ISP817 Series

DIP4, DC Input, Photo Transistor Coupler

Description

The ISP817 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP4 package with different lead forming options.

With the robust coplanar double mold structure, ISP817 series provide the most stable isolation feature.

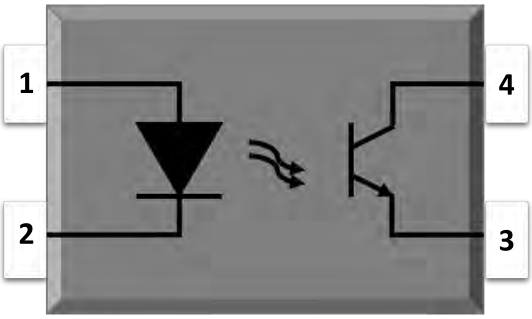
Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- RoHS & REACH Compliance
- MSL class 1
- Halogen free (Optional)
- Regulatory Approvals
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC - GB4943.1, GB8898
  - cUL- CSA Component Acceptance Service Notice No. 5A

Applications

- Switch mode power supplies
- Programmable controllers
- Household appliances
- Office equipment

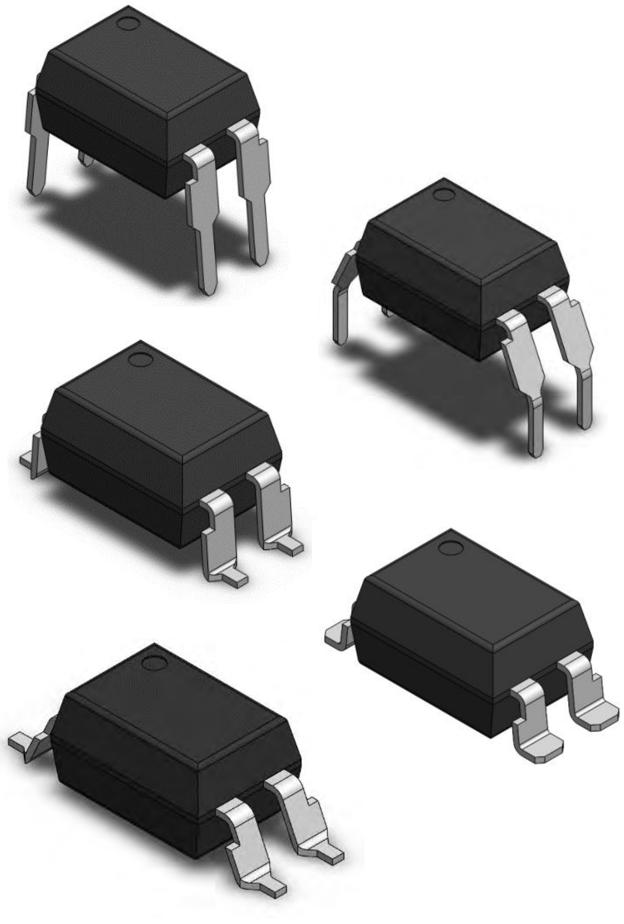
SCHEMATIC



PIN DEFINITION

1. **Anode**
2. **Cathode**
3. **Emitter**
4. **Collector**

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				
Collector - Emitter Voltage	V_{CEO}	35	V	
Emitter - Collector Voltage	V_{ECO}	6	V	
Collector Current	I_C	50	mA	
Output Power Dissipation	P_O	150	mW	
COMMON				
Total Power Dissipation	Ptot	200	mW	
Isolation Voltage	Viso	5000	Vrms	2
Operating Temperature	Topr	-55~110	°C	
Storage Temperature	Tstg	-55~125	°C	
Soldering Temperature	Tsol	260	°C	

Note 1. 100µs pulse, 100Hz frequency

Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

PARAMETER		SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT								
Forward Voltage		V_F	-	1.24	1.4	V	IF=10mA	
Reverse Current		I_R	-	-	10	μA	VR=6V	
Input Capacitance		Cin	-	10	-	pF	V=0, f=1kHz	
OUTPUT								
Collector Dark Current		I_{CEO}	-	-	100	nA	VCE=20V, IF=0	
Collector-Emitter Breakdown Voltage		BV_{CEO}	35	-	-	V	IC=0.1mA, IF=0	
Emitter-Collector Breakdown Voltage		BV_{ECO}	6	-	-	V	IE=0.1mA, IF=0	
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	ISP817A	CTR	80	-	160	%	IF=5mA, VCE=5V	
	ISP817B		130	-	260			
	ISP817C		200	-	400			
	ISP817D		300	-	600			
	ISP817E		100	-	200			
	ISP817F		150	-	300			
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	-	0.06	0.2	V	IF=20mA, IC=1mA	
Isolation Resistance		R_{ISO}	10^12	10^14	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance		C_{IO}	-	0.4	1	pF	V=0, f=1MHz	
Response Time (Rise)		tr	-	3	18	μs	VCE=2V, IC=2mA RL=100Ω	3
Response Time (Fall)		tf	-	4	18	μs		3
Cut-off Frequency		fc	-	80	-	kHz	VCE=2V, IC=2mA RL=100Ω,-3dB	4

Note 3. Fig.12&13

Note 4. Fig.14

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

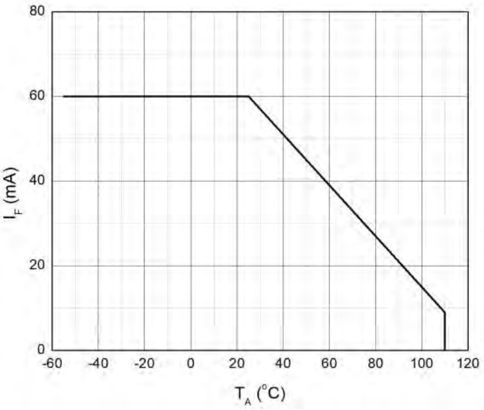


Fig.2 Collector Power Dissipation vs. Ambient Temperature

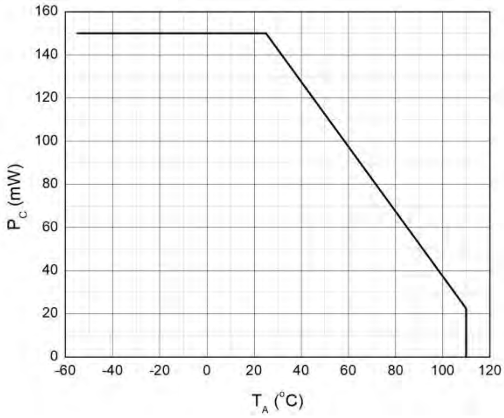


Fig.3 Forward Current vs. Forward Voltage

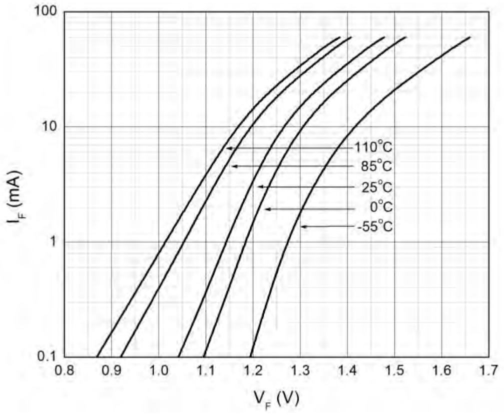


Fig.4 Collector Dark Current vs. Ambient Temperature

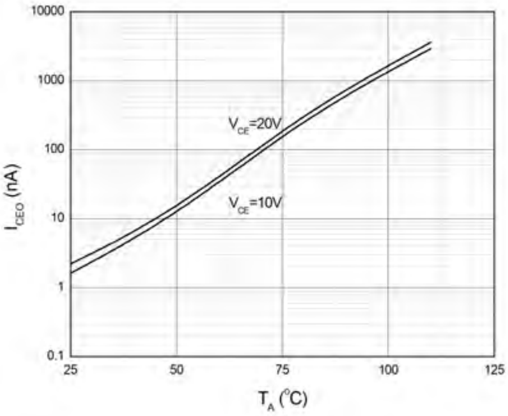


Fig.5 Collector Current vs. Collector-emitter Voltage

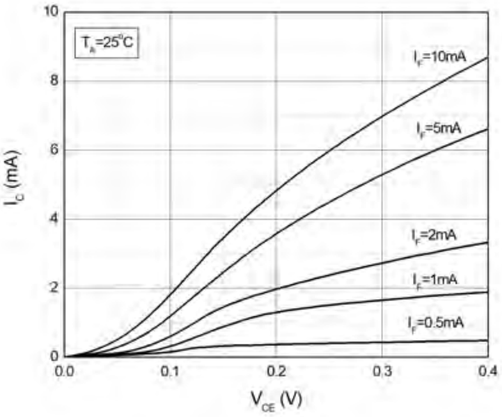
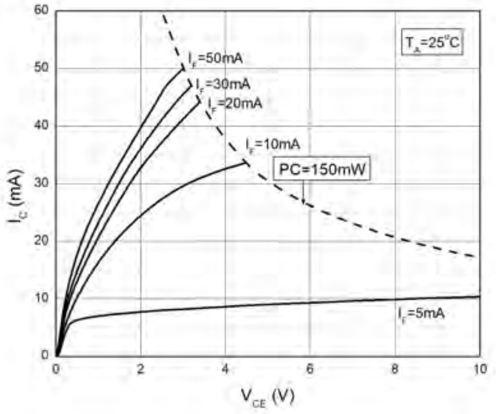


Fig.6 Collector Current vs. Collector-emitter Voltage



CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

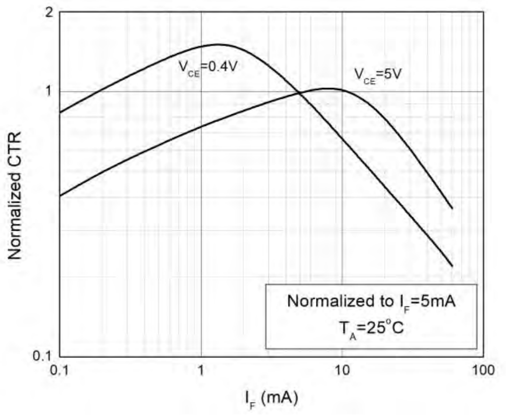


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

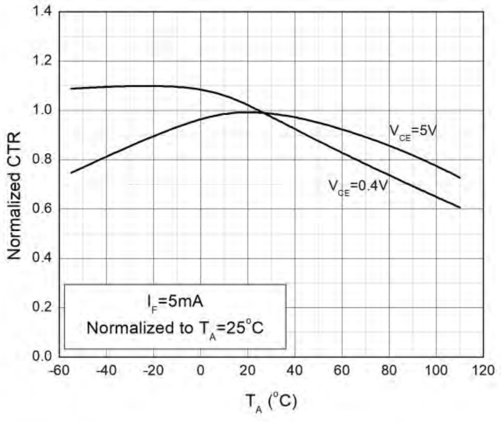


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

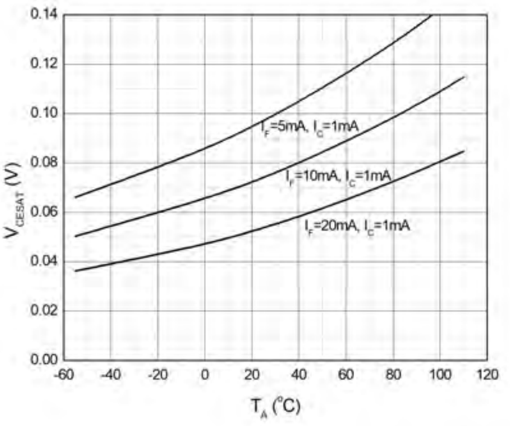


Fig.10 Switching Time vs. Load Resistance

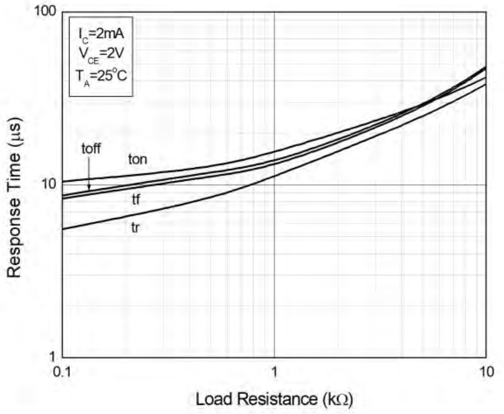
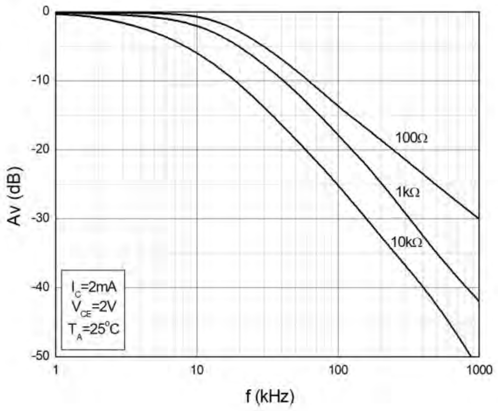


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

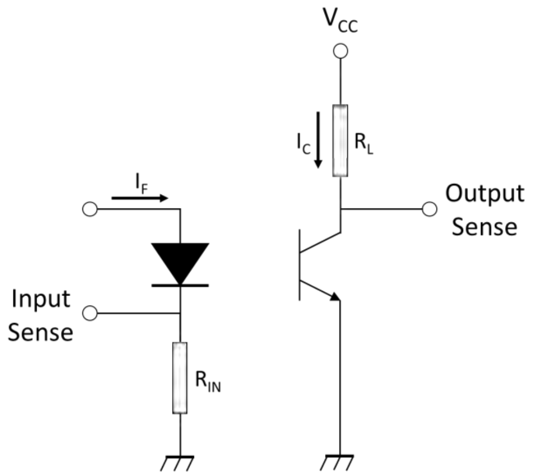


Fig.13 Curves of Response Time

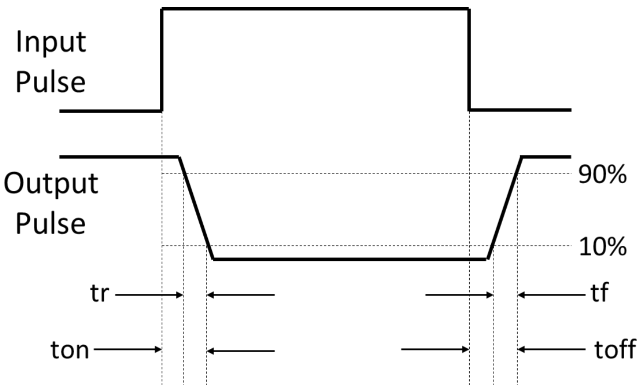
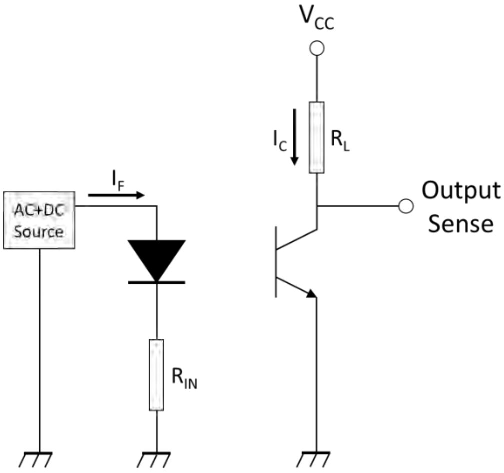
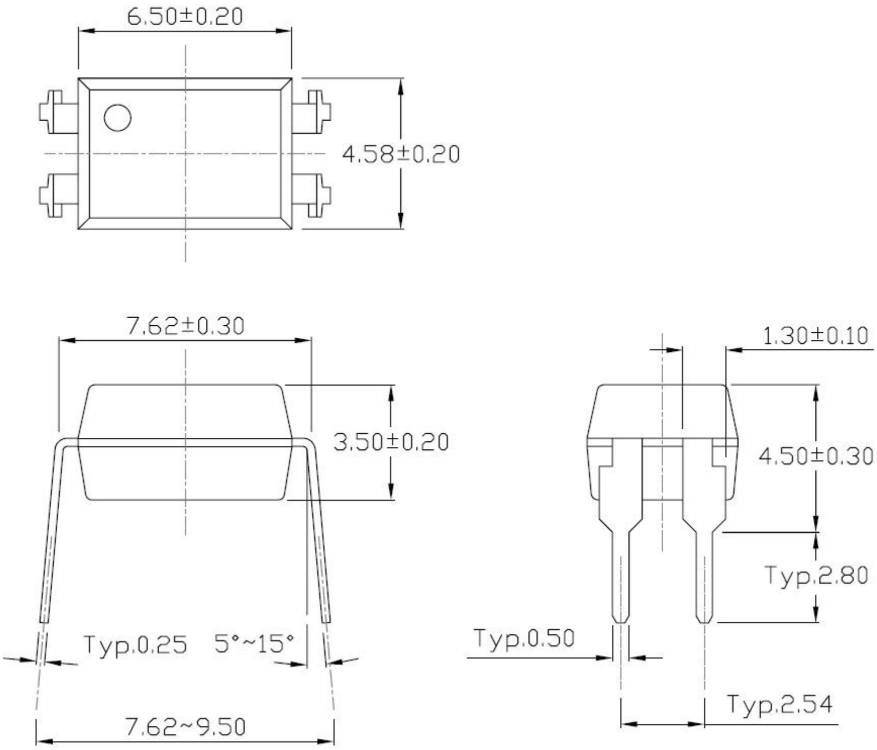


Fig.14 Test Circuits of Frequency Response

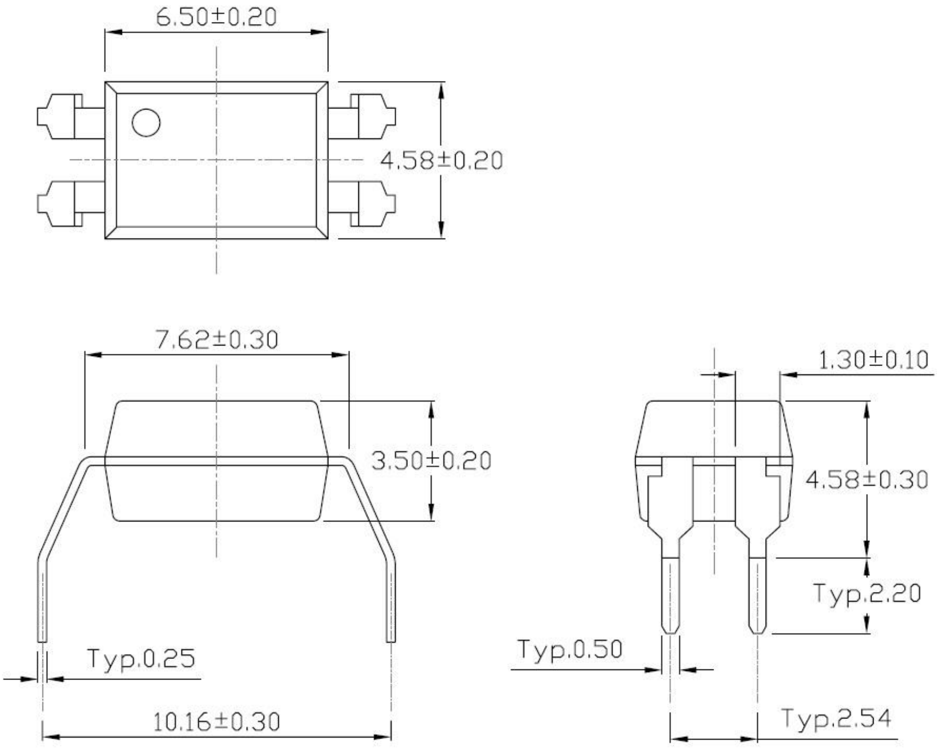


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)

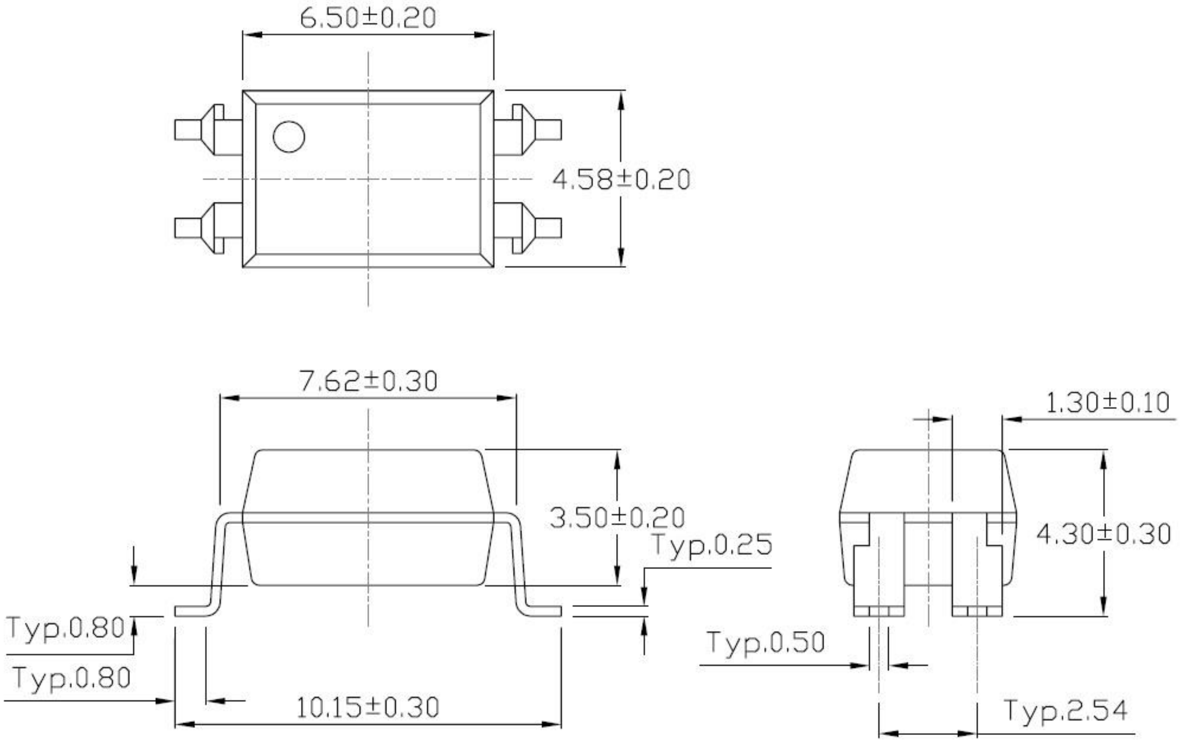


Gullwing (400mil) Lead Forming – Through Hole (M Type)

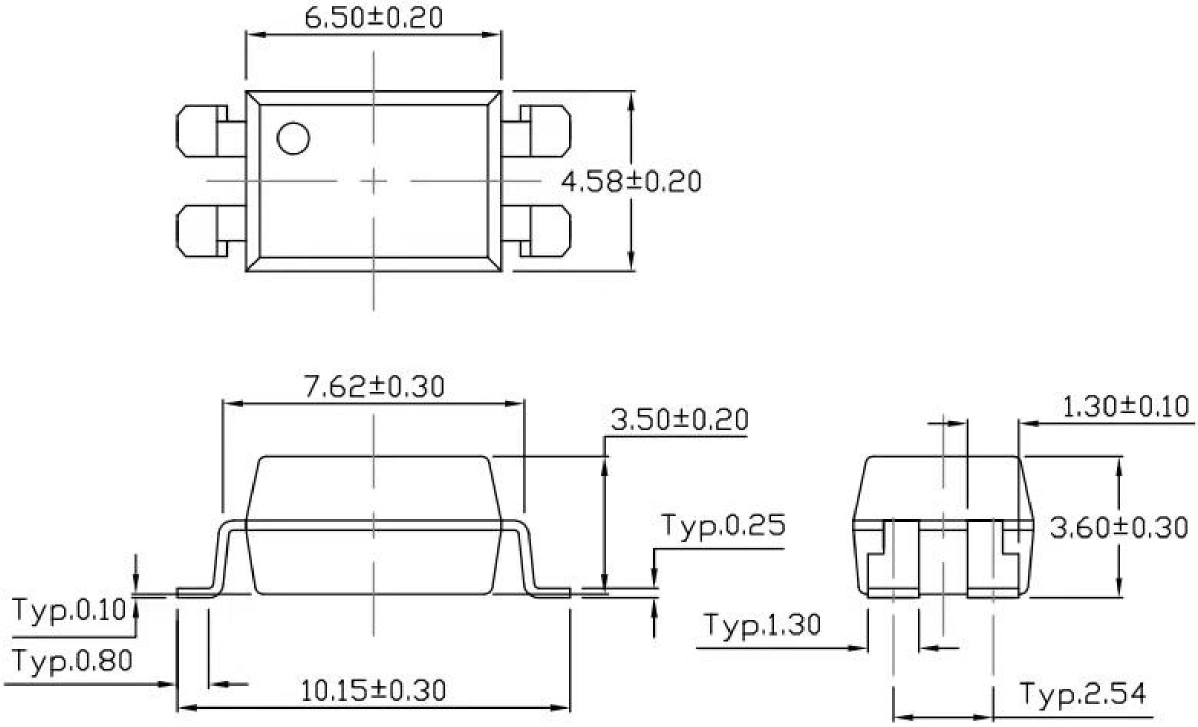


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (S Type)

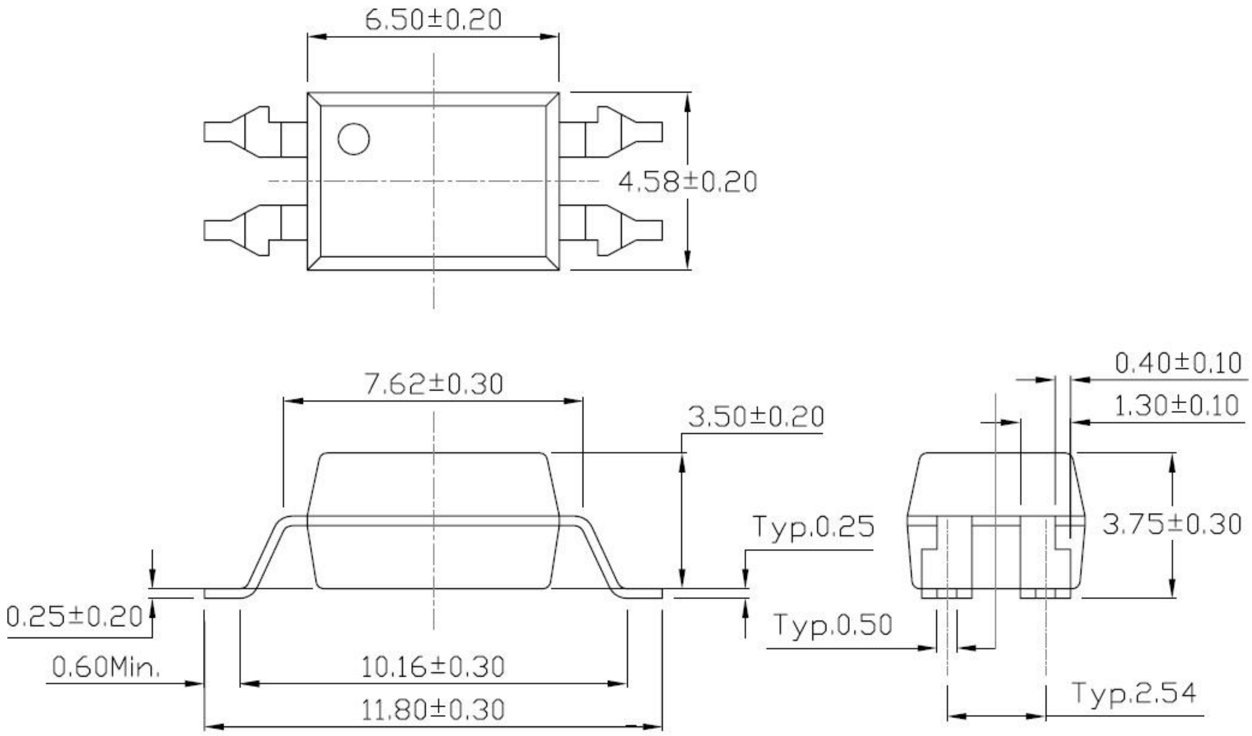


Surface Mount (Low Profile) Lead Forming (SM Type)



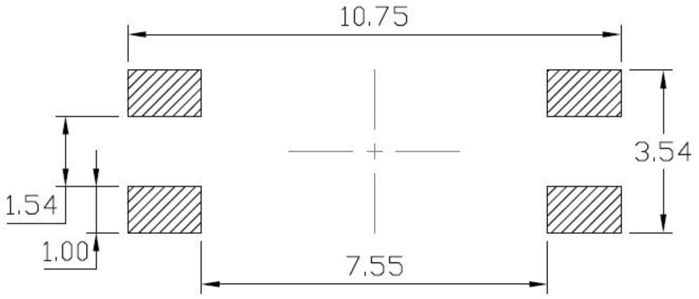
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount (Gullwing) Lead Forming (SLM Type)

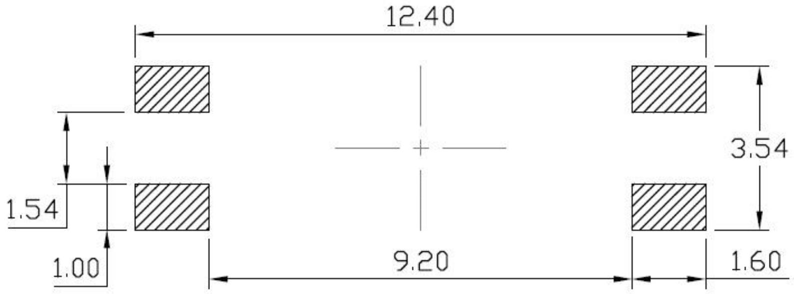


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

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

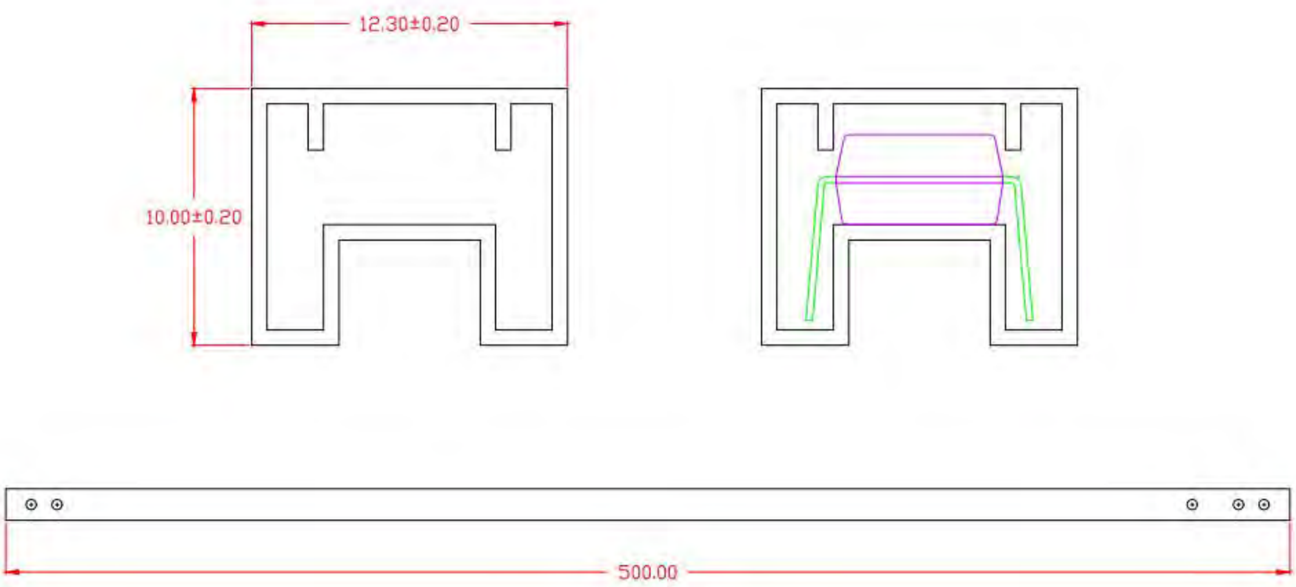


Surface Mount (Gullwing) Lead Forming



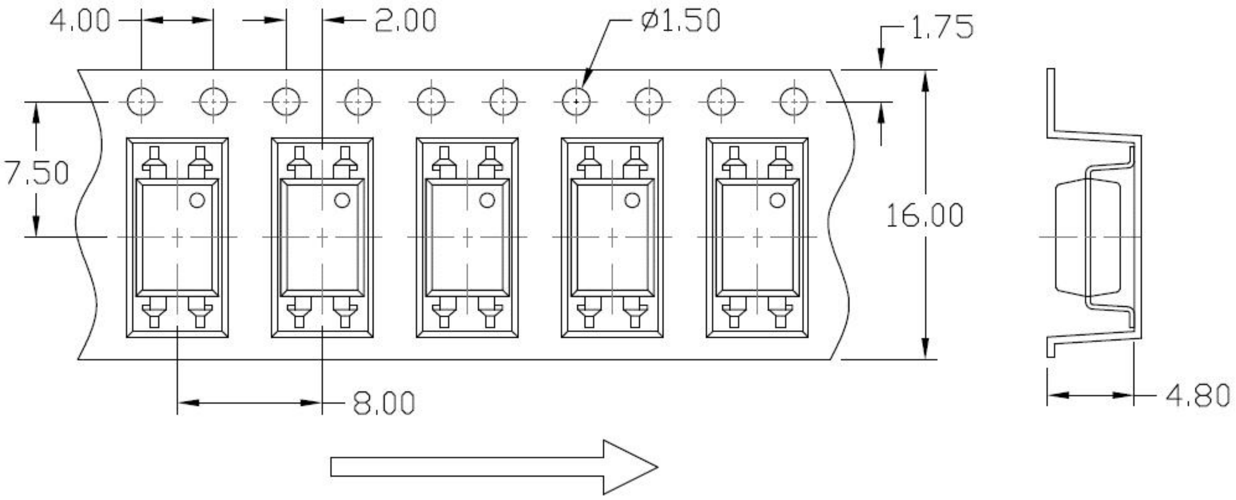
TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP / M

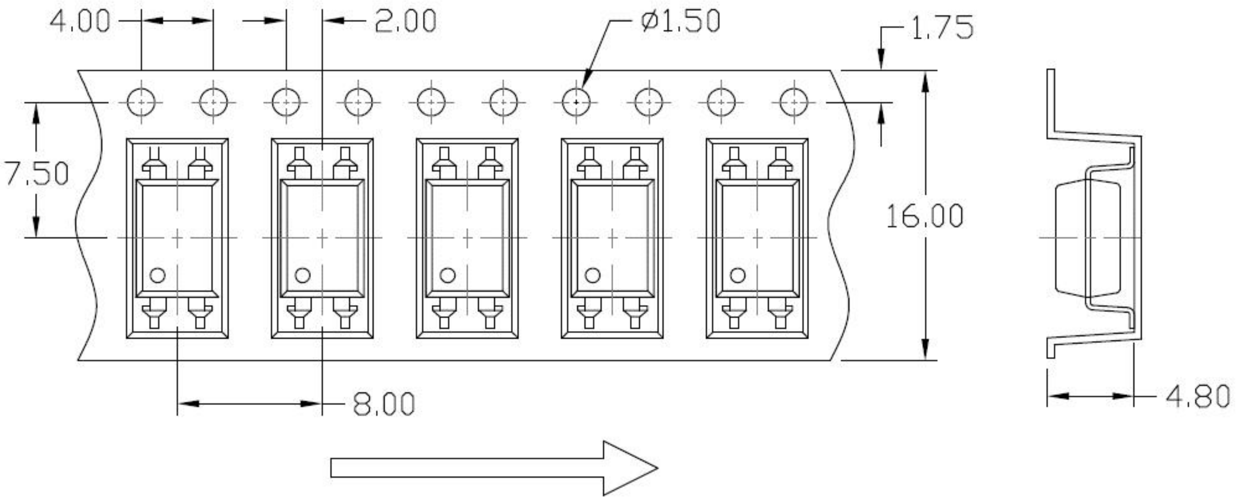


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1) & SM(T1)

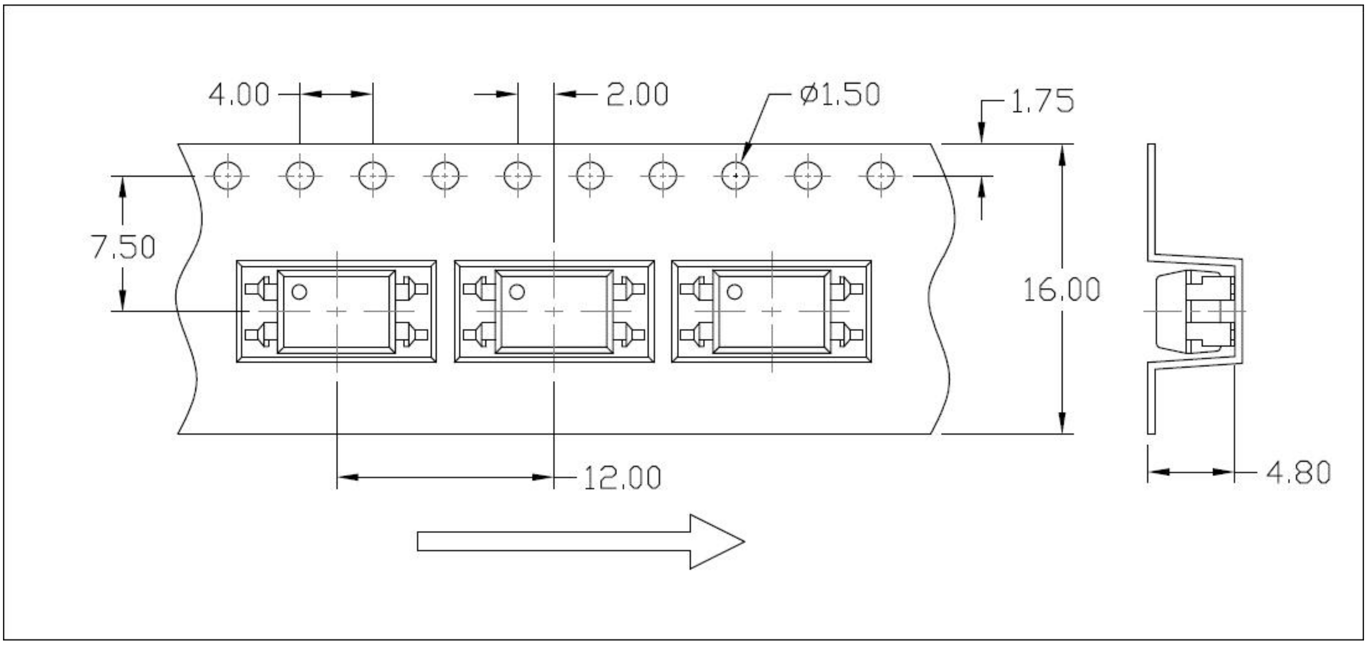


Option S(T2) & SM(T2)

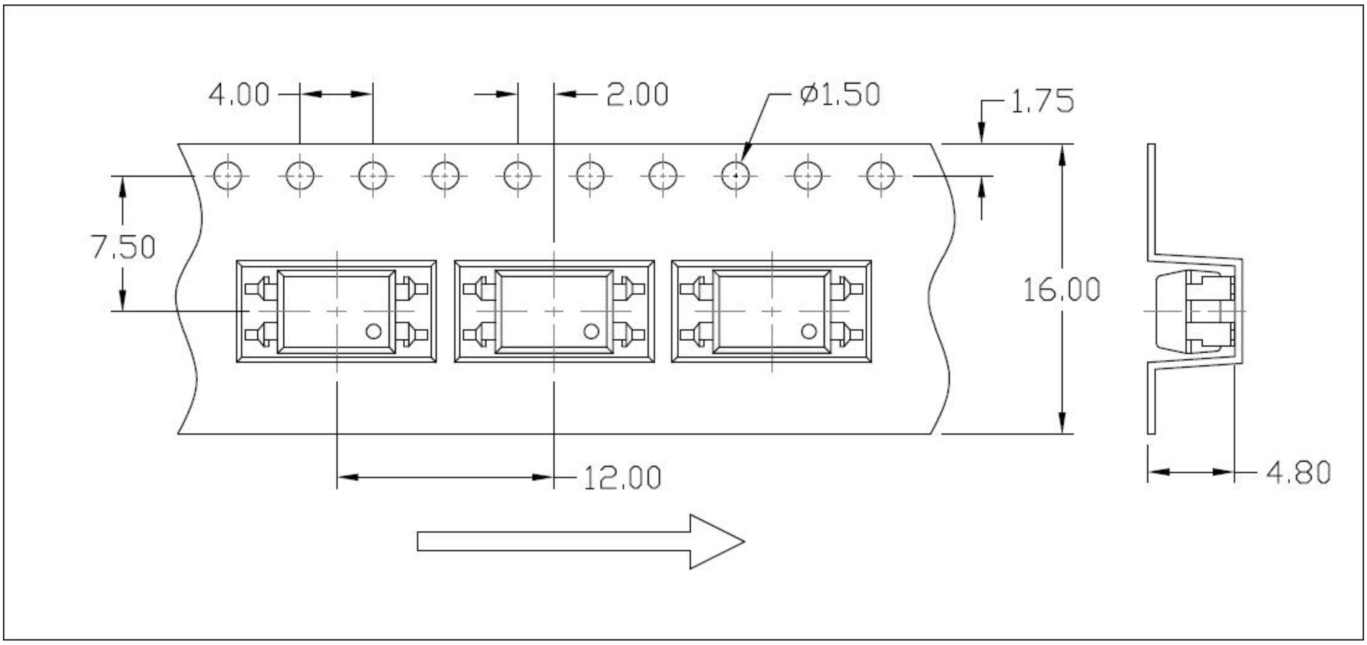


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T3) & SM(T&R)

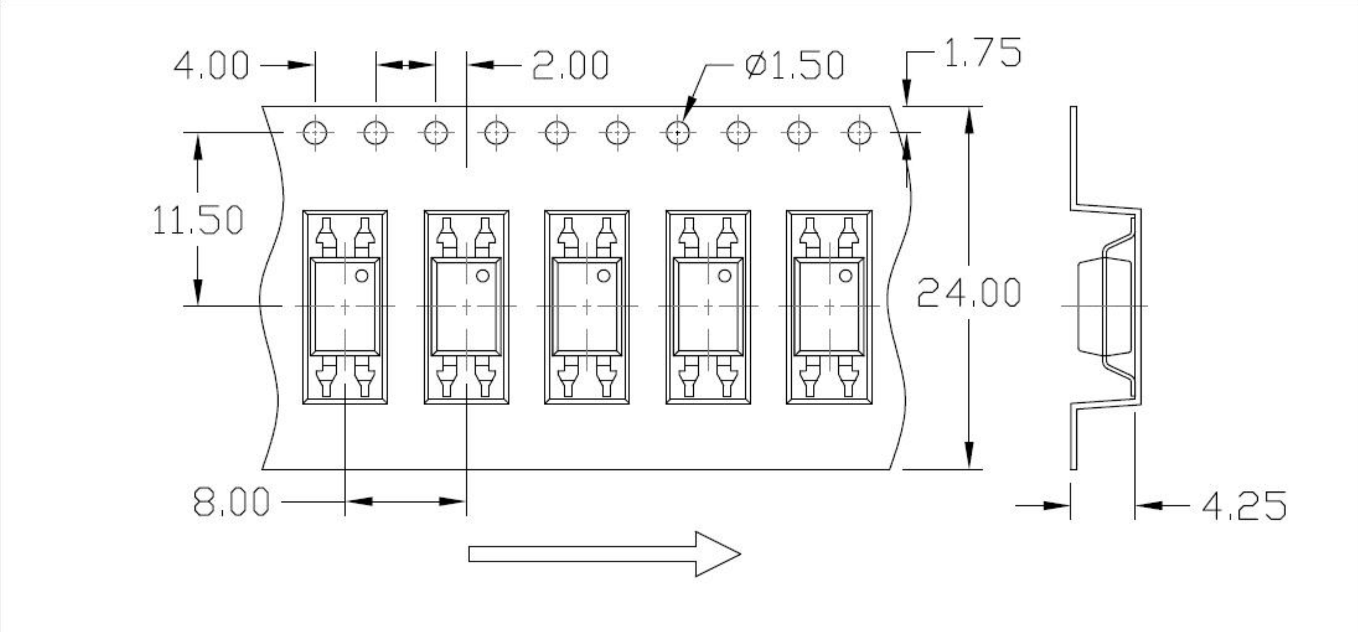


Option S(T4) & SM(T/R)

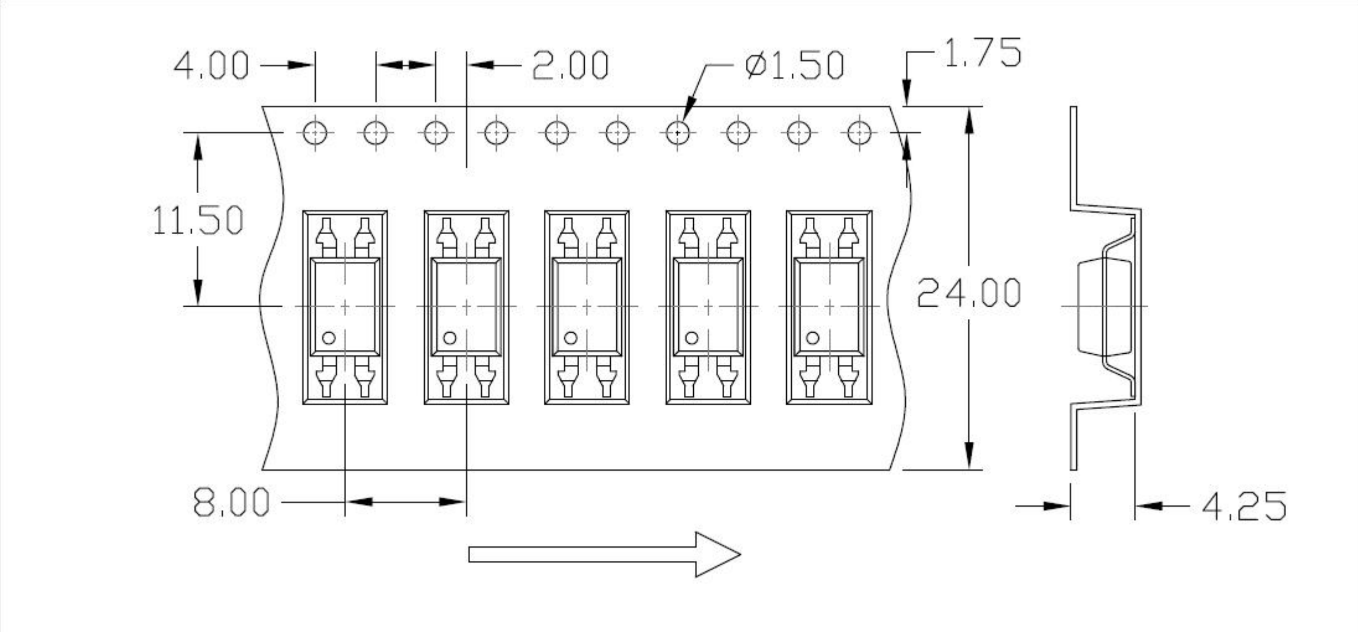


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SLM(T1)

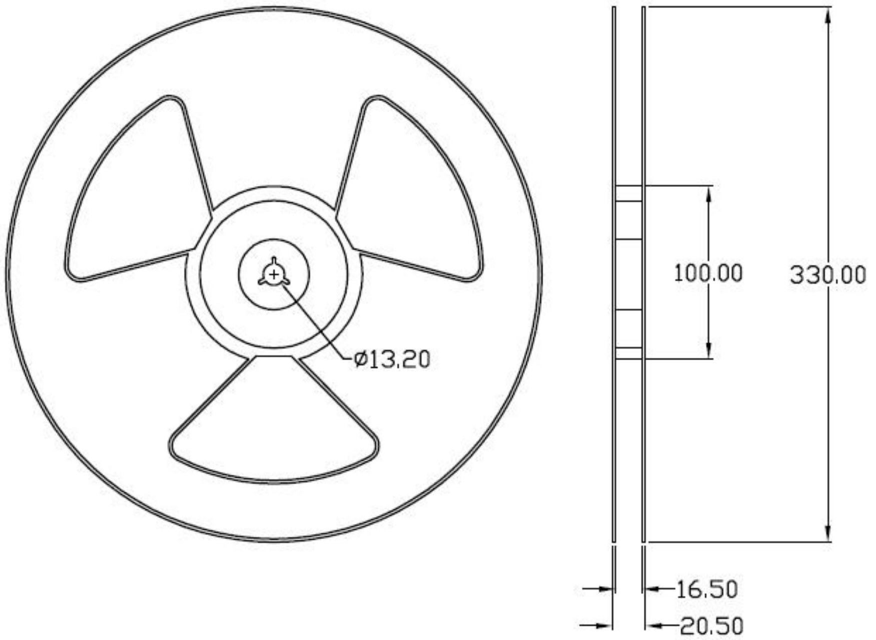


Option SLM(T2)

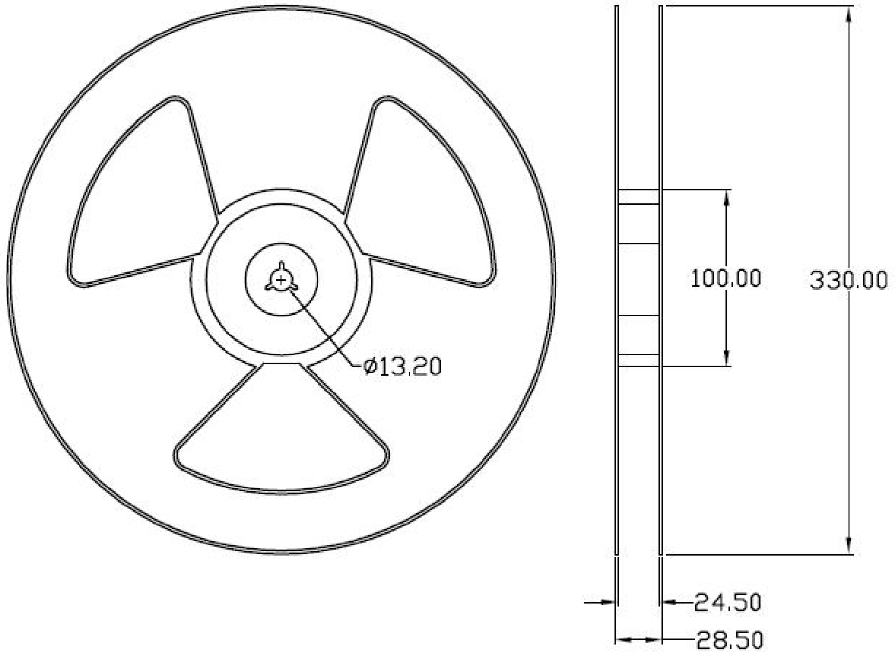


REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S & Option SM



Option SLM



ORDERING AND MARKING INFORMATION

MARKING INFORMATION

ISP817 : Part Number
X : VDE Option
D : CTR Rank
/ : Company Abbr.
YY : Fiscal Year
WW : Work Week

ORDERING INFORMATION

ISP817XD(L)(T)

ISP817 – Part Number
X – VDE Option (X or None)
D – CTR Rank (A/B/C/D)
L – Lead Form Option (M/S/SM/SLM/None)
T – Tape and Reel Option (T1/T2/T&R/T/R)

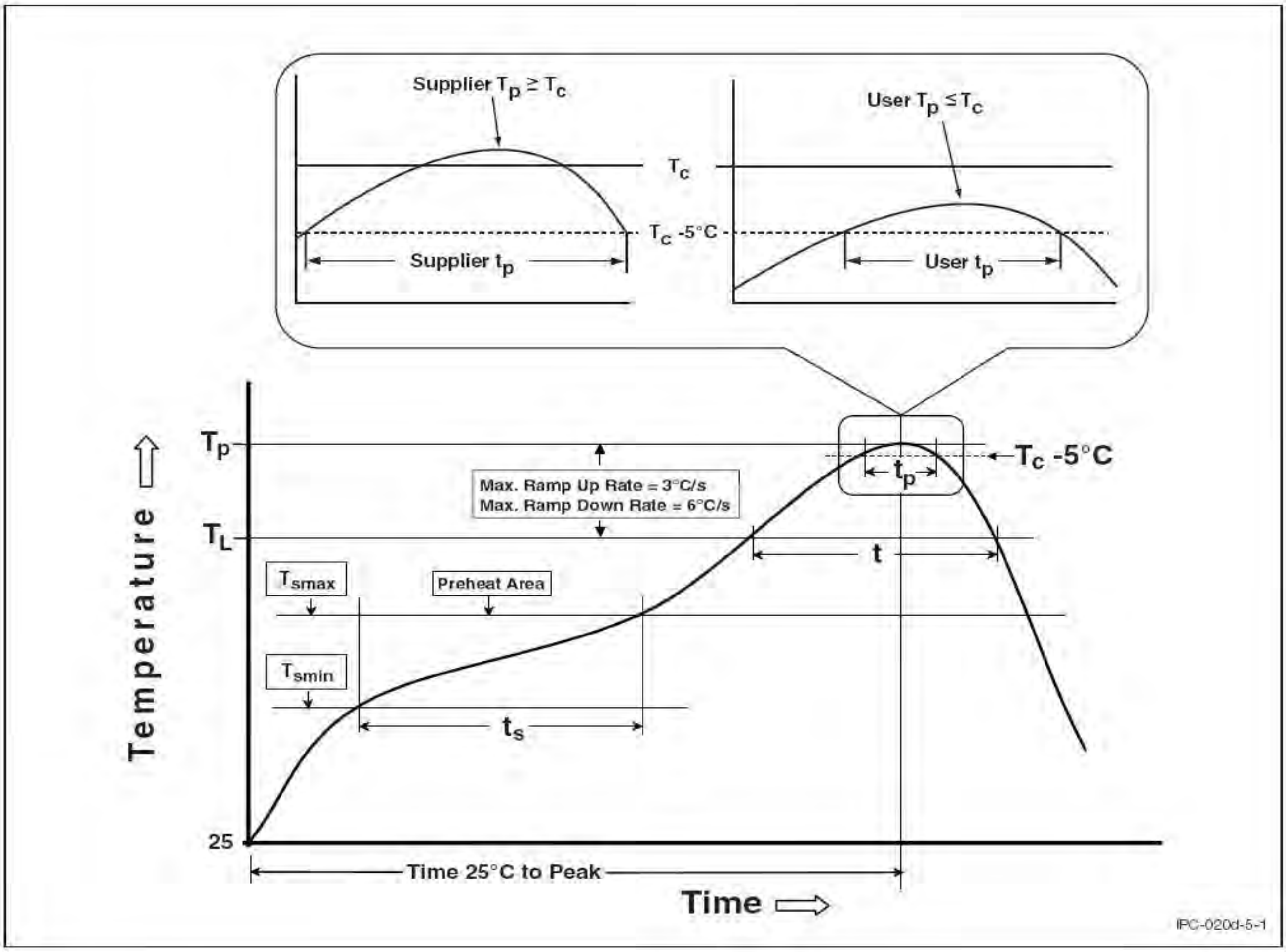
LABEL INFORMATION

Packing Quantity

Option	Quantity	Quantity – Inner box	Quantity – Outer box
None	100 Units/Tube	20 Tubes/Inner box	10 Inner box/Outer box = 20k Units
M	100 Units/Tube	20 Tubes/Inner box	10 Inner box/Outer box = 20k Units
S(T1)	1500 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 15k Units
S(T2)	1500 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 15k Units
S(T&R)	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units
S(T/R)	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units
SM(T1)	1500 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 15k Units
SM(T2)	1500 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 15k Units
SM(T&R)	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units
SM(T/R)	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units
SLM(T1)	1500 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 15k Units
SLM(T2)	1500 Units/Reel	2 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.

DISCLAIMER

- ASG is continually improving the quality, reliability, function and design. ASG reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- ASG 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, ASG 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 ASG 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 ISOCOM LIMITED’s terms and conditions of purchase, including but not limited to the warranty expressed therein.