

# ZXMN3A01F

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## 30V N-CANNEL ENHANCEMENT MODE MOSFET

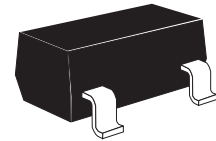
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### SUMMARY

$V_{(BR)DSS}=30V$ ;  $R_{DS(ON)}=0.12\Omega$   $I_D=2.0A$

### 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.



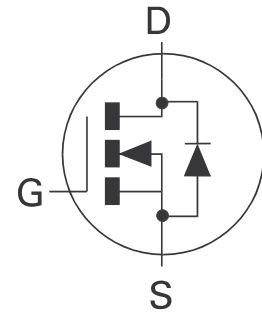
SOT23

### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT23 package

### APPLICATIONS

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

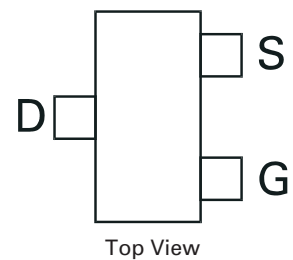


### ORDERING INFORMATION

| DEVICE      | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|-------------|-----------|------------|-------------------|
| ZXMN3A01FTA | 7"        | 12mm       | 1000 units        |
| ZXMN3A01FTC | 13"       | 12mm       | 4000 units        |

### DEVICE MARKING

- 7N3



# ZXMN3A01F

## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER   | SYMBOL                           | LIMIT               | UNIT       |
|---|----------------------------------|---------------------|------------|
| Drain-Source Voltage  | V <sub>DSS</sub>                 | 30                  | V          |
| Gate Source Voltage   | V <sub>GS</sub>                  | ±20                 | V          |
| Continuous Drain Current V <sub>GS</sub> =10V; T <sub>A</sub> =25°C (b)<br>V <sub>GS</sub> =10V; T <sub>A</sub> =70°C (b)<br>V <sub>GS</sub> =10V; T <sub>A</sub> =25°C (a) | I <sub>D</sub>                   | 2.0<br>1.64<br>1.81 | A          |
| Pulsed Drain Current (c)  | I <sub>DM</sub>                  | 8                   | A          |
| Continuous Source Current (Body Diode) (b)  | I <sub>S</sub>                   | 1.3                 | A          |
| Pulsed Source Current (Body Diode) (c)  | I <sub>SM</sub>                  | 8                   | A          |
| Power Dissipation at T <sub>A</sub> =25°C (a)<br>Linear Derating Factor   | P <sub>D</sub>                   | 625<br>5            | W<br>mW/°C |
| Power Dissipation at T <sub>A</sub> =25°C (b)<br>Linear Derating Factor   | P <sub>D</sub>                   | 806<br>6.4          | W<br>mW/°C |
| Operating and Storage Temperature Range   | T <sub>j</sub> :T <sub>stg</sub> | -55 to +150         | °C         |

## THERMAL RESISTANCE

| PARAMETER               | SYMBOL           | VALUE | UNIT |
|-------------------------|------------------|-------|------|
| Junction to Ambient (a) | R <sub>θJA</sub> | 200   | °C/W |
| Junction to Ambient (b) | R <sub>θJA</sub> | 155   | °C/W |

### NOTES

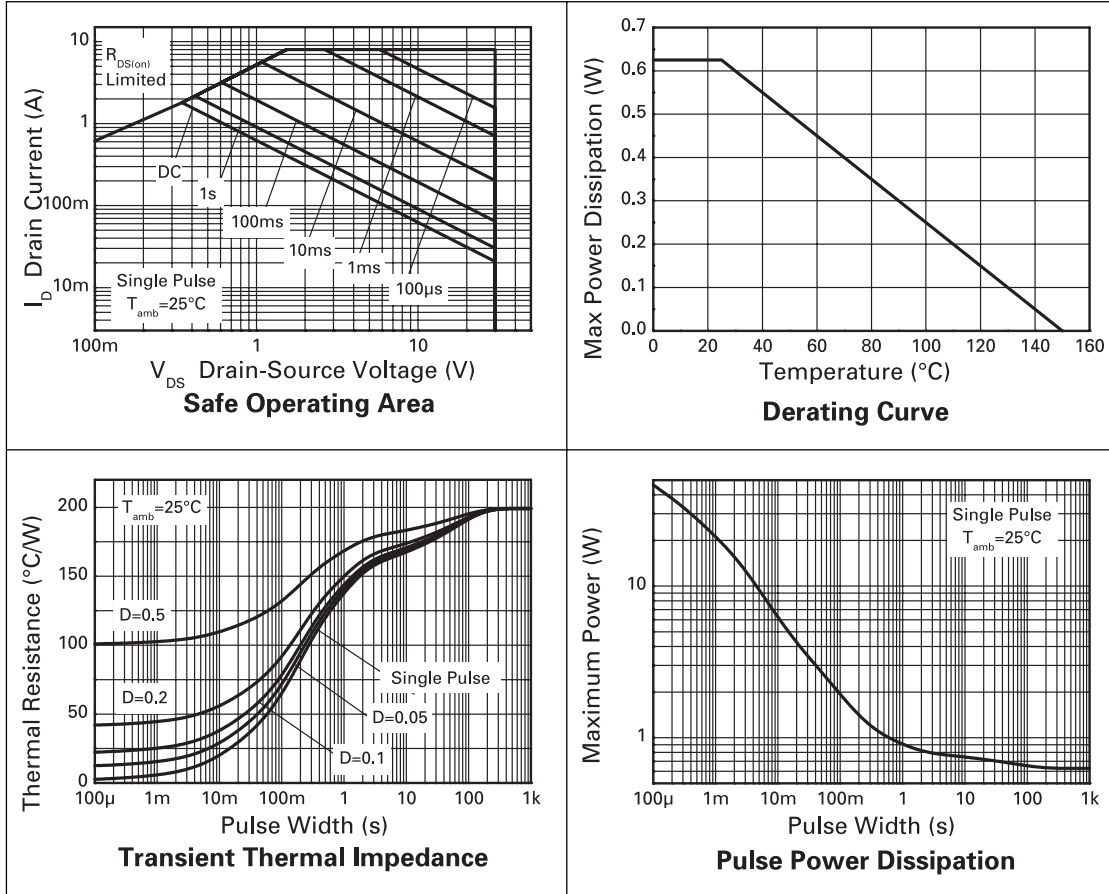
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(b) For a device surface mounted on FR4 PCB measured at t<sub>stg</sub> ≤ 5 secs.

(c) Repetitive rating 25mm x 25mm FR4 PCB, D = 0.05, pulse width 10μs - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

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## CHARACTERISTICS



# ZXMN3A01F

**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              | $V_{(BR)DSS}$ | 30   |       |              | V                    | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$  |
| Zero Gate Voltage Drain Current             | $I_{DSS}$     |      |       | 0.5          | $\mu\text{A}$        | $V_{DS}=30\text{V}, V_{GS}=0\text{V}$   |
| Gate-Body Leakage                           | $I_{GSS}$     |      |       | 100          | nA                   | $V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$                                     |
| Gate-Source Threshold Voltage               | $V_{GS(th)}$  | 1    |       |              | V                    | $I_D=250\mu\text{A}, V_{DS}=V_{GS}$   |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$  |      | 0.106 | 0.12<br>0.18 | $\Omega$<br>$\Omega$ | $V_{GS}=10\text{V}, I_D=2.5\text{A}$<br>$V_{GS}=4.5\text{V}, I_D=2.0\text{A}$ |
| Forward Transconductance (1)(3)             | $g_{fs}$      |      | 3.5   |              | S                    | $V_{DS}=4.5\text{V}, I_D=2.5\text{A}$   |
| <b>DYNAMIC (3)</b>                          |               |      |       |              |                      |   |
| Input Capacitance                           | $C_{iss}$     |      | 190   |              | pF                   | $V_{DS}=25\text{V}, V_{GS}=0\text{V},$<br>$f=1\text{MHz}$                     |
| Output Capacitance                          | $C_{oss}$     |      | 38    |              | pF                   |   |
| Reverse Transfer Capacitance                | $C_{rss}$     |      | 20    |              | pF                   |   |
| <b>SWITCHING(2) (3)</b>                     |               |      |       |              |                      |   |
| Turn-On Delay Time                          | $t_{d(on)}$   |      | 1.7   |              | ns                   | $V_{DD}=15\text{V}, I_D=2.5\text{A}$<br>$R_G=6.0\Omega, V_{GS}=10\text{V}$    |
| Rise Time                                   | $t_r$         |      | 2.3   |              | ns                   |   |
| Turn-Off Delay Time                         | $t_{d(off)}$  |      | 6.6   |              | ns                   |   |
| Fall Time                                   | $t_f$         |      | 2.9   |              | ns                   |   |
| Gate Charge                                 | $Q_g$         |      | 2.3   |              | nC                   | $V_{DS}=15\text{V}, V_{GS}=5\text{V},$<br>$I_D=2.5\text{A}$                   |
| Total Gate Charge                           | $Q_g$         |      | 3.9   |              | nC                   | $V_{DS}=15\text{V}, V_{GS}=10\text{V},$<br>$I_D=2.5\text{A}$                  |
| Gate-Source Charge                          | $Q_{gs}$      |      | 0.6   |              | nC                   |   |
| Gate-Drain Charge                           | $Q_{gd}$      |      | 0.9   |              | nC                   |   |
| <b>SOURCE-DRAIN DIODE</b>                   |               |      |       |              |                      |   |
| Diode Forward Voltage (1)                   | $V_{SD}$      |      | 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 (3)                   | $t_{rr}$      |      | 17.7  |              | ns                   | $T_J=25^\circ\text{C}, I_F=2.5\text{A},$<br>$di/dt=100\text{A}/\mu\text{s}$   |
| Reverse Recovery Charge (3)                 | $Q_{rr}$      |      | 13.0  |              | nC                   |   |

**NOTES**

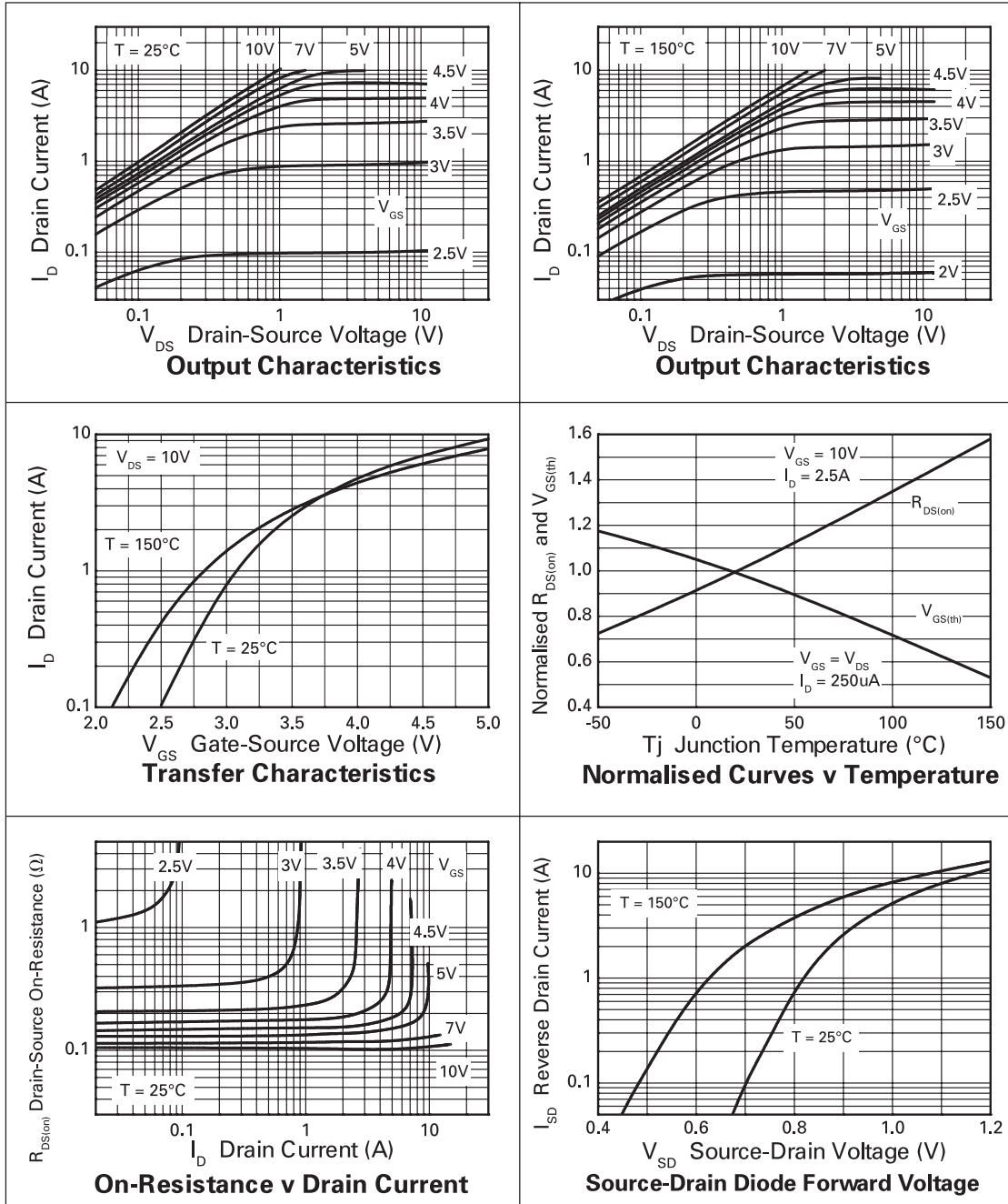
- (1) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$  .  
 (2) Switching characteristics are independent of operating junction temperature.  
 (3) For design aid only, not subject to production testing.



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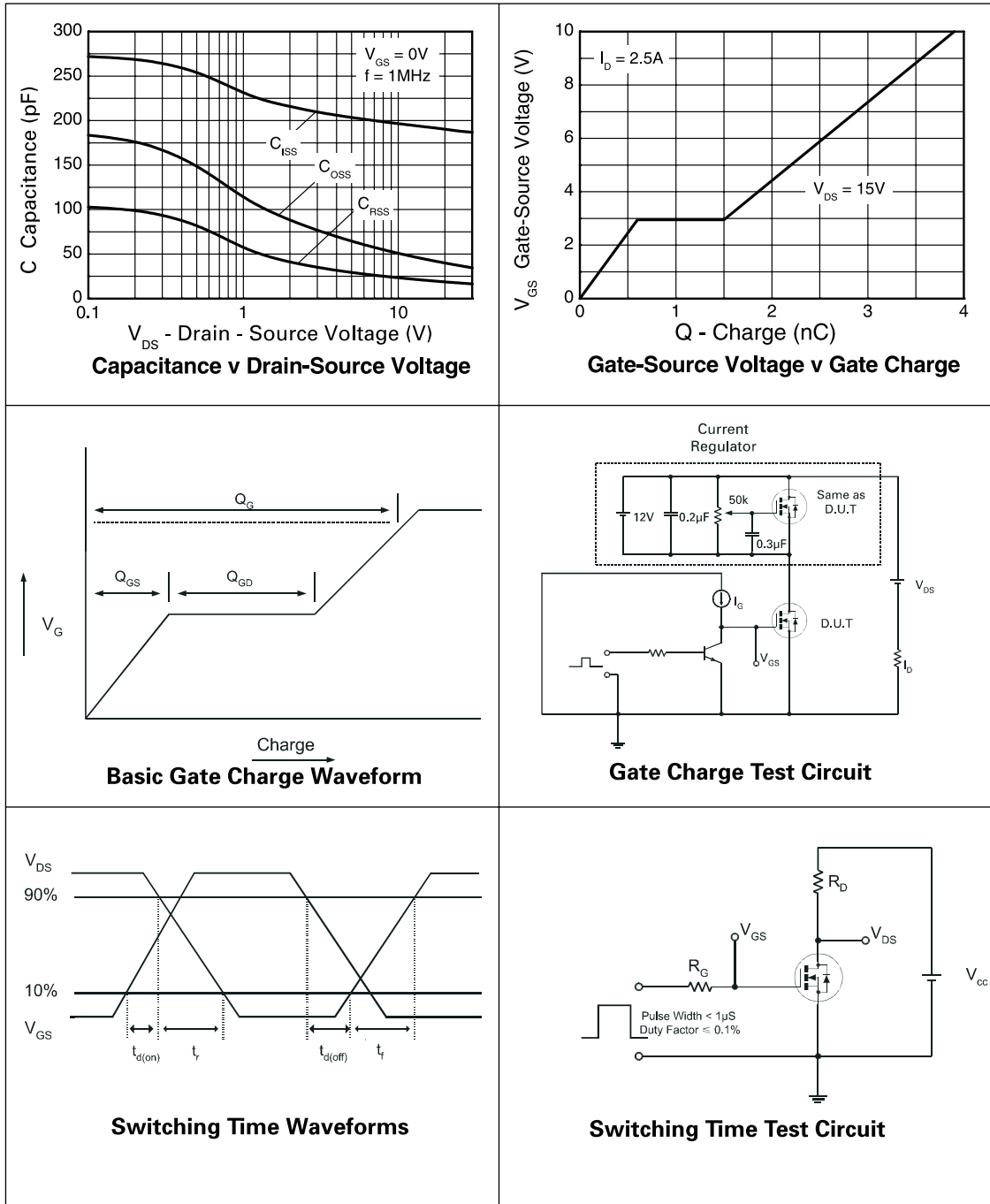
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## TYPICAL CHARACTERISTICS



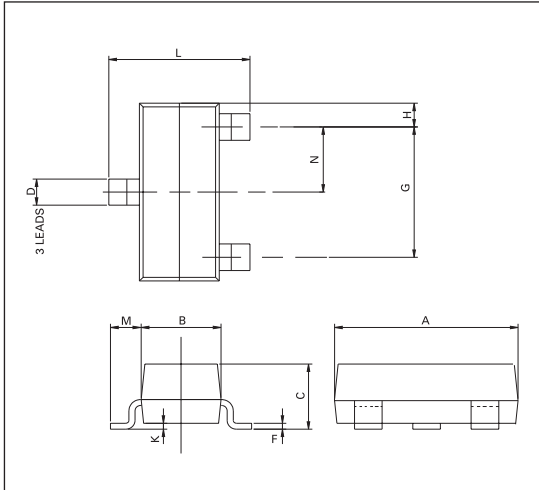
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## TYPICAL CHARACTERISTICS

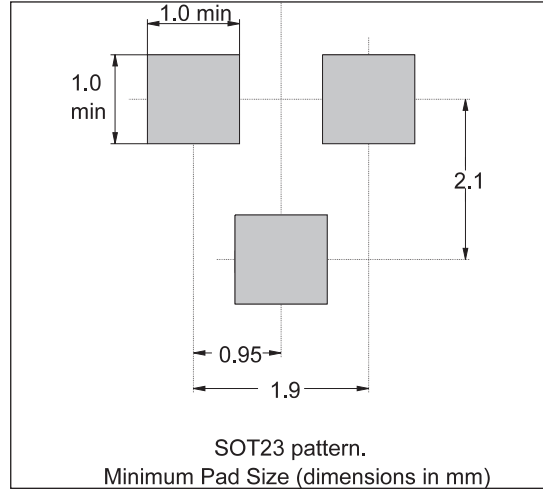


# ZXMN3A01F

## PACKAGE OUTLINE



## PAD LAYOUT



## PACKAGE DIMENSIONS

| DIM | MILLIMETRES |      | DIM | MILLIMETRES |      |
|-----|-------------|------|-----|-------------|------|
|     | MIN         | MAX  |     | MIN         | MAX  |
| A   | 2.67        | 3.05 | H   | 0.33        | 0.51 |
| B   | 1.20        | 1.40 | K   | 0.01        | 0.10 |
| C   | —           | 1.10 | L   | 2.10        | 2.50 |
| D   | 0.37        | 0.53 | M   | 0.45        | 0.64 |
| F   | 0.085       | 0.15 | N   | 0.95 NOM    |      |

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