



## ZXM61N02F

### 20V N-CHANNEL ENHANCEMENT MODE MOSFET

#### SUMMARY

$V_{(BR)DSS}=20V$ ;  $R_{DS(ON)}=0.18\Omega$ ;  $I_D=1.7A$

#### DESCRIPTION

This new generation of high density 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
- SOT23 package

#### APPLICATIONS

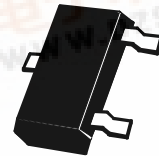
- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control

#### ORDERING INFORMATION

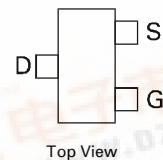
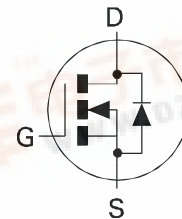
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXM61N02FTA	7	8mm embossed	3000 units
ZXM61N02FTC	13	8mm embossed	10000 units

#### DEVICE MARKING

- N02



SOT23



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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 ( $V_{GS}=4.5V$ ; $T_A=25^\circ C$ )(b) ( $V_{GS}=4.5V$ ; $T_A=70^\circ C$ )(b)	$I_D$	1.7 1.3	A
Pulsed Drain Current (c)	$I_{DM}$	7.4	A
Continuous Source Current (Body Diode) (b)	$I_S$	0.8	A
Pulsed Source Current (Body Diode)	$I_{SM}$	7.4	A
Power Dissipation at $T_A=25^\circ C$ (a) Linear Derating Factor	$P_D$	625 5	mW mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (b) Linear Derating Factor	$P_D$	806 6.4	mW 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)	$R_{\theta JA}$	200	$^\circ C/W$
Junction to Ambient (b)	$R_{\theta JA}$	155	$^\circ C/W$

### NOTES

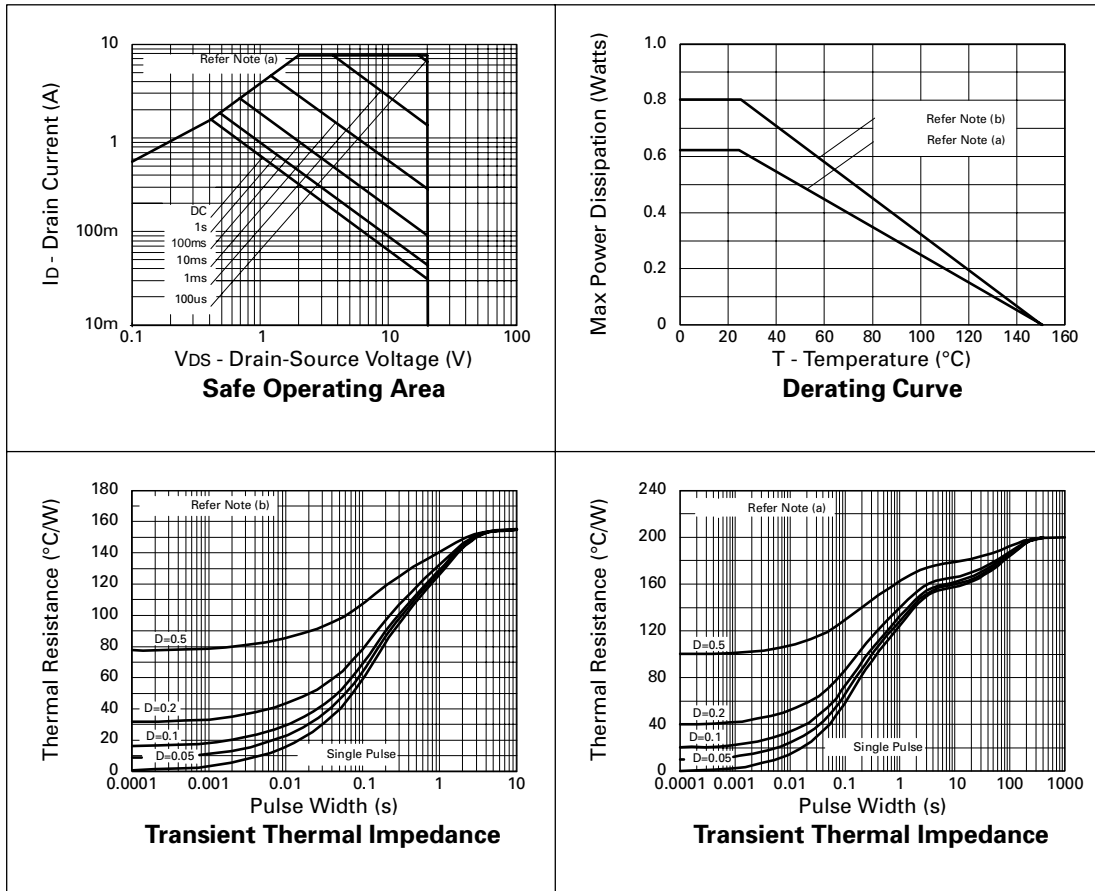
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(b) For a device surface mounted on FR4 PCB measured at  $t \leq 5$  secs.

(c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

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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.(3)	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	$I_{DSS}$			1	$\mu\text{A}$	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$
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 (1)	$R_{DS(on)}$			0.18 0.24	$\Omega$ $\Omega$	$V_{GS}=4.5\text{V}, I_D=0.93\text{A}$ $V_{GS}=2.7\text{V}, I_D=0.47\text{A}$
Forward Transconductance (3)	$g_{fs}$	1.3			S	$V_{DS}=10\text{V}, I_D=0.47\text{A}$
<b>DYNAMIC (3)</b>						
Input Capacitance	$C_{iss}$		160		pF	$V_{DS}=15\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$
Output Capacitance	$C_{oss}$		50		pF	
Reverse Transfer Capacitance	$C_{rss}$		30		pF	
<b>SWITCHING(2) (3)</b>						
Turn-On Delay Time	$t_{d(on)}$		2.4		ns	$V_{DD}=10\text{V}, I_D=0.93\text{A}$ $R_G=6.2\Omega, R_D=11\Omega$ (refer to test circuit)
Rise Time	$t_r$		4.2		ns	
Turn-Off Delay Time	$t_{d(off)}$		7.8		ns	
Fall Time	$t_f$		4.2		ns	
Total Gate Charge	$Q_g$			3.4	nC	$V_{DS}=16\text{V}, V_{GS}=4.5\text{V},$ $I_D=0.93\text{A}$ (refer to test circuit)
Gate-Source Charge	$Q_{gs}$			0.41	nC	
Gate-Drain Charge	$Q_{gd}$			0.8	nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (1)	$V_{SD}$			0.95	V	$T_J=25^\circ\text{C}, I_S=0.93\text{A},$ $V_{GS}=0\text{V}$
Reverse Recovery Time (3)	$t_{rr}$		12.9		ns	$T_J=25^\circ\text{C}, I_F=0.93\text{A},$ $di/dt=100\text{A}/\mu\text{s}$
Reverse Recovery Charge (3)	$Q_{rr}$		5.2		nC	

### NOTES

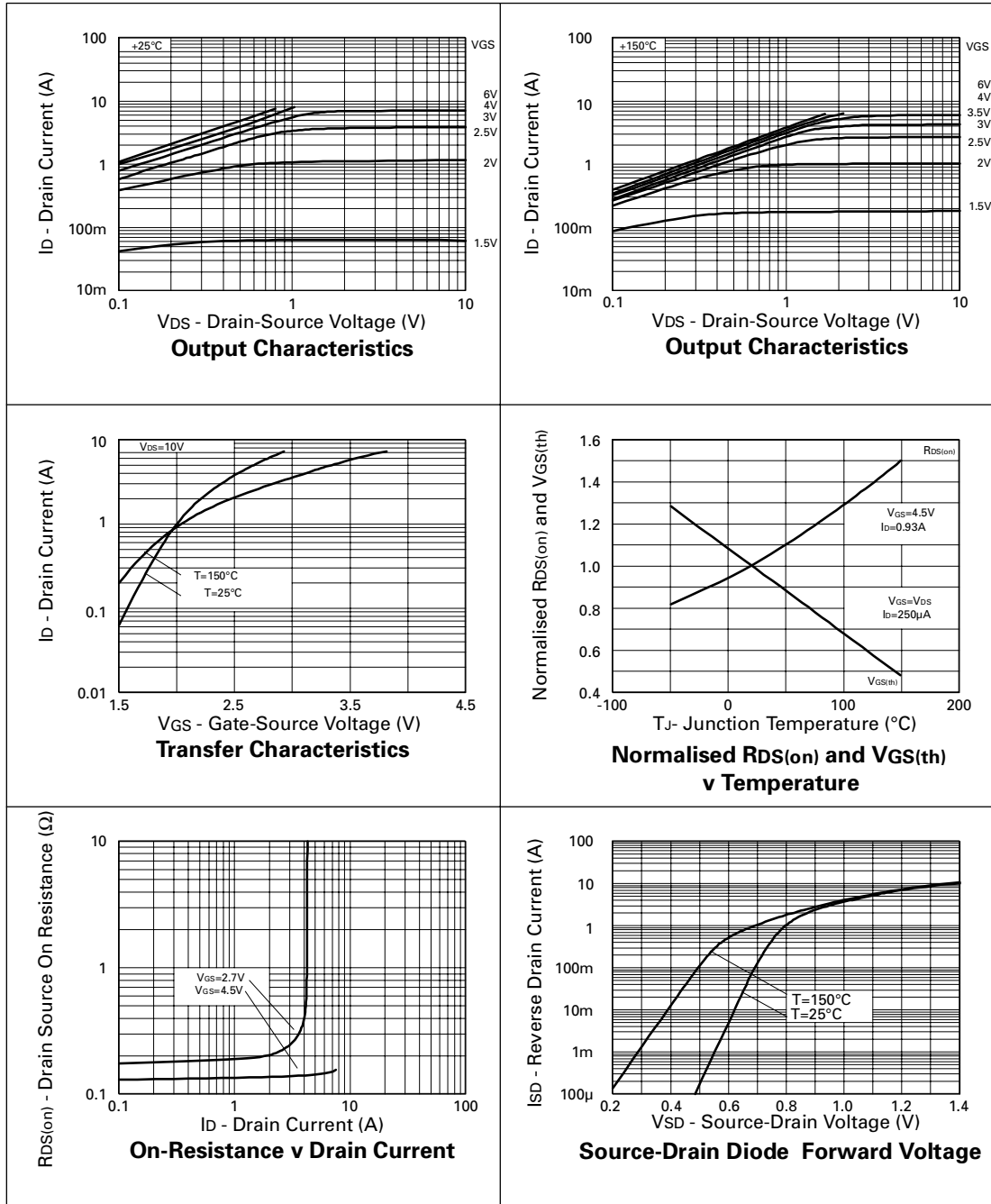
(1) Measured under pulsed conditions. Width $\leq$ 300 $\mu\text{s}$ . Duty cycle  $\leq$ 2% .

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

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

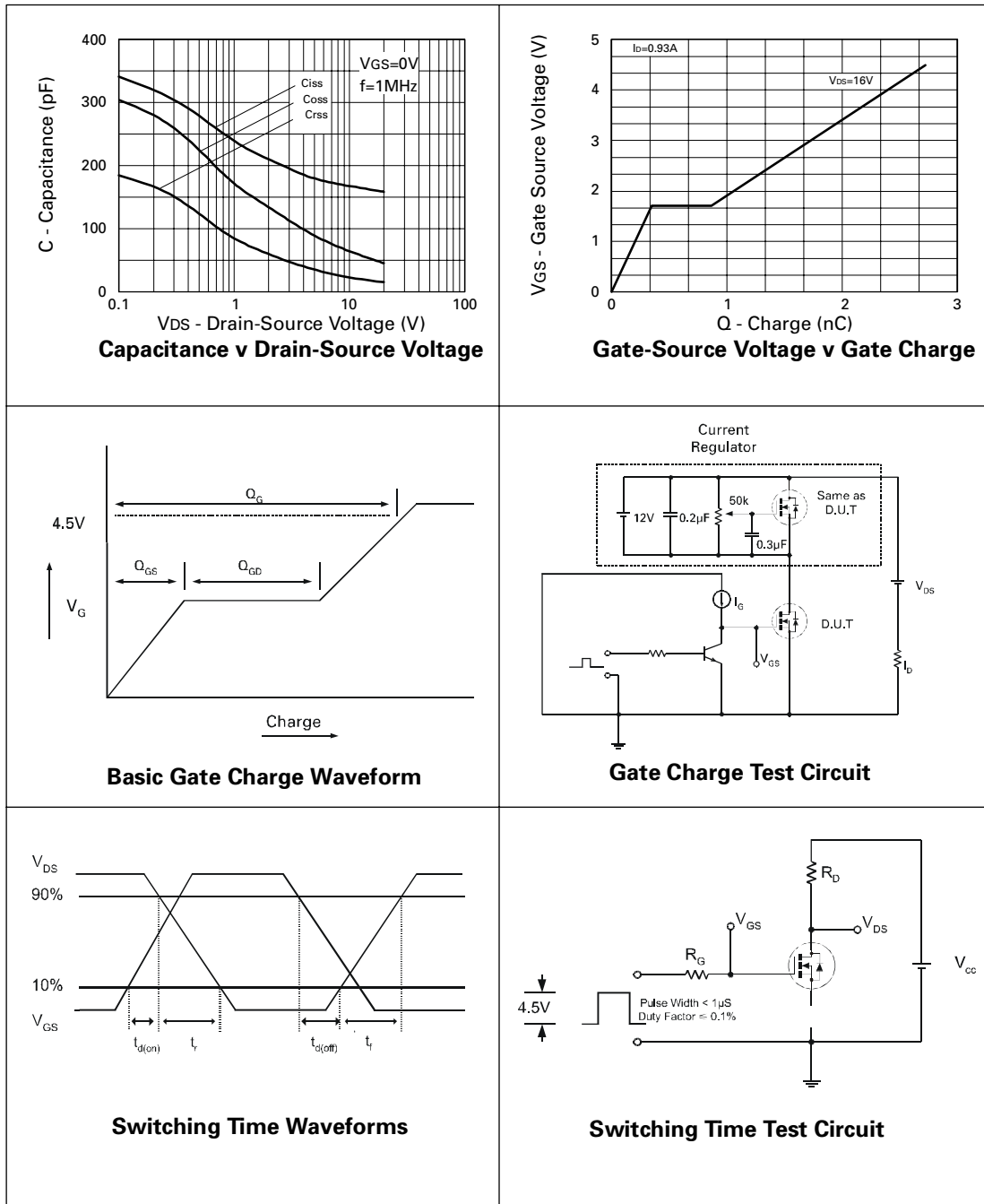
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## TYPICAL CHARACTERISTICS



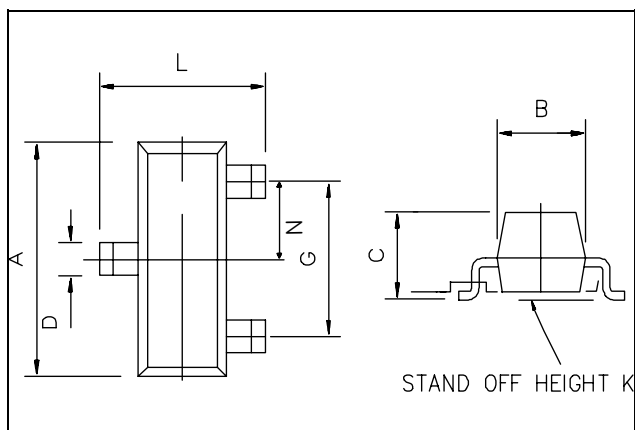
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## TYPICAL CHARACTERISTICS



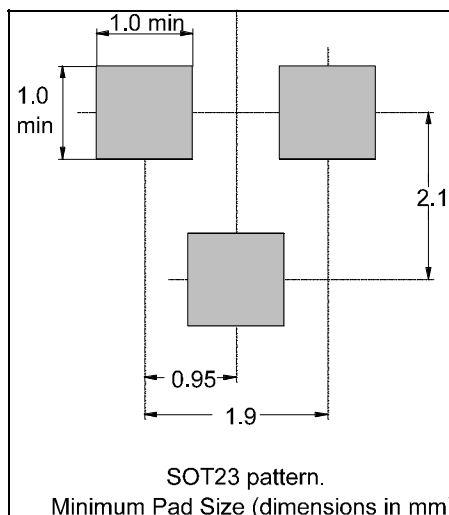
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## PACKAGE DIMENSIONS



DIM	Millimetres		Inches	
	Min	Max	Min	Max
A	2.67	3.05	0.105	0.120
B	1.20	1.40	0.047	0.055
C	-	1.10	-	0.043
D	0.37	0.53	0.0145	0.021
F	0.085	0.15	0.0033	0.0059
G	NOM 1.9		NOM 0.075	
K	0.01	0.10	0.0004	0.004
L	2.10	2.50	0.0825	0.0985
N	NOM 0.95		NOM 0.037	

## PAD LAYOUT DETAILS



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