

ZXMN6A09K

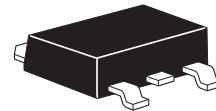
60V N-CHANNEL ENHANCEMENT MODE MOSFET IN D-PAK

SUMMARY

$V_{(BR)DSS} = 60V$: $R_{DS(on)} = 0.045\Omega$; $I_D = 11.2A$

DESCRIPTION

This new generation of Trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage power management applications.



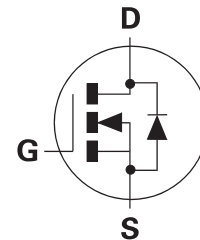
DPAK

FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- D-Pak (TO-252) package

APPLICATIONS

- DC-DC Converters
- Power Management functions
- Disconnect switches
- Motor control



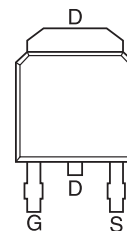
ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN6A09KTC	13"	16mm	2500 units

DEVICE MARKING

- ZXMN
6A09K

PINOUT



TOP VIEW

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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DSS}	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current @ $V_{GS}=10V$; $T_A=25^\circ C$ ^(b) @ $V_{GS}=10V$; $T_A=70^\circ C$ ^(b) @ $V_{GS}=10V$; $T_A=25^\circ C$ ^(a)	I_D	11.2 9.0 7.3	A
Pulsed drain current ^(c)	I_{DM}	40	A
Continuous source current (body diode) ^(b)	I_S	10.8	A
Pulsed source current (body diode) ^(c)	I_{SM}	40	A
Power dissipation at $T_A=25^\circ C$ ^(a) Linear derating factor	P_D	4.3 34.4	W mW/ $^\circ C$
Power dissipation at $T_A=25^\circ C$ ^(b) Linear derating factor	P_D	10.1 80.8	W mW/ $^\circ C$
Power dissipation at $T_A=25^\circ C$ ^(d) Linear derating factor	P_D	2.15 17.2	W mW/ $^\circ C$
Operating and storage temperature range	T_J, T_{stg}	-55 to +150	$^\circ C$

THERMAL RESISTANCE

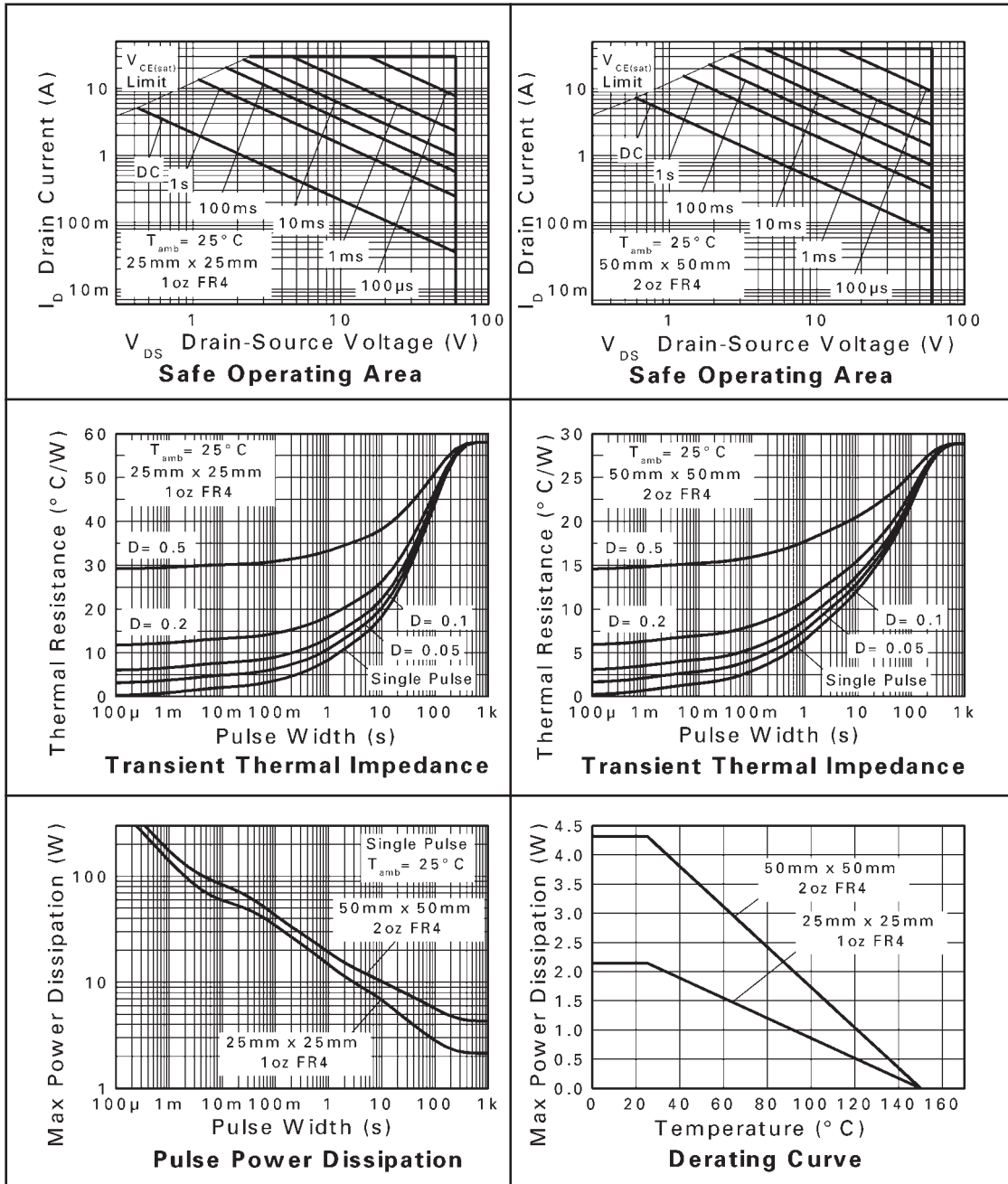
PARAMETER	SYMBOL	VALUE	UNIT
Junction to ambient ^(a)	$R_{\theta JA}$	29	$^\circ C/W$
Junction to ambient ^(b)	$R_{\theta JA}$	12.3	$^\circ C/W$
Junction to ambient ^(d)	$R_{\theta JA}$	58	$^\circ C/W$

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 $t \leq 10$ sec.
 (c) Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, $D=0.02$ pulse width=300 μs - pulse width limited by maximum junction temperature.
 (d) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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TYPICAL CHARACTERISTICS



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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}	60			V	I _D = 250μA, V _{GS} =0V
Zero gate voltage drain current	I _{DSS}			1	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)}	1.0			V	I _D = 250μA, V _{DS} =V _{GS}
Static drain-source on-state resistance ⁽¹⁾	R _{DS(on)}			0.045	Ω	V _{GS} = 10V, I _D = 7.3A
				0.070	Ω	V _{GS} = 4.5V, I _D = 5.6A
Forward transconductance ⁽¹⁾ ⁽³⁾	g _{fs}		15		S	V _{DS} = 15V, I _D = 7.3A
DYNAMIC ⁽³⁾						
Input capacitance	C _{iss}		1426		pF	V _{DS} = 30V, V _{GS} =0V f=1MHz
Output capacitance	C _{oss}		134		pF	
Reverse transfer capacitance	C _{rss}		64		pF	
SWITCHING ⁽²⁾ ⁽³⁾						
Turn-on-delay time	t _{d(on)}		4.8		ns	V _{DD} = 30V, I _D = 1A R _G ≐6.0Ω, V _{GS} = 10V (refer to test circuit)
Rise time	t _r		4.6		ns	
Turn-off delay time	t _{d(off)}		32.5		ns	
Fall time	t _f		14.5		ns	
Total gate charge	Q _g		15		nC	V _{DS} = 30V, V _{GS} = 4.5V I _D = 5.6A
Total gate charge	Q _g		29		nC	V _{DS} = 30V, V _{GS} = 10V I _D = 7.3A
Gate-source charge	Q _{gs}		7.0		nC	
Gate drain charge	Q _{gd}		4.7		nC	
SOURCE-DRAIN DIODE						
Diode forward voltage ⁽¹⁾	V _{SD}		0.85	0.95	V	T _j =25°C, I _S = 6.6A, V _{GS} =0V
Reverse recovery time ⁽³⁾	t _{rr}		25.6		ns	T _j =25°C, I _S = 3A, di/dt=100A/μs
Reverse recovery charge ⁽³⁾	Q _{rr}		26.0		nC	

NOTES

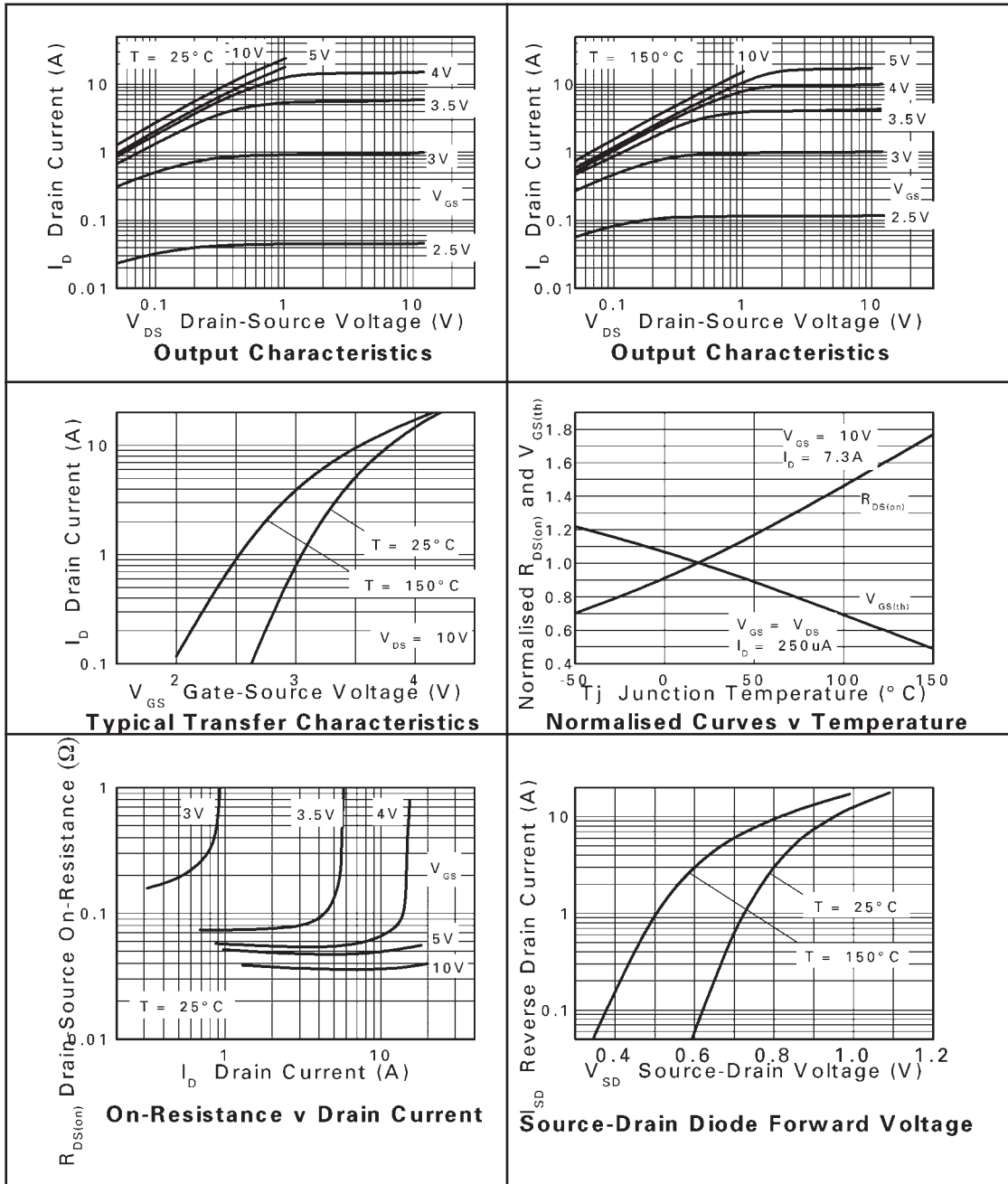
(1) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

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

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

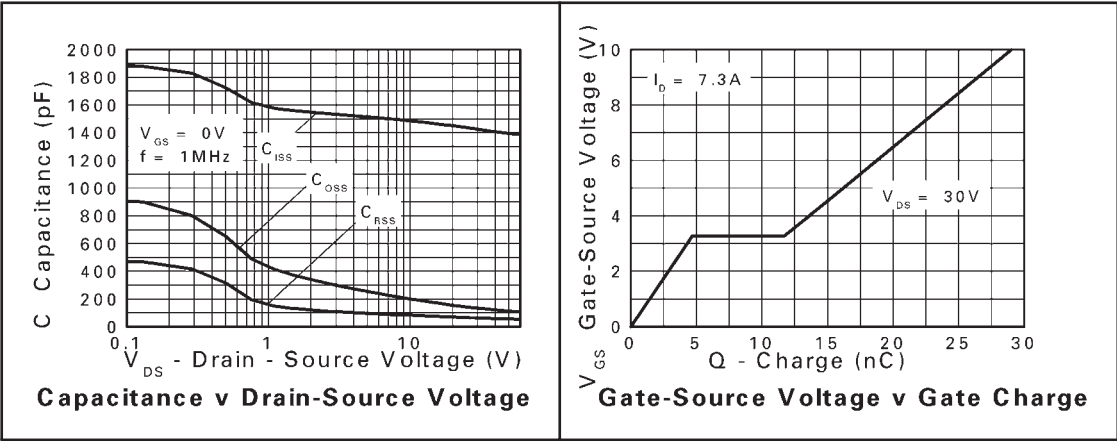
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TYPICAL CHARACTERISTICS



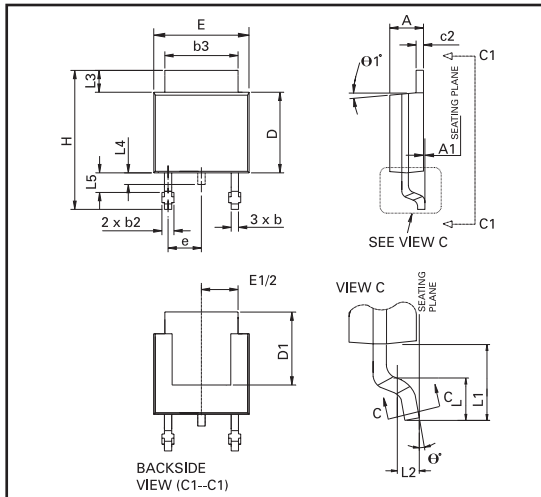
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TYPICAL CHARACTERISTICS



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PACKAGE OUTLINE



Controlling dimensions are in millimeters. Approximate conversions are given in inches

PACKAGE DIMENSIONS

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	2.18	2.38	0.086	0.094	e	2.30 BSC		0.090 BSC	
A1	—	0.127	—	0.005	H	9.40	10.41	0.370	0.410
b	0.635	0.89	0.025	0.035	L	1.40	1.78	0.055	0.070
b2	0.762	1.114	0.030	0.045	L1	2.74 REF		0.108 REF	
b3	5.20	5.46	0.205	0.215	L2	0.051 BSC		0.020 BSC	
c	0.457	0.609	0.018	0.024	L3	0.89	1.27	0.035	0.050
c2	0.457	0.584	0.018	0.023	L4	0.635	1.01	0.025	0.040
D	5.97	6.22	0.235	0.245	L5	1.14	1.52	0.045	0.060
D1	5.20	—	0.205	—	Θ1°	0°	10°	0°	10°
E	6.35	6.73	0.250	0.265	Θ°	0°	15°	0°	15°
E1	4.32	—	0.170	—	—	—	—	—	—

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