TWSR216-6L Series

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.

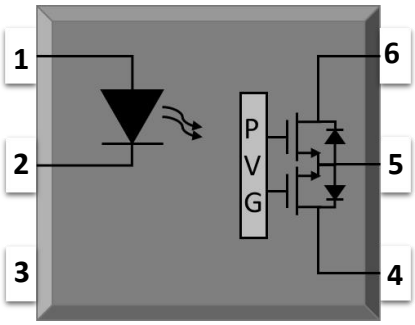
Features

- 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

Applications

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

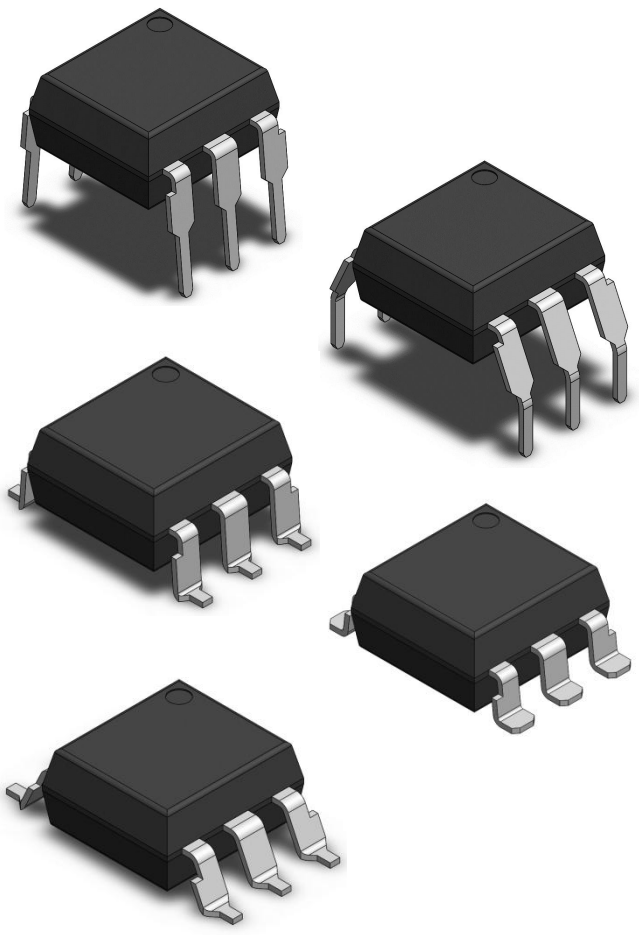
SCHEMATIC



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	Ptot		550	mW	
Isolation Voltage	Viso		5000	Vrms	2
Operating Temperature	Topr		-40~85	°C	
Storage Temperature	Tstg		-40~110	°C	
Soldering Temperature	Tsol		260	°C	

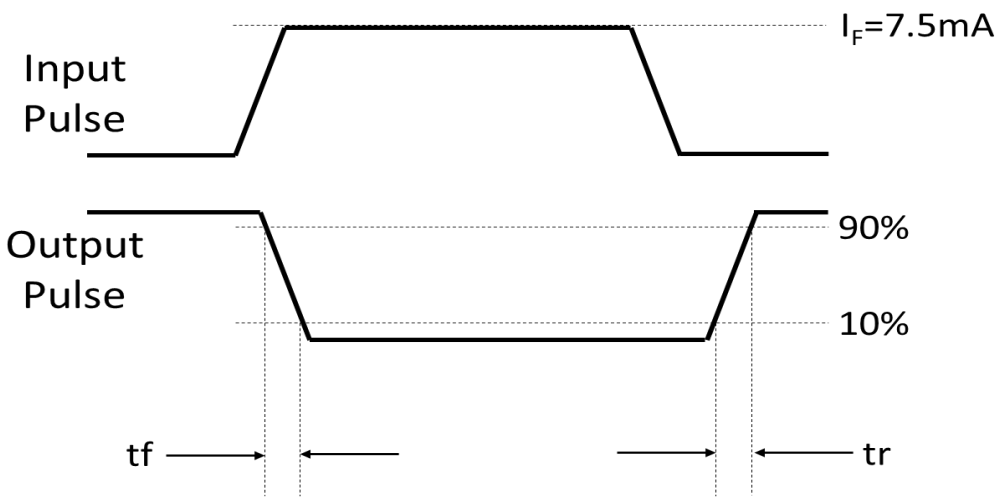
Note 1. AC For 1 Minute, R.H. = 40 ~ 60%

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	IF=10mA	
Reverse Current	I_R	-	-	1	μA	VR=5V	
OUTPUT							
Off State Leakage Current	I_{LEAK}	-	-	1	μA	V_L=Rated V_L, IF=0	
On Resistance	$Rd_{(ON)}A$	-	42	70	Ω	IF=5mA, IL=Rated IL t=1s	
	$Rd_{(ON)}B$		28	50	Ω		
	$Rd_{(ON)}C$		14	30	Ω		
Output Capacitance	C_{OUT}	-	30	-	pF	VL=0, f=1MHz	
TRANSFER CHARACTERISTICS							
Isolation Resistance	R_{ISO}	10^10	-	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C_{IO}	-	1.5	-	pF	VL=0, f=1MHz	
LED turn on Current	I_F(on)	-	1.1	3	mA	IL=Rated IL	
LED turn off Current	I_F(off)	0.4	1.1	-	mA		
Turn On Time	Ton	-	0.2	3	ms	IF=10mA, IL=Rated IL RL=200Ω	
Turn Off Time	Toff	-	0.2	0.5	ms		

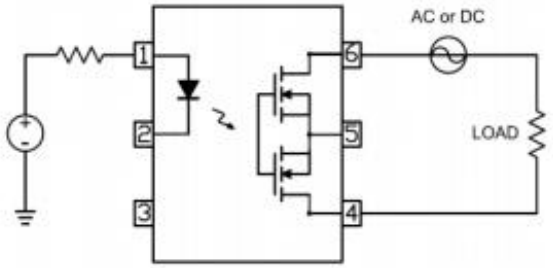
TEST CIRCUITS

Waveforms of tr, tf

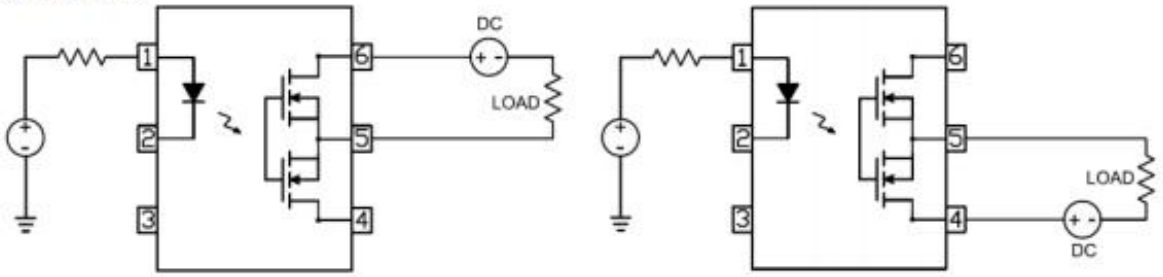


On Resistance test

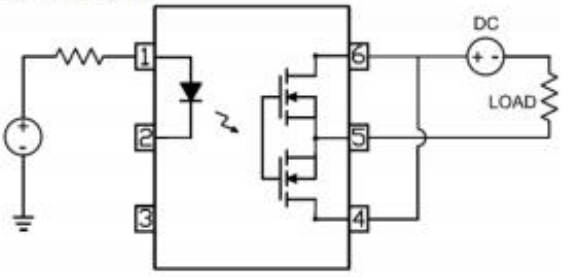
Connection A



Connection B



Connection C



CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

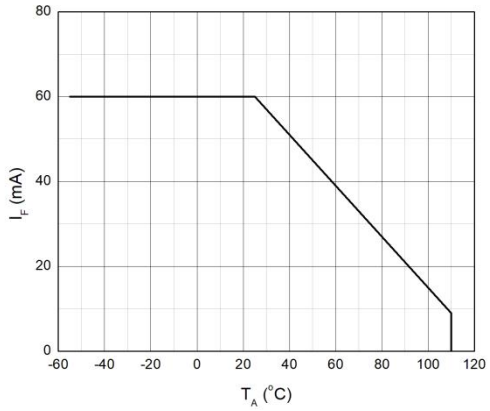


Fig.2 Collector Power Dissipation vs. Ambient Temperature

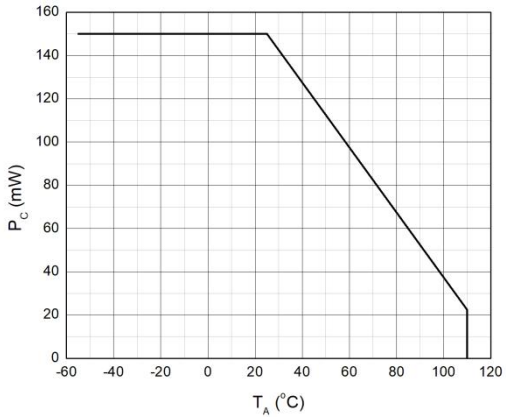


Fig.3 Forward Current vs. Forward Voltage

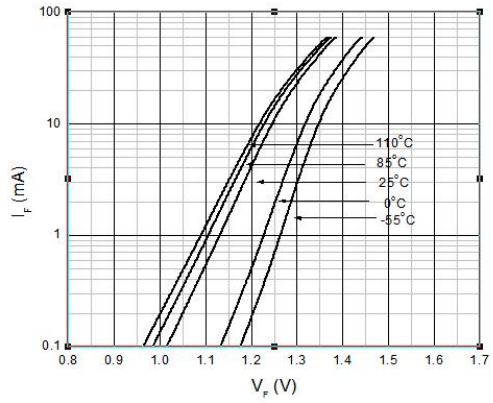


Fig.4 On Resistance vs. Ambient Temperature

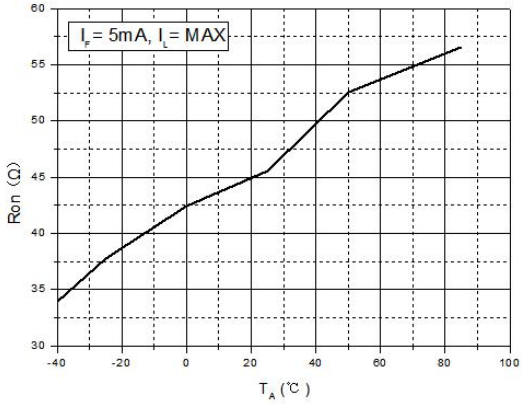


Fig.5 Switching Time vs. Ambient Temperature

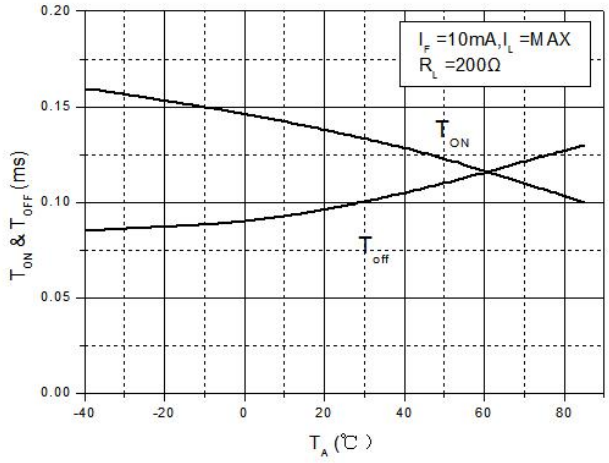
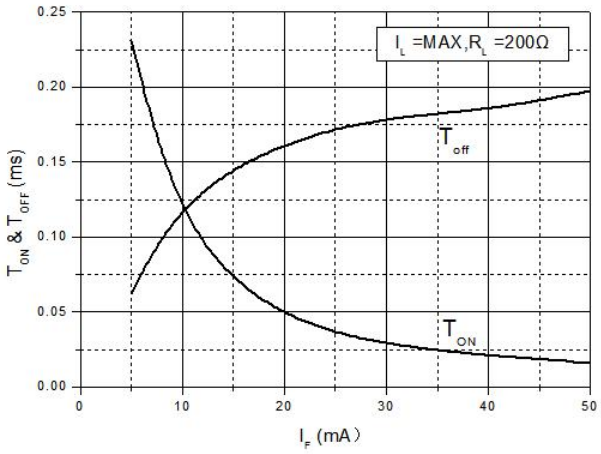


Fig.6 Switching Time vs.LED Forward Current



CHARACTERISTIC CURVES

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

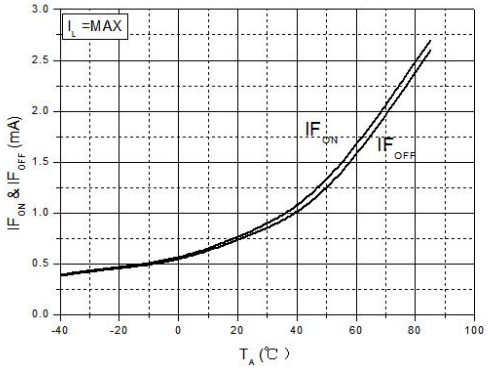


Fig.8 Load Current vs. Load voltage

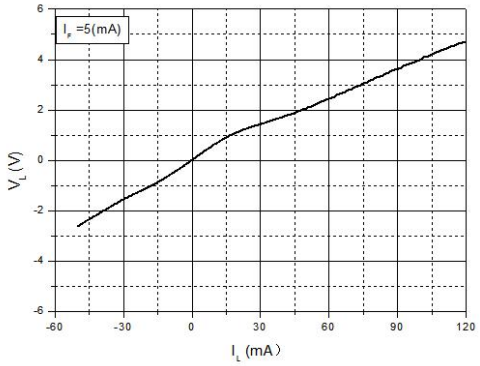


Fig.9 Off State Leakage Current vs. Load voltage

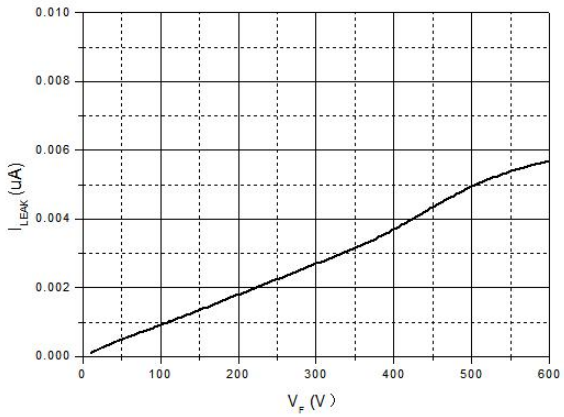
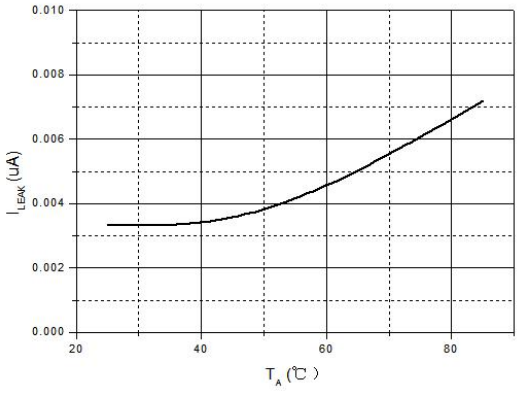
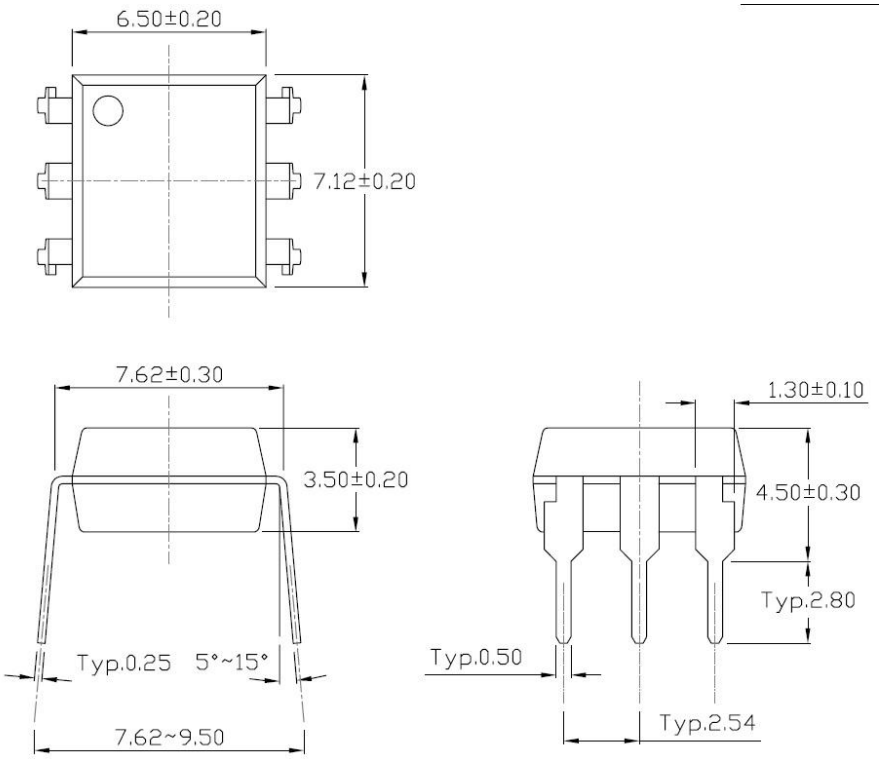


Fig.10 Off State Leakage Current vs. Ambient Temperature

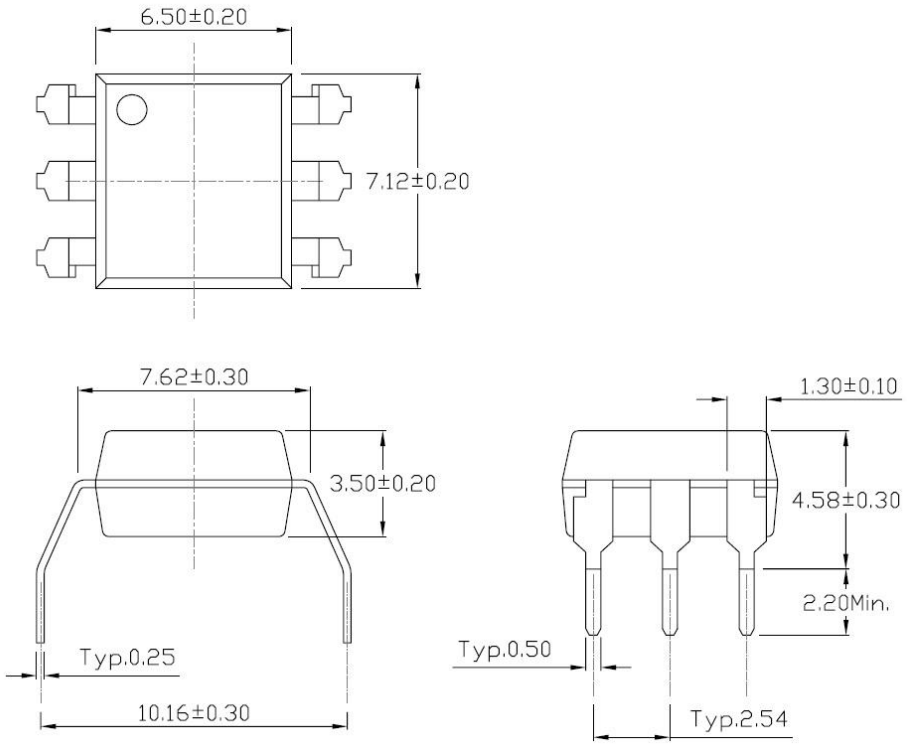


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)

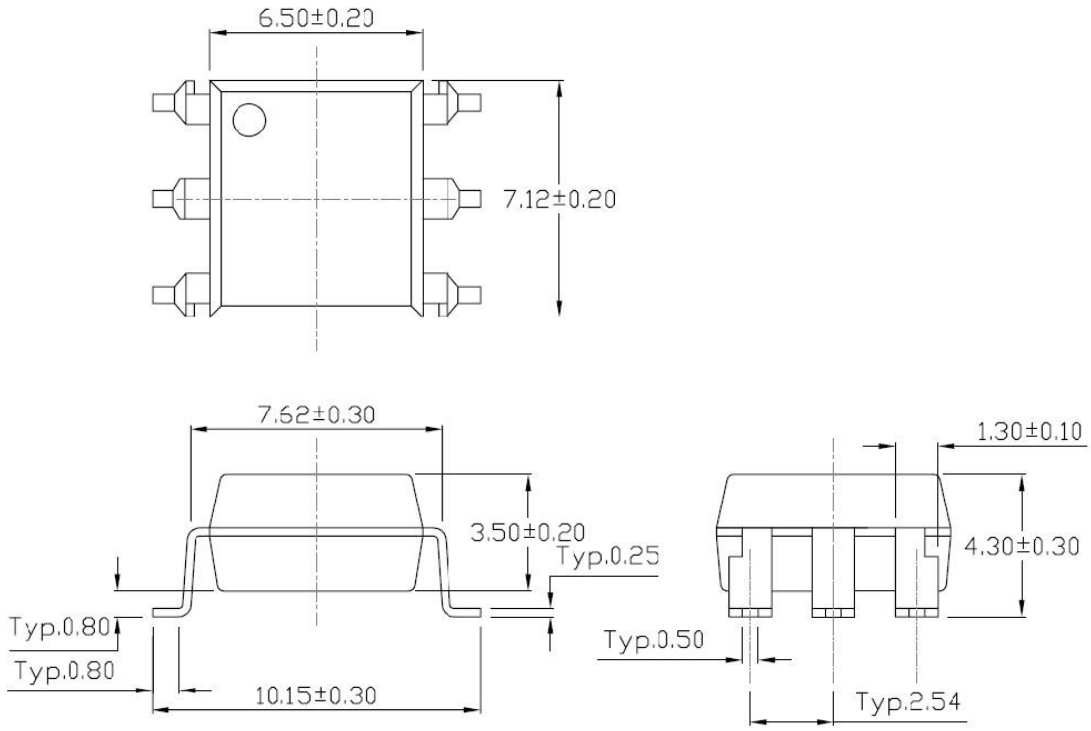


Gullwing (400mil) Lead Forming – Through Hole (M Type)

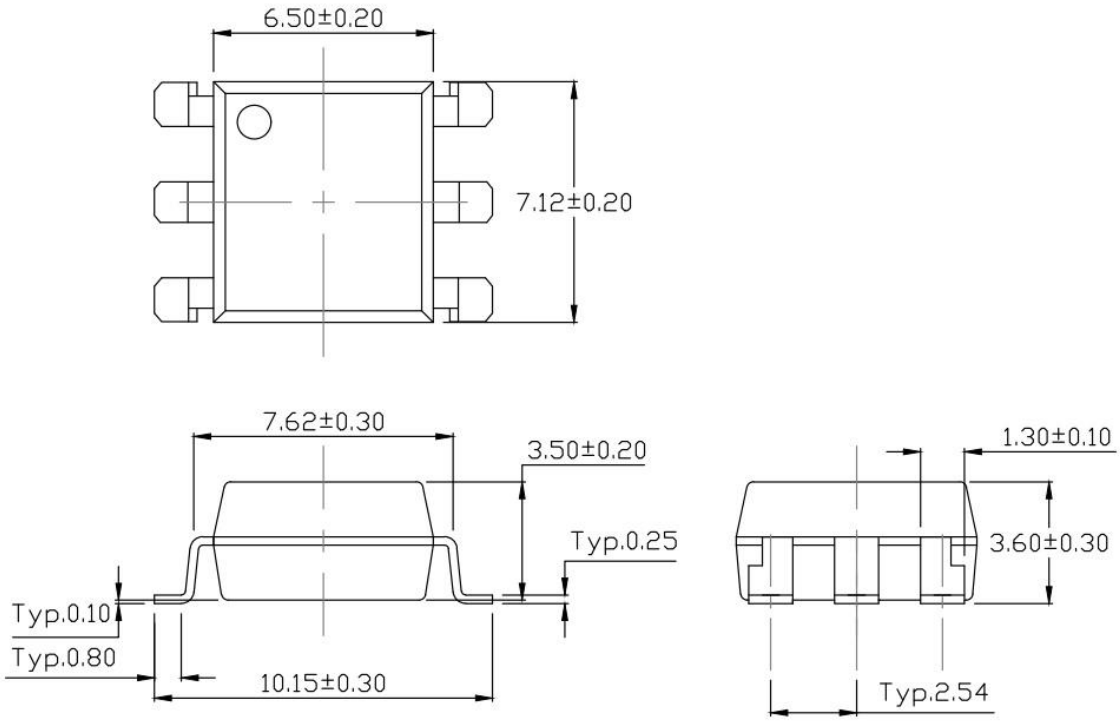


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (S Type)

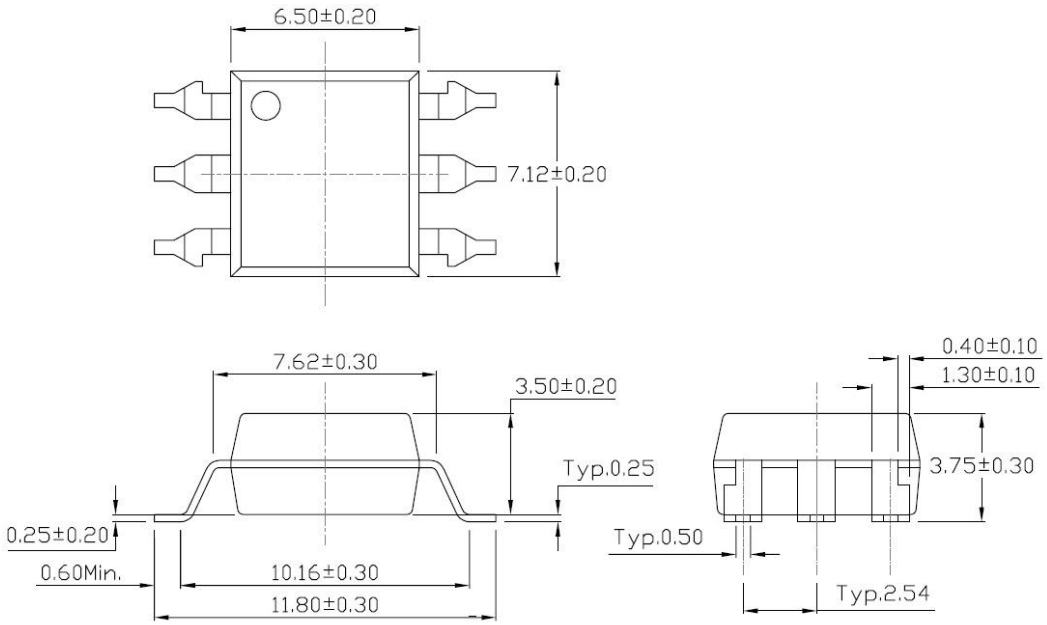


Surface Mount (Low Profile) Lead Forming (SL Type)



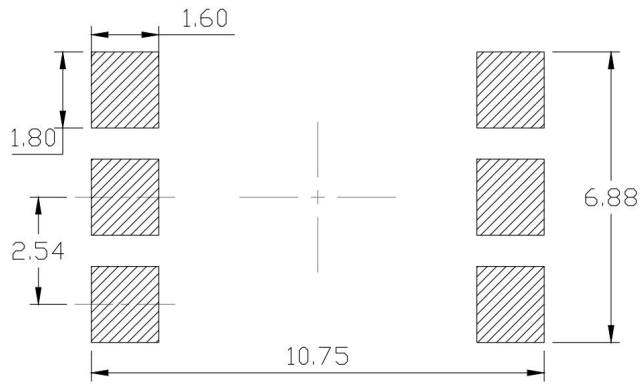
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

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

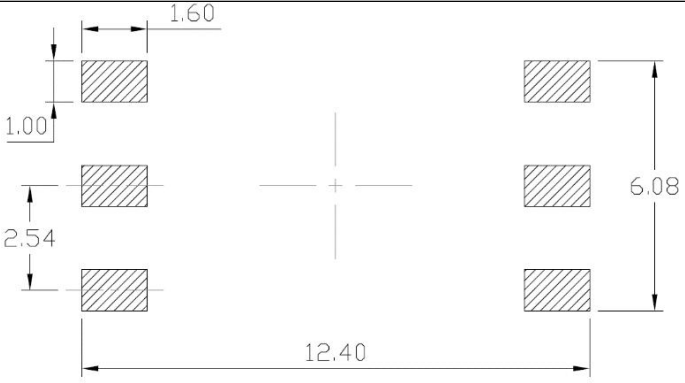


Recommended Solder Mask (Dimensions in mm unless otherwise stated)

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

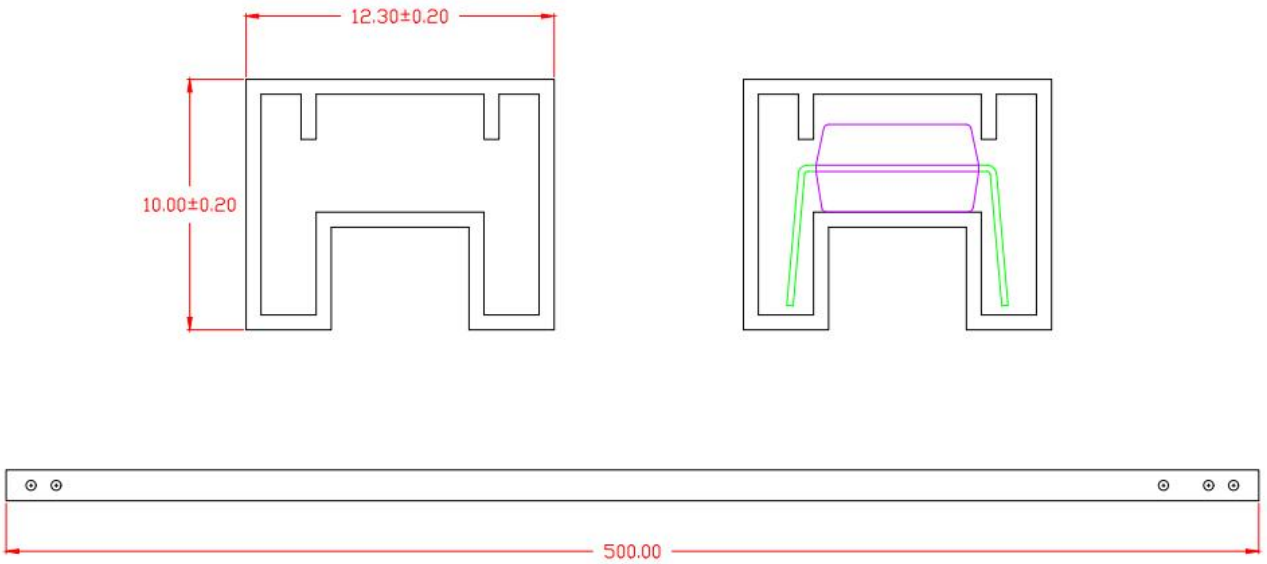


Surface Mount (Gullwing) Lead Forming

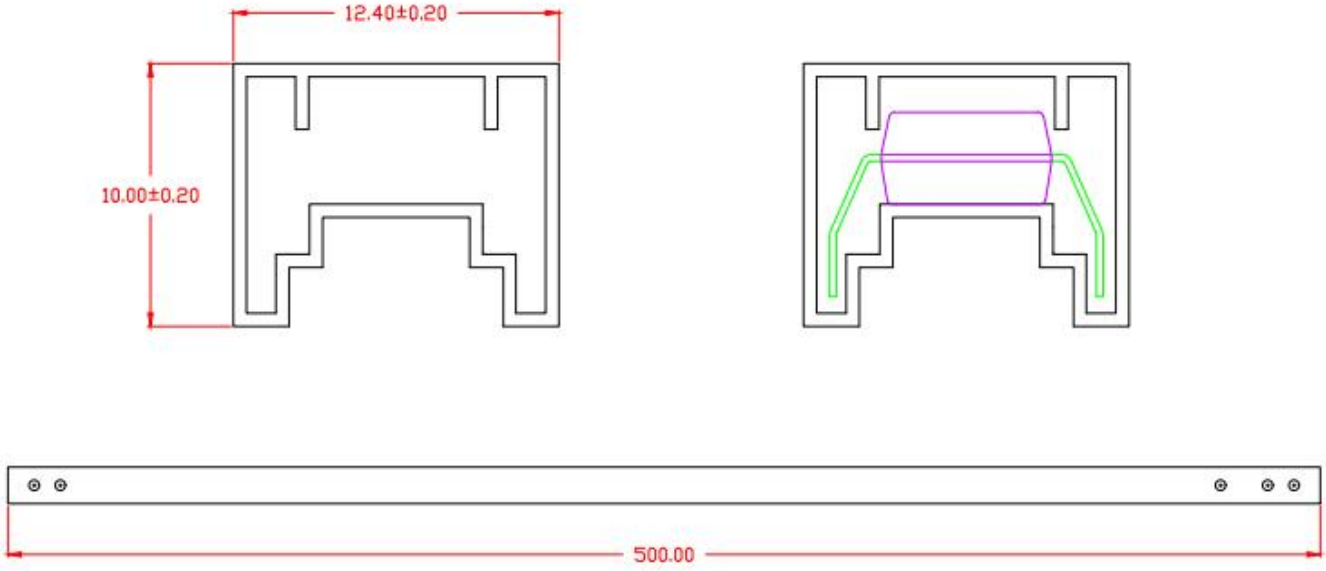


TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP

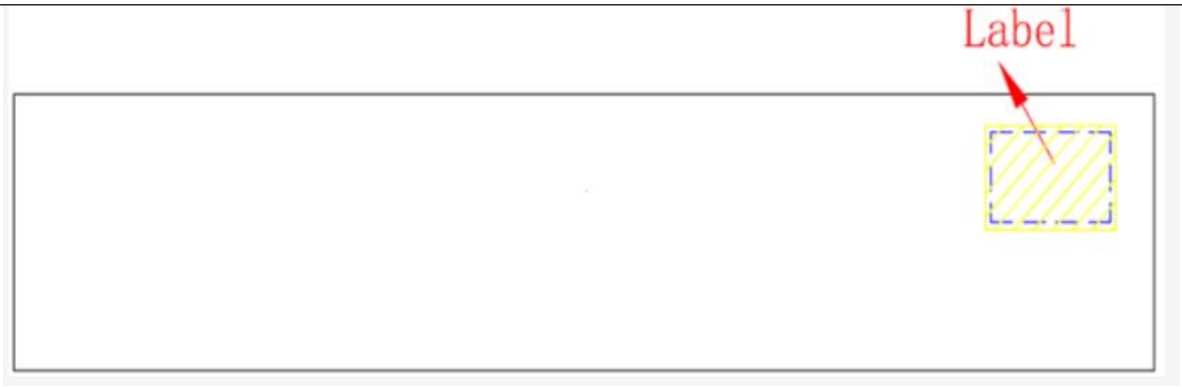


Option M



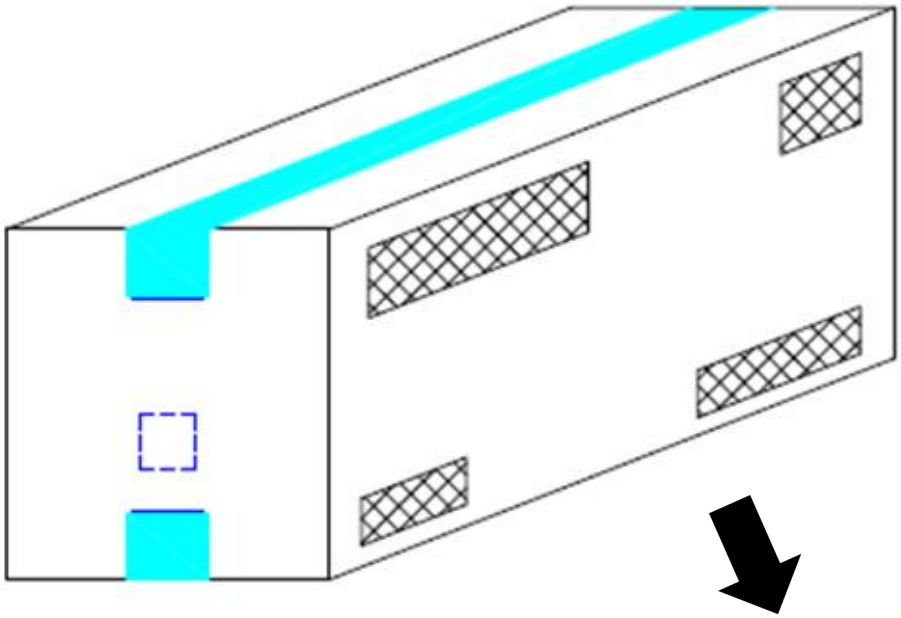
BOX SPECIFICATIONS (Tube Type)

Inner Box



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

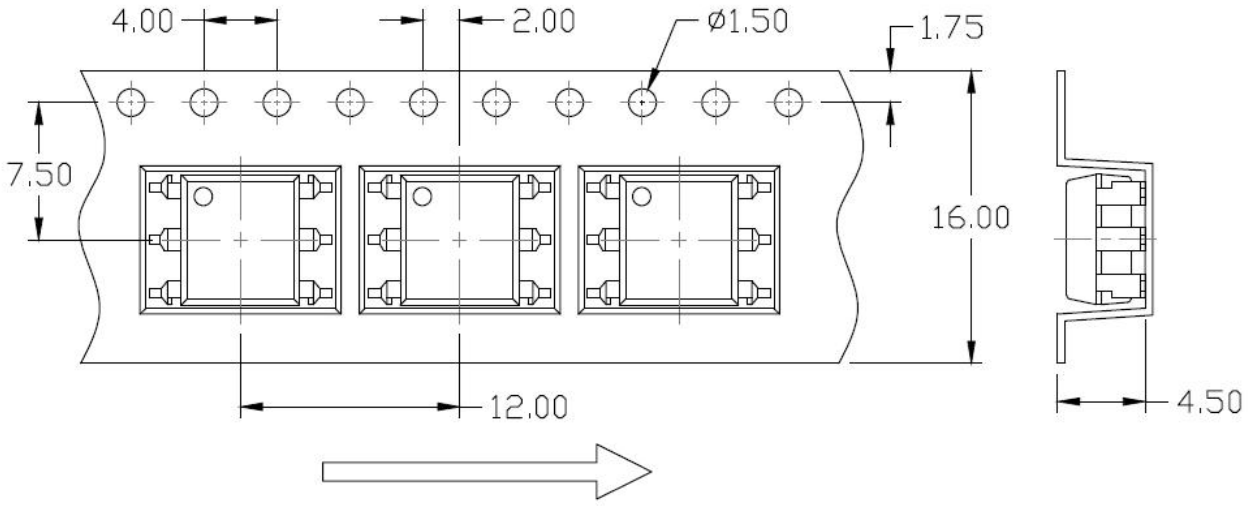
Outer Box



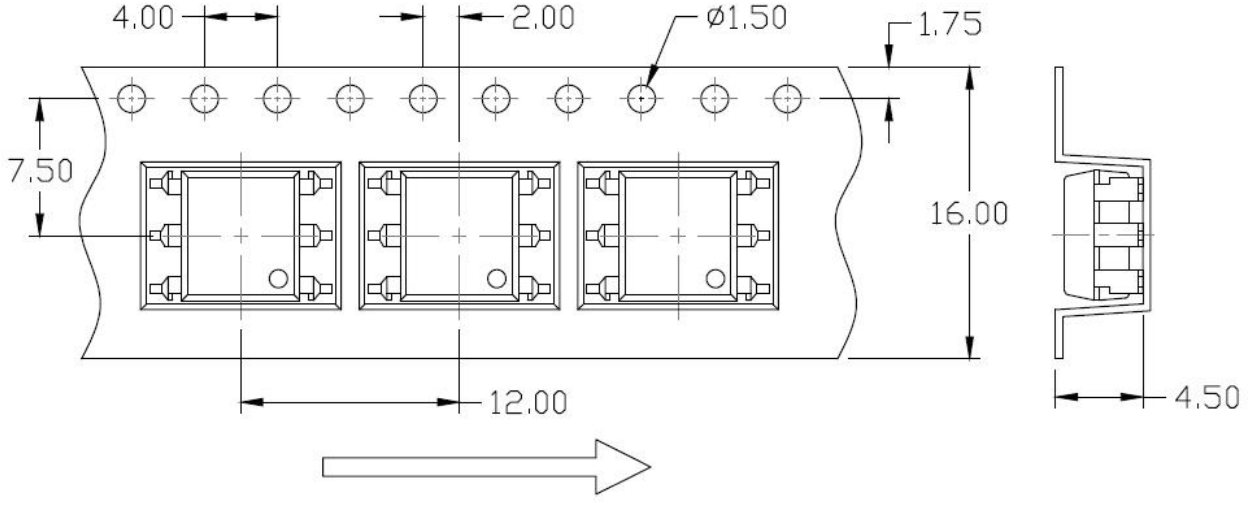
L x W x H = 53.5cm x 23.5cm x 25.5cm

CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1)

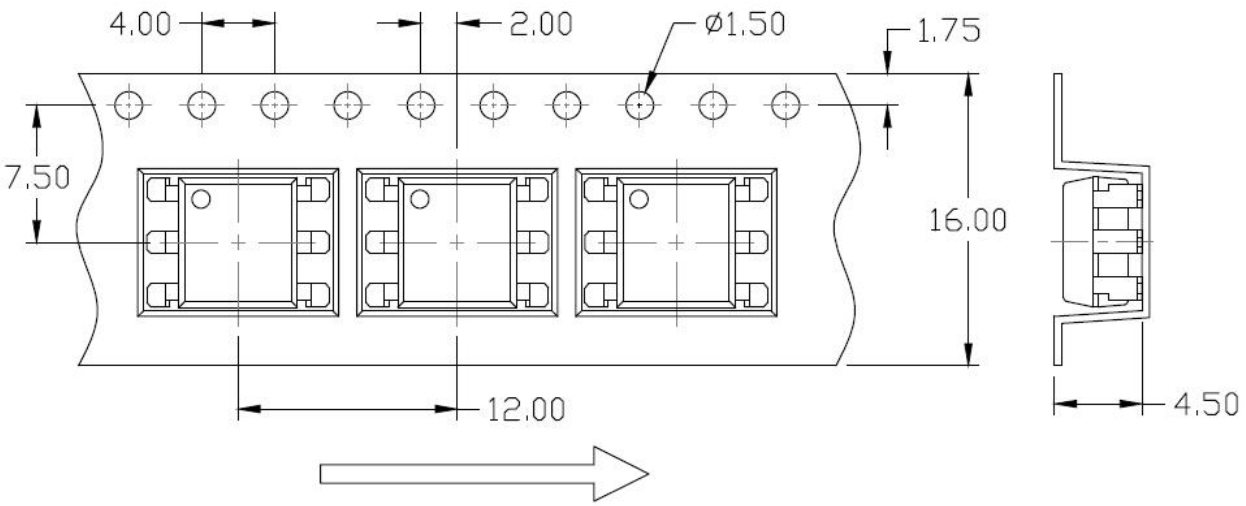


Option S(T2)

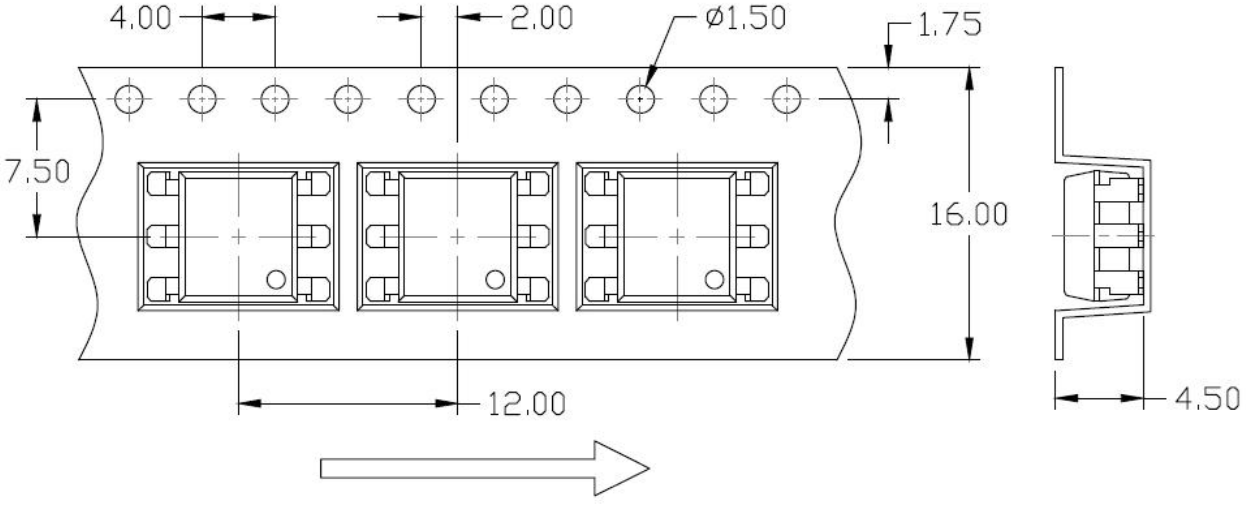


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL(T1)

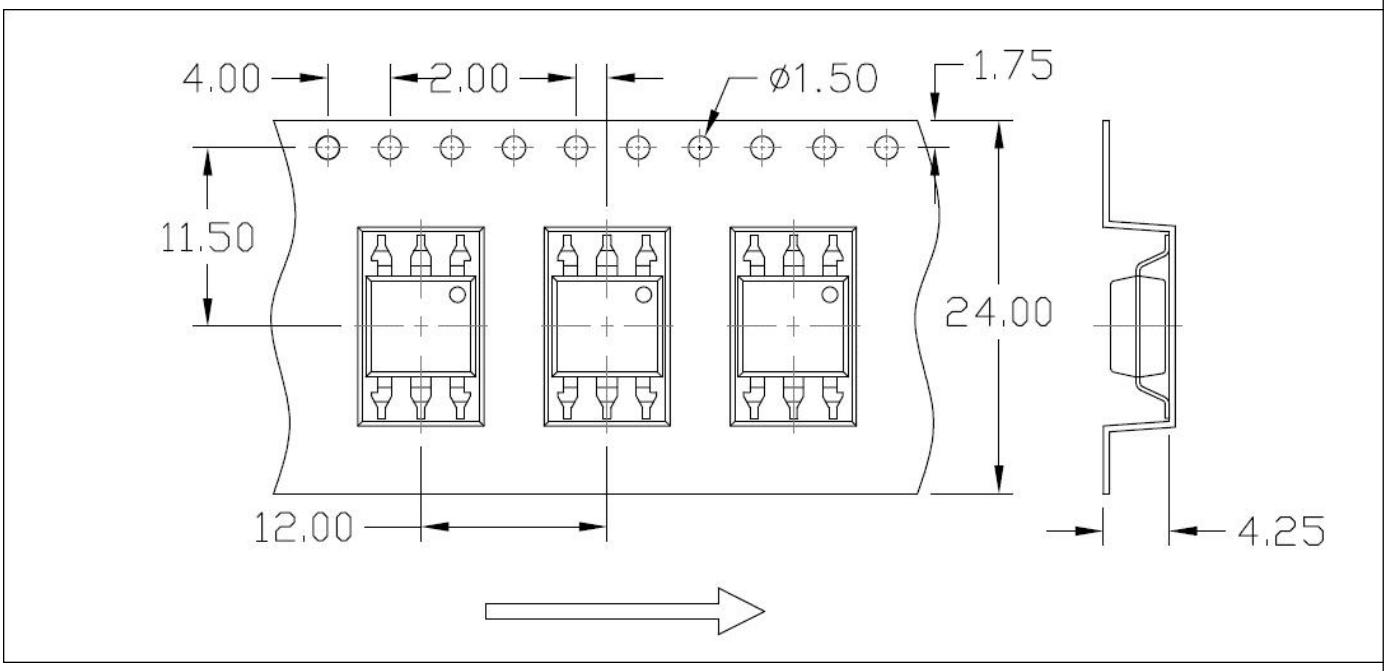


Option SL(T2)

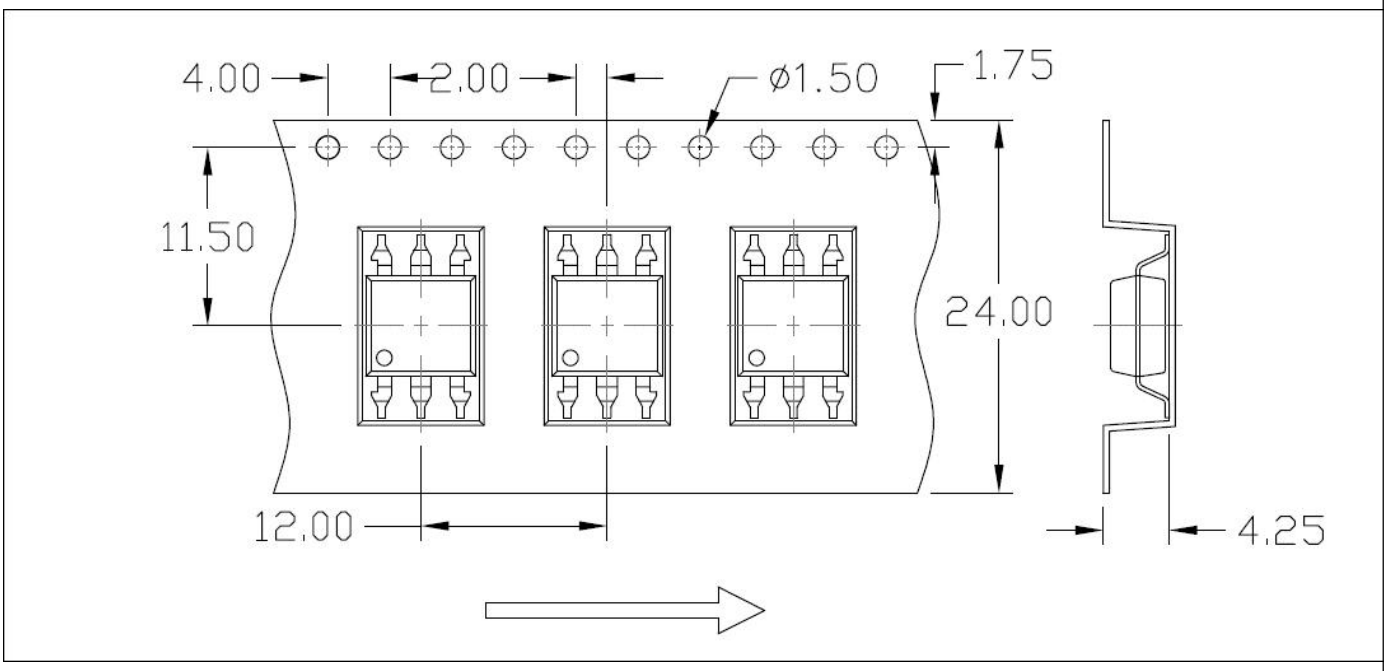


Carrier Tape Specifications (Dimensions in mm unless otherwise stated)

Option SLM(T1)

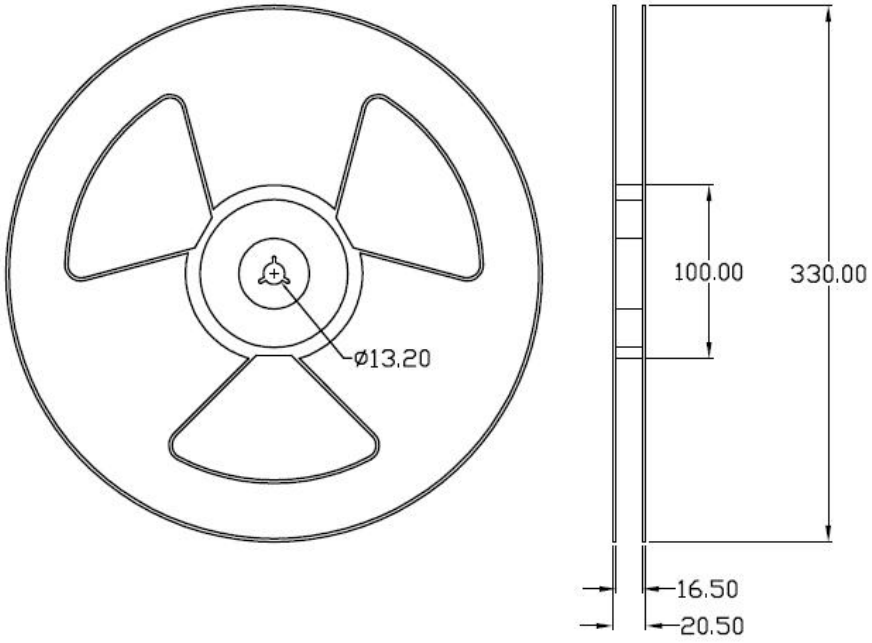


Option SLM(T2)

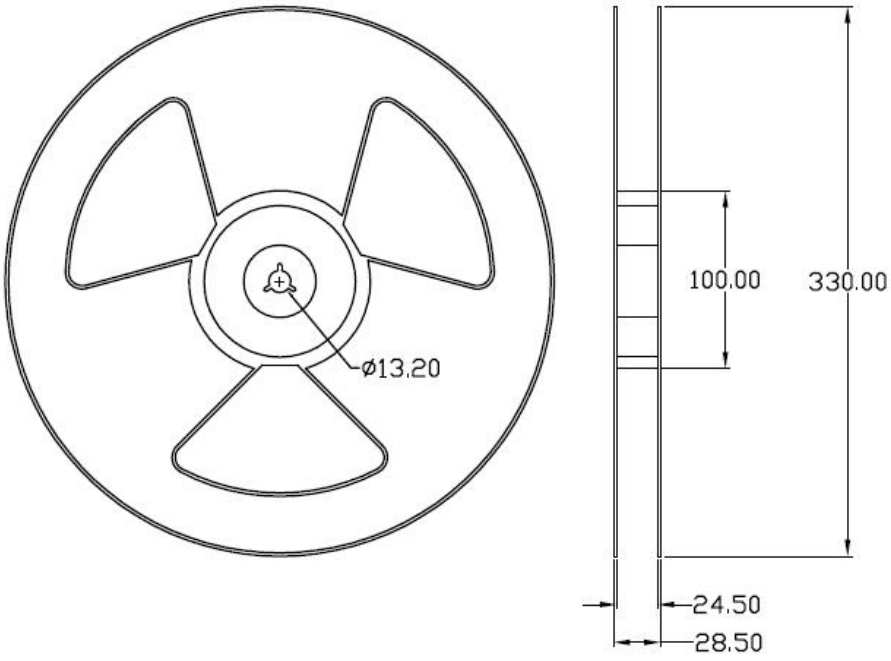


REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S & Option SL

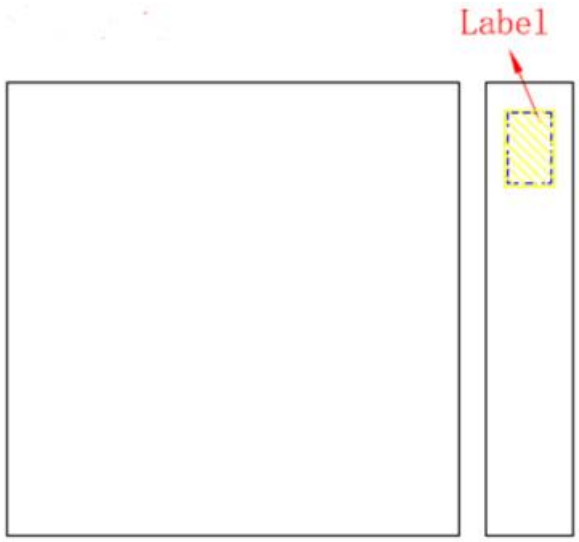


Option SLM



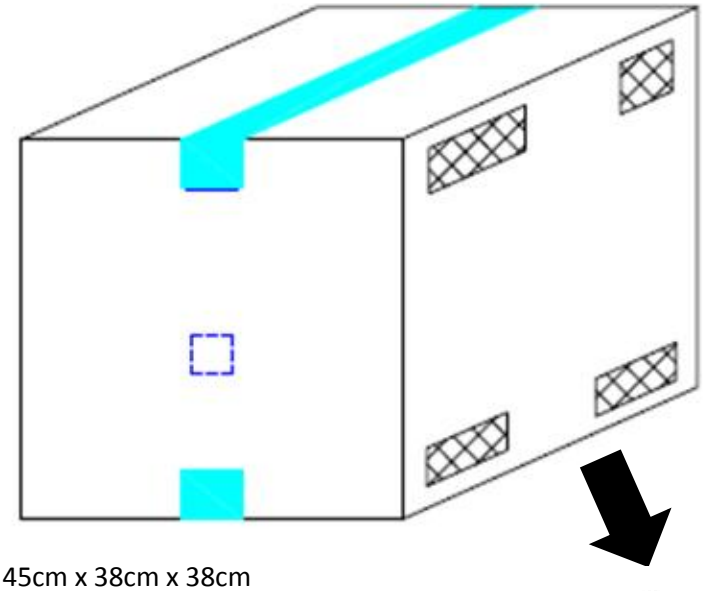
BOX SPECIFICATIONS (Reel Type)

Inner Box

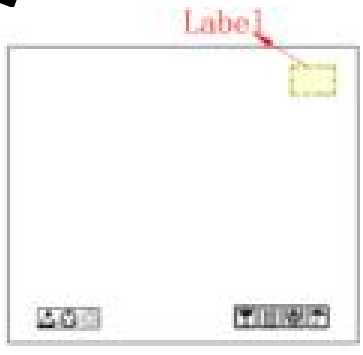


- L x W x H = 36cm x 36cm x 6.9cm

Outer Box

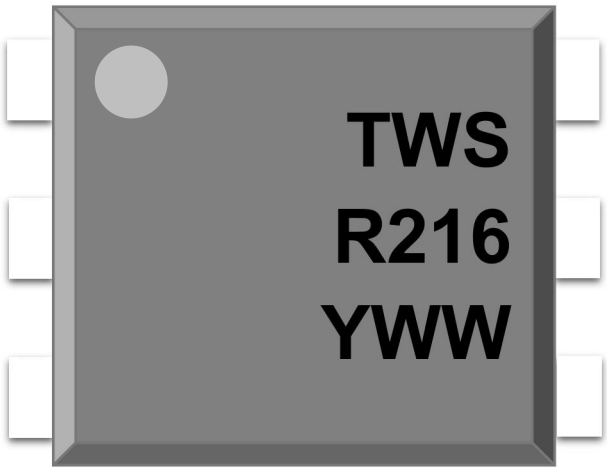


- Option1：L x W x H = 45cm x 38cm x 38cm
- Option2：L x W x H = 39cm x 38cm x 38cm



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



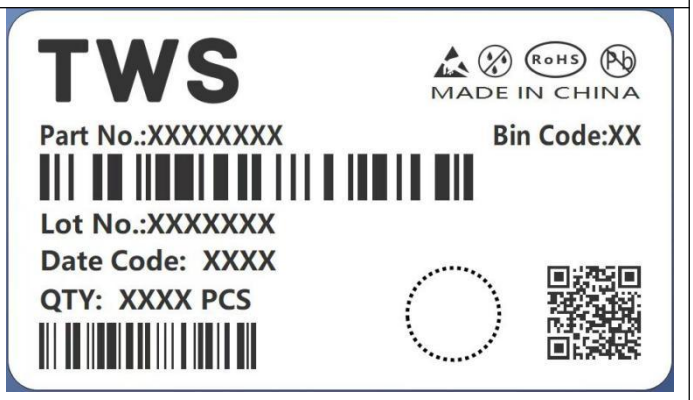
TWS : Company Abbr.
R216 : Part Number & Rank
Y : Fiscal Year
WW : Work Week

ORDERING INFORMATION

TWSR216-6L(Y)(Z)-G

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

LABEL INFORMATION

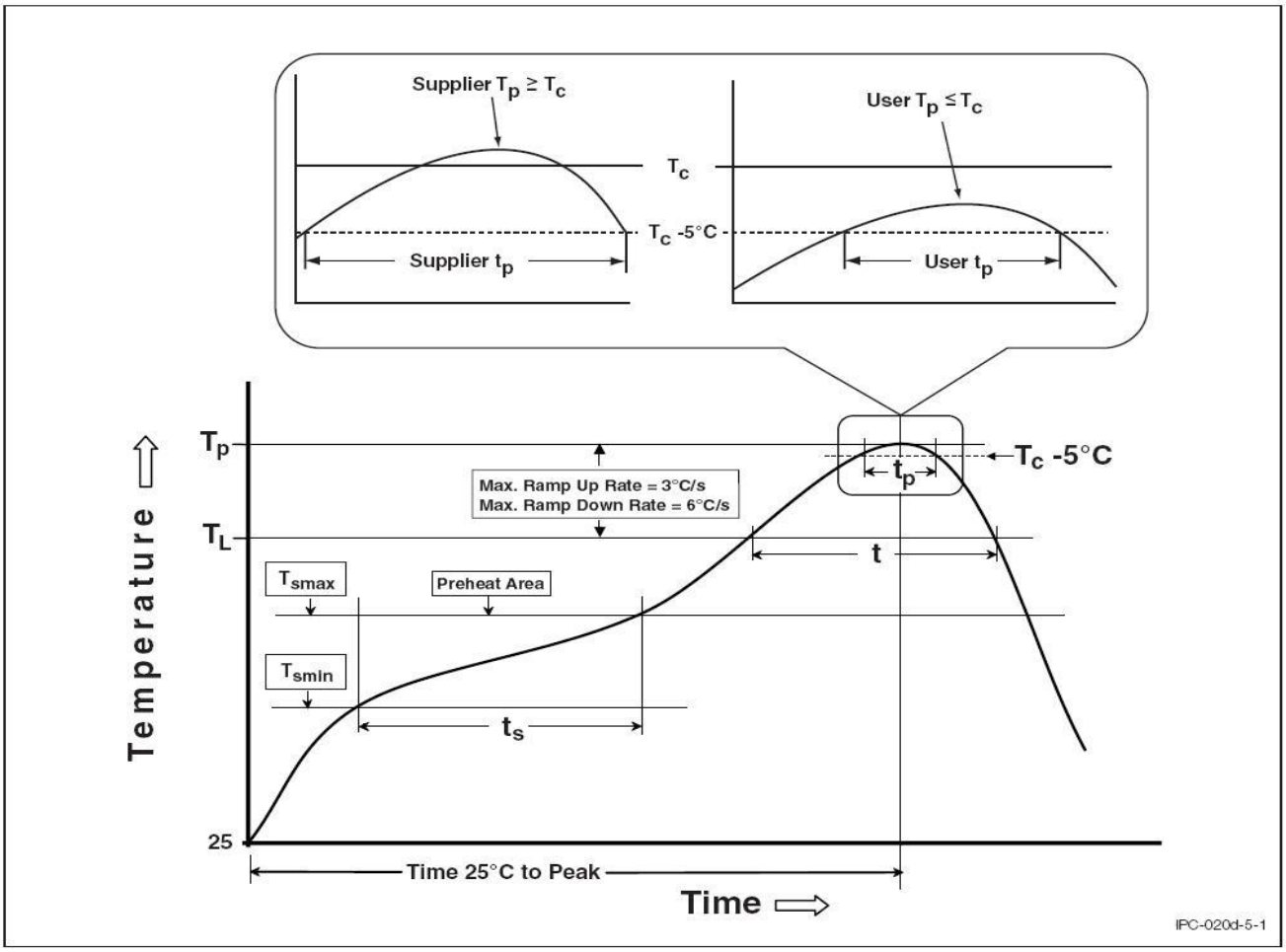


PACKING QUANTITY

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

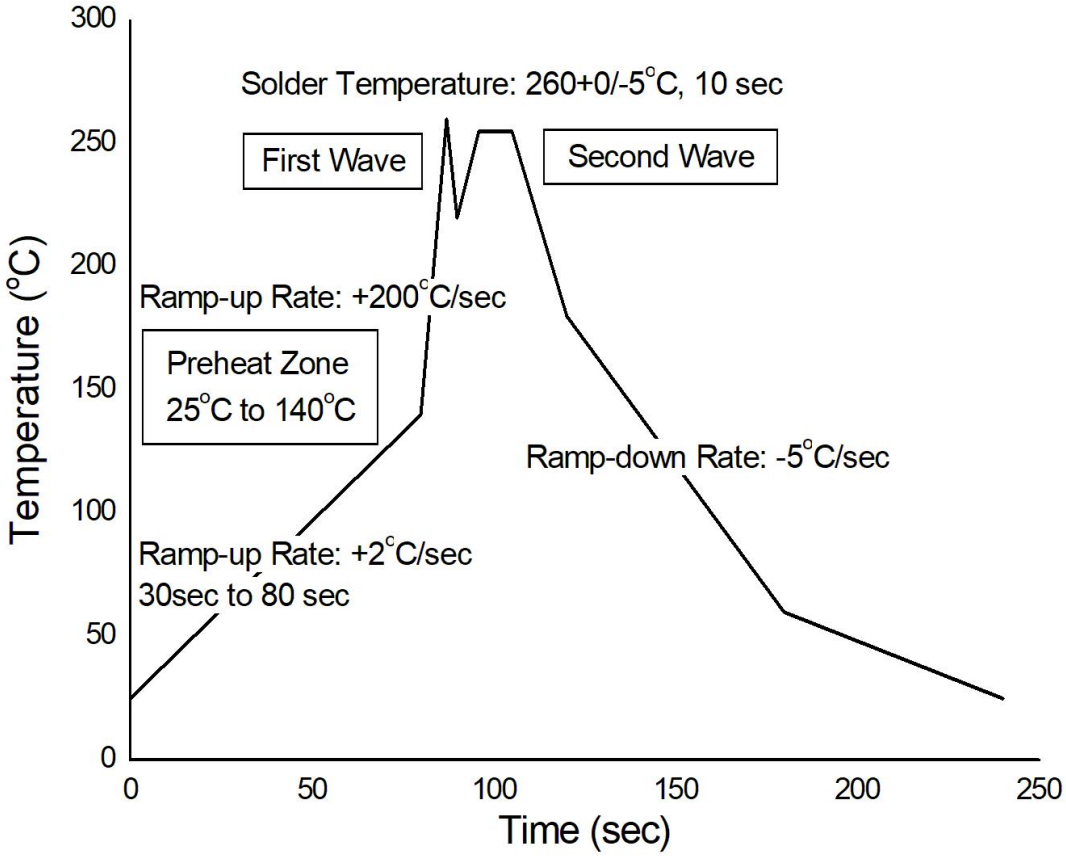
REFLOW PROFILE



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	100	150°C
Temperature Max. (Tsmax)	150	200°C
Time (ts) from (Tsmin to Tsmax)	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+0/-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.