60V N-CHANNEL ENHANCEMENT MODE VERTICAL MOSFET

Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D T_A = +25°C
60V	0.33Ω @ V_{GS}= 10V	2.1A

Features and Benefits

- $V_{(BR)DSS}$ > 60V
- $R_{DS(on)}$ ≤ 0.33Ω @ V_{GS} = 10V
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

This MOSFET is designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

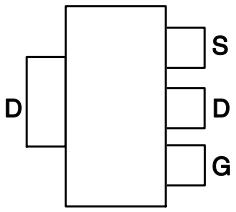
- DC-DC converters
- Solenoids/relay drivers for automotive applications

Mechanical Data

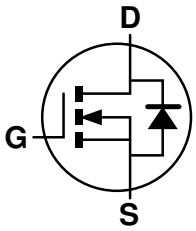
- Package: SOT223 (Type DN)
- Package Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223

Top View



Pin Out - Top



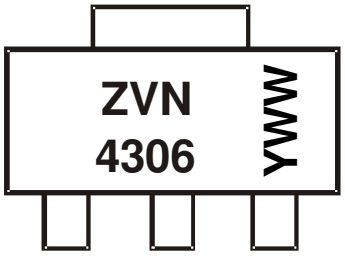
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZVN4306GTA	SOT223 (Type DN)	1,000	Tape & Reel

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/design/support/packaging/diodes-packaging/

Marking Information



ZVN4306 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 1= 2021)
WW or $\overline{WW}$ = Week Code (01~53)

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	2.1	A
Pulsed Drain Current (Note 6)	I_{DM}	15	A

Thermal Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)	T_A =+25°C	P_D	3	W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
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}	-	-	10 100	µA µA	V_{DS} = 60V, V_{GS} = 0V V_{DS} = 48V, V_{GS} = 0V, T_A = +125°C
Gate-Source Leakage	I_{GSS}	-	-	±20	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 7)						
Gate Threshold Voltage	$V_{GS(th)}$	1.3	-	3.0	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 = 3.0A V_{GS} = 5V, I_D = 1.5A
Forward Transconductance	g_{fs}	0.7	-	-	S	V_{DS} = 25V, I_D = 3.0A
DYNAMIC CHARACTERISTICS (Note 8)						
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	$t_{D(on)}$	-	-	8	ns	V_{DD} = 25V, I_D = 3A, V_{GEN} = 10V, R_{GS} = 50Ω
Turn-On Rise Time	t_R	-	-	25	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	-	30	ns	
Turn-Off Fall Time	t_F	-	-	16	ns	

Notes: 5. For a device mounted on 50mm x 50mm x 1.6mm FR-4 PCB with high coverage of single sided 2oz copper, in still air condition.
6. Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

Typical Characteristics

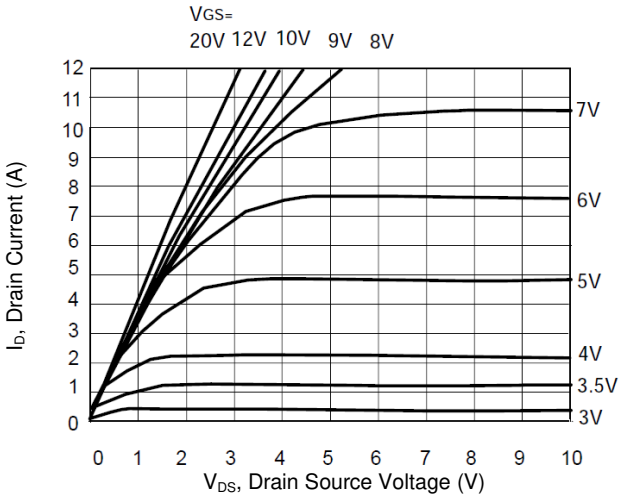


Figure 1. Saturation Characteristics

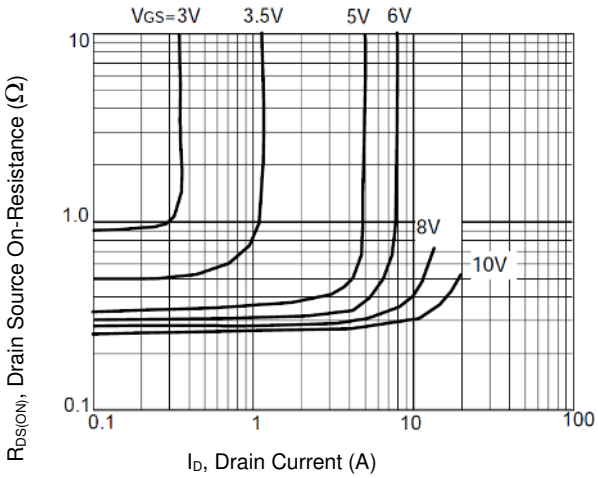


Figure 2. On-resistance vs. drain current

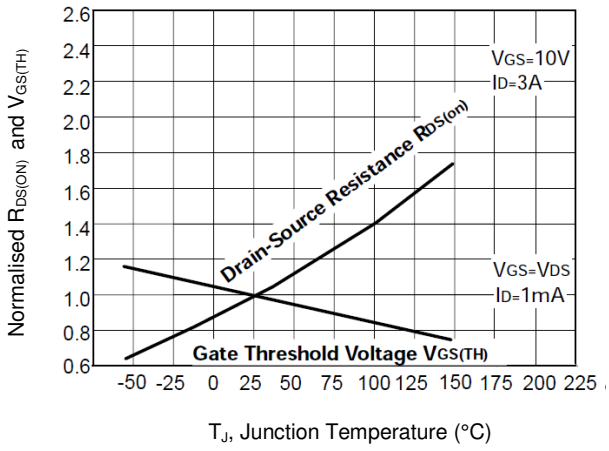


Figure 3. Normalised $R_{DS(ON)}$ and $V_{GS(TH)}$ vs. Temperature

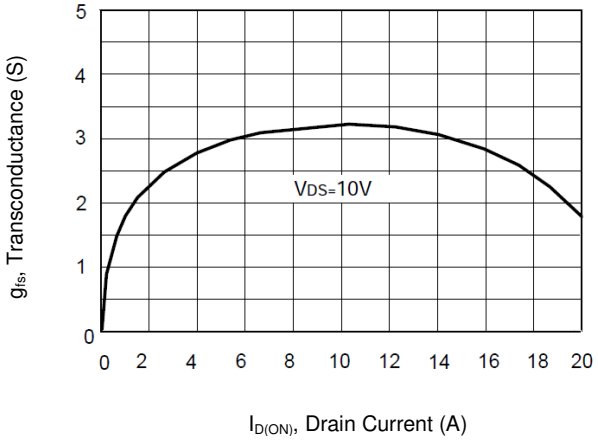


Figure 4. Transconductance vs. Drain Current

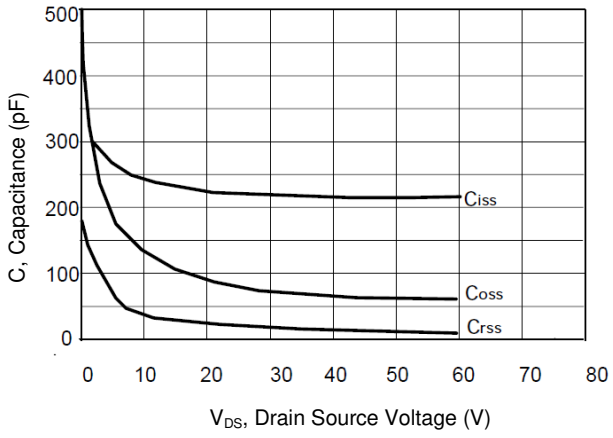


Figure 5. Capacitance vs. Drain-source Voltage

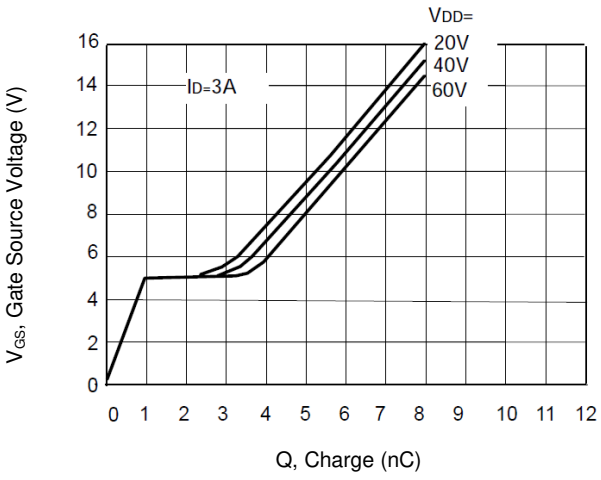
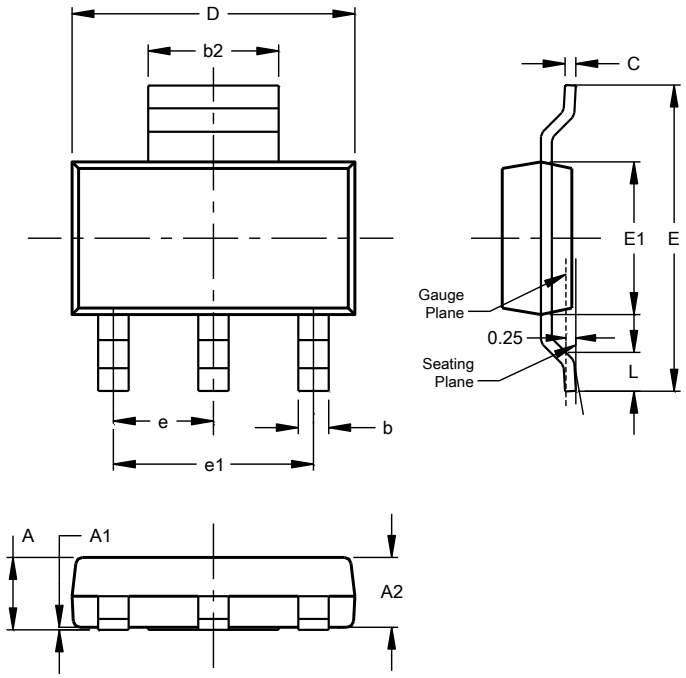


Figure 6. Gate Charge vs. Gate-source Voltage

Package Outline Dimensions

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

SOT223 (Type DN)

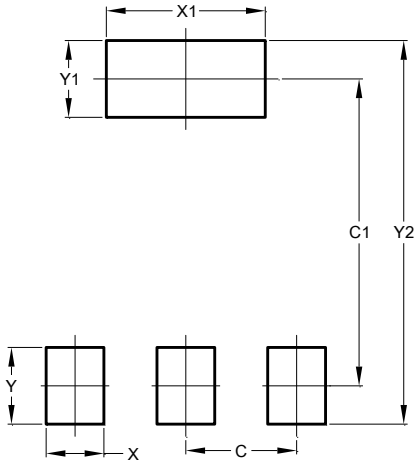


SOT223 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT223 (Type DN)



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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