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# CT851 Series

## DC Input 4-Pin DMC-Isolator®

### High BV<sub>ceo</sub> Phototransistor Optocoupler

#### Features

- High isolation 5000 VRMS
- Patented coplanar structure DMC-Isolator®
- DC input with transistor output
- Operating Temperature range - 55 °C to 110 °C
- External Creepage  $\geq 7.4\text{mm}$
- Distance Through Isolation  $\geq 0.4\text{mm}$
- Spatial Distance  $\geq 7.5\text{mm}$  (S/SL Type)
- Spatial Distance  $\geq 8.0\text{mm}$  (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)

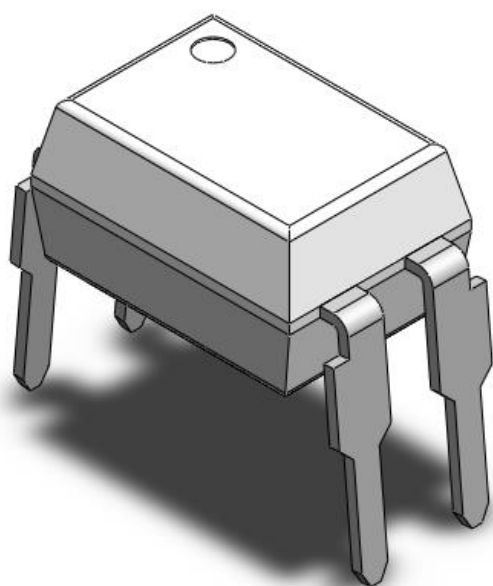
#### Description

The CT851 series consists of a high power transistor optically coupled to an Infrared-emitting diode in a 4-lead DMC-Isolator® package with different lead forming options.

#### Applications

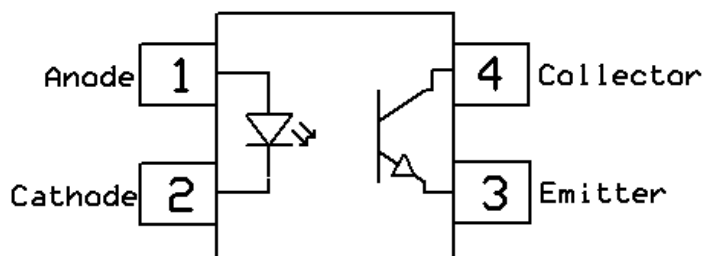
- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

#### Package Outline



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

#### Schematic





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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 <sub>ISO</sub>	Isolation voltage (AC, 1 minute, 40 ~ 60% R.H.)	5000	V <sub>RMS</sub>	
P <sub>TOT</sub>	Total power dissipation	260	mW	
T <sub>OPR</sub>	Operating temperature	-55 ~ +100	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +150	°C	
T <sub>SOL</sub>	C	260	°C	
<b>Emitter</b>				
I <sub>F</sub>	Forward current	60	mA	
I <sub>F(TRANS)</sub>	Peak transient current (Duty cyc 50% , pulse width<500ms)	100	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	150	mW	
<b>Detector</b>				
P <sub>D</sub>	Power dissipation	300	mW	
B <sub>VCEO</sub>	Collector-Emitter Breakdown Voltage	350	V	
B <sub>VECO</sub>	Emitter-Collector Breakdown Voltage	7	V	
I <sub>C</sub>	Collector Current	100	mA	

#### Note:

- 1.When plan operating current I<sub>F</sub> condition, the I<sub>C</sub> current limit must be considered.



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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	$I_F = 10\text{mA}$	-	1.2	1.4	V	
$I_R$	Reverse Current	$V_R = 6\text{V}$	-	-	5	$\mu\text{A}$	
$C_{IN}$	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	$I_C = 0.1\text{mA}$	350	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 0.1\text{mA}$	7	-	-	V	
$I_{CEO}$	Collector-Emitter Dark Current	$V_{CE} = 200\text{V}$ , $I_F = 0\text{mA}$	-	-	100	nA	

##### Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	$I_F = 5\text{mA}$ , $V_{CE} = 5\text{V}$	50	-	600	%	
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = 20\text{mA}$ , $I_C = 1\text{mA}$	-	-	0.4	V	
$R_{IO}$	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	$5 \times 10^{10}$	-	-	$\Omega$	
$C_{IO}$	Isolation Capacitance	$f = 1\text{MHz}$	-	10	-	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	18	$\mu\text{s}$	
$t_f$	Fall Time		-	8	18		



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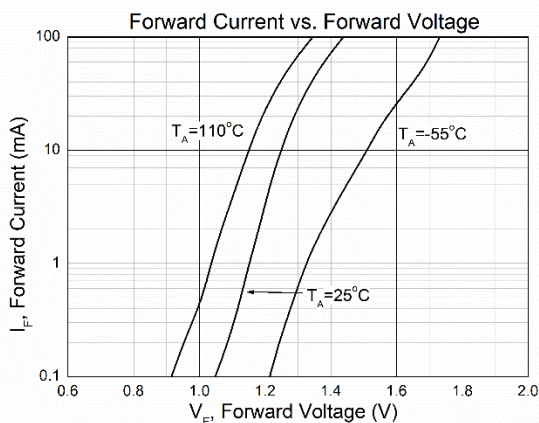


Figure 1

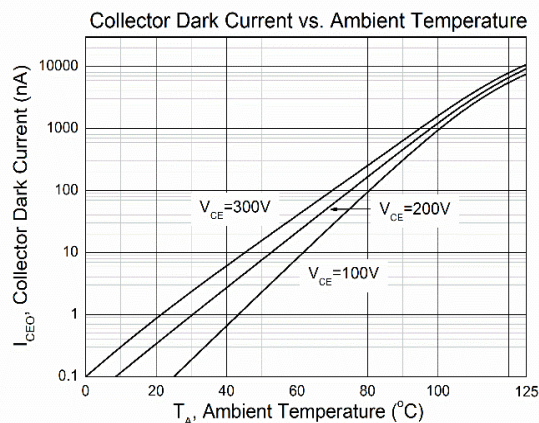


Figure 2

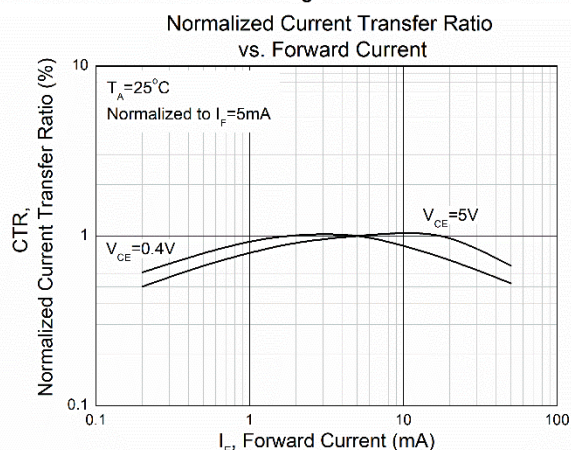


Figure 3

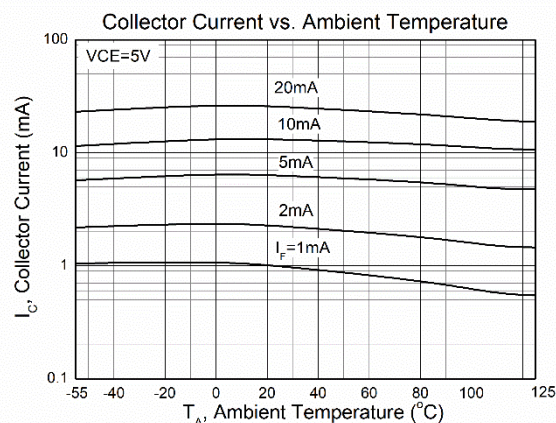


Figure 4

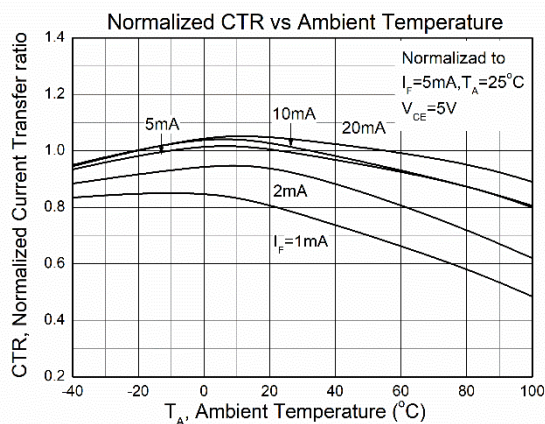


Figure 5

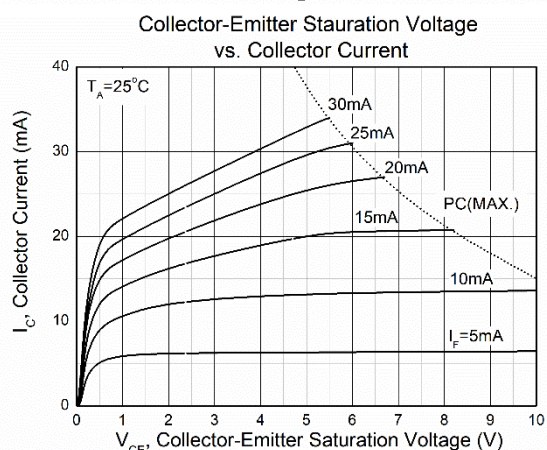


Figure 6



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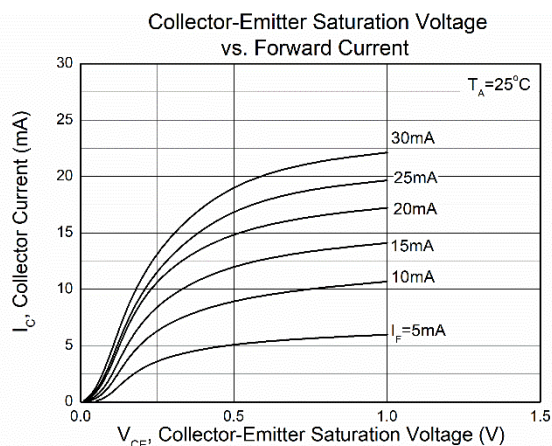


Figure 7

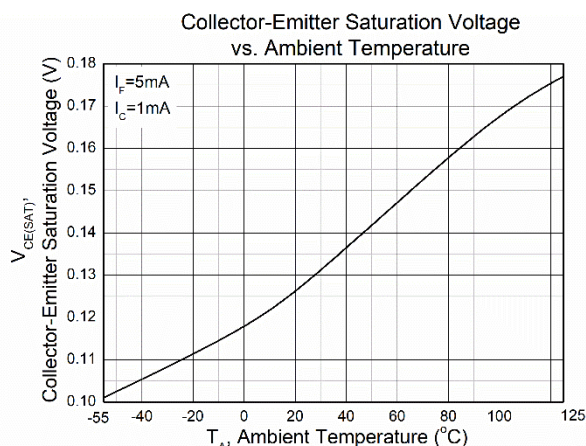


Figure 10

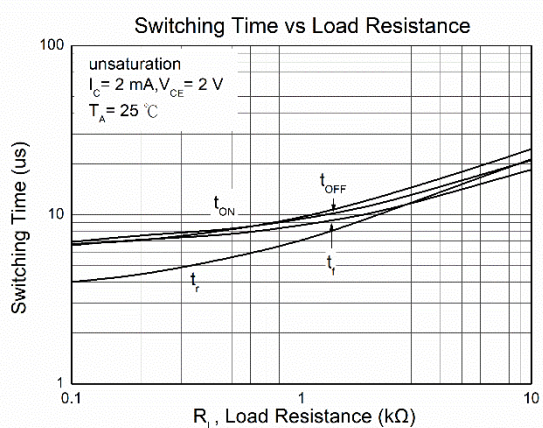


Figure 9



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#### Test Circuit

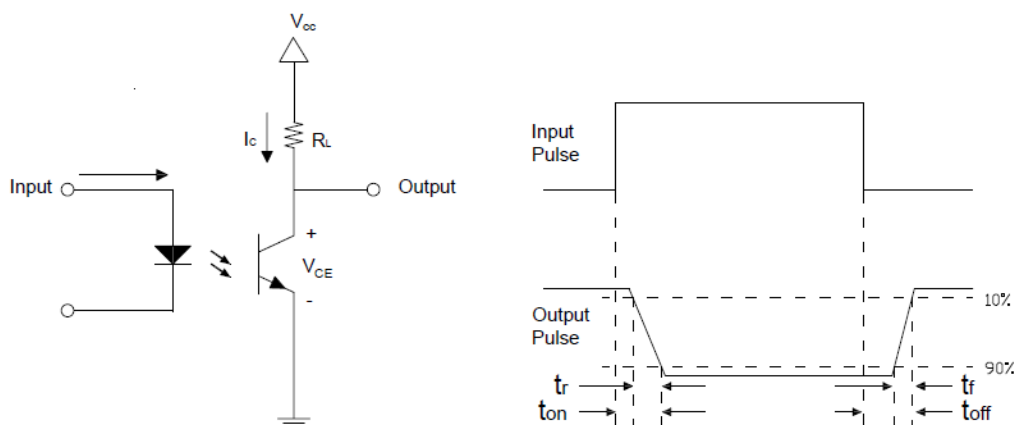


Figure 11: Switching Time Test Circuits



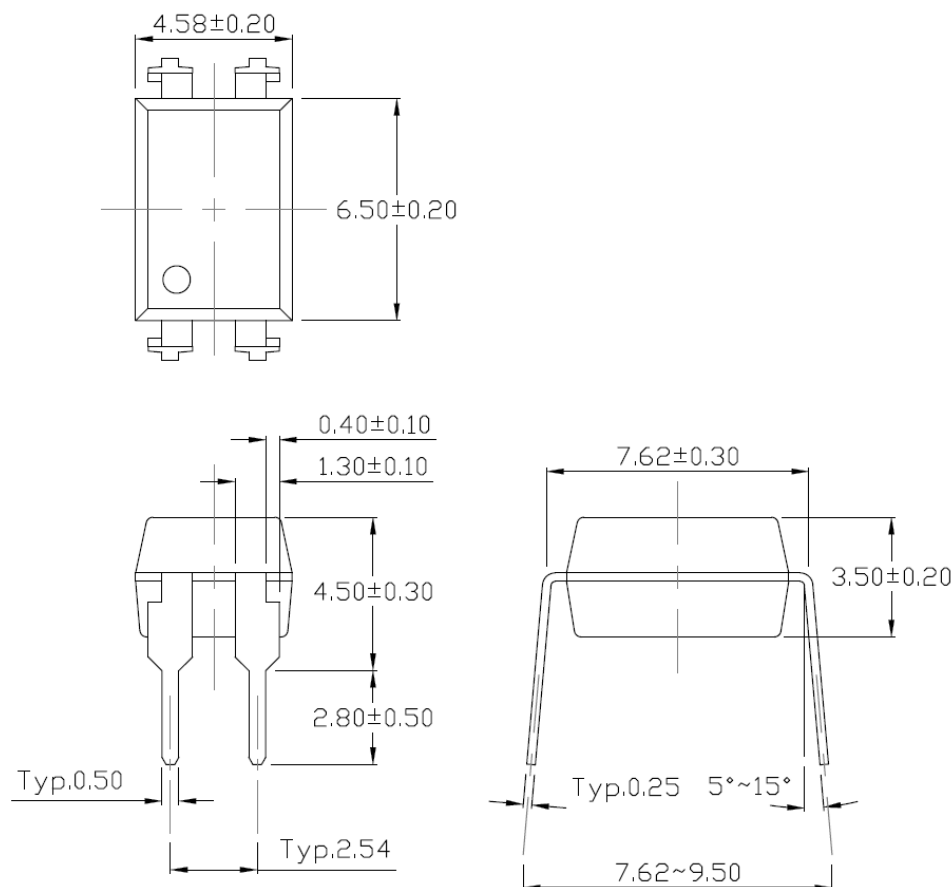
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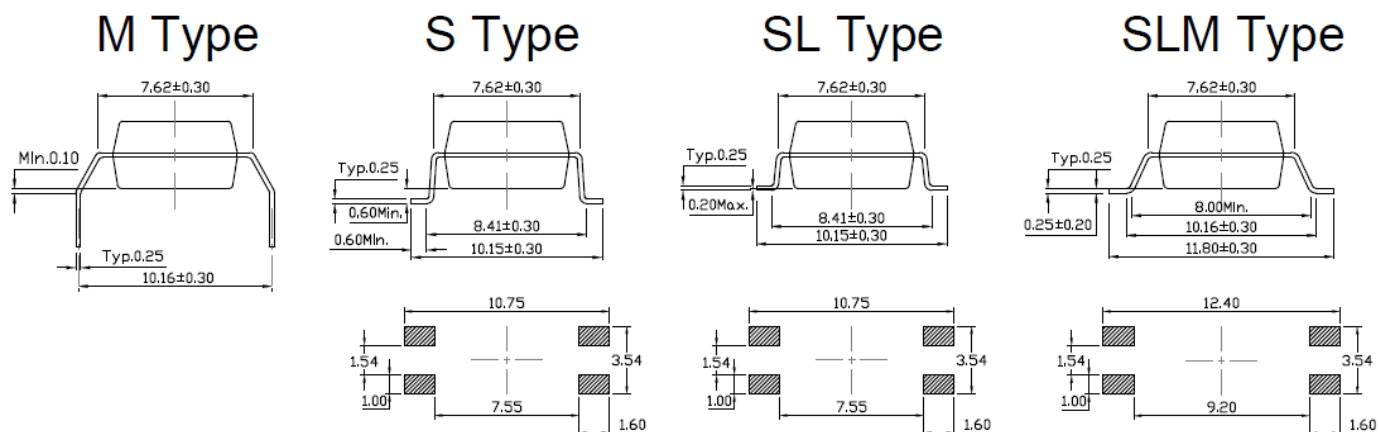
### High BV<sub>ceo</sub> Phototransistor Optocoupler

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

##### Standard DIP – Through Hole



##### Forming Option





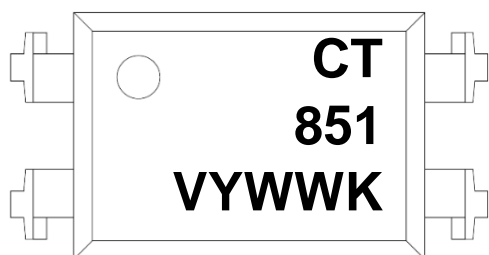


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## Marking Information



### Note:

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

## Ordering Information

### CT851 (V)(Y)(Z)

CT = Denotes “CT Micro”  
851 = Part Number  
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)  
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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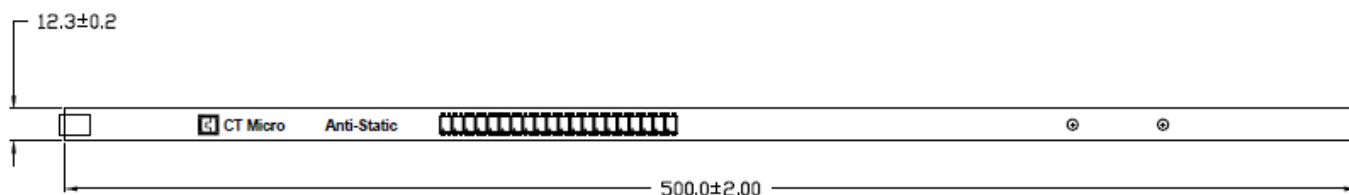
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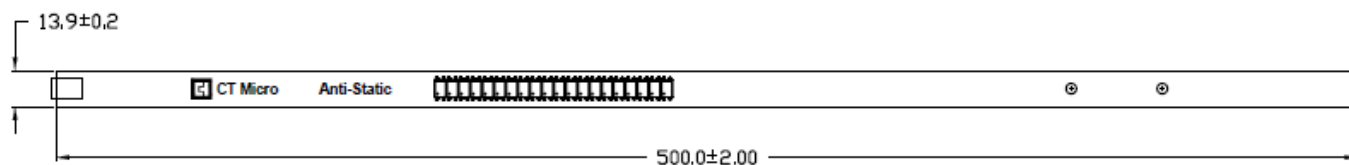
### High BV<sub>ceo</sub> Phototransistor Optocoupler

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

##### Tube Option Standard DIP

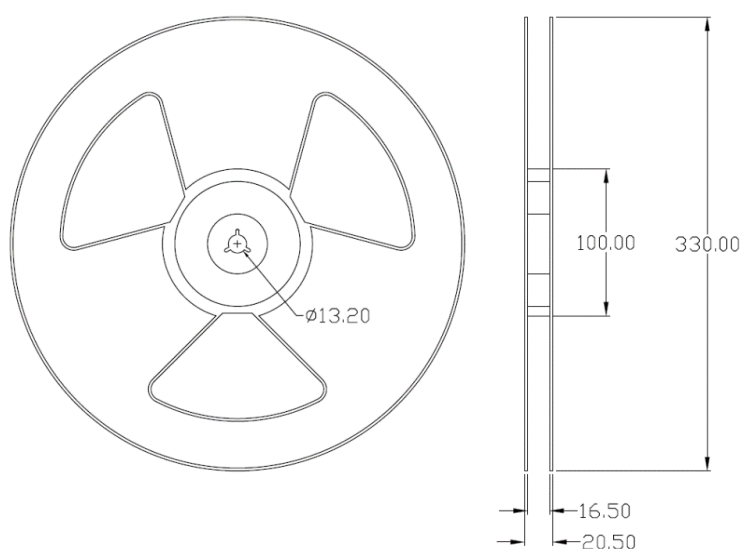


##### Tube Option M Type

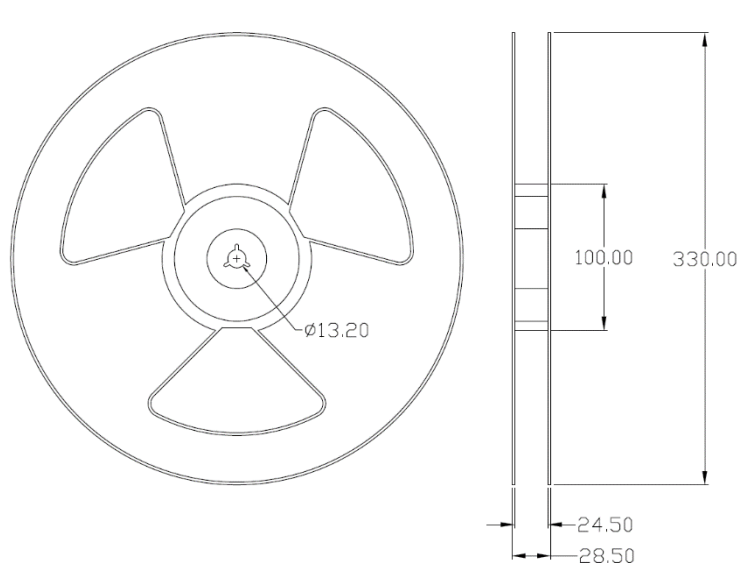


#### Reel Dimension *All dimensions are in mm, unless otherwise stated*

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



##### Option SLM(T1/T2)





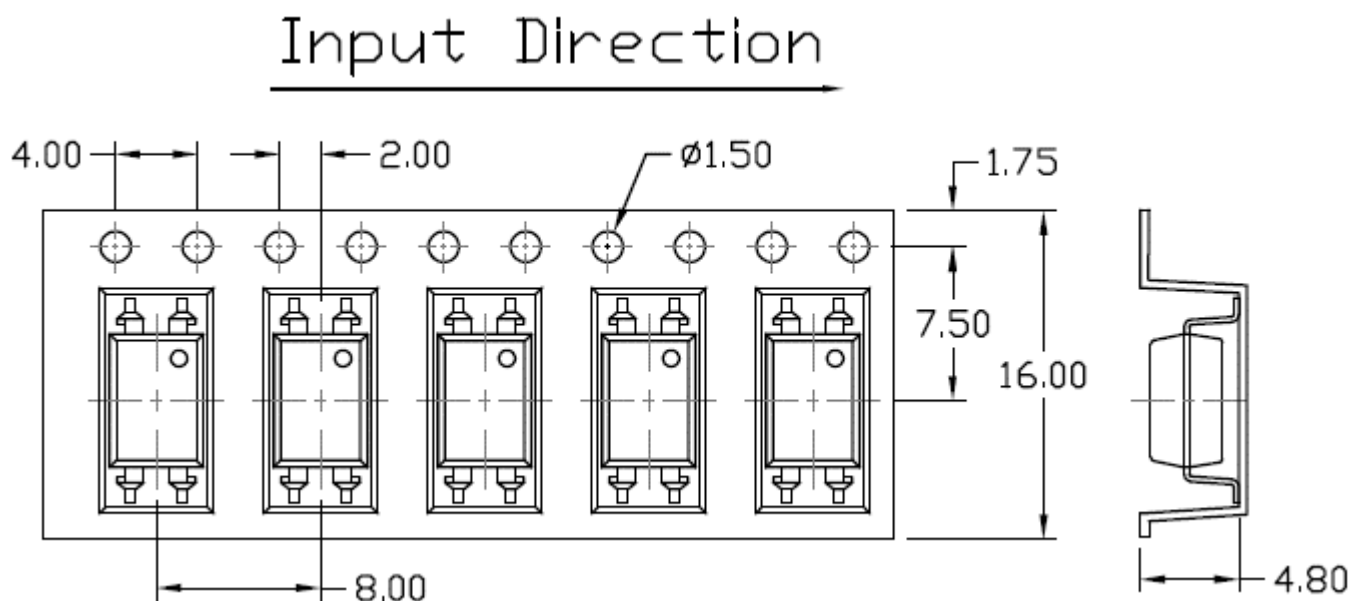
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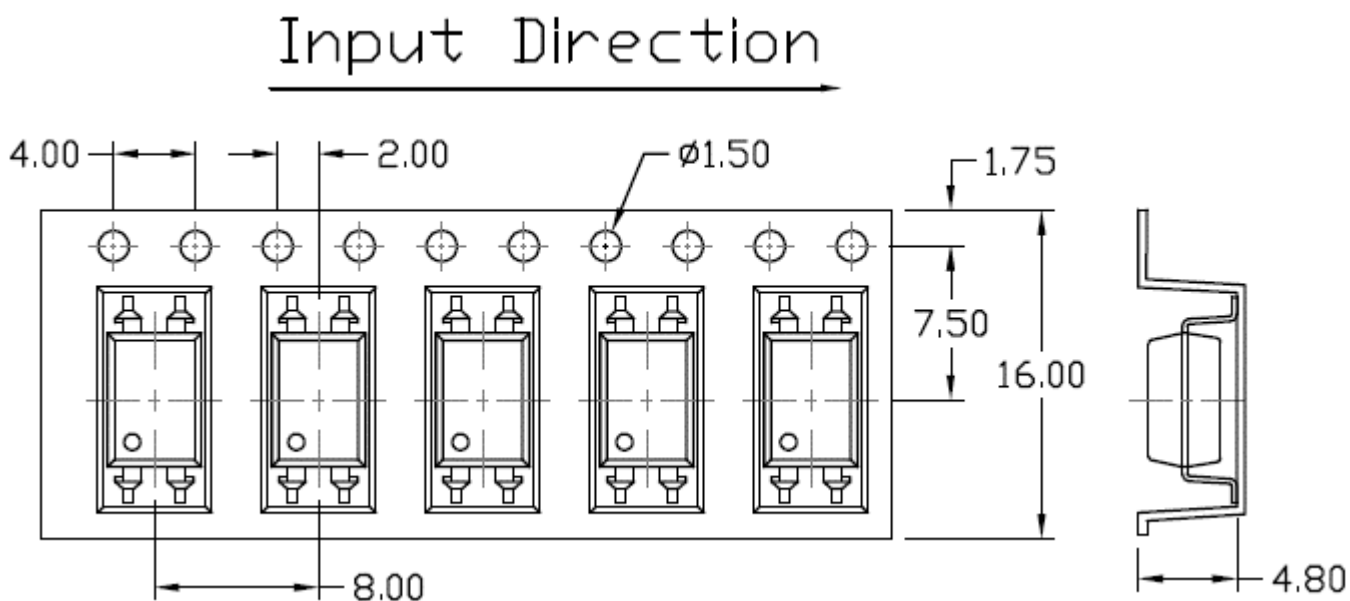
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#### Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

##### Option S(T1) & SL(T1)

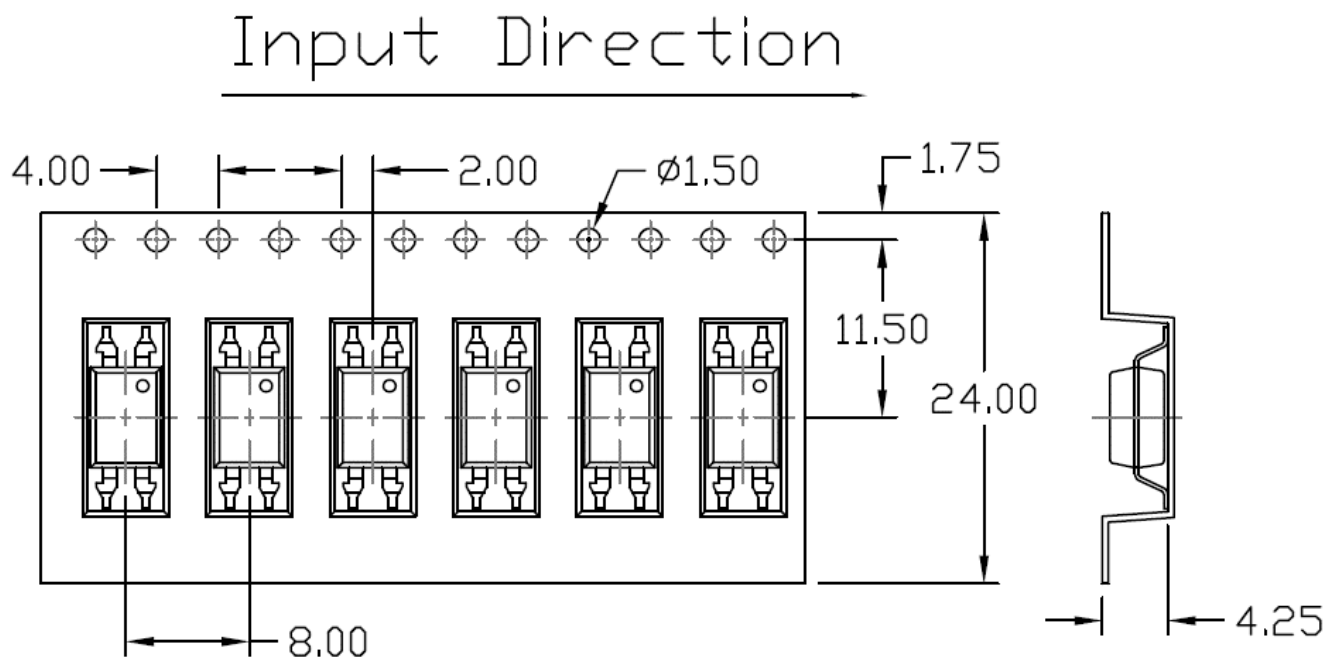


##### Option S(T2) & SL(T2)

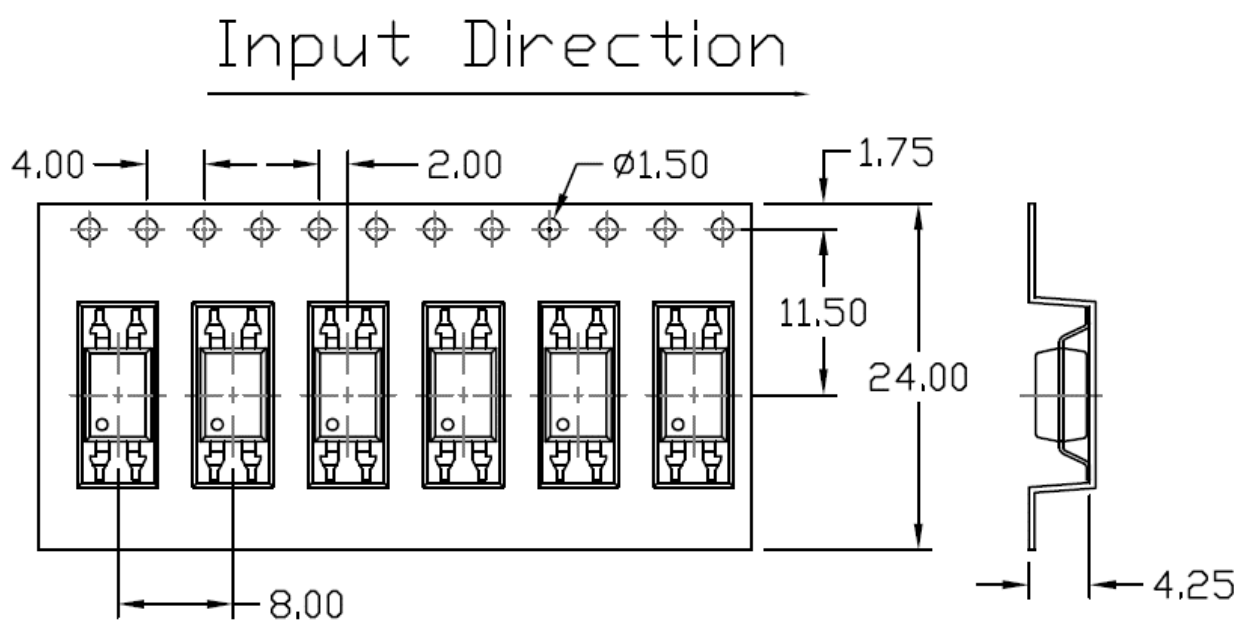




Option SLM(T1)



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)

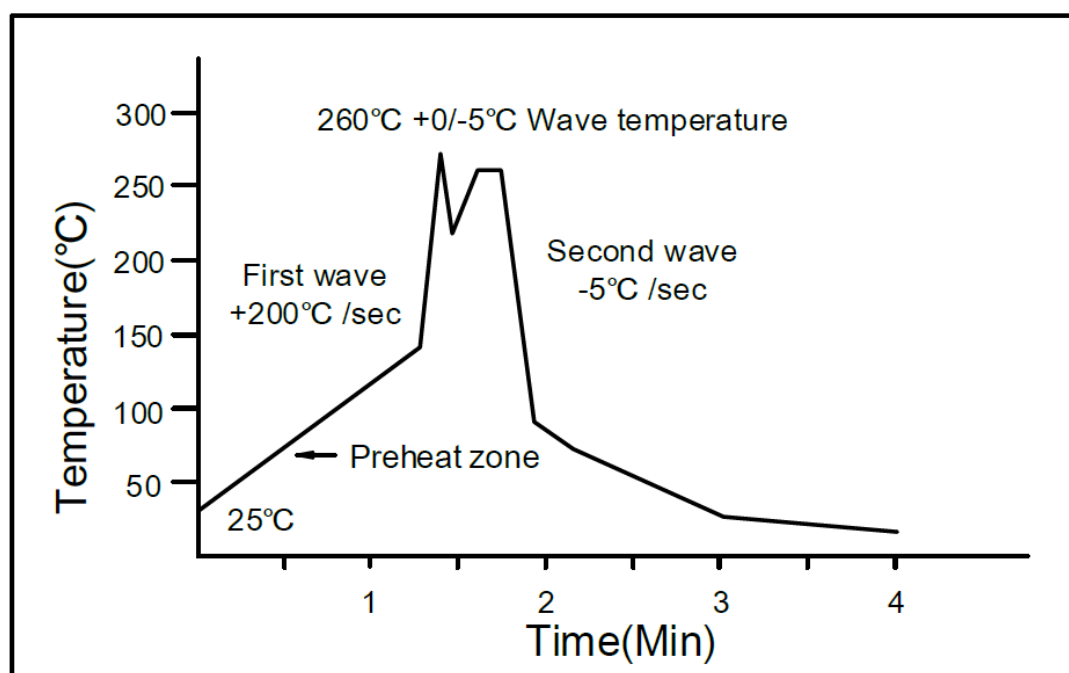
One time soldering is recommended within the condition of temperature.

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

Time: 10 sec.

Preheat temperature: 25 to  $140^{\circ}\text{C}$ .

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.

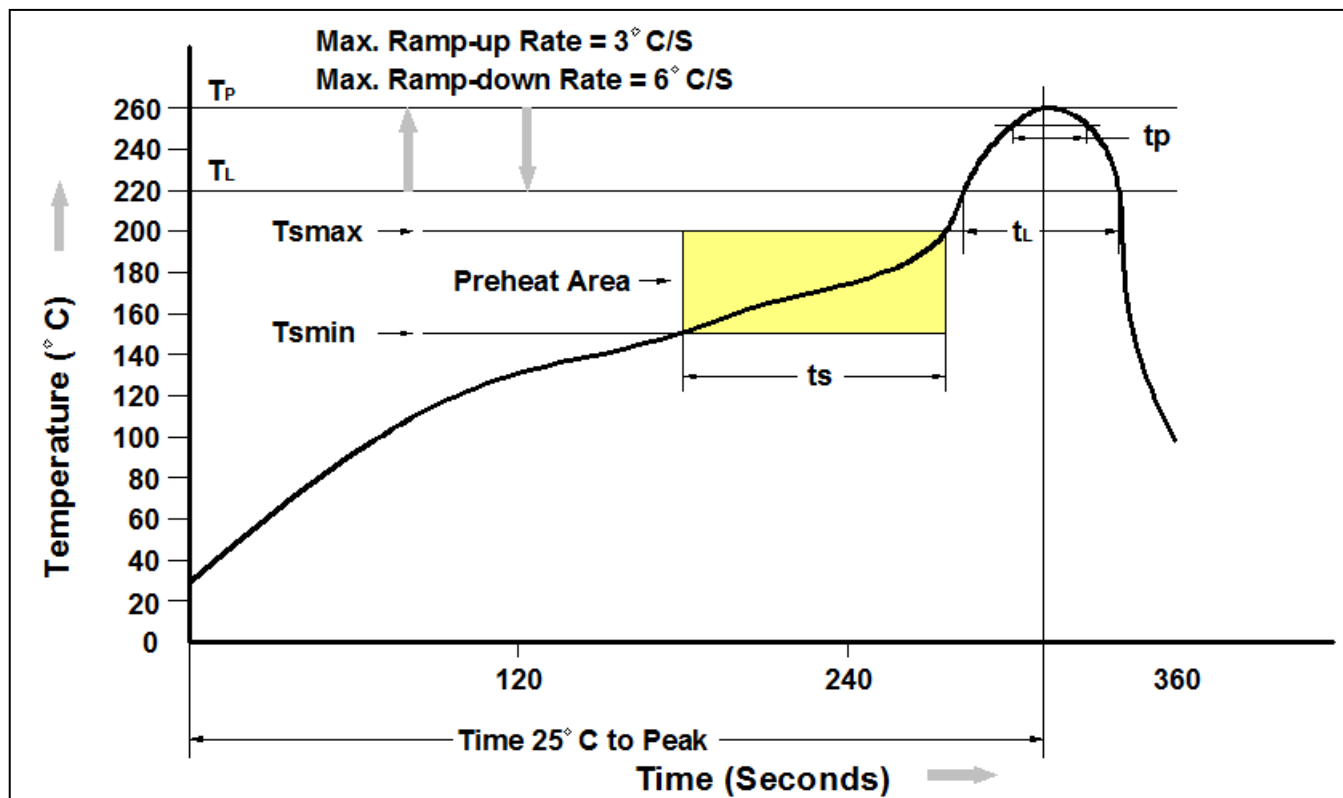


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#### Reflow Profile (Follow the JEDEC standard J-STD-020)



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <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.



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