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°C
60V	330mΩ @ V_{GS} = 10V	1.4A
	450mΩ @ V_{GS} = 5V	1.2A

Features and Benefits

- Breakdown Voltage BV_{DSS} > 60V
- $R_{DS(on)}$ ≤ 0.33Ω @ 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**

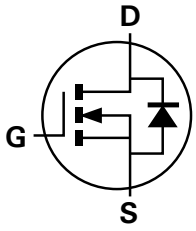
Application

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

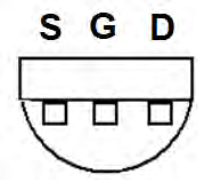
Mechanical Data

- 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



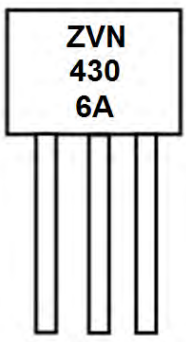
Pin Out - Bottom View

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

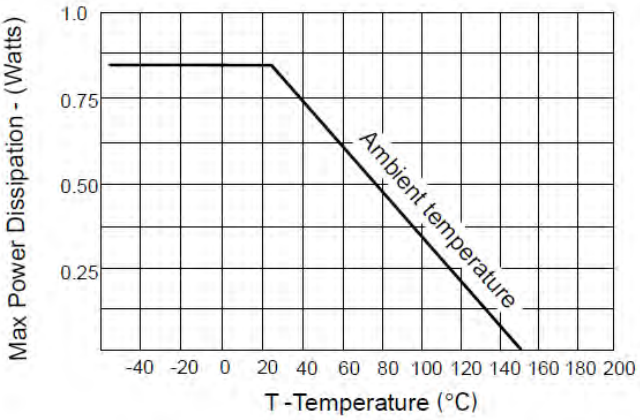
Maximum Ratings @T_A = 25°C unless otherwise specified

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

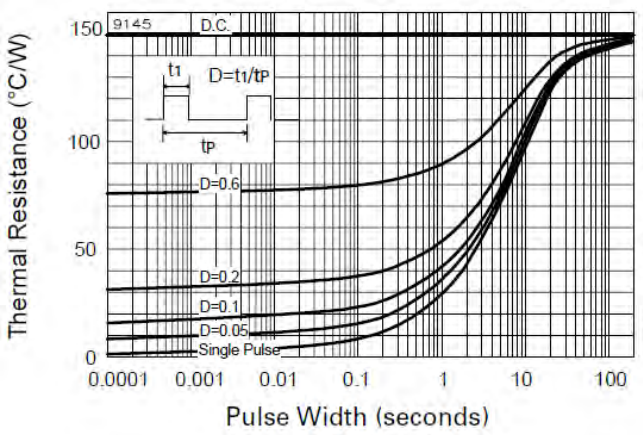
Thermal Characteristics @T_A = 25°C unless otherwise specified

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	°C/W
Thermal Resistance, Junction to Ambient	(Note 2)	$R_{\theta JA}$	111	°C/W
Thermal Resistance, Junction to Leads	(Note 3)	$R_{\theta JL}$	50	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°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



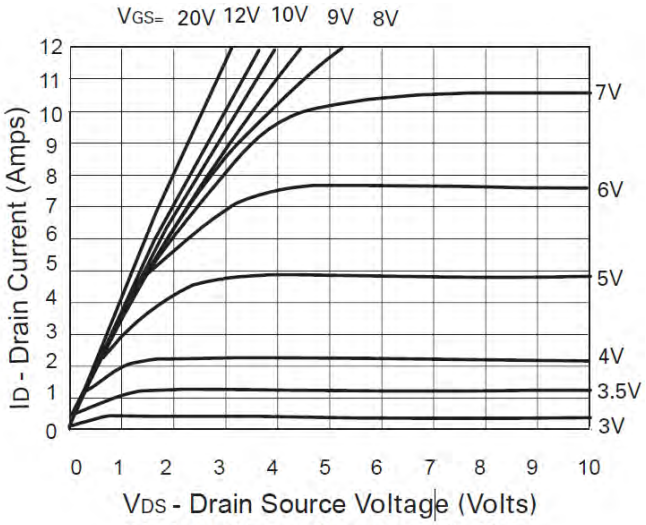
Maximum transient thermal impedance

Electrical Characteristics @T_A = 25°C unless otherwise specified

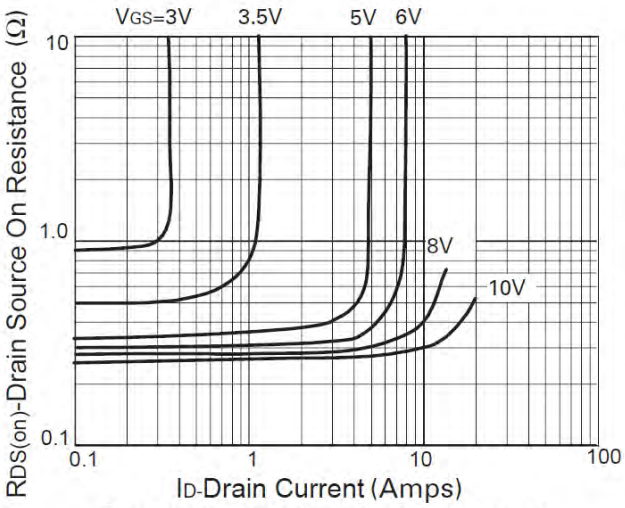
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 4)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	-	-	V	V_{GS} = 0V, I_D = 1mA
Zero Gate Voltage Drain Current T_J = 25°C	I_{DSS}	-	-	1 20	µA	V_{DS} = 60V, V_{GS} = 0V V_{DS} = 48V, V_{GS} = 0V, T_A = 125°C
Gate-Source 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

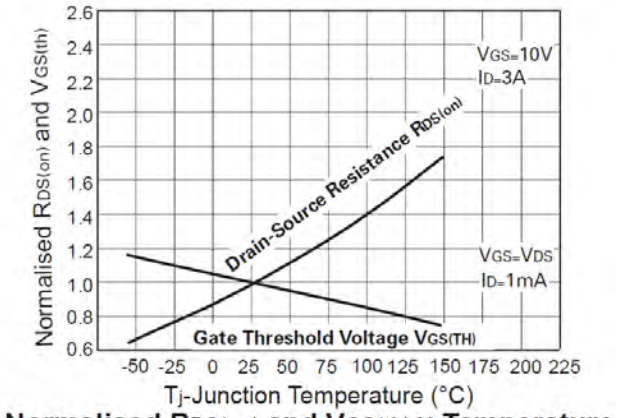
Electrical Characteristics



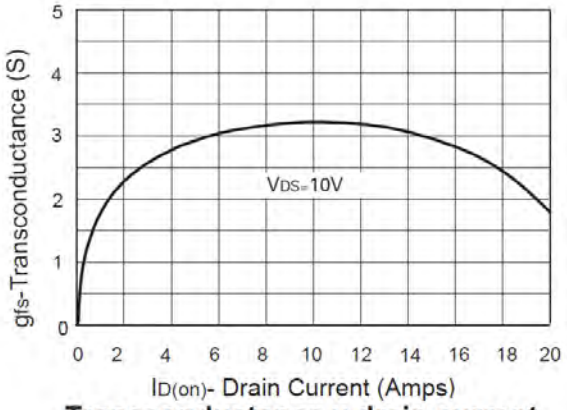
Saturation Characteristics



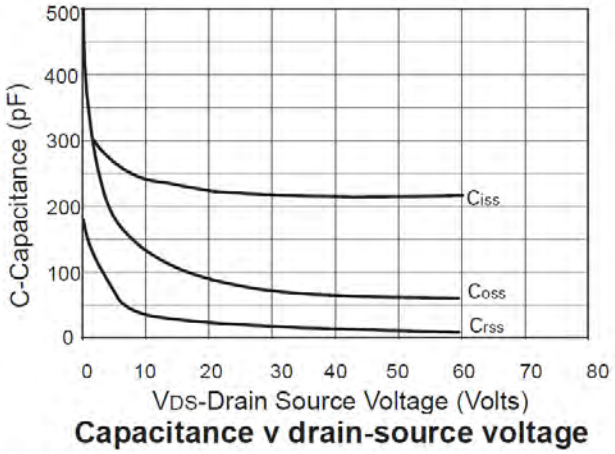
On-resistance v drain current



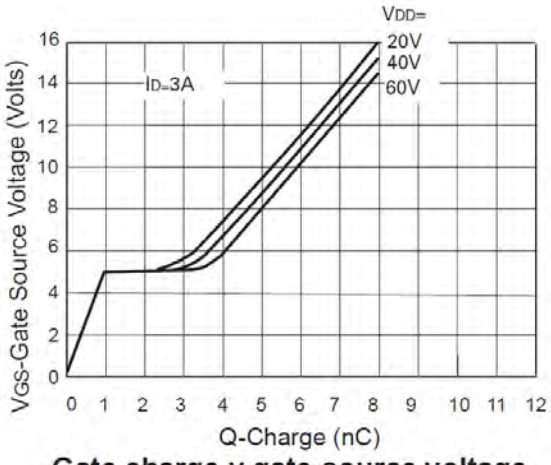
Normalised RDS(on) and VGS(th) v Temperature



Transconductance v drain current

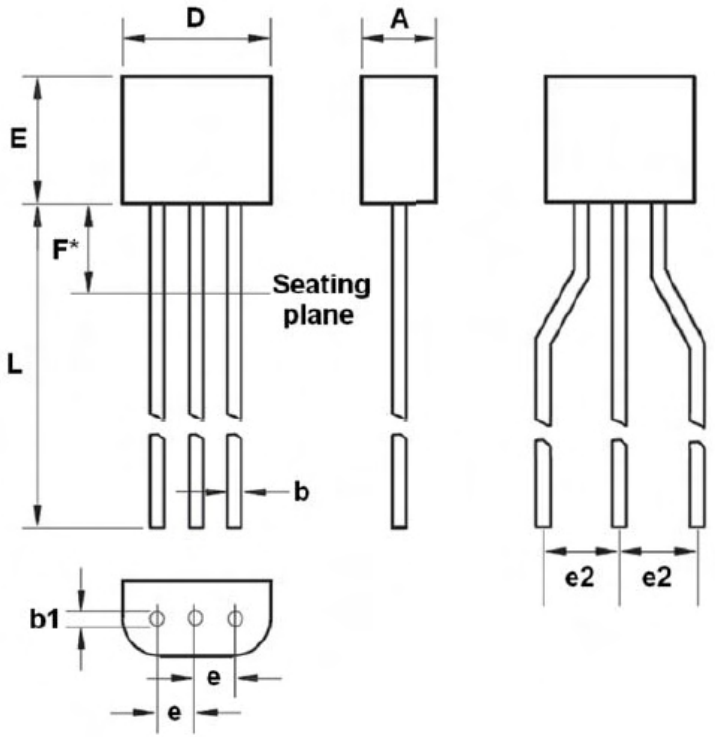


Capacitance v drain-source voltage



Gate charge v gate-source voltage

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

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