

ZXMC3A17DN8

COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET

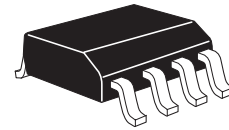
SUMMARY

N-Channel : $V_{(BR)DSS} = 30V$; $R_{DS(on)} = 0.050\Omega$; $I_D = 5.4A$

P-Channel : $V_{(BR)DSS} = -30V$; $R_{DS(on)} = 0.070\Omega$; $I_D = -4.4A$

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.



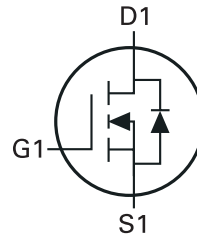
SO8

FEATURES

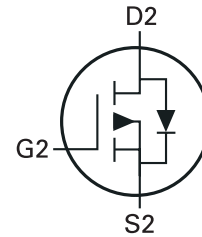
- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

APPLICATIONS

- Motor drive
- LCD backlighting



Q1 = N-channel

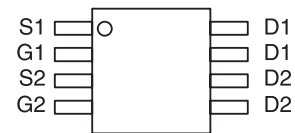


Q2 = P-channel

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

ZXMC3A17DN8

ADVANCE INFORMATION

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 ($V_{GS} = 10V$; $T_A = 25^\circ C$) ^{(b)(d)} ($V_{GS} = 10V$; $T_A = 70^\circ C$) ^{(b)(d)} ($V_{GS} = 10V$; $T_A = 25^\circ C$) ^{(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 $T_A = 25^\circ C$ ^{(a) (d)} Linear Derating Factor	P_D	1.25 10		W mW/ $^\circ C$
Power Dissipation at $T_A = 25^\circ C$ ^{(a) (e)} Linear Derating Factor	P_D	1.8 14		W mW/ $^\circ C$
Power Dissipation at $T_A = 25^\circ C$ ^{(b) (d)} Linear Derating Factor	P_D	2.1 17		W mW/ $^\circ C$
Operating and Storage Temperature Range	T_j, T_{stg}	-55 to +150		$^\circ C$

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient ^{(a) (d)}	$R_{\theta JA}$	100	$^\circ C/W$
Junction to Ambient ^{(a) (e)}	$R_{\theta JA}$	70	$^\circ C/W$
Junction to Ambient ^{(b) (d)}	$R_{\theta JA}$	60	$^\circ C/W$

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.

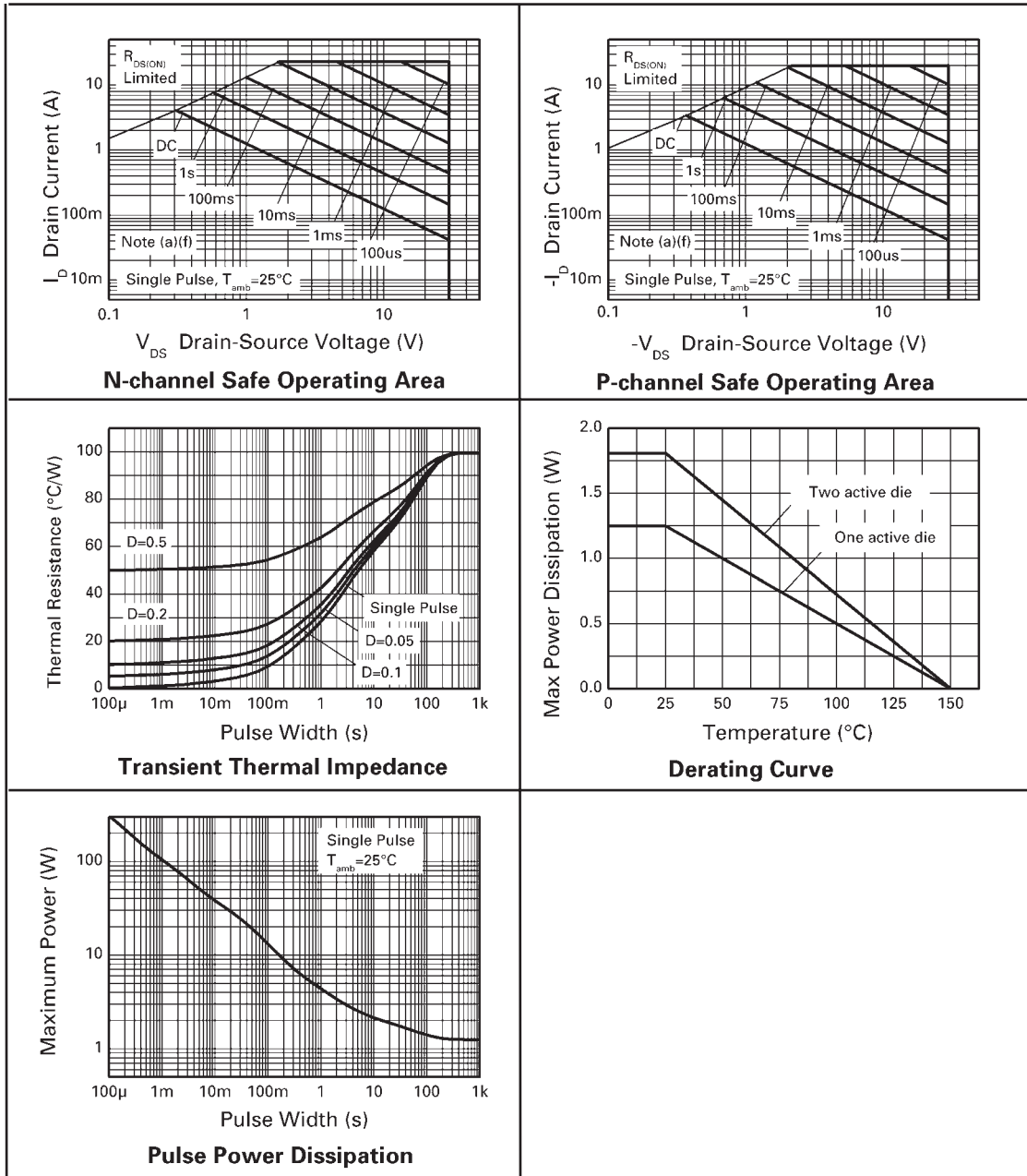
(b) For a dual device surface mounted on FR4 PCB measured at $t \leq 10$ sec.

(c) Repetitive rating 25mm x 25mm FR4 PCB, $D = 0.02$, pulse width = 300 μs - 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



ZXMC3A17DN8

ADVANCE INFORMATION

N-CHANNEL

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	30			V	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			0.5	μA	$V_{DS} = 30\text{V}$, $V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	1.0			V	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance ⁽¹⁾	$R_{DS(on)}$			0.050	Ω	$V_{GS} = 10\text{V}$, $I_D = 7.8\text{A}$
				0.065	Ω	$V_{GS} = 4.5\text{V}$, $I_D = 6.8\text{A}$
Forward Transconductance ^{(1) (3)}	g_{fs}		10		S	$V_{DS} = 10\text{V}$, $I_D = 7.8\text{A}$
DYNAMIC ⁽³⁾						
Input Capacitance	C_{iss}		600		pF	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
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	$V_{DD} = 15\text{V}$, $I_D = 3.5\text{A}$ $R_G \cong 6.0\Omega$, $V_{GS} = 10\text{V}$
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	$V_{DS} = 15\text{V}$, $V_{GS} = 5\text{V}$ $I_D = 3.5\text{A}$
Total Gate Charge	Q_g		12.2		nC	$V_{DS} = 15\text{V}$, $V_{GS} = 10\text{V}$ $I_D = 3.5\text{A}$
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	$T_j = 25^{\circ}\text{C}$, $I_S = 3.2\text{A}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time ⁽³⁾	t_{rr}		18.8		ns	$T_j = 25^{\circ}\text{C}$, $I_F = 3.5\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge ⁽³⁾	Q_{rr}		14.1		nC	

(1) Measured under pulsed conditions. Pulse width $\leq 300\text{ms}$; Duty cycle $\leq 2\%$.

(2) Switching characteristics are independent of operating junction temperature.

(3) For design aid only, not subject to production testing.

ZXMC3A17DN8

ADVANCE INFORMATION

P-CHANNEL

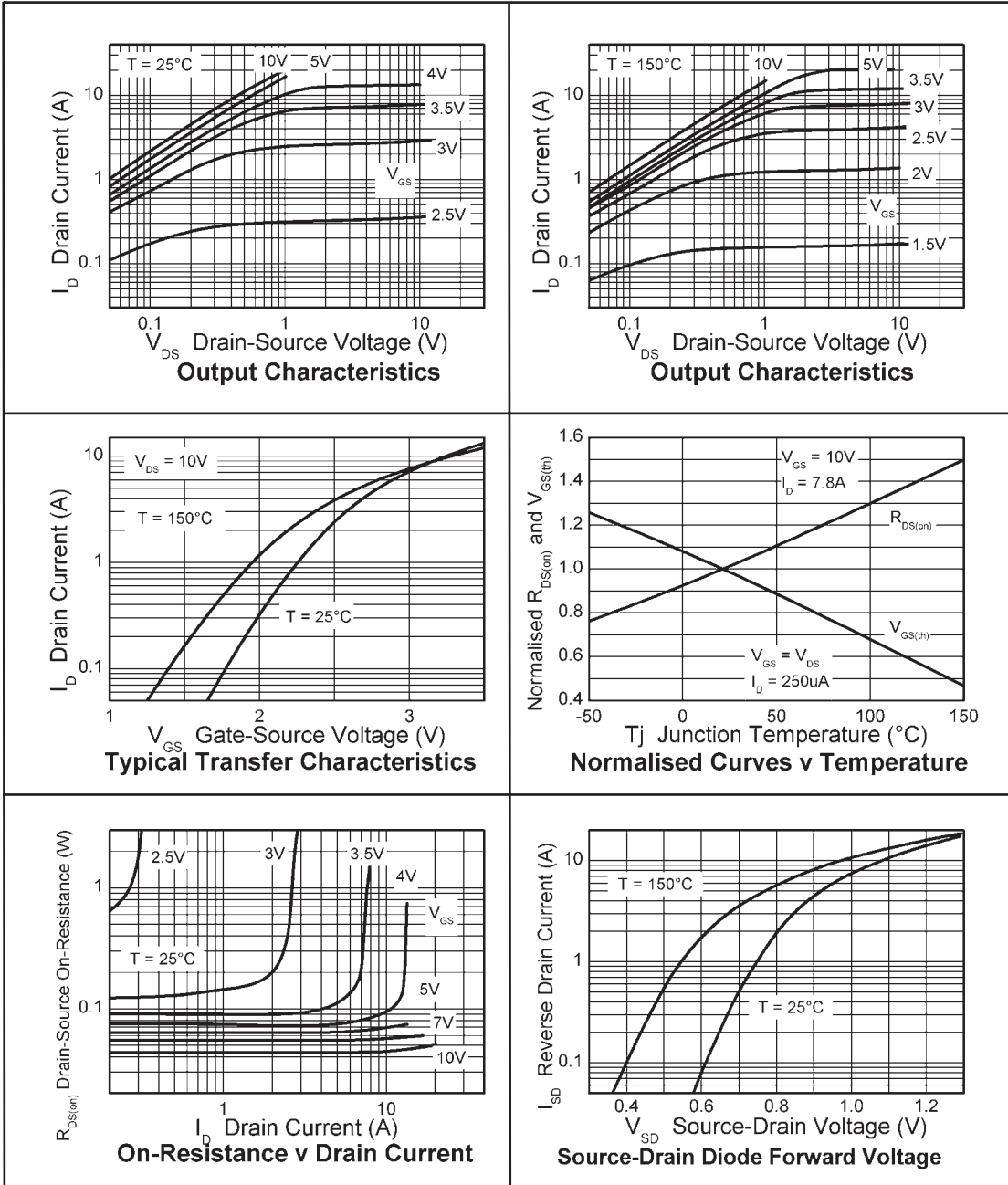
ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-30			V	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			-1.0	μA	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	-1.0			V	$I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance ⁽¹⁾	$R_{DS(on)}$			0.070	Ω	$V_{GS} = -10\text{V}$, $I_D = -3.2\text{A}$
				0.110	Ω	$V_{GS} = -4.5\text{V}$, $I_D = -2.5\text{A}$
Forward Transconductance ^{(1) (3)}	g_{fs}		6.4		S	$V_{DS} = -15\text{V}$, $I_D = -3.2\text{A}$
DYNAMIC ⁽³⁾						
Input Capacitance	C_{iss}		630		pF	$V_{DS} = -15\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
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	$V_{DD} = -15\text{V}$, $I_D = -1\text{A}$ $R_G \cong 6.0\Omega$, $V_{GS} = -10\text{V}$
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	$V_{DS} = -15\text{V}$, $V_{GS} = -5\text{V}$ $I_D = -3.2\text{A}$
Total Gate Charge	Q_g		15.8		nC	$V_{DS} = -15\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -3.2\text{A}$
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	$T_j = 25^{\circ}\text{C}$, $I_S = -2.5\text{A}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time ⁽³⁾	t_{rr}		19.5		ns	$T_j = 25^{\circ}\text{C}$, $I_S = -1.7\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge ⁽³⁾	Q_{rr}		16.3		nC	

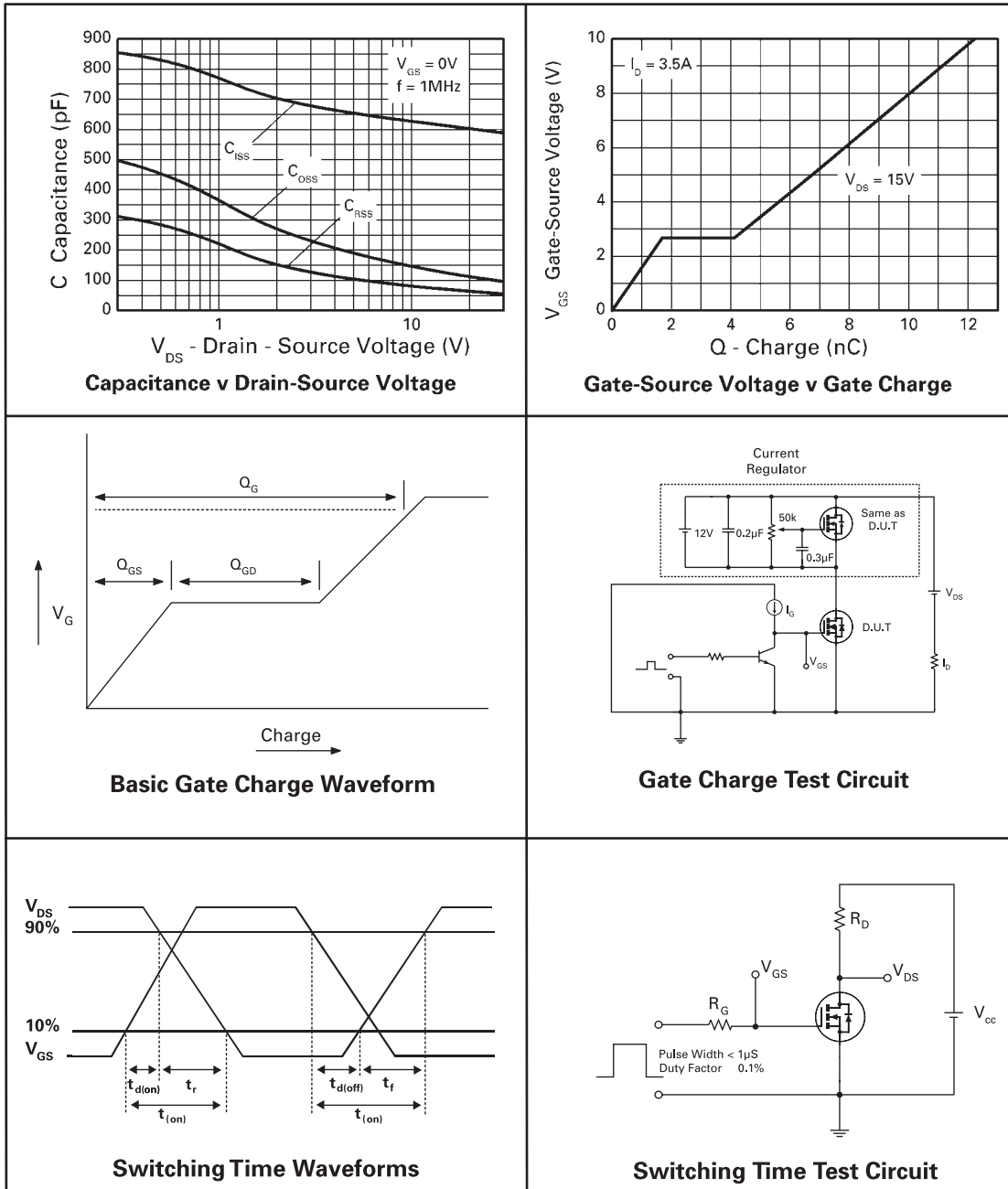
NOTES:

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

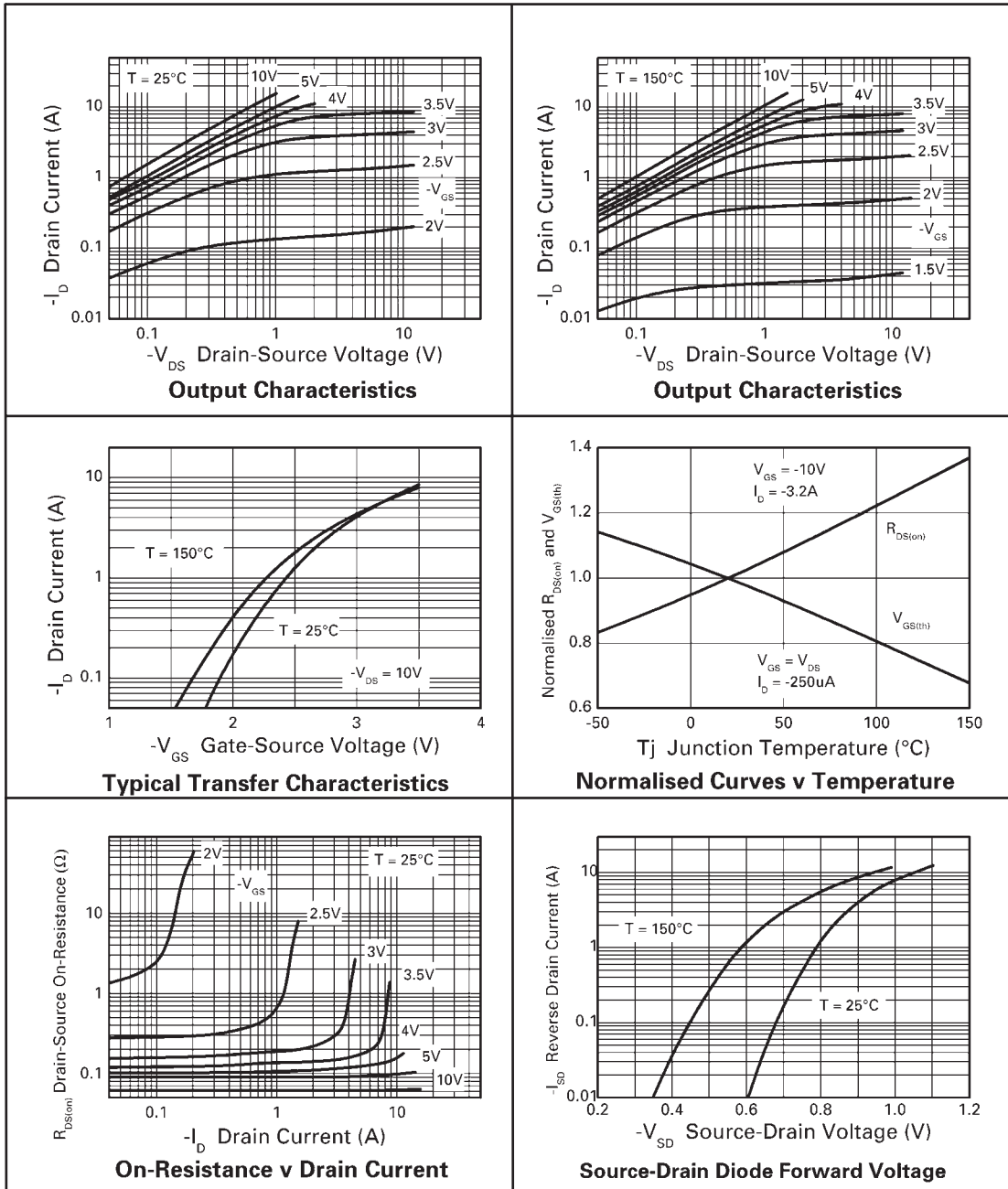
N-CHANNEL TYPICAL CHARACTERISTICS



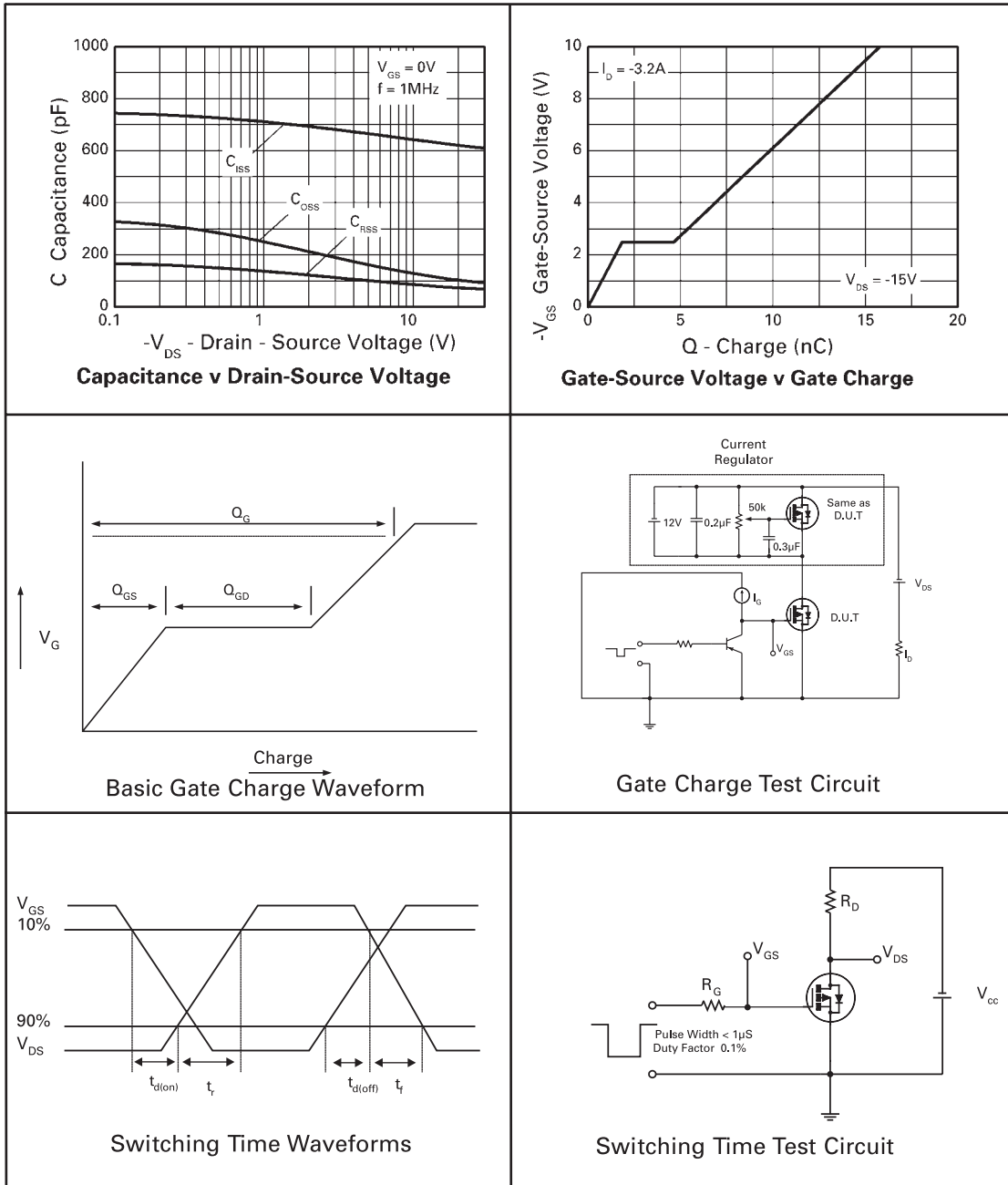
N-CHANNEL TYPICAL CHARACTERISTICS



P-CHANNEL TYPICAL CHARACTERISTICS

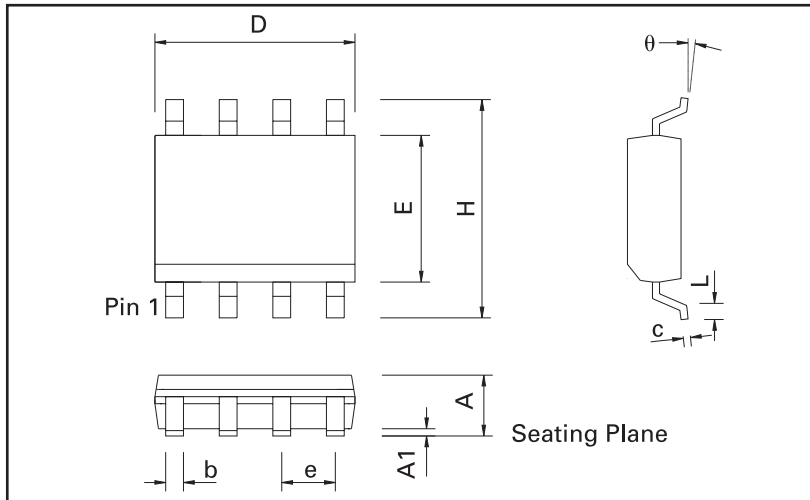


P-CHANNEL TYPICAL CHARACTERISTICS



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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