# MF303x, MF304x, MF306x, MF308x

## DESCRIPTION

The MF304x, MF306x and MF308x series of devices consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon detector performing the function of a zero voltage crossing bilateral triac driver. They are designed for use with a discrete power triac in the interface of logic systems to equipment powered from 110 to 240 VAC lines.

## FEATURES

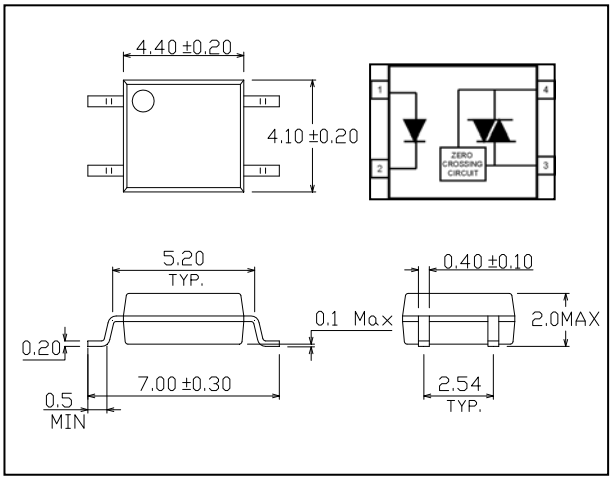
- Zero Voltage Crossing
- $V_{DRM}$
  MF303x 250V
  MF304x 400V
  MF306x 600V
  MF308x 800V
- Mini Flat Package
- Isolation Voltage 3750$V_{RMS}$
- Wide Operating Temperature Range
  -40°C to 110°C
- Pb Free and RoHS Compliant
- Safety Approvals Pending

## APPLICATIONS

- Solenoid / Valve Controls
- Light Controls
- AC Motor Drivers
- Temperature Controls
- AC Motor Starters
- Solid State Relays

## ORDER INFORMATION

- Available in Tape & Reel




## ABSOLUTE MAXIMUM RATINGS

**Input**

| | |
|---|---|
| Forward Current | 60mA |
| Peak Forward Current (1µs pulse 300pps) | 1A |
| Reverse Voltage | 6V |
| Power dissipation | 100mW |

**Output**

| | |
|---|---|
| Off-state Output Terminal Voltage | |
| MOC303x | 250V |
| MOC304x | 400V |
| MOC306x | 600V |
| MOC308x | 800V |
| On-state rms Current | 70mA |
| Power Dissipation | 300mW |

**Total Package**

| | |
|---|---|
| Isolation Voltage | 3750$V_{RMS}$ |
| Operating Temperature | -40 to 110 °C |
| Storage Temperature | -55 to 150 °C |
| Lead Soldering Temperature (10s) | 260°C |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## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise specified)

### INPUT

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | $I_F$ = 30mA | | | 1.5 | V |
| Reverse Leakage Current | $I_R$ | $V_R$ = 6V | | | 10 | µA |

### OUTPUT

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Peak Off-state Current | $I_{DRM}$ | $V_{DRM}$ = Rated $V_{DRM}$<br>$I_F$ = 0mA<br><br>(Note 1) | | | 100 | nA |
| Peak Blocking Voltage | $V_{DRM}$ | $I_{DRM}$ = 100nA<br><br>MF3030 / MF3031<br>MF3032 / MF3033<br><br>MF3040 / MF3041<br>MF3042 / MF3043<br><br>MF3060 / MF3061<br>MF3062 / MF3063<br><br>MF3080 / MF3081<br>MF3082 / MF3083 | | | <br><br>250<br><br>400<br><br>600<br><br>800 | V |
| On-state Voltage | $V_{TM}$ | $I_{TM}$ = 100mA (peak) | | | 3 | V |
| Critical Rate of Rise of Off-state Voltage | dv/dt | | 1000 | | | V/µs |

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise specified)

### COUPLED

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Input Trigger Current | $I_{FT}$ | $V_{TM}$ = 3V | | | | mA |
| | | MF3030 / MF3040 / MF3060 MF3080 | | | 30 | |
| | | MF3031 / MF3041 / MF3061 MF3081 | | | 15 | |
| | | MF3032 / MF3042 / MF3062 MF3082 | | | 10 | |
| | | MF3033 / MF3043 / MF3063 MF3083 | | | 5 | |
| | | (Note 2) | | | | |
| Holding Current (either direction) | $I_H$ | | | 280 | | µA |
| Input to Output Isolation Voltage | $V_{ISO}$ | (note 3) | 3750 | | | $V_{RMS}$ |

### ZERO CROSSING CHARACTERISTIC

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Inhibit Voltage | $V_{INH}$ | $I_F$ = Rated $I_{FT}$, MT1-MT2 Voltage above which device will not trigger | | | 20 | V |
| Leakage in Inhibit State | $I_{INH}$ | $I_F$ = Rated $I_{FT}$, $V_{DRM}$ = Rated $V_{DRM}$, Off-state | | | 1000 | µA |

Note 1 : Test Voltage must be applied within dv/dt rating.

Note 2 : Guaranteed to trigger at an $I_F$ value less than or equal to max $I_{FT}$, recommended $I_F$ lies between Rated $I_{FT}$ to Absolute Max $I_F$.

Note 3 : Measured with input leads shorted together and output leads shorted together.

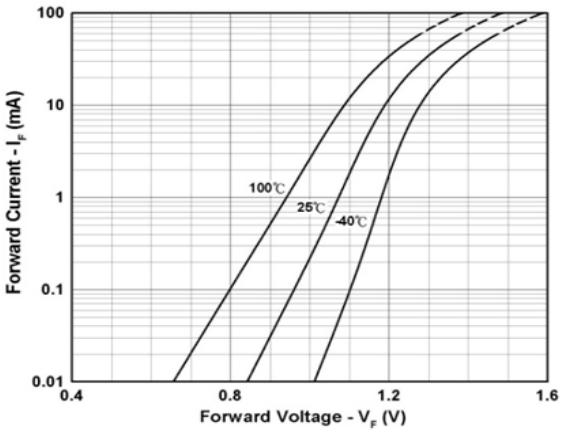



**Fig 1 Forward Current vs Forward Voltage**

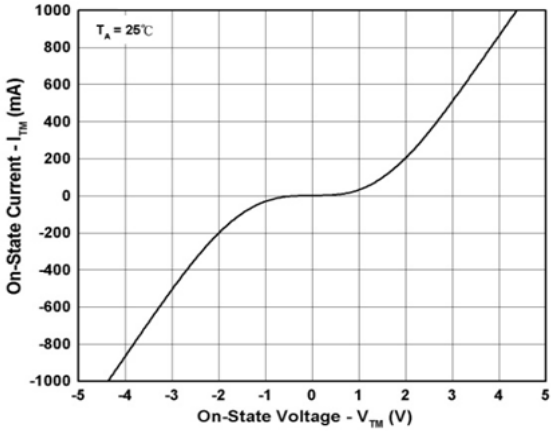



**Fig 2 On-State Characteristics**

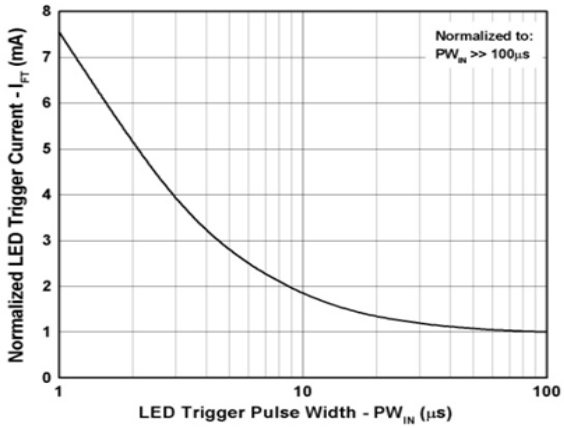



**Fig 3 LED Trigger Current vs Trigger Pulse Width**

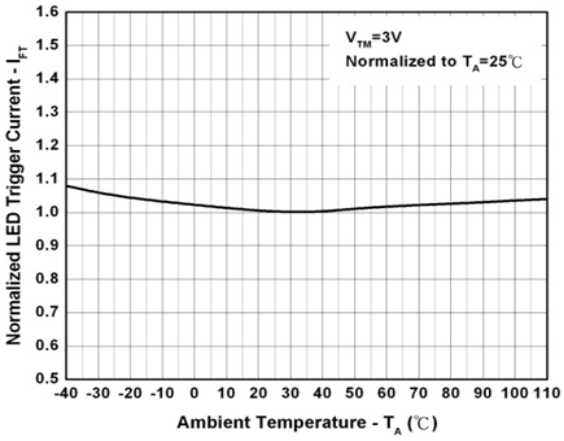



**Fig 4 LED Trigger Current vs Ambient Temperature**

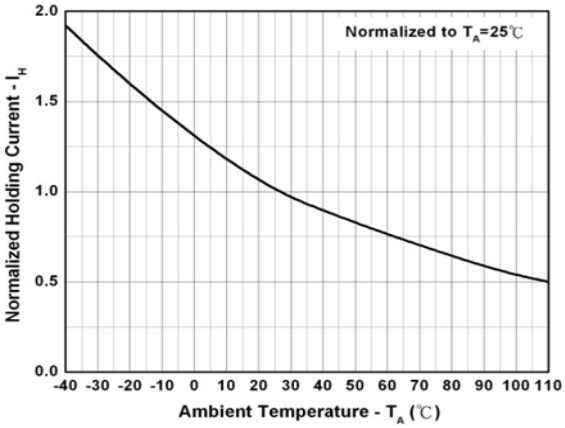



**Fig 5 Holding Current vs Ambient Temperature**

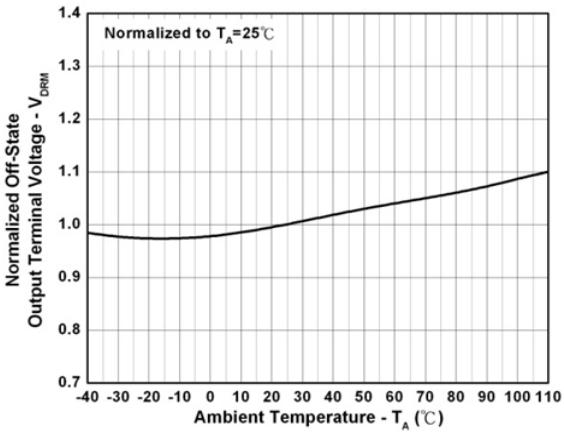



**Fig 6 Off-State Output Terminal Voltage vs Ambient Temperature**

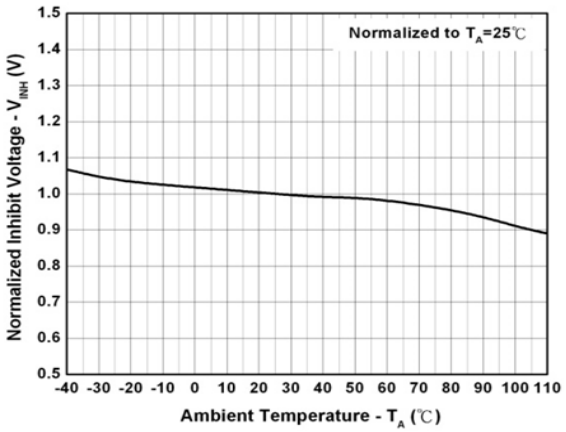



**Fig 7 Inhibit Voltage vs Ambient Temperature**

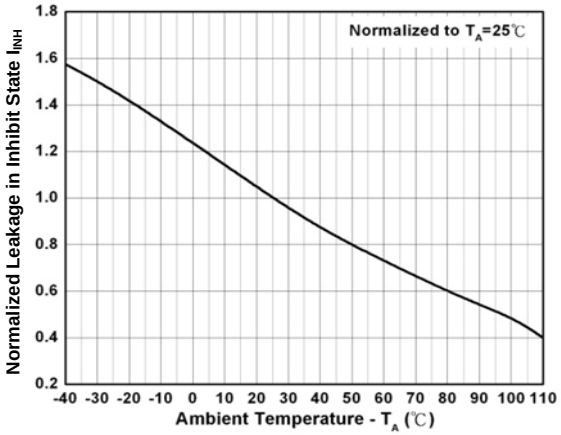



**Fig 8 Leakage Current in Inhibit State vs Ambient Temperature**

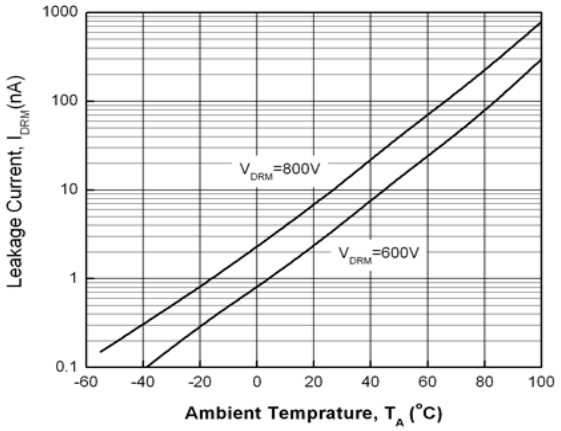
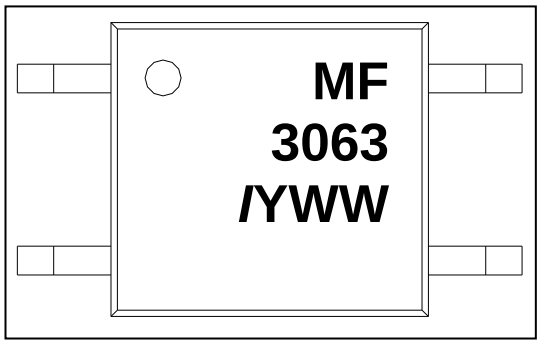



**Fig 9 Leakage Current vs Ambient Temperature**

## ORDER INFORMATION

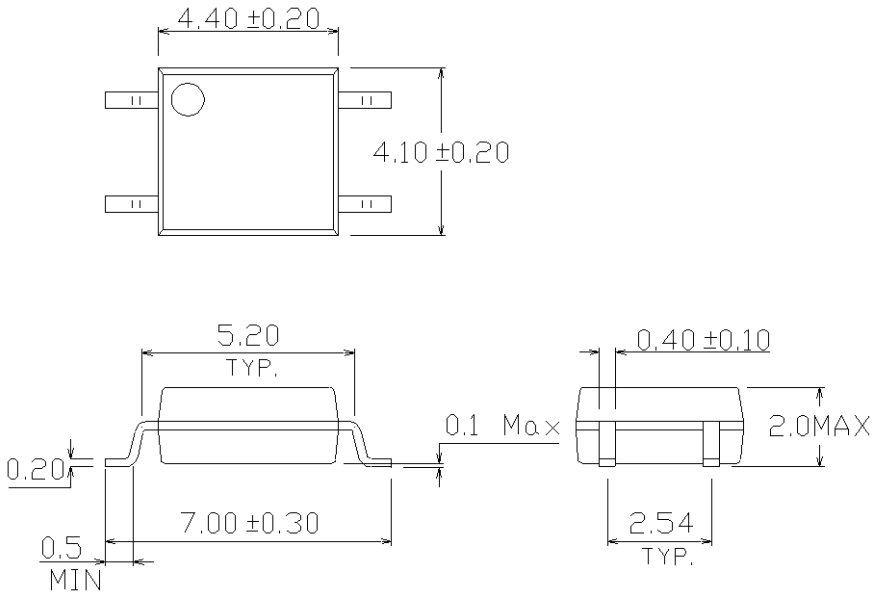
| IS281 | | | |
|---|---|---|---|
| **After PN** | **PN** | **Description** | **Packing quantity** |
| None | MF3030, MF3031, MF3032, MF3032, MF3033<br>MF3040, MF3041, MF3042, MF3043<br>MF3060, MF3061, MF3062, MF3063<br>MF3080, MF3081, MF3082, MF3083 | Surface Mount Tape & Reel | 3000 pcs per reel |

## DEVICE MARKING

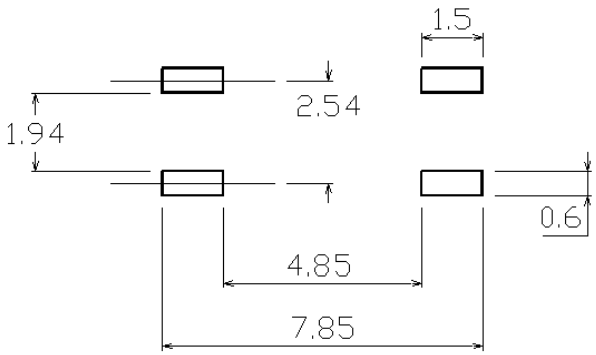



| | |
|---|---|
| MF3063 | denotes Device Part Number where “MF3063” is used as example |
| ***/*** | denotes Isocom |
| Y | denotes 1 digit Year code |
| WW | denotes 2 digit Week code |

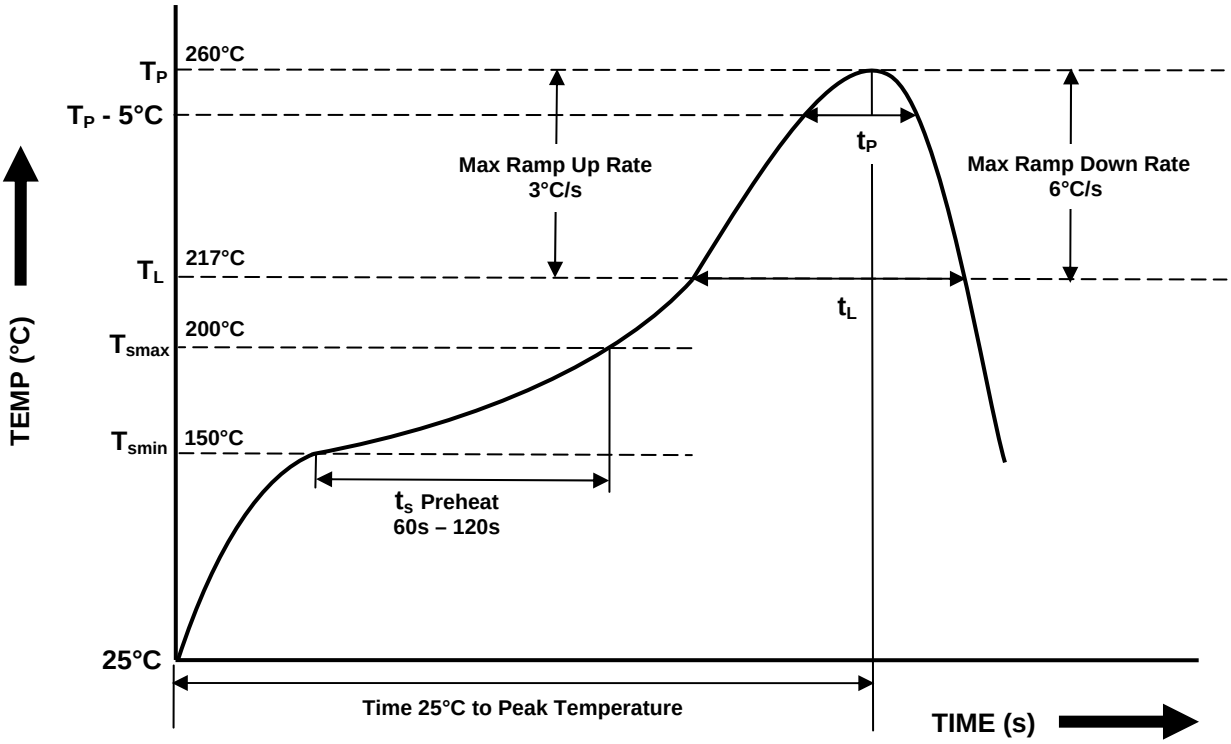
## PACKAGE DIMENSIONS (mm)




## RECOMMENDED PAD LAYOUT (mm)

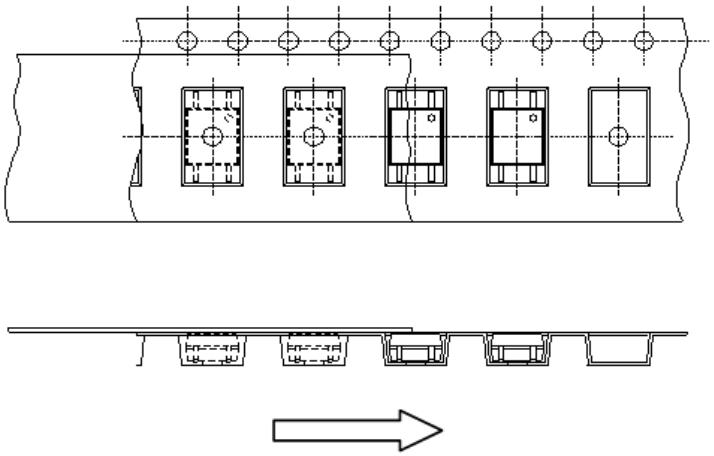


## IR REFLOW SOLDERING TEMPERATURE PROFILE
## (One Time Reflow Soldering is Recommended)

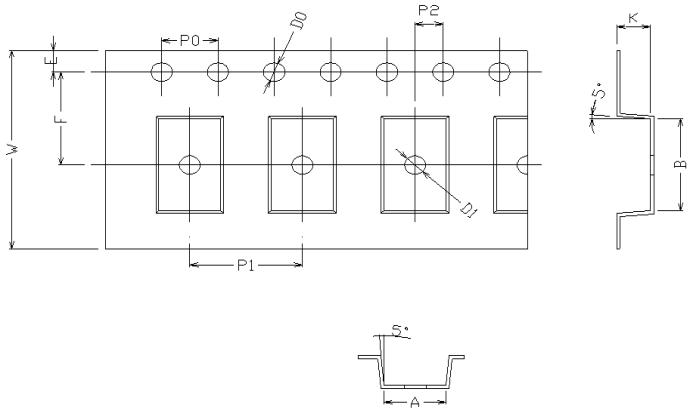



| Profile Details | Conditions |
|---|---|
| **Preheat**<br>- Min Temperature ($T_{SMIN}$)<br>- Max Temperature ($T_{SMAX}$)<br>- Time $T_{SMIN}$ to $T_{SMAX}$ ($t_s$) | <br>150°C<br>200°C<br>60s – 120s |
| **Soldering Zone**<br>- Peak Temperature ($T_P$)<br>- Liquidous Temperature ($T_L$)<br>- Time within 5°C of Actual Peak Temperature ($T_P$ – 5°C)<br>- Time maintained above $T_L$ ($t_L$)<br>- Ramp Up Rate ($T_L$ to $T_P$)<br>- Ramp Down Rate ($T_P$ to $T_L$) | <br>260°C<br>217°C<br>30s<br>60s – 100s<br>3°C/s max<br>6°C/s max |
| Average Ramp Up Rate ($T_{smax}$ to $T_P$) | 3°C/s max |
| Time 25°C to Peak Temperature | 8 minutes max |

## TAPE AND REEL PACKAGING (mm)



Direction of feed from reel




| Dimension No. | A | B | Do | D1 | E | F |
|---|---|---|---|---|---|---|
| mm | 4.4 ± 0.1 | 7.4 ± 0.1 | 1.5 + 0.1/-0 | 1.5 ± 0.1 | 1.7 5± 0.1 | 7.5 ± 0.1 |

| Dimension No. | Po | P1 | P2 | t | W | K |
|---|---|---|---|---|---|---|
| mm | 4.0 ± 0.15 | 8.0 ± 0.1 | 2.0 ± 0.1 | 0.25 ± 0.03 | 16.0 ± 0.2 | 2.4 ± 0.1 |

**NOTES :**

- Isocom is continually improving the quality, reliability, function or design and Isocom reserves the right to make changes without further notices.

- 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.

- For equipment/application where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc., please contact our sales representatives.

- When requiring a device for any ”specific” application, please contact our sales for advice.

- The contents described herein are subject to change without prior notice.

- Do not immerse device body in solder paste.