

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

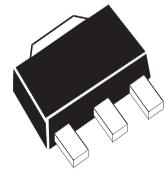
- Earth Recall and dialling switches
- Electronic hook switches
- High Voltage Power MOSFET Drivers
- Telecom call routers
- Solid state relays

ORDERING INFORMATION

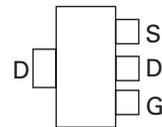
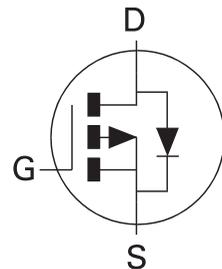
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZVP4525ZTA	7	8mm embossed	1000 units
ZVP4525ZTC	13	8mm embossed	4000 units

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}	± 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)	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	$^\circ C/W$

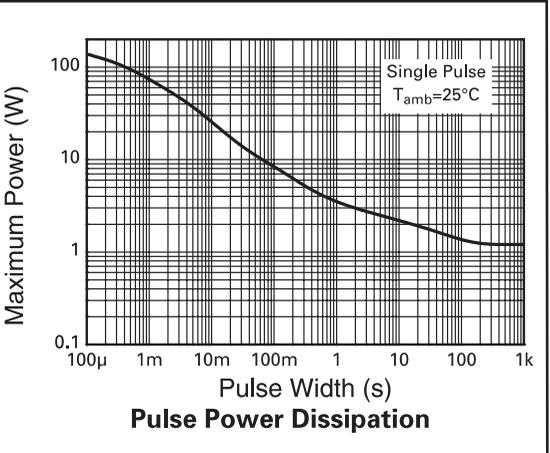
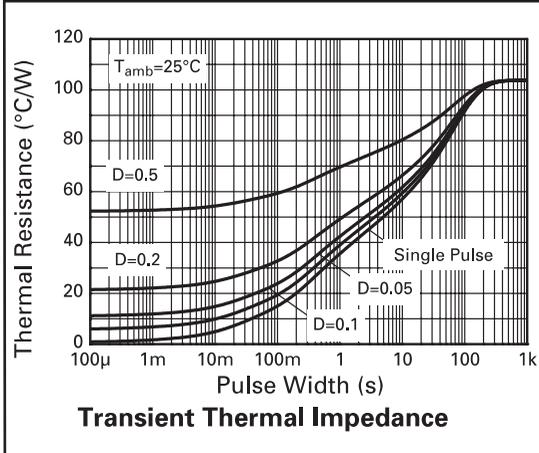
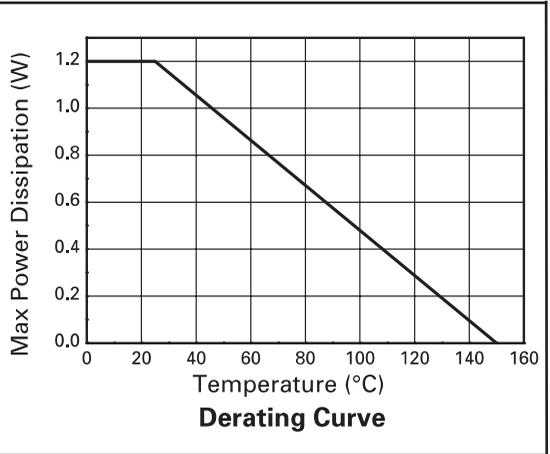
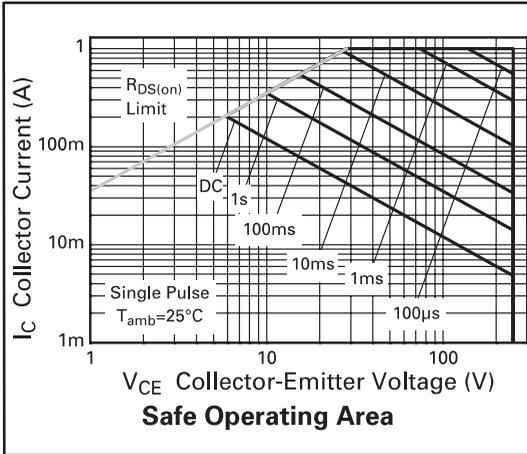
NOTES

- (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 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



ZVP4525Z

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

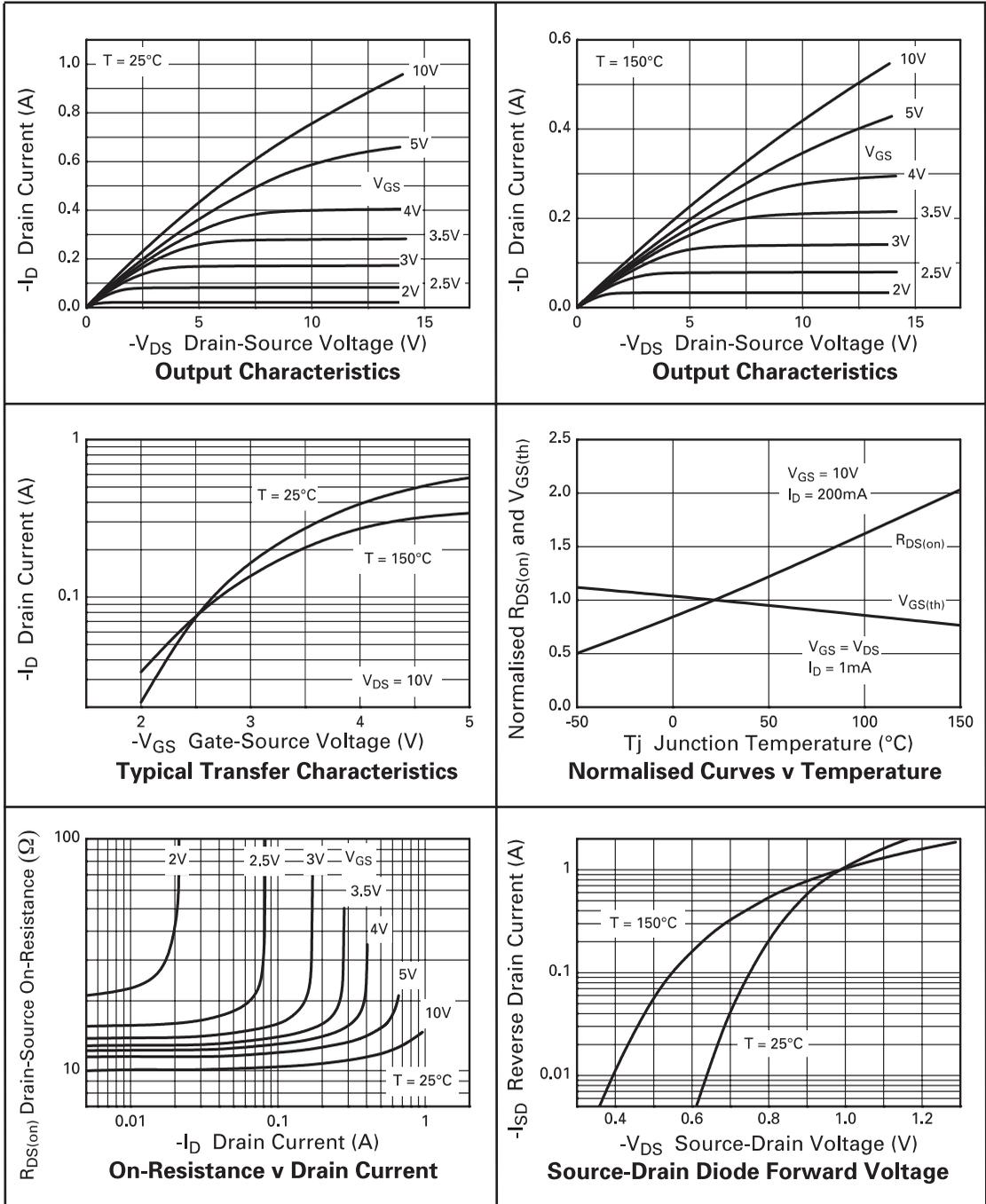
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-250	-285		V	$I_D = -1\text{mA}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}		-30	-500	nA	$V_{DS} = -250\text{V}$, $V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}		± 1	± 100	nA	$V_{GS} = \pm 40\text{V}$, $V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	-0.8	-1.5	-2.0	V	$I_D = -1\text{mA}$, $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$		10 13	14 18	Ω Ω	$V_{GS} = -10\text{V}$, $I_D = -200\text{mA}$ $V_{GS} = -3.5\text{V}$, $I_D = -100\text{mA}$
Forward Transconductance (3)	g_{fs}	80	200		mS	$V_{DS} = -10\text{V}$, $I_D = -0.15\text{A}$
DYNAMIC (3)						
Input Capacitance	C_{iss}		73		pF	$V_{DS} = -25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$
Output Capacitance	C_{oss}		12.8		pF	
Reverse Transfer Capacitance	C_{rss}		3.91		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	$t_{d(on)}$		1.53		ns	$V_{DD} = -30\text{V}$, $I_D = -200\text{mA}$ $R_G = 50\Omega$, $V_{GS} = -10\text{V}$ (refer to test circuit)
Rise Time	t_r		3.78		ns	
Turn-Off Delay Time	$t_{d(off)}$		17.5		ns	
Fall Time	t_f		7.85		ns	
Total Gate Charge	Q_g		2.45	3.45	nC	$V_{DS} = -25\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -200\text{mA}$ (refer to test circuit)
Gate-Source Charge	Q_{gs}		0.22	0.31	nC	
Gate Drain Charge	Q_{gd}		0.45	0.63	nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}			0.97	V	$T_j = 25^{\circ}\text{C}$, $I_S = -200\text{mA}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time (3)	t_{rr}		205	290	ns	$T_j = 25^{\circ}\text{C}$, $I_F = -200\text{mA}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge (3)	Q_{rr}		21	29	nC	

(1) Measured under pulsed conditions. Width=300 μs . Duty cycle $\leq 2\%$.

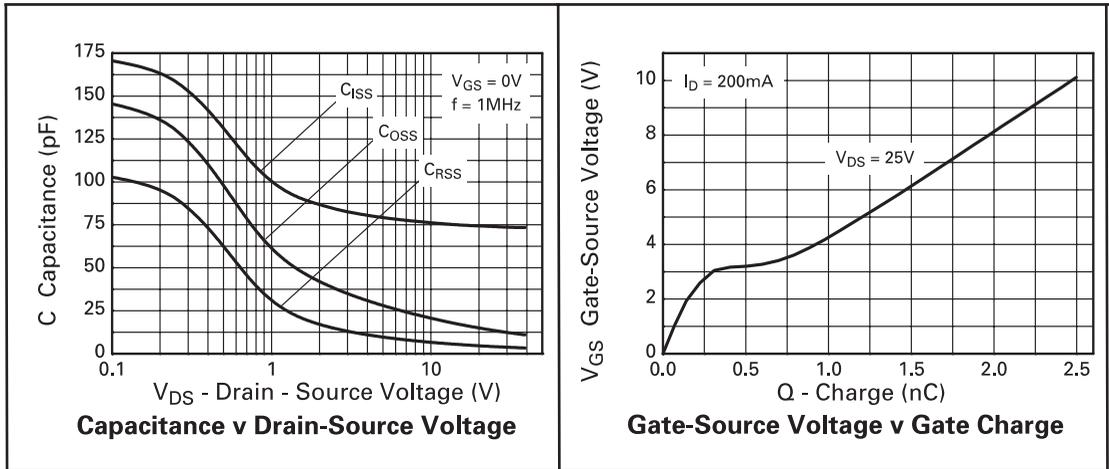
(2) Switching characteristics are independent of operating junction temperature.

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

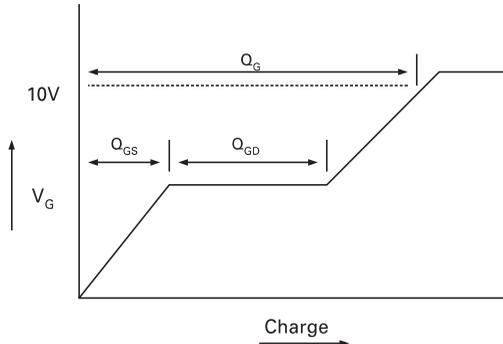
TYPICAL CHARACTERISTICS



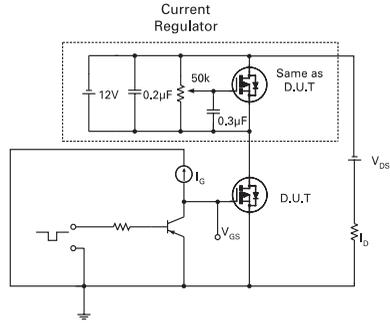
CHARACTERISTICS



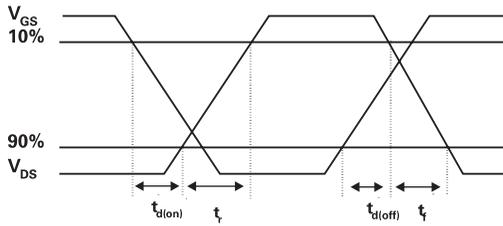
TEST CIRCUITS



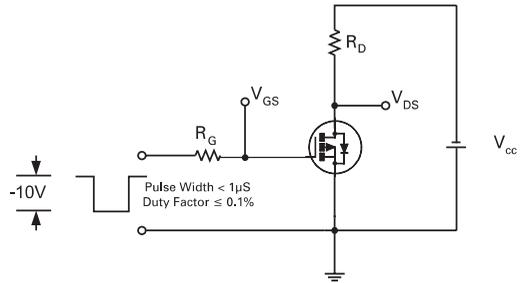
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms



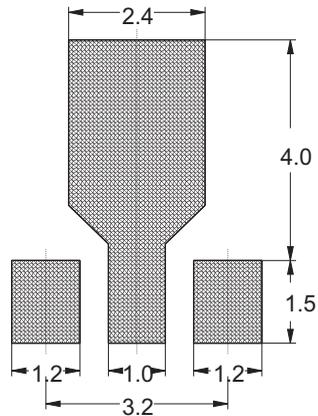
Switching Time Test Circuit

ZVP4525Z

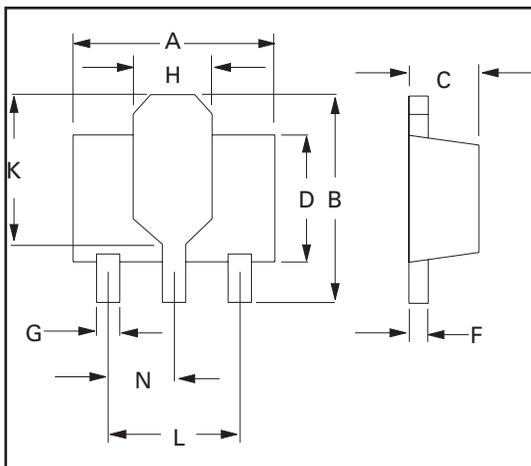
PACKAGE DIMENSIONS

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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