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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 $\geq$ **7.0mm**
- Distance Through Isolation $\geq$ **0.4mm**
- Clearances Distance $\geq$ **7.5mm (S/SL Type)**
- Clearances Distance $\geq$ **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)**

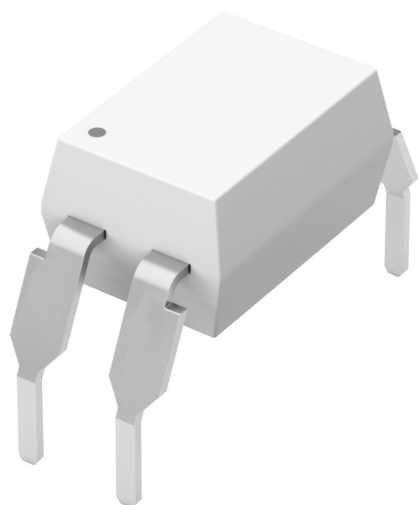
Description

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.

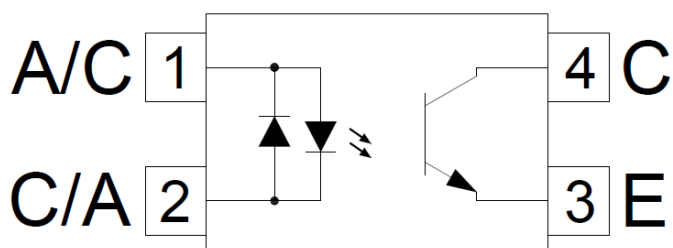
Applications

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

Package Outline



Schematic



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



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Absolute Maximum Ratings $T_A = 25^{\circ}\text{C}$, 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	$^{\circ}\text{C}$	
T_{STG}	Storage temperature	-55 ~ +150	$^{\circ}\text{C}$	
T_{SOL}	Soldering temperature (For 10 seconds)	260	$^{\circ}\text{C}$	
Emitter				
I_{F}	Forward current	± 60	mA	
$I_{\text{F(TRANS)}}$	Peak transient current ($\leq 1\mu\text{s P.W, 300pps}$)	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	



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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	$I_F = 10\text{mA}$	-	1.24	1.4	V	
C_{IN}	Input Capacitance	$f = 1\text{MHz}$	-	30	-	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{CEO}}$	Collector-Emitter Breakdown	$I_C = 100\mu\text{A}$	80	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 100\mu\text{A}$	6	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	$V_{CE} = 20\text{V}$, $I_F = 0\text{mA}$	-	-	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	$I_C = 2\text{mA}$, $V_{CE} = 2\text{V}$, $R_L = 100\Omega$	-	6	-	μs	
t_f	Fall Time		-	8	-		



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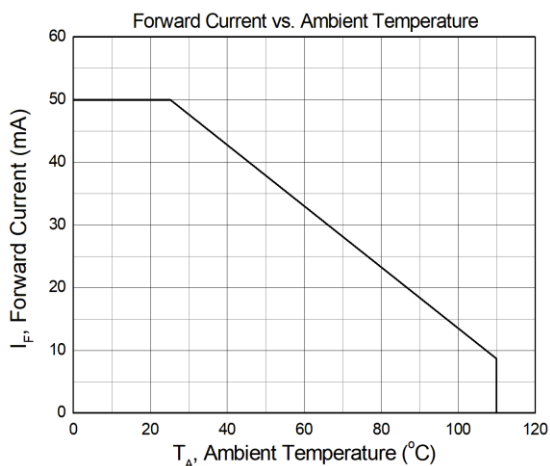


Figure 1

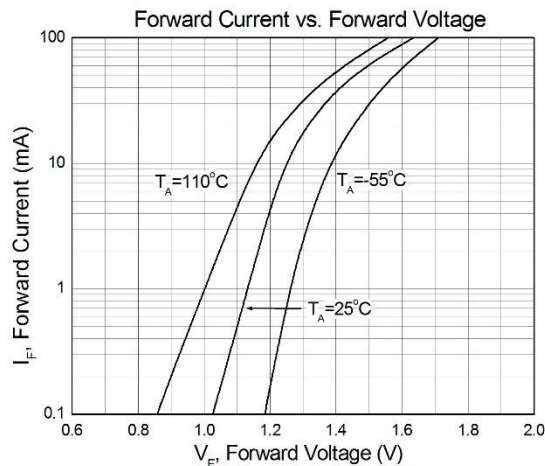


Figure 2

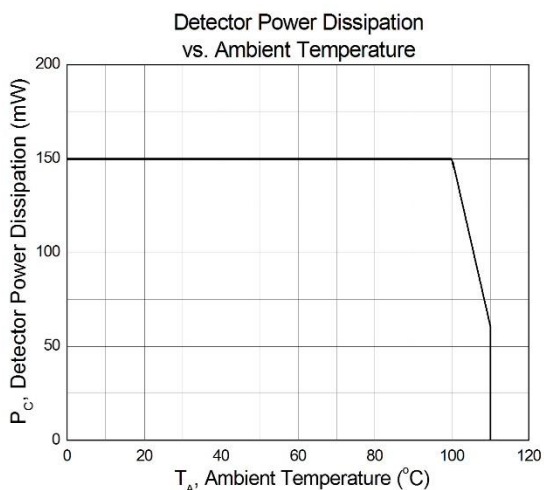


Figure 3

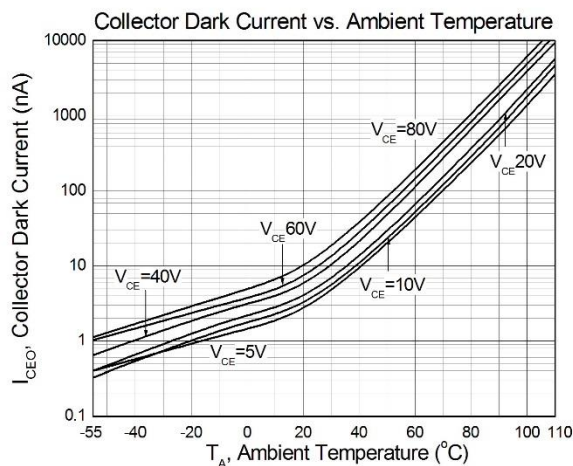


Figure 4

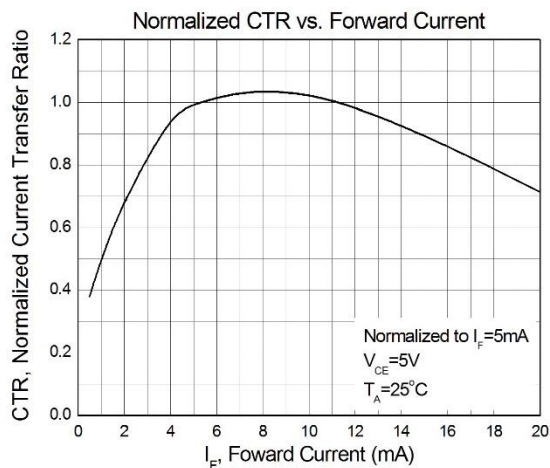


Figure 5

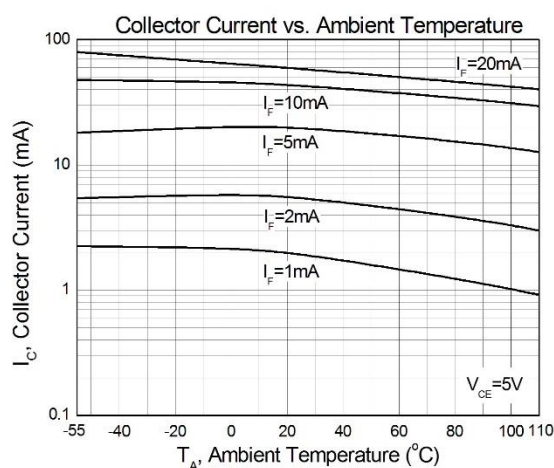


Figure 6



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Typical Characteristic Curves $T_A = 25^\circ\text{C}$, unless otherwise specified (Continued)

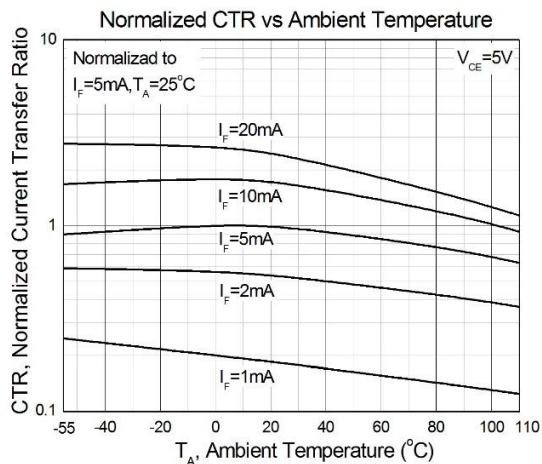


Figure 7

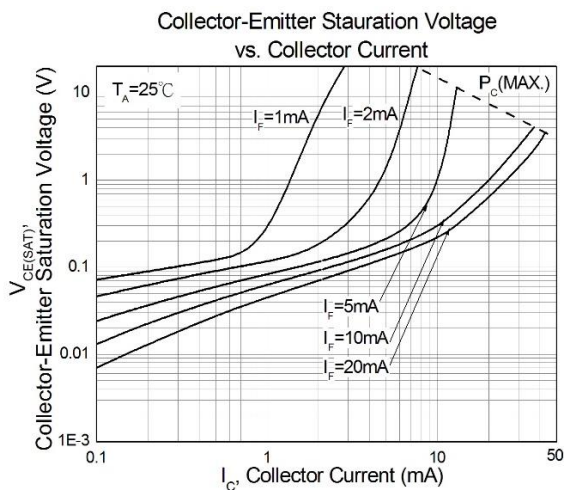


Figure 8

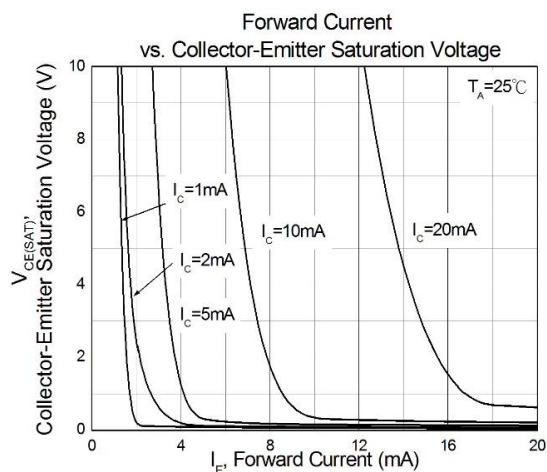


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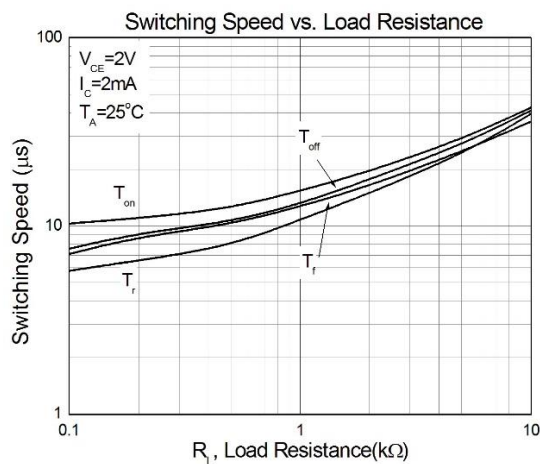


Figure 10

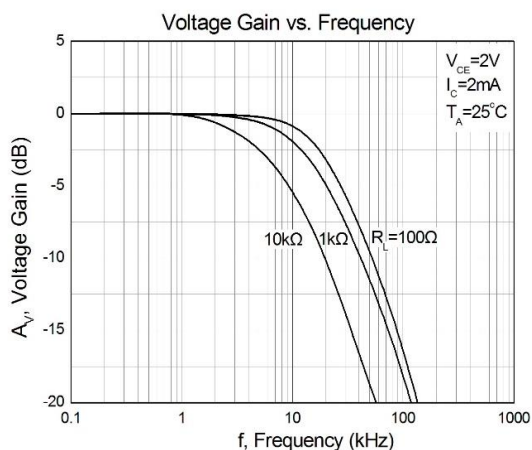


Figure 11



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Test Circuit

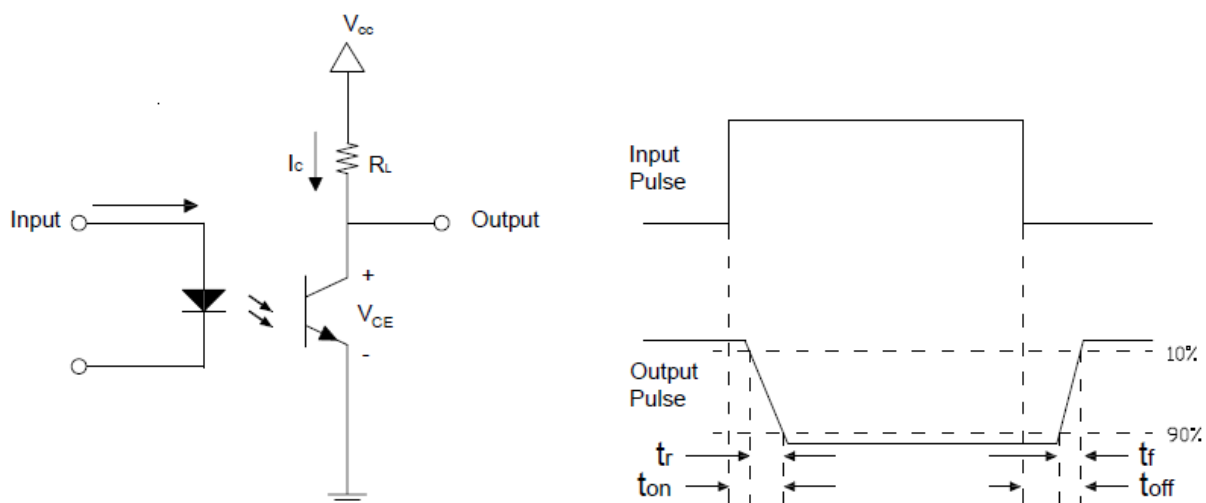


Figure 12: Switching Time Test Circuits



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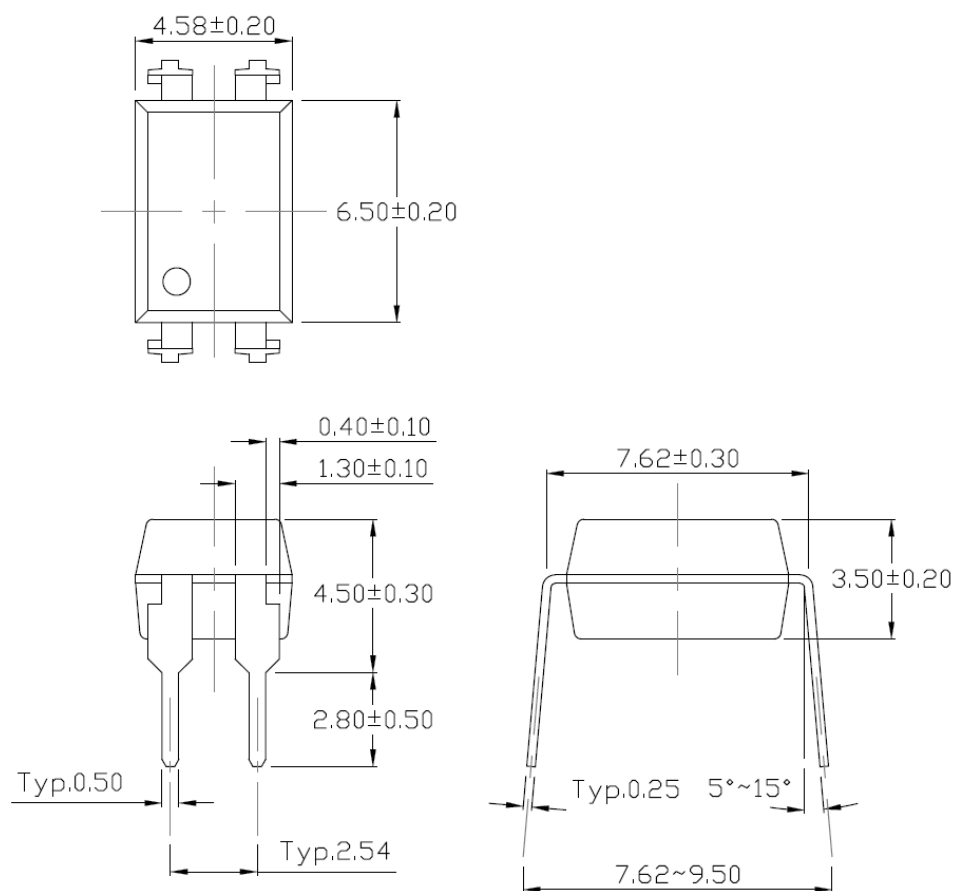
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Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole

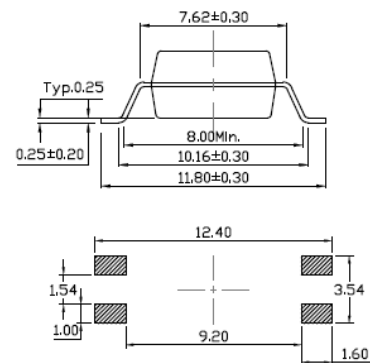


Forming Option



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SLM Type





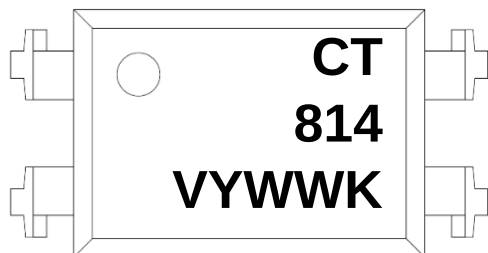
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Marking Information



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



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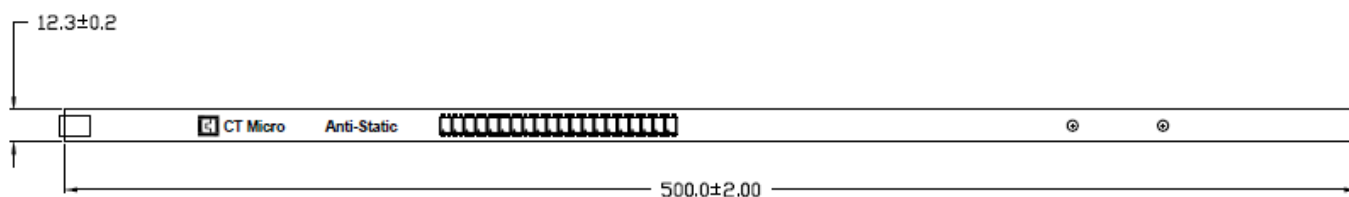
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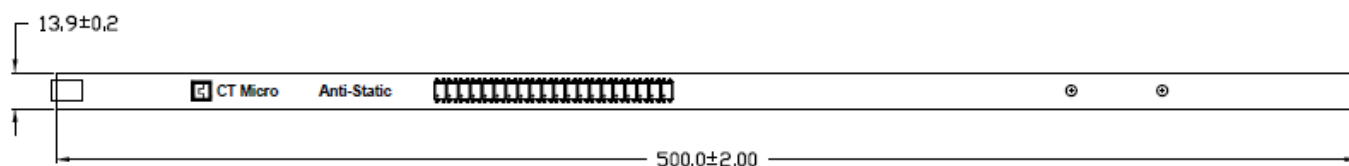
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Carrier Specifications *Dimensions in mm unless otherwise stated*

Tube Option Standard DIP

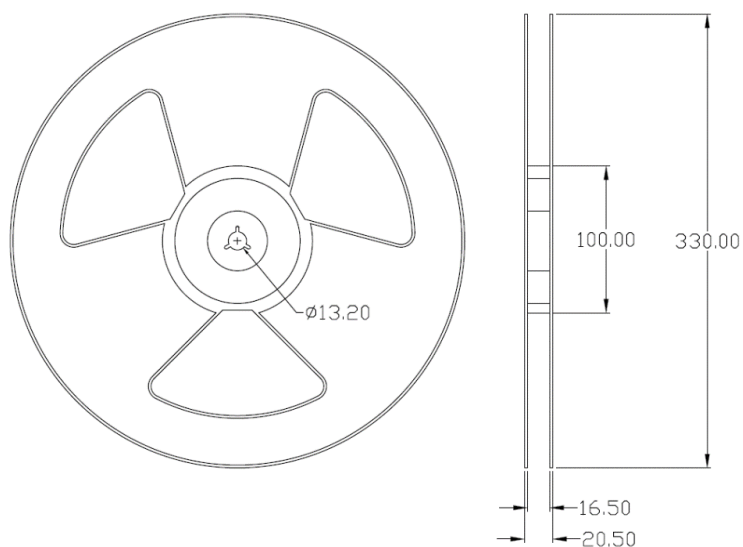


Tube Option M Type

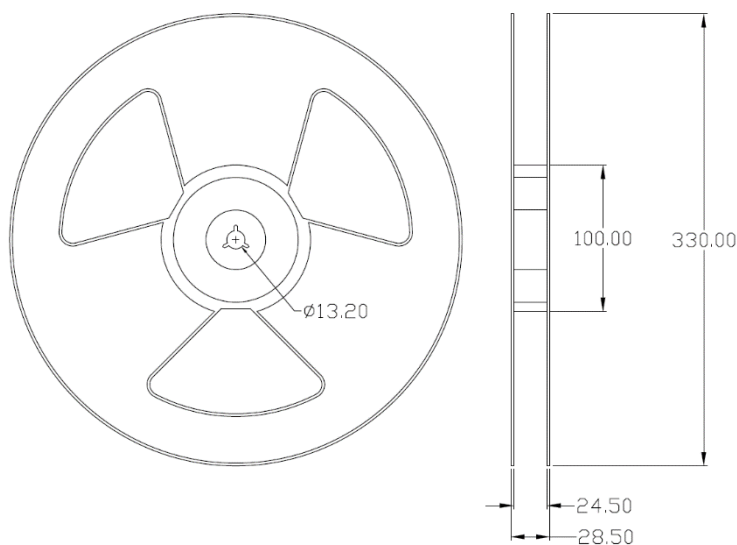


Reel Dimension *All dimensions are in mm, unless otherwise stated*

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



Option SLM(T1/T2)





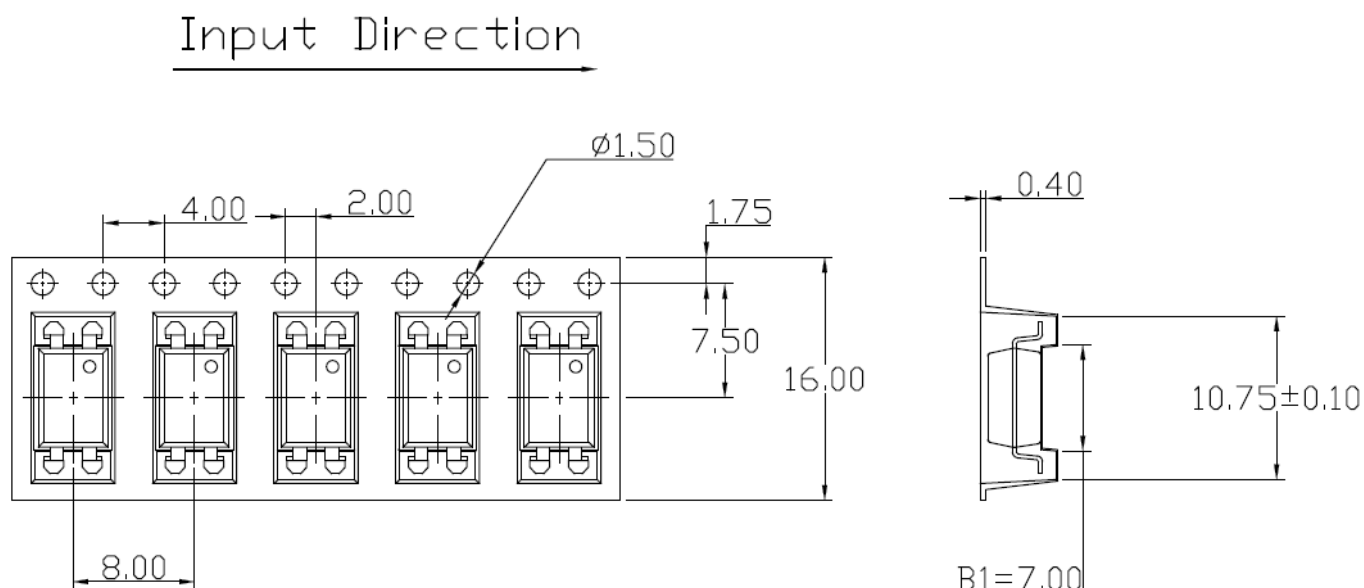
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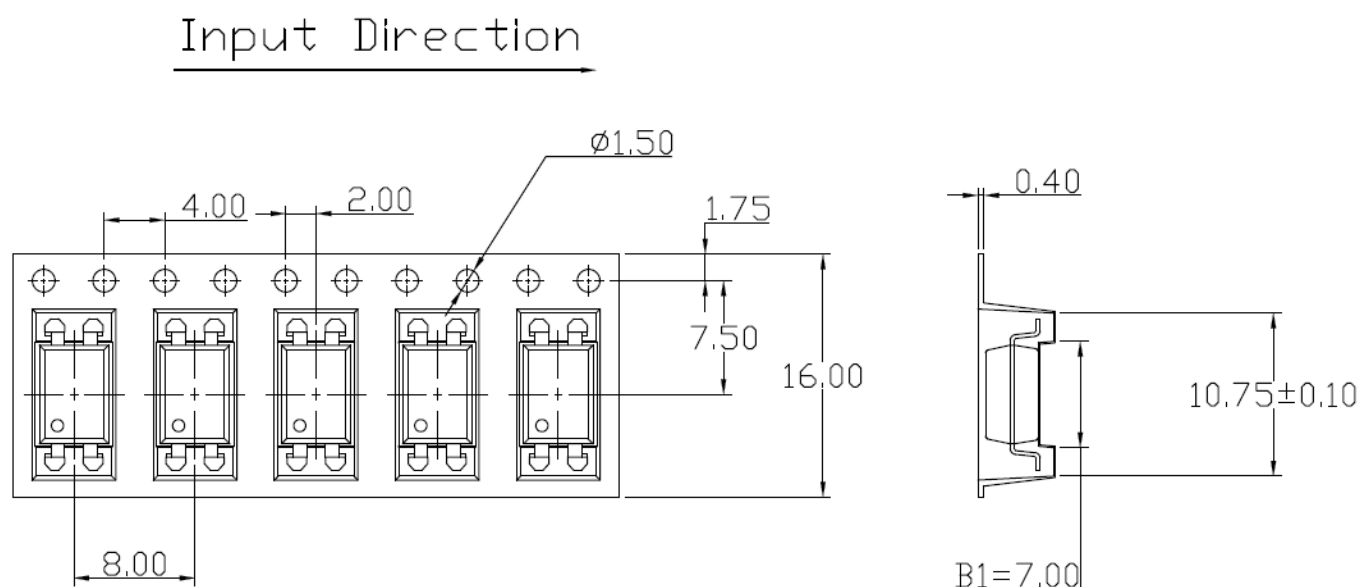
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Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option S(T1) & SL(T1)



Option S(T2) & SL(T2)



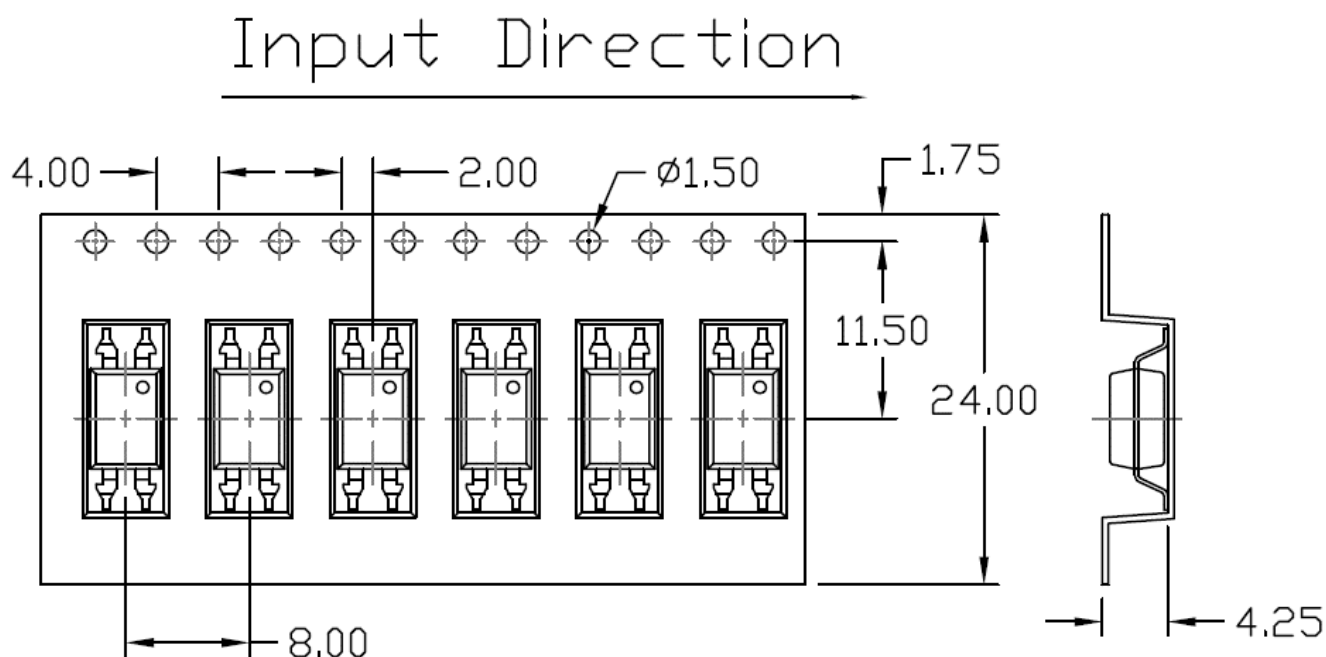


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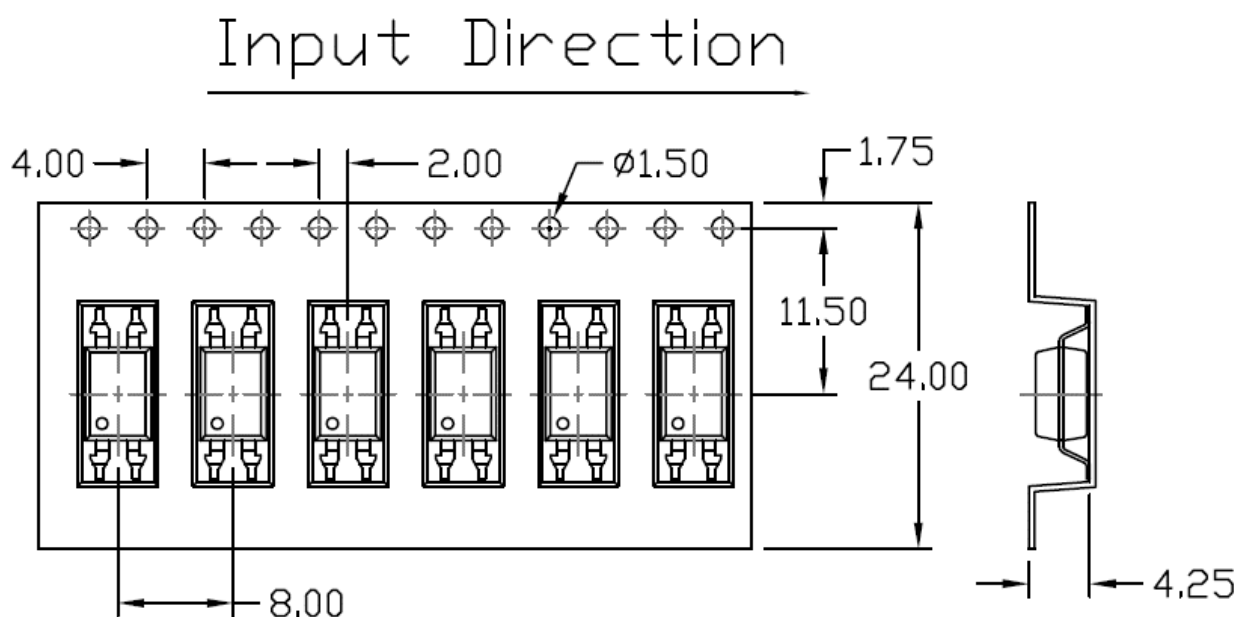
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Option SLM(T1)



Option SLM(T2)





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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)

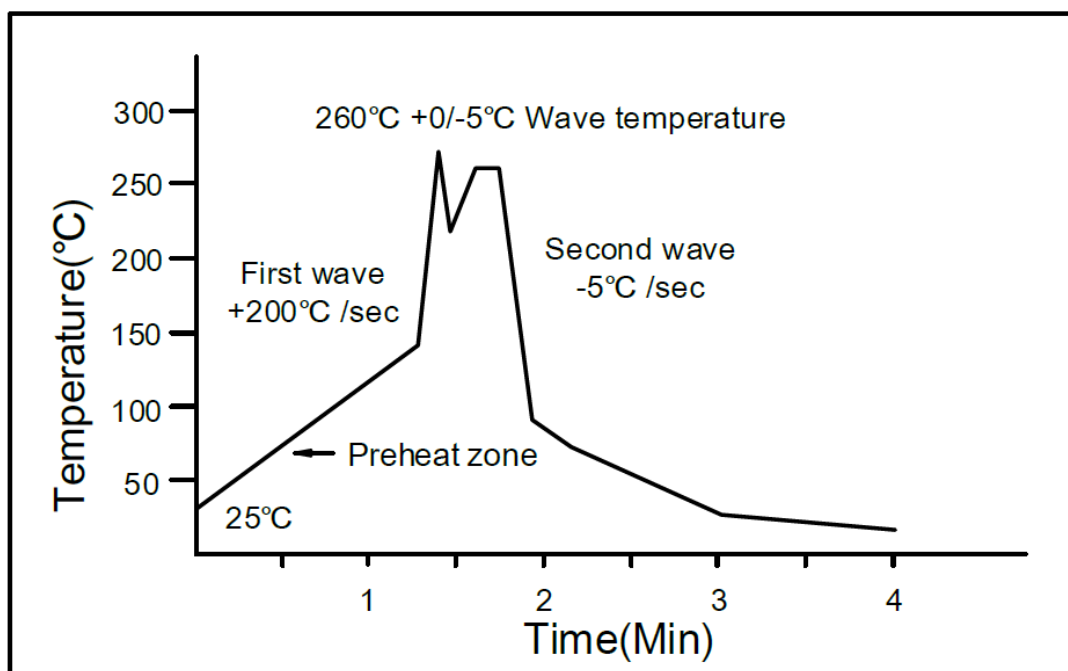
One time soldering is recommended within the condition of temperature.

Temperature: $260 \pm 0/-5^{\circ}\text{C}$.

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: $350 \pm 10^{\circ}\text{C}$

Time: 5 sec max.



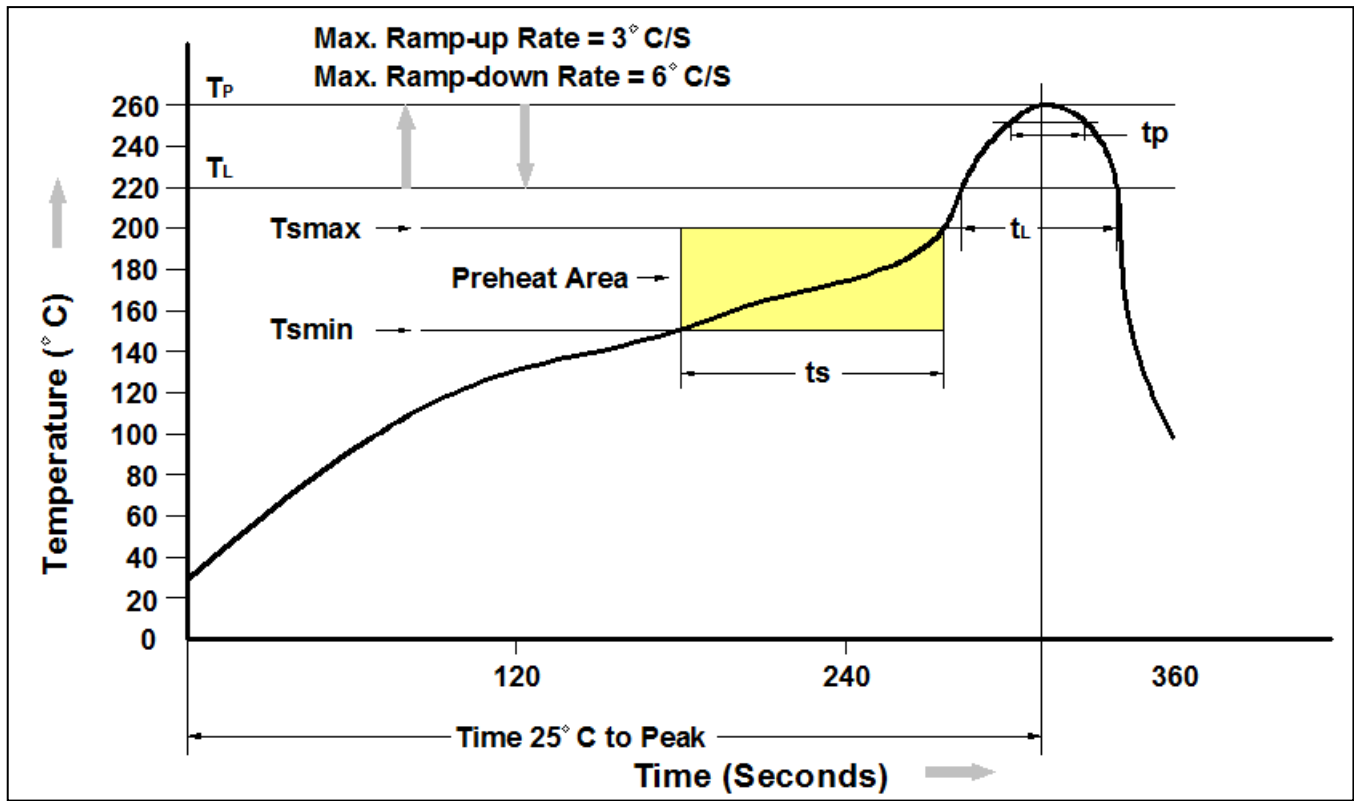
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Reflow Profile (Follow the JEDEC standard J-STD-020)



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{smin} to T _{smax})	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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