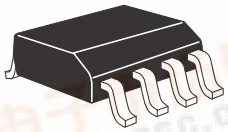
ZXMC3A17DN8

COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET

SUMMARY

N-Channel : $V_{(BR)DSS}$= 30V : $R_{DS(on)}$= 0.050Ω; I_D= 5.4A
P-Channel : $V_{(BR)DSS}$= -30V : $R_{DS(on)}$= 0.070Ω; I_D= -4.4A



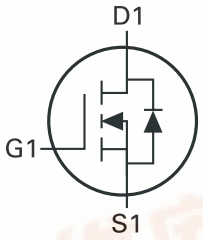
SO8

DESCRIPTION

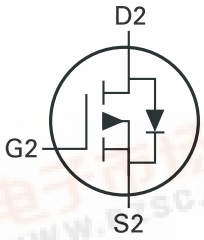
This new generation of trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.

FEATURES

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



Q1 = N-channel



Q2 = P-channel

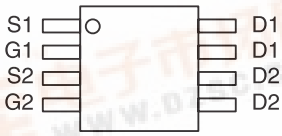
APPLICATIONS

- Motor drive
- LCD backlighting

ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMC3A17DN8TA	7″	12mm	500 units
ZXMC3A17DN8TC	13″	12mm	2500 units

PINOUT



Top View

DEVICE MARKING

- ZXMC
  3A17

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	N-channel	P-channel	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	 5.4 4.3 4.1	 -4.4 -3.6 -3.4	A
Pulsed Drain Current (c)	I_{DM}	23	-20	A
Continuous Source Current (Body Diode) (b)	I_S	2.6	-2.5	A
Pulsed Source Current (Body Diode) (c)	I_{SM}	23	-20	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 dual device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

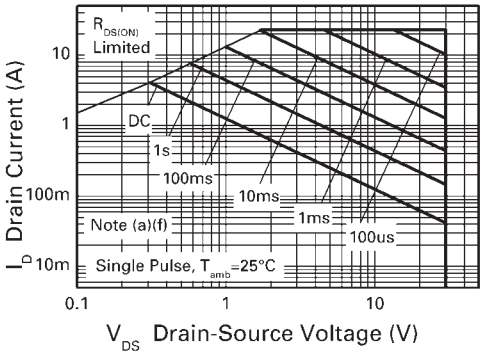
(b) For a dual device surface mounted on FR4 PCB measured at t ≤ 10 sec.

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

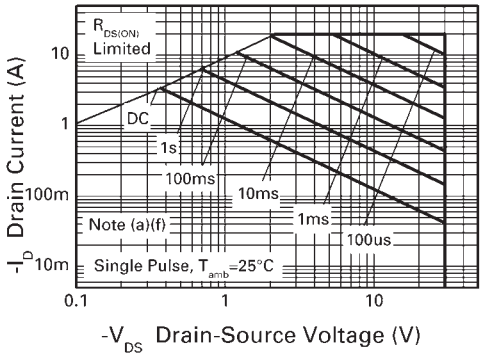
(d) For a dual device with one active die.

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

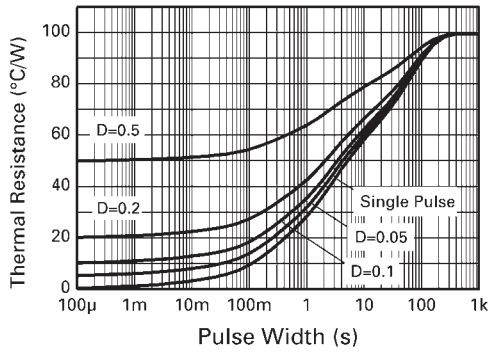
CHARACTERISTICS



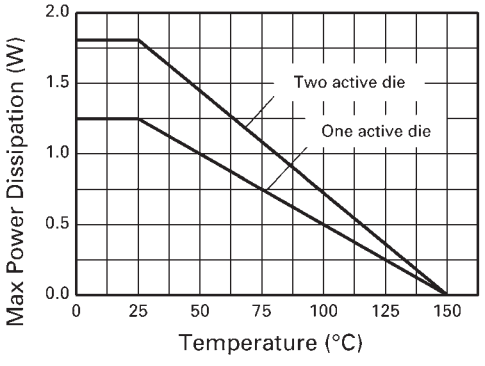
N-channel Safe Operating Area



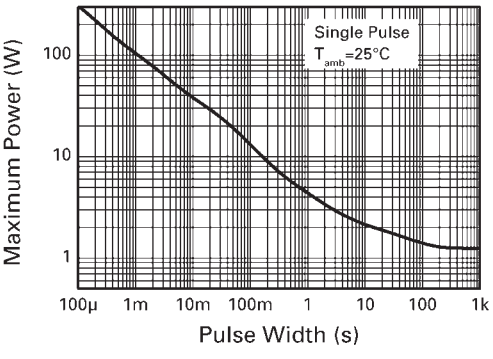
P-channel Safe Operating Area



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)	$R_{DS(on)}$			0.050 0.065	Ω Ω	V_{GS}= 10V, I_D= 7.8A V_{GS}= 4.5V, I_D= 6.8A
Forward Transconductance (1) (3)	g_{fs}		10		S	V_{DS}= 10V, I_D= 7.8A
DYNAMIC (3)						
Input Capacitance	C_{iss}		600		pF	V_{DS}= 25V, V_{GS}=0V f=1MHz
Output Capacitance	C_{oss}		104		pF	
Reverse Transfer Capacitance	C_{rss}		58.5		pF	
SWITCHING (2) (3)						
Turn-On-Delay Time	$t_{d(on)}$		2.9		ns	V_{DD}= 15V, I_D=3.5A $R_G \cong 6.0\Omega$, V_{GS} = 10V
Rise Time	t_r		6.4		ns	
Turn-Off Delay Time	$t_{d(off)}$		16		ns	
Fall Time	t_f		11.2		ns	
Gate Charge	Q_g		6.9		nC	V_{DS}= 15V, V_{GS}= 5V I_D= 3.5A
Total Gate Charge	Q_g		12.2		nC	V_{DS}= 15V, V_{GS}= 10V I_D= 3.5A
Gate-Source Charge	Q_{gs}		1.7		nC	
Gate-Drain Charge	Q_{gd}		2.4		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}		0.85	0.95	V	T_j=25°C, I_S= 3.2A, V_{GS}=0V
Reverse Recovery Time (3)	t_{rr}		18.8		ns	T_j=25°C, I_F= 3.5A, di/dt=100A/μs
Reverse Recovery Charge (3)	Q_{rr}		14.1		nC	

(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.

ADVANCE INFORMATION

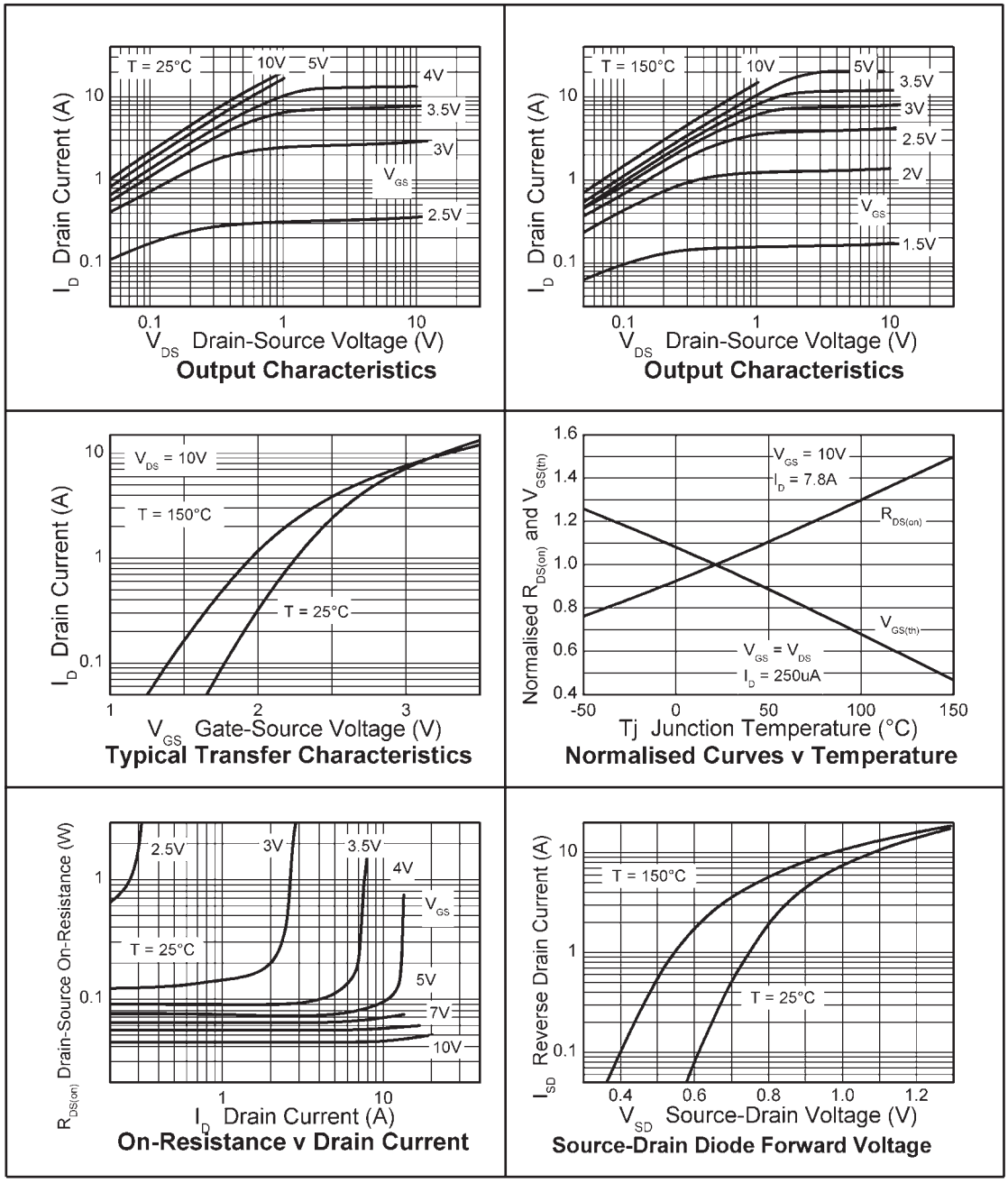
P-CHANNEL
ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

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)	$R_{DS(on)}$			0.070 0.110	Ω Ω	V_{GS}= -10V, I_D= -3.2A V_{GS}= -4.5V, I_D= -2.5A
Forward Transconductance (1) (3)	g_{fs}		6.4		S	V_{DS}= -15V, I_D= -3.2A
DYNAMIC (3)						
Input Capacitance	C_{iss}		630		pF	V_{DS}= -15V, V_{GS}=0V f=1MHz
Output Capacitance	C_{oss}		113		pF	
Reverse Transfer Capacitance	C_{rss}		78		pF	
SWITCHING (2) (3)						
Turn-On-Delay Time	$t_{d(on)}$		1.7		ns	V_{DD}= -15V, I_D= -1A $R_G \cong 6.0\Omega$, V_{GS}= -10V
Rise Time	t_r		2.9		ns	
Turn-Off Delay Time	$t_{d(off)}$		29.2		ns	
Fall Time	t_f		8.7		ns	
Gate Charge	Q_g		8.3		nC	V_{DS}= -15V, V_{GS}= -5V I_D= -3.2A
Total Gate Charge	Q_g		15.8		nC	V_{DS}= -15V, V_{GS}= -10V I_D= -3.2A
Gate-Source Charge	Q_{gs}		1.8		nC	
Gate Drain Charge	Q_{gd}		2.8		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}		-0.85	-0.95	V	T_j=25°C, I_S= -2.5A, V_{GS}=0V
Reverse Recovery Time (3)	t_{rr}		19.5		ns	T_j=25°C, I_S= -1.7A, di/dt=100A/μs
Reverse Recovery Charge (3)	Q_{rr}		16.3		nC	

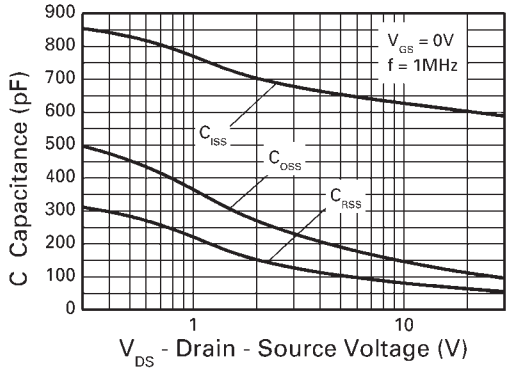
NOTES:

(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.

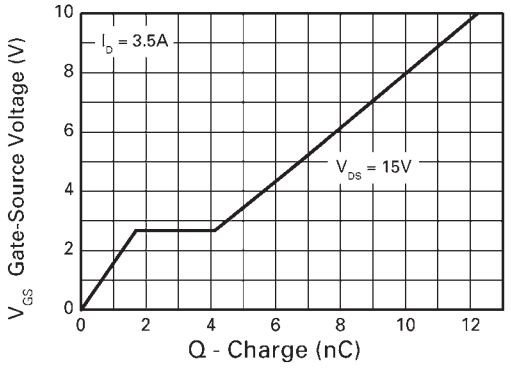
N-CHANNEL TYPICAL CHARACTERISTICS



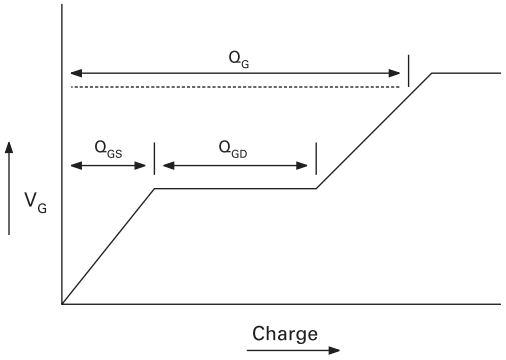
N-CHANNEL TYPICAL CHARACTERISTICS



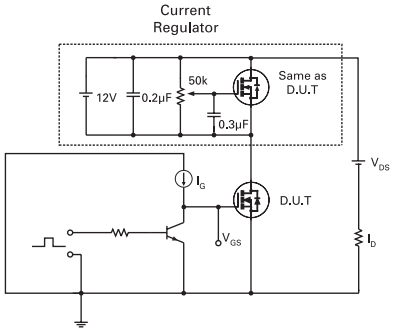
Capacitance v Drain-Source Voltage



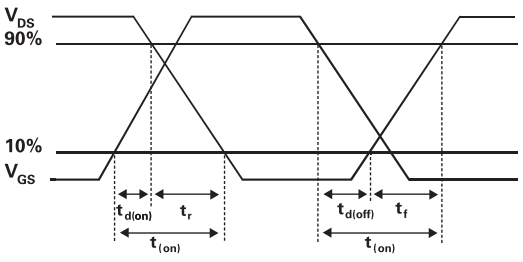
Gate-Source Voltage v Gate Charge



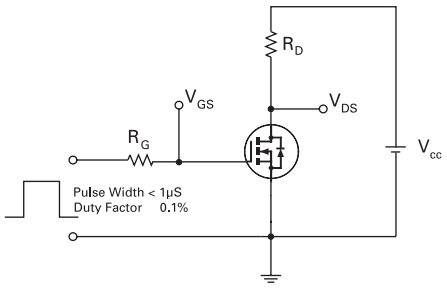
Basic Gate Charge Waveform



Gate Charge Test Circuit

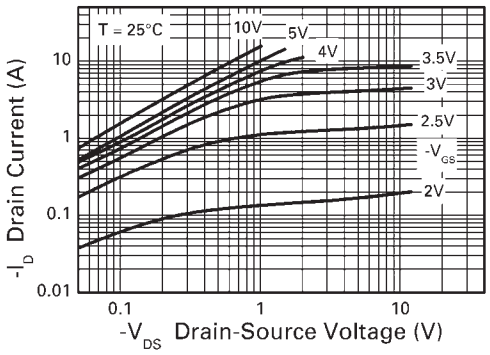


Switching Time Waveforms

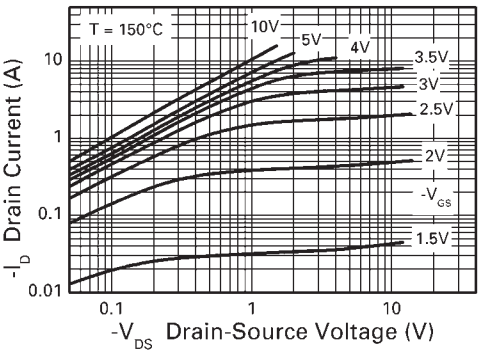


Switching Time Test Circuit

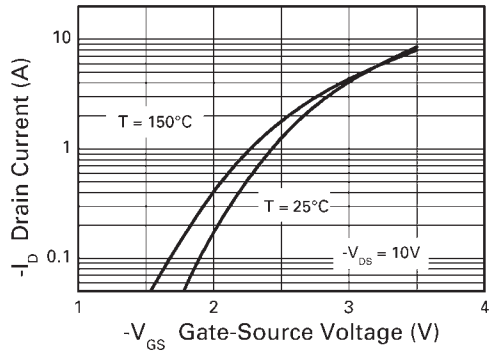
P-CHANNEL TYPICAL CHARACTERISTICS



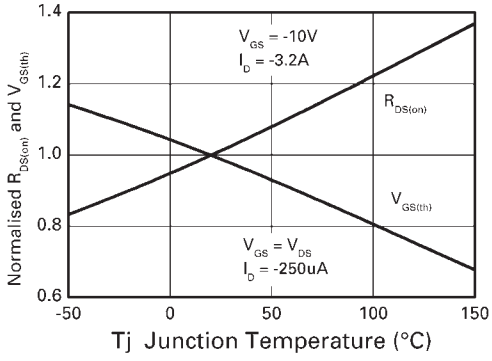
Output Characteristics



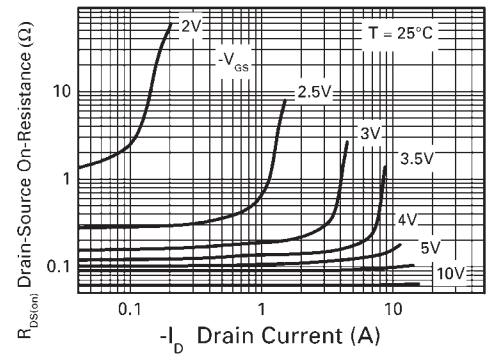
Output Characteristics



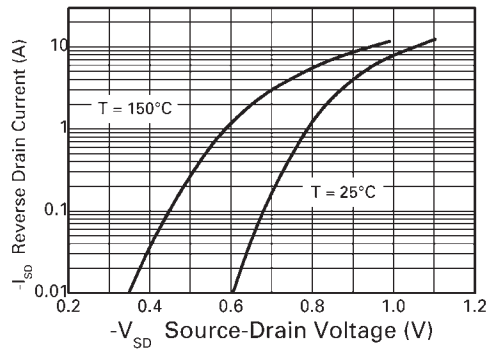
Typical Transfer Characteristics



Normalised Curves v Temperature

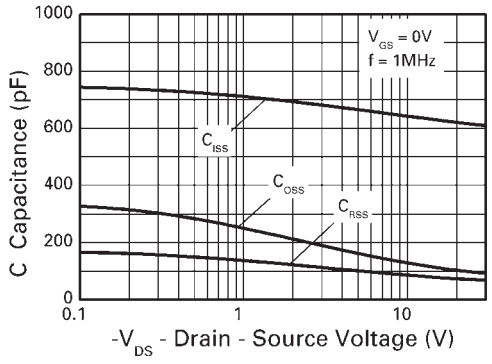


On-Resistance v Drain Current

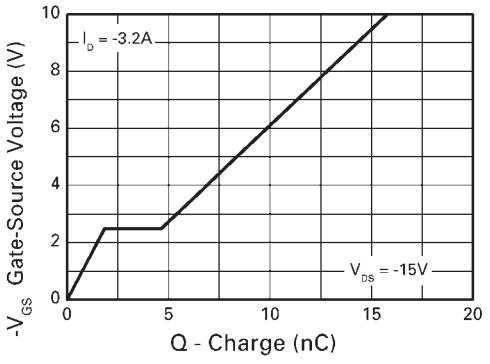


Source-Drain Diode Forward Voltage

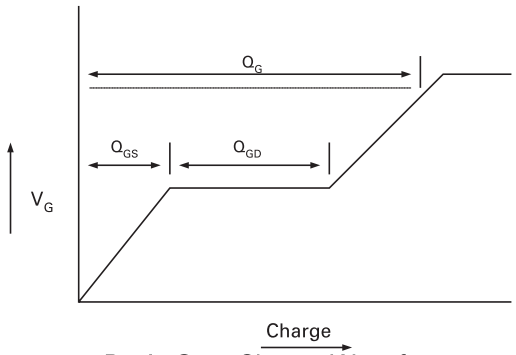
P-CHANNEL TYPICAL CHARACTERISTICS



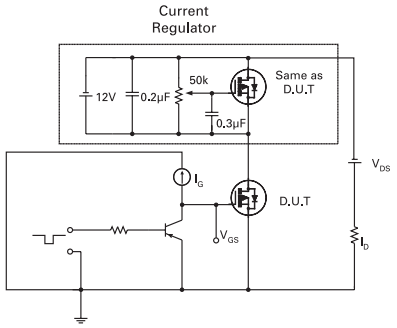
Capacitance v Drain-Source Voltage



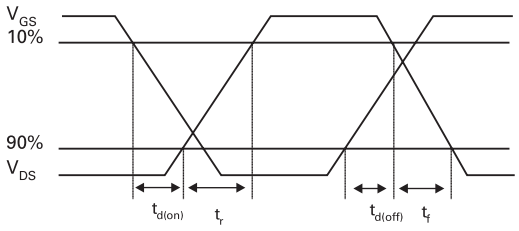
Gate-Source Voltage v Gate Charge



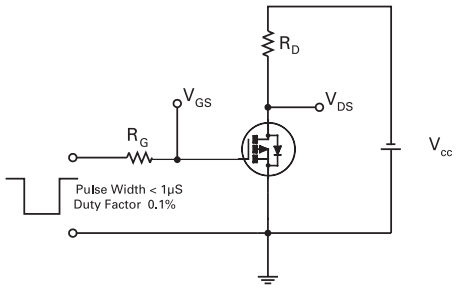
Basic Gate Charge Waveform



Gate Charge Test Circuit



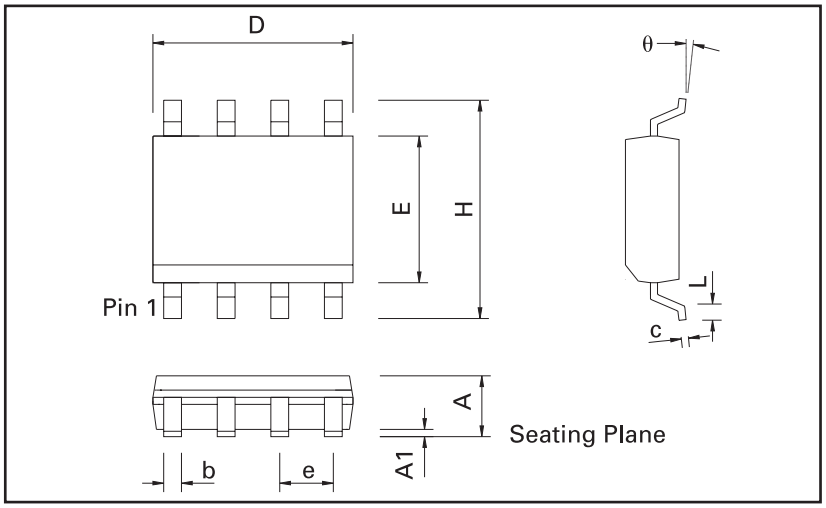
Switching Time Waveforms



Switching Time Test Circuit

ZXMC3A17DN8

SO8 PACKAGE OUTLINE (Conforms to JEDEC MS-012AA Iss. C)



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

PACKAGE DIMENSIONS

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.35	1.75	0.053	0.069	e	1.27 BSC		0.050 BSC	
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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