

# ZXMN2A01F

## 20V N-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

$V_{(BR)DSS}=20V$ ;  $R_{DS(on)}=0.12\Omega$   $I_D=2.09A$

### DESCRIPTION

This new generation of TRENCH 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

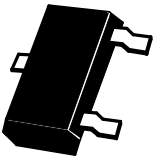
- DC - DC Converters
- Power Management Functions
- Motor control

### ORDERING INFORMATION

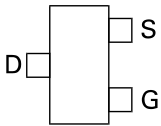
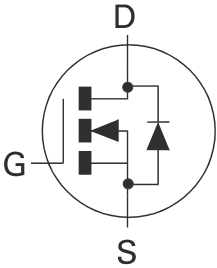
| DEVICE      | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|-------------|-----------|------------|-------------------|
| ZXMN2A01FTA | 7"        | 8mm        | 3000 units        |
| ZXMN2A01FTC | 13"       | 8mm        | 10000 units       |

### DEVICE MARKING

- 7N2



SOT23



Top View

## ZXMN2A01F

### ABSOLUTE MAXIMUM RATINGS.

| PARAMETER  | SYMBOL         | LIMIT                | UNIT                  |
|--|----------------|----------------------|-----------------------|
| Drain-Source Voltage   | $V_{DS}$       | 20                   | V                     |
| Gate Source Voltage  | $V_{GS}$       | 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)<br>$V_{GS}=4.5V$ ; $T_A=25^{\circ}C$ (a) | $I_D$          | 2.09<br>1.67<br>1.84 | A                     |
| Pulsed Drain Current (c)   | $I_{DM}$       | 10                   | A                     |
| Continuous Source Current (Body Diode) (b)   | $I_S$          | 1.05                 | A                     |
| Pulsed Source Current (Body Diode)(c)  | $I_{SM}$       | 10                   | 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.

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

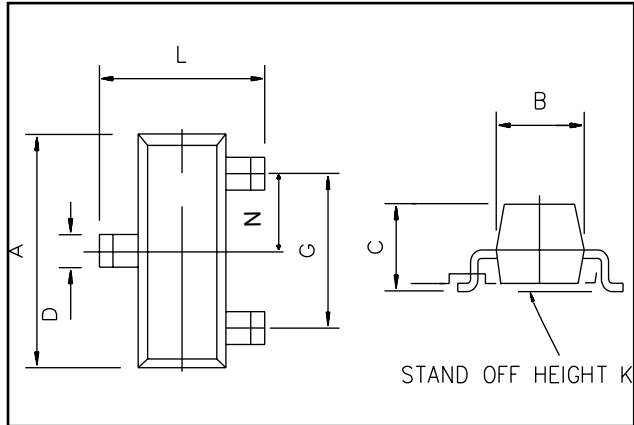
| PARAMETER                                   | SYMBOL               | MIN. | TYP. | MAX.         | UNIT   | CONDITIONS.  |
|---|----------------------|------|------|--------------|--------|--|
| STATIC                                      |                      |      |      |              |        |  |
| Drain-Source Breakdown Voltage              | V <sub>(BR)DSS</sub> | 20   |      |              | V      | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V   |
| Zero Gate Voltage Drain Current             | I <sub>DSS</sub>     |      |      | 1            | μA     | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V  |
| Gate-Body Leakage                           | I <sub>GSS</sub>     |      |      | 100          | nA     | V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V   |
| Gate-Source Threshold Voltage               | V <sub>GS(th)</sub>  | 0.7  |      |              | V      | I <sub>D</sub> =250μA, V <sub>DS</sub> = V <sub>GS</sub>                                 |
| Static Drain-Source On-State Resistance (1) | R <sub>DS(on)</sub>  |      | 0.09 | 0.12<br>0.30 | Ω<br>Ω | V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A<br>V <sub>GS</sub> =2.5V, I <sub>D</sub> =1.5A |
| Forward Transconductance (3)                | g <sub>fs</sub>      |      | 6.2  |              | S      | V <sub>DS</sub> =10V, I <sub>D</sub> =4A   |
| DYNAMIC (3)                                 |                      |      |      |              |        |  |
| Input Capacitance                           | C <sub>iss</sub>     |      | 299  |              | pF     | V <sub>DS</sub> =15 V, V <sub>GS</sub> =0V,<br>f=1MHz                                    |
| Output Capacitance                          | C <sub>oss</sub>     |      | 60   |              | pF     |  |
| Reverse Transfer Capacitance                | C <sub>rss</sub>     |      | 33   |              | pF     |  |
| SWITCHING(2) (3)                            |                      |      |      |              |        |  |
| Turn-On Delay Time                          | t <sub>d(on)</sub>   |      | 2.31 |              | ns     | V <sub>DD</sub> =10V, I <sub>D</sub> =4A<br>R <sub>G</sub> =6.0Ω, V <sub>GS</sub> =5V    |
| Rise Time                                   | t <sub>r</sub>       |      | 2.60 |              | ns     |  |
| Turn-Off Delay Time                         | t <sub>d(off)</sub>  |      | 1.55 |              | ns     |  |
| Fall Time                                   | t <sub>f</sub>       |      | 1.31 |              | ns     |  |
| Total Gate Charge                           | Q <sub>g</sub>       |      | 3.1  |              | nC     | V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V,<br>I <sub>D</sub> =4A                       |
| Gate-Source Charge                          | Q <sub>gs</sub>      |      | 0.7  |              | nC     |  |
| Gate-Drain Charge                           | Q <sub>gd</sub>      |      | 1.0  |              | nC     |  |
| SOURCE-DRAIN DIODE                          |                      |      |      |              |        |  |
| Diode Forward Voltage (1)                   | V <sub>SD</sub>      |      | 0.84 | 0.95         | V      | T <sub>J</sub> =25°C, I <sub>S</sub> =0.6A,<br>V <sub>GS</sub> =0V                       |
| Reverse Recovery Time (3)                   | t <sub>rr</sub>      |      | 11.2 |              | ns     | T <sub>J</sub> =25°C, I <sub>F</sub> =4A,<br>di/dt= 100A/μs                              |
| Reverse Recovery Charge (3)                 | Q <sub>rr</sub>      |      | 3.64 |              | nC     |  |

### NOTES

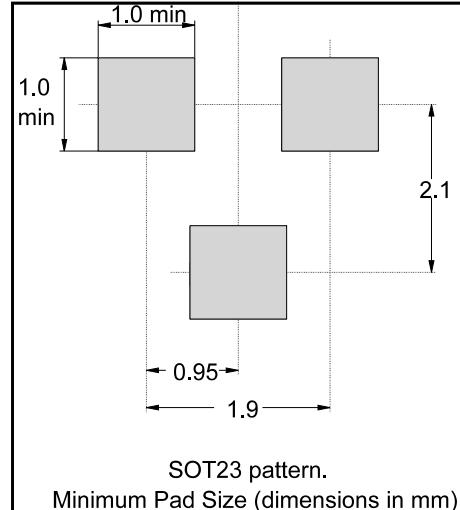
- (1) Measured under pulsed conditions. Width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .  
 (2) Switching characteristics are independent of operating junction temperature.  
 (3) For design aid only, not subject to production testing.

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## PACKAGE DIMENSIONS



## PAD LAYOUT DETAILS



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| 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 |        |



**ZETEX**

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