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CTR258-6L

5-Pin PhotoMOS Relays

Features

- High isolation 5000 VRMS
- OFF-state output terminal voltage: 1500 V
- Operating temperature range - 40 °C to 85 °C
- Creepage distance ≥ 7mm
- Distance through insulation > 0.4mm
- RoHS and REACH Compliance
- Halogen Free compliance
- MSL class 1
- Regulatory Approvals
  - UL - UL1577 (Pending approve)
  - VDE - EN60747-5-5(Pending approve)
  - CQC – GB4943.1, GB8898(Pending approve)
  - IEC62368 (Pending approve)

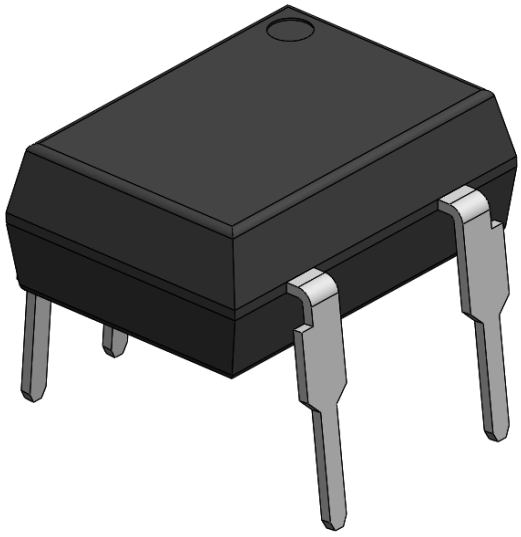
Description

The CTR258-6L (1-form A) consists of two MOSFET and one photovoltaic chip optically coupled to an Infrared-emitting diode in package.

Applications

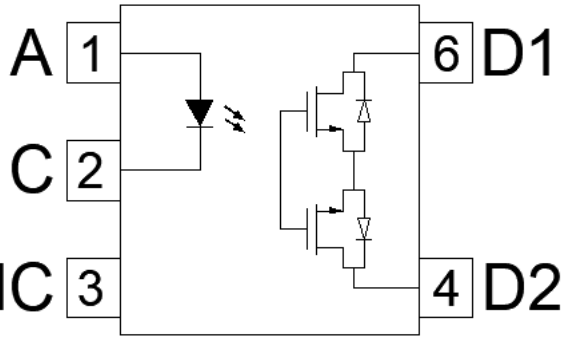
- Battery Management System (BMS)
- Security Systems
- Smart Meters
- Mechanical relay replacements
- General telecom switching
- Industrial controls
- Automatic measurement equipment

Package Outline



Note: Different bending options available. See package dimension.

Schematic



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	5000	Vrms	AC, 60S
T_{OPR}	Operating temperature	-40 ~+85	℃	
T_{STG}	Storage temperature	-40 ~+100	℃	
T_{SOL}	Soldering temperature	260	℃	1
Emitter				
I_F	LED forward current	50	mA	
I_{FP}	LED forward current (pulsed) (≤1μs P.W,300pps)	100	mA	
V_R	LED reverse voltage	6	V	
P_{in}	Power dissipation	90	mW	
T_j	Junction Temperature	115	℃	
Detector				
V_{OFF}	OFF-state output terminal Voltage	1500	V	
I_{ON}	ON-state Current	20	mA	
P_o	Output Power dissipation	240	mW	
T_j	Junction Temperature	125	℃	

Notes

1. For reflow profile 10 second peak.

Recommended Operating Conditions

Symbol	Parameters	Min	Typ	Max	Units
V_{DD}	Supply Voltage	-	-	1500	V
I_{FT}	Trigger LED Current	5	-	15	mA
T_{OPR}	Operating temperature	-40	-	85	℃

Electrical Characteristics *Typical values are measured at $T_A = 25^0C$*

Emitter Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
V_F	Forward voltage	I_F = 10mA	-	1.4	1.7	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*
I_{OFF}	OFF-state Current	V_{OFF} =1500V	-	-	10	μA	
C_{OFF}	Output Capacitance	V_O= 0V, f=1 MHz	-	30	-	pF	

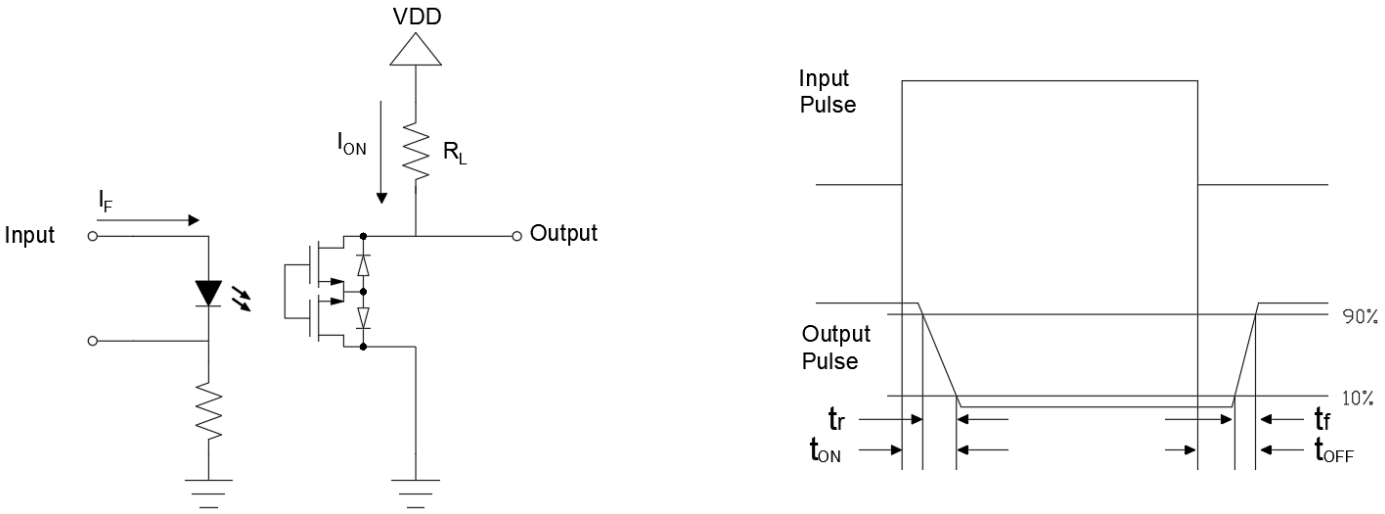
Transfer Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
I_{FT}	Trigger LED Current	I_{ON} =Max	-	-	3	mA	
R_{ON}	ON-state resistance	I_{ON} =Max, I_F =5 mA , t < 1s	-	300	500	Ω	

Switching Characteristics

Symbol	*Parameters*		*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
Ton	Turn-on Time	CTR258-6L	See Fig. 7, I_{ON}=Max, I_F=5mA f=100Hz, Duty=50%	-	0.2	1	ms	
Toff	Turn-off Time	CTR258-6L		-	0.2	1	ms	

Test Circuit



Switching Time Test Circuits

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

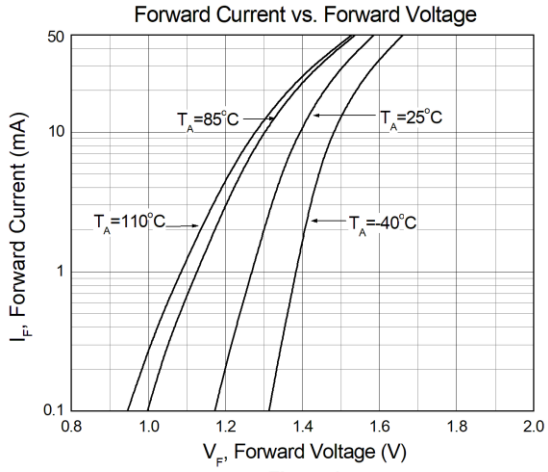


Figure 1

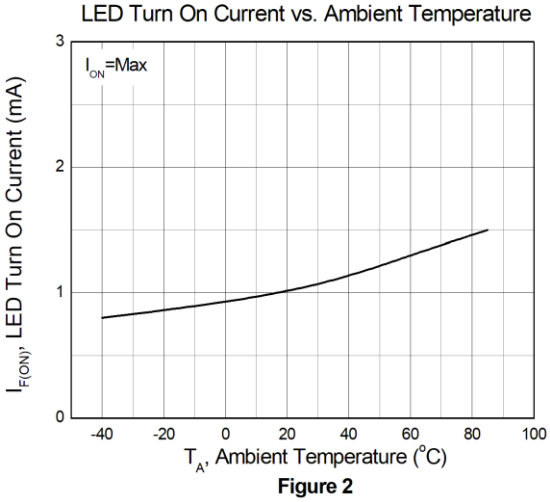


Figure 2

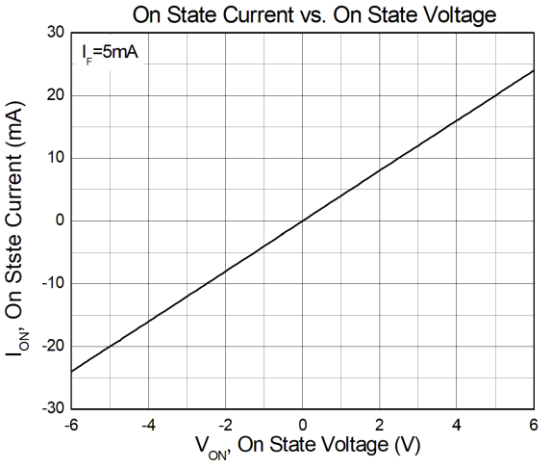


Figure 3

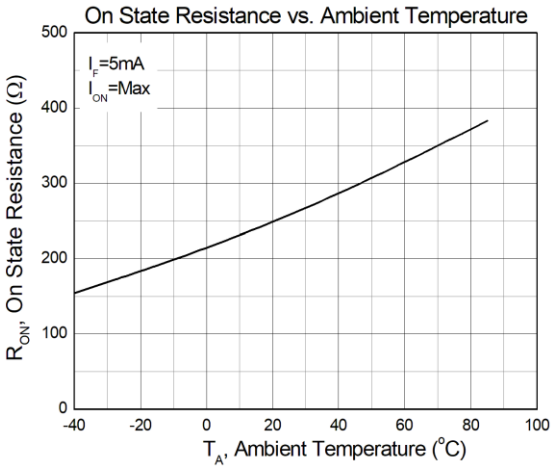


Figure 4

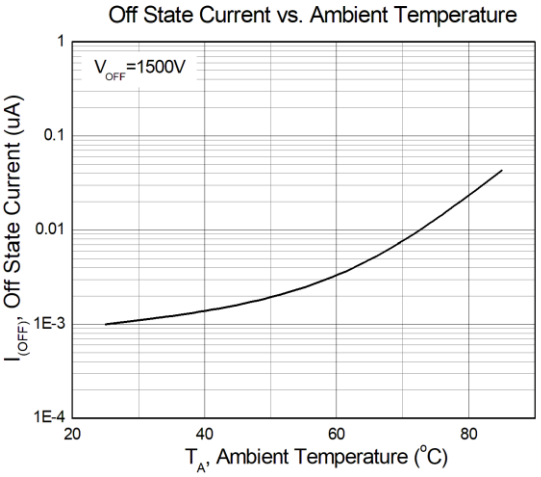


Figure 5

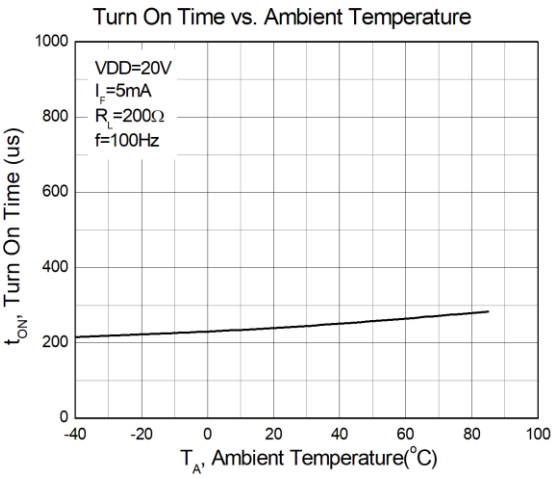


Figure 6

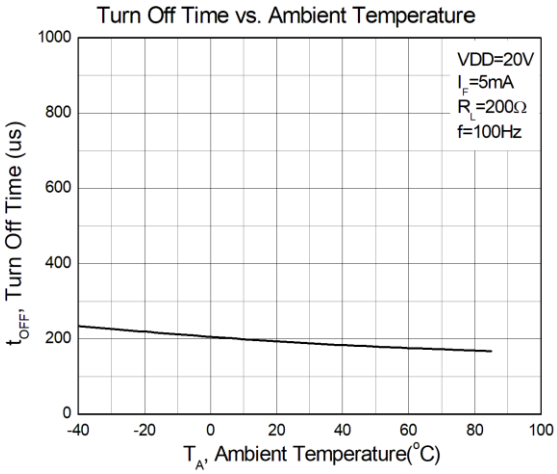


Figure 7

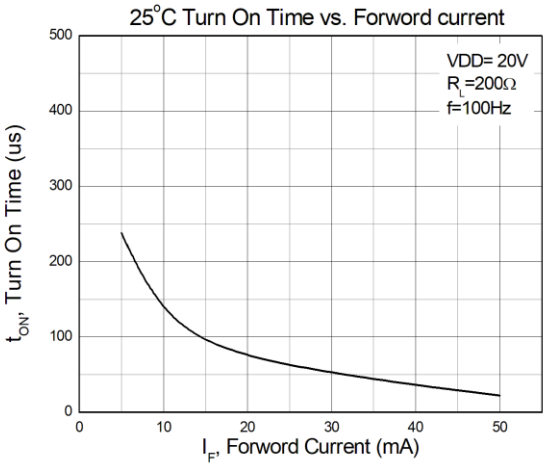


Figure 8

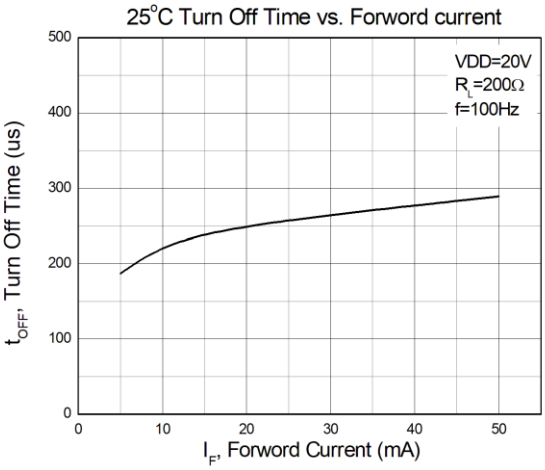
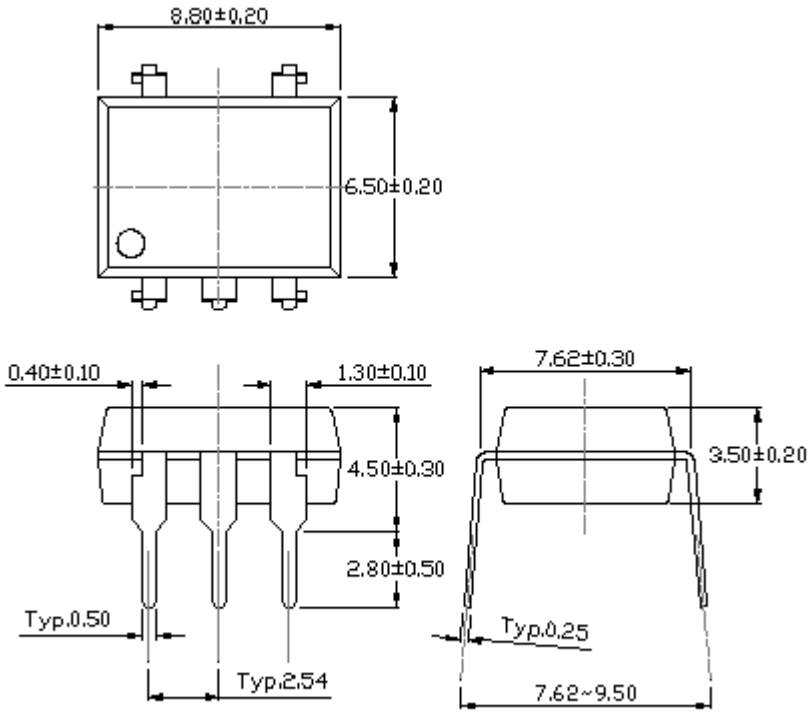


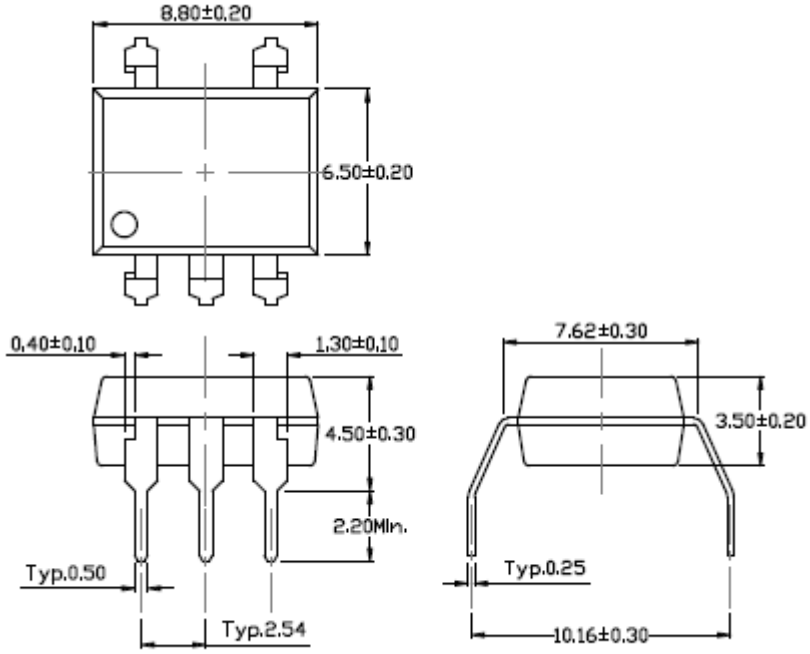
Figure 9

Package Dimension *Dimensions in mm unless otherwise stated*

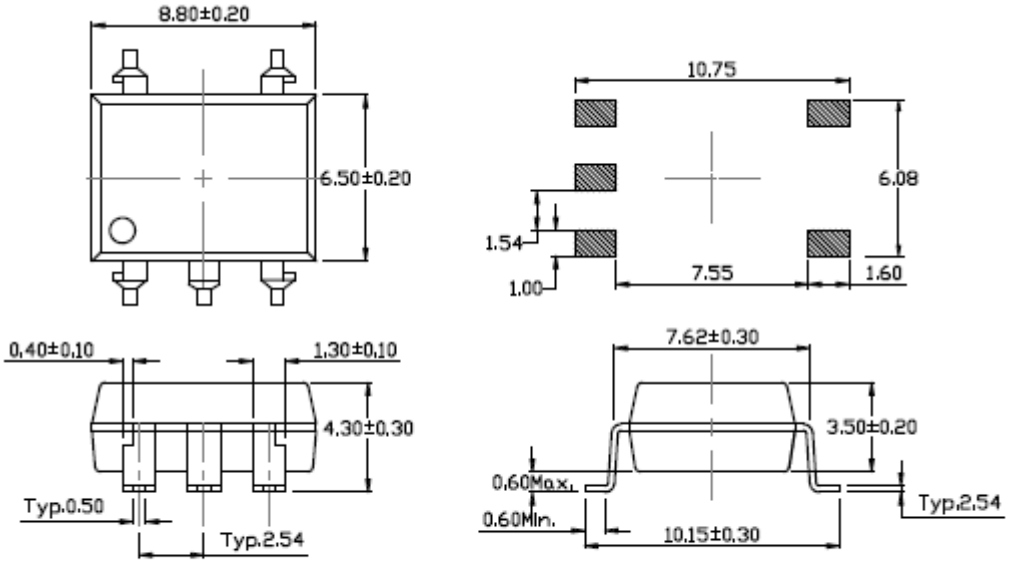
Standard DIP – Through Hole



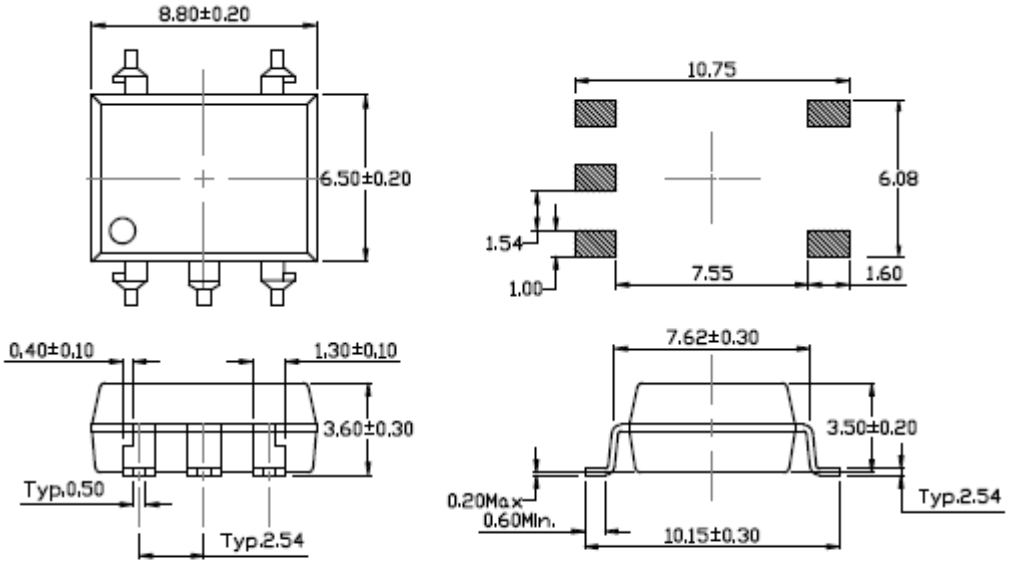
Gullwing (400mil) Lead Forming – Through Hole (M Type)



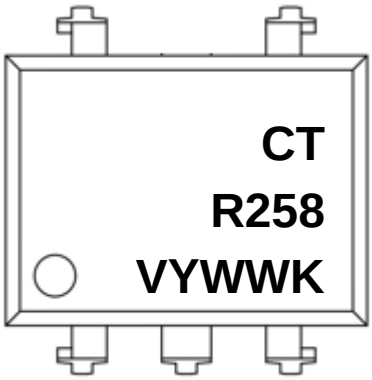
Surface Mount Lead Forming (S Type)



Surface Mount (Low Profile) Lead Forming (SL Type)



Marking Information



CT : Denotes “CT Micro”
R258 : 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

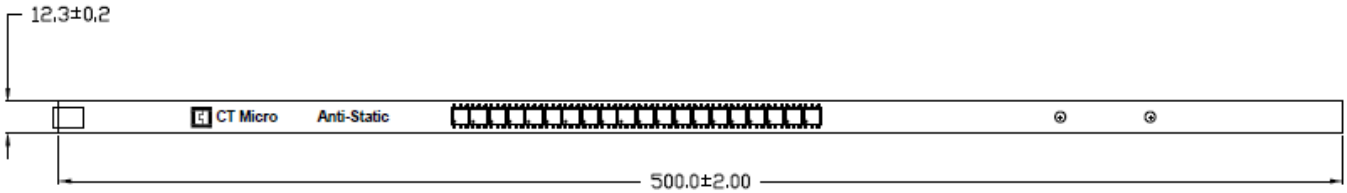
CTR258(V)(Y)(Z)-6L

CT = Denotes “CT Micro”
R258 = Part Number
V = VDE Safety Mark Option (Blank or V)
Y = Lead Form Option (Blank, S, SL, M)
Z = Tape and Reel Option (Blank, T1 or T2)
6L = Package

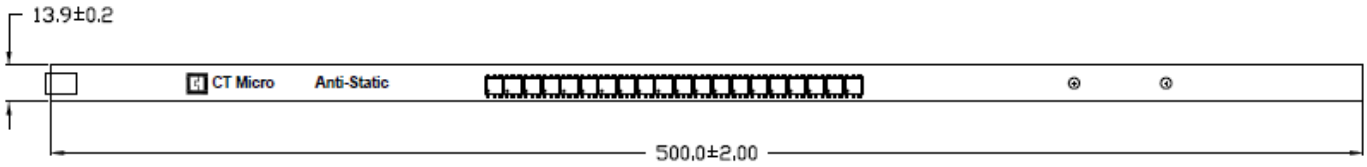
Option	***Description***	***Quantity***
None	Standard 8 Pin Dip	50 Units/Tube
M	Gullwing (400mil) Lead Forming	50 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) 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

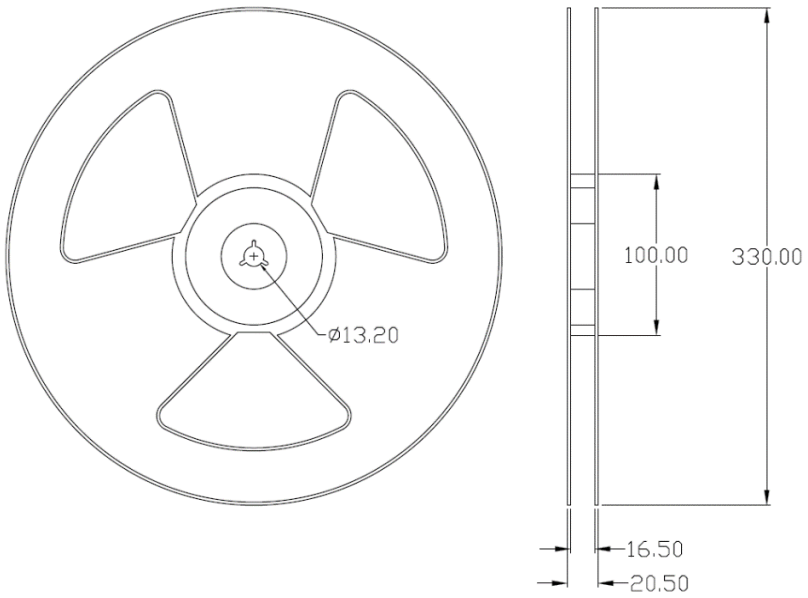


Tube Option M Type



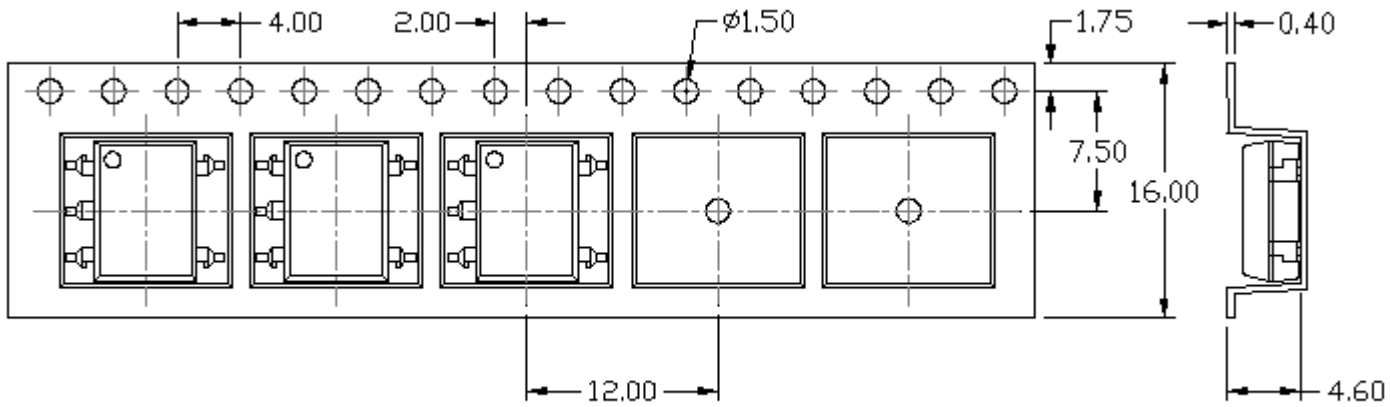
Reel Dimension *All dimensions are in mm, unless otherwise stated*

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

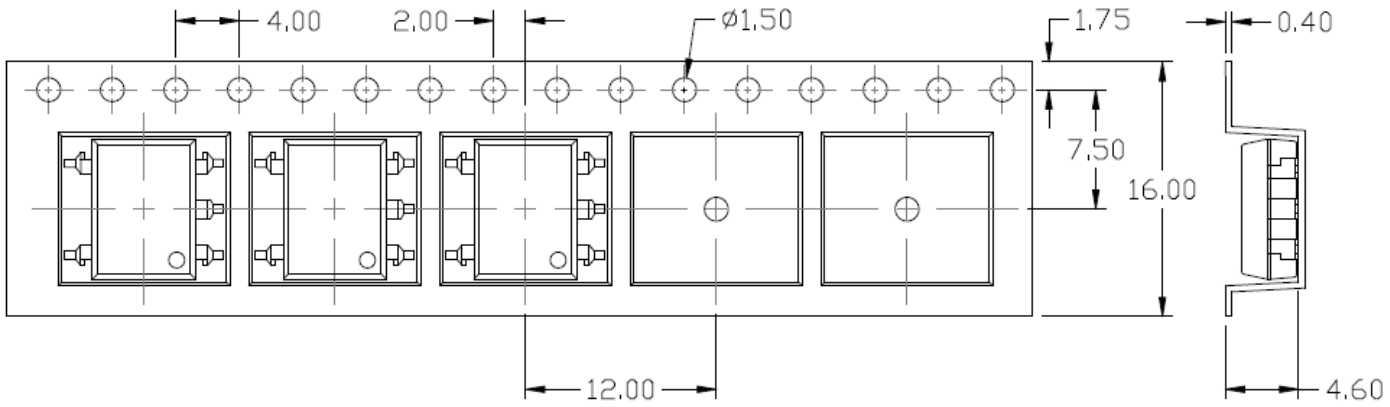


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option S (T1) & SL (T1)



Option S (T2) & SL (T2)

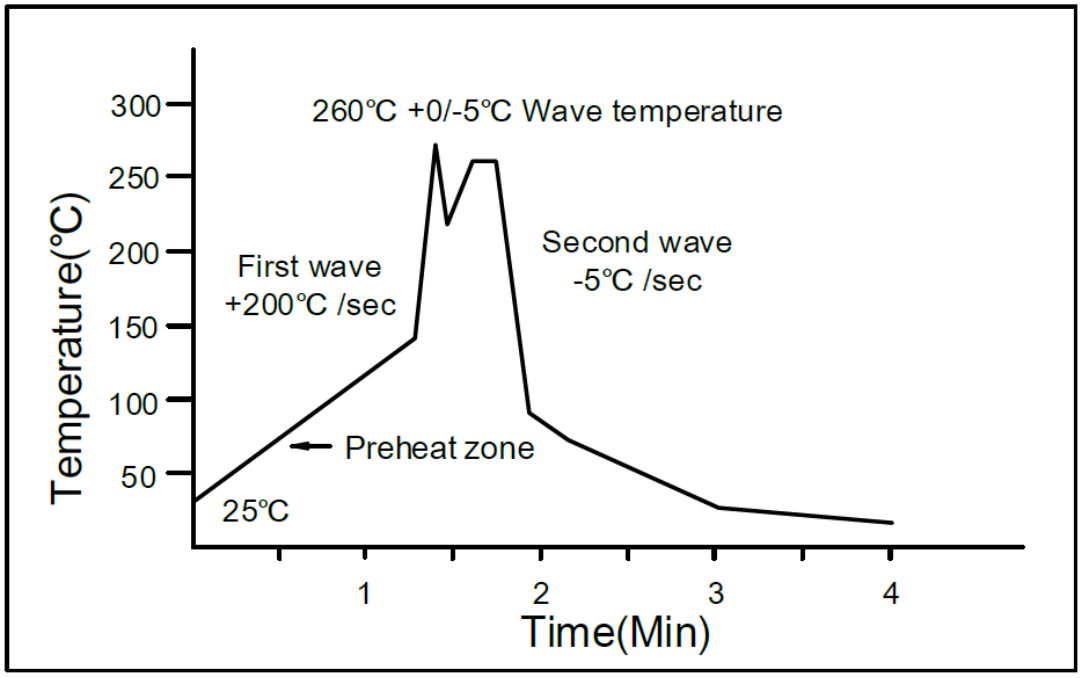


Solderability spec (follow the JEDEC standard JESD22-B102)

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)

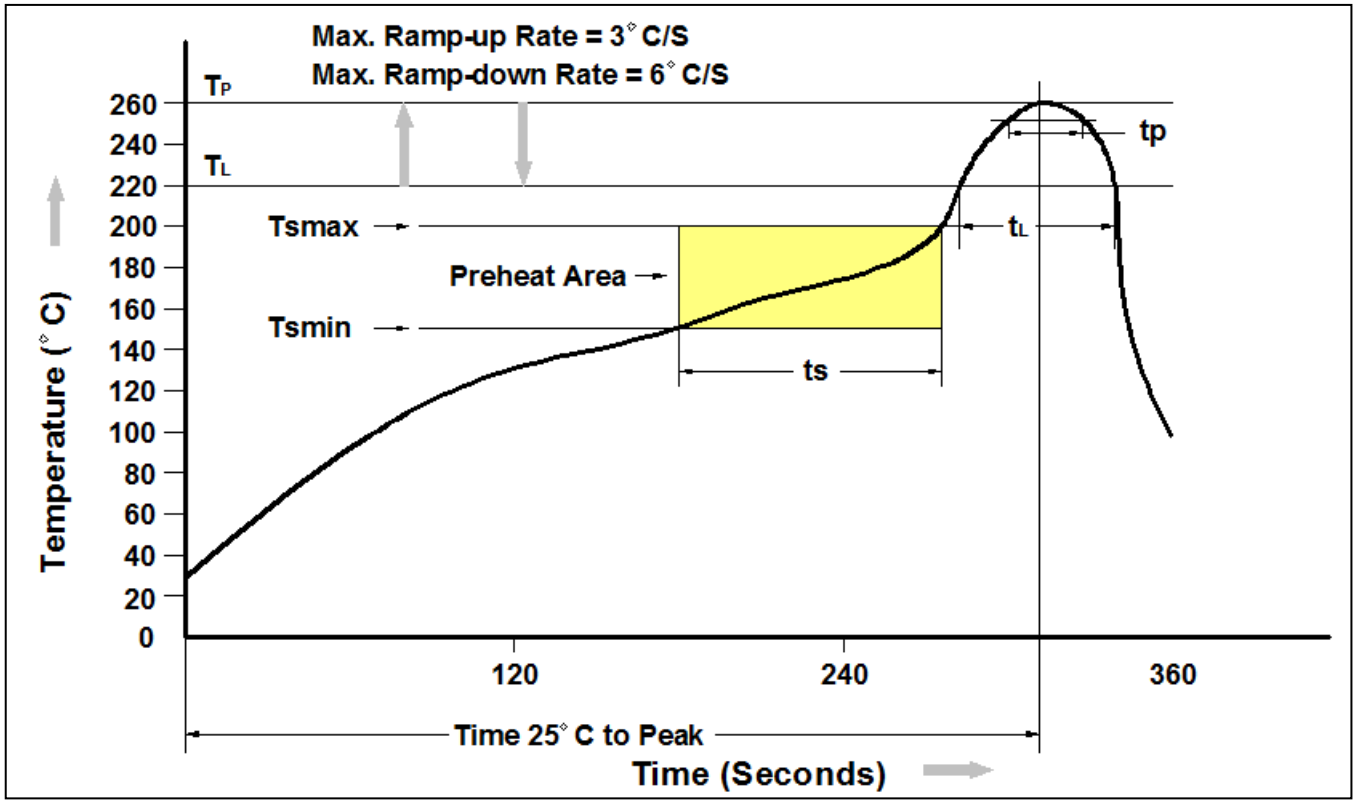
One time soldering is recommended within the condition of temperature.
Temperature: 260+0/-5˚C.
Time: 10 sec.
Preheat temperature: 25 to 140˚C.
Preheat time: 30 to 80 sec.



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.*