MPCS-M306X Series

SOP4, DC Input, Zero-Cross Photo TRIAC Coupler

Description

The MPCS-M306X series combine red emitting diode as the emitter which is optically coupled to a monolithic silicon Zero-Cross photo TRIAC in a plastic SOP4 package.

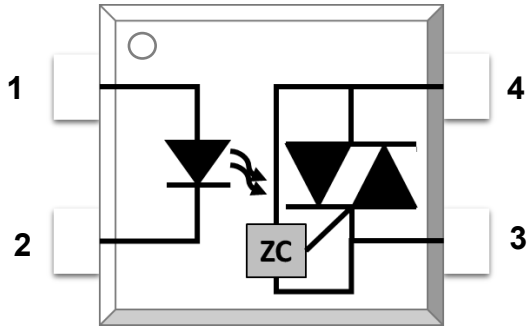
Features

- High isolation 3750 VRMS
- DC input with zero-cross photo triac output
- MSL class 1
- Guaranteed performance over temperature -40°C ~ +110°C.

Applications

- Solenoid/valve controls
- Lighting controls
- Motor controls
- Temperature controls
- Static AC power switches
- Solid state relays
- Interfacing microprocessors to 115 to 240VAC peripherals

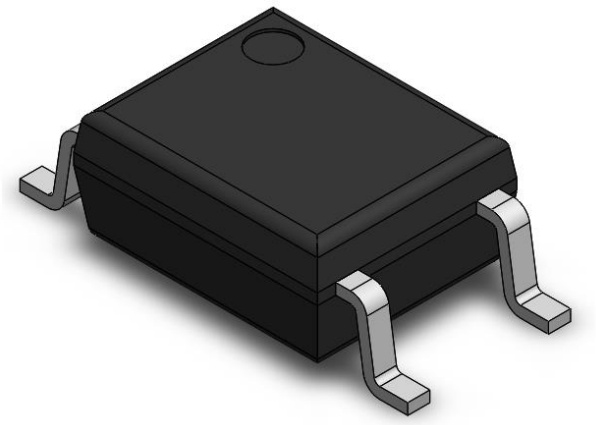
SCHEMATIC



PIN DEFINITION

1. **Anode**
2. **Cathode**
3. **Terminal**
4. **Terminal**

PACKAGE OUTLINE



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	I_F	25	mA	
Peak Forward Current	I_{FP}	50	mA	1
Peak Transient Current	$I_{F(trans)}$	1	A	2
Operating Frequency	f	50	kHz	
Reverse Voltage	V_R	5	V	
Input Power Dissipation	P_I	100	mW	
OUTPUT				
Off-state Output Terminal Voltage	V_{DRM}	600	V	
Peak Repetitive Surge Current PW=100μs, 120pps	I_{TSM}	1	A	
Junction Temperature	T_j	125	°C	
Output Power Dissipation	P_O	300	mW	
COMMON				
Total Power Dissipation	P_{tot}	400	mW	
Isolation Voltage	V_{iso}	3750	Vrms	3
Operating Temperature	T_{opr}	-40~110	°C	
Storage Temperature	T_{stg}	-55~125	°C	
Soldering Temperature	T_{sol}	260	°C	4

Note 1. 50% duty, 1ms P.W

Note 2. ≤1μs P.W,300pps

Note 3. AC For 1 Minute, R.H. = 40 ~ 60%

Note 4. For 10 seconds

ELECTRICAL OPTICAL CHARACTERISTICS (TA=25°C)

PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT CHARACTERISTICS								
Forward Voltage		V_F	-	2.0	2.4	V	I_F=10mA	
Reverse Current		I_R	-	-	10	μA	V_R=5V	
Input Capacitance		C_{IN}	-	60	-	pF	V=0, f=1MHz	
OUTPUT CHARACTERISTICS								
Peak Off-state Current, Either Direction		I_{DRM}	-	-	100	nA	V_{DRM}=Rated V_{DRM} I_F=0	1
Peak On-state Current, Either Direction		V_{TM}	-	2.0	2.5	V	I_{TM}=100mA I_F=Rated I_{FT}	
Critical Rate of Rise of Off-state Voltage		dV/dt	10	-	-	kV/μs	V_{PEAK} =Rated V_{DRM}	2
TRANSFER CHARACTERISTICS								
LED Trigger Current	M3061	I_{FT}	-	-	15	mA	Terminal Voltage = 3V I_{TM}=100mA	
	M3062		-	-	10			
	M3063		-	3.3	5			
Holding Current		I_H	-	200	-	μA		
Isolation Resistance		R_{iso}	10^12	10^14	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance		C_{IO}	-	0.3	1	pF	V=0, f=1MHz	
ZERO CROSSING								
Inhibit Voltage		V_{INH}	-	9.1	20	V	I_F=10mA	
Leakage in Inhibited State		I_{DRM2}	-	-	500	uA	I_F=10mA V_{DRM}=600V	
Response Time (Rise)		T_{ON}	-	30	-	μs	V_D=6V R_L=100Ω I_F=10mA	3

Note 1. Test voltage must be applied within dV/dt rating.

Note 2. Reference Fig.12/13.

Note 3. Reference Fig.10/11.

TYPICAL PERFORMANCE CURVES & TEST CIRCUITS

Fig.1 Normalized Trigger LED Current vs. Temperature

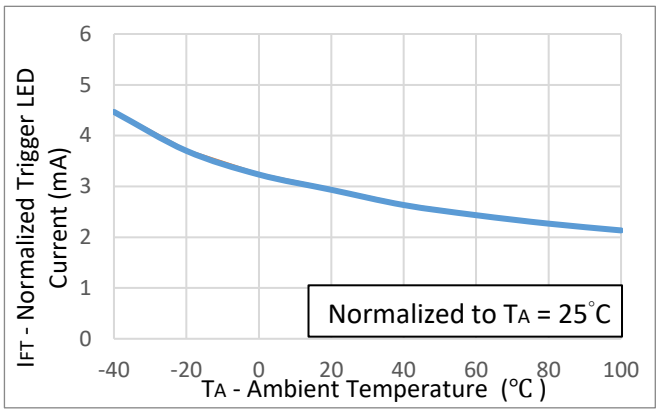


Fig.2 Forward Current vs. Forward Voltage

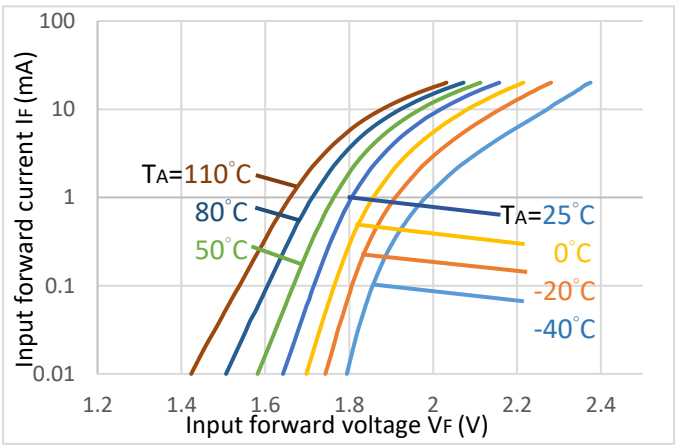


Fig.3 Normalized On-state Voltage vs. Temperature

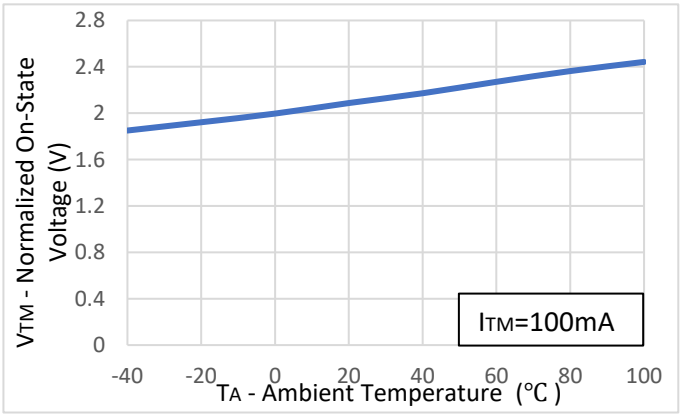


Fig.4 Normalized Holding Current vs. Temperature

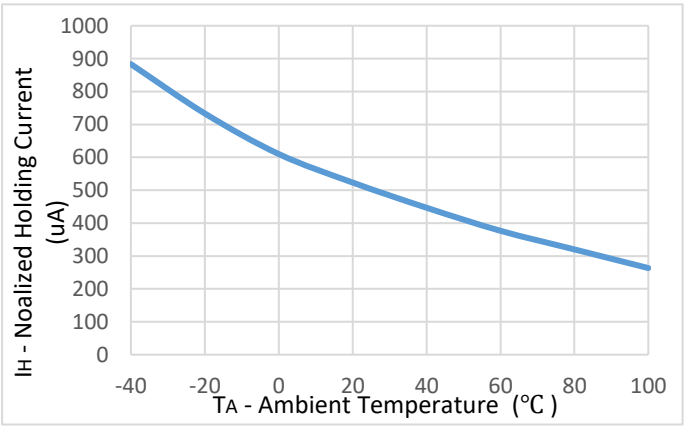


Fig.5 Off-state Current vs Temperature

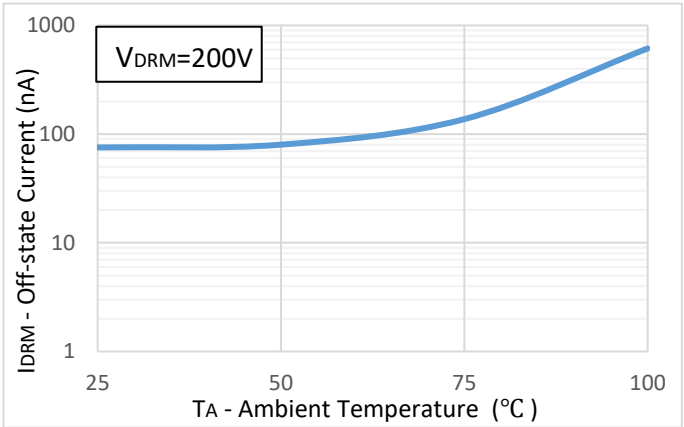


Fig.6 On-state Current vs On-state Voltage

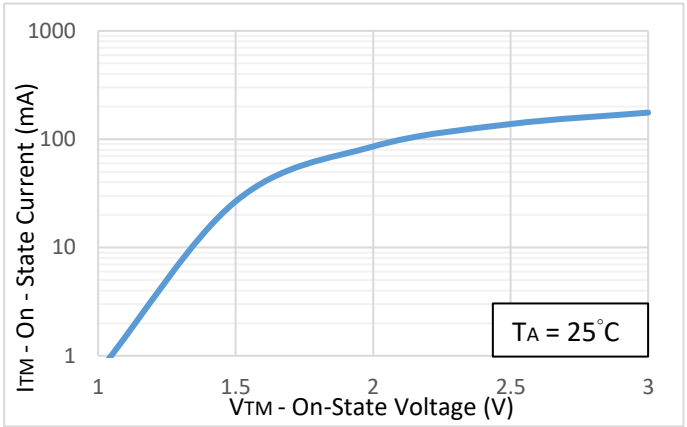


Fig.7 Inhibit Voltage vs. Temperature

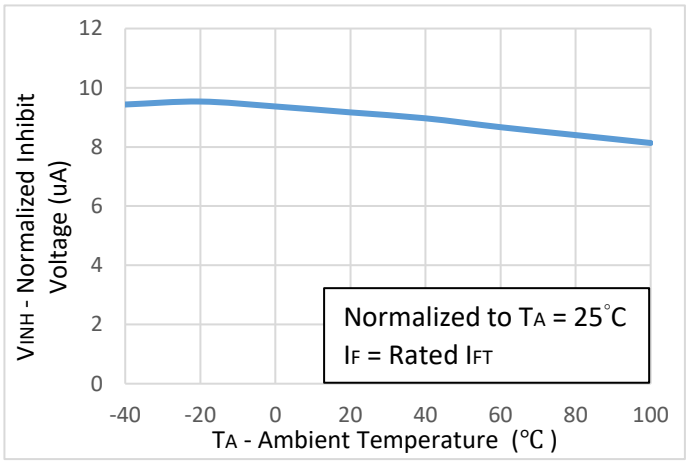


Fig.8 Leakage in Inhibited State vs. Temperature

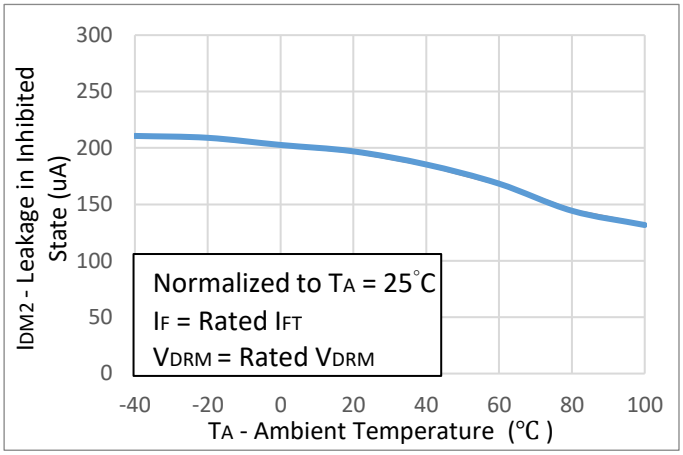
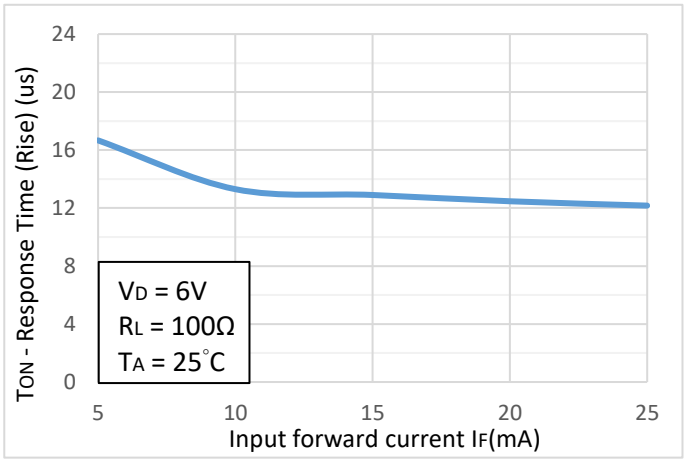


Fig.9 Response Time (Rise) vs. Forward Current



TEST CIRCUITS

Fig.10 Test Circuits of Turn On Time

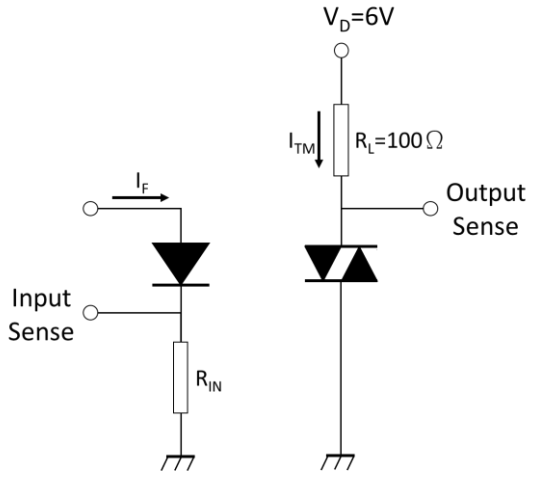


Fig.11 Waveforms of Turn On Time

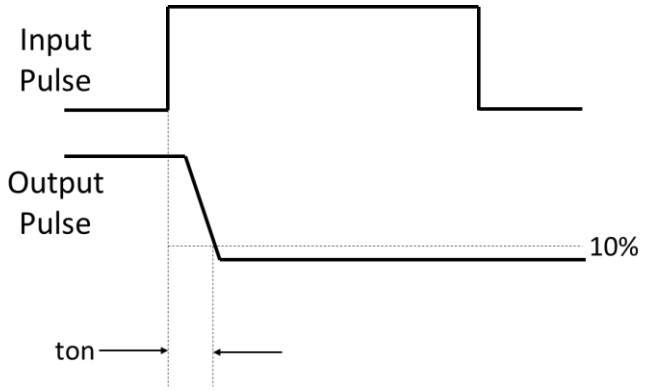


Fig.12 Test Circuits of dV/dt

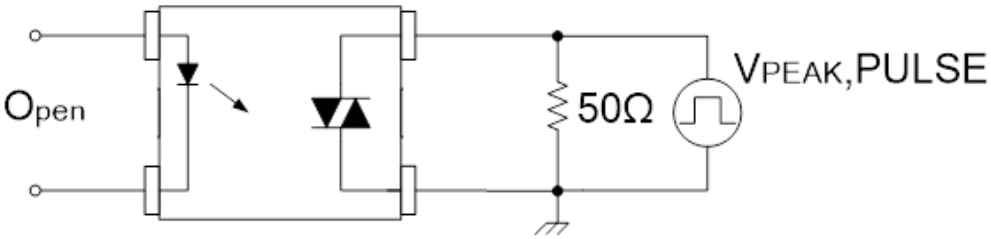
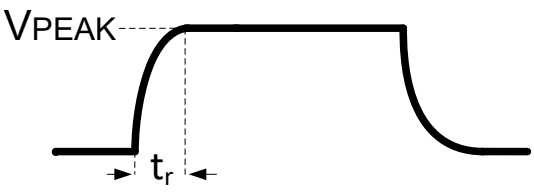
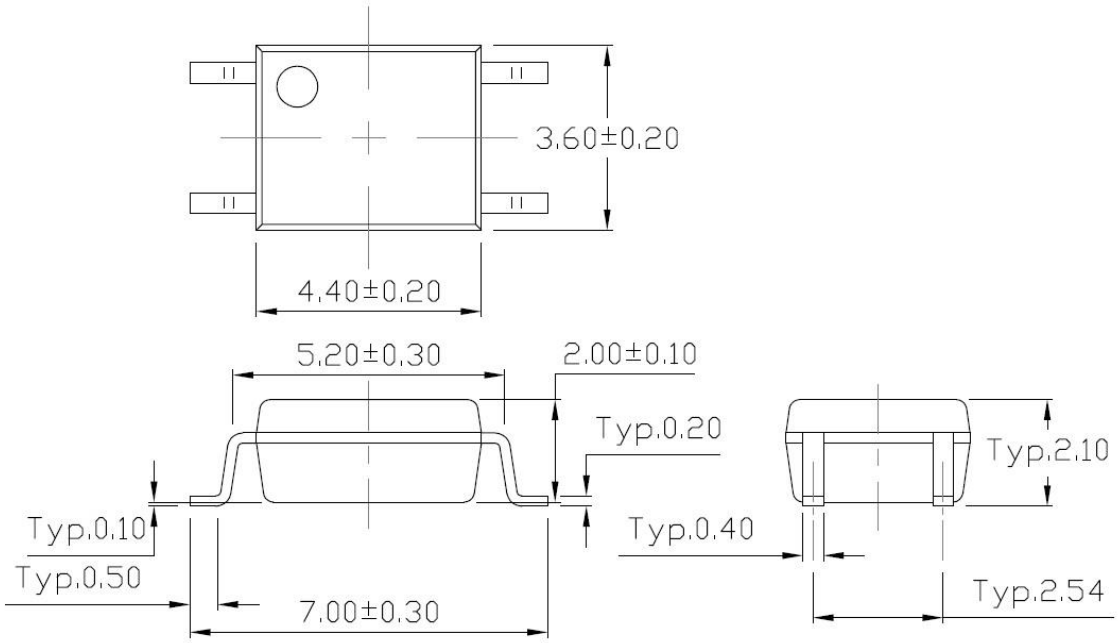


Fig.13 Waveforms of dV/dt

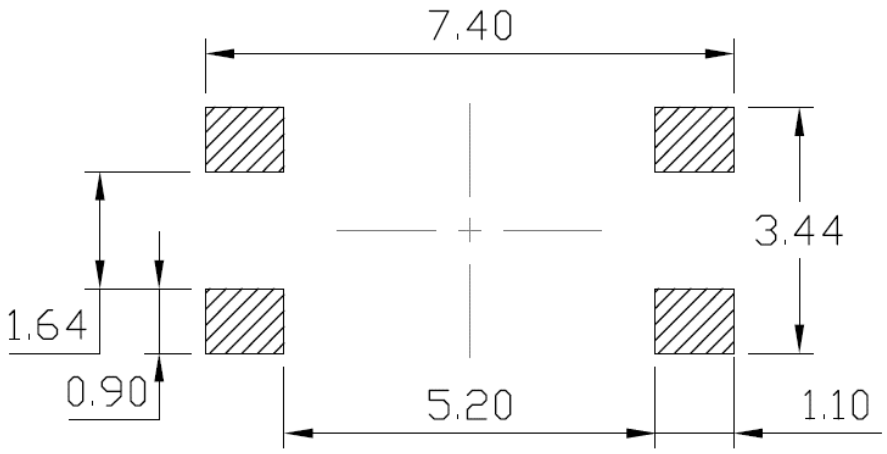


$$dV/dt = \frac{V_{PEAK}}{t_r}$$

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

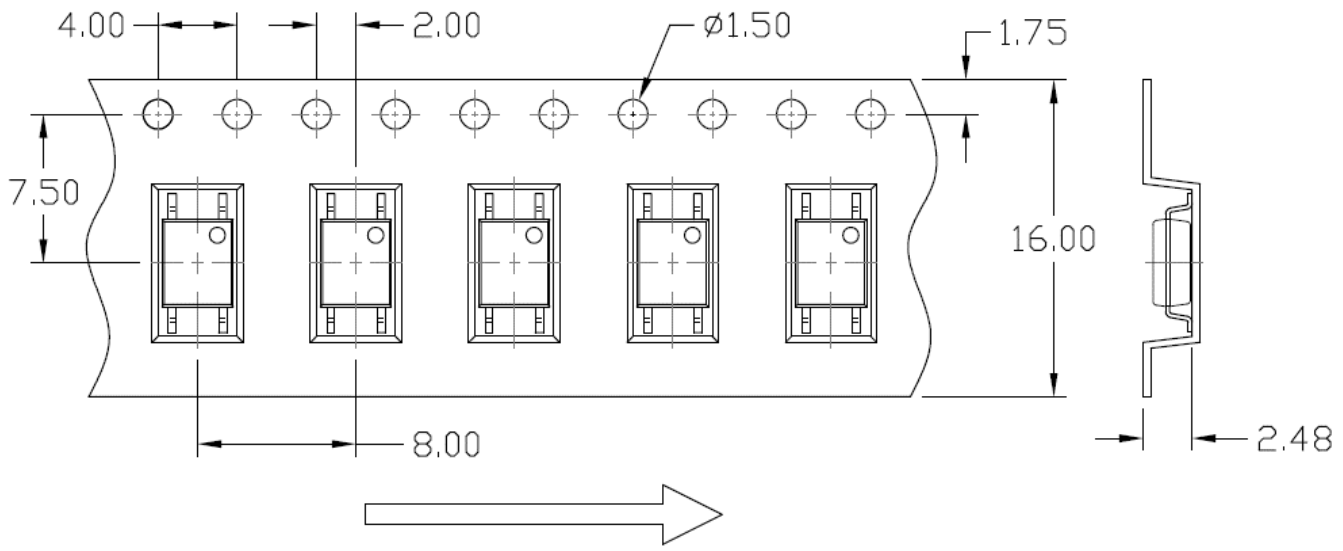


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

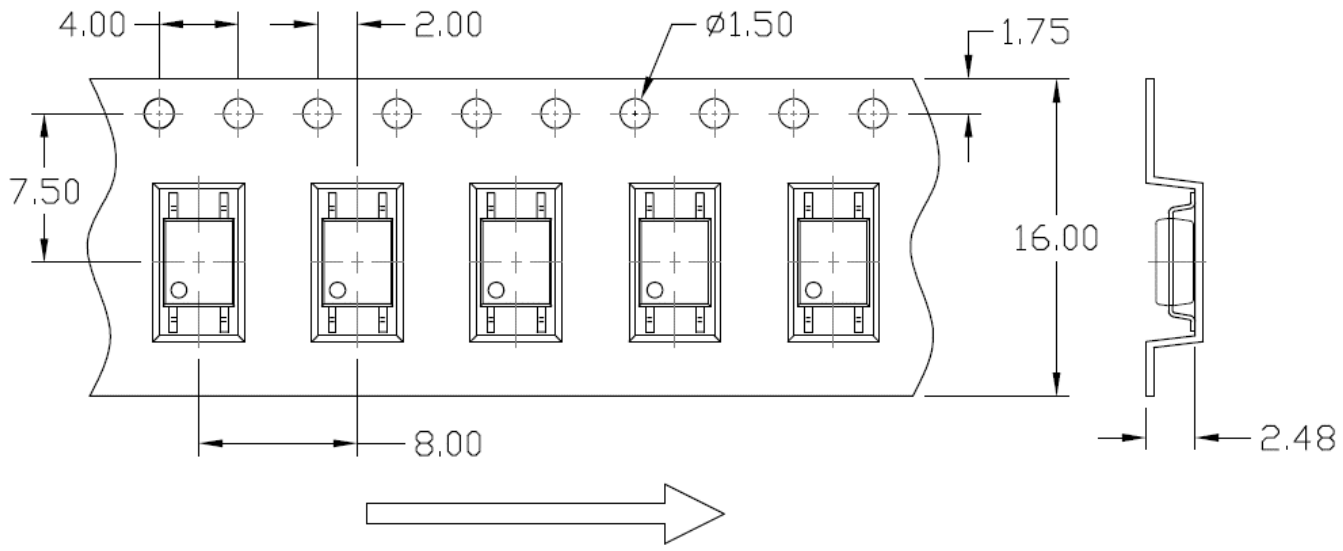


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

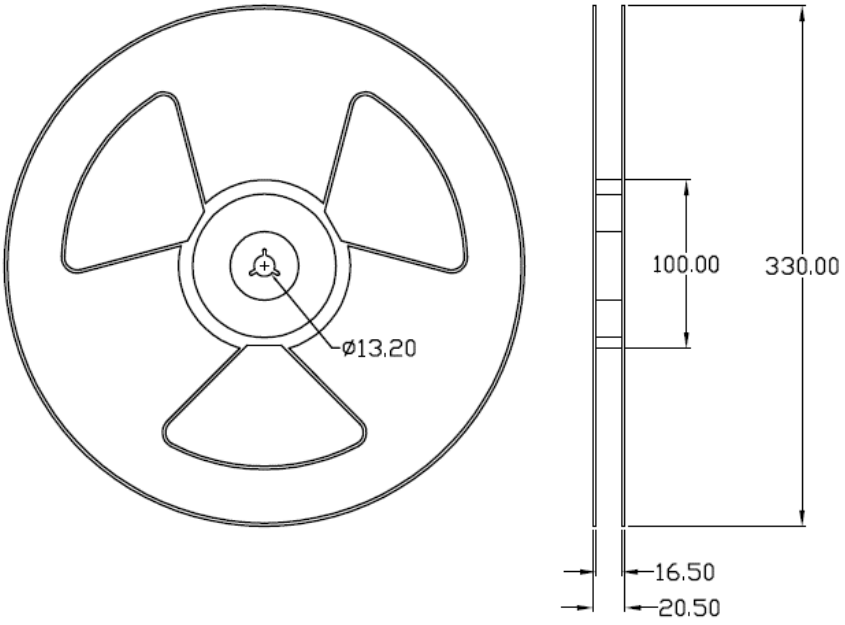
Option T1



Option T2

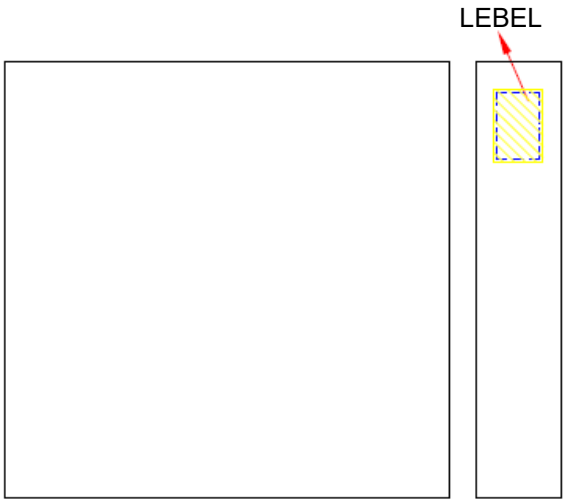


REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)



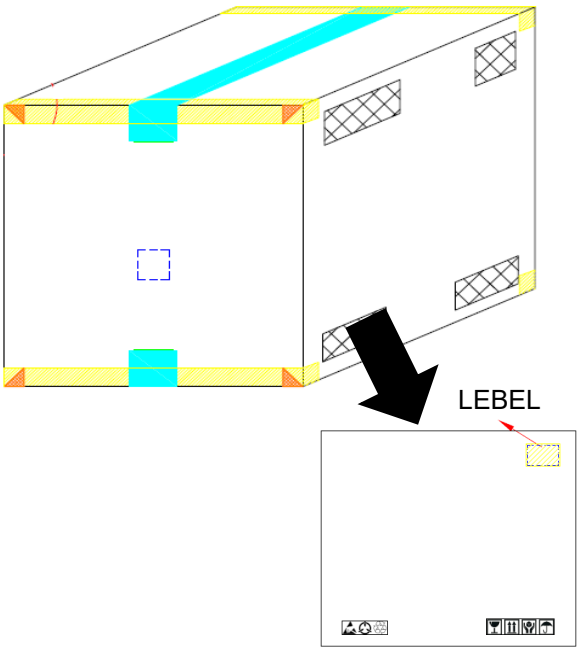
BOX SPECIFICATIONS (Reel Type)

INNER BOX



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

OUTER BOX



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
M306 : Part Number
X : Rank
T : Factory identification mark
V :VDE Identification(Option)

ORDERING INFORMATION

MPCS-M306X(Z)-GV

MPC – Company Abbr.
S – Stack
M306 – Part Number
X – Rank
Z – Tape and Reel Option (T1/T2)
G – Green Part
V –VDE Option (V or None)

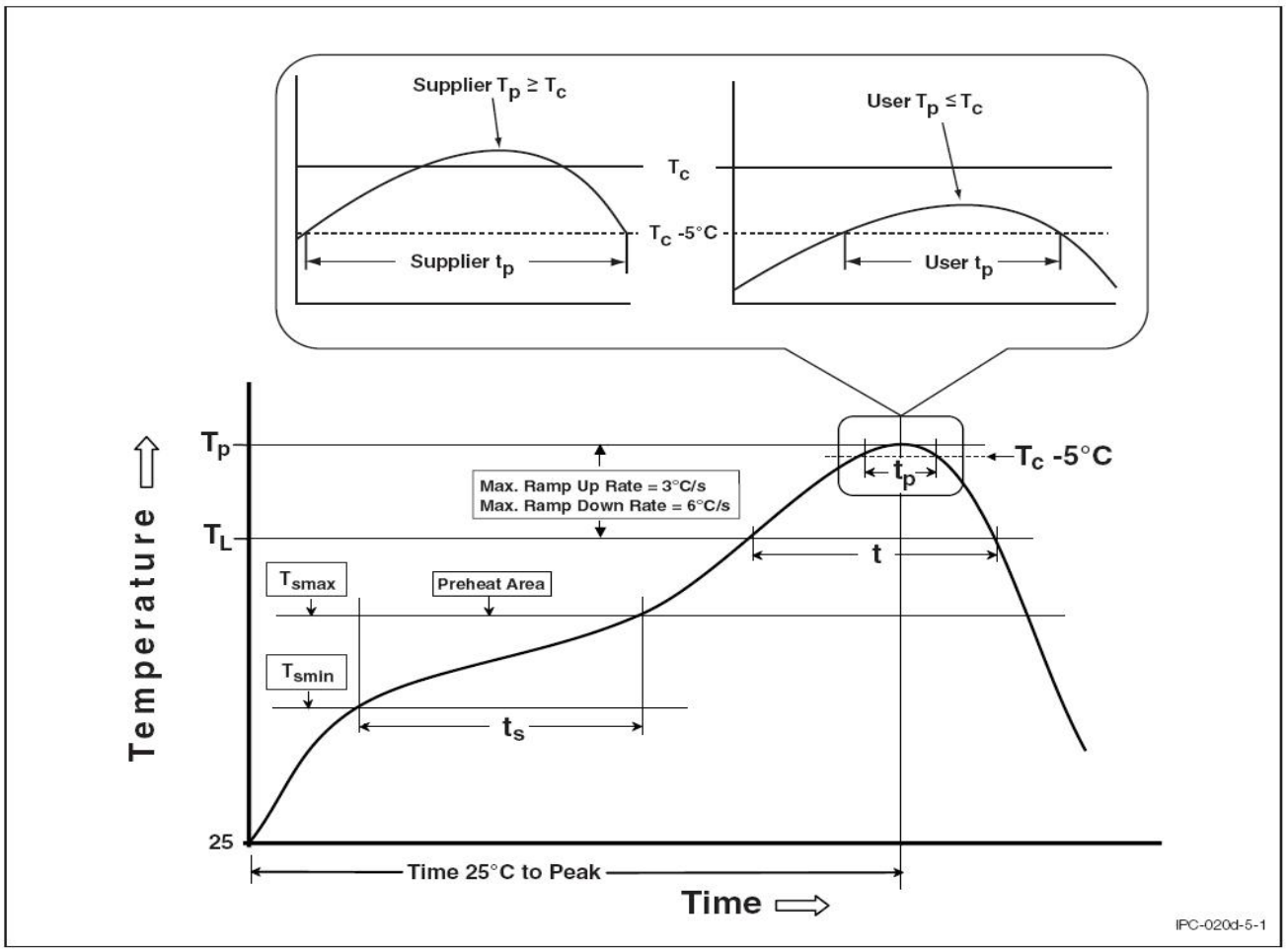
LABEL INFORMATION

PACKING QUANTITY

Option	Quantity	Quantity – Inner box	Quantity – Outer box
T1	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 45k Units
T2	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 45k Units

REFLOW INFORMATION

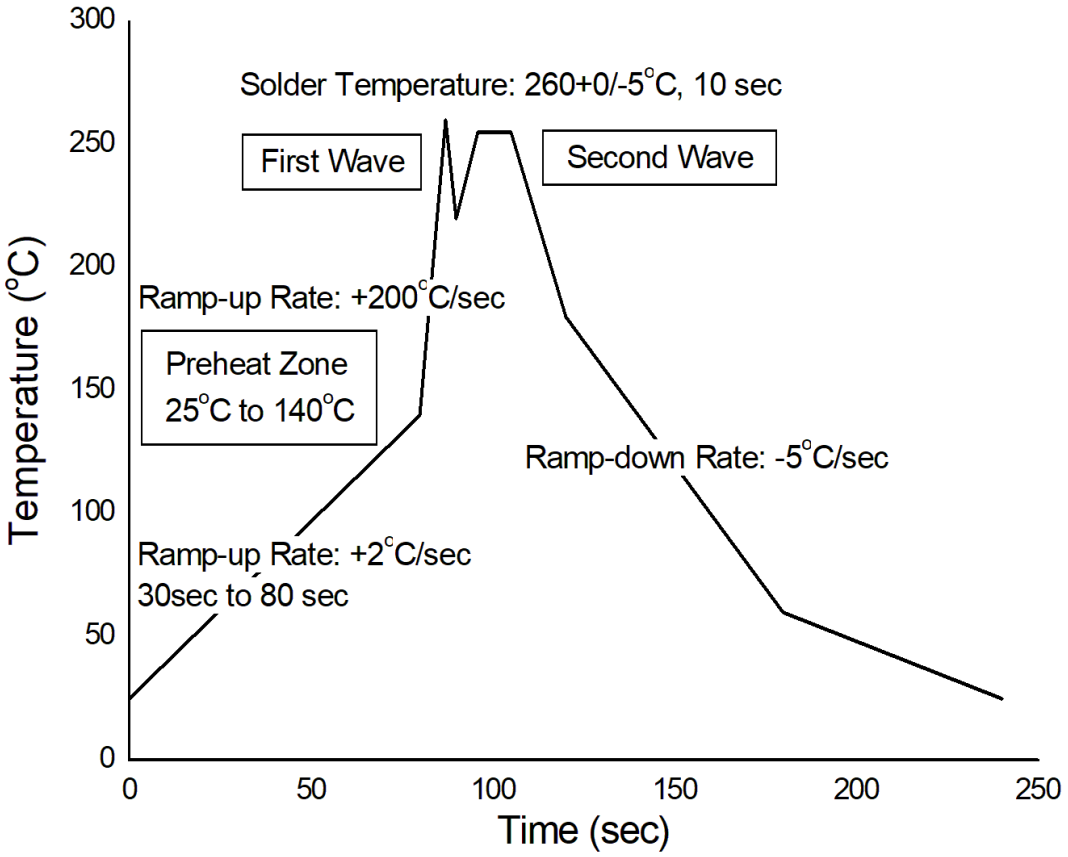
REFLOW PROFILE



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.
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- 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.

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