

### Description

The MPC817 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP4 package with different lead forming options.

With the robust coplanar double mold structure, MPC817 series provide the most stable isolation feature.

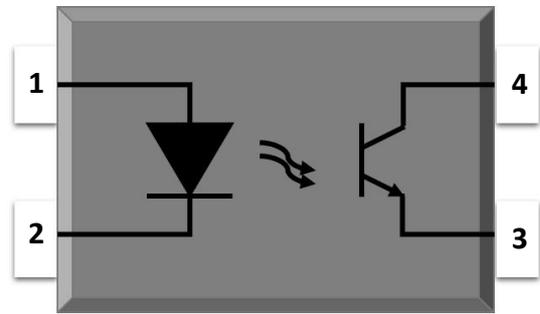
### Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- REACH compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - DEMKO approved (No. D-07670)
  - FIMKO approved (No. FI/40479/A1)
  - NEMKO approved (No. P20224171)
  - SEMKO approved (No. 1920191)

### Applications

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

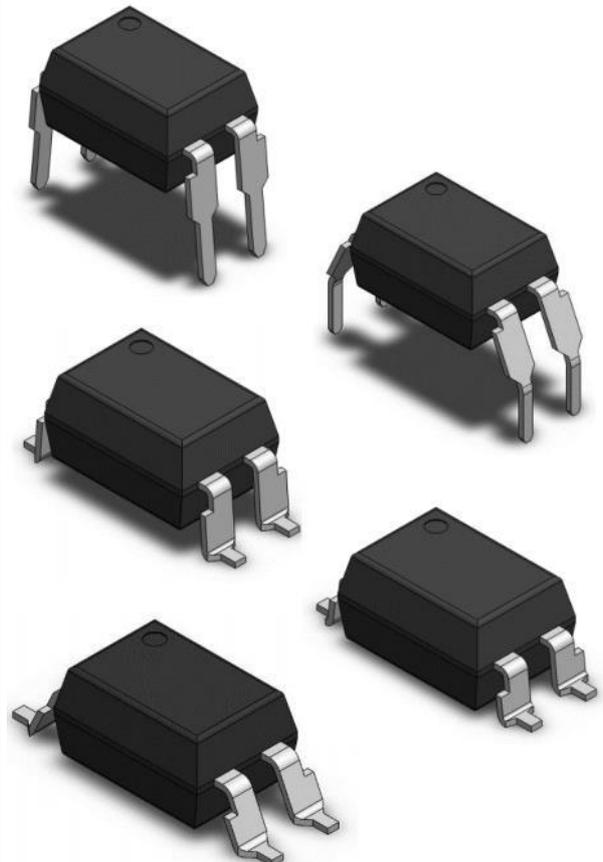
### SCHEMATIC



### PIN DEFINITION

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

### PACKAGE OUTLINE





# MPC817 Series

## DIP4, 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	$V_{CEO}$	35	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	$P_{tot}$	200	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. 100 $\mu$ s pulse, 100Hz frequency Note

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



# MPC817 Series

## DIP4, DC Input Photo Transistor Coupler

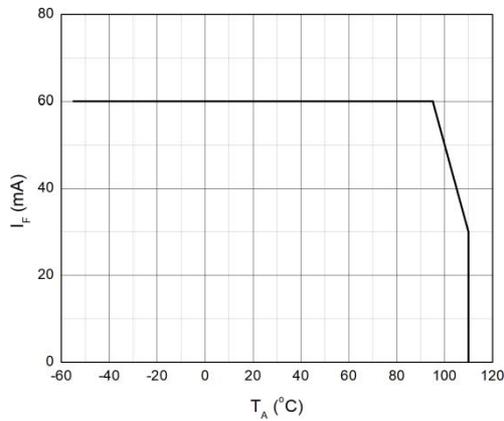
ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C								
PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE	
INPUT								
Forward Voltage	$V_F$	-	1.24	1.4	V	$I_F=10\text{mA}$		
Reverse Current	$I_R$	-	-	10	$\mu\text{A}$	$V_R=6\text{V}$		
Input Capacitance	$C_{in}$	-	10	-	pF	$V=0, f=1\text{kHz}$		
OUTPUT								
Collector Dark Current	$I_{CEO}$	-	-	100	nA	$V_{CE}=20\text{V}, I_F=0$		
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	35	-	-	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	MPC817	CTR	50	-	600	%	$I_F=5\text{mA}, V_{CE}=5\text{V}$	
	MPC817A		80	-	160			
	MPC817B		130	-	260			
	MPC817C		200	-	400			
	MPC817D		300	-	600			
	MPC817A1		80	-	160			
	MPC817B9		130	-	260			
	MPC817C1		200	-	400			
	MPC817D1		300	-	600			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.06	0.2	V	$I_F=20\text{mA}, I_C=1\text{mA}$		
Isolation Resistance	$R_{iso}$	$10^{12}$	$10^{14}$	-	$\Omega$	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	$\mu\text{s}$	$V_{CE}=2\text{V}, I_C=2\text{mA}$	4	
Response Time (Fall)	$t_f$	-	8	18	$\mu\text{s}$	$R_L=100\Omega$	4	

Note 3. Fig.12&13

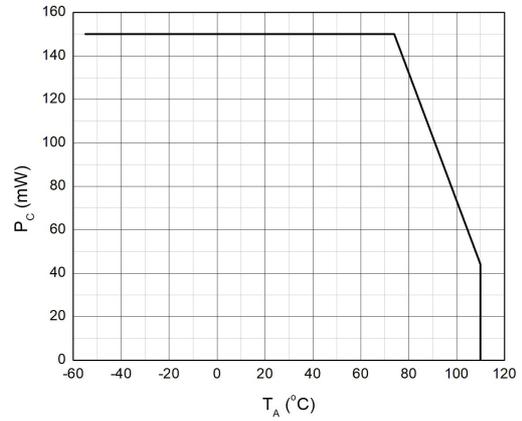
Note 4. Fig.14

### CHARACTERISTIC CURVES

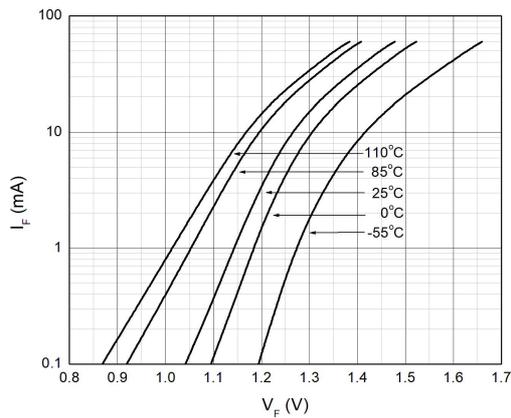
**Fig.1 Forward Current vs. Ambient Temperature**



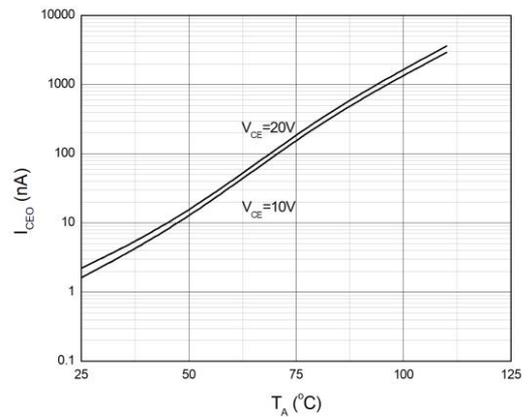
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



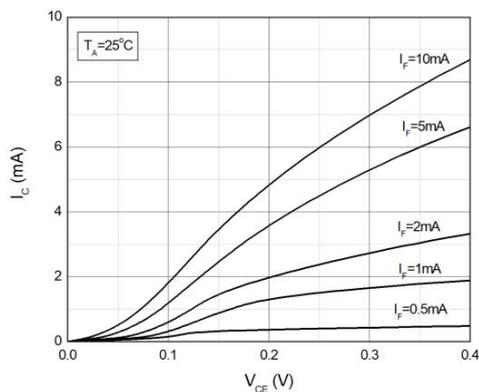
**Fig.3 Forward Current vs. Forward Voltage**



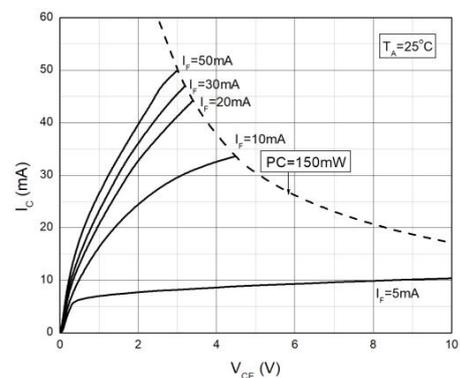
**Fig.4 Collector Dark Current vs. Ambient Temperature**



**Fig.5 Collector Current vs. Collector-emitter Voltage**

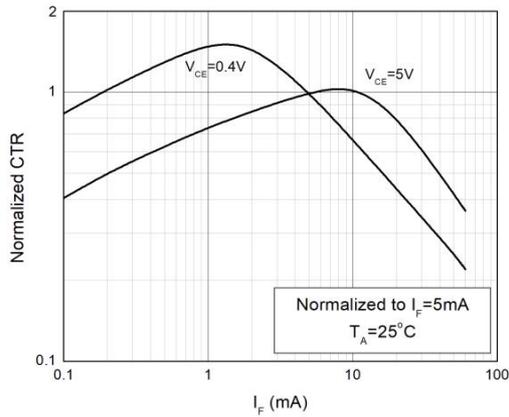


**Fig.6 Collector Current vs. Collector-emitter Voltage**

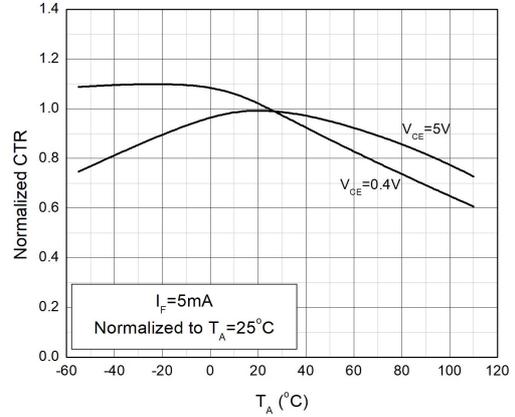


### CHARACTERISTIC CURVES

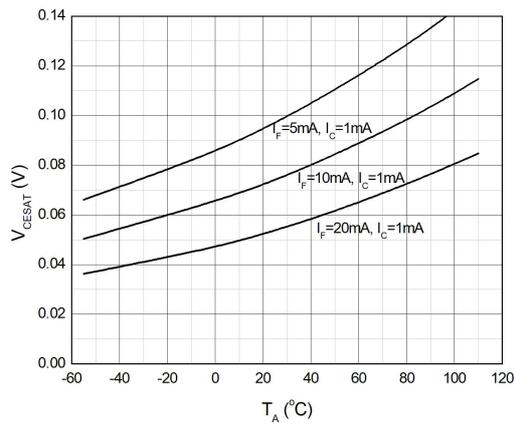
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



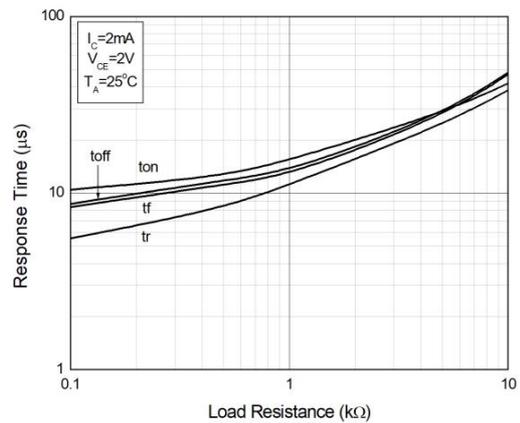
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



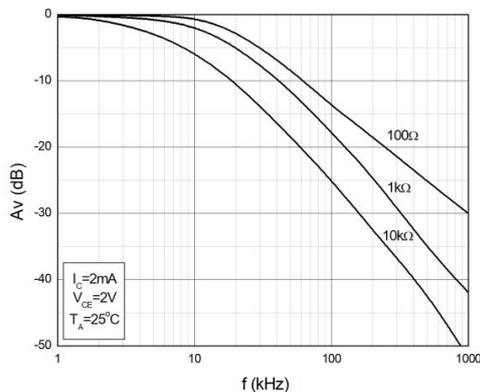
**Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature**



**Fig.10 Switching Time vs. Load Resistance**

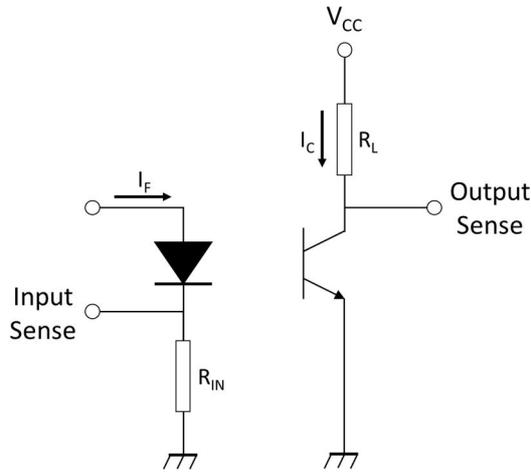


**Fig.11 Frequency Response**

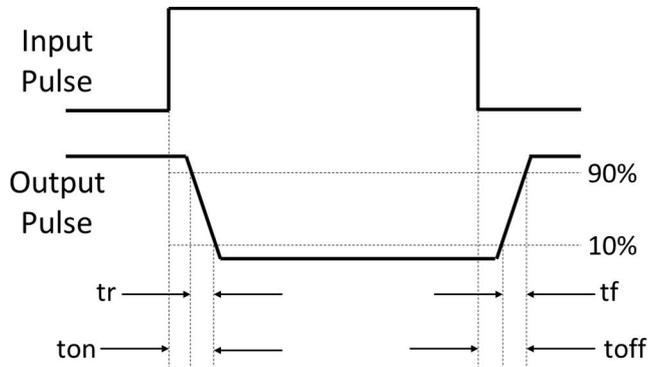


### TEST CIRCUITS

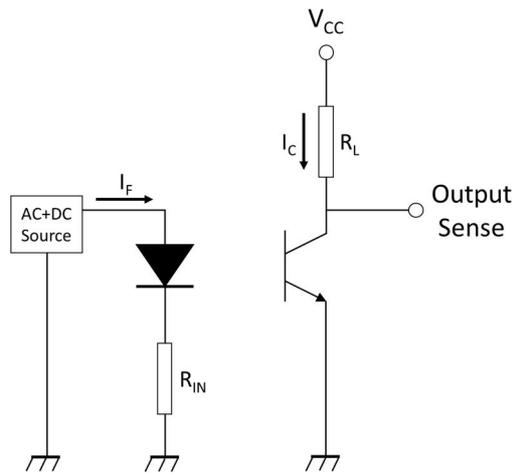
**Fig.12 Test Circuits of Response Time**



**Fig.13 Curves of Response Time**

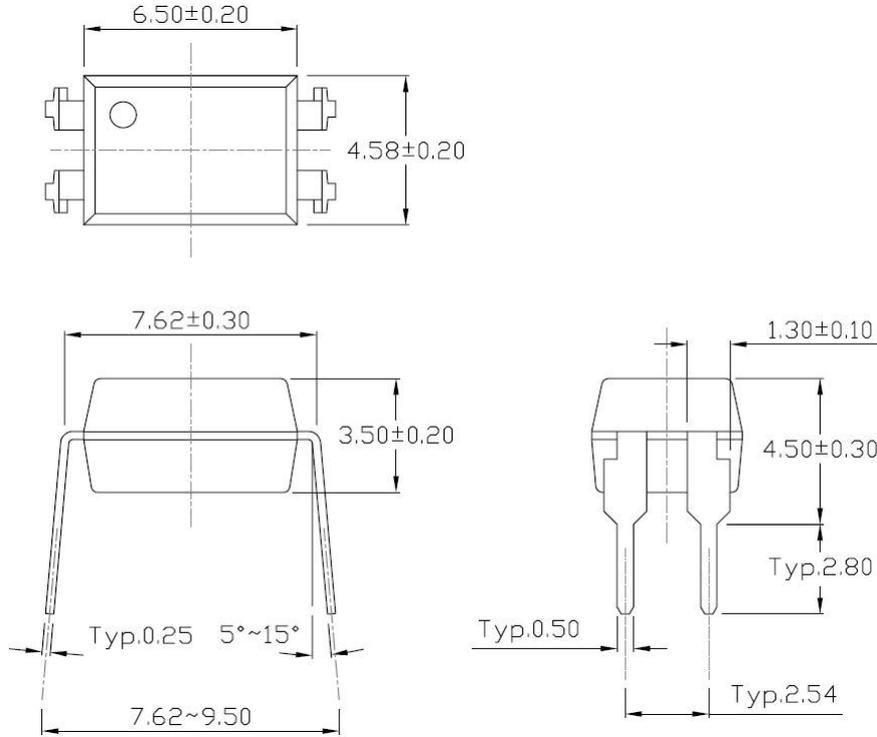


**Fig.14 Test Circuits of Frequency Response**

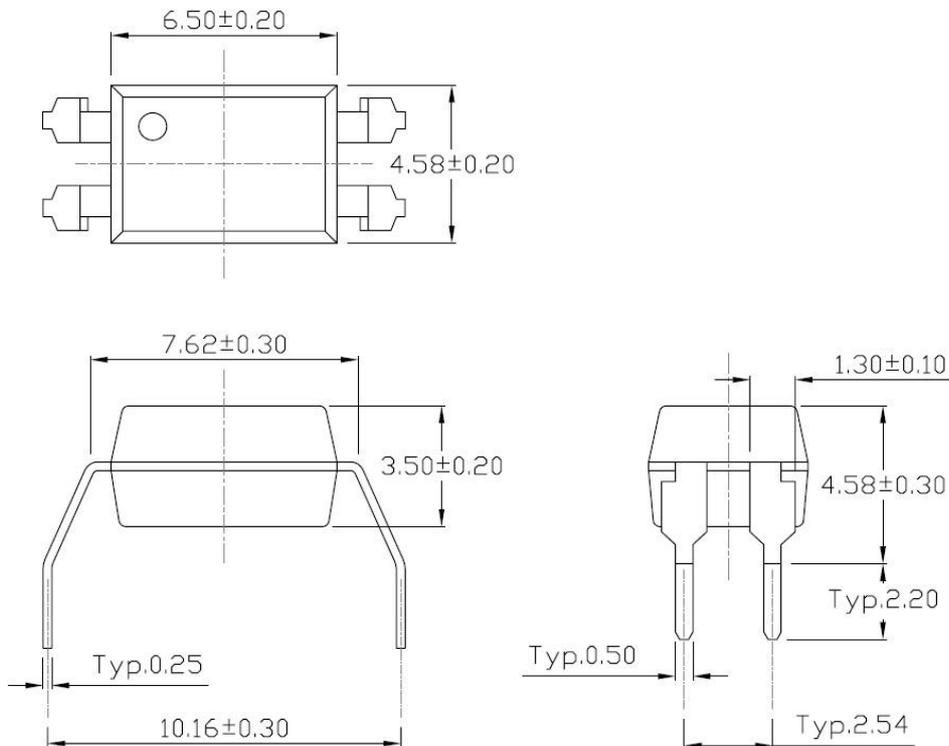


**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)**

**Standard DIP – Through Hole (DIP Type)**

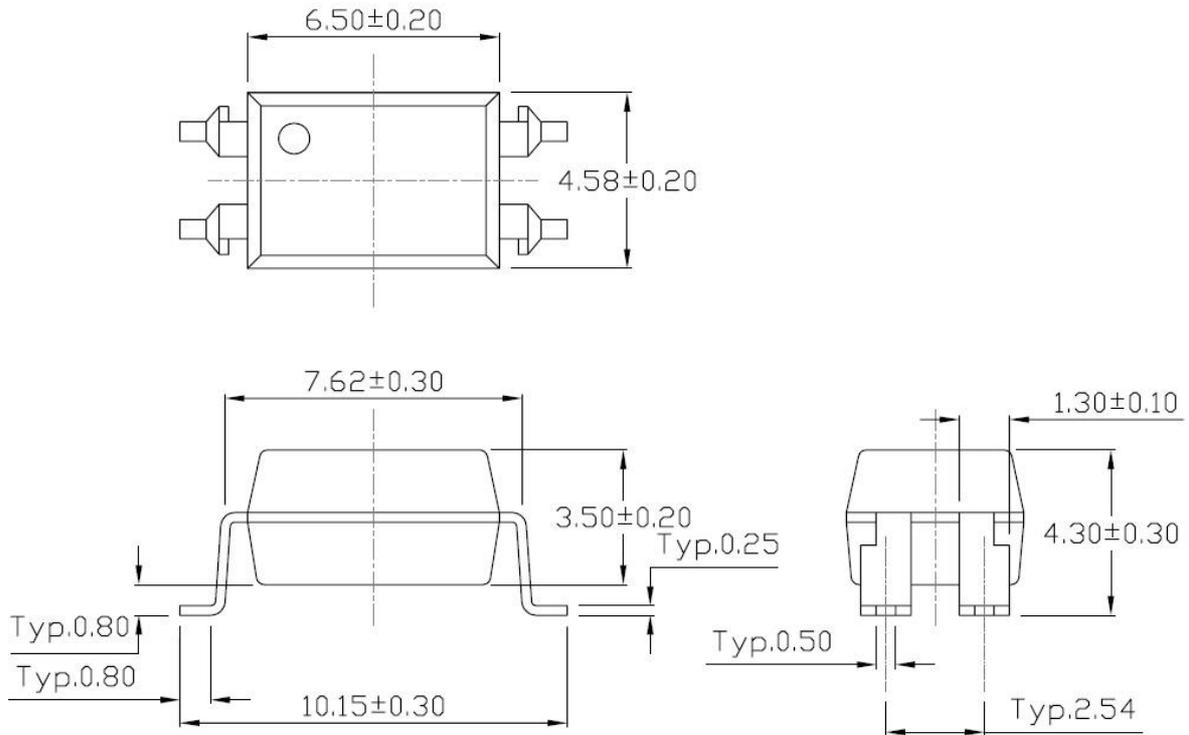


**Gullwing (400mil) Lead Forming – Through Hole (M Type)**

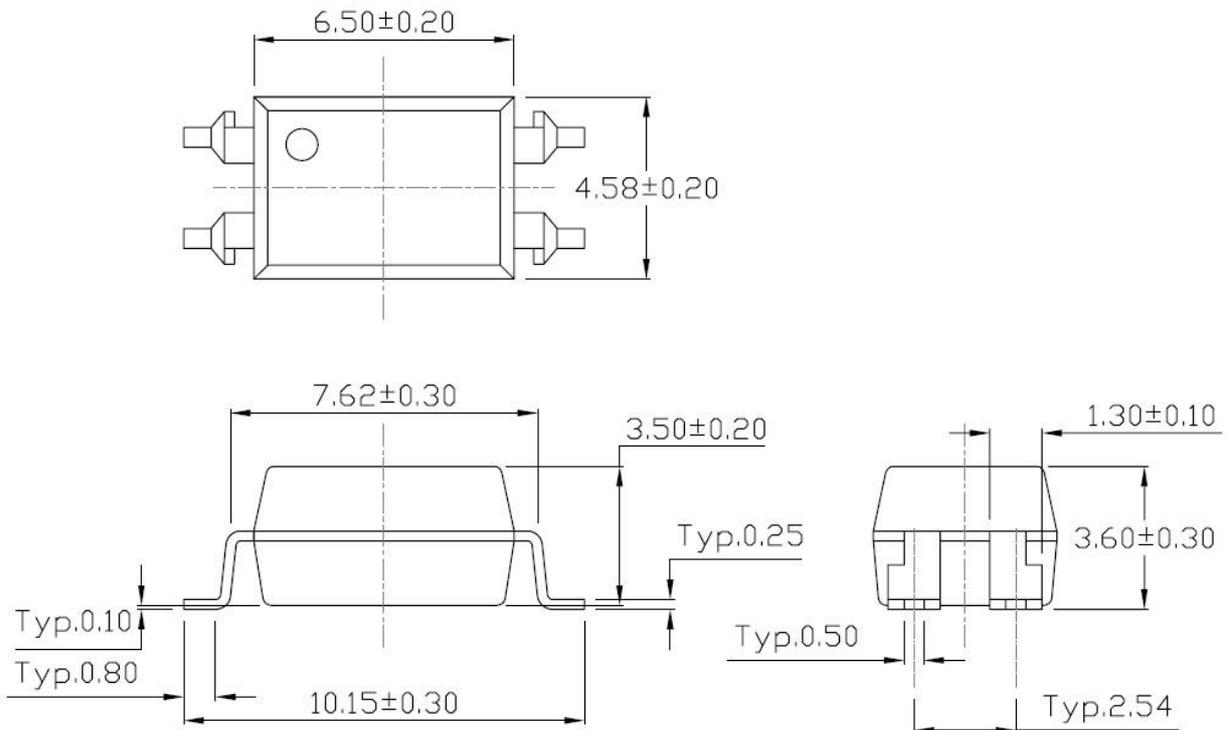


**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)**

**Surface Mount Lead Forming (S Type)**

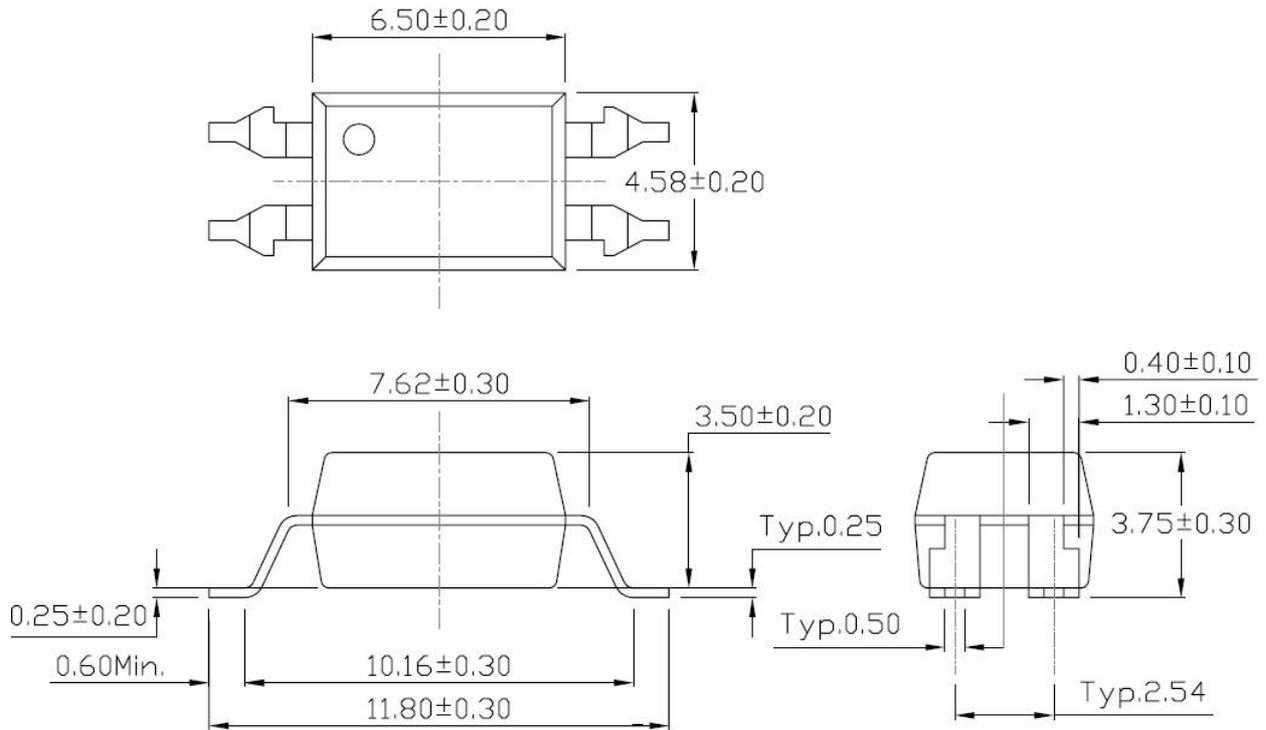


**Surface Mount (Low Profile) Lead Forming (SL Type)**



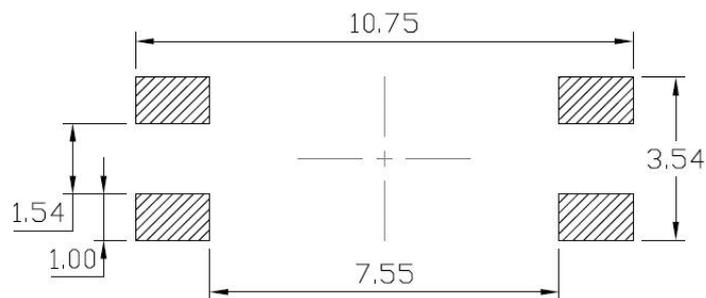
**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)**

**Surface Mount (Gullwing) Lead Forming (SLM Type)**

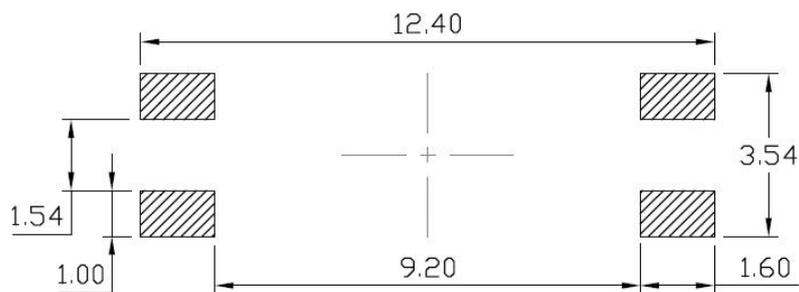


**RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)**

**Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming**

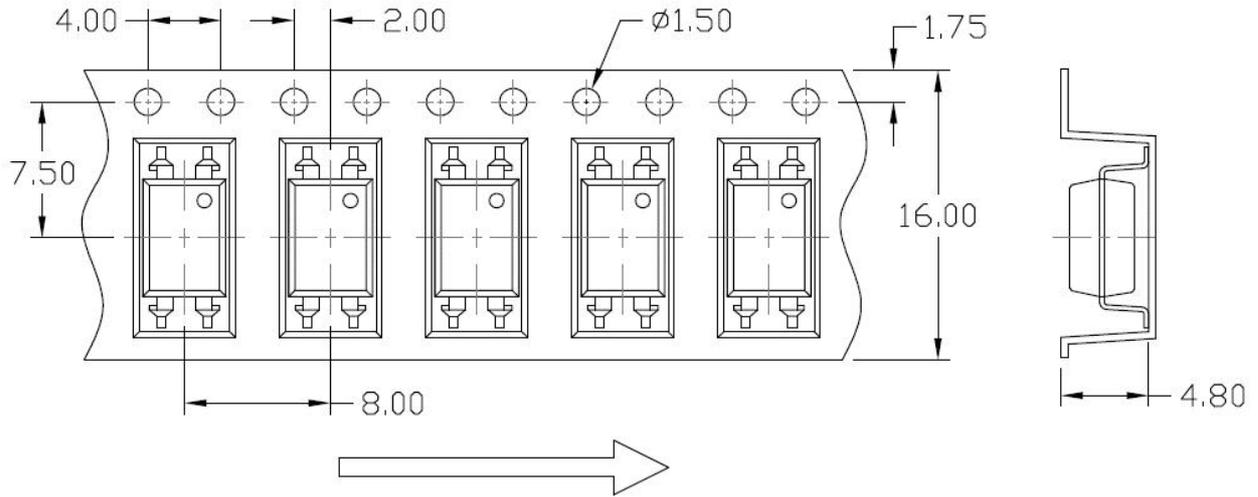


**Surface Mount (Gullwing) Lead Forming**

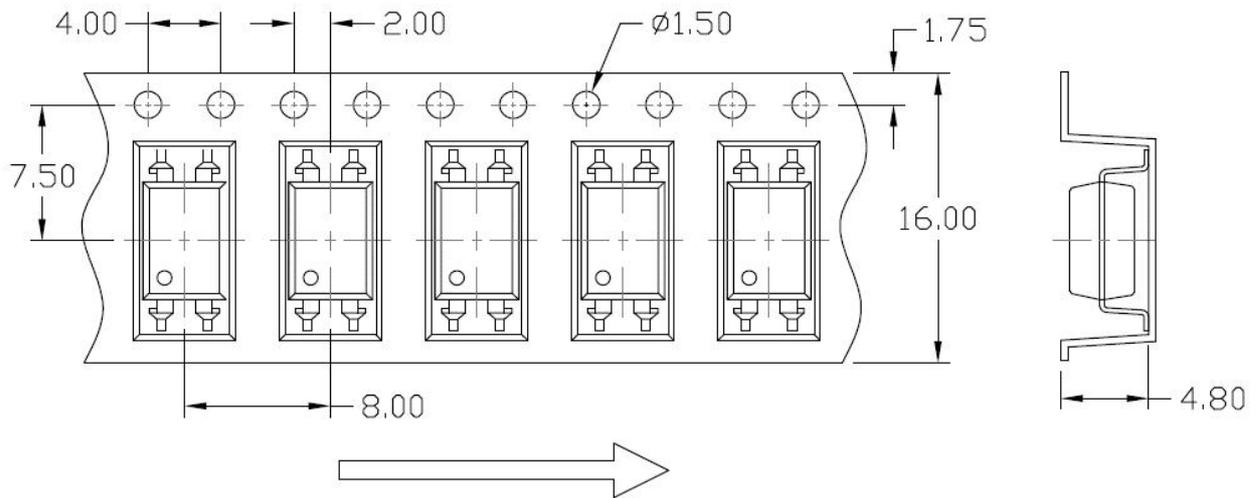


### CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

#### Option S(T1) & SL(T1)

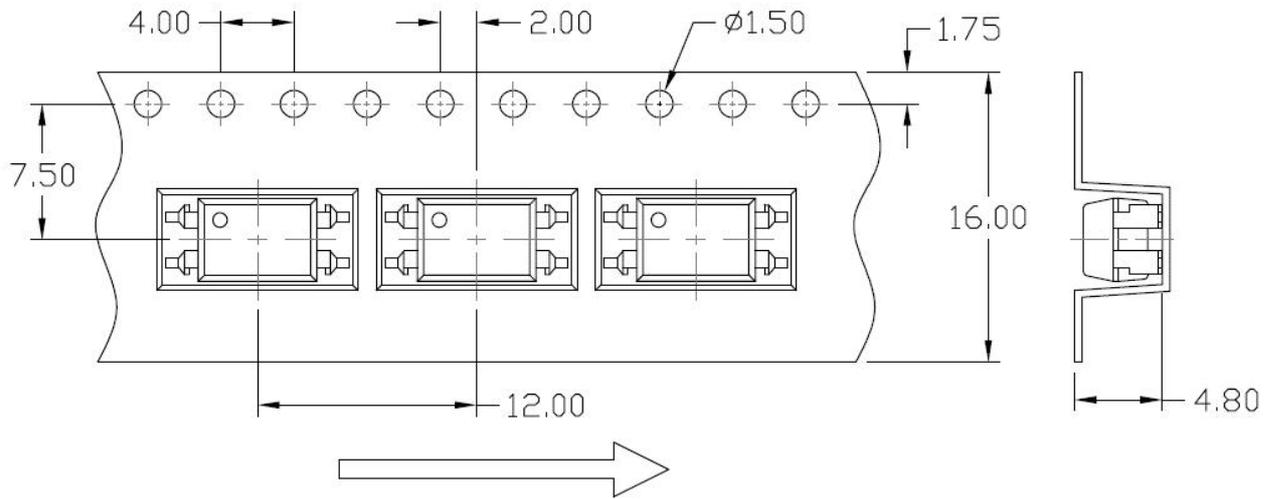


#### Option S(T2) & SL(T2)

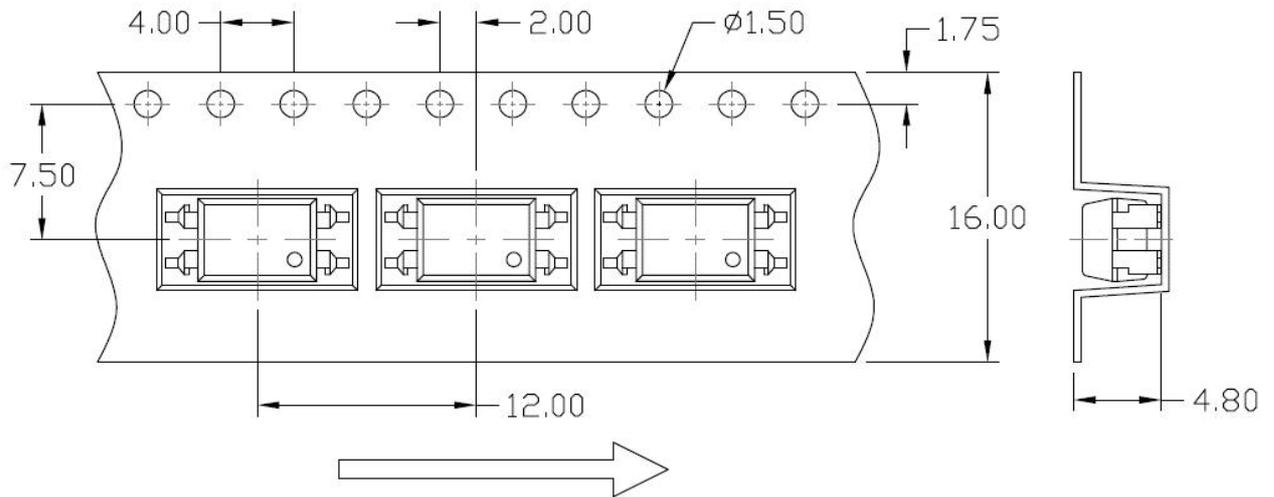


### CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

#### Option S(T3) & SL(T3)

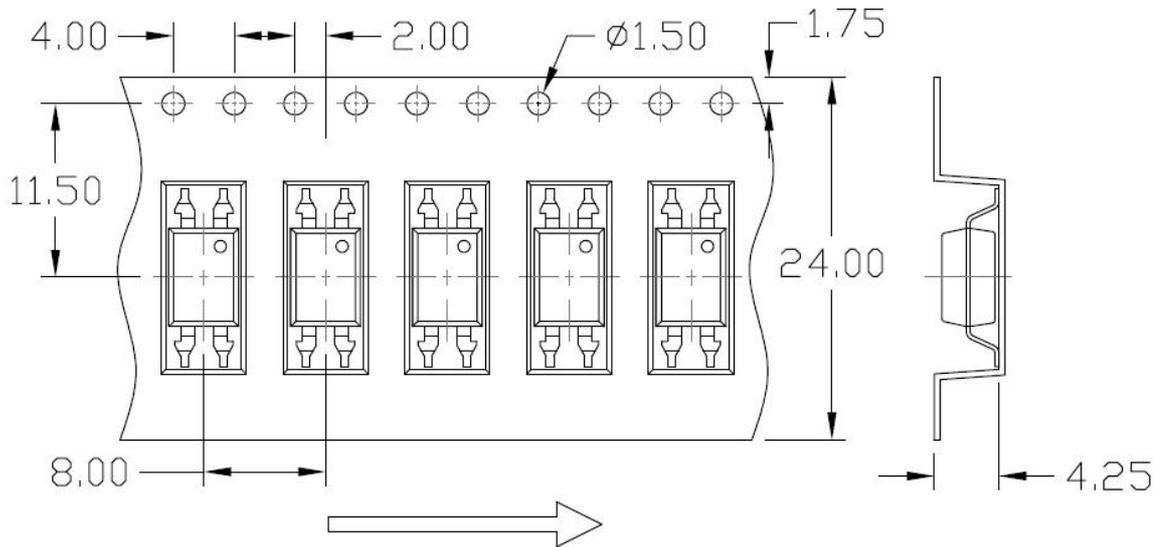


#### Option S(T4) & SL(T4)

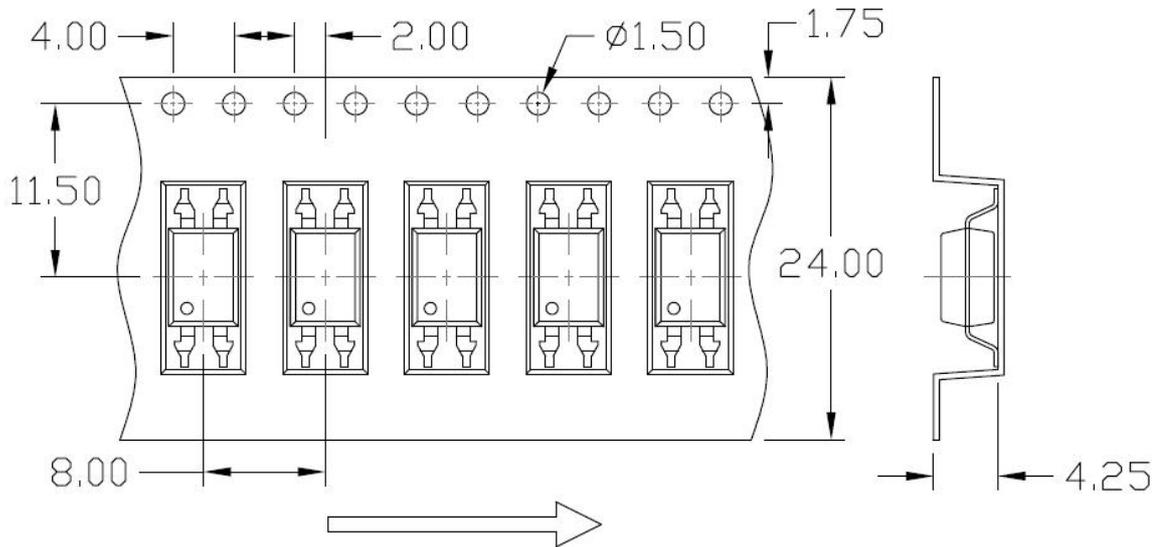


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option SLM(T1)**



**Option SLM(T2)**



### ORDERING AND MARKING INFORMATION

#### MARKING INFORMATION



**MPC** : Company Abbr.  
**817** : Part Number  
**X** : CTR Rank  
**F** : Lead-frame Option  
 (F: Iron, None: Copper)  
**V** : VDE Option  
**Y** : Fiscal Year  
**A** : Manufacturing Code  
**WW** : Work Week

#### ORDERING INFORMATION

### MPC817XN(Y)(Z)-FGV

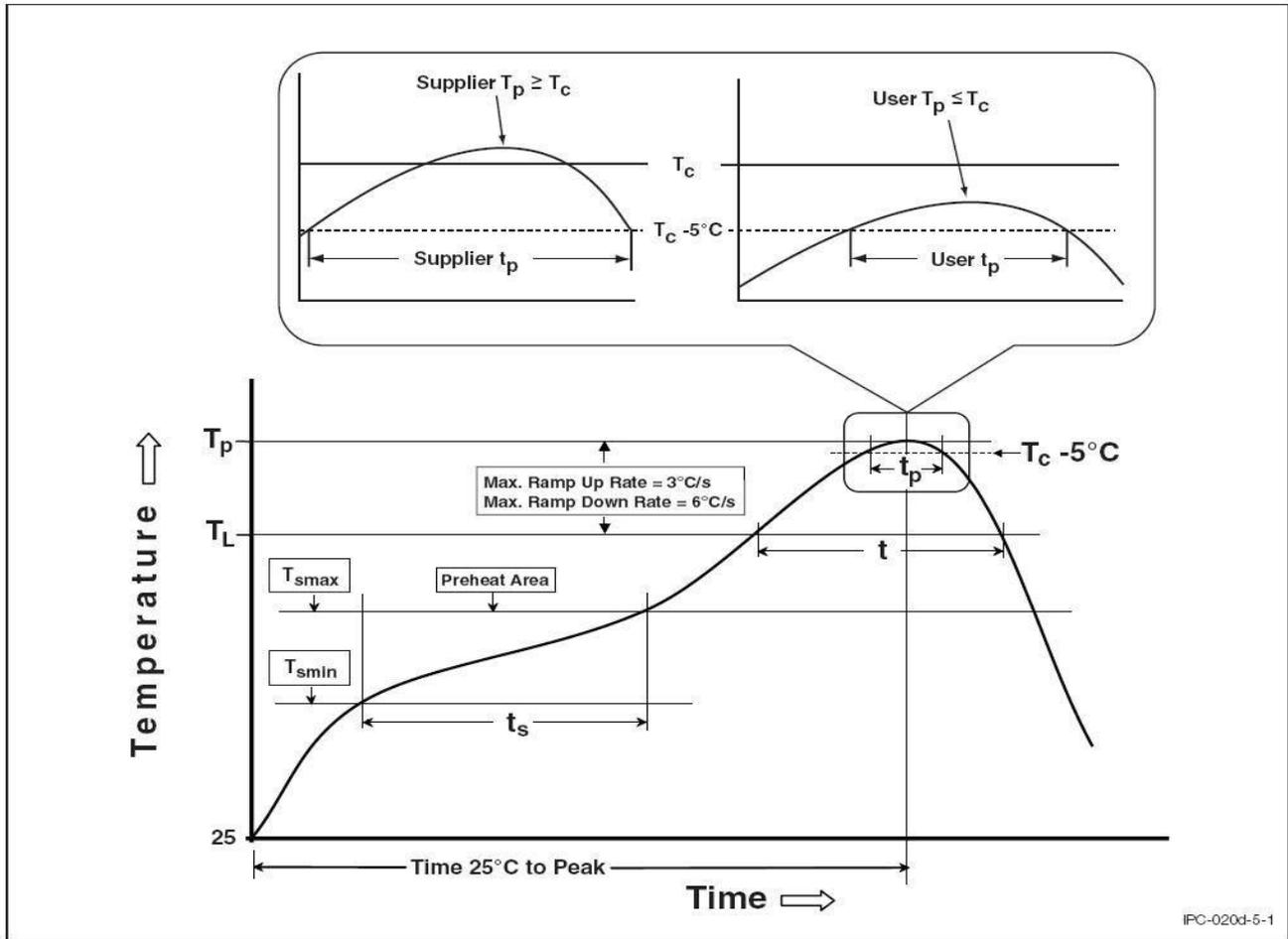
MPC – Company Abbr. (Y) – Lead Form Option (M/S/SL/SLM/None)  
 817 – Part Number (Z) – Tape and Reel Option (T1/T2/T3/T4)  
 XN – Rank (A/A1/B/B9/C/C1/D/D1 or None) F – Lead-frame Option (F: Iron, None: Copper)  
 G – Green  
 V – VDE Option (V or None)

#### Packing Quantity

Option	Description	Quantity
None	Standard 4 Pin Dip	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
S(T3)	Surface Mount Lead Forming – With Option 3 Taping	1000 Units/Reel
S(T4)	Surface Mount Lead Forming – With Option 4 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1500 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T3)	Surface Mount (Low Profile) Lead Forming– With Option 3 Taping	1000 Units/Reel
SL(T4)	Surface Mount (Low Profile) Lead Forming – With Option 4 Taping	1000 Units/Reel
SLM(T1)	Surface Mount (Gullwing) Lead Forming– With Option 1 Taping	1500 Units/Reel
SLM(T2)	Surface Mount (Gullwing) Lead Forming – With Option 2 Taping	1500 Units/Reel

**REFLOW INFORMATION**

**REFLOW PROFILE**



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. ( $T_{smin}$ )	100	$150^\circ\text{C}$
Temperature Max. ( $T_{smax}$ )	150	$200^\circ\text{C}$
Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )	60-120 seconds	60-120 seconds
Ramp-up Rate ( $t_L$ to $t_P$ )	$3^\circ\text{C/second max.}$	$3^\circ\text{C/second max.}$
Liquidous Temperature ( $T_L$ )	$183^\circ\text{C}$	$217^\circ\text{C}$
Time ( $t_L$ ) Maintained Above ( $T_L$ )	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	$235^\circ\text{C} +0^\circ\text{C} / -5^\circ\text{C}$	$260^\circ\text{C} +0^\circ\text{C} / -5^\circ\text{C}$
Time ( $t_P$ ) within $5^\circ\text{C}$ of $260^\circ\text{C}$	20 seconds	30 seconds
Ramp-down Rate ( $T_P$ to $T_L$ )	$6^\circ\text{C/second max}$	$6^\circ\text{C/second max}$
Time $25^\circ\text{C}$ to Peak Temperature	6 minutes max.	8 minutes max.



# **MPC817X1 Series**

## **DIP4, DC Input Photo Transistor Coupler**

### **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.