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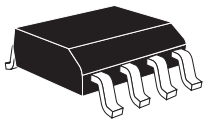
ZXMN6A09DN8

DUAL 60V N-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

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



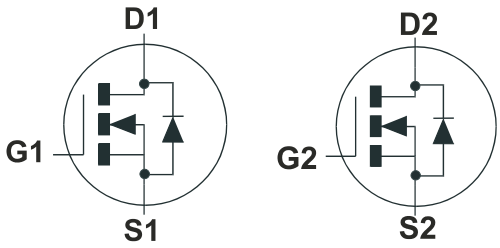
SO8

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.

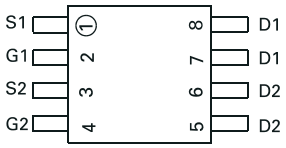
FEATURES

- 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



Top View

ORDERING INFORMATION

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

DEVICE MARKING

- ZXMN
  6A09D

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	5.1 4.1 3.9	A
Pulsed Drain Current [c]	I_{DM}	25	A
Continuous Source Current (Body Diode) [b]	I_S	3.5	A
Pulsed Source Current (Body Diode)[c]	I_{SM}	25	A
Power Dissipation at T_A=25°C [a][d] Linear Derating Factor	P_D	1.25 10	W mW/°C
Power Dissipation at T_A=25°C [a][e] Linear Derating Factor	P_D	1.8 14	W mW/°C
Power Dissipation at T_A=25°C [b][d] Linear Derating Factor	P_D	2.1 17	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]	$R_{\theta JA}$	100	°C/W
Junction to Ambient [a][e]	$R_{\theta JA}$	69	°C/W
Junction to Ambient [b][d]	$R_{\theta JA}$	58	°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

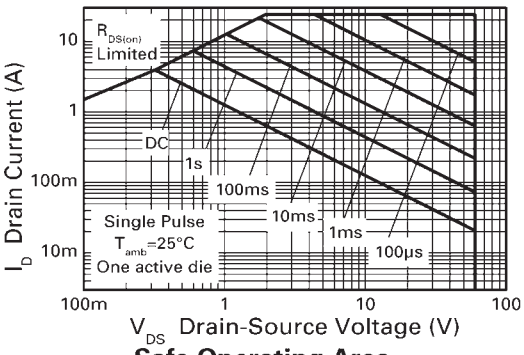
(b) For a device surface mounted on FR4 PCB measured at t≤10 secs.

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

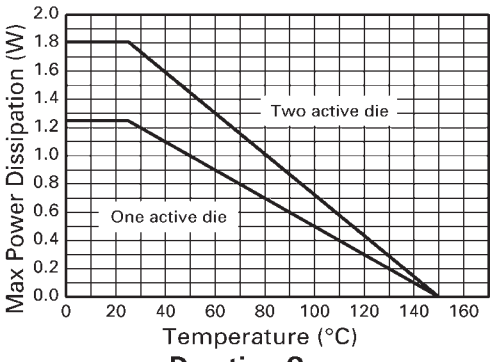
(d) For a device with one active die

(e) For a device with two active die running at equal power.

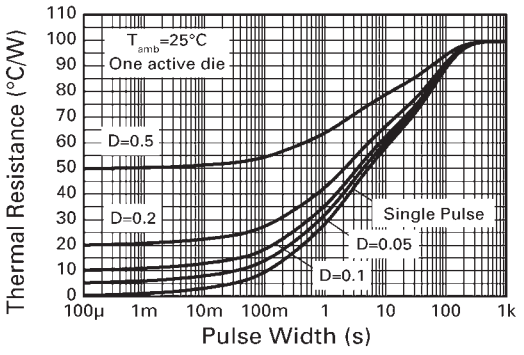
TYPICAL CHARACTERISTICS



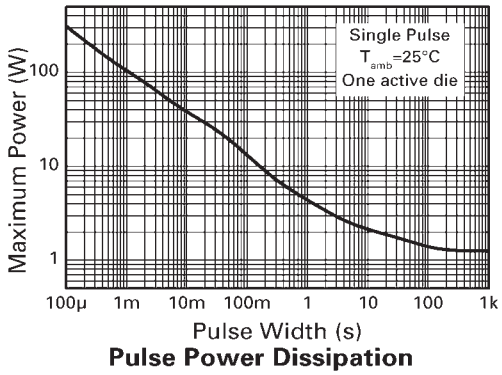
Safe Operating Area



Derating Curve



Transient Thermal Impedance



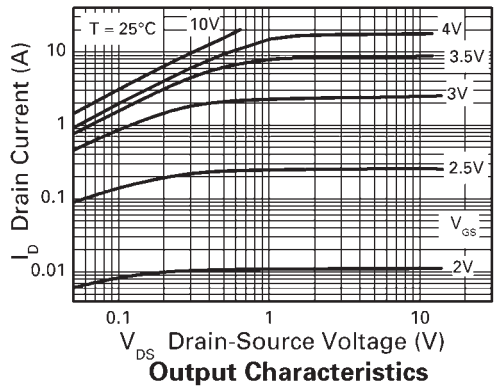
Pulse Power Dissipation

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

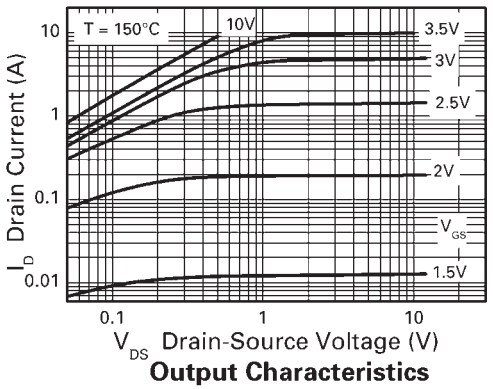
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	60			V	I_D=250µA, V_{GS}=0V
Zero Gate Voltage Drain Current	I_{DSS}			1	µA	V_{DS}=60V, V_{GS}=0V
Gate-Body Leakage	I_{GSS}			100	nA	V_{GS}=±20V, V_{DS}=0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	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.

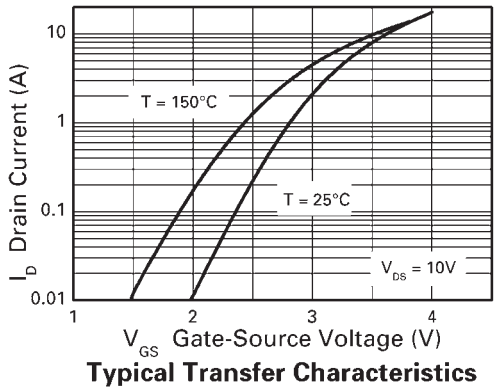
TYPICAL CHARACTERISTICS



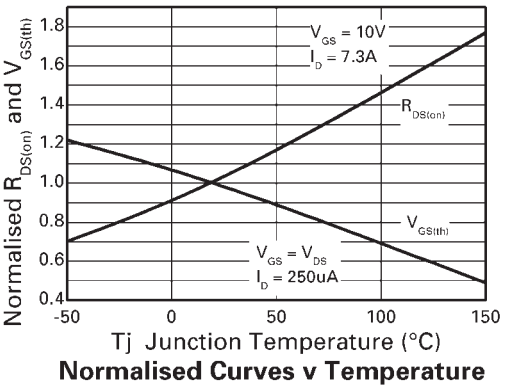
Output Characteristics



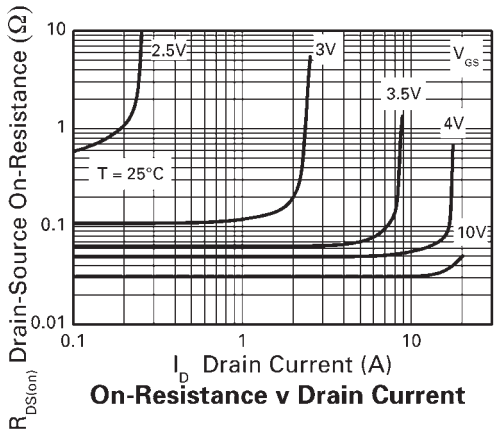
Output Characteristics



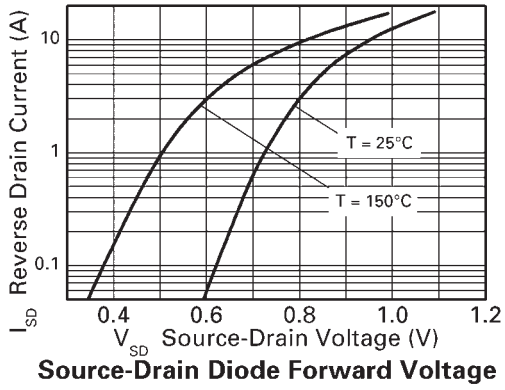
Typical Transfer Characteristics



Normalised Curves v Temperature

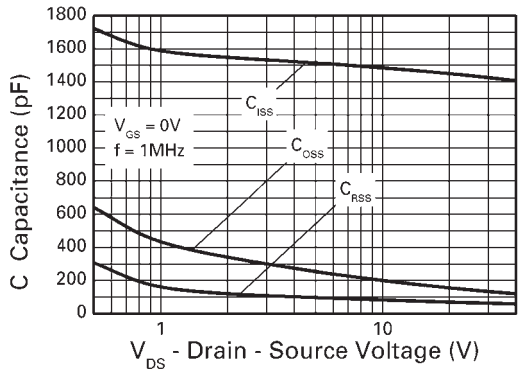


On-Resistance v Drain Current

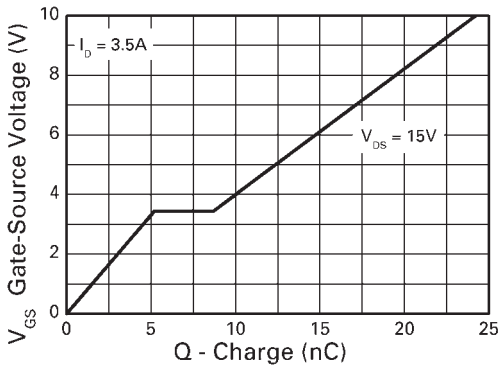


Source-Drain Diode Forward Voltage

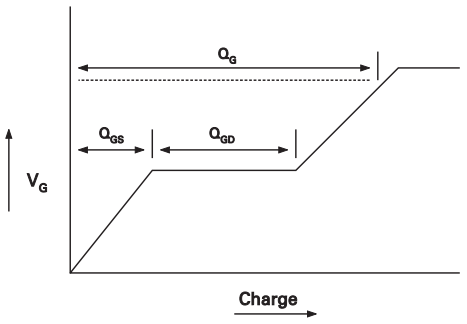
TYPICAL CHARACTERISTICS



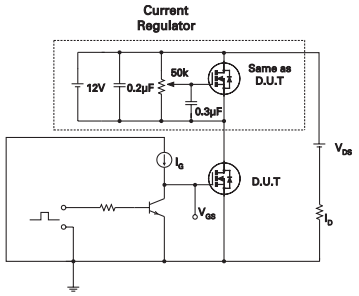
Capacitance v Drain-Source Voltage



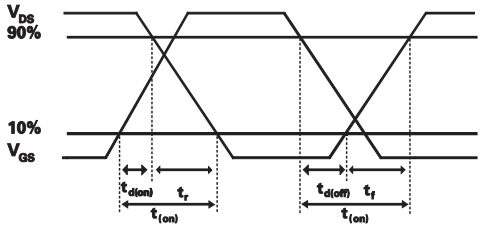
Gate-Source Voltage v Gate Charge



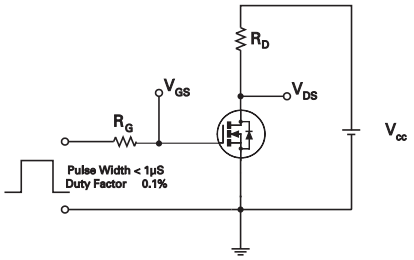
Basic Gate Charge Waveform



Gate Charge Test Circuit

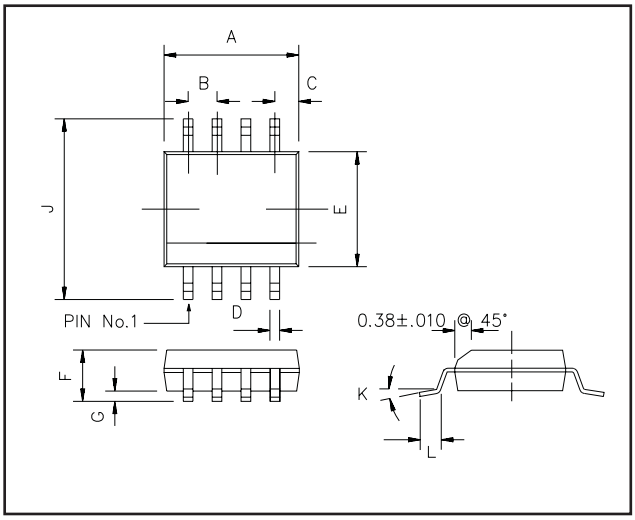


Switching Time Waveforms



Switching Time Test Circuit

PACKAGE 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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