

DIP6, DC Input, 600V Normally Open PhotoMOS Relay**Description**

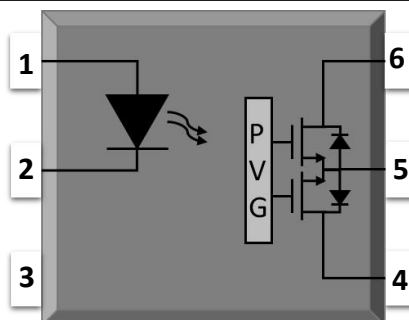
The TWSR214-6L series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a photovoltaic chip to drive two MOSFET in a plastic DIP6 package with different lead forming options.

Features

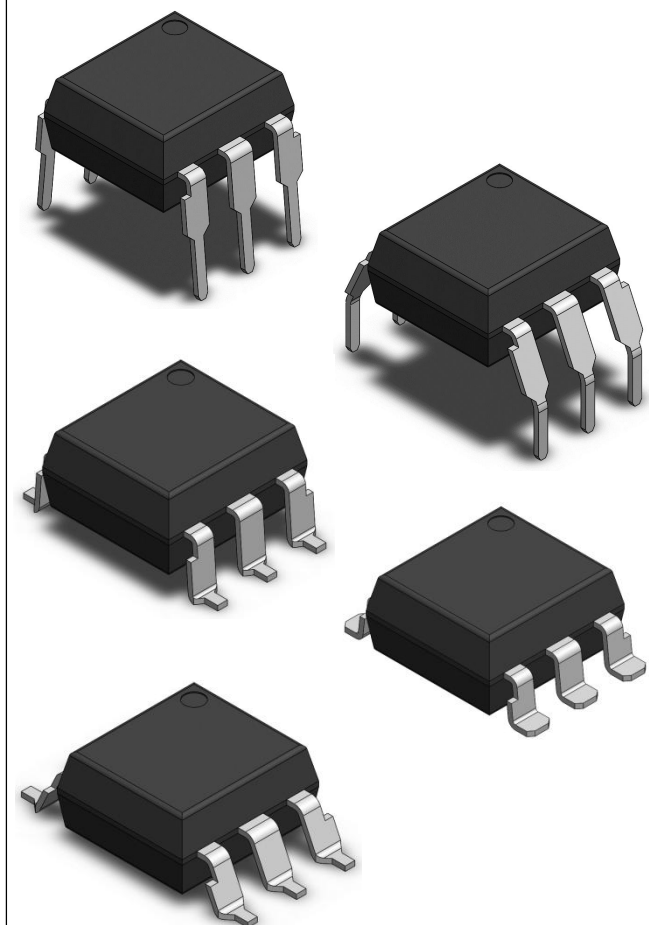
- Normally open signal pole signal throw relay
- Low operating current
- 600V output withstand voltage
- Low on resistance
- High isolation 5000 VRMS
- Operating temperature range - 40 °C to 85 °C
- RoHS & REACH Compliance
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC - GB4943.1, GB8898

Applications

- Computer peripheral interface
- Telephone equipment
- Data communication equipment
- Computers

SCHEMATIC**PIN DEFINITION**

1.LED Anode	4.MOSFET Drain
2.LED Cathode	5.MOSFET Source
3.NC	6.MOSFET Drain

PACKAGE OUTLINE

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	I_F	60	mA	
Peak Forward Current	I_{FP}	1	A	1
Reverse Voltage	V_R	6	V	
Input Power Dissipation	P_I	100	mW	
OUTPUT				
Load Voltage	V_L	600	V	
Continuous Load Current	I_L	A	0.05	A
		B	0.06	A
		C	0.08	A
Peak Load Current	I_{PEAK}	0.15	A	
Output Power Dissipation	P_O	500	mW	
COMMON				
Total Power Dissipation	P_{tot}	550	mW	
Isolation Voltage	V_{iso}	5000	V _{rms}	2
Operating Temperature	T_{opr}	-40~85	°C	
Storage Temperature	T_{stg}	-40~110	°C	
Soldering Temperature	T_{sol}	260	°C	

Note 1. AC For 1 Minute, R.H. = 40 ~ 60%

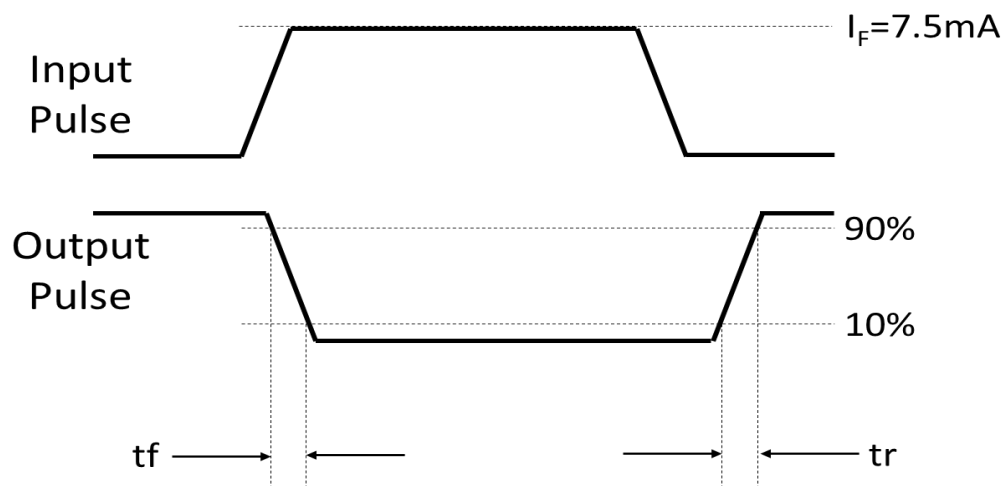
Note 2. For 10 seconds

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	V_F	-	1.3	1.5	V	$I_F=10\text{mA}$	
Reverse Current	I_R	-	-	1	μA	$V_R=5\text{V}$	
OUTPUT							
Off State Leakage Current	I_{LEAK}	-	-	1	μA	$V_L=\text{Rated } V_L, I_F=0$	
On Resistance	$R_{d(ON)A}$	-	42	70	Ω	$I_F=5\text{mA}, I_L=\text{Rated } I_L$ $t=1\text{s}$	
	$R_{d(ON)B}$		28	50	Ω		
	$R_{d(ON)C}$		14	30	Ω		
Output Capacitance	C_{OUT}	-	30	-	pF	$V_L=0, f=1\text{MHz}$	
TRANSFER CHARACTERISTICS							
Isolation Resistance	R_{ISO}	10^{10}	-	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C_{IO}	-	1.5	-	pF	$V_L=0, f=1\text{MHz}$	
LED turn on Current	$I_F(\text{on})$	-	1.1	3	mA	$I_L=\text{Rated } I_L$	
LED turn off Current	$I_F(\text{off})$	0.4	1.1	-	mA		
Turn On Time	T_{on}	-	0.2	3	ms	$I_F=10\text{mA}, I_L=\text{Rated } I_L$ $R_L=200\Omega$	
Turn Off Time	T_{off}	-	0.2	0.5	ms		

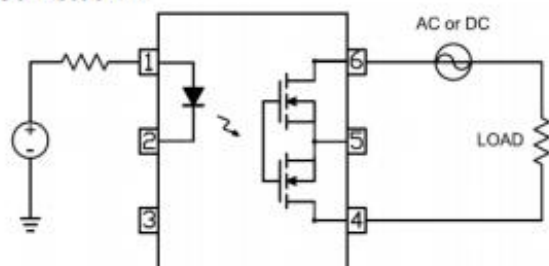
TEST CIRCUITS

Waveforms of tr, tf

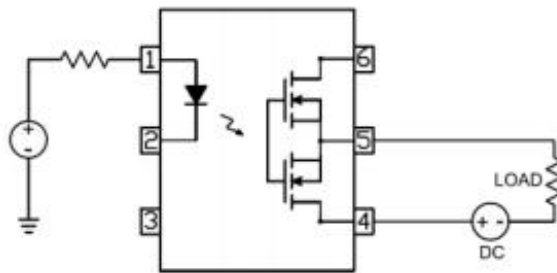
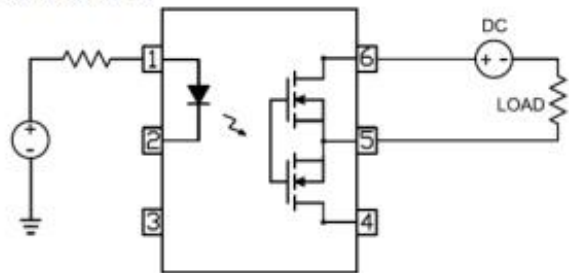


On Resistance test

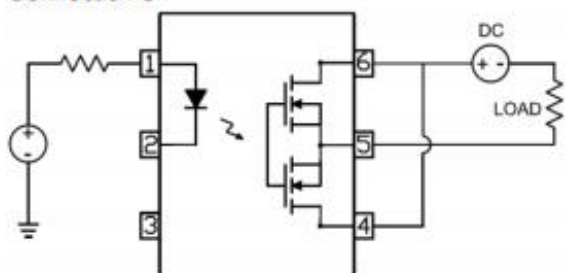
Connection A



Connection B



Connection C



CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

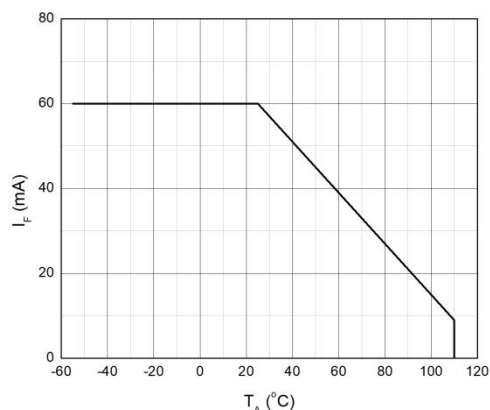


Fig.2 Collector Power Dissipation vs. Ambient Temperature

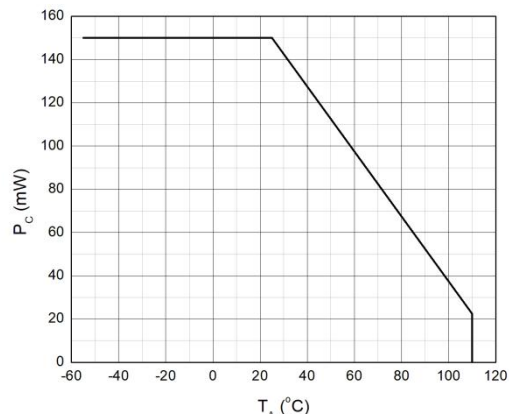


Fig.3 Forward Current vs. Forward Voltage

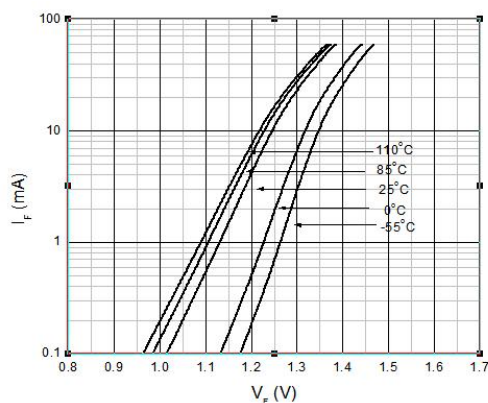


Fig.4 On Resistance vs. Ambient Temperature

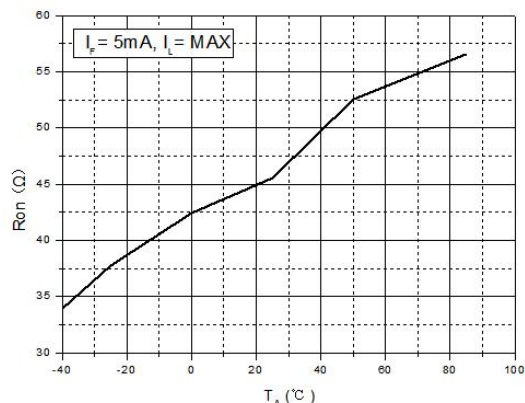


Fig.5 Switching Time vs. Ambient Temperature

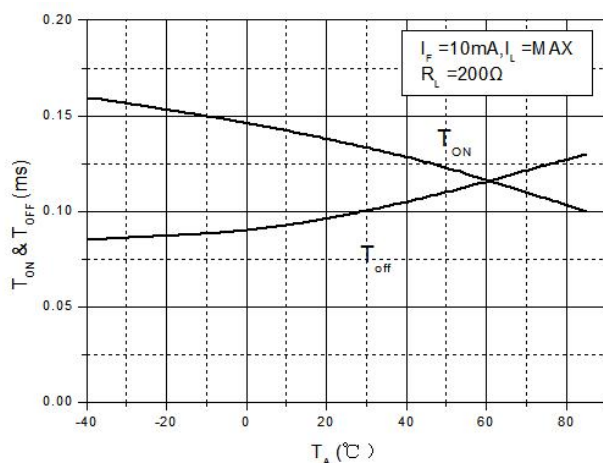
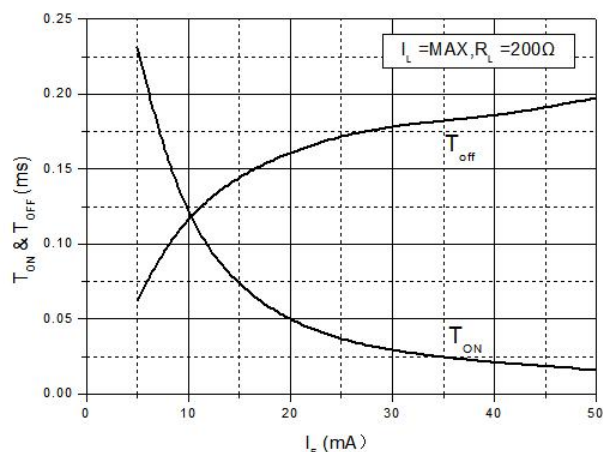
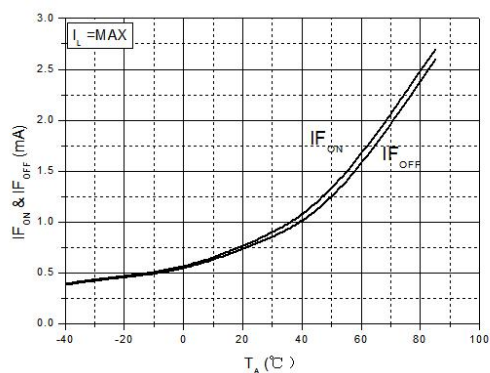


Fig.6 Switching Time vs. LED Forward Current

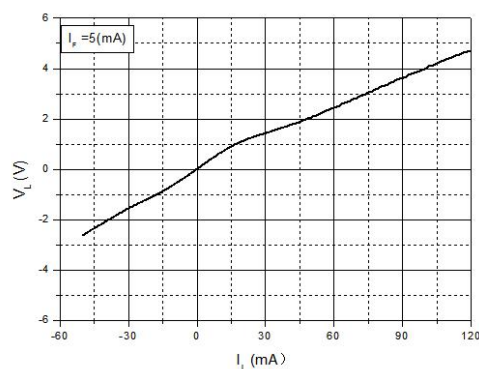


CHARACTERISTIC CURVES

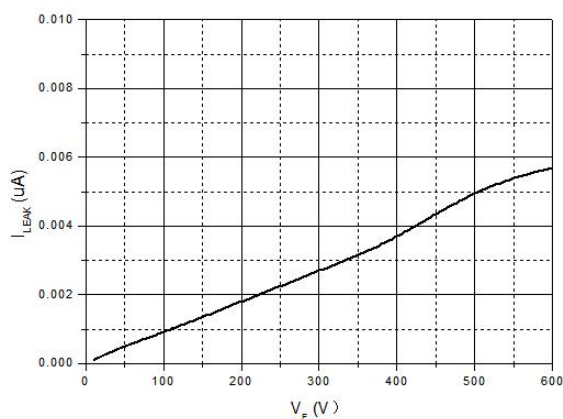
**Fig.7 LED turn on&off Current
vs. Ambient Temperature**



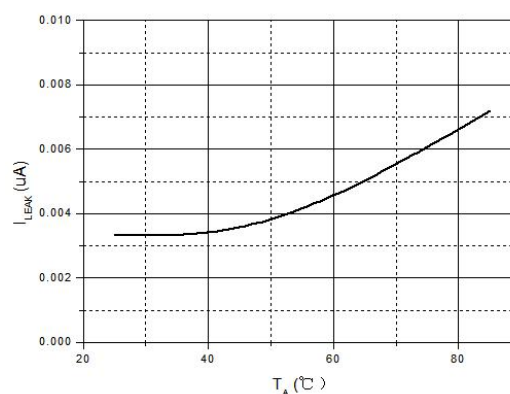
**Fig.8 Load Current
vs. Load voltage**



**Fig.9 Off State Leakage Current
vs. Load voltage**

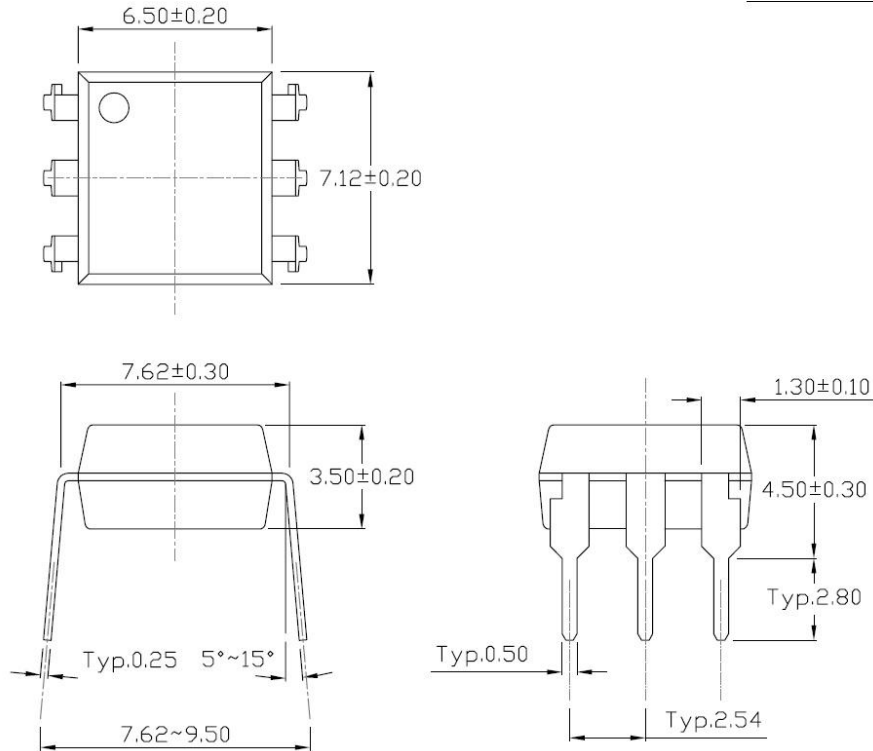


**Fig.10 Off State Leakage Current
vs. Ambient Temperature**

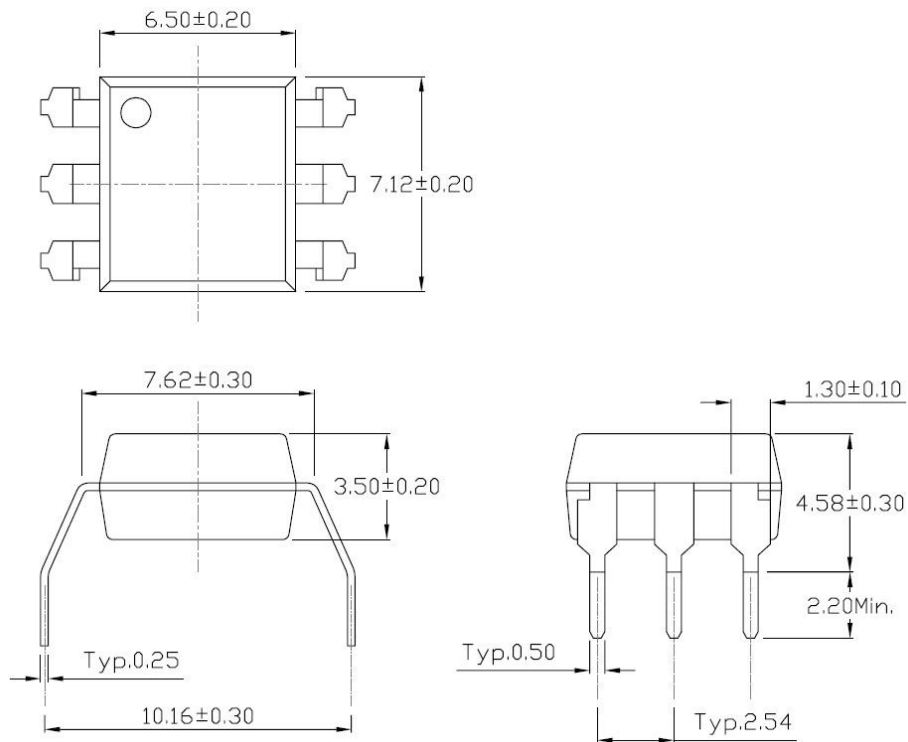


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)

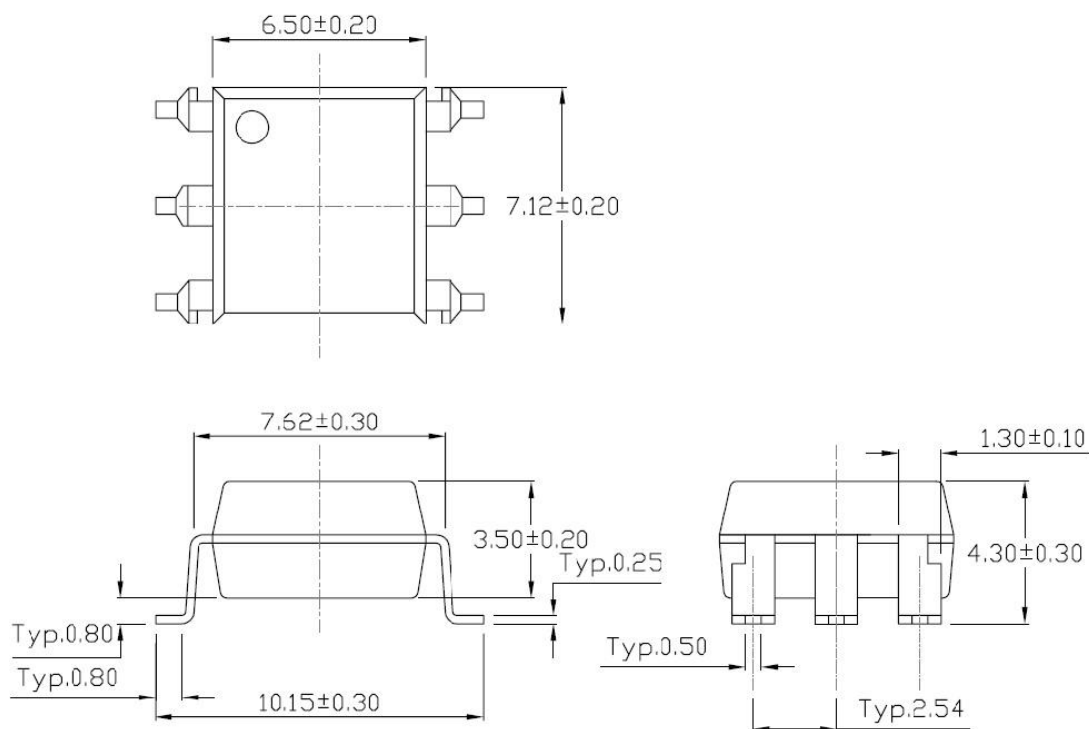


Gullwing (400mil) Lead Forming – Through Hole (M Type)

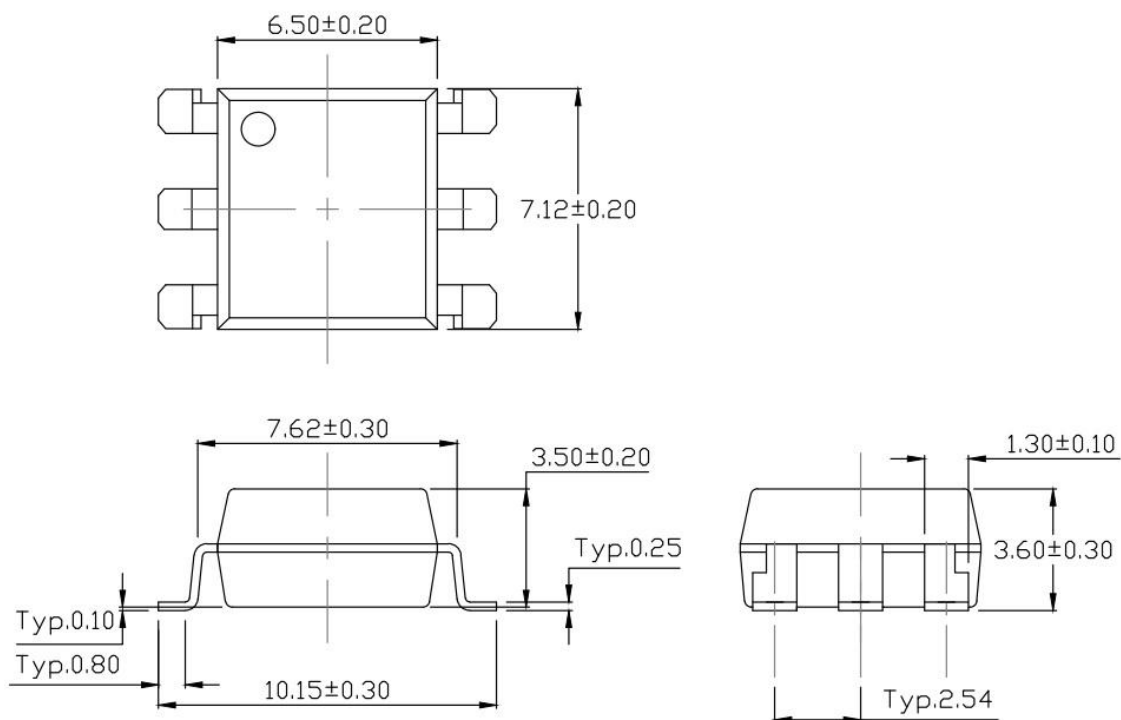


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (S Type)

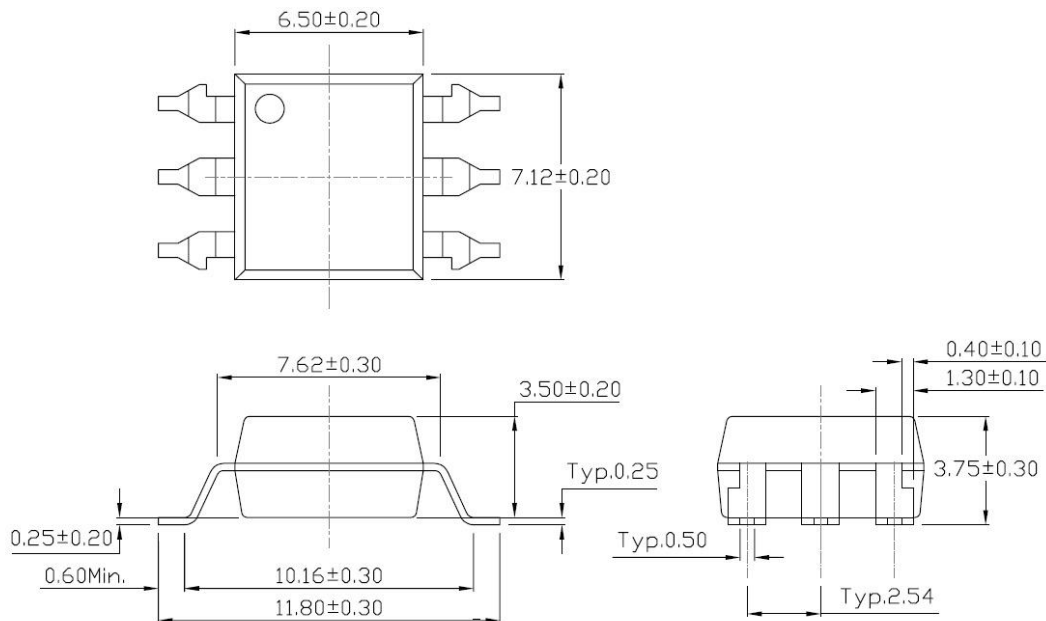


Surface Mount (Low Profile) Lead Forming (SL Type)



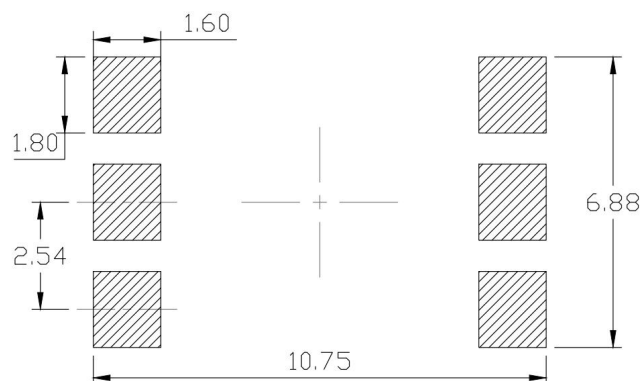
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

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

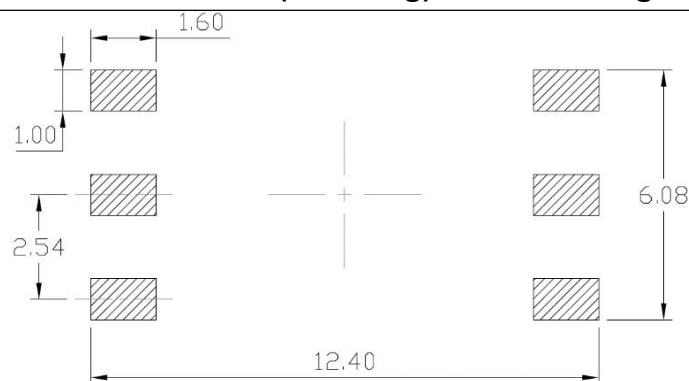


Recommended Solder Mask (Dimensions in mm unless otherwise stated)

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

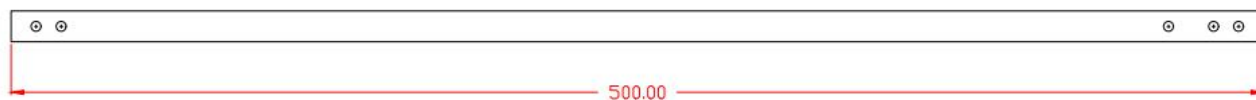
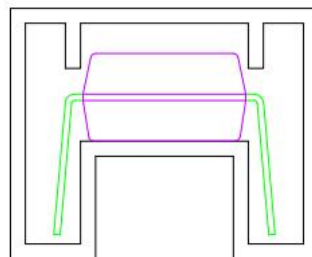
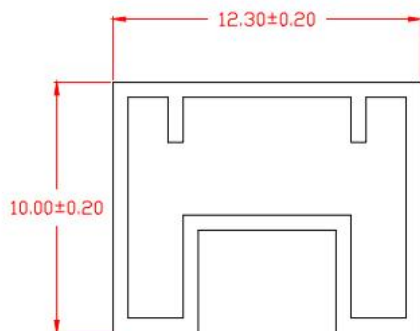


Surface Mount (Gullwing) Lead Forming

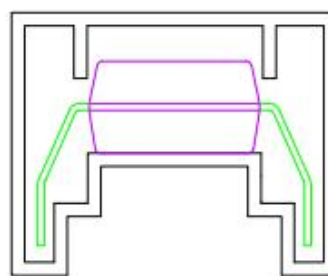
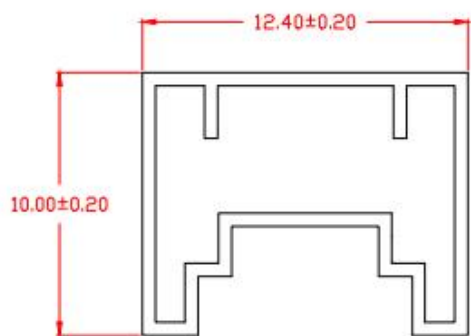


TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP

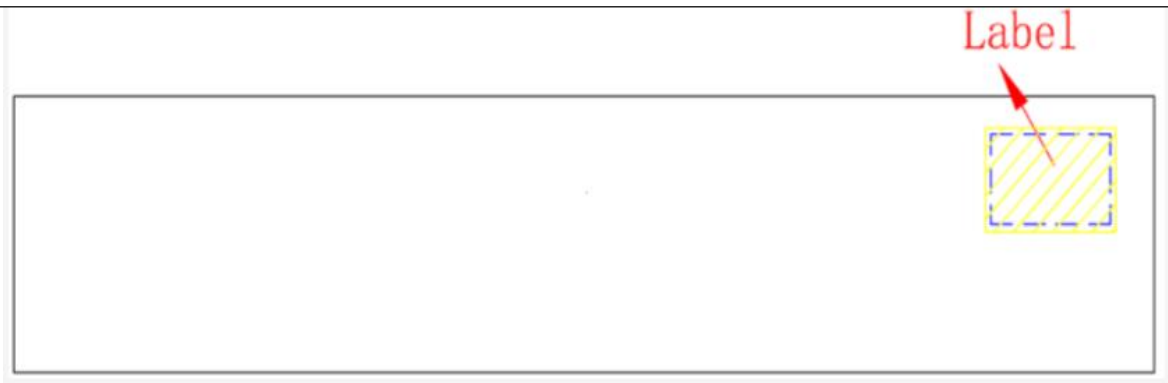


Option M



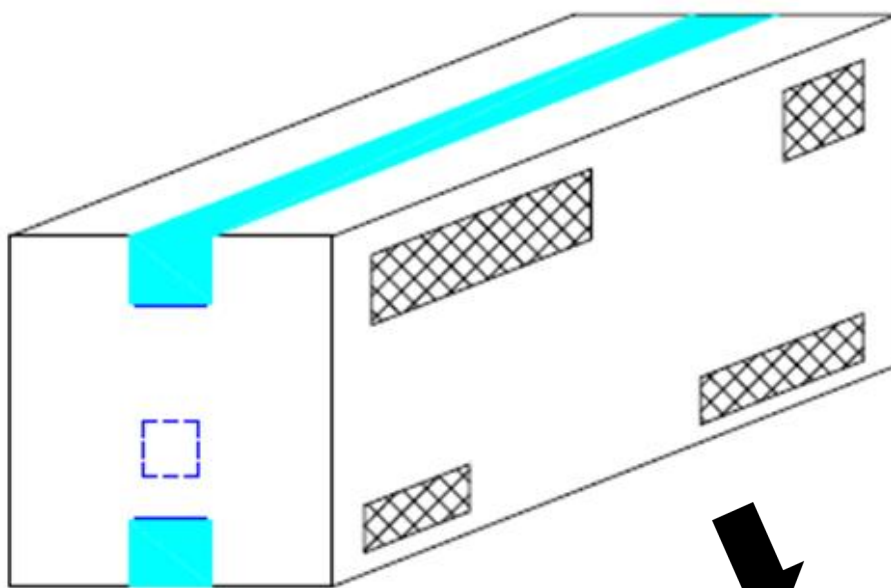
BOX SPECIFICATIONS (Tube Type)

Inner Box



L x W x H = 52.5cm x 10.7cm x 4.7cm

Outer Box

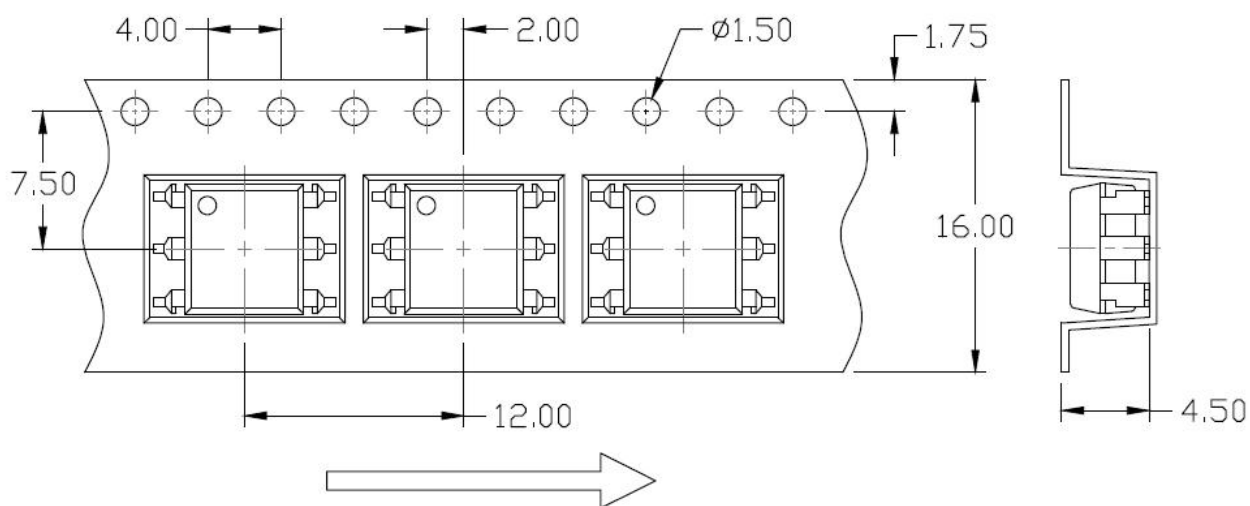


L x W x H = 53.5cm x 23.5cm x 25.5cm

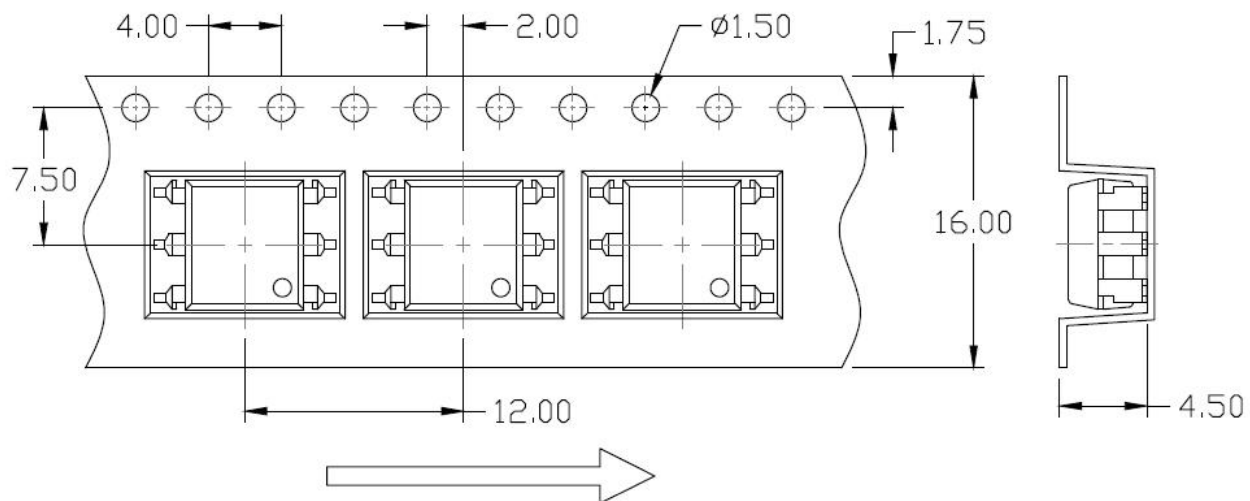


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1)

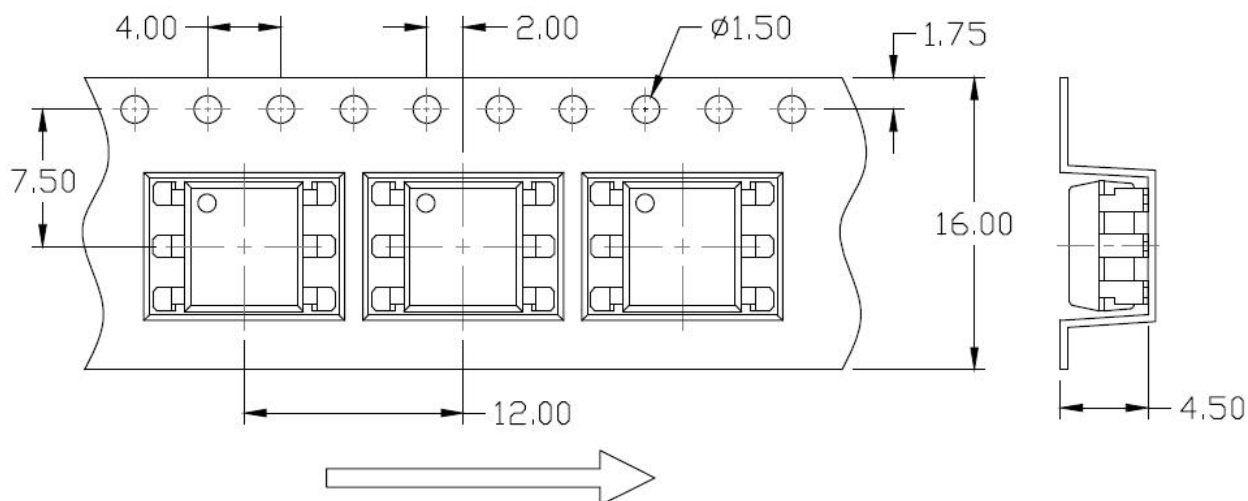


Option S(T2)

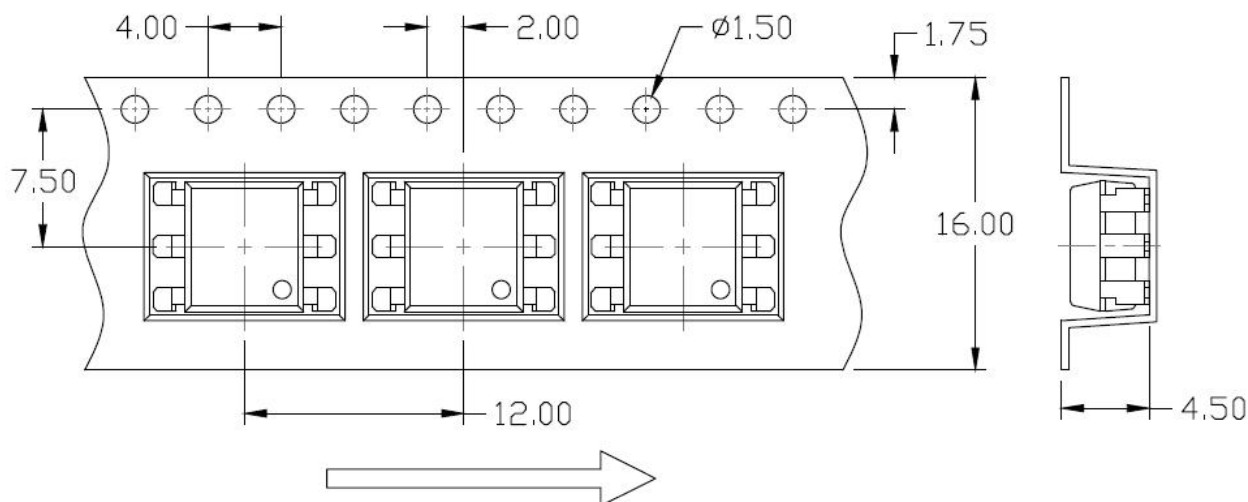


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL(T1)

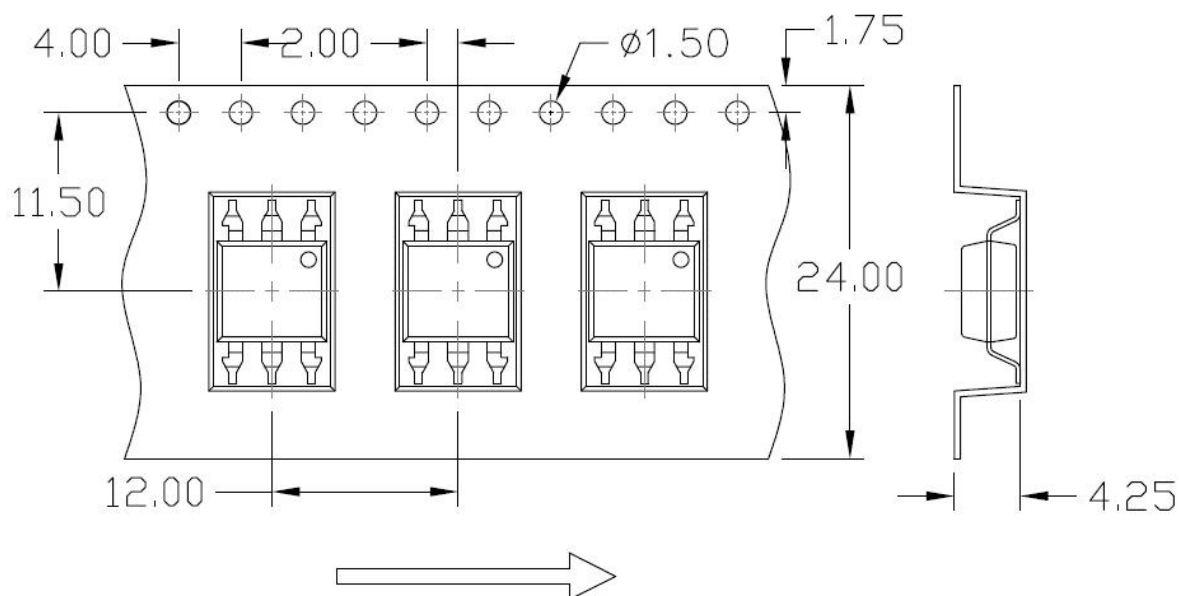


Option SL(T2)

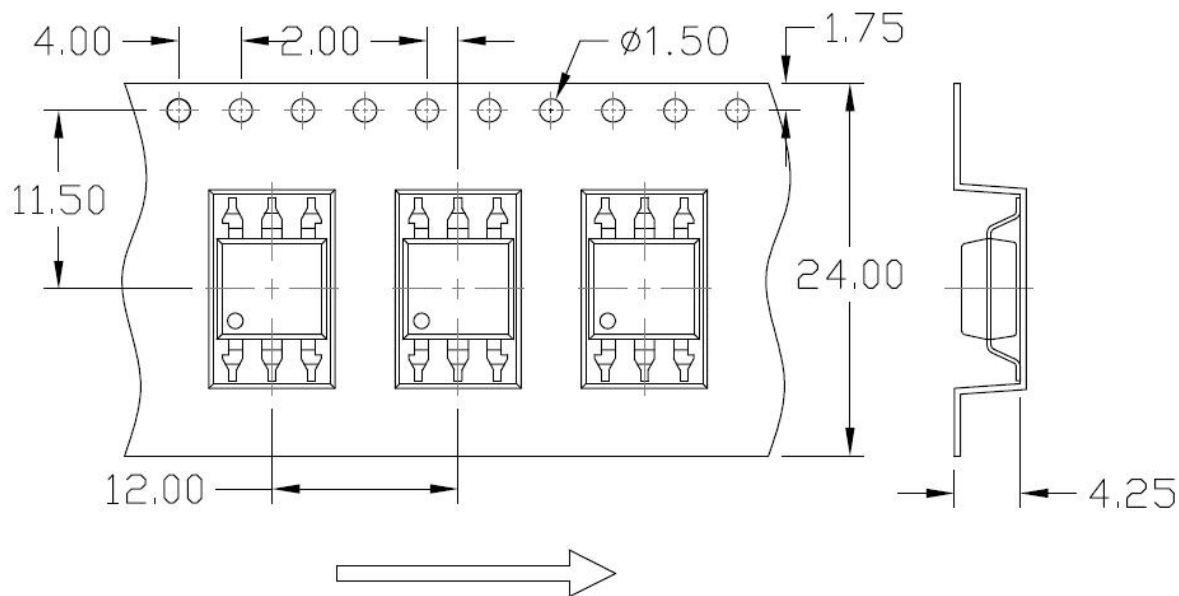


Carrier Tape Specifications (Dimensions in mm unless otherwise stated)

Option SLM(T1)

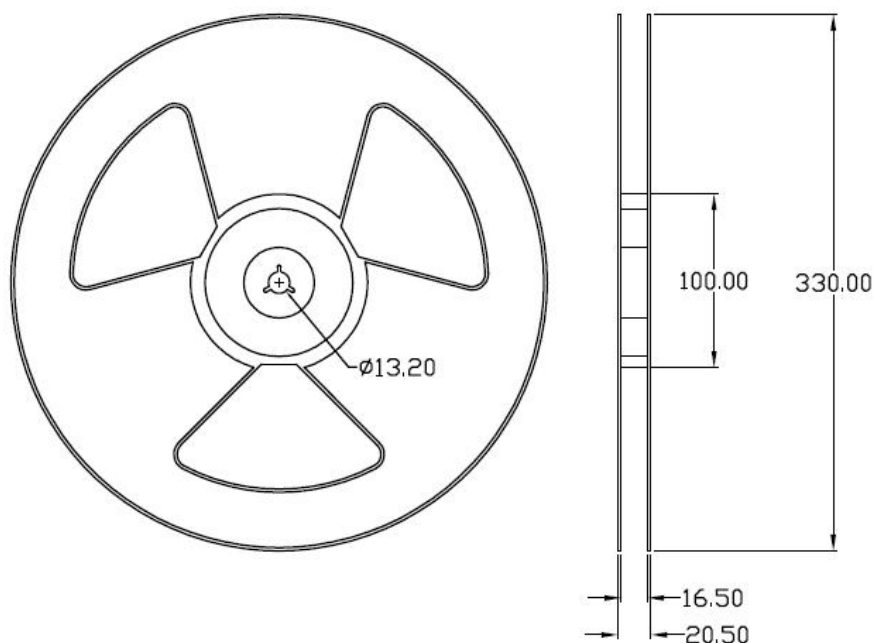


Option SLM(T2)

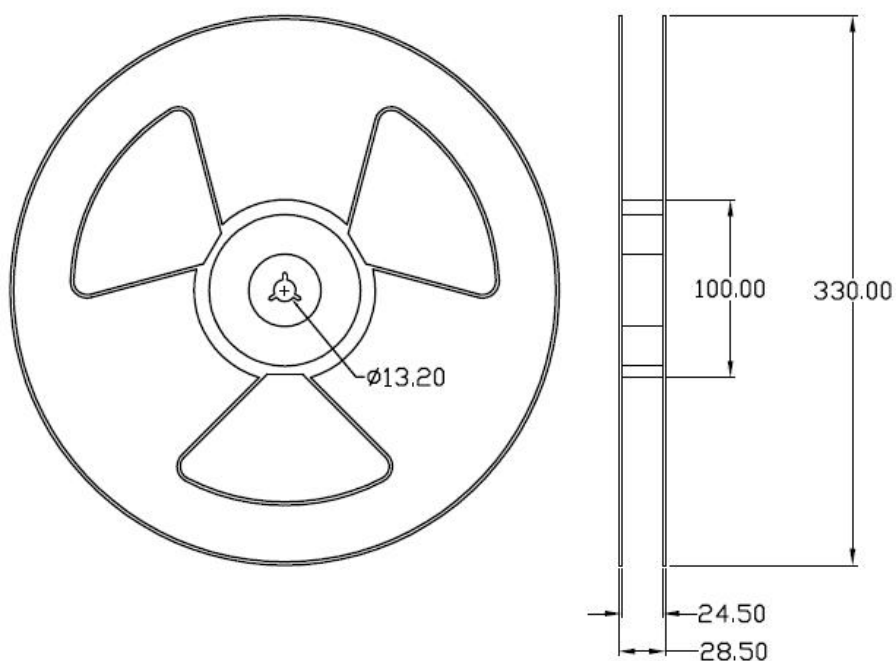


REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S & Option SL

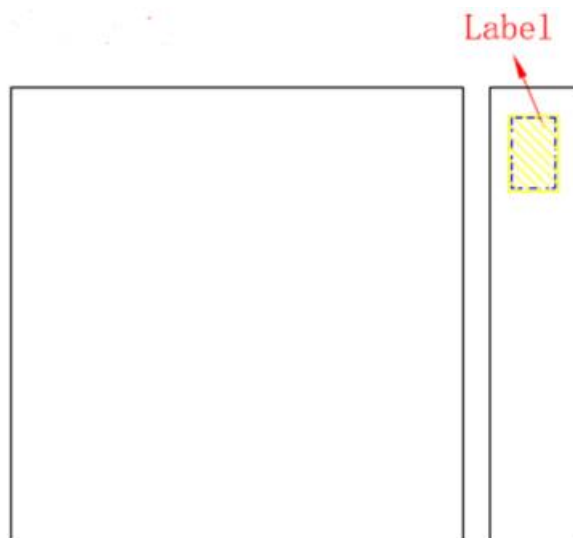


Option SLM



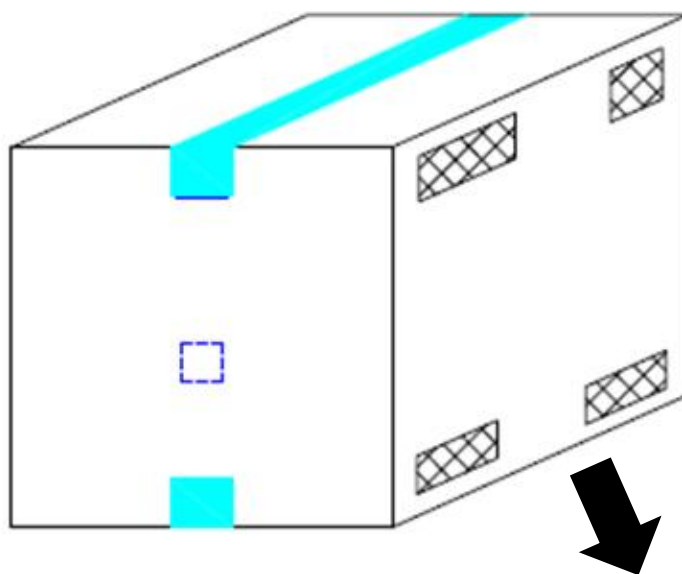
BOX SPECIFICATIONS (Reel Type)

Inner Box

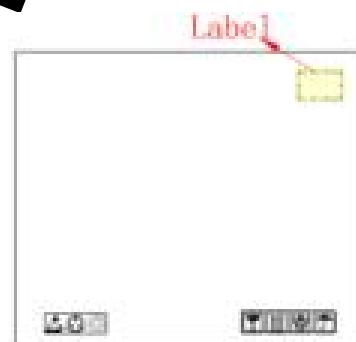


- L x W x H = 36cm x 36cm x 6.9cm

Outer Box



- Option1: L x W x H = 45cm x 38cm x 38cm
- Option2: L x W x H = 39cm x 38cm x 38cm



ORDERING AND MARKING INFORMATION**MARKING INFORMATION**

TWS : Company Abbr.
R216 : Part Number & Rank
V : VDE Option
Y : Fiscal Year
WW : Work Week

ORDERING INFORMATION**TWSR216-6L(Y)(Z)-GV**

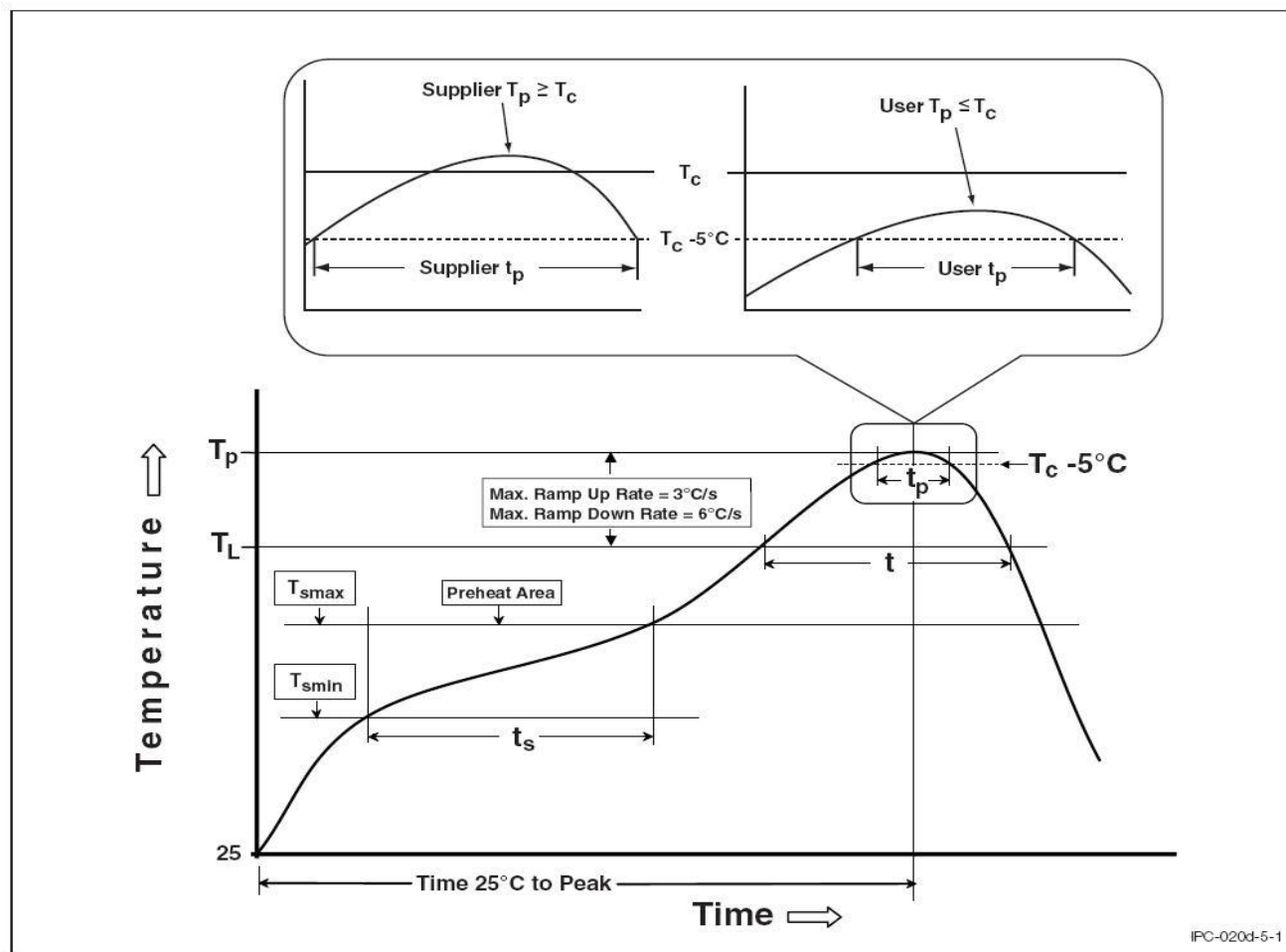
TWS – Company Abbr.
 R216 – Part Number
 -6L – DIP6
 Y–Lead Form Option(M/S/SL/SLM/None)
 Z – Tape and Reel Option (T1/T2)
 G – Green
 V – VDE Option (V or None)

LABEL INFORMATION**PACKING QUANTITY**

Option	Quantity	Quantity – Inner box	Quantity – Outer box
None	65 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box = 20.8k Units
M	65 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box = 20.8k Units
S(T1)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
S(T2)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
SL(T1)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
SL(T2)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
SLM(T1)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
SLM(T2)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units

REFLOW INFORMATION

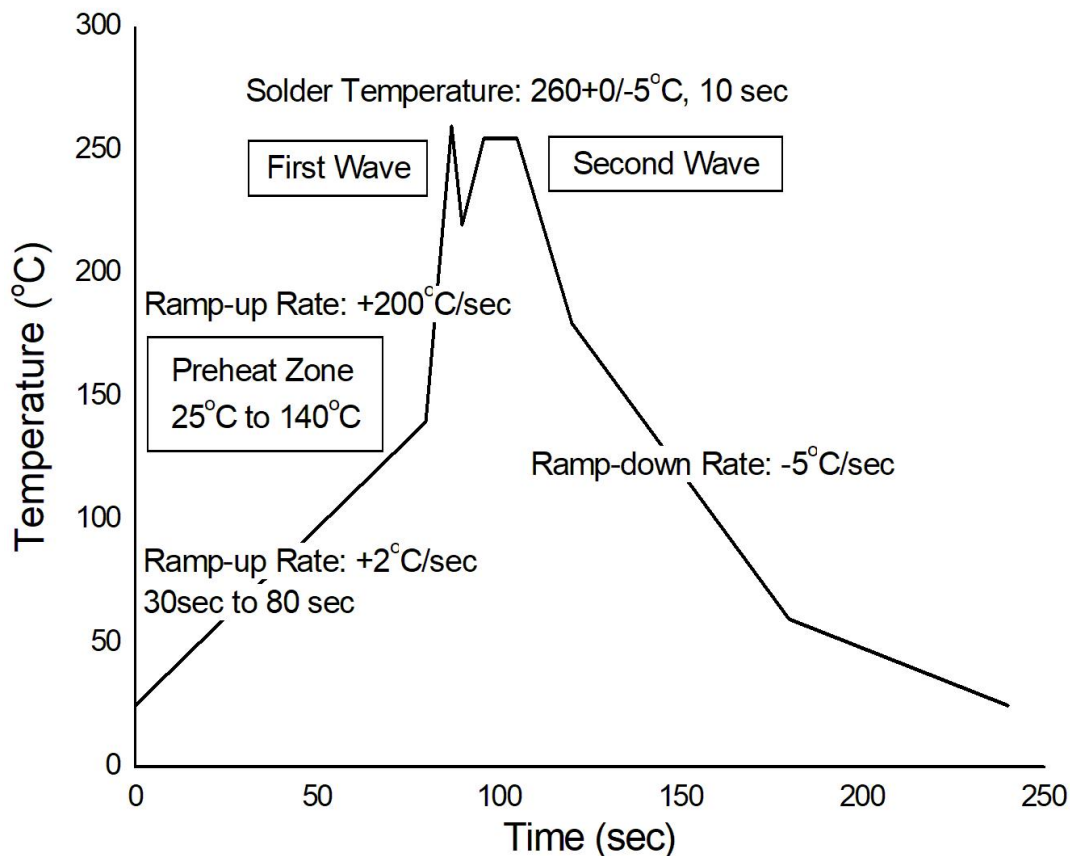
REFLOW PROFILE



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (Tsmmin)	100	150°C
Temperature Max. (Tsmmax)	150	200°C
Time (ts) from (Tsmmin to Tsmmax)	60-120 seconds	60-120 seconds
Ramp-up Rate (tL to tP)	3°C/second max.	3°C/second max.
Liquidous Temperature (TL)	183°C	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (tP) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (TP to TL)	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

TEMPERATURE PROFILE OF SOLDERING

WAVE SOLDERING (JESD22-A111 COMPLIANT)



HAND SOLDERING BY SOLDERING IRON

Soldering Temperature	380±5°C
Soldering Time	3 sec max.

- One time soldering is recommended for all soldering method.
- Do not solder more than three times for IR reflow soldering.

DISCLAIMER

- TWS is continually improving the quality, reliability, function and design. TWS reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- TWS makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, TWS disclaims (a) any and all liability arising out of the application or use of any product, (b) any and all liability, including without limitation special, consequential or incidental damages, and (c) any and all implied warranties, including warranties of fitness for particular
- The products shown in this publication are designed for the general use in electronic applications such as office automation, equipment, communications devices, audio/visual equipment, electrical application and instrumentation purpose, non-infringement and merchantability.
- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact TWS sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
- Parameters provided in datasheets may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated in each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify TWS's terms and conditions of purchase, including but not limited to the warranty expressed therein.
- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.