

# ZXMN2A04DN8

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## DUAL 20V N-CANNEL ENHANCEMENT MODE MOSFET

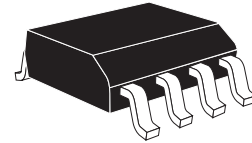
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### SUMMARY

$V_{(BR)DSS} = 20V$ ;  $R_{DS(ON)} = 0.025\Omega$ ;  $I_D = 7.7A$

### 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.



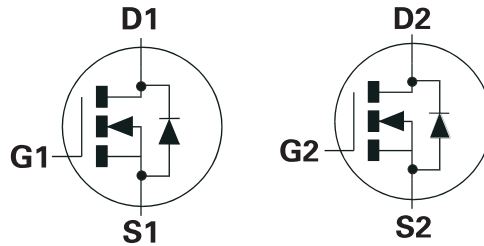
SO8

### FEATURES

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

### APPLICATIONS

- DC - DC converters
- Power management functions
- Disconnect switches
- Motor control



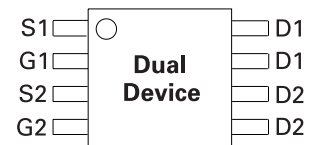
### ORDERING INFORMATION

DEVICE	REEL	TAPE WIDTH	QUANTITY PER REEL
ZXMN2A04DN8TA	7"	12mm	500 units
ZXMN2A04DN8TC	13"	12mm	2500 units

### DEVICE MARKING

ZXMN  
2A04D

### PINOUT



Top view

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## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DSS}$	20	V
Gate Source Voltage	$V_{GS}$	$\pm 12$	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>	$I_D$	7.7	A
		6.2	A
		5.9	A
Pulsed Drain Current <sup>(c)</sup>	$I_{DM}$	38	A
Continuous Source Current (Body Diode) <sup>(b)</sup>	$I_S$	2.9	A
Pulsed Source Current (Body Diode) <sup>(c)</sup>	$I_{SM}$	38	A
Power Dissipation at $T_A=25^\circ C$ <sup>(a) (d)</sup>	$P_D$	1.25	W
Linear Derating Factor		10	mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ <sup>(a) (e)</sup>	$P_D$	1.8	W
Linear Derating Factor		14	mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ <sup>(b) (d)</sup>	$P_D$	2.1	W
Linear Derating Factor		17	mW/ $^\circ C$
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +150	$^\circ C$

## THERMAL RESISTANCE

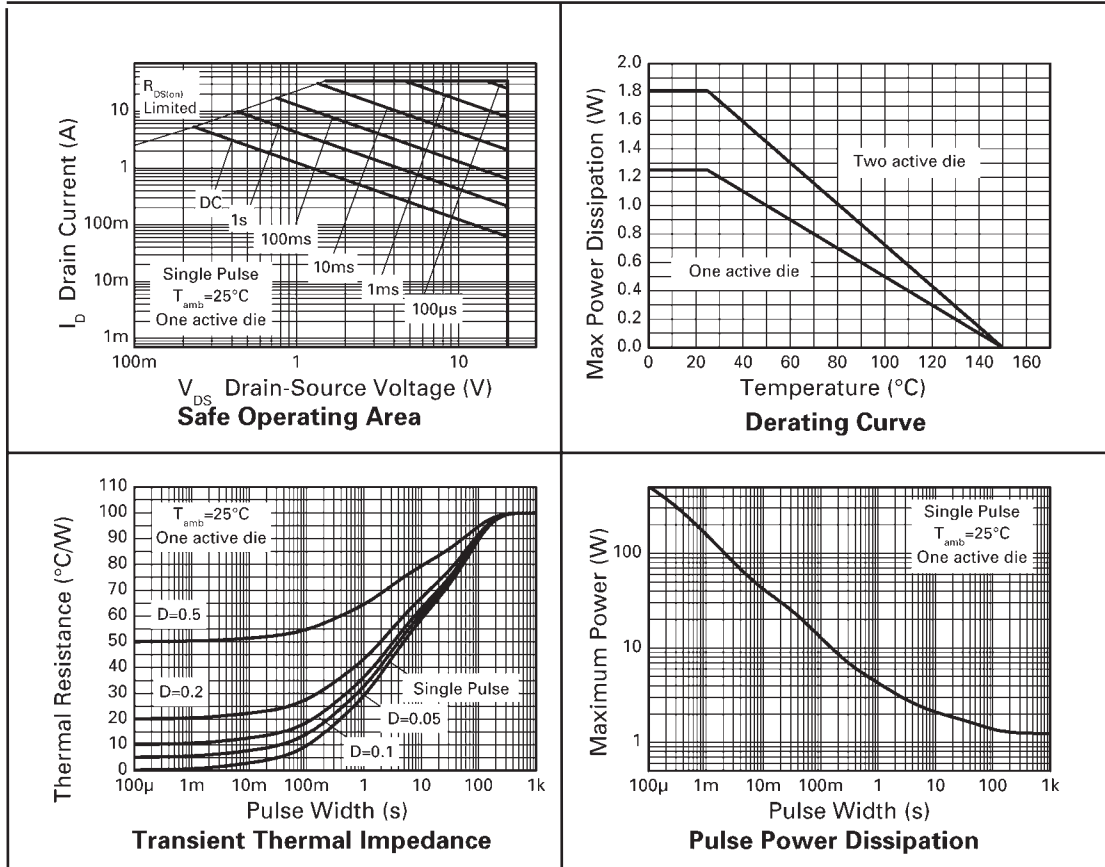
PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient <sup>(a) (d)</sup>	$R_{\theta JA}$	100	$^\circ C/W$
Junction to Ambient <sup>(b) (e)</sup>	$R_{\theta JA}$	70	$^\circ C/W$
Junction to Ambient <sup>(b) (d)</sup>	$R_{\theta JA}$	60	$^\circ C/W$

### NOTES:

- (a) For a dual device surface mounted on 25mm x 25mm FR4 PCB with 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. Refer to Transient Thermal Impedance Graph.
- (d) For a dual device with one active die.
- (e) For dual device with 2 active die running at equal power.

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## CHARACTERISTICS



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

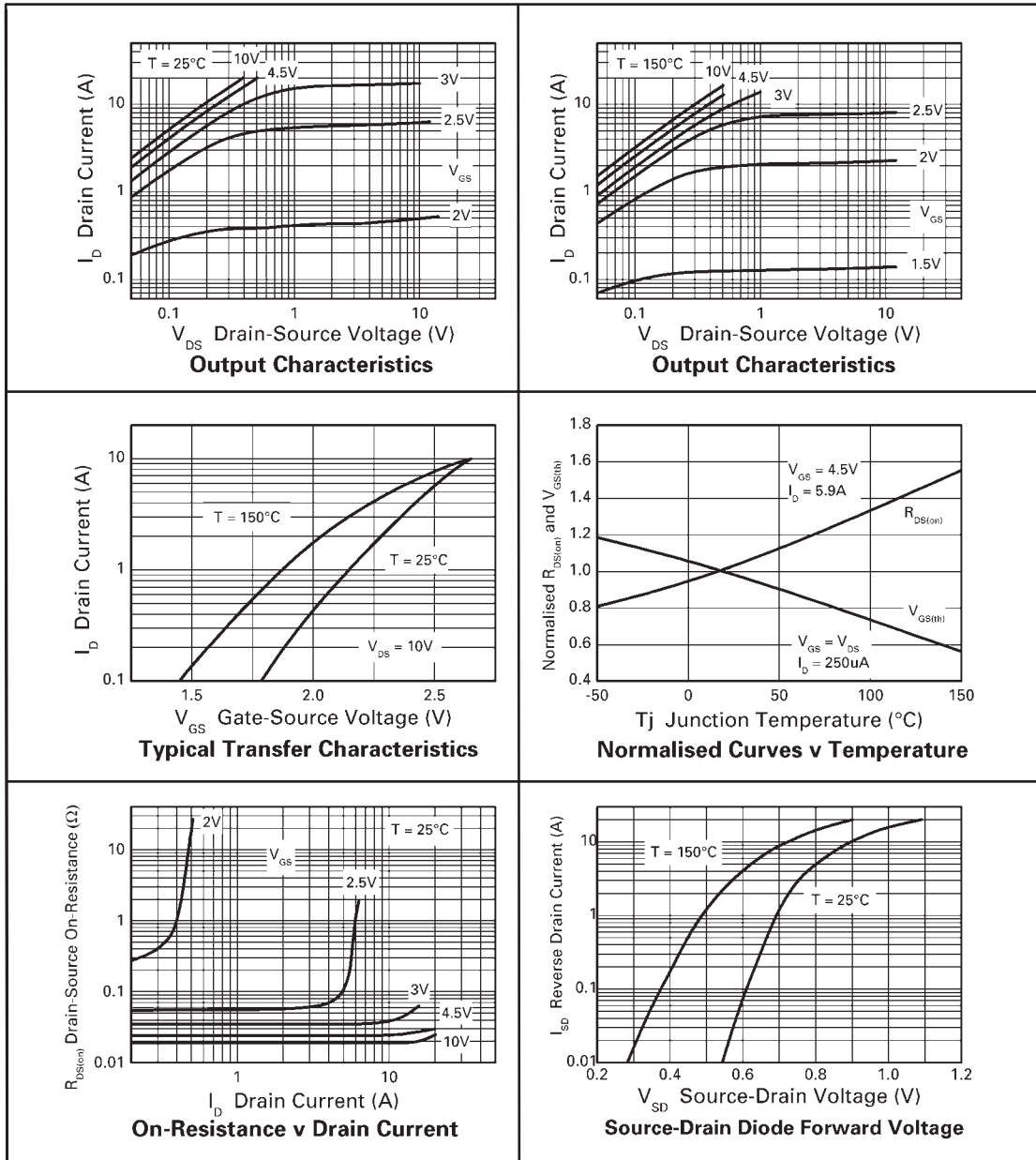
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	20			V	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			0.5	$\mu\text{A}$	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS}=\pm 12\text{V}, V_{DS}=0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.7			V	$I_D=250\mu\text{A}, V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance <sup>(1)</sup>	$R_{DS(on)}$			0.025	$\Omega$	$V_{GS}=4.5\text{V}, I_D=5.9\text{A}$
				0.035	$\Omega$	$V_{GS}=2.5\text{V}, I_D=5\text{A}$
Forward Transconductance <sup>(3)</sup>	$g_{fs}$		40		S	$V_{DS}=10\text{V}, I_D=5.9\text{A}$
<b>DYNAMIC</b> <sup>(3)</sup>						
Input Capacitance	$C_{ISS}$		1880		pF	$V_{DS}=10\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$
Output Capacitance	$C_{OSS}$		506		pF	
Reverse Transfer Capacitance	$C_{RSS}$		386		pF	
<b>SWITCHING</b> <sup>(2) (3)</sup>						
Turn-On Delay Time	$t_{d(on)}$		7.9		ns	$V_{DD}=10\text{V}, I_D=1\text{A}$ $R_G=6\Omega, V_{GS}=5\text{V}$
Rise Time	$t_r$		14.8		ns	
Turn-Off Delay Time	$t_{d(off)}$		50.5		ns	
Fall Time	$t_f$		30.6		ns	
Gate Charge	$Q_g$		22.1		nC	$V_{DS}=15\text{V}, V_{GS}=5\text{V},$ $I_D=3.5\text{A}$
Total Gate Charge	$Q_g$		40.5		nC	$V_{DS}=10\text{V}, V_{GS}=4.5\text{V},$ $I_D=5.9\text{A}$
Gate-Source Charge	$Q_{gs}$		5.6		nC	
Gate-Drain Charge	$Q_{gd}$		8.0		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage <sup>(1)</sup>	$V_{SD}$		0.85	0.95	V	$T_J=25^\circ\text{C}, I_S=5.1\text{A},$ $V_{GS}=0\text{V}$
Reverse Recovery Time <sup>(3)</sup>	$t_{rr}$		18.0		ns	$T_J=25^\circ\text{C}, I_F=1.9\text{A},$
Reverse Recovery Charge <sup>(3)</sup>	$Q_{rr}$		8.9		nC	$di/dt= 100\text{A}/\mu\text{s}$

### NOTES:

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

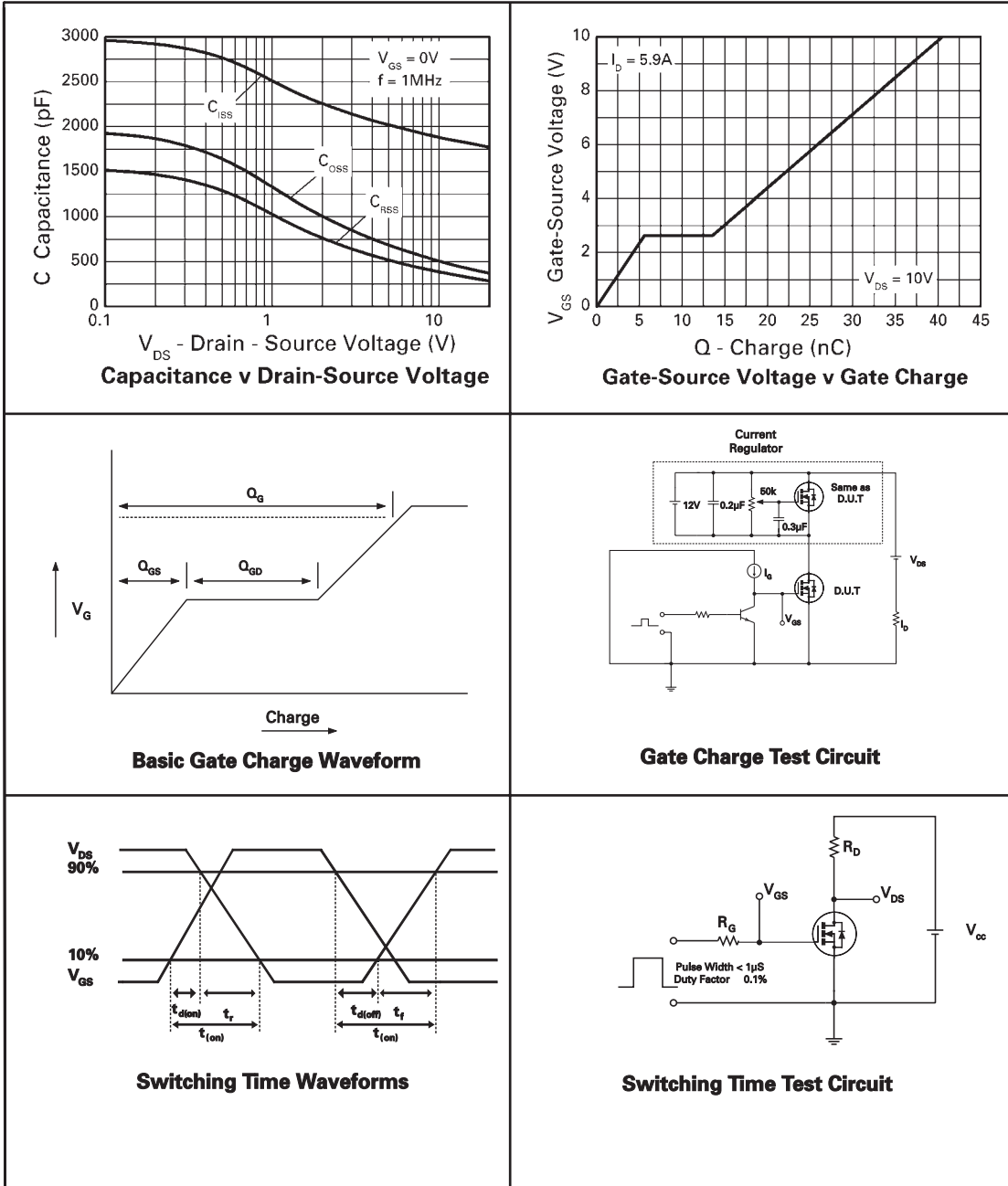
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## TYPICAL CHARACTERISTICS



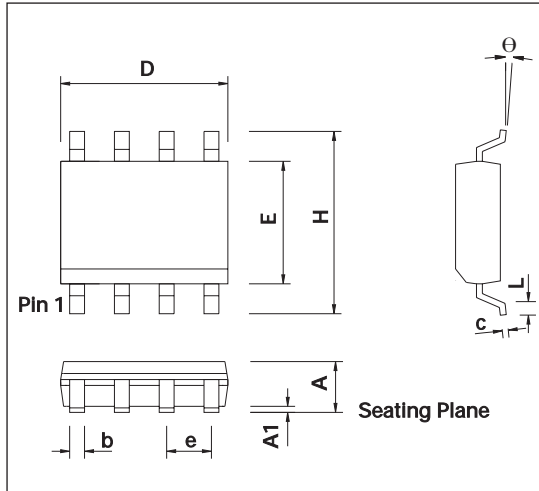
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## TYPICAL CHARACTERISTICS



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## PACKAGE OUTLINE



CONTROLLING DIMENSIONS ARE IN INCHES  
APPROX IN MILLIMETRES

## PACKAGE DIMENSIONS

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.053	0.069	1.35	1.75
A1	0.004	0.010	0.10	0.25
D	0.189	0.197	4.80	5.00
H	0.228	0.244	5.80	6.20
E	0.150	0.157	3.80	4.00
L	0.016	0.050	0.40	1.27
e	0.050 BSC		1.27 BSC	
b	0.013	0.020	0.33	0.51
c	0.008	0.010	0.19	0.25
theta	0°	8°	0°	8°
h	0.010	0.020	0.25	0.50

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