

# ZXMC3A17DN8

## COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET

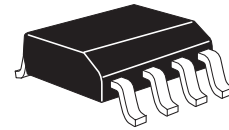
### SUMMARY

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.



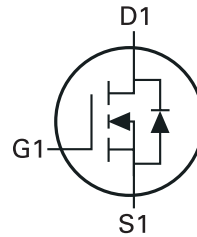
SO8

### FEATURES

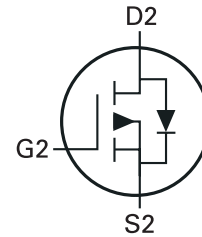
- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

### APPLICATIONS

- Motor drive
- LCD backlighting



Q1 = N-channel

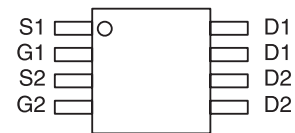


Q2 = P-channel

### 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	$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current ( $V_{GS} = 10V$ ; $T_A = 25^\circ C$ ) <sup>(b)(d)</sup> ( $V_{GS} = 10V$ ; $T_A = 70^\circ C$ ) <sup>(b)(d)</sup> ( $V_{GS} = 10V$ ; $T_A = 25^\circ C$ ) <sup>(a)(d)</sup>	$I_D$	5.4 4.3 4.1	-4.4 -3.6 -3.4	A
Pulsed Drain Current <sup>(c)</sup>	$I_{DM}$	23	-20	A
Continuous Source Current (Body Diode) <sup>(b)</sup>	$I_S$	2.6	-2.5	A
Pulsed Source Current (Body Diode) <sup>(c)</sup>	$I_{SM}$	23	-20	A
Power Dissipation at $T_A = 25^\circ C$ <sup>(a) (d)</sup> Linear Derating Factor	$P_D$	1.25 10		W mW/ $^\circ C$
Power Dissipation at $T_A = 25^\circ C$ <sup>(a) (e)</sup> Linear Derating Factor	$P_D$	1.8 14		W mW/ $^\circ C$
Power Dissipation at $T_A = 25^\circ C$ <sup>(b) (d)</sup> Linear Derating Factor	$P_D$	2.1 17		W mW/ $^\circ C$
Operating and Storage Temperature Range	$T_j, T_{stg}$	-55 to +150		$^\circ C$

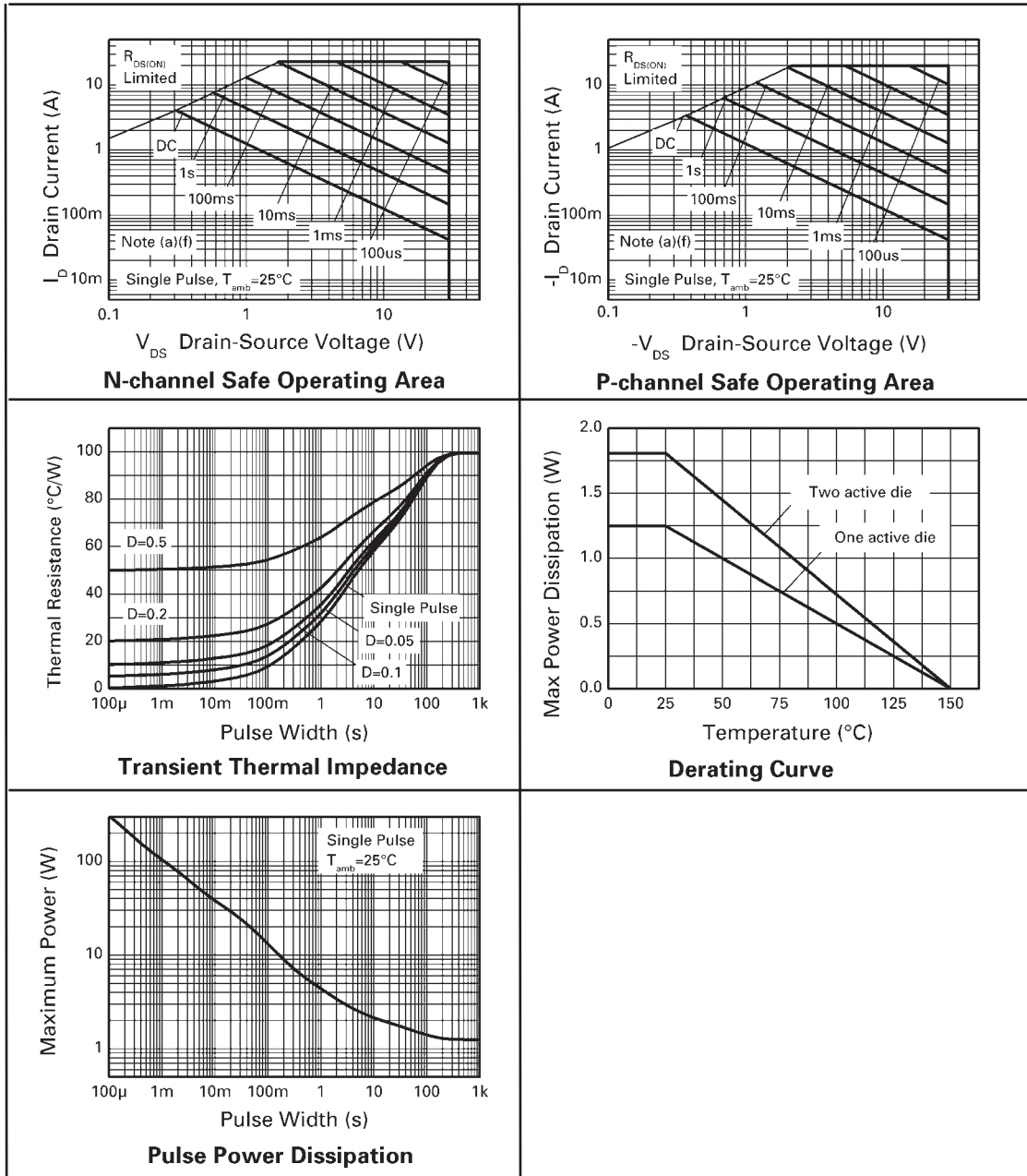
### THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient <sup>(a) (d)</sup>	$R_{\theta JA}$	100	$^\circ C/W$
Junction to Ambient <sup>(a) (e)</sup>	$R_{\theta JA}$	70	$^\circ C/W$
Junction to Ambient <sup>(b) (d)</sup>	$R_{\theta JA}$	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 $\mu s$  - 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
<b>STATIC</b>						
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	$\mu\text{A}$	$V_{DS} = 30\text{V}$ , $V_{GS} = 0\text{V}$
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 <sup>(1)</sup>	$R_{DS(on)}$			0.050	$\Omega$	$V_{GS} = 10\text{V}$ , $I_D = 7.8\text{A}$
				0.065	$\Omega$	$V_{GS} = 4.5\text{V}$ , $I_D = 6.8\text{A}$
Forward Transconductance <sup>(1) (3)</sup>	$g_{fs}$		10		S	$V_{DS} = 10\text{V}$ , $I_D = 7.8\text{A}$
<b>DYNAMIC <sup>(3)</sup></b>						
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	
<b>SWITCHING <sup>(2) (3)</sup></b>						
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	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage <sup>(1)</sup>	$V_{SD}$		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 <sup>(3)</sup>	$t_{rr}$		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 <sup>(3)</sup>	$Q_{rr}$		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

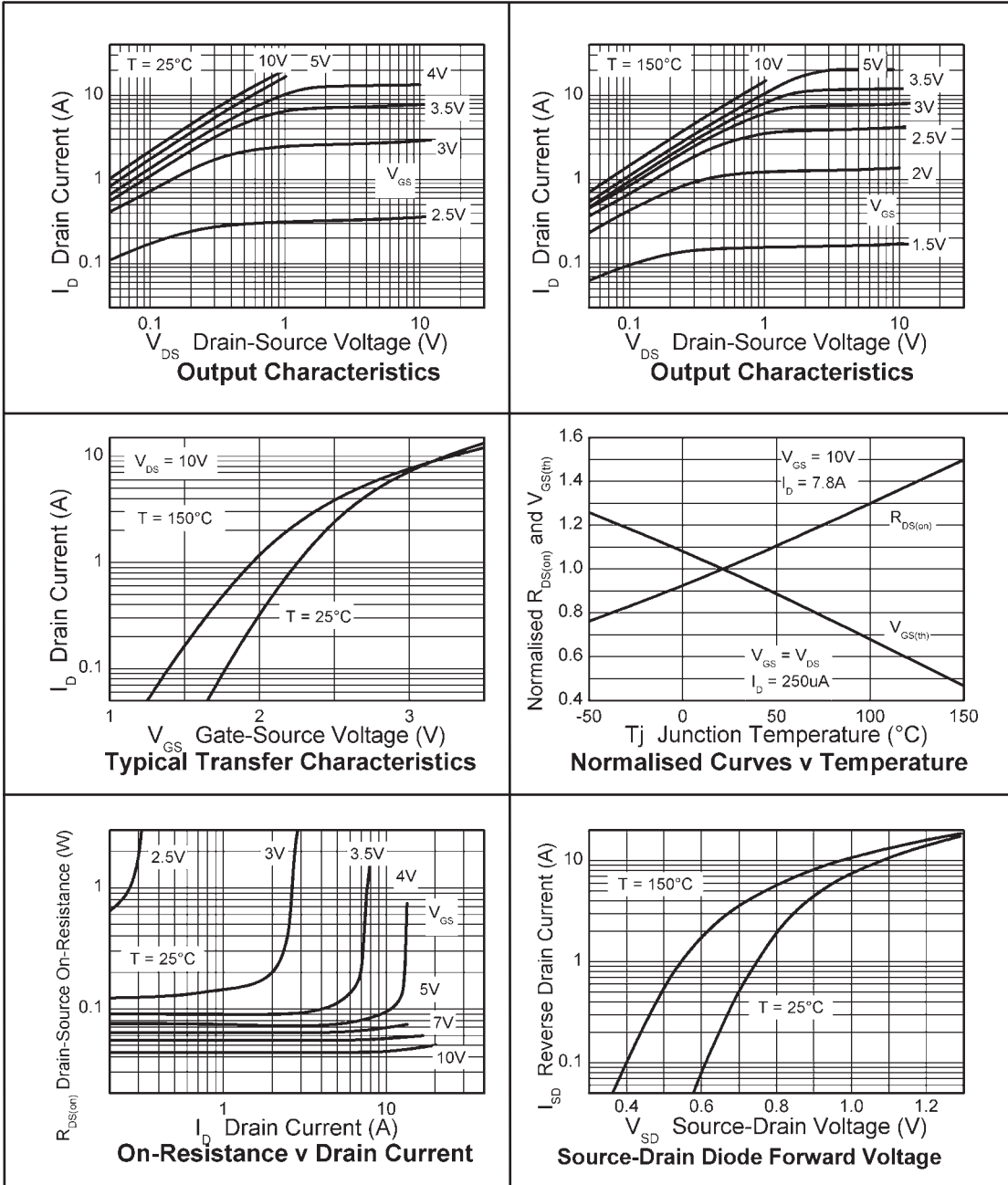
### ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
<b>STATIC</b>						
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	$\mu\text{A}$	$V_{DS} = -30\text{V}$ , $V_{GS} = 0\text{V}$
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 <sup>(1)</sup>	$R_{DS(on)}$			0.070	$\Omega$	$V_{GS} = -10\text{V}$ , $I_D = -3.2\text{A}$
				0.110	$\Omega$	$V_{GS} = -4.5\text{V}$ , $I_D = -2.5\text{A}$
Forward Transconductance <sup>(1) (3)</sup>	$g_{fs}$		6.4		S	$V_{DS} = -15\text{V}$ , $I_D = -3.2\text{A}$
<b>DYNAMIC <sup>(3)</sup></b>						
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	
<b>SWITCHING <sup>(2) (3)</sup></b>						
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	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage <sup>(1)</sup>	$V_{SD}$		-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 <sup>(3)</sup>	$t_{rr}$		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 <sup>(3)</sup>	$Q_{rr}$		16.3		nC	

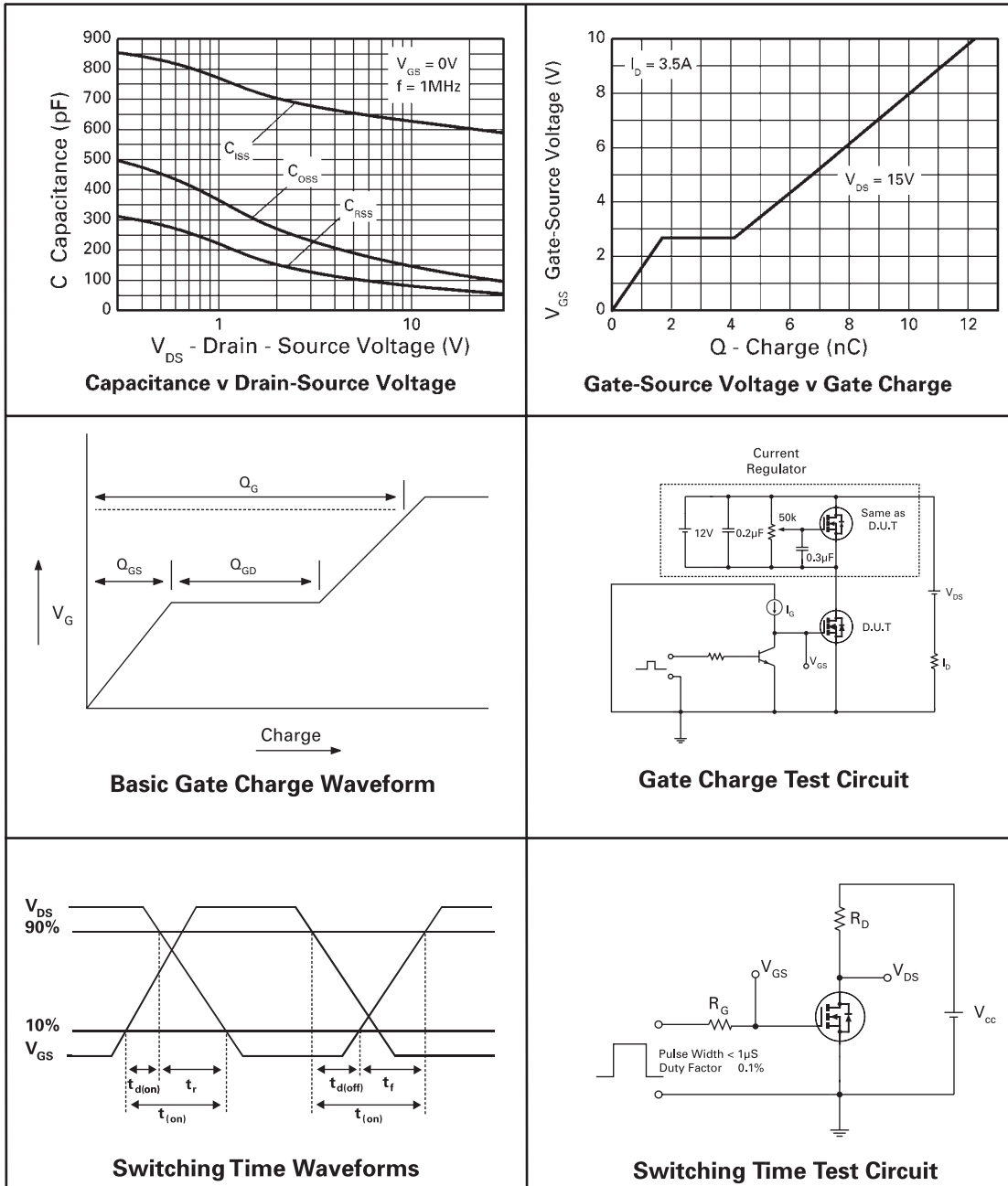
NOTES:

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 (2) Switching characteristics are independent of operating junction temperature.  
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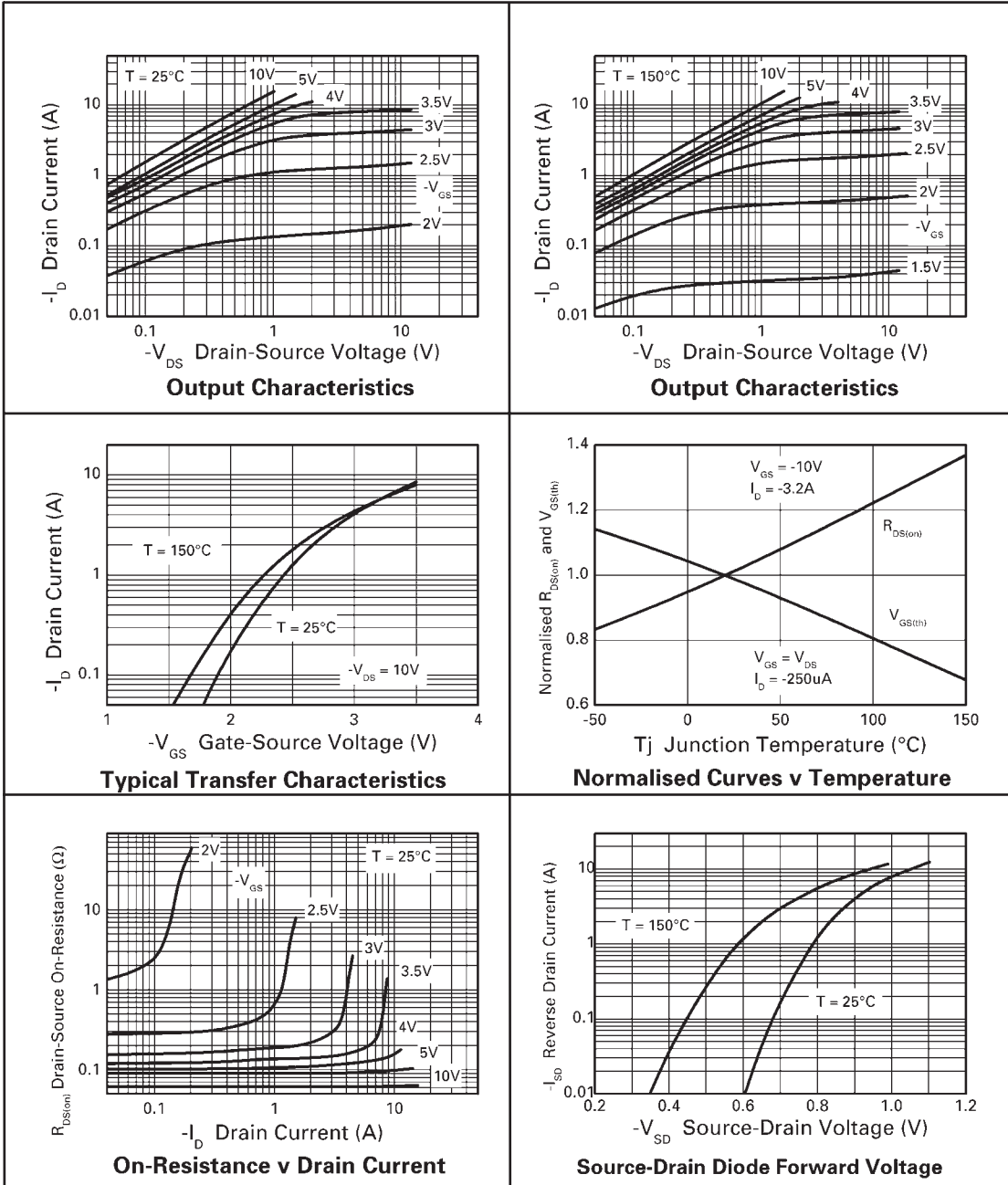
N-CHANNEL TYPICAL CHARACTERISTICS



N-CHANNEL TYPICAL CHARACTERISTICS

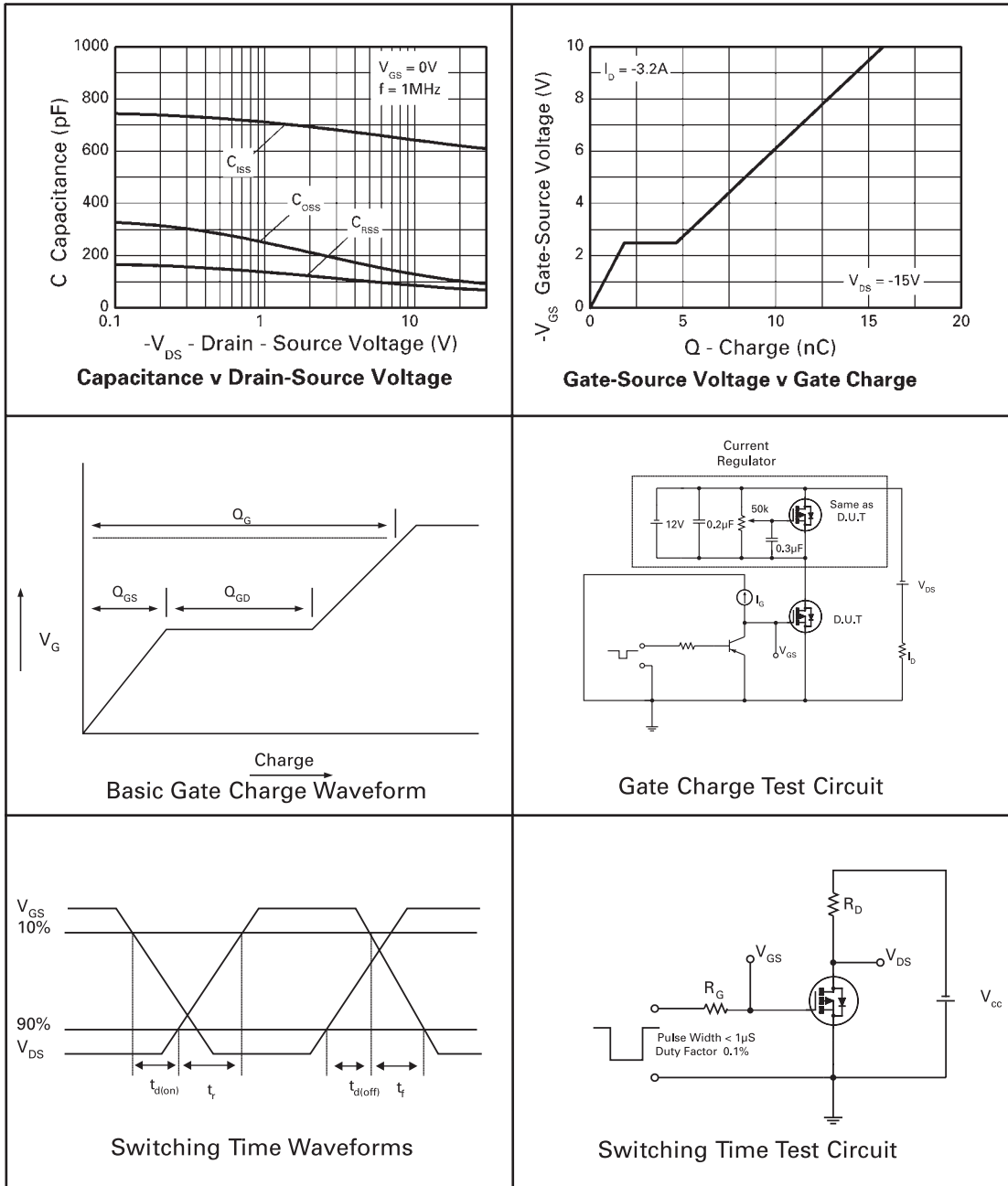


P-CHANNEL TYPICAL CHARACTERISTICS



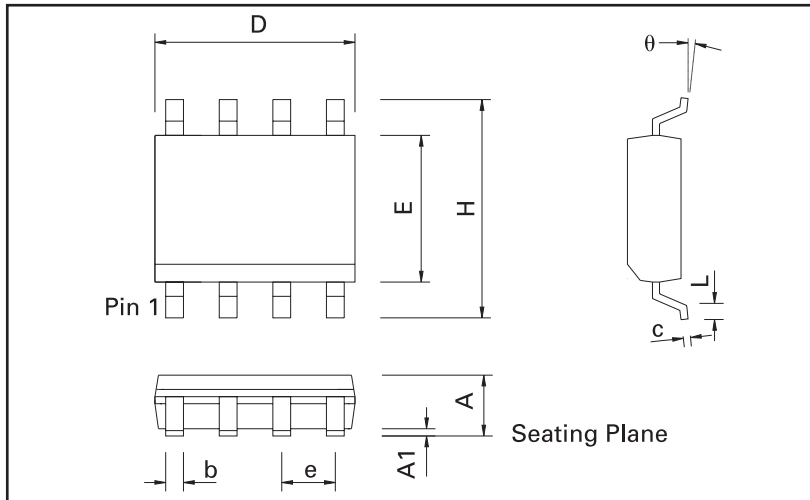


P-CHANNEL TYPICAL CHARACTERISTICS



# 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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