ZXMC3A18DN8

ADVANCE INFORMATION

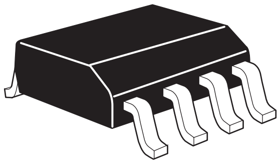
COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET

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

DESCRIPTION

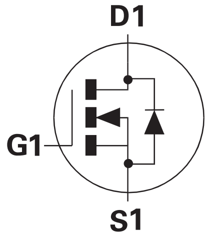
This new generation of trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.



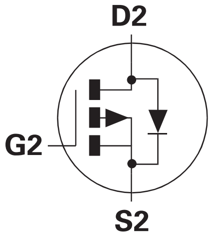
SO8

FEATURES

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



Q1 = N-channel



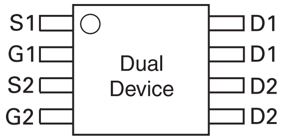
Q2 = P-channel

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)	I_D	7.6	-6.3	A
(V_{GS}= 10V; T_A=70°C) (b)(d)		6.1	-5.0	A
(V_{GS}= 10V; T_A=25°C) (a)(d)		5.8	-4.8	A
Pulsed Drain Current (c)	I_{DM}	37	-30	A
Continuous Source Current (Body Diode) (b)	I_S	3.6	tbd	A
Pulsed Source Current (Body Diode) (c)	I_{SM}	37	30	A
Power Dissipation at T_A =25°C (a) (d)	P_D	1.25		W
Linear Derating Factor		10		mW/°C
Power Dissipation at T_A =25°C (a) (e)	P_D	1.8		W
Linear Derating Factor		14		mW/°C
Power Dissipation at T_A =25°C (b) (d)	P_D	2.1		W
Linear Derating Factor		17		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.

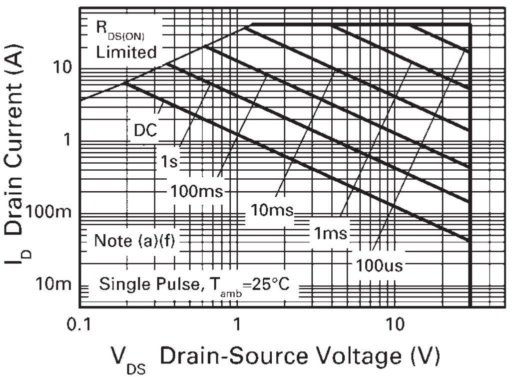
(b) For a device surface mounted on FR4 PCB measured at $t \leq 10$ sec.

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

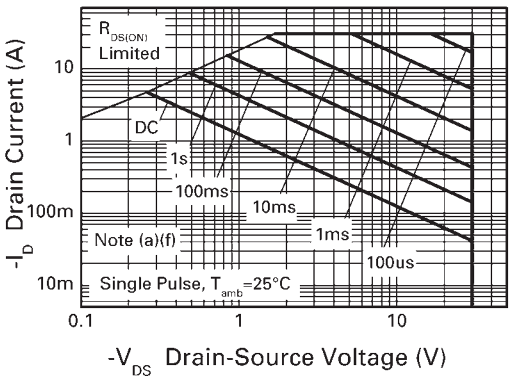
(d) For device with one active die.

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

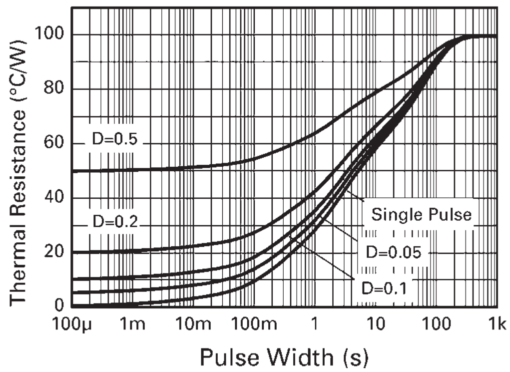
CHARACTERISTICS



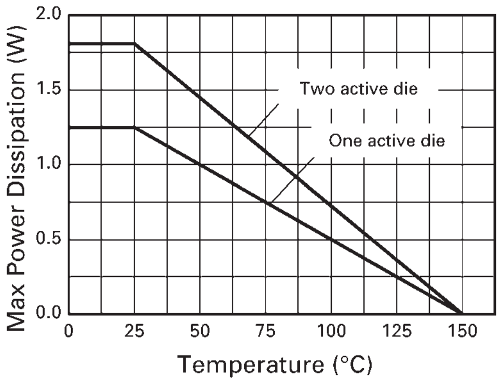
N-channel Safe Operating Area



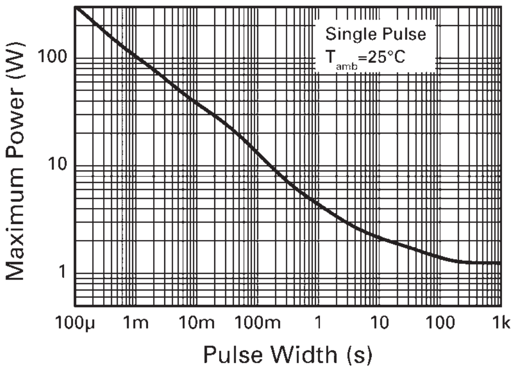
P-channel Safe Operating Area



Transient Thermal Impedance



Derating Curve



Pulse Power Dissipation

N-Channel

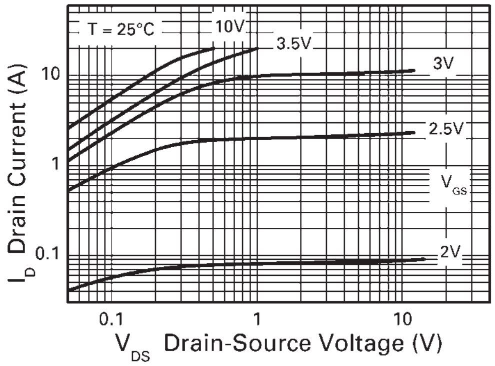
ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

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 ≅ 6.0Ω, 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	

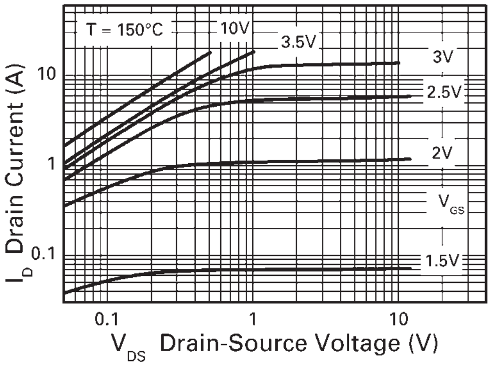
NOTES

(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.

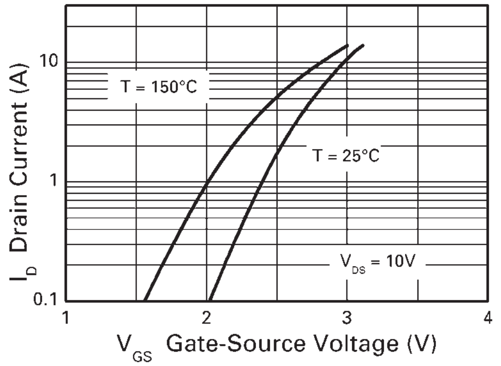
TYPICAL CHARACTERISTICS



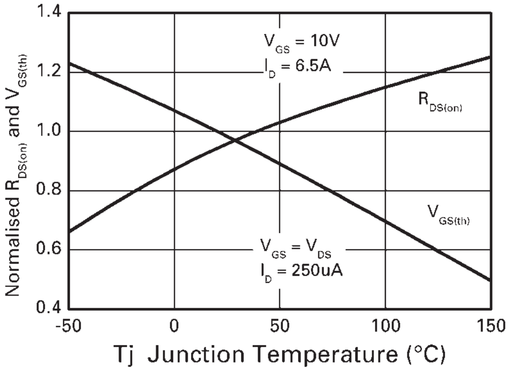
Output Characteristics



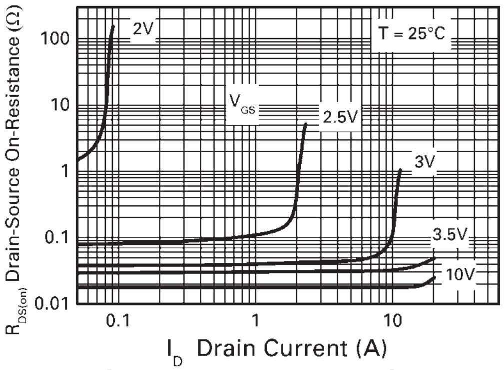
Output Characteristics



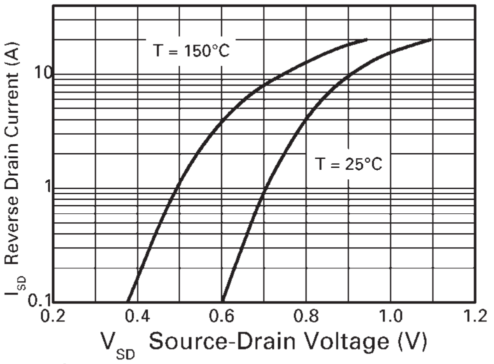
Typical Transfer Characteristics



Normalised Curves v Temperature

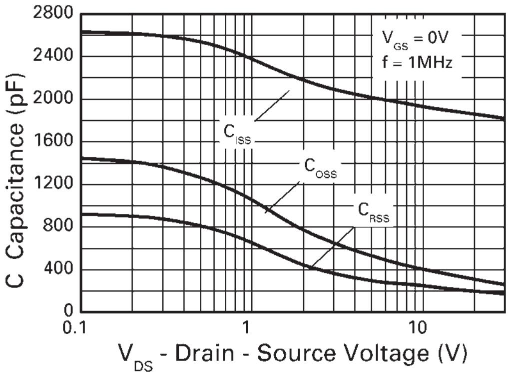


On-Resistance v Drain Current

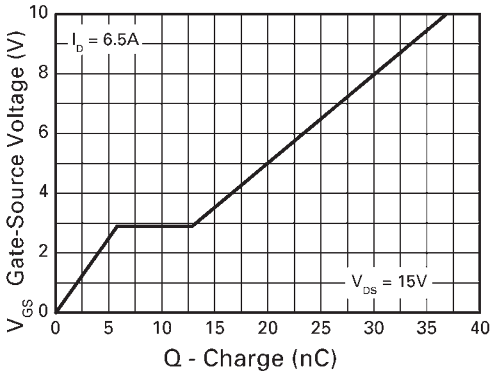


Source-Drain Diode Forward Voltage

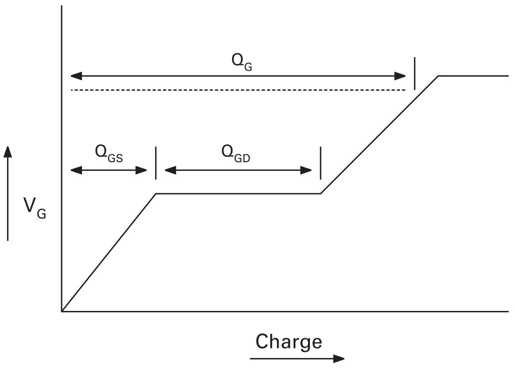
TYPICAL CHARACTERISTICS



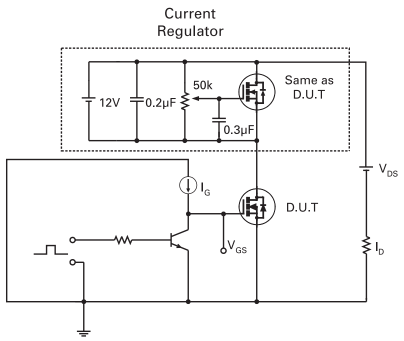
Capacitance v Drain-Source Voltage



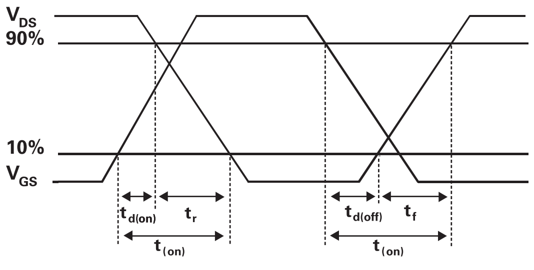
Gate-Source Voltage v Gate Charge



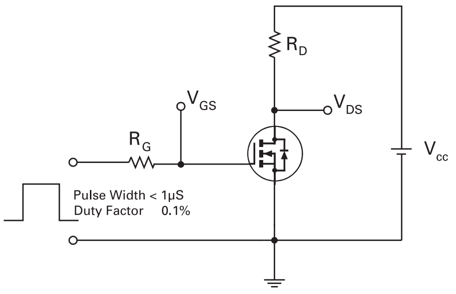
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms



Switching Time Test Circuit

P-Channel

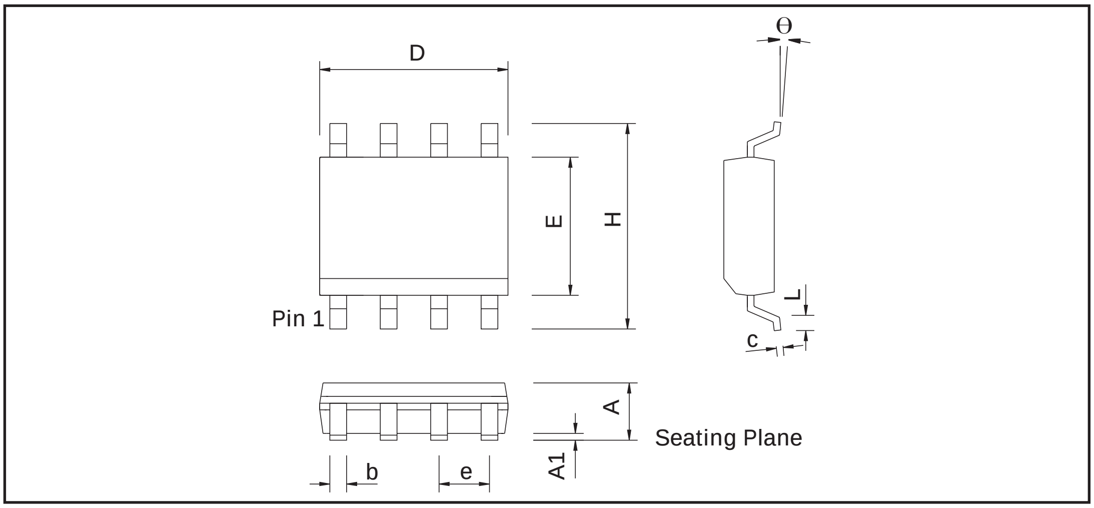
ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

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}		tbd		S	V_{DS}= -15V, I_D= -4.8A
DYNAMIC (3)						
Input Capacitance	C_{iss}		1630		pF	V_{DS}= -15V, V_{GS}=0V f=1MHz
Output Capacitance	C_{oss}		320		pF	
Reverse Transfer Capacitance	C_{rss}		210		pF	
SWITCHING (2) (3)						
Turn-On-Delay Time	$t_{d(on)}$		9.2		ns	V_{DD}= -15V, I_D=-1A $R_G \cong 6.0\Omega$, V_{GS} = 10V
Rise Time	t_r		18		ns	
Turn-Off Delay Time	$t_{d(off)}$		96		ns	
Fall Time	t_f		60		ns	
Gate Charge	Q_g		tbd		nC	V_{DS}= -15V, V_{GS}= -5V I_D= -5.0A
Total Gate Charge	Q_g		41		nC	V_{DS}= -15V, V_{GS}= -10V I_D= -5.0A
Gate-Source Charge	Q_{gs}		5.2		nC	
Gate-Drain Charge	Q_{gd}		7.3		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}			-0.95	V	T_j=25°C, I_S= -tbd, V_{GS}=0V
Reverse Recovery Time (3)	t_{rr}		tbd		ns	T_j=25°C, I_F= -tbd, di/dt=100A/µs
Reverse Recovery Charge (3)	Q_{rr}		tbd		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.

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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