

MMBD6050/MMBD6100/MMBD7000

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MMBD6050/MMBD6100/MMBD7000

225mW Surface Mount
Switching Diode-70-100V

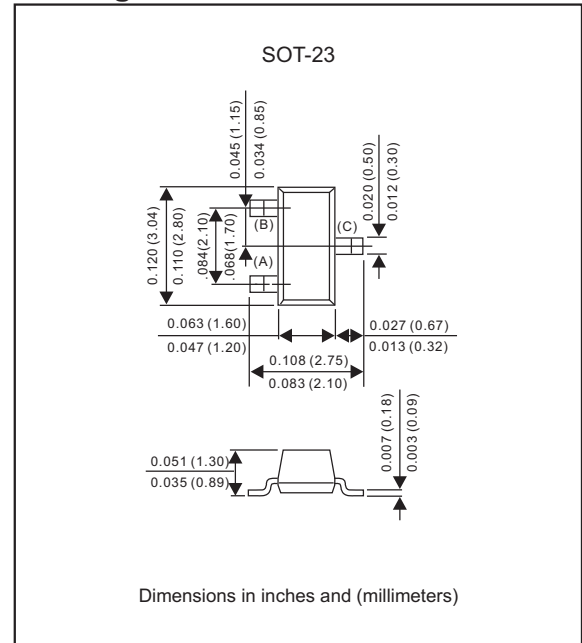
Features

- Fast speed switching.
- For general purpose switching application.
- High conductance.
- Silicon epitaxial planar chip.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.MMBD6050-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	MMBD6050 / 6100	MMBD7000	UNIT
Reverse voltage	V_R	70	100	V
Forward current	I_F	200		mA
Peak forward surge current	$I_{FM}(\text{surge})$	500		mA

Thermal characteristics

PARAMETER	SYMBOL	MAX.	UNIT
Total device dissipation FR-5 board (note 1) $T_A=25^{\circ}\text{C}$ Derate above 25°C	P_D	225	mW
Thermal resistance junction to ambient	$R_{\theta JA}$	1.8	$\text{mW}/^{\circ}\text{C}$
Total device dissipation alumina substrate (note 2) $T_A=25^{\circ}\text{C}$ Derate above 25°C	P_D	300	mW
Thermal resistance junction to ambient	$R_{\theta JA}$	2.4	$\text{mW}/^{\circ}\text{C}$
Operating junction temperature range	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^{\circ}\text{C}$

Notes 1: FR-5 = 1.0 x 0.75 x 0.062 in.

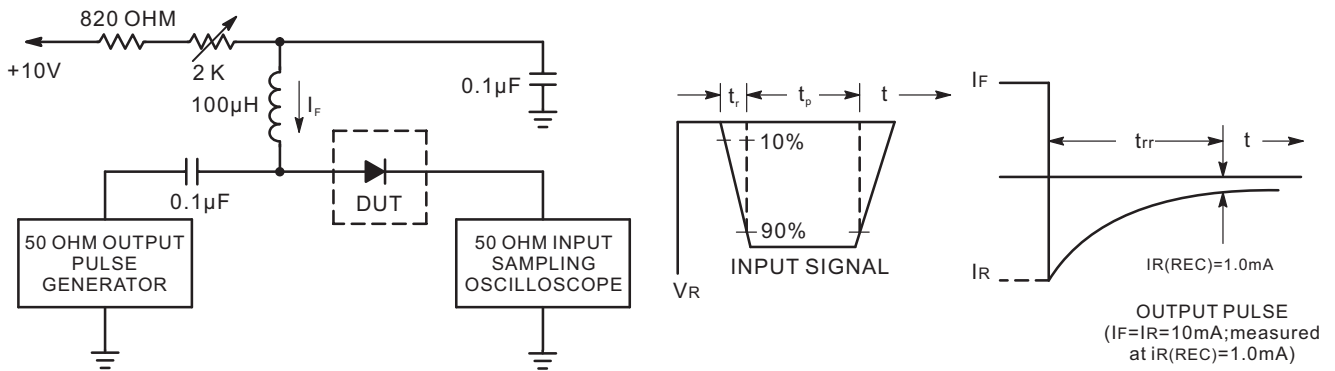
2: Alumina = 0.4x0.3x0.024 in. 99.5% alumina.

MMBD6050/MMBD6100/MMBD7000

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

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Reverse breakdown voltage MMBD6050 / 6100, $I_R=100\mu\text{A}$ MMBD7000, $I_R=100\mu\text{A}$	V_{BR}	70 100		V
Reverse leakage current MMBD6050 / 6100, $V_R=50\text{V}$, $T_J=25^\circ\text{C}$ MMBD7000, $V_R=50\text{V}$, $T_J=25^\circ\text{C}$ MMBD7000, $V_R=100\text{V}$, $T_J=25^\circ\text{C}$ MMBD7000, $V_R=50\text{V}$, $T_J=125^\circ\text{C}$	I_R		0.1 1.0 3.0 100	μA
Diode capacitance MMBD6050 / 6100, $V_R=0\text{V}$, $f=1.0\text{MHz}$ MMBD7000, $V_R=0\text{V}$, $f=1.0\text{MHz}$	C_J		2.5 1.5	pF
Reverse recovery time $I_F=I_R=10\text{mA}$, $I_{R(REC)}=1.0\text{mA}$ (Figure 1)	t_{rr}		4.0	ns
Forward voltage MMBD6050 / 6100 / 7000, $I_F=1.0\text{mA}$ MMBD7000, $I_F=10\text{mA}$ MMBD6050, $I_F=100\text{mA}$ MMBD6100, $I_F=100\text{mA}$ MMBD7000, $I_F=100\text{mA}$	V_F	0.55 0.67 0.85 0.80 0.75	0.70 0.82 1.10 1.10 1.10	V

Figure 1 : Recovery Time Equivalent Test Circuit



- Notes : 1. A2.0 Kohm variable resistor adjusted for a forward Current (I_F) of 10mA.
 2. Input pulse is adjusted so $I_R(\text{peak})$ is equal to 10 mA.
 3. $t_p \gg t_{rr}$.

Rating and characteristic curves for each diode (MMBD6050/MMBD6100/MMBD7000)

FIG.1-TYPICAL FORWARD CHARACTERISTICS

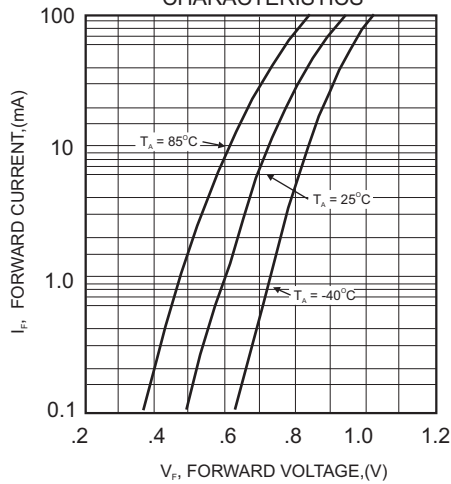


FIG.2 - TYPICAL REVERSE LEAKAGE CURRENT CHARACTERISTICS

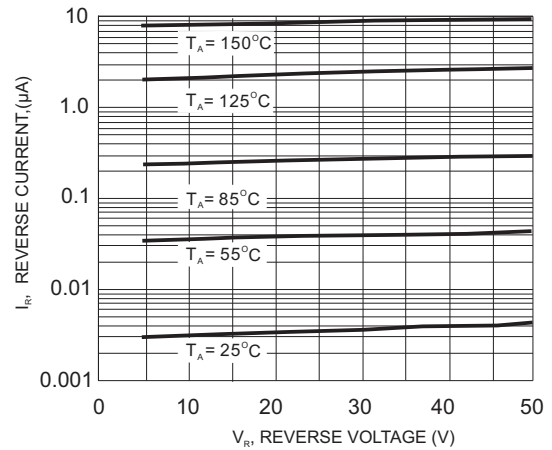


FIG.2 - DIODE CAPACITANCE (MMBD6050 / 7000)

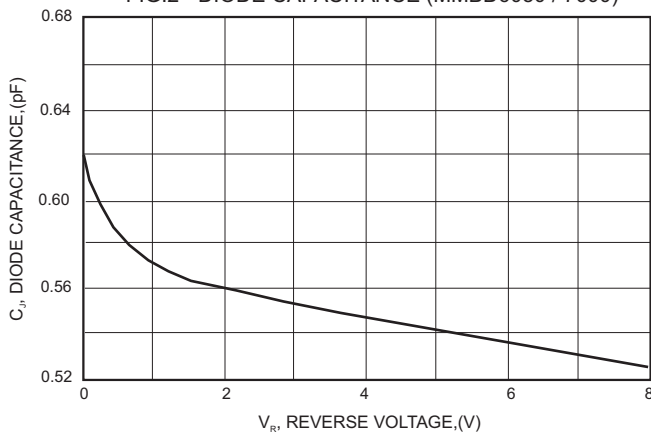
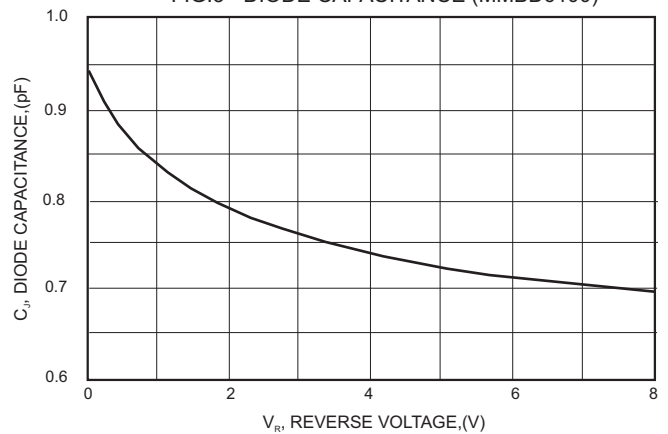
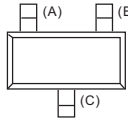
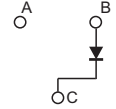
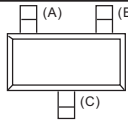
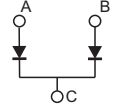
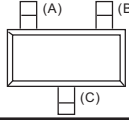
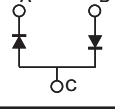


FIG.3 - DIODE CAPACITANCE (MMBD6100)



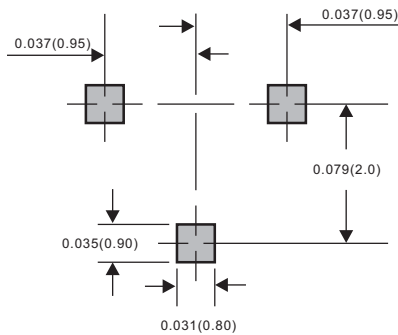
MMBD6050/MMBD6100/MMBD7000

Pinning information

Type number	Marking code	Simplified outline	Symbol
MMBD6050	5A		
MMBD6100	5BM		
MMBD7000	M5C		

Suggested solder pad layout

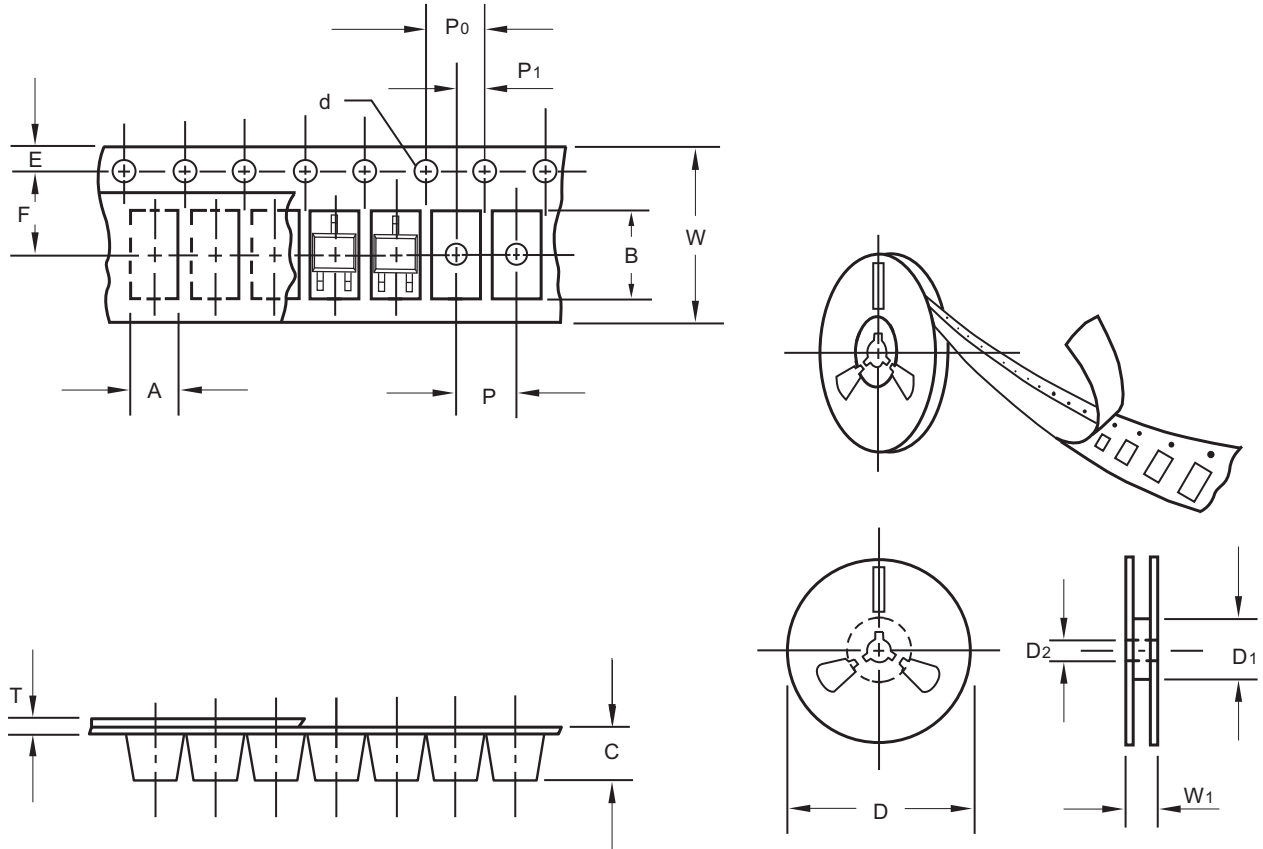
SOT-23



Dimensions in inches and (millimeters)

MMBD6050/MMBD6100/MMBD7000

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	55.00
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	12.0

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

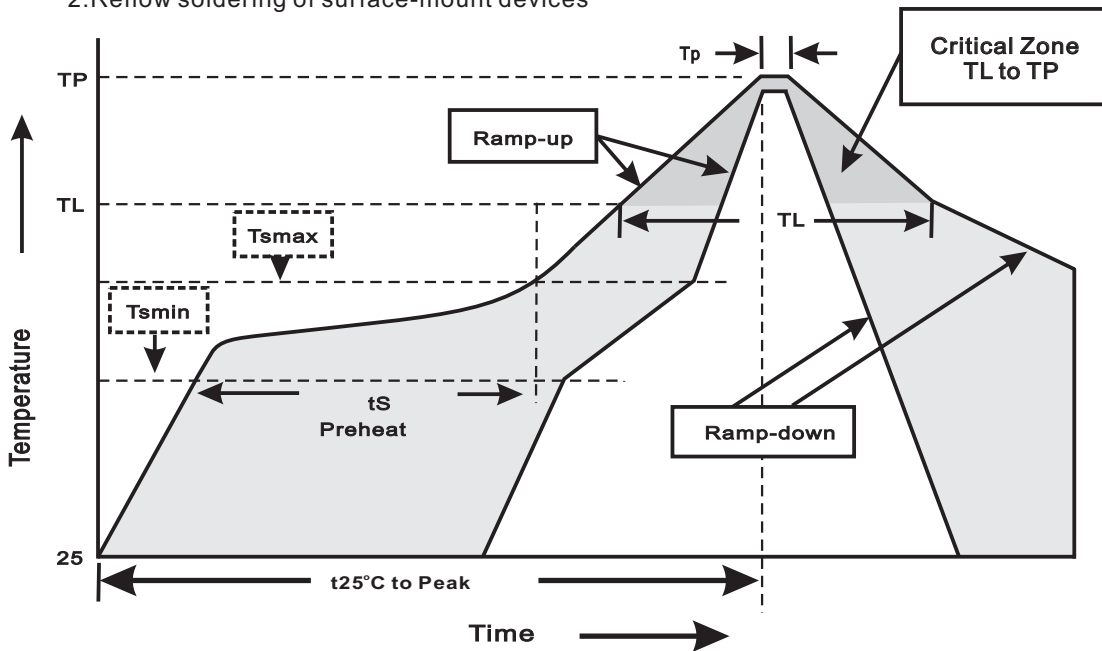
MMBD6050/MMBD6100/MMBD7000

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

MMBD6050/MMBD6100/MMBD7000**High reliability test capabilities**

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