CTR214

400V PhotoMOS Relays

Features

- High isolation
  - MFP : 3750V
  - 4/6/8 PIN : 5000V
- OFF-state output terminal voltage: 400 V (min)
- Operating temperature range - 40 °C to 100 °C
- Creepage distance
  - MFP ≥ 5mm
  - 4/6/8 PIN ≥ 7.4mm
- Distance through insulation > 0.4mm
- RoHS compliance
- REACH compliance
- Halogen free
- Regulatory Approvals
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

Description

The CTR214 consists of two MOSFET and one photovoltaic chip optically coupled to a gallium arsenide Infrared-emitting diode in different package and lead forming options.

Applications

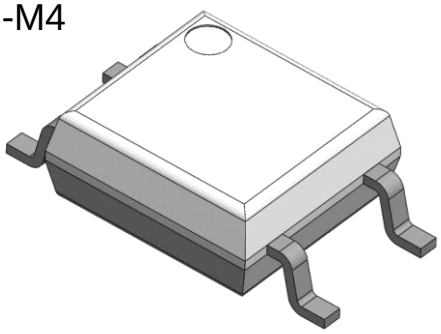
- Battery Management System (BMS)
- Security Systems
- Smart Meters
- Mechanical relay replacements
- General telecom switching
- Industrial controls
- Automatic measurement equipment

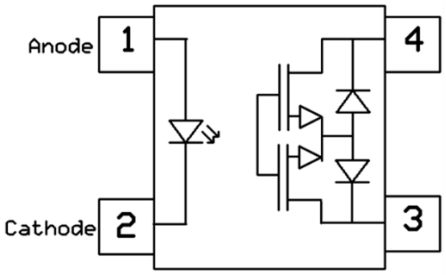
Package Type Naming Code

- MFP : CTR214-M4
- 4PIN : CTR214-4L
- 6PIN : CTR214-6L
- 8PIN : CTR214-8L

Package Type

-M4





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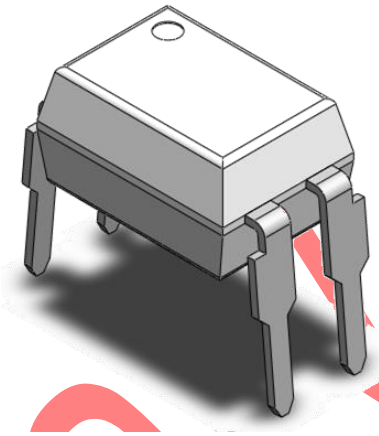

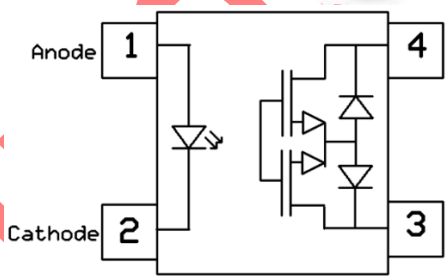

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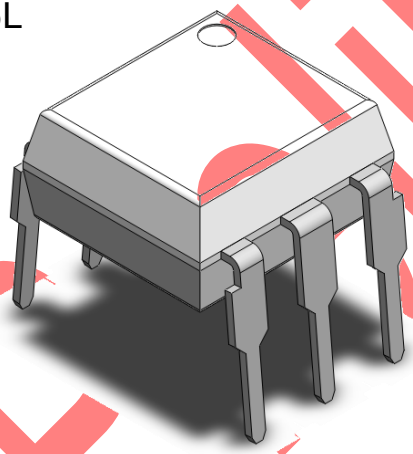
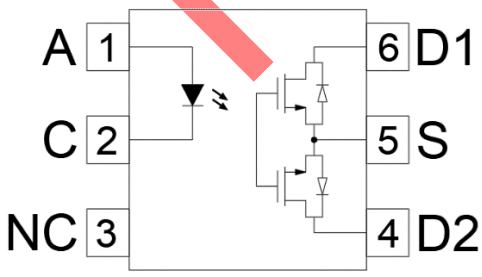
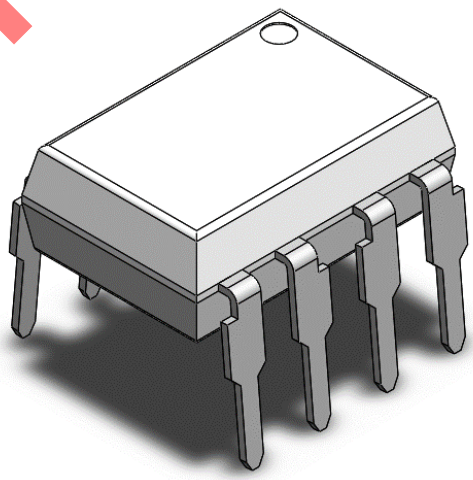
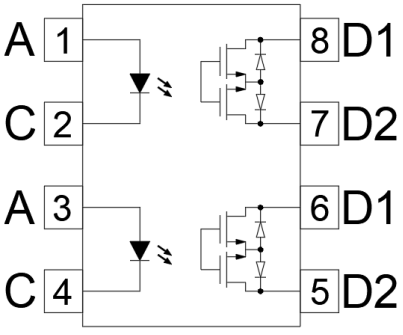




-8L





Note: Different bending options available. See package dimension.

Absolute Maximum Rating at 25ºC

Symbol	Parameters		Ratings	Units	Notes
V_{iso}	Isolation voltage	M4	3750	Vrms	*1*
		4/6/8L	5000	Vrms	*1*
T_{OPR}	Operating temperature		-40 ~+110	ºC	
T_{STG}	Storage temperature		-55 ~+125	ºC	
T_{SOL}	Soldering temperature		260	ºC	
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		5	V	
P_{in}	Power dissipation		32	mW	
T_j	Junction Temperature		115	℃	
Detector					
V_{OFF}	OFF-state output terminal Voltage		400	V	
I_{ON}	ON-state Current	CTR214A	80	mA	*2*
		CTR214B	100	mA	*2*
P_o	Output Power dissipation	CTR214A	320	mW	
		CTR214B	150	mW	
T_j	Junction Temperature		125	℃	

Note:

1: AC , 60s

2: Pule Duty : 20%

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	1.6	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} =400V	-	0.2	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	CTR214A	I_{ON} =80 mA	-	1.5	3	mA	
		CTR214B	I_{ON} =100 mA		3	5		
R_{ON}	ON-state resistance	CTR214A	I_{ON} =80 mA, I_F =5 mA, t < 0.5s	-	33	50	Ω	3
		CTR214B	I_{ON} =100 mA, I_F =5 mA, t < 0.5s	-	10	15	Ω	3

Switching Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
Ton	Turn-on Time	CTR214A	See Fig. 7, R_L=200Ω, V_{DD}=20V, I_F=10mA f=100Hz	-	0.1	1	ms	
		CTR214B			0.1	1		
Toff	Turn-off Time	CTR214A		-	0.3	1	ms	
		CTR214B			0.4	1		

Note:

3. Pulse duty: 20 %

Typical Characteristic Curves

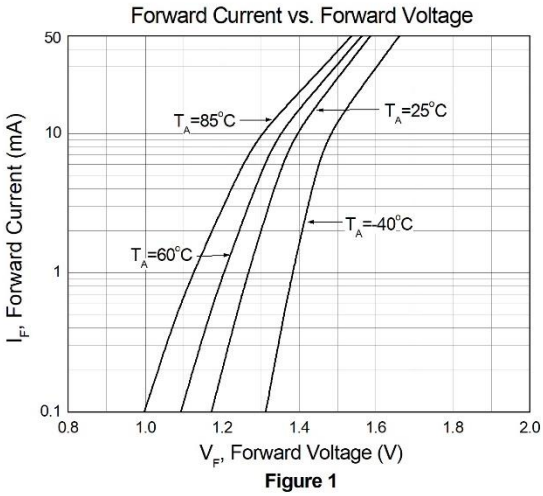


Figure 1

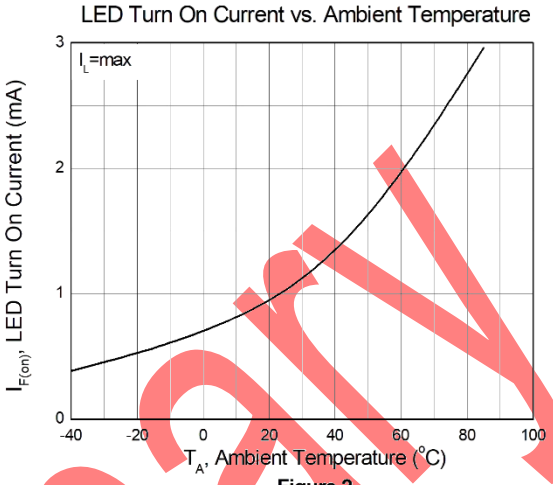


Figure 2

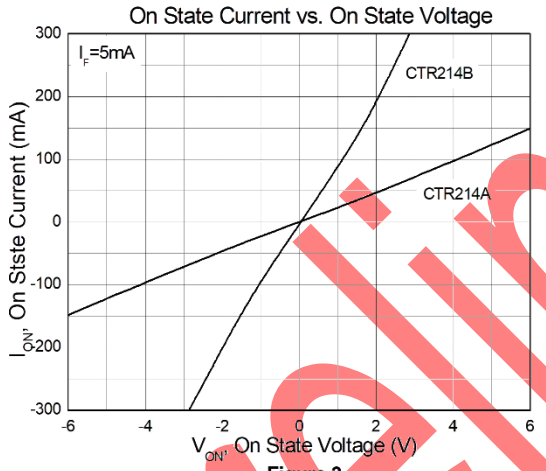


Figure 3

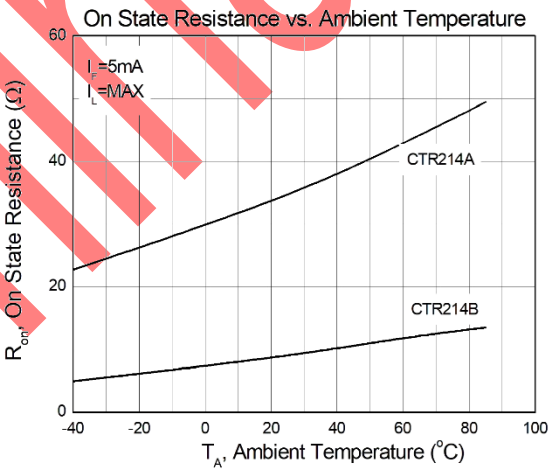


Figure 4

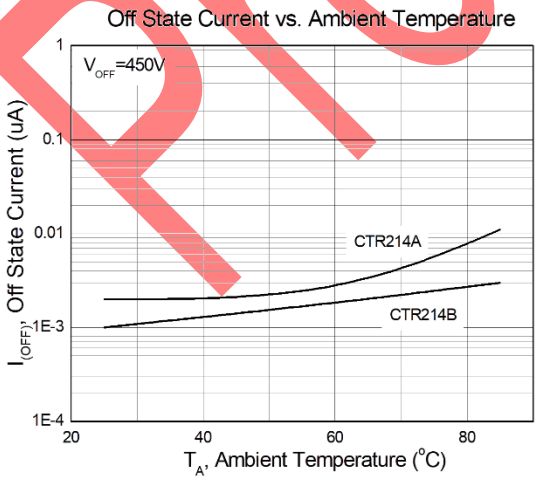
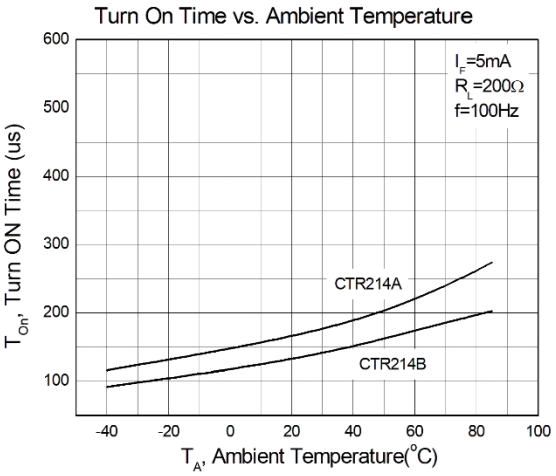


Figure 5



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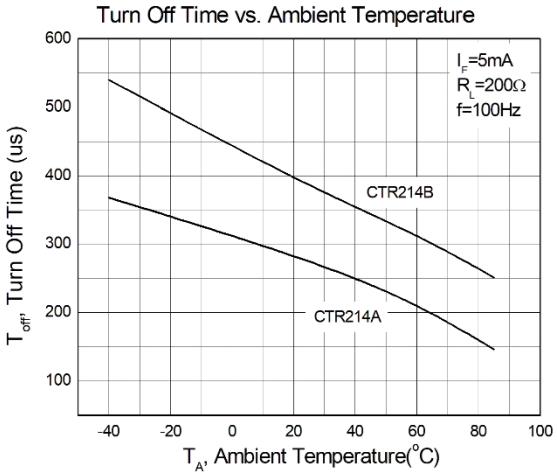


Figure 7

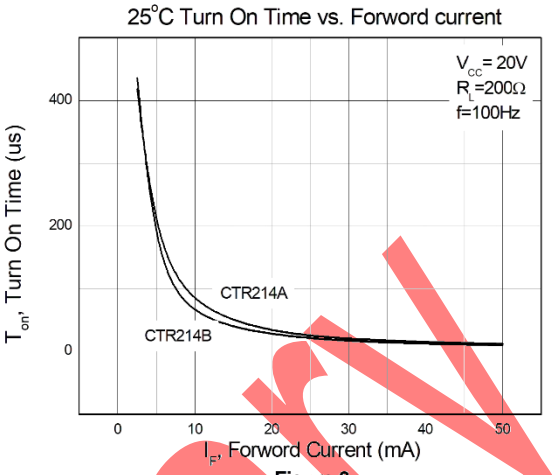


Figure 8

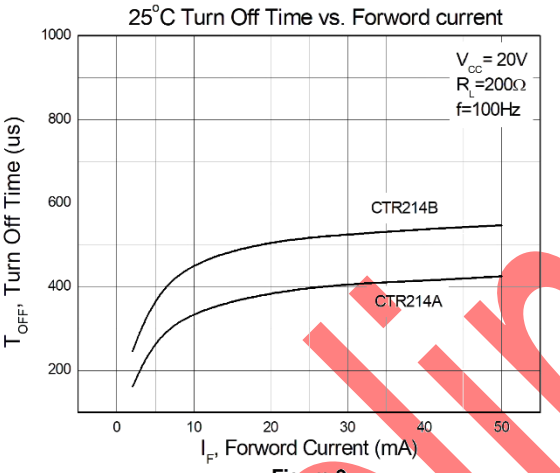


Figure 9

Test Circuit

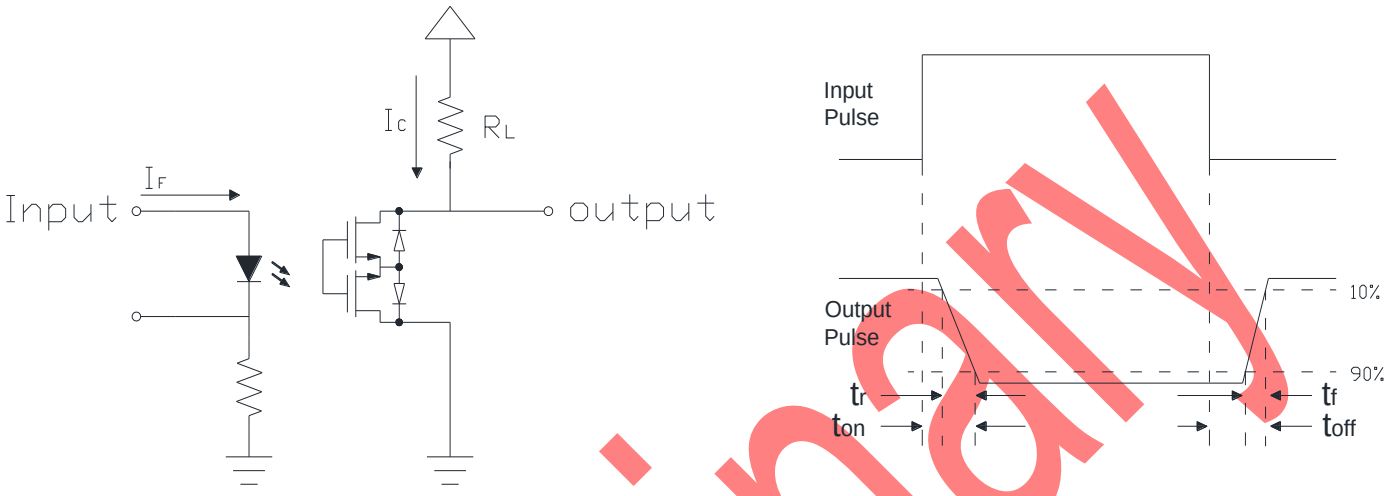
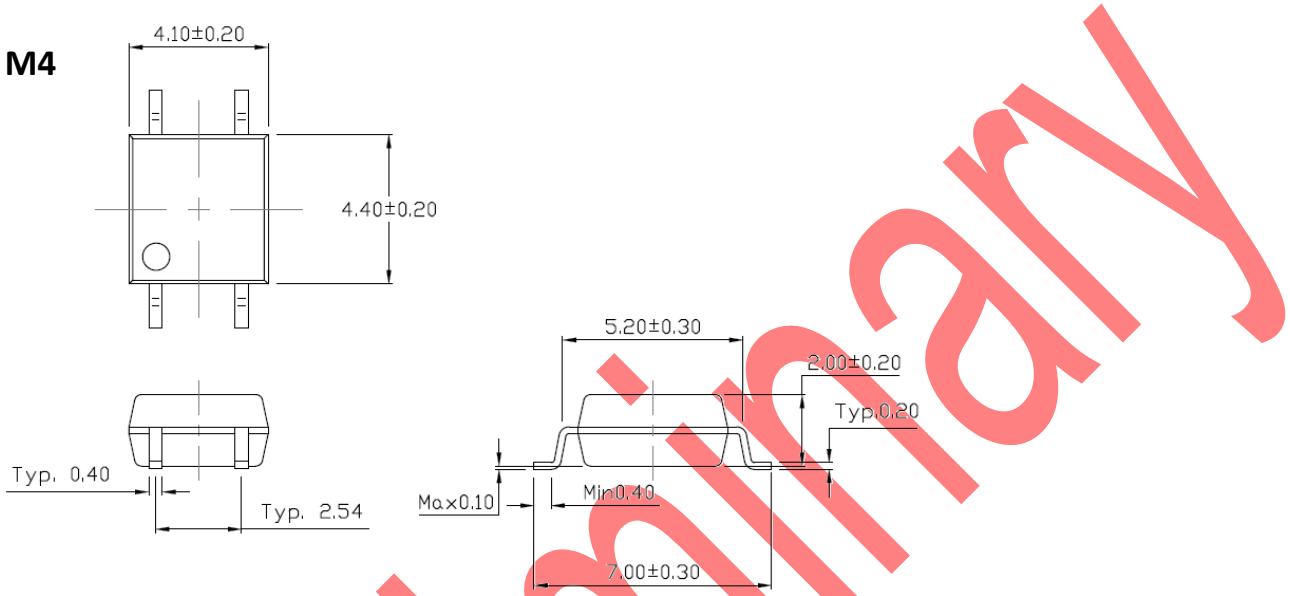


Figure 10: Switching Time Test Circuits

Package Dimension *Dimensions in mm unless otherwise stated*

Standard

M4



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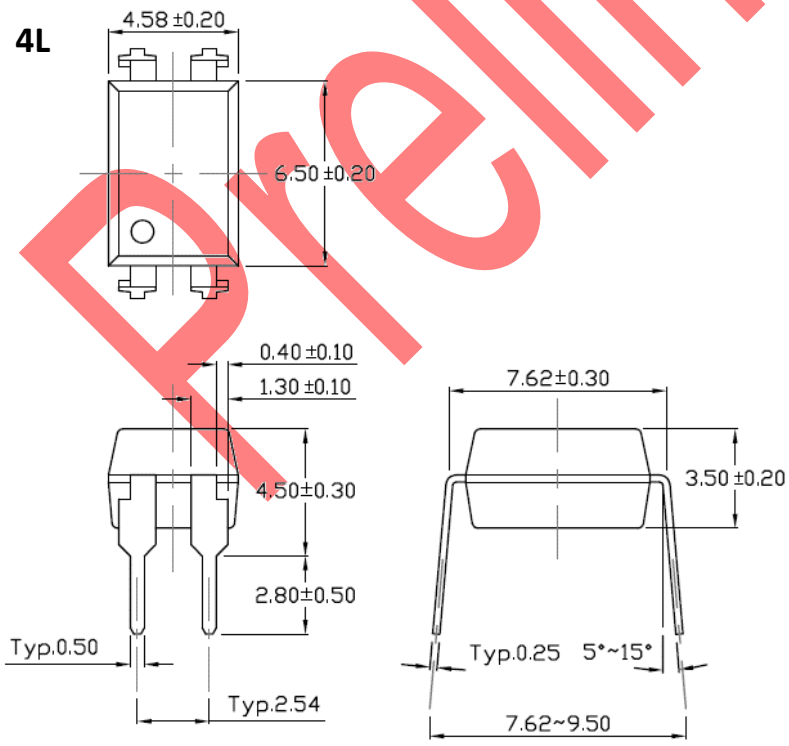

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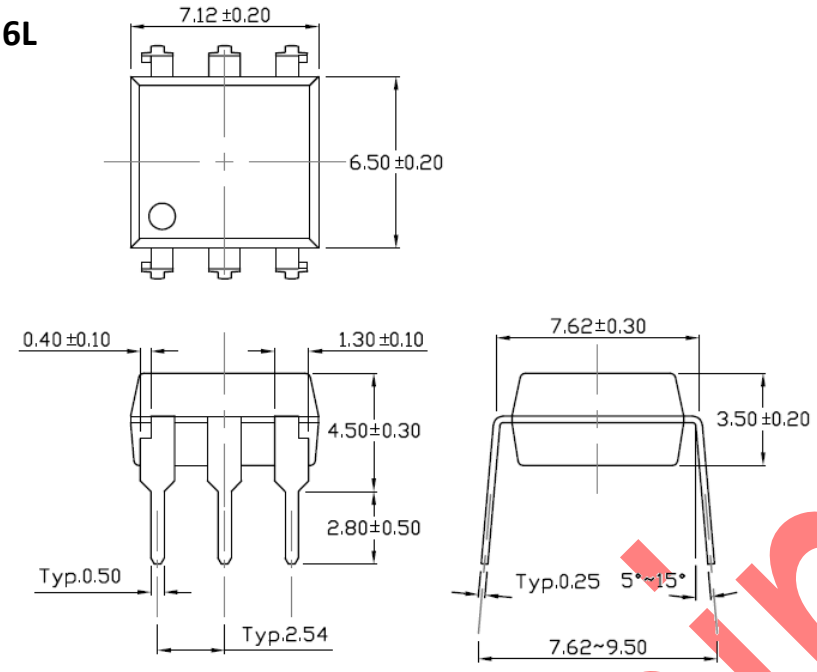

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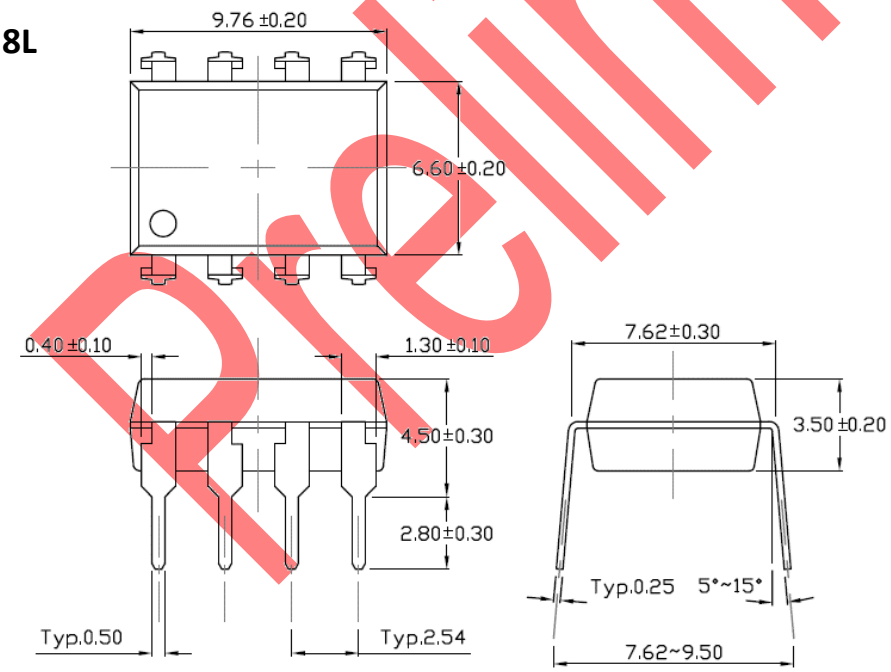

Wide Lead Forming – Through Hole (M Type)

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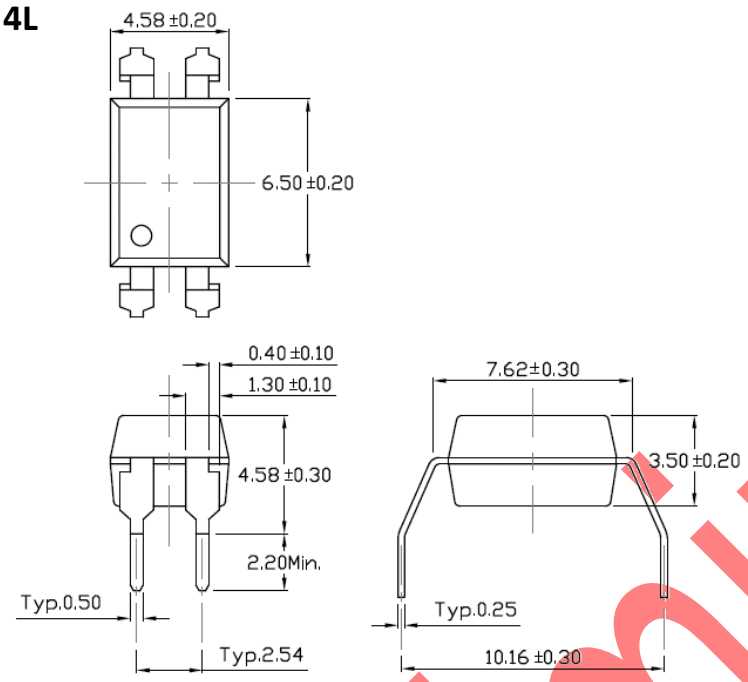

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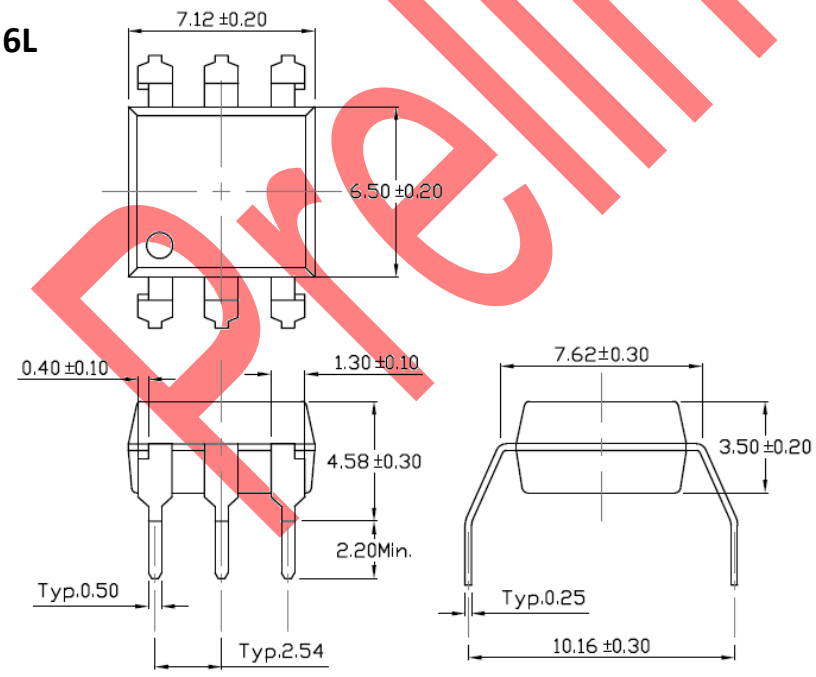

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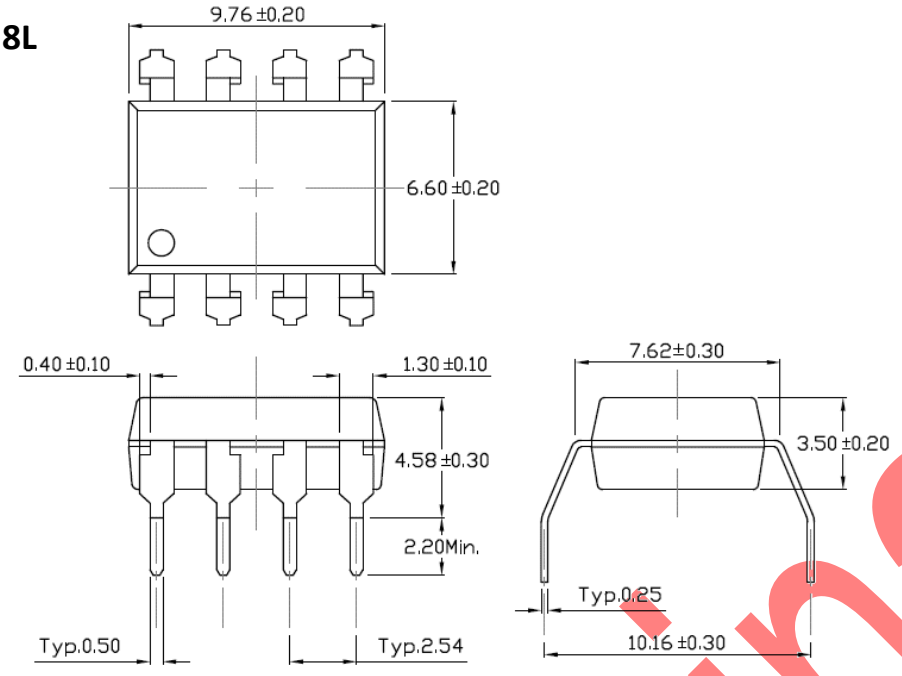
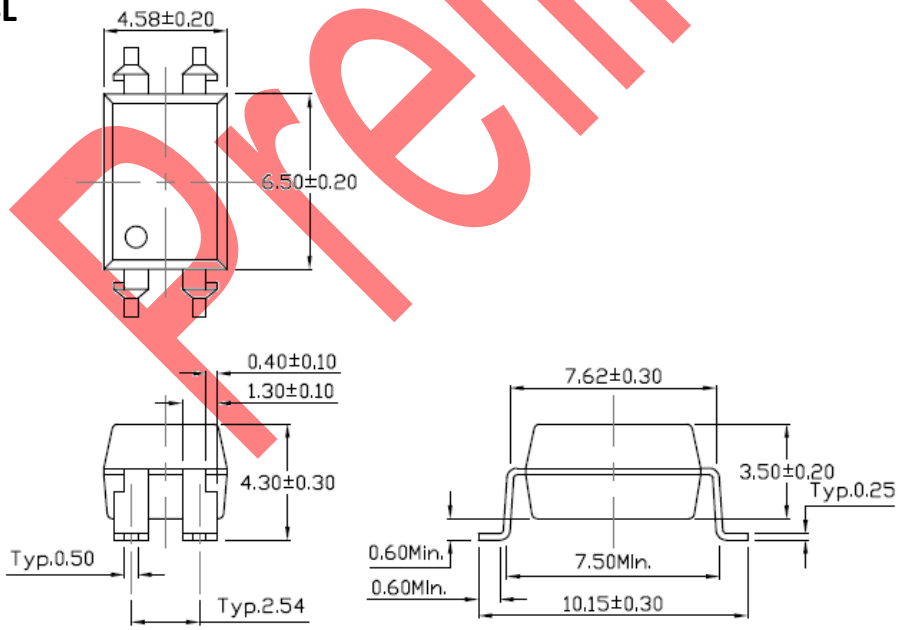


Surface Mount Forming (S Type)

4L



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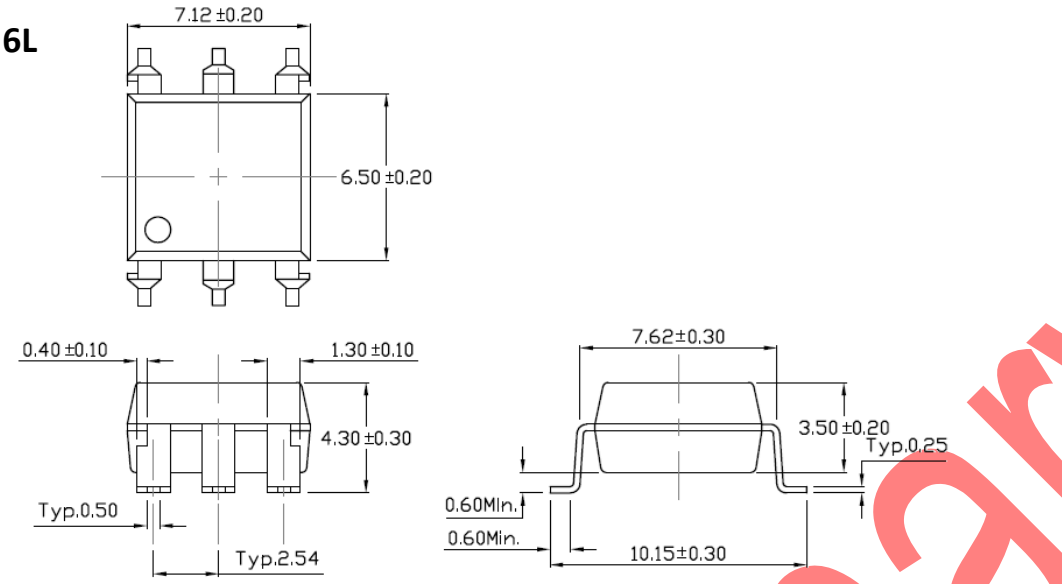

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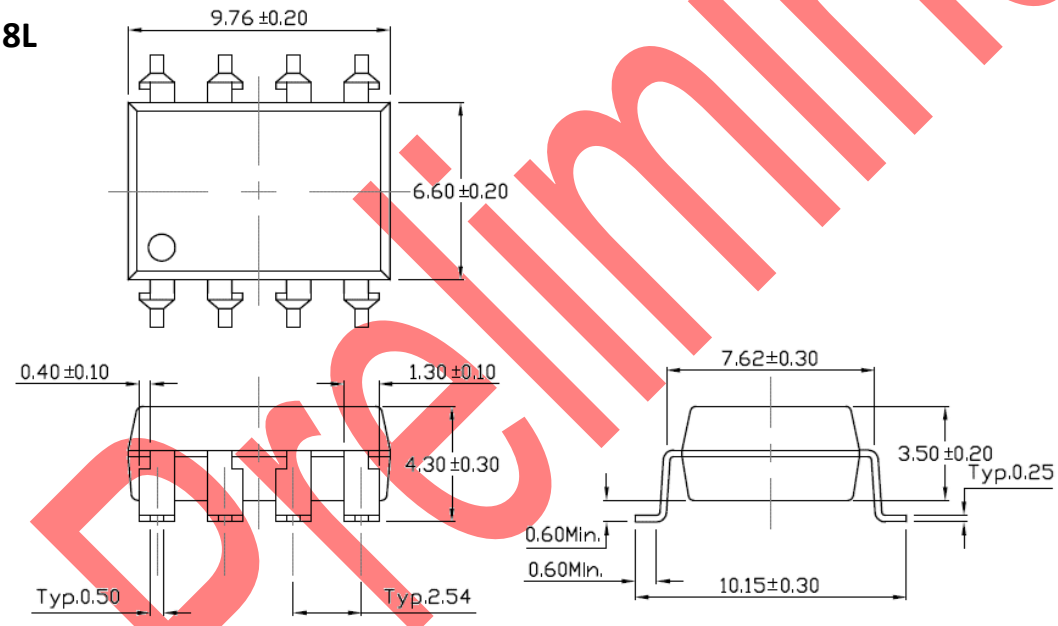

Surface Mount (Low Profile) Lead Forming (SL Type)

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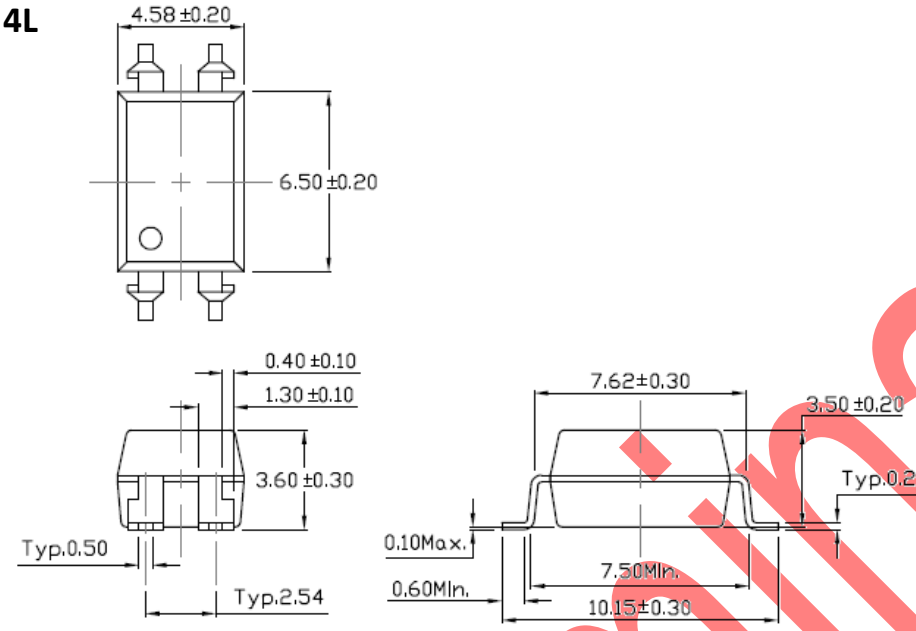

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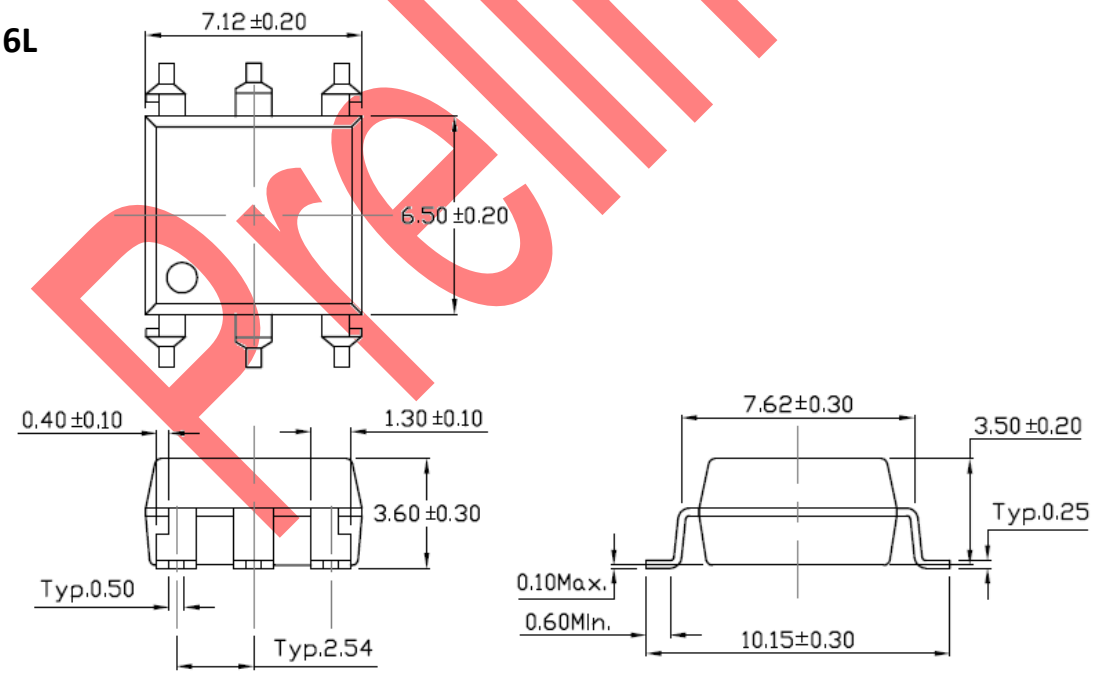

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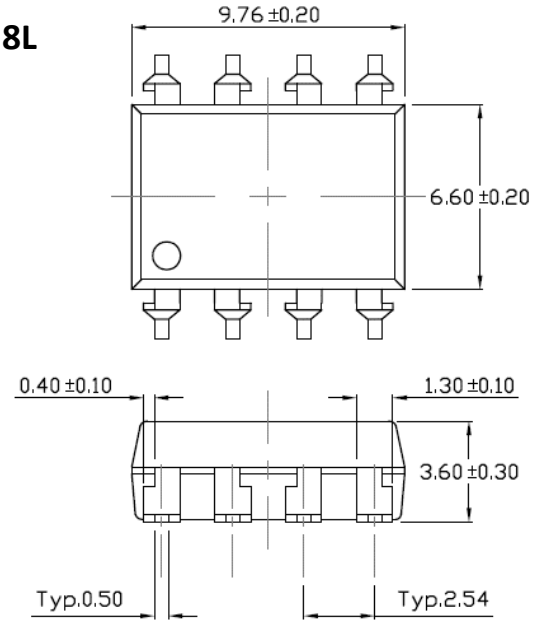
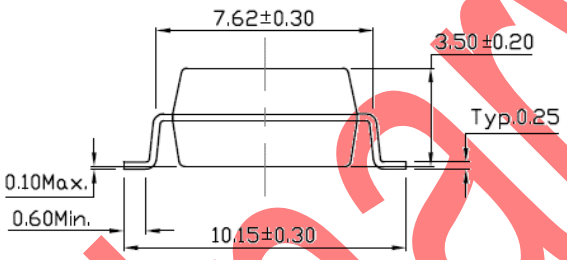
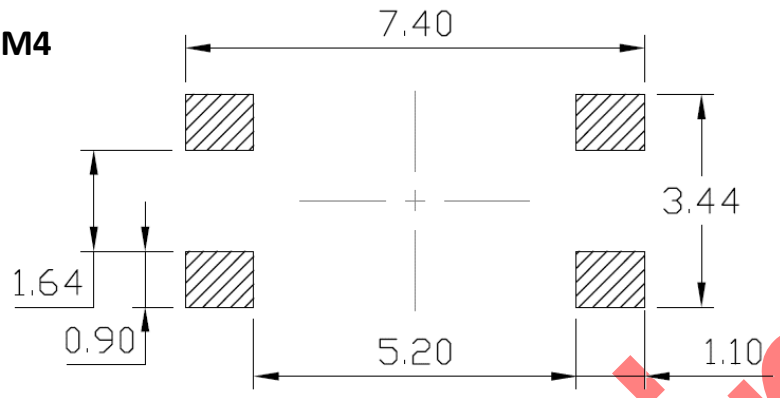




Recommended Solder Mask *Dimensions in mm unless otherwise stated*

Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming

M4



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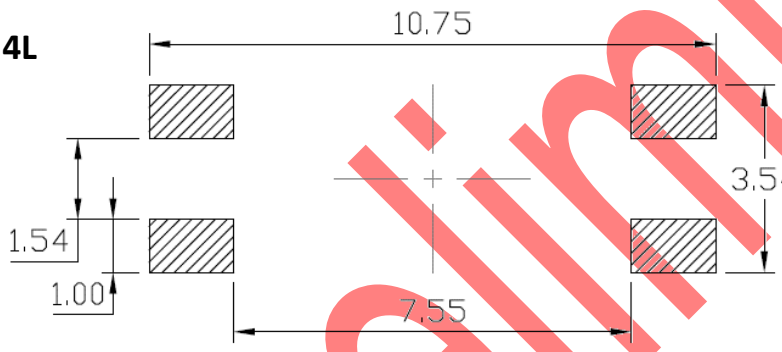

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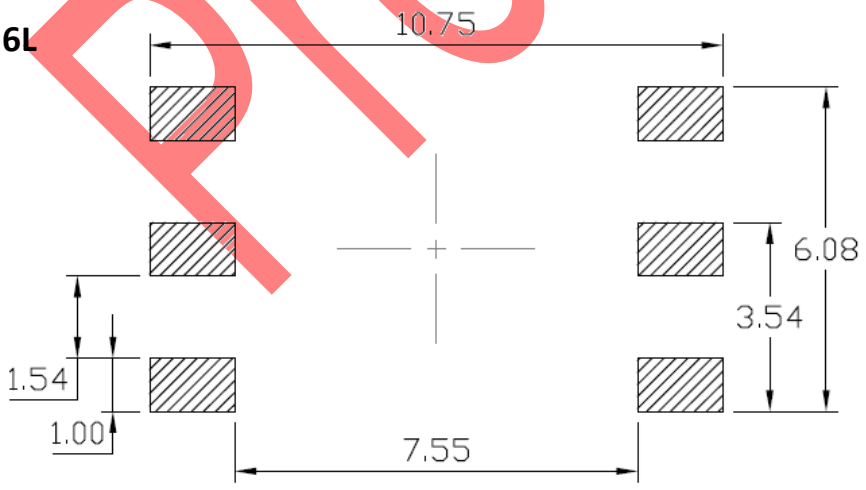

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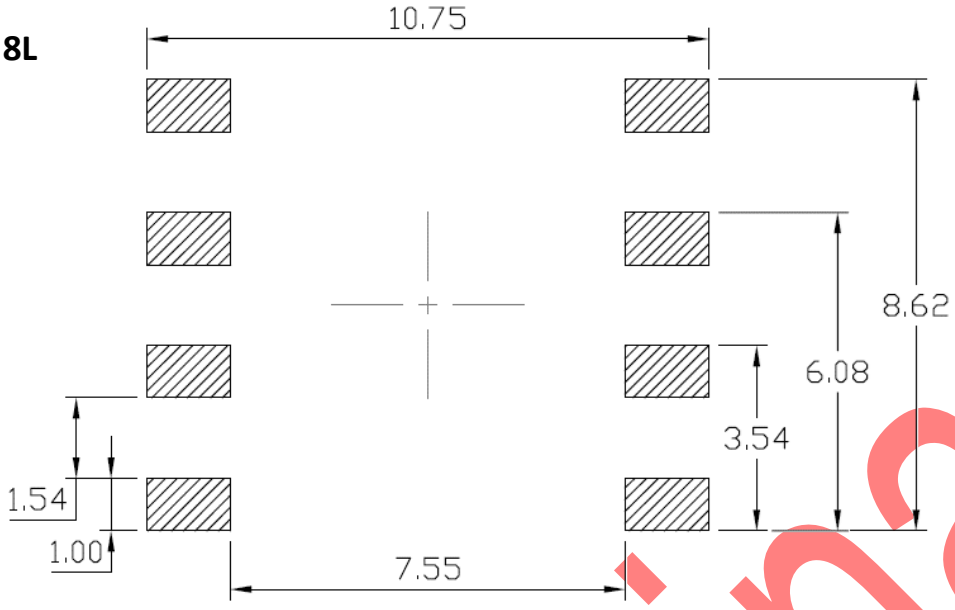
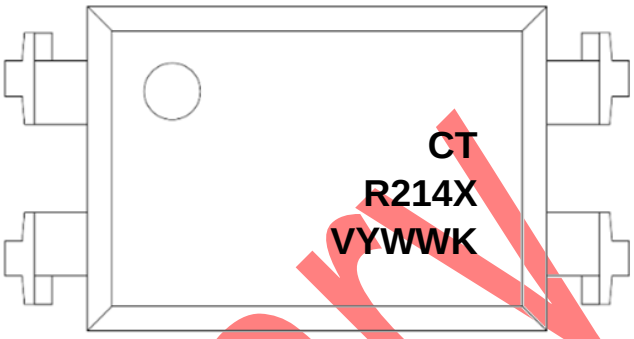
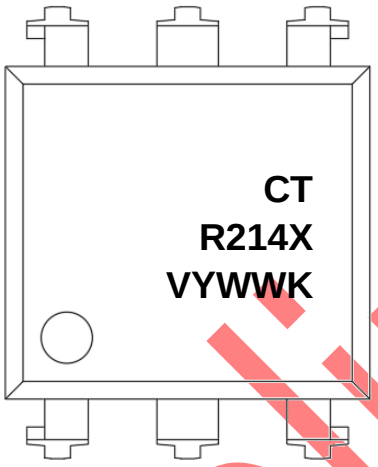
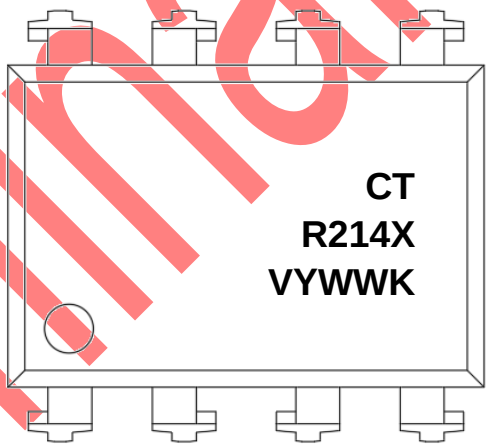


Marking Information







Note:

CT : Denotes “CT Micro”
R214X : Part Number (X : A or B)
V : VDE Certification Mark Option
Y : Fiscal Year
WW : Work Week
K : Manufacturing Code

Ordering Information

CTR214X(V)(Y)(Z) – M4

CT = Denotes “CT Micro”
R214X= Product Number (X: A, B)
V = VDE Certification Mark Option
Y = Lead form option (M, S, SL or none)
M4 = Package Type (M4 = M4 , 4L ,6L , 8L)
Z = Tape and Reel Option (T1 or T2)

Option	***M4 Description***	***Quantity***
T1	Surface Mount Lead Forming – With Option 1 Tapping	3000 Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Tapping	3000 Units/Reel

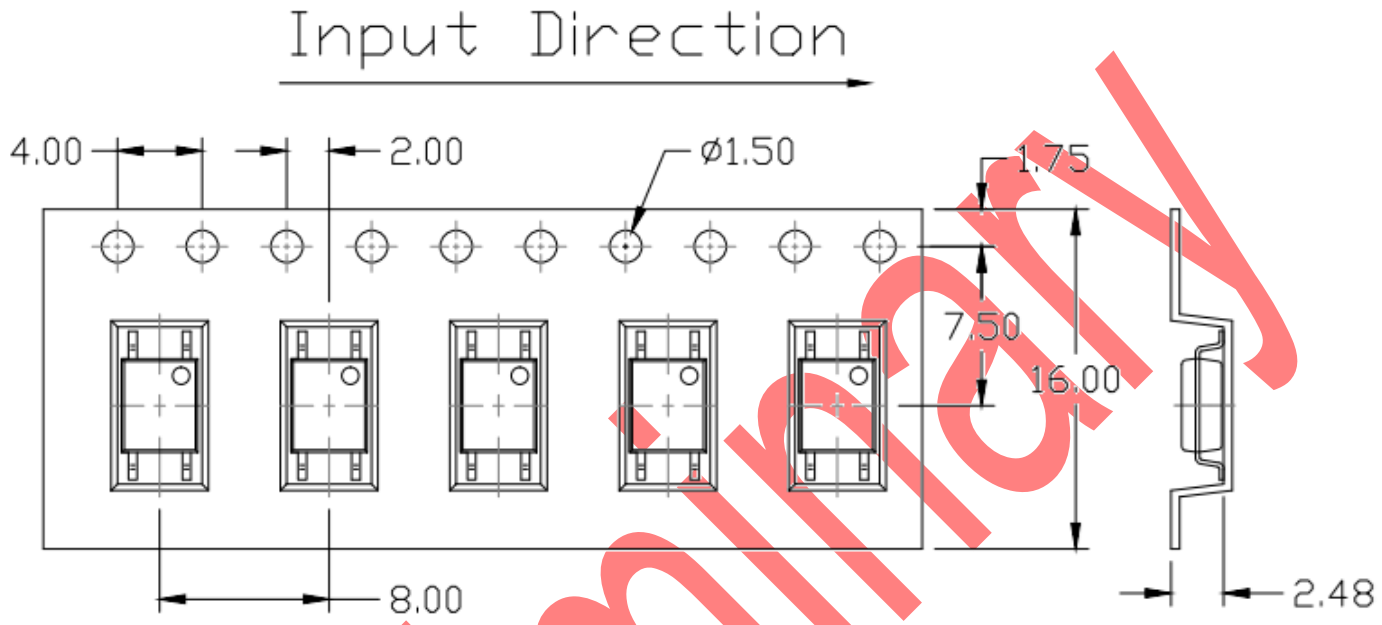
Option	***4L Description***	***Quantity***
None	Standard 4 Pin DIP	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T1)	Surface Mount (Low Profile)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

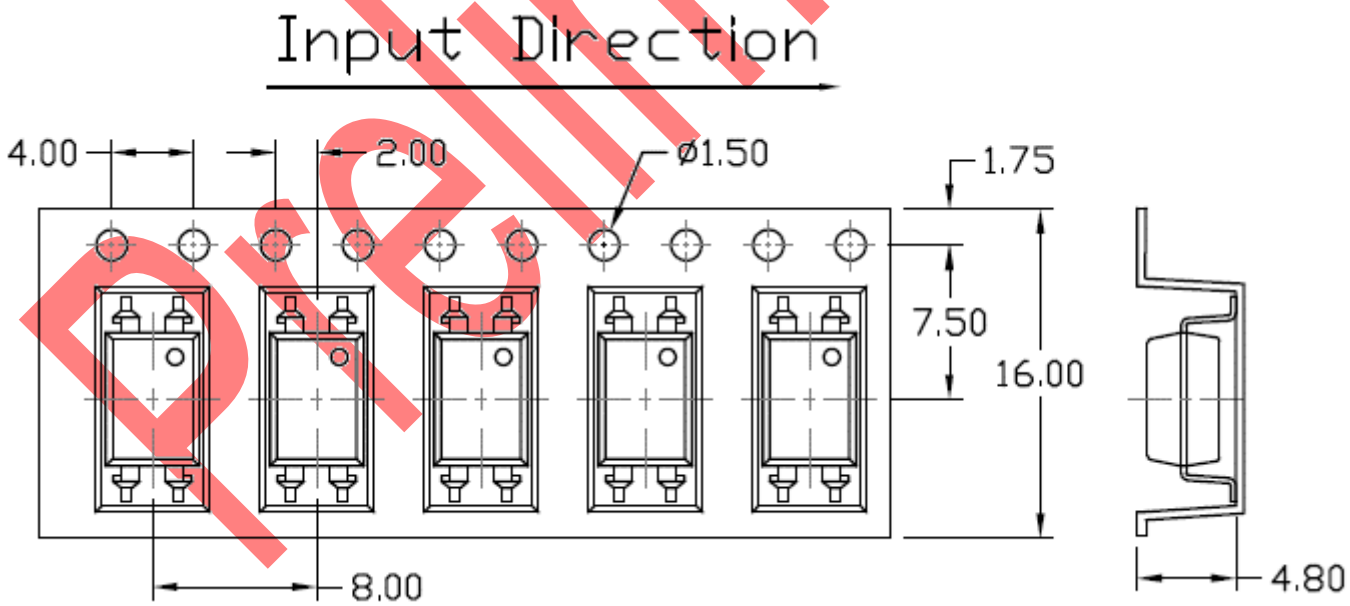
Option	***6L Description***	***Quantity***
None	Standard 6 Pin Dip	50Units/Tube
M	Gullwing (400mil) Lead Forming	50Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1000 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1000 Units/Reel

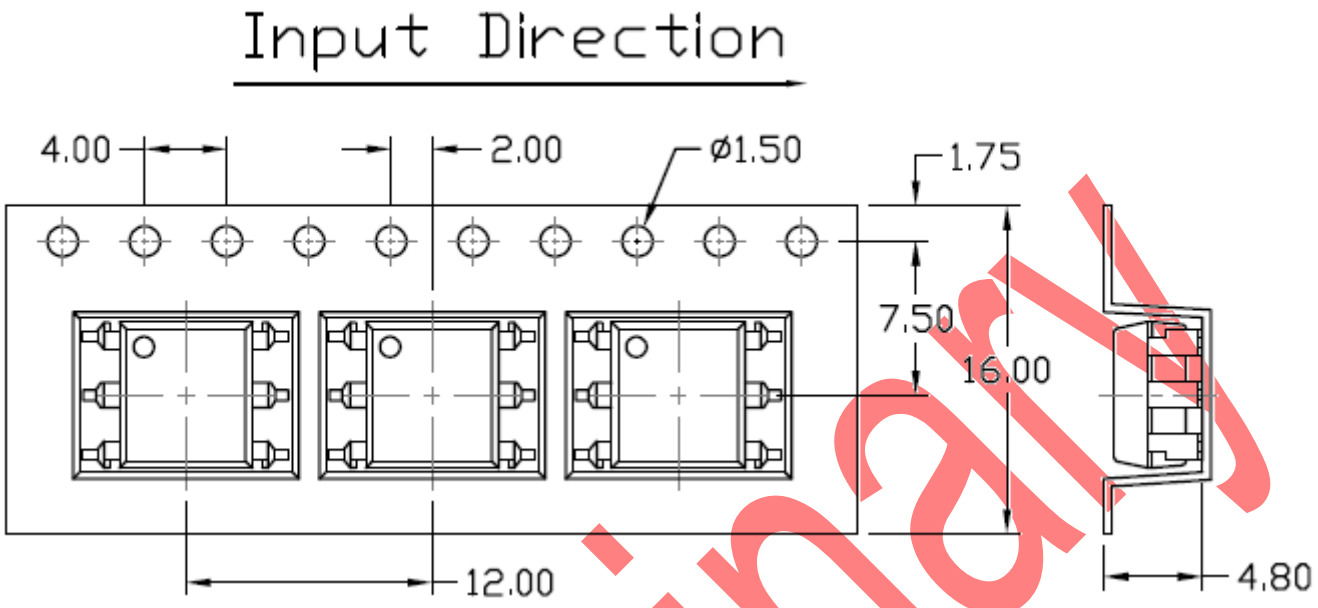
Option	*8L Description*	*Quantity*
None	Standard 8 Pin Dip	40 Units/Tube
M	Gullwing (400mil) Lead Forming	40 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead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

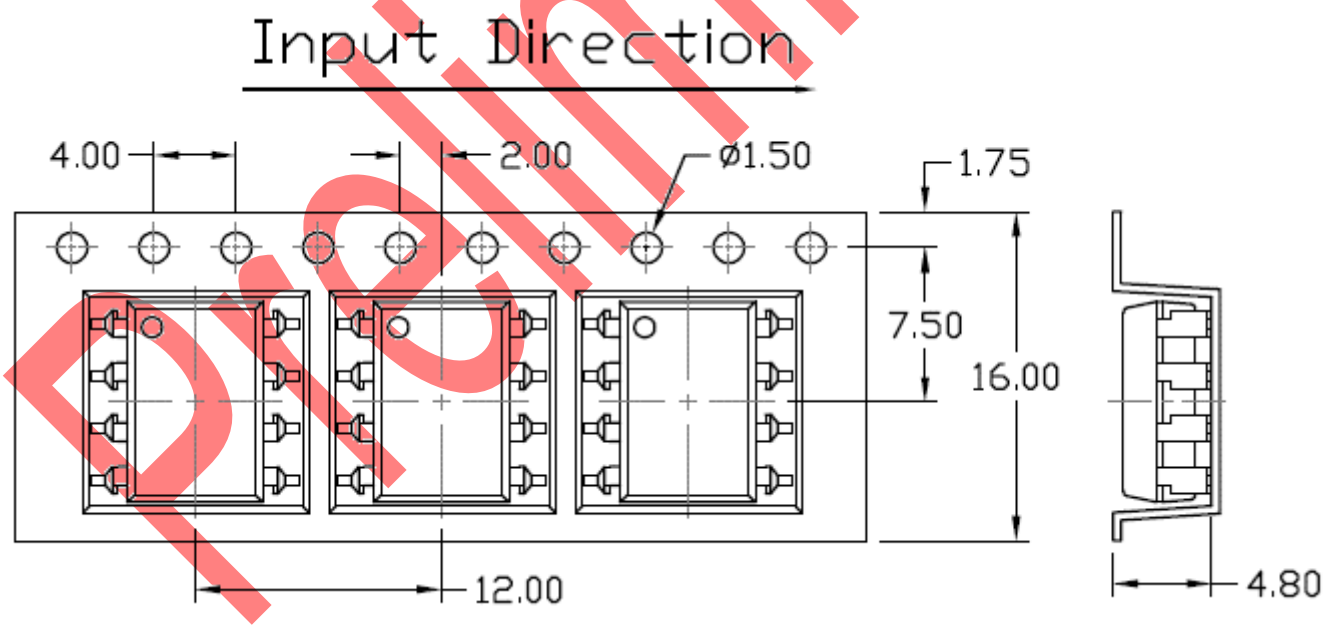
Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option (S)(SL) T1

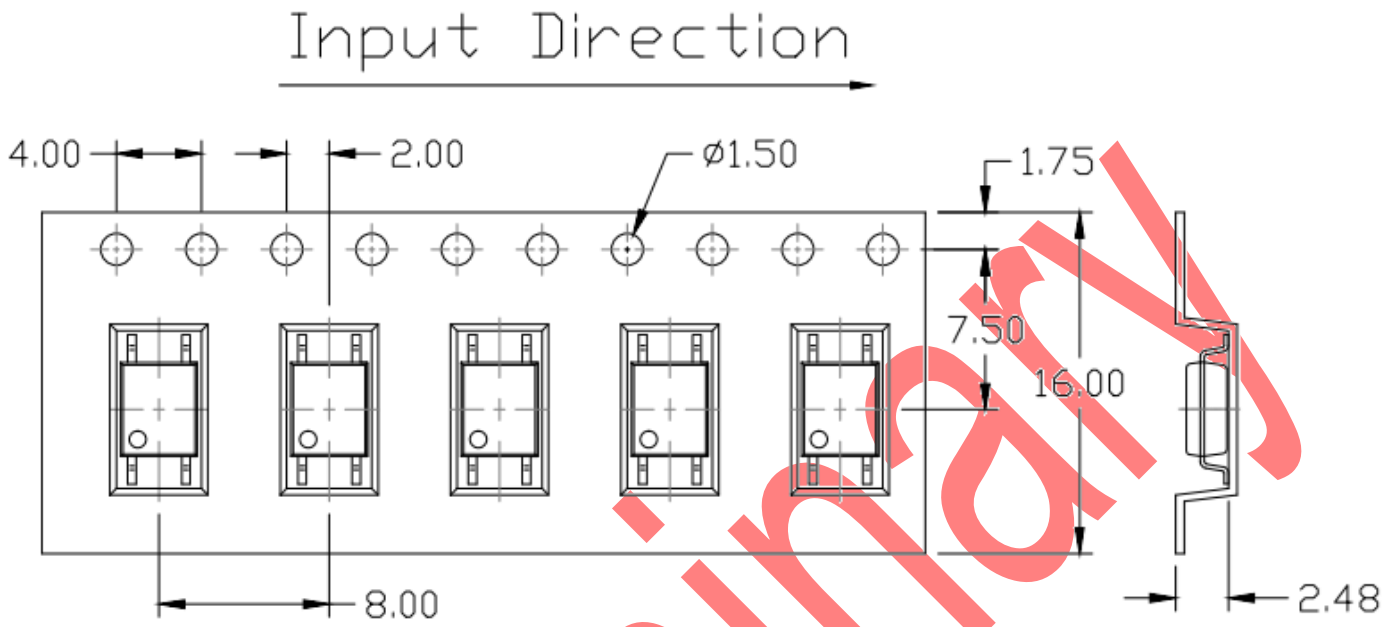


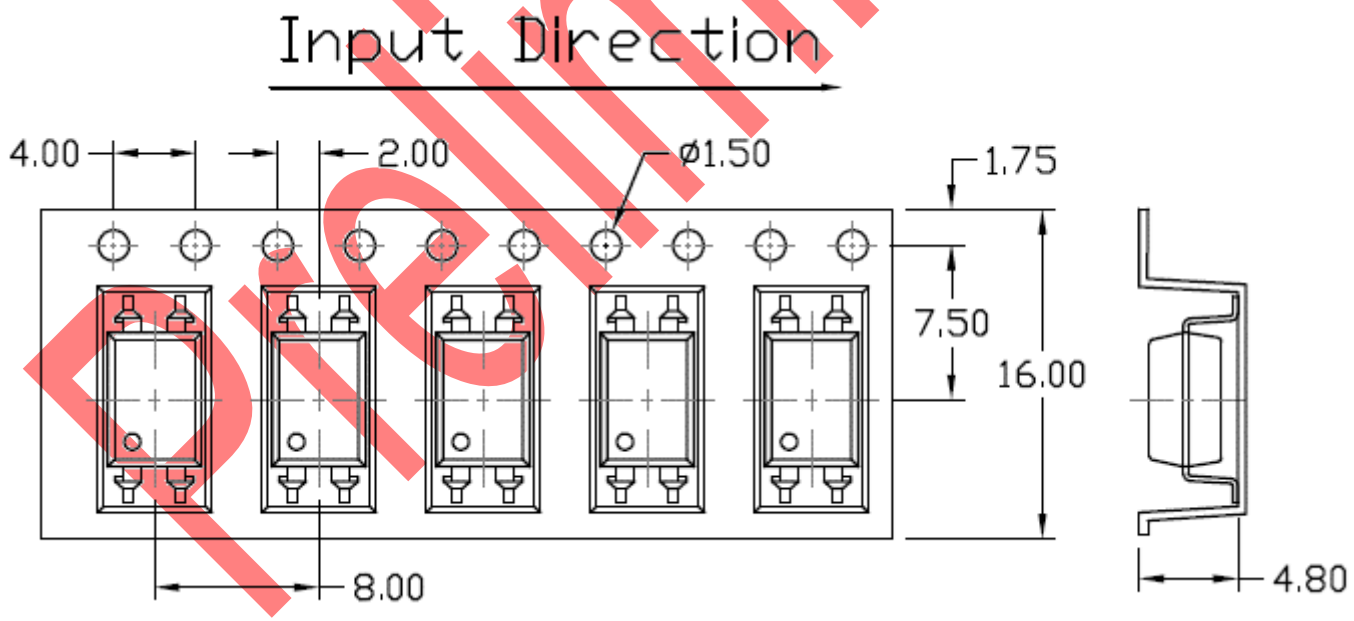


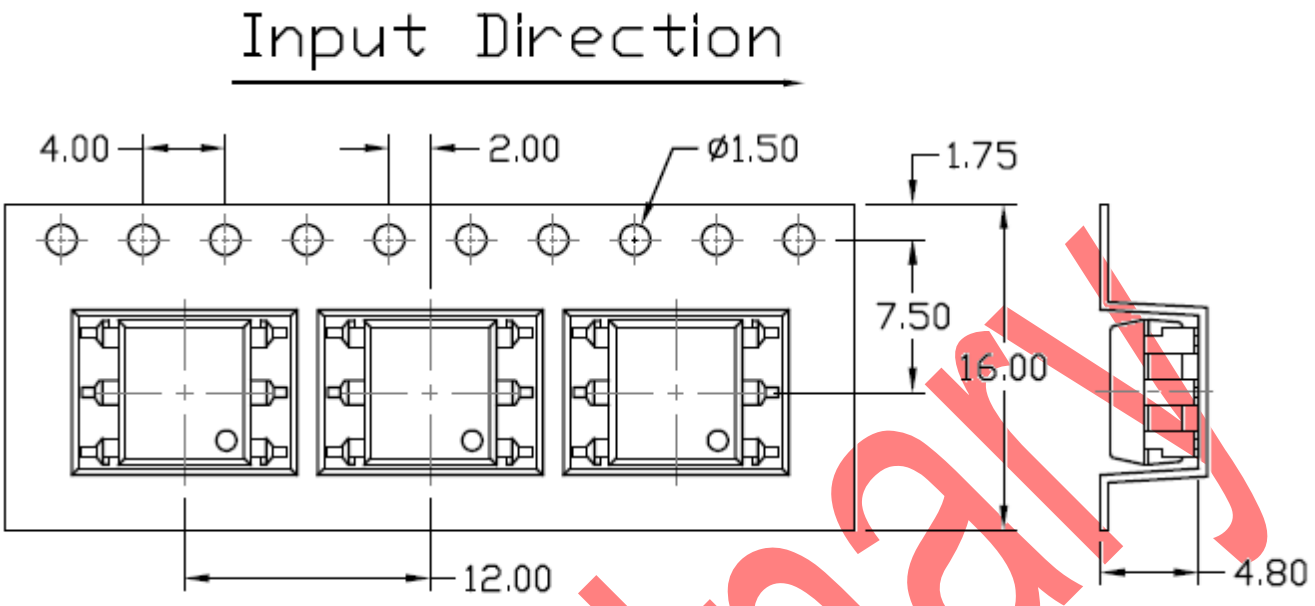


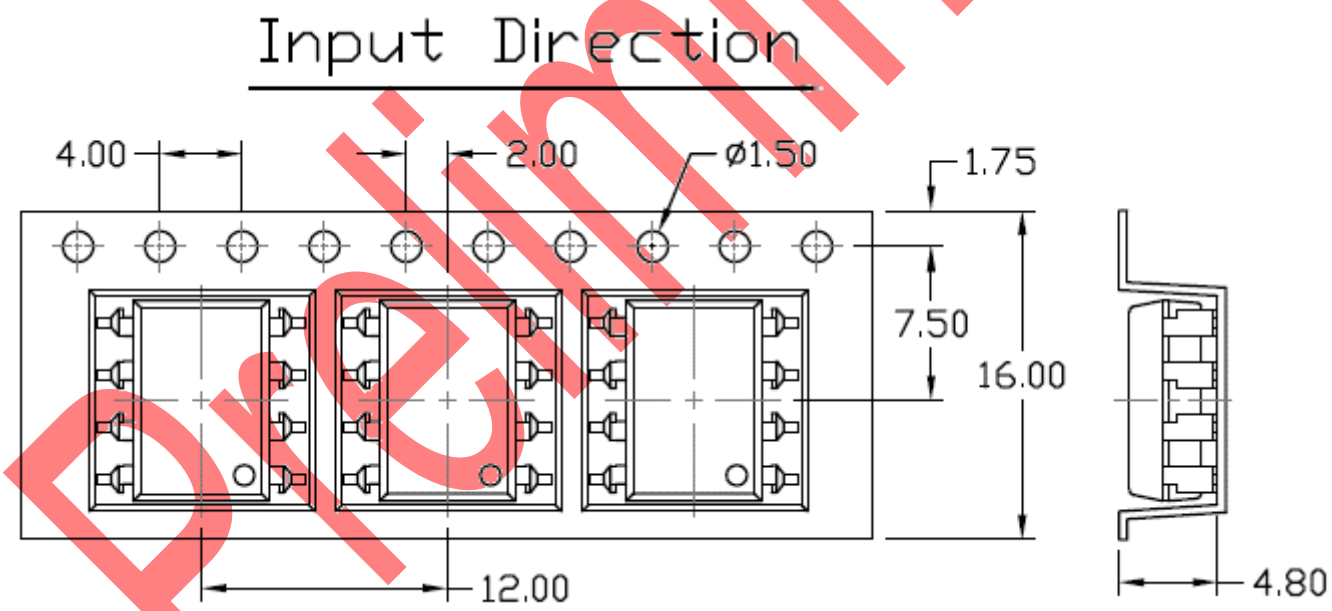


Option (S)(SL) T2

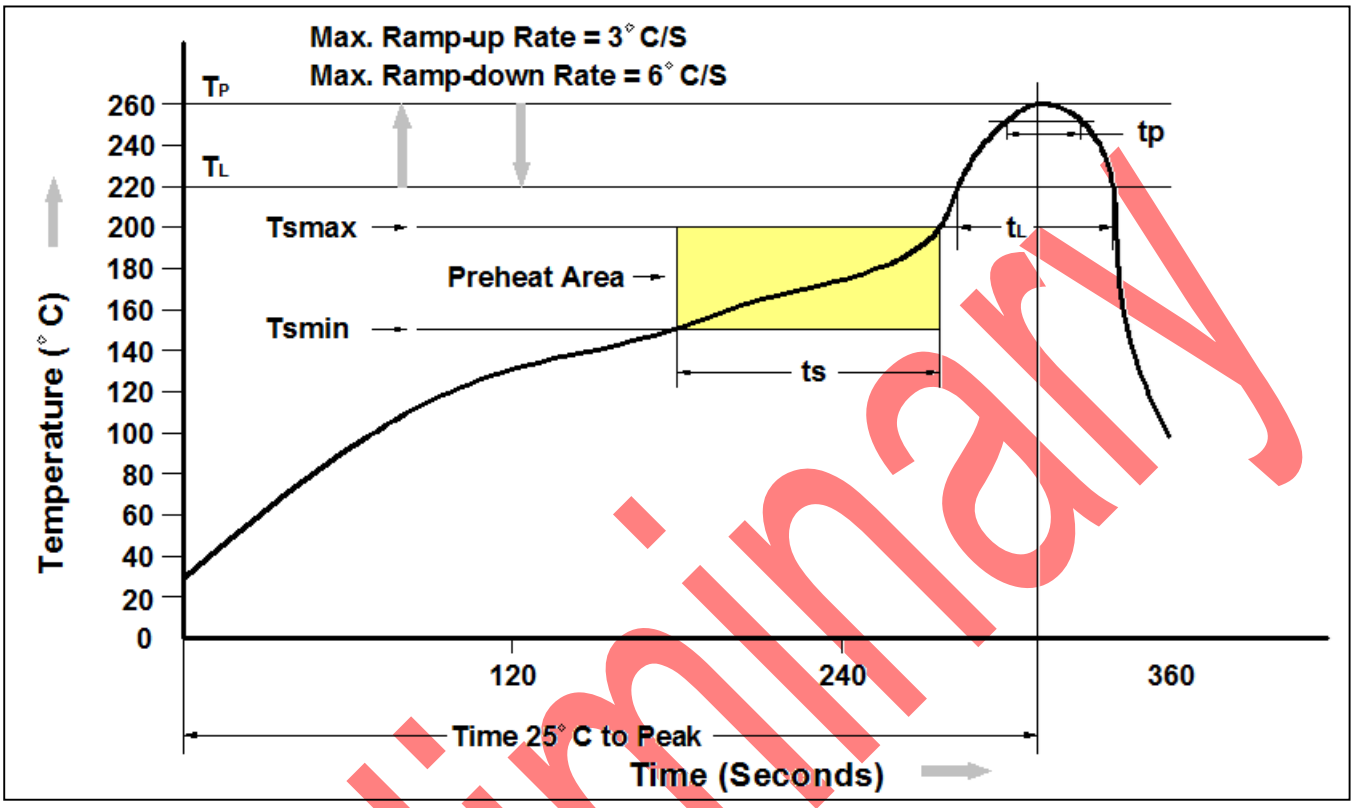








Reflow Profile



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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