

## Features

- Fast Switching Speed: Maximum of 50ns
- High Reverse Breakdown Voltage Rating: 350V
- Low Reverse Current: Maximum of 100nA when  $V_R = 240V$  at Room Temperature
- Surface Mount Package Ideally Suited for Automated Insertion
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3 & 4)**
- **Qualified to AEC-Q101 Standards for High Reliability**

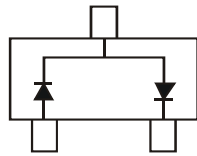
## Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 (E3)
- Polarity: See Diagram
- Weight: 0.008 grams (approximate)

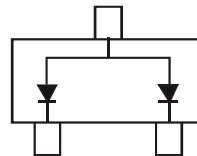
SOT23



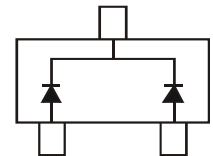
Top View



MMBD3004S Marking: KAE



MMBD3004A Marking: KAD



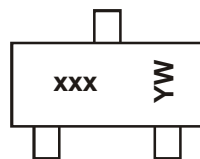
MMBD3004C Marking: KAC

## Ordering Information (Note 5)

Part Number	Qualification	Case	Packaging
MMBD3004S-7-F	AEC-Q101	SOT23	3000/Tape & Reel
MMBD3004SQ-7-F	Automotive	SOT23	3000/Tape & Reel
MMBD3004S-13-F	AEC-Q101	SOT23	10,000/Tape & Reel
MMBD3004A-7-F	AEC-Q101	SOT23	3000/Tape & Reel
MMBD3004C-7-F	AEC-Q101	SOT23	3000/Tape & Reel
MMBD3004CQ-7-F	Automotive	SOT23	3000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. Product manufactured with Date Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or  $Sb_2O_3$  Fire Retardants.
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



- xxx = Product Type Marking Code  
 KAE = MMBD3004S  
 KAD = MMBD3004A  
 KAC = MMBD3004C  
 YM = Date Code Marking  
 Y = Year (ex: Z = 2012)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Code	T	U	V	W	X	Y	Z	A	B	C	D	E

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

### Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Repetitive Peak Reverse Voltage	V <sub>RRM</sub>	350	V
Working Peak Reverse Voltage DC Blocking Voltage	V <sub>RWM</sub> V <sub>R</sub>	300	V
RMS Reverse Voltage	V <sub>R(RMS)</sub>	212	V
Forward Continuous Current (Note 6)	I <sub>F</sub>	225	mA
Peak Repetitive Forward Current (Note 6)	I <sub>FRM</sub>	625	mA
Non-Repetitive Peak Forward Surge Current	I <sub>FSM</sub>	4.0 1.0	A
		@ t = 1.0μs @ t = 1.0s	

### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	350	mW
Thermal Resistance Junction to Ambient Air (Note 6)	R <sub>θJA</sub>	357	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

### Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 7)	V <sub>(BR)R</sub>	350	—	—	V	I <sub>R</sub> = 150μA
Forward Voltage	V <sub>F</sub>	—	0.78 0.93 1.03	0.87 1.0 1.25	V	I <sub>F</sub> = 20mA I <sub>F</sub> = 100mA I <sub>F</sub> = 200mA
Reverse Current (Note 7)	I <sub>R</sub>	—	30 35	100 100	nA μA	V <sub>R</sub> = 240V V <sub>R</sub> = 240V, T <sub>J</sub> = +150°C
Total Capacitance	C <sub>T</sub>	—	1.0	5.0	pF	V <sub>R</sub> = 0V, f = 1.0MHz
Reverse Recovery Time	t <sub>rr</sub>	—	—	50	ns	I <sub>F</sub> = I <sub>R</sub> = 30mA, I <sub>rr</sub> = 3.0mA, R <sub>L</sub> = 100Ω

Notes: 6. Part mounted on FR-4 substrate with pad dimensions 1 inch X 1 inch, 2oz, copper, single-sided, PC board.  
7. Short duration pulse test used to minimize self-heating effect.

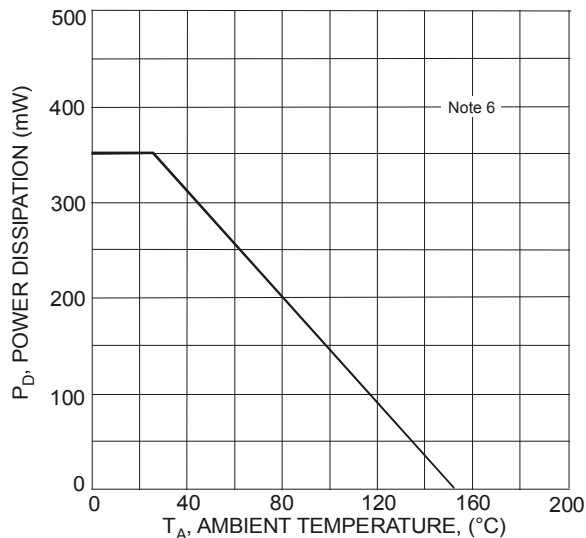


Figure 1 Power Derating Curve, Total Package

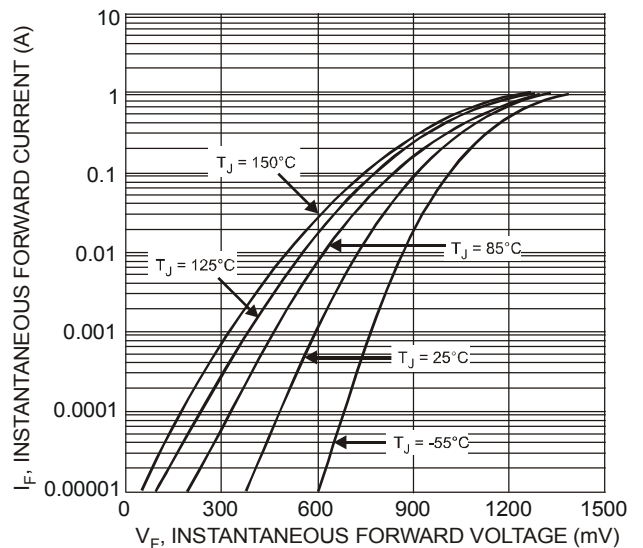


Figure 2 Typical Forward Characteristics, Per Element

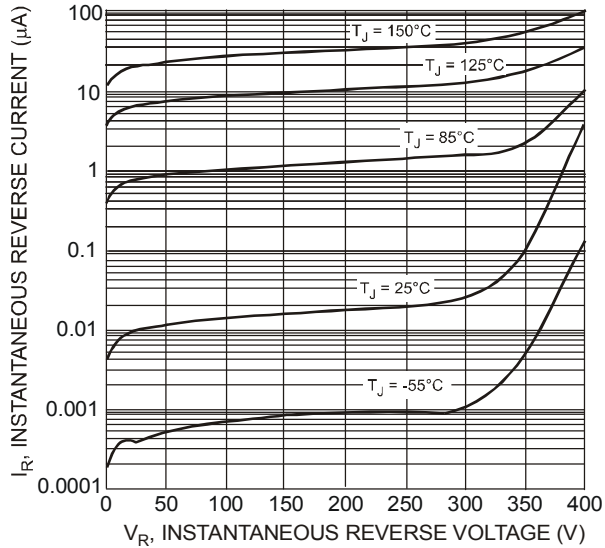


Figure 3 Typical Reverse Characteristics, Per Element

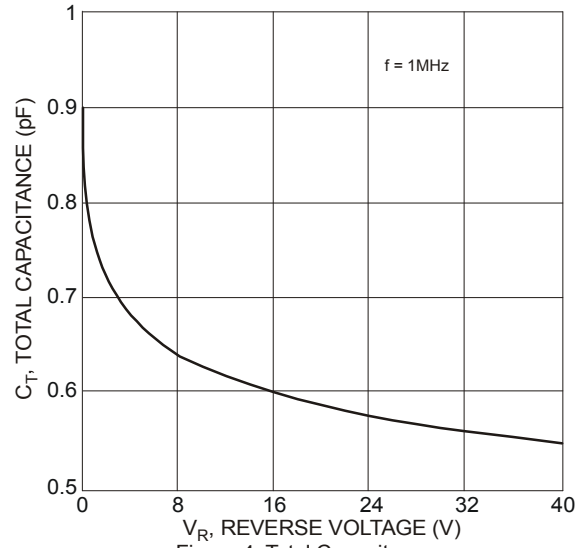
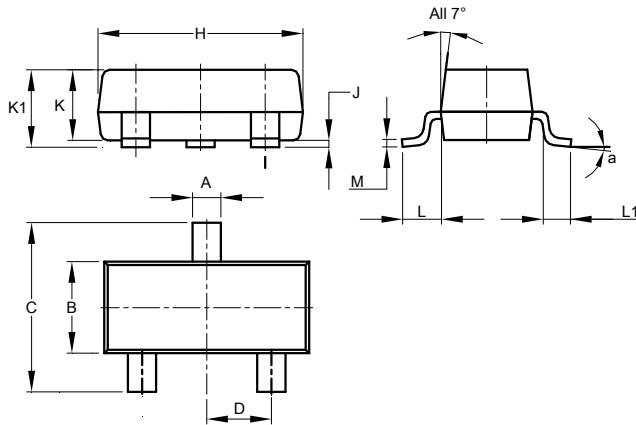


Figure 4 Total Capacitance vs. Reverse Voltage, Per Element

### Package Outline Dimensions

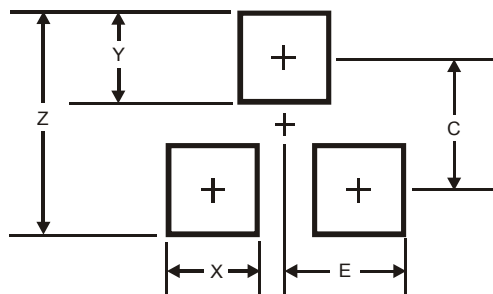
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

### Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for latest version.



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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