

# ZXMN6A09DN8

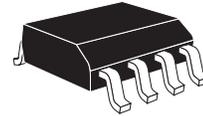
## DUAL 60V N-CANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

$V_{(BR)DSS}=60V$ ;  $R_{DS(ON)}=0.045\Omega$   $I_D=5.1A$

### DESCRIPTION

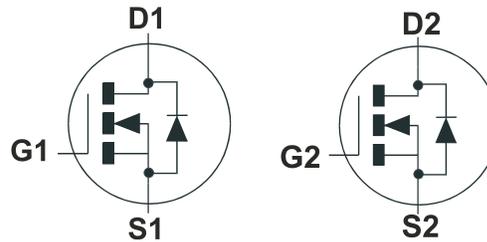
This new generation of TRENCH MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.



SO8

### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

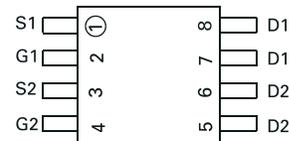


### APPLICATIONS

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

### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN6A09DN8TA	7"	12mm	500 units
ZXMN6A09DN8TC	13"	12mm	2500 units



Top View

### DEVICE MARKING

- ZXMN  
6A09D

# ZXMN6A09DN8

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DSS}$	60	V
Gate Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $V_{GS}=10V$ ; $T_A=25^\circ C$ ) <sup>(b)</sup> ( $V_{GS}=10V$ ; $T_A=70^\circ C$ ) <sup>(b)</sup> ( $V_{GS}=10V$ ; $T_A=25^\circ C$ ) <sup>(a)</sup>	$I_D$	5.1 4.1 3.9	A
Pulsed Drain Current <sup>(c)</sup>	$I_{DM}$	25	A
Continuous Source Current (Body Diode) <sup>(b)</sup>	$I_S$	3.5	A
Pulsed Source Current (Body Diode) <sup>(c)</sup>	$I_{SM}$	25	A
Power Dissipation at $T_A=25^\circ C$ <sup>(a)(d)</sup> Linear Derating Factor	$P_D$	1.25 10	W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ <sup>(a)(e)</sup> Linear Derating Factor	$P_D$	1.8 14	W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ <sup>(b)(d)</sup> Linear Derating Factor	$P_D$	2.1 17	W mW/ $^\circ C$
Operating and Storage Temperature Range	$T_j$ ; $T_{stg}$	-55 to +150	$^\circ C$

## THERMAL RESISTANCE

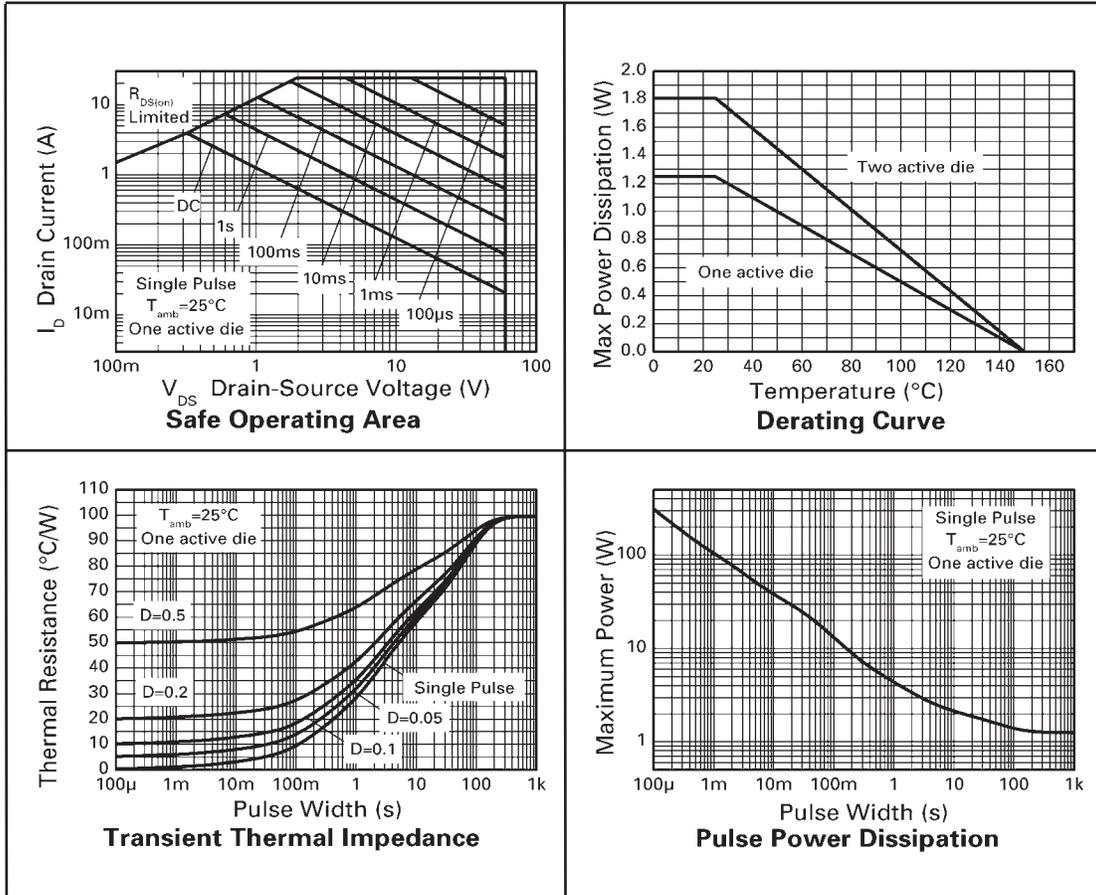
PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient <sup>(a)(d)</sup>	$R_{\theta JA}$	100	$^\circ C/W$
Junction to Ambient <sup>(a)(e)</sup>	$R_{\theta JA}$	69	$^\circ C/W$
Junction to Ambient <sup>(b)(d)</sup>	$R_{\theta JA}$	58	$^\circ C/W$

### NOTES

- (a) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 1oz copper, in still air conditions
- (b) For a device surface mounted on FR4 PCB measured at  $t \leq 10$  secs.
- (c) Repetitive rating 25mm x 25mm FR4 PCB,  $D=0.02$ , pulse width=300 $\mu s$  - pulse width limited by maximum junction temperature.
- (d) For a device with one active die
- (e) For a device with two active die running at equal power.

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## TYPICAL CHARACTERISTICS



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## ELECTRICAL CHARACTERISTICS (at T<sub>A</sub> = 25°C unless otherwise stated)

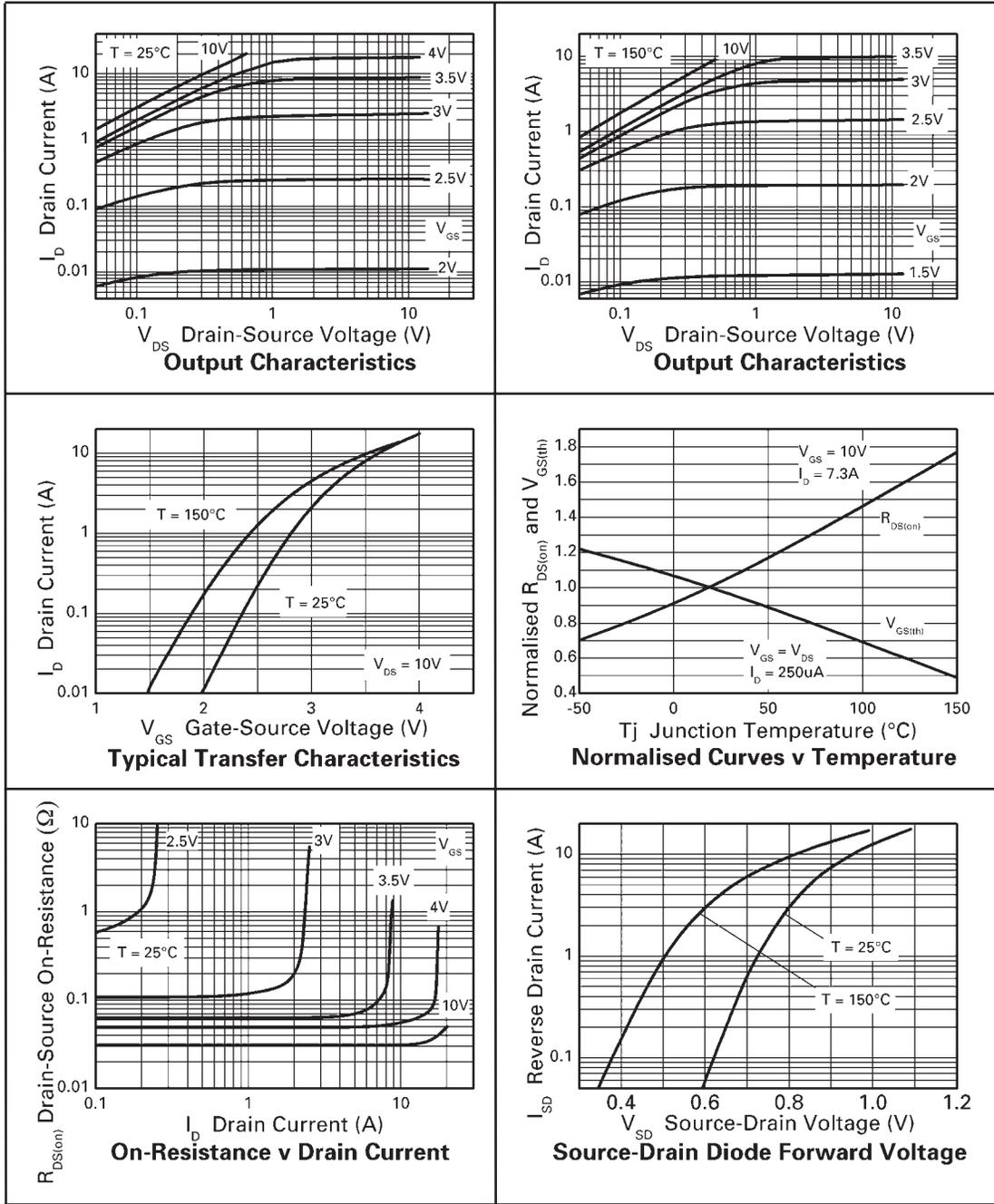
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
<b>STATIC</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	60			V	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			1	μA	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V
Gate-Body Leakage	I <sub>GSS</sub>			100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	1.0			V	I <sub>D</sub> =250μA, V <sub>DS</sub> =V <sub>GS</sub>
Static Drain-Source On-State Resistance (1)	R <sub>DS(on)</sub>			0.045 0.070	Ω	V <sub>GS</sub> =10V, I <sub>D</sub> =8.2A V <sub>GS</sub> =4.5V, I <sub>D</sub> =7.4A
Forward Transconductance (3)	g <sub>fs</sub>		15		S	V <sub>DS</sub> =15V, I <sub>D</sub> =8.2A
<b>DYNAMIC (3)</b>						
Input Capacitance	C <sub>iss</sub>		1407		pF	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, f=1MHz
Output Capacitance	C <sub>oss</sub>		121		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		59		pF	
<b>SWITCHING(2) (3)</b>						
Turn-On Delay Time	t <sub>d(on)</sub>		4.9		ns	V <sub>DD</sub> =15V, I <sub>D</sub> =3.5A R <sub>G</sub> ≅6.0Ω, V <sub>GS</sub> =10V (refer to test circuit)
Rise Time	t <sub>r</sub>		5.0		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		25.3		ns	
Fall Time	t <sub>f</sub>		4.6		ns	
Gate Charge	Q <sub>g</sub>		12.4		nC	V <sub>DS</sub> =15V, V <sub>GS</sub> =5V, I <sub>D</sub> =3.5A
Total Gate Charge	Q <sub>g</sub>		24.2		nC	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =3.5A
Gate-Source Charge	Q <sub>gs</sub>		5.2		nC	
Gate-Drain Charge	Q <sub>gd</sub>		3.5		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (1)	V <sub>SD</sub>		0.85	0.95	V	T <sub>J</sub> =25°C, I <sub>S</sub> =6.6A, V <sub>GS</sub> =0V
Reverse Recovery Time (3)	t <sub>rr</sub>		26.3		ns	T <sub>J</sub> =25°C, I <sub>F</sub> =3.5A, di/dt= 100A/μs
Reverse Recovery Charge (3)	Q <sub>rr</sub>		26.6		nC	

### NOTES

- (1) Measured under pulsed conditions. Width=300μs. Duty cycle ≤ 2% .
- (2) Switching characteristics are independent of operating junction temperature.
- (3) For design aid only, not subject to production testing.

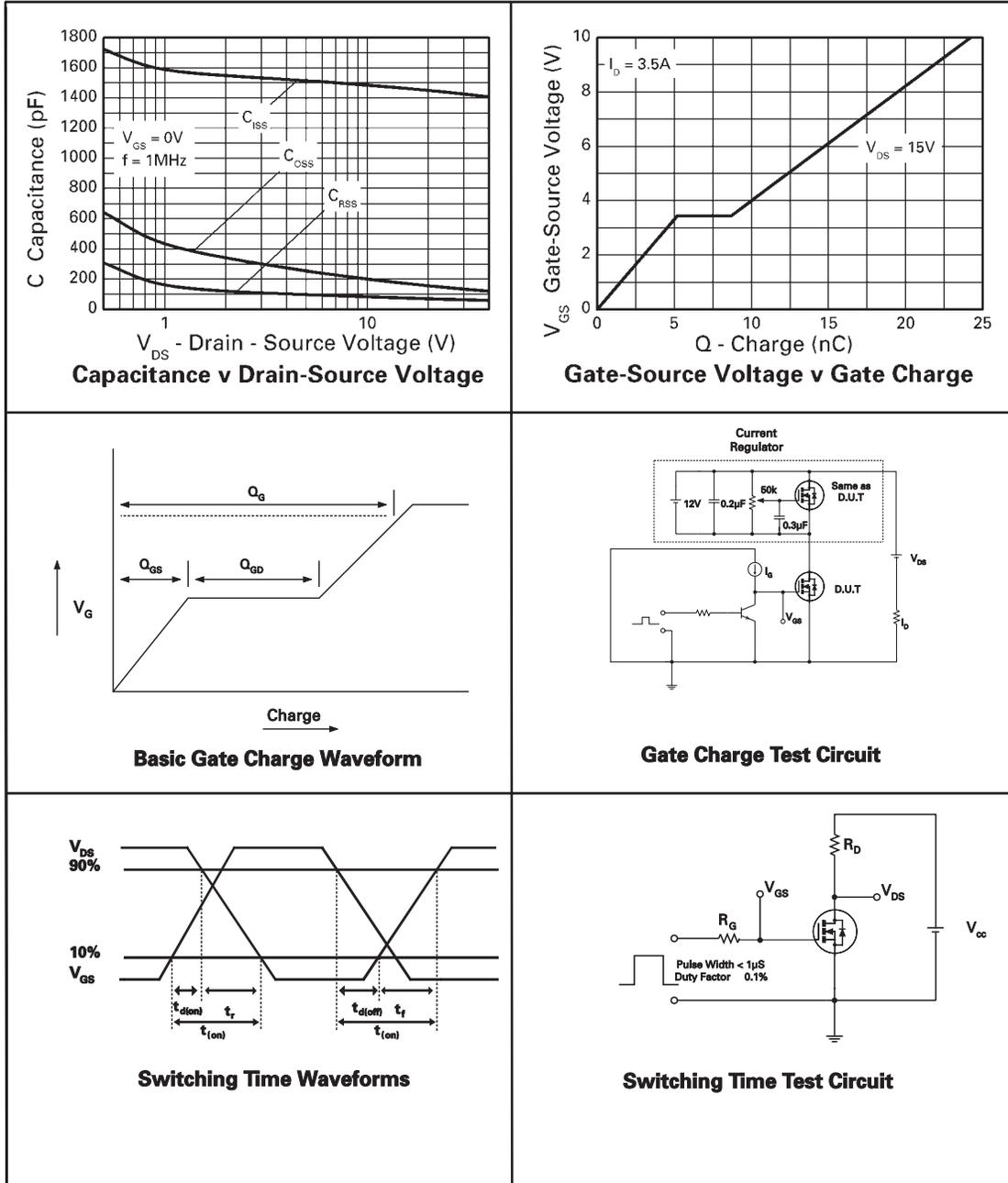
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## TYPICAL CHARACTERISTICS



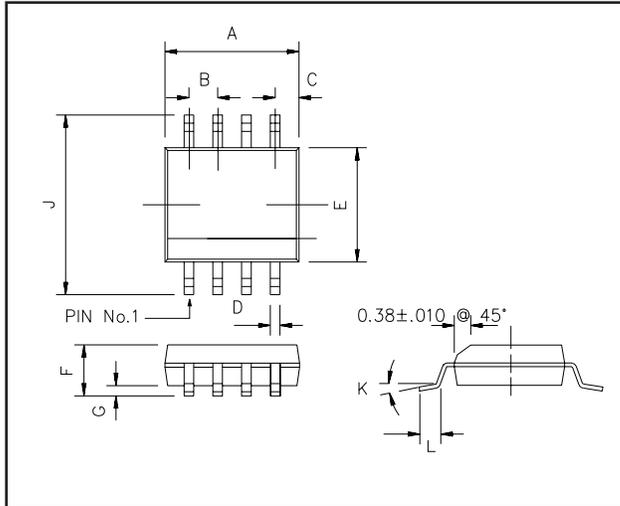
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## TYPICAL CHARACTERISTICS



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## PACKAGE DIMENSIONS



DIM	Millimetres		Inches	
	Min	Max	Min	Max
A	4.80	4.98	0.189	0.196
B	1.27 BSC		0.05 BSC	
C	0.53 REF		0.02 REF	
D	0.36	0.46	0.014	0.018
E	3.81	3.99	0.15	0.157
F	1.35	1.75	0.05	0.07
G	0.10	0.25	0.004	0.010
J	5.80	6.20	0.23	0.24
K	0°	8°	0°	8°
L	0.41	1.27	0.016	0.050

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