



**THE DATASHEET OF
MMSZ5228B-7-F**



Features

- 500mW Power Dissipation
- General Purpose, Medium Current
- Ideally Suited for Automated Assembly Processes
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Notes 3 & 4)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: SOD123
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Polarity: Cathode Band
- Weight: 0.01 grams (Approximate)

SOD123



Top View

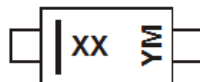
Ordering Information (Note 5)

| Part Number | Qualification | Case | Packaging |
|----------------------|---------------|--------|--------------------|
| (Type Number)-7-F* | Commercial | SOD123 | 3,000/Tape & Reel |
| (Type Number)Q-7-F* | Automotive | SOD123 | 3,000/Tape & Reel |
| (Type Number)-13-F* | Commercial | SOD123 | 10,000/Tape & Reel |
| (Type Number)Q-13-F* | Automotive | SOD123 | 10,000/Tape & Reel |

*For (Type Number), please see the Electrical Characteristics Table. Example: 6.2V Zener = MMSZ5234B-7-F.

- 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 Sb₂O₃ Fire Retardants.
 5. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information



xx = Product Type Marking Code
(See Electrical Characteristics Table)
YM = Date Code Marking
Y = Year (ex: E = 2017)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2013 | 2014 | 2015 | 2016 | 2017 | ... | 2020 | 2021 | 2022 | 2023 | 2024 |
|------|------|------|------|------|------|-----|------|------|------|------|------|
| Code | A | B | C | D | E | ... | H | I | J | K | L |

| 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°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|----------------|-------|------|
| Forward Voltage @ I _F = 10mA | V _F | 0.9 | V |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 4) @T _L = +75°C | P _D | 500 | mW |
| Power Dissipation (Note 5) @T _A = +25°C | P _D | 370 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 5) | R _{θJA} | 338 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -65 to +150 | °C |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Type Number | Type Code | Zener Voltage Range (Note 6) | | | Test Current | Maximum Zener Impedance f = 1KHz | | Maximum Reverse Leakage Current (Note 6) | |
|-------------|-----------|----------------------------------|---------|---------|--------------|-------------------------------------|-----------------------------------|---|----------------|
| | | V _Z @ I _{ZT} | | | | I _{ZT} | Z _{ZT} @ I _{ZT} | Z _{ZK} @ I _{ZK} = 0.25mA | I _R |
| | | Nom (V) | Min (V) | Max (V) | mA | Ω | | μA | V |
| MMSZ5221B | C1 | 2.4 | 2.28 | 2.52 | 20 | 30 | 1,200 | 100 | 1.0 |
| MMSZ5223B | C3 | 2.7 | 2.57 | 2.84 | 20 | 30 | 1,300 | 75 | 1.0 |
| MMSZ5225B | C5 | 3.0 | 2.85 | 3.15 | 20 | 30 | 1,600 | 50 | 1.0 |
| MMSZ5226B | G1 | 3.3 | 3.14 | 3.47 | 20 | 28 | 1,600 | 25 | 1.0 |
| MMSZ5227B | G2 | 3.6 | 3.42 | 3.78 | 20 | 24 | 1,700 | 15 | 1.0 |
| MMSZ5228B | G3 | 3.9 | 3.71 | 4.10 | 20 | 23 | 1,900 | 10 | 1.0 |
| MMSZ5229B | G4 | 4.3 | 4.09 | 4.52 | 20 | 22 | 2,000 | 5.0 | 1.0 |
| MMSZ5230B | G5 | 4.7 | 4.47 | 4.94 | 20 | 19 | 1,900 | 5.0 | 2.0 |
| MMSZ5231B | E1 | 5.1 | 4.85 | 5.36 | 20 | 17 | 1,600 | 5.0 | 2.0 |
| MMSZ5232B | E2 | 5.6 | 5.32 | 5.88 | 20 | 11 | 1,600 | 5.0 | 3.0 |
| MMSZ5233B | E3 | 6.0 | 5.70 | 6.30 | 20 | 7 | 1,600 | 5.0 | 3.5 |
| MMSZ5234B | E4 | 6.2 | 5.89 | 6.51 | 20 | 7 | 1,000 | 5.0 | 4.0 |
| MMSZ5235B | E5 | 6.8 | 6.46 | 7.14 | 20 | 5 | 750 | 3.0 | 5.0 |
| MMSZ5236B | F1 | 7.5 | 7.13 | 7.88 | 20 | 6 | 500 | 3.0 | 6.0 |
| MMSZ5237B | F2 | 8.2 | 7.79 | 8.61 | 20 | 8 | 500 | 3.0 | 6.5 |
| MMSZ5238B | F3 | 8.7 | 8.27 | 9.14 | 20 | 8 | 600 | 3.0 | 6.5 |
| MMSZ5239B | F4 | 9.1 | 8.65 | 9.56 | 20 | 10 | 600 | 3.0 | 7.0 |
| MMSZ5240B | F5 | 10 | 9.50 | 10.50 | 20 | 17 | 600 | 3.0 | 8.0 |
| MMSZ5241B | H1 | 11 | 10.45 | 11.55 | 20 | 22 | 600 | 2.0 | 8.4 |
| MMSZ5242B | H2 | 12 | 11.40 | 12.60 | 20 | 30 | 600 | 1.0 | 9.1 |
| MMSZ5243B | H3 | 13 | 12.35 | 13.65 | 9.5 | 13 | 600 | 0.5 | 9.9 |
| MMSZ5245B | H5 | 15 | 14.25 | 15.75 | 8.5 | 16 | 600 | 0.1 | 11 |
| MMSZ5246B | J1 | 16 | 15.20 | 16.80 | 7.8 | 17 | 600 | 0.1 | 12 |
| MMSZ5248B | J3 | 18 | 17.10 | 18.90 | 7.0 | 21 | 600 | 0.1 | 14 |
| MMSZ5250B | J5 | 20 | 19.00 | 21.00 | 6.2 | 25 | 600 | 0.1 | 15 |
| MMSZ5251B | K1 | 22 | 20.90 | 23.10 | 5.6 | 29 | 600 | 0.1 | 17 |
| MMSZ5252B | K2 | 24 | 22.80 | 25.20 | 5.2 | 33 | 600 | 0.1 | 18 |
| MMSZ5254B | K4 | 27 | 25.65 | 28.35 | 5.0 | 41 | 600 | 0.1 | 21 |
| MMSZ5255B | K5 | 28 | 26.60 | 29.40 | 4.5 | 44 | 600 | 0.1 | 21 |
| MMSZ5256B | M1 | 30 | 28.50 | 31.50 | 4.2 | 49 | 600 | 0.1 | 23 |
| MMSZ5257B | M2 | 33 | 31.35 | 34.65 | 3.8 | 58 | 700 | 0.1 | 25 |
| MMSZ5258B | M3 | 36 | 34.20 | 37.80 | 3.4 | 70 | 700 | 0.1 | 27 |
| MMSZ5259B | M4 | 39 | 37.05 | 40.95 | 3.2 | 80 | 800 | 0.1 | 30 |

Notes: 4. R_{θJL} = 132°C/W
 5. Device mounted on FR-4 PCB with 1 inch copper pad layout.
 6. Short duration pulse test used to minimize self-heating effect.



Figure 1 Power Derating Curve



Figure 2 Typical Zener Breakdown Characteristics



Figure 3 Typical Zener Breakdown Characteristics

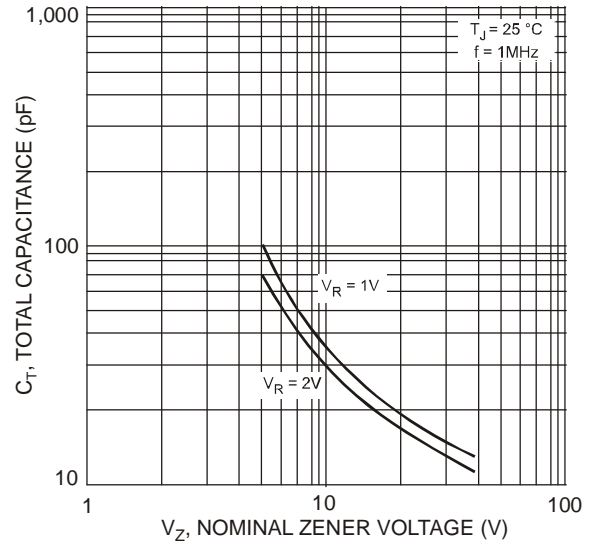


Figure 4 Typical Total Capacitance vs. Nominal Zener Voltage



Figure 5 Typical Zener Impedance Characteristics



Figure 6 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage (MMSZ5227B - MMSZ5258B)

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOD123

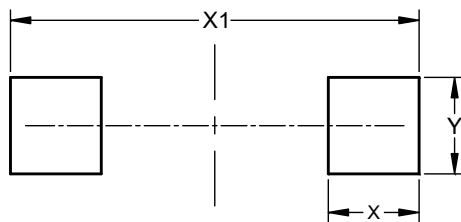


| SOD123 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 1.00 | 1.35 | 1.05 |
| A1 | 0.00 | 0.10 | 0.05 |
| b | 0.52 | 0.62 | 0.57 |
| c | 0.10 | 0.15 | 0.11 |
| D | 1.40 | 1.70 | 1.55 |
| E | 2.55 | 2.85 | 2.65 |
| He | 3.55 | 3.85 | 3.65 |
| L | 0.25 | 0.40 | 0.30 |
| a | 0° | 8° | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOD123



| Dimensions | Value (in mm) |
|------------|---------------|
| X | 0.900 |
| X1 | 4.050 |
| Y | 0.950 |

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