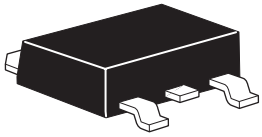
ZXMN6A25K
60V DPAK N-channel enhancement mode MOSFET

Summary



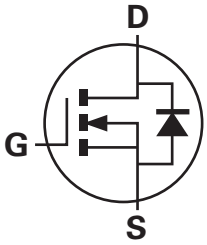
$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
60	0.050 @ V_{GS}= 10V	10.7
	0.070 @ V_{GS}= 4.5V	9

Description

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

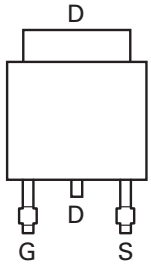
Features

- Low on-resistance
- Fast switching speed
- Low gate drive
- DPAK package



Applications

- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control



Pinout - top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN6A25KTC	13	16	2,500

Device marking

ZXMN
6A25

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DSS}	60	V
Gate-source voltage	V_{GS}	±20	V
Continuous drain current @ V_{GS}= 10V; T_{amb}=25°C[b]	I_D	10.7	A
@ V_{GS}= 10V; T_{amb}=70°C[b]		8.6	A
@ V_{GS}= 10V; T_{amb}=25°C[a]		7	A
Pulsed drain current[c]	I_{DM}	36	A
Continuous source current (body diode)[b]	I_S	11.8	A
Pulsed source current (body diode)[c]	I_{SM}	36	A
Power dissipation at T_{amb} =25°C[a]	P_D	4.25	W
Linear derating factor		34	mW/°C
Power dissipation at T_{amb} =25°C[b]	P_D	9.85	W
Linear derating factor		78.7	mW/°C
Power dissipation at T_{amb} =25°C[d]	P_D	2.11	W
Linear derating factor		16.8	mW/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	°C

Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient[a]	$R_{\Theta JA}$	29.4	°C/W
Junction to ambient[b]	$R_{\Theta JA}$	12.7	°C/W
Junction to ambient[d]	$R_{\Theta JA}$	59.1	°C/W

NOTES:

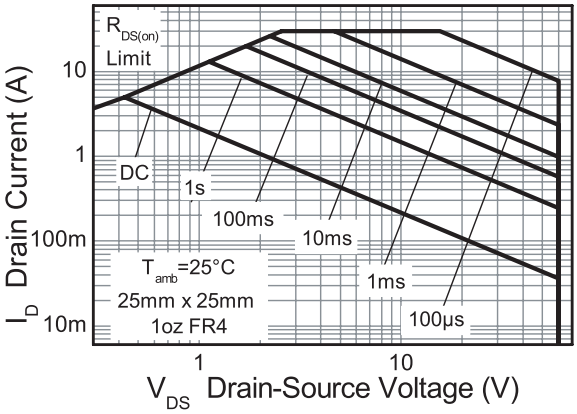
(a) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.

(b) For a device surface mounted on FR4 PCB measured at t ≤10 sec.

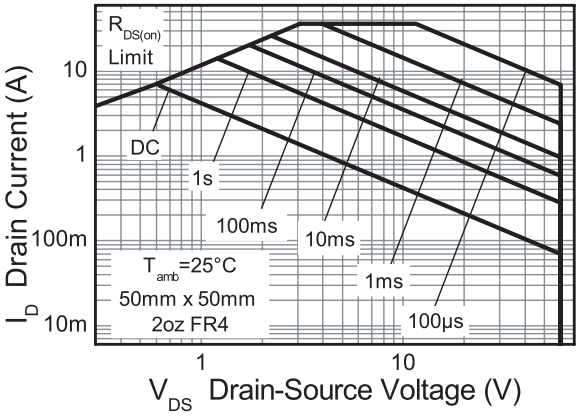
(c) Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, D=0.02 pulse width=300μs - pulse width limited by maximum junction temperature.

(d) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz. copper, in still air conditions.

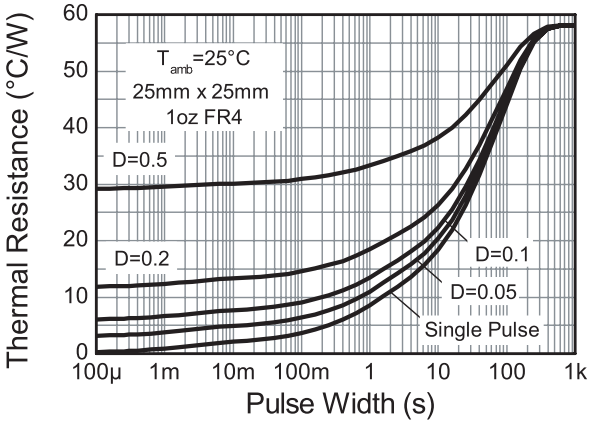
Thermal characteristics



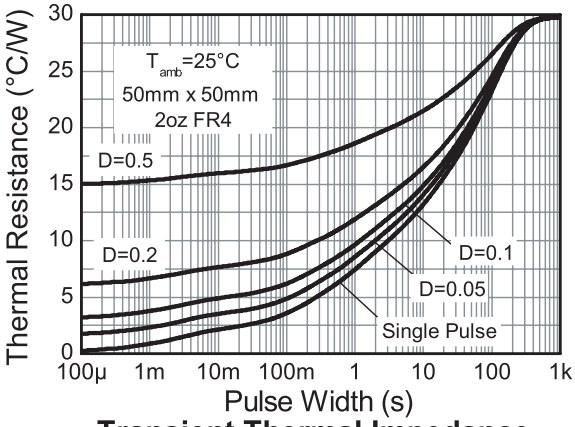
Safe Operating Area



Safe Operating Area



Transient Thermal Impedance



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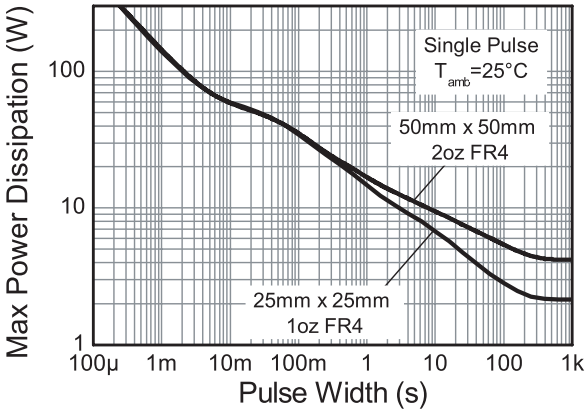
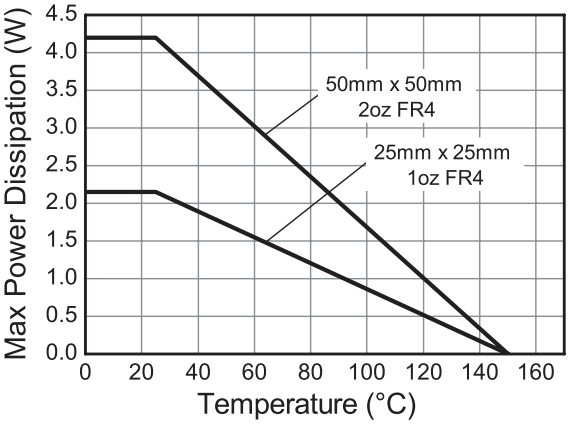


Pulse Power Dissipation



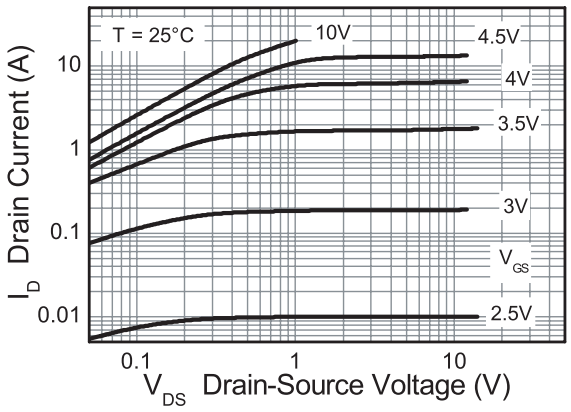
Derating Curve

Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

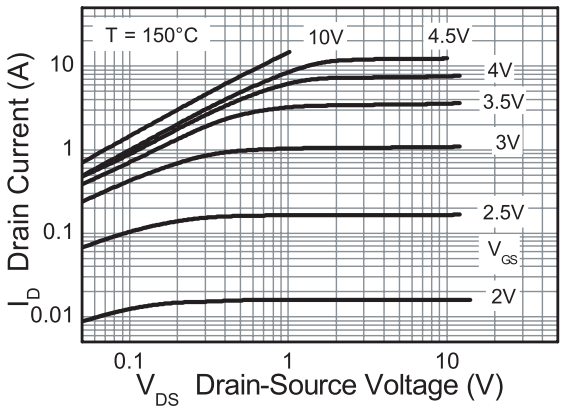
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	60			V	I_D= 250μA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}			1.0	μA	V_{DS}= 60V, V_{GS}=0V
Gate-body leakage	I_{GSS}			100	nA	V_{GS}=±20V, V_{DS}=0V
Gate-source threshold voltage	$V_{GS(th)}$	1		3	V	I_D= 250μA, V_{DS}=V_{GS}
Static drain-source on-state resistance (*)	$R_{DS(on)}$			0.050	Ω	V_{GS}= 10V, I_D= 3.6A
				0.070	Ω	V_{GS}= 4.5V, I_D = 3.0A
Forward transconductance (*)(‡)	g_{fs}		10.2		S	V_{DS}= 15V, I_D= 4.5A
Dynamic(‡)						
Input capacitance	C_{iss}		1063		pF	V_{DS}= 30V, V_{GS}=0V f=1MHz
Output capacitance	C_{oss}		104		pF	
Reverse transfer capacitance	C_{rss}		64		pF	
Switching (†) (‡)						
Turn-on-delay time	$t_{d(on)}$		3.8		ns	V_{DD}= 30V, I_D= 1A R_G≅6.0Ω, V_{GS}= 10V
Rise time	t_r		4.0		ns	
Turn-off delay time	$t_{d(off)}$		26.2		ns	
Fall time	t_f		10.6		ns	
Gate charge	Q_g		11.0		nC	V_{DS}= 30V, V_{GS}= 5V I_D= 1.4A
Total gate charge	Q_g		20.4		nC	V_{DS}= 30V, V_{GS}= 10V I_D= 1.4A
Gate-source charge	Q_{gs}		4.1		nC	
Gate drain charge	Q_{gd}		5.1		nC	
Source-drain diode						
Diode forward voltage(*)	V_{SD}		0.85	0.95	V	T_j=25°C, I_S= 5.5A, V_{GS}=0V
Reverse recovery time(‡)	t_{rr}		22.0		ns	T_j=25°C, I_S= 2.2A, di/dt=100A/μs
Reverse recovery charge(‡)	Q_{rr}		21.4		nC	

NOTES:
(*) 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.

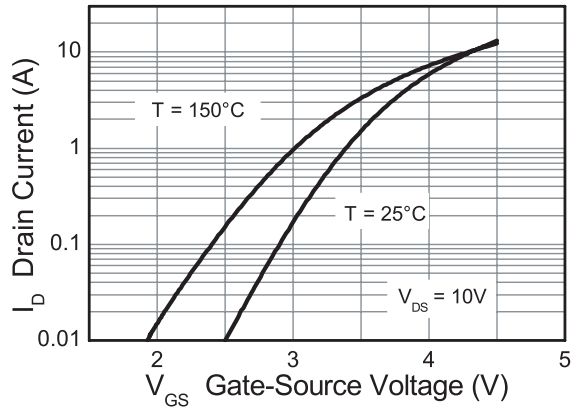
Typical characteristics



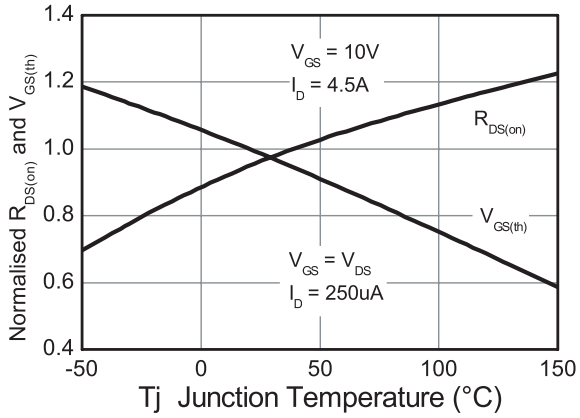
Output Characteristics



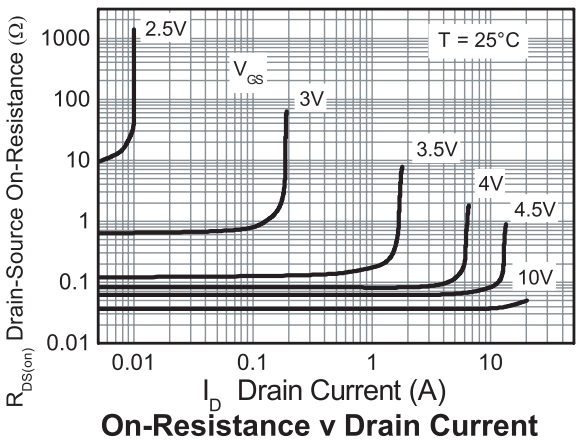
Output Characteristics



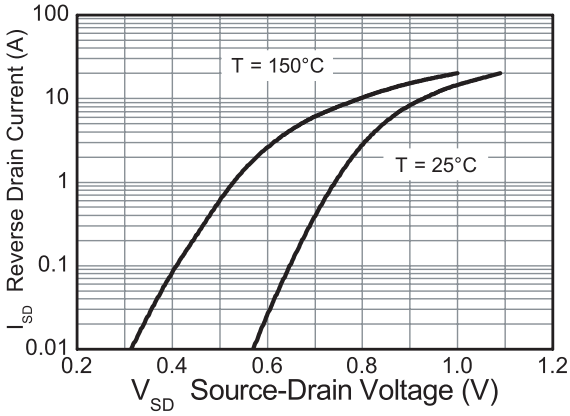
Typical Transfer Characteristics



Normalised Curves v Temperature

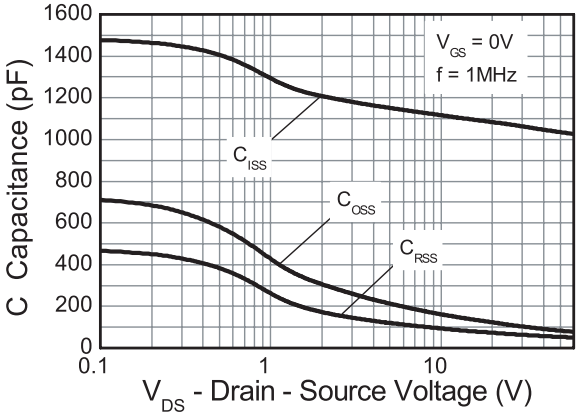


On-Resistance v Drain Current

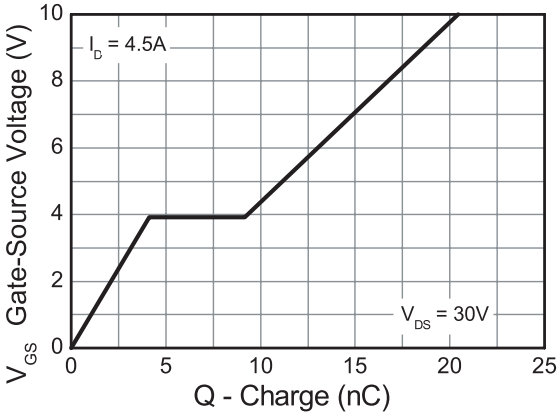


Source-Drain Diode Forward Voltage

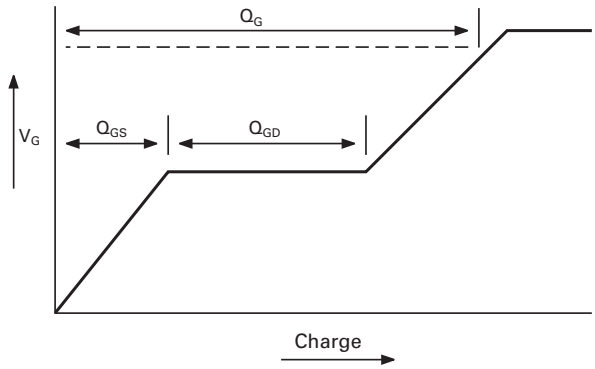
Typical characteristics



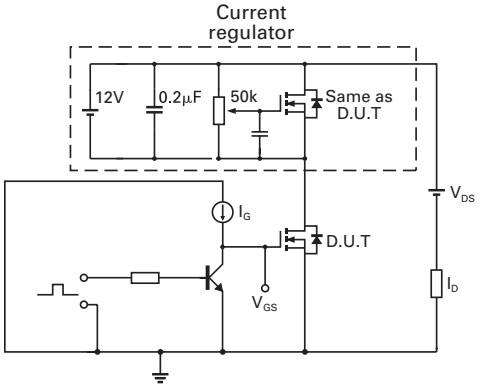
Capacitance v Drain-Source Voltage



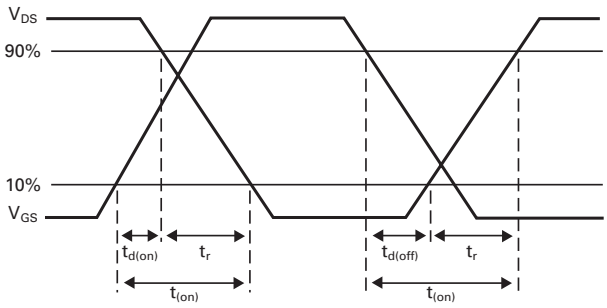
Gate-Source Voltage v Gate Charge



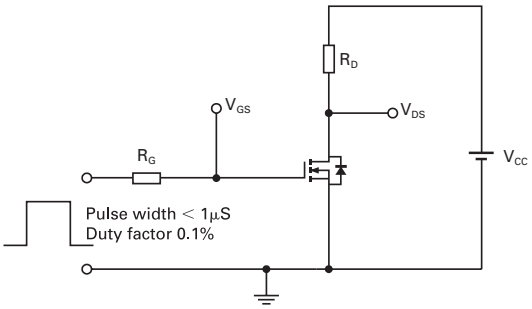
Basic gate charge waveform



Gate charge test circuit

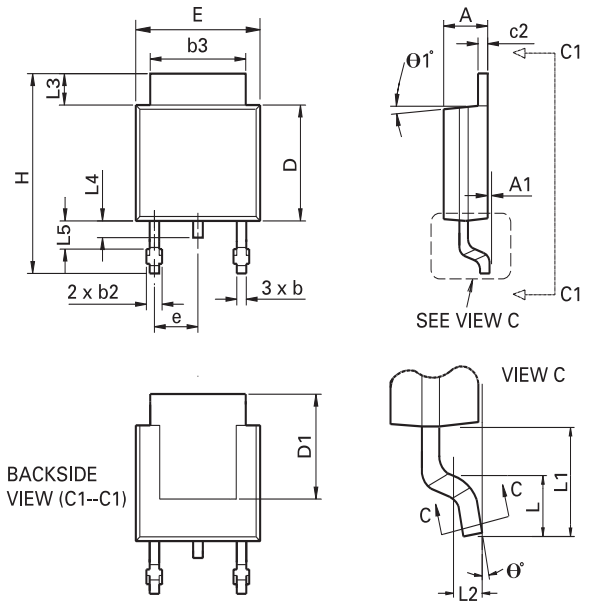


Switching time waveforms



Switching time test circuit

Package outline - DPAK



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.086	0.094	2.18	2.39	e	0.090 BSC		2.29 BSC	
A1	-	0.005	-	0.127	H	0.370	0.410	9.40	10.41
b	0.020	0.035	0.508	0.89	L	0.055	0.070	1.40	1.78
b2	0.030	0.045	0.762	1.14	L1	0.108 REF		2.74 REF	
b3	0.205	0.215	5.21	5.46	L2	0.020 BSC		0.508 BSC	
c	0.018	0.024	0.457	0.61	L3	0.035	0.065	0.89	1.65
c2	0.018	0.023	0.457	0.584	L4	0.025	0.040	0.635	1.016
D	0.213	0.245	5.41	6.22	L5	0.045	0.060	1.14	1.52
D1	0.205	-	5.21	-	θ1°	0°	10°	0°	10°
E	0.250	0.265	6.35	6.73	θ°	0°	15°	0°	15°
E1	0.170	-	4.32	-	-	-	-	-	-

Note: Controlling dimensions are in inches. Approximate dimensions are provided in millimeters