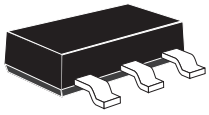
ZXMN6A09G

60V N-CHANNEL ENHANCEMENT MODE MOSFET

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

DESCRIPTION

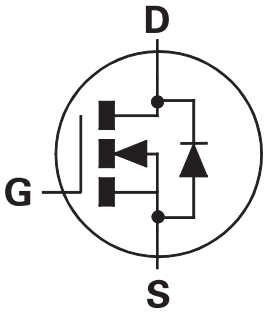
This new generation of TRENCH MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.



SOT223

FEATURES

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



APPLICATIONS

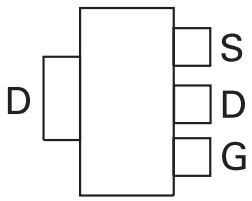
- DC - DC Converters
- Power Management Functions
- Relay and Solenoid driving
- Motor control

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

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°C)[b] (V_{GS}=10V; T_A=70°C)[b] (V_{GS}=10V; T_A=25°C)[a]	I_D	6.9 5.6 5.0	A
Pulsed Drain Current [c]	I_{DM}	30.6	A
Continuous Source Current (Body Diode) [b]	I_S	3.5	A
Pulsed Source Current (Body Diode)[c]	I_{SM}	30.6	A
Power Dissipation at T_A=25°C [a][d] Linear Derating Factor	P_D	2.0 16	W mW/°C
Power Dissipation at T_A=25°C [b][d] Linear Derating Factor	P_D	3.9 31	W mW/°C
Operating and Storage Temperature Range	T_j:T_{stg}	-55 to +150	°C

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient [a][d]	$R_{\theta JA}$	62.5	°C/W
Junction to Ambient [b][d]	$R_{\theta JA}$	32.2	°C/W

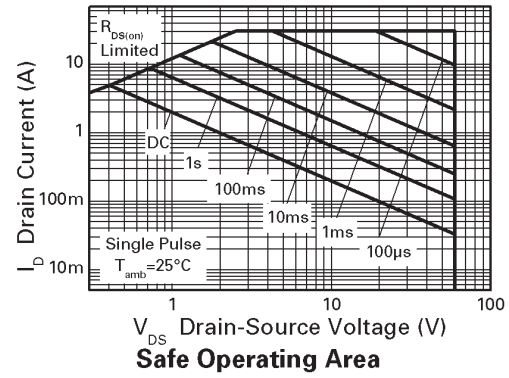
NOTES

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

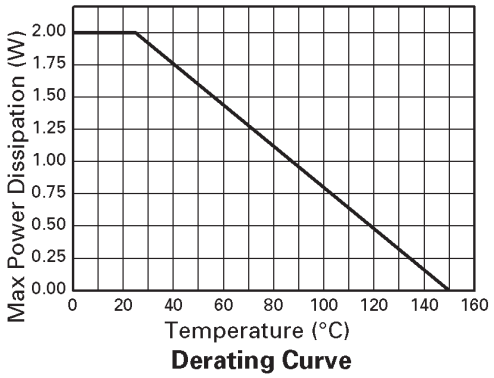
(b) For a device surface mounted on FR4 PCB measured at t≤5 secs.

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

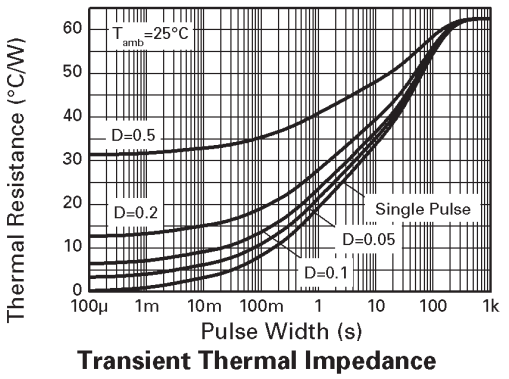
CHARACTERISTICS



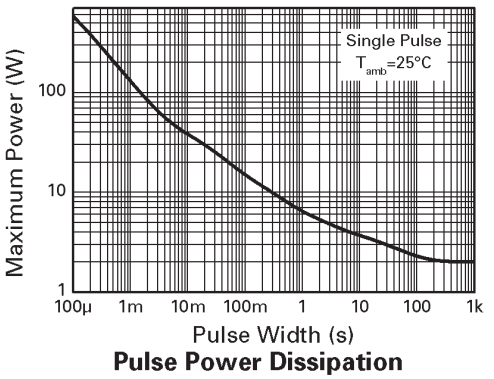
Safe Operating Area



Derating Curve



Transient Thermal Impedance



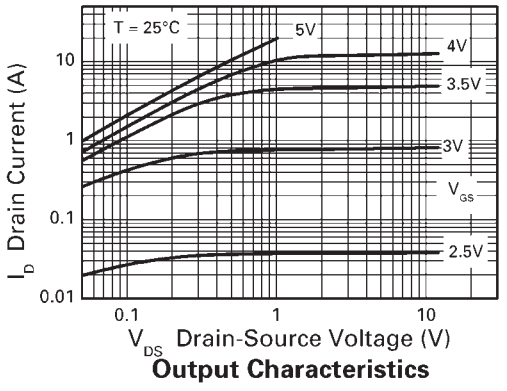
Pulse Power Dissipation

ELECTRICAL CHARACTERISTICS (at T_A = 25°C unless otherwise stated).

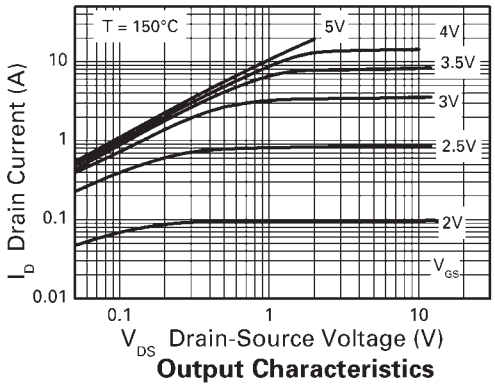
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	60			V	I_D=250μA, V_{GS}=0V
Zero Gate Voltage Drain Current	I_{DSS}			1	μA	V_{DS}=60V, V_{GS}=0V
Gate-Body Leakage	I_{GSS}			100	nA	V_{GS}=±20V, V_{DS}=0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	1.0			V	I_D=250μA, V_{DS}= V_{GS}
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.045 0.070	Ω Ω	V_{GS}=10V, I_D=8.2A V_{GS}=4.5V, I_D=7.4A
Forward Transconductance (3)	g_{fs}		15		S	V_{DS}=15V,I_D=8.2A
DYNAMIC (3)						
Input Capacitance	C_{iss}		1407		pF	V_{DS}=40 V, V_{GS}=0V, f=1MHz
Output Capacitance	C_{oss}		121		pF	
Reverse Transfer Capacitance	C_{rss}		59		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	$t_{d(on)}$		4.9		ns	V_{DD} =15V, I_D=3.5A R_G≅6.0Ω, V_{GS}=10V (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}=15V,V_{GS}=5V, I_D=3.5A
Total Gate Charge	Q_g		24.2		nC	V_{DS}=15V,V_{GS}=10V, I_D=3.5A
Gate-Source Charge	Q_{gs}		5.2		nC	
Gate-Drain Charge	Q_{gd}		3.5		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}		26.3		ns	T_J=25°C, I_F=3.5A, di/dt= 100A/μs
Reverse Recovery Charge (3)	Q_{rr}		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.

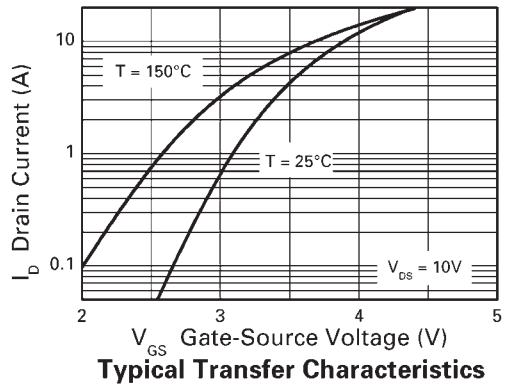
TYPICAL CHARACTERISTICS



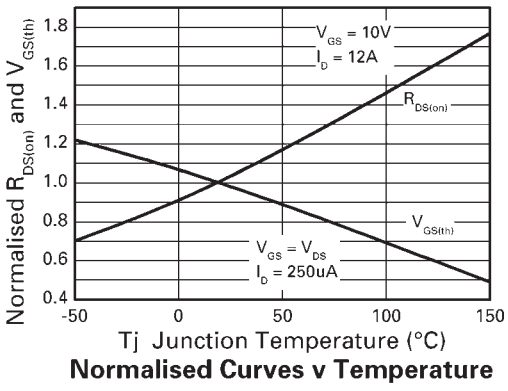
Output Characteristics



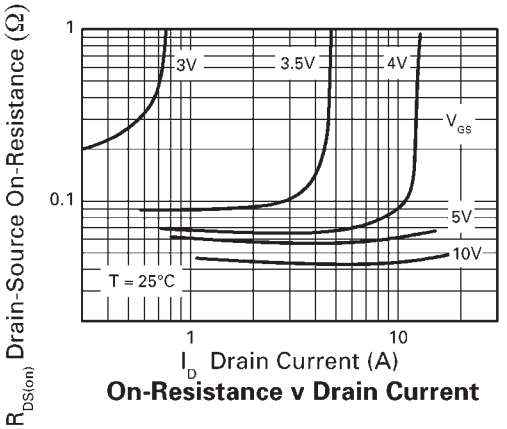
Output Characteristics



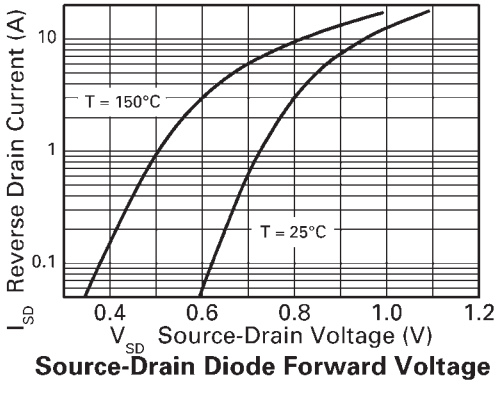
Typical Transfer Characteristics



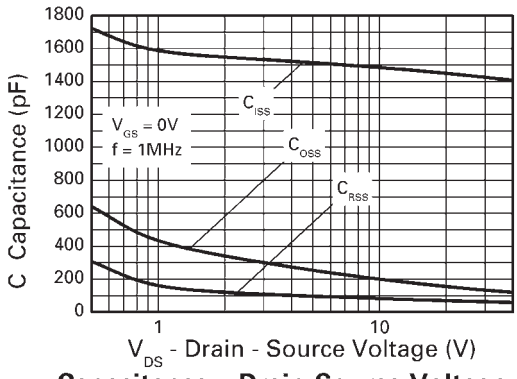
Normalised Curves v Temperature



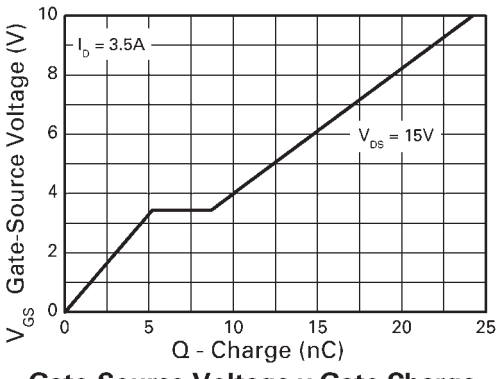
On-Resistance v Drain Current



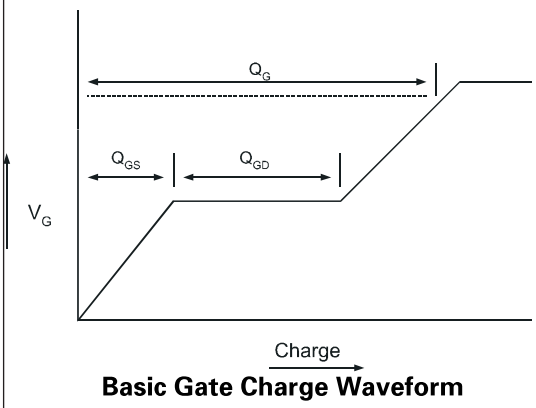
Source-Drain Diode Forward Voltage



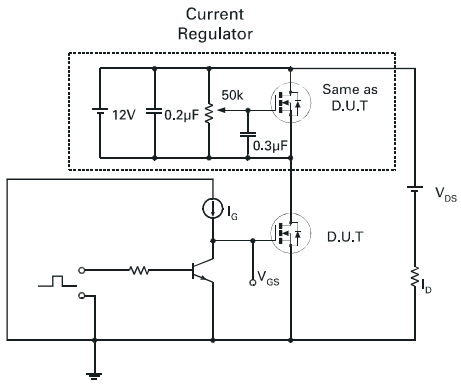
Capacitance v Drain-Source Voltage



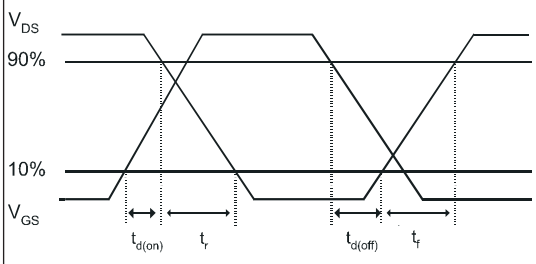
Gate-Source Voltage v Gate Charge



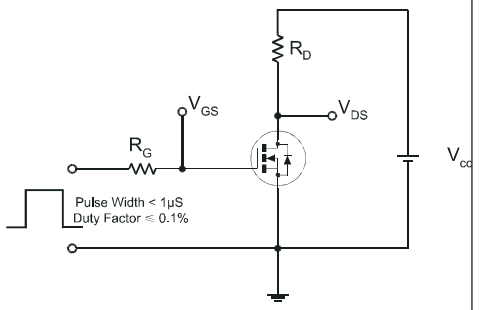
Basic Gate Charge Waveform



Gate Charge Test Circuit

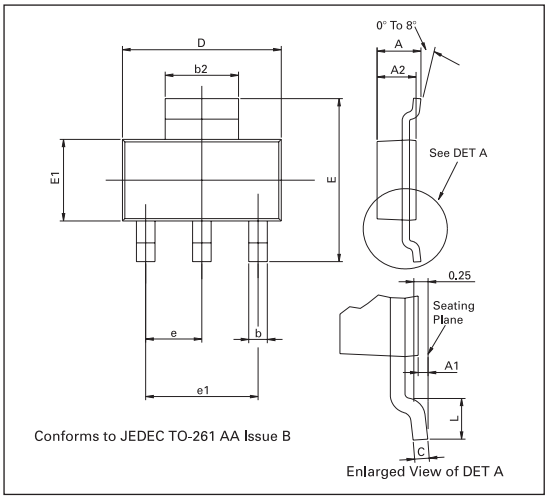


Switching Time Waveforms

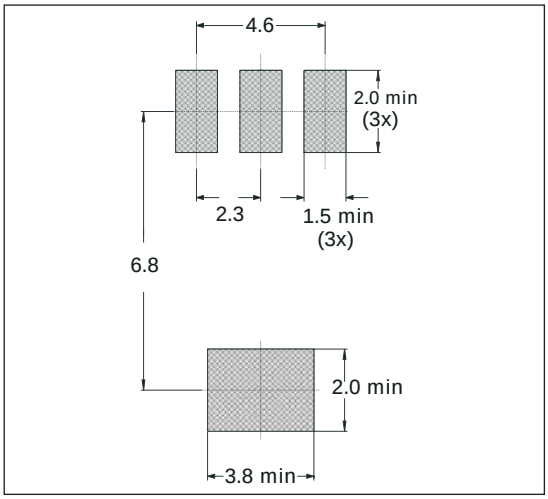


Switching Time Test Circuit

PACKAGE OUTLINE



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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