

MMBD3004A-Q1/MMBD3004C-Q1 MMBD3004S-Q1

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MMBD3004A-Q1/MMBD3004C-Q1 MMBD3004S-Q1

**350mW Surface Mount
Switching Diode:350V**

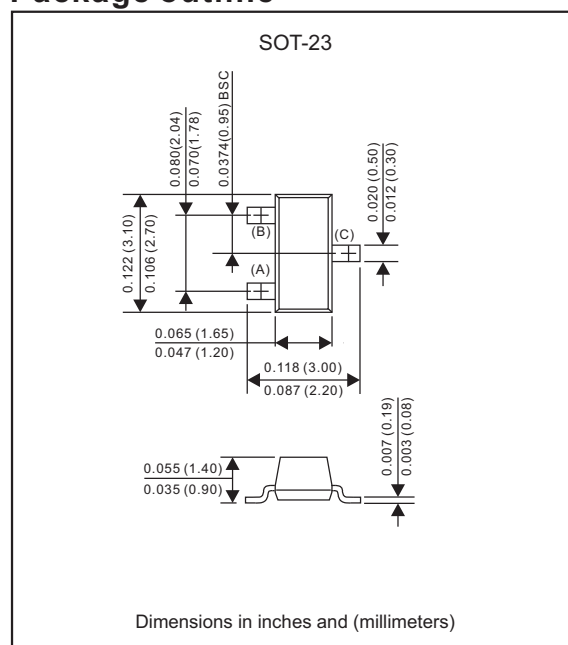
Features

- Fast switching speed
- High conductance
- High reverse breakdown voltage rating
- Lead-free parts meet RoHS requirements.
- Qualified to AEC-Q101 standards for high reliability
- Suffix "-H" indicates Halogen-free part, ex.MMBD3004A-Q1-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	VALUE	UNIT
Repetitive peak reverse voltage	V_{RRM}	350	V
Working peak reverse voltage	V_{RWM}	300	V
DC blocking voltage	V_R	212	V
RMS reverse voltage	$V_{R(RMS)}$	212	V
Forward continuous current (note 2)	I_F	225	mA
Peak repetitive forward current (note 2)	I_{FRM}	625	mA
Power dissipation (note 2)	P_D	350	mW
Non-repetitive peak forward surge current @ $t=1.0\mu\text{s}$ @ $t=1.0\text{s}$	I_{FSM}	4.0 1.0	A
Thermal resistance junction to ambient air (note 2)	$R_{\theta JA}$	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	SYMBOL	MIN.	TYP.	MAX.	UNIT
Reverse breakdown voltage (note 1) $I_R=100\mu\text{A}$	$V_{(BR)R}$	350			V
Forward voltage (note 1) $I_F=20\text{mA}$ $I_F=100\text{mA}$ $I_F=200\text{mA}$	V_F		0.78 0.93 1.03	0.87 1.00 1.25	V
Reverse leakage current (note 1) $V_R=240\text{V}$, $T_J=25^{\circ}\text{C}$ Reverse leakage current (note 1) $V_R=240\text{V}$, $T_J=150^{\circ}\text{C}$	I_R		30 35	100 100	nA μA
Total capacitance at $V_R=0\text{V}$, $f=1.0\text{MHz}$	C_T		1	5	pF
Reverse recovery time at $I_F=I_R=30\text{mA}$, $I_{RR}=3\text{mA}$, $R_L=100\Omega$	t_{rr}			50	ns

Notes1: Short duration test pulse used to minimize self-heating effect.

2: Part mounted on FR-4 board with recommended pad layout.

Rating and characteristic curves (MMBD3004A-Q1/MMBD3004C-Q1/MMBD3004S-Q1)

FIG.1 POWER DERATING CURVE

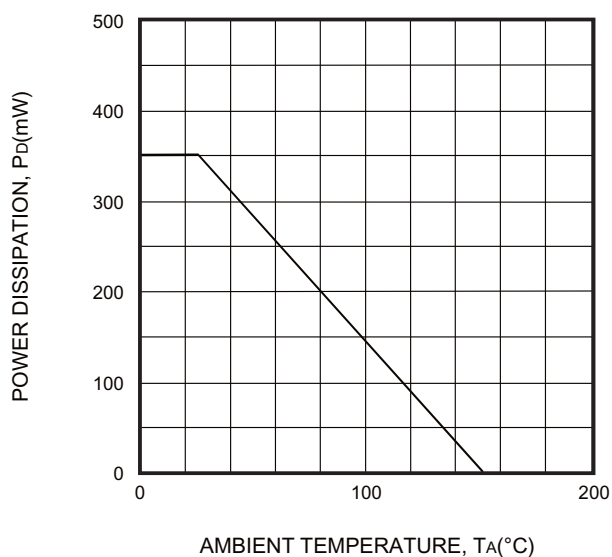


FIG.2 TYPICAL FORWARD CHARACTERISTICS

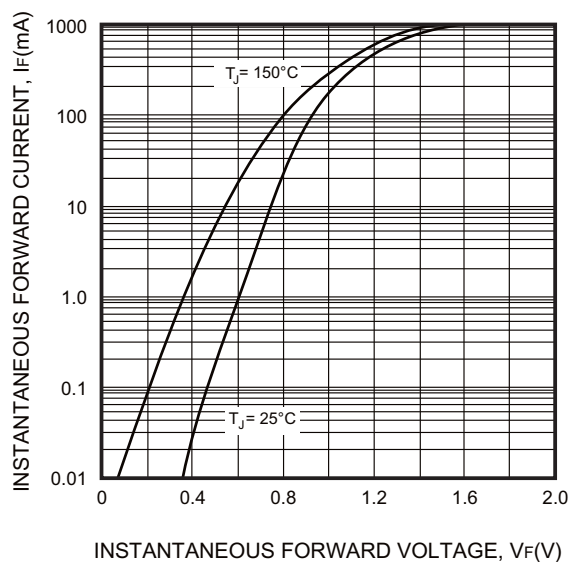


FIG.3 TYPICAL REVERSE CHARACTERISTICS

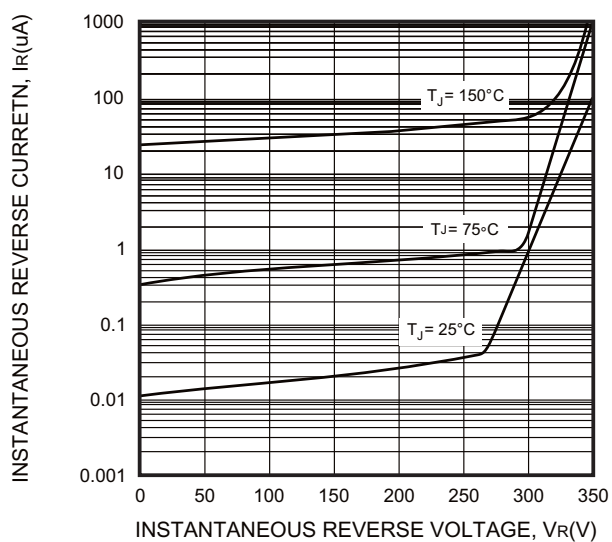
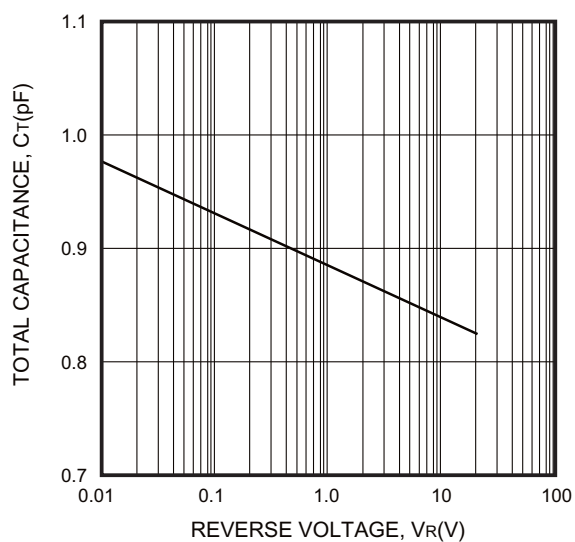


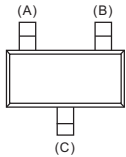
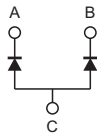
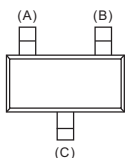
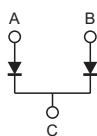
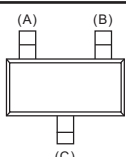
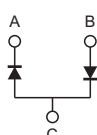
FIG.4 TYPICAL TOTAL CAPACITANCE VS. REVERSE VOLTAGE



MMBD3004A-Q1/MMBD3004C-Q1

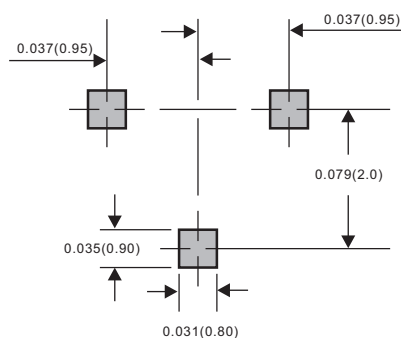
MMBD3004S-Q1

Pinning information

Type number	Marking code	Simplified outline	Symbol
MMBD3004A-Q1	RA		
MMBD3004C-Q1	PZ		
MMBD3004S-Q1	PY		

Suggested solder pad layout

SOT-23

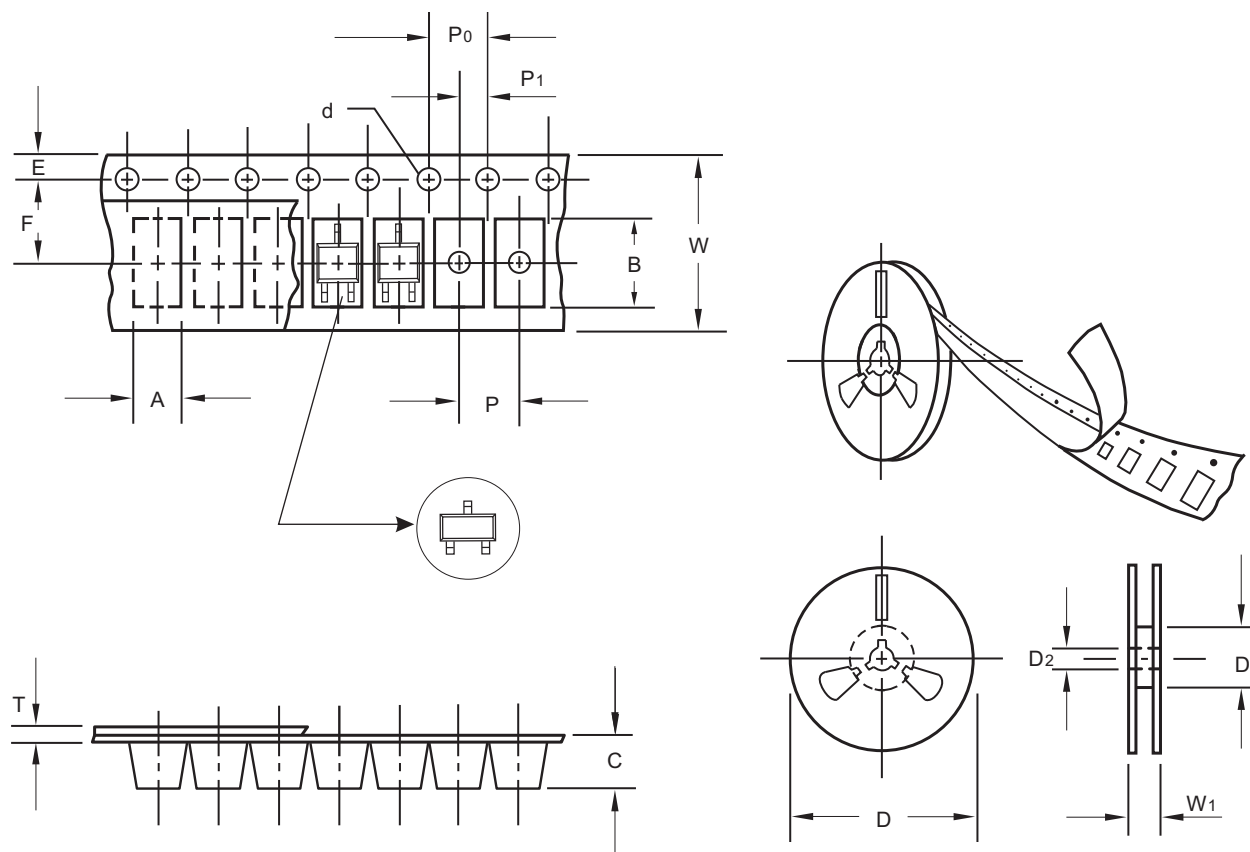


Dimensions in inches and (millimeters)

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MMBD3004S-Q1

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	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	54.4
Feed hole diameter	D ₂	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	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	12.3

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

MMBD3004A-Q1/MMBD3004C-Q1

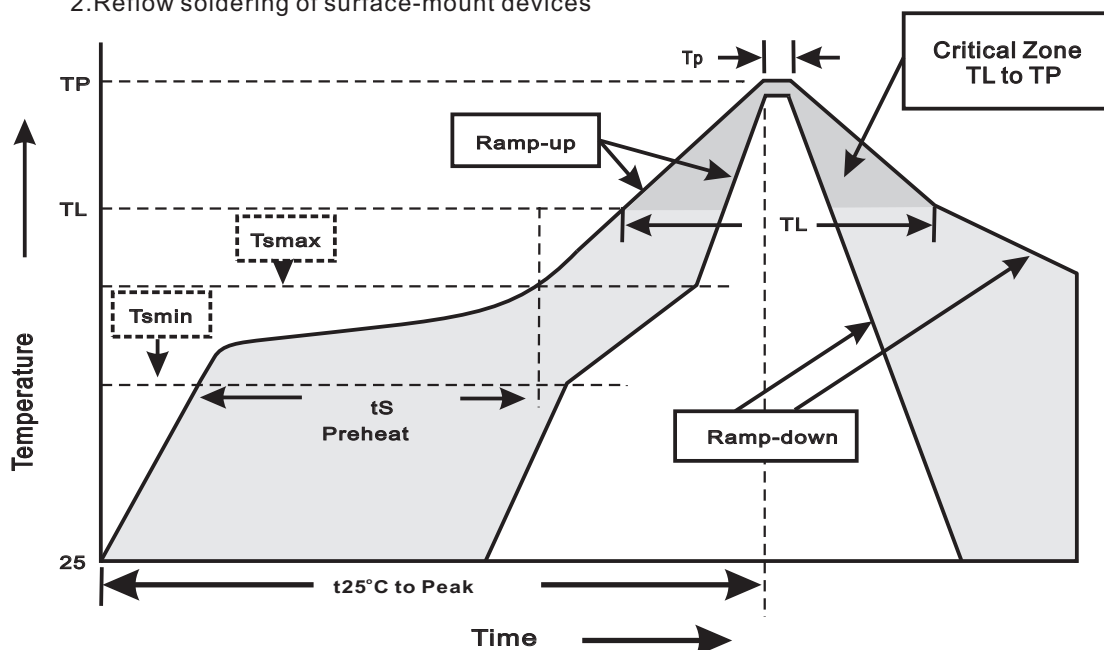
MMBD3004S-Q1

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(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _P)	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. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. Operation Life	Ta=25°C, Rated Current (Io=Io max.)Test Duration:1000hrs	MIL-STD-750E METHOD 1027.3
3. High Temperature Reverse Bias	80% Rated VR (Tj=Tj max.)Test Duration:1000hrs	JESD22-A108
4. High Temperature Storage Life	Ta=125°C Test Duration: 1000hrs	JESD22 A-103
5. Temperature Cycle	-55°C (15min) to 150°C (15min)Test Cycles: 1000cycles	JESD22 A-104
6. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs	JESD22 A-102
7. Intermittent Operational Life	Ta=25°C,On/Io Max. 2min, Off/2min, Test Cycles:15000cycles	MIL-STD-750E METHOD 1037
8. Solderability	245±5°C for 5sec	J-STD-002
9. Moisture Resistance	Ta=85°C/85% Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
10. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
11. High Temperature High Humidity Reverse Bias	Ta=85°C, 85%RH, with device reverse biased at 80% of rated breakdown voltage up to a maximum of 100V or limit of chamber Test Duration:1000hrs	JESD22-A101