



# MPC814 Series

## DIP4, AC Input, Photo Transistor Coupler

### ■ Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- AC 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

### ■ Description

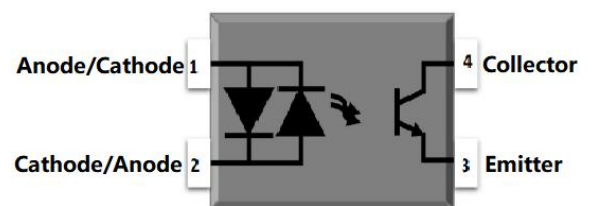
The MPC814 series combine two AlGaAs infrared emitting diode as the AC input which is optically coupled to a silicon planar phototransistor detector in a plastic DIP4 package with different lead forming options.

With the robust coplanar double mold structure, MPC814 series provide the most stable isolation feature.

### ■ Applications

- AC line monitor
- Programmable controller
- Telephone line interface
- System appliance
- Measurement instrument
- Unknown polarity DC sensor

### ■ Schematic





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ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	$I_F$	$\pm 60$	mA	
Peak Forward Current	$I_{FP}$	$\pm 1$	A	1
Input Power Dissipation	$P_I$	100	mW	
OUTPUT				
Collector - Emitter Voltage	$V_{CEO}$	80	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	$P_{tot}$	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%



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ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C								
PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE	
INPUT								
Forward Voltage	V <sub>F</sub>	-	1.24	1.4	V	IF=±10mA		
Input Capacitance	C <sub>in</sub>	-	10	-	pF	V=0, f=1kHz		
OUTPUT								
Collector Dark Current	I <sub>CEO</sub>	-	-	100	nA	VCE=20V, IF=0		
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	80	-	-	V	IC=0.1mA, IF=0		
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	7	-	-	V	IE=0.1mA, IF=0		
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	MPC814	CTR	20	-	300	%	IF=±1mA, VCE=5V	
	MPC814A		50	-	150			
	MPC814B		100	-	300			
CTR Symmetry			0.7	-	1.3		IF=±1mA, VCE=5V	
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	0.06	0.2	V	IF=±20mA, IC=1mA		
Isolation Resistance	R <sub>ISO</sub>	10 <sup>12</sup>	10 <sup>14</sup>	-	Ω	DC500V, 40 ~ 60% R.H.		
Floating Capacitance	C <sub>IO</sub>	-	0.4	1	pF	V=0, f=1MHz		
Cut-off Frequency	f <sub>c</sub>	-	80	-	kHz	VCE=2V, IC=2mA RL=100Ω,-3dB	3	
Response Time (Rise)	t <sub>r</sub>	-	3	18	μs	VCE=2V, IC=2mA	4	
Response Time (Fall)	t <sub>f</sub>	-	4	18	μs	RL=100Ω	4	

Note 3. Fig.12&13

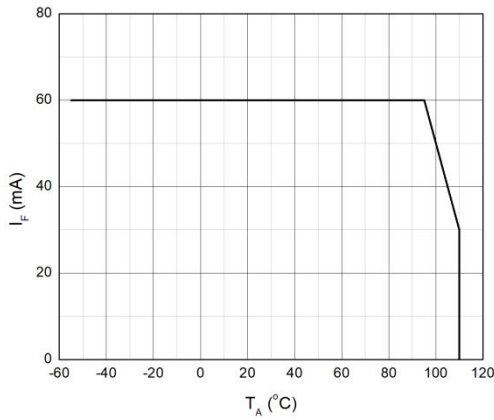
Note 4. Fig.14



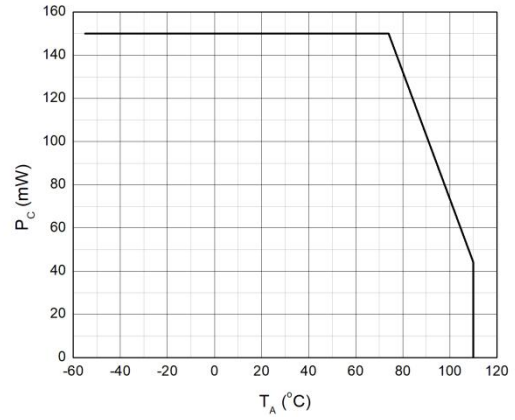
# MPC814 Series

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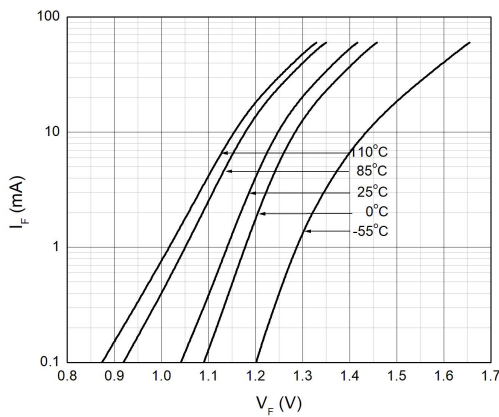
### CHARACTERISTIC CURVES



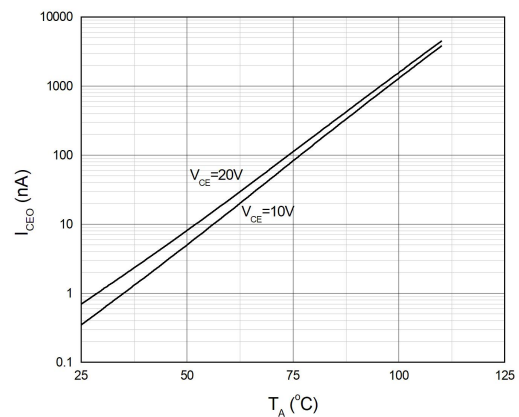
**Fig.1 Forward Current vs. Ambient Temperature**



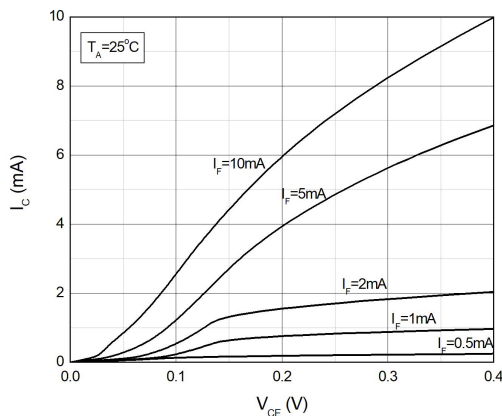
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



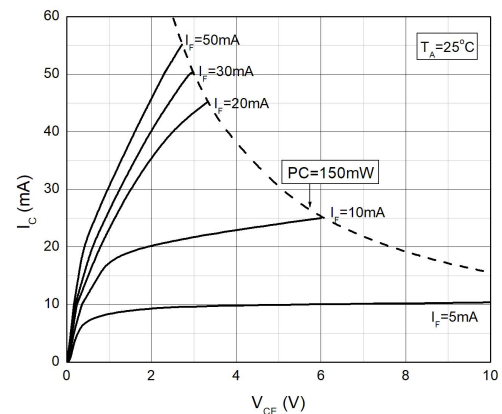
**Fig.3 Forward Current vs. Forward Voltage**



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



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



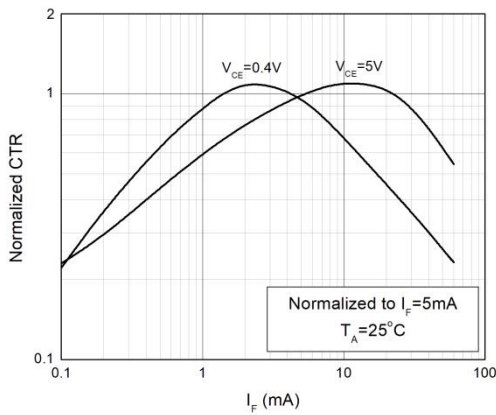
**Fig.6 Collector Current vs. Collector-emitter Voltage**



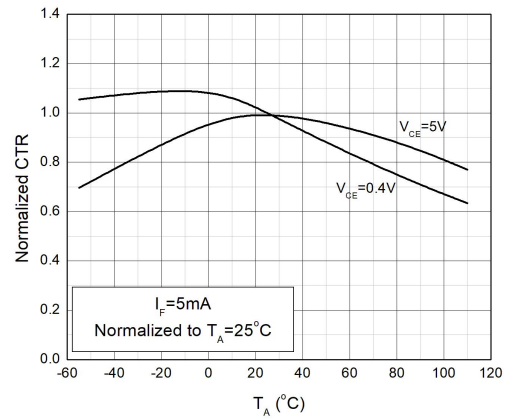
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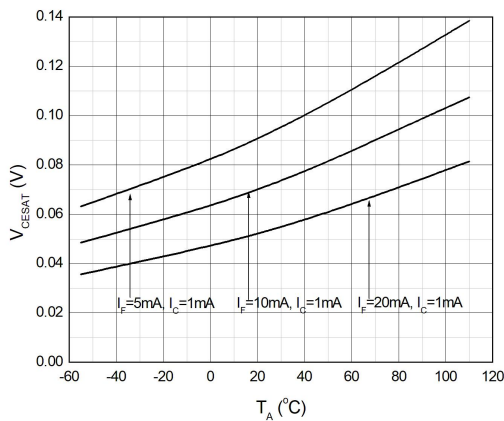
### CHARACTERISTIC CURVES



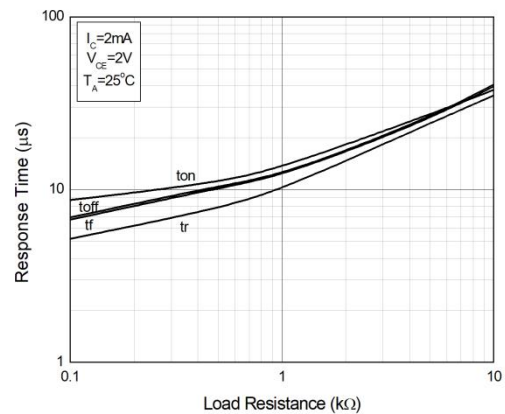
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



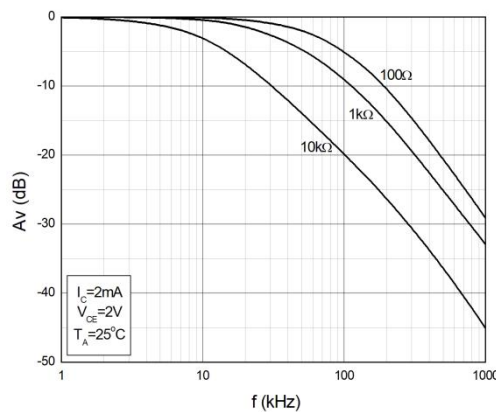
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



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

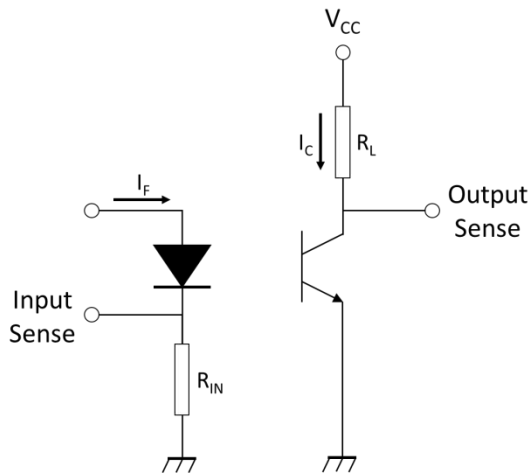


**Fig.10 Switching Time vs. Load Resistance**

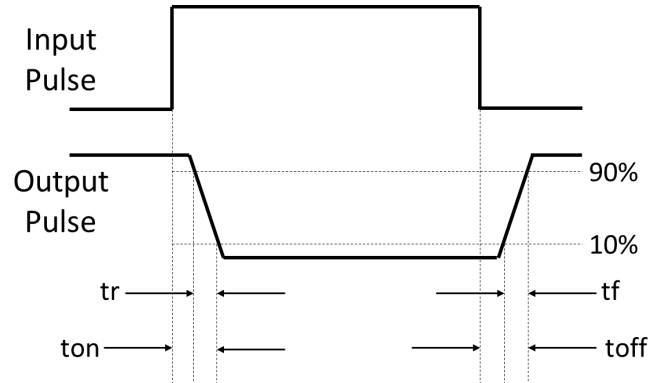


**Fig.11 Frequency Response**

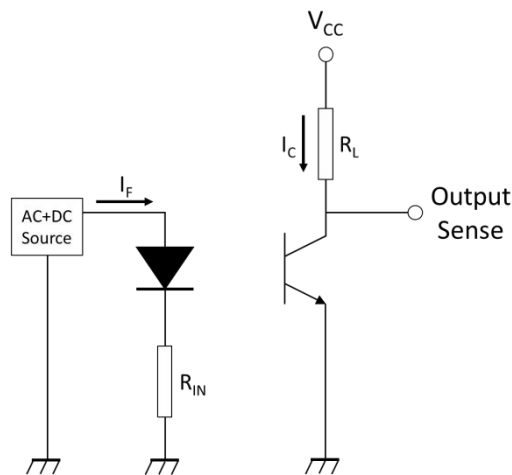
**TEST CIRCUITS**



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



**Fig.13 Curves of Response Time**



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

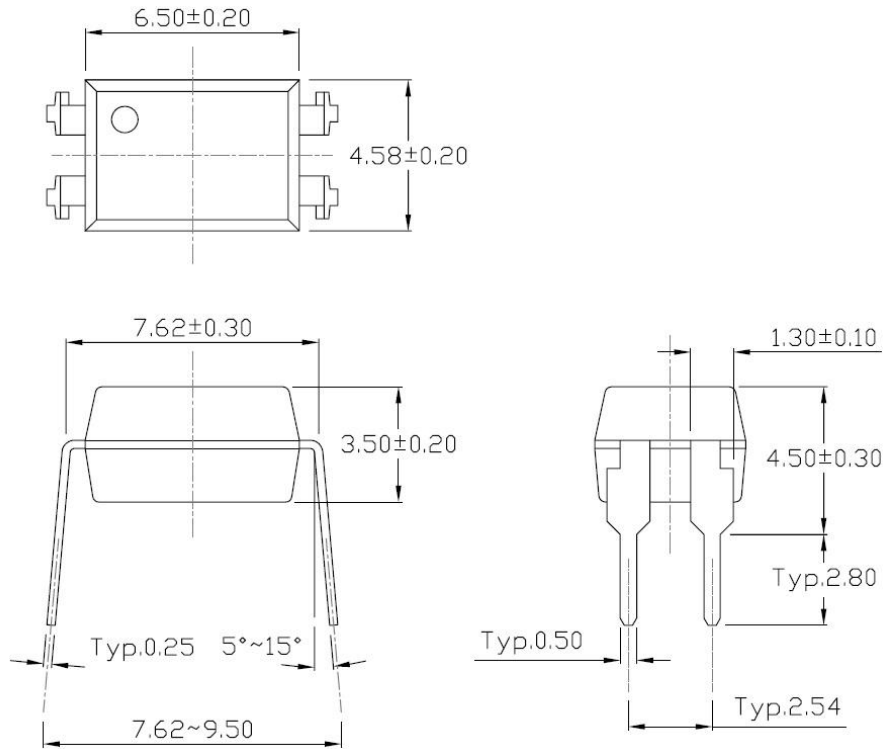


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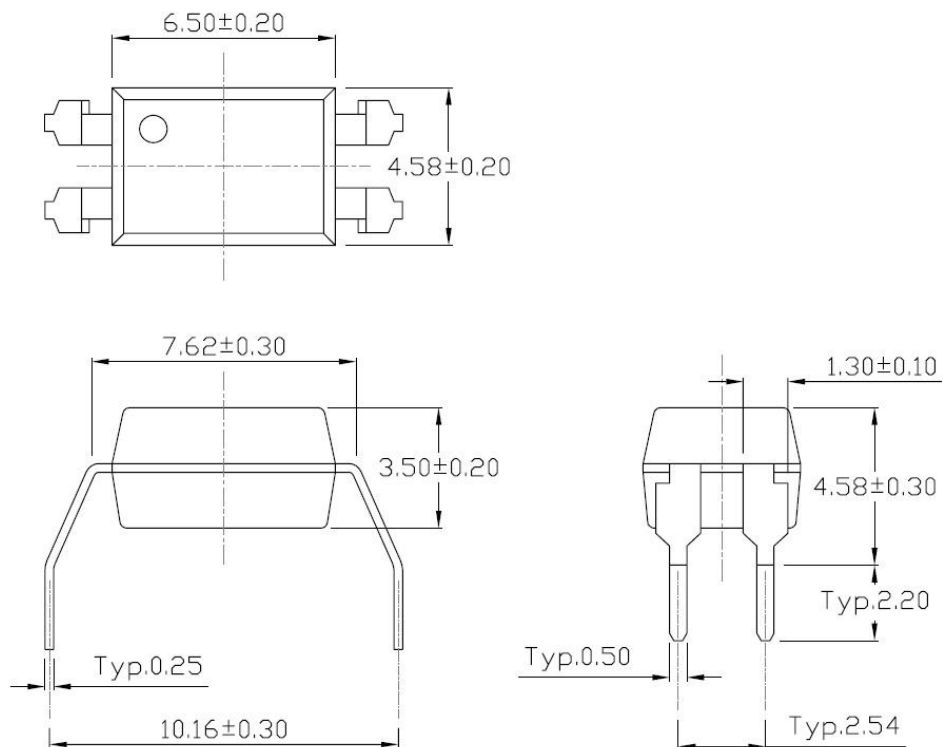
## DIP4, AC Input, Photo Transistor Coupler

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

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

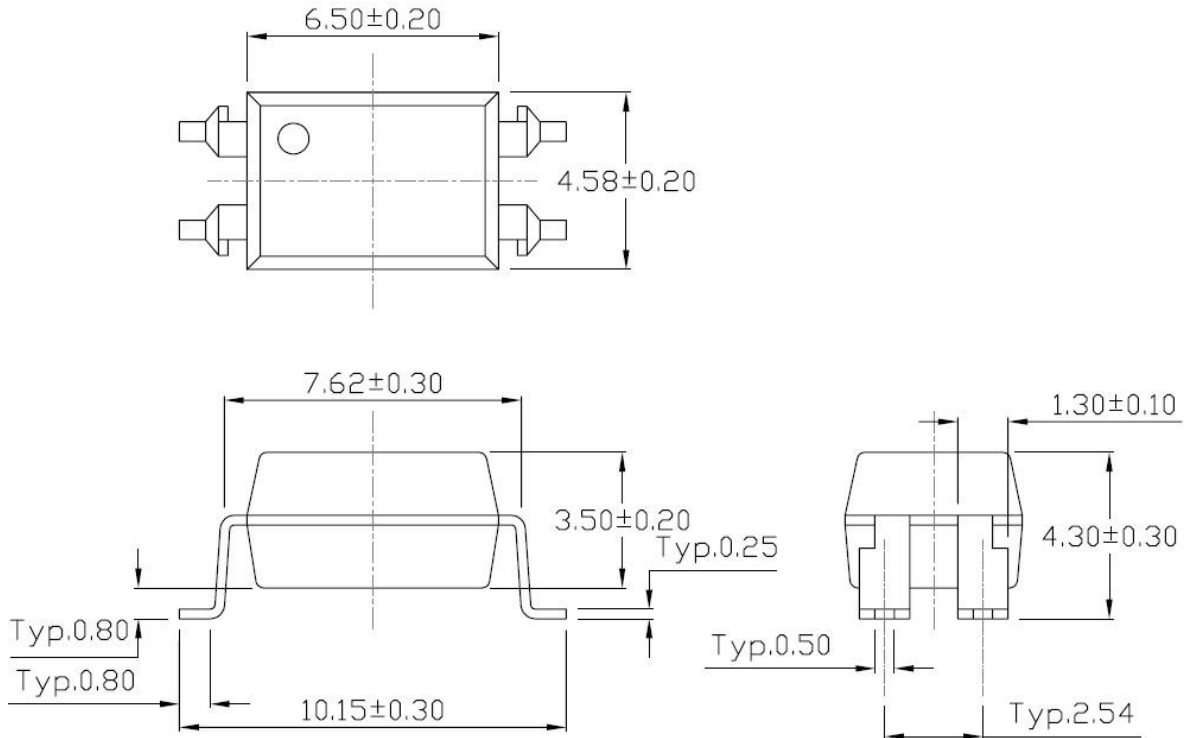


#### Gullwing (400mil) Lead Forming – Through Hole (M Type)

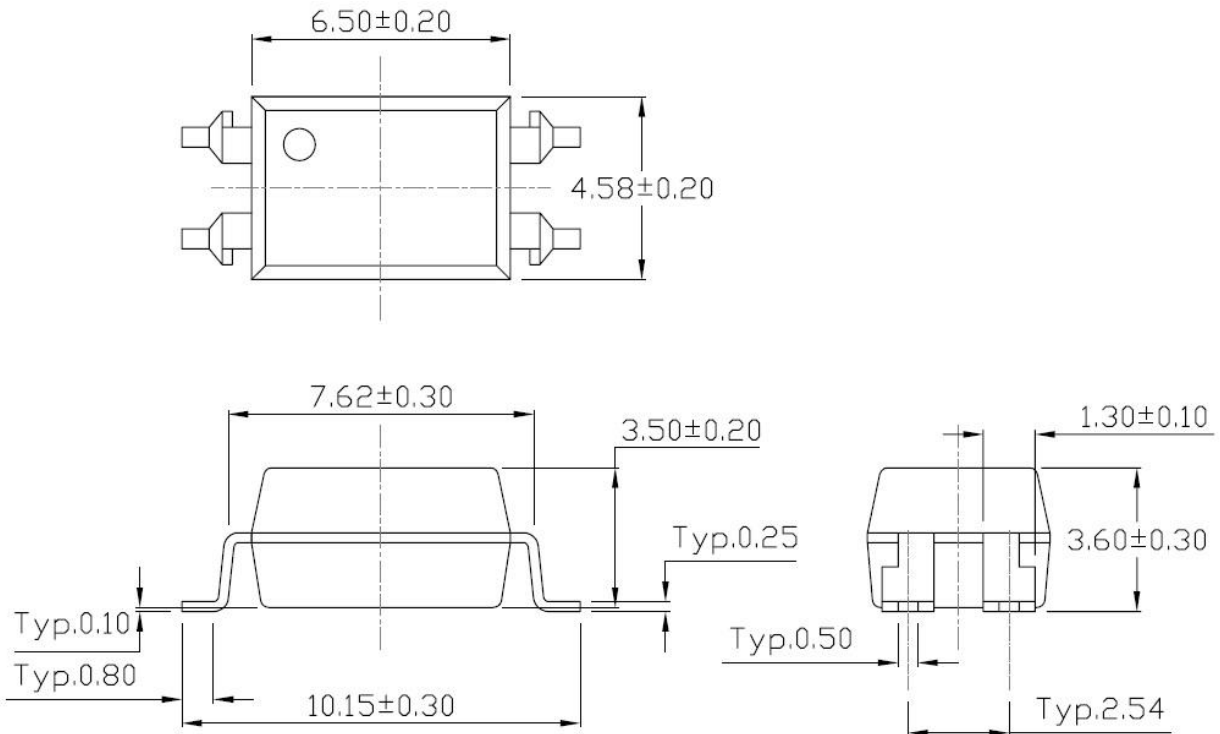


**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)**

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



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





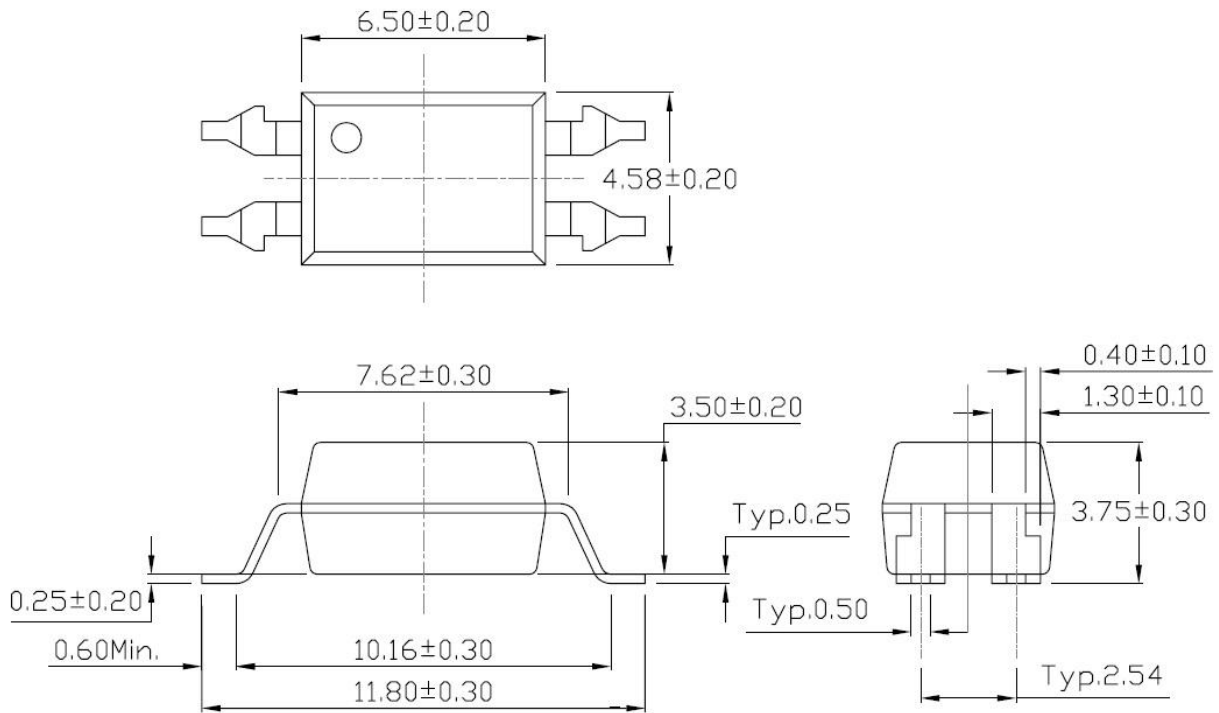


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## DIP4, AC Input, Photo Transistor Coupler

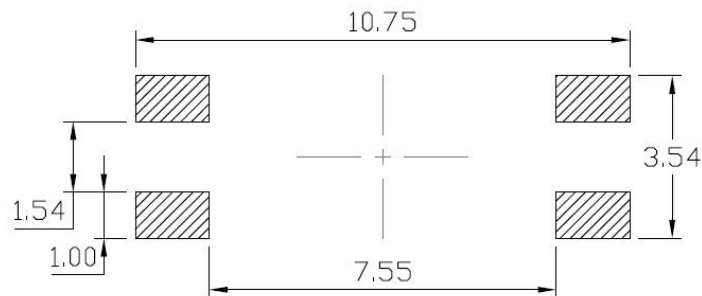
### PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

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

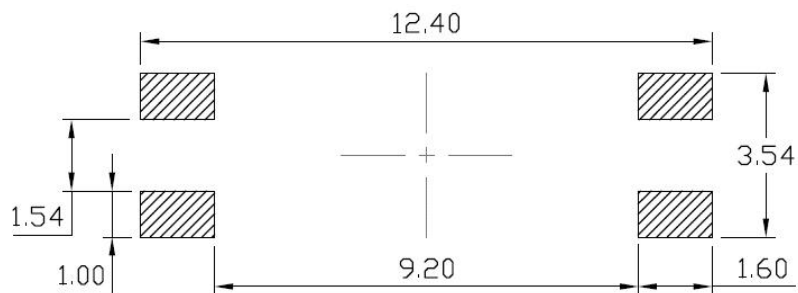


### RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

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

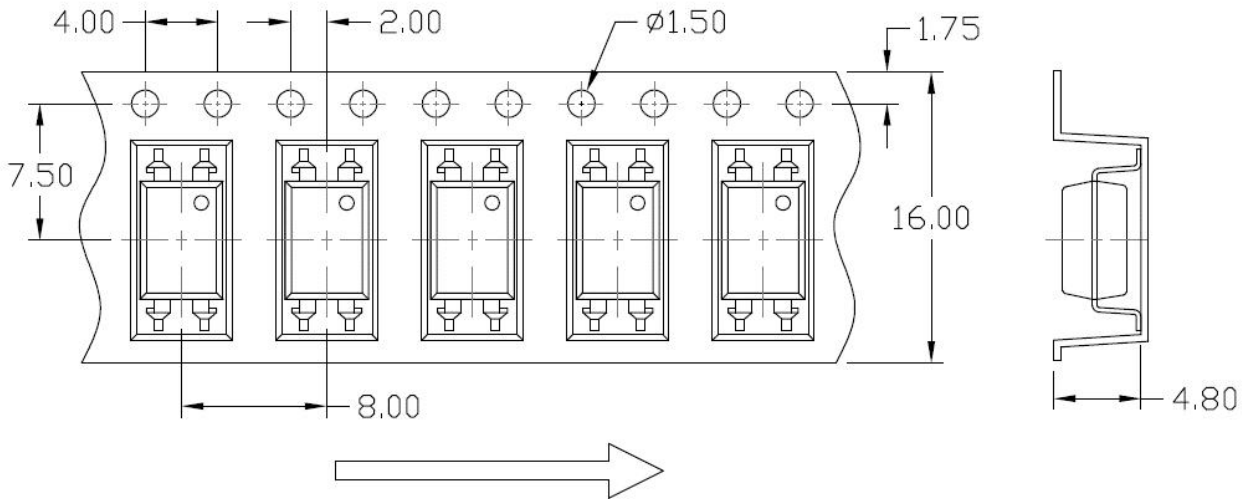


#### Surface Mount (Gullwing) Lead Forming

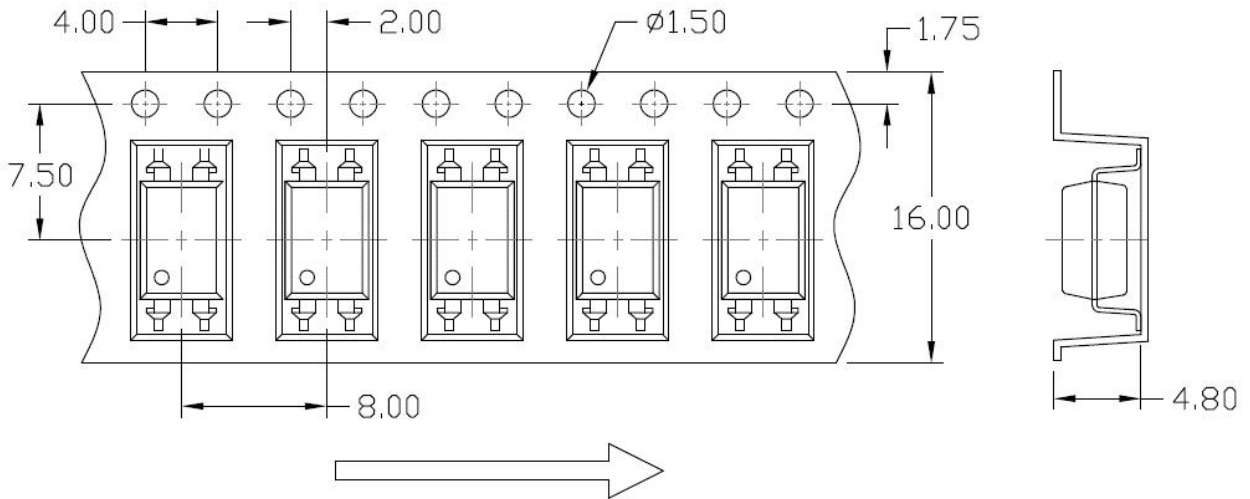


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option S(T1) & SL(T1)**

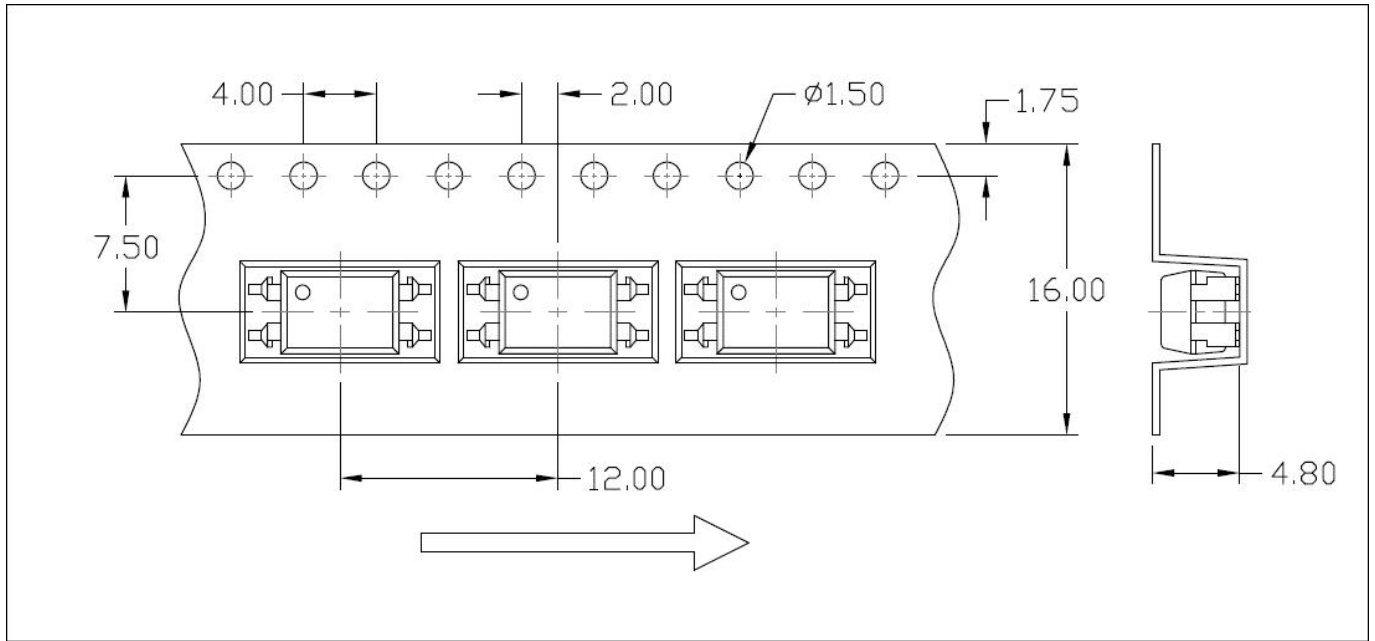


**Option S(T2) & SL(T2)**

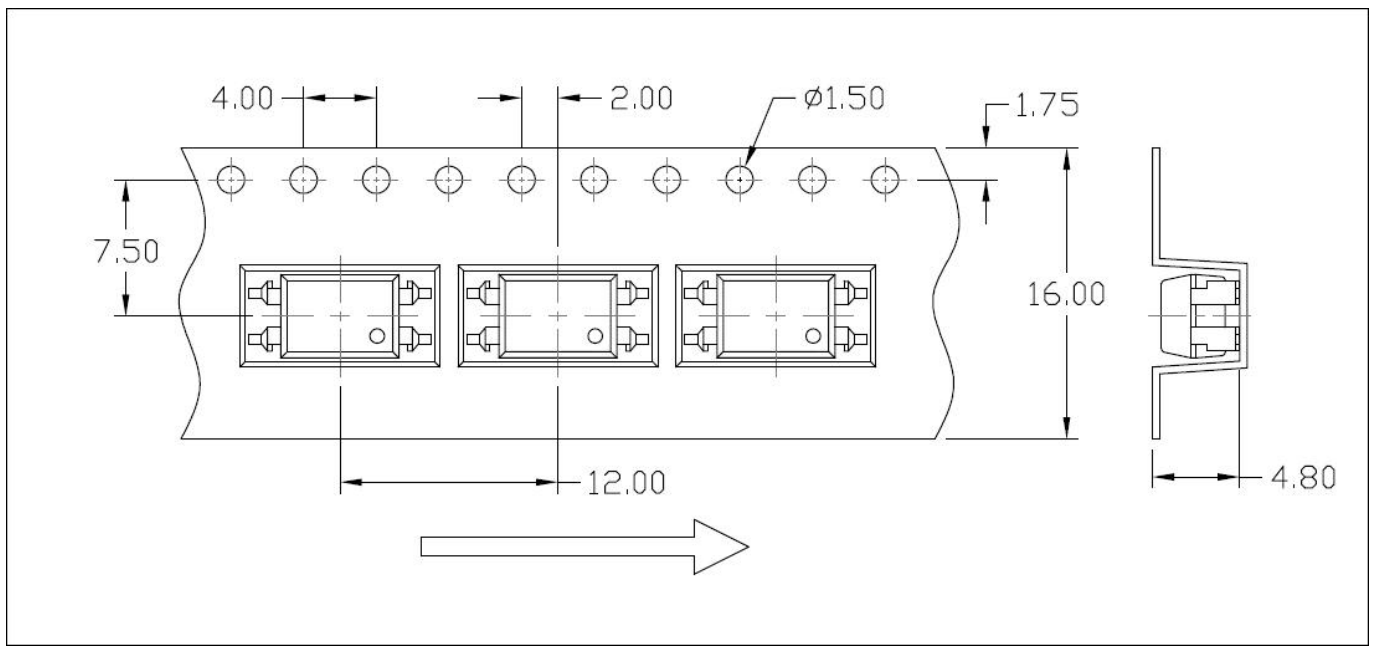


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option S(T3) & SL(T3)**

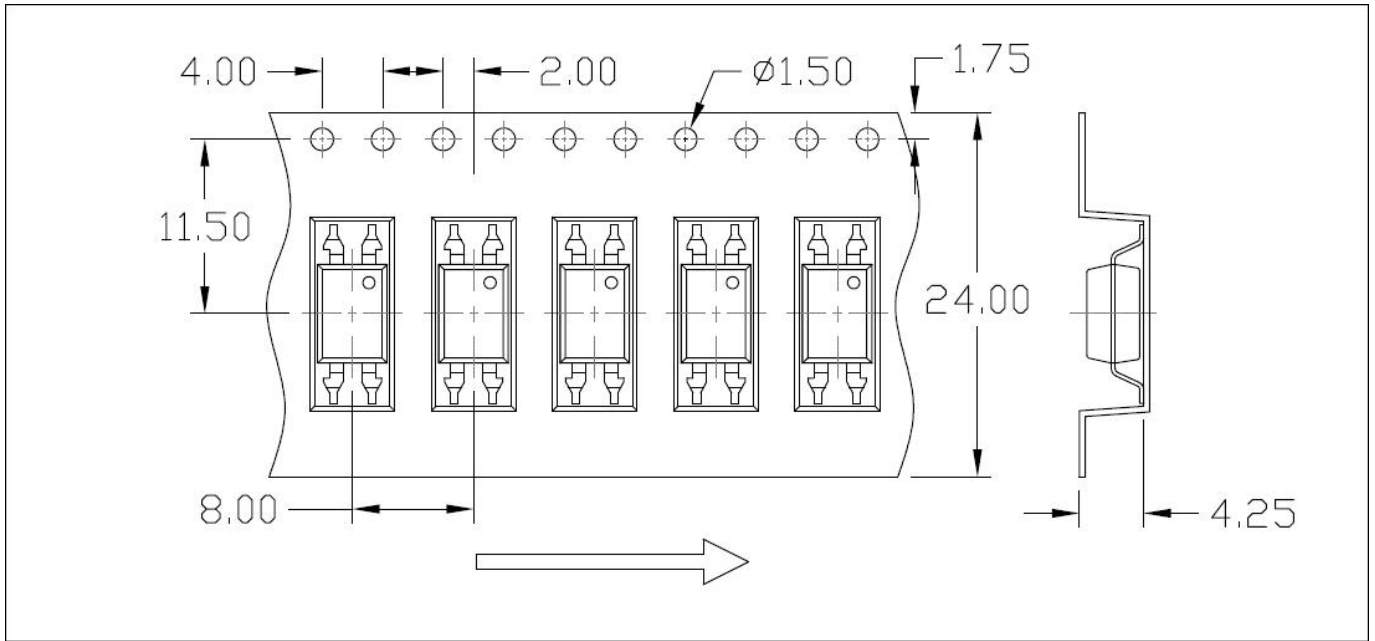


**Option S(T4) & SL(T4)**

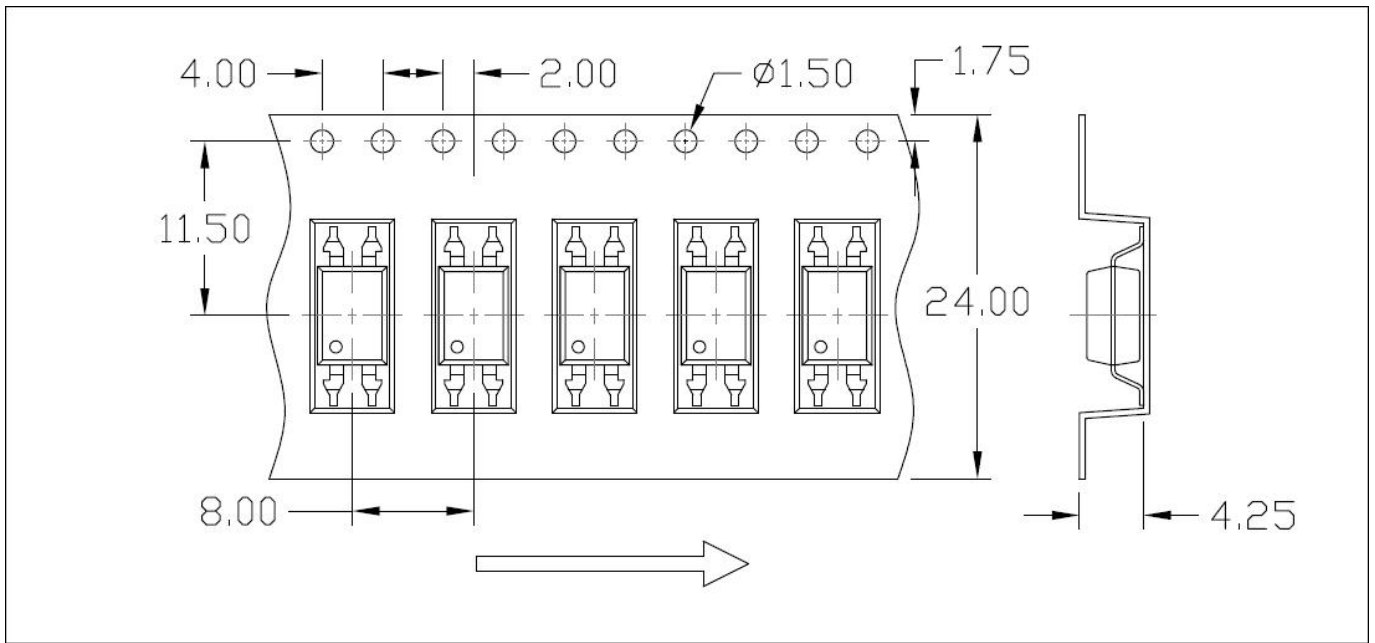


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option SLM(T1)**



**Option SLM(T2)**



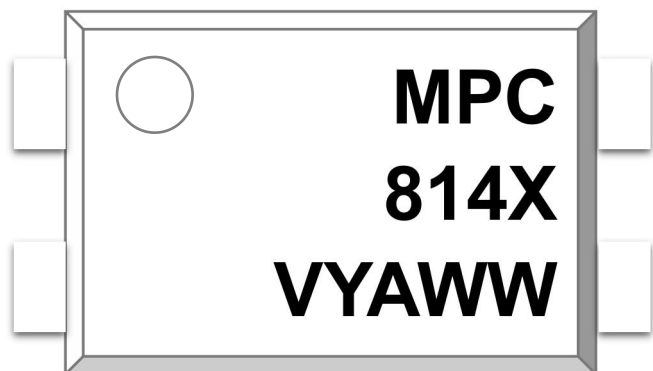


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### ORDERING AND MARKING INFORMATION

#### MARKING INFORMATION



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

#### ORDERING INFORMATION

### MPC814XN(Y)(Z)-GV

MPC – Company Abbr.  
 814 – Part Number  
 X – Rank1 (A to Z, or None)  
 N – Rank2 (1 to 9, or None)

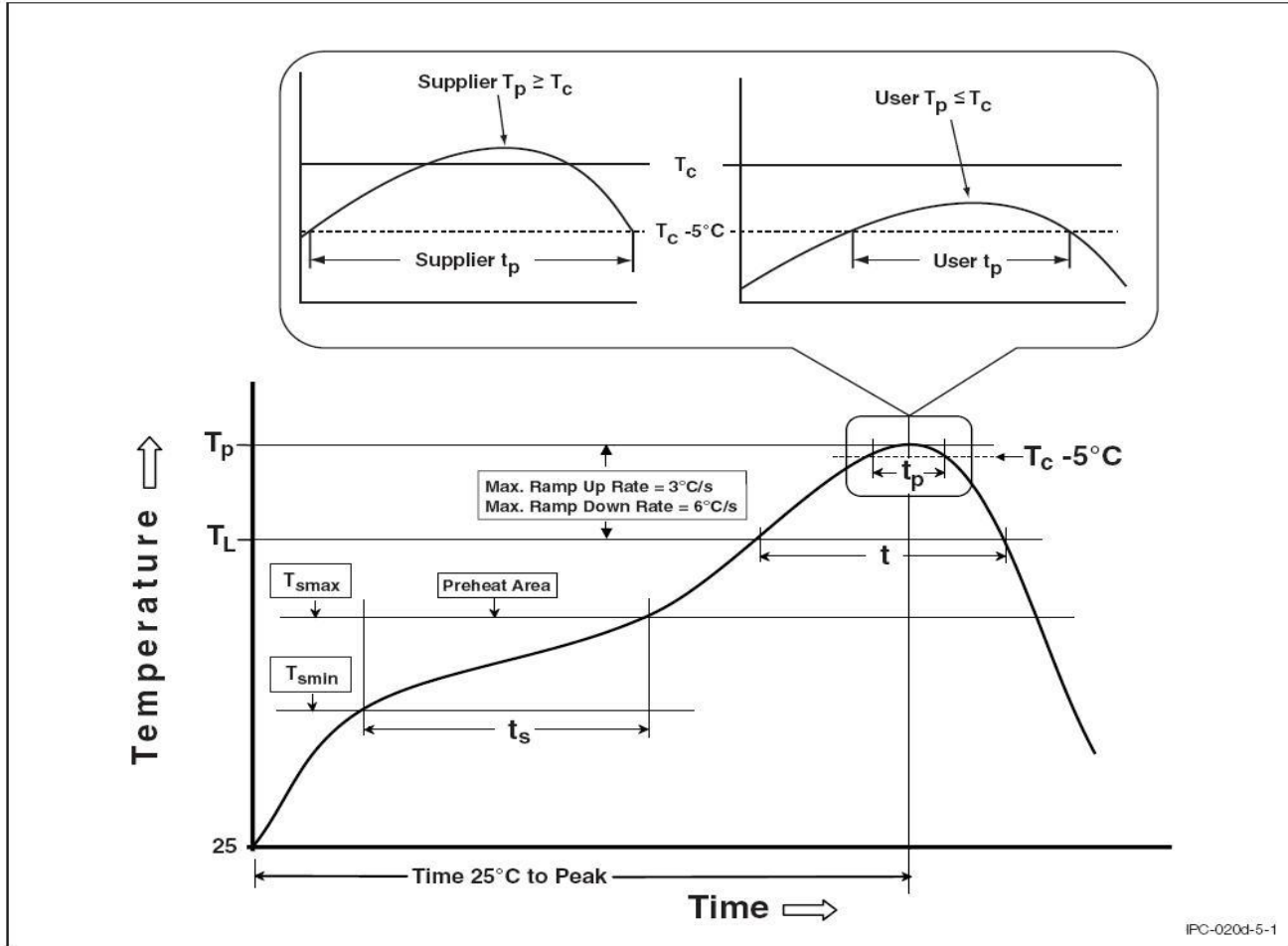
Y – Lead Form Option (M/S/SL/SLM/None)  
 Z – Tape and Reel Option (T1/T2/T3/T4)  
 G – Green  
 V – VDE Option (V or None)

#### 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°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.



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### 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	2020-03-08	Upgrade Datasheet