

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = +25^\circ C$
-250V	14Ω @ $V_{GS} = 10V$	-265mA

## Description

This new generation trench MOSFET features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

## Applications

- Earth Recall and Dialling Switches
- Electronic Hook Switches
- High Voltage Power MOSFET Drivers
- Telecom Call Routers
- Solid State Relays

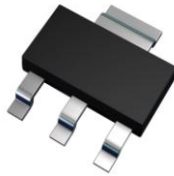
## Features and Benefits

- High Voltage
- Low On-resistance
- Fast Switching Speed
- Low Gate Drive
- Low Threshold
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

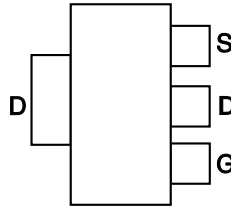
## Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish  $\text{e3}$
- Weight: 0.112 grams (Approximate)

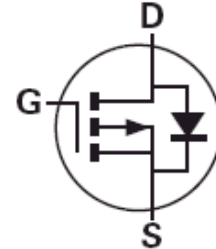
SOT223



Top View



Pin Out - Top



Equivalent Circuit

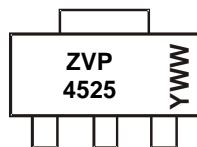
## Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZVP4525GTA	ZVP4525	7	12	1,000

- 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](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



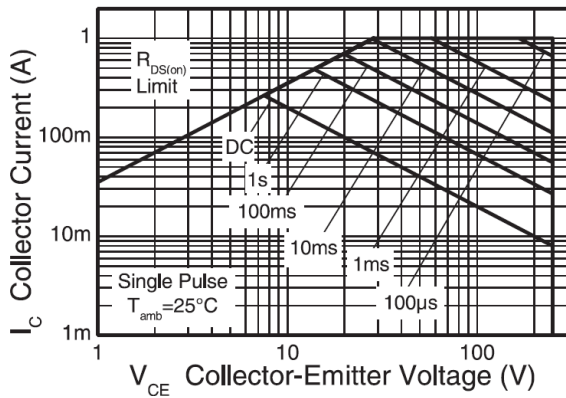
ZVP4525 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 5 = 2015)  
 WW or  $\bar{W}W$  = Week Code (01~53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

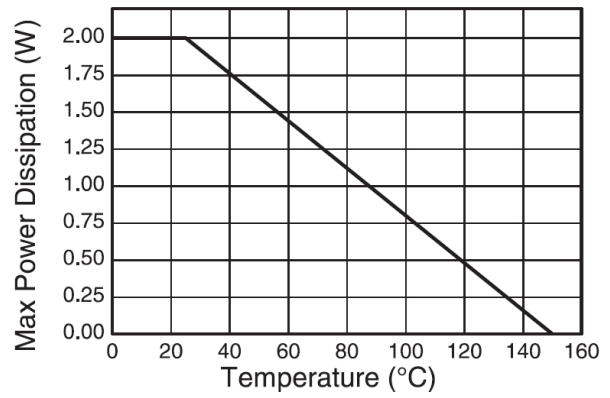
Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	-250	V
Gate-Source Voltage	V <sub>GSS</sub>	±40	V
Continuous Drain Current @V <sub>GS</sub> = 10V; T <sub>A</sub> = +25°C (Note 5)	I <sub>D</sub>	-265	mA
@V <sub>GS</sub> = 10V; T <sub>A</sub> = +70°C (Note 5)		-212	
Pulsed Drain Current (Note 7)	I <sub>DM</sub>	-1	A
Continuous Source Current (Body Diode)	I <sub>S</sub>	-0.75	A
Pulsed Source Current (Body Diode)	I <sub>SM</sub>	-1	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

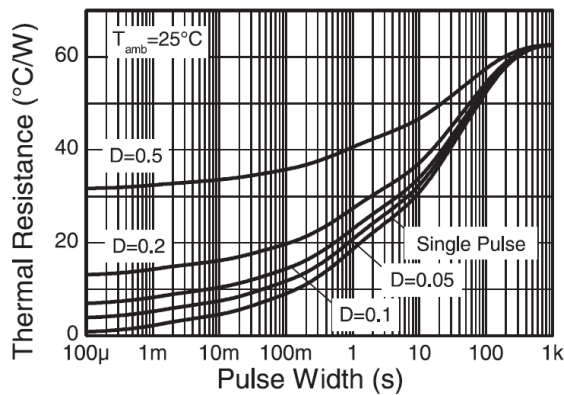
Characteristic	Symbol	Value	Unit
Power Dissipation at T <sub>A</sub> = +25°C (Note 5)	P <sub>D</sub>	2.0	W
Linear Derating Factor		16	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	63	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	26	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C



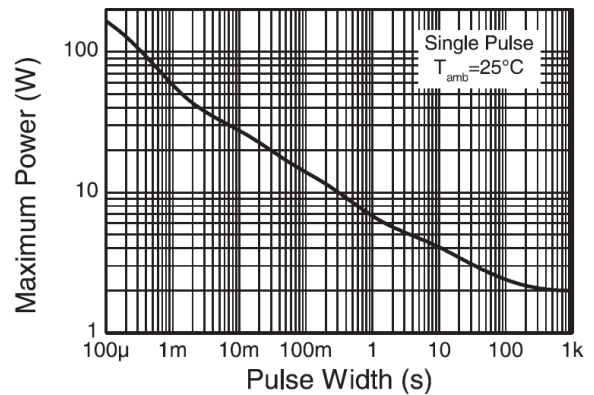
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**

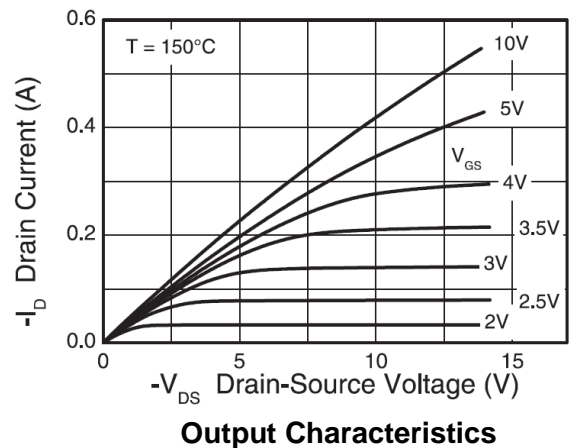
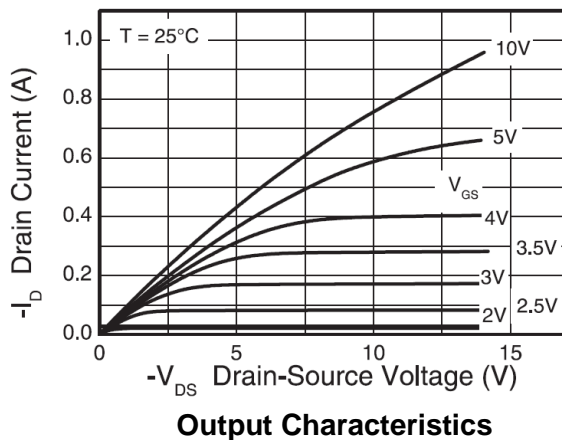


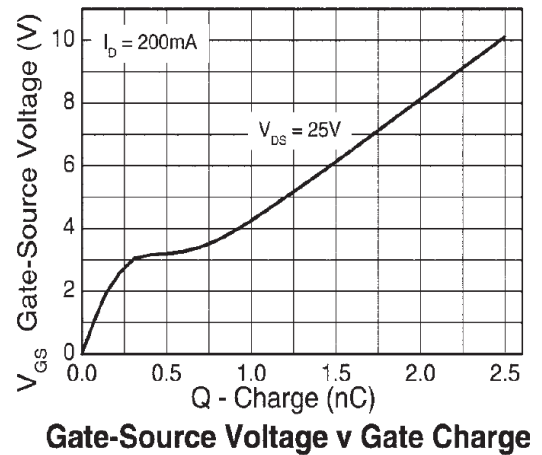
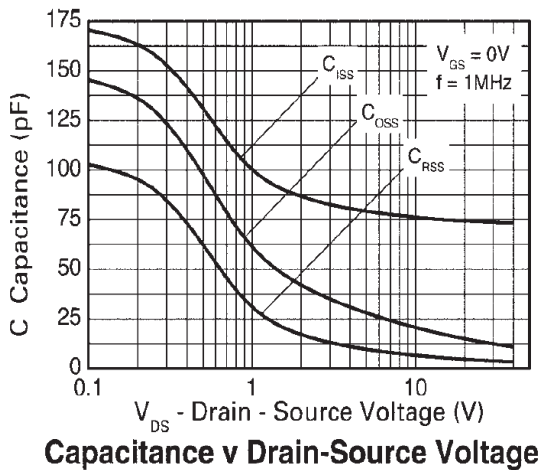
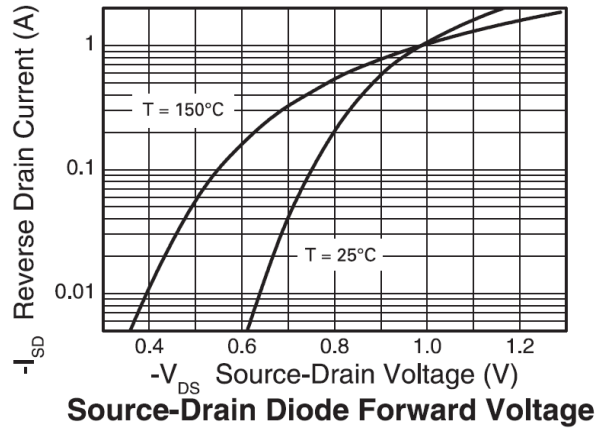
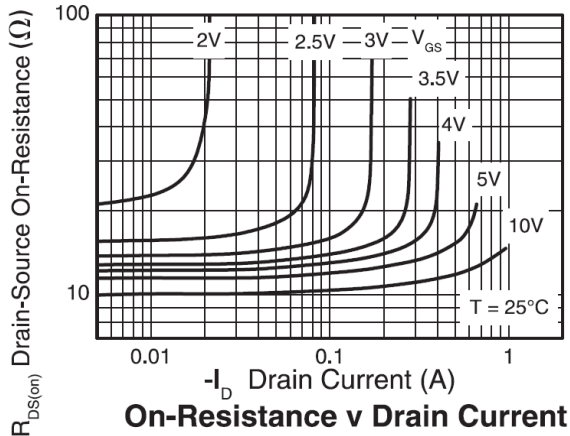
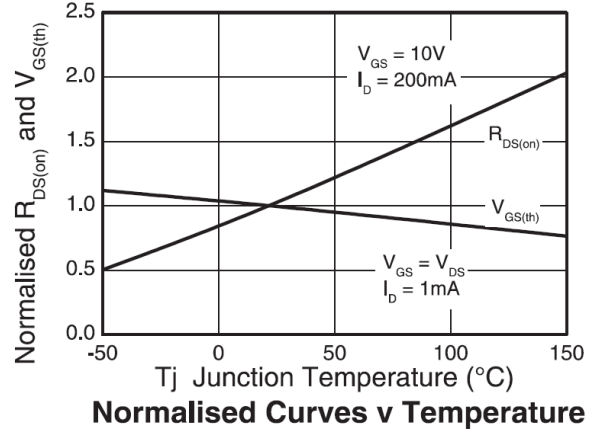
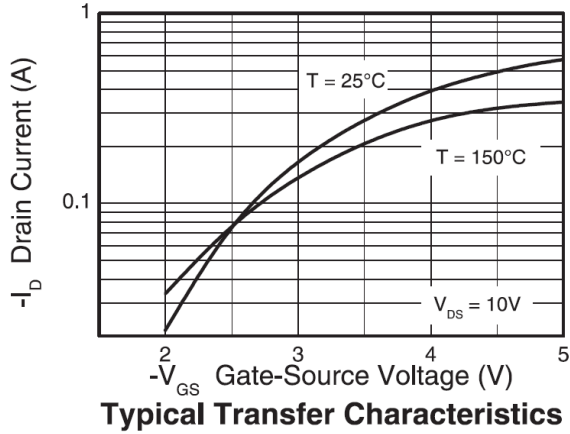
**Pulse Power Dissipation**

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

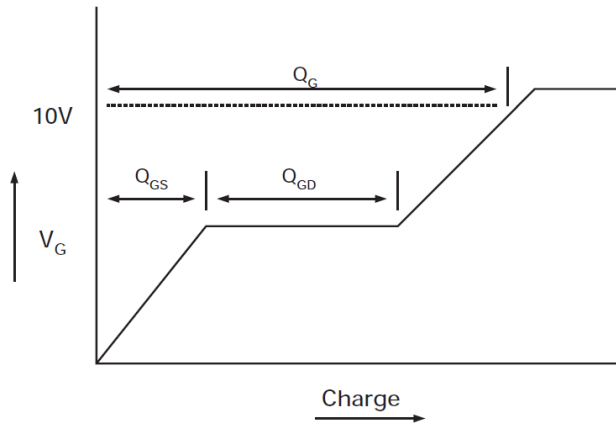
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-250	-285	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-30	-500	nA	V <sub>DS</sub> = -250V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	±1	±100	nA	V <sub>GS</sub> = ±40V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.8	-1.5	-2.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -1mA
Static Drain-Source On-Resistance (Note 8)	R <sub>DS(ON)</sub>	-	10	14	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -200mA
		-	13	18	Ω	V <sub>GS</sub> = -3.5V, I <sub>D</sub> = -100mA
Forward Transconductance (Note 10)	g <sub>fs</sub>	80	200	-	mS	V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.15A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	-	-	0.97	V	I <sub>S</sub> = -200mA, V <sub>GS</sub> = 0V, T <sub>J</sub> = +25°C
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance (Note 10)	C <sub>iss</sub>	-	73	-	pF	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance (Note 10)	C <sub>oss</sub>	-	12.8	-	pF	
Reverse Transfer Capacitance (Note 10)	C <sub>rss</sub>	-	3.91	-	pF	
Total Gate Charge (Notes 9 & 10)	Q <sub>g</sub>	-	2.45	3.45	nC	V <sub>GS</sub> = -10V, V <sub>DS</sub> = -25V I <sub>D</sub> = -200mA
Gate-Source Charge (Notes 9 & 10)	Q <sub>gs</sub>	-	0.22	0.31	nC	
Gate-Drain Charge (Notes 9 & 10)	Q <sub>gd</sub>	-	0.45	0.63	nC	
Turn-On Delay Time (Notes 9 & 10)	t <sub>D(ON)</sub>	-	1.53	-	ns	V <sub>DD</sub> = -30V, I <sub>D</sub> = -200mA, V <sub>GS</sub> = -10V, R <sub>G</sub> = 50Ω
Turn-On Rise Time (Notes 9 & 10)	t <sub>R</sub>	-	3.78	-	ns	
Turn-Off Delay Time (Notes 9 & 10)	t <sub>D(OFF)</sub>	-	17.5	-	ns	
Turn-Off Fall Time (Notes 9 & 10)	t <sub>F</sub>	-	7.85	-	ns	
Reverse Recovery Time (Note 10)	t <sub>RR</sub>	-	205	290	ns	I <sub>F</sub> = -200mA, di/dt = 100A/μs, T <sub>J</sub> = +25°C
Reverse Recovery Charge (Note 10)	Q <sub>rr</sub>	-	21	29	nC	

- Notes:
- For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  - For a device surface mounted on FR4 PCB measured at t ≤ 5 secs.
  - Repetitive rating 25mm x 25mm FR4 PCB, D=0.02 pulse width=300μs - pulse width limited by maximum junction temperature.
  - Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
  - Switching characteristics are independent of operating junction temperature.
  - For design aid only, not subject to production testing.

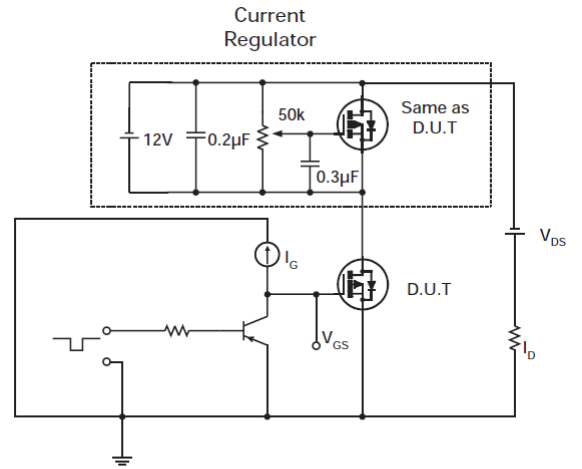




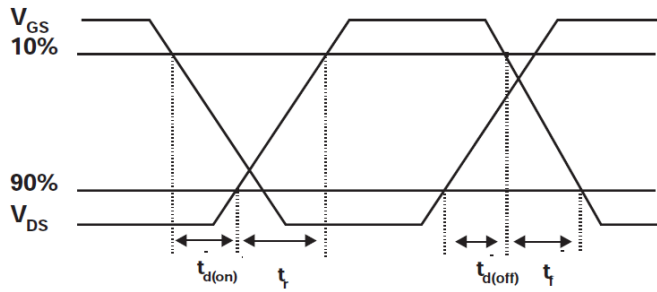
**Test Circuits**



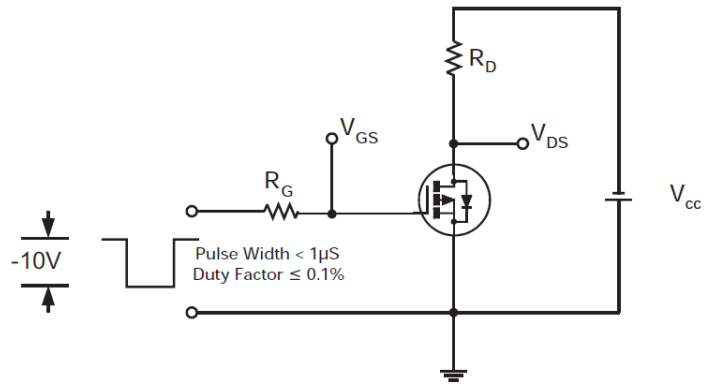
**Basic Gate Charge Waveform**



**Gate Charge Test Circuit**



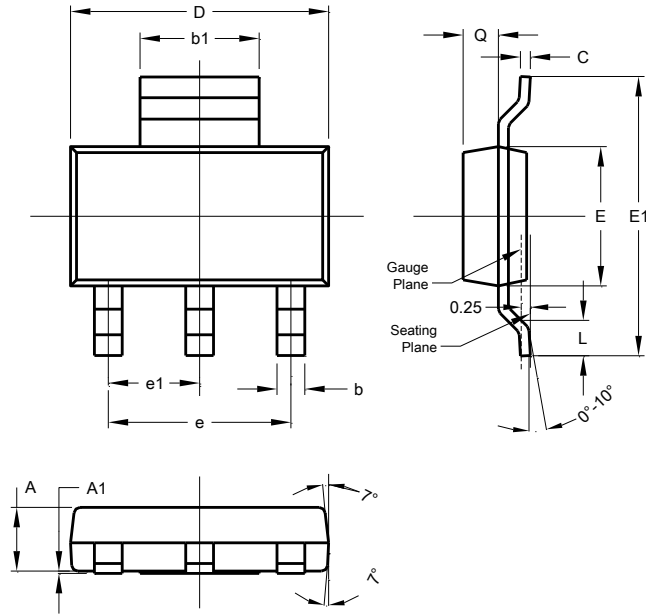
**Switching Time Waveforms**



**Switching Time Test Circuit**

**Package Outline Dimensions**

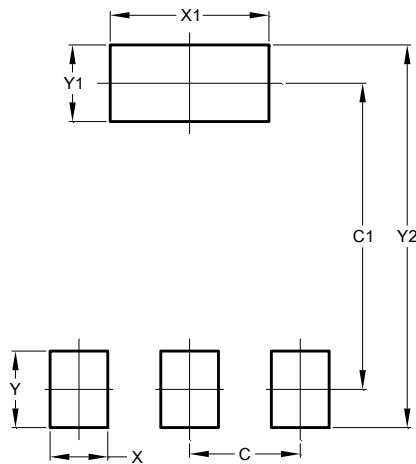
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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
<b>All Dimensions in mm</b>			

**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
Y2	8.00

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