### 250V P-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

V(BR)DSS=-250V;  $RDS(ON)=14\Omega$ ; ID=-205mA

#### **DESCRIPTION**

This 250V enhancement mode P-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 Telecom and general high voltage switching circuits.

SOT223 and SOT23-6 versions are also available.

#### **FEATURES**

- High voltage
- Low on-resistance
- · Fast switching speed
- Low gate drive
- Low threshold
- Complementary N-channel Type ZVN4525Z
- SOT89 package

### **APPLICATIONS**

- · Earth Recall and dialling switches
- · Electronic hook switches
- High Voltage Power MOSFET Drivers
- Telecom call routers
- Solid state relays

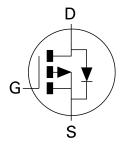
### **ORDERING INFORMATION**

DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZVP4525ZTA	7	12mm embossed	1000 units
ZVP4525ZTC	13	12mm embossed	4000 units

### **DEVICE MARKING**

• P52









### **ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V <sub>DSS</sub>	250	V
Gate Source Voltage	V <sub>GS</sub>	±40	V
Continuous Drain Current (VGS=10V; TA=25°C)(a) (VGS=10V; TA=70°C)(a)	I <sub>D</sub>	-205 -164	mA mA
Pulsed Drain Current (c)	I <sub>DM</sub>	-1	A
Continuous Source Current (Body Diode)	IS	-0.75	А
Pulsed Source Current (Body Diode)	I <sub>SM</sub>	-1	А
Power Dissipation at T <sub>A</sub> =25°C (a) Linear Derating Factor	PD	1.2 9.6	W mW/°C
Operating and Storage Temperature Range	T <sub>j</sub> :T <sub>stg</sub>	-55 to +150	°C

### THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)	$R_{\theta JA}$	103	°C/W
Junction to Ambient (b)	$R_{\theta JA}$	50	°C/W

#### NOTES

 $(a) For a device surface mounted on 25 mm\ x\ 25 mm\ FR4\ PCB\ with\ high\ coverage\ of\ single\ sided\ 1oz\ copper,\ in\ still\ air\ conditions$ 

(b) For a device surface mounted on FR4 PCB measured at t $\!\!<\!\!5$  secs.

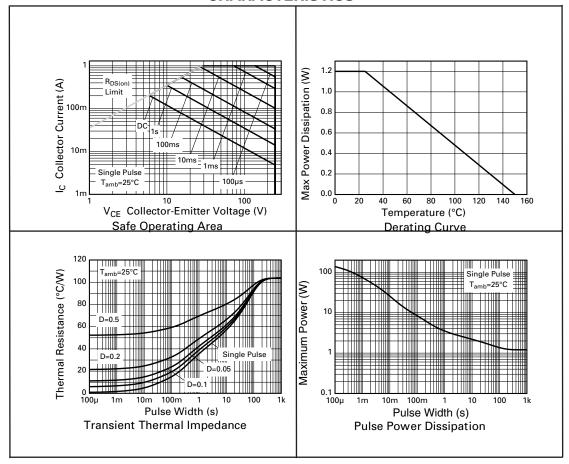
(c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

### **NB High Voltage Applications**

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



### **CHARACTERISTICS**





# **ELECTRICAL CHARACTERISTICS** (at T<sub>amb</sub> = 25°C unless otherwise stated)

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PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.	
STATIC	_		•				
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	-250	-285		V	I <sub>D</sub> =-1mA, V <sub>G</sub> S=0V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>		-30	-500	nA	V <sub>DS</sub> =-250V, V <sub>GS</sub> =0V	
Gate-Body Leakage	I <sub>GSS</sub>		±1	±100	nA	V <sub>GS</sub> =±40V, V <sub>DS</sub> =0V	
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	-0.8	-1.5	-2.0	V	I <sub>D</sub> =-1mA, V <sub>DS</sub> = V <sub>GS</sub>	
Static Drain-Source On-State Resistance (1)	R <sub>DS(on)</sub>		10 13	14 18	ΩΩ	V <sub>GS</sub> =-10V, I <sub>D</sub> =-200mA V <sub>GS</sub> =-3.5V, I <sub>D</sub> =-100mA	
Forward Transconductance (3)	9fs	80	200		mS	V <sub>DS</sub> =-10V,I <sub>D</sub> =-0.15A	
DYNAMIC (3)	•						
Input Capacitance	Ciss		73		pF	V 05 V V 0V	
Output Capacitance	Coss		12.8		pF	V <sub>DS</sub> =-25 V, V <sub>GS</sub> =0V, f=1MHz	
Reverse Transfer Capacitance	C <sub>rss</sub>		3.91		pF		
SWITCHING(2) (3)		•	•				
Turn-On Delay Time	t <sub>d(on)</sub>		1.53		ns		
Rise Time	t <sub>r</sub>		3.78		ns	V <sub>DD</sub> =-30V, I <sub>D</sub> =-200m	
Turn-Off Delay Time	t <sub>d(off)</sub>		17.5		ns	R <sub>G</sub> =50Ω, V <sub>GS</sub> =-10V (refer to test circuit)	
Fall Time	t <sub>f</sub>		7.85		ns		
Total Gate Charge	Ωg		2.45	3.45	nC		
Gate-Source Charge	Qgs		0.22	0.31	nC	V <sub>DS</sub> =-25V,V <sub>GS</sub> =-10V I <sub>D</sub> =-200mA(refer to	
Gate Drain Charge	Q <sub>gd</sub>		0.45	0.63	nC	test circuit)	
SOURCE-DRAIN DIODE	•		•			,	
Diode Forward Voltage (1)	V <sub>SD</sub>			0.97	V	T <sub>j</sub> =25°C, I <sub>S</sub> =-200mA, V <sub>GS</sub> =0V	
Reverse Recovery Time (3)	t <sub>rr</sub>		205	290	ns	T <sub>j</sub> =25°C, I <sub>F</sub> =-200mA,	
Reverse Recovery Charge (3)	Q <sub>rr</sub>		21	29	nC	di/dt=100A/μs	
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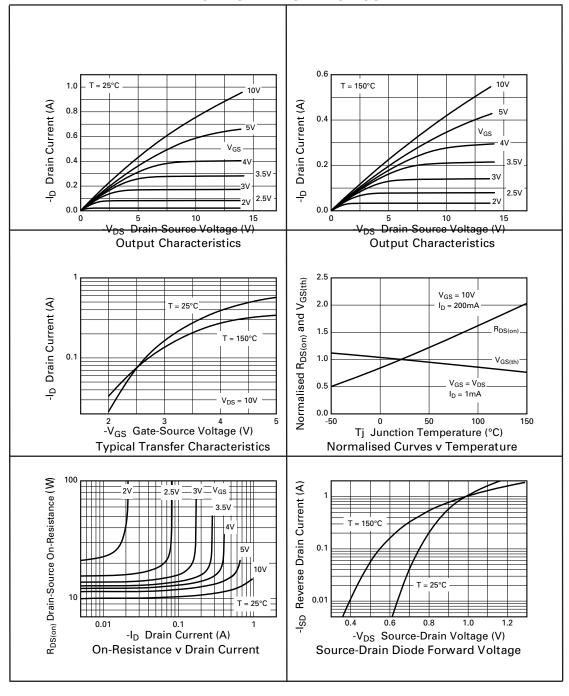
<sup>(1)</sup> Measured under pulsed conditions. Width=300 $\mu s.$  Duty cycle  $\leq~2\%$  .

<sup>(3)</sup> For design aid only, not subject to production testing.



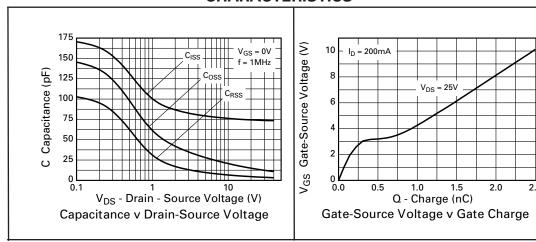
<sup>(2)</sup> Switching characteristics are independent of operating junction temperature.

### **TYPICAL CHARACTERISTICS**



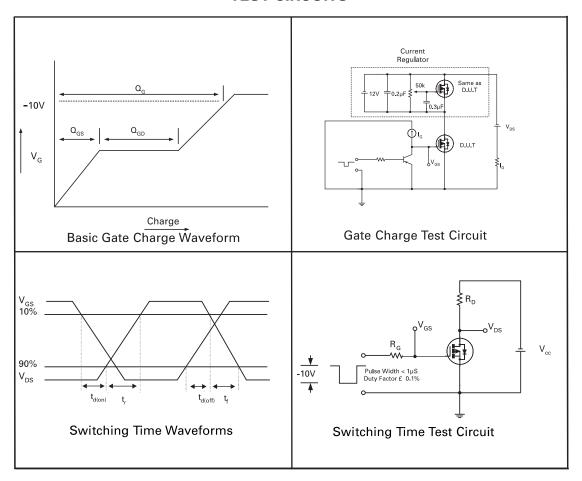


### **CHARACTERISTICS**





### **TEST CIRCUITS**



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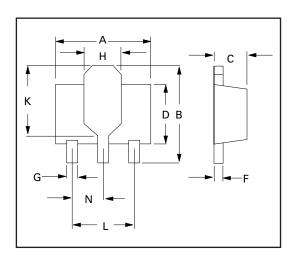
### **PACKAGE DIMENSIONS**

DIM	Millimetres		Inc	hes
	Min	Max	Min	Max
А	4.40	4.60	0.173	0.181
В	3.75	4.25	0.150	0.167
С	1.40	1.60	0.550	0.630
D	-	2.60	-	0.102
F	0.28	0.45	0.011	0.018
G	0.38	0.55	0.015	0.022
Н	1.50	1.80	0.060	0.072
K	2.60	2.85	0.102	0.112
L	2.90	3.10	0.114	0.122
N	1.40	1.60	0.055	0.063

# 4.0 4.0 1.5 3.2

**PAD LAYOUT DETAILS** 

SOT89 pattern.
Minimum Pad Size (dimensions in mm)



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