PC817XX Series

DIP4, DC Input, Photo Transistor Coupler

Description

The PC817XX 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, PC817XX series provide the most stable isolation feature.

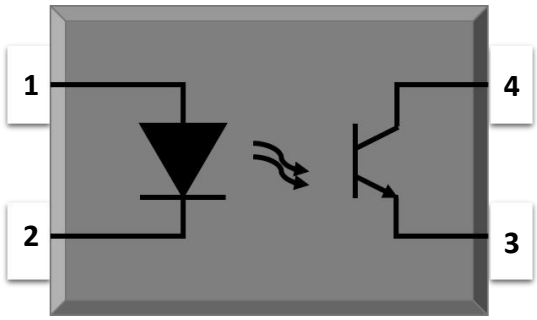
Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- ESD：HBM8000V&MM2000V
- Regulatory Approvals
  - CQC - GB4943.1, GB8898

Applications

- Switching power supply
- Ammeter
- Computer
- Instrumental application, measurement machine
- Imbursement equipments, duplicating machine, aut
- Family-use electric equipments, such as fans
- Signal transforming systems

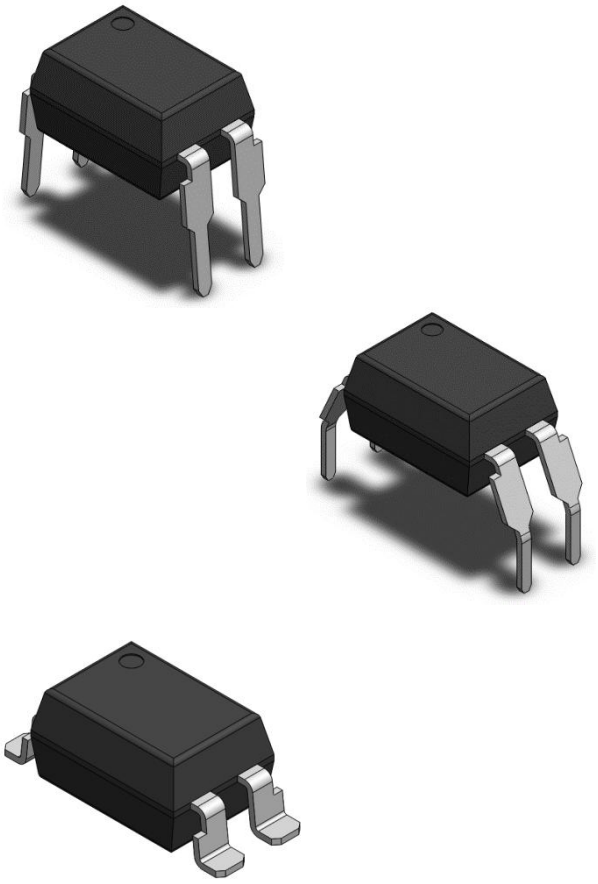
SCHEMATIC



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	50	mA	
Reverse Voltage	V_R	6	V	
Input Power Dissipation	P_I	70	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	70	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	1
Max Insulation Voltage	Viotm	6000	V	
Rated Impulse Insulation Voltage	Viorm	630	V	
Operating Temperature	Topr	-55~110	°C	
Storage Temperature	Tstg	-55~125	°C	
Soldering Temperature	Tsol	260	°C	2

Note 1. AC Test, 1 minute, humidity = 40~60%

Insulation test method as below

(1) Short circuit both terminals of photocoupler

(2) No Current when testing insulation voltage

(3) Adding sine wave voltage when testing

Note 2. soldering time is 10 seconds

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C								
PARAMETER		SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT								
Forward Voltage		V_F	-	1.20	1.40	V	IF=20mA	
Reverse Current		I_R	-	-	5	μA	VR=5V	
Input Capacitance		Cin	-	30	250	pF	V=0, f=1kHz	
OUTPUT								
Collector Dark Current		I_{CEO}	-	-	100	nA	VCE=20V, IF=0	
Collector-Emitter Breakdown Voltage		BV_{CEO}	70	-	-	V	IC=0.1mA, IF=0	
Emitter-Collector Breakdown Voltage		BV_{ECO}	6	-	-	V	IE=10uA, IF=0	
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	PC817	CTR	50	-	600	%	IF=5mA, VCE=5V	
	PC817A		80	-	160			
	PC817B		130	-	260			
	PC817C		200	-	400			
	PC817C1		200	-	300			
	PC817C2		300	-	400			
	PC817D		150	-	300			
	PC817D1		300	-	450			
	PC817D2		450	-	600			
	A or B or C or D		80	-	600			
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	-	0.1	0.2	V	IF=20mA, IC=1mA	
Isolation Resistance		R_{ISO}	5×10^{10}	1×10^{11}	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance		C_{IO}	-	0.6	1	pF	V=0, f=1MHz	
Response Time (Rise)		tr	-	6	18	μs	VCE=2V, IC=2mA RL=100Ω	3
Response Time (Fall)		tf	-	5	18	μs		3
Cut-off Frequency		fc	-	80	-	kHz	VCE=2V, IC=2mA RL=100Ω,-3dB	4

Current Conversion Ratio = IC / IF × 100%

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

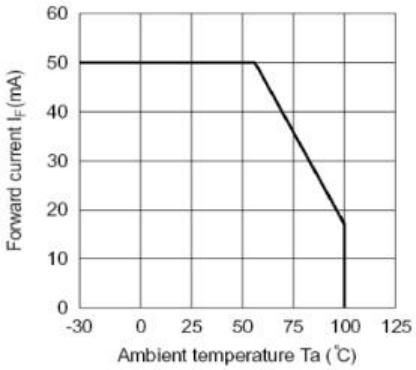


Fig.2 Collector Power Dissipation vs. Ambient Temperature

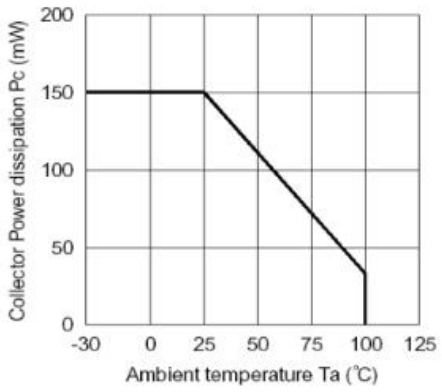


Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

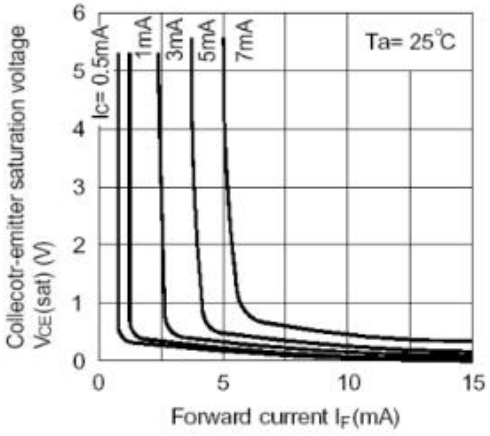


Fig.4 Forward Current vs. Forward Voltage

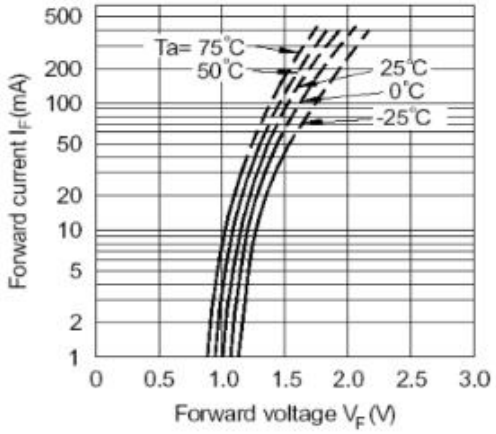


Fig.5 Current Transfer Ratio vs. Forward Current

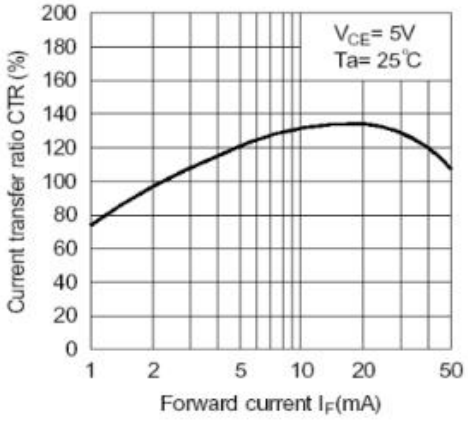
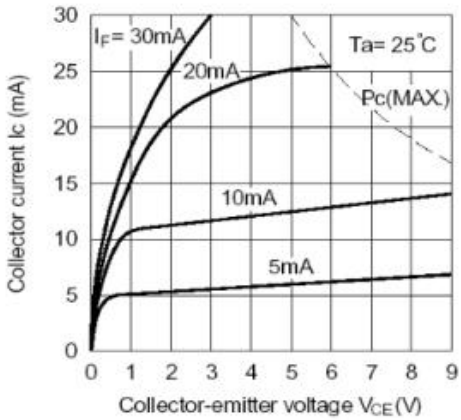


Fig.6 Collector Current vs. Collector-emitter Voltage



CHARACTERISTIC CURVES

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

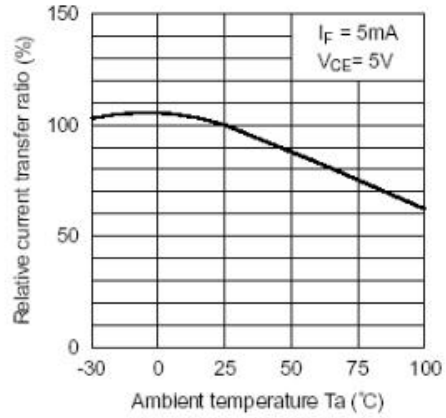


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

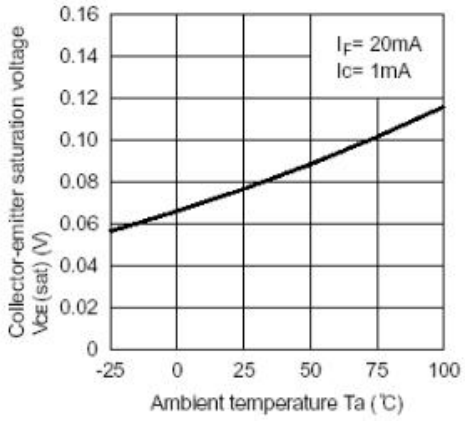


Fig.9 Collector Dark Current vs. Ambient Temperature

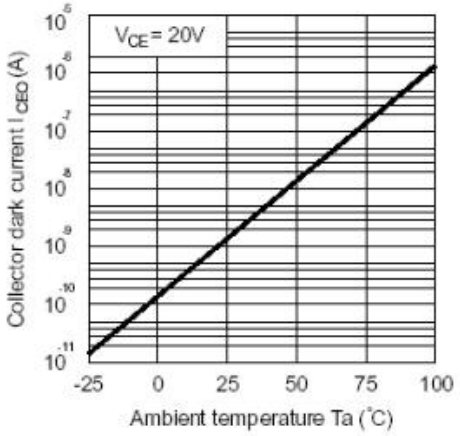


Fig.10 Response Time vs. Load Resistance

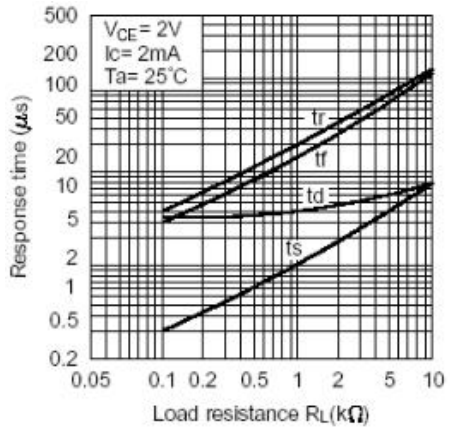
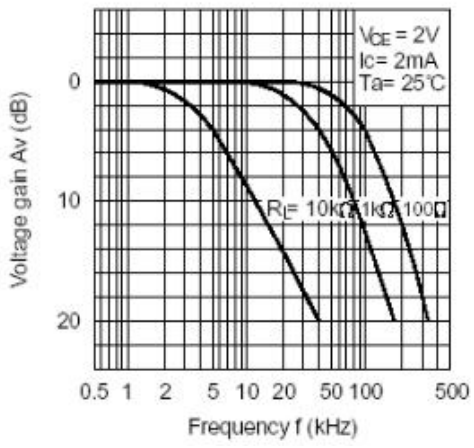


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

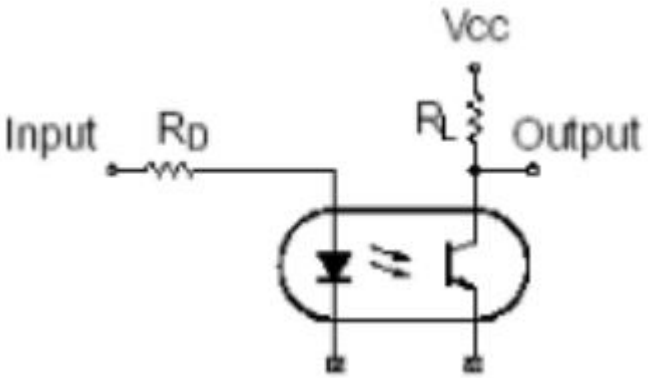


Fig.13 Curves of Response Time

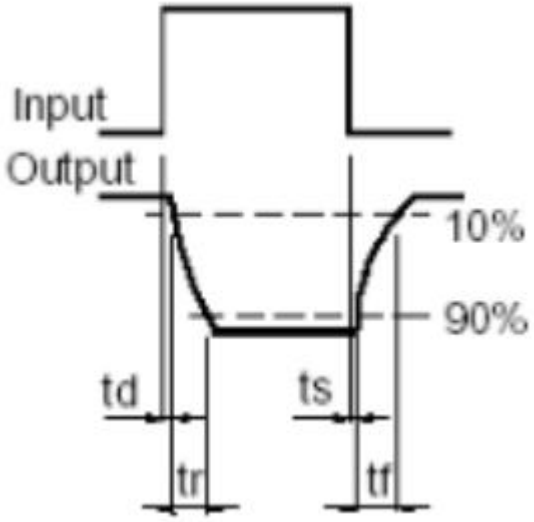
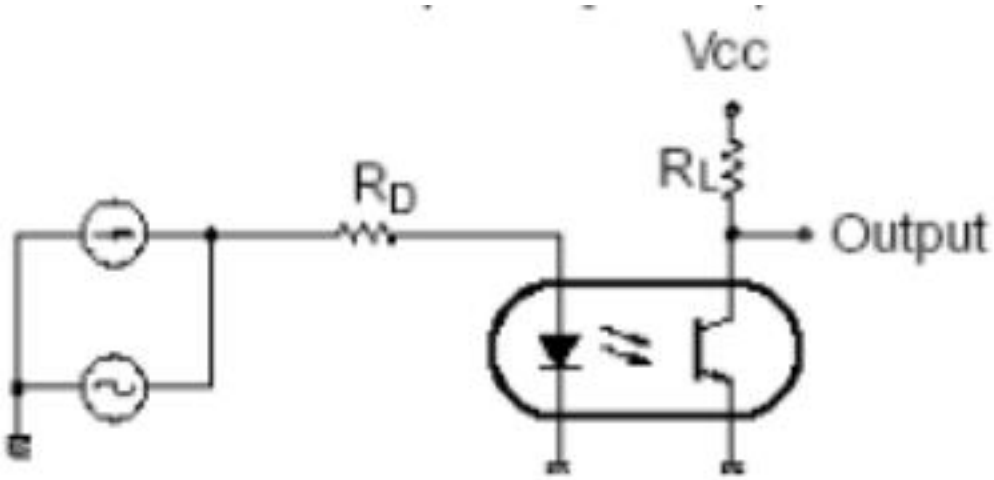
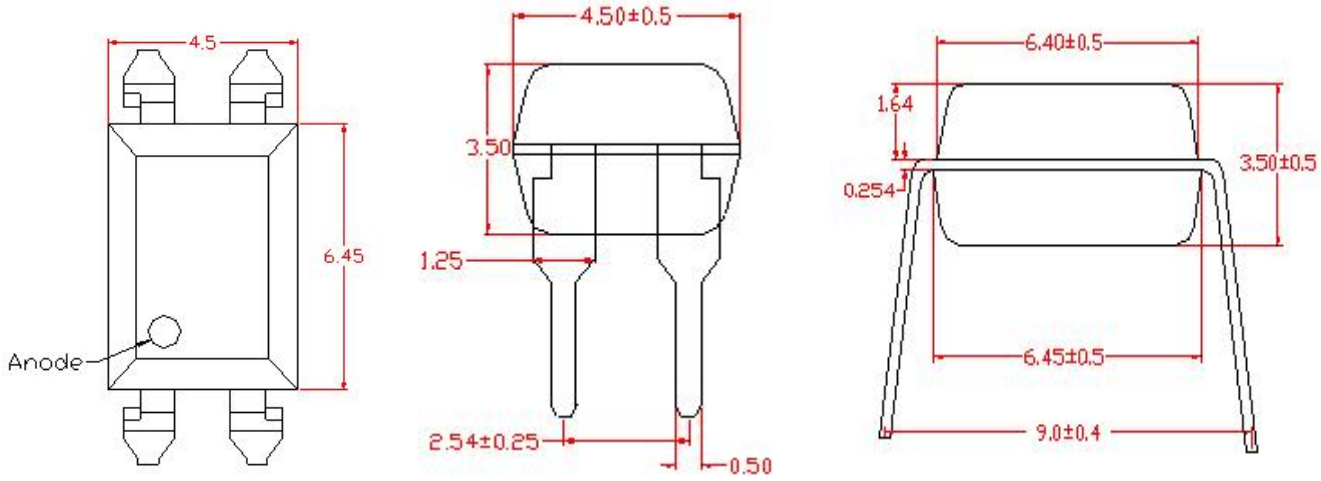


Fig.14 Test Circuits of Frequency Response

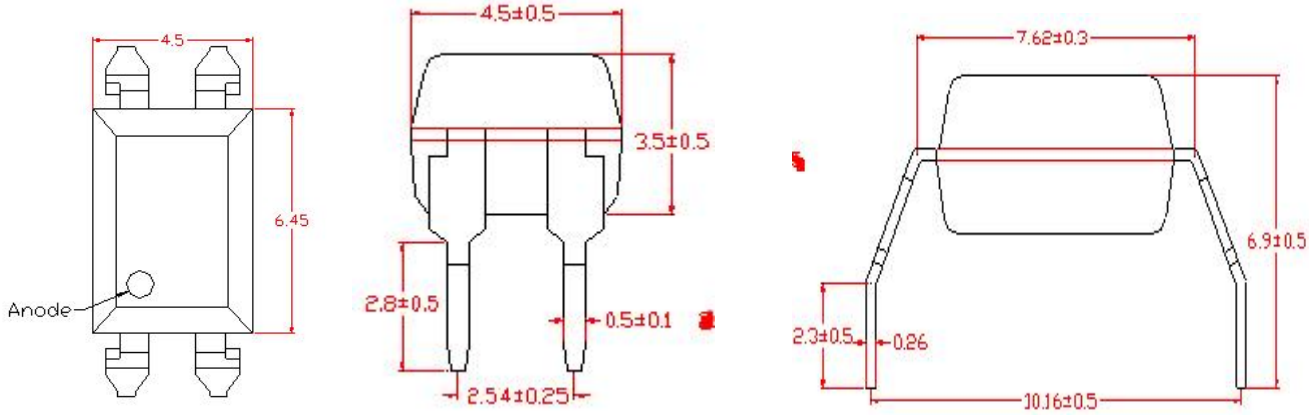


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

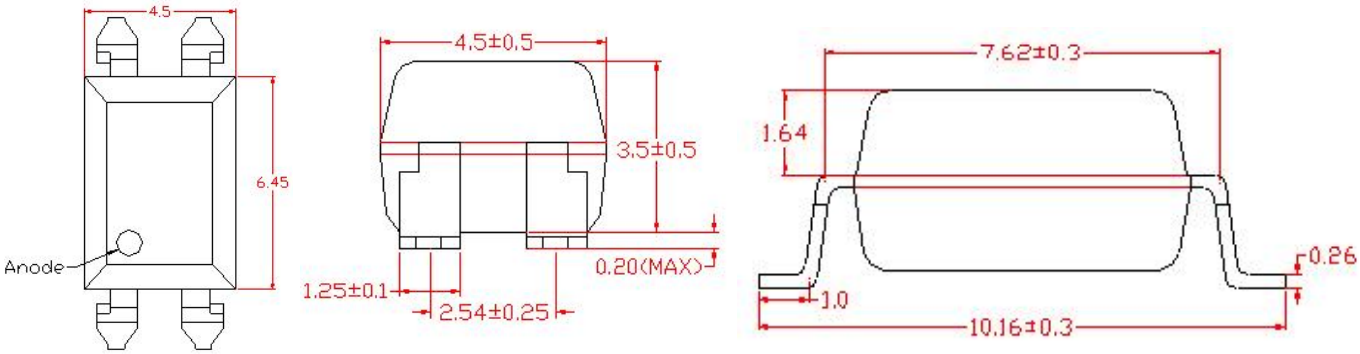
Standard DIP – Through Hole (DIP Type)



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

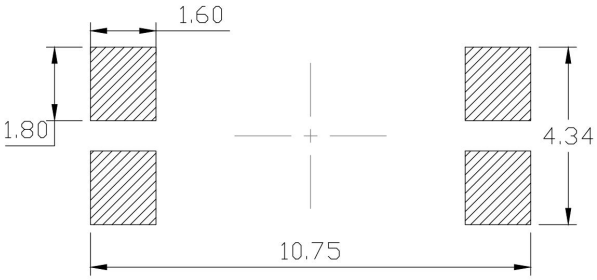


Surface Mount (Low Profile) Lead Forming (SL Type)



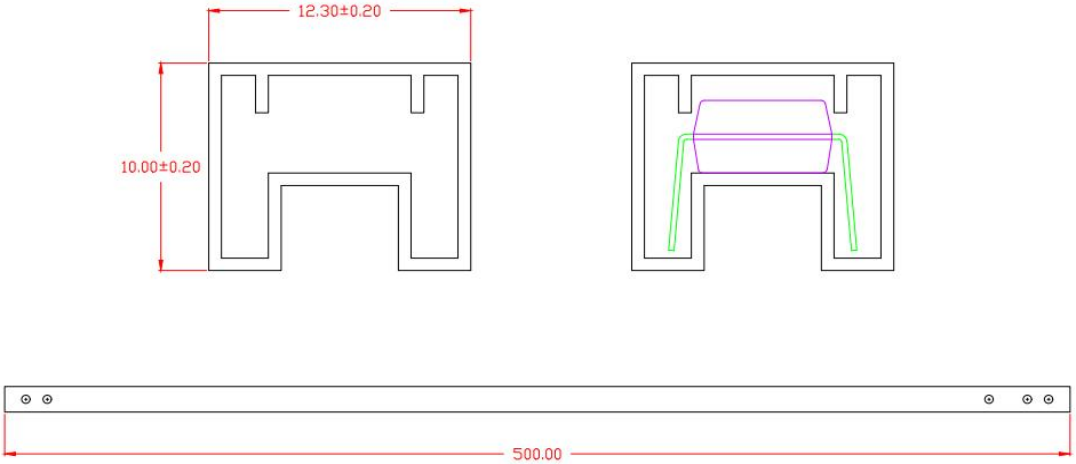
RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

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

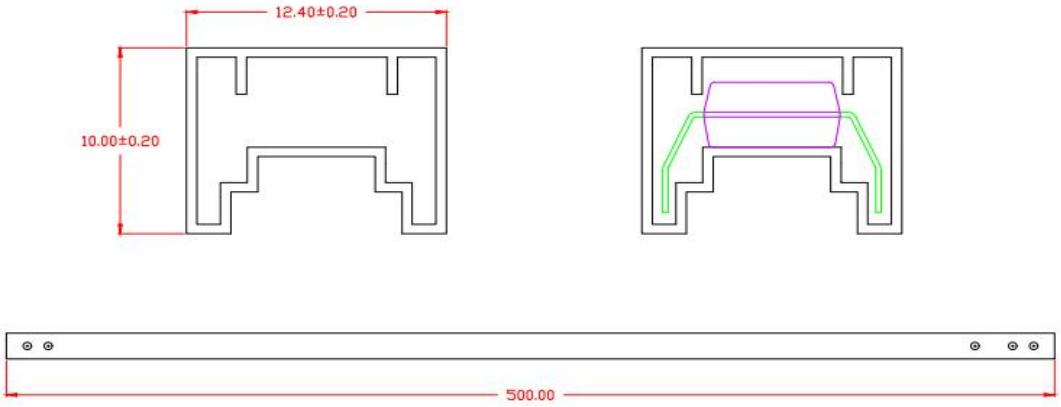


TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP

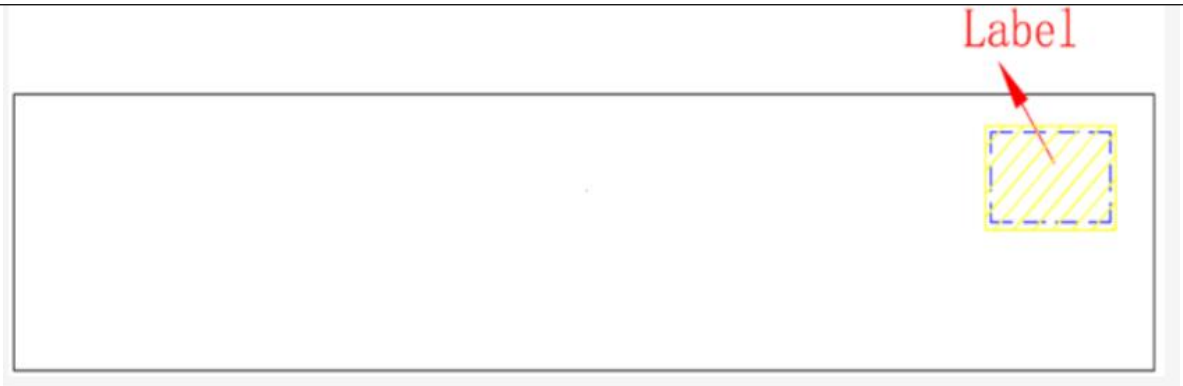


Standard M



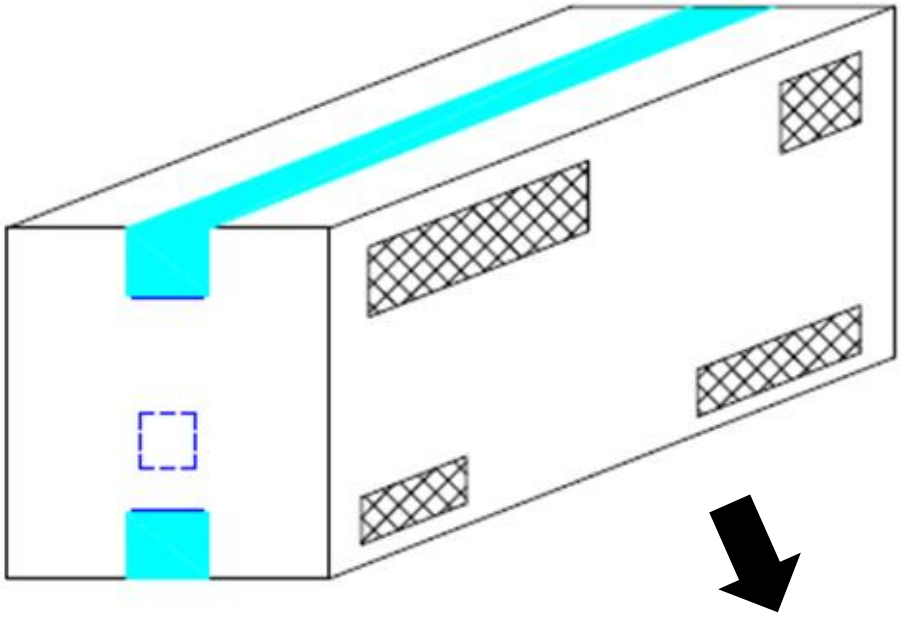
BOX SPECIFICATIONS (Tube Type)

Inner Box



L x W x H = 52.5cm x 12.8cm x 5.7cm

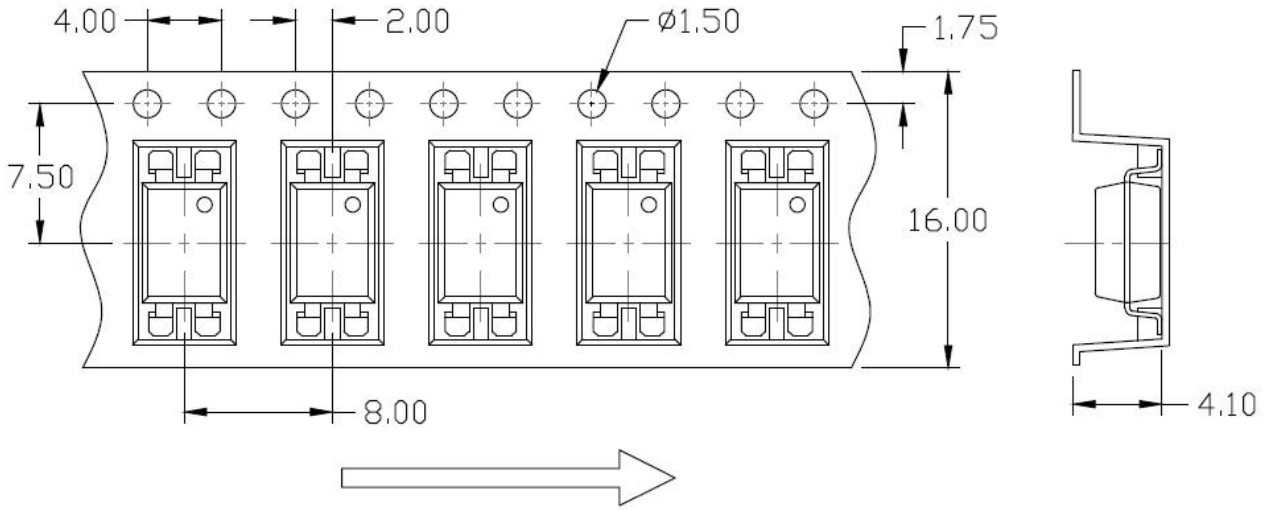
Outer Box



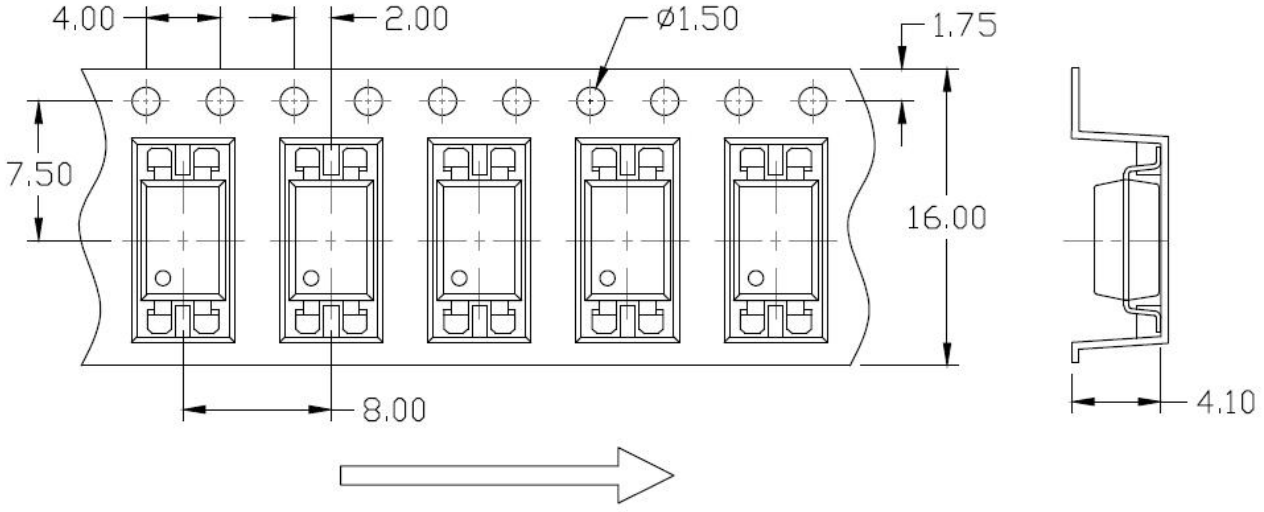
L x W x H = 53.5cm x 27.5cm x 30.0cm

CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL(T1)

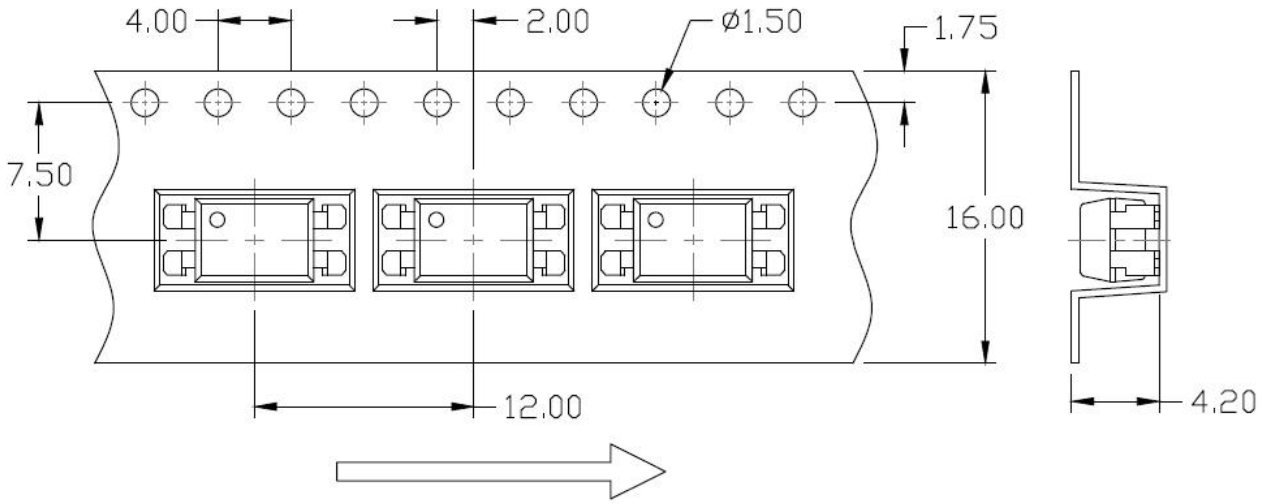


Option SL(T2)

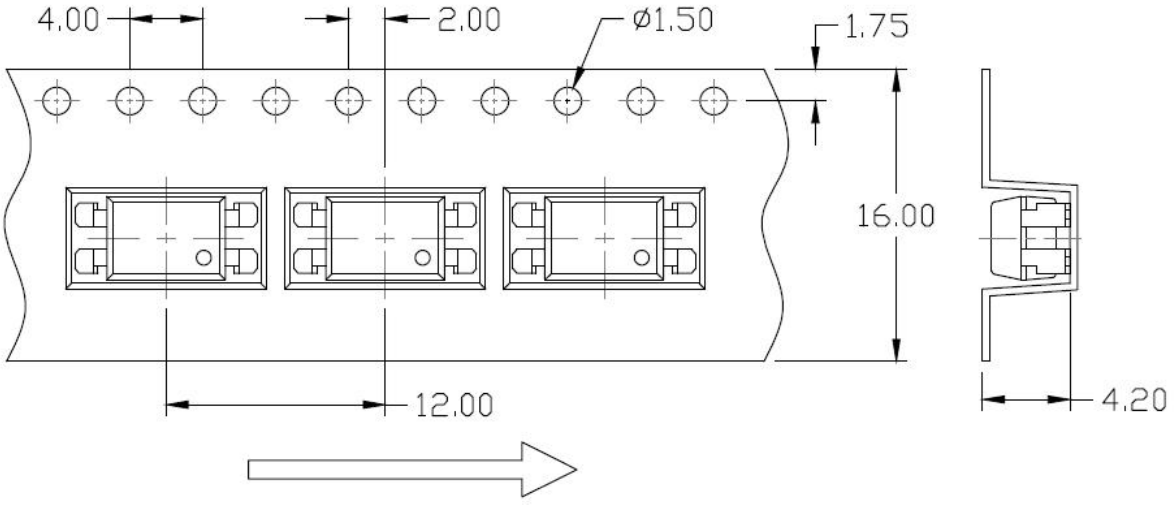


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL(T3)

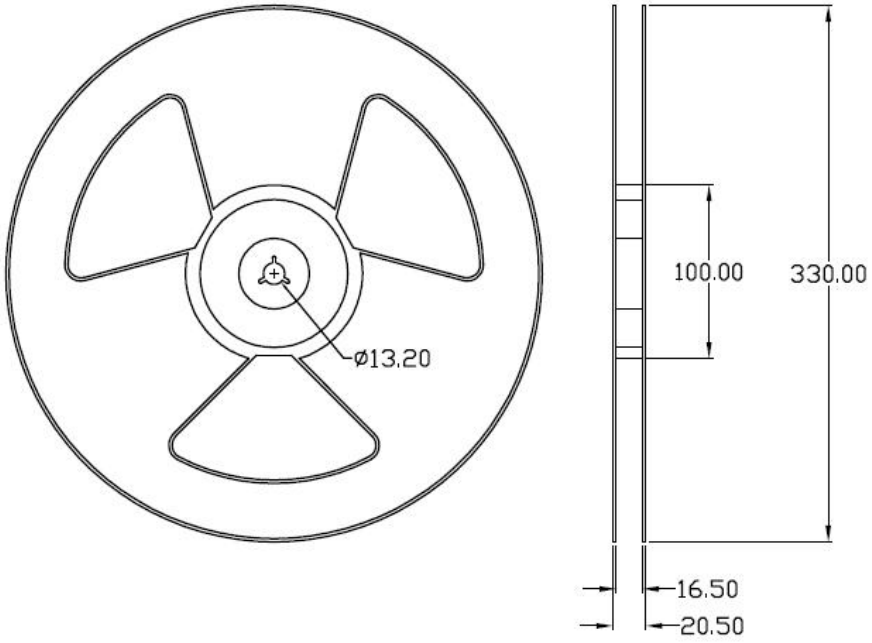


Option SL(T4)



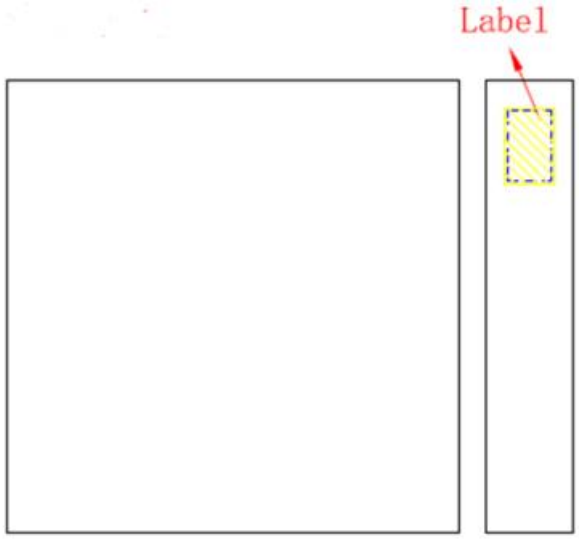
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S & Option SL



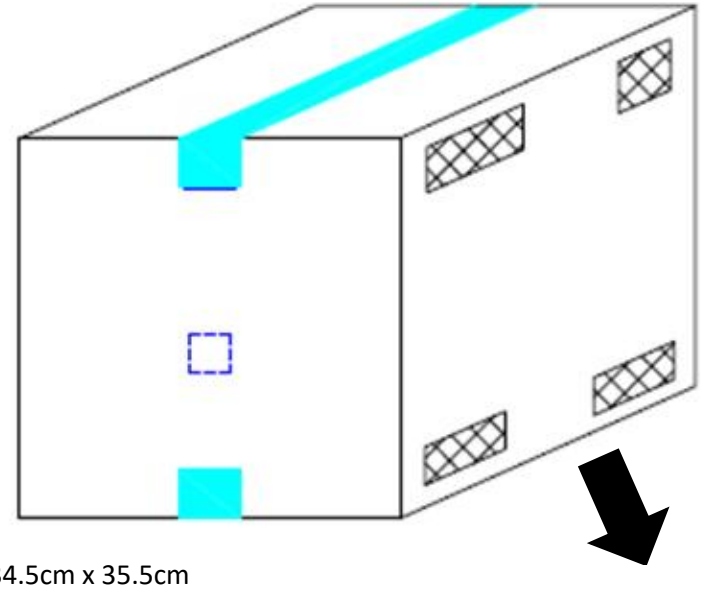
BOX SPECIFICATIONS (Reel Type)

Inner Box

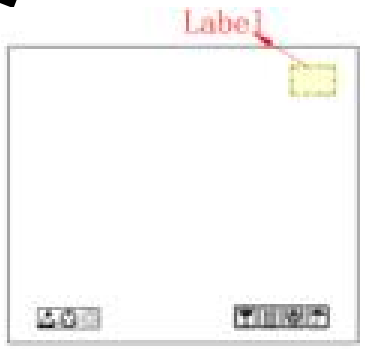


- L x W x H = 33.5cm x 33.5cm x 4.5cm

Outer Box

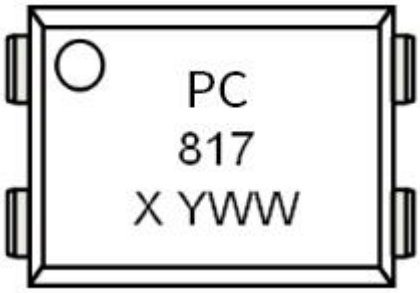


- L x W x H = 47.8cm x 34.5cm x 35.5cm



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



PC : Company Abbr.
817 : Part Number & Rank
X : CTR Rank
Y : Fiscal Year
WW : Work Week

ORDERING INFORMATION

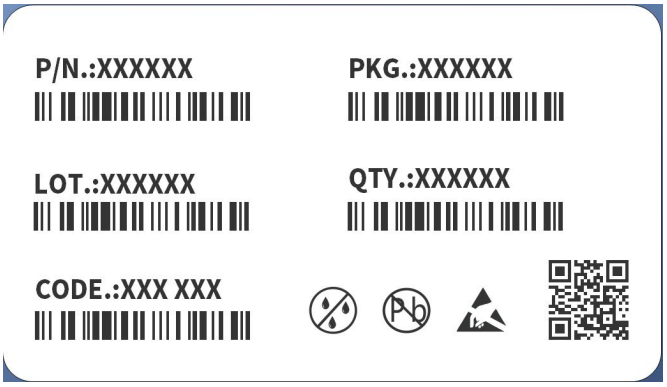
PC817XX

PC – Company Abbr.
817– Part Number

X – Lead Form Option (M/S/None)

X – Rank (A/B/C/D/C1/D1 or None)

LABEL INFORMATION



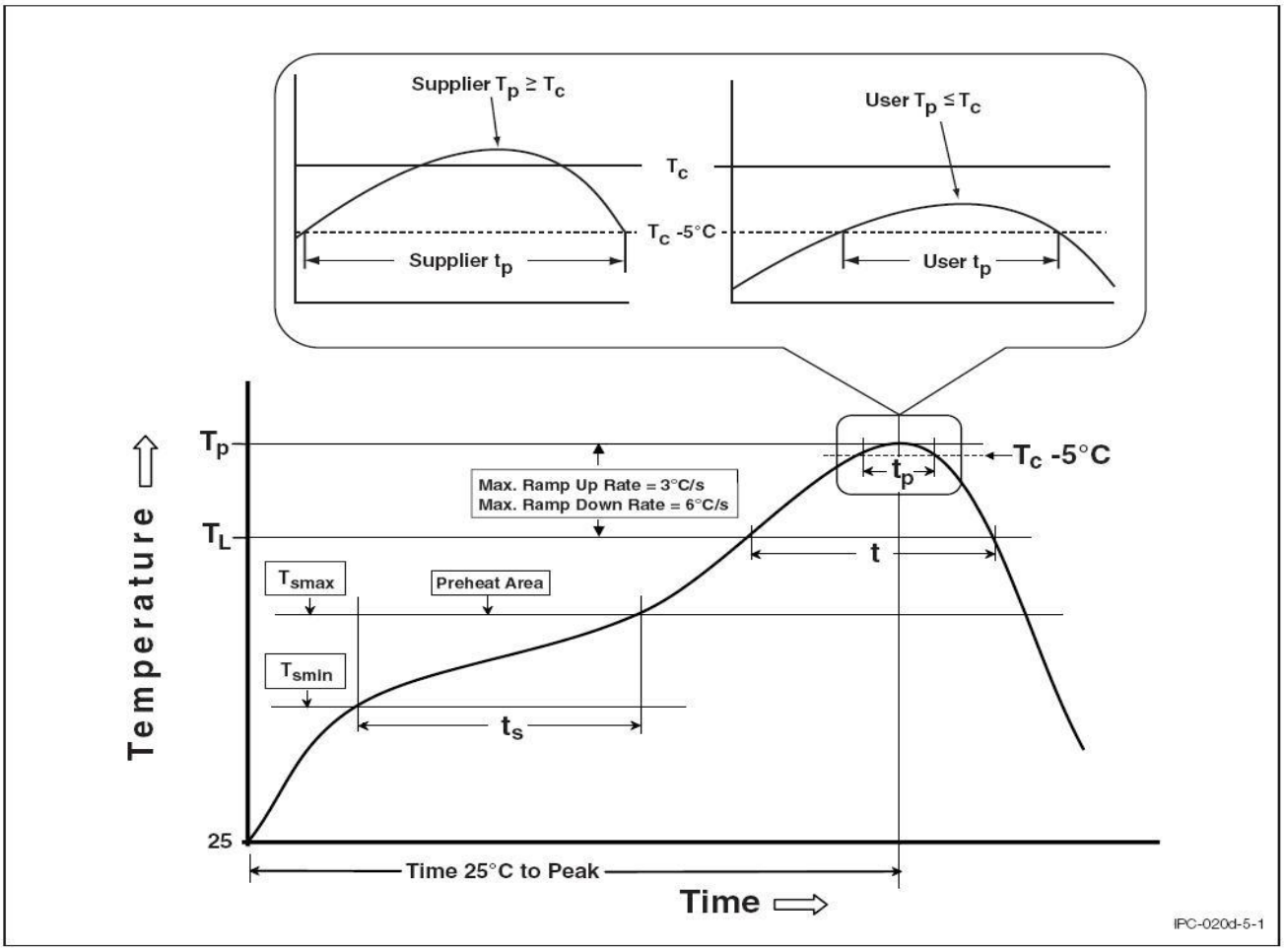
Product label:70mm*40mm Art Paper

Packing Quantity

Option	Quantity	Quantity – Inner box	Quantity – Outer box
None	100 Units/Tube	50 Tubes/Inner box	10 Inner box/Outer box = 50k Units
M	100 Units/Tube	50 Tubes/Inner box	10 Inner box/Outer box = 50k Units
SL(T1)	2000 Units/Reel	2 Reels/Inner box	10 Inner box/Outer box = 40k Units
SL(T2)	2000 Units/Reel	2 Reels/Inner box	10 Inner box/Outer box = 40k Units
SL(T3)	1000 Units/Reel	2 Reels/Inner box	10 Inner box/Outer box = 20k Units
SL(T4)	1000 Units/Reel	2 Reels/Inner box	10 Inner box/Outer box = 20k Units

REFLOW INFORMATION

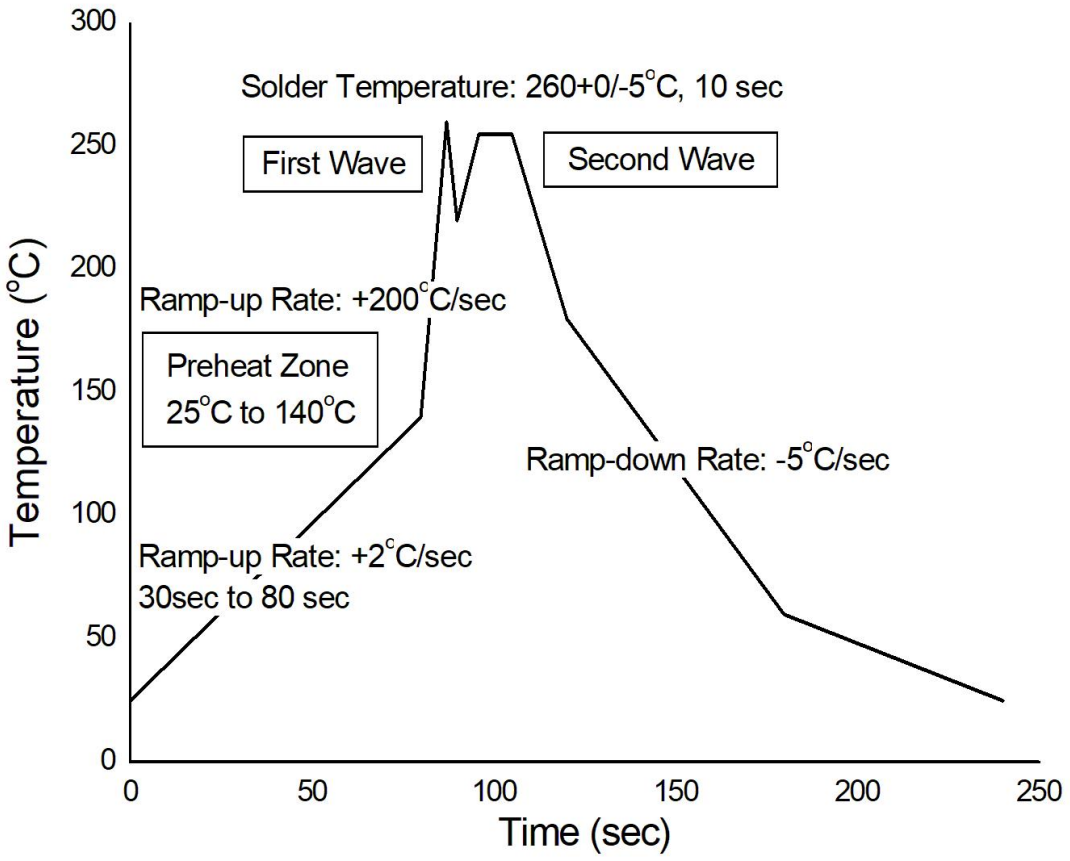
REFLOW PROFILE



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.