



MPCM303X, MPCM304X, MPCM306X, MPCM308X Series

SOP4, DC Input, Zero-Cross Photo TRIAC Optocoupler

■ Features

- High isolation 3750 VRMS
- DC input with zero-cross photo triac output
- Operating temperature range - 40 °C to 100 °C
- RoHS & REACH Compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1-2022

■ Applications

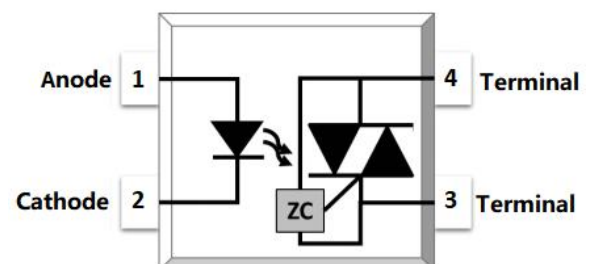
- Solenoid/valve controls
- Lighting controls
- Motor controls
- Temperature controls
- Static AC power switches
- Solid state relays
- Interfacing microprocessors to 115 to 240VAC peripherals

■ Description

The MPCM303X, MPCM304X, MPCM306X and MPCM308X series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon zero-cross photo triac in a plastic SOP4 package with different lead forming options.

With the robust coplanar double mold structure, MPCM303X, MPCM304X, MPCM306X and MPCM308X series provide the most stable isolation feature.

■ Schematic





MPCM303X, MPCM304X, MPCM306X, MPCM308X Series
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| ABSOLUTE MAXIMUM RATINGS | | | | | |
|---|-----------|---------|------|------|--|
| PARAMETER | SYMBOL | VALUE | UNIT | NOTE | |
| INPUT | | | | | |
| Forward Current | I_F | 60 | mA | | |
| Reverse Voltage | V_R | 6 | V | | |
| Junction Temperature | T_j | 125 | °C | | |
| Input Power Dissipation | P_I | 100 | mW | | |
| OUTPUT | | | | | |
| Off-state Output Terminal Voltage | MPCM303X | 250 | V | | |
| | MPCM304X | 400 | | | |
| | MPCM306X | 600 | | | |
| | MPCM308X | 800 | | | |
| Peak Repetitive Surge Current PW=100µs, 120pps | I_{TSM} | 1 | A | | |
| Junction Temperature | T_j | 125 | °C | | |
| Output Power Dissipation | P_O | 300 | mW | | |
| COMMON | | | | | |
| Total Power Dissipation | P_{tot} | 400 | mW | | |
| Isolation Voltage | V_{iso} | 3750 | Vrms | 1 | |
| Operating Temperature | T_{opr} | -40~100 | °C | | |
| Storage Temperature | T_{stg} | -55~150 | °C | | |
| Soldering Temperature | T_{sol} | 260 | °C | 2 | |

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

Note 2. For 10 seconds



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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 | - | 1.2 | 1.4 | V | I _F =10mA | |
| Reverse Current | I _R | - | - | 10 | μA | V _R =6V | |
| Input Capacitance | C _{in} | - | 8.5 | 250 | pF | V=0, f=1kHz | |
| OUTPUT | | | | | | | |
| Peak Off-state Current, Either Direction | I _{DRM} | - | - | 500 | nA | V _{DRM} =Rated V _{DRM} I _F =0 | 3 |
| Peak On-state Current, Either Direction | V _{TM} | - | 1.42 | 2.5 | V | I _{TM} =100mA | |
| Critical Rate of Rise of Off-state Voltage Breakdown Voltage | dV/dt | 1000 | - | - | V | V _{PEAK} =Rated V _{DRM} | 4 |
| TRANSFER CHARACTERISTICS | | | | | | | |
| LED Trigger Current | MPCM3031, MPCM3041, MPCM3061, MPCM3081 | I _{FT} | - | - | 15 | mA | Terminal Voltage = 3V I _{TM} =100mA |
| | MPCM3032, MPCM3042, MPCM3062, MPCM3082 | | - | - | 10 | | |
| | MPCM3032, MPCM3043, MPCM3063, MPCM3083 | | - | - | 5 | | |
| Holding Current Saturation Voltage | I _H | - | 450 | - | μA | | |
| 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 | |
| ZERO-CROSS CHARACTERISTICS | | | | | | | |
| Inhibit Voltage | V _{INH} | - | - | 20 | V | I _F =Rated I _{FT} | |
| Leakage in Inhibited State | I _{DRM2} | - | - | 500 | μA | I _F =Rated I _{FT} V _{DRM} =Rated V _{DRM} | |

Note3. Test voltage must be applied within dV/dt rating.

Note4. Refer to Fig.17 & Fig.18.



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CHARACTERISTIC CURVES

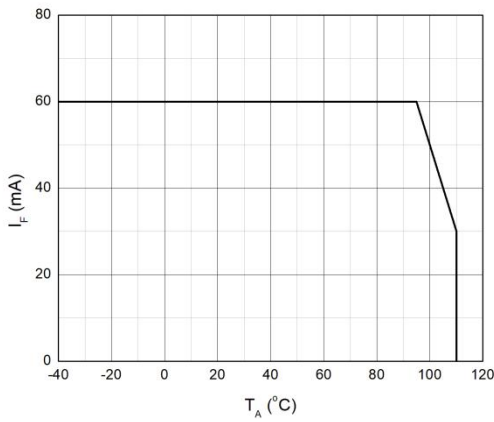


Fig.1 Forward Current vs. Ambient Temperature

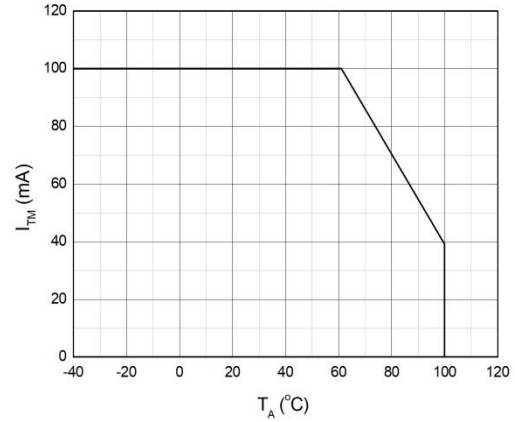


Fig.2 On-state Terminal Current vs. Ambient Temperature

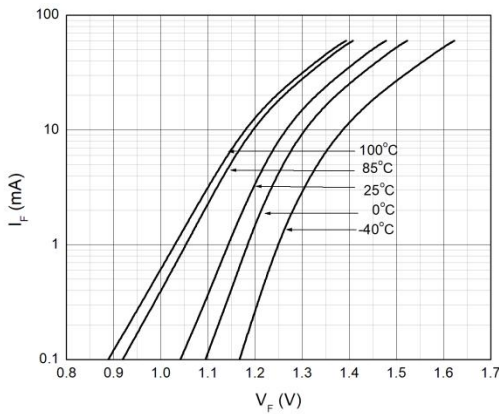


Fig.3 Forward Current vs. Forward Voltage

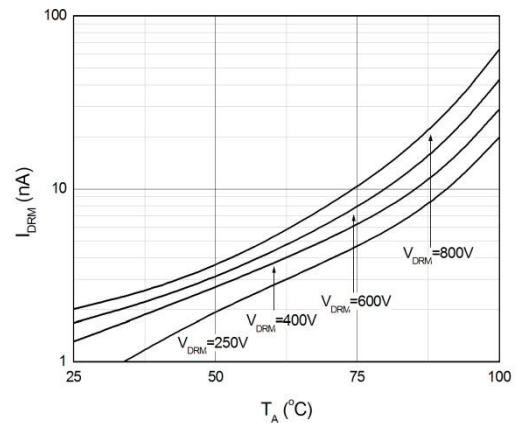


Fig.4 Off-state Terminal Current vs. Ambient Temperature

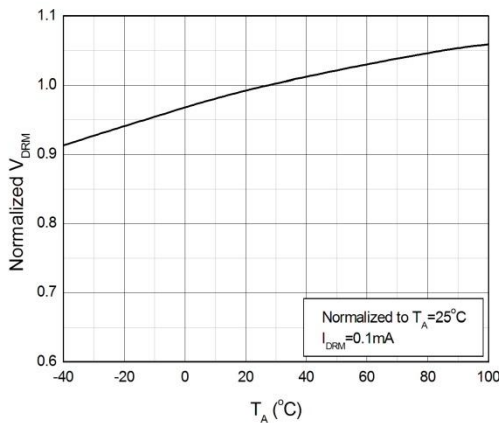


Fig.5 Normalized Off-state Terminal Voltage vs. Ambient Temperature

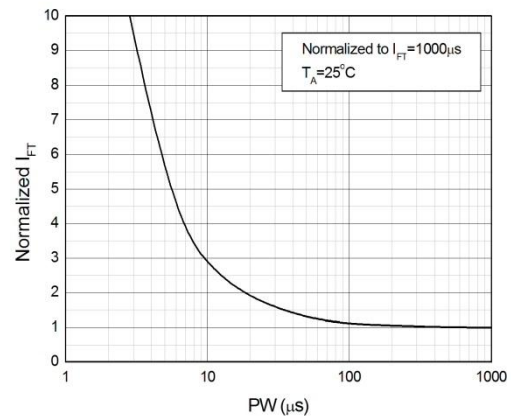


Fig.6 Normalized Trigger Current vs. LED Trigger Pulse Width



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CHARACTERISTIC CURVES

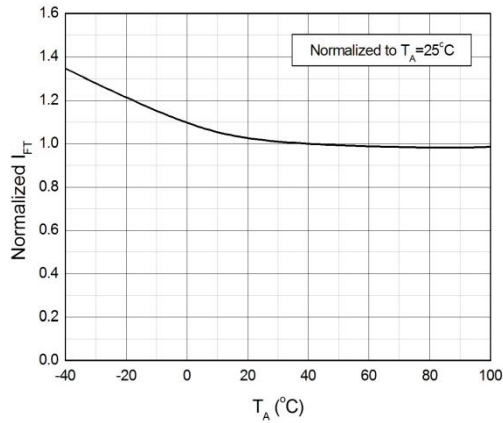


Fig.7 Normalized Trigger Current vs. Ambient Temperature

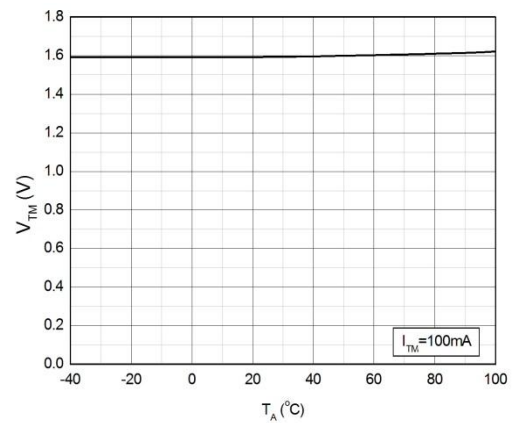


Fig.8 On-state Terminal Voltage vs. Ambient Temperature

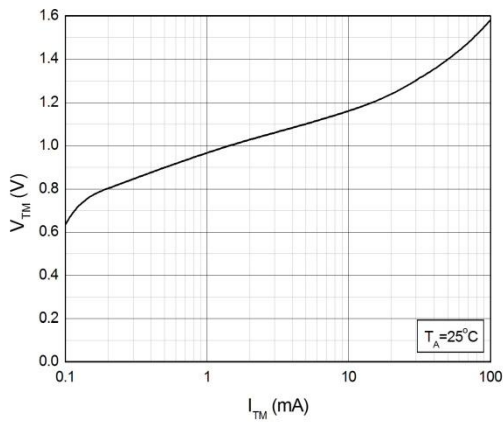


Fig.9 On-state Terminal Voltage vs. On-state Terminal Current

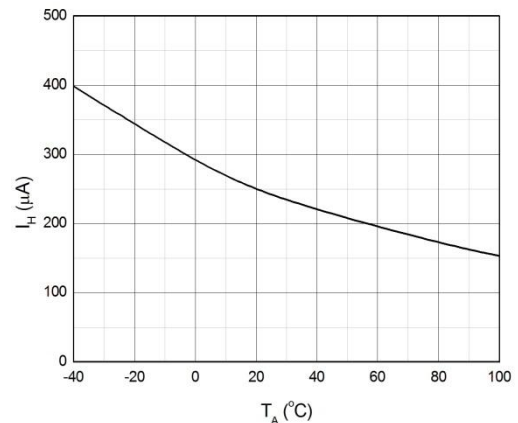


Fig.10 Holding Current vs. Ambient Temperature

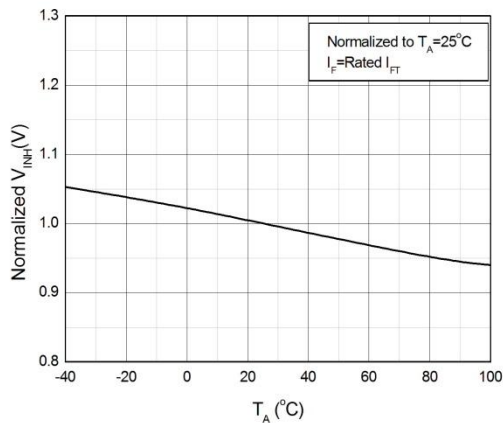


Fig.11 Normalized Inhibit Voltage vs. Ambient Temperature

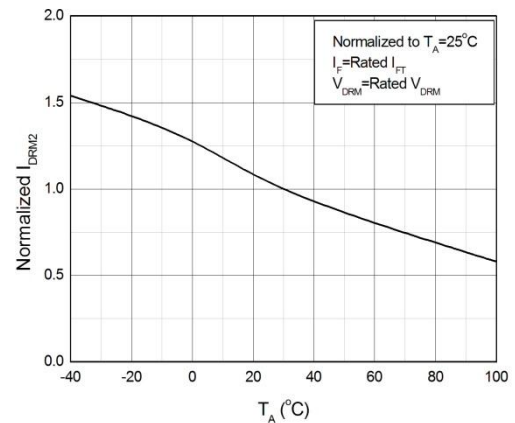


Fig.12 Normalized Leakage in Inhibit State vs. Ambient Temperature

CHARACTERISTIC CURVES

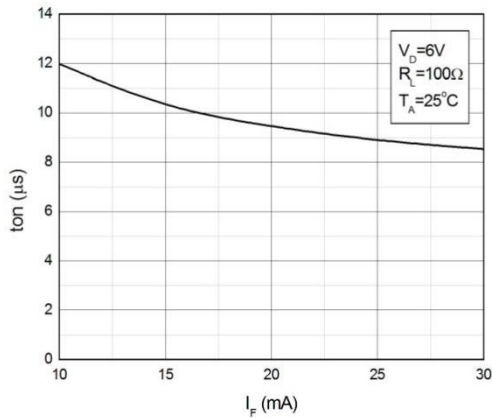


Fig.13 Turn On Time vs. Forward Current

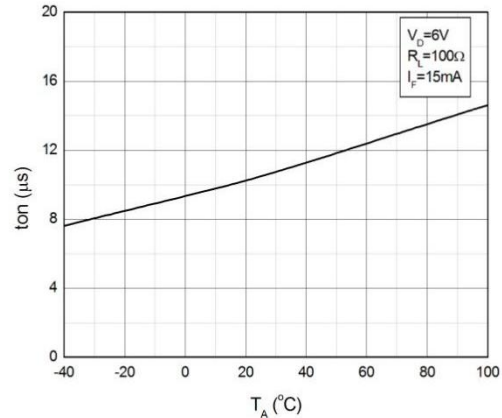


Fig.14 Turn On Time vs. Ambient Temperature

TEST CIRCUITS

Fig.15 Test Circuits of Turn On Time

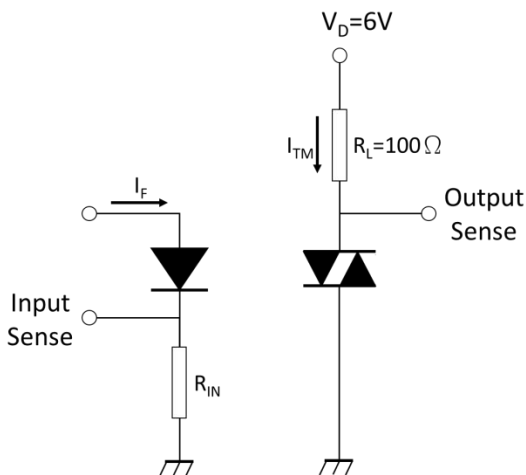


Fig.16 Waveforms of Turn On Time

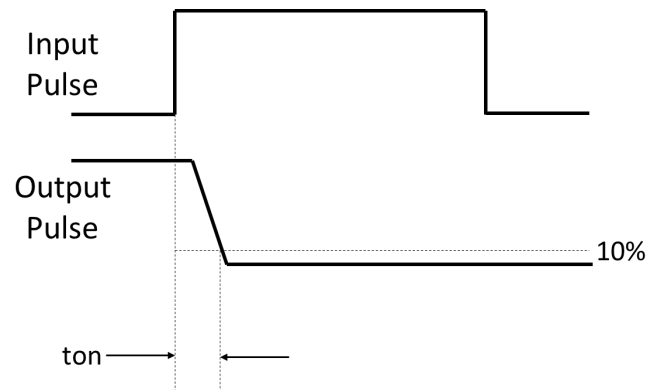


Fig.17 Test Circuits of dV/dt

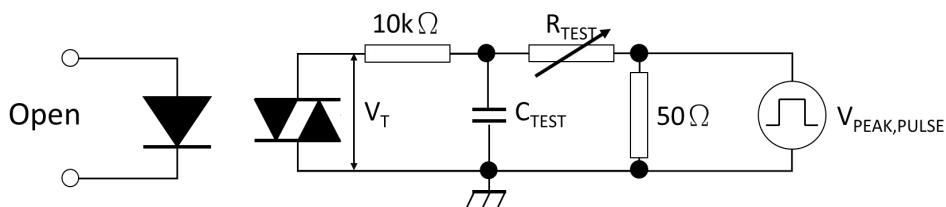
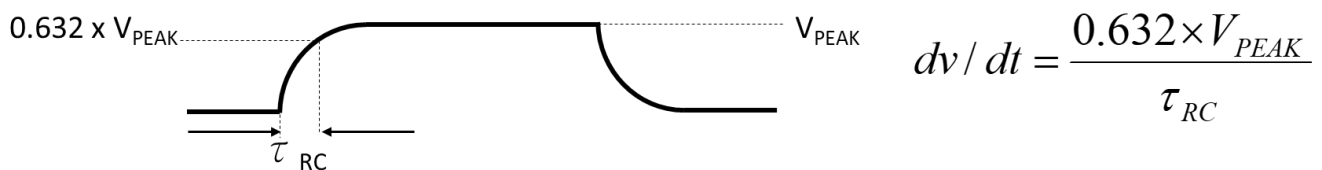


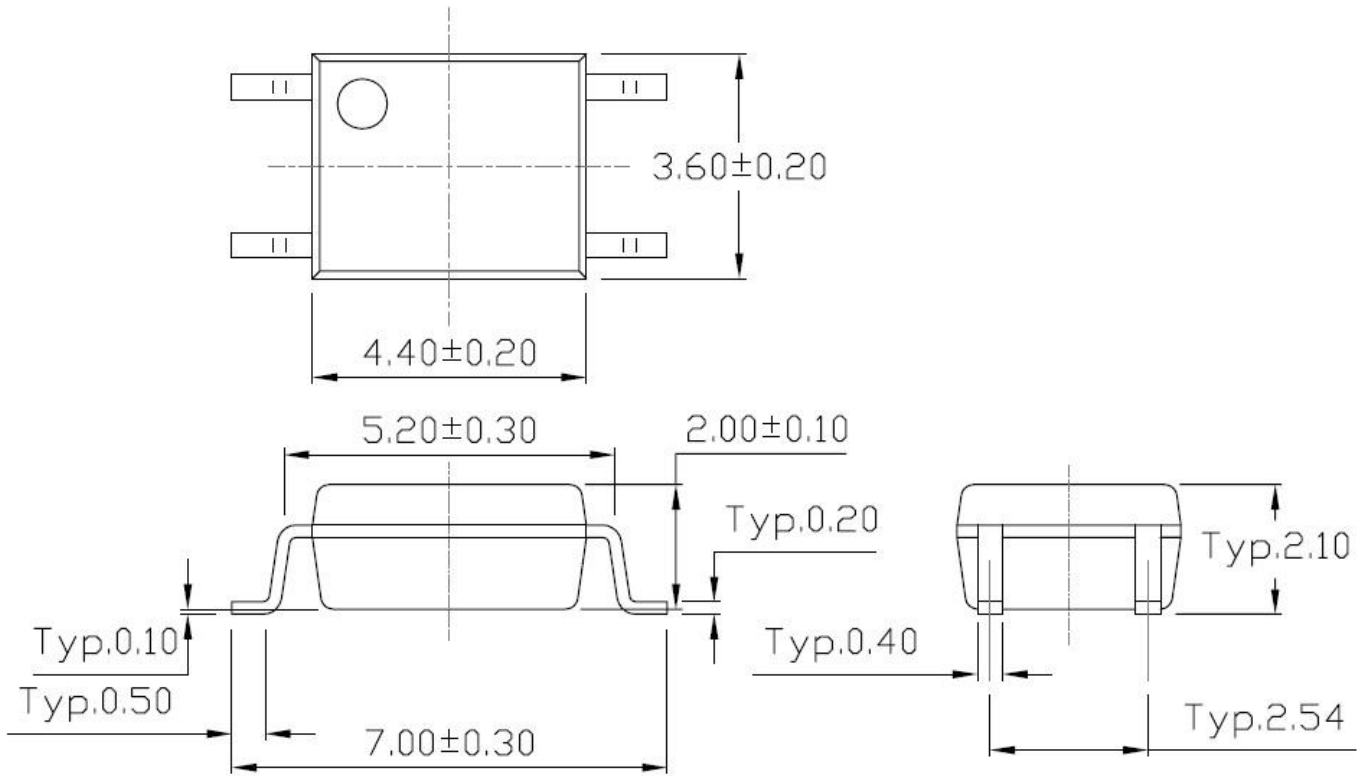
Fig.18 Waveforms of dV/dt



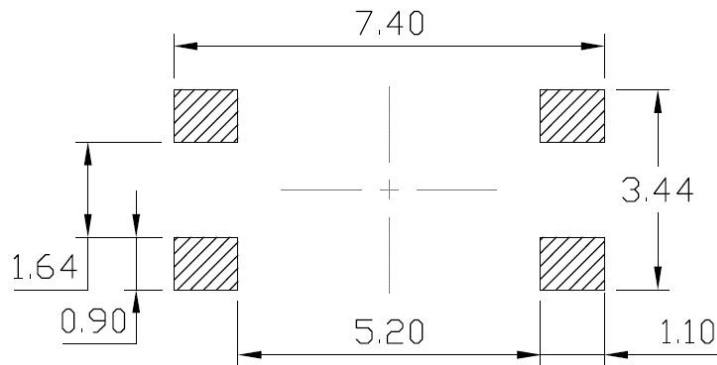


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PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)



Recommended Solder Mask (Dimensions in mm unless otherwise stated)

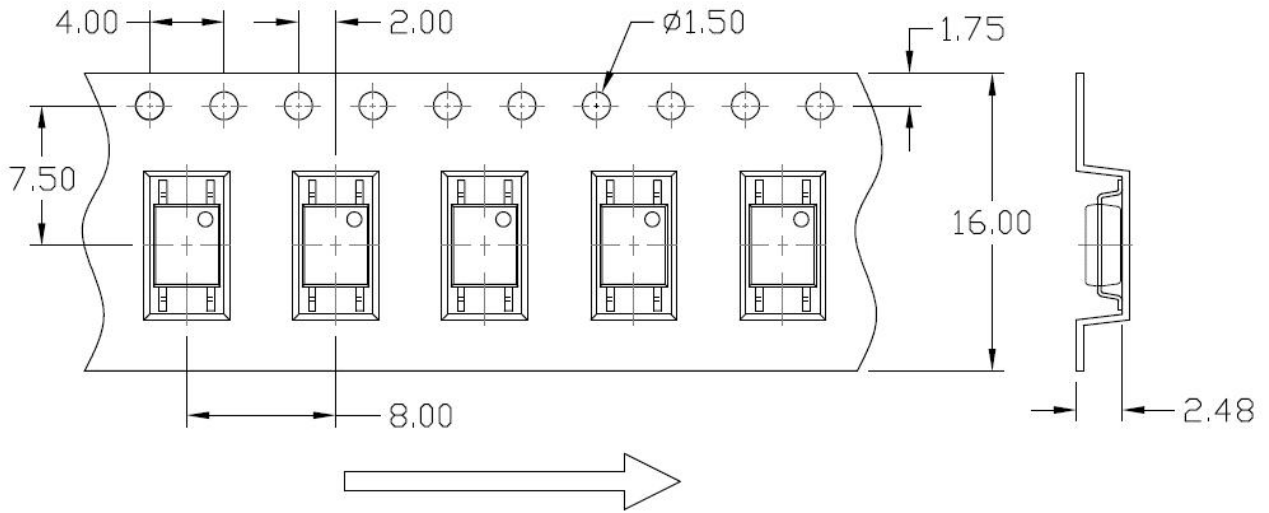




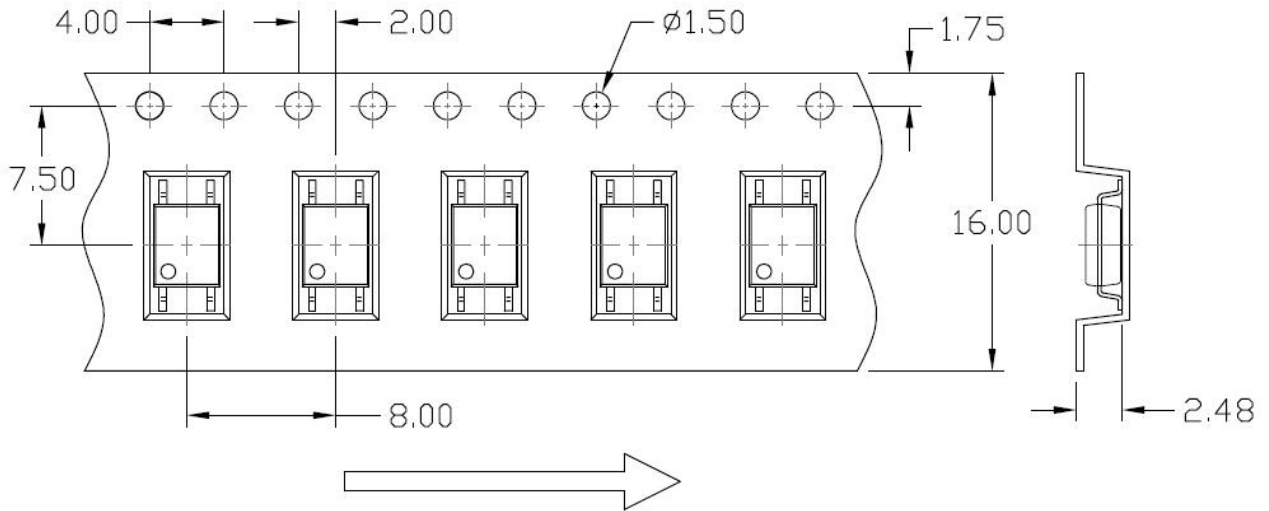
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CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1



Option T2

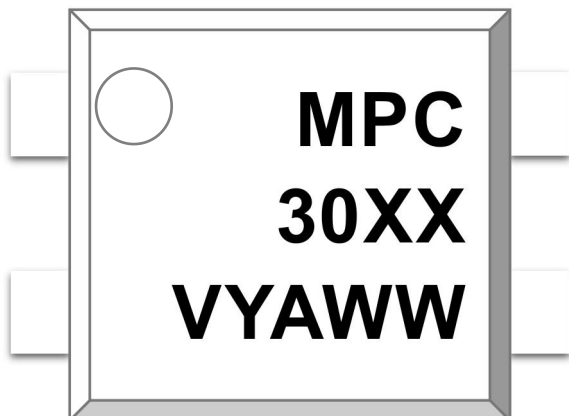




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ORDERING AND MARKING INFORMATION

MARKING INFORMATION



MPC :Company Abbr.
30XX :Part Number
V :VDE Option
Y :Fiscal Year
A :Manufacturing Code
WW :Work Week

ORDERING INFORMATION

MPCM30XX(Z)-GV

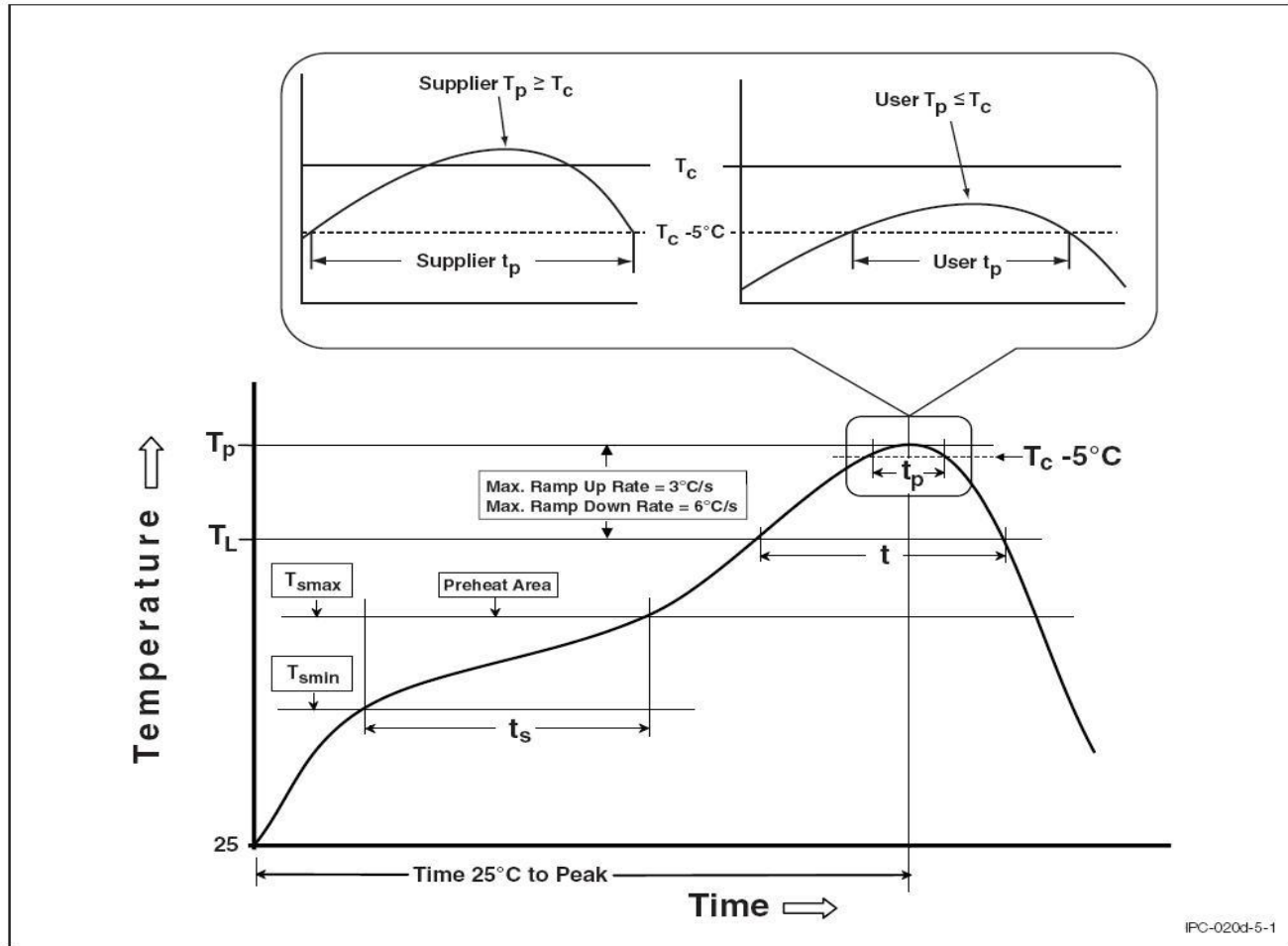
MPC – Company Abbr.
M – Package Type: SOP4
30XX – Part Number & Rank(31/32/33/41/42/43/61/62/63/81/82/83)
Z – Tape and Reel Option (T1/T2)
G – Material Option (G: Green, None: Non-Green)
V – VDE Option (V or None)

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



IPC-020d-5-1

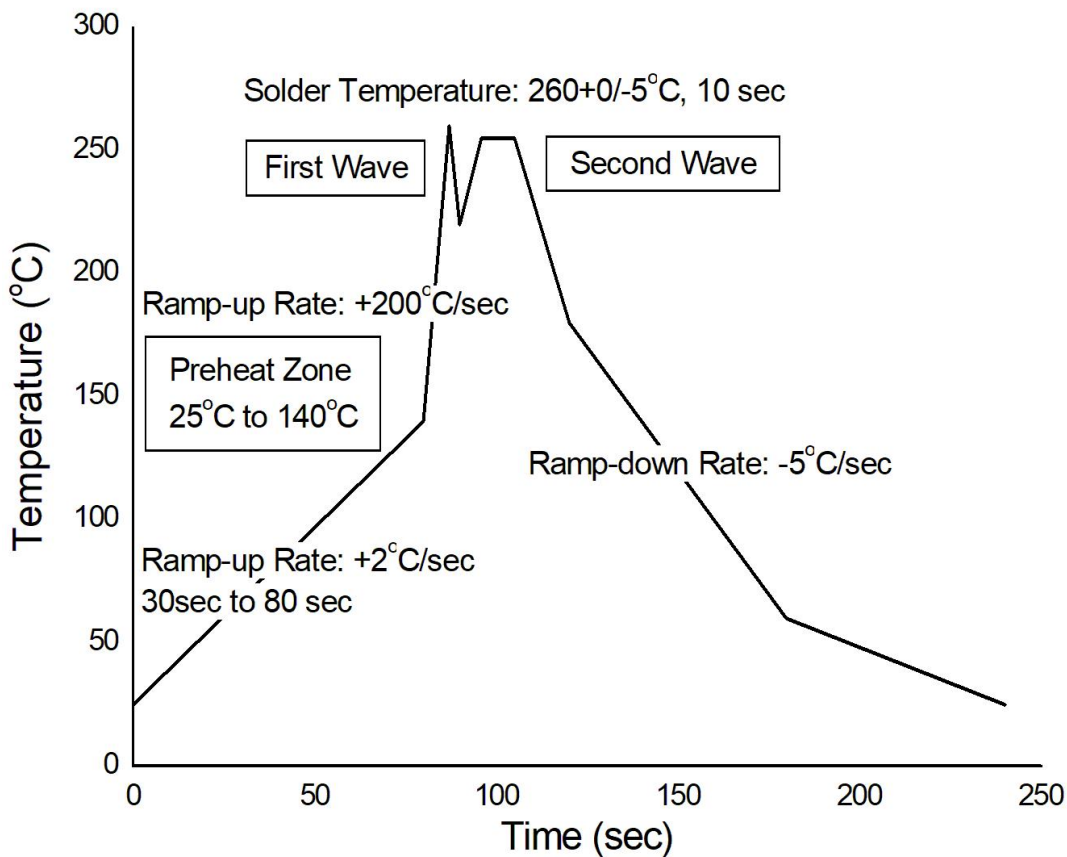
| Profile Feature | Sn-Pb Assembly Profile | Pb-Free Assembly Profile |
|---------------------------------|------------------------|--------------------------|
| Temperature Min. (TsmIn) | 100 | 150°C |
| Temperature Max. (Tsmax) | 150 | 200°C |
| Time (ts) from (TsmIn to Tsmax) | 60-120 seconds | 60-120 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. |



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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. |

- One time soldering is recommended for all soldering method.
- Do not solder more than three times for IR reflow soldering.



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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 | 2023-07-05 | Upgrade Datasheet |

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Miracle Technology Co., Ltd.
美祿科技股份有限公司

經銷商授權證書

本公司特此授權美祿之經銷商
於指定授權地區進行
合約內指定產品之推廣銷售與服務

公司名稱：安迪斯智控（深圳）有限公司

營業據點：中国广东省深圳市

授權地區：中国

授權期限：2025/12/25

授權產品：GaN(氮化鎵)器件/MOSFET 管/光耦合器/IGBT 器件

美祿科技股份有限公



西元 2022 年 12 月 25 日