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CT816 Series
DC Input 4-Pin DMC-Isolator® Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- Patented coplanar structure DMC-Isolator®
- Various CTR selection available
- DC 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)

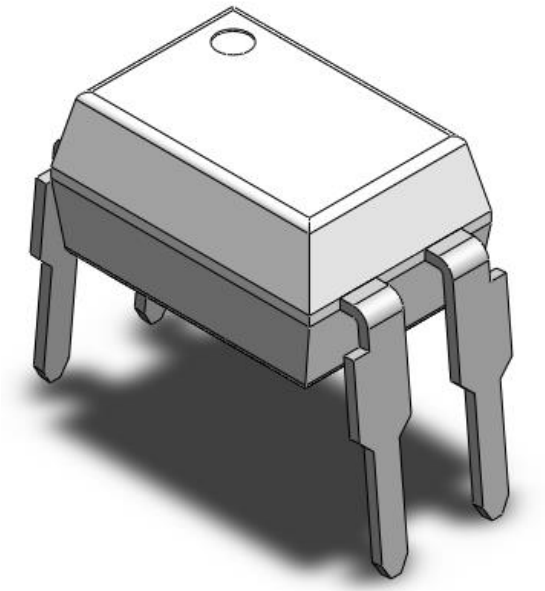
Description

The CT816 series consists of a photo transistor optically coupled to an Infrared-emitting diode in a 4-lead DIP DMC-Isolator® package with different lead forming options.

Applications

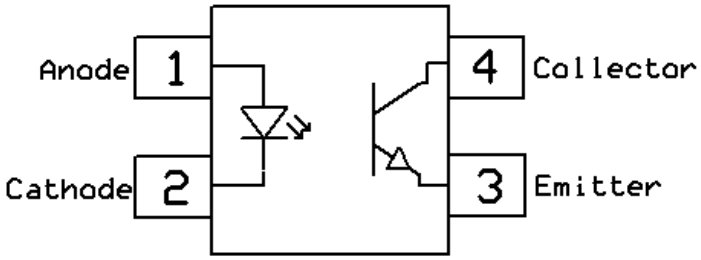
- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

Package Outline



Note: Different bending options available. See package dimension

Schematic



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}	
T_{OPR}	Operating temperature	-55 ~ +110	°C	
T_{STG}	Storage temperature	-55 ~ +150	°C	
T_{SOL}	Soldering temperature (For 10 seconds)	260	°C	
P_{TOT}	Total power dissipation	200	mW	
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	Emitter power dissipation	100	mW	
Detector				
P_C	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	
I_R	Reverse Current	V_R = 6V	-	-	5	μA	
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	

Electrical Characteristics *T_A = 25°C, unless otherwise specified*

Transfer Characteristics

Symbol	*Parameters*		*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
CTR	Current Transfer Ratio	CT816	I_F= 5mA, V_{CE}= 5V	50	-	600	%	
		CT816A		80	-	160		
		CT816B		130	-	260		
		CT816C		200	-	400		
		CT816D		300	-	600		
		CT816F		100	-	200		
		CT816Y		200		300		
CTR	Current Transfer Ratio	CT816I	I_F= 10mA, V_{CE}= 5V	63	-	125	%	
		CT816J		100	-	200		
		CT816K		160	-	320		
		CT816N		40		80		
		CT816I	I_F= 1mA, V_{CE}= 5V	22	-	-		
		CT816J		34	-	-		
		CT816K		56	-	-		
		CT816N		13				
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage		I_F= 20mA, I_C= 1mA	-	0.1	0.2	V	
R_{IO}	Isolation Resistance		V_{IO}= 500V_{DC}, 40 ~ 60% R.H.	$5x10^{10}$	-	-	Ω	
C_{IO}	Isolation Capacitance		f= 1MHz	-	0.25	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	18	μs	
t_f	Fall Time		-	8	18		

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

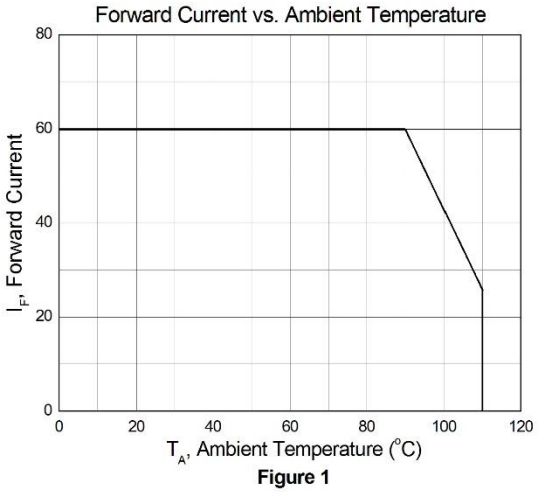


Figure 1

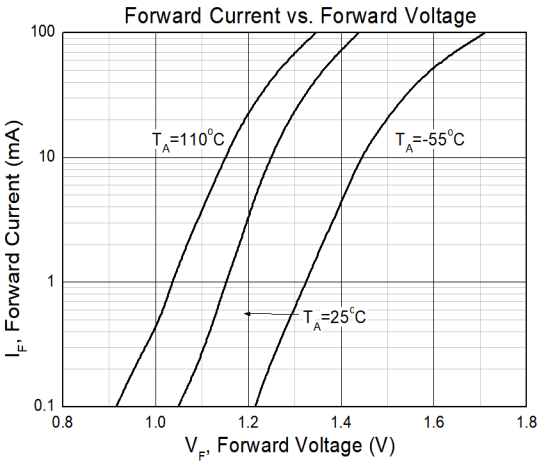


Figure 1

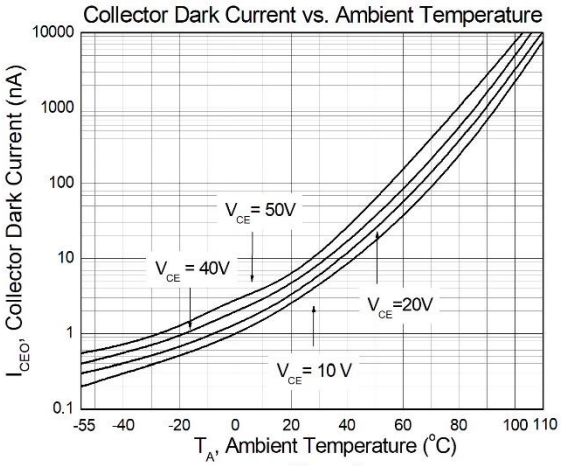


Figure 3

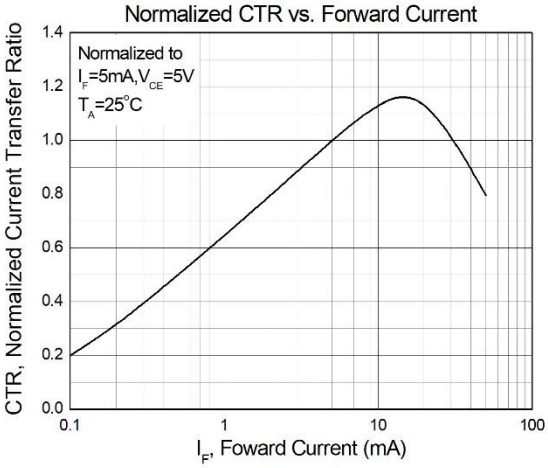


Figure 4

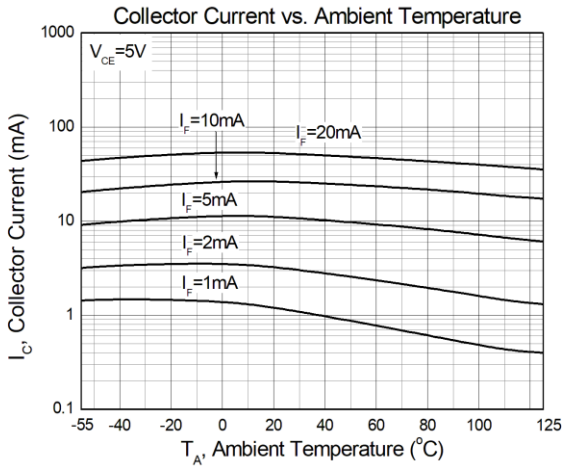


Figure 5

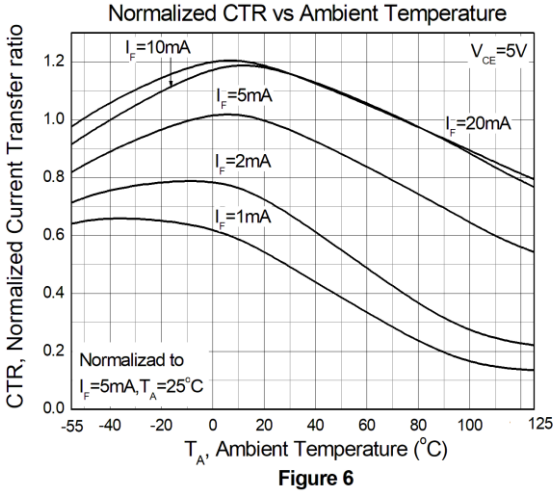


Figure 6

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

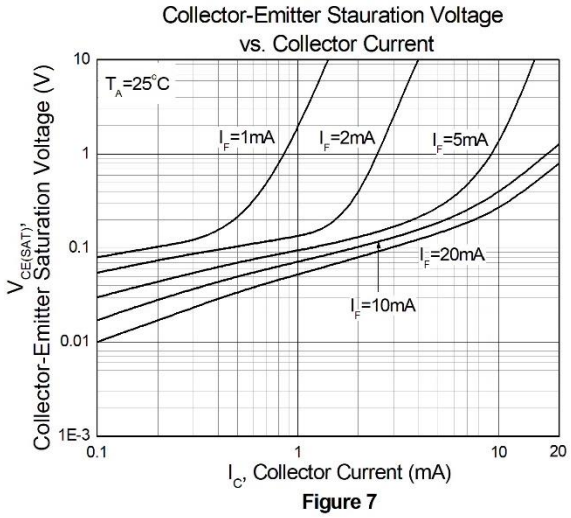


Figure 7

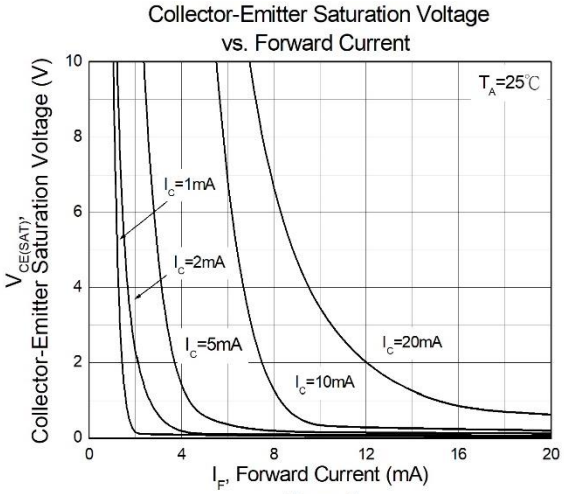


Figure 8

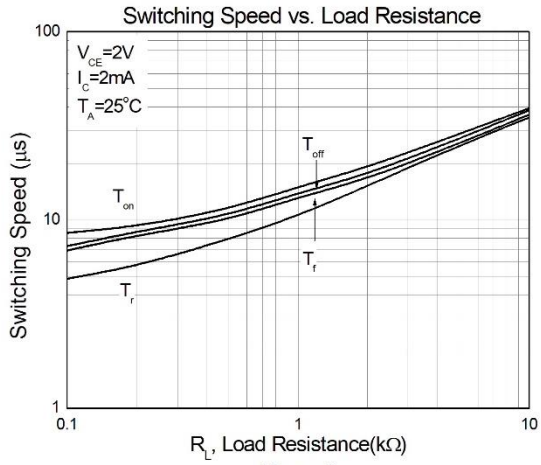


Figure 9

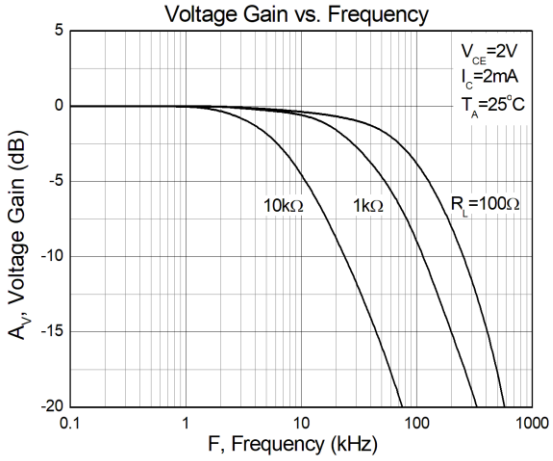


Figure 10

Test Circuit

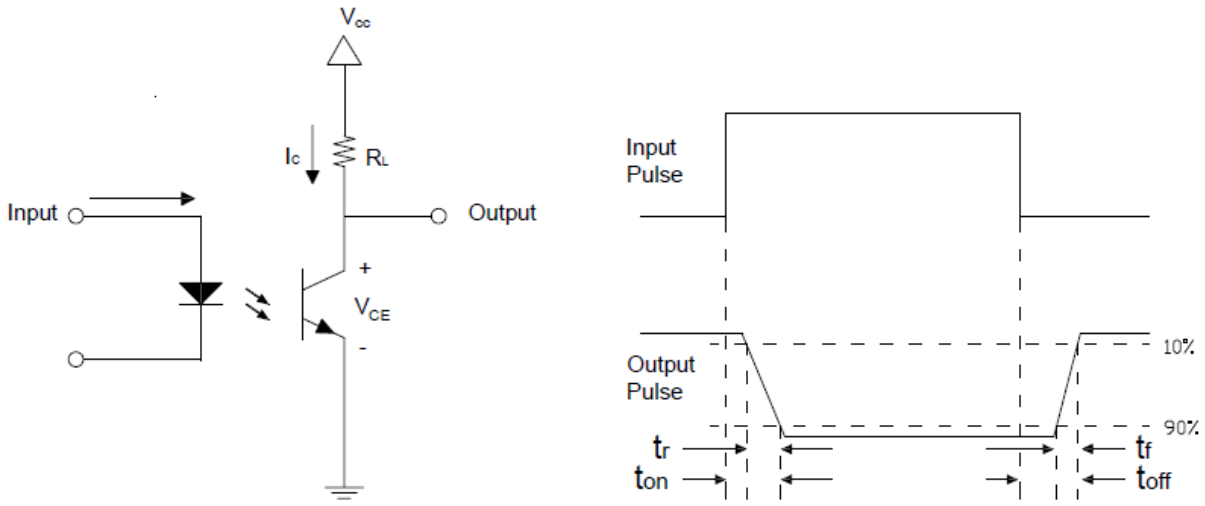
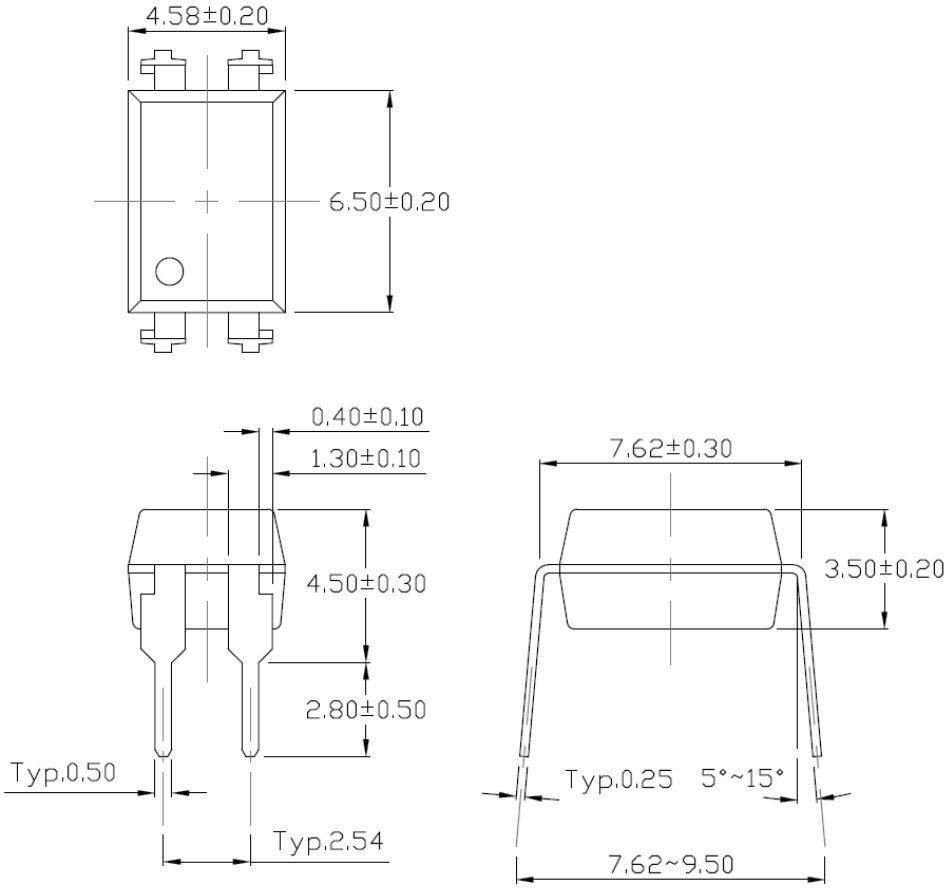


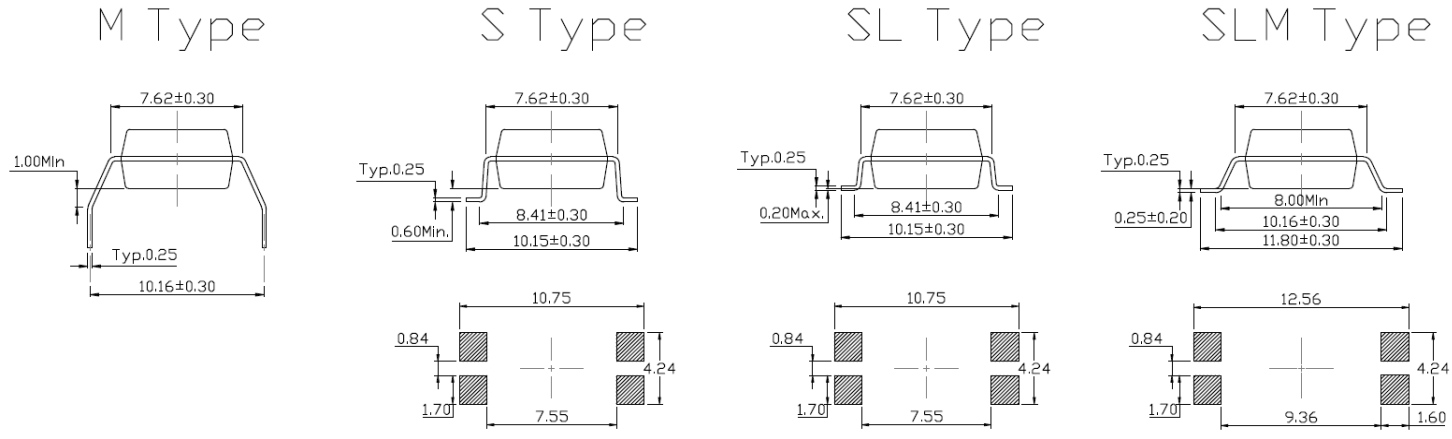
Figure 11: Switching Time Test Circuits

Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole



Forming Option



Marking Information

Note:

CT : Denotes “CT Micro”
816 : Part Number
X : CTR Rank Option (Blank, A, B, C or D)
V : VDE Safety Mark Option (Blank or V)
Y : One Digit Year Code
WW : Two Digit Work Week
K : Manufacturing Code
● : Lead Frame Material Option
(Blank：Iron；●：Copper)

Ordering Information

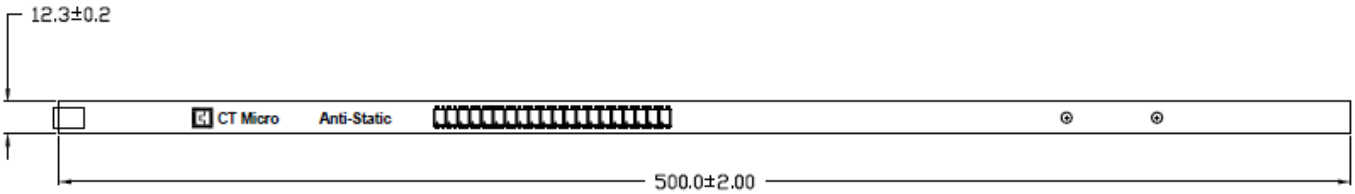
CT816X (V)(Y)(Z)-HG

CT = Denotes “CT Micro”
816 = Part Number
X = CTR Rank Option (Blank, A, B, C, D, I, J, K, N, F or Y)
V = VDE Safety Mark Option (Blank or V)
Y = Lead Form Option (S, SL, M, SLM or Blank)
Z = Tape and Reel Option (Blank, T1 or T2)
H = Lead Frame Option (H: Iron, Blank: Copper)
G = Material Option (G: Halogen Free, Blank: Non-Halogen Free)

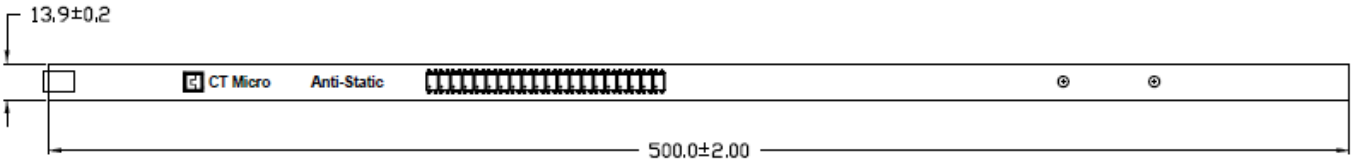
Option	***Description***	***Quantity***
None	Standard 4 Pin DIP	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T1)	Surface Mount (Low Profile)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

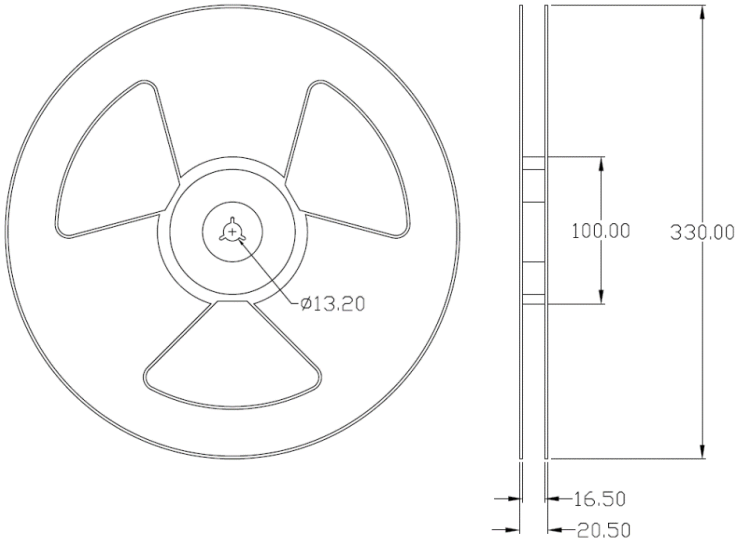


Tube Option M Type

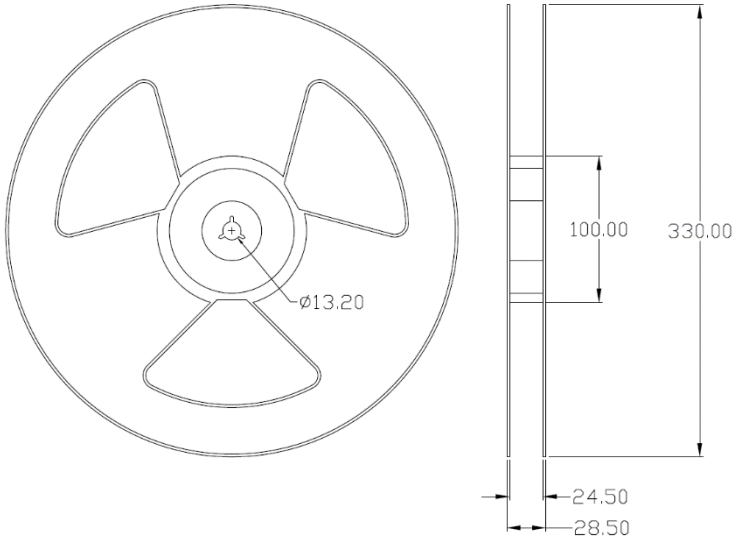


Reel Dimension *All dimensions are in mm, unless otherwise stated*

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

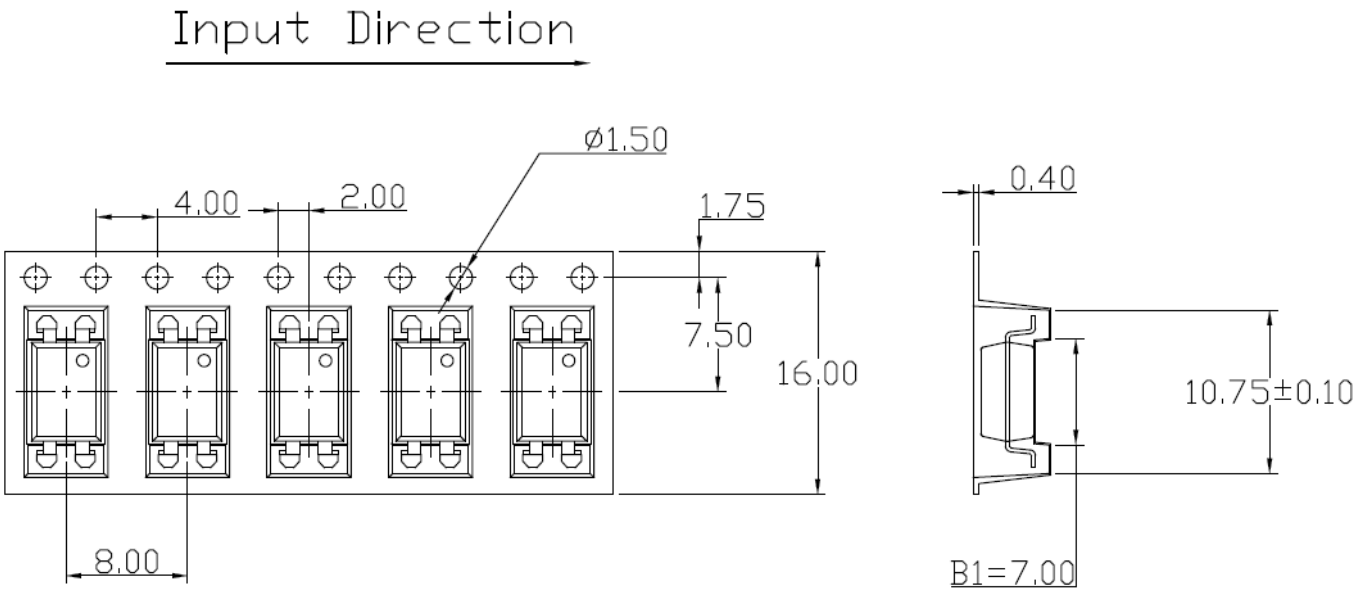


Option SLM(T1/T2)

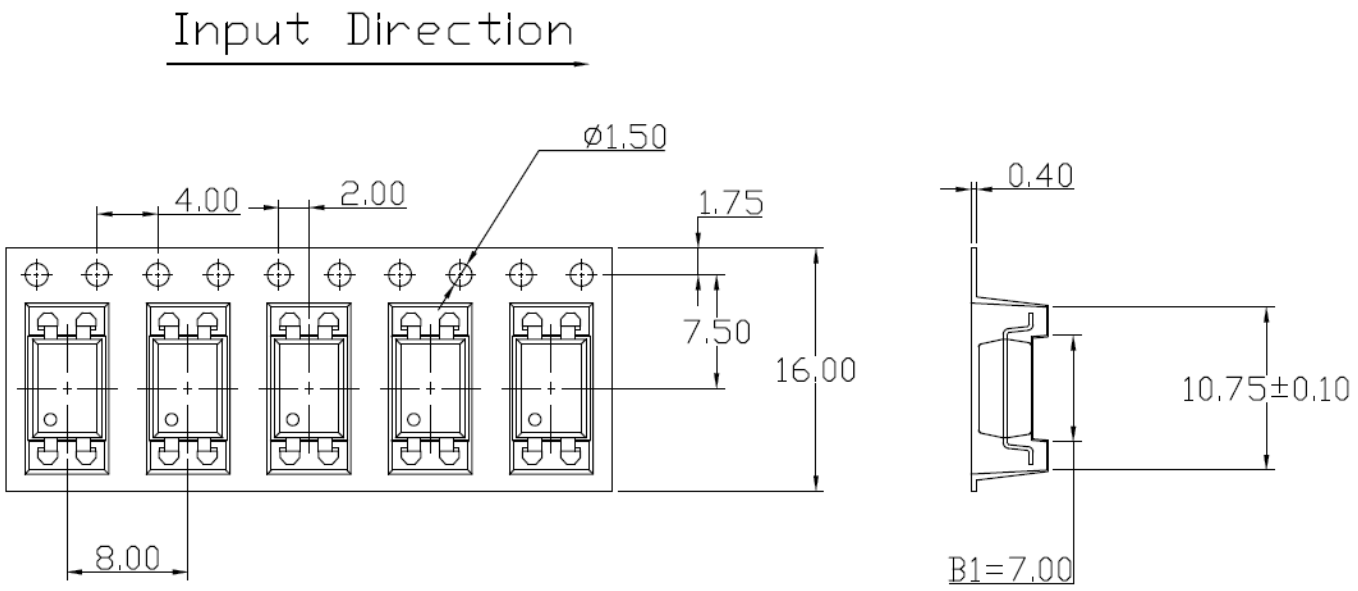


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

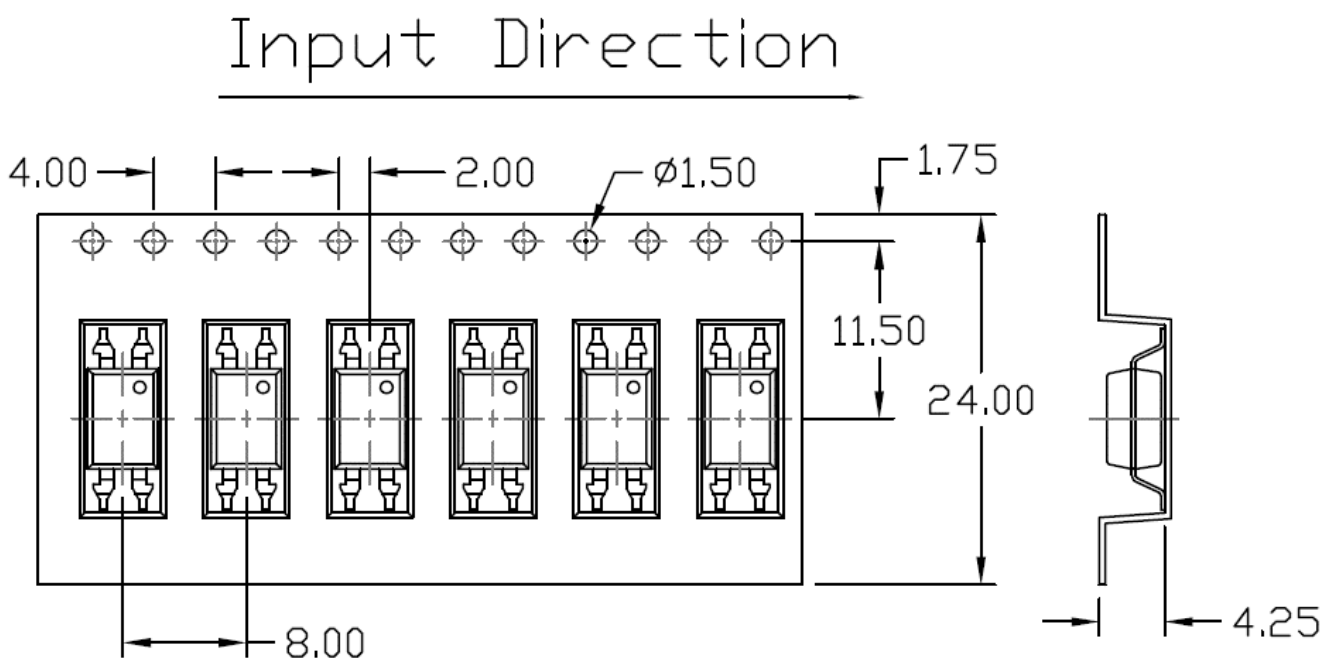
Option S(T1) & SL(T1)



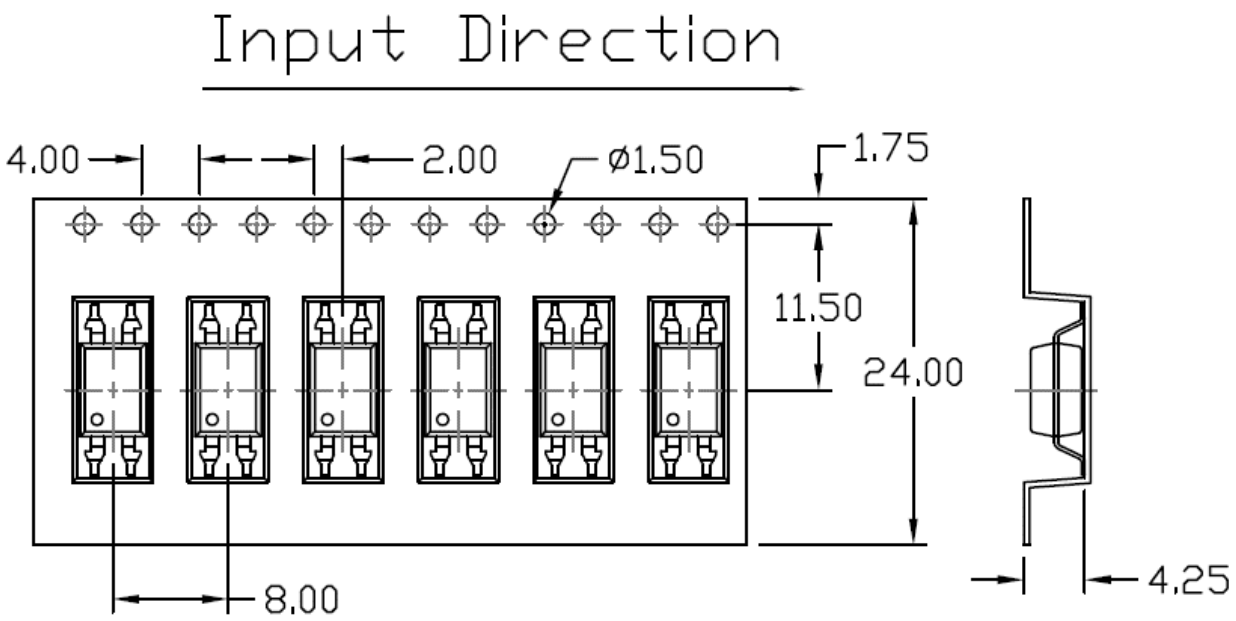
Option S(T2) & SL(T2)



Option SLM(T1)



Option SLM(T2)

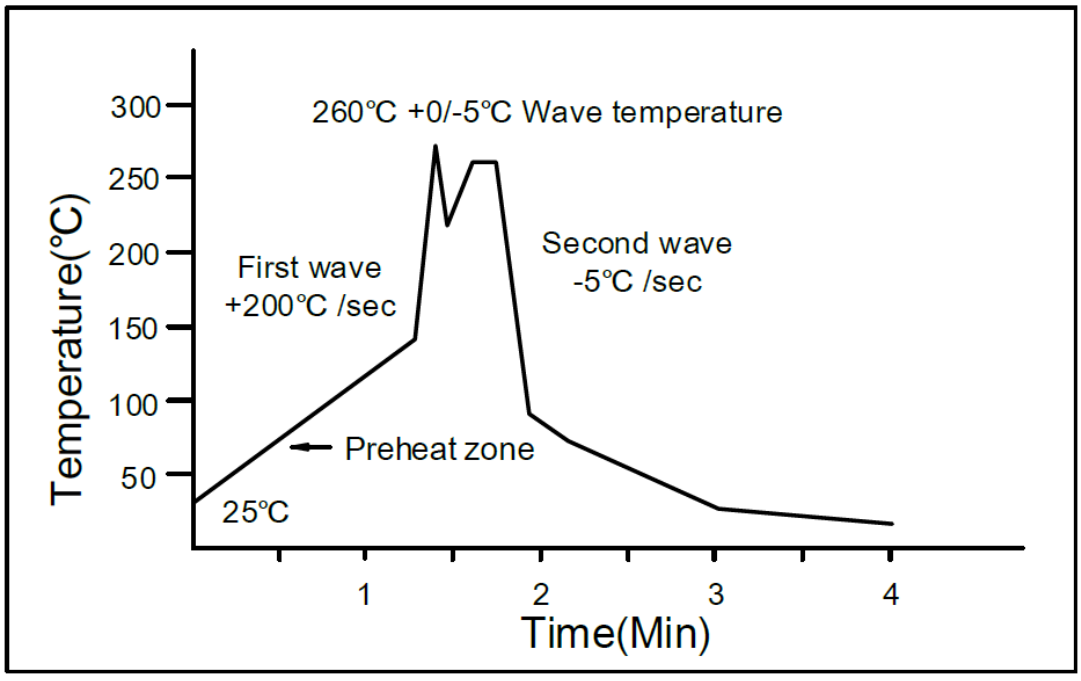


Solderability spec (Follow the JEDEC standard JESD22-B102)

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)

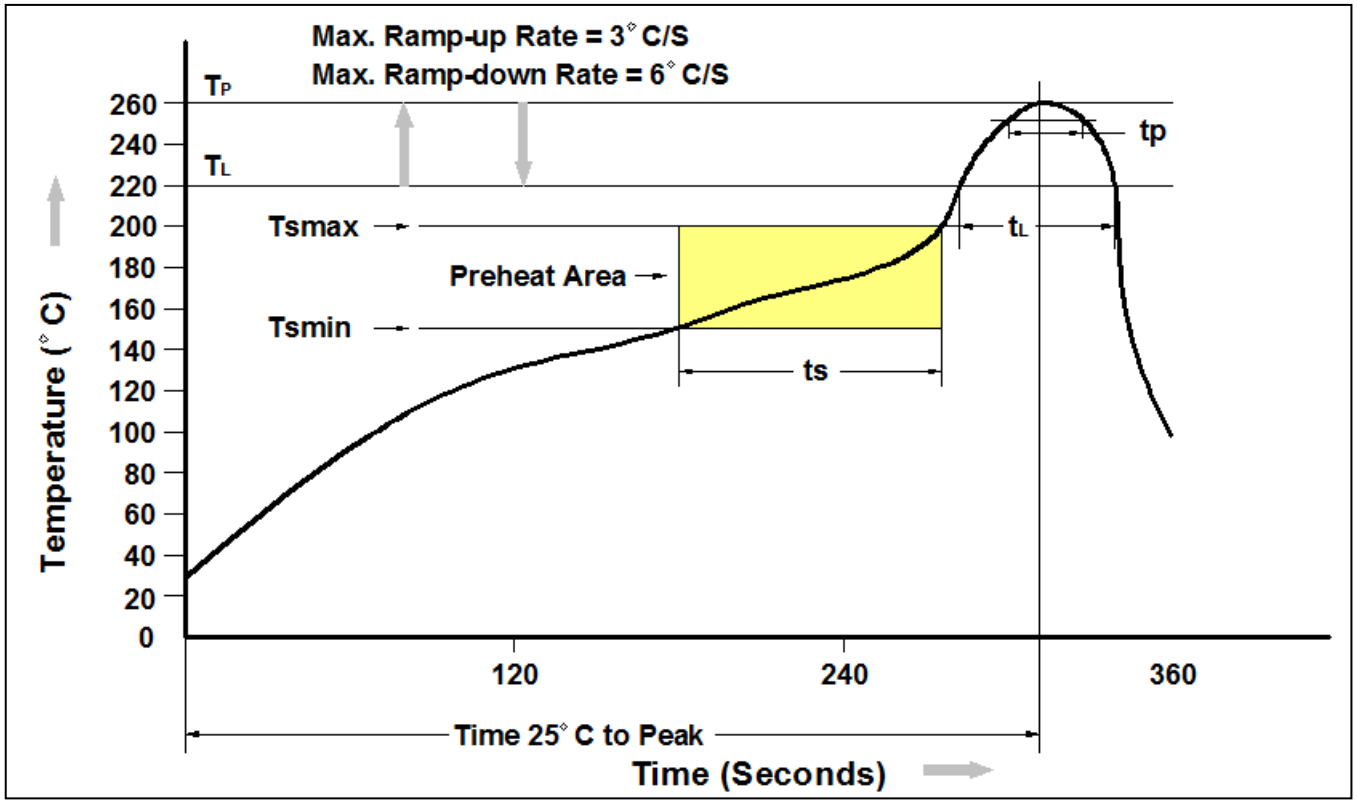
One time soldering is recommended within the condition of temperature.
Temperature: 260+0/-5˚C.
Time: 10 sec.
Preheat temperature: 25 to 140˚C.
Preheat time: 30 to 80 sec.



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.*