

# MMBD4148

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# MMBD4148

## 350mW Surface Mount Switching Diode-100V

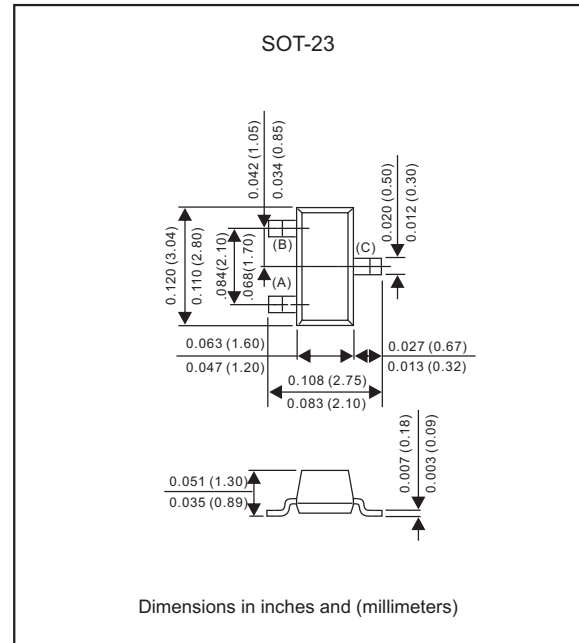
### Features

- Fast switching speed
- For general purpose switching applications
- High conductance
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex. MMBD4148-H

### Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

### Package Outline



### Maximum ratings (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

| PARAMETER                                       | Symbol          | Limit       | UNIT               |
|-------------------------------------------------|-----------------|-------------|--------------------|
| Non-Repetitive Peak Reverse Voltage             | $V_{RM}$        | 100         | V                  |
| Peak Repetitive Peak Reverse Voltage            | $V_{RRM}$       | 75          | V                  |
| Working Peak Reverse Voltage                    | $V_{RWM}$       |             |                    |
| DC Blocking Voltage                             | $V_R$           |             |                    |
| RMS Reverse Voltage                             | $V_{R(RMS)}$    | 53          | mA                 |
| Forward continuous current                      | $I_{FM}$        | 300         | mA                 |
| Average rectified output current (note 1)       | $I_O$           | 150         | mA                 |
| Non-repetitive peak forward surge current 8.3ms | $I_{FSM}$       | 2.0         | A                  |
| Power dissipation (note 1)                      | $P_D$           | 350         | mW                 |
| Thermal resistance junction to ambient (note 1) | $R_{\theta JA}$ | 357         | $^\circ\text{C/W}$ |
| Operating junction temperature range            | $T_J$           | -55 to +150 | $^\circ\text{C}$   |
| Storage temperature range                       | $T_{STG}$       | -55 to +150 | $^\circ\text{C}$   |

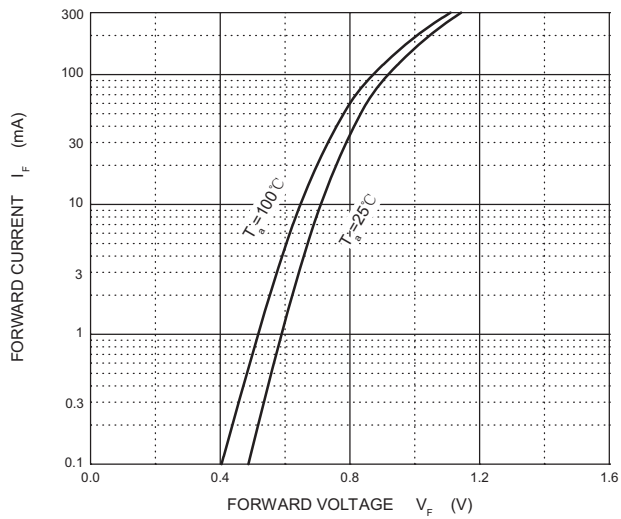
### Electrical characteristics (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

| PARAMETER                     | CONDITION                                                                                    | Symbol      | MIN. | TYP. | MAX.                             | UNIT                |
|-------------------------------|----------------------------------------------------------------------------------------------|-------------|------|------|----------------------------------|---------------------|
| Reverse breakdown voltage     | $I_R = 100\mu\text{A}$                                                                       | $V_{(BR)R}$ | 75   |      |                                  | V                   |
| Forward voltage               | $I_F = 1\text{ mA}$<br>$I_F = 10\text{ mA}$<br>$I_F = 50\text{ mA}$<br>$I_F = 150\text{ mA}$ | $V_F$       |      |      | 0.715<br>0.855<br>1.000<br>1.250 | V                   |
| Reverse leakage current       | $V_R = 20\text{V}, T_J = 25^\circ\text{C}$<br>$V_R = 75\text{V}, T_J = 25^\circ\text{C}$     | $I_R$       |      |      | 25<br>2.5                        | nA<br>$\mu\text{A}$ |
| Capacitance between terminals | $V_R = 0, f = 1\text{MHz}$                                                                   | $C_T$       |      |      | 2.0                              | pF                  |
| Reverse recovery time         | $I_F = I_R = 10\text{mA}$<br>$I_{rr} = 0.1 I_R, R_L = 100\Omega$                             | $t_{rr}$    |      |      | 4.0                              | ns                  |

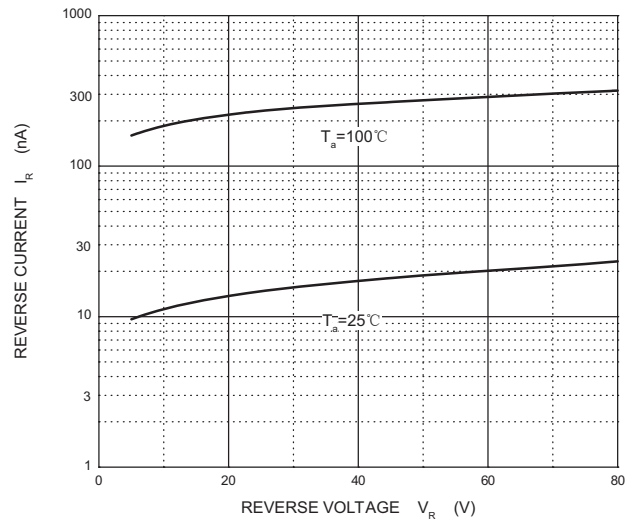
Note 1: Valid provided that electrodes are kept at ambient temperature.

## Rating and characteristic curves (MMBD4148)

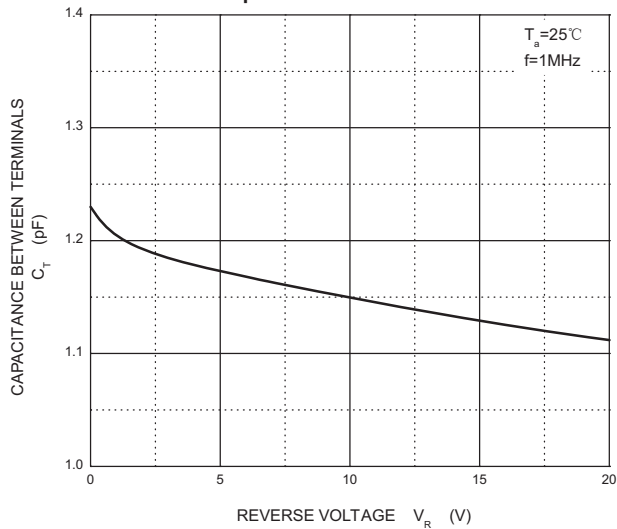
**Forward Characteristics**



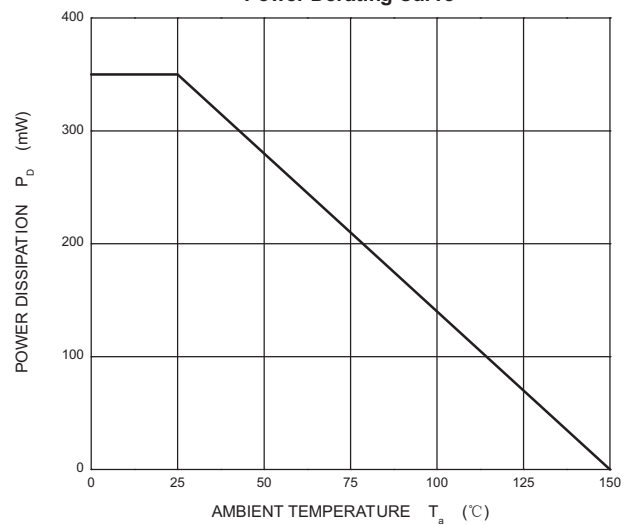
**Reverse Characteristics**



**Capacitance Characteristics**

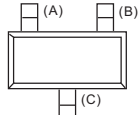
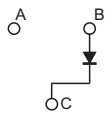


**Power Derating Curve**



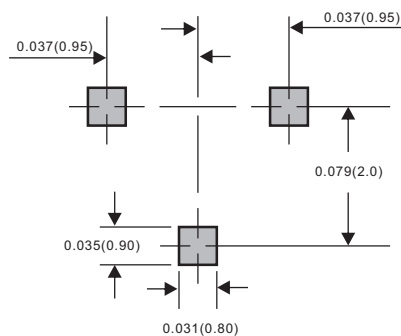
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## Pinning information

| Type number | Marking code | Simplified outline                                                                | Symbol                                                                              |
|-------------|--------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| MMBD4148    | KA2          |  |  |

## Suggested solder pad layout

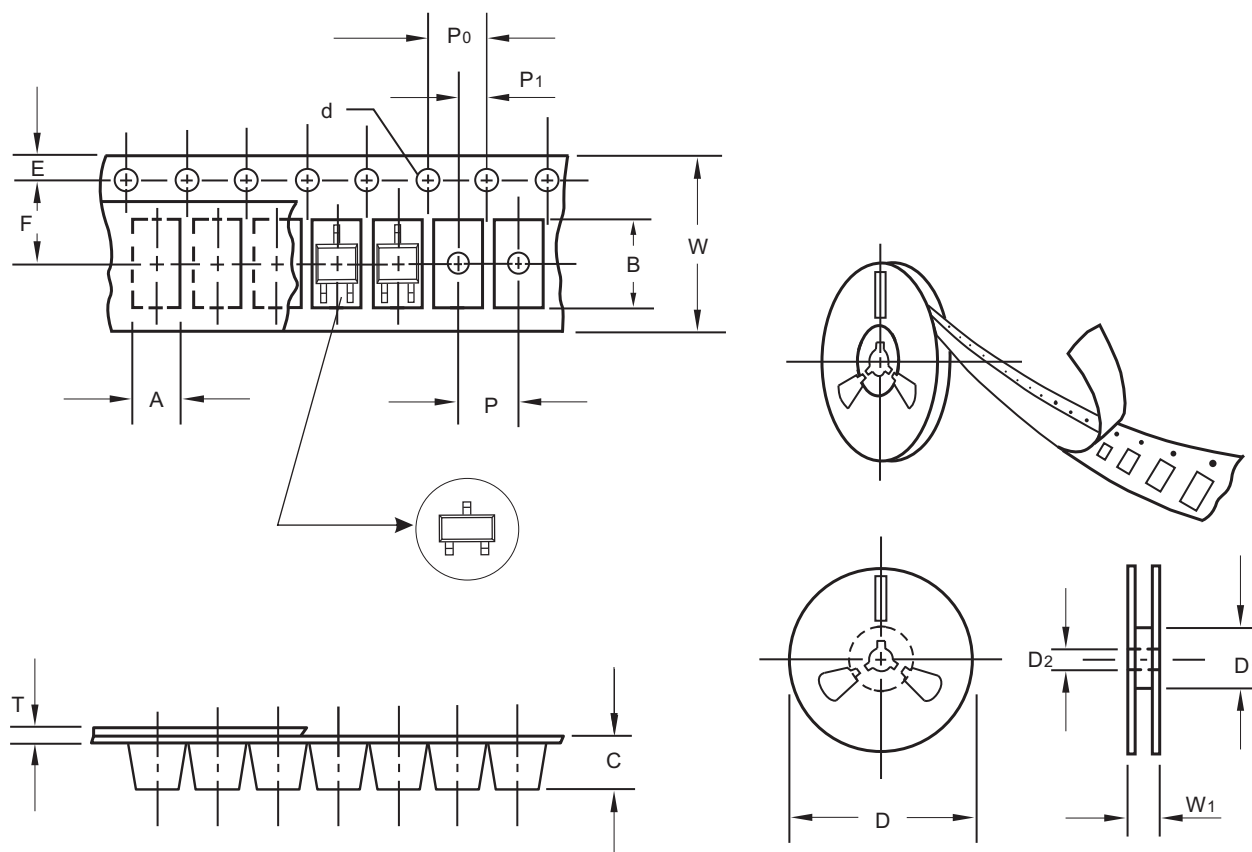
SOT-23



Dimensions in inches and (millimeters)

## MMBD4148

## Packing information



unit:mm

| Item                      | Symbol | Tolerance | SOT-23 |
|---------------------------|--------|-----------|--------|
| Carrier width             | A      | 0.1       | 3.15   |
| Carrier length            | B      | 0.1       | 2.77   |
| Carrier depth             | C      | 0.1       | 1.22   |
| Sprocket hole             | d      | 0.1       | 1.50   |
| 13" Reel outside diameter | D      | 2.0       | -      |
| 13" Reel inner diameter   | D1     | min       | -      |
| 7" Reel outside diameter  | D      | 2.0       | 178.00 |
| 7" Reel inner diameter    | D1     | min       | 54.4   |
| Feed hole diameter        | D2     | 0.5       | 13.00  |
| Sprocket hole position    | E      | 0.1       | 1.75   |
| Punch hole position       | F      | 0.1       | 3.50   |
| Punch hole pitch          | P      | 0.1       | 4.00   |
| Sprocket hole pitch       | P0     | 0.1       | 4.00   |
| Embossment center         | P1     | 0.1       | 2.00   |
| Overall tape thickness    | T      | 0.1       | 0.23   |
| Tape width                | W      | 0.3       | 8.00   |
| Reel width                | W1     | 1.0       | 12.3   |

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

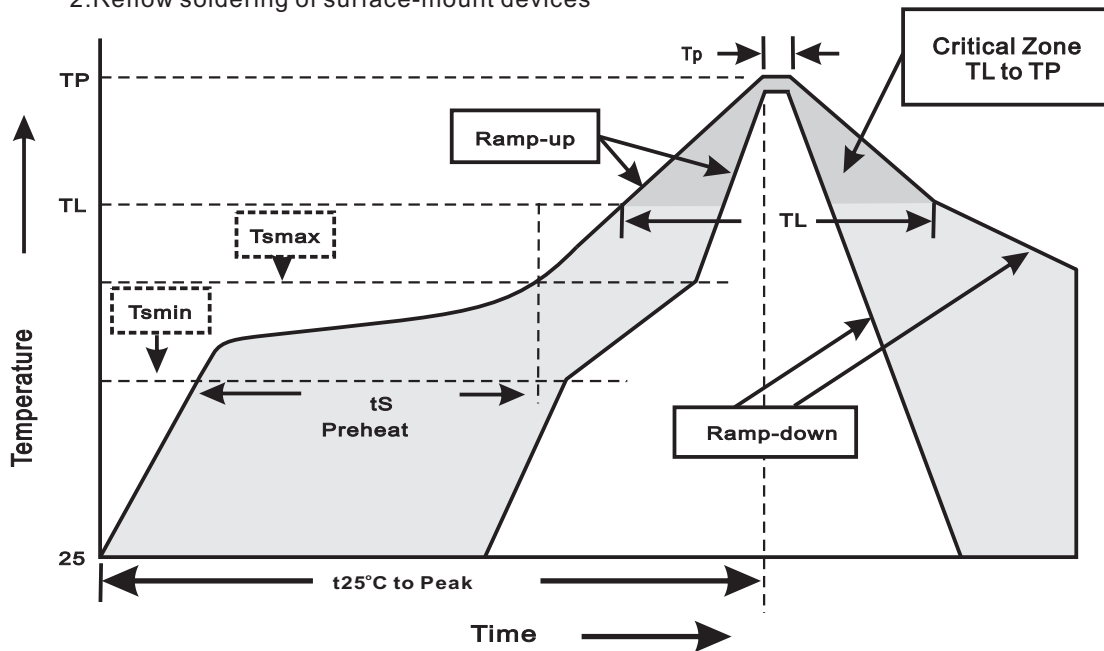
## MMBD4148

## Reel packing

| PACKAGE | REEL SIZE | REEL (pcs) | COMPONENT SPACING (m/m) | BOX (pcs) | INNER BOX (m/m) | REEL DIA, (m/m) | CARTON SIZE (m/m) | CARTON (pcs) | APPROX. GROSS WEIGHT (kg) |
|---------|-----------|------------|-------------------------|-----------|-----------------|-----------------|-------------------|--------------|---------------------------|
| SOT-23  | 7"        | 3,000      | 4.0                     | 30,000    | 183*123*183     | 178             | 382*257*387       | 240,000      | 11.6                      |

## Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



## 3.Reflow soldering

| Profile Feature                                                                        | Soldering Condition         |
|----------------------------------------------------------------------------------------|-----------------------------|
| Average ramp-up rate(TL to TP)                                                         | <3°C/sec                    |
| Preheat<br>-Temperature Min(Tsmin)<br>-Temperature Max(Tsmax)<br>-Time(min to max)(ts) | 150°C<br>200°C<br>60~120sec |
| Tsmax to TL<br>-Ramp-upRate                                                            | <3°C/sec                    |
| Time maintained above:<br>-Temperature(TL)<br>-Time(tL)                                | 217°C<br>60~260sec          |
| Peak Temperature(TP)                                                                   | 255°C-0/+5°C                |
| Time within 5°C of actual Peak Temperature(tp)                                         | 10~30sec                    |
| Ramp-down Rate                                                                         | <6°C/sec                    |
| Time 25°C to Peak Temperature                                                          | <6minutes                   |

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## High reliability test capabilities

| Item Test                         | Conditions                                                                                                                               | Reference                     |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1. Solder Resistance              | at $260 \pm 5^\circ\text{C}$ for $10 \pm 2\text{sec.}$                                                                                   | MIL-STD-750D<br>METHOD-2031   |
| 2. Solderability                  | at $245 \pm 5^\circ\text{C}$ for 5 sec.                                                                                                  | MIL-STD-202F<br>METHOD-208    |
| 3. High Temperature Reverse Bias  | $V_R = 80\%$ rate at $T_J = 150^\circ\text{C}$ for 168 hrs.                                                                              | MIL-STD-750D<br>METHOD-1038   |
| 4. Forward Operation Life         | Rated average rectifier current at $T_A = 25^\circ\text{C}$ for 500hrs.                                                                  | MIL-STD-750D<br>METHOD-1027   |
| 5. Intermittent Operation Life    | $T_A = 25^\circ\text{C}$ , $I_F = I_O$<br>On state: power on for 5 min.<br>off state: power off for 5 min.<br>on and off for 500 cycles. | MIL-STD-750D<br>METHOD-1036   |
| 6. Pressure Cooker                | $15P_{SIG}$ at $T_A = 121^\circ\text{C}$ for 4 hrs.                                                                                      | JESD22-A102                   |
| 7. Temperature Cycling            | $-55^\circ\text{C}$ to $+125^\circ\text{C}$ dwelled for 30 min.<br>and transferred for 5min. total 10 cycles.                            | MIL-STD-750D<br>METHOD-1051   |
| 8. Forward Surge                  | Peak forward surge current                                                                                                               | MIL-STD-750D<br>METHOD-4066-2 |
| 9. Humidity                       | at $T_A = 85^\circ\text{C}$ , RH=85% for 1000hrs.                                                                                        | MIL-STD-750D<br>METHOD-1021   |
| 10. High Temperature Storage Life | at $175^\circ\text{C}$ for 1000 hrs.                                                                                                     | MIL-STD-750D<br>METHOD-1031   |