

## Product Summary

$V_{(BR)DSS}$	Max $R_{DS(on)}$	Max $I_D$ $T_A = +25^\circ C$
250V	8.5Ω @ $V_{GS} = 10V$	310mA

## Description and Applications

This 250V enhancement mode N-Channel MOSFET provides users with a competitive specification offering efficient power handling capability, high impedance, and is free from thermal runaway and thermally induced secondary breakdown. Applications benefiting from this device include a variety of telecommunication and general high voltage circuits.

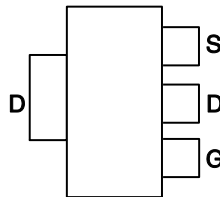
SOT89 and SOT23-6 versions are also available.

- Earth recall and dialing switches
- Electronic hook switches
- High voltage power MOSFET drivers
- Telecom call routers
- Solid state relays

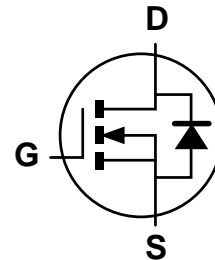
SOT223 (Type DN)



Top View



Pin Out Top-View



Equivalent Circuit

## Features and Benefits

- High Voltage
- Low On-Resistance
- Fast Switching Speed
- Low Gate Drive
- Low Threshold
- Complementary P-Channel Type ZVP4525G
- **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](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

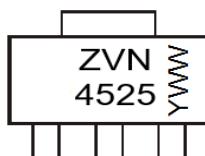
- Package: SOT223 (Type DN)
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per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

## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZVN4525GTA	SOT223 (Type DN)	1,000	Tape & Reel
ZVN4525GTC	SOT223 (Type DN)	4,000	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



ZVN 4525 = 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	$V_{DSS}$	250	V
Gate-Source Voltage	$V_{GS}$	$\pm 40$	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 5)	$I_D$	$T_A = +25^\circ\text{C}$	310
		$T_A = +70^\circ\text{C}$	248
Pulsed Drain Current (Note 7)	$I_{DM}$	1.44	A
Continuous Source Current (Body Diode)	$I_S$	310	mA
Pulsed Source Current (Body Diode)	$I_{SM}$	1.44	A

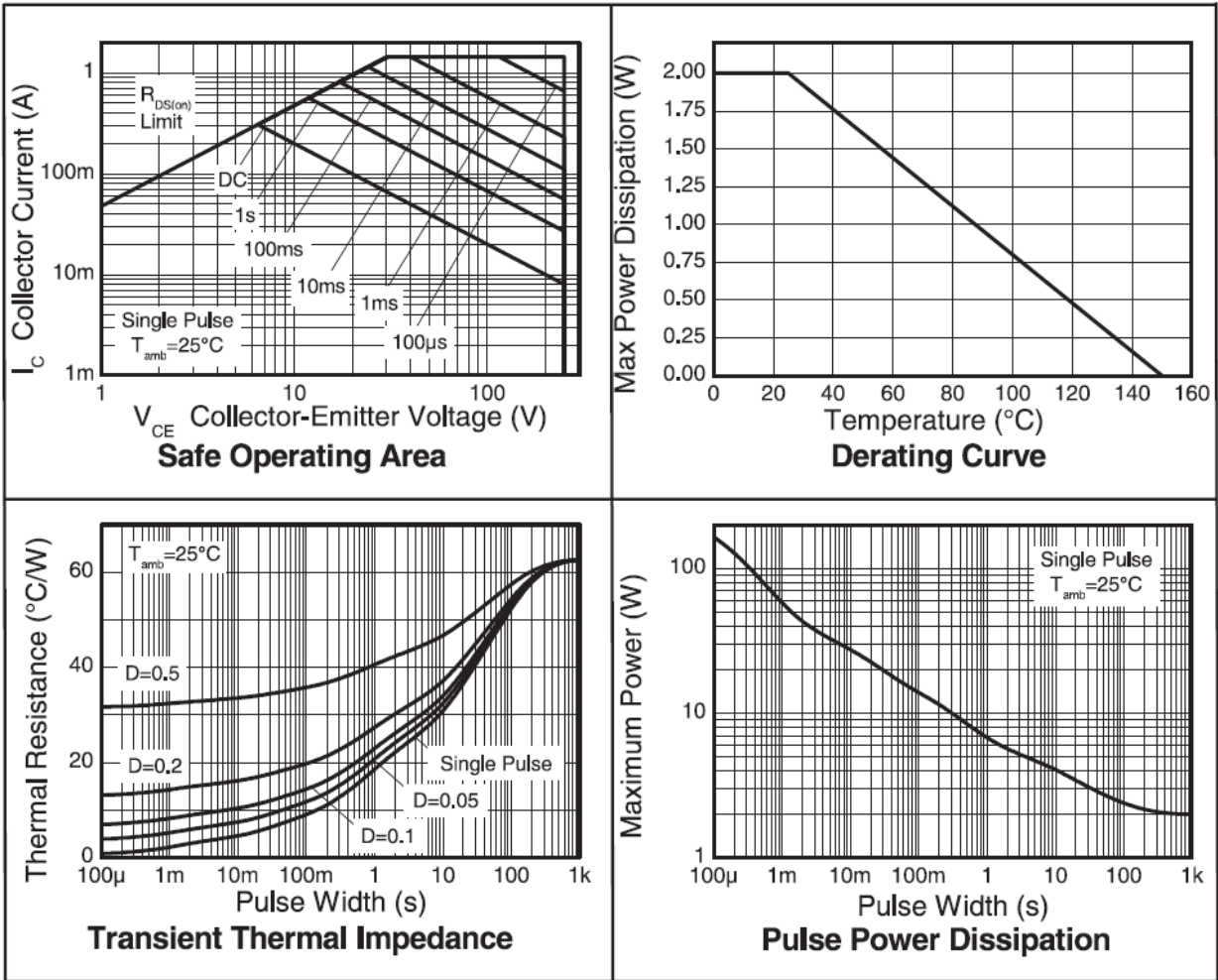
**Thermal Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation at $T_A = +25^\circ\text{C}$ (Note 5)	$P_D$	2	W
Linear Derating Factor		16	mW/ $^\circ\text{C}$
Junction to Ambient (Note 5)	$R_{\theta JA}$	63	$^\circ\text{C}/\text{W}$
Junction to Ambient (Note 6)	$R_{\theta JA}$	26	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  6. For a device surface mounted on FR4 PCB measured at  $t \leq 5$  seconds.
  7. Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal.

**NB High Voltage Applications**

For high voltage applications, the appropriate industry sector guidelines should be considered with regard to voltage spacing between conductors.

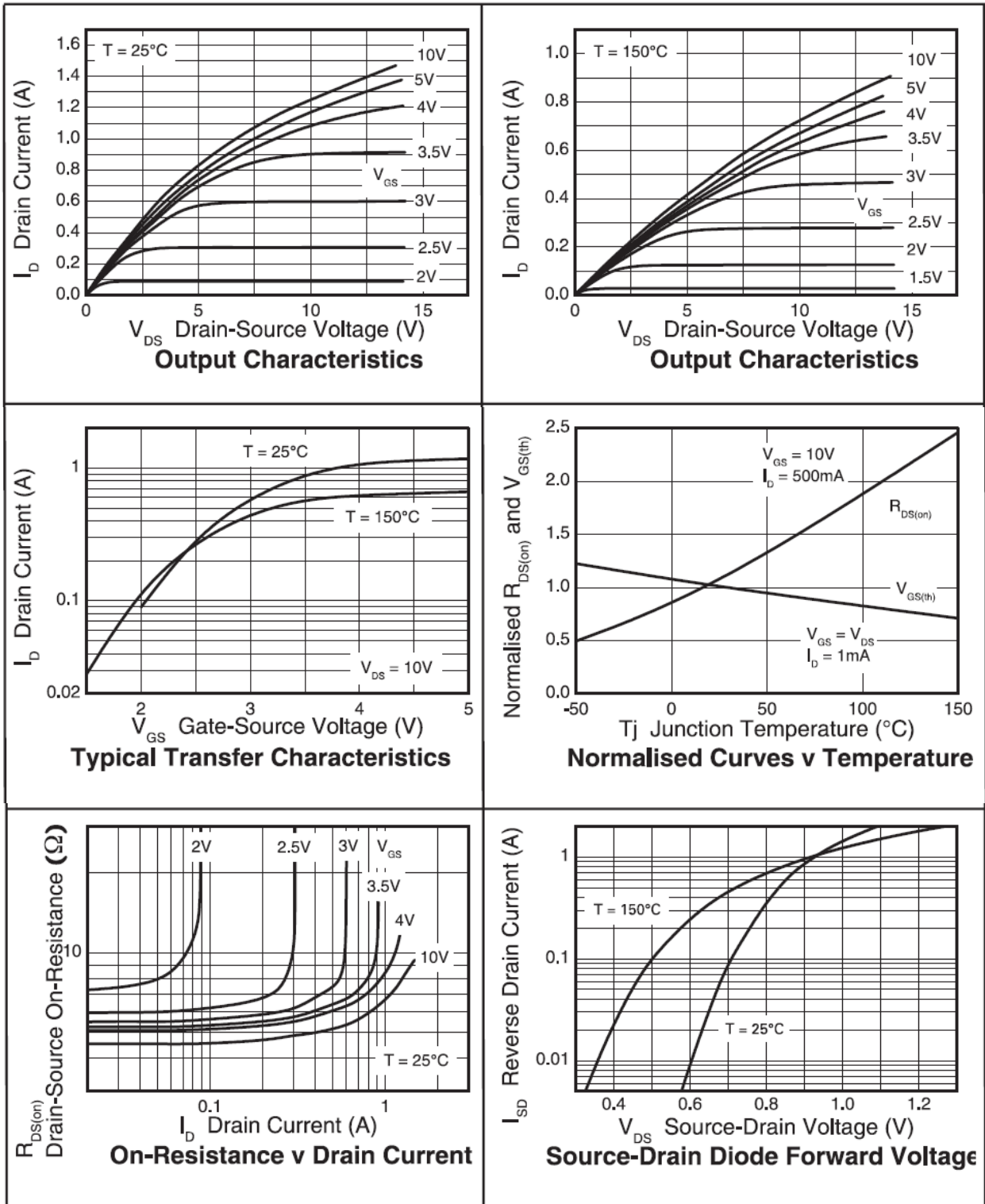


**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

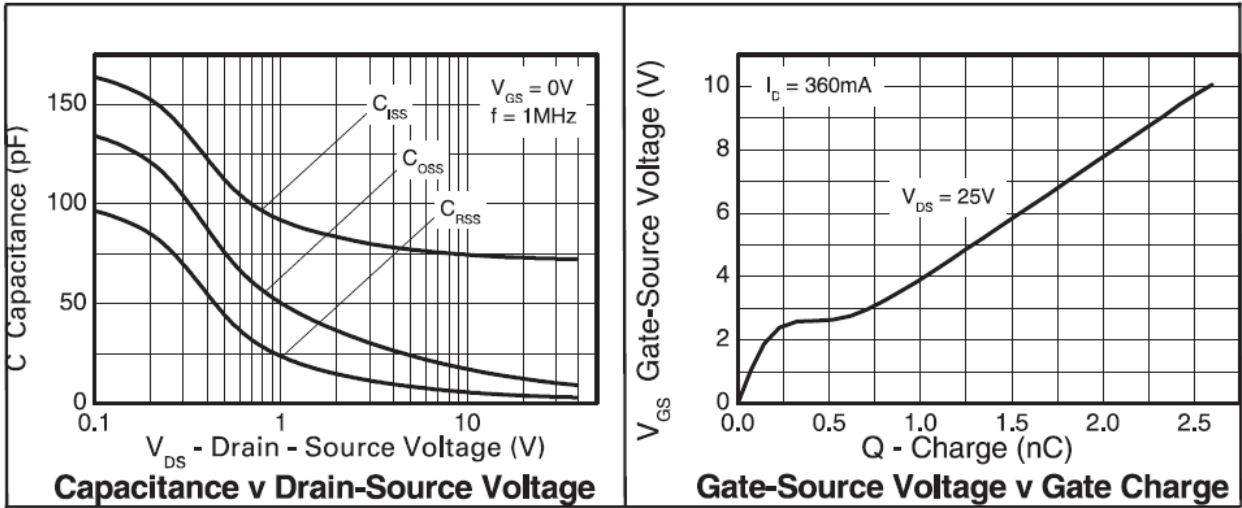
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	250	285	—	V	$I_D = 1\text{mA}$ , $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	35	500	nA	$V_{DS} = 250\text{V}$ , $V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$	—	$\pm 1$	$\pm 100$	nA	$V_{GS} = \pm 40\text{V}$ , $V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.8	1.4	1.8	V	$I_D = 1\text{mA}$ , $V_{DS} = V_{GS}$
On-State Drain Current (Note 8)	$I_{D(on)}$	3	—	—	A	$V_{DS} = 25\text{V}$ , $V_{GS} = 10\text{V}$
Static Drain-Source On-State Resistance (Note 8)	$R_{DS(on)}$	—	5.6	8.5	$\Omega$	$V_{GS} = 10\text{V}$ , $I_D = 500\text{mA}$
		—	5.9	9		$V_{GS} = 4.5\text{V}$ , $I_D = 360\text{mA}$
		—	6.4	9.5		$V_{GS} = 2.5\text{V}$ , $I_D = 20\text{mA}$
Forward Transconductance (Note 10)	$g_{fs}$	0.3	0.475	—	S	$V_{DS} = 10\text{V}$ , $I_D = 0.3\text{A}$
Diode Forward Voltage (Note 8)	$V_{SD}$	—	—	0.97	V	$I_S = 360\text{mA}$ , $V_{GS} = 0\text{V}$ , $T_J = +25^\circ\text{C}$
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	$C_{iss}$	—	72	—	pF	$V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	11	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	3.6	—	pF	
Total Gate Charge	$Q_g$	—	2.6	3.65	nC	$V_{DS} = 25\text{V}$ , $V_{GS} = 10\text{V}$ , $I_D = 360\text{mA}$ (refer to test circuit)
Gate-Source Charge	$Q_{gs}$	—	0.2	0.28		
Gate-Drain Charge	$Q_{gd}$	—	0.5	0.70		
Turn-On Delay Time (Note 9)	$t_{d(on)}$	—	1.25	—	ns	$V_{DD} = 30\text{V}$ , $I_D = 360\text{mA}$ , $R_G = 50\Omega$ , $V_{GS} = 10\text{V}$ (refer to test circuit)
Rise Time (Note 9)	$t_r$	—	1.7	—		
Turn-Off Delay Time (Note 9)	$t_{d(off)}$	—	11.4	—		
Fall Time (Note 9)	$t_f$	—	3.5	—		
Reverse Recovery Time	$t_{rr}$	—	186	260	ns	$I_F = 360\text{mA}$ , $di/dt = 100\text{A}/\mu\text{s}$ ,
Reverse Recovery Charge	$Q_{rr}$	—	34	48	nC	$T_J = +25^\circ\text{C}$

Notes: 8. Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .  
9. Switching characteristics are independent of operating junction temperature.  
10. For design aid only, not subject to production testing.

**Typical Characteristics**



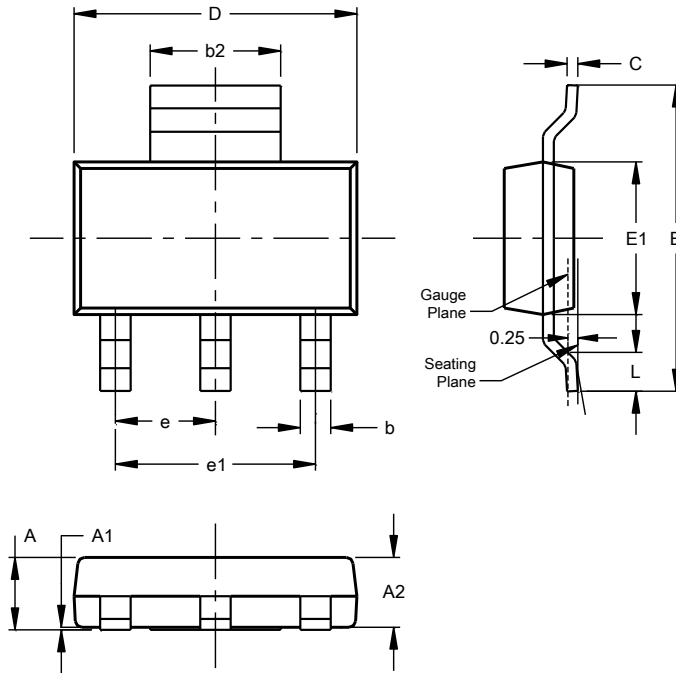
**Typical Characteristics** (continued)



## Package Outline Dimensions

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

### SOT223 (Type DN)

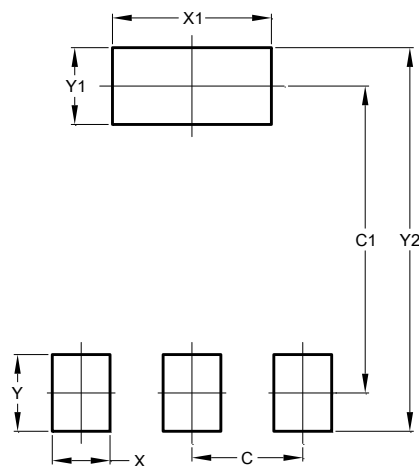


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

## 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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