



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.

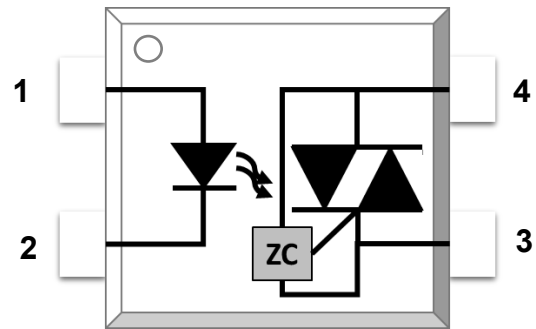
Features

- 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

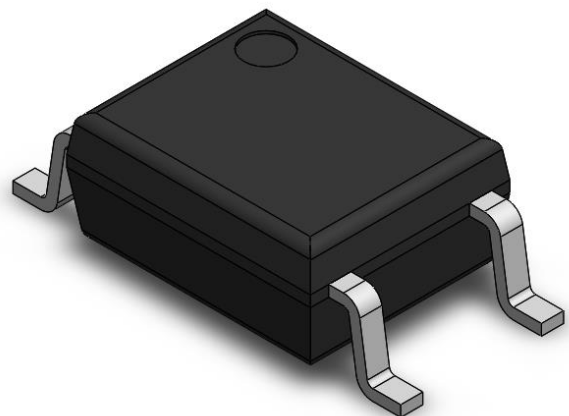
SCHEMATIC



PIN DEFINITION

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

PACKAGE OUTLINE





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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	V _{rms}	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



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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	$I_F=10\text{mA}$	
Reverse Current	I_R	-	-	10	μA	$V_R=5\text{V}$	
Input Capacitance	C_{IN}	-	60	-	pF	$V=0, f=1\text{MHz}$	
OUTPUT CHARACTERISTICS							
Peak Off-state Current, Either Direction	I_{DRM}	-	-	100	nA	$V_{DRM}=\text{Rated } V_{DRM}$ $I_F=0$	1
Peak On-state Current, Either Direction	V_{TM}	-	2.0	2.5	V	$I_{TM}=100\text{mA}$ $I_F=\text{Rated } I_{FT}$	
Critical Rate of Rise of Off-state Voltage	dV/dt	10	-	-	kV/ μs	$V_{PEAK}=\text{Rated } V_{DRM}$	2
TRANSFER CHARACTERISTICS							
LED Trigger Current	M3061	I_{FT}	-	-	15	Terminal Voltage = 3V $I_{TM}=100\text{mA}$	
	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	$V=0, f=1\text{MHz}$	
ZERO CROSSING							
Inhibit Voltage	V_{INH}	-	9.1	20	V	$I_F=10\text{mA}$	
Leakage in Inhibited State	I_{DRM2}	-	-	500	μA	$I_F=10\text{mA}$ $V_{DRM}=600\text{V}$	
Response Time (Rise)	T_{ON}	-	30	-	μs	$V_D=6\text{V } R_L=100\Omega$ $I_F=10\text{mA}$	3

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

Note 2. Reference Fig.12/13.

Note 3. Reference Fig.10/11.



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TYPICAL PERFORMANCE CURVES & TEST CIRCUITS

Fig.1 Normalized Trigger LED Current vs. Temperature

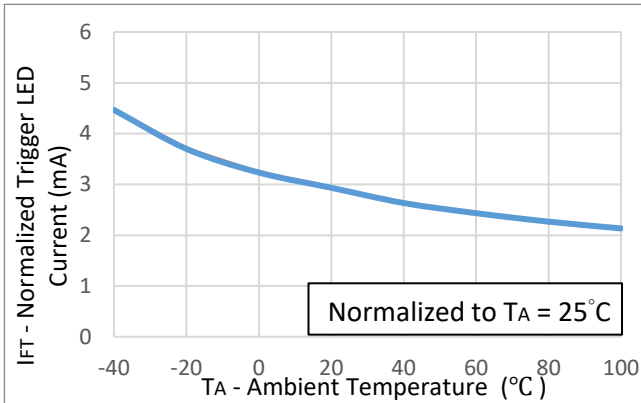


Fig.2 Forward Current vs. Forward Voltage

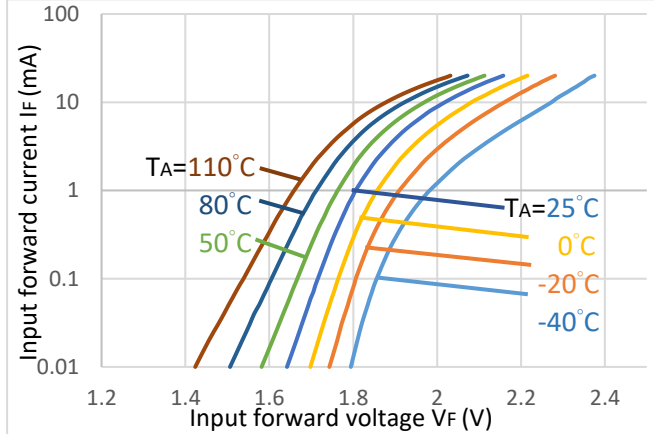


Fig.3 Normalized On-state Voltage vs. Temperature

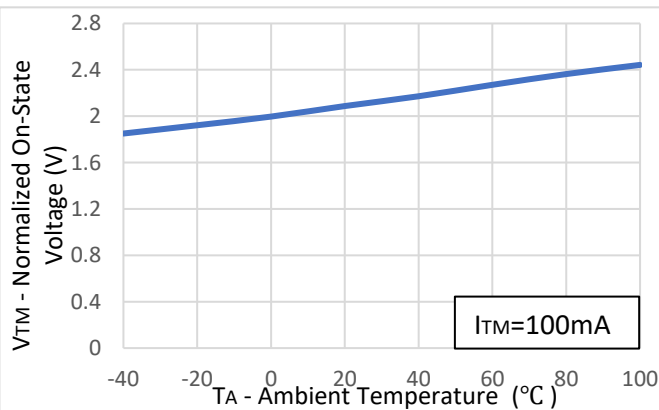


Fig.4 Normalized Holding Current vs. Temperature

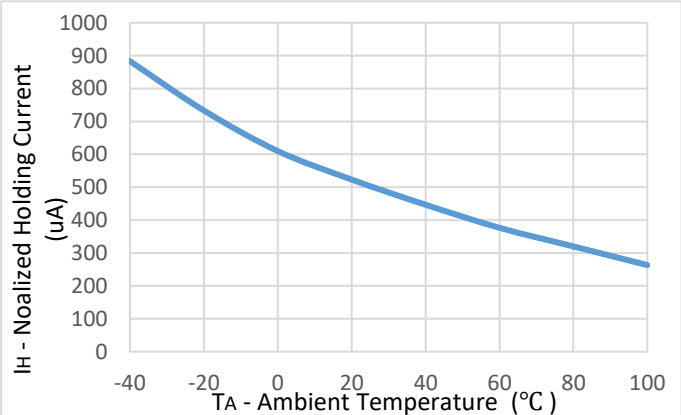


Fig.5 Off-state Current vs Temperature

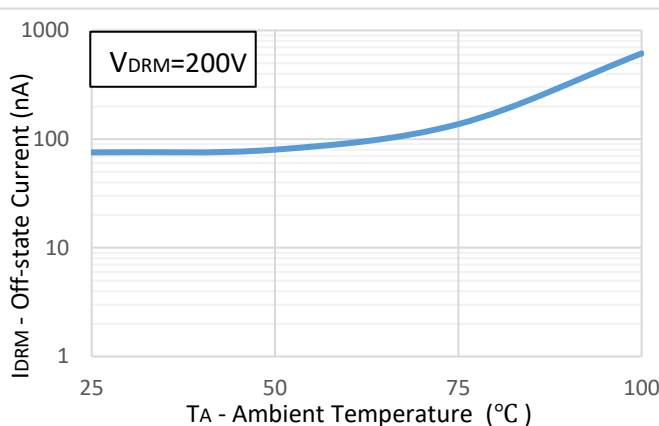
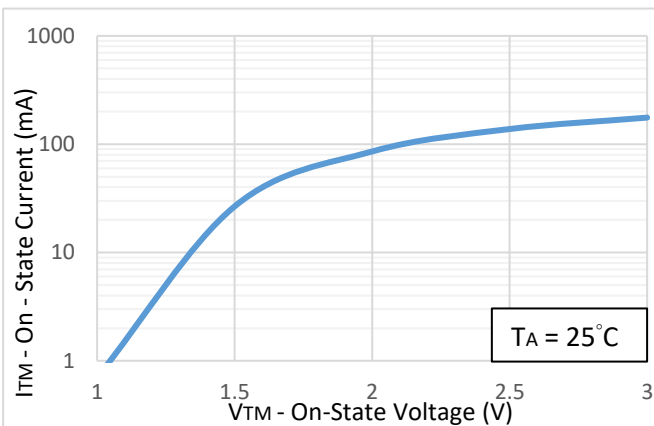


Fig.6 On-state Current vs On-state Voltage

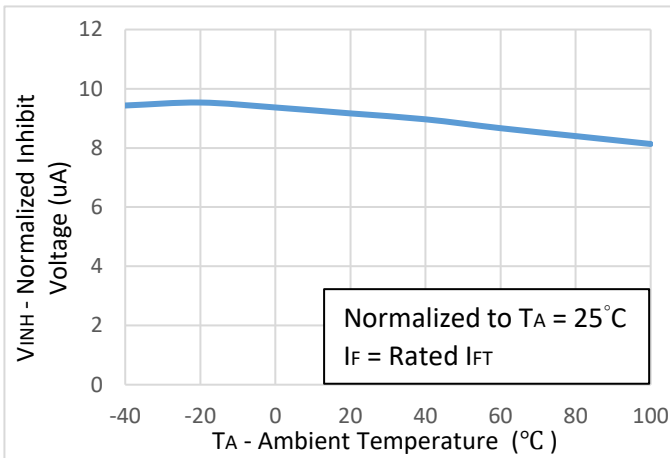




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**Fig.7 Inhibit Voltage
vs. Temperature**



**Fig.8 Leakage in Inhibited State
vs. Temperature**

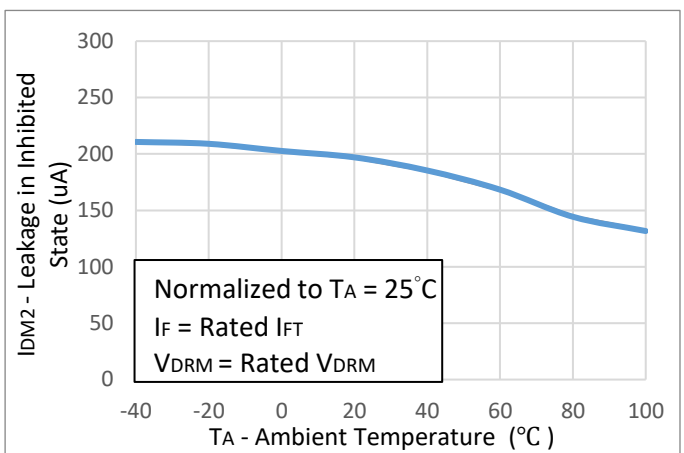
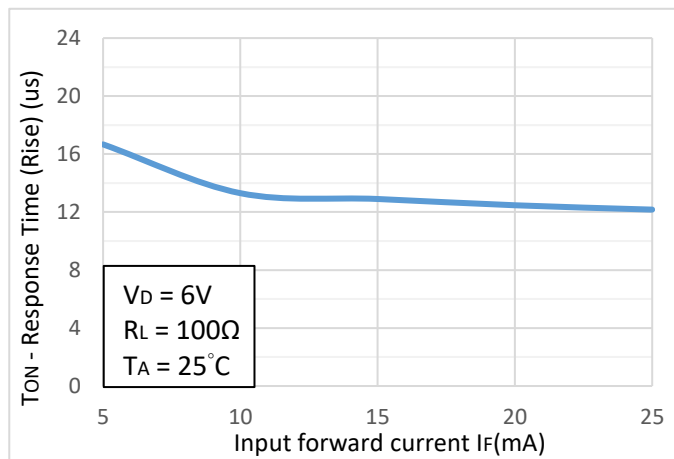


Fig.9 Response Time (Rise) vs. Forward Current



TEST CIRCUITS

Fig.10 Test Circuits of Turn On Time

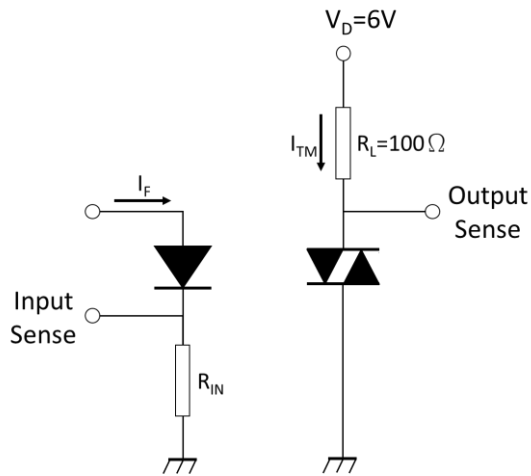


Fig.11 Waveforms of Turn On Time

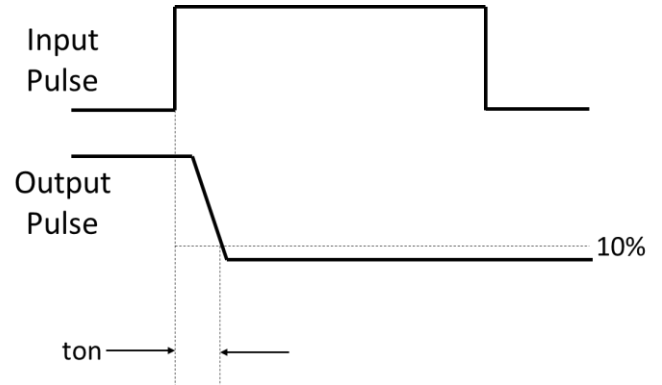


Fig.12 Test Circuits of dV/dt

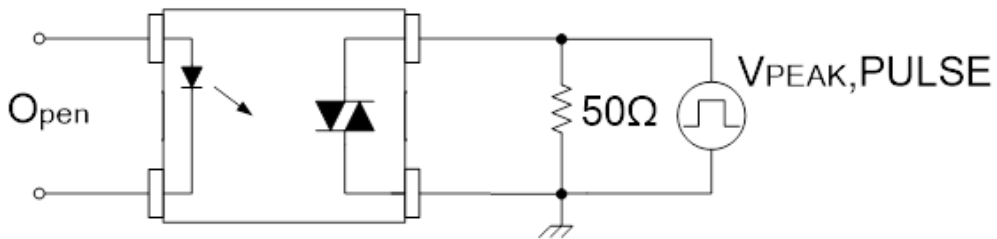
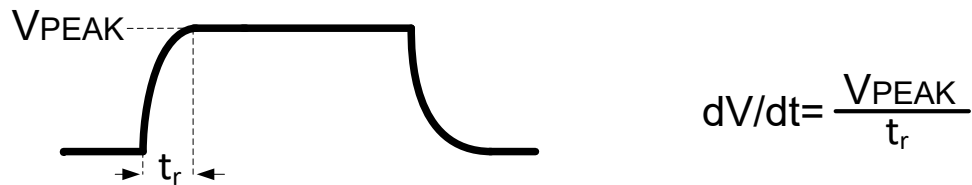


Fig.13 Waveforms of dV/dt

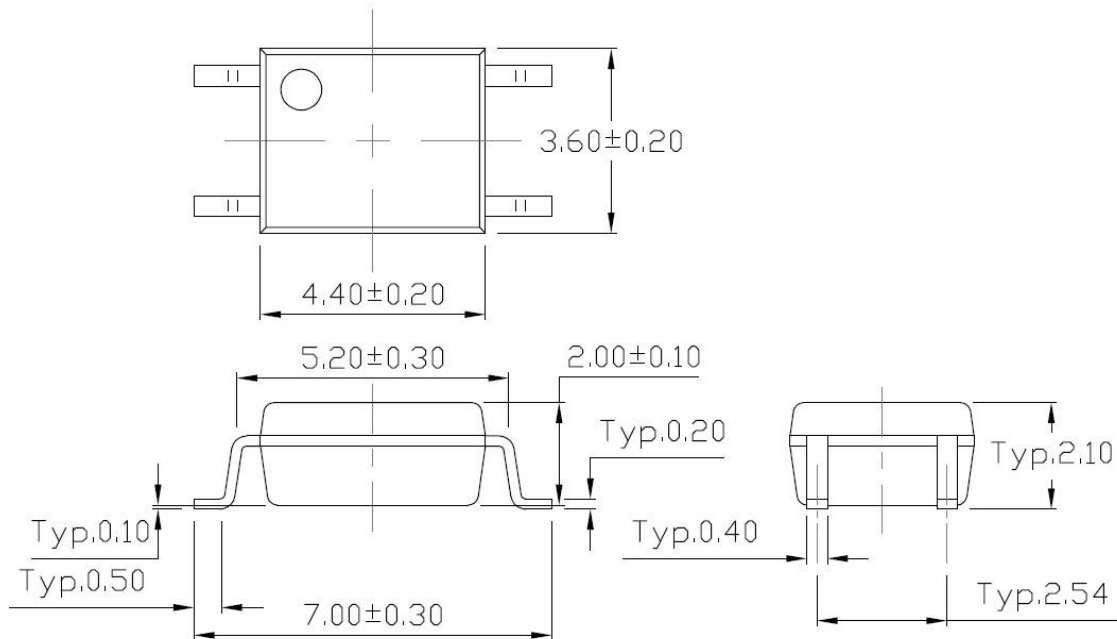




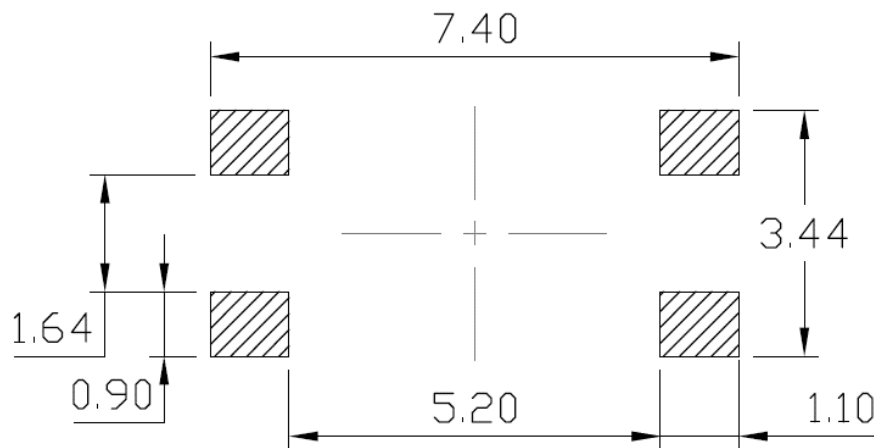
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PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)



RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)



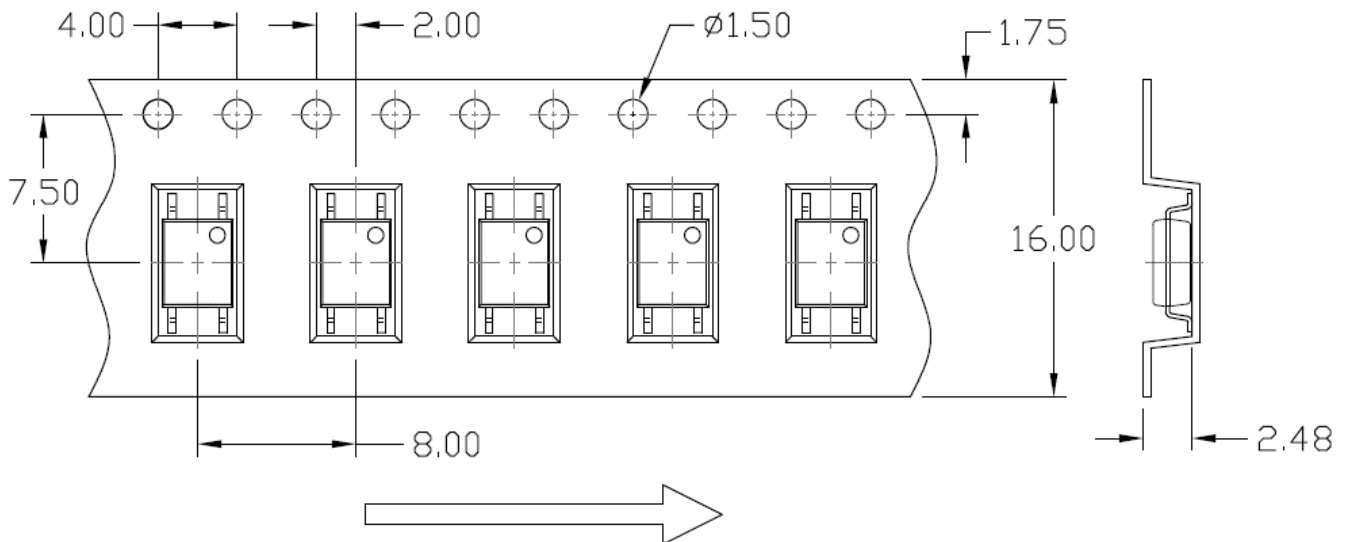


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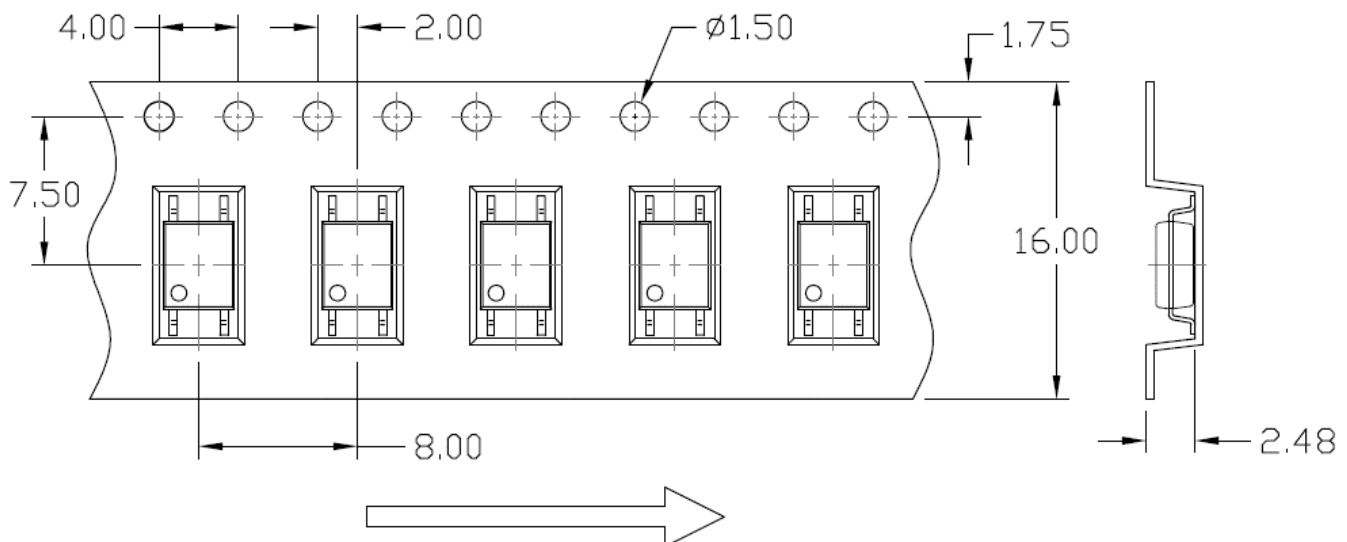
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CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1



Option T2

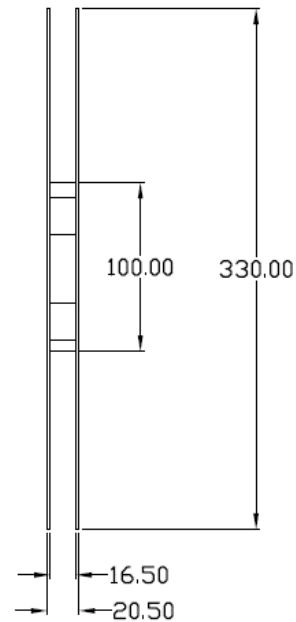
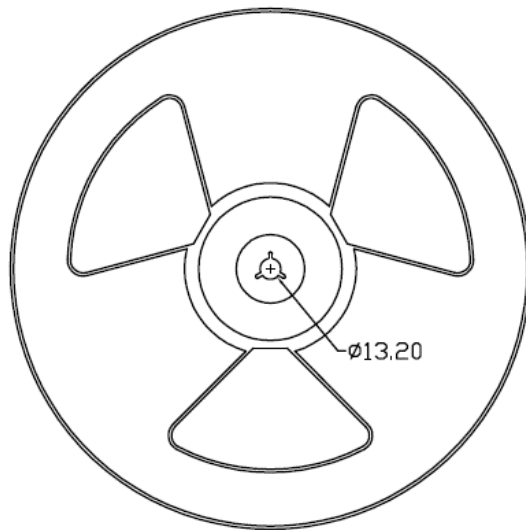




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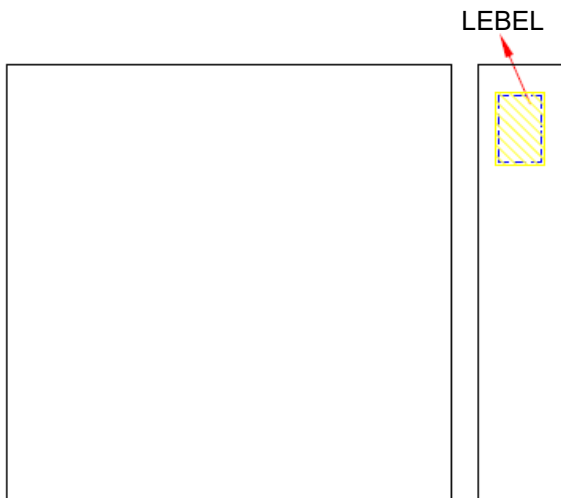
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REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)



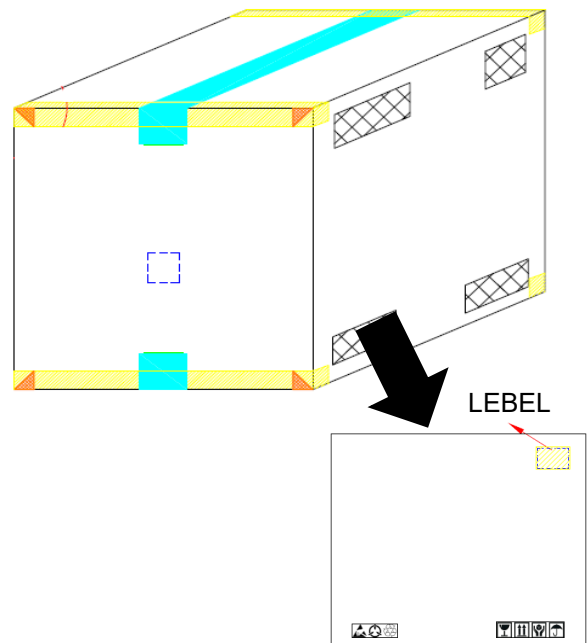
BOX SPECIFICATIONS (Reel Type)

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



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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(Optional)

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

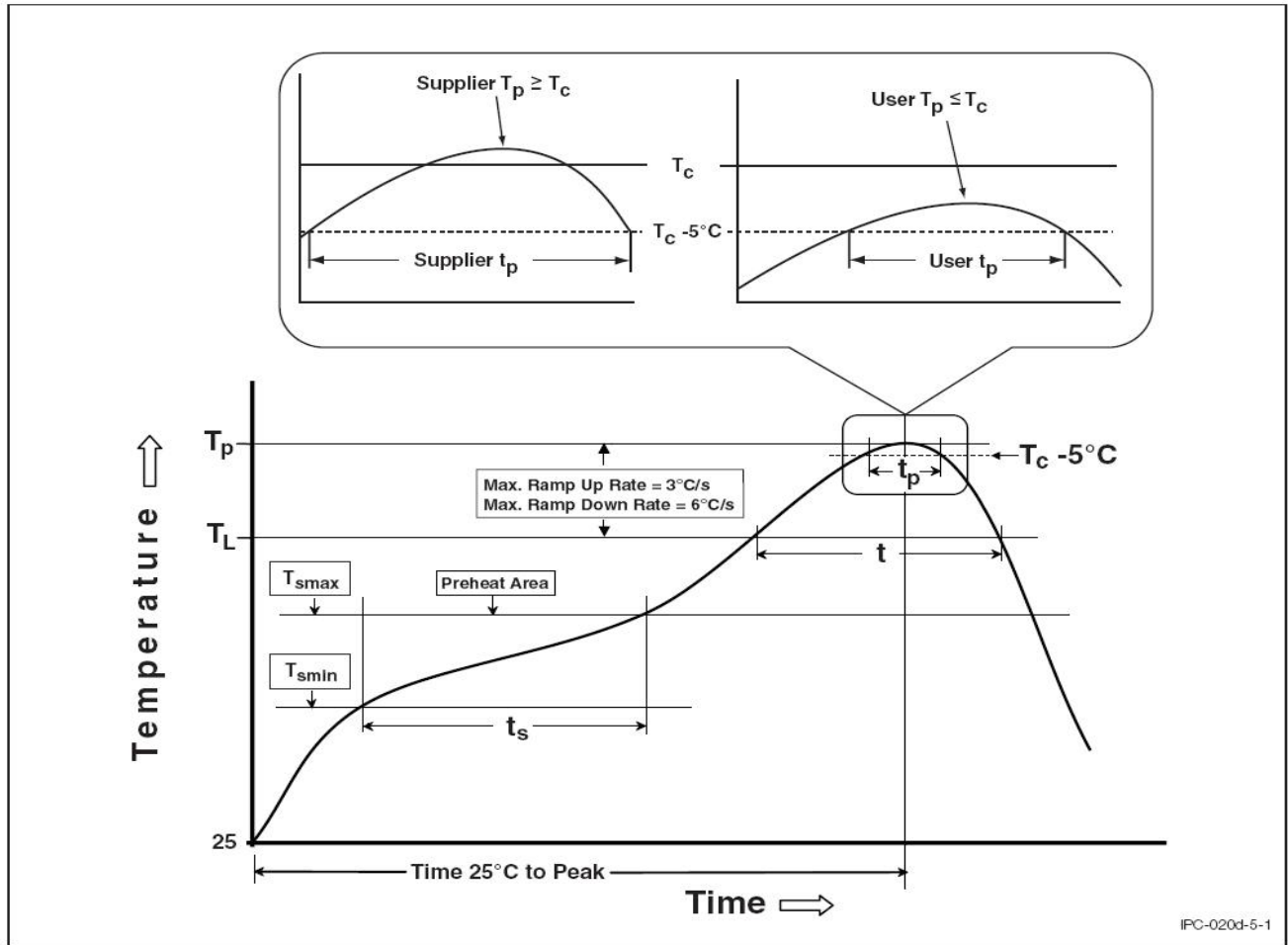


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REFLOW INFORMATION

REFLOW PROFILE



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	100°C	150°C
Temperature Max. (T _{smax})	150°C	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds	60-120 seconds
Ramp-up Rate (t _L to t _P)	3°C/second max.	3°C/second max.
Liquidous Temperature (T _L)	183°C	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t _P) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T _P to T _L)	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

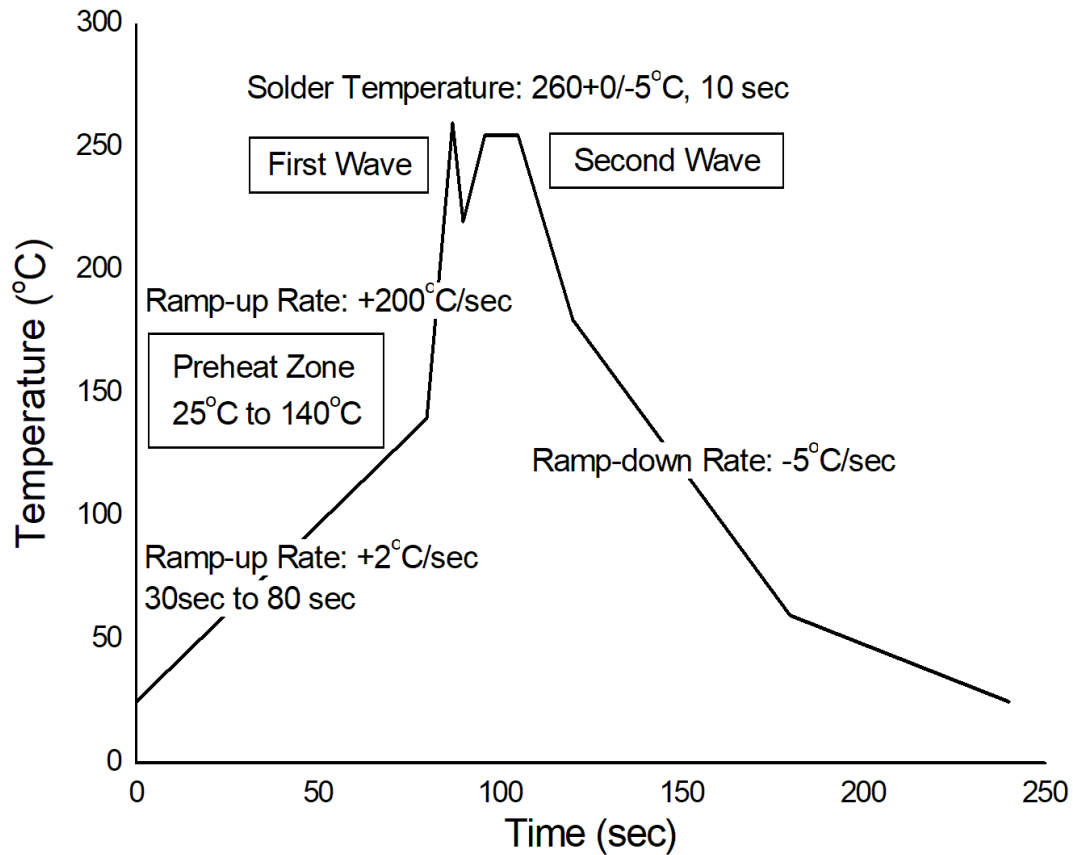


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TEMPERATURE PROFILE OF SOLDERING

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.



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DISCLAIMER

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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.