MPCS-816 Series

DIP4, DC Input, High Switching Time Photo Transistor Coupler

Description

The MPCS-816 series combine an Light emitting diode as the emitter which is optically coupled to a silicon phototransistor enabling relatively high switching speed with high load resistor of several KΩ. The MPCS-816 Series is in a plastic DIP4 package.

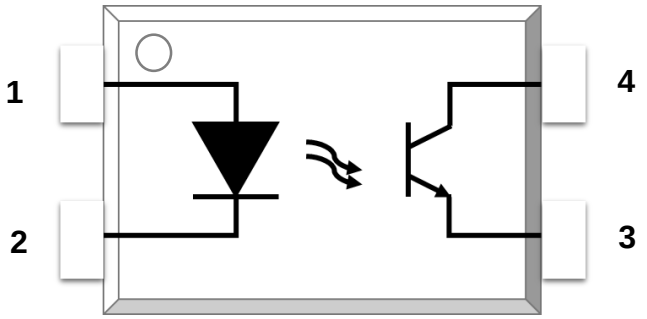
Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- MSL class 1
- Guaranteed performance over temperature -40°C ~ +110°C.

Applications

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

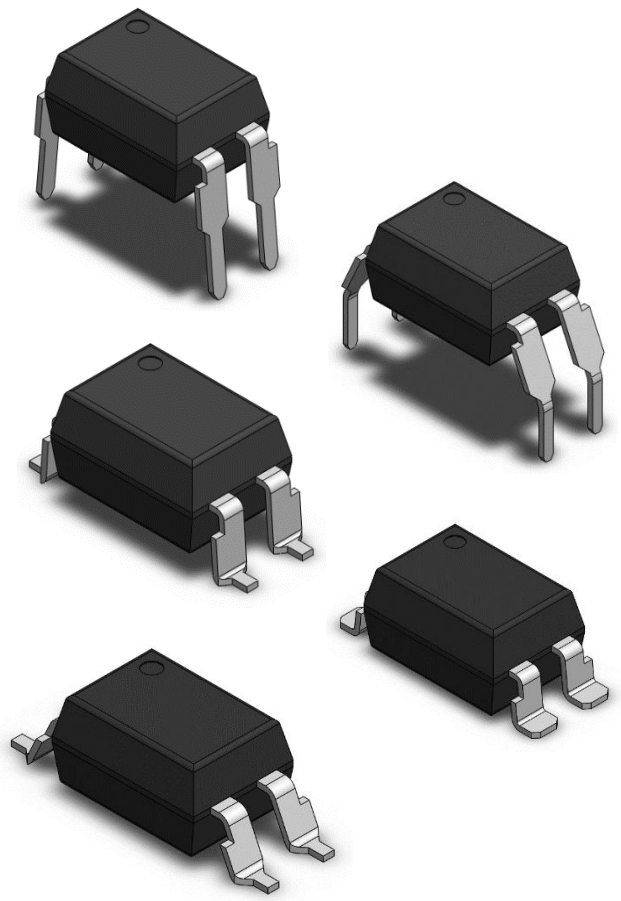
SCHEMATIC



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	20	mA	
Reverse Voltage	V_R	6	V	
Input Power Dissipation	P_I	50	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	80	V	
Emitter - Collector Voltage	V_{ECO}	7	V	
Collector Current	I_C	50	mA	
Output Power Dissipation	P_O	150	mW	
COMMON				
Total Power Dissipation	P_{tot}	200	mW	
Isolation Voltage	V_{iso}	5000	Vrms	1
Operating Temperature	T_{opr}	-40~110	°C	
Storage Temperature	T_{stg}	-55~125	°C	
Soldering Temperature	T_{sol}	260	°C	2

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

Note 2. For 10 Seconds

ELECTRICAL OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT CHARACTERISTICS							
Forward Voltage	V_F	1.6	2.0	2.4	V	I_F= 10 mA	
Input Reverse Current	I_R	-	-	10	uA	V_R = 4V	
Input Capacitance	C_{IN}	-	60	-	pF	V= 0V, f = 1MHz	
OUTPUT CHARACTERISTICS							
Collector Dark Current	I_{CEO}	-	10	100	nA	V_{CE}=20V,I_F=0mA	
Collector- Emitter Breakdown Voltage	BV_{CEO}	80	-	-	V	I_C = 100uA, I_F = 0mA	
Emitter -Collector Breakdown Voltage	BV_{ECO}	7	-	-	V	I_E = 100uA, I_F = 0mA	
TRANSFER CHARACTERISTICS							
Collector Current	I_C	2.5	-	30	mA	I_F = 5 mA, V_{CE} = 5V	
Current Transfer Ratio	CTR	80	-	600	%	I_F = 5 mA, V_{CE} = 5V	1
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	-	0.3	V	I_F = 10 mA, I_C = 1mA	
Isolation Resistance	R_{iso}	$1X10^{12}$	-	-	Ω	DC500V,40 ~ 60% R.H.	
Floating Capacitance	C_f	-	0.3	-	pF	V= 0V, f = 1MHz	
Response Time (Rise)	t_r		0.3	10	us	VCC = 5 V, IF = 5 mA, RL = 1 kΩ	2
Response Time (Fall)	t_f		1.3	10			
Turn-on Time	T_{on}		0.5	10			
Turn-off Time	T_{off}		4.5	10			

Note 1: CTR=IC/IF X 100%.

Note 2: Fig.13&14.

RANK TABLE OF CTR (CURRENT TRANSFER RATIO)

CTR Rank	Min.	Typ.	Max.	Unit	Test Condition
MPCS-816A	80	-	160	%	I_F = 5 mA, V_{CE} = 5V
MPCS-816B	130	-	260	%	
MPCS-816C	200	-	400	%	
MPCS-816D	300	-	600	%	

TYPICAL PERFORMANCE CURVES & TEST CIRCUITS

Fig.1 I_F vs. V_F

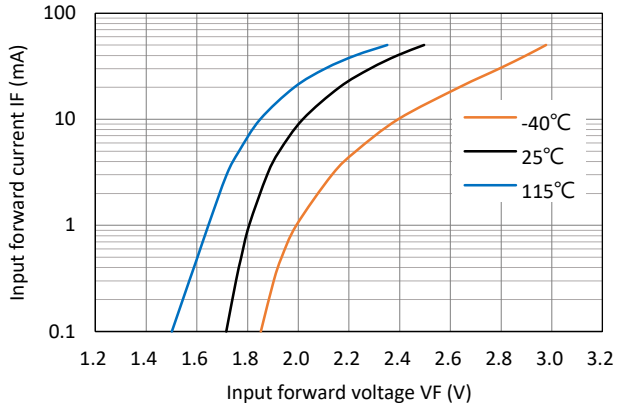


Fig.2 Dark Current vs. Ta

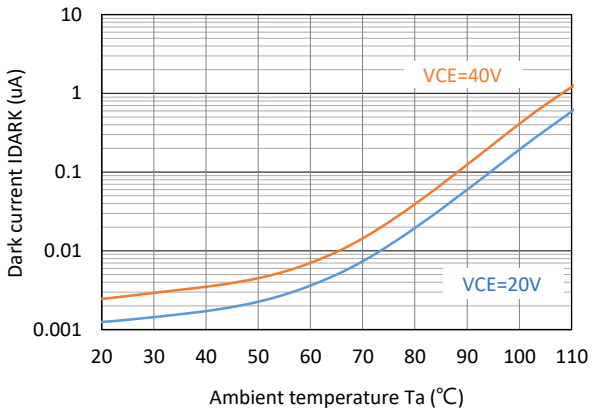


Fig.3 I_C vs. V_{CE}

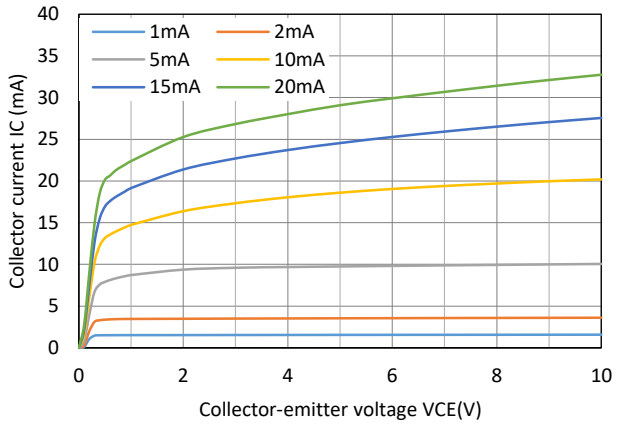


Fig.4 I_C vs. V_{CE}

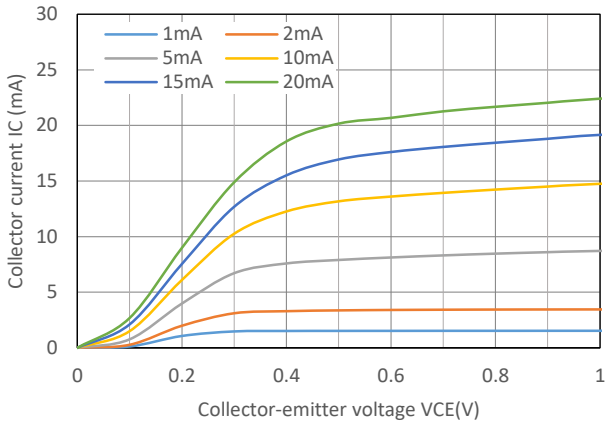


Fig.5 I_C vs. I_F

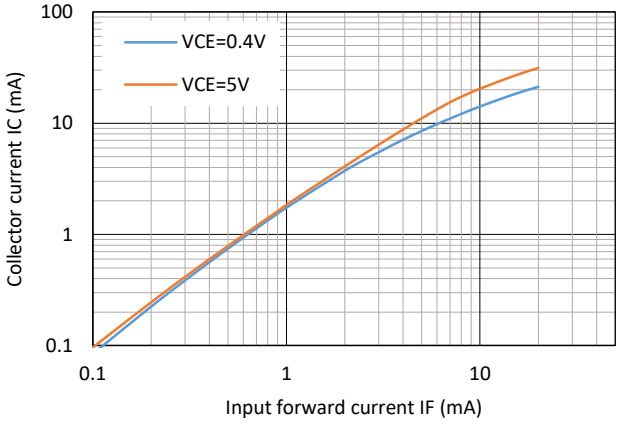
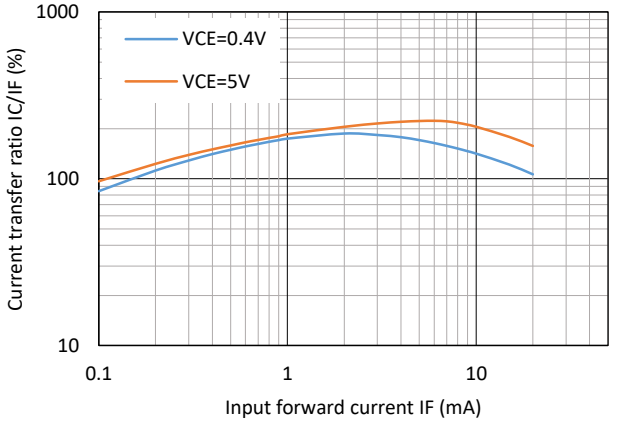


Fig.6 CTR vs. I_F



TYPICAL PERFORMANCE CURVES & TEST CIRCUITS

Fig.7. I_C vs. Ta

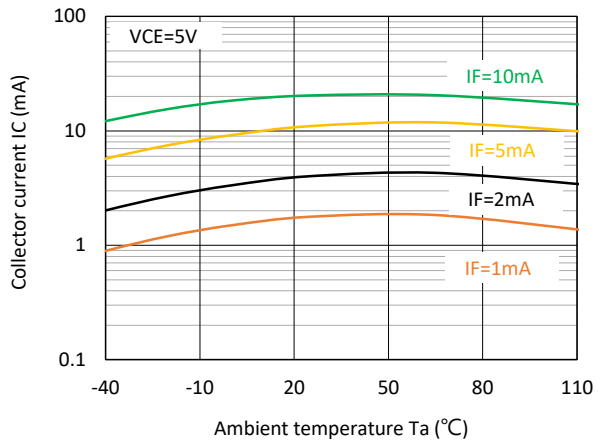


Fig.8 Normalized CTR vs. Ta

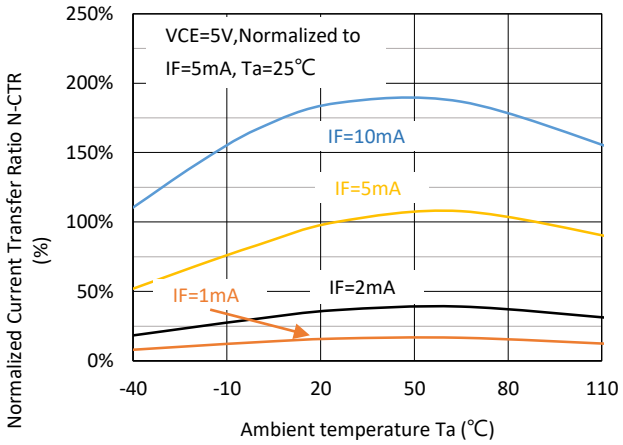


Fig.9 V_{CE}(sat) vs. Ta

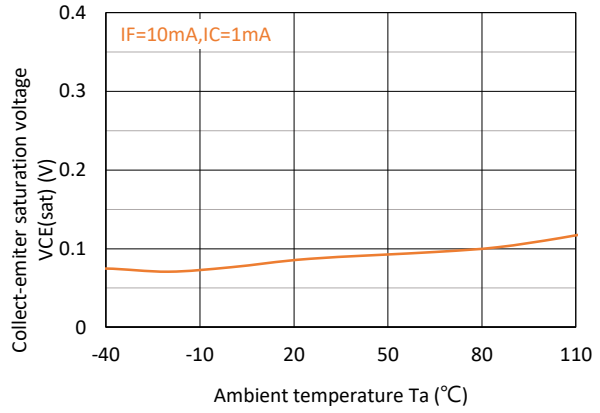


Fig.10 Switching Time vs. I_F

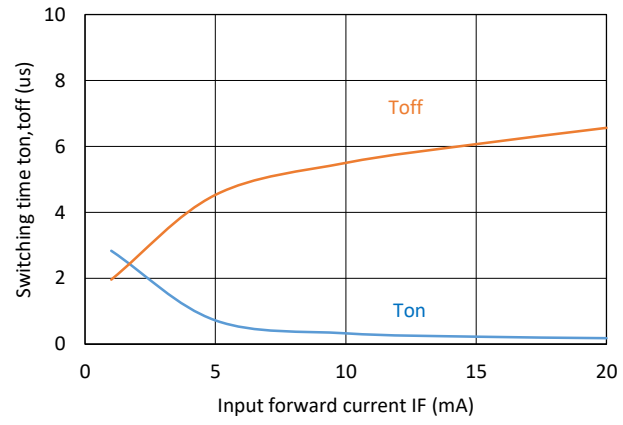


Fig.11 Switching Time vs. R_L

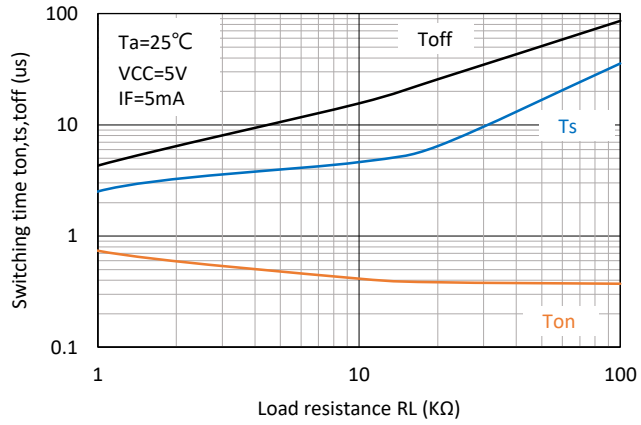
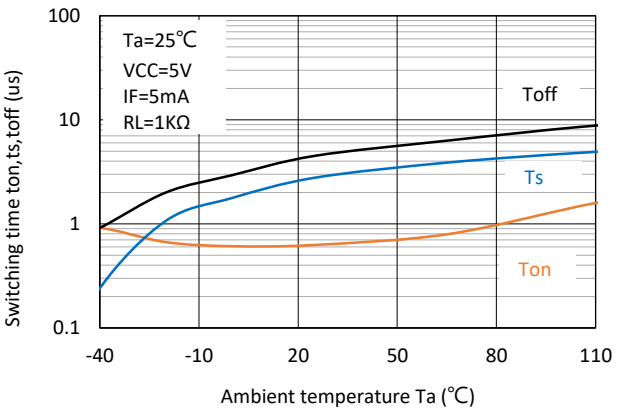


Fig.12 Switching Time vs. Ta



TYPICAL PERFORMANCE CURVES & TEST CIRCUITS

Fig.13 Test Circuits of Switching Time

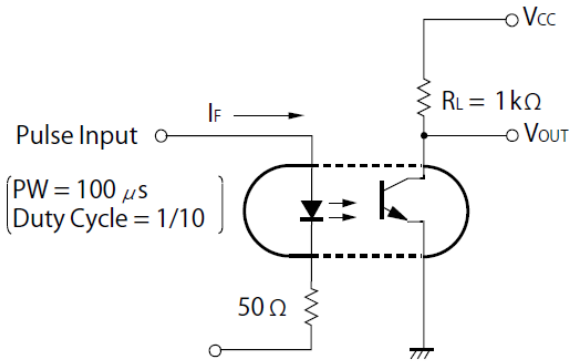
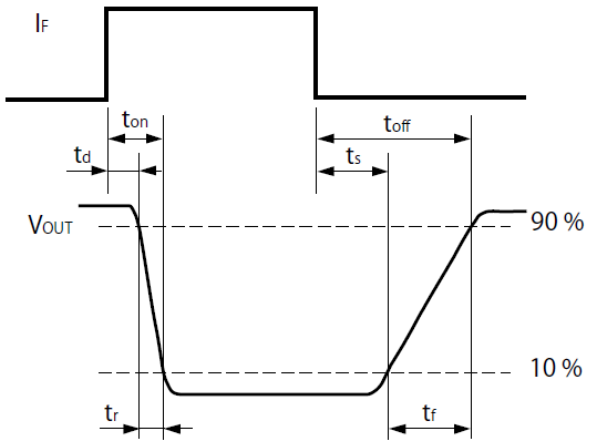
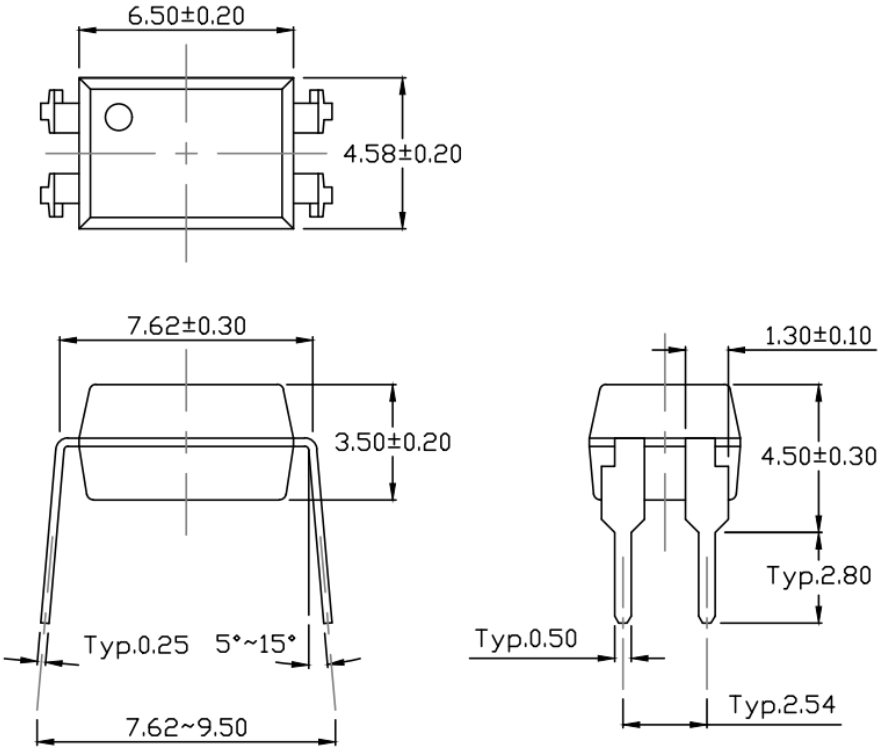


Fig.14 Curves of Switching Time

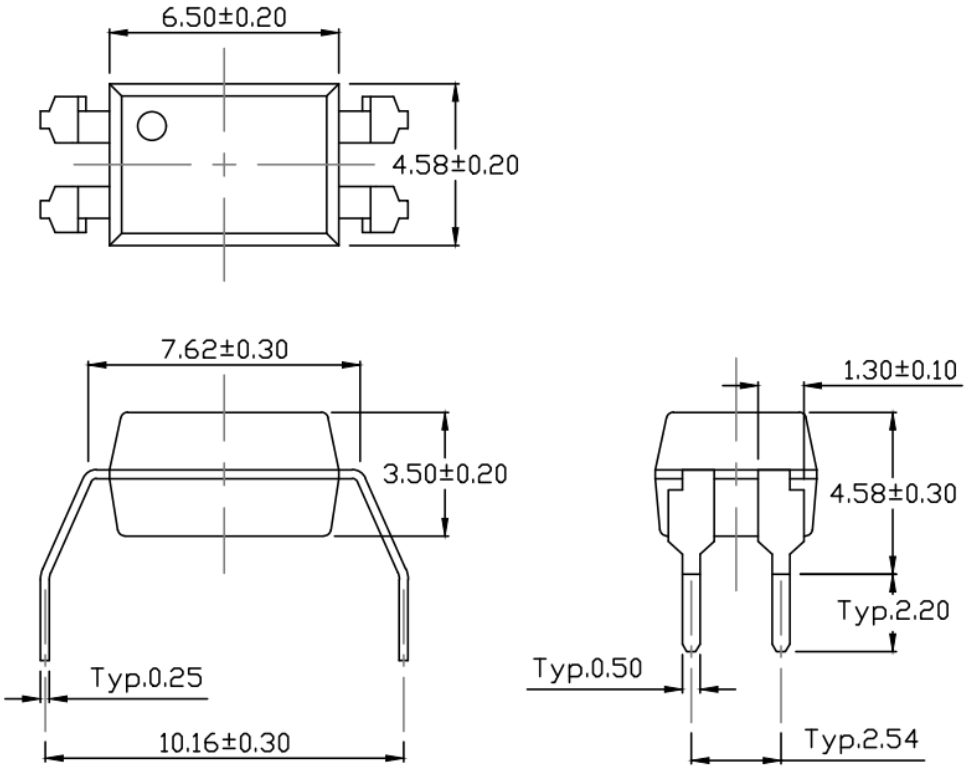


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)

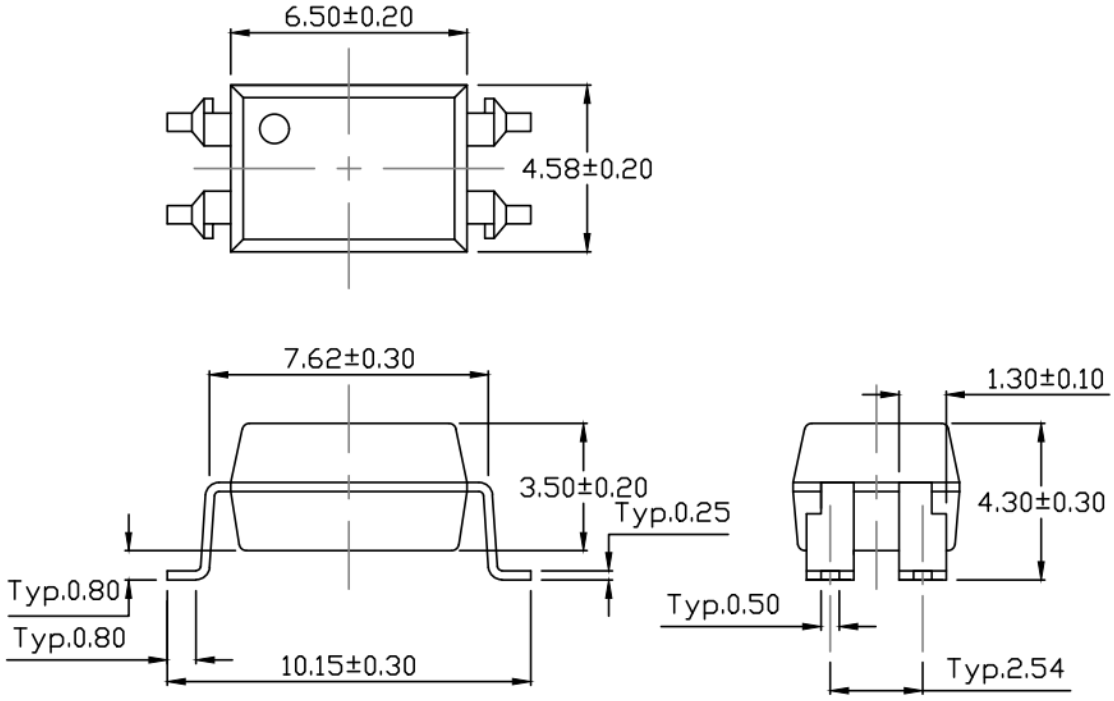


Gullwing (400mil) Lead Forming – Through Hole (M Type)

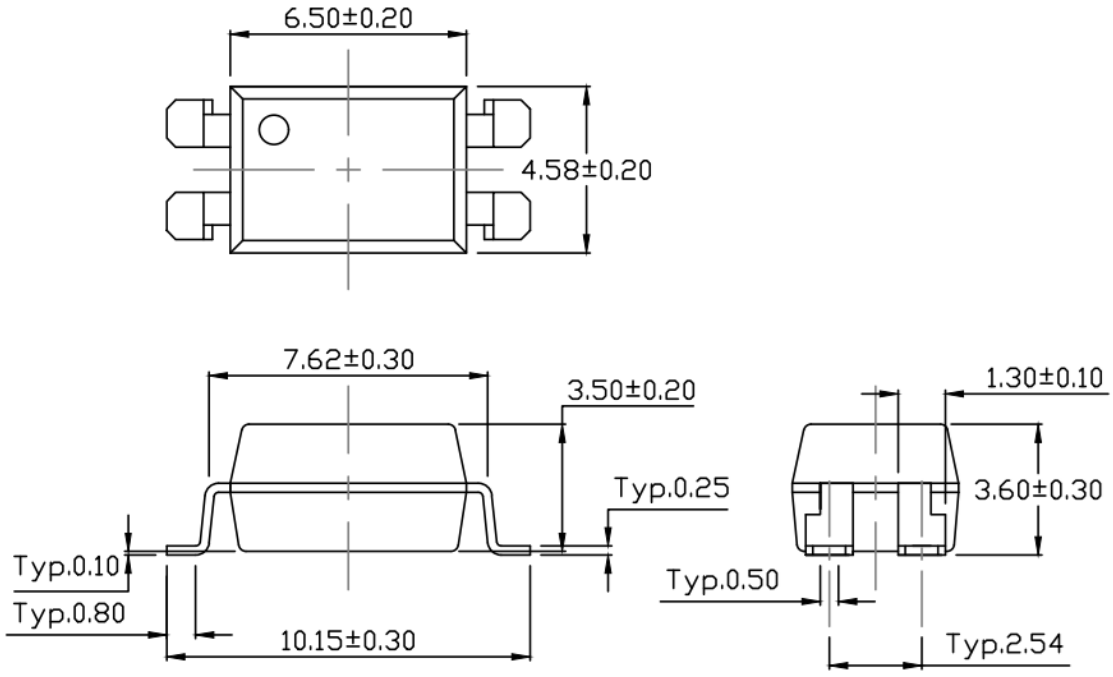


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (S Type)

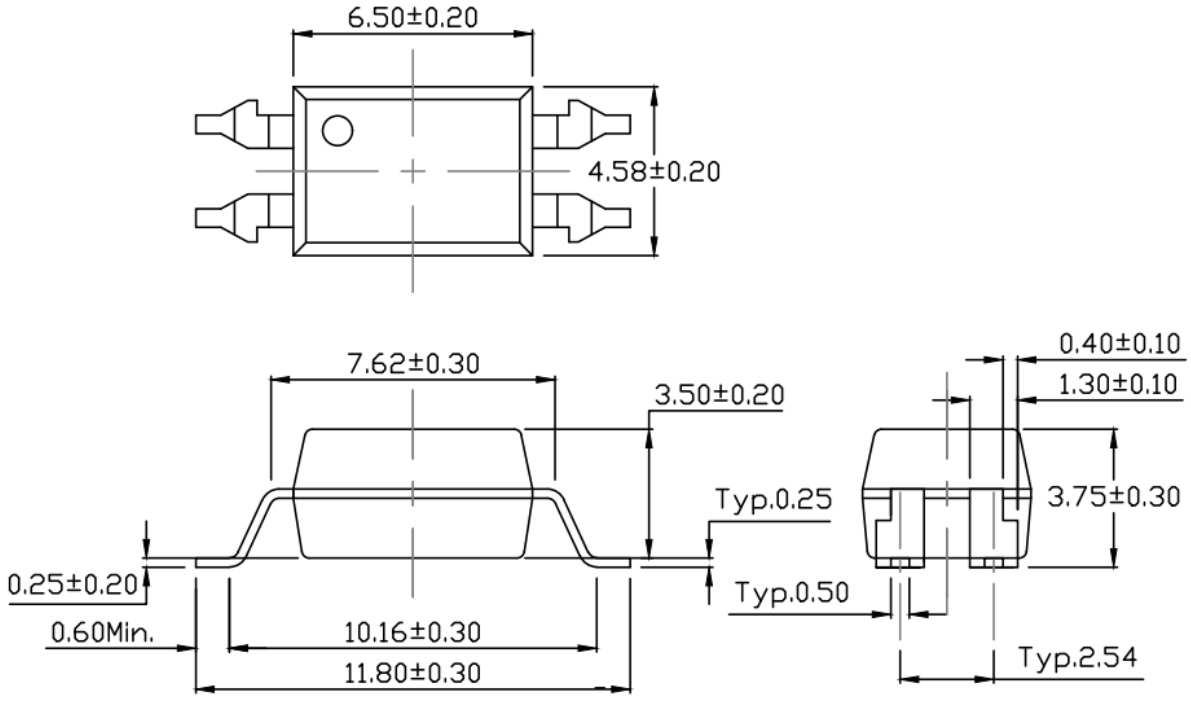


Surface Mount (Low Profile) Lead Forming (SL Type)



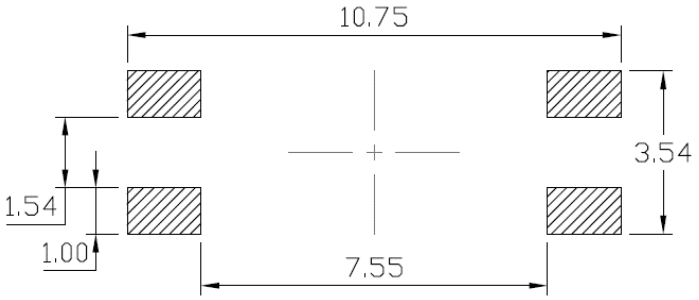
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount (Gullwing) Lead Forming (SLM Type)

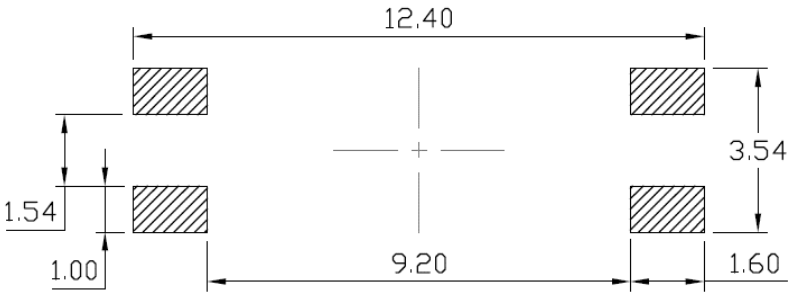


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

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

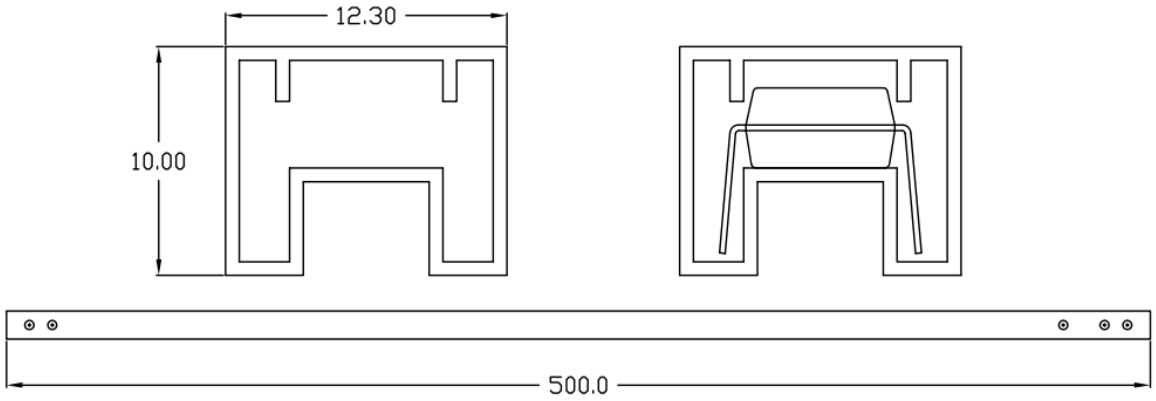


Surface Mount (Gullwing) Lead Forming



TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

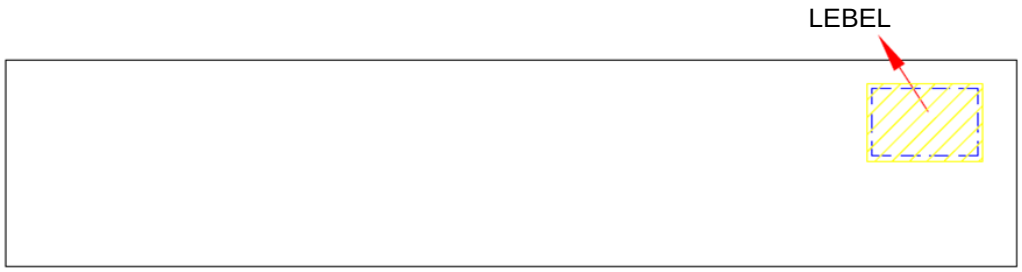
Standard DIP / Option M



L x W x H = 500mm x 12.3mm x 10.0mm

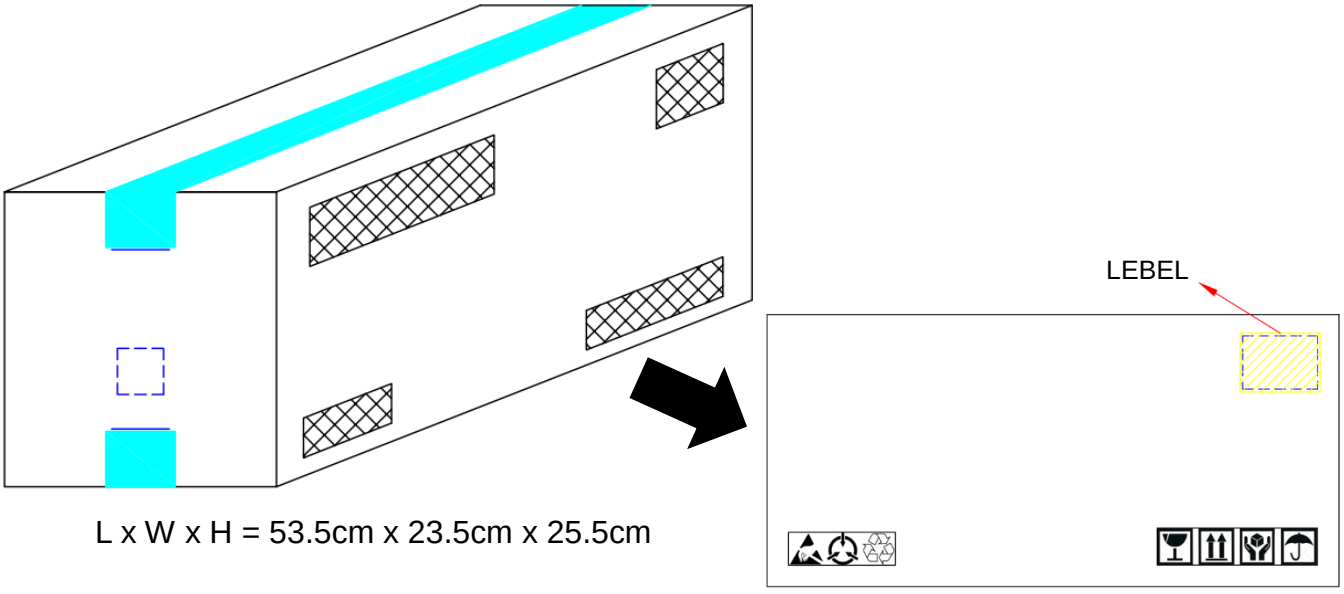
BOX SPECIFICATIONS (Tube Type)

Inner Box



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

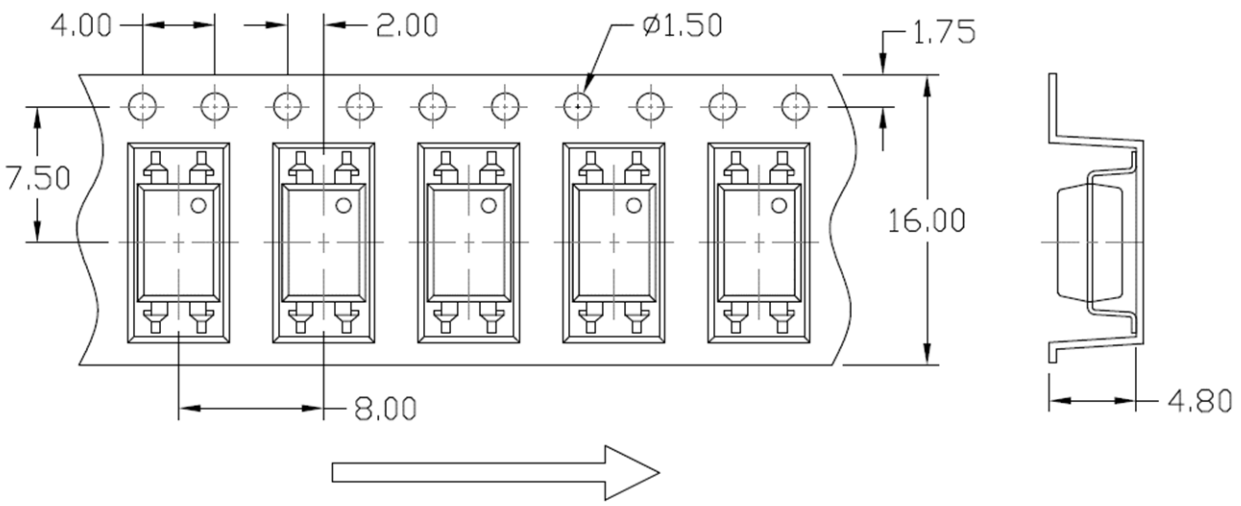
Outer Box



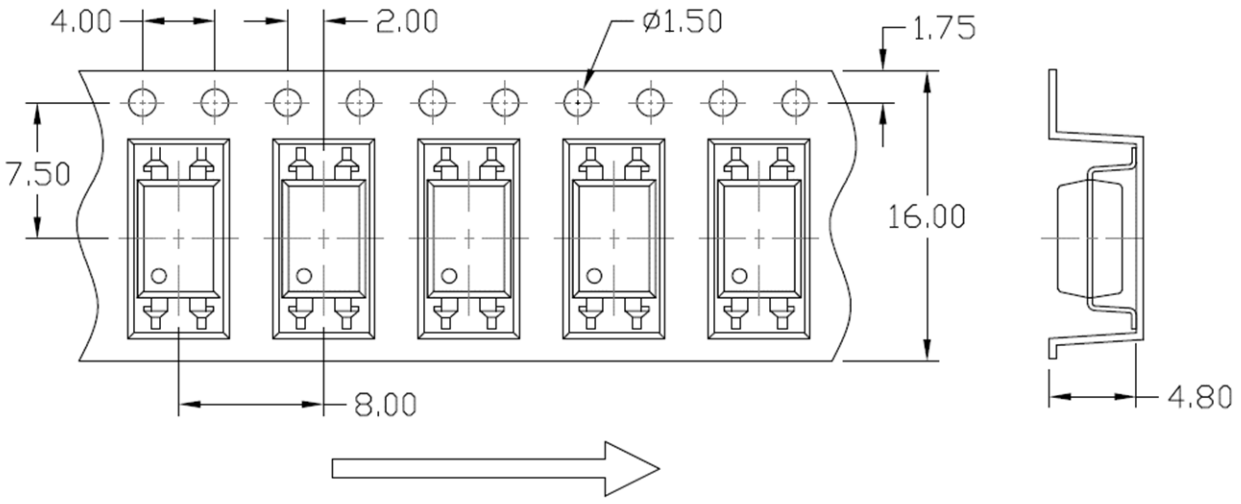
L x W x H = 53.5cm x 23.5cm x 25.5cm

CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1) & SL(T1)

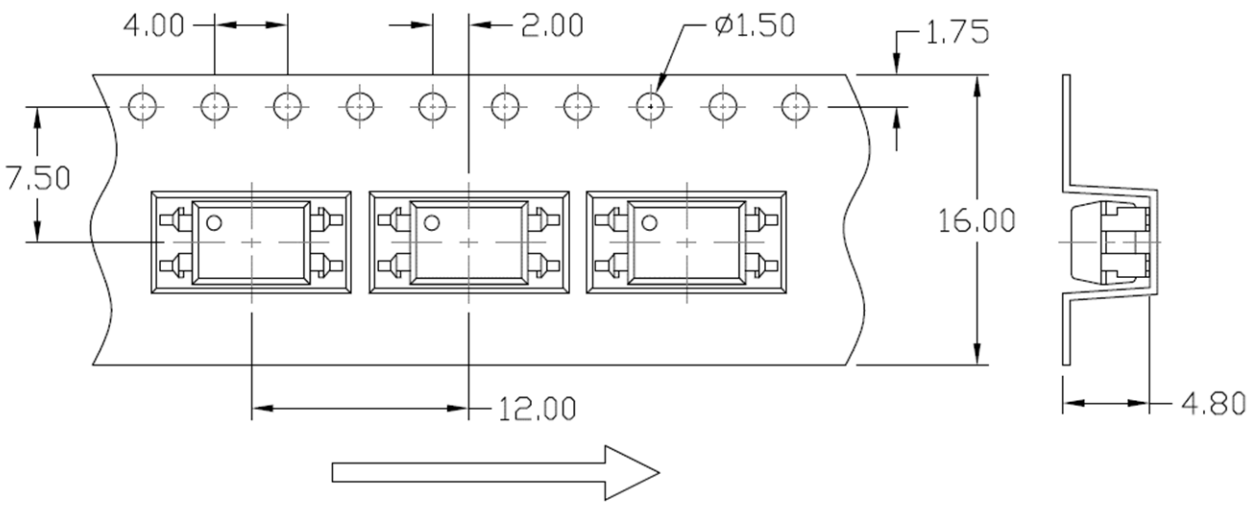


Option S(T2) & SL(T2)

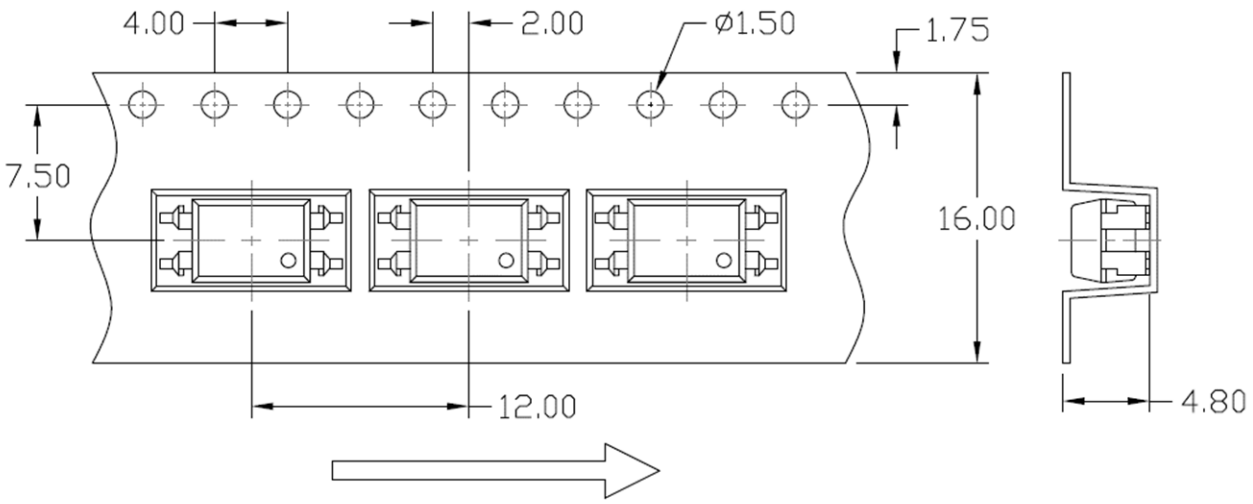


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T3) & SL(T3)

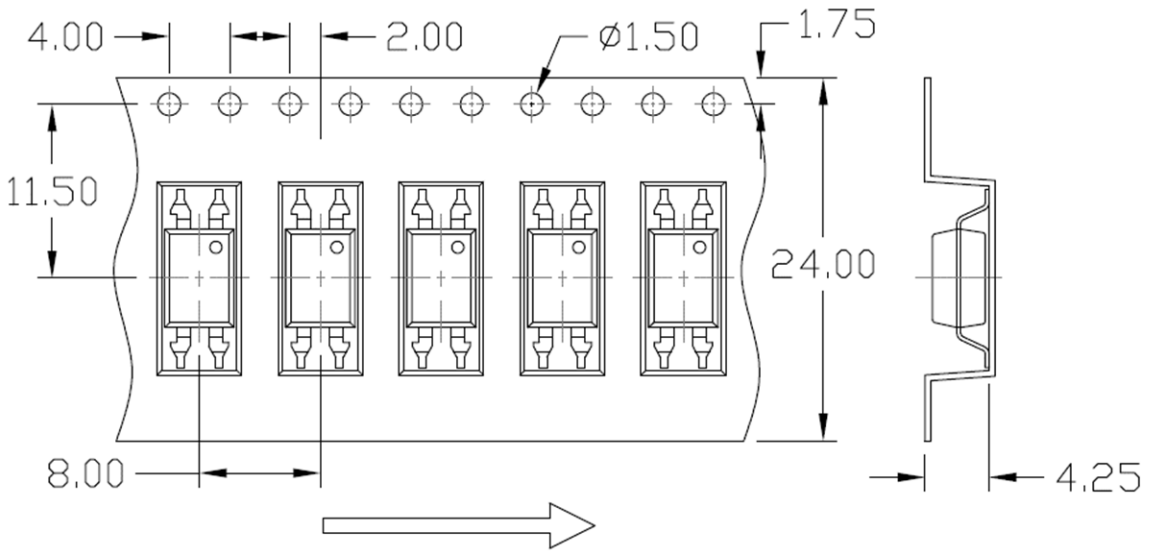


Option S(T4) & SL(T4)

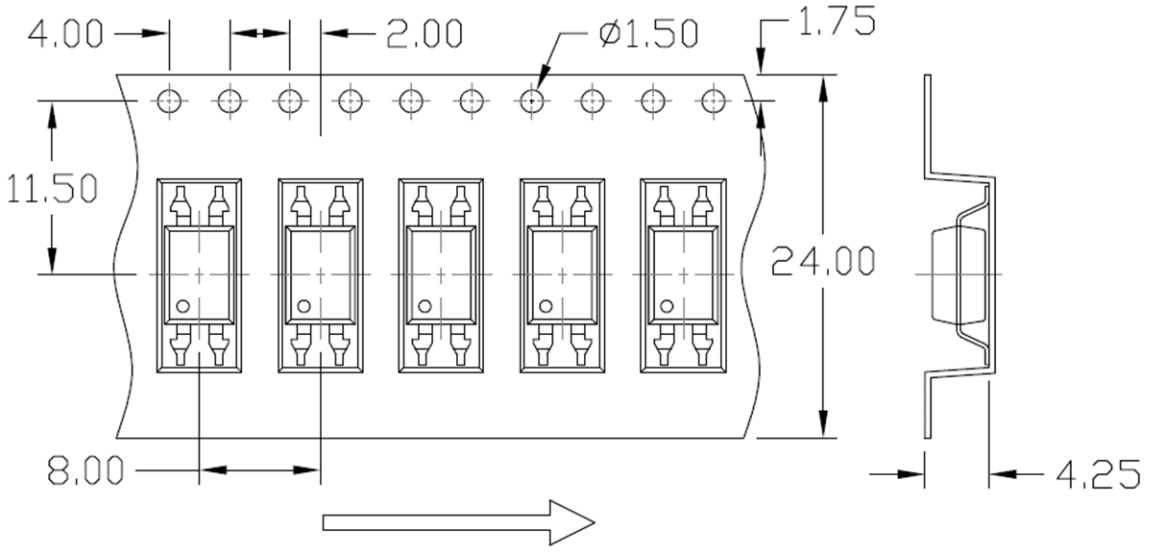


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

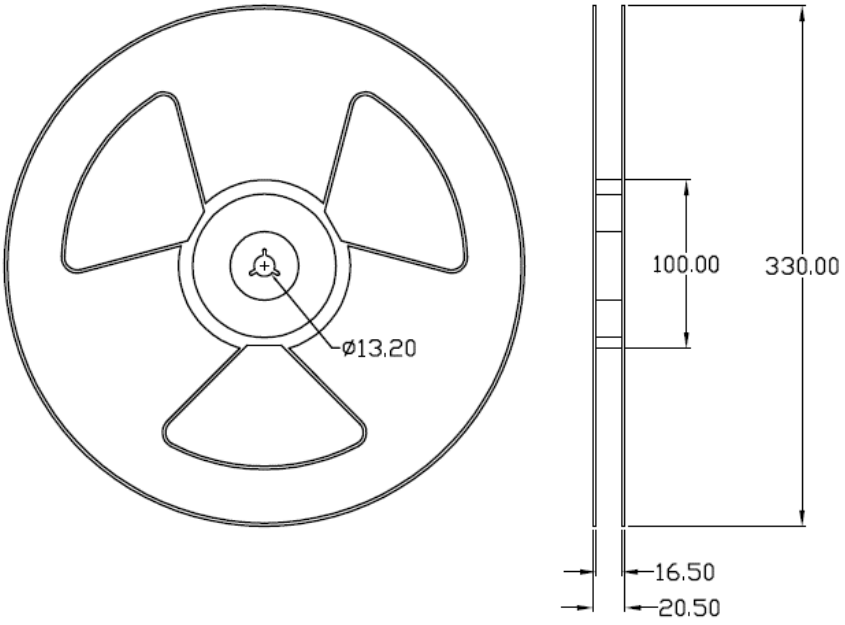
Option SLM(T1)



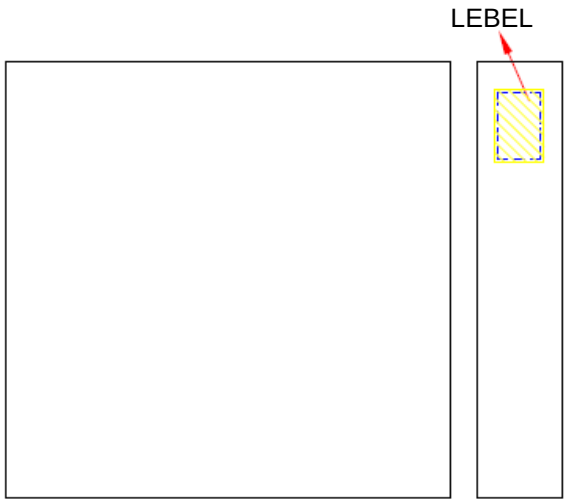
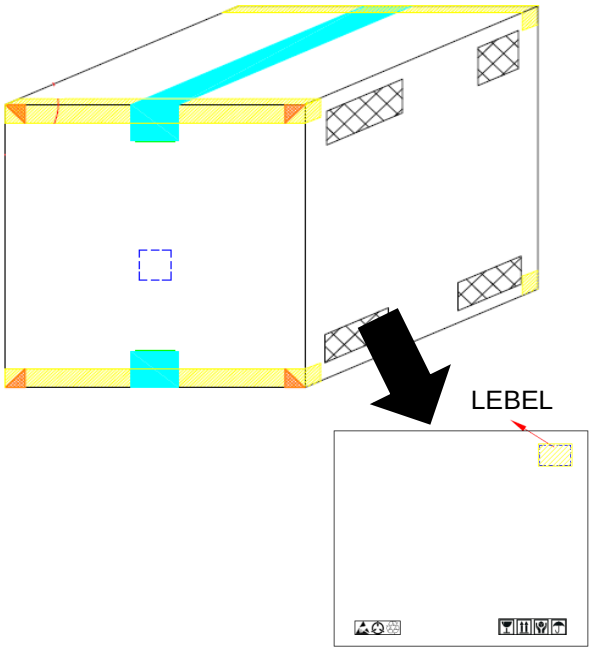
Option SLM(T2)



REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)



BOX SPECIFICATIONS (Reel Type)

INNER BOX	OUTER BOX
	
L x W x H = 36cm x 36cm x 6.9cm	L x W x H = 45cm x 38cm x 38cm

ORDERING AND MARKING INFORMATION

MARKING INFORMATION

M : Company Abbr.
YY : Year date code
WW : 2-digit work week
816 : Part Number
X : CTR Rank
T : Factory identification mark
V :VDE Identification(Option)

ORDERING INFORMATION

MPCS-816X(Y)(Z)-GV

MPC – Company Abbr.
S – Stack
816 – Part Number
X – CTR Rank(A/B/C/D)
Y – Lead Form Option(None/M/S/SL/SM)
(None-7mm Clearance or M-10mm Clearance or S/SL-10mm Clearance or SM-11.8mm Clearance)
Z – Tape and Reel Option(T1/T2/T3/T4)
G – Green Part
V – VDE Option (V or None)

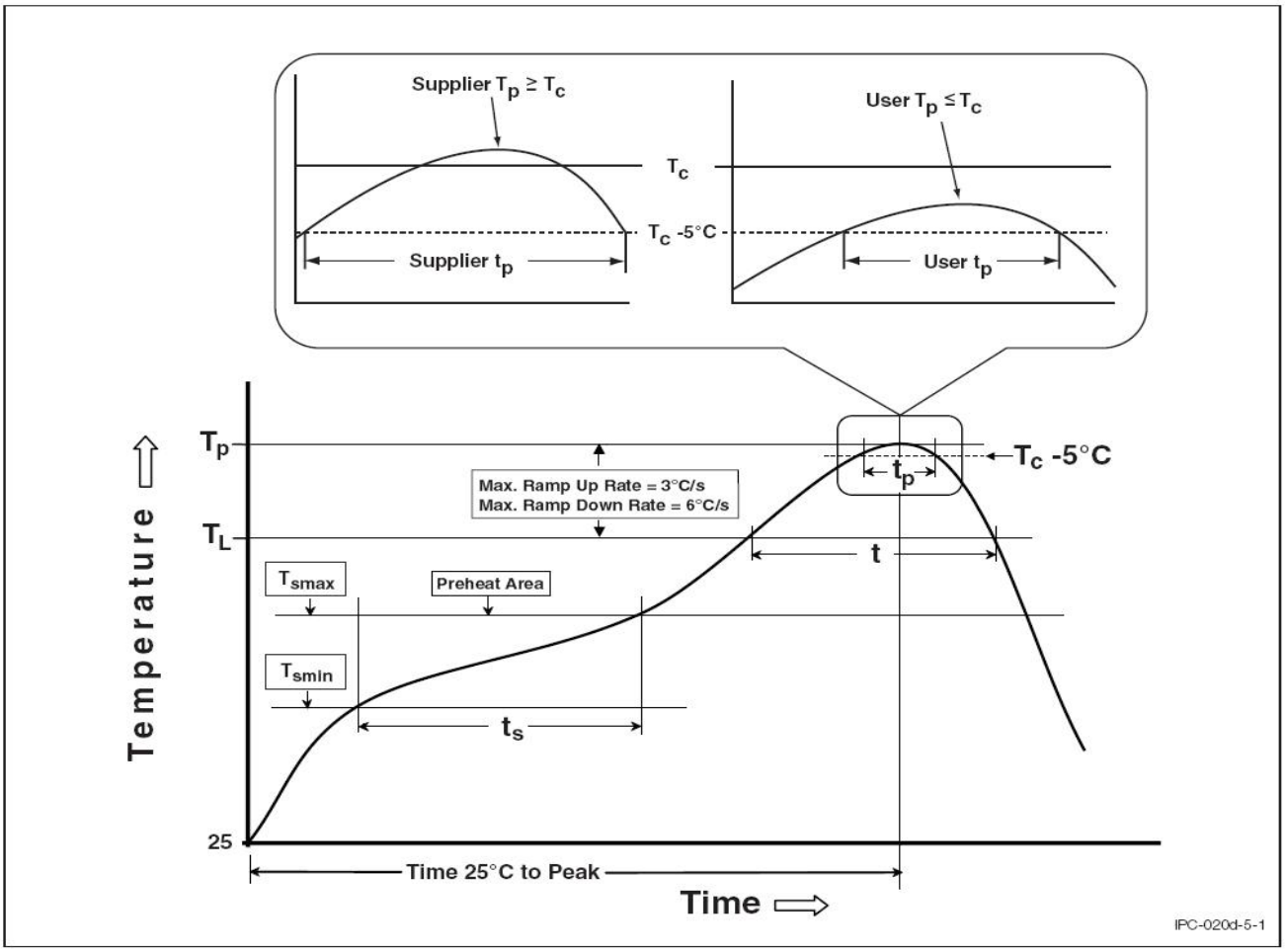
LABEL INFORMATION

PACKING QUANTITY

Option	Quantity	Quantity – Inner box	Quantity – Outer box
None	100 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box = 32k Units
M	100 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box = 32k Units
S(T1/T2)	1500 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 22.5k Units
S(T3/T4)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
SL(T1/T2)	1500 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 22.5k Units
SL(T3/T4)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
SLM(T1/T2)	1500 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 15k Units

REFLOW INFORMATION

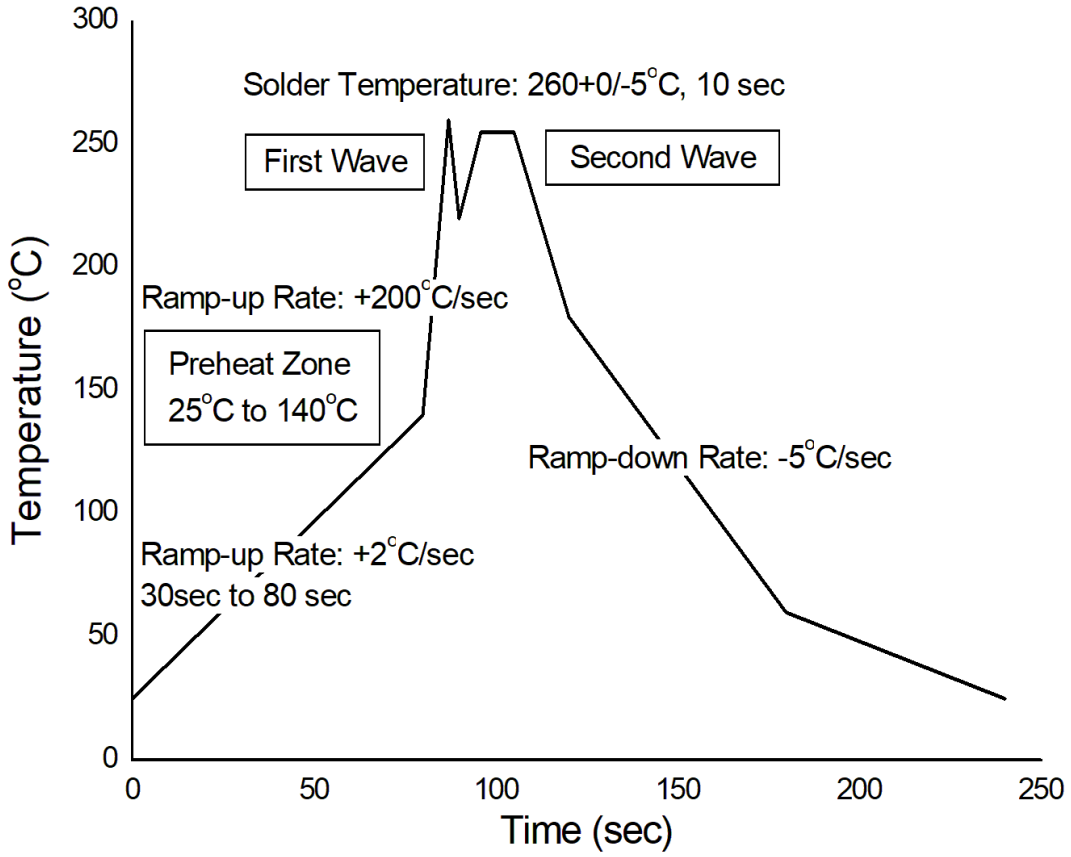
REFLOW PROFILE



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	100°C	150°C
Temperature Max. (Tsmax)	150°C	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

- WISELITE is continually improving the quality, reliability, function and design. WISELITE reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- WISELITE 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, WISELITE 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, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact WISELITE 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 WISELITE’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.