

## Product Summary

$BV_{DSS}$	$R_{DS(on)}$	$I_D$ $T_A = +25^\circ C$
-60V	125m $\Omega$ @ $V_{GS} = -10V$	-4.3A
	190m $\Omega$ @ $V_{GS} = -4.5V$	-3.5A

## Features and Benefits

- $V_{(BR)DSS} > 100V$
- $R_{DS(on)} \leq 0.54\Omega$  @  $V_{GS} = 10V$
- Maximum Continuous Drain Current  $I_D = 1.67A$
- 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 refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**
- An Automotive-Compliant Part is Available Under Separate Datasheet (ZEMP6A17GQ)**

## Description and Applications

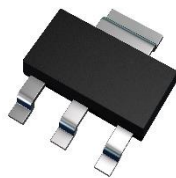
This MOSFET is designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

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

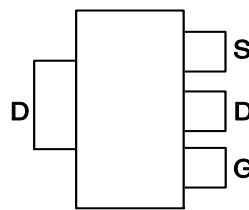
## Mechanical Data

- 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  $\text{e3}$
- Weight: 0.112 grams (Approximate)

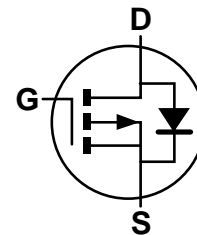
SOT223 (Type DN)



Top View



Pin Out - Top View



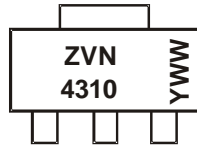
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZVN4310GTA	SOT223 (Type DN)	1,000	Tape & Reel

- Notes:
- EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  - 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.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>

## Marking Information



ZVN4310 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 1= 2021)  
 WW or  $\bar{W}W$  = Week Code (01~53)

## Maximum Ratings (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	100	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	1.67	A
Pulsed Drain Current (Note 6)	$I_{DM}$	12	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	3	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	41.7	$^\circ\text{C/W}$
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	8.84	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	100	-	-	V	$V_{GS} = 0V, I_D = 1mA$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	$I_{DSS}$	-	-	10 100	$\mu\text{A}$ $\mu\text{A}$	$V_{DS} = 100V, V_{GS} = 0V$ $V_{DS} = 80V, V_{GS} = 0V, T_A = +125^\circ\text{C}$
Gate-Source Leakage	$I_{GSS}$	-	-	$\pm 20$	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
On-State Drain Current	$I_{D(on)}$	9	-	-	A	$V_{GS} = 10V, V_{DS} = 10V$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1	-	3	V	$V_{DS} = V_{GS}, I_D = 1mA$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	0.4 0.5	0.54 0.75	$\Omega$	$V_{GS} = 10V, I_D = 3.3A$ $V_{GS} = 5V, I_D = 1.5A$
Forward Transconductance	$g_{fs}$	0.6	-	-	S	$V_{DS} = 10V, I_D = 3.3A$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	-	-	350	pF	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$
Output Capacitance	$C_{oss}$	-	-	140	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	-	20	pF	
Turn-On Delay Time	$t_{D(on)}$	-	-	8	ns	$V_{DD} = 25V, I_D = 3A, V_{GEN} = 10V,$ $R_{GS} = 50\Omega$
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:
- 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.
  - Device mounted on minimum recommended pad layout test board, 10 $\mu\text{s}$  pulse duty cycle = 1%.
  - Thermal resistance from junction to solder-point (at the end of the drain lead).
  - Short duration pulse test used to minimize self-heating effect.

**Electrical Characteristics**

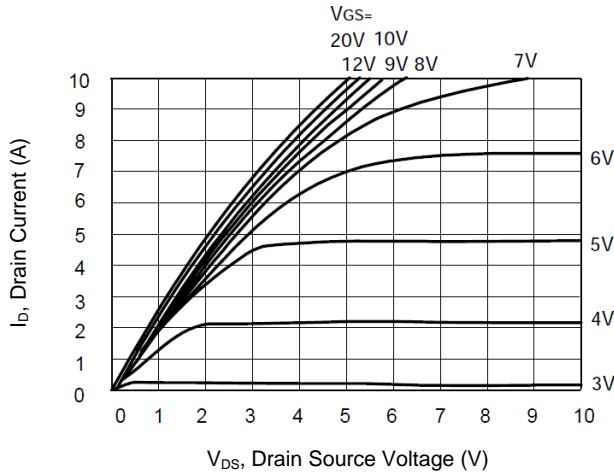


Figure 1. Saturation Characteristics

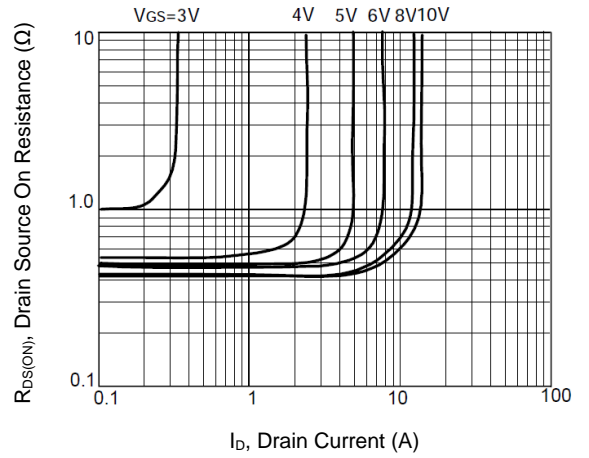


Figure 2. On-resistance vs. Drain Current

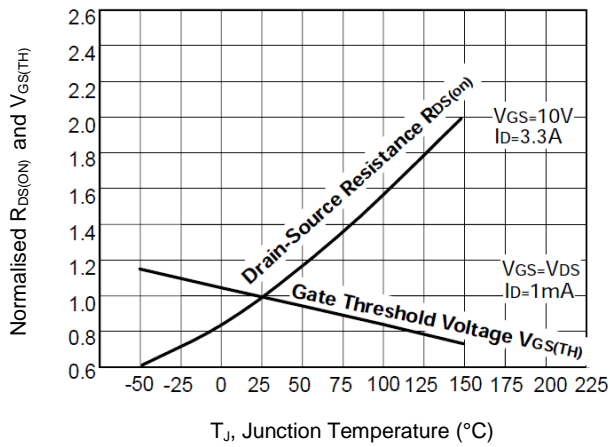


Figure 3. Normalised  $R_{DS(ON)}$  and  $V_{GS(TH)}$  vs. Temperature

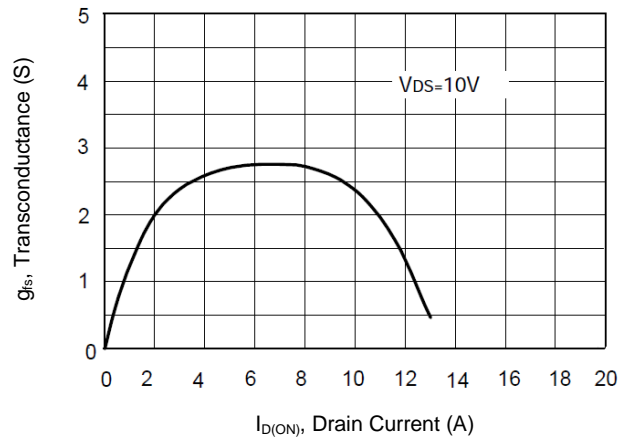


Figure 4. Transconductance vs. Drain Current

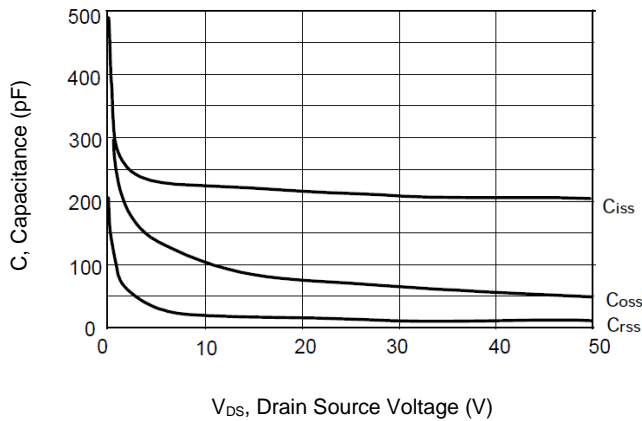


Figure 5. Capacitance vs. Drain-source Voltage

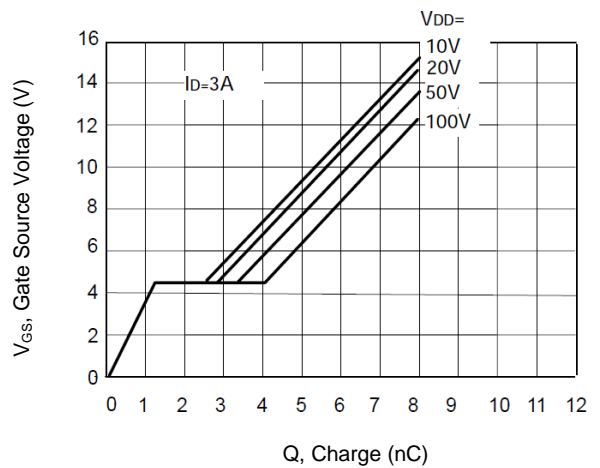
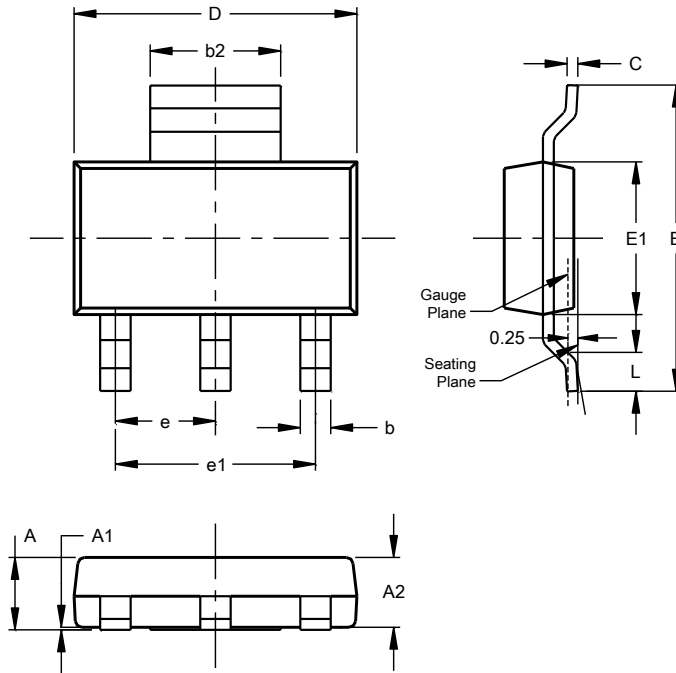


Figure 6. Gate Charge vs. Gate-source Voltage

## Package Outline Dimensions

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

### SOT223 (Type DN)

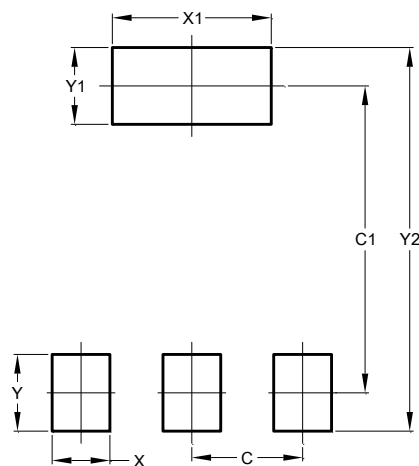


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

## 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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