



**THE DATASHEET OF  
ZVN4424ASTZ**



**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**

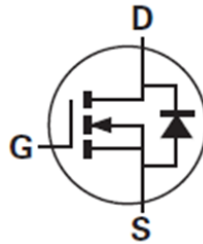
**Mechanical Data**

- 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)

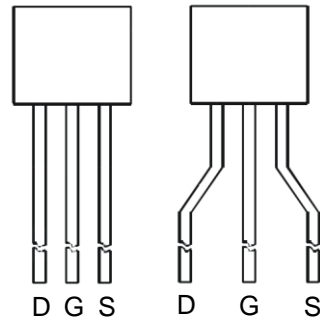
E-Line  
(TO92 Compatible)



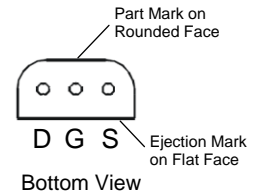
Flat Face View



Device Symbol



Rounded Face View

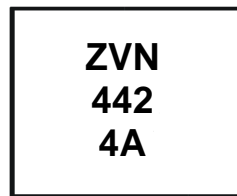


**Ordering Information** (Note 4)

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

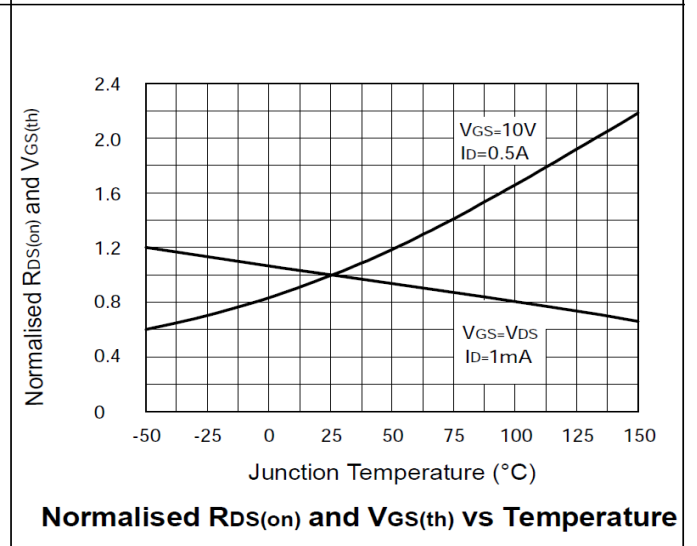
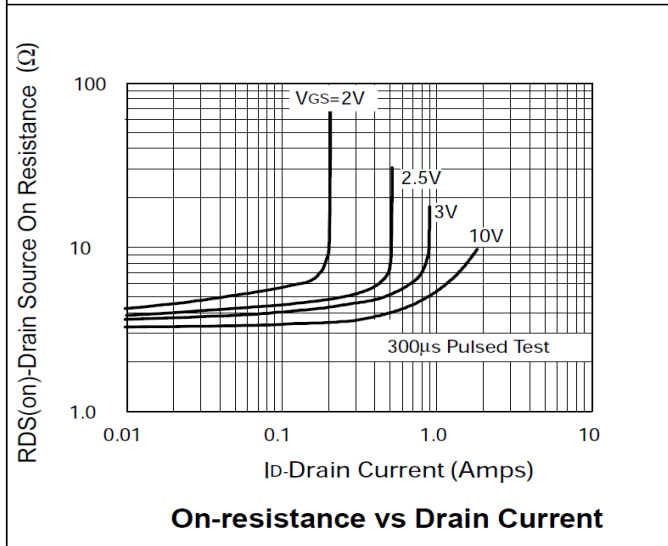
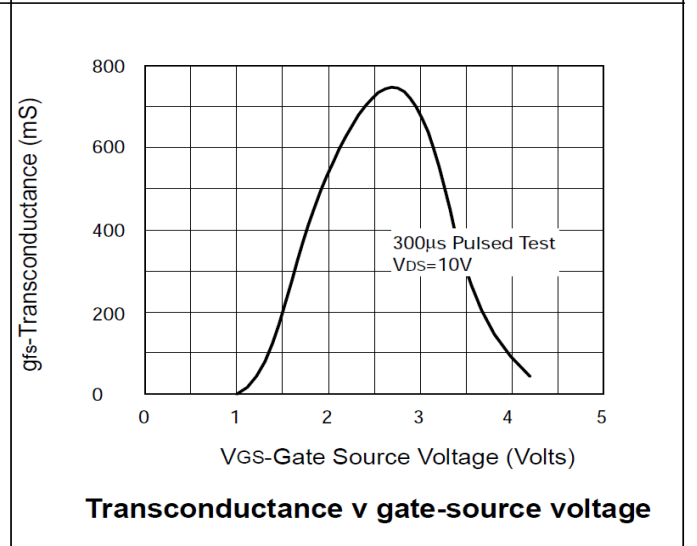
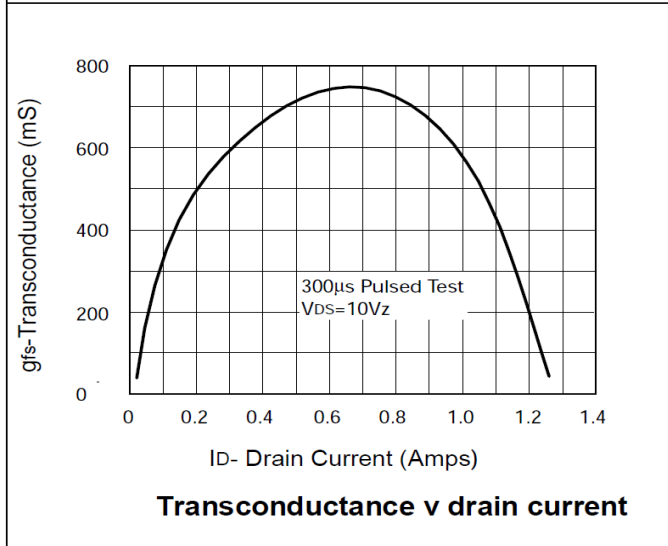
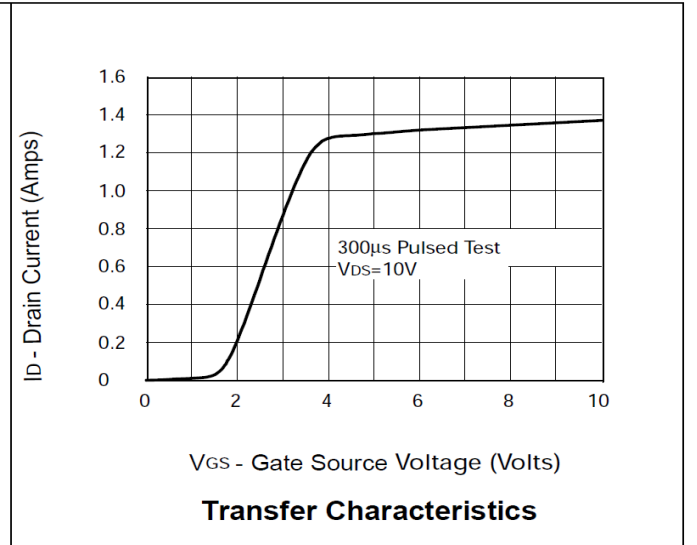
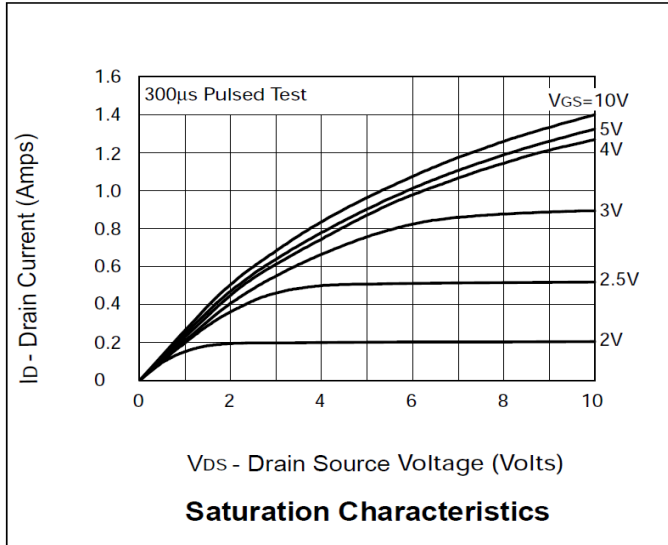
- Notes:
- For a through-hole device mounted on the minimum recommended pad layout with 12mm lead length from the bottom of package to the single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Thermal resistance from junction to solder-point at the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

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

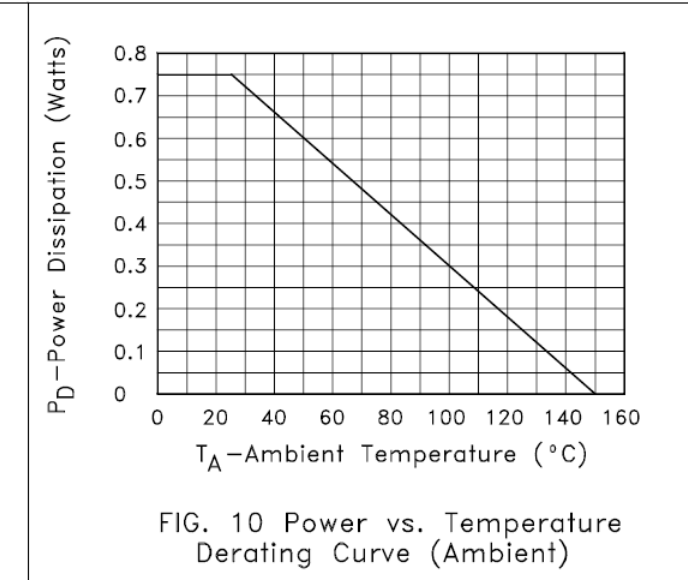
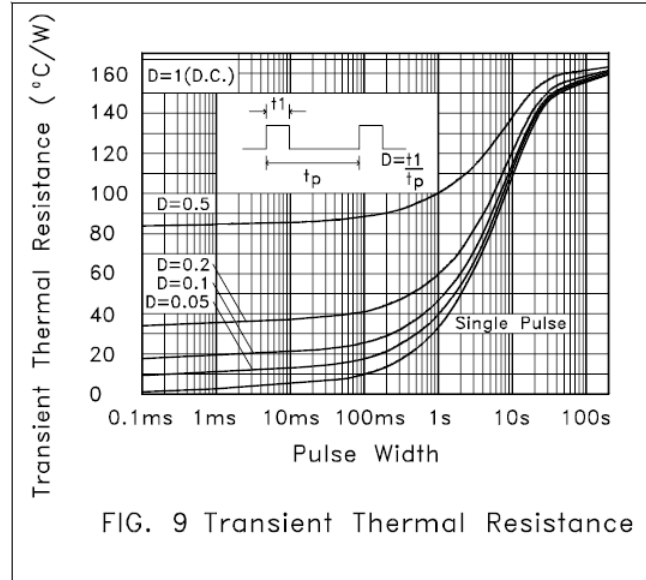
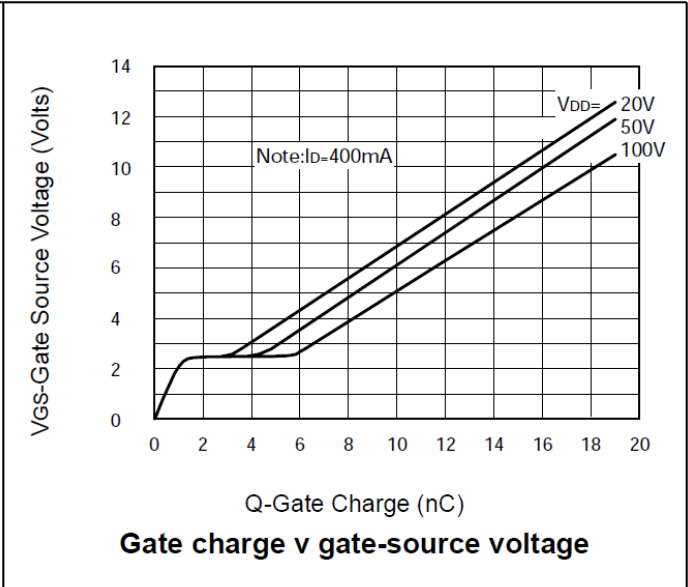
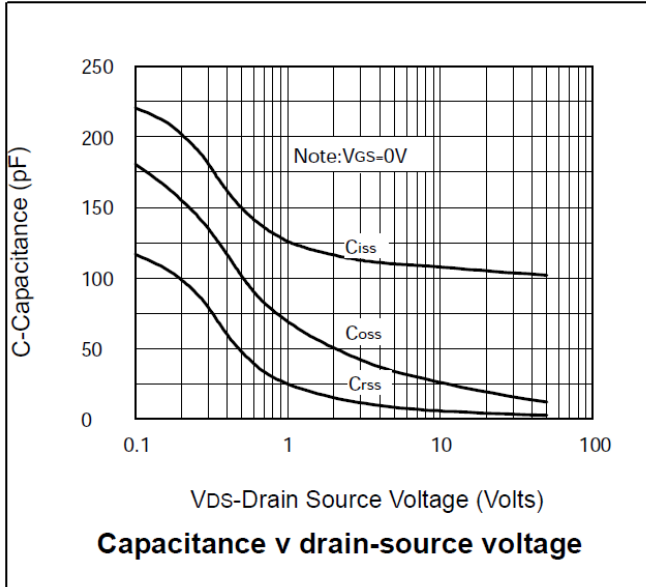
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	240	—	—	V	I <sub>D</sub> = 1mA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	10 100	μA	V <sub>DS</sub> = 240V, V <sub>GS</sub> = 0V V <sub>DS</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 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 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 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.)



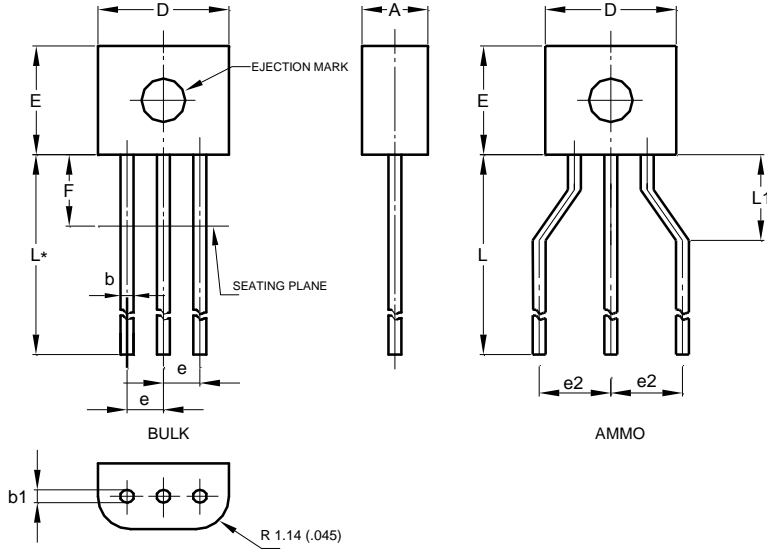
**Typical Electrical Characteristics** (Cont.) (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**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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