



MPCS-M305X Series

SOP4, DC Input, Random-Phase Photo TRIAC Coupler

Description

The MPCS-M305X series combine red emitting diode as the emitter which is optically coupled to a monolithic silicon Random-Phase photo TRIAC in a plastic SOP4 package.

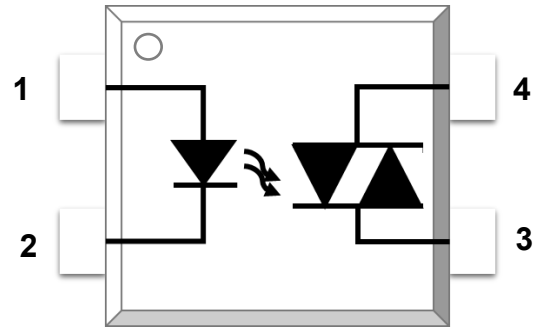
Features

- High isolation 3750 VRMS
- DC input with random-phase 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

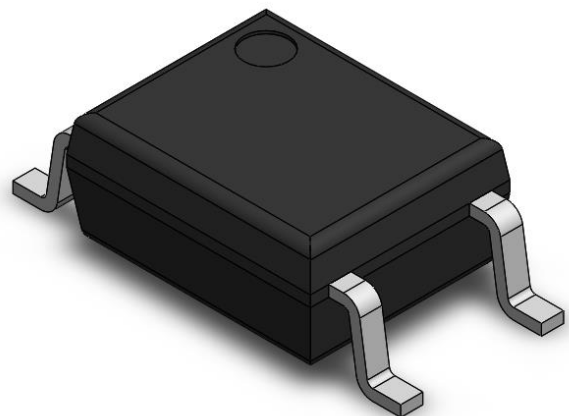
SCHEMATIC



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}	330	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}	-	1.5	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	M3051	I_{FT}	-	-	15	Terminal Voltage = 3V $I_{TM}=100\text{mA}$	
	M3052		-	-	10		
	M3053		-	1.5	5		
Holding Current	I_H	-	110	-	μA		
Isolation Resistance	R_{ISO}	10^{12}	10^{14}	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C_{IO}	-	0.3	1	pF	$V=0, f=1\text{MHz}$	

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

Note 2. Reference Fig.7/8.



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TYPICAL PERFORMANCE CURVES & TEST CIRCUITS

Fig.1 Normalized Trigger LED Current vs. Temperature

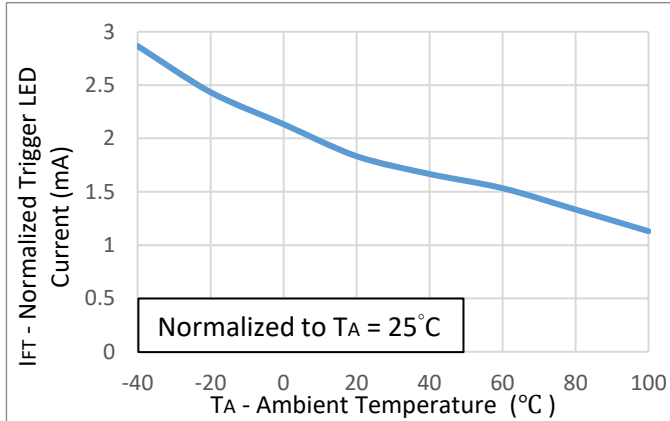


Fig.2 Forward Current vs. Forward Voltage

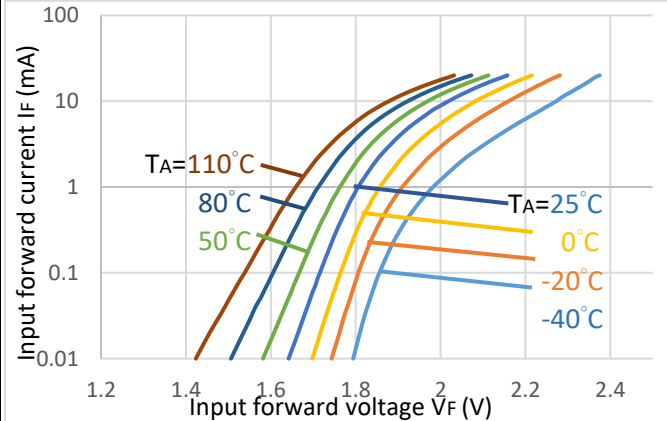


Fig.3 Normalized On-state Voltage vs. Temperature

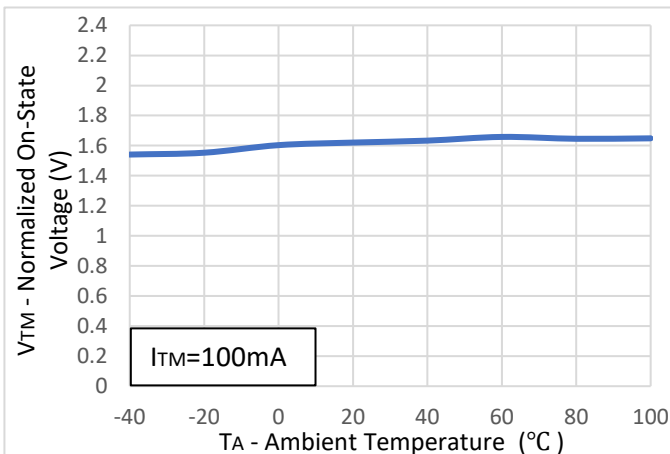


Fig.4 Normalized Holding Current vs. Temperature

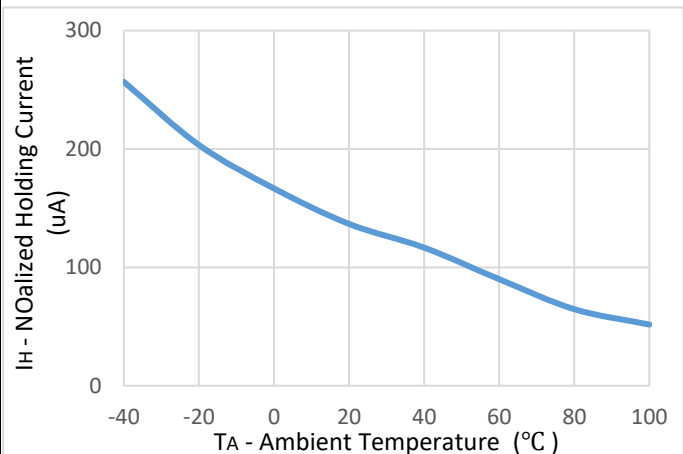


Fig.5 Off-state Current vs Temperature

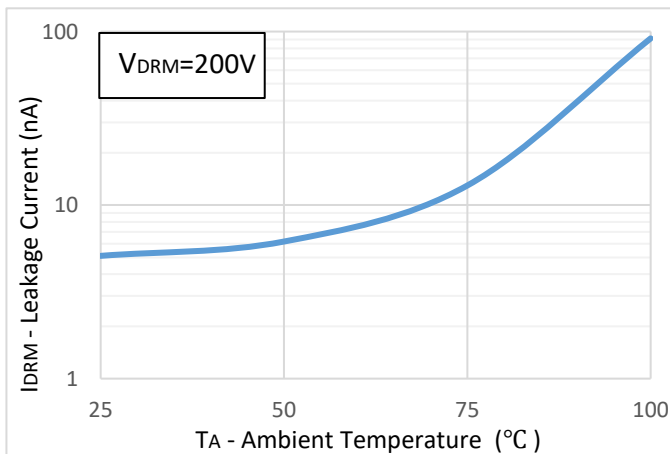
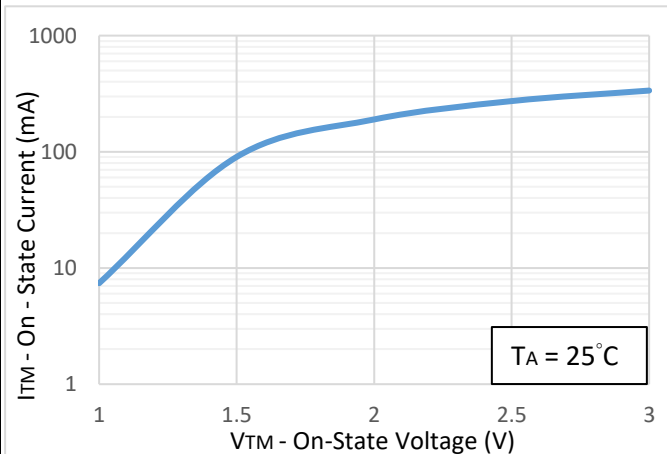


Fig.6 On-state Current vs On-state Voltage



TEST CIRCUITS

Fig.7 Test Circuits of dV/dt

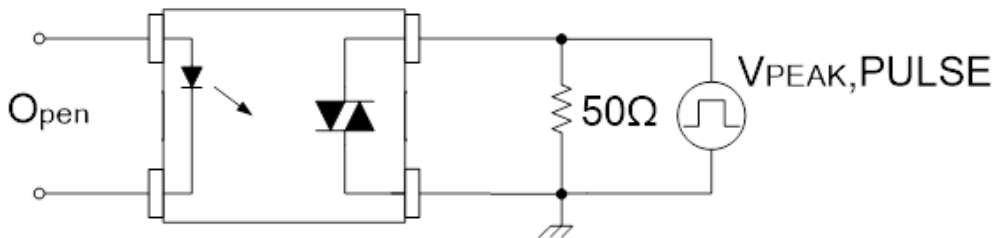
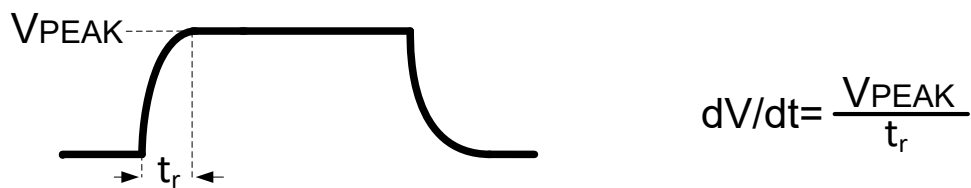


Fig.8 Waveforms of dV/dt

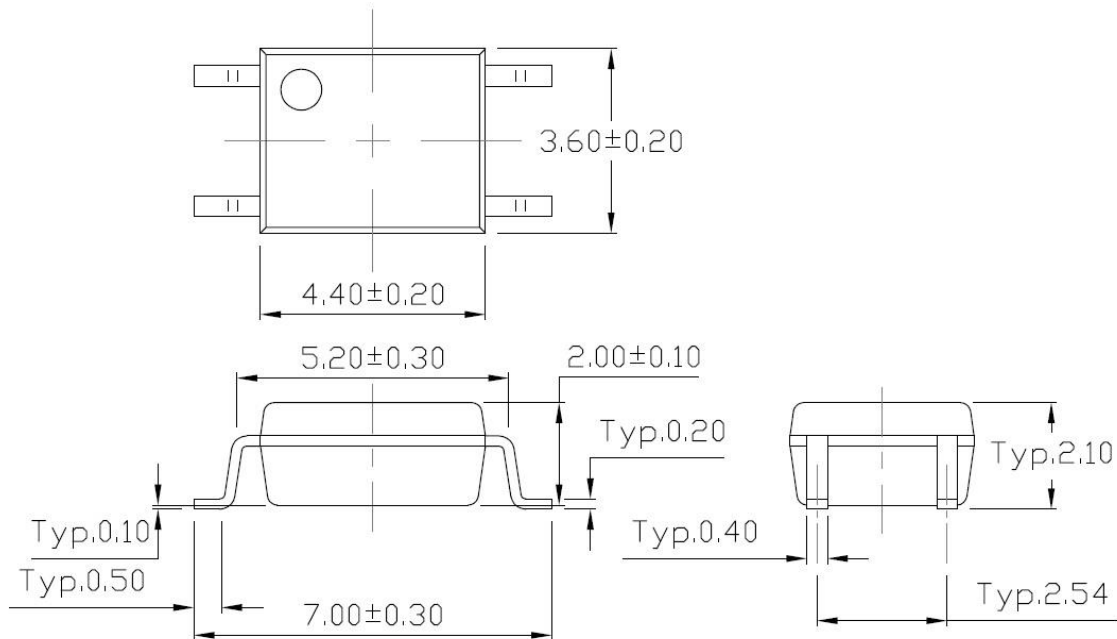




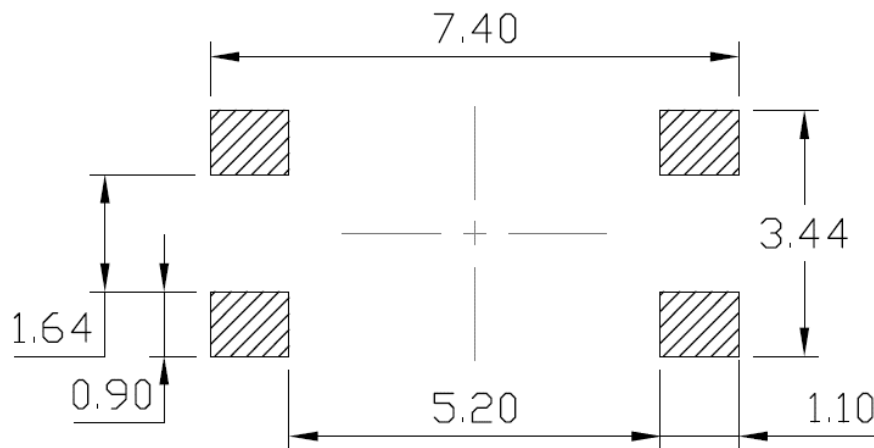
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PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)



RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)



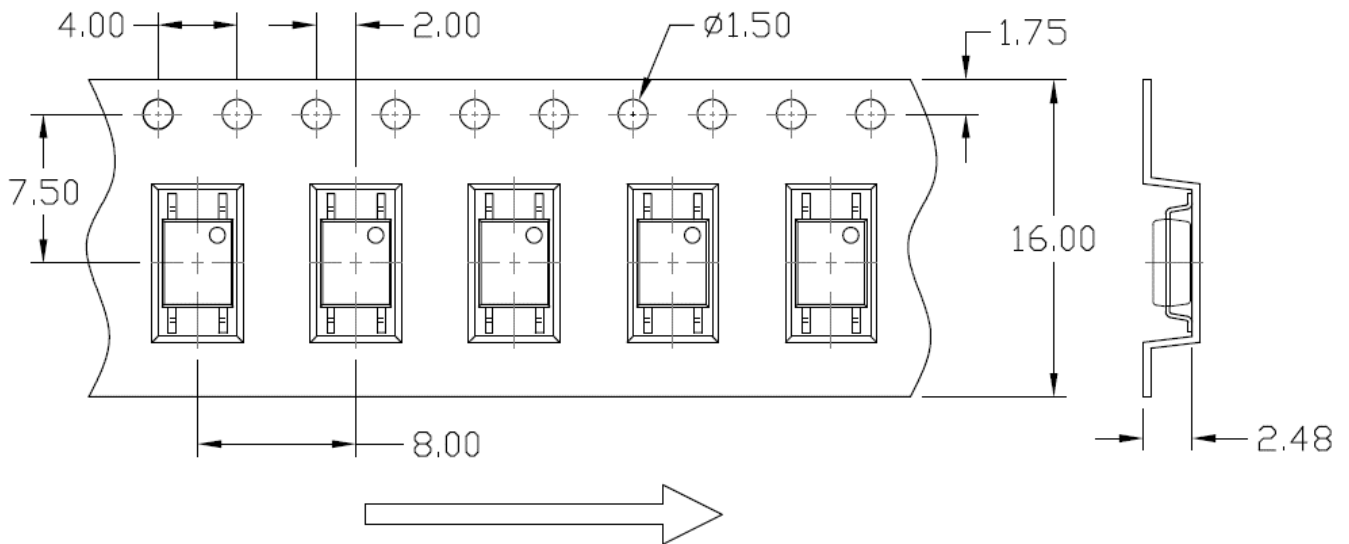


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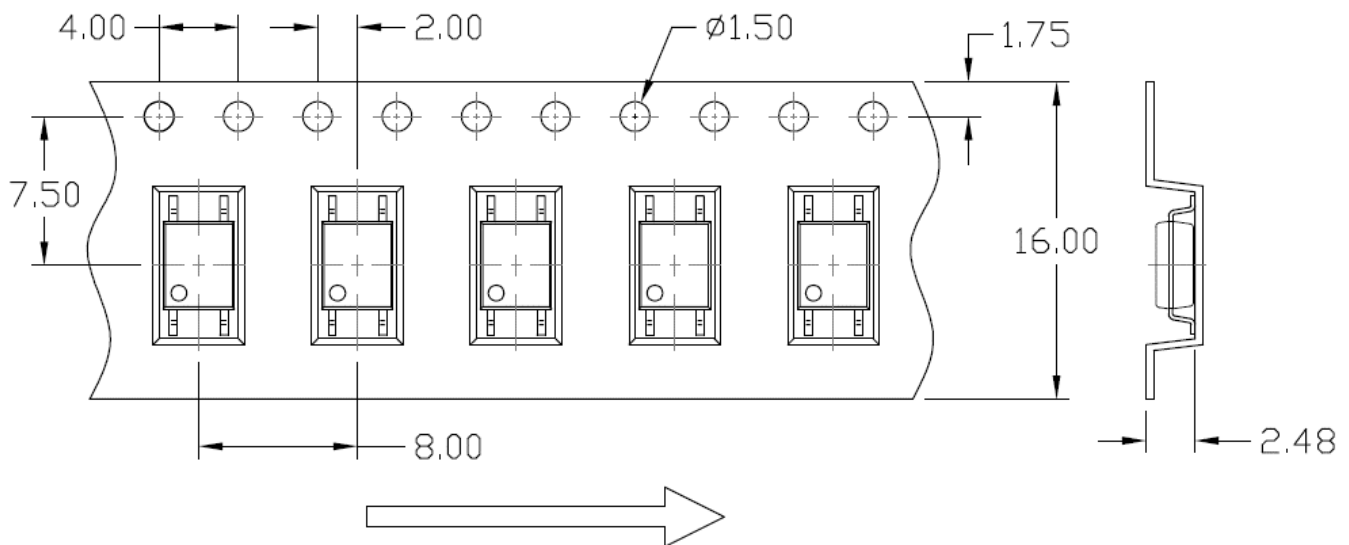
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CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1



Option T2

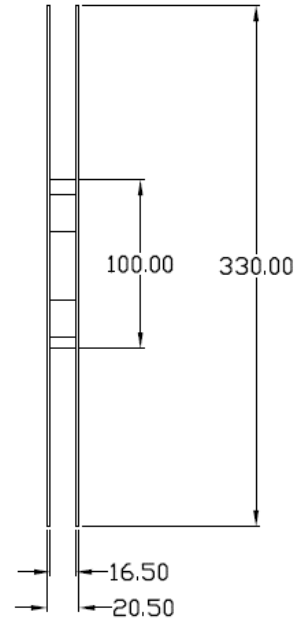
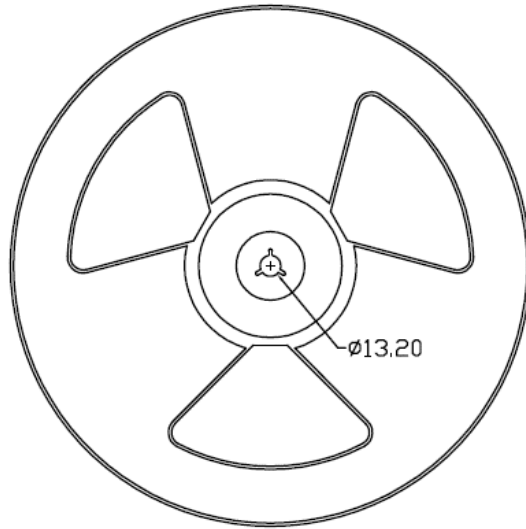




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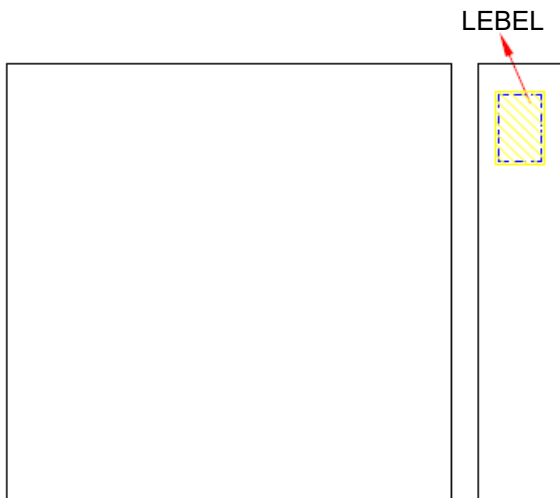
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REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)



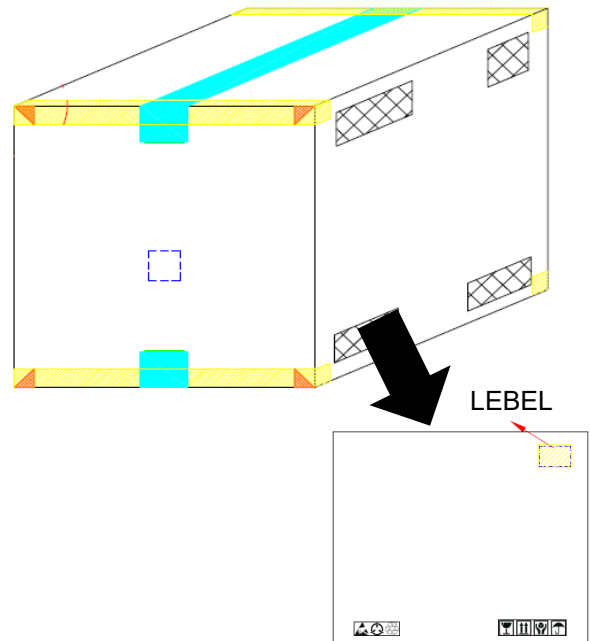
BOX SPECIFICATIONS (Reel Type)

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
M305 : Part Number
X : Rank
T : Factory identification mark
V : VDE Identification(Optional)

ORDERING INFORMATION

MPCS-M305X(Z)-GV

MPC – Company Abbr.
S – Stack
M305 – 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

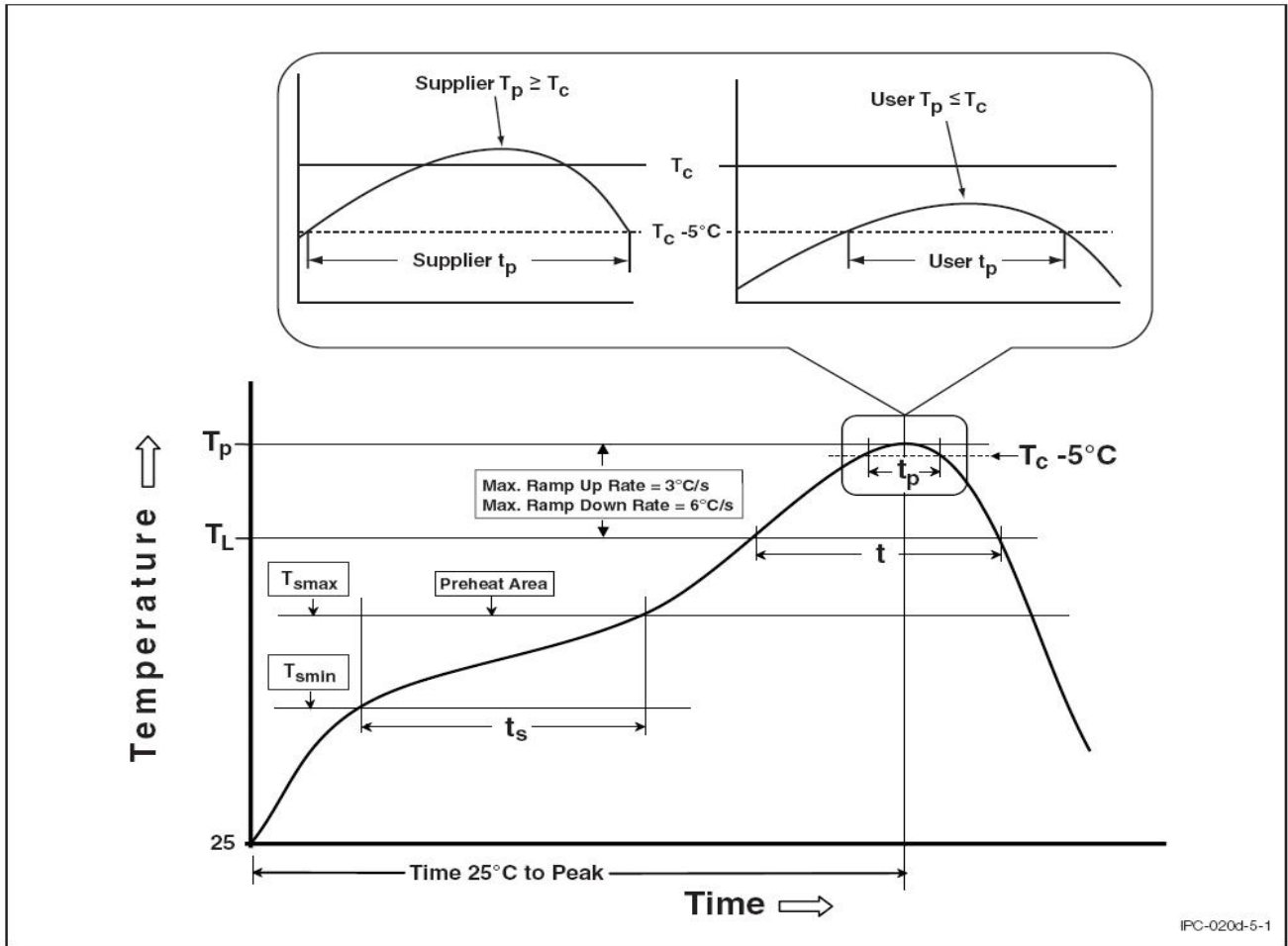


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REFLOW INFORMATION

REFLOW PROFILE



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T _{min})	100°C	150°C
Temperature Max. (T _{max})	150°C	200°C
Time (t _s) from (T _{min} to T _{max})	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.

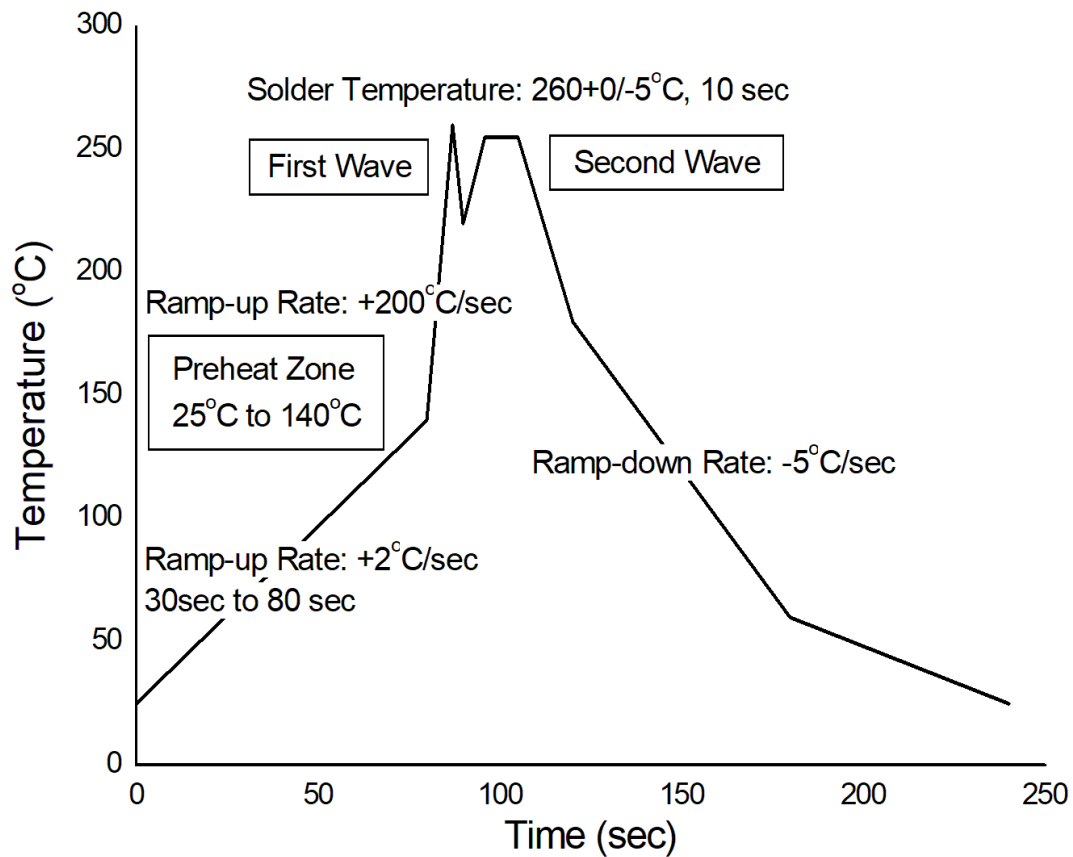


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TEMPERATURE PROFILE OF SOLDERING

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.



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.
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- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.