

## ADVANCE INFORMATION

## ZXMC3A17DN8

### COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET

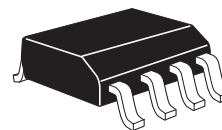
#### SUMMARY

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.



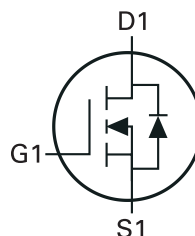
SO8

#### FEATURES

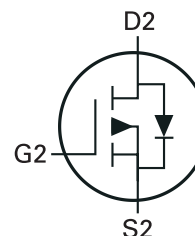
- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

#### APPLICATIONS

- Motor drive
- LCD backlighting



Q1 = N-channel

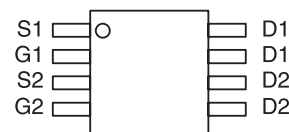


Q2 = P-channel

#### 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.

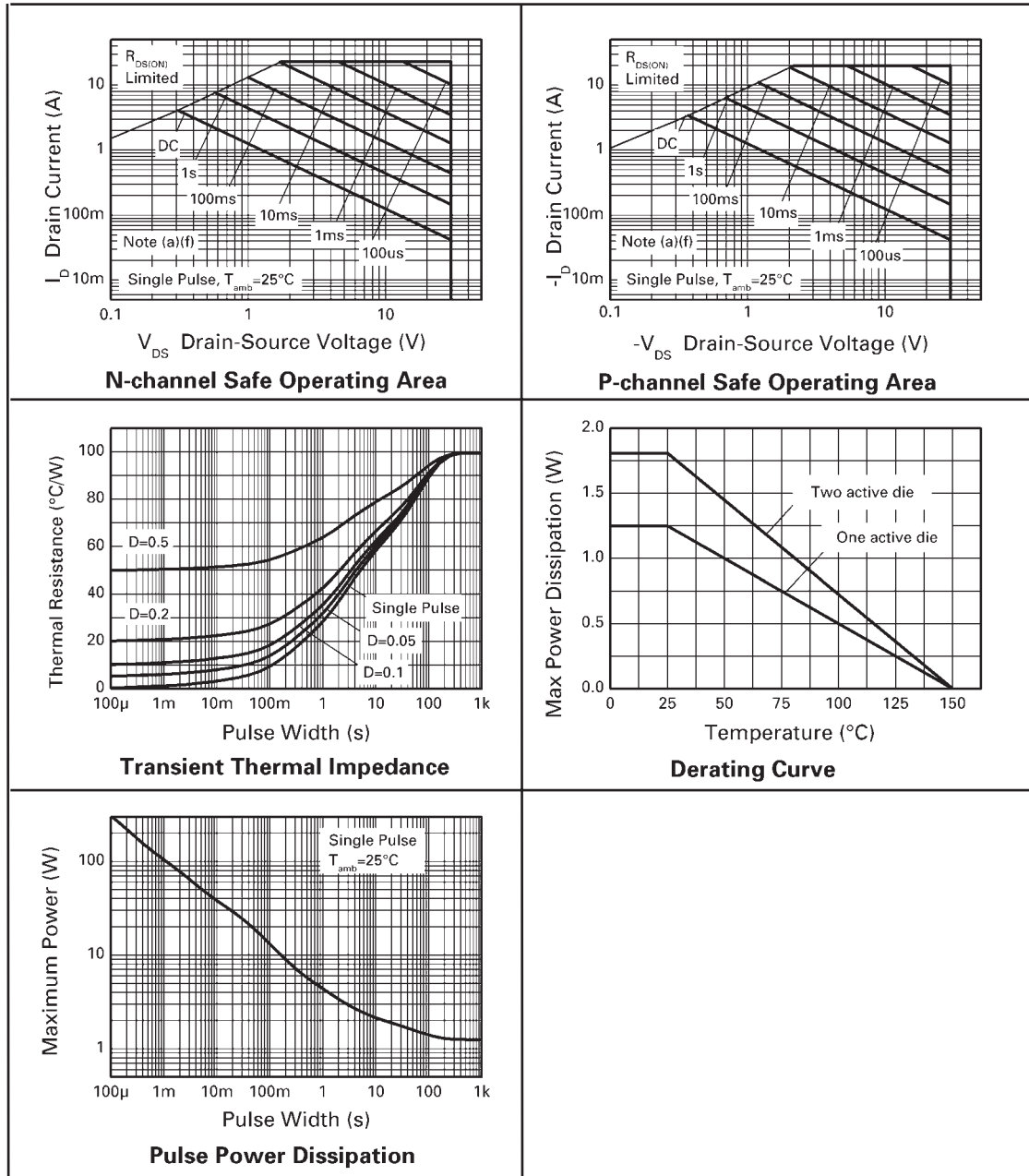
(d) For a dual device with one active die.

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

## ADVANCE INFORMATION

## ZXMC3A17DN8

### 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 <sub>(BR)DSS</sub>	30			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> =0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			0.5	μA	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V
Gate-Body Leakage	I <sub>GSS</sub>			100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	1.0			V	I <sub>D</sub> = 250μA, V <sub>DS</sub> =V <sub>GS</sub>
Static Drain-Source On-State Resistance <sup>(1)</sup>	R <sub>DS(on)</sub>			0.050	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 7.8A
				0.065	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6.8A
Forward Transconductance <sup>(1)</sup> <sup>(3)</sup>	g <sub>fs</sub>		10		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 7.8A
DYNAMIC <sup>(3)</sup>						
Input Capacitance	C <sub>ISS</sub>		600		pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> =0V f=1MHz
Output Capacitance	C <sub>OSS</sub>		104		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		58.5		pF	
SWITCHING <sup>(2)</sup> <sup>(3)</sup>						
Turn-On-Delay Time	t <sub>d(on)</sub>		2.9		ns	V <sub>DD</sub> = 15V, I <sub>D</sub> =3.5A R <sub>G</sub> ≅ 6.0Ω, V <sub>GS</sub> = 10V
Rise Time	t <sub>r</sub>		6.4		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		16		ns	
Fall Time	t <sub>f</sub>		11.2		ns	
Gate Charge	Q <sub>g</sub>		6.9		nC	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 5V I <sub>D</sub> = 3.5A
Total Gate Charge	Q <sub>g</sub>		12.2		nC	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V I <sub>D</sub> = 3.5A
Gate-Source Charge	Q <sub>gs</sub>		1.7		nC	
Gate-Drain Charge	Q <sub>gd</sub>		2.4		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage <sup>(1)</sup>	V <sub>SD</sub>		0.85	0.95	V	T <sub>J</sub> =25°C, I <sub>S</sub> = 3.2A, V <sub>GS</sub> =0V
Reverse Recovery Time <sup>(3)</sup>	t <sub>rr</sub>		18.8		ns	T <sub>J</sub> =25°C, I <sub>F</sub> = 3.5A, di/dt=100A/μs
Reverse Recovery Charge <sup>(3)</sup>	Q <sub>rr</sub>		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 <sub>(BR)DSS</sub>	-30			V	I <sub>D</sub> = -250μA, V <sub>GS</sub> =0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			-1.0	μA	V <sub>DS</sub> = -30V, V <sub>GS</sub> =0V
Gate-Body Leakage	I <sub>GSS</sub>			100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	-1.0			V	I <sub>D</sub> = -250μA, V <sub>DS</sub> =V <sub>GS</sub>
Static Drain-Source On-State Resistance <sup>(1)</sup>	R <sub>DS(on)</sub>			0.070 0.110	Ω Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -3.2A V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.5A
Forward Transconductance <sup>(1) (3)</sup>	g <sub>fs</sub>		6.4		S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -3.2A
DYNAMIC <sup>(3)</sup>						
Input Capacitance	C <sub>iss</sub>		630		pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> =0V f=1MHz
Output Capacitance	C <sub>oss</sub>		113		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		78		pF	
SWITCHING <sup>(2) (3)</sup>						
Turn-On-Delay Time	t <sub>d(on)</sub>		1.7		ns	V <sub>DD</sub> = -15V, I <sub>D</sub> = -1A R <sub>G</sub> ≡ 6.0Ω, V <sub>GS</sub> = -10V
Rise Time	t <sub>r</sub>		2.9		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		29.2		ns	
Fall Time	t <sub>f</sub>		8.7		ns	
Gate Charge	Q <sub>g</sub>		8.3		nC	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -5V I <sub>D</sub> = -3.2A
Total Gate Charge	Q <sub>g</sub>		15.8		nC	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V I <sub>D</sub> = -3.2A
Gate-Source Charge	Q <sub>gs</sub>		1.8		nC	
Gate Drain Charge	Q <sub>gd</sub>		2.8		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage <sup>(1)</sup>	V <sub>SD</sub>		-0.85	-0.95	V	T <sub>J</sub> =25°C, I <sub>S</sub> = -2.5A, V <sub>GS</sub> =0V
Reverse Recovery Time <sup>(3)</sup>	t <sub>rr</sub>		19.5		ns	T <sub>J</sub> =25°C, I <sub>S</sub> = -1.7A, di/dt=100A/μs
Reverse Recovery Charge <sup>(3)</sup>	Q <sub>rr</sub>		16.3		nC	

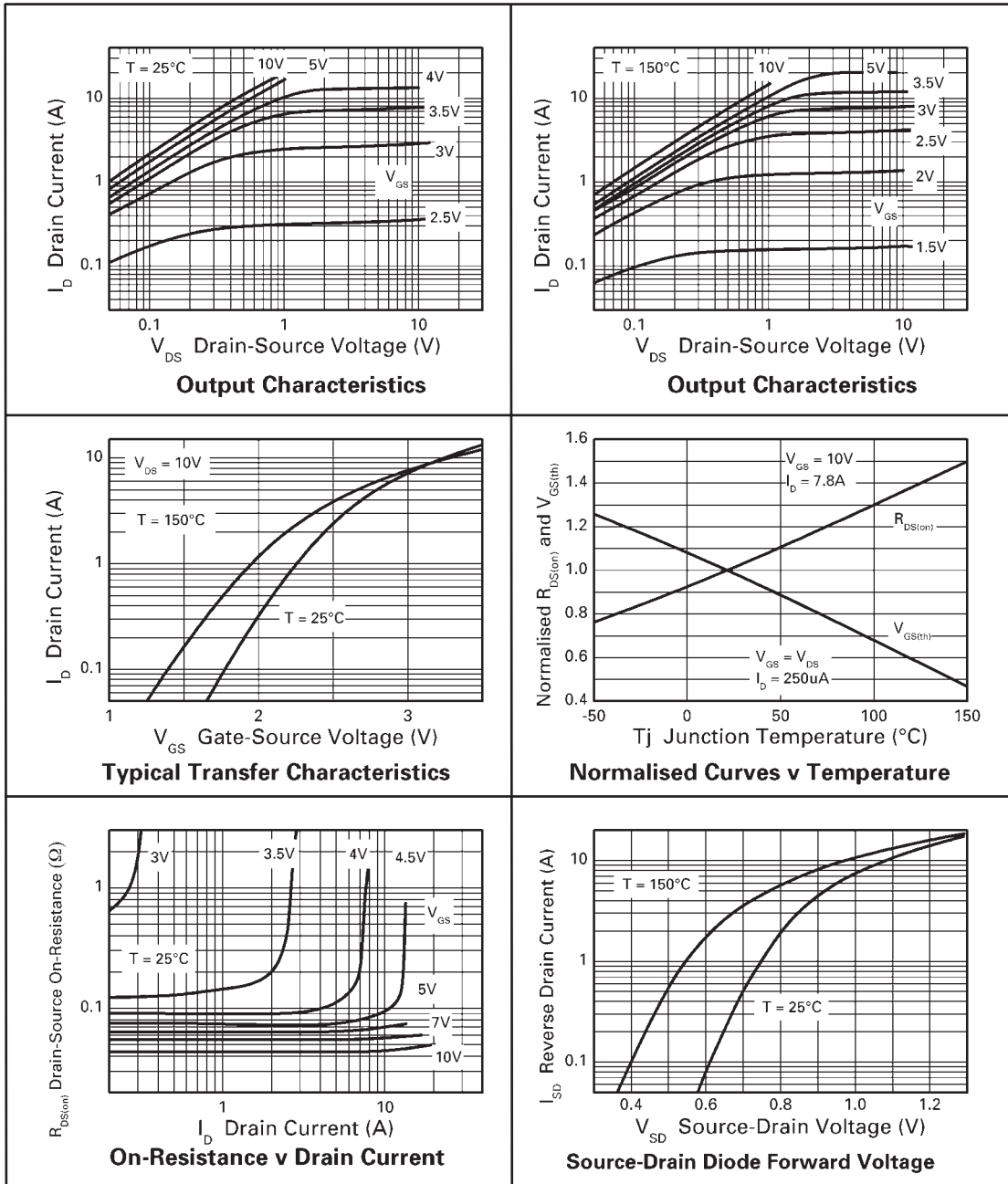
#### NOTES:

- (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.

# ZXMC3A17DN8

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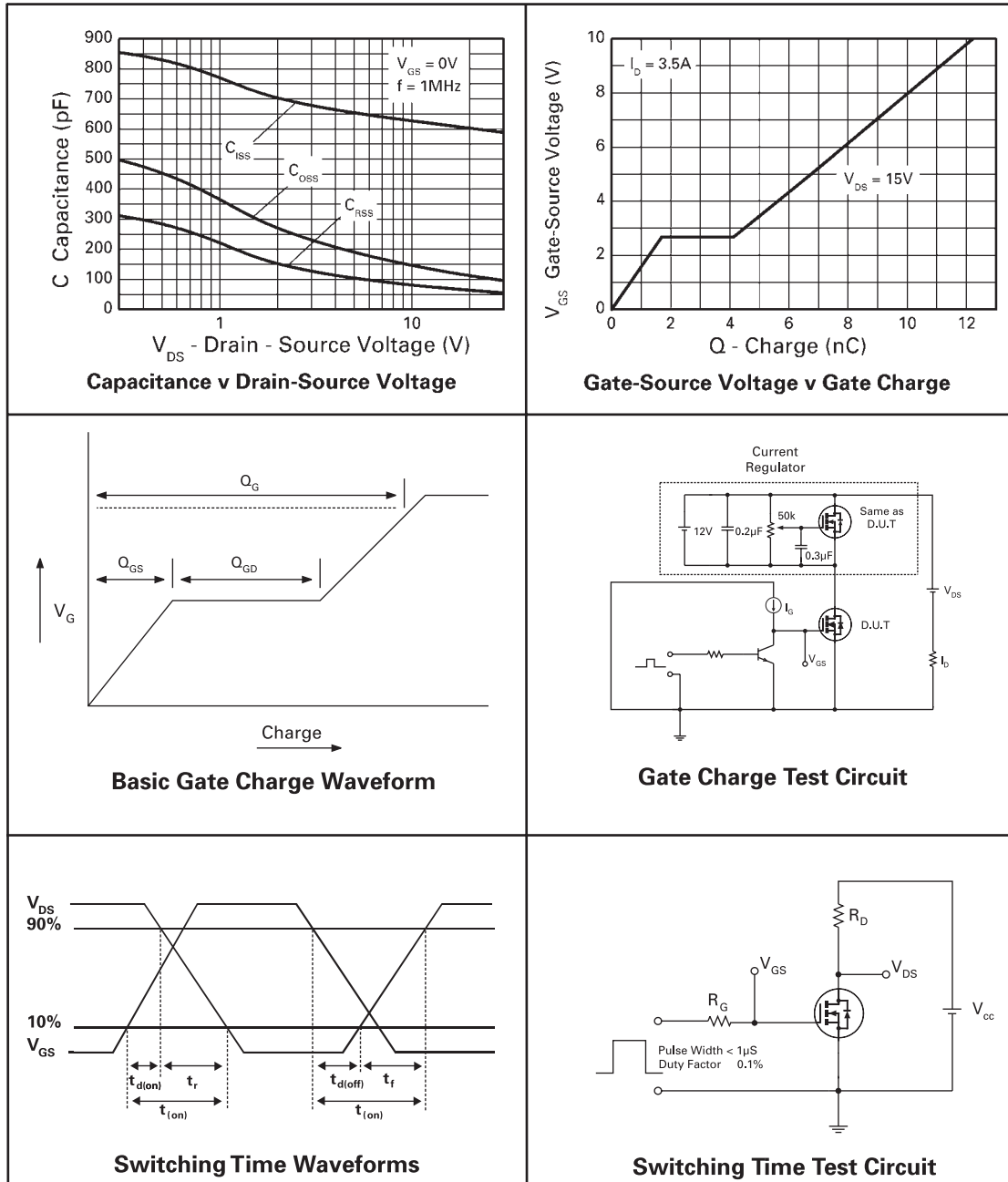
### N-CHANNEL TYPICAL CHARACTERISTICS



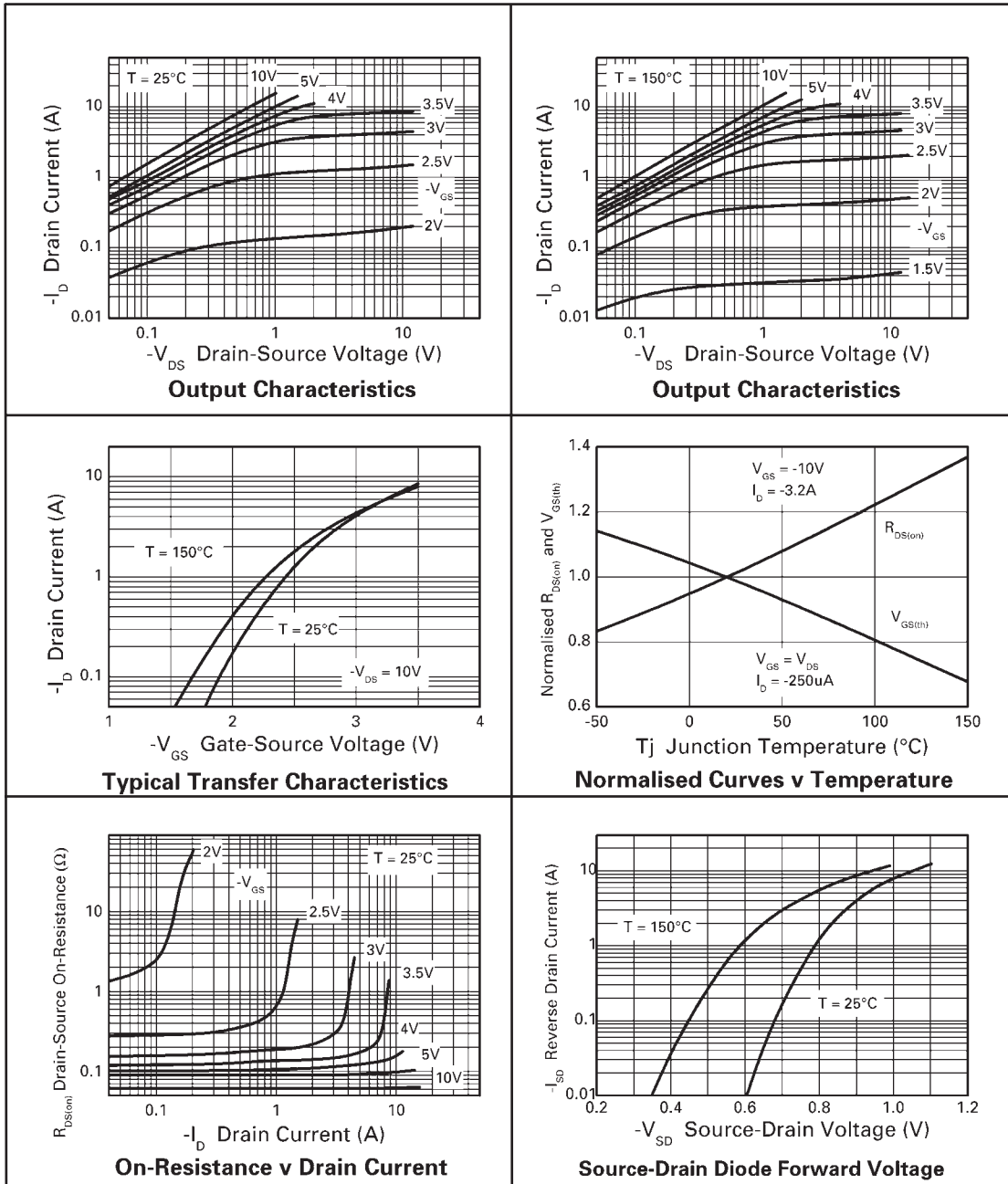
## ADVANCE INFORMATION

## ZXMC3A17DN8

### N-CHANNEL TYPICAL CHARACTERISTICS

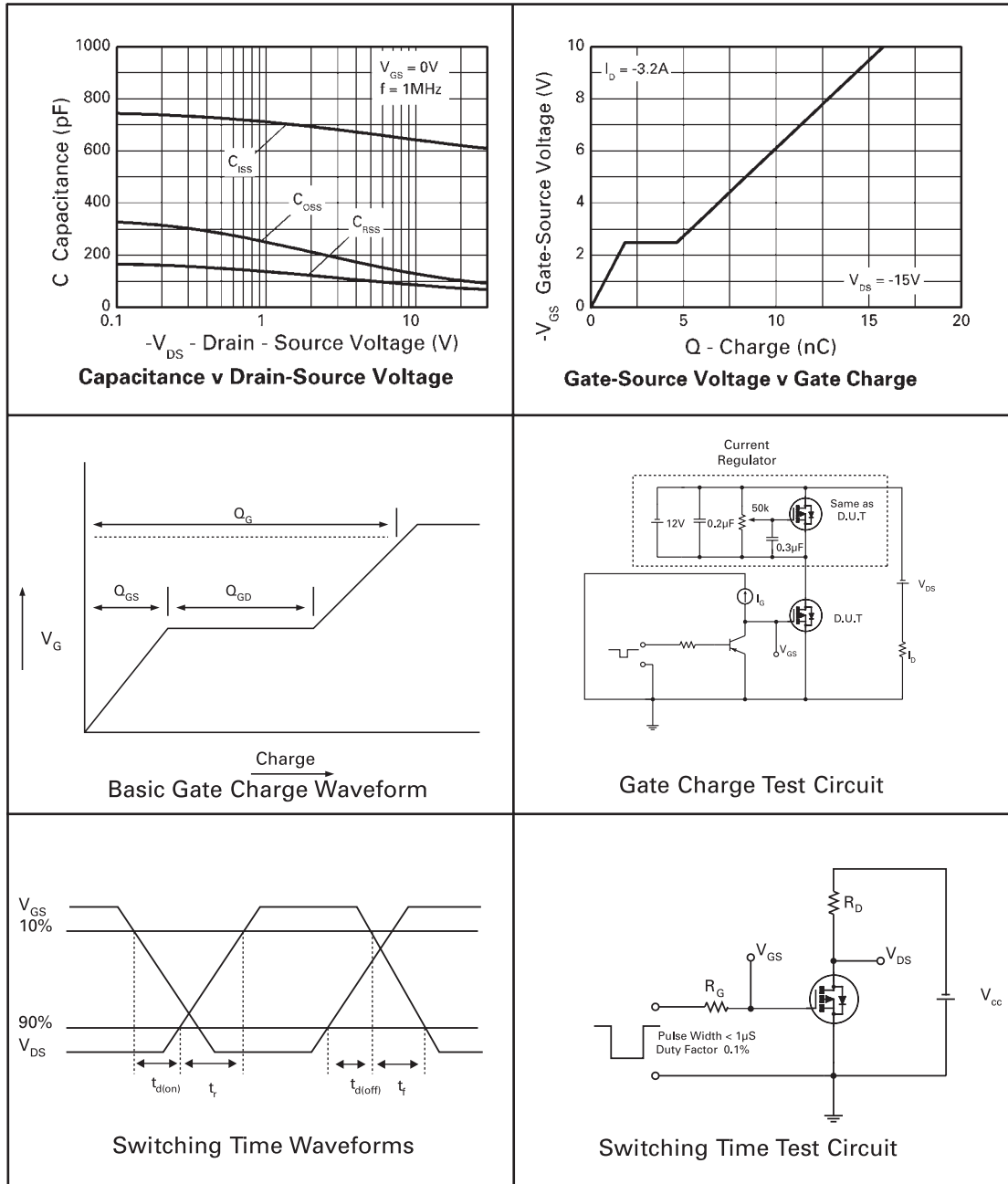


### P-CHANNEL TYPICAL CHARACTERISTICS





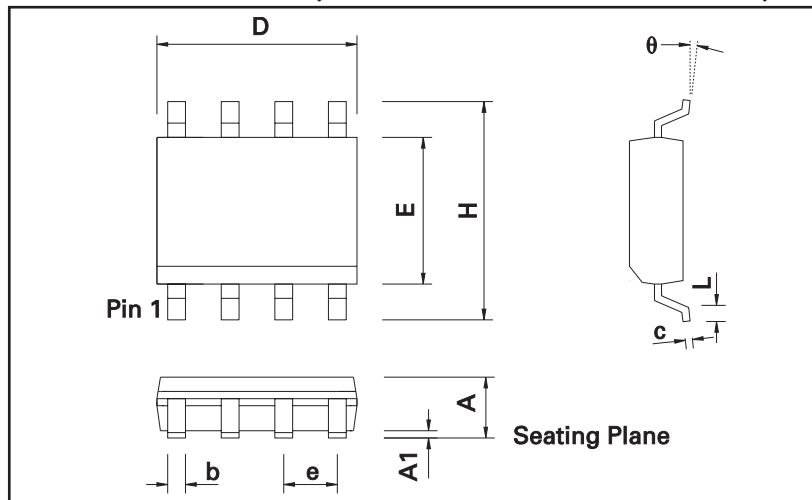
P-CHANNEL TYPICAL CHARACTERISTICS



# ZXMC3A17DN8

## ADVANCE INFORMATION

### 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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