



# CTR214-8L

## 8-Pin DMC-Isolator®

### Opto MOS Relays

#### Features

- High isolation 5000 VRMS
- OFF-state output terminal voltage: 400 V (min)
- Operating temperature range - 40 °C to 85 °C
- Creepage distance  $\geq 7\text{mm}$
- Distance Through Isolation  $\geq 0.4\text{mm}$
- RoHS and REACH Compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
  - ✓ UL - UL1577 (E364000)
  - ✓ VDE - EN60747-5-5(40039590)
  - ✓ CQC – GB4943.1, GB8898(14001104781)
  - ✓ IEC62368 (FI/41119)

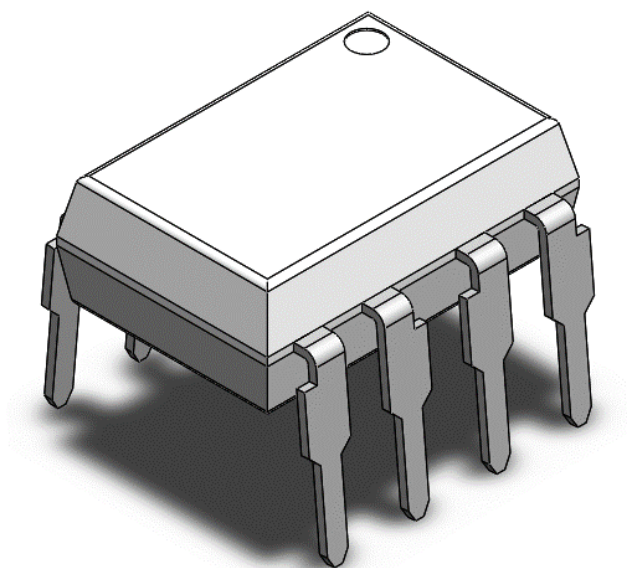
#### Description

The CTR214-8L (1 form-A x 2) is a dual channel Opto MOS relay. Each independent channel consists of two MOSFET and one photovoltaic chip optically coupled to an Infrared-emitting diode in 8 PIN package.

#### Applications

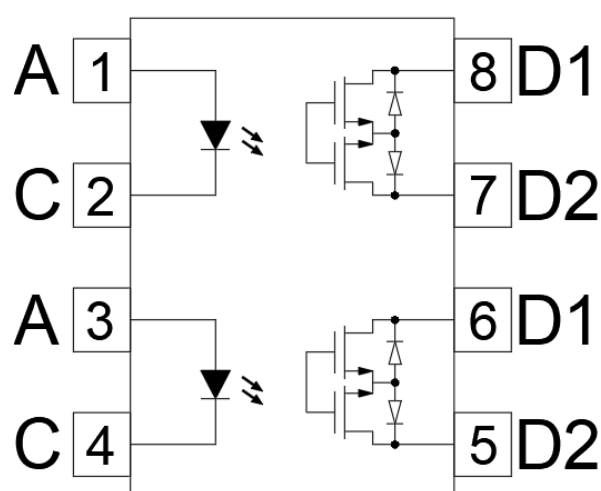
- Battery Management System (BMS)
- Security Systems
- Smart Meters
- Mechanical relay replacements
- General telecom switching
- Industrial controls
- Automatic measurement equipment

#### Package Outline



Note: Different bending 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>	
T <sub>OPR</sub>	Operating temperature		-40 ~+85	°C	
T <sub>STG</sub>	Storage temperature		-40 ~+100	°C	
T <sub>SOL</sub>	Soldering temperature (For 10 seconds)		260	°C	
Emitter					
I <sub>F</sub>	LED forward current (50% duty, 1ms P.W)		20	mA	
I <sub>FP</sub>	LED forward current (pulsed) (≤1μs P.W,300pps)		100	mA	
V <sub>R</sub>	LED reverse voltage		6	V	
P <sub>in</sub>	Power dissipation		32	mW	
T <sub>j</sub>	Junction Temperature		125	°C	
Detector					
V <sub>OFF</sub>	OFF-state output terminal Voltage		400	V	
I <sub>ON</sub>	ON-state Current	CTR214	80	mA	
		CTR214B	140	mA	
P <sub>o</sub>	Output Power dissipation	CTR214	320	mW	
		CTR214B	392	mW	
T <sub>j</sub>	Junction Temperature		125	°C	

#### Recommended Operating Conditions

Symbol	Parameters	Min	Typ	Max	Units
$V_{\text{DD}}$	Supply Voltage	-	-	320	V
$I_{\text{FT}}$	Trigger LED Current	10	15	25	mA
$T_{\text{OPR}}$	Operating temperature	-40	-	60	°C



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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	$I_F = 10\text{mA}$	-	1.4	1.6	V	
$I_R$	Reverse Current	$V_R = 6\text{V}$	-	-	5	$\mu\text{A}$	

##### Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$I_{OFF}$	OFF-state Current	$V_{OFF} = 400\text{V}$	-	0.1	1	$\mu\text{A}$	
$C_{OFF}$	Output Capacitance	$V_O = 0\text{V}$ , $f = 1\text{MHz}$	-	30	-	pF	

##### Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$I_{FT}$	Trigger LED Current	$I_{ON} = \text{Max}$	-	1.5	5	mA	
$R_{ON}$	ON-state resistance	CTR214-8L	$I_{ON} = \text{Max}$ , $I_F = 5\text{mA}$ , $t < 1\text{s}$	-	33	50	$\Omega$
		CTR214B-8L	$I_{ON} = \text{Max}$ , $I_F = 5\text{mA}$ , $t < 1\text{s}$	-	15	20	$\Omega$

##### Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$t_{ON}$	Turn-on Time	$R_L = 200\Omega$ , $V_{DD} = 20\text{V}$ , $I_F = 10\text{mA}$	-	0.2	1	ms	
$t_{OFF}$	Turn-off Time		-	0.2	1	ms	



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

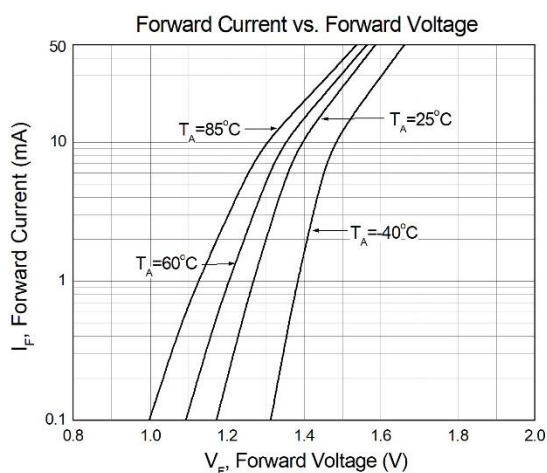


Figure 1

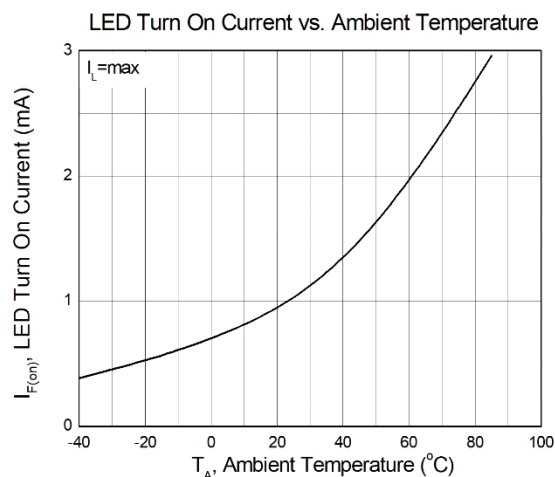


Figure 2

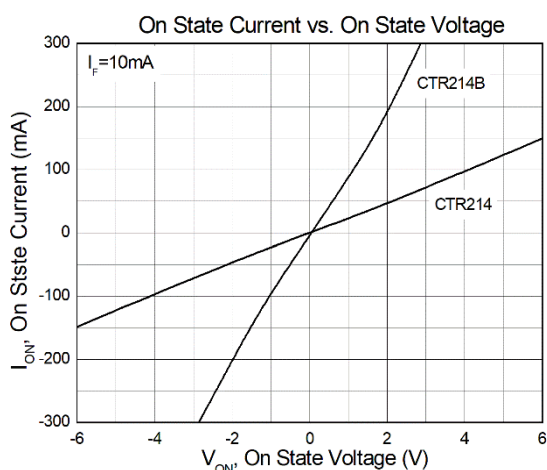


Figure 3

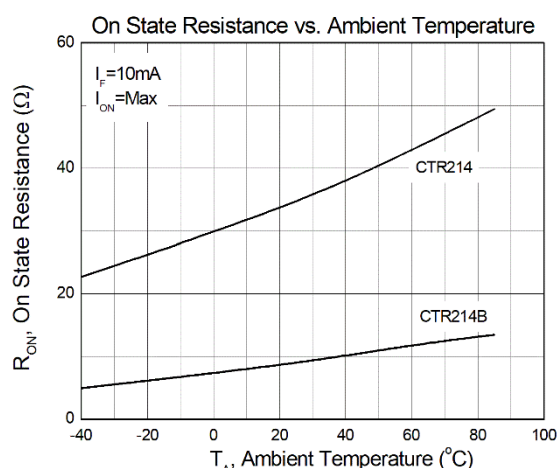


Figure 4

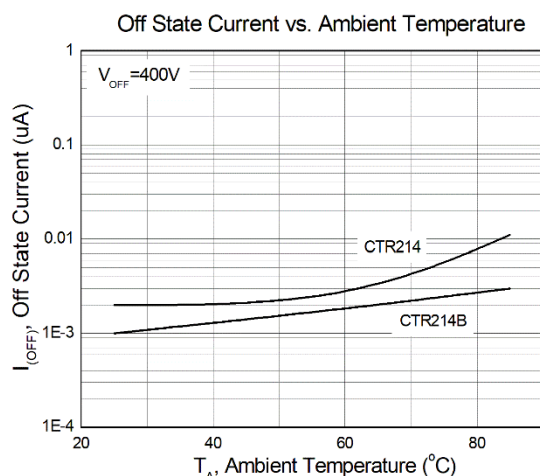


Figure 5

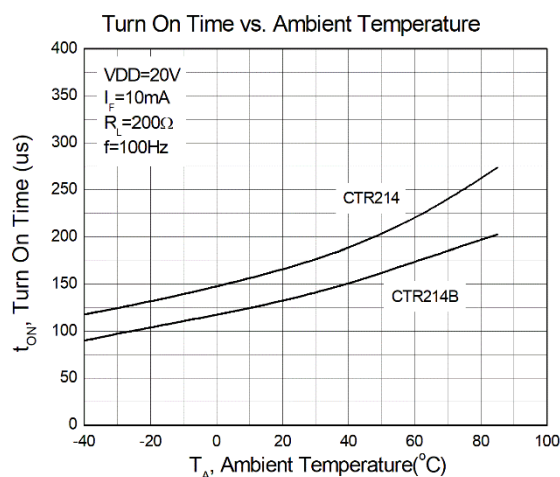
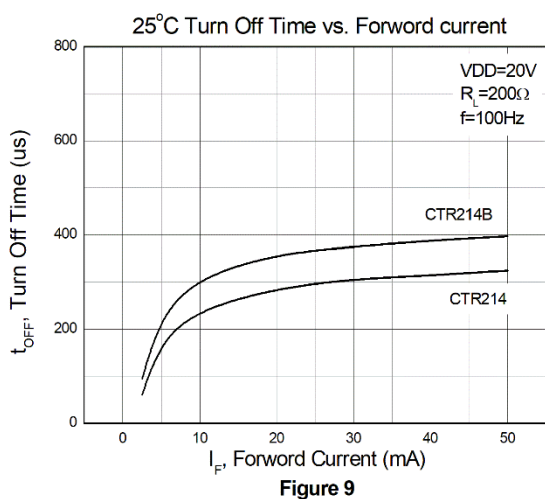
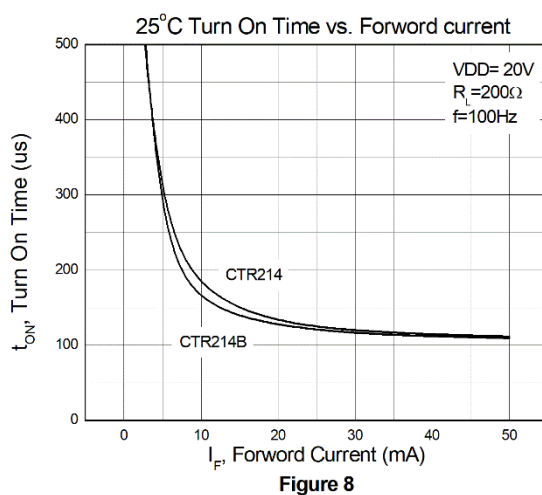
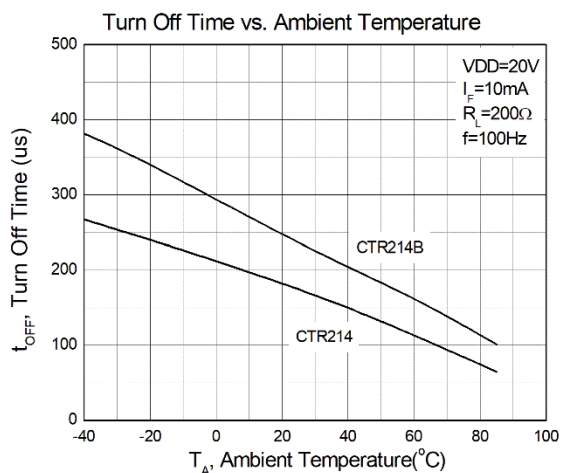


Figure 6

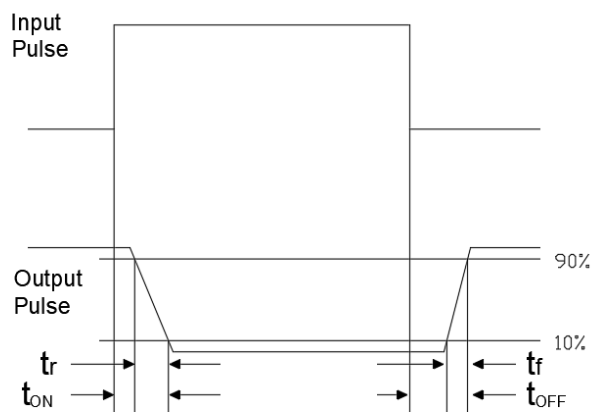
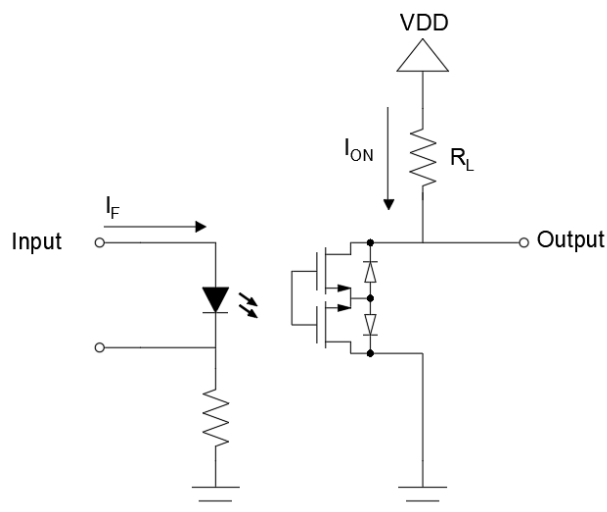


### Typical Characteristic Curves $T_A = 25^\circ\text{C}$ , unless otherwise specified





## Test Circuit

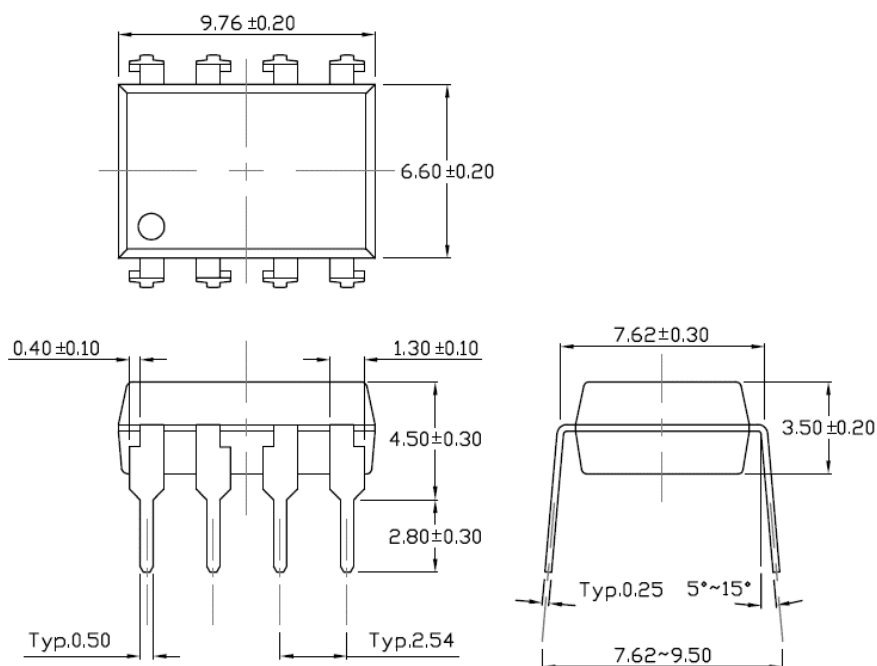


**Switching Time Test Circuits**



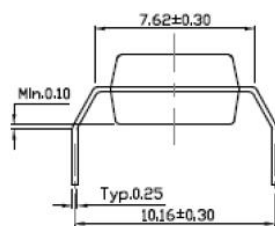
## Package Dimension *Dimensions in mm unless otherwise stated*

### Standard DIP – Through Hole

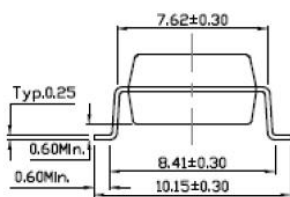


### Forming Option

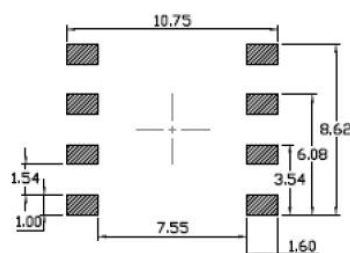
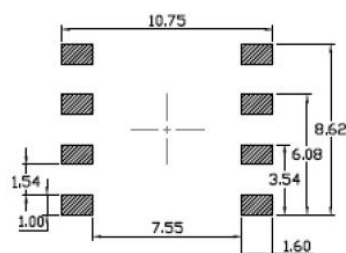
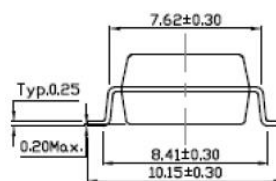
#### M Type



#### S Type



#### SL Type



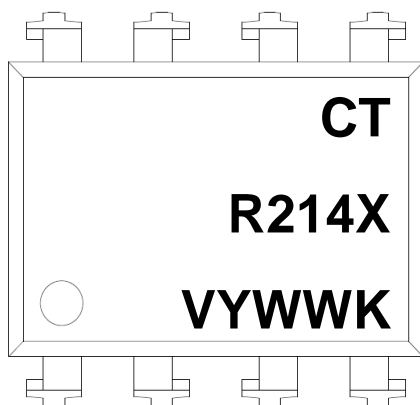


# CTR214-8L

## 8-Pin DMC-Isolator®

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## Marking Information



### Note:

- CT : Denotes “CT Micro”
- R214X: Part Number
- X : CTR Rank Option (Blank or B)
- V : VDE Safety Mark Option (Blank or V)
- Y : One Digit Year Code
- WW : Two Digit Work Week
- K : Manufacturing Code

## Ordering Information

### CTR214X(V)(Y)(Z)-8L

- CT = Denotes “CT Micro”
- R214X = Part Number
- V = VDE Safety Mark Option (Blank or V)
- Y = Lead Form Option (Blank, S, SL or M)
- Z = Tape and Reel Option (Blank, T1 or T2)
- 8L = 8 PIN Package

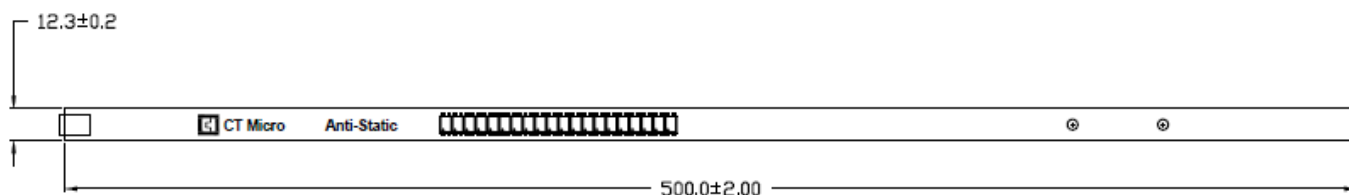
<b>Option</b>	<b>Description</b>	<b>Quantity</b>
None	Standard 8 Pin Dip	40 Units/Tube
M	Gullwing (400mil) Lead Forming	40 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1000 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1000 Units/Reel



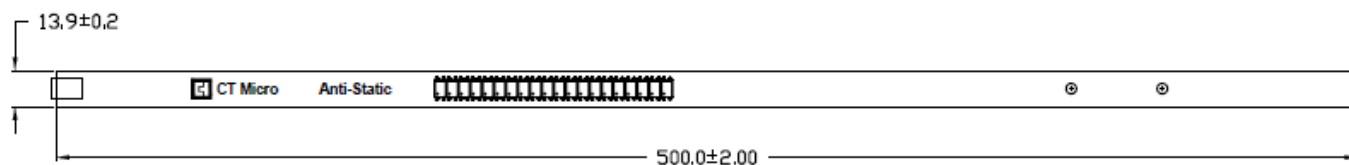


## Carrier Specifications *Dimensions in mm unless otherwise stated*

### Tube Option Standard DIP

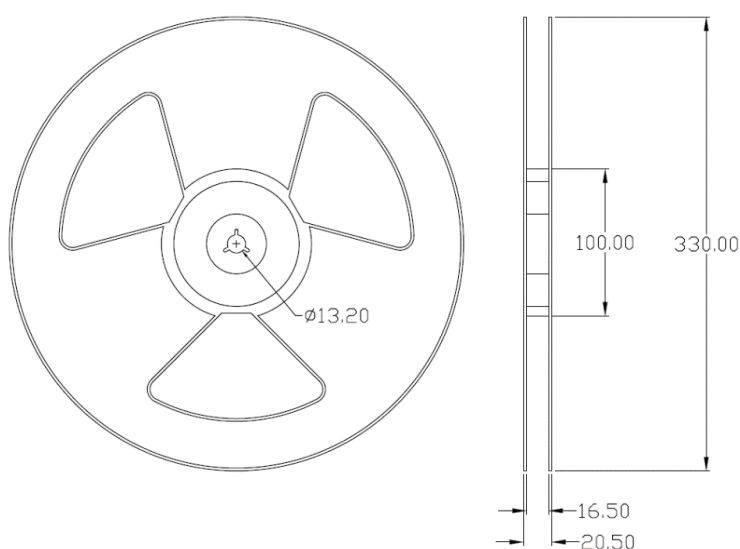


### Tube Option M Type



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

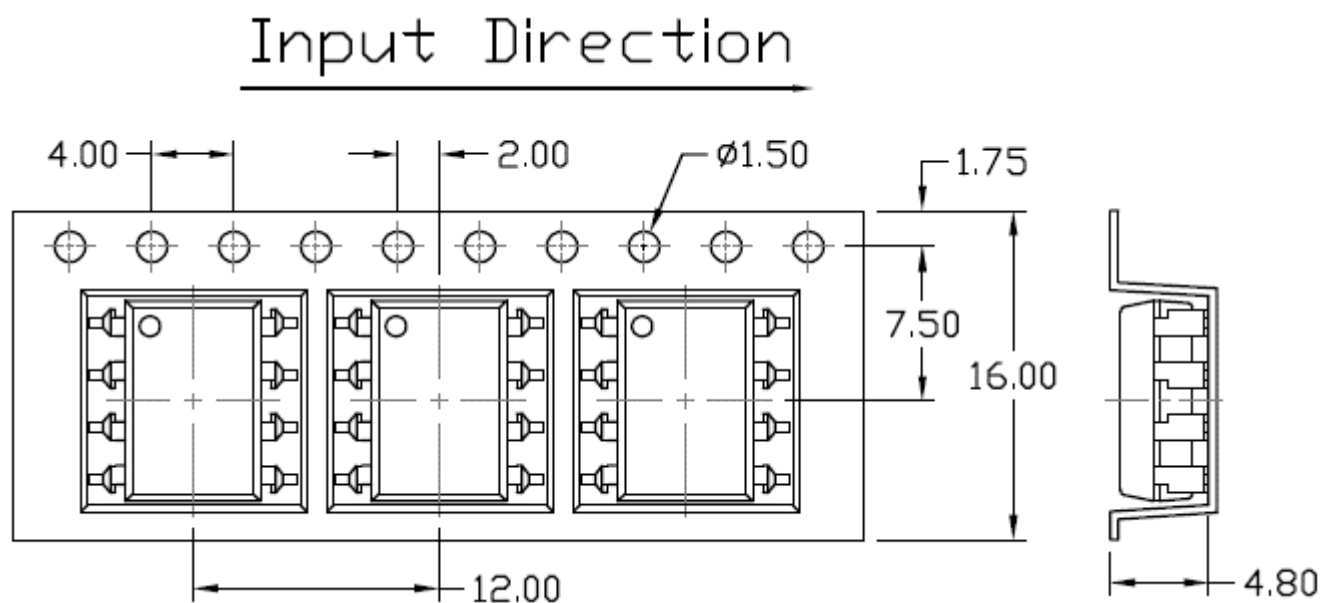
### Option S(T1/T2) & SL(T1/T2)



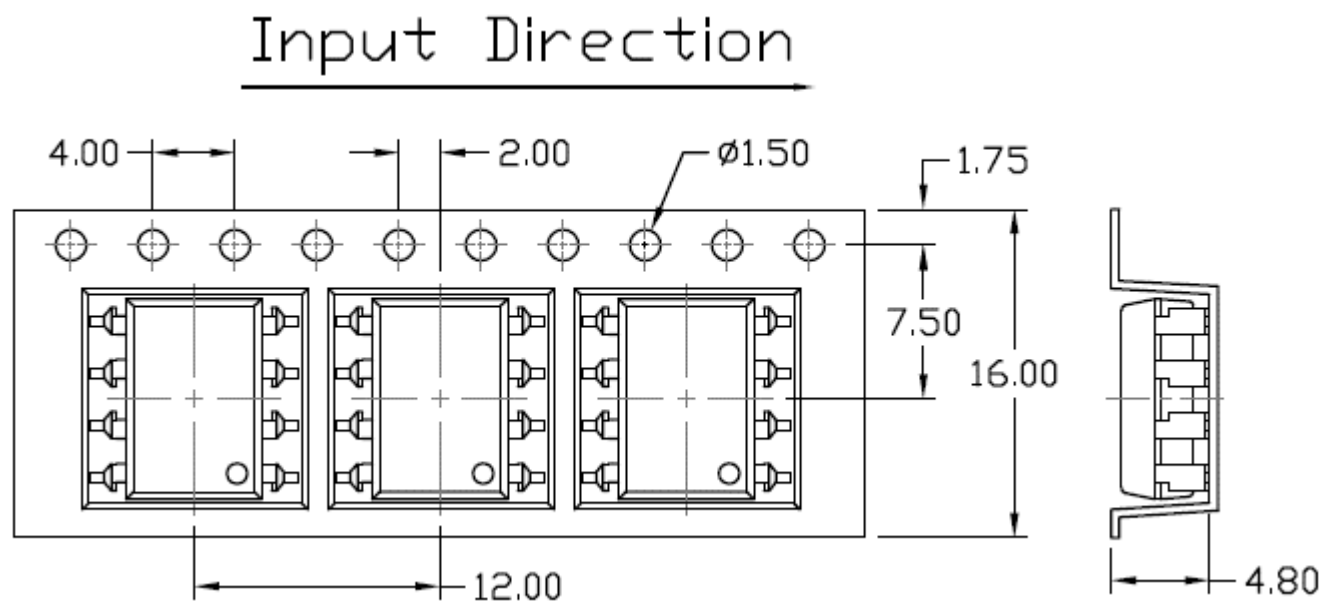


**Carrier Tape Specifications** *Dimensions in mm unless otherwise stated*

**Option S(T1) & SL(T1)**



**Option S(T2) & SL(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)**

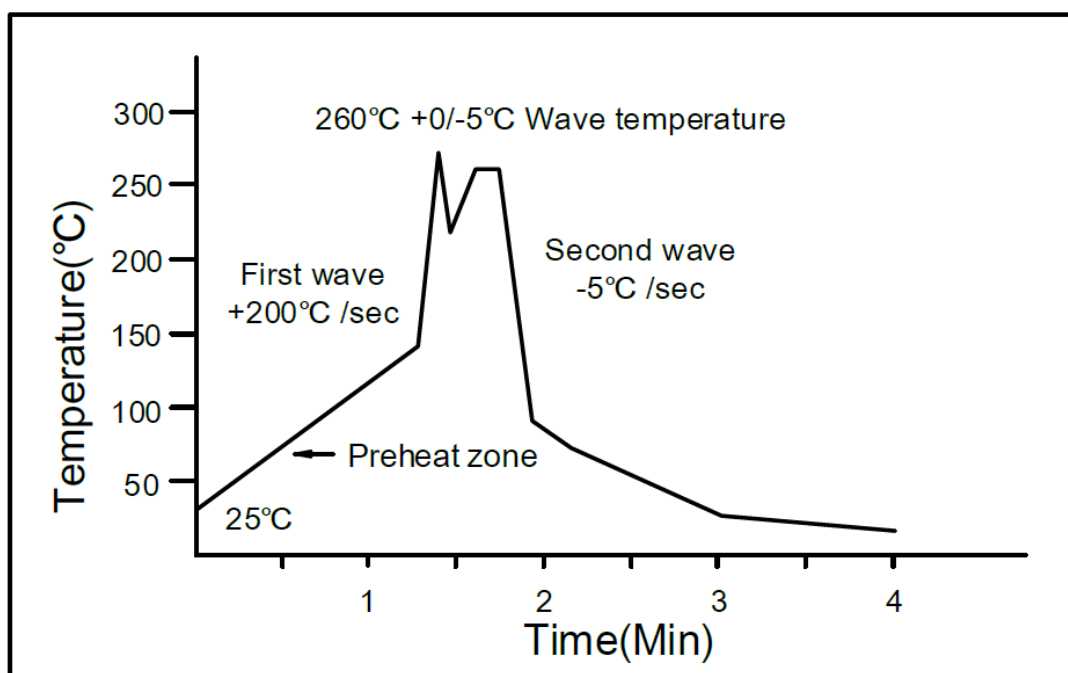
One time soldering is recommended within the condition of temperature.

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

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)**

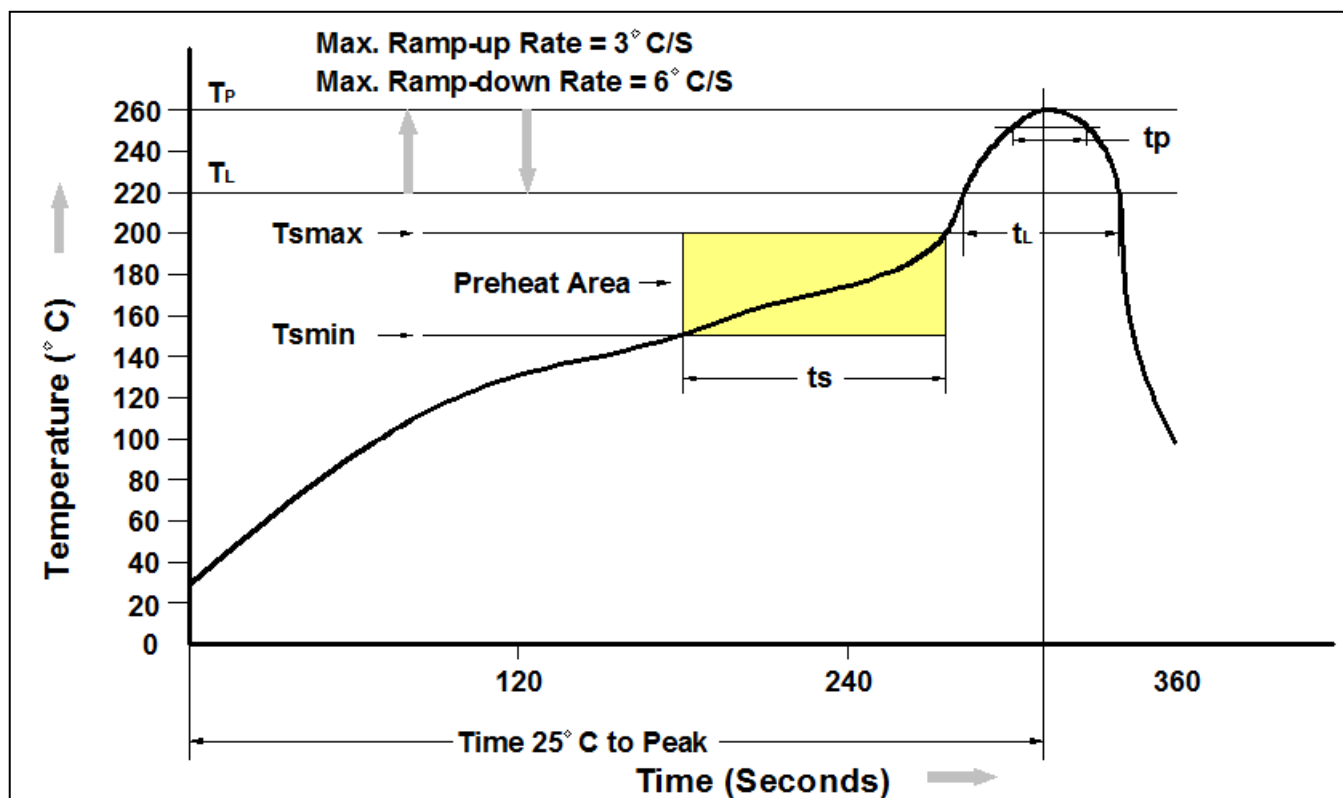
Allow single lead soldering in every single process.

One time soldering is recommended. Temperature:  $350 \pm 10^{\circ}\text{C}$

Time: 5 sec max.



## 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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