

## 250V P-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

**$V_{(BR)DSS}=-250V$ ;  $R_{DS(ON)}=14\Omega$ ;  $I_D=-205mA$**

### 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

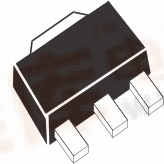
- Earth Recall and dialling switches
- Electronic hook switches
- High Voltage Power MOSFET Drivers
- Telecom call routers
- Solid state relays

### ORDERING INFORMATION

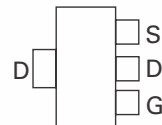
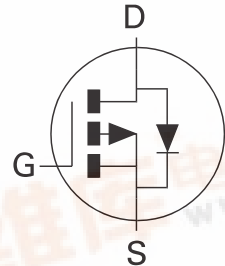
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZVP4525ZTA	7	8mm embossed	1000 units
ZVP4525ZTC	13	8mm embossed	4000 units

### DEVICE MARKING

P52



**SOT89**



**Top View**

# ZVP4525Z

## ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DSS}$	250	V
Gate Source Voltage	$V_{GS}$	$\pm 40$	V
Continuous Drain Current ( $V_{GS}=10V$ ; $T_A=25^\circ C$ )(a) ( $V_{GS}=10V$ ; $T_A=70^\circ C$ )(a)	$I_D$ $I_D$	-205 -164	mA mA
Pulsed Drain Current (c)	$I_{DM}$	-1	A
Continuous Source Current (Body Diode)	$I_S$	-0.75	A
Pulsed Source Current (Body Diode)	$I_{SM}$	-1	A
Power Dissipation at $T_A=25^\circ C$ (a) Linear Derating Factor	$P_D$	1.2 9.6	W mW/ $^\circ C$
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +150	$^\circ C$

## THERMAL RESISTANCE

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

### NOTES

(a) For a device surface mounted on 25mm x 25mm 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  $t \leq 5$  secs.

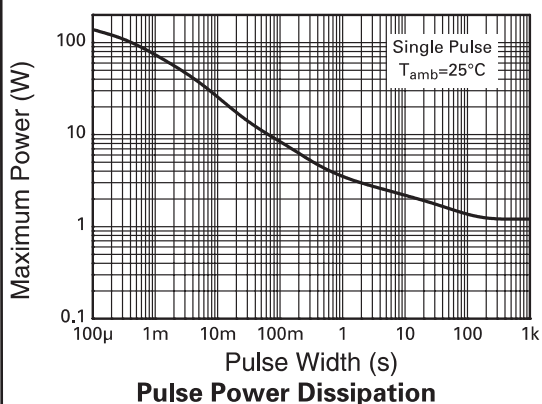
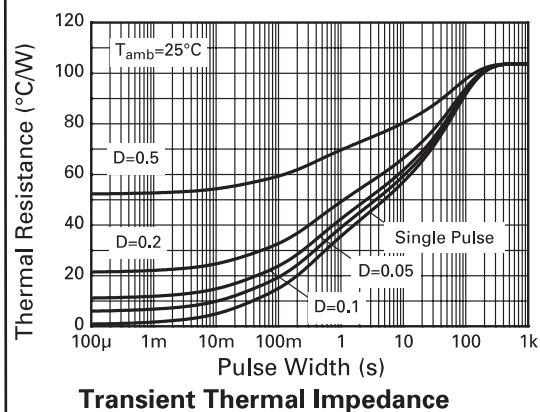
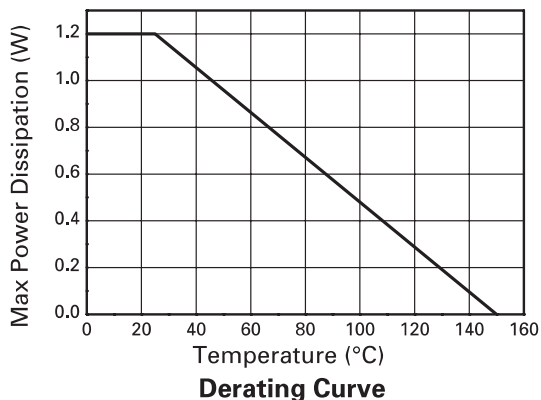
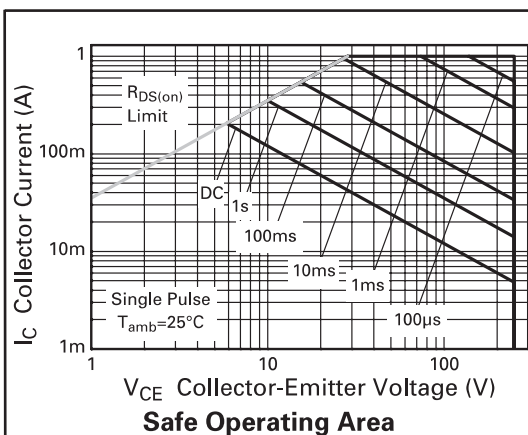
(c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

### NB High Voltage Applications

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

# ZVP4525Z

## CHARACTERISTICS



# ZVP4525Z

## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

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>GS</sub> =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	Ω Ω	V <sub>GS</sub> =-10V, I <sub>D</sub> =-200mA V <sub>GS</sub> =-3.5V, I <sub>D</sub> =-100mA
Forward Transconductance (3)	g <sub>fs</sub>	80	200		mS	V <sub>DS</sub> =-10V,I <sub>D</sub> =-0.15A
DYNAMIC (3)						
Input Capacitance	C <sub>iss</sub>		73		pF	V <sub>DS</sub> =-25 V, V <sub>GS</sub> =0V, f=1MHz
Output Capacitance	C <sub>oss</sub>		12.8		pF	
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	V <sub>DD</sub> =-30V, I <sub>D</sub> =-200mA R <sub>G</sub> =50Ω, V <sub>GS</sub> =-10V (refer to test circuit)
Rise Time	t <sub>r</sub>		3.78		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		17.5		ns	
Fall Time	t <sub>f</sub>		7.85		ns	
Total Gate Charge	Q <sub>g</sub>		2.45	3.45	nC	V <sub>DS</sub> =-25V,V <sub>GS</sub> =-10V, I <sub>D</sub> =-200mA(refer to test circuit)
Gate-Source Charge	Q <sub>gs</sub>		0.22	0.31	nC	
Gate Drain Charge	Q <sub>gd</sub>		0.45	0.63	nC	
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, di/dt=100A/μs
Reverse Recovery Charge (3)	Q <sub>rr</sub>		21	29	nC	

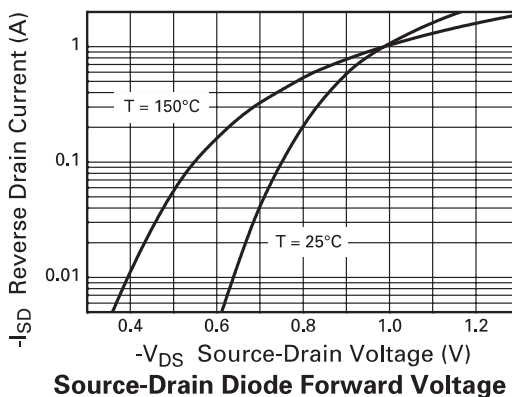
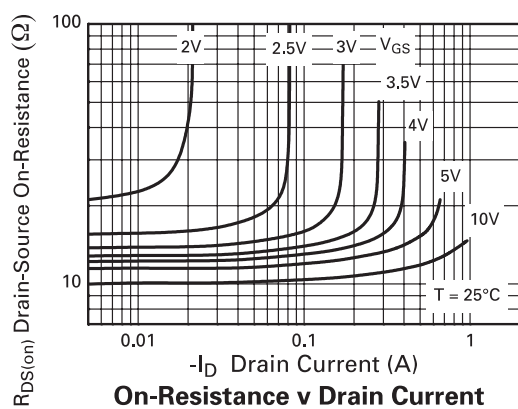
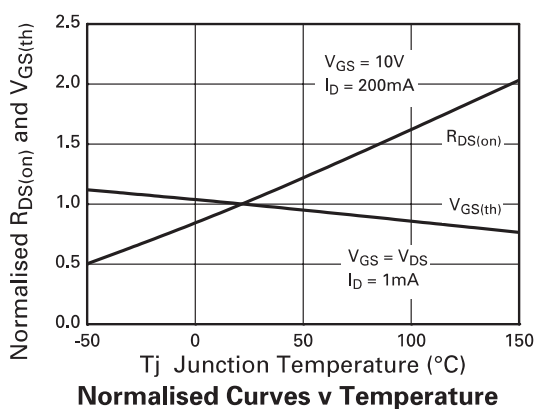
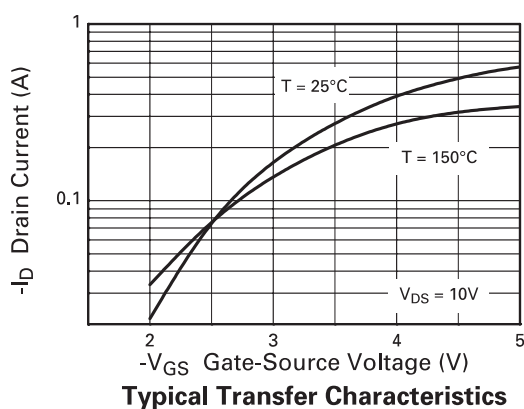
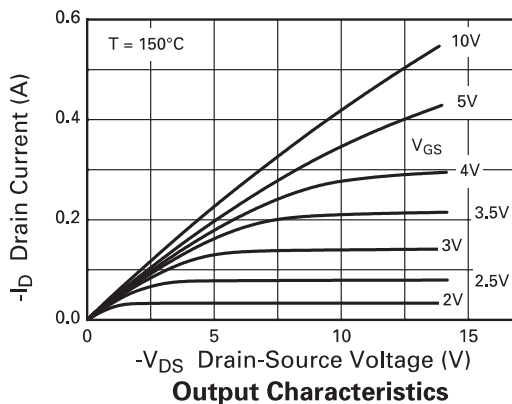
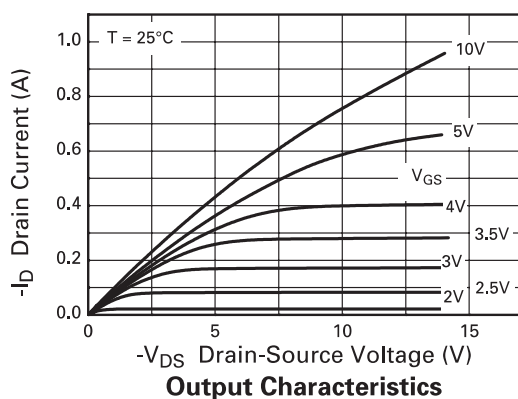
(1) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$  .

(2) Switching characteristics are independent of operating junction temperature.

(3) For design aid only, not subject to production testing.

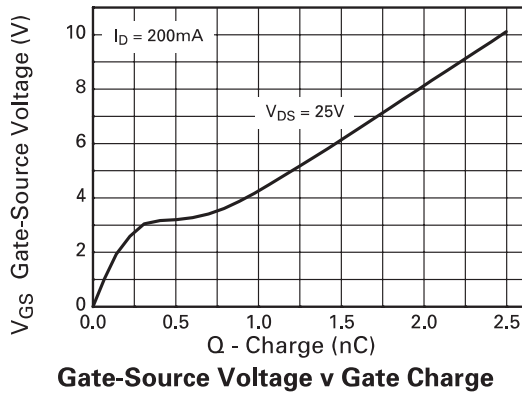
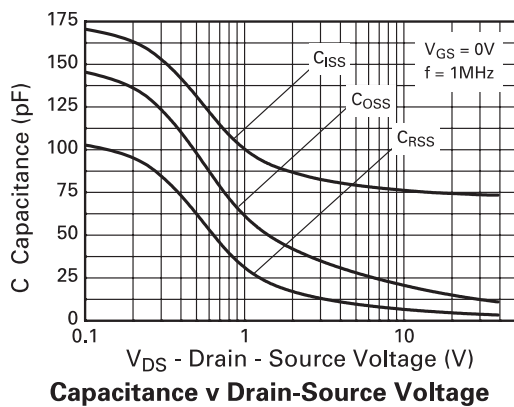
# ZVP4525Z

## TYPICAL CHARACTERISTICS

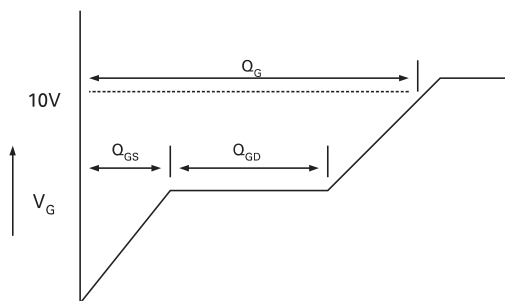


# ZVP4525Z

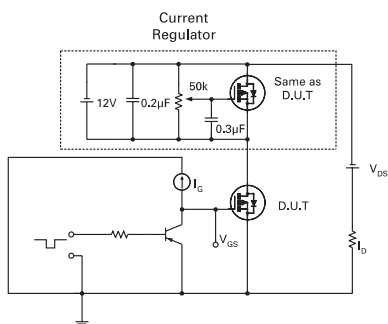
## CHARACTERISTICS



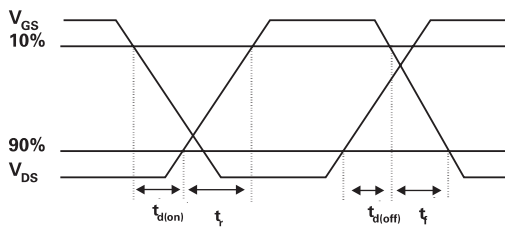
## TEST CIRCUITS



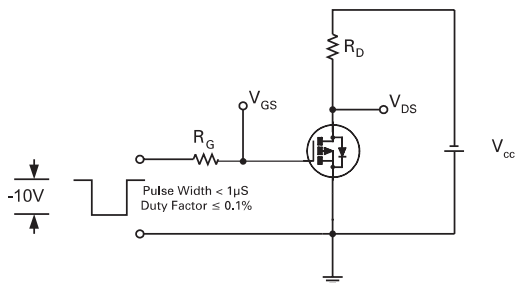
**Basic Gate Charge Waveform**



**Gate Charge Test Circuit**



**Switching Time Waveforms**



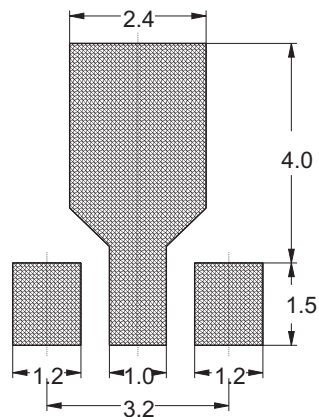
**Switching Time Test Circuit**

# ZVP4525Z

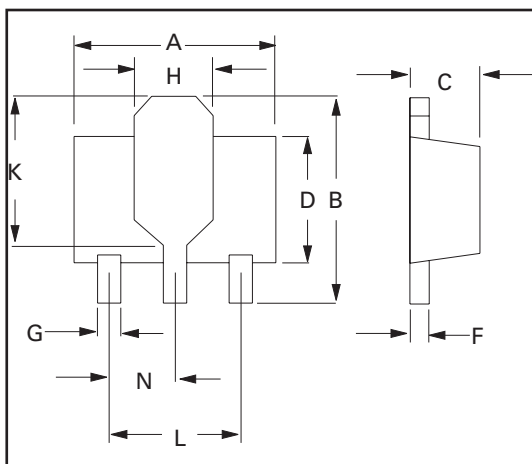
## PACKAGE DIMENSIONS

DIM	Millimetres		Inches	
	Min	Max	Min	Max
A	4.40	4.60	0.173	0.181
B	3.75	4.25	0.150	0.167
C	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
H	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

## PAD LAYOUT DETAILS



SOT89 pattern.  
Minimum Pad Size (dimensions in mm)



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