

■ Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- RoHS & REACH Compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1-2022

■ Applications

- Switch mode power supplies
- Programmable controllers
- Office equipment
- System appliances, measuring instruments
- Telecommunication equipments
- Signal transmission between circuits of different potentials and impedances
- Home appliances, such as fan heaters, etc.

■ Description

The MPC101X series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic LSOP4 package with different lead forming options.

With the robust coplanar double mold structure, MPC101X series provide the most stable isolation feature.

■ Schematic





MPC101X Series

LSOP4, DC Input Photo Transistor Coupler

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	I_F	60	mA	
Peak Forward Current	I_{FP}	1	A	1
Reverse Voltage	V_R	6	V	
Input Power Dissipation	P_I	100	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	80	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	P_{tot}	250	mW	
Isolation Voltage	V_{iso}	5000	V _{rms}	2
Operating Temperature	T_{opr}	-55~110	°C	
Storage Temperature	T_{stg}	-55~150	°C	
Soldering Temperature	T_{sol}	260	°C	

Note 1. 100μs pulse, 100Hz frequency

Note 2. AC For 1 Minute, R.H. =40~60%



MPC101X Series

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ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C							
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	V_F	-	1.45	1.6	V	$I_F=50\text{mA}$	
Reverse Current	I_R	-	-	10	μA	$V_R=6\text{V}$	
Input Capacitance	C_{in}	-	30	250	pF	$V=0, f=1\text{kHz}$	
OUTPUT							
Collector Dark Current	I_{CEO}	-	-	100	nA	$V_{CE}=20\text{V}, I_F=0$	
Collector-Emitter Breakdown Voltage	BV_{CEO}	80	-	-	V	$I_C=0.1\text{mA}, I_F=0$	
Emitter-Collector Breakdown Voltage	BV_{ECO}	6	-	-	V	$I_E=0.1\text{mA}, I_F=0$	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	MPC1010	CTR	300	-	600	$I_F=5\text{mA}, V_{CE}=5\text{V}$	
	MPC1015		50	-	150		
	MPC1016		100	-	300		
	MPC1017		80	-	160		
	MPC1018		130	-	260		
	MPC1019		200	-	400	$I_F=10\text{mA}, V_{CE}=5\text{V}$	
	MPC1011		60	-	300		
	MPC1012		63	-	125		
	MPC1013		100	-	200		
	MPC1014		160	-	320		
	MPC1012		22	-	-	$I_F=1\text{mA}, V_{CE}=5\text{V}$	
	MPC1013		34	-	-		
	MPC1014		56	-	-		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.1	0.3	V	$I_F=10\text{mA}, I_C=1\text{mA}$	
Isolation Resistance	R_{ISO}	10^{12}	10^{14}	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C_{IO}	-	0.4	1	pF	$V=0, f=1\text{MHz}$	
Cut-off Frequency	F_c	-	80	-	kHz	$V_{CE}=2\text{V}, I_C=2\text{mA}$ $R_L=100\Omega, -3\text{dB}$	3
Response Time (Rise)	T_r	-	6	18	μs	$V_{CE}=2\text{V}, I_C=2\text{mA}$ $R_L=100\Omega$	4
Response Time (Fall)	T_f	-	8	18	μs		4

Note 3. Fig.12&13

Note 4. Fig.14

CHARACTERISTIC CURVES

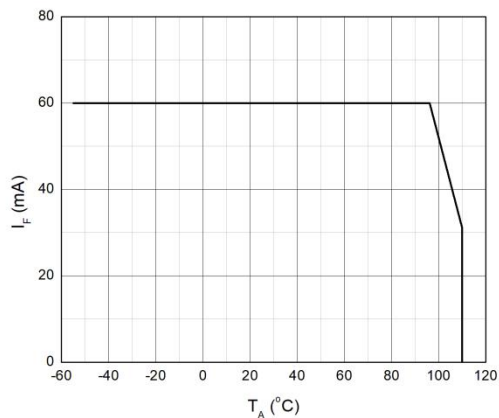


Fig.1 Forward Current vs. Ambient Temperature

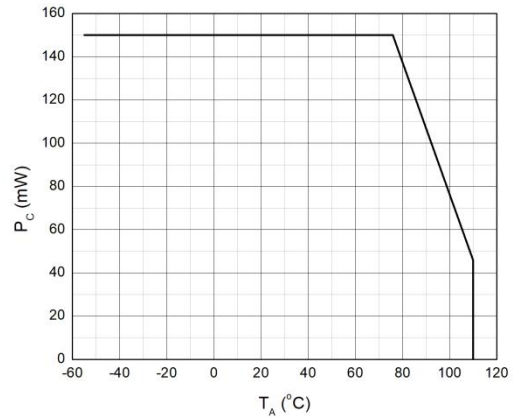


Fig.2 Collector Power Dissipation vs. Ambient Temperature

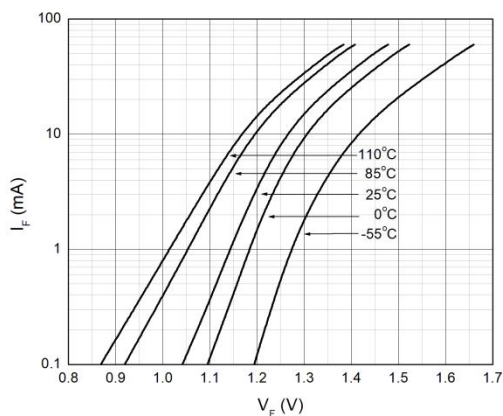


Fig.3 Forward Current vs. Forward Voltage

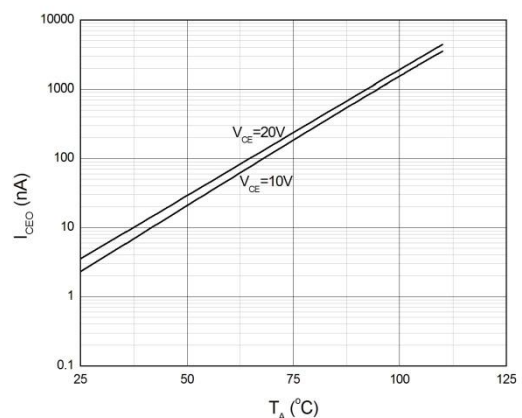


Fig.4 Collector Dark Current vs. Ambient Temperature

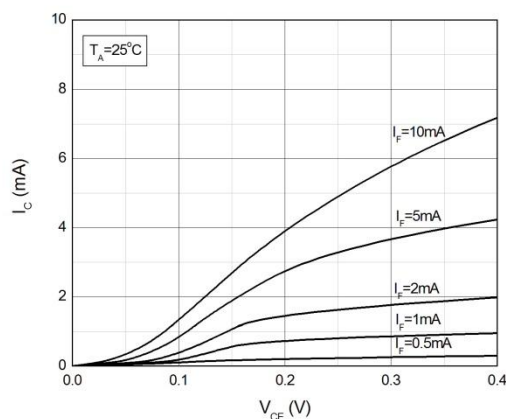


Fig.5 Collector Current vs. Collector-emitter Voltage

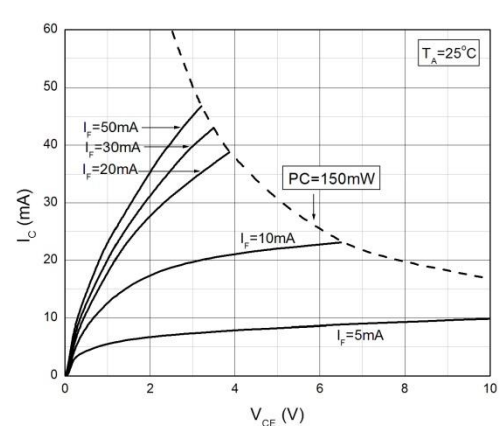


Fig.6 Collector Current vs. Collector-emitter Voltage

CHARACTERISTIC CURVES

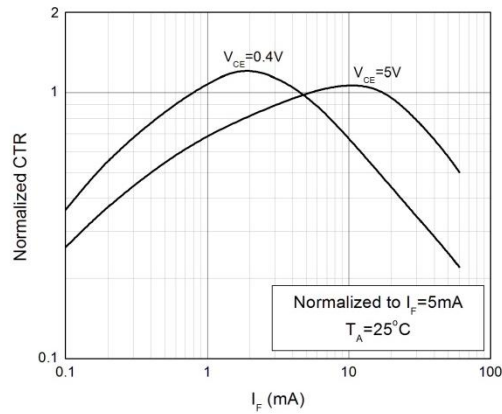


Fig.7 Normalized Current Transfer Ratio vs. Forward Current

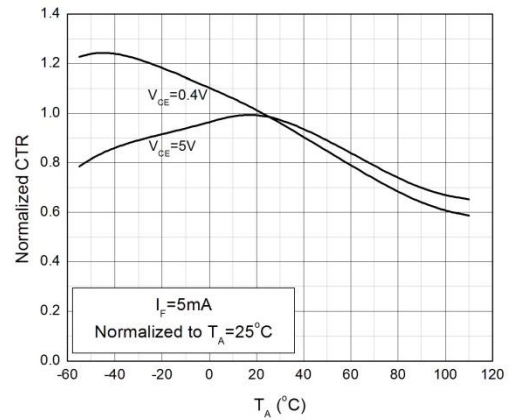


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

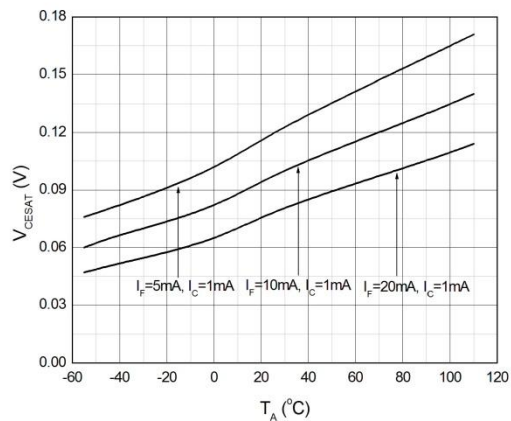


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

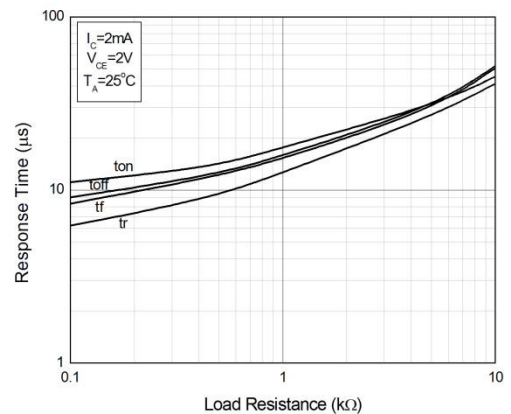


Fig.10 Switching Time vs. Load Resistance

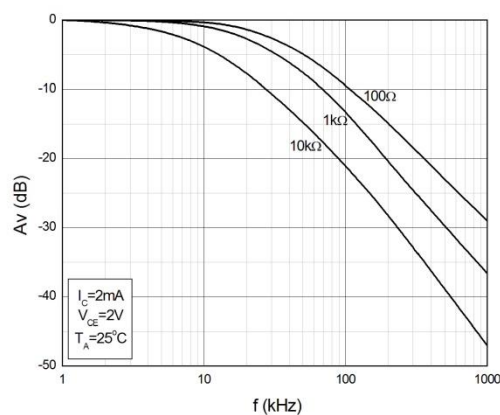


Fig.11 Frequency Response

TEST CIRCUITS

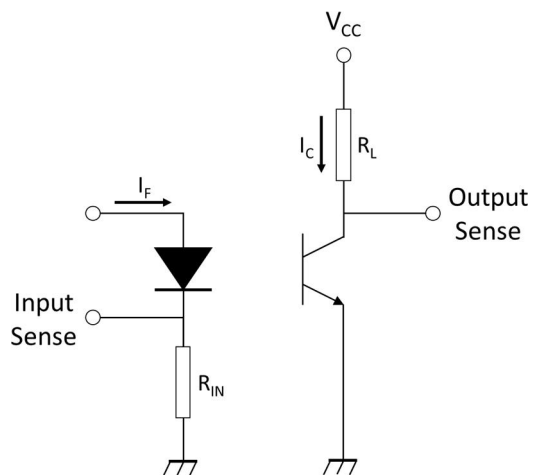


Fig.12 Test Circuits of Response Time

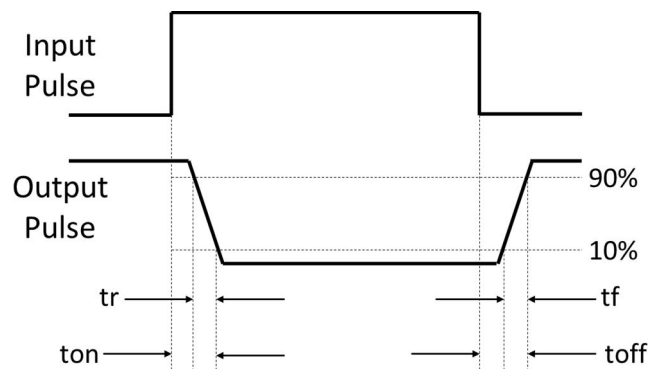


Fig.13 Curves of Response Time

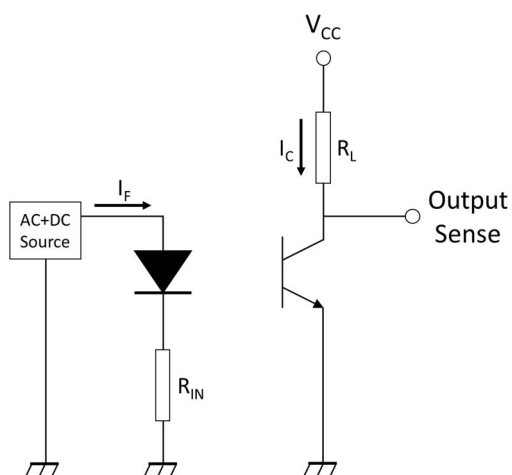
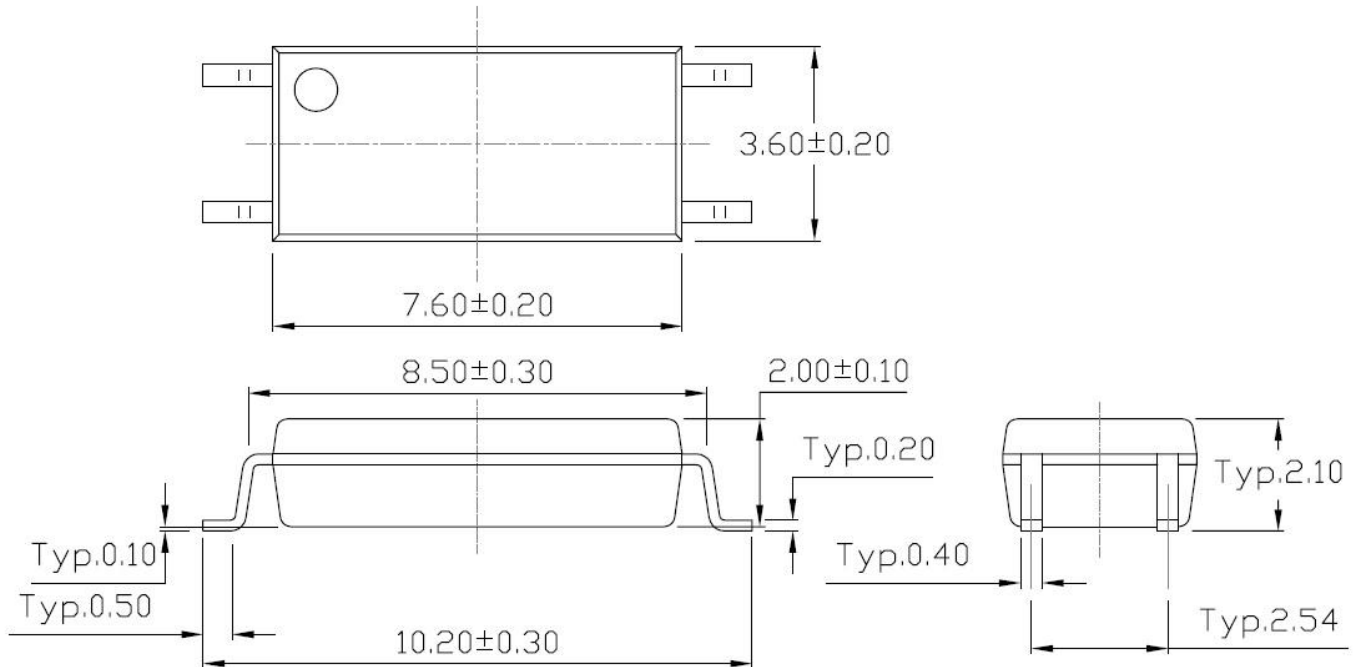
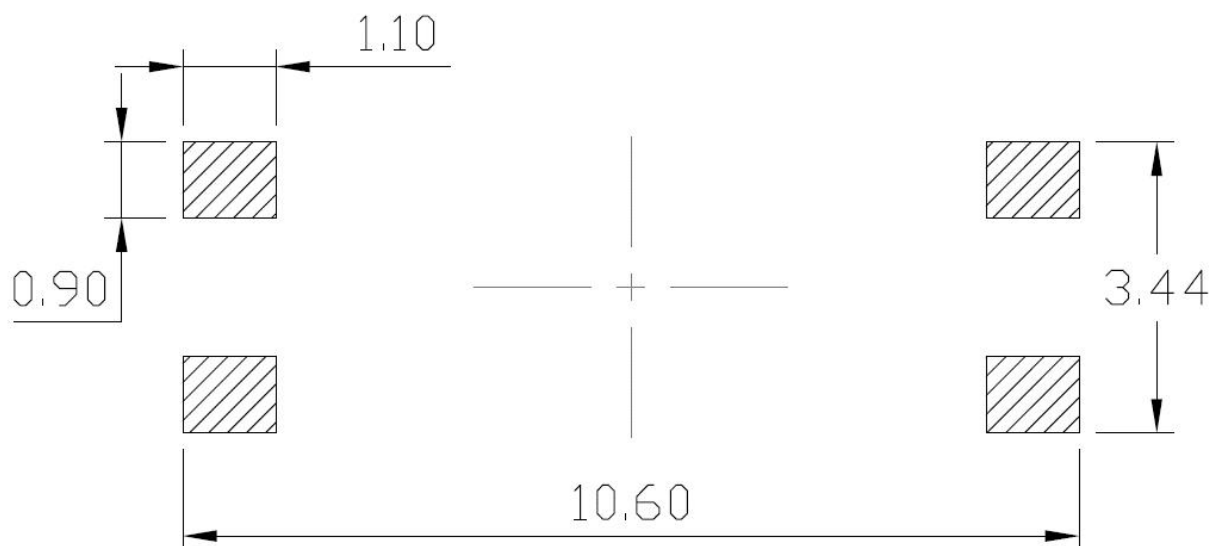


Fig.14 Test Circuits of Frequency Response

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

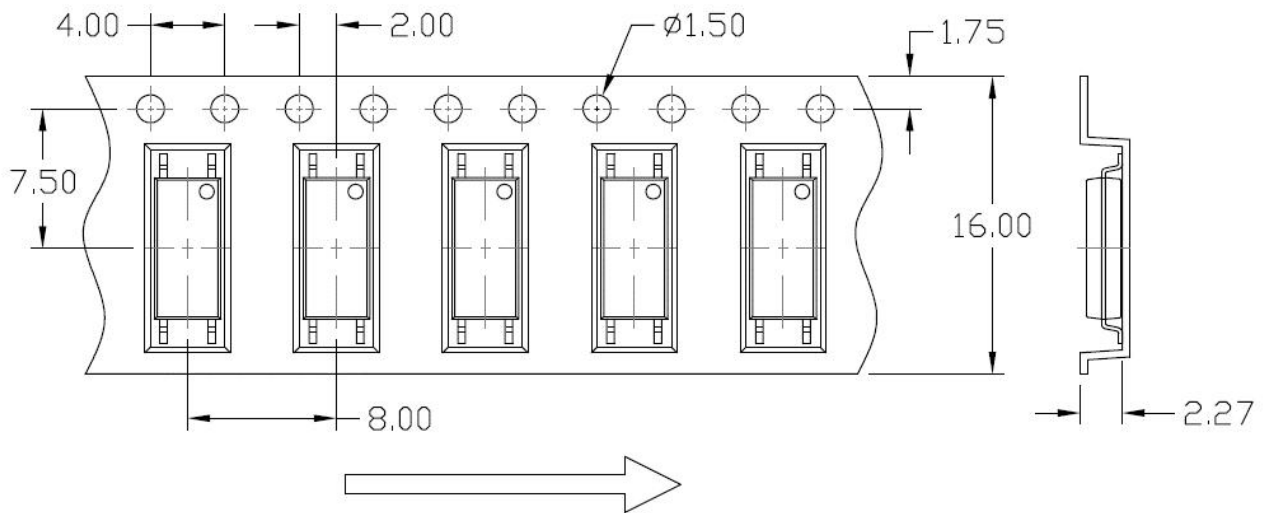


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

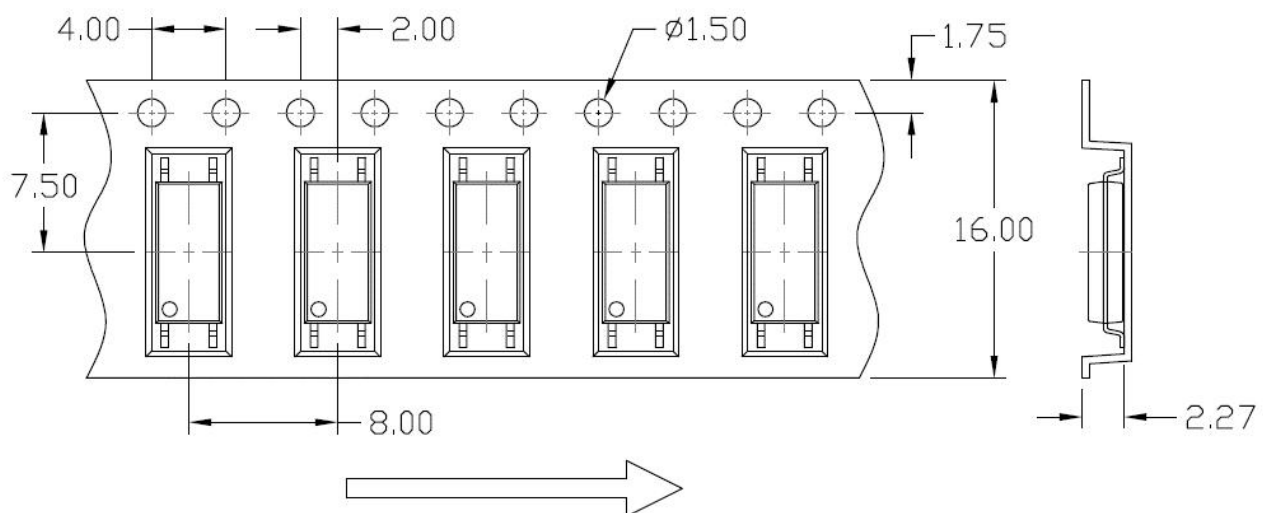


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1



Option T2



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



MPC : Company Abbr.

101X : Part Number & Rank

V : VDE Option

Y : Fiscal Year

A : Manufacturing Code

WW : Work Week

ORDERING INFORMATION

MPC101X(Z)-GV(B)

MPC – Company Abbr.

101 – Part Number

X – Rank (0/1/2/3/4/5/6/7/8/9)

Z – Tape and Reel Option (T1/T2)

G – Green

V – VDE Option (V or None)

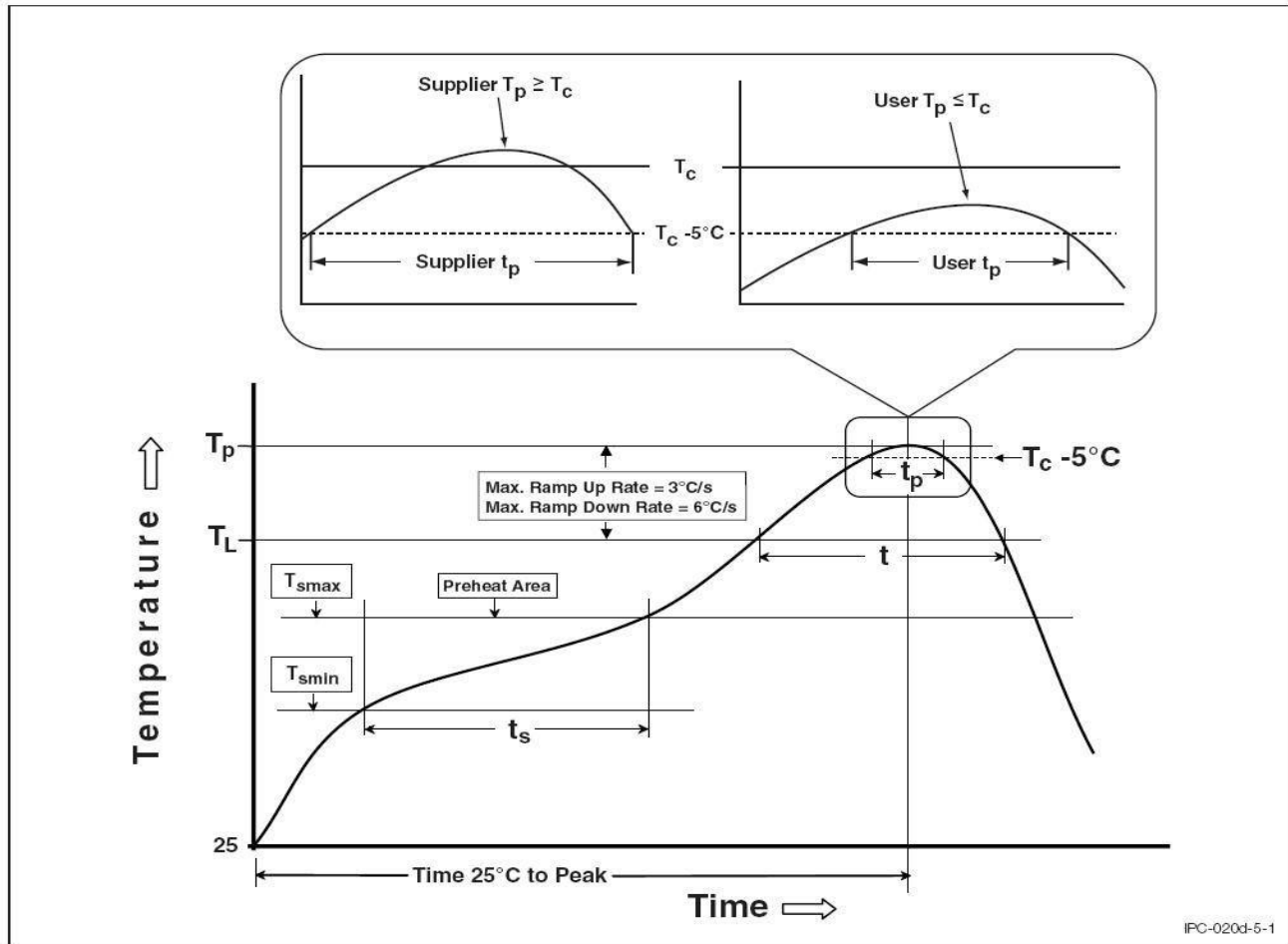
B – Molding Compound Type (B:Black , None:White)

PACKING QUANTITY

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

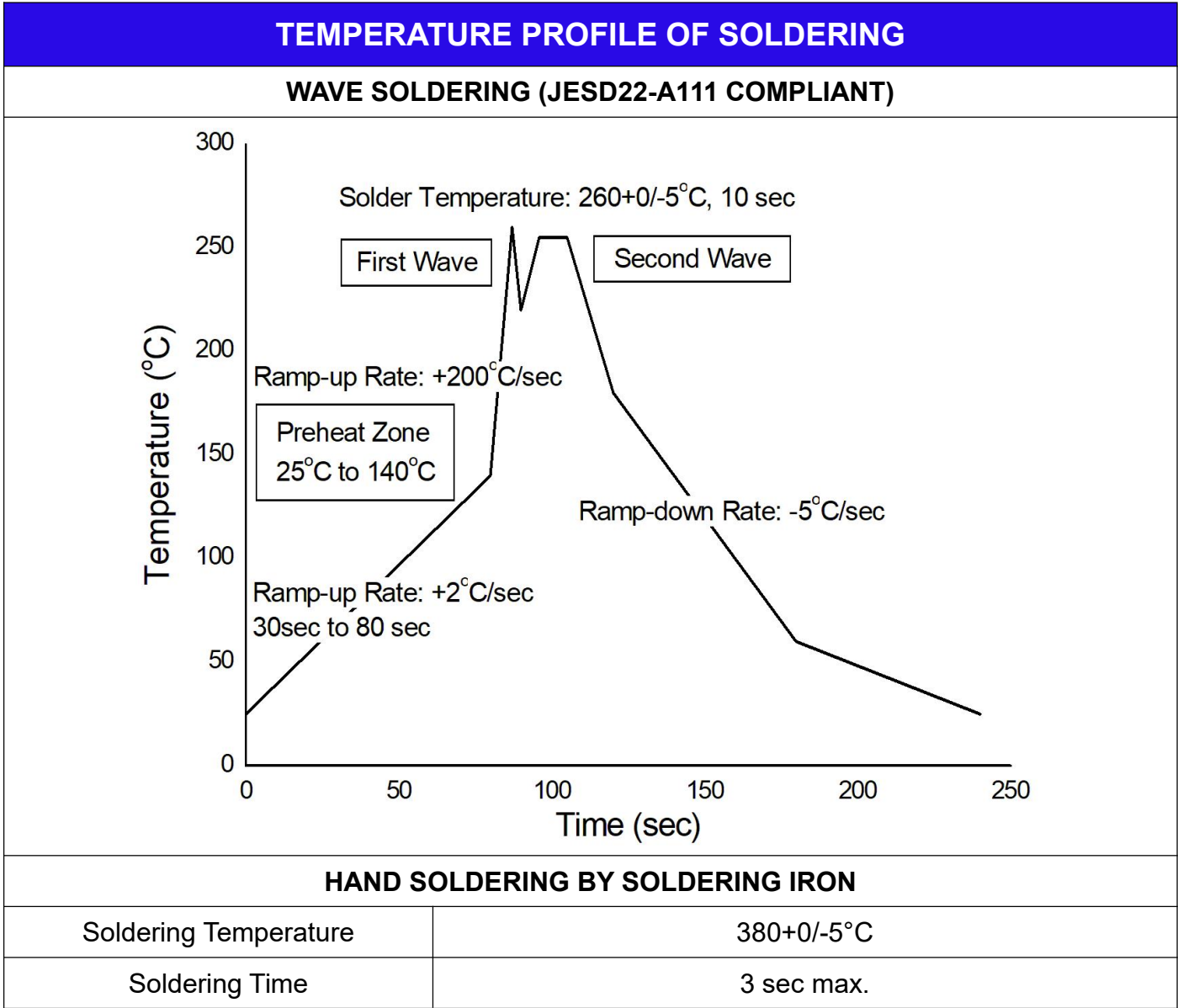
REFLOW INFORMATION

REFLOW PROFILE



IPC-020d-5-1

Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	100	150°C
Temperature Max. (T _{smax})	150	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.





MPC101X Series

LSOP4, DC Input Photo Transistor Coupler

DISCLAIMER

- Our company is continually improving the quality, reliability, function and design. Our company reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- 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.
- Immerge unit's body in solder paste is not recommended.
- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.

■ Revision History

Version	Date	Subjects (major changes since last revision)
1.0	2018-12-21	Datasheet Complete
1.1	2023-07-05	Upgrade Datasheet