CTR215-4L

4-Pin DMC-Isolator®

Opto MOS Relays

Features

- High isolation 5000 VRMS
- OFF-state output terminal voltage:100V(max)
- Operating temperature range - 40 °C to 85 °C
- Creepage distance ≥ 5mm
- Distance through insulation > 0.4mm
- RoHS compliance
- REACH compliance
- Halogen free
- Regulatory Approvals
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1-2022

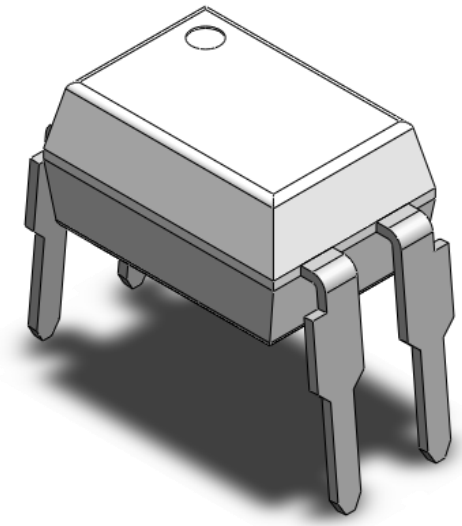
Description

The CTR215-4L consists of two MOSFET and one photovoltaic chip optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead DIP package different lead forming options.

Applications

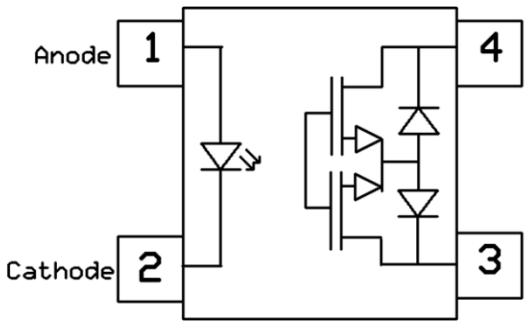
- Battery Management System (BMS)
- Security Systems
- Smart Meters
- Mechanical relay replacements
- General telecom switching
- Industrial controls
- Automatic measurement equipment

Package Outline



Note: Different bending options available. See package dimension.

Schematic



Absolute Maximum Rating at 25°C

Symbol	*Parameters*	*Ratings*	*Units*	*Notes*
V_{iso}	Isolation voltage	5000	Vrms	AC,60 s
V_{IORM}	Maximum repetitive peak isolation voltage	850	V_{peak}	
V_{PR}	Input-to-Output Test Voltage, Method b, V_{IORM} × 1.875 = V_{PR}, 100% Production Test with t_m = 1 sec, Partial Discharge < 5 pC	1594	V_{peak}	***1***
V_{PR}	Input-to-Output Test Voltage, Method a, V_{IORM} × 1.6 = V_{PR}, Type and Sample Test, t_m = 10sec, Partial Discharge < 5 pC	1360	V_{peak}	***1***
V_{IOTM}	Maximum transient isolation voltage	6000	V_{peak}	
T_{OPR}	Operating temperature	-40 ~+85	°C	
T_{STG}	Storage temperature	-40 ~+100	°C	
T_{SOL}	Soldering temperature	260	°C	***2***
Emitter				
I_F	LED forward current	20	mA	
I_{FP}	LED forward current (pulsed) (≤1μs P.W,300pps)	100	mA	
V_R	LED reverse voltage	6	V	
P_{in}	Power dissipation	50	mW	
T_j	Junction Temperature	115	℃	
Detector				
V_{OFF}	OFF-state output terminal Voltage	100	V	
I_{ON}	ON-state Current	0.5	A	
P_o	Output Power dissipation	375	mW	
T_j	Junction Temperature	125	℃	

Notes

1. Refer to the front of the optocoupler section of the current catalog, under Product Safety Regulations section, IEC/EN/DIN EN 60747-5-5, for a detailed description
2. For reflow profile 10 second peak.

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

Emitter Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
V_F	Forward voltage	I_F = 10mA	-	1.4	1.6	V	
I_R	Reverse Current	V_R = 6V	-	-	5	μA	

Detector Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
I_{OFF}	OFF-state Current	V_{OFF} =100V	-	-	1	uA	
C_{OFF}	Output Capacitance	V_O= 0V, f=1 MHz	-	22	-	pF	

Transfer Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
I_{FT}	Trigger LED Current	I_{ON} =Max	-	-	5	mA	
R_{ON}	ON-state resistance	I_{ON} =Max, I_F =5 mA, t < 0.5s	-	0.5	2	Ω	

Switching Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
Ton	Turn-on Time	R_L=200Ω, V_{DD}=20V, I_F=5mA f=100Hz, Duty=50%	-	1.0		ms	
Toff	Turn-off Time		-	0.2		ms	

Typical Characteristic Curves

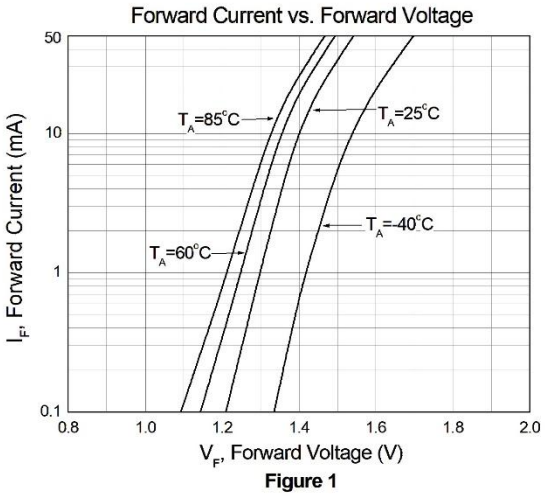


Figure 1

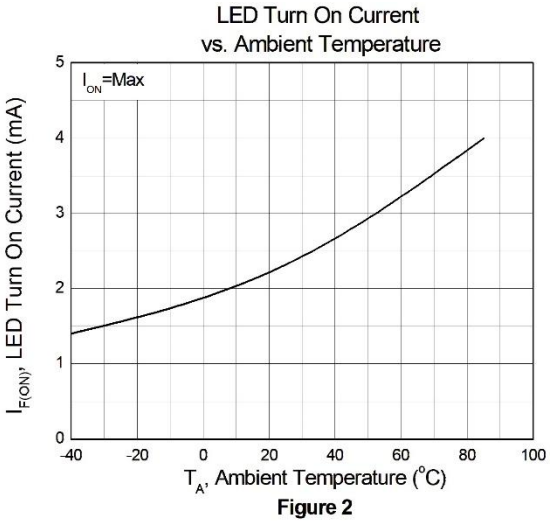


Figure 2

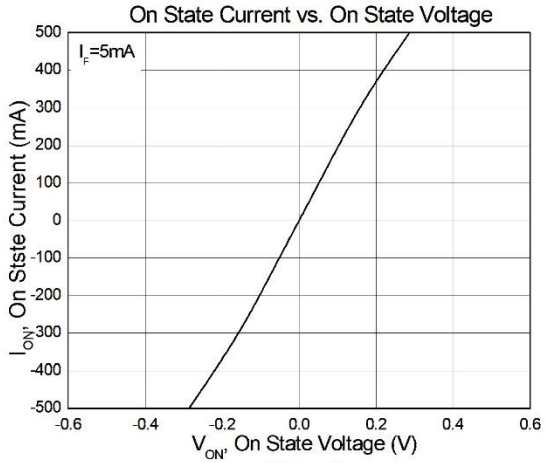


Figure 3

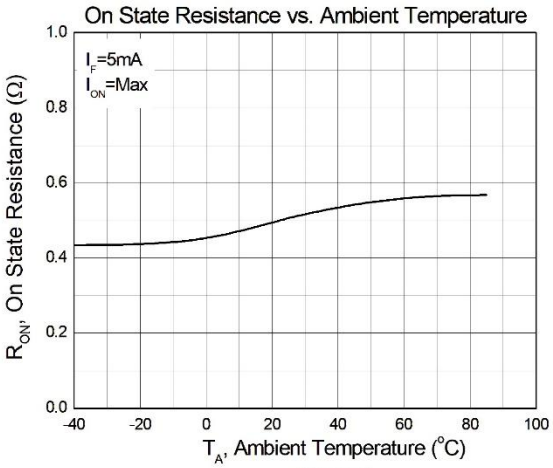


Figure 4

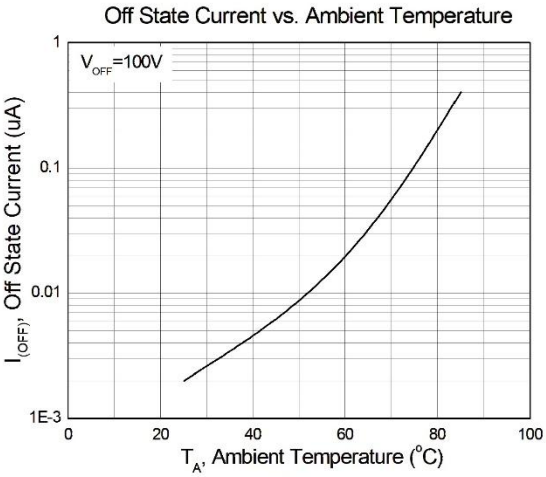


Figure 5

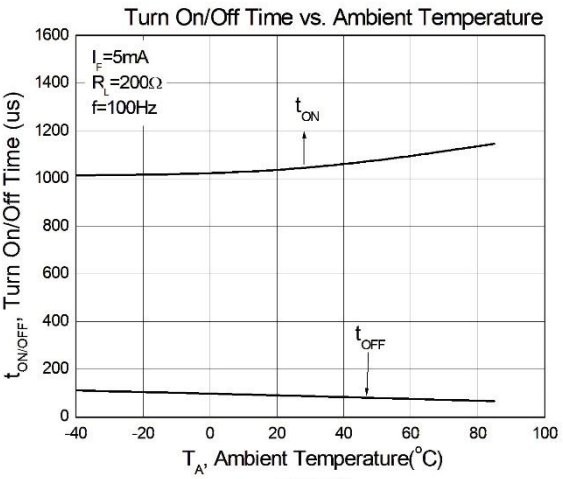


Figure 6

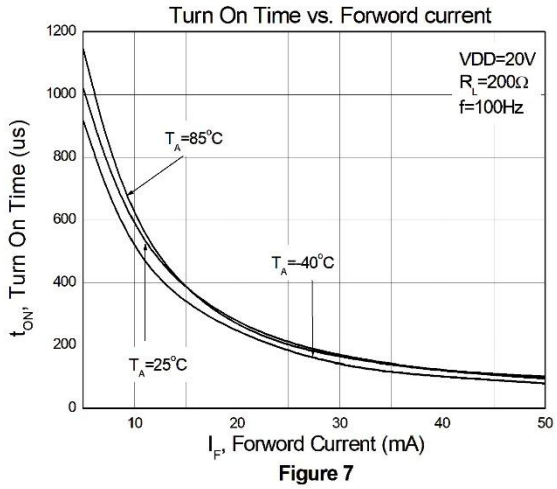


Figure 7

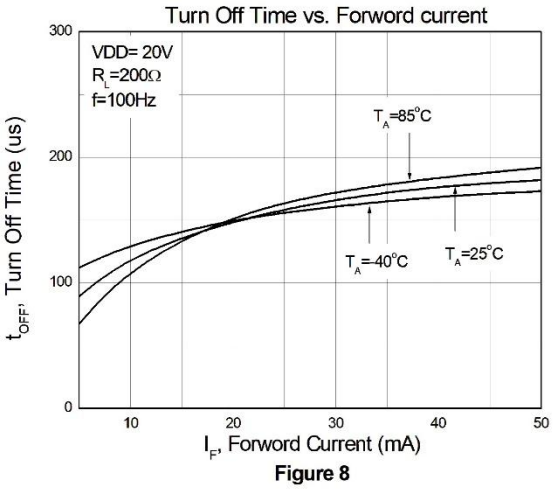


Figure 8

Test Circuit

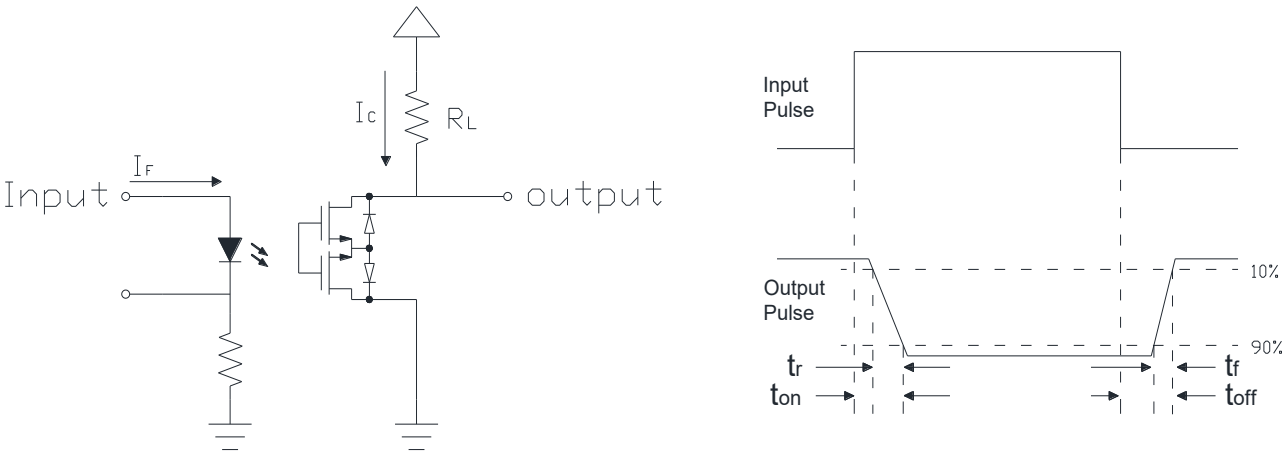
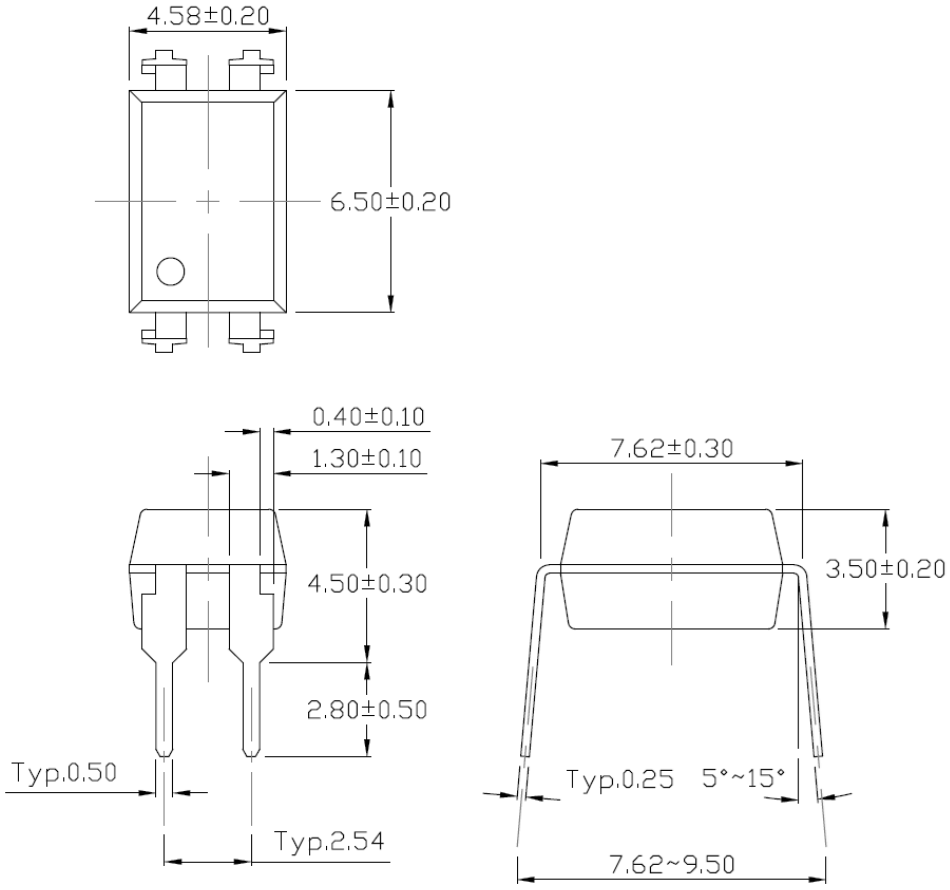
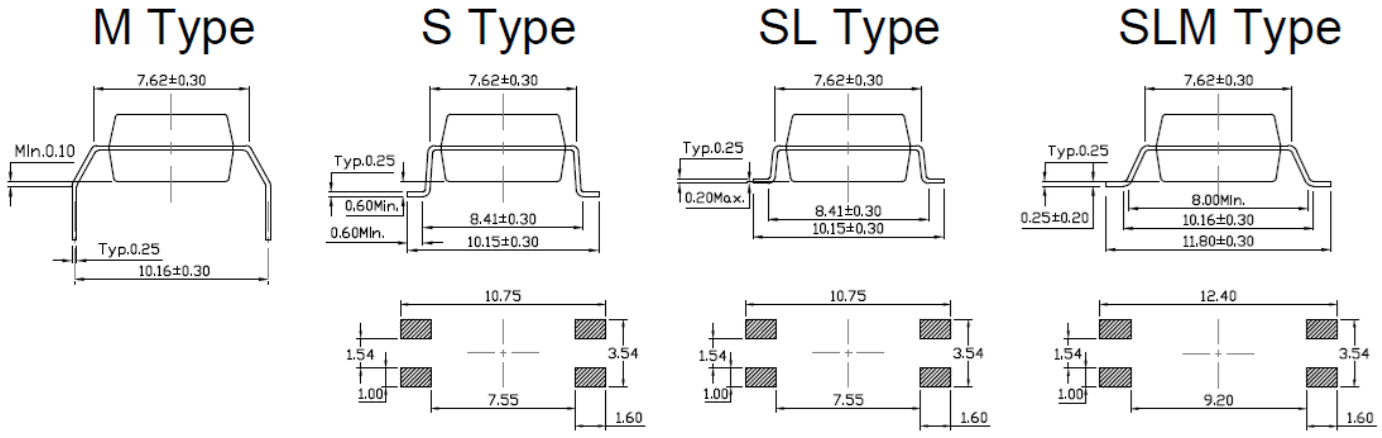


Figure 9: Switching Time Test Circuits

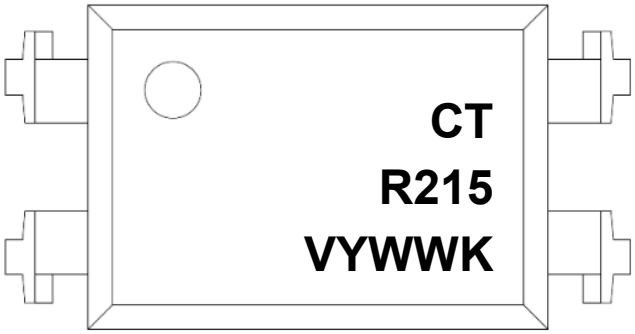
Package Dimension *Dimensions in mm unless otherwise stated*



Forming Option *Dimensions in mm unless otherwise stated*



Marking Information



Note:

CT	: Denotes “CT Micro”
R215	: Part Number
V	: VDE Certification Mark Option
Y	: Fiscal Year
WW	: Work Week
K	: Manufacturing Code

Ordering Information

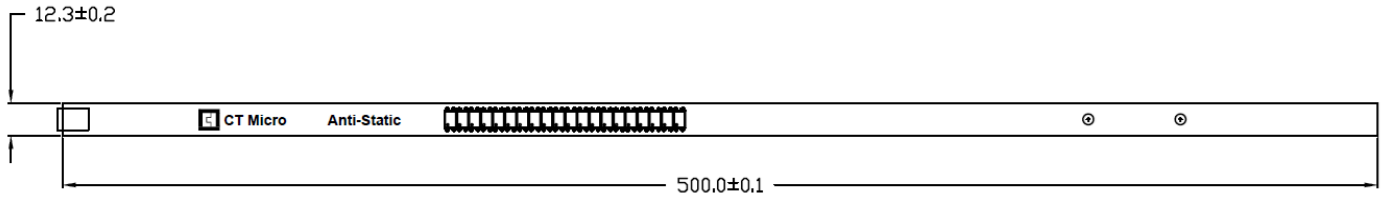
CTR215(V)(Y)(Z)-4L

CT	= Denotes “CT Micro”
R215	= Part Number
V	= VDE Safety Mark Option (Blank or V)
Y	= Lead Form Option (Blank, S, SL, M or SLM)
Z	= Tape and Reel Option (Blank, T1 or T2)

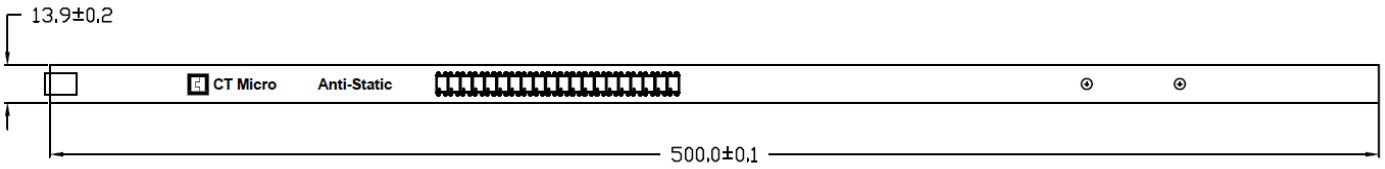
Option	***Description***	***Quantity***
None	Standard 4 Pin DIP	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T1)	Surface Mount (Low Profile)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

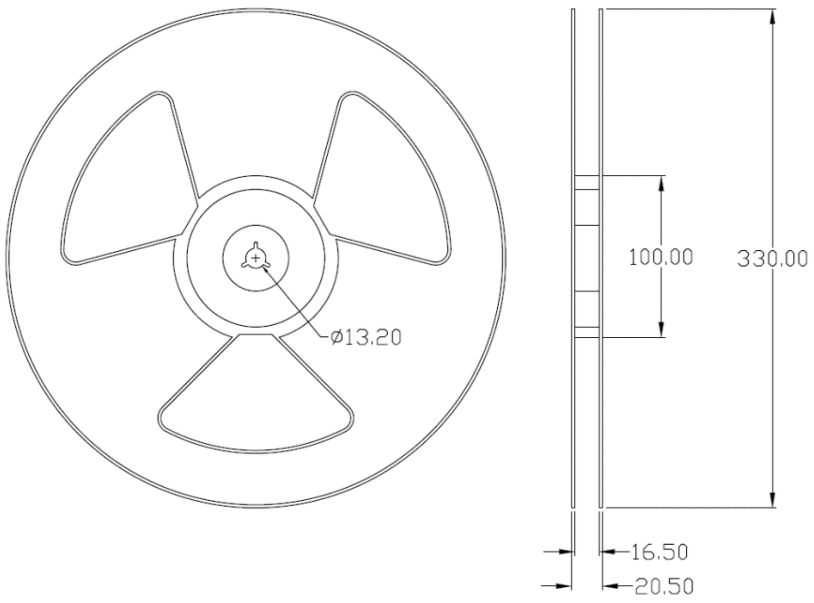
Tube Option Standard DIP



Tube Option M Type

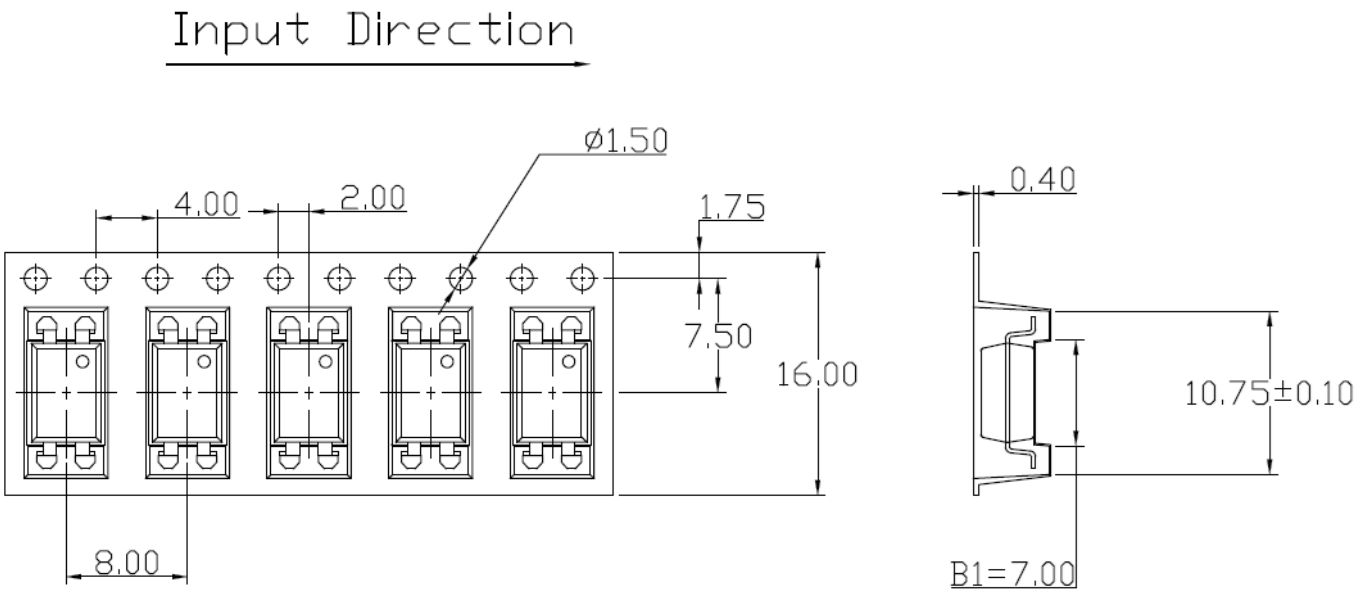


Reel Dimension *Dimensions in mm unless otherwise stated*

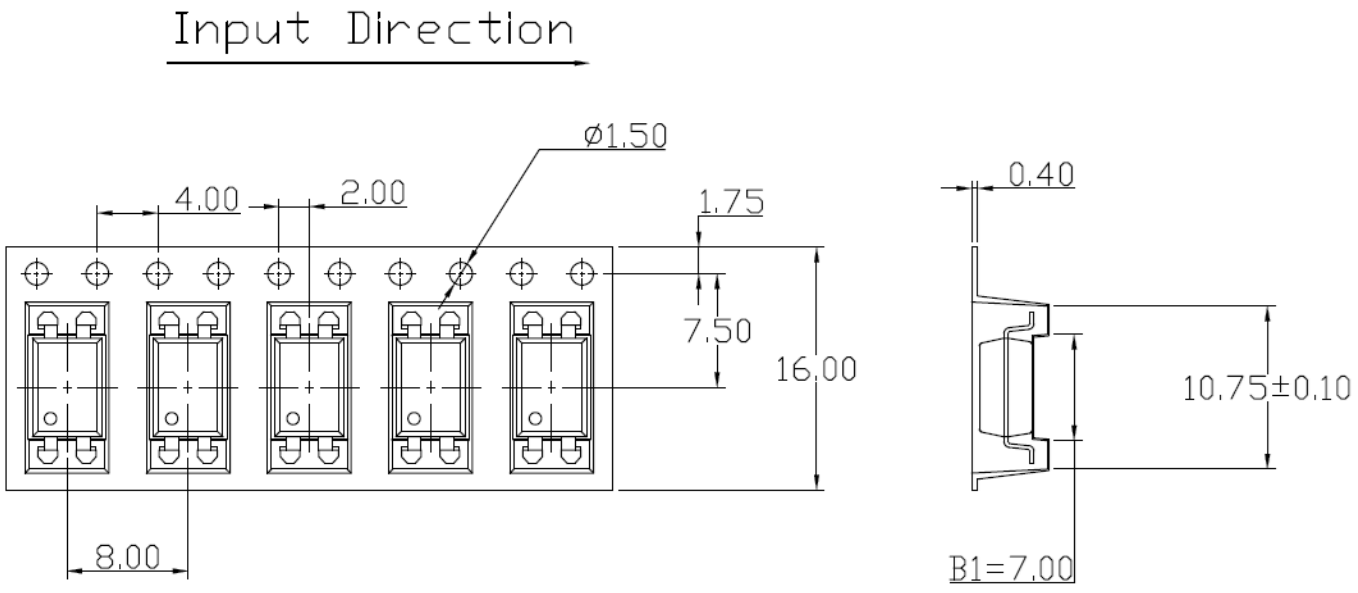


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

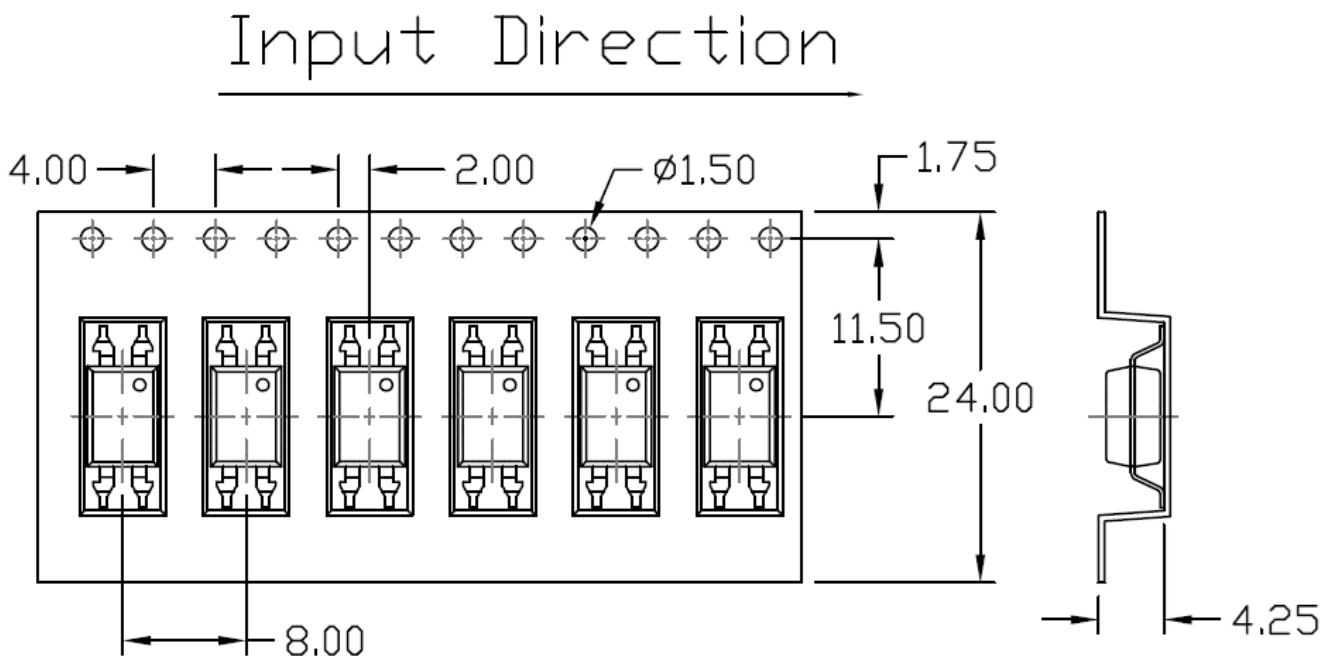
Option S(T1) & SL(T1)



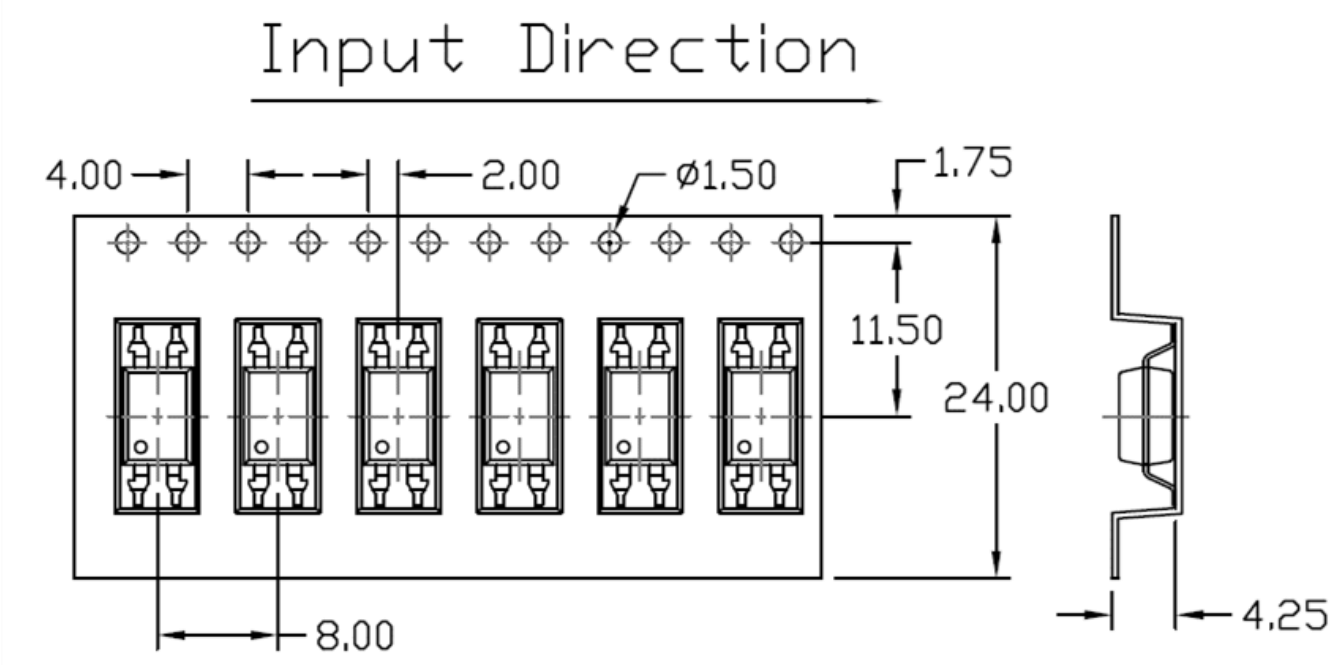
Option S(T2) & SL(T2)



Option SLM(T1)



Option SLM(T2)

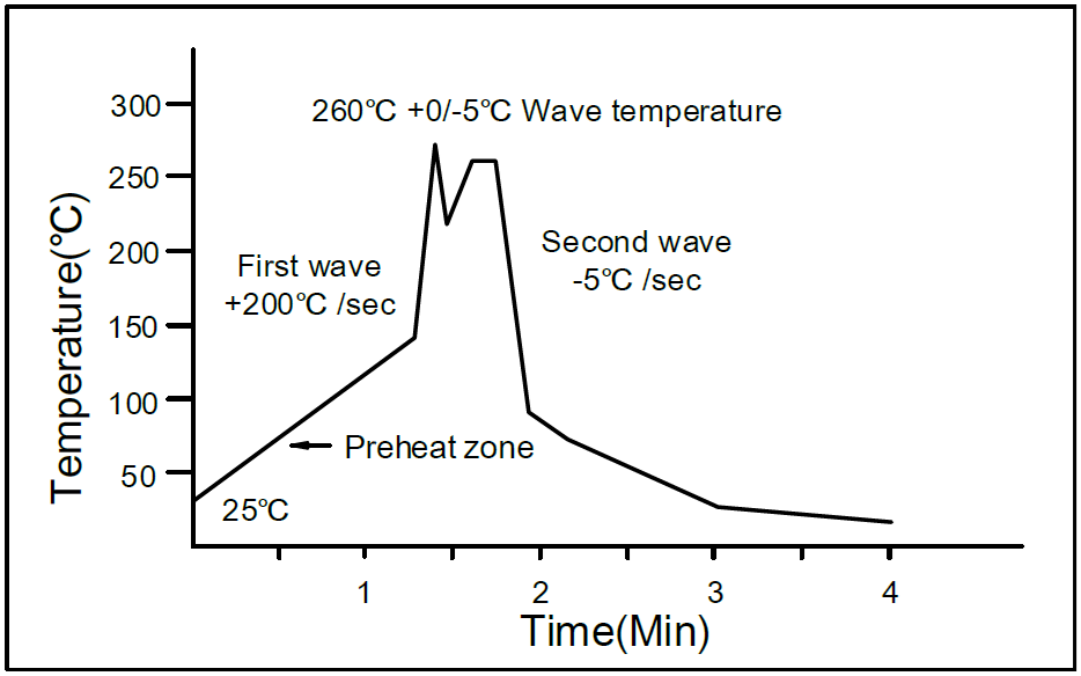


Solderability Specification (follow the JEDEC standard JESD22-B102)

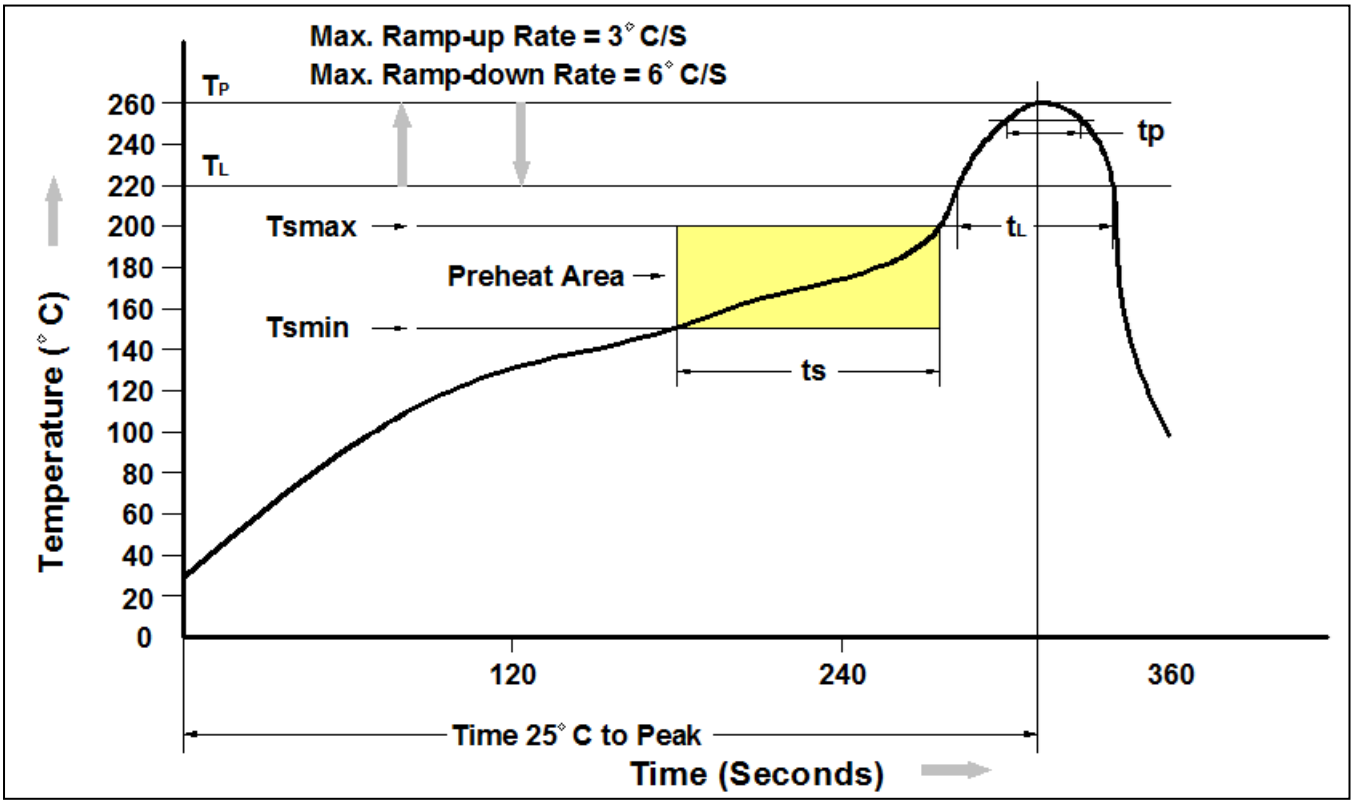
Reflow Soldering: Immersed surface, other than the end of pin as cut-surface, must be covered by solder.
Solder-Bath: More than 95% of the electrode must be covered with solder.

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.



Reflow Profile



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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