250V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	Max $R_{DS(on)}$	Max I_D T_A = +25°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

Features and Benefits

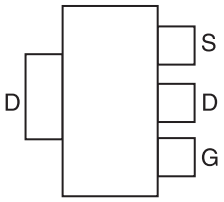
- High Voltage
- Low On-Resistance
- Fast Switching Speed
- Low Gate Drive
- Low Threshold
- Complementary P-Channel Type ZVP4525G
- SOT223 Package
- **Lead-Free Finish; RoHS Compliant (Notes 1& 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

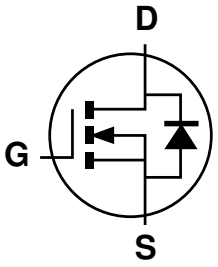
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223

Top View



Pin Out Top-View



Equivalent Circuit

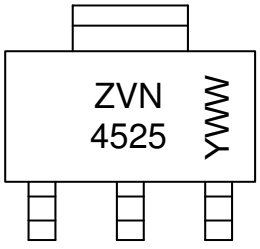
Ordering Information (Note 4)

Part Number	REEL SIZE (inches)	TAPE WIDTH (mm)	Packaging
ZVN4525GTA	7	8mm Embossed	1,000
ZVN4525GTC	13	8mm Embossed	4,000

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
2. See http://www.diodes.com/quality/lead_free.html 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 http://www.diodes.com/products/packages.html.

Marking Information

SOT223



ZVN 4525 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 5= 2015)
WW or $\overline{WW}$ = Week Code (01~53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

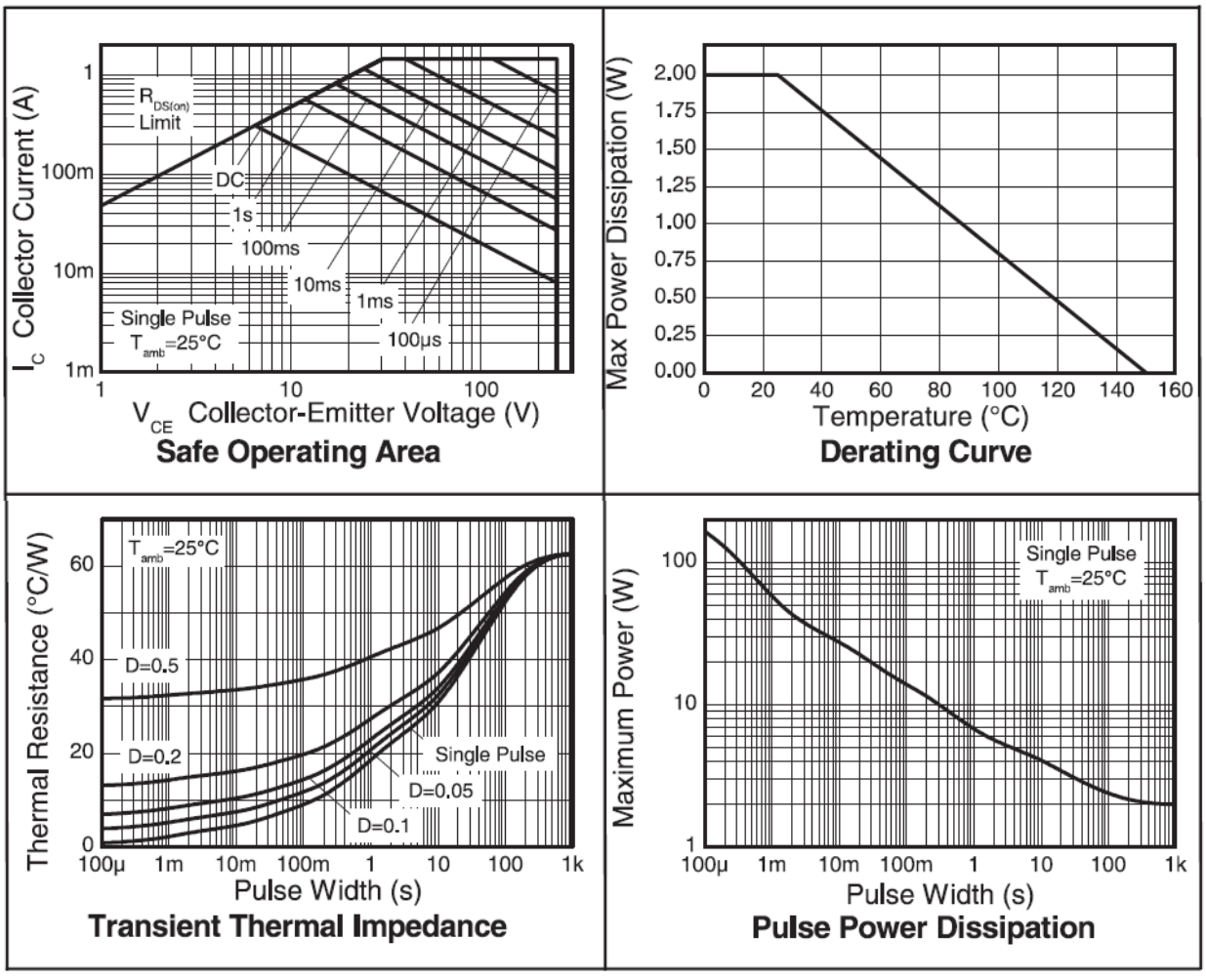
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	250	V
Gate-Source Voltage		V_{GS}	±40	V
Continuous Drain Current, V_{GS} = 10V (Note 5)	T_A = +25°C T_A = +70°C	I_D	310 248	mA
Pulsed Drain Current (Note 7)		I_{DM}	1.44	A
Continuous Source Current (Body Diode)		I_S	1.1	A
Pulsed Source Current (Body Diode)		I_{SM}	1.44	A

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

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

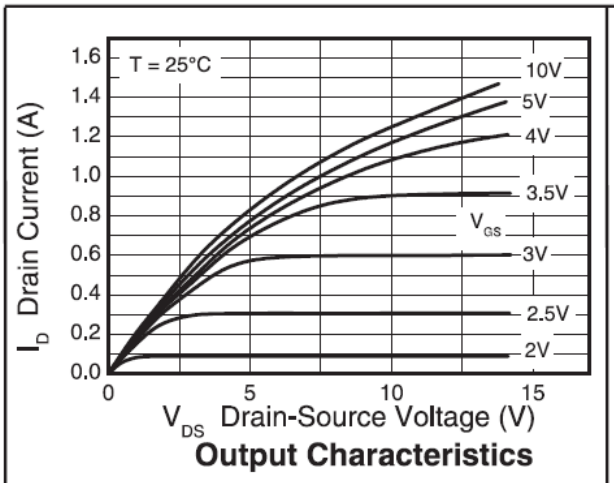


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

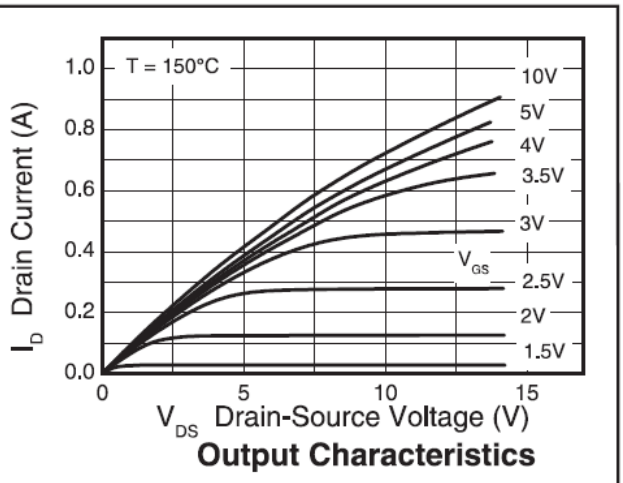
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	250	285	—	V	I_D = 1mA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	35	500	nA	V_{DS} = 250V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	±1	±100	nA	V_{GS} = ±40V, V_{DS} = 0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.8	1.4	1.8	V	I_D = 1mA, V_{DS} = V_{GS}
On-State Drain Current (Note 8)	$I_{D(on)}$	3	—	—	A	V_{DS} = 25V, V_{GS} = 10V
Static Drain-Source On-State Resistance (Note 8)	$R_{DS\ (ON)}$	—	5.6	8.5	Ω	V_{GS} = 10V, I_D = 500mA
		—	5.9	9		V_{GS} = 4.5V, I_D = 360mA
		—	6.4	9.5		V_{GS} = 2.5V, I_D = 20mA
Forward Transconductance (Note 10)	g_{fs}	0.3	0.475	—	S	V_{DS} = 10V, I_D = 0.3A
Diode Forward Voltage (Note 8)	V_{SD}	—	—	0.97	V	I_S = 360mA, V_{GS} = 0V, T_J = +25°C
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	72	—	pF	V_{DS} = 25 V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	11	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	3.6	—	pF	
Total Gate Charge	Q_g	—	2.6	3.65	nC	VDS = 25V, VGS = 10V, ID = 360mA (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} = 30V, I_D = 360mA, R_G = 50Ω, V_{GS} = 10V (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	IF = 360mA, di/dt = 100A/µs, TJ = +25°C
Reverse Recovery Charge	Q_{rr}	—	34	48	nC	

Notes: 8. Measured under pulsed conditions. Width=300µs. Duty cycle ≤ 2%.
9. Switching characteristics are independent of operating junction temperature.
10. For design aid only, not subject to production testing.

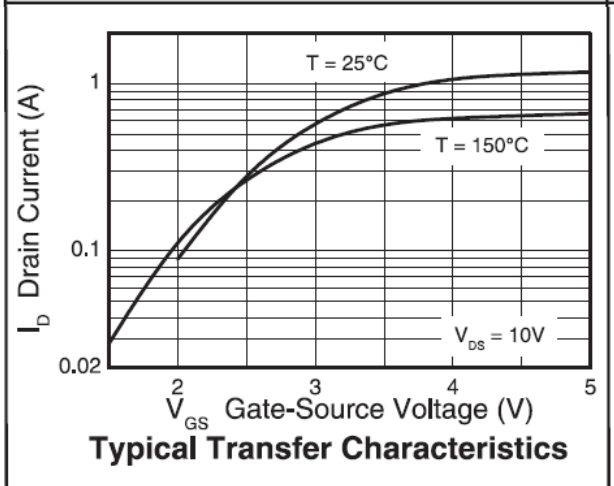
Typical Characteristics



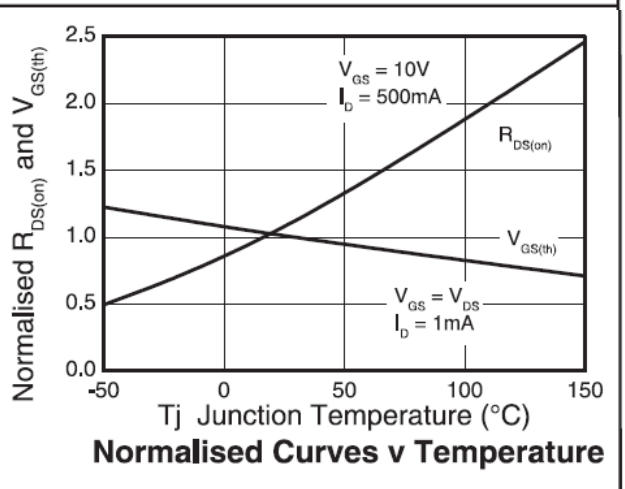
Output Characteristics



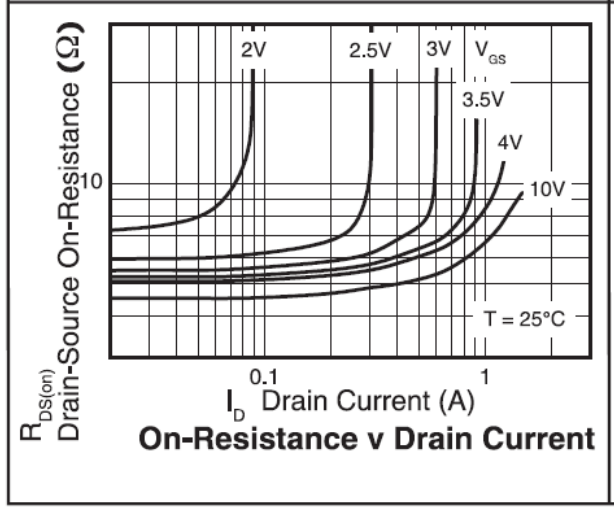
Output Characteristics



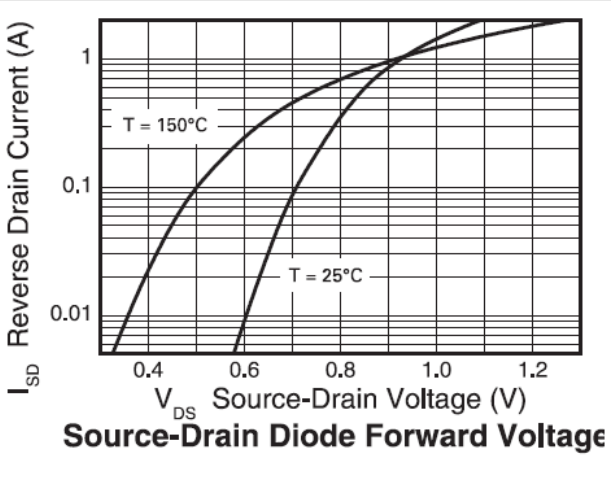
Typical Transfer Characteristics



Normalised Curves v Temperature

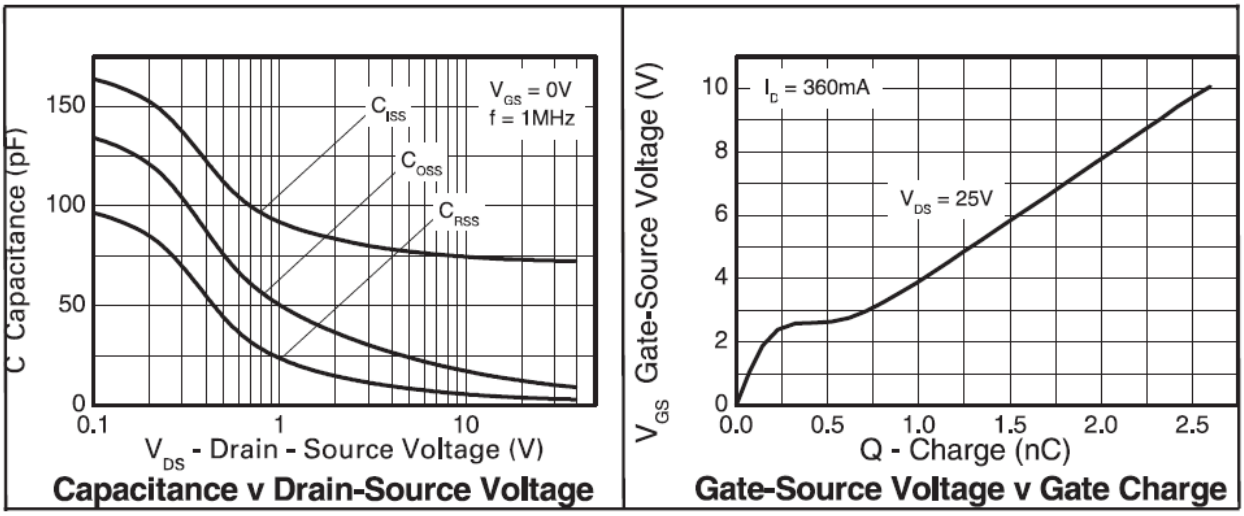


On-Resistance v Drain Current



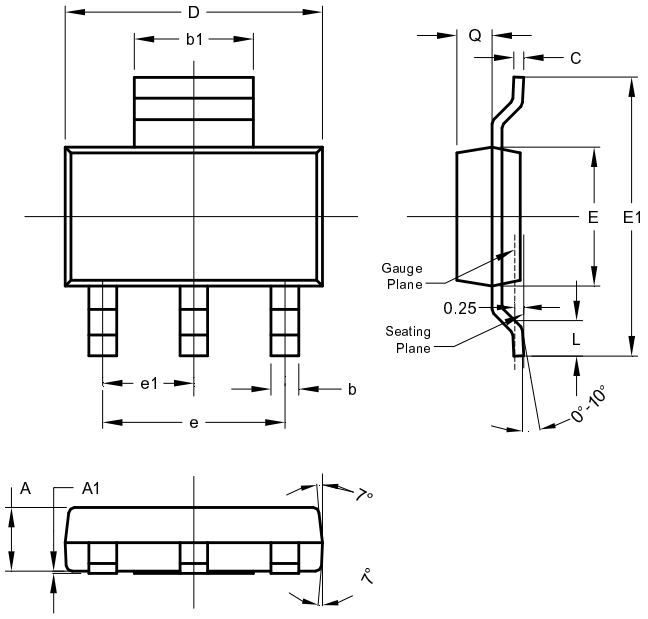
Source-Drain Diode Forward Voltage

Typical Characteristics (cont.)



Package Outline Dimensions

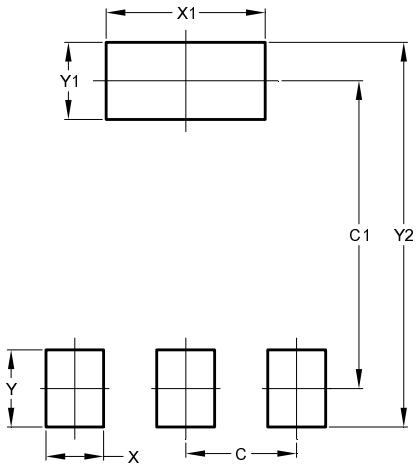
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
C2	8.00

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  Email amall@ameya360.com

  QQ 800077892

  Skype ameyasales1 ameyasales2

- ### Customer Service :

  Email service@ameya360.com

- ### Partnership :

  Tel +86 (21) 64016692-8333

  Email mkt@ameya360.com