

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.

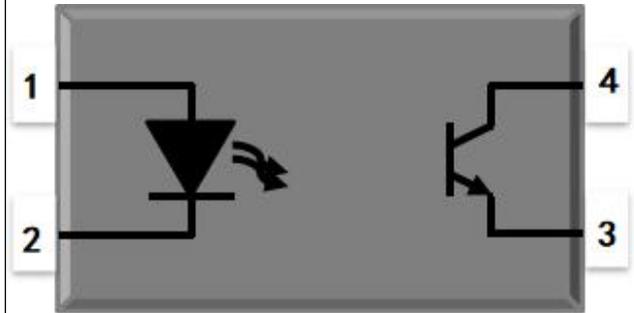
Features

- 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
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1, GB8898

Applications

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

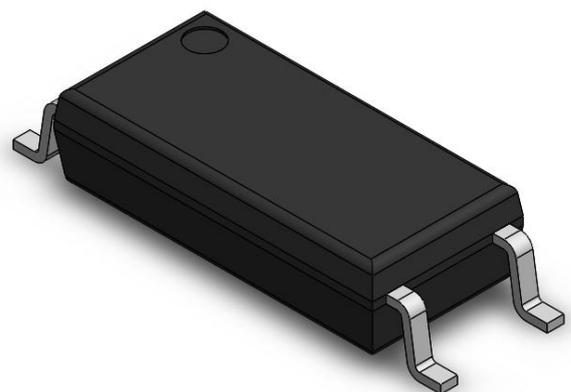
SCHEMATIC



PIN DEFINITION

1. Anode
2. Cathode
3. Emitter
4. Collector

PACKAGE OUTLINE





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	Vrms	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%



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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 =50mA		
Reverse Current	I _R	-	-	10	μA	V _R =6V		
Input Capacitance	C _{in}	-	30	250	pF	V=0, f=1kHz		
OUTPUT								
Collector Dark Current	I _{CEO}	-	-	100	nA	V _{CE} =20V, I _F =0		
Collector-Emitter Breakdown Voltage	BV _{CEO}	80	-	-	V	I _C =0.1mA, I _F =0		
Emitter-Collector Breakdown Voltage	BV _{ECO}	6	-	-	V	I _E =0.1mA, I _F =0		
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	MPC1010	CTR	300	-	600	%	I _F =5mA, V _{CE} =5V	
	MPC1015		50	-	150			
	MPC1016		100	-	300			
	MPC1017		80	-	160			
	MPC1018		130	-	260			
	MPC1019		200	-	400			
	MPC1011		60	-	300		I _F =10mA, V _{CE} =5V	
	MPC1012		63	-	125			
	MPC1013		100	-	200			
	MPC1014		160	-	320			
	MPC1012		22	-	-			
	MPC1013		34	-	-		I _F =1mA, V _{CE} =5V	
	MPC1014		56	-	-			
	Collector-Emitter Saturation Voltage		V _{CE(sat)}	-	0.1		0.3	V
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=1MHz		
Cut-off Frequency	F _c	-	80	-	kHz	V _{CE} =2V, I _C =2mA R _L =100Ω, -3dB	3	
Response Time (Rise)	T _r	-	6	18	μs	V _{CE} =2V, I _C =2mA R _L =100Ω	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

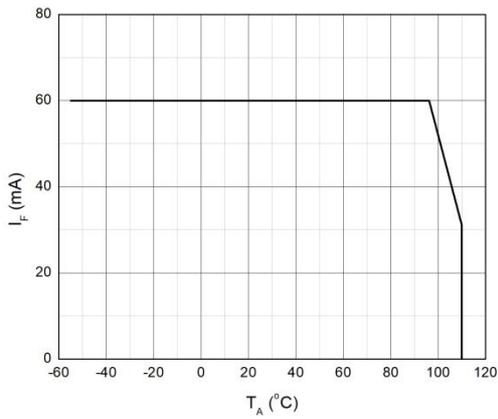


Fig.2 Collector Power Dissipation vs. Ambient Temperature

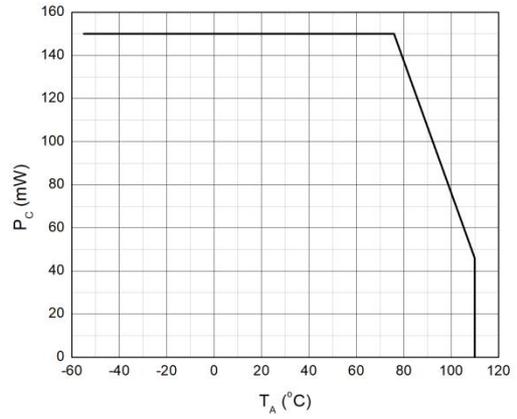


Fig.3 Forward Current vs. Forward Voltage

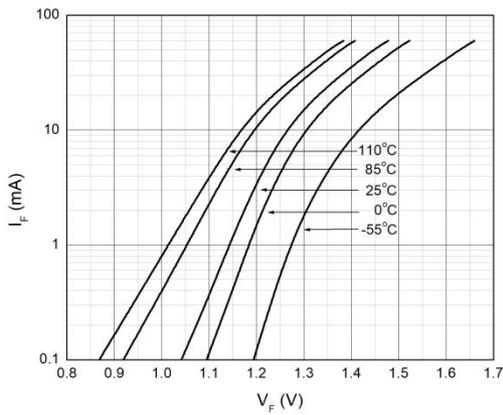


Fig.4 Collector Dark Current vs. Ambient Temperature

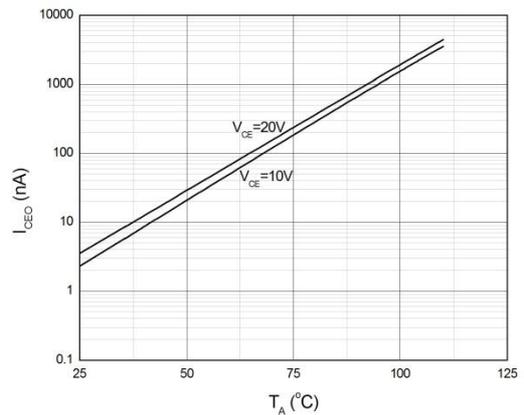


Fig.5 Collector Current vs. Collector-emitter Voltage

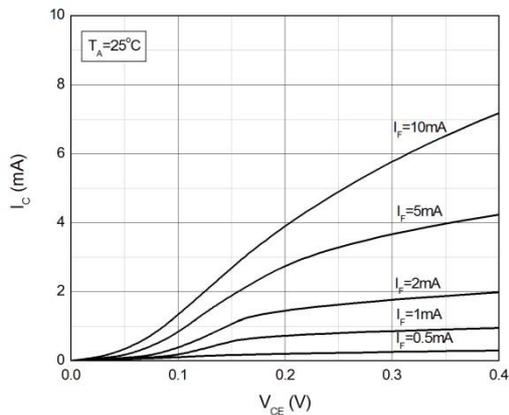
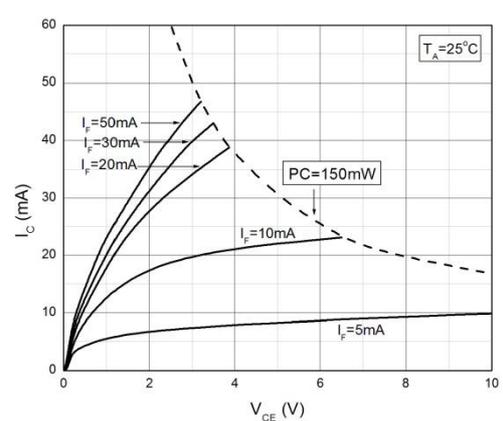


Fig.6 Collector Current vs. Collector-emitter Voltage



CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

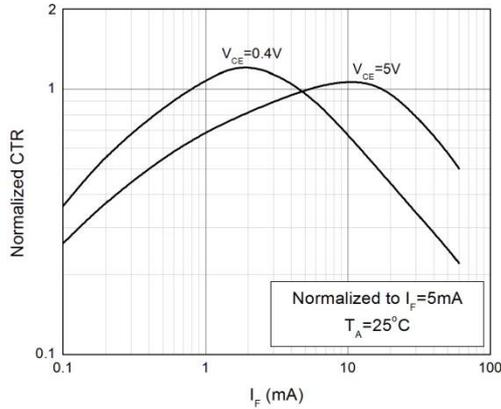


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

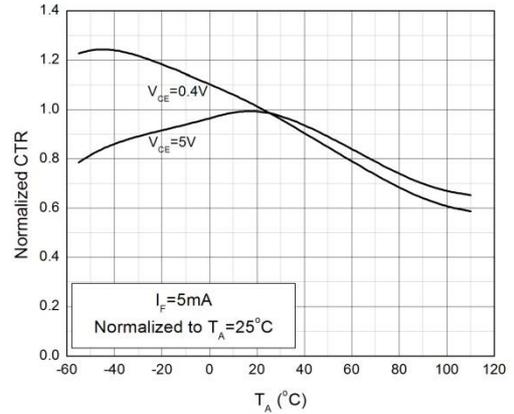


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

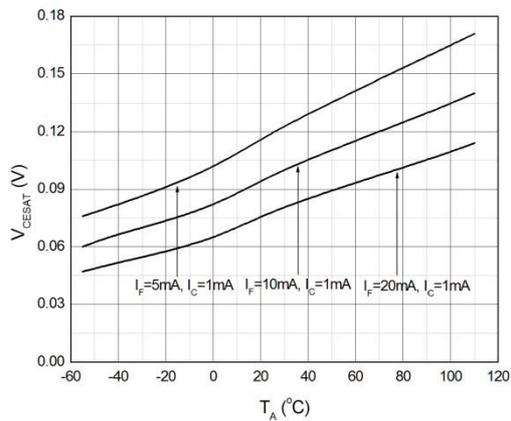


Fig.10 Switching Time vs. Load Resistance

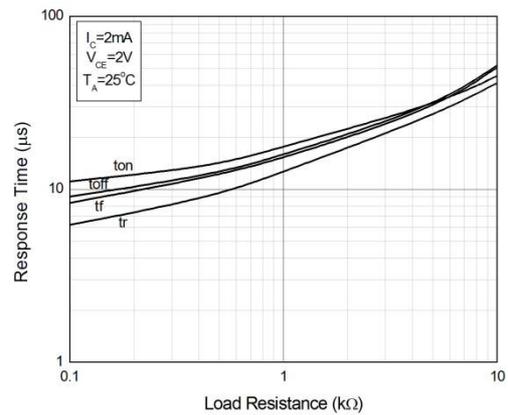
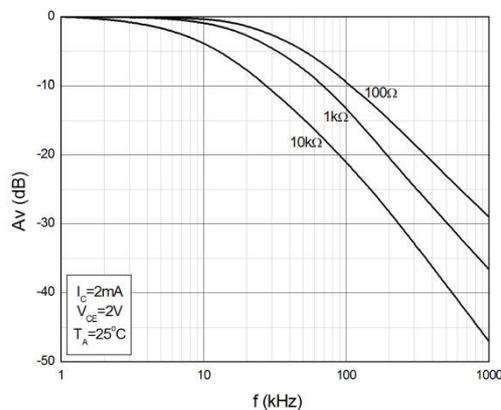


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

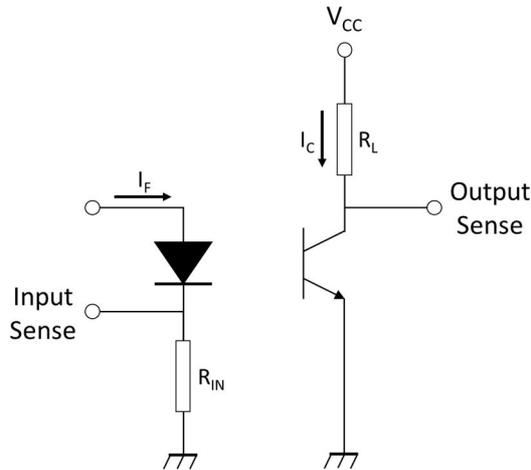


Fig.13 Curves of Response Time

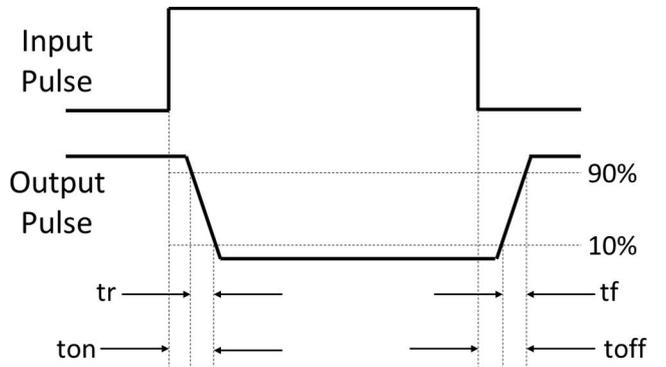
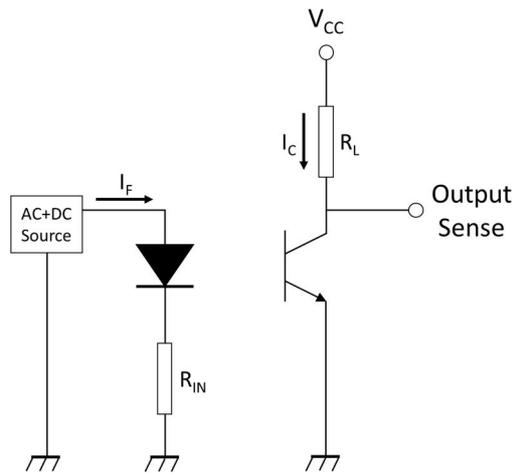
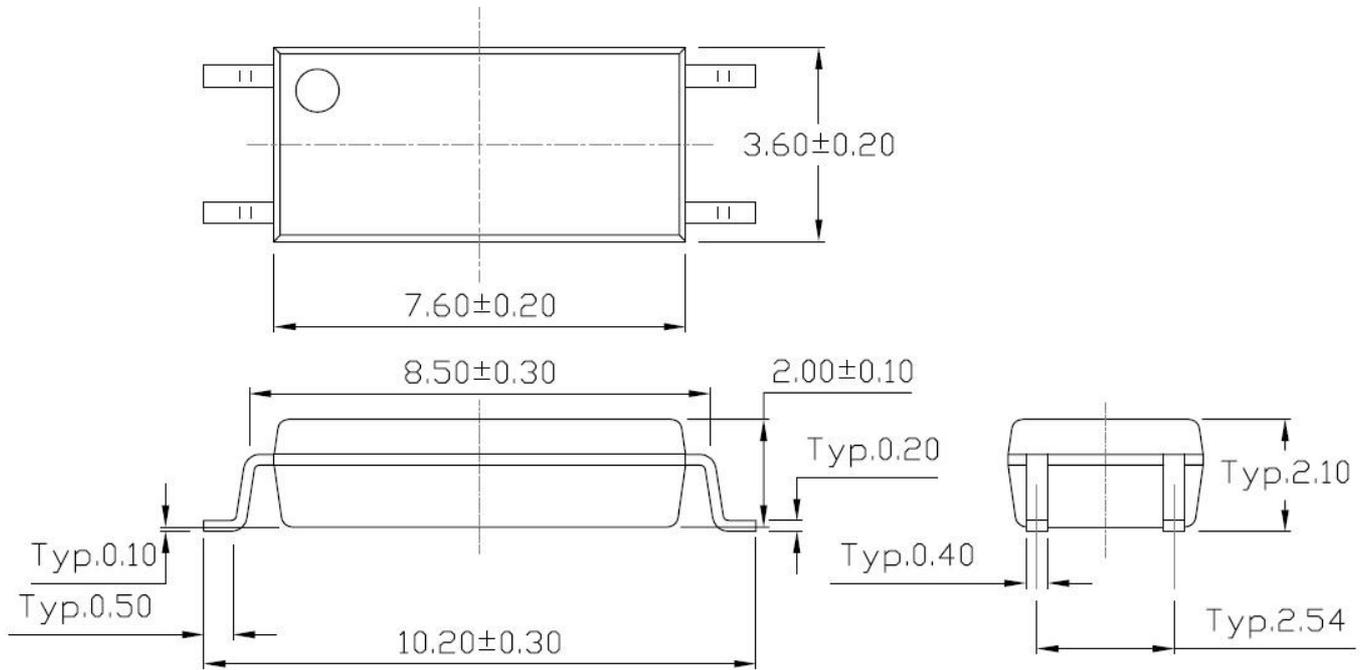


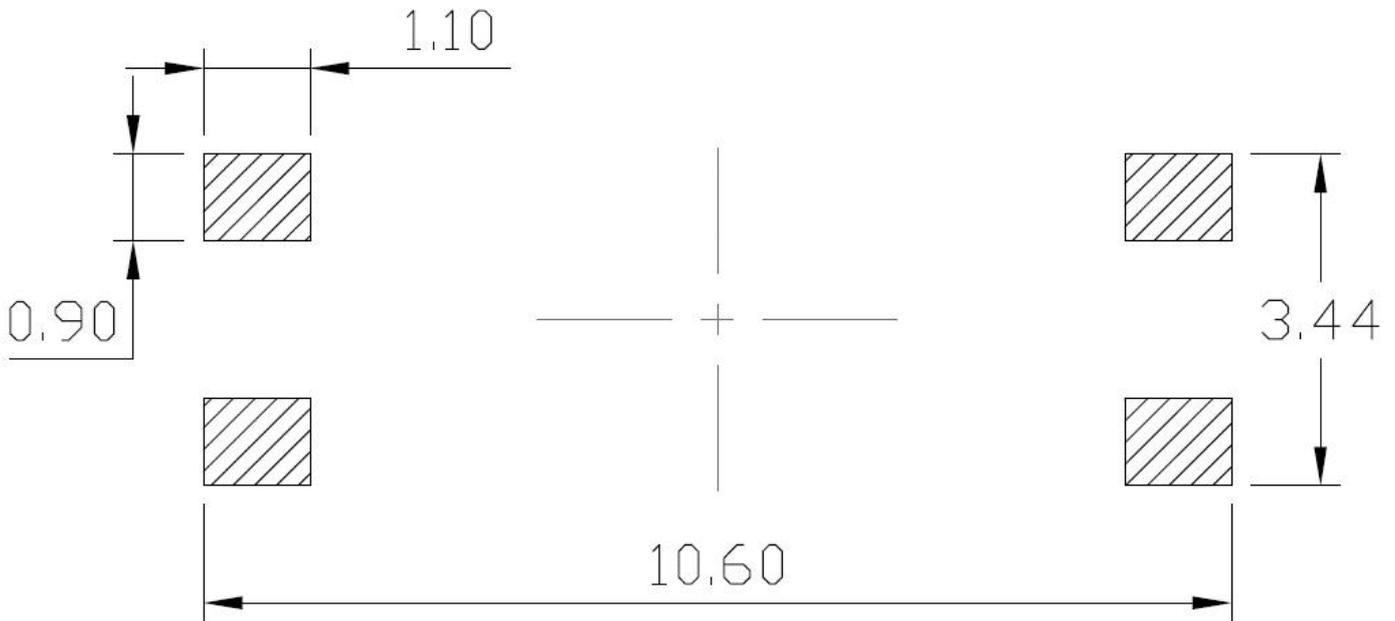
Fig.14 Test Circuits of Frequency Response



PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

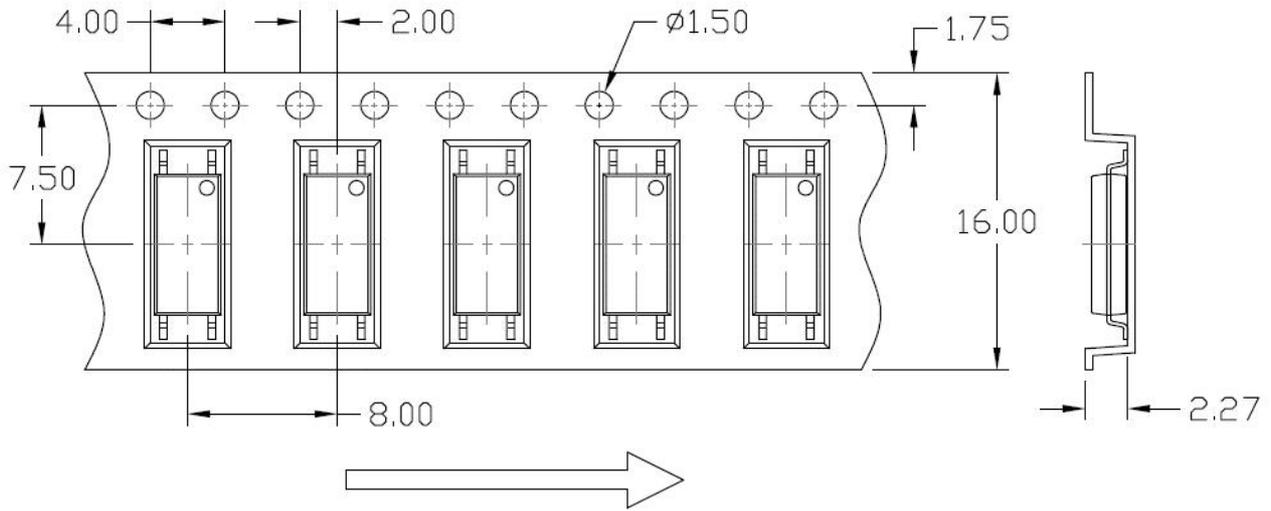


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

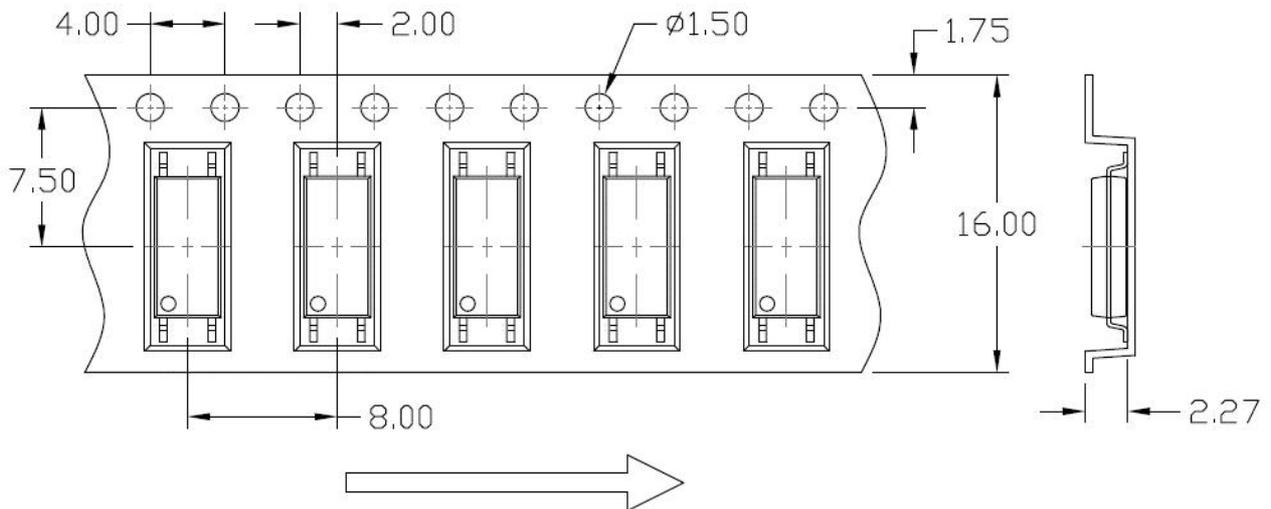


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1

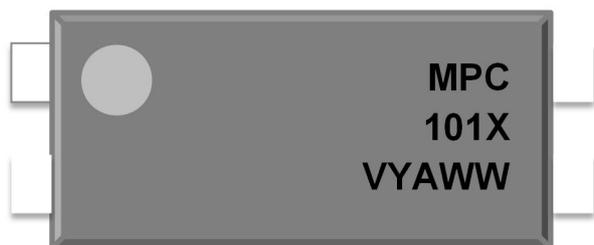


Option T2



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)

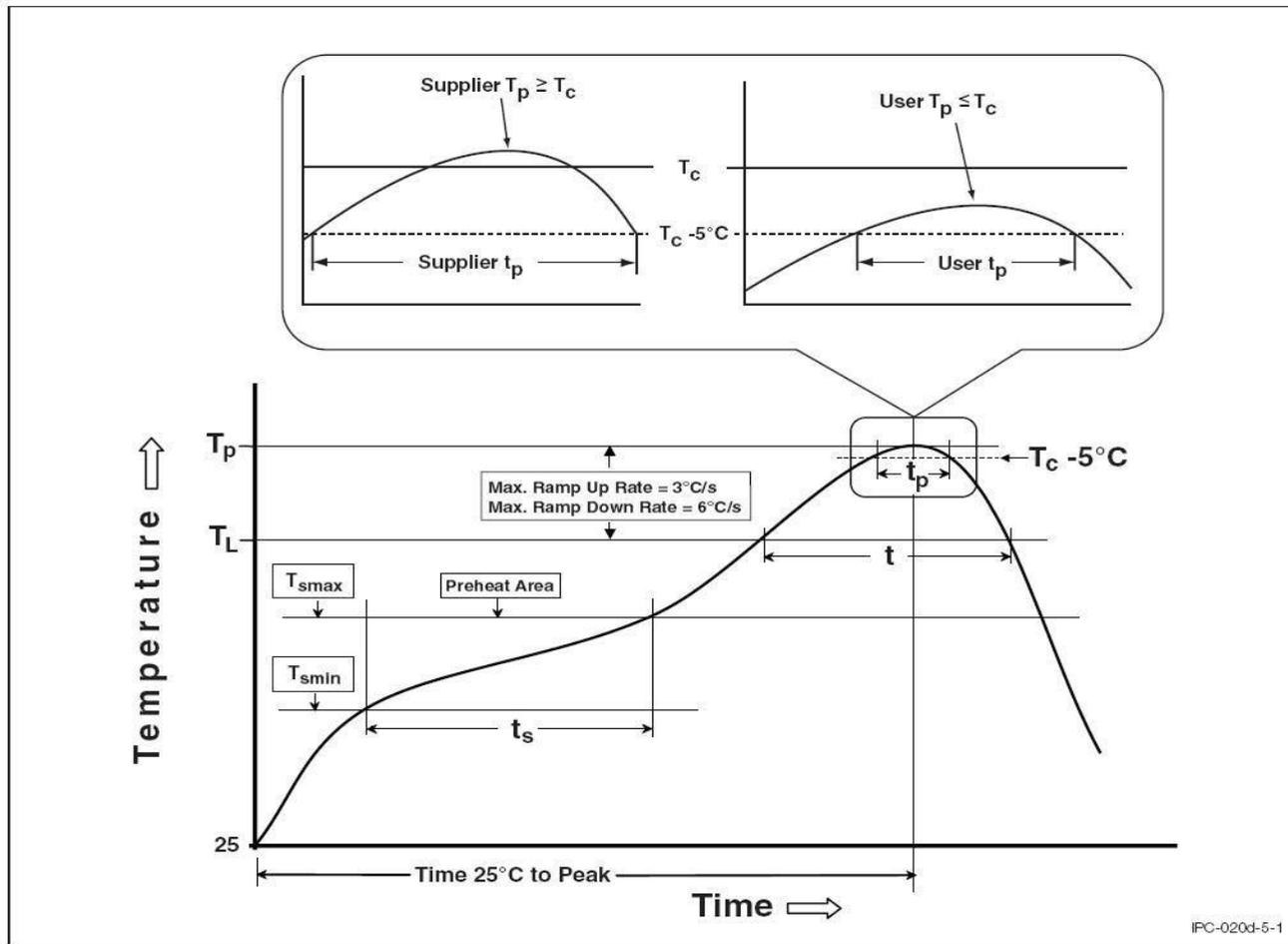
MPC – Company Abbr.
 101 – Part Number
 X – Rank (0/1/2/3/4/5/6/7/8/9)
 Z – Tape and Reel Option (T1/T2)
 G – Green
 V – VDE Option (V or None)
 B – Molding Compound Type (B:Black , None:White)

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



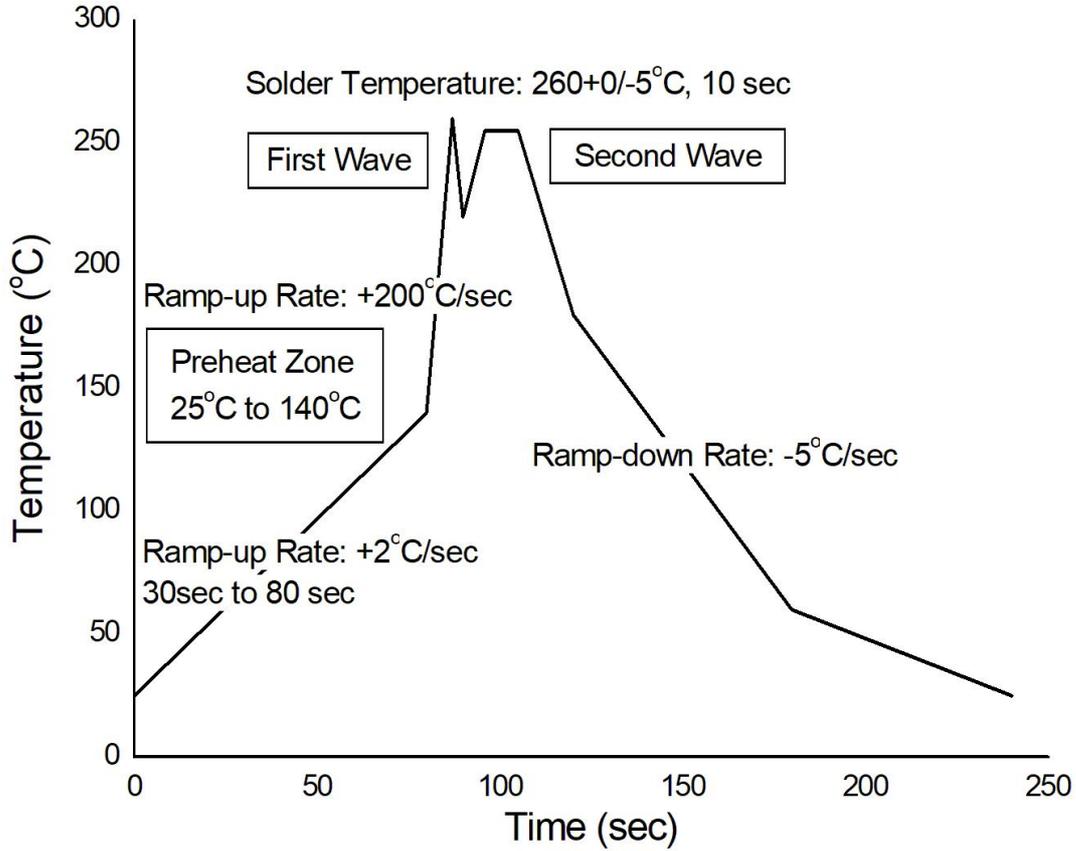
IPC-020d-5-1

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

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.



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DISCLAIMER

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