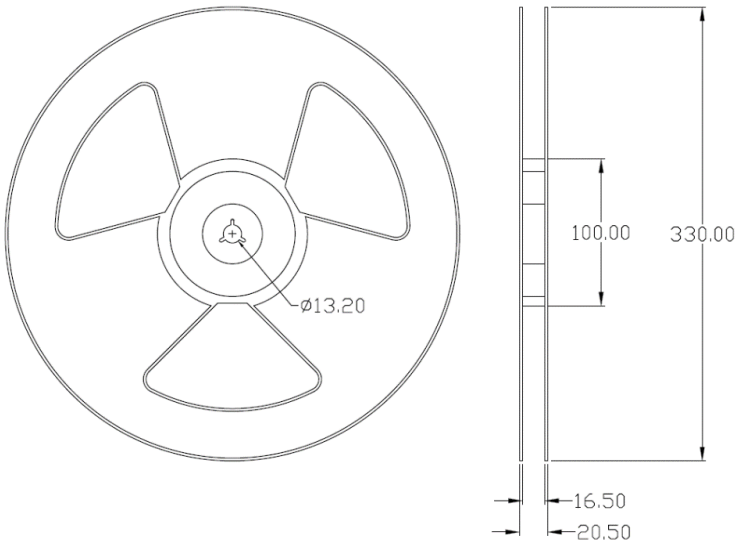


Tube Option M Type

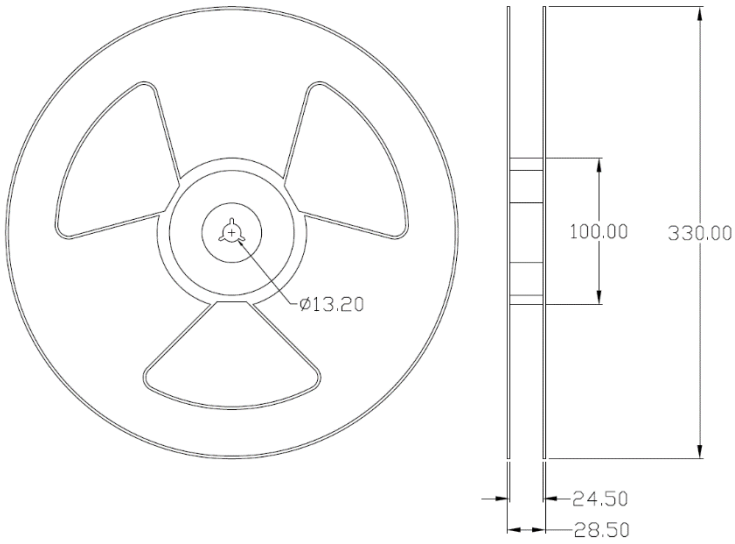


Reel Dimension *All dimensions are in mm, unless otherwise stated*

Option S(T1/T2) & SL(T1/T2)

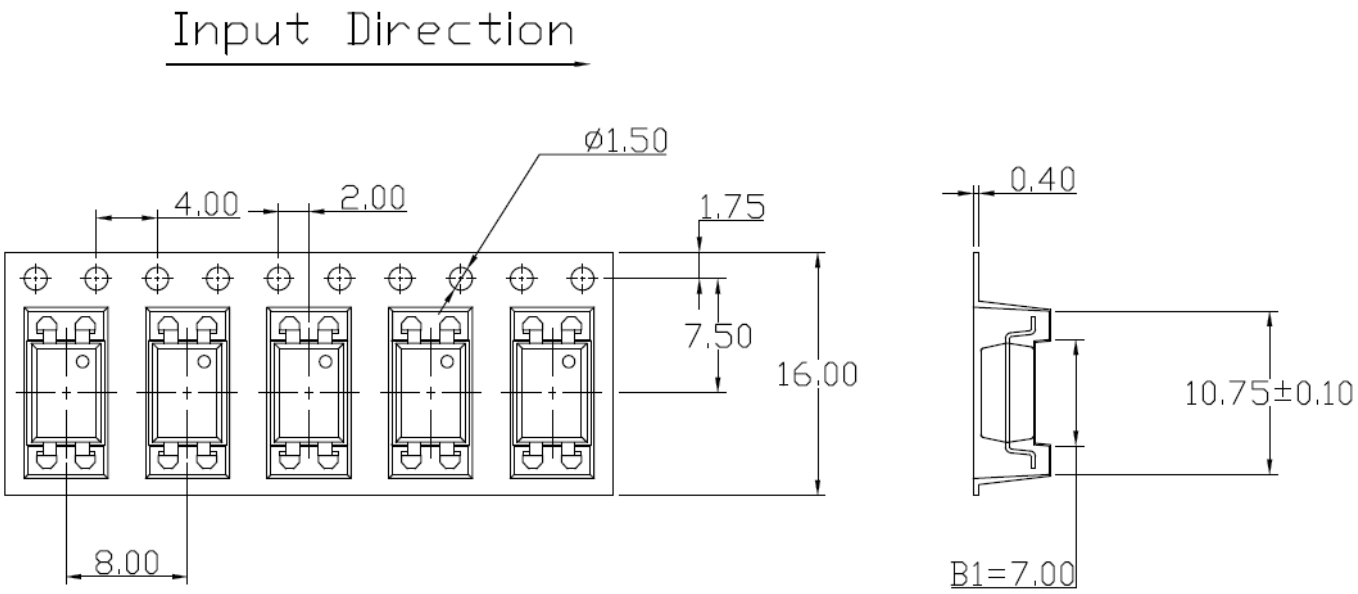


Option SLM(T1/T2)

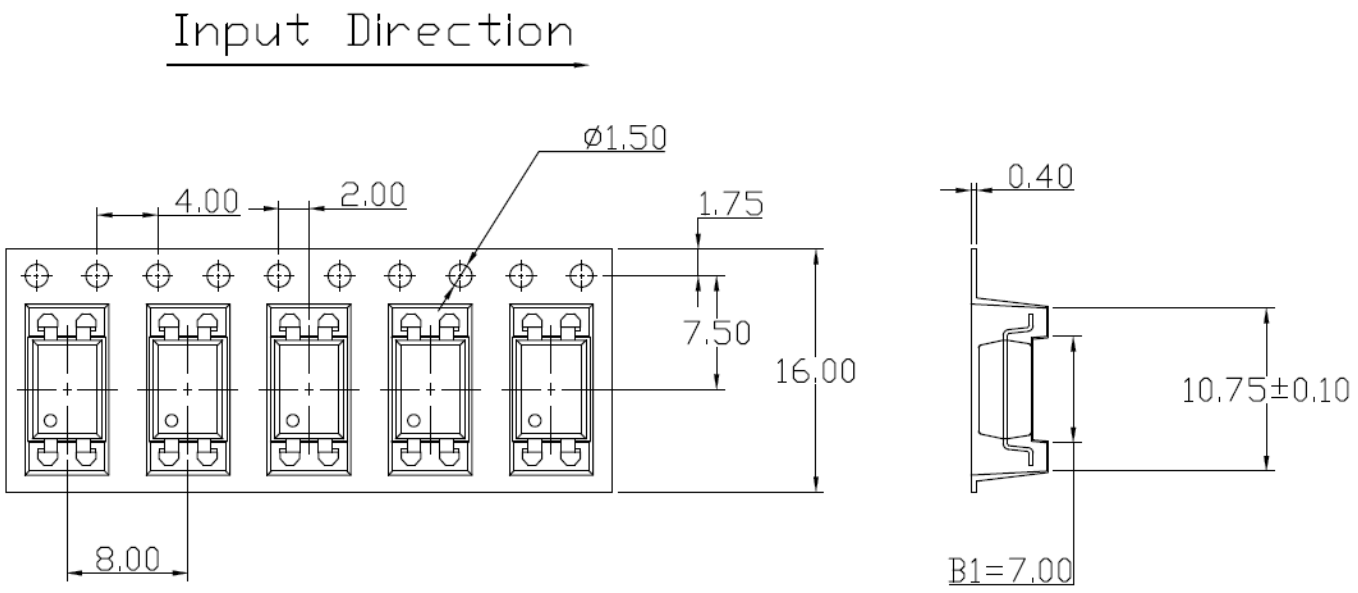


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

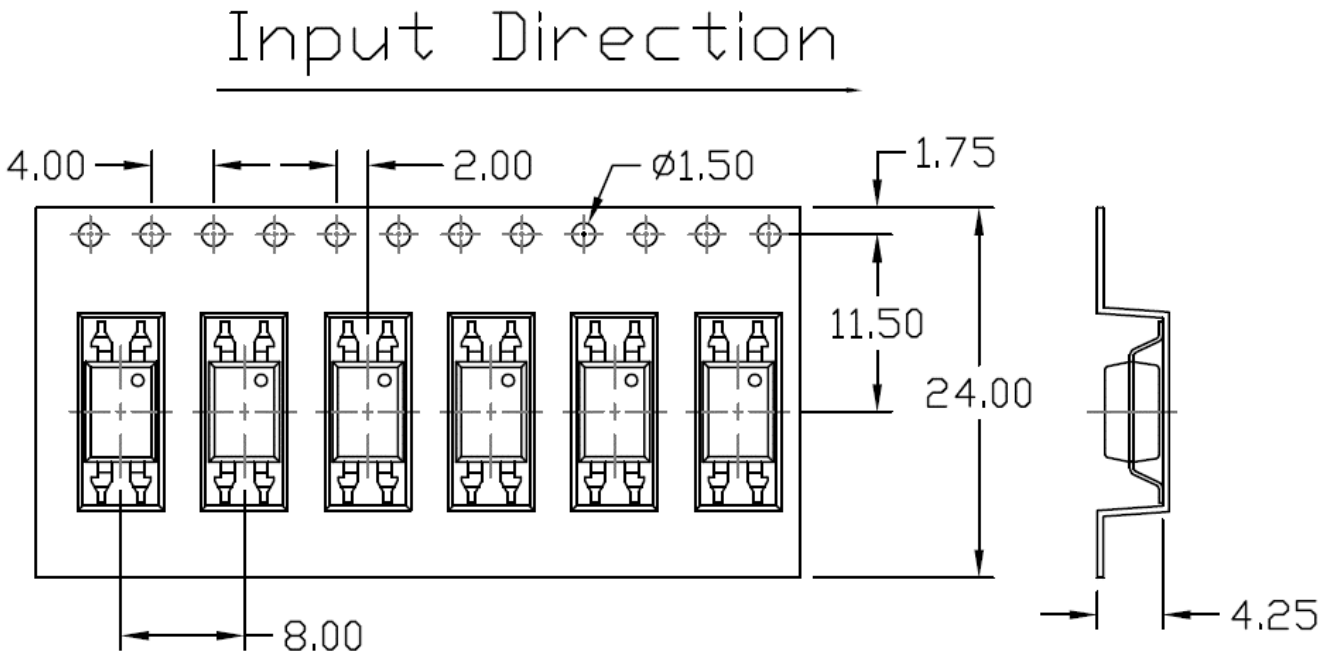
Option S(T1) & SL(T1)



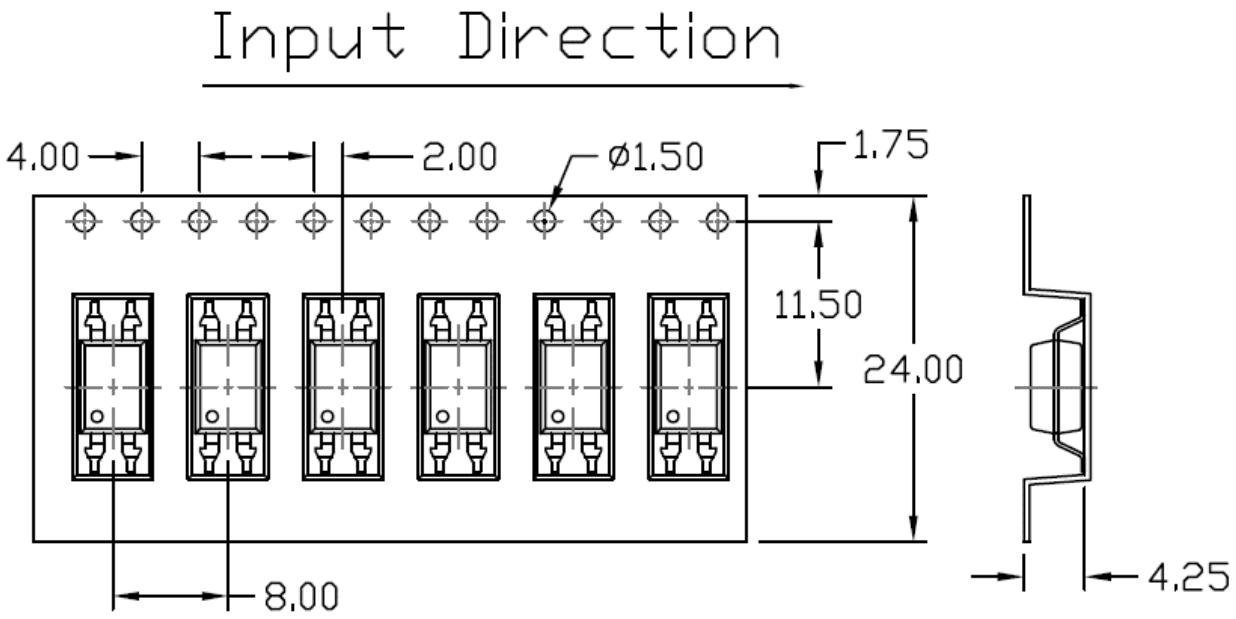
Option S(T2) & SL(T2)



Option SLM(T1)



Option SLM(T2)

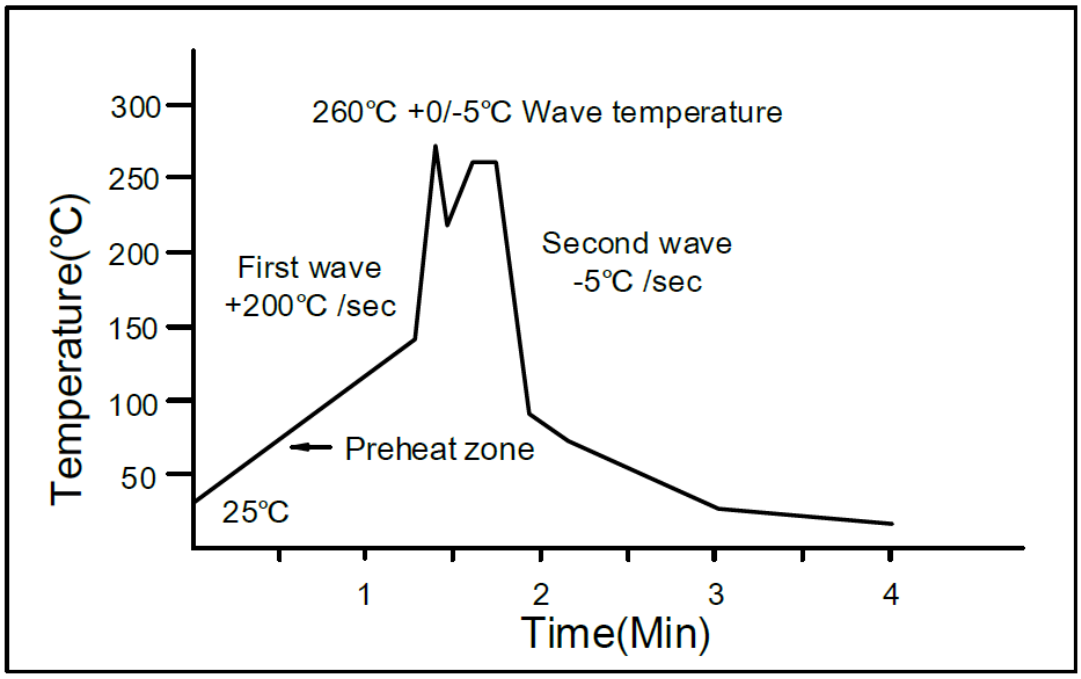


Solderability spec (Follow the JEDEC standard JESD22-B102)

Reflow Soldering: Immersed surface, other than the end of pin as cut-surface, must be covered by solder.
Solder-Bath: More than 95% of the electrode must be covered with solder.

Wave soldering (Follow the JEDEC standard JESD22-A111)

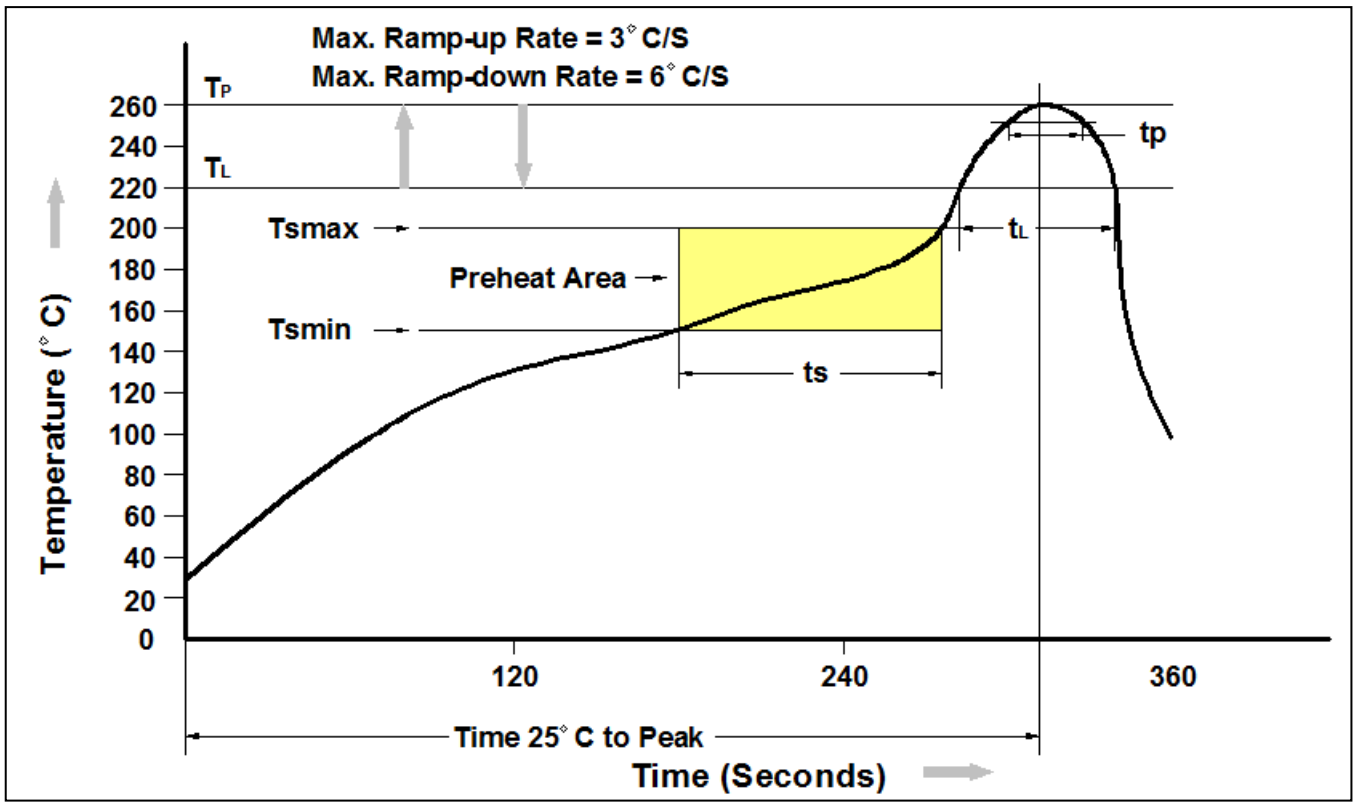
One time soldering is recommended within the condition of temperature.
Temperature: 260+0/-5˚C.
Time: 10 sec.
Preheat temperature: 25 to 140˚C.
Preheat time: 30 to 80 sec.



Iron soldering (Follow the standard MIL-STD 202G, Method 210F)

Allow single lead soldering in every single process.
One time soldering is recommended. Temperature: 350±10˚C
Time: 5 sec max.

Reflow Profile (Follow the JEDEC standard J-STD-020)



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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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.*