

60V N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET IN E-LINE

Product Summary

$V_{(BR)DSS}$	Max $R_{DS(on)}$	Max I_D @ $T_A = 25^\circ C$
60V	330m Ω @ $V_{GS} = 10V$	1.4A
	450m Ω @ $V_{GS} = 5V$	1.2A

Features and Benefits

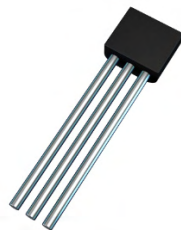
- Breakdown Voltage $BV_{DSS} > 60V$
- $R_{DS(on)} \leq 0.33\Omega$ @ $V_{GS} = 10V$
- Maximum continuous drain current $I_D = 1.1A$
- “Green” component, Lead Free Finish / RoHS compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

Application

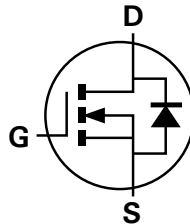
- DC – DC convertors
- Solenoids / relay drivers for automotive

Mechanical Data

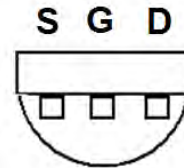
- Case: E-Line (TO-92 Compatible)
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.159 grams (approximate)



E-Line



Equivalent Circuit



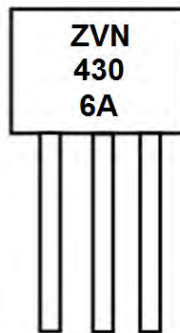
Pin Out - Bottom View

Ordering Information (Note 1)

Part Number	Package	Marking	Quantity
ZVN4306ASTZ	E-Line	ZVN4306A	2,000 per Ammo pack
ZVN4306A	E-Line	ZVN4306A	4,000 loose per box

Notes: 1. Diodes, Inc. defines “Green” products as those which are RoHS compliant and contain no halogens or antimony compounds. All applicable RoHS exemptions applied. Further information about Diodes Inc.’s “Green” Policy can be found on our website at <http://www.diodes.com>

Marking Information



ZVN4306A = Product Type Marking Code On Rounded Face

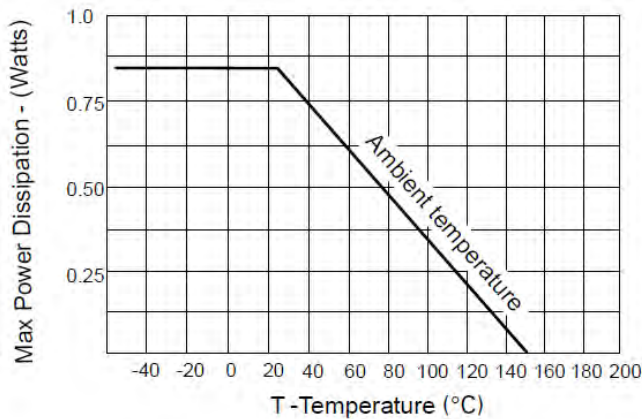
Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current	I_D	1.1	A
Practical Continuous Drain Current	I_{DP}	1.3	A
Pulsed Drain Current	I_{DM}	15	A

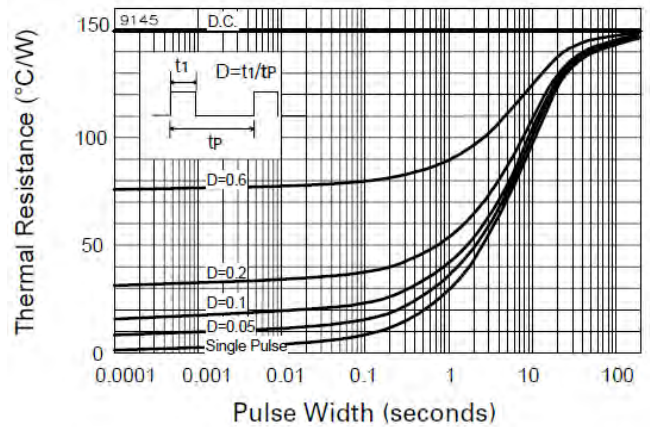
Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	850	mW
Practical Power Dissipation (Note 2)	P_{DP}	1.13	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	150	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient (Note 2)	$R_{\theta JA}$	111	$^\circ\text{C/W}$
Thermal Resistance, Junction to Leads (Note 3)	$R_{\theta JL}$	50	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Notes: 2. 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.
3. Thermal resistance from junction to solder-point



Derating curve



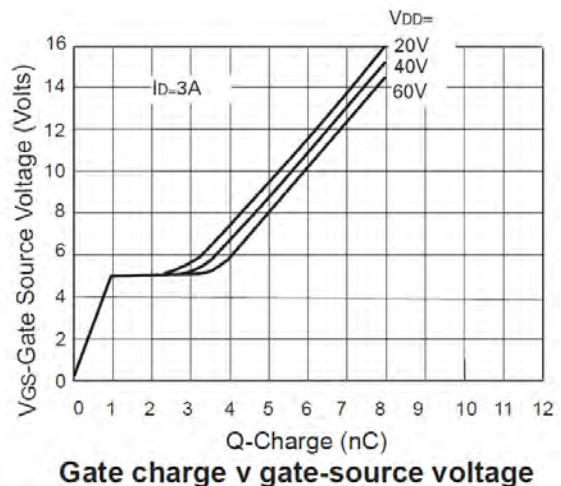
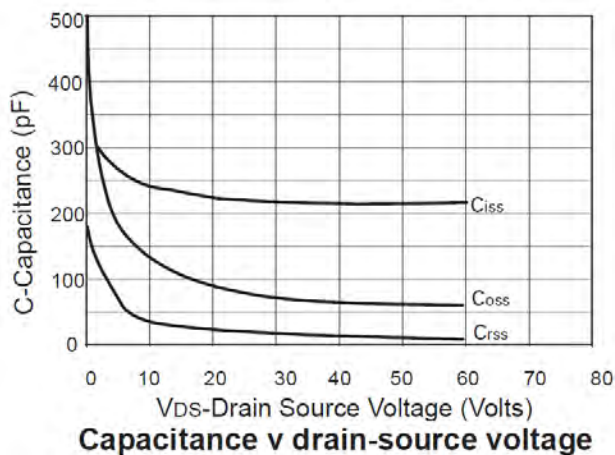
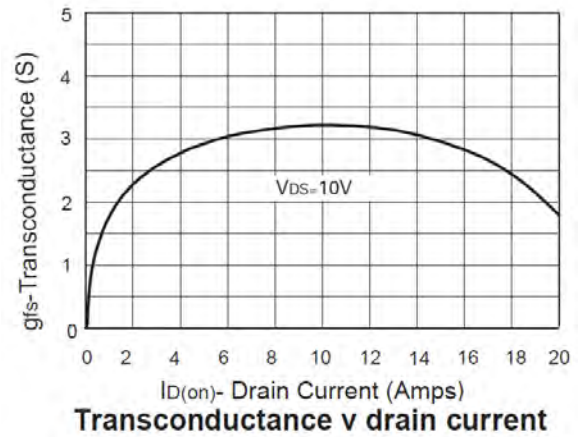
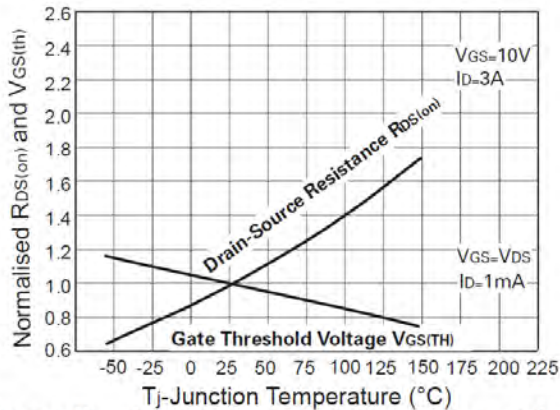
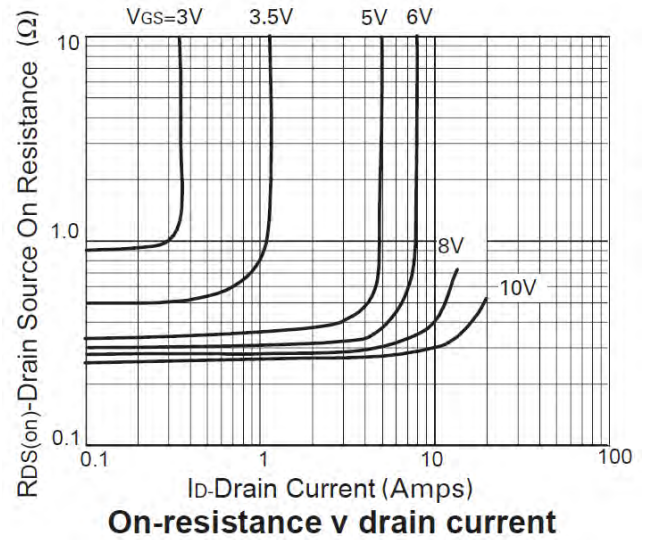
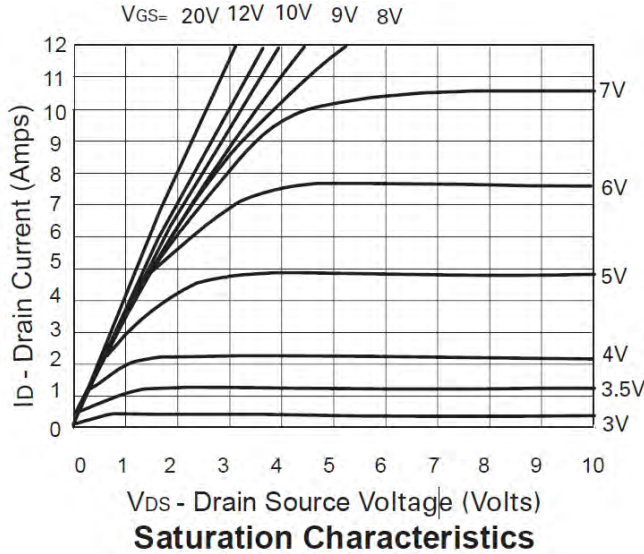
Maximum transient thermal impedance

Electrical Characteristics @T_A = 25°C unless otherwise specified

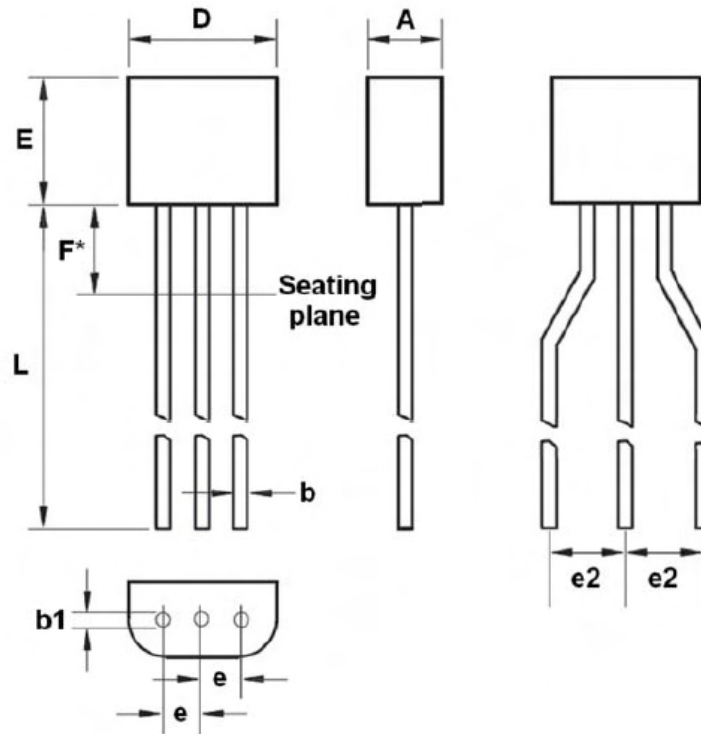
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 4)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	-	-	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current T _J = 25°C	I _{DSS}	-	-	1 20	μA	V _{DS} = 60V, V _{GS} = 0V V _{DS} = 48V, V _{GS} = 0V, T _A = 125°C
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
On-State Drain Current	I _{D(on)}	12	-	-	A	V _{GS} = 10V, V _{DS} = 10V
ON CHARACTERISTICS (Note 4)						
Gate Threshold Voltage	V _{GS(th)}	1.3	-	3	V	V _{DS} = V _{GS} , I _D = 1mA
Static Drain-Source On-Resistance	R _{DS(on)}	-	0.22 0.32	0.33 0.45	Ω	V _{GS} = 10V, I _D = 3A V _{GS} = 5V, I _D = 1.5A
Forward Transconductance	g _{fs}	700	-	-	mS	V _{DS} = 10V, I _D = 3A
DYNAMIC CHARACTERISTICS (Note 4)						
Input Capacitance	C _{iss}	-	-	350	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	-	140	pF	
Reverse Transfer Capacitance	C _{rss}	-	-	30	pF	
Turn-On Delay Time (Note 5)	t _{d(on)}	-	-	8	ns	V _{DD} = 25V, I _D = 3A, V _{GEM} = 10V
Turn-On Rise Time (Note 5)	t _r	-	-	25	ns	
Turn-Off Delay Time (Note 5)	t _{d(off)}	-	-	30	ns	
Turn-Off Fall Time (Note 5)	t _f	-	-	16	ns	

Notes: 4. Measured under pulsed conditions. Width = 300μs. Duty cycle ≤ 2%
5. Switching times measured with 50Ω source impedance and <5ns rise time on a pulse generator

Electrical Characteristics



Package Outline Dimensions



DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.16	2.41	0.085	0.095
b	0.41	0.495	0.016	0.0195
b1	0.41	0.495	0.016	0.0195
D	4.37	4.77	0.172	0.188
E	3.61	4.01	0.142	0.158
e*	1.27 NOM		0.050 NOM	
e†	2.54 NOM		0.100 NOM	
F‡	—	2.50	—	0.098
L	13.00	13.97	0.512	0.550

NOTES:

- * loose product only
- † taped product only
- ‡ leads uncontrolled above seating plane

Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2012, Diodes Incorporated

www.diodes.com