

# ZXMN3B01F

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## 30V N-CHANNEL ENHANCEMENT MODE MOSFET 2.5V GATE DRIVE

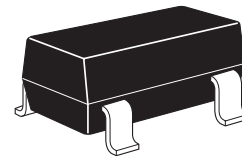
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### SUMMARY

$V_{(BR)DSS}=30V$  ;  $R_{DS(on)}=0.15\Omega$ ;  $I_D=2A$

### 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.



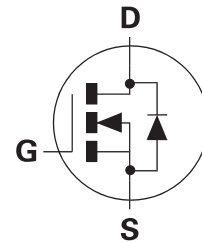
SOT23

### 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

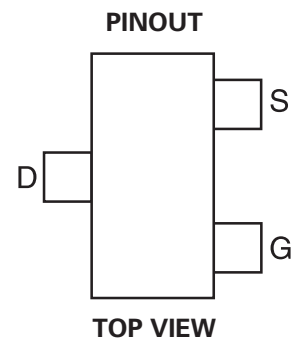


### ORDERING INFORMATION

| DEVICE      | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|-------------|-----------|------------|-------------------|
| ZXMN3B01FTA | 7"        | 8mm        | 3000 units        |
| ZXMN3B01FTC | 13"       | 8mm        | 10000 units       |

### DEVICE MARKING

- 3B1



# ZXMN3B01F

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER  | SYMBOL         | LIMIT       | UNIT           |
|--|----------------|-------------|----------------|
| Drain-Source Voltage   | $V_{DSS}$      | 30          | V              |
| Gate-Source Voltage  | $V_{GS}$       | $\pm 12$    | V              |
| Continuous Drain Current @ $V_{GS}=4.5V$ ; $T_A=25^\circ C$ <sup>(b)</sup><br>@ $V_{GS}=4.5V$ ; $T_A=70^\circ C$ <sup>(b)</sup><br>@ $V_{GS}=4.5V$ ; $T_A=25^\circ C$ <sup>(a)</sup> | $I_D$          | 2.0         | A              |
|  |                | 1.6         | A              |
|  |                | 1.7         | A              |
| Pulsed Drain Current <sup>(c)</sup>  | $I_{DM}$       | 9.4         | A              |
| Continuous Source Current (Body Diode) <sup>(b)</sup>  | $I_S$          | 1.3         | A              |
| Pulsed Source Current (Body Diode) <sup>(c)</sup>  | $I_{SM}$       | 9.4         | A              |
| Power Dissipation at $T_A = 25^\circ C$ <sup>(a)</sup>   | $P_D$          | 625         | mW             |
| Linear Derating Factor   |                | 5           | mW/ $^\circ C$ |
| Power Dissipation at $T_A = 25^\circ C$ <sup>(b)</sup>   | $P_D$          | 806         | mW             |
| Linear Derating Factor   |                | 6.4         | mW/ $^\circ C$ |
| Operating and Storage Temperature Range  | $T_j, T_{stg}$ | -55 to +150 | $^\circ C$     |

## THERMAL RESISTANCE

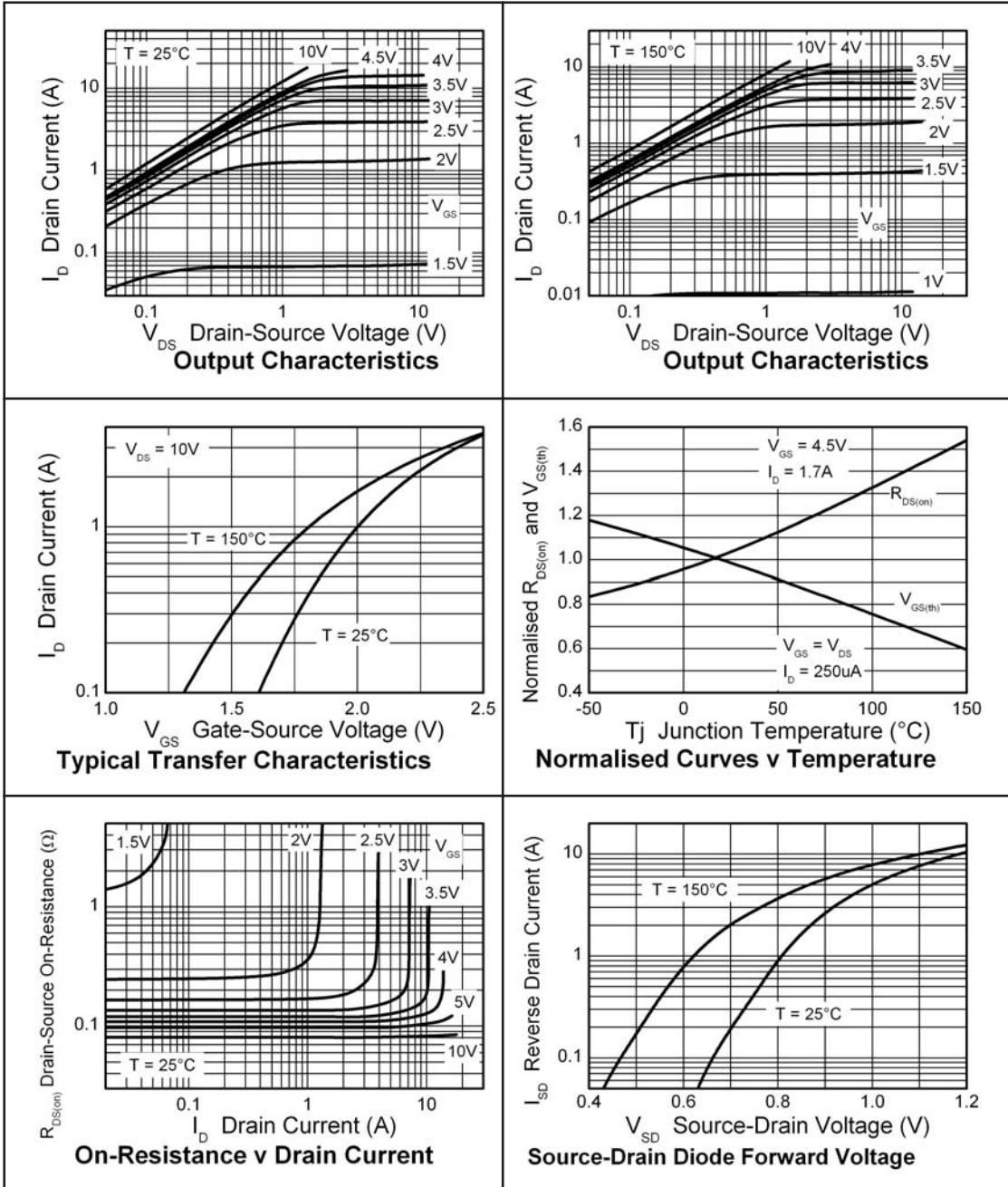
| PARAMETER                          | SYMBOL          | VALUE | UNIT         |
|------------------------------------|-----------------|-------|--------------|
| Junction to Ambient <sup>(a)</sup> | $R_{\theta JA}$ | 200   | $^\circ C/W$ |
| Junction to Ambient <sup>(b)</sup> | $R_{\theta JA}$ | 155   | $^\circ C/W$ |

### 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  $t \leq 5$  sec.  
(c) Repetitive rating - 25mm x 25mm FR4 PCB,  $D=0.02$ , pulse width 300 $\mu s$  - pulse width limited by maximum junction temperature.

# ZXMN3B01F

## TYPICAL CHARACTERISTICS



# ZXMN3B01F

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

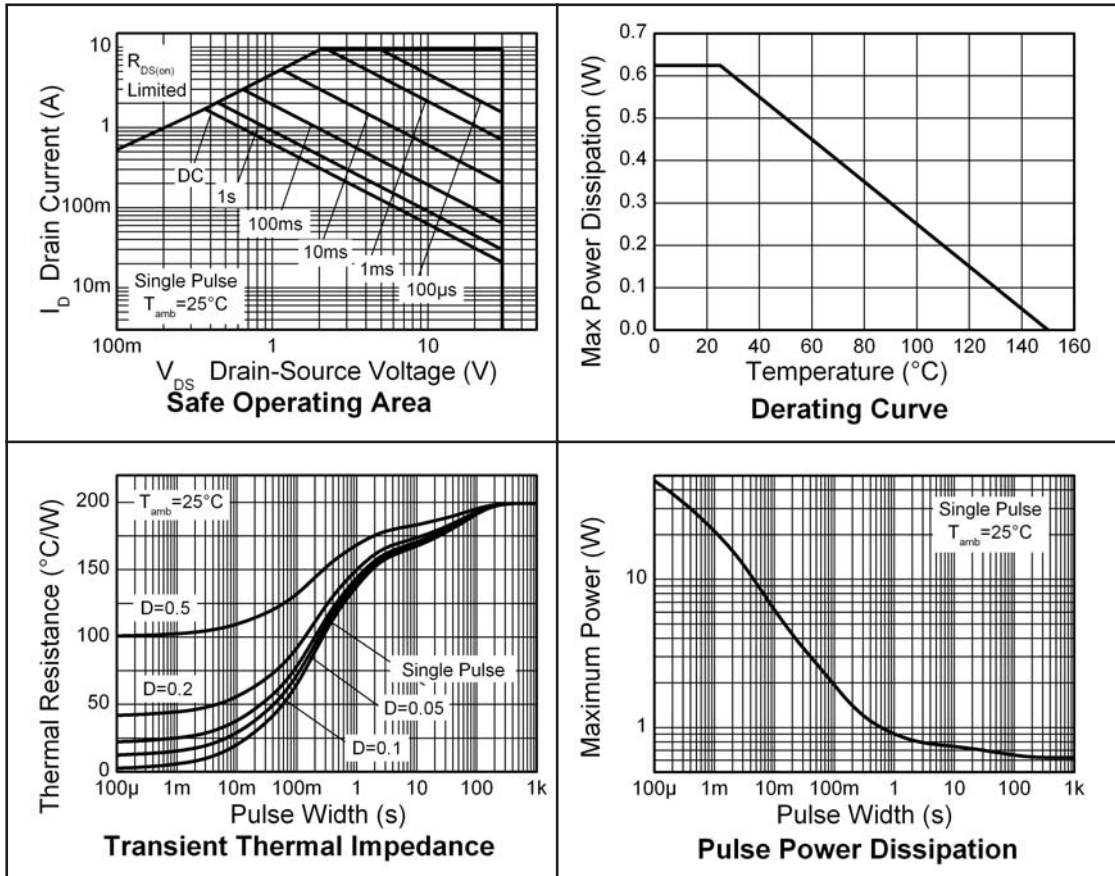
| PARAMETER  | SYMBOL        | MIN. | TYP.  | MAX.  | UNIT          | CONDITIONS  |
|--|---------------|------|-------|-------|---------------|---|
| <b>STATIC</b>  |               |      |       |       |               |   |
| Drain-Source Breakdown Voltage                         | $V_{(BR)DSS}$ | 30   |       |       | V             | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$  |
| Zero Gate Voltage Drain Current                        | $I_{DSS}$     |      |       | 1     | $\mu\text{A}$ | $V_{DS}=30\text{V}, V_{GS}=0\text{V}$   |
| 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> | $R_{DS(on)}$  |      |       | 0.150 | $\Omega$      | $V_{GS}=4.5\text{V}, I_D=1.7\text{A}$   |
|  |               |      |       | 0.240 | $\Omega$      | $V_{GS}=2.5\text{V}, I_D=1.2\text{A}$   |
| Forward Transconductance <sup>(1) (3)</sup>            | $g_{fs}$      |      | 4     |       | S             | $V_{DS}=15\text{V}, I_D=1.7\text{A}$  |
| <b>DYNAMIC</b> <sup>(3)</sup>                          |               |      |       |       |               |   |
| Input Capacitance                                      | $C_{iss}$     |      | 258   |       | 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</b> <sup>(2) (3)</sup>                    |               |      |       |       |               |   |
| Turn-On Delay Time                                     | $t_{d(on)}$   |      | 2.69  |       | ns            | $V_{DD}=15\text{V}, V_{GS}=4.5\text{V}$<br>$I_D=1\text{A}$<br>$R_G \cong 6.0\Omega$ |
| Rise Time  | $t_r$         |      | 3.98  |       | ns            |   |
| Turn-Off Delay Time                                    | $t_{d(off)}$  |      | 8     |       | ns            |   |
| Fall Time  | $t_f$         |      | 5.27  |       | ns            |   |
| Total Gate Charge                                      | $Q_g$         |      | 2.93  |       | nC            |   |
| Gate-Source Charge                                     | $Q_{gs}$      |      | 0.57  |       | nC            | $V_{DS}=15\text{V}, V_{GS}=4.5\text{V},$<br>$I_D=1.7\text{A}$                       |
| Gate-Drain Charge                                      | $Q_{gd}$      |      | 0.92  |       | nC            |   |
| <b>SOURCE-DRAIN DIODE</b>                              |               |      |       |       |               |   |
| Diode Forward Voltage <sup>(1)</sup>                   | $V_{SD}$      |      | 0.85  | 0.95  | V             | $T_J=25^{\circ}\text{C}, I_S=1.7\text{A},$<br>$V_{GS}=0\text{V}$                    |
| Reverse Recovery Time <sup>(3)</sup>                   | $t_{rr}$      |      | 10.85 |       | ns            | $T_J=25^{\circ}\text{C}, I_F=1.3\text{A},$  |
| Reverse Recovery Charge <sup>(3)</sup>                 | $Q_{rr}$      |      | 5     |       | NC            | $di/dt=100\text{A}/\mu\text{s}$   |

### NOTES

- (1) Measured under pulsed conditions. Pulse 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.

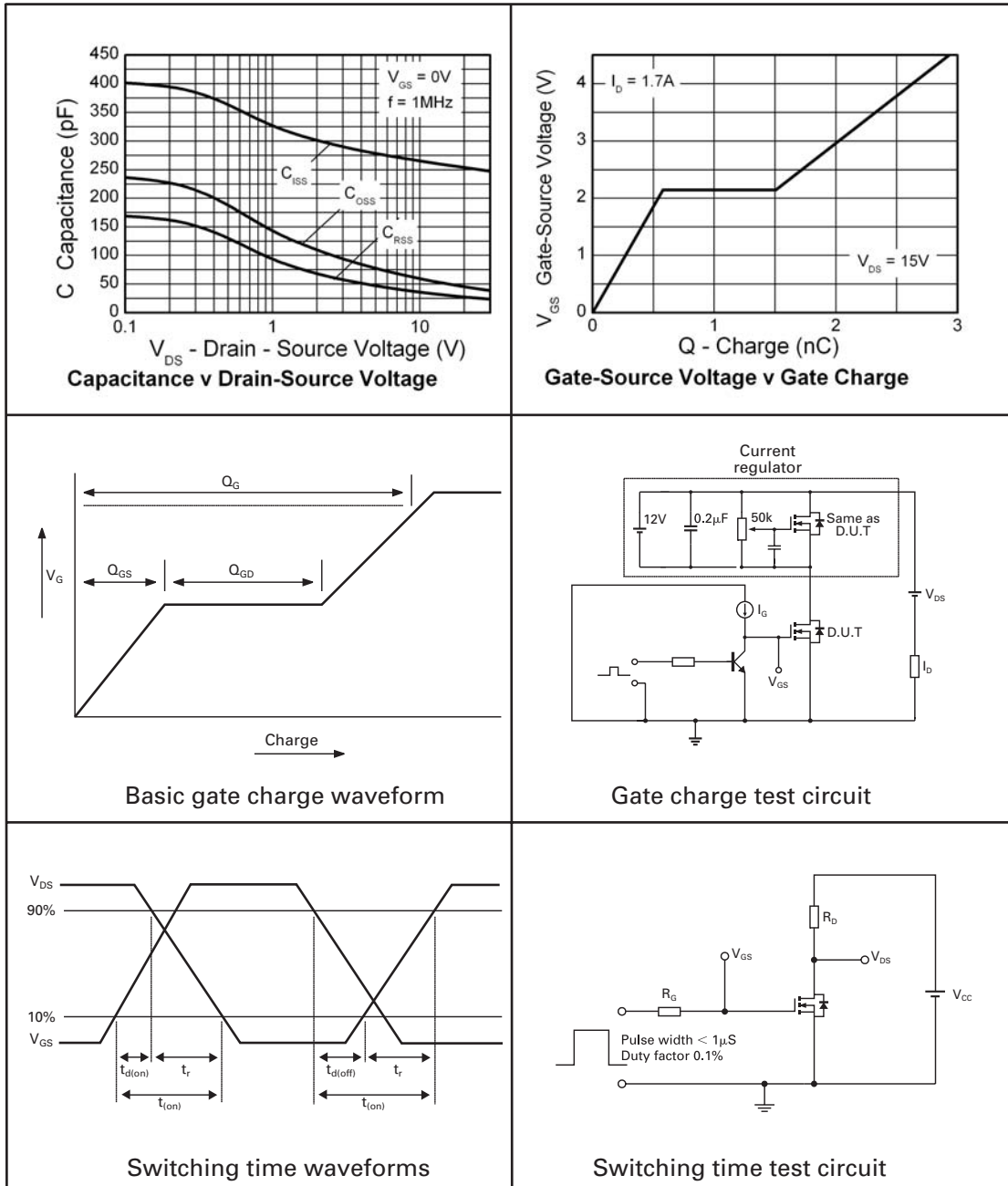
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## CHARACTERISTICS



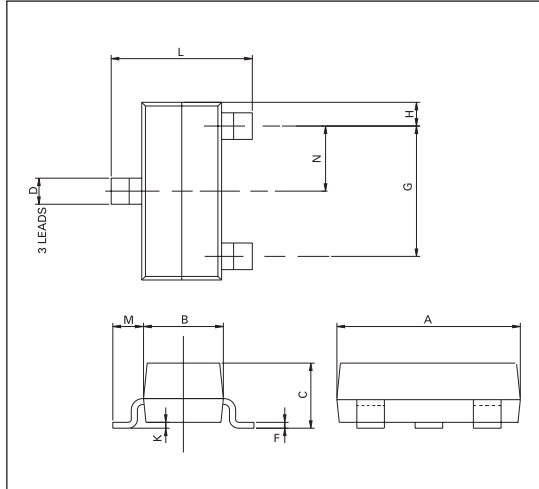
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## TYPICAL CHARACTERISTICS

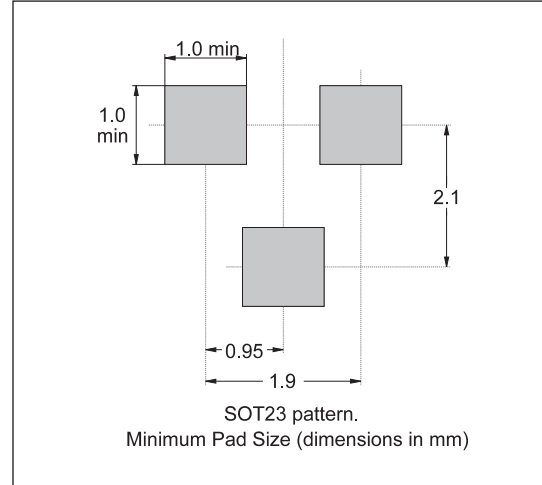


# ZXMN3B01F

## PACKAGE OUTLINE



## PAD LAYOUT



Controlling dimensions are in millimetres. Approximate conversions are given in inches

## PACKAGE DIMENSIONS

| DIM | MILLIMETERS |      | INCHES    |        | DIM | MILLIMETERS |      | INCHES     |        |
|-----|-------------|------|-----------|--------|-----|-------------|------|------------|--------|
|     | MIN         | MAX  | MIN       | MAX    |     | MIN         | MAX  | MIN        | MAX    |
| A   | 2.67        | 3.05 | 0.105     | 0.120  | H   | 0.33        | 0.51 | 0.013      | 0.020  |
| B   | 1.20        | 1.40 | 0.047     | 0.055  | K   | 0.01        | 0.10 | 0.0004     | 0.004  |
| C   | —           | 1.10 | —         | 0.043  | L   | 2.10        | 2.50 | 0.083      | 0.0985 |
| D   | 0.37        | 0.53 | 0.015     | 0.021  | M   | 0.45        | 0.64 | 0.018      | 0.025  |
| F   | 0.085       | 0.15 | 0.0034    | 0.0059 | N   | 0.95 NOM    |      | 0.0375 NOM |        |
| G   | 1.90 NOM    |      | 0.075 NOM |        | Θ   | 10° TYP     |      | 10° TYP    |        |

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