

**240V N-CHANNEL ENHANCEMENT MODE VERTICAL DMOSFET**

**Features**

- $BV_{DSS} > 240V$
- $R_{DS(ON)} \leq 6\Omega @ V_{GS} = 2.5V$
- $I_D = 260mA$  Maximum Continuous Drain Current
- Fast Switching Speed
- Low Threshold
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

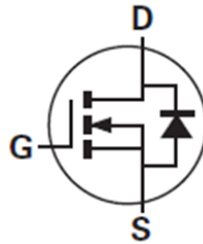
**Mechanical Data**

- Case: E-Line (TO92 Compatible)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Rating 94V-0
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208<sup>(3)</sup>
- Weight: 0.159 grams (Approximate)

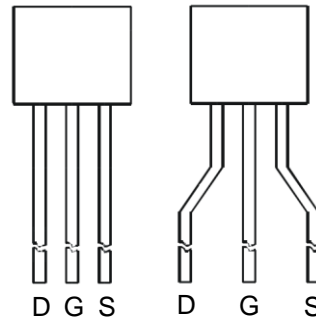
E-Line  
(TO92 Compatible)



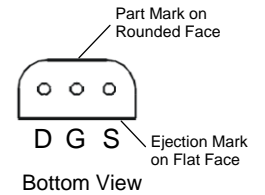
Flat Face View



Device Symbol



Rounded Face View

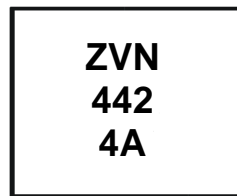


**Ordering Information** (Note 4)

| Part Number | Compliance | Package | Leads    | Quantity                 |
|-------------|------------|---------|----------|--------------------------|
| ZVN4424A    | AEC-Q101   | E-Line  | Straight | 4,000 Loose in a Box     |
| ZVN4424ASTZ | AEC-Q101   | E-Line  | Joggled  | 2,000 Taped per Ammo Box |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**



Rounded Face View

ZVN  
442 = Product Type Marking Code  
4A

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

| Characteristic           | Symbol           | Value | Unit |
|--------------------------|------------------|-------|------|
| Drain-Source Voltage     | V <sub>DSS</sub> | 240   | V    |
| Gate-Source Voltage      | V <sub>GSS</sub> | ±40   | V    |
| Continuous Drain Current | I <sub>D</sub>   | 260   | mA   |
| Pulsed Drain Current     | I <sub>DM</sub>  | 1.5   | A    |

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

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                       | P <sub>D</sub>                    | 750         | mW   |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 167         | °C/W |
| Thermal Resistance, Junction to Lead (Note 6)    | R <sub>θJL</sub>                  | 71          | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

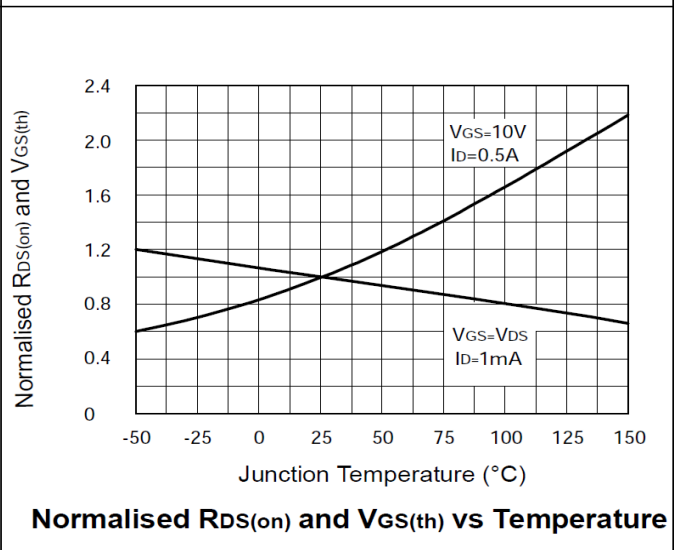
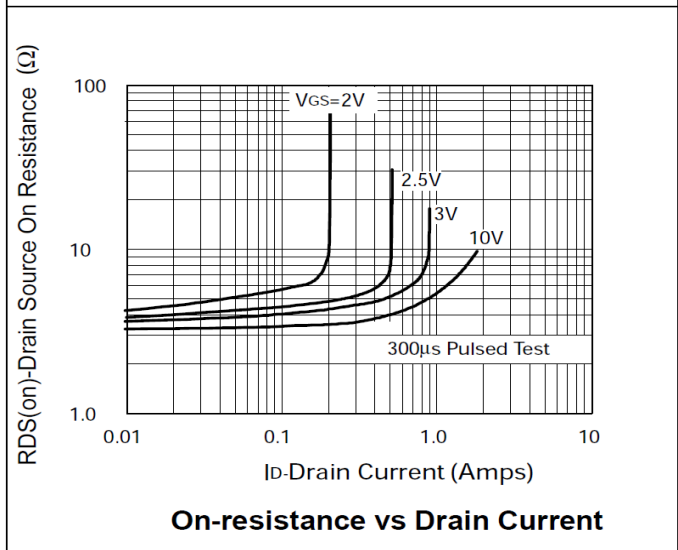
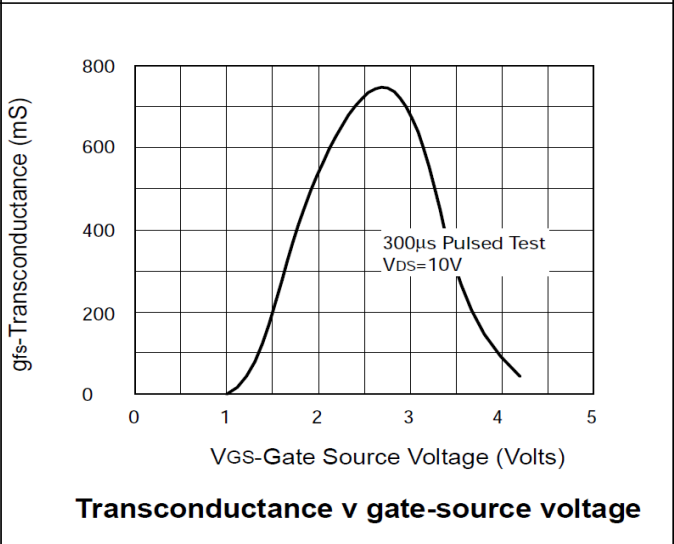
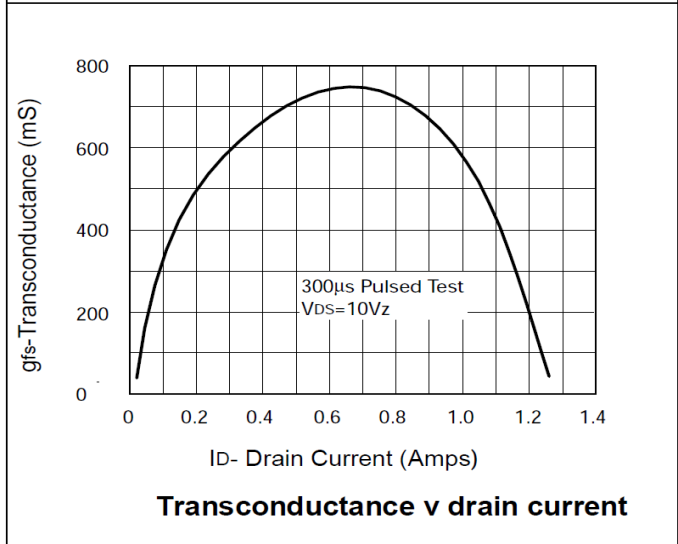
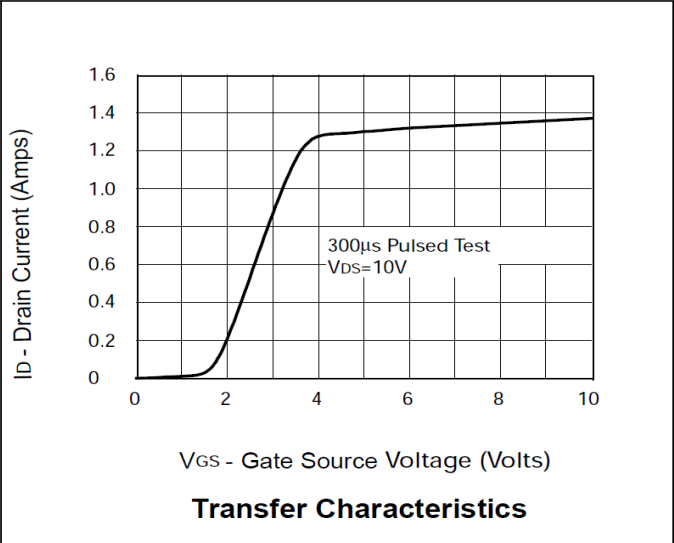
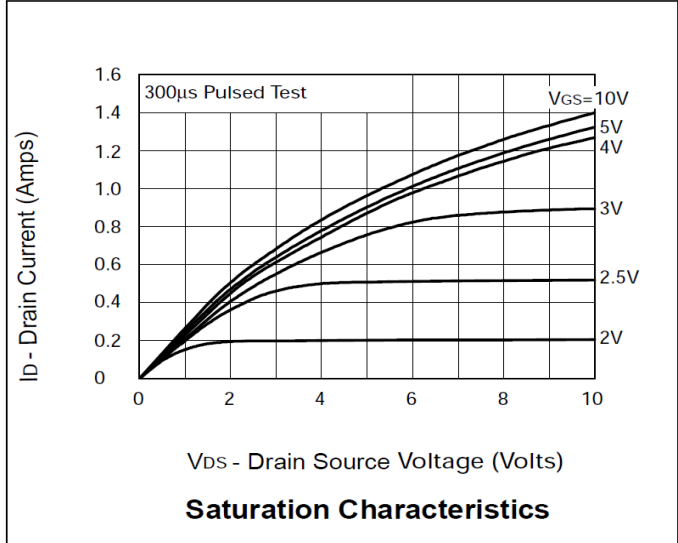
- Notes:
- For a through-hole device mounted on the minimum recommended pad layout with 12mm lead length from the bottom of package to the single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Thermal resistance from junction to solder-point at the seating plane (2.5mm from the bottom of package along the collector lead).

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

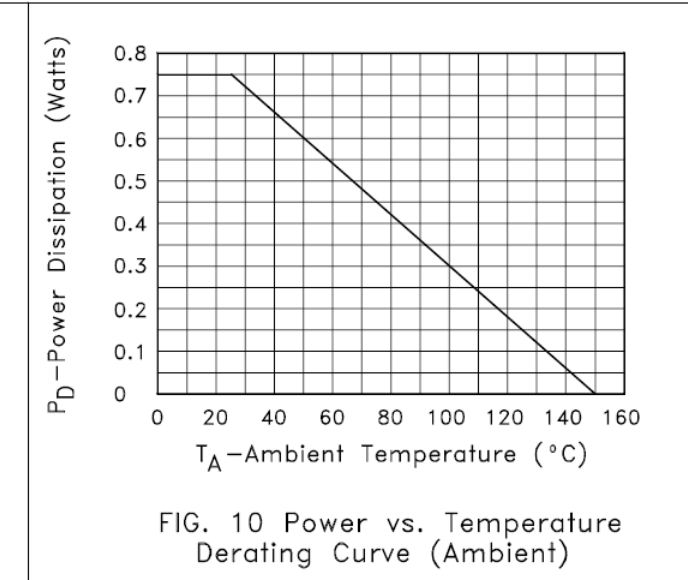
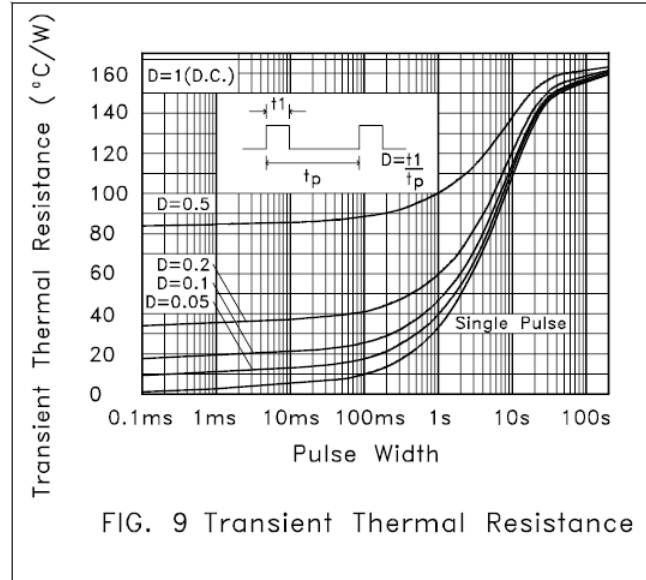
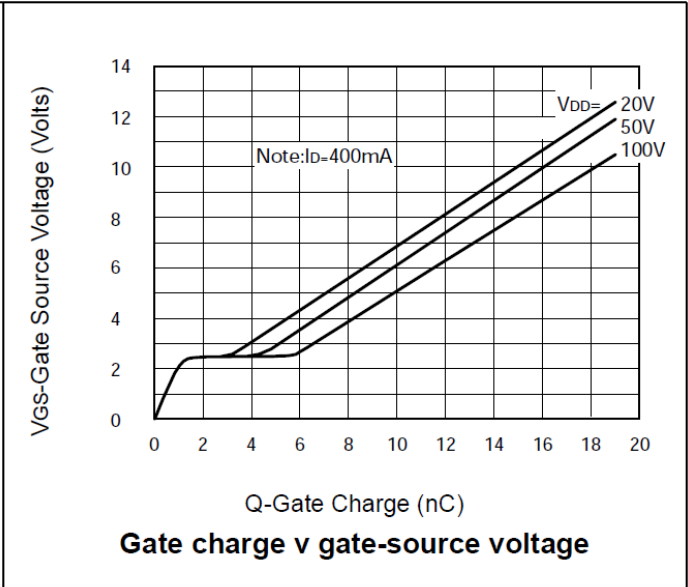
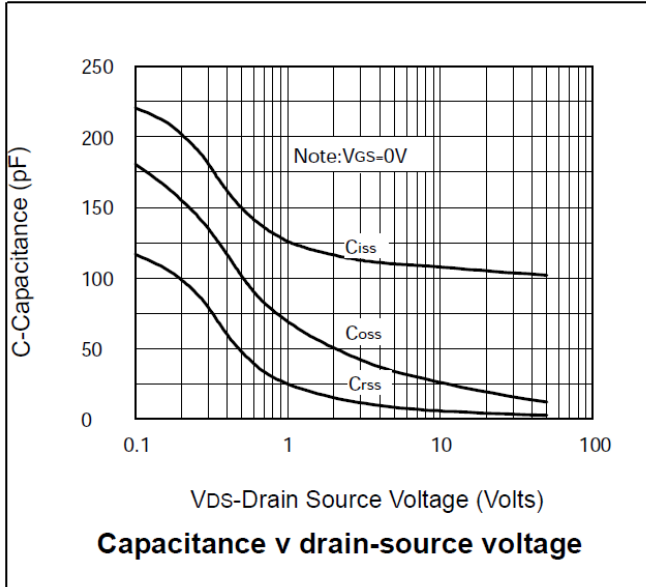
| Characteristic                             | Symbol              | Min | Typ  | Max       | Unit | Test Condition   |
|--|---------------------|-----|------|-----------|------|--|
| <b>OFF CHARACTERISTICS</b>                 |                     |     |      |           |      |  |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>   | 240 | —    | —         | V    | I <sub>D</sub> = 1mA, V <sub>GS</sub> = 0V   |
| Zero Gate Voltage Drain Current            | I <sub>DSS</sub>    | —   | —    | 10<br>100 | μA   | V <sub>DS</sub> = 240V, V <sub>GS</sub> = 0V<br>V <sub>DS</sub> = 190V, V <sub>GS</sub> = 0V, T = +125°C |
| Gate-Source Leakage                        | I <sub>GSS</sub>    | —   | —    | 100       | nA   | V <sub>GS</sub> = ±40V, V <sub>DS</sub> = 0V   |
| <b>ON CHARACTERISTICS</b>                  |                     |     |      |           |      |  |
| Gate Threshold Voltage                     | V <sub>GS(TH)</sub> | 0.8 | 1.3  | 1.8       | V    | I <sub>D</sub> = 1mA, V <sub>DS</sub> = V <sub>GS</sub>  |
| Static Drain-Source On-Resistance (Note 7) | R <sub>DS(ON)</sub> | —   | 4    | 5.5       | Ω    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 500mA<br>V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 500mA          |
|  |                     |     | 4.3  | 6         |      |  |
| Forward Transconductance (Notes 7 & 9)     | g <sub>FS</sub>     | 0.4 | 0.75 | —         | S    | V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.5A   |
| <b>DYNAMIC CHARACTERISTICS (Note 9)</b>    |                     |     |      |           |      |  |
| Input Capacitance                          | C <sub>ISS</sub>    | —   | 110  | 200       | pF   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |
| Output Capacitance                         | C <sub>OSS</sub>    | —   | 15   | 25        |      |  |
| Reverse Transfer Capacitance               | C <sub>RSS</sub>    | —   | 3.5  | 15        |      |  |
| Turn-On Delay Time (Note 8)                | t <sub>D(ON)</sub>  | —   | 2.5  | 5         | ns   | V <sub>DD</sub> = 50V, V <sub>GEN</sub> = 10V<br>I <sub>D</sub> = 0.25A                                  |
| Turn-On Rise Time (Note 8)                 | t <sub>R</sub>      | —   | 5    | 8         |      |  |
| Turn-Off Delay Time (Note 8)               | t <sub>D(OFF)</sub> | —   | 40   | 60        |      |  |
| Turn-Off Fall Time (Note 8)                | t <sub>F</sub>      | —   | 16   | 25        |      |  |

- Notes:
- Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.
  - Switching characteristics are independent of operating junction temperature. Switching times are measured with 50Ω source impedance and <5ns rise time on a pulse generator.
  - For design aid only, not subject to production testing.

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



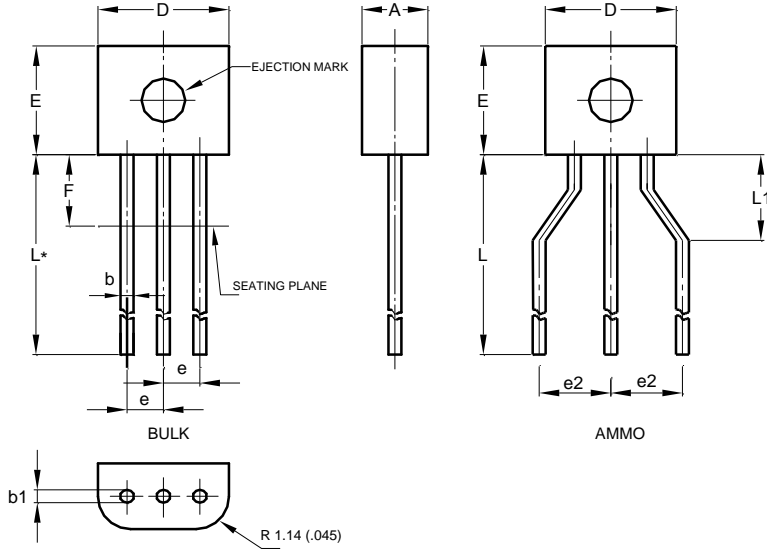
**Typical Electrical Characteristics** (Cont.) (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

**E-Line**



| E-Line                      |       |       |      |
|-----------------------------|-------|-------|------|
| Dim                         | Min   | Max   | Typ  |
| A                           | 2.16  | 2.41  | -    |
| b                           | 0.41  | 0.495 | -    |
| b1                          | 0.41  | 0.495 | -    |
| D                           | 4.37  | 4.77  | -    |
| E                           | 3.61  | 4.01  | -    |
| e                           | -     | -     | 1.27 |
| e2                          | -     | -     | 2.54 |
| F                           | -     | 2.50  | -    |
| L                           | 13.00 | 13.97 | -    |
| L1                          | 2.50  | 3.50  | -    |
| <b>All Dimensions in mm</b> |       |       |      |

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