

ZXMN3A04K

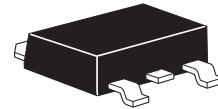
30V N-CANNEL ENHANCEMENT MODE MOSFET IN DPAK

SUMMARY

$V_{(BR)DSS}=30V$; $R_{DS(on)}=0.02\Omega$; $I_D=18.4A$

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.



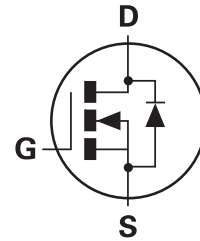
DPAK

FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- DPAK (TO252) package

APPLICATIONS

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



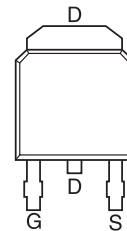
ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN3A04KTC	13"	16mm	2500 units

DEVICE MARKING

- ZXMN
3A04K

PINOUT



TOP VIEW

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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DSS}	30	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current @ $V_{GS}=10V$; $T_A=25^\circ C$ ^(b)	I_D	18.4	A
@ $V_{GS}=10V$; $T_A=70^\circ C$ ^(b)		14.7	A
@ $V_{GS}=10V$; $T_A=25^\circ C$ ^(a)		12.0	A
Pulsed drain current ^(c)	I_{DM}	66	A
Continuous source current (body diode) ^(b)	I_S	11.5	A
Pulsed source current (body diode) ^(c)	I_{SM}	66	A
Power dissipation at $T_A = 25^\circ C$ ^(a)	P_D	4.3	W
Linear derating factor		34.4	mW/ $^\circ C$
Power dissipation at $T_A = 25^\circ C$ ^(b)	P_D	10.1	W
Linear derating factor		80.8	mW/ $^\circ C$
Power dissipation at $T_A = 25^\circ C$ ^(d)	P_D	2.15	W
Linear derating factor		17.2	mW/ $^\circ C$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	$^\circ C$

THERMAL RESISTANCE

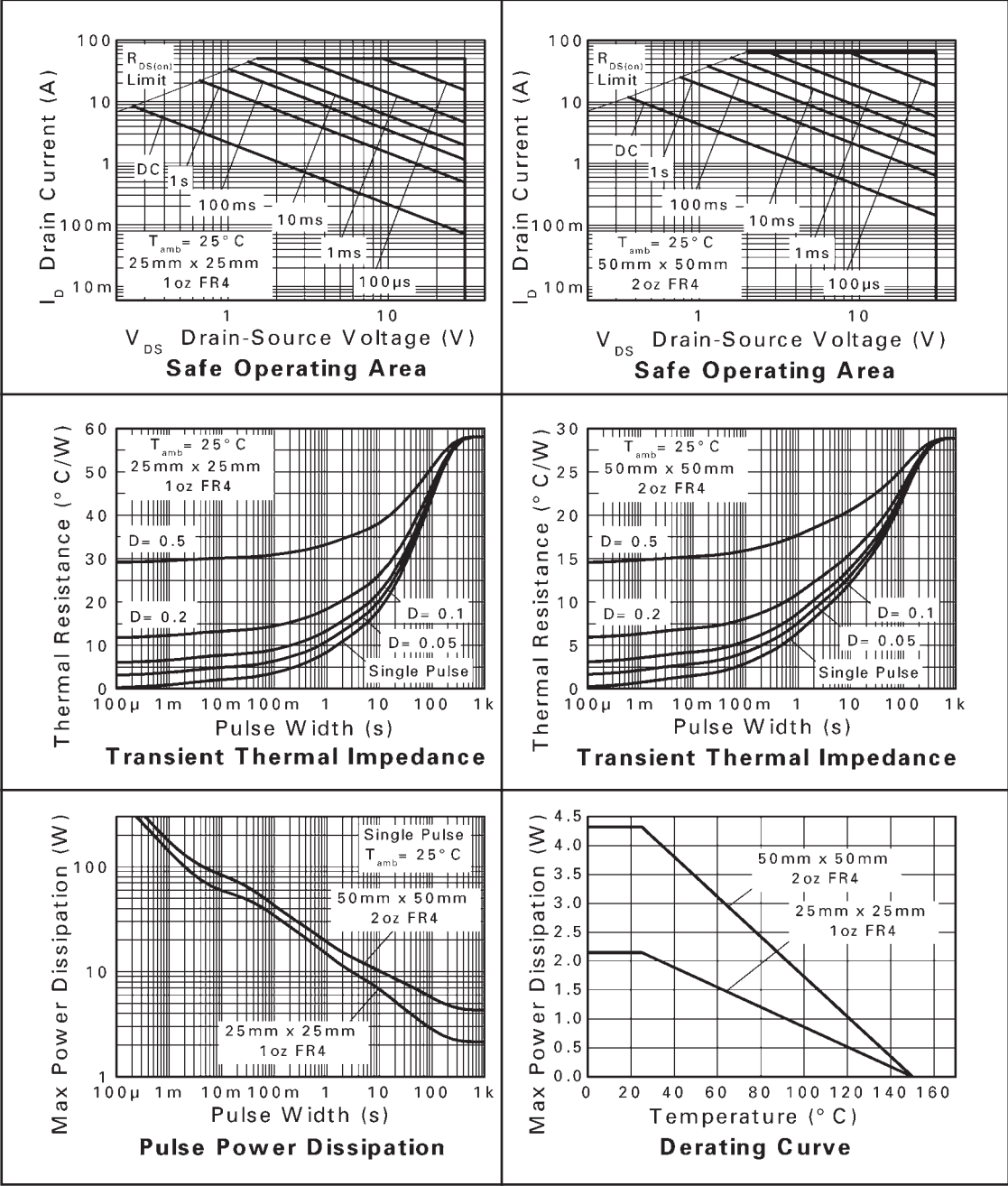
PARAMETER	SYMBOL	VALUE	UNIT
Junction to ambient ^(a)	$R_{\theta JA}$	29	$^\circ C/W$
Junction to ambient ^(b)	$R_{\theta JA}$	12.3	$^\circ C/W$
Junction to ambient ^(d)	$R_{\theta JA}$	58	$^\circ C/W$

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 ≤ 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	$V_{(BR)DSS}$	30			V	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero gate voltage drain current	I_{DSS}			0.5	μA	$V_{DS} = 30\text{V}$, $V_{GS} = 0\text{V}$
Gate-body leakage	I_{GSS}			100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
Gate-source threshold voltage	$V_{GS(th)}$	1.0			V	$I_D = 250\text{mA}$, $V_{DS} = V_{GS}$
Static drain-source on-state resistance ⁽¹⁾	$R_{DS(on)}$			0.02	Ω	$V_{GS} = 10\text{V}$, $I_D = 12\text{A}$
				0.03	Ω	$V_{GS} = 4.5\text{V}$, $I_D = 9.8\text{A}$
Forward transconductance ⁽¹⁾ ⁽³⁾	g_{fs}		22.1		S	$V_{DS} = 15\text{V}$, $I_D = 12.6\text{A}$
DYNAMIC ⁽³⁾						
Input capacitance	C_{iss}		1890		pF	$V_{DS} = 15\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output capacitance	C_{oss}		349		pF	
Reverse transfer capacitance	C_{rss}		218		pF	
SWITCHING ⁽²⁾ ⁽³⁾						
Turn-on-delay time	$t_{d(on)}$		5.2		ns	$V_{DD} = 15\text{V}$, $I_D = 1\text{A}$ $R_G = 6.0\Omega$, $V_{GS} = 10\text{V}$
Rise time	t_r		6.1		ns	
Turn-off delay time	$t_{d(off)}$		38.1		ns	
Fall time	t_f		20.2		ns	
Total gate charge	Q_g		19.9		nC	$V_{DS} = 15\text{V}$, $V_{GS} = 5\text{V}$ $I_D = 6.5\text{A}$
Total gate charge	Q_g		36.8		nC	$V_{DS} = 15\text{V}$, $V_{GS} = 10\text{V}$ $I_D = 6.5\text{A}$
Gate-source charge	Q_{gs}		5.8		nC	
Gate drain charge	Q_{gd}		7.1		nC	
SOURCE-DRAIN DIODE						
Diode forward voltage (1)	V_{SD}		0.85	0.95	V	$T_J = 25^{\circ}\text{C}$, $I_S = 6.8\text{A}$, $V_{GS} = 0\text{V}$
Reverse recovery time (3)	t_{rr}		18.4		ns	$T_J = 25^{\circ}\text{C}$, $I_S = 2.3\text{A}$,
Reverse recovery charge (3)	Q_{rr}		11		nC	$di/dt = 100\text{A}/\mu\text{s}$

NOTES

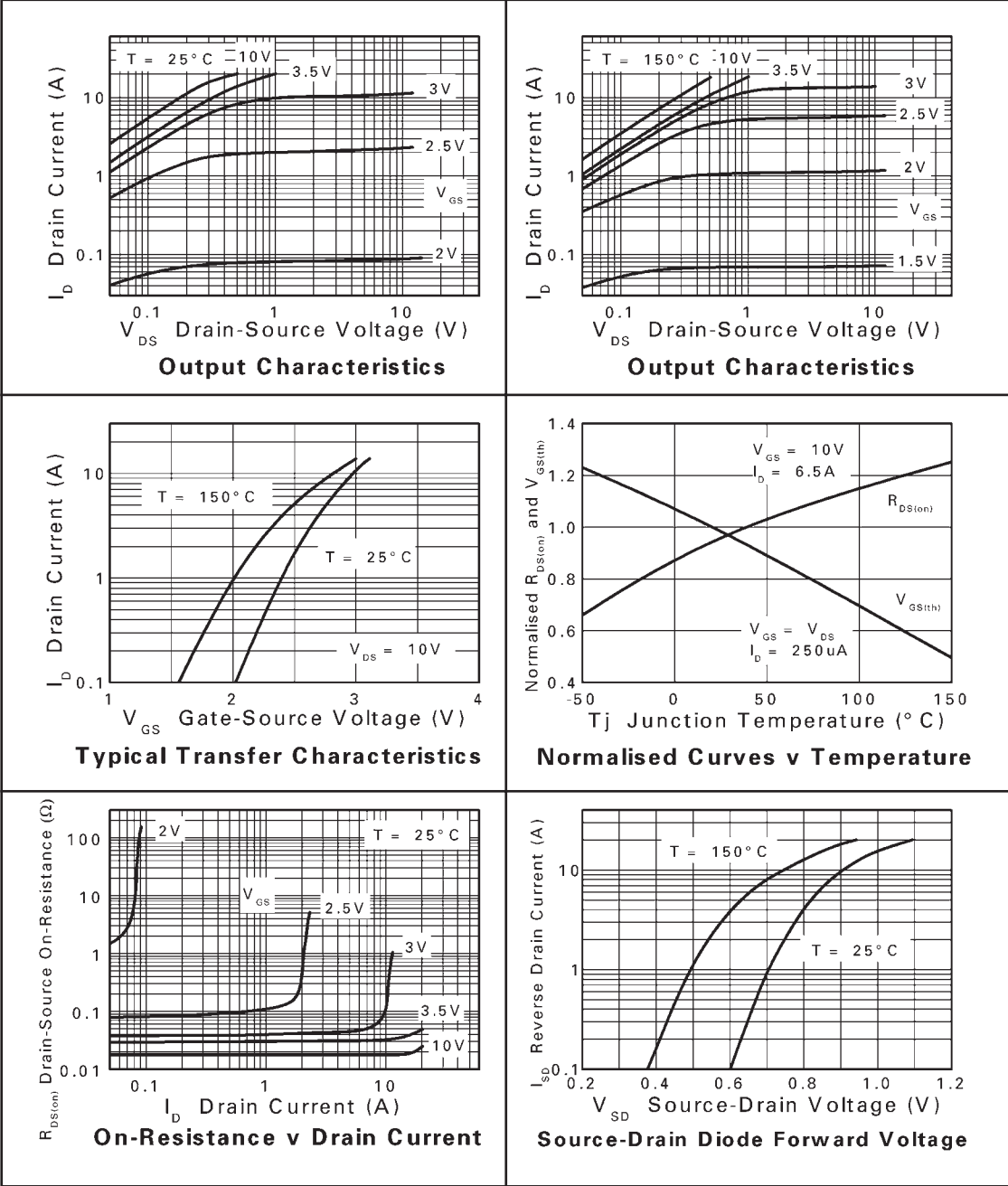
(1) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

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

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

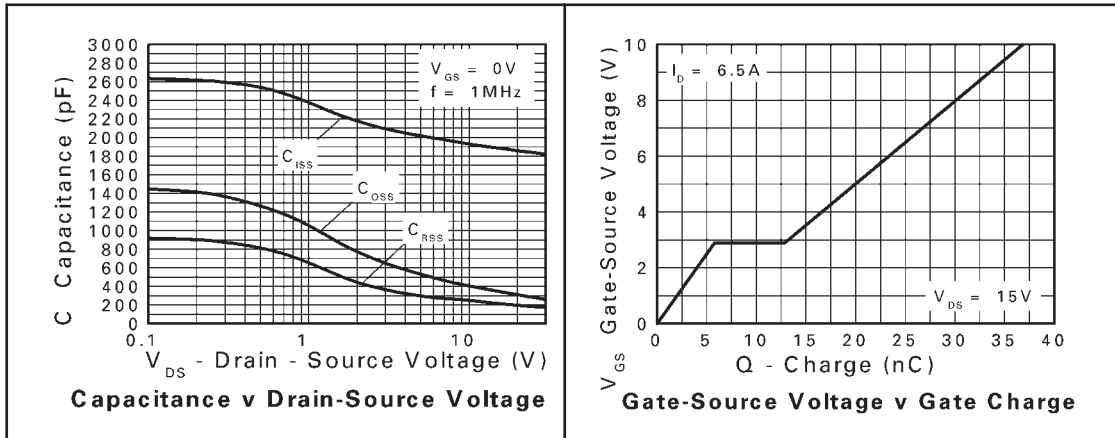
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TYPICAL CHARACTERISTICS



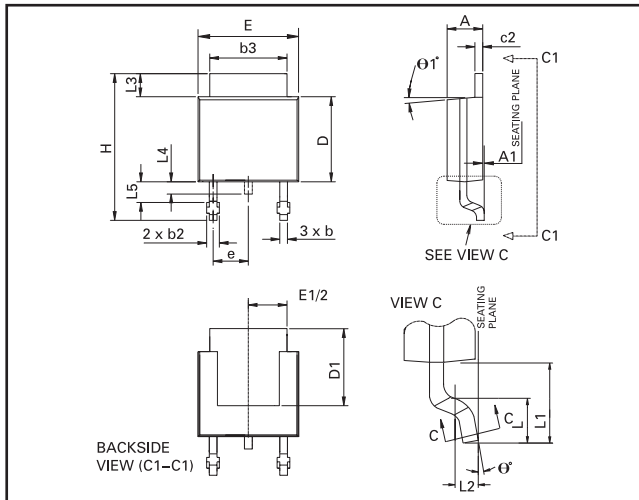
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TYPICAL CHARACTERISTICS



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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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