

Not Recommended for New Design  
Use DMN3025LSS

## ZXMN2A02X8

### 20V N-CHANNEL ENHANCEMENT MODE MOSFET

#### SUMMARY

$V_{(BR)DSS} = 20V$ ;  $R_{DS(ON)} = 0.02\Omega$   $I_D = 7.8A$

#### 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.

#### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

#### APPLICATIONS

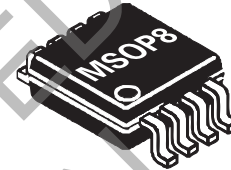
- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control

#### ORDERING INFORMATION

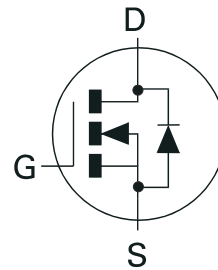
| DEVICE       | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|--------------|-----------|------------|-------------------|
| ZXMN2A02X8TA | 7"        | 12mm       | 1000 units        |
| ZXMN2A02X8TC | 13"       | 12mm       | 4000 units        |

#### DEVICE MARKING

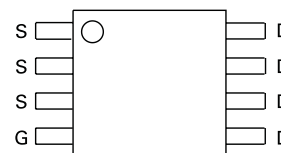
- ZXMN  
2A02



MSOP8



#### PINOUT



Top View

# ZXMN2A02X8

## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                                                                                                                  | SYMBOL         | LIMIT             | UNIT                |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------|---------------------|
| Drain-Source Voltage                                                                                                                       | $V_{DSS}$      | 20                | V                   |
| Gate Source Voltage                                                                                                                        | $V_{GS}$       | $\pm 20$          | V                   |
| Continuous Drain Current $V_{GS}=10V$ ; $T_A=25^\circ C$ (b)<br>$V_{GS}=10V$ ; $T_A=70^\circ C$ (b)<br>$V_{GS}=10V$ ; $T_A=25^\circ C$ (a) | $I_D$          | 7.8<br>6.3<br>6.2 | A                   |
| Pulsed Drain Current (c)                                                                                                                   | $I_{DM}$       | 39                | A                   |
| Continuous Source Current (Body Diode) (b)                                                                                                 | $I_S$          | 3.1               | A                   |
| Pulsed Source Current (Body Diode) (c)                                                                                                     | $I_{SM}$       | 39                | A                   |
| Power Dissipation at $T_A=25^\circ C$ (a)<br>Linear Derating Factor                                                                        | $P_D$          | 1.1<br>8.8        | W<br>mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ (b)<br>Linear Derating Factor                                                                        | $P_D$          | 1.67<br>13.4      | W<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) | $R_{\theta JA}$ | 113   | $^\circ C/W$ |
| Junction to Ambient (b) | $R_{\theta JA}$ | 74.5  | $^\circ C/W$ |

### NOTES

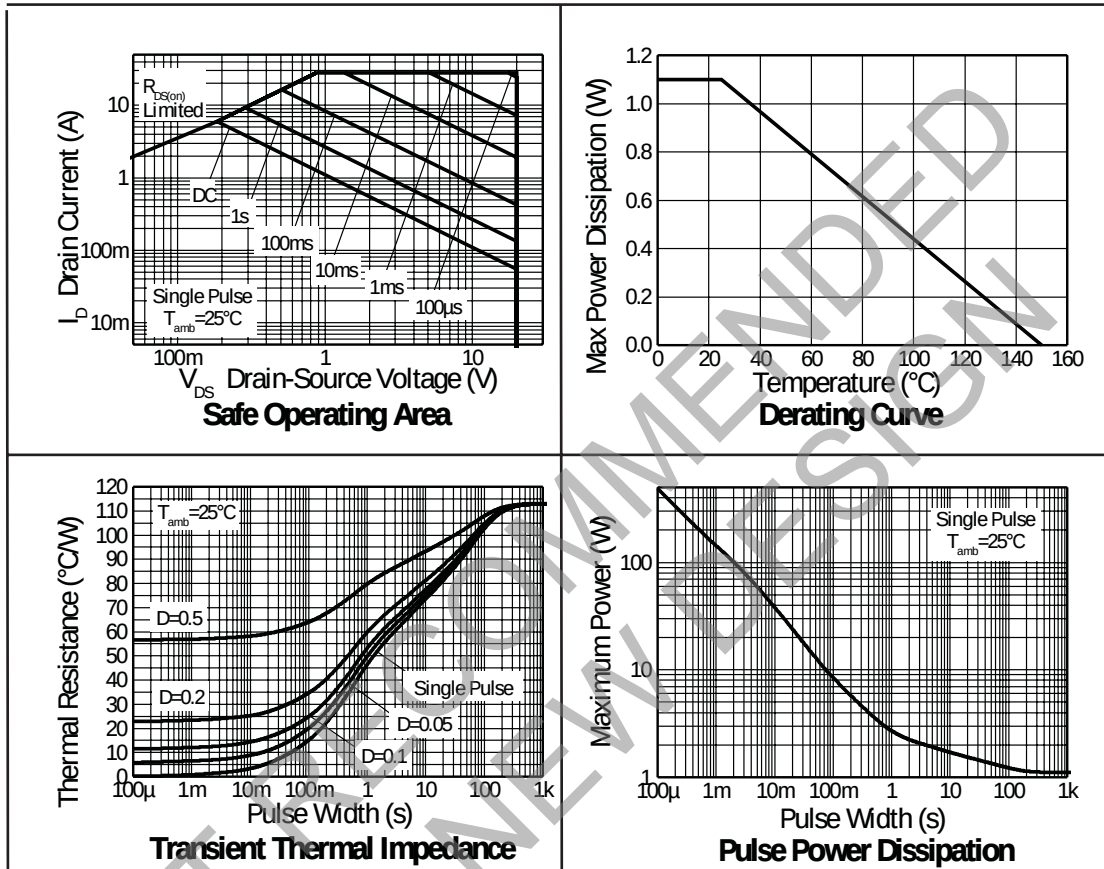
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(b) For a device surface mounted on FR4 PCB measured at  $t \leq 10$  secs.

(c) Repetitive rating 25mm x 25mm FR4 PCB,  $D = 0.05$ , pulse width 10 $\mu s$  - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph. Refer to transient thermal impedance graph.

# ZXMN2A02X8

## CHARACTERISTICS



# ZXMN2A02X8

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

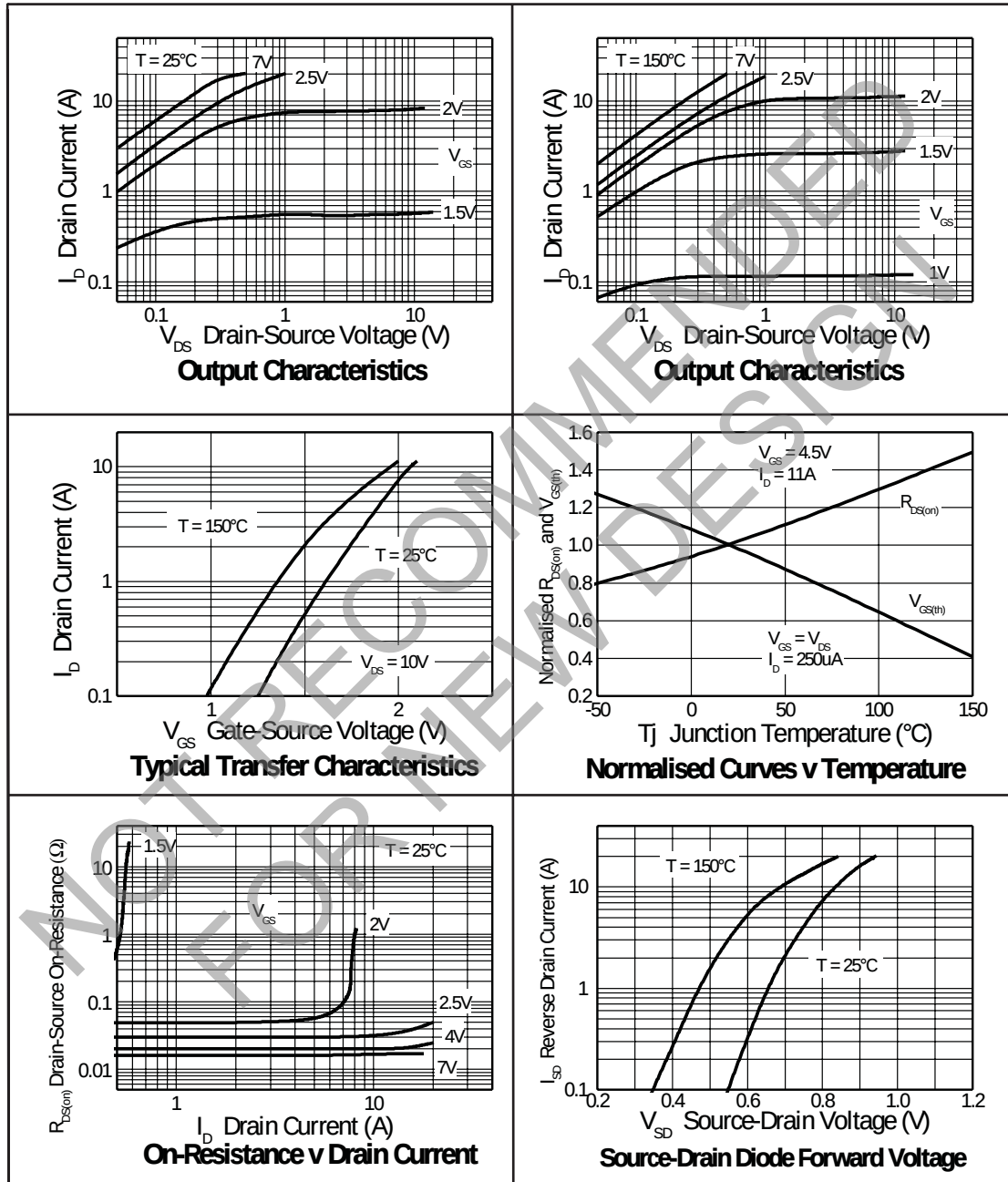
| PARAMETER                                   | SYMBOL               | MIN. | TYP. | MAX.         | UNIT   | CONDITIONS.                                                                               |
|---------------------------------------------|----------------------|------|------|--------------|--------|-------------------------------------------------------------------------------------------|
| 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>  |      |      | 0.02<br>0.04 | Ω<br>Ω | V <sub>GS</sub> =4.5V, I <sub>D</sub> =11A<br>V <sub>GS</sub> =2.5V, I <sub>D</sub> =8.4A |
| Forward Transconductance (1)(3)             | g <sub>fs</sub>      |      | 27   |              | S      | V <sub>DS</sub> =10V, I <sub>D</sub> =11A                                                 |
| DYNAMIC (3)                                 |                      |      |      |              |        |                                                                                           |
| Input Capacitance                           | C <sub>iss</sub>     |      | 1900 |              | pF     | V <sub>DS</sub> =10 V, V <sub>GS</sub> =0V, f=1MHz                                        |
| Output Capacitance                          | C <sub>oss</sub>     |      | 356  |              | pF     |                                                                                           |
| Reverse Transfer Capacitance                | C <sub>rss</sub>     |      | 218  |              | pF     |                                                                                           |
| SWITCHING(2) (3)                            |                      |      |      |              |        |                                                                                           |
| Turn-On Delay Time                          | t <sub>d(on)</sub>   |      | 7.9  |              | ns     | V <sub>DD</sub> =10V, I <sub>D</sub> =1A<br>R <sub>G</sub> =6.0Ω, V <sub>GS</sub> =4.5V   |
| Rise Time                                   | t <sub>r</sub>       |      | 10   |              | ns     |                                                                                           |
| Turn-Off Delay Time                         | t <sub>d(off)</sub>  |      | 33.3 |              | ns     |                                                                                           |
| Fall Time                                   | t <sub>f</sub>       |      | 13.6 |              | ns     |                                                                                           |
| Total Gate Charge                           | Q <sub>g</sub>       |      | 18.6 |              | nC     | V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =11A                          |
| Gate-Source Charge                          | Q <sub>gs</sub>      |      | 5.2  |              | nC     |                                                                                           |
| Gate-Drain Charge                           | Q <sub>gd</sub>      |      | 4.9  |              | nC     |                                                                                           |
| SOURCE-DRAIN DIODE                          |                      |      |      |              |        |                                                                                           |
| Diode Forward Voltage (1)                   | V <sub>SD</sub>      |      | 0.85 | 0.95         | V      | T <sub>J</sub> =25°C, I <sub>S</sub> =11.5A, V <sub>GS</sub> =0V                          |
| Reverse Recovery Time (3)                   | t <sub>rr</sub>      |      | 16.3 |              | ns     | T <sub>J</sub> =25°C, I <sub>F</sub> =2.1A, di/dt= 100A/μs                                |
| Reverse Recovery Charge (3)                 | Q <sub>rr</sub>      |      | 7.8  |              | 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.

# ZXMN2A02X8

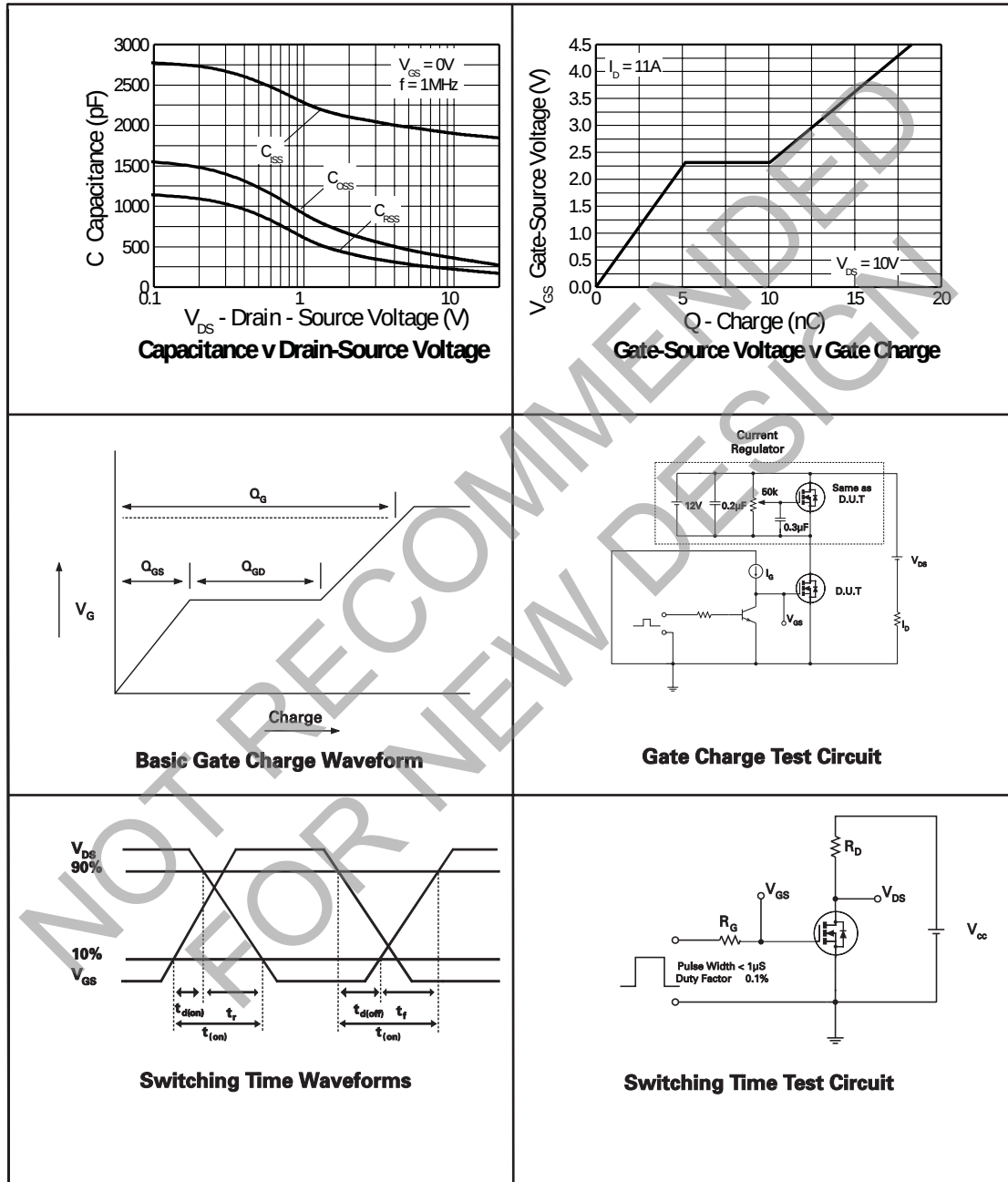
## TYPICAL CHARACTERISTICS



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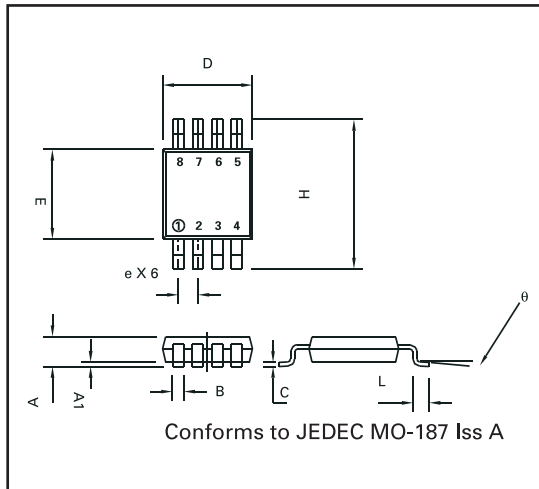
# ZXMN2A02X8

## TYPICAL CHARACTERISTICS

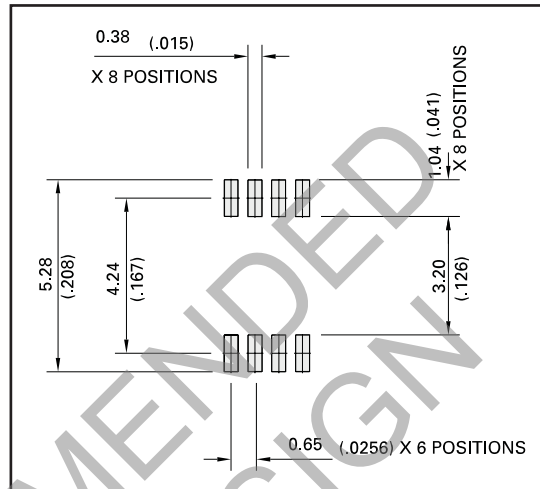


# ZXMN2A02X8

## PACKAGE OUTLINE



## PAD LAYOUT



## PACKAGE DIMENSIONS

| DIM | Millimetres |      | Inches |       | DIM | Millimetres |      | Inches     |       |
|-----|-------------|------|--------|-------|-----|-------------|------|------------|-------|
|     | MIN         | MAX  | MIN    | MAX   |     | MIN         | MAX  | MIN        | MAX   |
| A   | —           | 1.10 | —      | 0.043 | e   | 0.65 BSC    |      | 0.0256 BSC |       |
| A1  | 0.05        | 0.15 | 0.002  | 0.006 | E   | 2.90        | 3.10 | 0.114      | 0.122 |
| B   | 0.25        | 0.40 | 0.010  | 0.016 | H   | 4.90 BSC    |      | 0.193 BSC  |       |
| C   | 0.13        | 0.23 | 0.005  | 0.009 | L   | 0.40        | 0.70 | 0.016      | 0.028 |
| D   | 2.90        | 3.10 | 0.114  | 0.122 | θ°  | 0°          | 6°   | 0°         | 6°    |

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