

**60V N-CHANNEL ENHANCEMENT MODE VERTICAL DMOSFET IN SOT23**

**Features**

- $BV_{DSS} > 60V$
- $R_{DS(on)} \leq 2.5\Omega @ V_{GS} = 10V$
- Maximum continuous drain current  $I_D = 200mA$
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

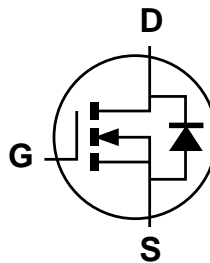
**Mechanical Data**

- 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. Solderable per MIL-STD-202, Method 208  $\text{e3}$
- Weight: 0.008 grams (approximate)

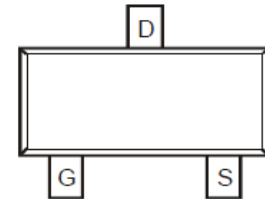
SOT23



Top View



Device symbol



Pin-Out  
Top View

**Ordering Information** (Note 4)

| Part Number | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|---------|--------------------|-----------------|-------------------|
| ZVN4106FTA  | MZ      | 7                  | 8               | 3000              |

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

**Marking Information**



MZ = Product Type Marking Code

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

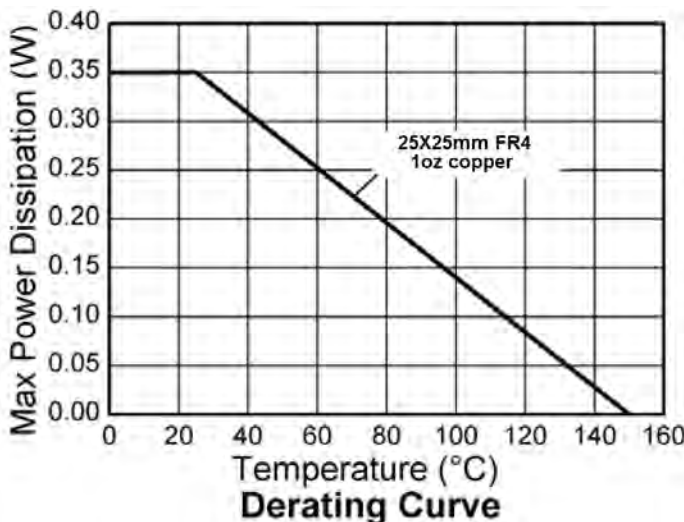
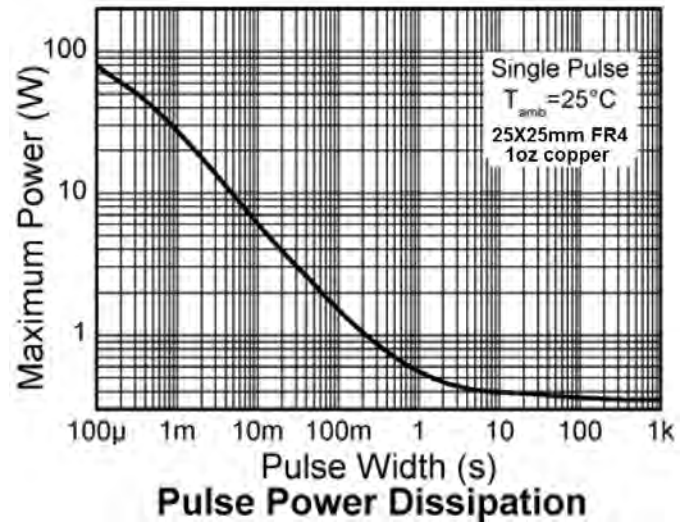
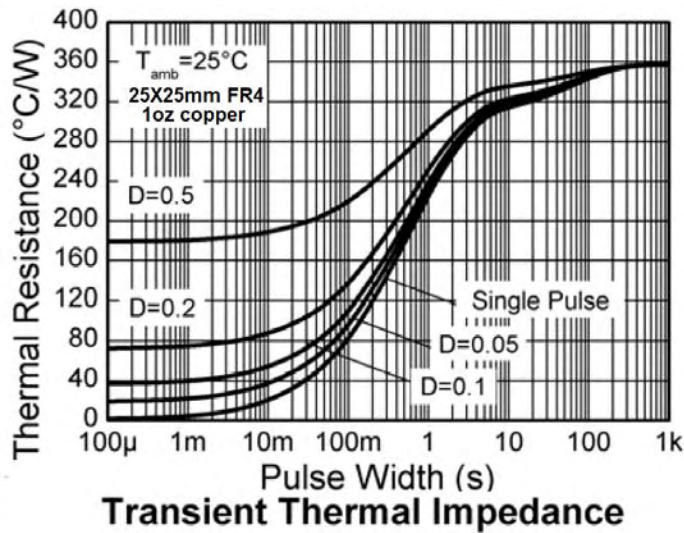
| Characteristic                | Symbol    | Value    | Unit |
|-------------------------------|-----------|----------|------|
| Drain-Source Voltage          | $V_{DSS}$ | 60       | V    |
| Gate-Source Voltage           | $V_{GSS}$ | $\pm 20$ | V    |
| Continuous Drain Current      | $I_D$     | 200      | mA   |
| Pulsed Drain Current (Note 5) | $I_{DM}$  | 3        | A    |

**Thermal Characteristics**

| Characteristic                                   | Symbol          | Value       | Unit                      |
|--|-----------------|-------------|---------------------------|
| Power Dissipation (Note 6)                       | $P_D$           | 350         | mW                        |
| Thermal Resistance, Junction to Ambient (Note 6) | $R_{\theta JA}$ | 357         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range          | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

Notes: 5. Device mounted on minimum recommended pad layout test board, 10  $\mu\text{s}$  pulse duty cycle = 1%.  
6. For a device mounted on 25mm X 25mm X 1.6mm FR-4 PCB with high coverage of single sided 1oz copper, in still air condition.

**Thermal Characteristics**

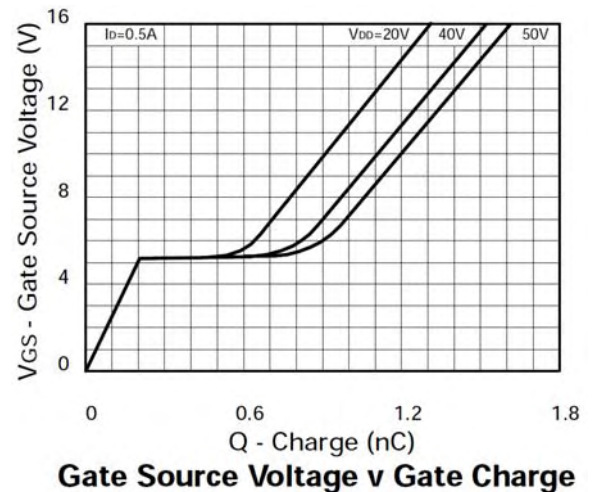
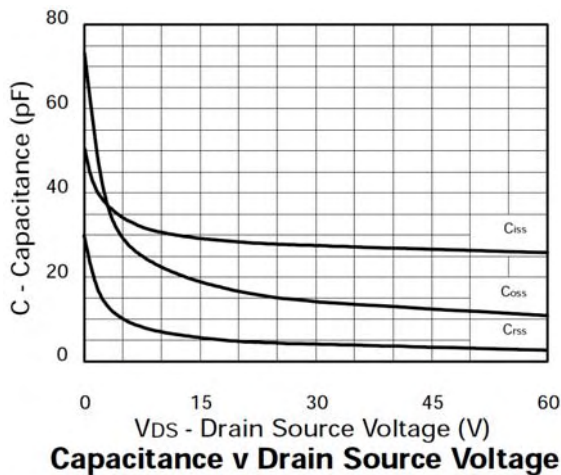
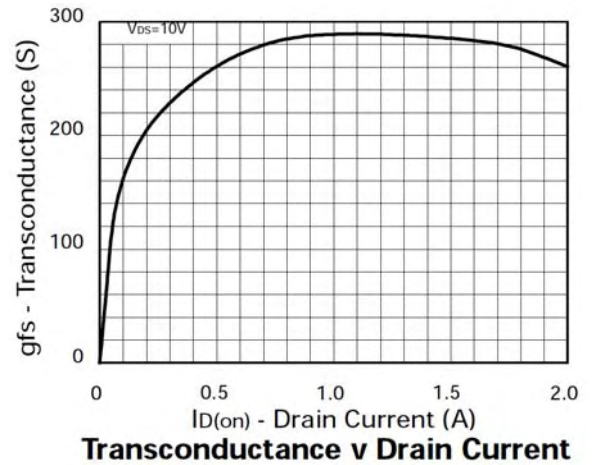
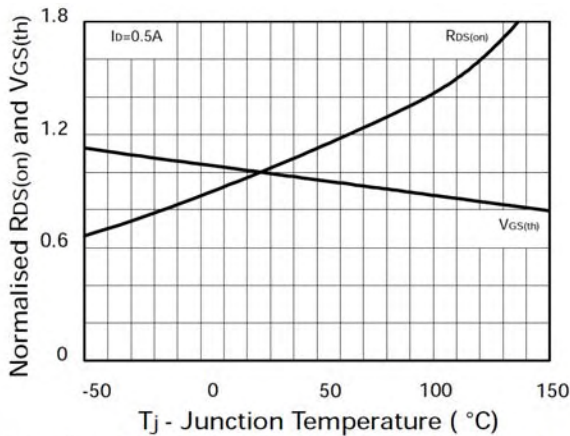
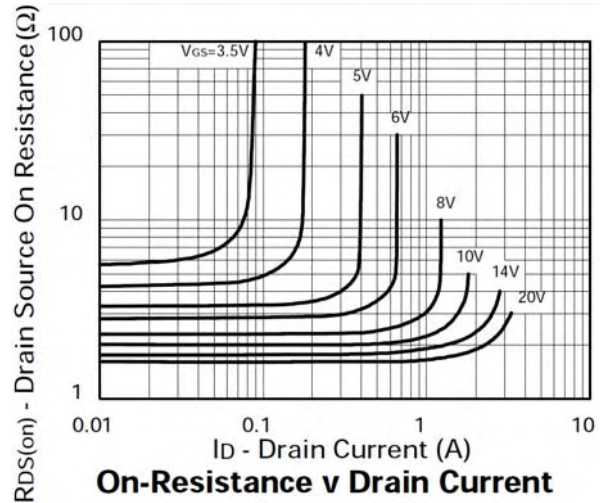
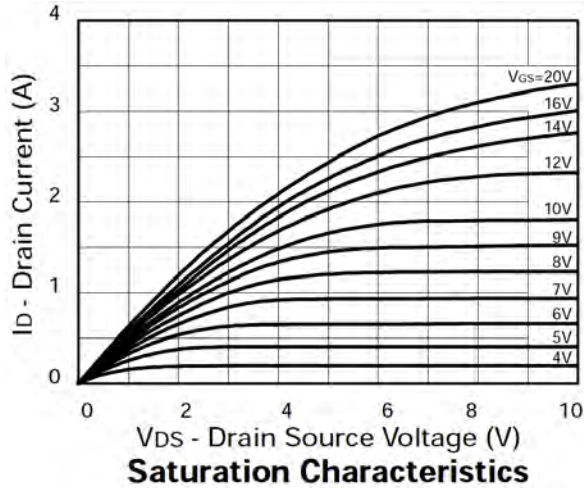


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

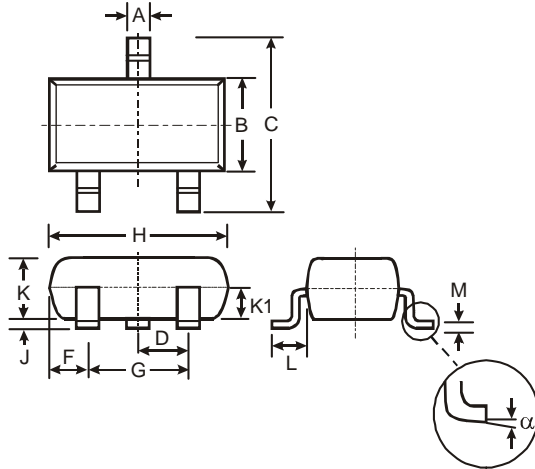
| Characteristic   | Symbol              | Min | Typ | Max      | Unit | Test Condition  |
|--|---------------------|-----|-----|----------|------|---|
| <b>OFF CHARACTERISTICS (Note 7)</b>                    |                     |     |     |          |      |   |
| Drain-Source Breakdown Voltage                         | BV <sub>DSS</sub>   | 60  | —   | —        | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 10mA   |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C | I <sub>DSS</sub>    | —   | —   | 10<br>50 | μA   | V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V<br>V <sub>DS</sub> = 48V, V <sub>GS</sub> = 0V, T <sub>A</sub> = +125°C |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | —   | —   | 100      | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V  |
| On-State Drain Current                                 | I <sub>D(on)</sub>  | 1   | —   | -        | A    | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V  |
| <b>ON CHARACTERISTICS (Note 7)</b>                     |                     |     |     |          |      |   |
| Gate Threshold Voltage                                 | V <sub>GS(th)</sub> | 1.3 | —   | 3        | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA  |
| Static Drain-Source On-Resistance                      | R <sub>DS(on)</sub> | —   | —   | 2.5<br>5 | Ω    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 500mA<br>V <sub>GS</sub> = 5V, I <sub>D</sub> = 200mA                       |
| Forward Transconductance                               | g <sub>fs</sub>     | 150 | —   | -        | mS   | V <sub>DS</sub> = 25V, I <sub>D</sub> = 250mA   |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b>                |                     |     |     |          |      |   |
| Input Capacitance                                      | C <sub>iss</sub>    | —   | —   | 35       | pF   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz  |
| Output Capacitance                                     | C <sub>oss</sub>    | —   | —   | 25       | pF   |   |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | —   | —   | 8        | pF   |   |
| Turn-On Delay Time                                     | t <sub>D(on)</sub>  | —   | —   | 5        | ns   | V <sub>DS</sub> = 25V, I <sub>D</sub> = 150mA   |
| Turn-On Rise Time                                      | t <sub>r</sub>      | —   | —   | 7        | ns   |   |
| Turn-Off Delay Time                                    | t <sub>D(off)</sub> | —   | —   | 6        | ns   |   |
| Turn-Off Fall Time                                     | t <sub>f</sub>      | —   | —   | 8        | ns   |   |

Notes: 7. Short duration pulse test used to minimize self-heating effect.

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

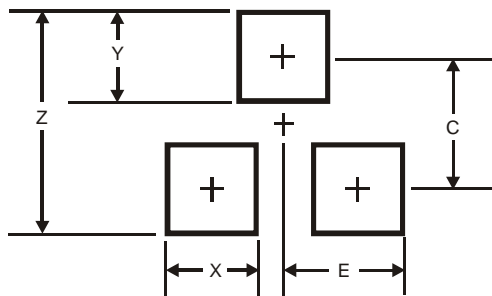


**Package Outline Dimensions**



| 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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