



**THE DATASHEET OF  
SM6227FT649R**



## Features

- Dual Zeners in Common Anode Configuration
- 300mW Power Dissipation Rating
- Ideally Suited for Automated Insertion
- $\Delta V_Z$  for Both Diodes in One Case is  $\leq 5\%$
- Common Cathode Style Available: See DZ23 Series
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

## ESD Sensitivity Rating

- AEC-Q101, HBM - 8kV, MM - 400V
- IEC 61000-4-2, Air - 15kV, Contact - 8kV



## Ordering Information (Note 4)

| Part Number         | Qualification | Case  | Packaging        |
|---------------------|---------------|-------|------------------|
| (Type Number)-7-F*  | Commercial    | SOT23 | 3000/Tape & Reel |
| (Type Number)Q-7-F* | Automotive    | SOT23 | 3000/Tape & Reel |

\*Add "-7-F" to the appropriate type number in Electrical Characteristics Table on Page 2 example: 6.2V Zener = AZ23C6V2-7F.

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free/](http://www.diodes.com/quality/lead_free/) 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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**



K/D = SAT (Shanghai Assembly / Test site)  
 xx = Product Type Marking Code  
 See Electrical Characteristics Table  
 YM = Date Code Marking  
 Y = Year (ex: F = 2018)  
 M = Month (ex: 9 = September)



For AZ23C5V1-7-F & AZ23C6V2-7-F only:  
 Assembly/Test in Shanghai or Chuzhou  
 M or  $\bar{M}$  = Month (ex: 9 = September)



C = CAT (Chengdu Assembly / Test site)  
 xx = Product Type Marking Code  
 See Electrical Characteristics Table  
 YM = Date Code Marking  
 Y = Year (ex: F = 2018)  
 M = Month (ex: 9 = September)

Date Code Key

|              |             |            |             |             |             |             |             |             |             |             |             |             |
|--------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Year</b>  | <b>2014</b> | .....      | <b>2021</b> | <b>2022</b> | <b>2023</b> | <b>2024</b> | <b>2025</b> | <b>2026</b> | <b>2027</b> | <b>2028</b> | <b>2029</b> | <b>2030</b> |
| <b>Code</b>  | B           | .....      | I           | J           | K           | L           | M           | N           | O           | P           | R           | S           |
| <b>Month</b> | <b>Jan</b>  | <b>Feb</b> | <b>Mar</b>  | <b>Apr</b>  | <b>May</b>  | <b>Jun</b>  | <b>Jul</b>  | <b>Aug</b>  | <b>Sep</b>  | <b>Oct</b>  | <b>Nov</b>  | <b>Dec</b>  |
| <b>Code</b>  | 1           | 2          | 3           | 4           | 5           | 6           | 7           | 8           | 9           | O           | N           | D           |

### Thermal Characteristics

| Characteristic                                       | Symbol          | Value       | Unit          |
|--|-----------------|-------------|---------------|
| Power Dissipation (Note 5)                           | $P_D$           | 300         | mW            |
| Thermal Resistance, Junction to Ambient Air (Note 5) | $R_{\theta JA}$ | 417         | $^{\circ}C/W$ |
| Operating and Storage Temperature Range              | $T_J, T_{STG}$  | -65 to +150 | $^{\circ}C$   |

Note: 5. Mounted on FR-4 PC Board with recommended pad layout which can be found on our website at <http://www.diodes.com/package-outlines.html>.

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

| Type Number | Marking Code | Zener Voltage Range (Note 6) | Maximum Zener Impedance<br>$f = 1kHz$ |                             | Typical Temperature Coefficient | Min. Reverse Voltage (Note 6) |
|-------------|--------------|------------------------------|---------------------------------------|-----------------------------|---------------------------------|-------------------------------|
|             |              | @ $I_{ZT} = 5.0mA$           | $Z_{ZT}$ @ $I_{ZT} = 5.0mA$           | $Z_{ZK}$ @ $I_{ZK} = 1.0mA$ |                                 | @ $I_R = 0.1\mu A$            |
|             |              | $V_Z$ (V)                    | $\Omega$                              | $\Omega$                    | $T_C$ (%/ $^{\circ}C$ )         | $V_R$ (V)                     |
| AZ23C2V7    | D1           | 2.5 to 2.9                   | 83                                    | 500                         | -0.065                          | —                             |
| AZ23C3V0    | D2           | 2.8 to 3.2                   | 95                                    | 500                         | -0.060                          | —                             |
| AZ23C3V3    | D3           | 3.1 to 3.5                   | 95                                    | 500                         | -0.055                          | —                             |
| AZ23C3V6    | D4           | 3.4 to 3.8                   | 95                                    | 500                         | -0.055                          | —                             |
| AZ23C3V9    | D5           | 3.7 to 4.1                   | 95                                    | 500                         | -0.050                          | —                             |
| AZ23C4V3    | D6           | 4.0 to 4.6                   | 95                                    | 500                         | -0.035                          | —                             |
| AZ23C4V7    | D7           | 4.4 to 5.0                   | 78                                    | 500                         | -0.015                          | —                             |
| AZ23C5V1    | D8           | 4.8 to 5.4                   | 60                                    | 480                         | +0.005                          | 0.8                           |
| AZ23C5V6    | D9           | 5.2 to 6.0                   | 40                                    | 400                         | +0.020                          | 1.0                           |
| AZ23C6V2    | DA           | 5.8 to 6.6                   | 10                                    | 200                         | +0.030                          | 2.0                           |
| AZ23C6V8    | DB           | 6.4 to 7.2                   | 8.0                                   | 150                         | +0.045                          | 3.0                           |
| AZ23C7V5    | DC           | 7.0 to 7.9                   | 7.0                                   | 50                          | +0.050                          | 5.0                           |
| AZ23C8V2    | DD           | 7.7 to 8.7                   | 7.0                                   | 50                          | +0.055                          | 6.0                           |
| AZ23C9V1    | DE           | 8.5 to 9.6                   | 10                                    | 50                          | +0.065                          | 7.0                           |
| AZ23C10     | DF           | 9.4 to 10.6                  | 15                                    | 70                          | +0.065                          | 7.5                           |
| AZ23C11     | DG           | 10.4 to 11.6                 | 20                                    | 70                          | +0.070                          | 8.5                           |
| AZ23C12     | DH           | 11.4 to 12.7                 | 20                                    | 90                          | +0.075                          | 9.0                           |
| AZ23C13     | DI           | 12.4 to 14.1                 | 25                                    | 110                         | +0.080                          | 10.0                          |
| AZ23C15     | DJ           | 13.8 to 15.6                 | 30                                    | 110                         | +0.080                          | 11.0                          |
| AZ23C16     | DK           | 15.3 to 17.1                 | 40                                    | 170                         | +0.090                          | 12.0                          |
| AZ23C18     | DL           | 16.8 to 19.1                 | 50                                    | 170                         | +0.090                          | 14.0                          |
| AZ23C20     | DM           | 18.8 to 21.2                 | 50                                    | 220                         | +0.090                          | 15.0                          |
| AZ23C22     | DN           | 20.8 to 23.3                 | 55                                    | 220                         | +0.090                          | 17.0                          |
| AZ23C24     | DO           | 22.8 to 25.6                 | 80                                    | 220                         | +0.090                          | 18.0                          |
| AZ23C27     | DP           | 25.1 to 28.9                 | 80                                    | 250                         | +0.090                          | 20.0                          |
| AZ23C30     | DQ           | 28 to 32                     | 80                                    | 250                         | +0.090                          | 22.5                          |
| AZ23C33     | DR           | 31 to 35                     | 80                                    | 250                         | +0.090                          | 25.0                          |
| AZ23C36     | DS           | 34 to 38                     | 90                                    | 250                         | +0.090                          | 27.0                          |
| AZ23C39     | DT           | 37 to 41                     | 90                                    | 300                         | +0.110                          | 29.0                          |
| AZ23C43     | 30           | 40 to 46                     | 100                                   | 700                         | +0.110                          | 32.0                          |
| AZ23C47     | 31           | 44 to 50                     | 100                                   | 750                         | +0.110                          | 35.0                          |
| AZ23C51     | 32           | 48 to 54                     | 100                                   | 750                         | +0.110                          | 38.0                          |

Note: 6. Short duration pulse test used to minimize self-heating effect.



Fig. 1 Power Derating Curve

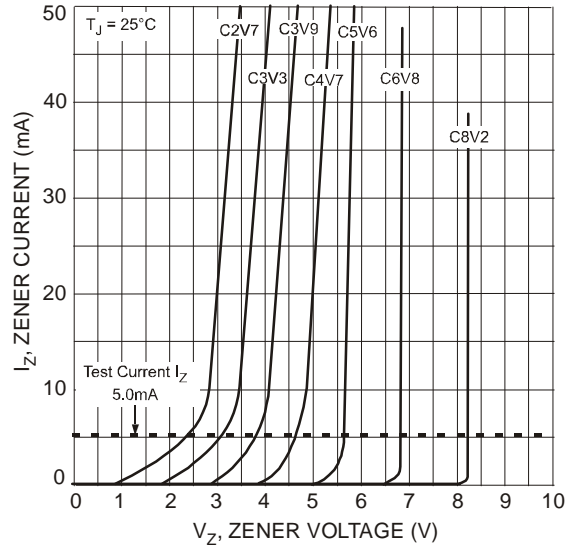


Fig. 2 Typical Zener Breakdown Characteristics

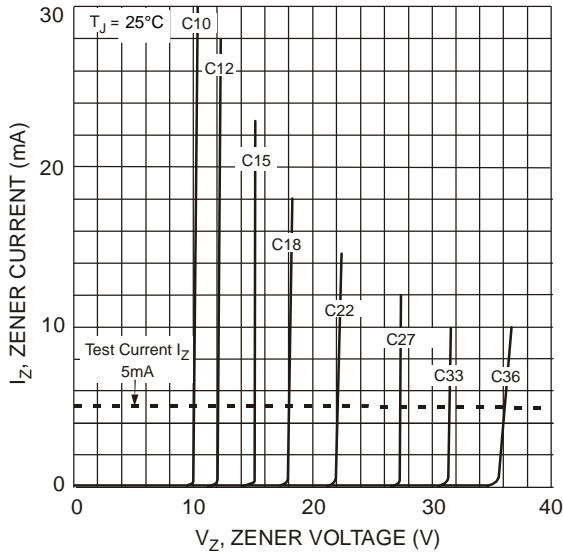


Fig. 3 Typical Zener Breakdown Characteristics

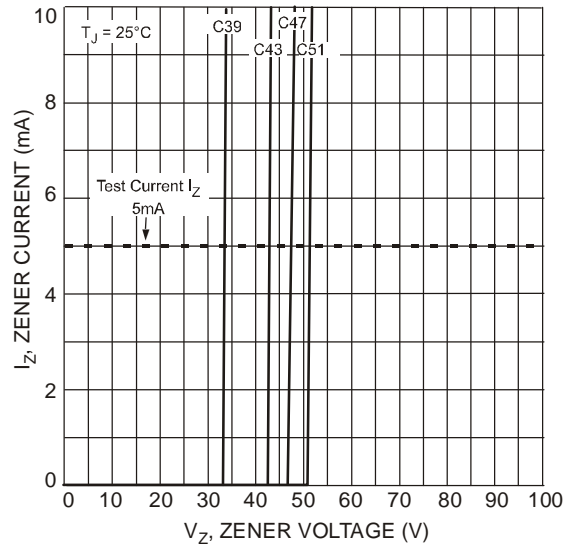


Fig. 4 Typical Zener Breakdown Characteristics

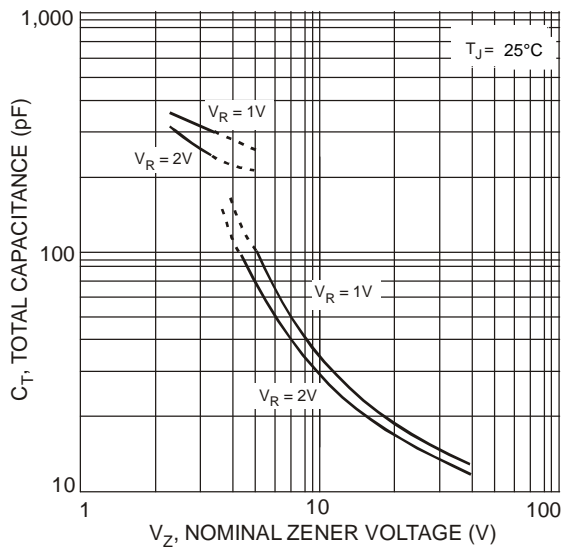
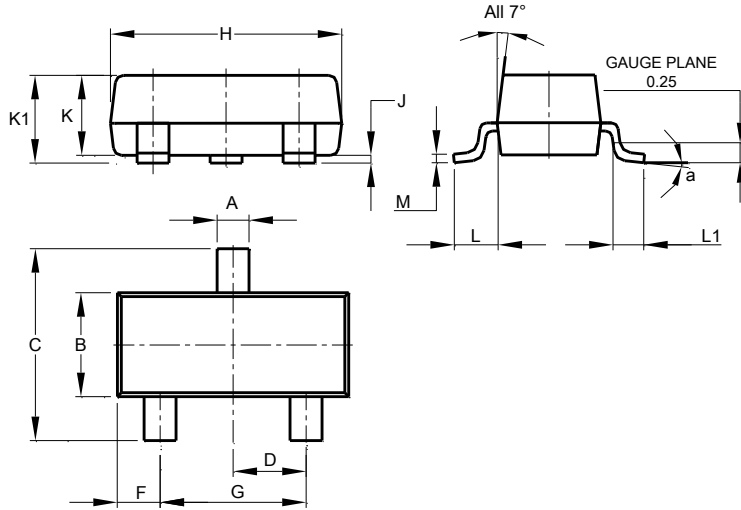


Fig. 5 Typical Total Capacitance vs. Nominal Zener Voltage

**Package Outline Dimensions**

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

**SOT23**



| 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                    | 0°    | 8°    | --    |
| All Dimensions in mm |       |       |       |

For AZ23C5V1-7-F & AZ23C6V2-7-F only:

**SOT23 (Standard)**



| SOT23 (Standard)     |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.90  | 1.15  | 1.025 |
| A1                   | 0.00  | 0.10  | 0.05  |
| A2                   | 0.85  | 1.10  | 0.975 |
| b                    | 0.30  | 0.51  | 0.40  |
| c                    | 0.080 | 0.202 | 0.11  |
| D                    | 2.80  | 3.00  | 2.90  |
| E                    | 2.25  | 2.55  | 2.40  |
| E1                   | 1.20  | 1.40  | 1.30  |
| e                    | 0.89  | 1.03  | 0.915 |
| e1                   | 1.78  | 2.05  | 1.83  |
| F                    | 0.40  | 0.60  | 0.535 |
| L1                   | 0.45  | 0.61  | 0.55  |
| L                    | 0.25  | 0.55  | 0.40  |
| a                    | 0°    | 8°    | --    |
| All Dimensions in mm |       |       |       |

**Suggested Pad Layout**

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

**SOT23**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 2.0           |
| X          | 0.8           |
| X1         | 1.35          |
| Y          | 0.9           |
| Y1         | 2.9           |

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