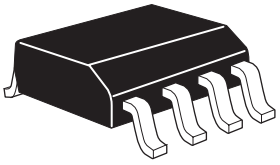
ZXMC3A18DN8

COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET

SUMMARY

N-Channel = $V_{(BR)DSS}$= 30V : $R_{DS(on)}$= 0.025Ω; I_D= 7.6A
P-Channel = $V_{(BR)DSS}$= -30V : $R_{DS(on)}$= 0.035Ω; I_D= -6.3A



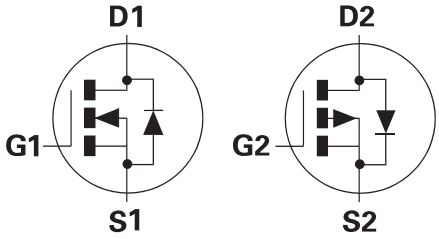
SO8

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



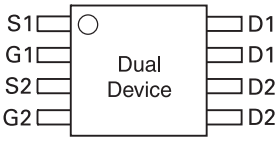
Q1 = N-channel **Q2 = P-channel**

APPLICATIONS

- Motor Drive
- LCD backlighting

ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMC3A18DN8TA	7”	12mm	500 units
ZXMC3A18DN8TC	13”	12mm	2500 units



Top View

DEVICE MARKING

- ZXMC
  3A18

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-Source Voltage	V_{DSS}	30	-30	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current (V_{GS}= 10V; T_A=25°C) (b)(d) (V_{GS}= 10V; T_A=70°C) (b)(d) (V_{GS}= 10V; T_A=25°C) (a)(d)	I_D	 7.6 6.1 5.8	 -6.3 -5.0 -4.8	 A A A
Pulsed Drain Current (c)	I_{DM}	37	-30	A
Continuous Source Current (Body Diode) (b)	I_S	3.6	3.2	A
Pulsed Source Current (Body Diode) (c)	I_{SM}	37	30	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)	$R_{\Theta JA}$	70	°C/W
Junction to Ambient (b) (d)	$R_{\Theta JA}$	60	°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.

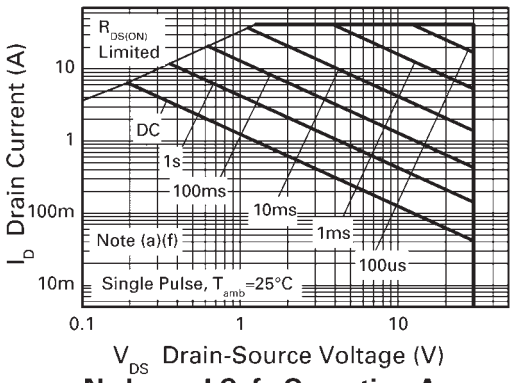
(b) For a device surface mounted on FR4 PCB measured at t ≤ 10 sec.

(c) Repetitive rating - pulse width limited by maximum junction temperature. Pulse width 300μs, d<= 0.02. Refer to Transient Thermal Impedance graph.

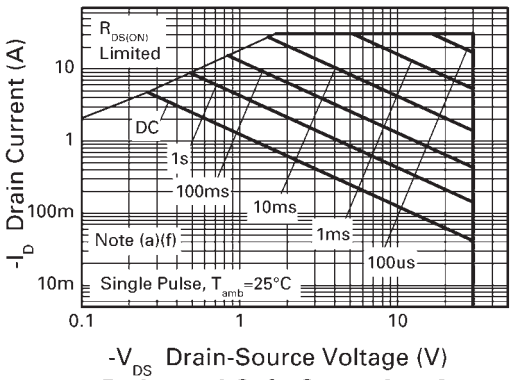
(d) For device with one active die.

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

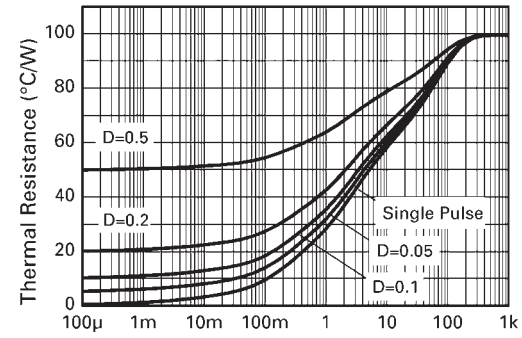
CHARACTERISTICS



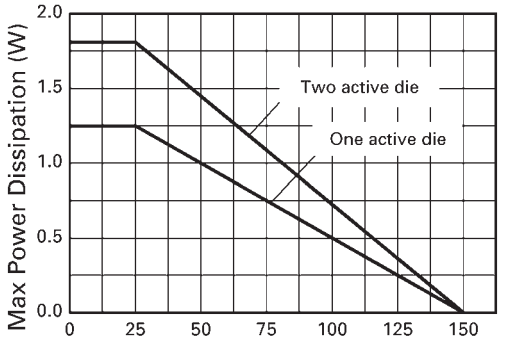
N-channel Safe Operating Area



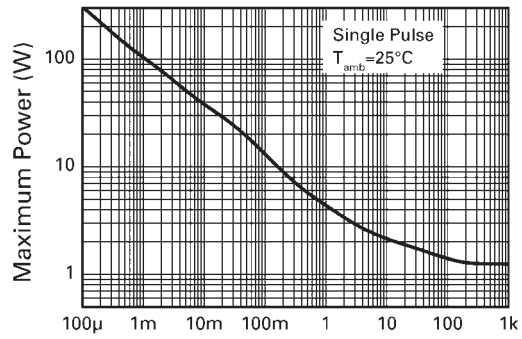
P-channel Safe Operating Area



Transient Thermal Impedance



Derating Curve



Pulse Power Dissipation

ZXMC3A18DN8

N-Channel

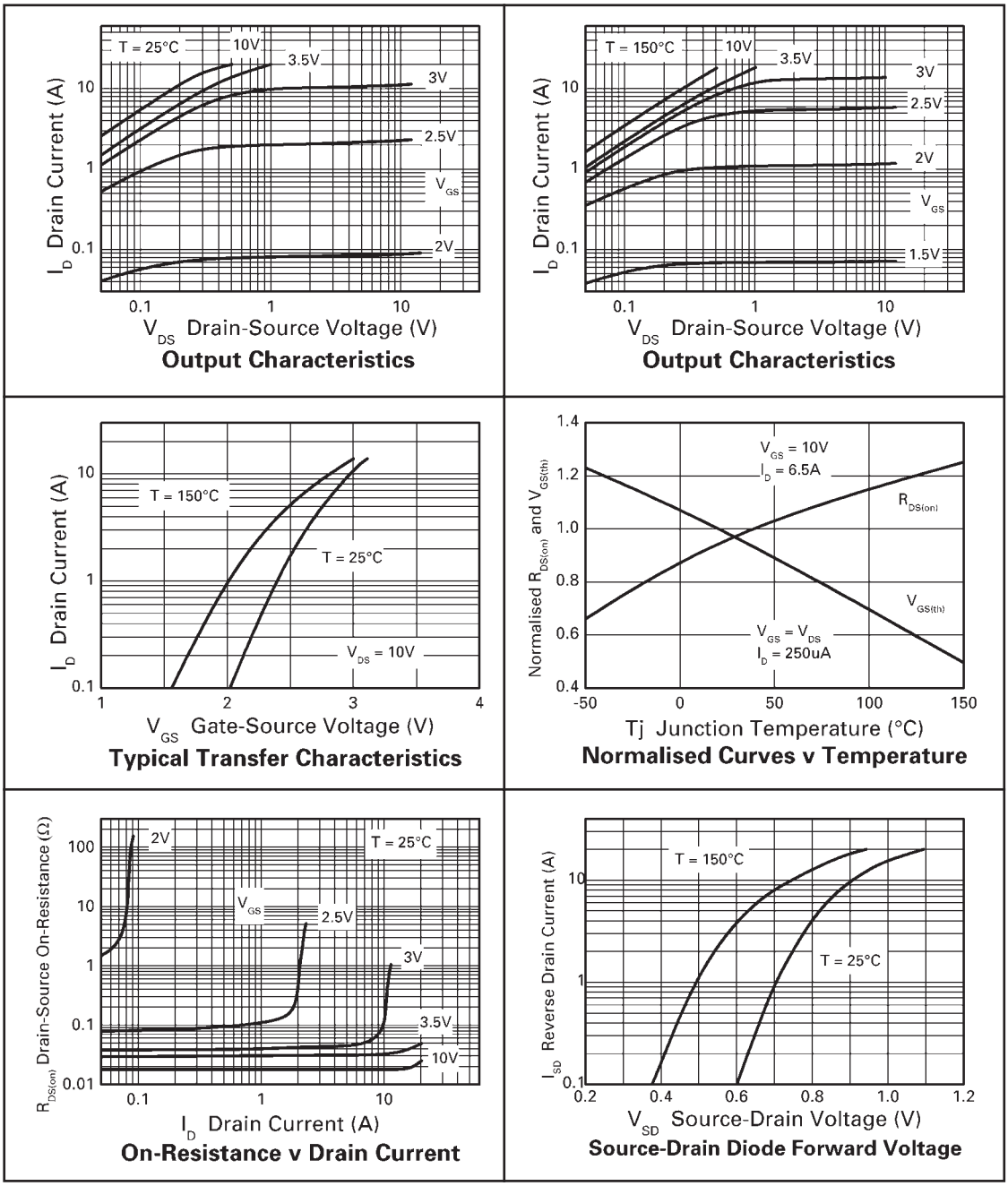
ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	30			V	I_D= 250μA, V_{GS}=0V
Zero Gate Voltage Drain Current	I_{DSS}			0.5	μA	V_{DS}=30V, 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)	$R_{DS(on)}$			0.025 0.030	Ω Ω	V_{GS}= 10V, I_D= 5.8A V_{GS}= 4.5V, I_D= 5.3A
Forward Transconductance (1) (3)	g_{fs}		17.5		S	V_{DS}= 15V, I_D= 5.8A
DYNAMIC (3)						
Input Capacitance	C_{iss}		1800		pF	V_{DS}= 25V, V_{GS}=0V f=1MHz
Output Capacitance	C_{oss}		289		pF	
Reverse Transfer Capacitance	C_{rss}		178		pF	
SWITCHING (2) (3)						
Turn-On-Delay Time	$t_{d(on)}$		5.5		ns	V_{DD}= 15V, I_D=6A $R_G \cong 6.0\Omega$, V_{GS} = 10V
Rise Time	t_r		8.7		ns	
Turn-Off Delay Time	$t_{d(off)}$		33		ns	
Fall Time	t_f		8.5		ns	
Gate Charge	Q_g		19.4		nC	V_{DS}= 15V, V_{GS}= 5V I_D= 3.5A
Total Gate Charge	Q_g		36		nC	V_{DS}= 15V, V_{GS}= 10V I_D= 3.5A
Gate-Source Charge	Q_{gs}		5.5		nC	
Gate-Drain Charge	Q_{gd}		7.0		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}			0.95	V	T_j=25°C, I_S= 6A, V_{GS}=0V
Reverse Recovery Time (3)	t_{rr}		20.5		ns	T_j=25°C, I_F= 6A, di/dt=100A/μs
Reverse Recovery Charge (3)	Q_{rr}		41.5		nC	

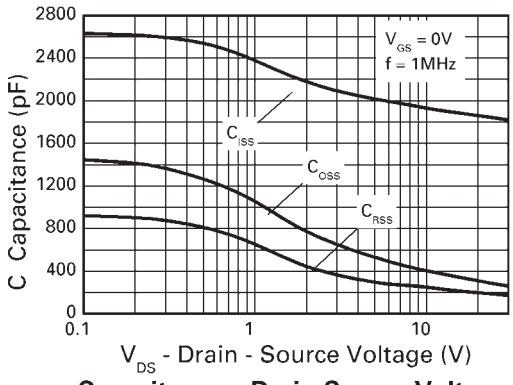
NOTES

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

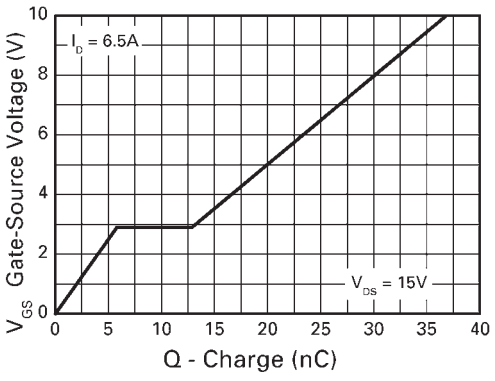
TYPICAL CHARACTERISTICS



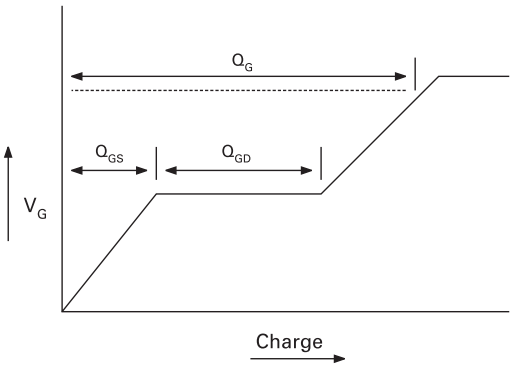
TYPICAL CHARACTERISTICS



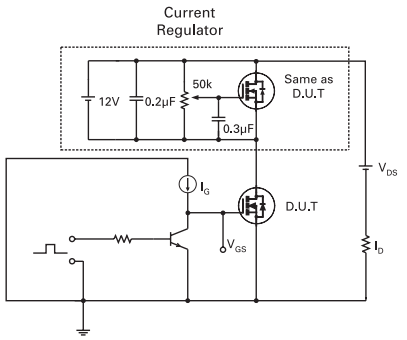
Capacitance v Drain-Source Voltage



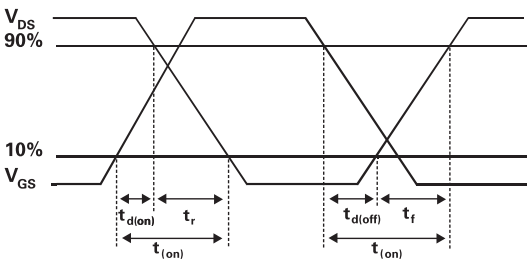
Gate-Source Voltage v Gate Charge



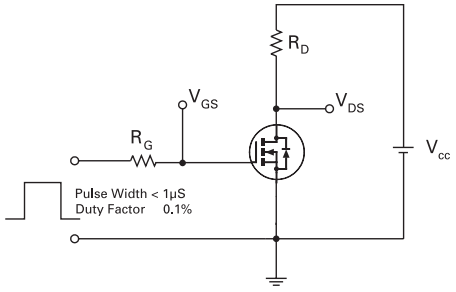
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms



Switching Time Test Circuit

P-Channel

ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-30			V	I_D= -250μA, V_{GS}=0V
Zero Gate Voltage Drain Current	I_{DSS}			-1.0	μA	V_{DS}=-30V, 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)	$R_{DS(on)}$			0.035 0.050	Ω Ω	V_{GS}= -10V, I_D= -4.8A V_{GS}= -4.5V, I_D= -4.0A
Forward Transconductance (1) (3)	g_{fs}		8.6		S	V_{DS}= -15V, I_D= -4.8A
DYNAMIC (3)						
Input Capacitance	C_{iss}		1603		pF	V_{DS}= -15V, V_{GS}=0V f=1MHz
Output Capacitance	C_{oss}		434		pF	
Reverse Transfer Capacitance	C_{rss}		388		pF	
SWITCHING (2) (3)						
Turn-On-Delay Time	$t_{d(on)}$		4.8		ns	V_{DD}= -15V, I_D=-1A $R_G \cong 6.0\Omega$, V_{GS} = 10V
Rise Time	t_r		9.5		ns	
Turn-Off Delay Time	$t_{d(off)}$		60		ns	
Fall Time	t_f		38		ns	
Gate Charge	Q_g		25		nC	V_{DS}= -15V, V_{GS}= -5V I_D= -4.8A
Total Gate Charge	Q_g		45		nC	V_{DS}= -15V, V_{GS}= -10V I_D= -4.8A
Gate-Source Charge	Q_{gs}		5.1		nC	
Gate-Drain Charge	Q_{gd}		11.5		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}		0.82	-0.95	V	T_j=25°C, I_S= -3.7, V_{GS}=0V
Reverse Recovery Time (3)	t_{rr}		32.5		ns	T_j=25°C, I_F= -2.2, di/dt=100A/μs
Reverse Recovery Charge (3)	Q_{rr}		18.4		nC	

NOTES

(1) Measured under pulsed conditions. Pulse width ≤ 300ms; 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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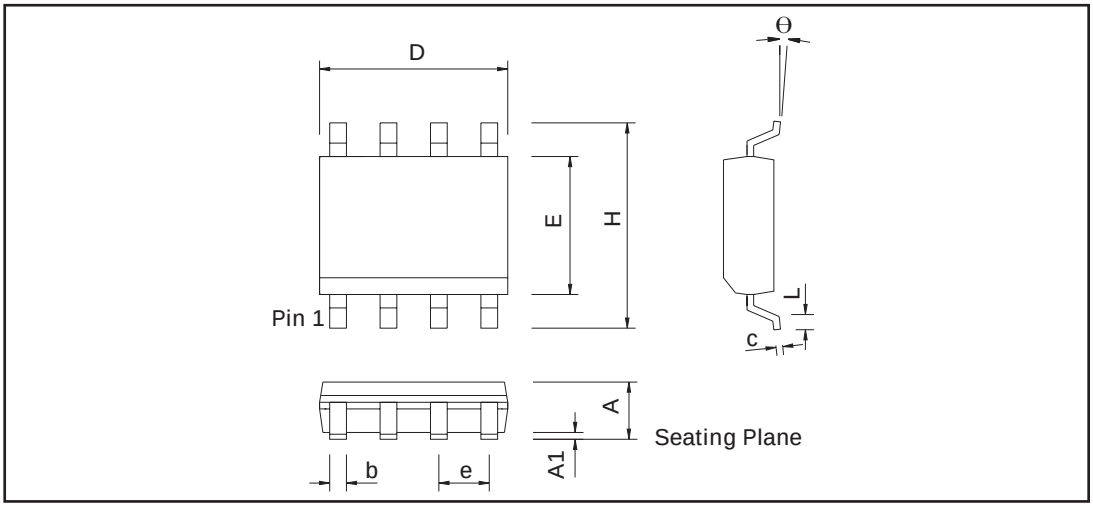
PACKAGE OUTLINE



Controlling dimensions are in millimetres. Approximate conversions are given in inches

PACKAGE DIMENSIONS

DIM	Millimetres		Inches		DIM	Millimetres		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.35	1.75	0.053	0.069	e	1.27BSC		0.050BSC	
A1	0.10	0.25	0.004	0.010	b	0.33	0.51	0.013	0.020
D	4.80	5.00	0.189	0.197	c	0.19	0.25	0.008	0.010
H	5.80	6.20	0.228	0.244	θ	0°	8°	0°	8°
E	3.80	4.00	0.150	0.157	h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050	-	-	-	-	-

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