SOP4, DC Input Photo Transistor Coupler

Features

- High isolation 3750 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

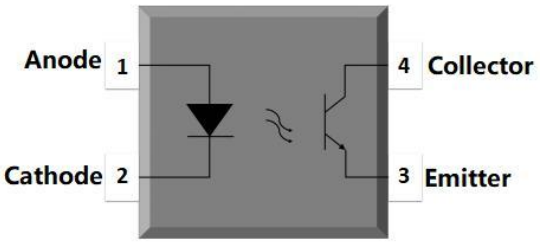
- Switch mode power supplies
- Programmable controllers
- Office equipment
- System appliances, measuring instruments
- Telecommunication equipments
- Signal transmission between circuits of different potentials and impedances
- Home appliances, such as fan heaters, etc.

Description

The MPC357 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic SOP4 package

With the robust coplanar double mold structure, MPC357 series provide the most stable isolation feature.

Schematic



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}	35	V	
Emitter - Collector Voltage	V_{ECO}	7	V	
Collector Current	I_C	50	mA	
Output Power Dissipation	P_O	150	mW	
COMMON				
Total Power Dissipation	Ptot	250	mW	
Isolation Voltage	Viso	3750	Vrms	2
Operating Temperature	Topr	-55~110	°C	
Storage Temperature	Tstg	-55~150	°C	
Soldering Temperature	Tsol	260	°C	

Note 1. 100μs pulse, 100Hz frequency

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

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C								
PARAMETER		SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	REMARK
INPUT								
Forward Voltage		V_F	-	1.24	1.4	V	IF=10mA	
Reverse Current		I_R	-	-	10	μA	VR=6V	
Input Capacitance		Cin	-	10	-	pF	V=0, f=1kHz	
OUTPUT								
Collector Dark Current		I_{CEO}	-	-	100	nA	VCE=20V, IF=0	
Collector-Emitter Breakdown Voltage		BV_{CEO}	35	-	-	V	IC=0.1mA, IF=0	
Emitter-Collector Breakdown Voltage		BV_{ECO}	6	-	-	V	IE=0.1mA, IF=0	
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	MPC357	CTR	50	-	600	%	IF=5mA, VCE=5V	
	MPC357A		80	-	160			
	MPC357B		130	-	260			
	MPC357C		200	-	400			
	MPC357D		300	-	600			
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	-	0.06	0.2	V	IF=20mA, IC=1mA	
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		fc	-	80	-	kHz	VCE=2V, IC=2mA RL=100Ω,-3dB	(Note 4)
Response Time (Rise)		tr	-	3	18	μs	VCE=2V, IC=2mA RL=100Ω	X Series (Note 3)
Response Time (Fall)		tf	-	4	18	μs		
Response Time (Rise)		tr	-	6	18	μs		X1 Series (Note 3)
Response Time (Fall)		tf	-	8	18	μs		

Note 3. Fig. 12&13

Note 4. Fig. 14

CHARACTERISTIC CURVES

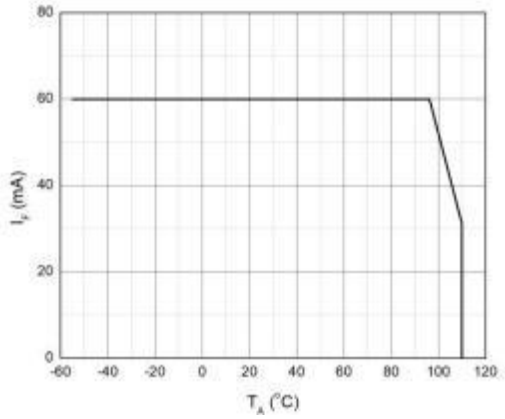


Fig.1 Forward Current vs. Ambient Temperature

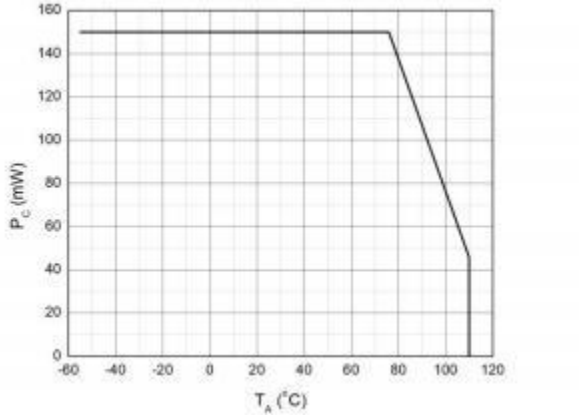


Fig.2 Collector Power Dissipation vs. Ambient Temperature

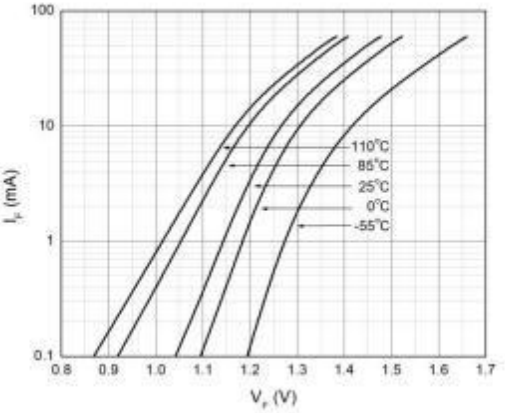


Fig.3 Forward Current vs. Forward Voltage

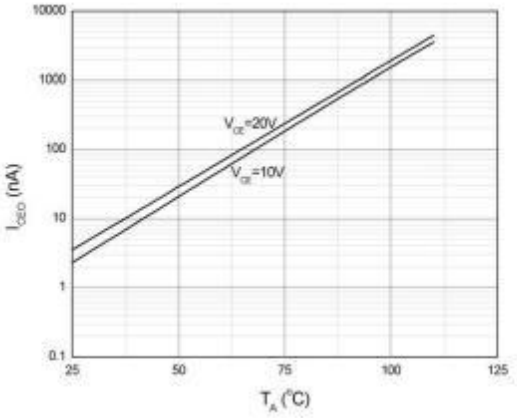


Fig.4 Collector Dark Current vs. Ambient Temperature

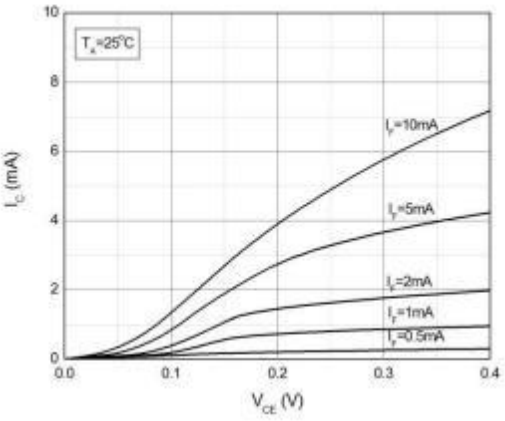


Fig.5 Collector Current vs Collector-emitter Voltage

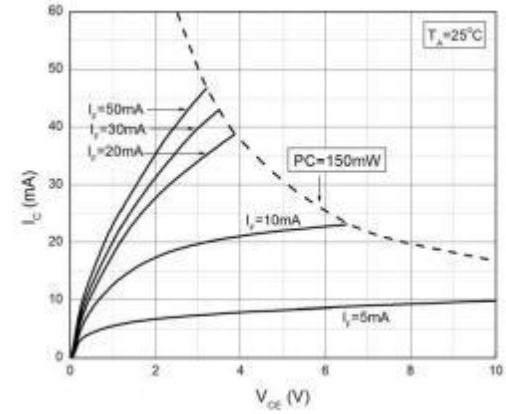


Fig.6 Collector Current vs Collector-emitter Voltage

CHARACTERISTIC CURVES

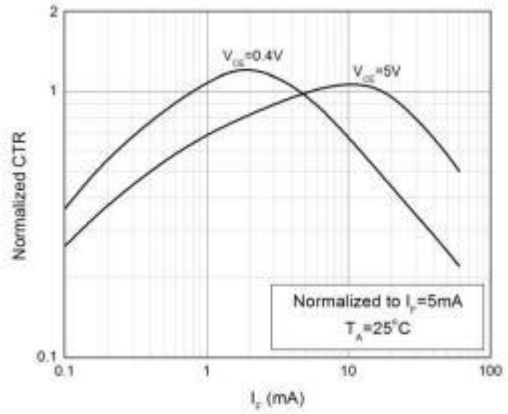


Fig.7 Normalized Current Transfer Ratio vs. Forward Current

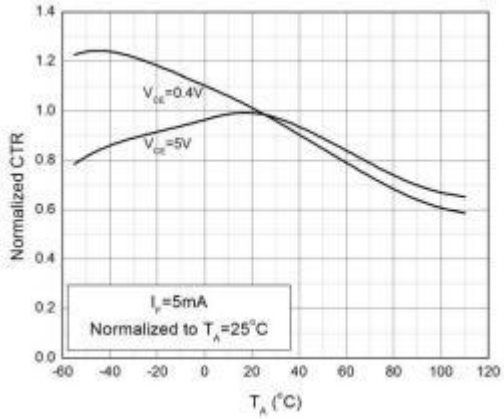


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

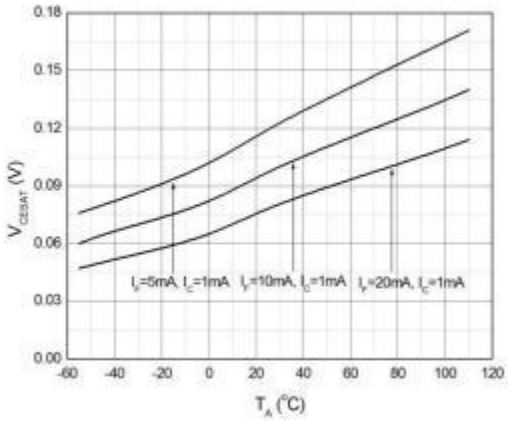


Fig. 9 Collector- emitter Saturation Voltage vs Ambient Temperature

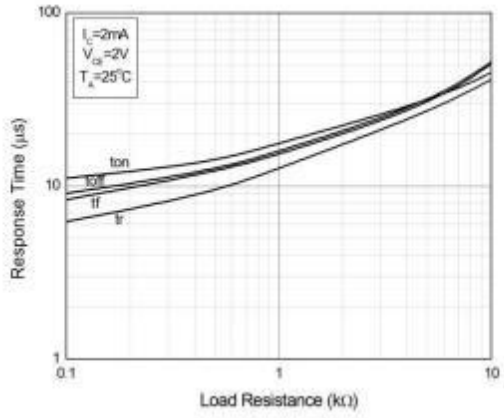


Fig. 10 Switching Time vs Load Resistance

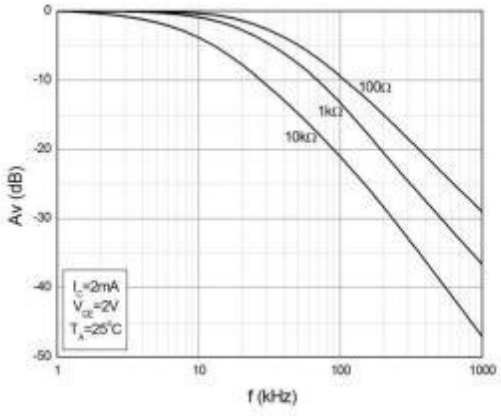


Fig.11 Frequency Response

TEST CIRCUITS

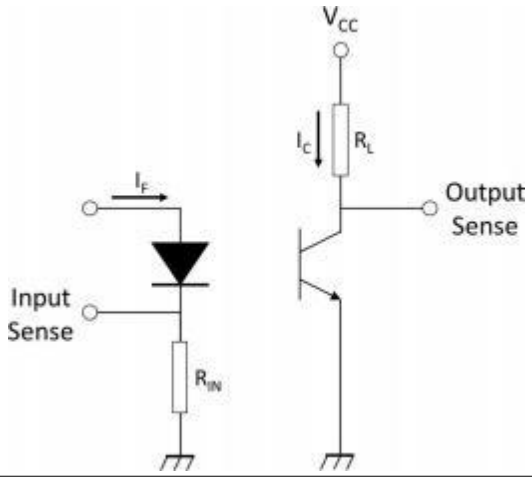


Fig.12 Test Circuits of Response Time

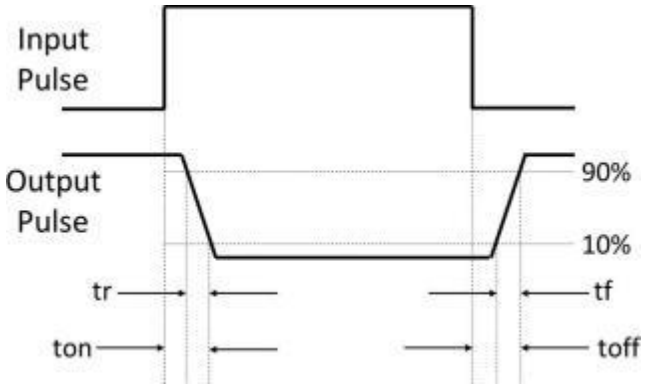


Fig.13 Curves of Response Time

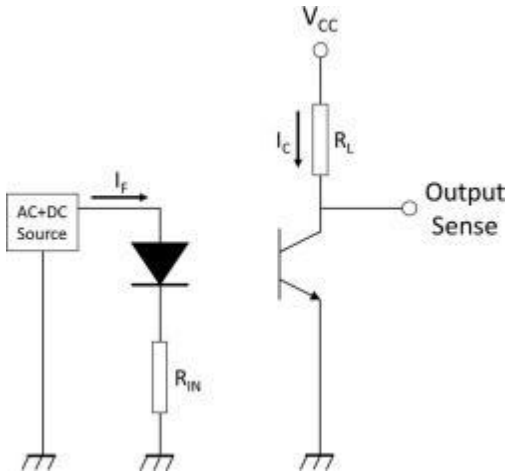
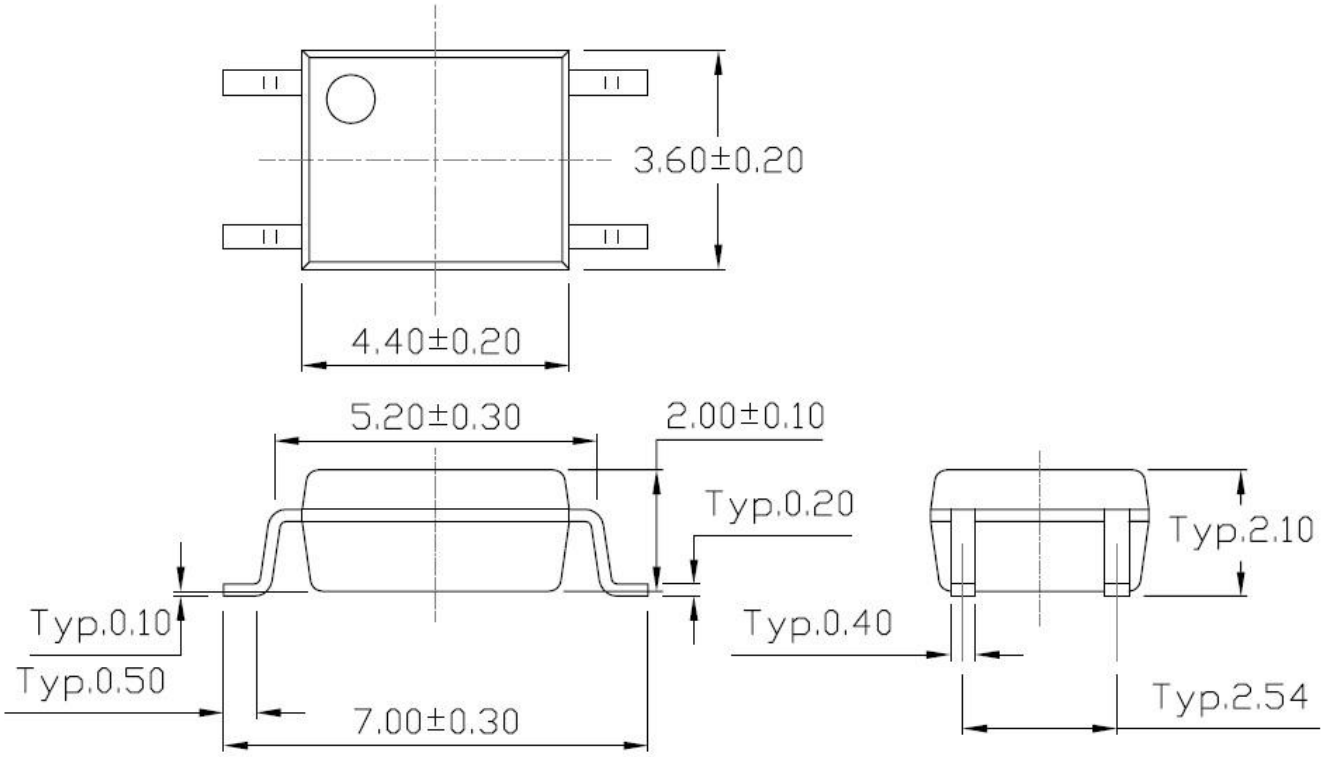
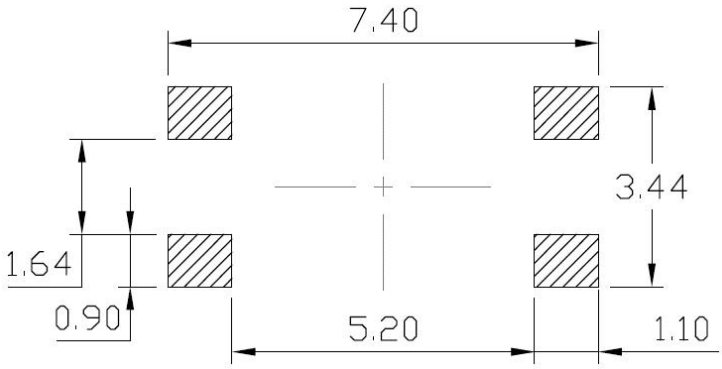


Fig.14 Test Circuits of Frequency Response

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

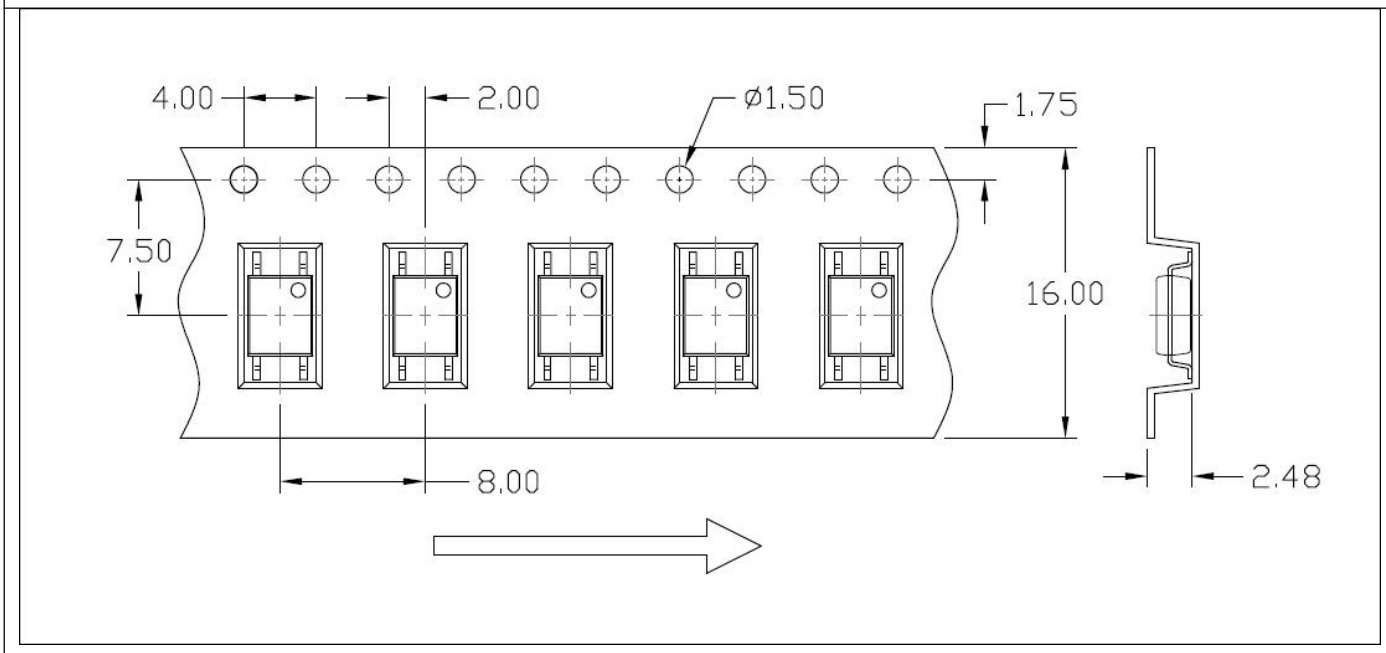


Recommended Solder Mask (Dimensions in mm unless otherwise stated)

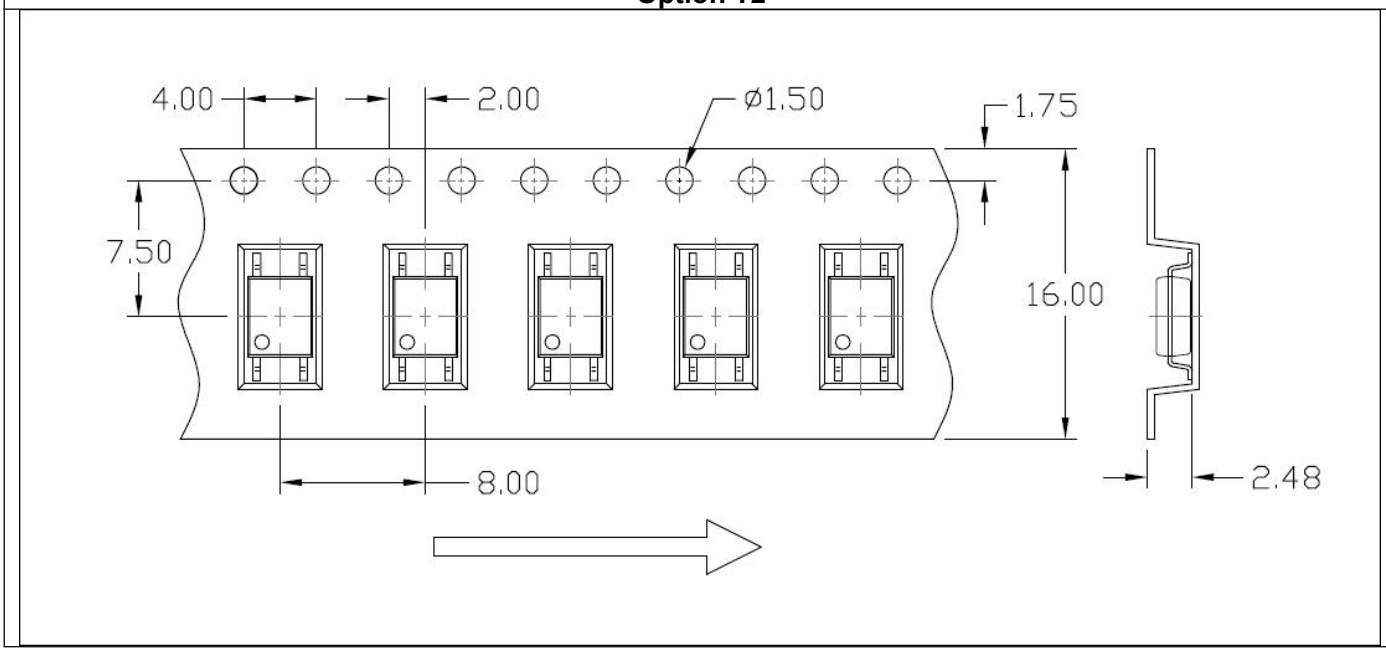


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1

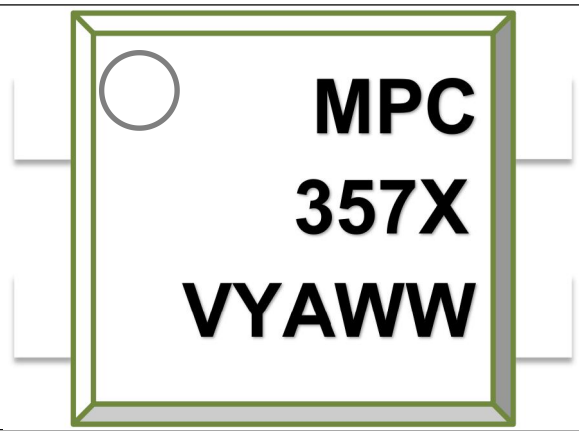


Option T2



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



MPC : Company Abbr.
357 : Part Number
X : CTR Rank
V : VDE Option
Y : Fiscal Year
A : Manufacturing Code
WW : Work Week

ORDERING INFORMATION

MPC357XN(Z)-GV

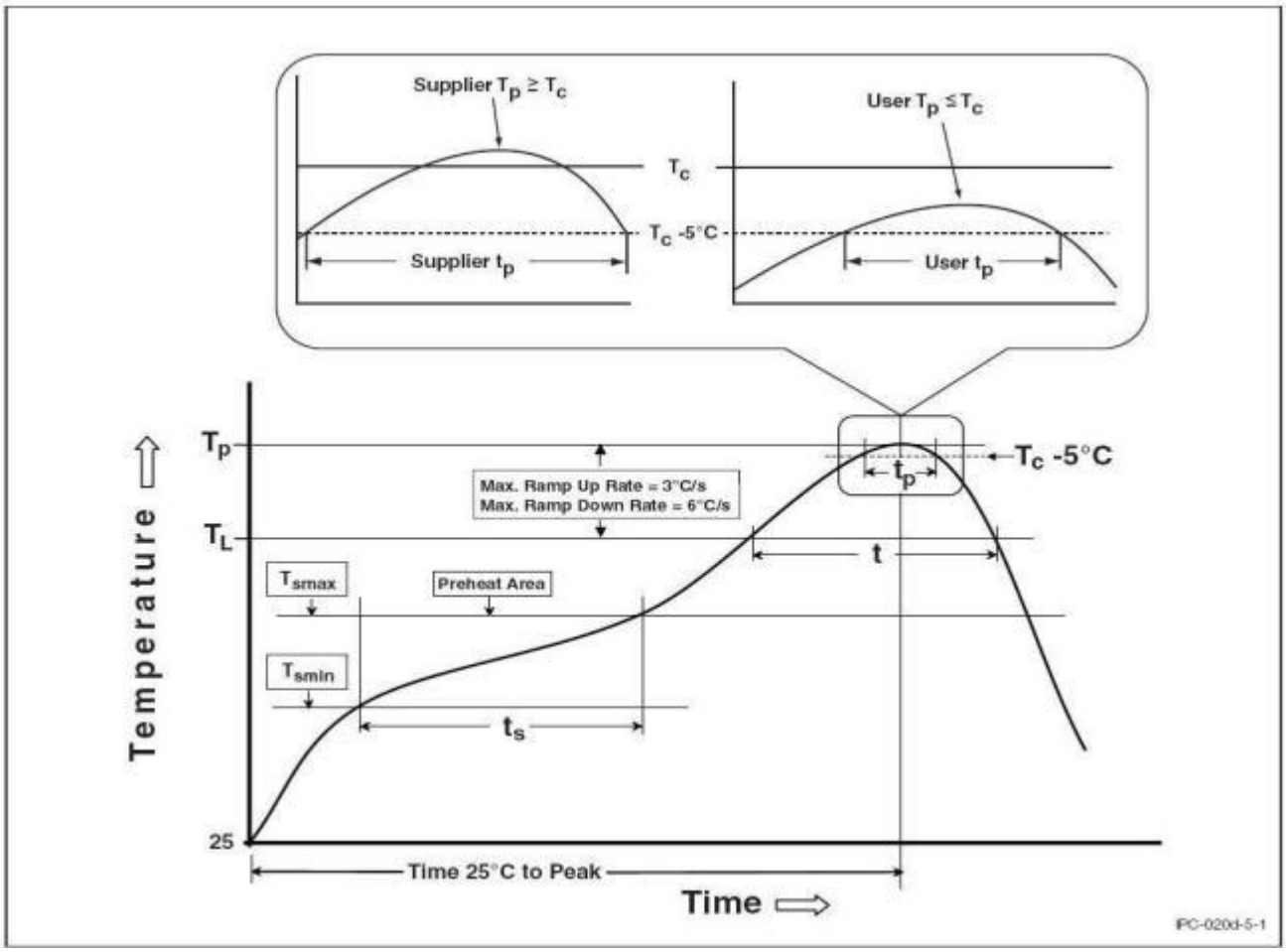
MPC – Company Abbr.
357 – Part Number
X – Rank1 (A/B/C/D or None)
N – Rank2 (1~9 or None)
Z – Tape and Reel Option (T1/T2)
G – Green
V – VDE Option (V or None)

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	150°C
Temperature Max. (Tsmax)	150	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.

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.
- 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 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.

■ Revision History

Version	Date	Subjects (major changes since last revision)
1.0	2018-12-21	Datasheet Complete
1.1	2023-06-02	CQC product standards and technical requirements updated
1.2	2023-06-05	Upgrade Datasheet