

**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 utilises 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**

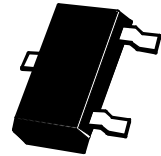
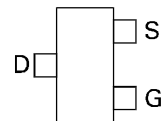
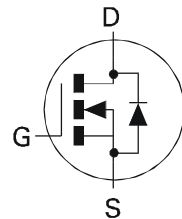
- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control

**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**

Top View

# ZXM61N02F

## 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)<br>( $V_{GS}=4.5V$ ; $T_A=70^\circ C$ )(b) | $I_D$             | 1.7<br>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)<br>Linear Derating Factor   | $P_D$             | 625<br>5    | mW<br>mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ (b)<br>Linear Derating Factor   | $P_D$             | 806<br>6.4  | mW<br>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   | $^\circ C/W$ |

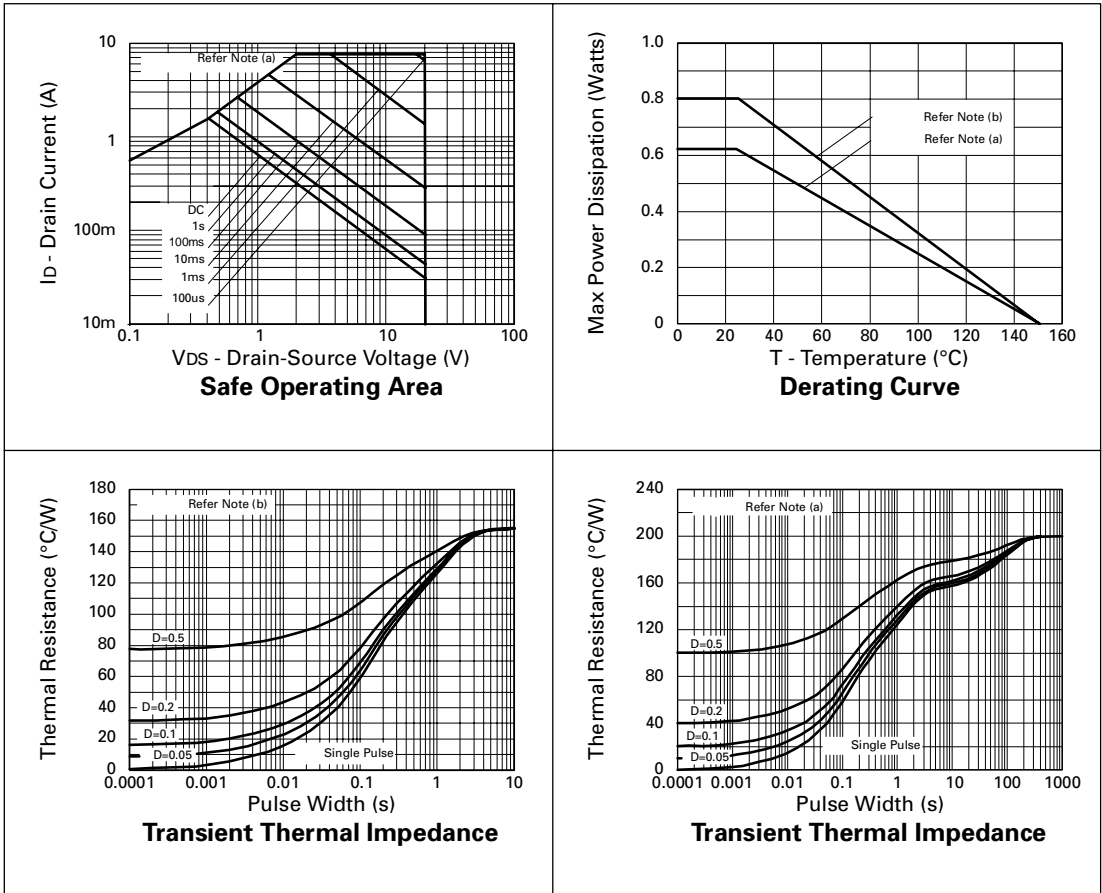
### NOTES

(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.

## CHARACTERISTICS



# ZXM61N02F

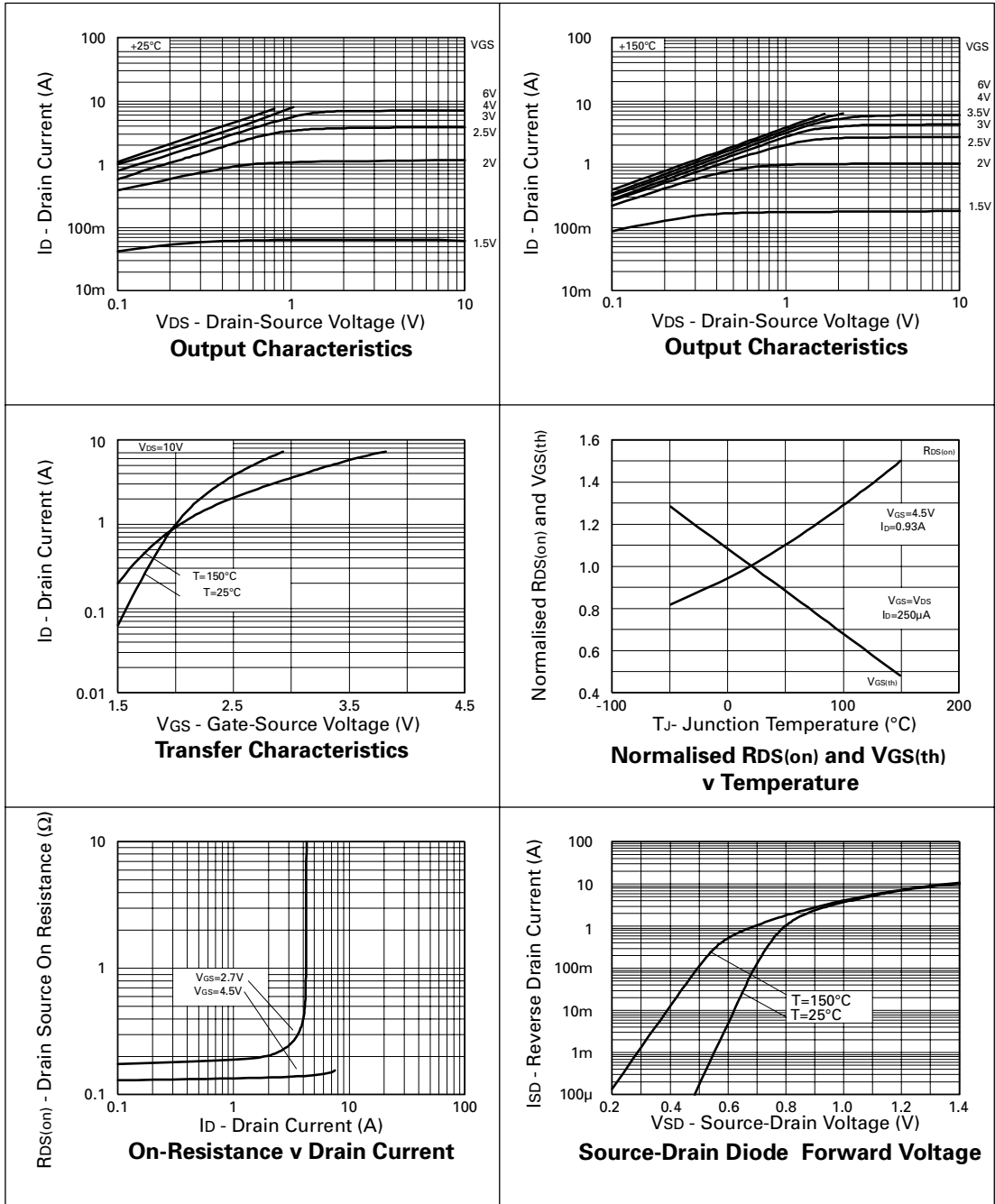
## ELECTRICAL CHARACTERISTICS (at $T_A = 25^\circ\text{C}$ unless otherwise stated).

| 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<br>0.24 | $\Omega$<br>$\Omega$ | $V_{GS}=4.5\text{V}, I_D=0.93\text{A}$<br>$V_{GS}=2.7\text{V}, I_D=0.47\text{A}$                  |
| 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                   | $V_{DS}=15\text{V}, V_{GS}=0\text{V},$<br>$f=1\text{MHz}$   |
| 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                   | $V_{DD}=10\text{V}, I_D=0.93\text{A}$<br>$R_G=6.2\Omega, R_D=11\Omega$<br>(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                   | $V_{DS}=16\text{V}, V_{GS}=4.5\text{V},$<br>$I_D=0.93\text{A}$<br>(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                    | $T_J=25^\circ\text{C}, I_S=0.93\text{A},$<br>$V_{GS}=0\text{V}$                                   |
| Reverse Recovery Time (3)                   | $t_{rr}$      |      | 12.9    |              | ns                   | $T_J=25^\circ\text{C}, I_F=0.93\text{A},$<br>$di/dt=100\text{A}/\mu\text{s}$                      |
| Reverse Recovery Charge (3)                 | $Q_{rr}$      |      | 5.2     |              | nC                   |   |

### NOTES

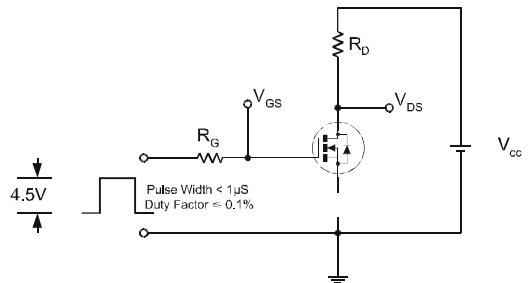
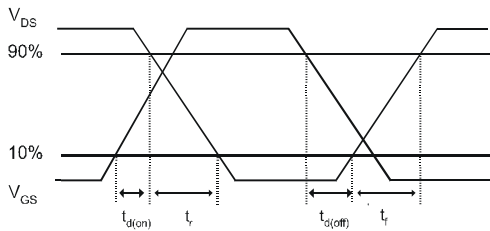
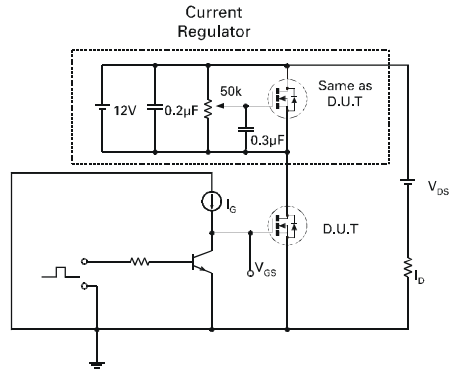
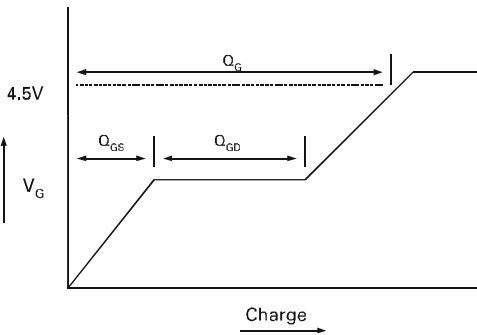
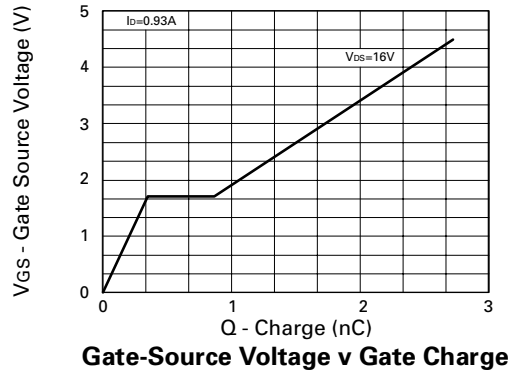
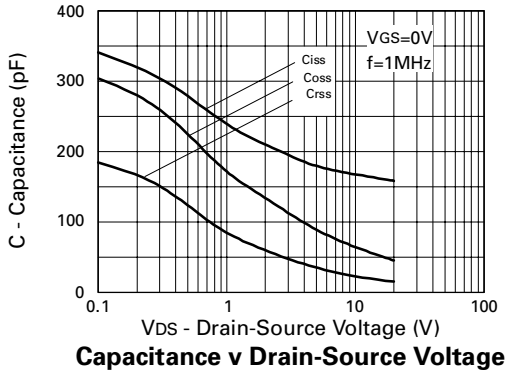
- (1) Measured under pulsed conditions. Width $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$  .  
 (2) Switching characteristics are independent of operating junction temperature.  
 (3) For design aid only, not subject to production testing.

## TYPICAL CHARACTERISTICS



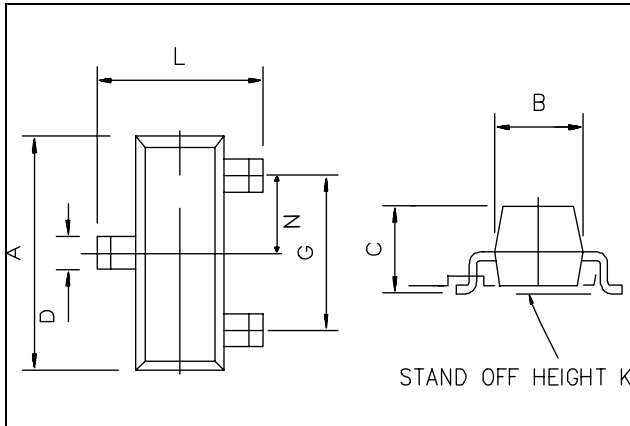
# ZXM61N02F

## TYPICAL CHARACTERISTICS



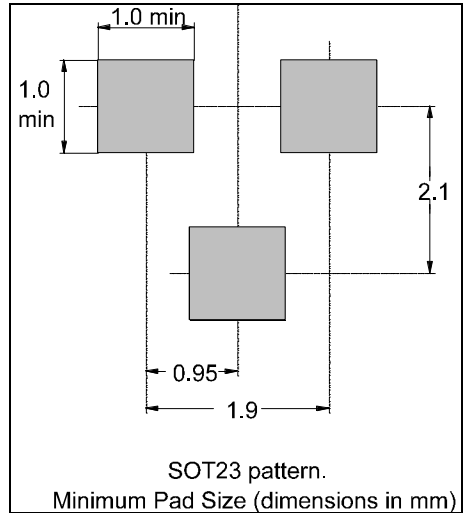
# ZXM61N02F

## 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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