

# ZXMN6A09G

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## 60V N-CANNEL ENHANCEMENT MODE MOSFET

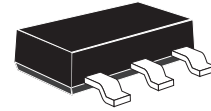
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### SUMMARY

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

### 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.



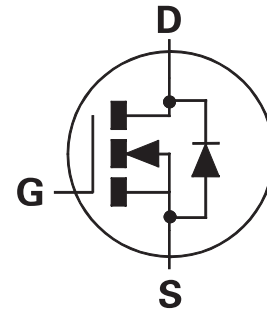
SOT223

### FEATURES

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

### APPLICATIONS

- DC - DC Converters
- Power Management Functions
- Relay and Solenoid driving
- Motor control

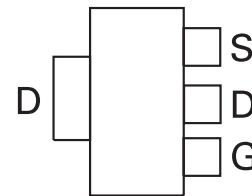


### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN6A09GTA	7"	12mm	1000 units
ZXMN6A09GTC	13"	12mm	4000 units

### DEVICE MARKING

- ZXMN  
6A09



Top View

# ZXMN6A09G

## 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>	$I_D$	6.9 5.6 5.0	A
Pulsed Drain Current <sup>(c)</sup>	$I_{DM}$	30.6	A
Continuous Source Current (Body Diode) <sup>(b)</sup>	$I_S$	3.5	A
Pulsed Source Current (Body Diode) <sup>(c)</sup>	$I_{SM}$	30.6	A
Power Dissipation at $T_A=25^\circ C$ <sup>(a)(d)</sup> Linear Derating Factor	$P_D$	2.0 16	W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ <sup>(b)(d)</sup> Linear Derating Factor	$P_D$	3.9 31	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>	$R_{\theta JA}$	62.5	$^\circ C/W$
Junction to Ambient <sup>(b)(d)</sup>	$R_{\theta JA}$	32.2	$^\circ C/W$

### NOTES

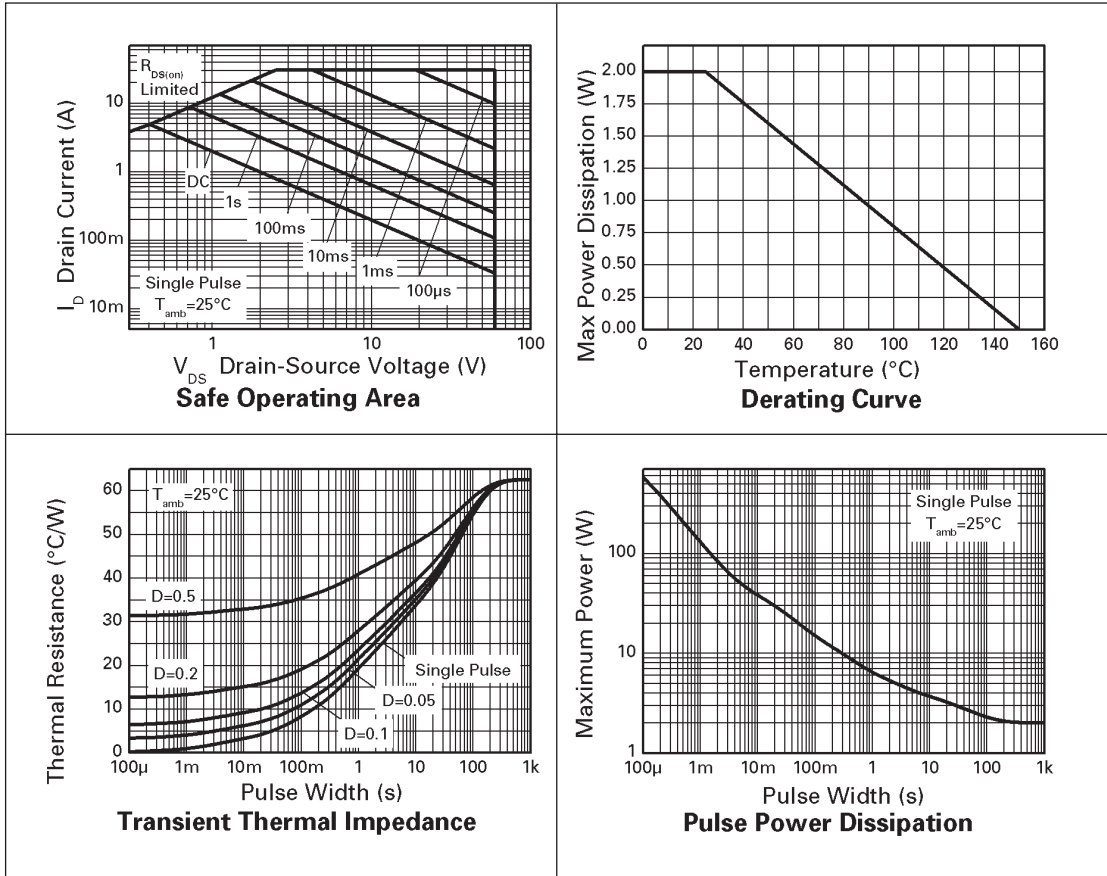
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(b) For a device surface mounted on FR4 PCB measured at  $t \leq 5$  secs.

(c) Repetitive rating 25mm x 25mm FR4 PCB, D=0.02 pulse width=300 $\mu s$  - pulse width limited by maximum junction temperature.

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## CHARACTERISTICS



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

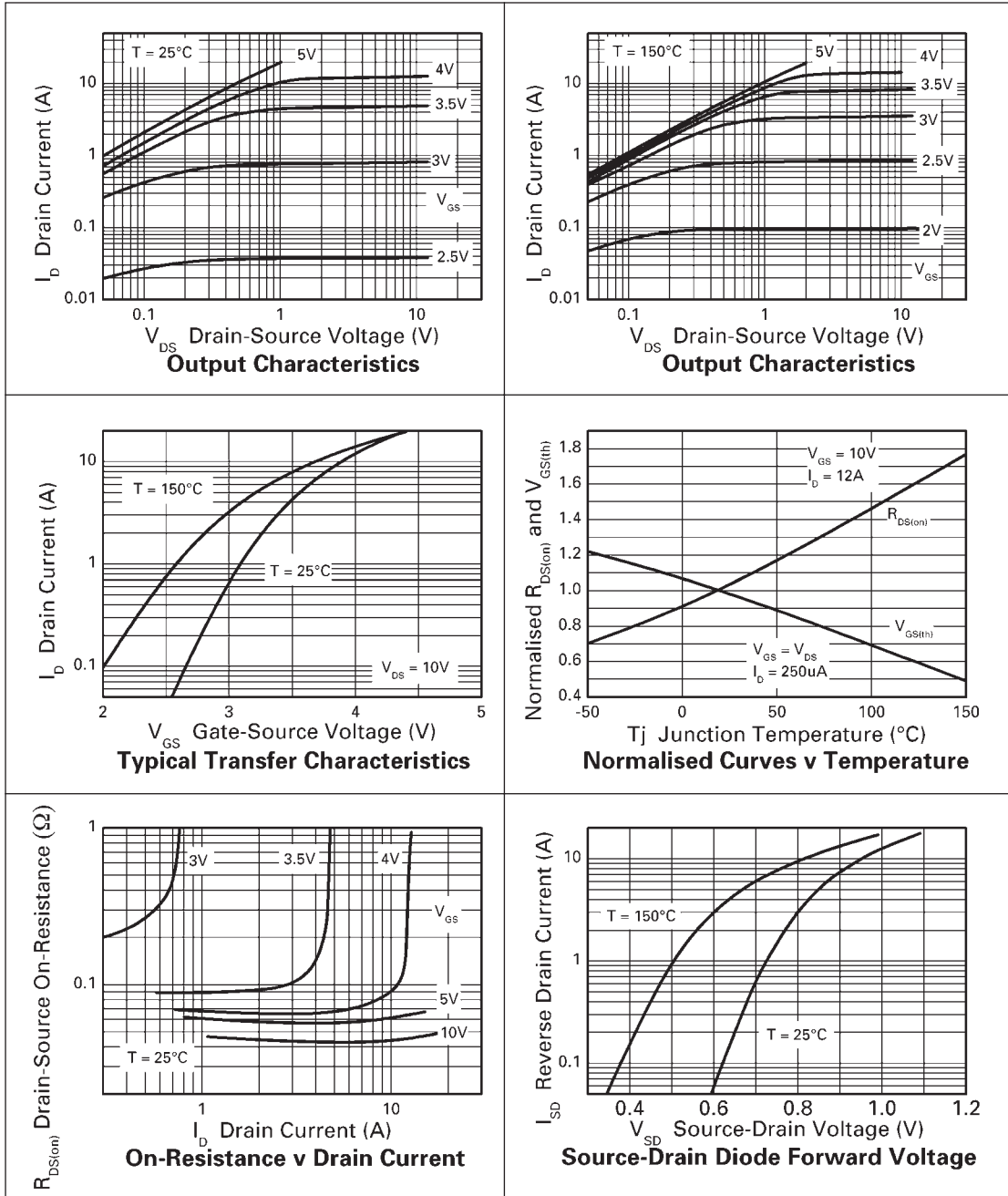
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	60			V	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			1	$\mu\text{A}$	$V_{DS}=60\text{V}$ , $V_{GS}=0\text{V}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS}=\pm 20\text{V}$ , $V_{DS}=0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	1.0			V	$I_D=250\mu\text{A}$ , $V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.045 0.070	$\Omega$	$V_{GS}=10\text{V}$ , $I_D=8.2\text{A}$ $V_{GS}=4.5\text{V}$ , $I_D=7.4\text{A}$
Forward Transconductance (3)	$g_{fs}$		15		S	$V_{DS}=15\text{V}$ , $I_D=8.2\text{A}$
<b>DYNAMIC (3)</b>						
Input Capacitance	$C_{iss}$		1407		pF	$V_{DS}=40\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$
Output Capacitance	$C_{oss}$		121		pF	
Reverse Transfer Capacitance	$C_{rss}$		59		pF	
<b>SWITCHING(2) (3)</b>						
Turn-On Delay Time	$t_{d(on)}$		4.9		ns	$V_{DD}=15\text{V}$ , $I_D=3.5\text{A}$ $R_G=6.0\Omega$ , $V_{GS}=10\text{V}$ (refer to test circuit)
Rise Time	$t_r$		5.0		ns	
Turn-Off Delay Time	$t_{d(off)}$		25.3		ns	
Fall Time	$t_f$		4.6		ns	
Gate Charge	$Q_g$		12.4		nC	$V_{DS}=15\text{V}$ , $V_{GS}=5\text{V}$ , $I_D=3.5\text{A}$
Total Gate Charge	$Q_g$		24.2		nC	$V_{DS}=15\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=3.5\text{A}$
Gate-Source Charge	$Q_{gs}$		5.2		nC	
Gate-Drain Charge	$Q_{gd}$		3.5		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (1)	$V_{SD}$		0.85	0.95	V	$T_J=25^\circ\text{C}$ , $I_S=6.6\text{A}$ , $V_{GS}=0\text{V}$
Reverse Recovery Time (3)	$t_{rr}$		26.3		ns	$T_J=25^\circ\text{C}$ , $I_F=3.5\text{A}$ , $di/dt=100\text{A}/\mu\text{s}$
Reverse Recovery Charge (3)	$Q_{rr}$		26.6		nC	

### NOTES

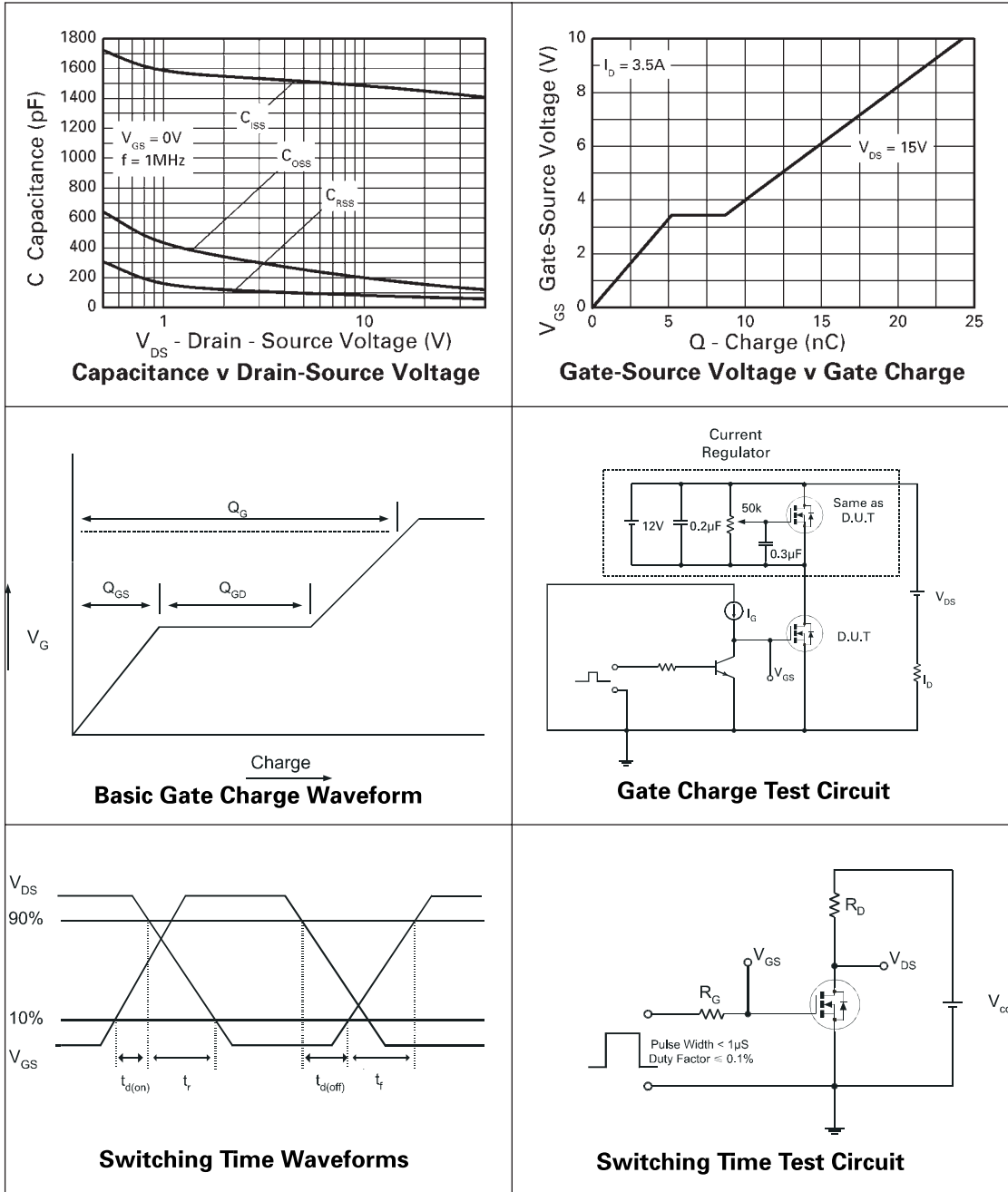
- (1) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .
- (2) Switching characteristics are independent of operating junction temperature.
- (3) For design aid only, not subject to production testing.

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## TYPICAL CHARACTERISTICS

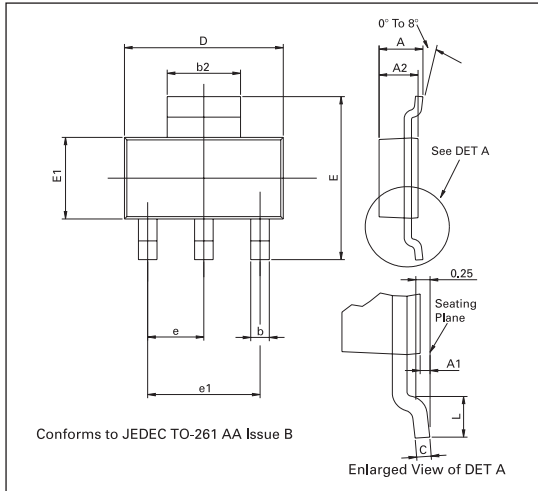


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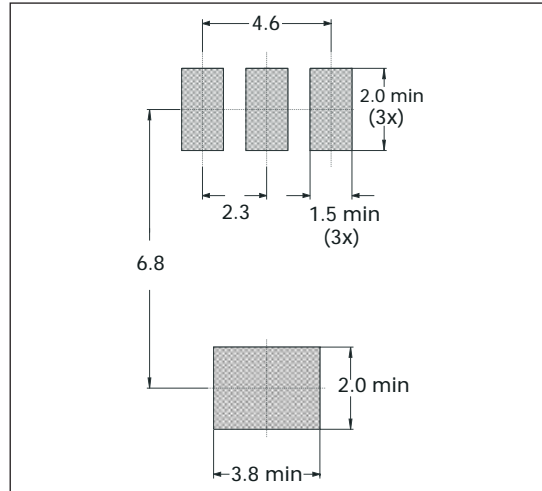


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## PACKAGE OUTLINE



## PAD LAYOUT DETAILS



## PACKAGE DIMENSIONS

DIM	MILLIMETRES		DIM	MILLIMETRES	
	MIN	MAX		MIN	MAX
A	—	1.80	D	6.30	6.70
A1	0.02	0.10	e	2.30 BASIC	
A2	1.55	1.65	e1	4.60 BASIC	
b	0.66	0.84	E	6.70	7.30
b2	2.90	3.10	E1	3.30	3.70
C	0.23	0.33	L	0.90	—

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