

## 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**

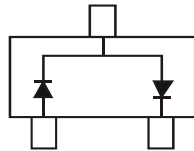
## Mechanical Data

- 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
- Polarity: See Diagram
- Weight: 0.008 grams (approximate)

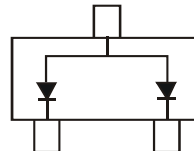
SOT23



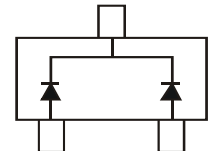
Top View



MMBD3004S Marking: KAE



MMBD3004A Marking: KAD



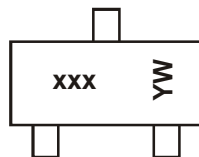
MMBD3004C Marking: KAC

## Ordering Information (Note 5)

| Part Number    | Qualification | Case  | Packaging          |
|----------------|---------------|-------|--------------------|
| MMBD3004S-7-F  | Commercial    | SOT23 | 3000/Tape & Reel   |
| MMBD3004SQ-7-F | Automotive    | SOT23 | 3000/Tape & Reel   |
| MMBD3004S-13-F | Commercial    | SOT23 | 10,000/Tape & Reel |
| MMBD3004A-7-F  | Commercial    | SOT23 | 3000/Tape & Reel   |
| MMBD3004C-7-F  | Commercial    | 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> 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<sub>2</sub>O<sub>3</sub> Fire Retardants.
  5. For Packaging Details, go to our website at <http://www.diodes.com>.

## 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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                            | Symbol       | Value                  | Unit |
|---|--------------|------------------------|------|
| Repetitive Peak Reverse Voltage           | $V_{RRM}$    | 350                    | V    |
| Working Peak Reverse Voltage              | $V_{RWM}$    | 300                    | V    |
| DC Blocking Voltage                       | $V_R$        |                        |      |
| RMS Reverse Voltage                       | $V_{R(RMS)}$ | 212                    | V    |
| Forward Continuous Current (Note 6)       | $I_F$        | 225                    | mA   |
| Peak Repetitive Forward Current (Note 6)  | $I_{FRM}$    | 625                    | mA   |
| Non-Repetitive Peak Forward Surge Current | $I_{FSM}$    | @ $t = 1.0\mu\text{s}$ | 4.0  |
|   |              | @ $t = 1.0\text{s}$    | 1.0  |

**Thermal Characteristics**

| Characteristic                                      | Symbol          | Value       | Unit                      |
|---|-----------------|-------------|---------------------------|
| Power Dissipation (Note 6)                          | $P_D$           | 350         | mW                        |
| Thermal Resistance Junction to Ambient Air (Note 6) | $R_{\theta JA}$ | 357         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range             | $T_J, T_{STG}$  | -65 to +150 | $^\circ\text{C}$          |

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                     | Symbol      | Min | Typ                  | Max                 | Unit                | Test Condition  |
|------------------------------------|-------------|-----|----------------------|---------------------|---------------------|---|
| Reverse Breakdown Voltage (Note 7) | $V_{(BR)R}$ | 350 | —                    | —                   | V                   | $I_R = 150\mu\text{A}$  |
| Forward Voltage                    | $V_F$       | —   | 0.78<br>0.93<br>1.03 | 0.87<br>1.0<br>1.25 | V                   | $I_F = 20\text{mA}$<br>$I_F = 100\text{mA}$<br>$I_F = 200\text{mA}$     |
| Reverse Current (Note 7)           | $I_R$       | —   | 30<br>35             | 100<br>100          | nA<br>$\mu\text{A}$ | $V_R = 240\text{V}$<br>$V_R = 240\text{V}, T_J = +150^\circ\text{C}$    |
| Total Capacitance                  | $C_T$       | —   | 1.0                  | 5.0                 | pF                  | $V_R = 0\text{V}, f = 1.0\text{MHz}$                                    |
| Reverse Recovery Time              | $t_{rr}$    | —   | —                    | 50                  | ns                  | $I_F = I_R = 30\text{mA}$ ,<br>$I_{rr} = 3.0\text{mA}, R_L = 100\Omega$ |

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.

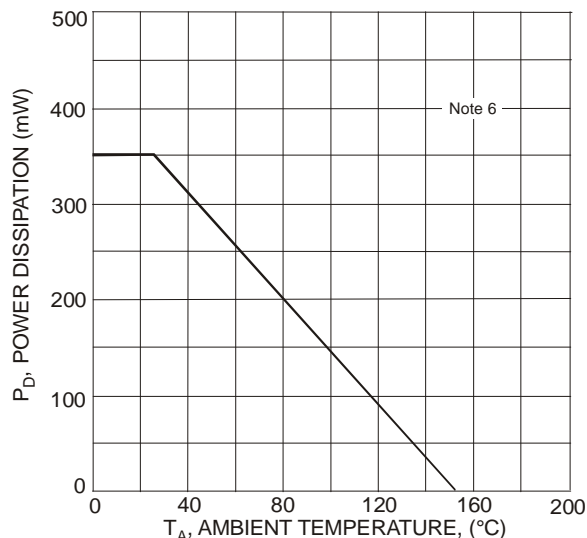


Figure 1 Power Derating Curve, Total Package

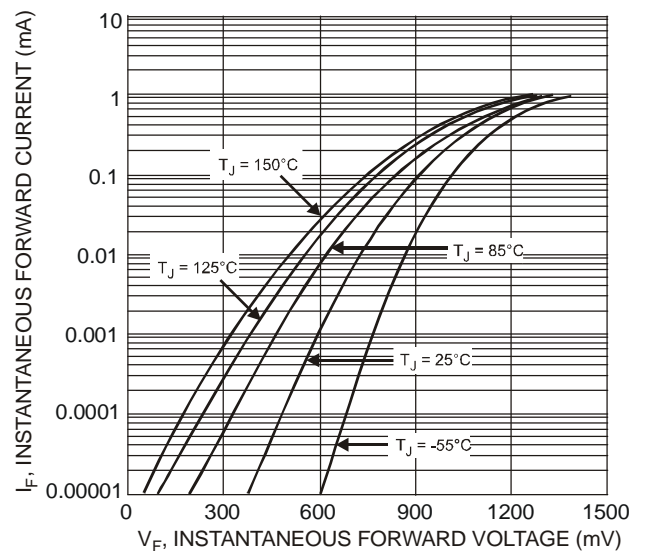


Figure 2 Typical Forward Characteristics, Per Element

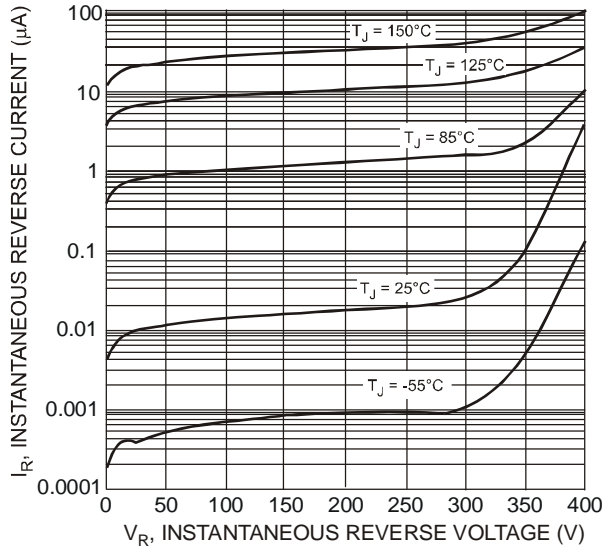


Figure 3 Typical Reverse Characteristics, Per Element

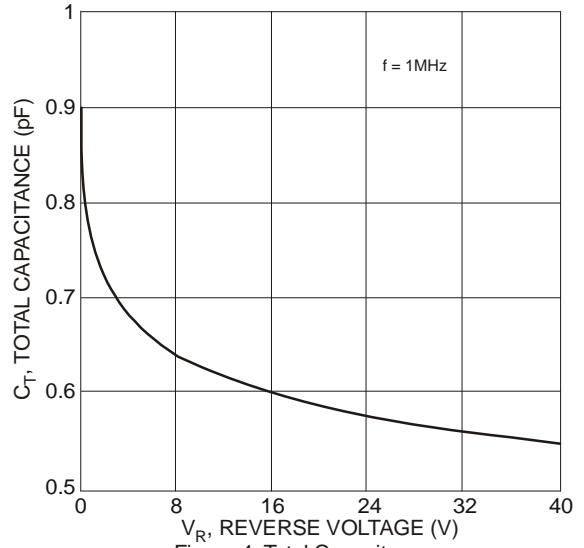
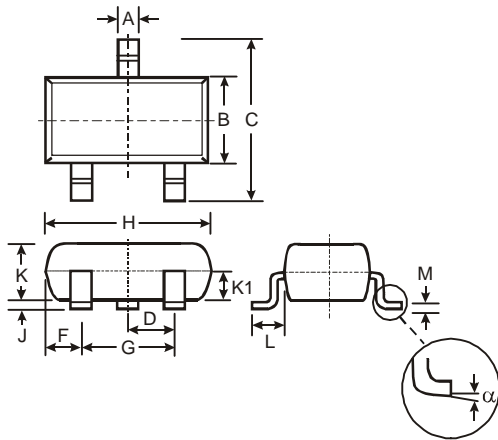


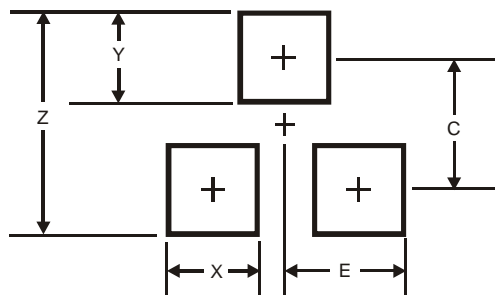
Figure 4 Total Capacitance vs. Reverse Voltage, Per Element

**Package Outline Dimensions**



| 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                    | 0.903 | 1.10 | 1.00  |
| K1                   | -     | -    | 0.400 |
| L                    | 0.45  | 0.61 | 0.55  |
| M                    | 0.085 | 0.18 | 0.11  |
| α                    | 0°    | 8°   | -     |
| All Dimensions in mm |       |      |       |

**Suggested Pad Layout**



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

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