

# ZXMP3A16DN8

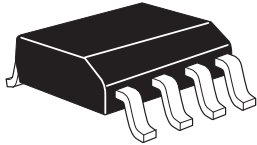
## DUAL P-CANAL 30V ENHANCEMENT MODE MOSFET

### SUMMARY

$V_{(BR)DSS} = -30V$ ;  $R_{DS(ON)} = 0.045\Omega$ ;  $I_D = -5.5A$

### 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.



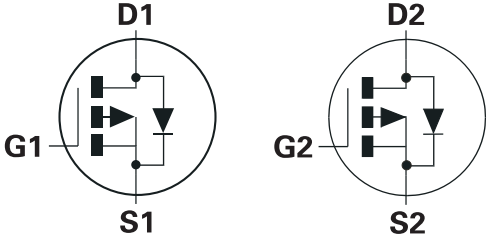
SO8

### FEATURES

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

### APPLICATIONS

- Motor Drive
- LCD backlighting



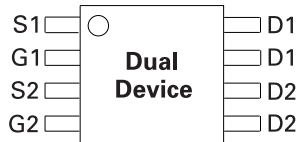
### ORDERING INFORMATION

| DEVICE        | REEL | TAPE WIDTH | QUANTITY PER REEL |
|---------------|------|------------|-------------------|
| ZXMP3A16DN8TA | 7"   | 12mm       | 500 units         |
| ZXMP3A16DN8TC | 13"  | 12mm       | 2500 units        |

### DEVICE MARKING

ZXMP  
3A16

### PINOUT



Top view

# ZXMP3A16DN8

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER  | SYMBOL        | LIMIT                | UNIT                |
|--|---------------|----------------------|---------------------|
| Drain-Source Voltage   | $V_{DSS}$     | -30                  | V                   |
| Gate-Source Voltage  | $V_{GS}$      | $\pm 20$             | V                   |
| Continuous Drain Current @ $V_{GS}=10V$ ; $T_A=25^\circ C$ <sup>(b)(d)</sup><br>@ $V_{GS}=10V$ ; $T_A=70^\circ C$ <sup>(b)(d)</sup><br>@ $V_{GS}=10V$ ; $T_A=25^\circ C$ <sup>(a)(d)</sup> | $I_D$         | -5.5<br>-4.4<br>-4.2 | A<br>A<br>A         |
| Pulsed Drain Current <sup>(c)</sup>  | $I_{DM}$      | -20                  | A                   |
| Continuous Source Current (Body Diode) <sup>(b)</sup>  | $I_S$         | -3.2                 | A                   |
| Pulsed Source Current (Body Diode) <sup>(c)</sup>  | $I_{SM}$      | -20                  | A                   |
| Power Dissipation at $T_A=25^\circ C$ <sup>(a)(d)</sup><br>Linear Derating Factor  | $P_D$         | 1.25<br>10           | W<br>mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ <sup>(a)(e)</sup><br>Linear Derating Factor  | $P_D$         | 1.8<br>14            | W<br>mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ <sup>(b)(d)</sup><br>Linear Derating Factor  | $P_D$         | 2.1<br>17            | W<br>mW/ $^\circ C$ |
| Operating and Storage Temperature Range  | $T_J:T_{stg}$ | -55 to +150          | $^\circ C$          |

## THERMAL RESISTANCE

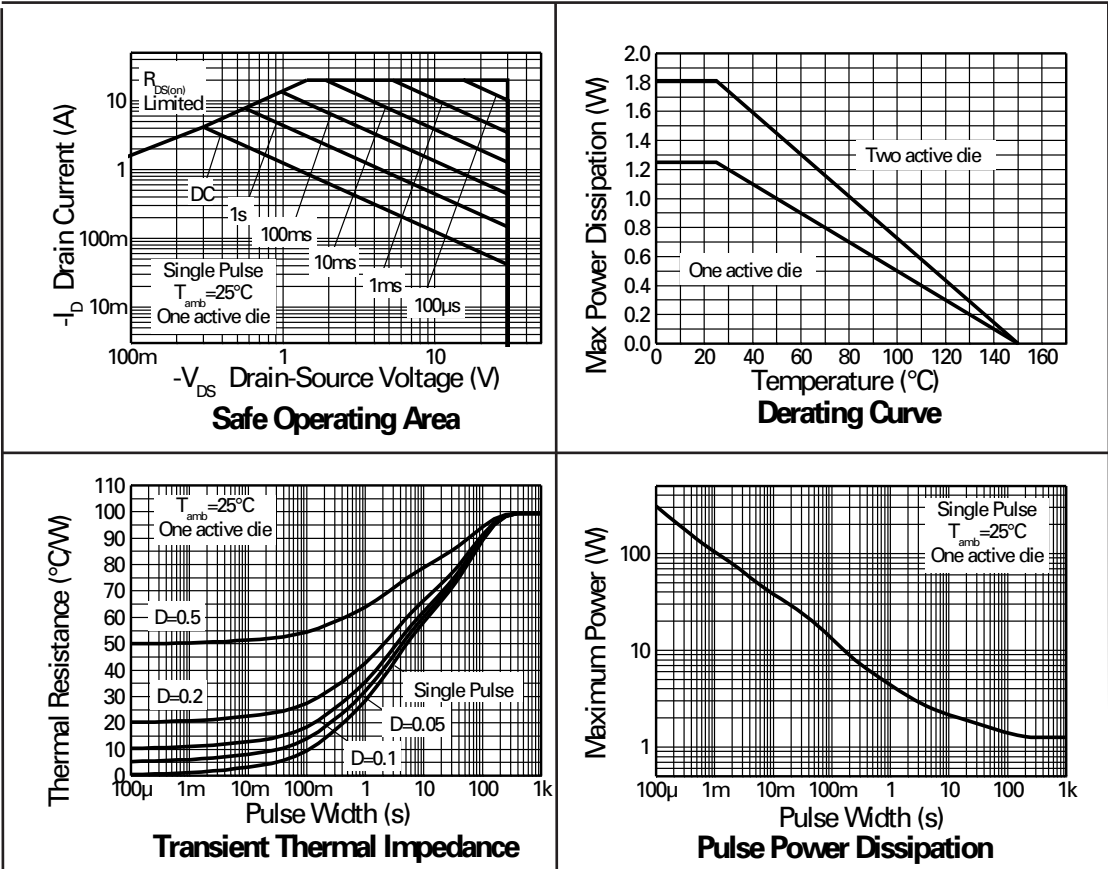
| PARAMETER                             | SYMBOL          | VALUE | UNIT         |
|---------------------------------------|-----------------|-------|--------------|
| Junction to Ambient <sup>(a)(d)</sup> | $R_{\theta JA}$ | 100   | $^\circ C/W$ |
| Junction to Ambient <sup>(b)(e)</sup> | $R_{\theta JA}$ | 70    | $^\circ C/W$ |
| Junction to Ambient <sup>(b)(d)</sup> | $R_{\theta JA}$ | 60    | $^\circ C/W$ |

### Notes

- (a) For a dual device surface mounted on 25mm x 25mm FR4 PCB with coverage of single sided 1oz copper in still air conditions.
- (b) For a dual device surface mounted on FR4 PCB measured at  $t \leq 10$  sec.
- (c) Repetitive rating 25mm x 25mm FR4 PCB,  $D=0.05$  pulse width=10 $\mu s$  - pulse width limited by maximum junction temperature.
- (d) For a dual device with one active die.
- (e) For dual device with 2 active die running at equal power.

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## CHARACTERISTICS



# ZXMP3A16DN8

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

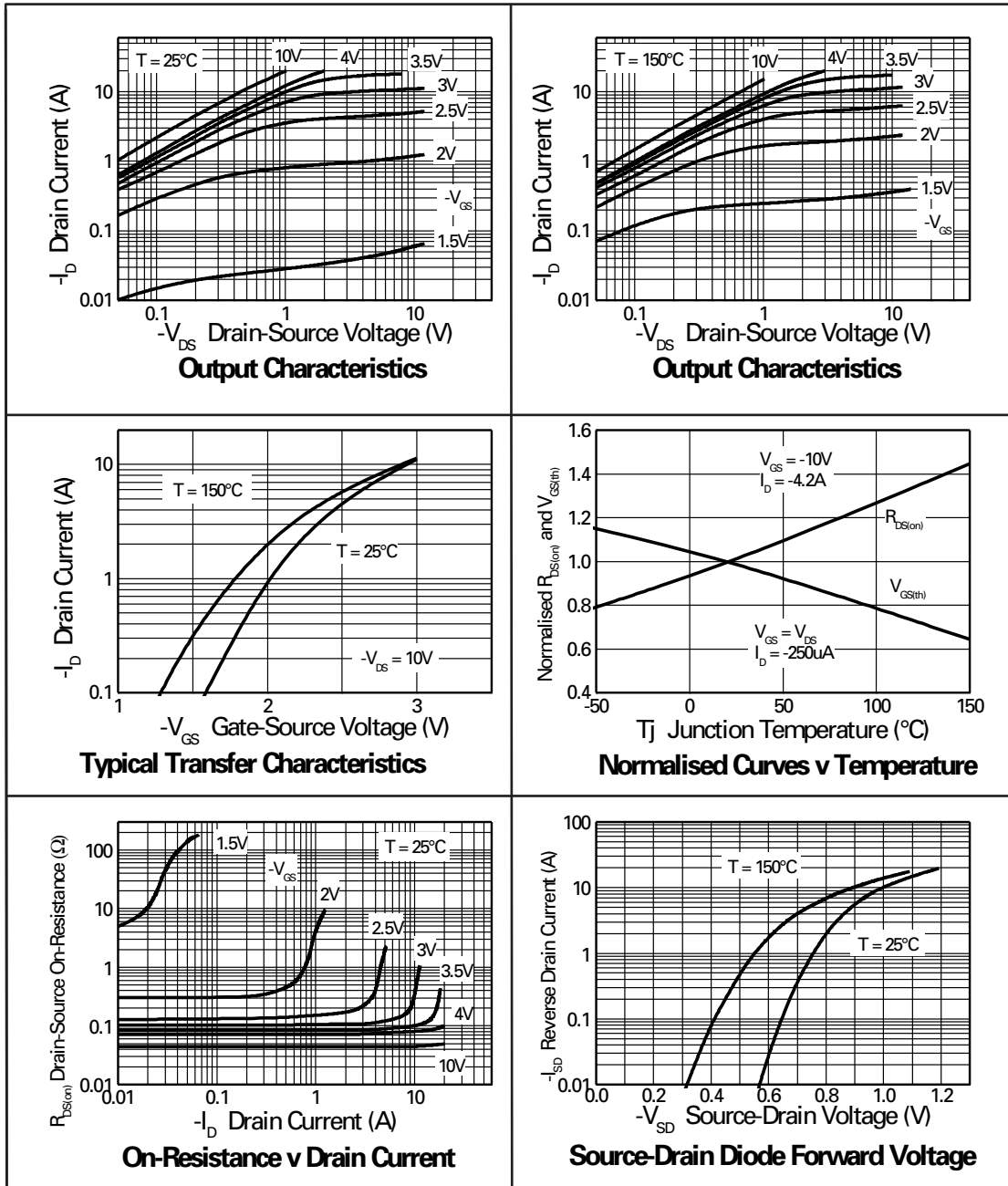
| PARAMETER  | SYMBOL        | MIN. | TYP.  | MAX.           | UNIT                 | CONDITIONS  |
|--|---------------|------|-------|----------------|----------------------|---|
| <b>STATIC</b>  |               |      |       |                |                      |   |
| Drain-Source Breakdown Voltage                         | $V_{(BR)DSS}$ | -30  |       |                | V                    | $I_D = -250\mu\text{A}$ , $V_{GS} = 0\text{V}$  |
| Zero Gate Voltage Drain Current                        | $I_{DSS}$     |      |       | -1.0           | $\mu\text{A}$        | $V_{DS} = -30\text{V}$ , $V_{GS} = 0\text{V}$   |
| Gate-Body Leakage                                      | $I_{GSS}$     |      |       | 100            | nA                   | $V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$  |
| Gate-Source Threshold Voltage                          | $V_{GS(th)}$  | -1.0 |       |                | V                    | $I_D = -250\mu\text{A}$ ,<br>$V_{DS} = V_{GS}$  |
| Static Drain-Source On-State Resistance <sup>(1)</sup> | $R_{DS(on)}$  |      |       | 0.045<br>0.070 | $\Omega$<br>$\Omega$ | $V_{GS} = -10\text{V}$ , $I_D = -4.2\text{A}$<br>$V_{GS} = -4.5\text{V}$ , $I_D = -3.4\text{A}$ |
| Forward Transconductance <sup>(1)(3)</sup>             | $g_{fs}$      |      | 9.2   |                | S                    | $V_{DS} = -15\text{V}$ , $I_D = -4.2\text{A}$   |
| <b>DYNAMIC</b> <sup>(3)</sup>                          |               |      |       |                |                      |   |
| Input Capacitance                                      | $C_{iss}$     |      | 1022  |                | pF                   | $V_{DS} = -15\text{V}$ , $V_{GS} = 0\text{V}$ ,<br>$f = 1\text{MHz}$                            |
| Output Capacitance                                     | $C_{oss}$     |      | 267   |                | pF                   |   |
| Reverse Transfer Capacitance                           | $C_{rss}$     |      | 229   |                | pF                   |   |
| <b>SWITCHING</b> <sup>(2) (3)</sup>                    |               |      |       |                |                      |   |
| Turn-On Delay Time                                     | $t_{d(on)}$   |      | 3.8   |                | ns                   | $V_{DD} = -15\text{V}$ , $I_D = -1\text{A}$<br>$R_G = 6.0\Omega$ , $V_{GS} = -10\text{V}$       |
| Rise Time  | $t_r$         |      | 6.5   |                | ns                   |   |
| Turn-Off Delay Time                                    | $t_{d(off)}$  |      | 37.1  |                | ns                   |   |
| Fall Time  | $t_f$         |      | 21.4  |                | ns                   |   |
| Gate Charge  | $Q_g$         |      | 17.2  |                | nC                   | $V_{DS} = -15\text{V}$ , $V_{GS} = -5\text{V}$ ,<br>$I_D = -4.2\text{A}$                        |
| Total Gate Charge                                      | $Q_g$         |      | 29.6  |                | nC                   | $V_{DS} = -15\text{V}$ , $V_{GS} = -10\text{V}$ ,<br>$I_D = -4.2\text{A}$                       |
| Gate-Source Charge                                     | $Q_{gs}$      |      | 2.8   |                | nC                   |   |
| Gate-Drain Charge                                      | $Q_{gd}$      |      | 8.6   |                | nC                   |   |
| <b>SOURCE-DRAIN DIODE</b>                              |               |      |       |                |                      |   |
| Diode Forward Voltage <sup>(1)</sup>                   | $V_{SD}$      |      | -0.85 | -0.95          | V                    | $T_J = 25^{\circ}\text{C}$ , $I_S = -3.6\text{A}$ ,<br>$V_{GS} = 0\text{V}$                     |
| Reverse Recovery Time <sup>(3)</sup>                   | $t_{rr}$      |      | 21.7  |                | ns                   | $T_J = 25^{\circ}\text{C}$ , $I_F = -2\text{A}$ ,<br>$di/dt = 100\text{A}/\mu\text{s}$          |
| Reverse Recovery Charge <sup>(3)</sup>                 | $Q_{rr}$      |      | 16.1  |                | nC                   |   |

### NOTES

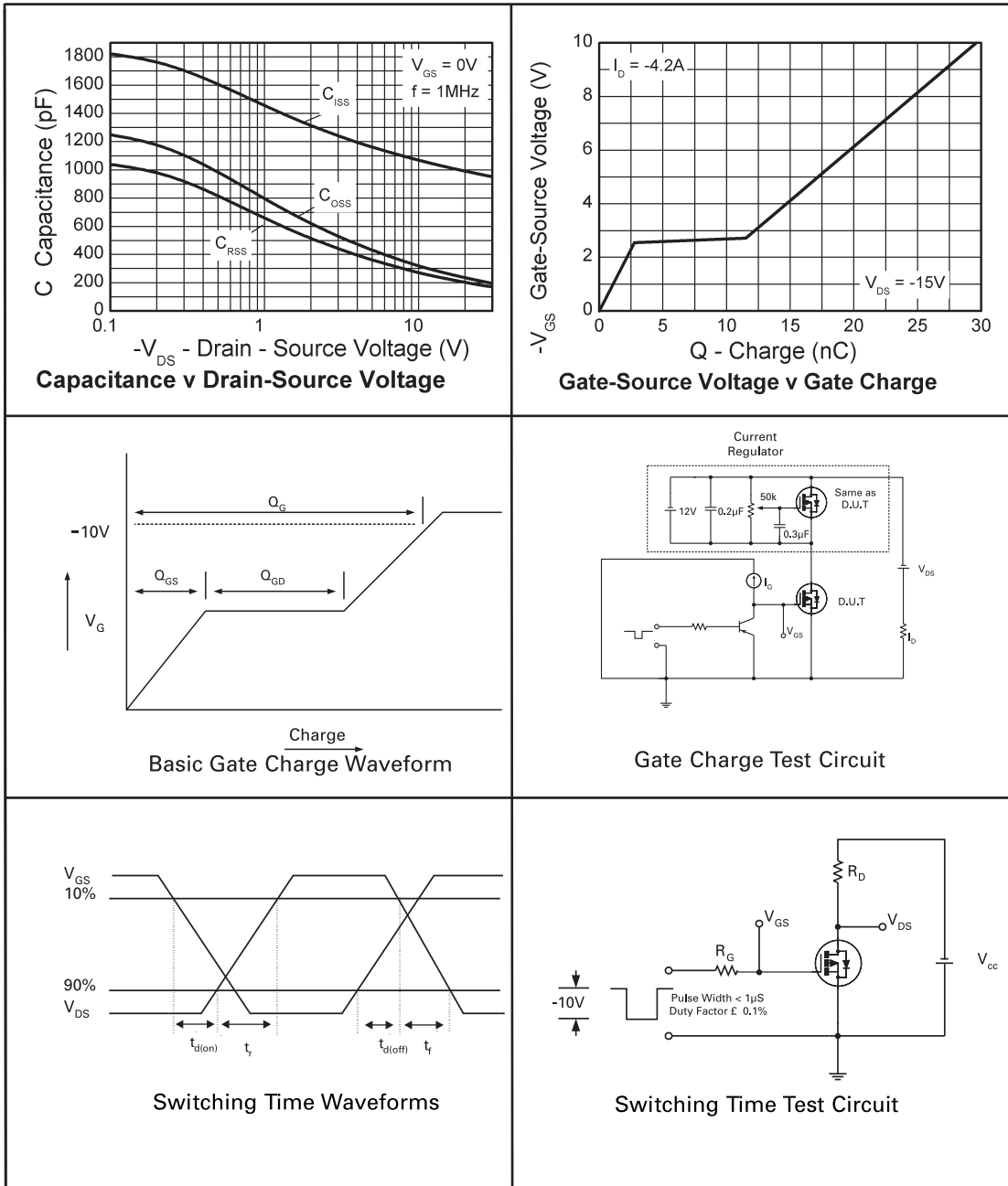
- (1) Measured under pulsed conditions. Width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .  
(2) Switching characteristics are independent of operating junction temperature.  
(3) For design aid only, not subject to production testing.

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## TYPICAL CHARACTERISTICS



# ZXMP3A16DN8



# ZXMP3A16DN8

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"Active"Product status recommended for new designs

"Last time buy (LTB)"Device will be discontinued and last time buy period and delivery is in effect

"Not recommended for new designs"Device is still in production to support existing designs and production

"Obsolete"Production has been discontinued

Datasheet status key:

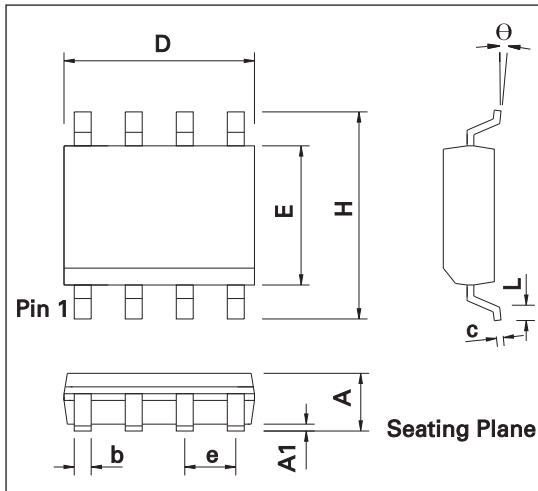
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# ZXMP3A16DN8

## PACKAGE OUTLINE



CONTROLLING DIMENSIONS ARE IN INCHES  
APPROX IN MILLIMETRES

## PACKAGE DIMENSIONS

| DIM | Millimeters |      | Inches |       | DIM | Millimeters |      | Inches    |       |
|-----|-------------|------|--------|-------|-----|-------------|------|-----------|-------|
|     | Min         | Max  | Min    | Max   |     | Min         | Max  | Min       | Max   |
| A   | 1.35        | 1.75 | 0.053  | 0.069 | e   | 1.27 BSC    |      | 0.050 BSC |       |
| A1  | 0.10        | 0.25 | 0.004  | 0.010 | b   | 0.33        | 0.51 | 0.013     | 0.020 |
| D   | 4.80        | 5.00 | 0.189  | 0.197 | c   | 0.19        | 0.25 | 0.008     | 0.010 |
| H   | 5.80        | 6.20 | 0.228  | 0.244 | Θ   | 0°          | 8°   | 0°        | 8°    |
| E   | 3.80        | 4.00 | 0.150  | 0.157 | h   | 0.25        | 0.50 | 0.010     | 0.020 |
| L   | 0.40        | 1.27 | 0.016  | 0.050 | -   | -           | -    | -         | -     |

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