

## 250V N-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

**$V_{(BR)DSS}=250V$ ;  $R_{DS(ON)}=8.5\Omega$ ;  $I_D=240mA$**

### DESCRIPTION

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 Telecom and general high voltage circuits.

SOT223 and SOT23-6 versions are also available.

### FEATURES

- High voltage
- Low on-resistance
- Fast switching speed
- Low gate drive
- Low threshold
- Complementary P-channel Type ZVP4525G
- SOT223 package

### APPLICATIONS

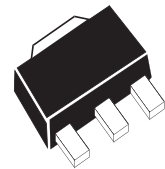
- Earth Recall and dialling switches
- Electronic hook switches
- High Voltage Power MOSFET Drivers
- Telecom call routers
- Solid state relays

### ORDERING INFORMATION

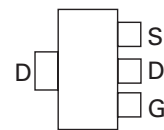
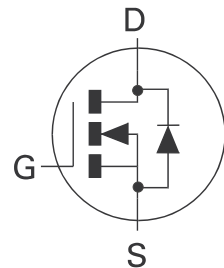
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZVN4525ZTA	7	8mm embossed	1000 units

### DEVICE MARKING

N52



**SOT89**



Top View

# ZVN4525Z

## 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)	$I_D$ $I_D$	240 192	mA mA
Pulsed Drain Current (c)	$I_{DM}$	1.44	A
Continuous Source Current (Body Diode)	$I_S$	1.1	A
Pulsed Source Current (Body Diode)	$I_{SM}$	1.44	A
Power Dissipation at $T_A=25^\circ C$ (a)	$P_D$	1.2	W
Linear Derating Factor		9.6	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

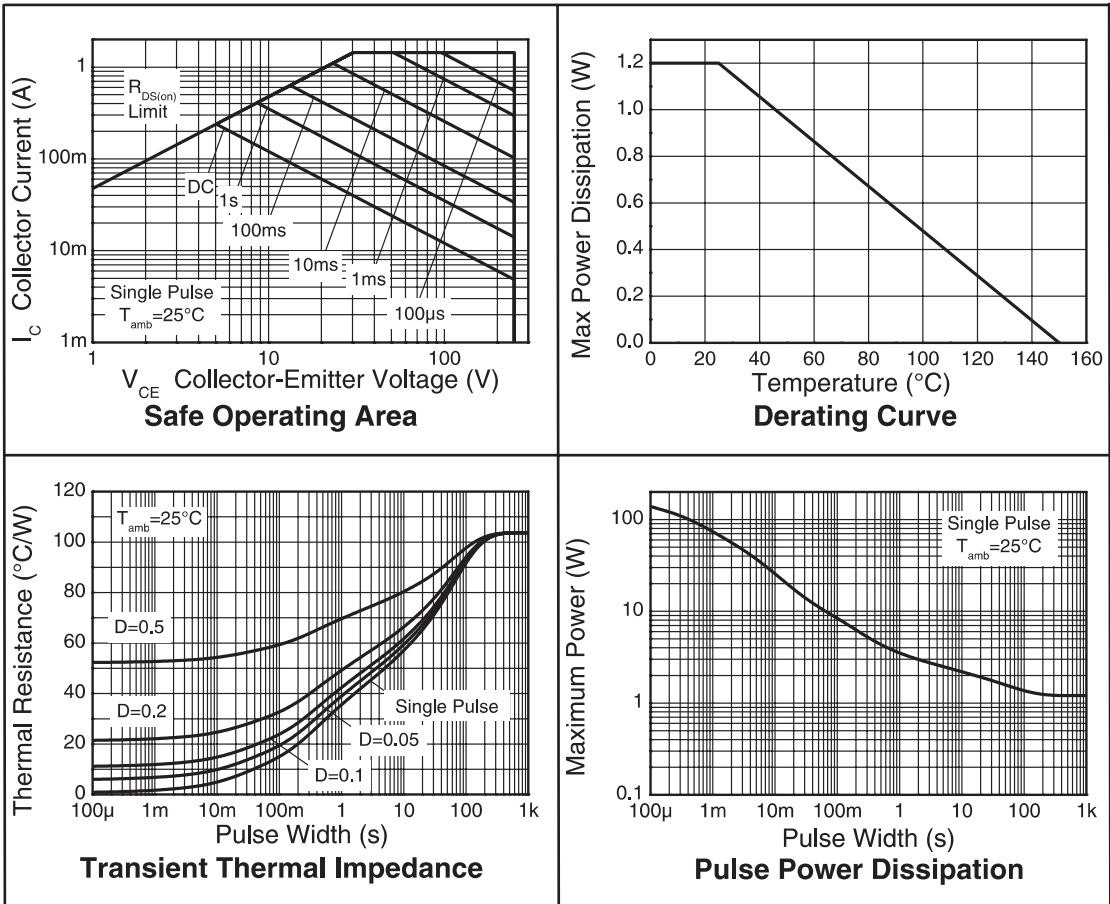
(b) For a device surface mounted on FR4 PCB measured at  $t \leq 5$  secs.

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

### NB High Voltage Applications

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

## CHARACTERISTICS



# ZVN4525Z

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

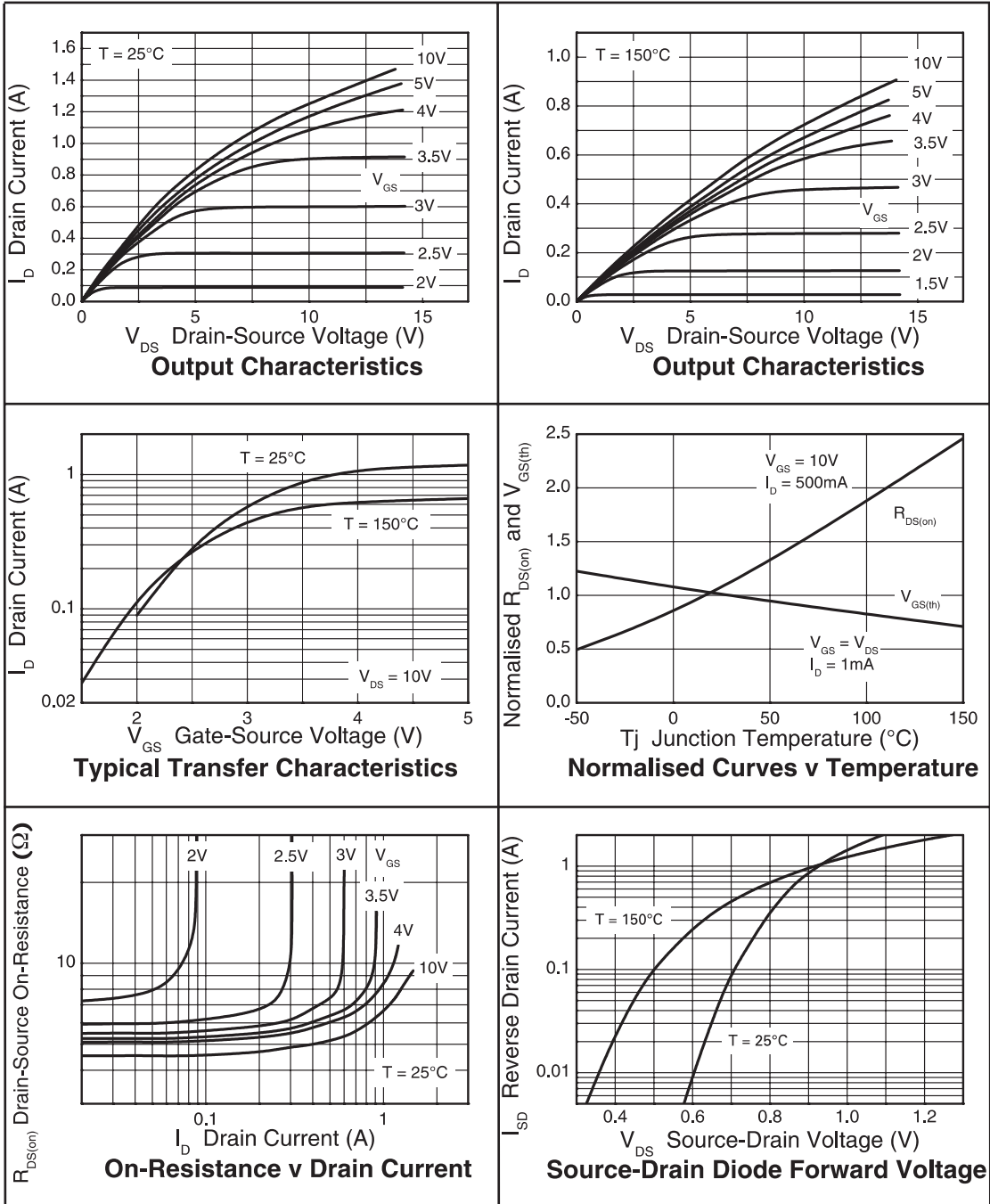
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNI T	CONDITIONS.
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	250	285		V	$I_D=1\text{mA}, V_{GS}=0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$		35	500	nA	$V_{DS}=250\text{V}, V_{GS}=0\text{V}$
Gate-Body Leakage	$I_{GSS}$		$\pm 1$	$\pm 100$	nA	$V_{GS}=\pm 40\text{V}, V_{DS}=0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.8	1.4	1.8	V	$I_D=1\text{mA}, V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$		5.6 5.9 6.4	8.5 9.0 9.5	$\Omega$	$V_{GS}=10\text{V}, I_D=500\text{mA}$ $V_{GS}=4.5\text{V}, I_D=360\text{mA}$ $V_{GS}=2.4\text{V}, I_D=20\text{mA}$
Forward Transconductance (3)	$g_{fs}$	0.3	475		S	$V_{DS}=10\text{V}, I_D=0.3\text{A}$
<b>DYNAMIC (3)</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	
<b>SWITCHING(2) (3)</b>						
Turn-On Delay Time	$t_{d(on)}$		1.25		ns	$V_{DD}=50\text{V}, I_D=200\text{mA}$ $R_G=6.0\Omega, R_D=4.4\Omega$ (refer to test circuit)
Rise Time	$t_r$		1.70		ns	
Turn-Off Delay Time	$t_{d(off)}$		11.40		ns	
Fall Time	$t_f$		3.50		ns	
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	nC	
Gate Drain Charge	$Q_{gd}$		0.5	0.70	nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (1)	$V_{SD}$			0.97	V	$T_j=25^{\circ}\text{C}, I_S=360\text{mA},$ $V_{GS}=0\text{V}$
Reverse Recovery Time (3)	$t_{rr}$		186	260	ns	$T_j=25^{\circ}\text{C}, I_F=360\text{mA},$ $di/dt=100\text{A}/\mu\text{s}$
Reverse Recovery Charge (3)	$Q_{rr}$		34	48	nC	

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

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

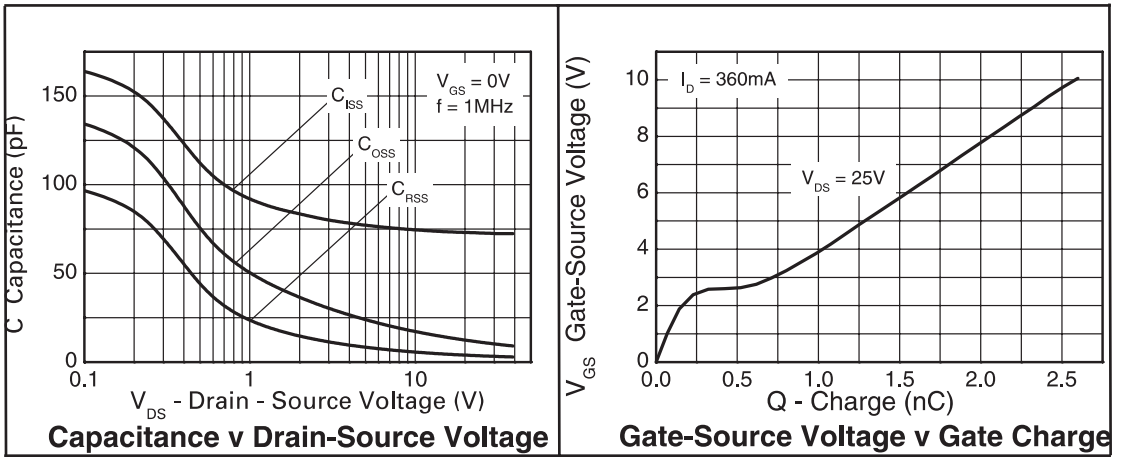
(3) For design aid only, not subject to production testing.

## TYPICAL CHARACTERISTICS

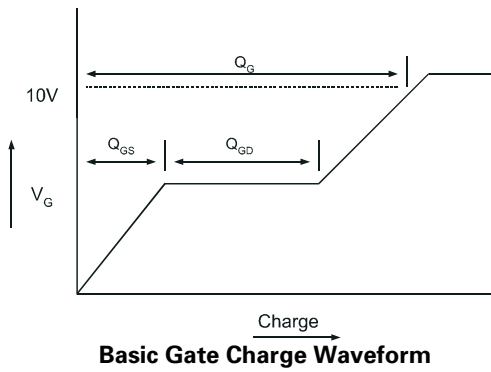


# ZVN4525Z

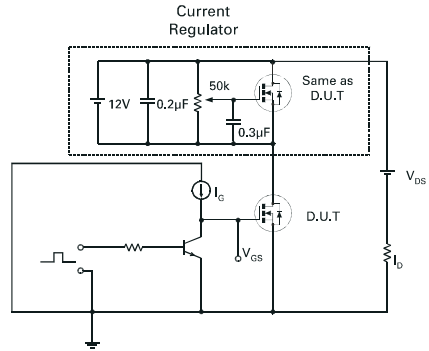
## CHARACTERISTICS



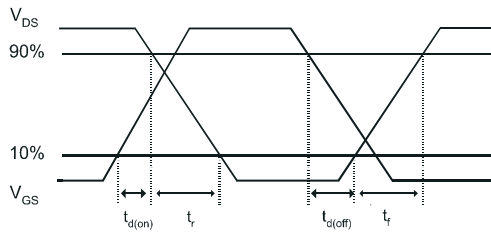
## CHARACTERISTICS



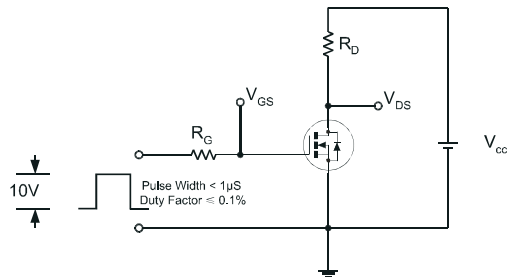
**Basic Gate Charge Waveform**



**Gate Charge Test Circuit**



**Switching Time Waveforms**



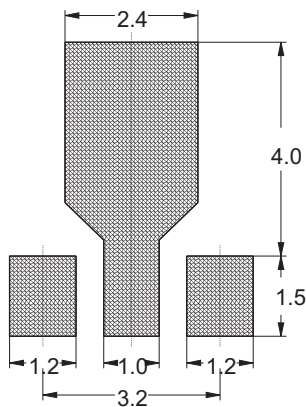
**Switching Time Test Circuit**

# ZVN4525Z

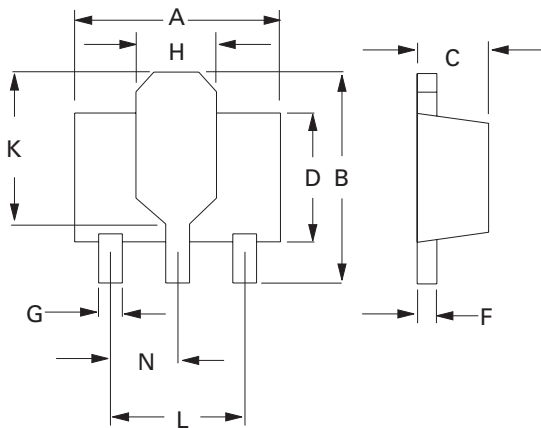
## PACKAGE DIMENSIONS

Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	4.40	4.6	0.173	0.181
B	3.75	4.25	0.150	0.167
C	1.40	1.6	0.550	0.630
D	-	2.6	-	0.102
F	0.28	0.45	0.011	0.018
G	0.38	0.55	0.015	0.022
H	1.5	1.80	0.060	0.072
K	2.6	2.85	0.102	0.112
L	2.90	3.10	0.114	0.122
N	1.4	1.60	0.055	0.063

## PAD LAYOUT DETAILS



SOT89 pattern.  
Minimum Pad Size (dimensions in mm)



Zetex plc.  
Fields New Road, Chadderton, Oldham, OL9-8NP, United Kingdom.  
Telephone: (44)161 622 4422 (Sales), (44)161 622 4444 (General Enquiries)  
Fax: (44)161 622 4420

Zetex GmbH  
Streitfeldstraße 19  
D-81673 München  
Germany  
Telephone: (49) 89 45 49 49 0  
Fax: (49) 89 45 49 49 49

Zetex Inc.  
47 Mall Drive, Unit 4  
Commack NY 11725  
USA  
Telephone: (631) 543-7100  
Fax: (631) 864-7630

Zetex (Asia) Ltd.  
3701-04 Metroplaza, Tower 1  
Hing Fong Road,  
Kwai Fong, Hong Kong  
Telephone: (852) 26100 611  
Fax: (852) 24250 494

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