

# ZXMC3A17DN8

## COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET

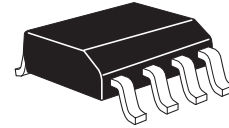
### SUMMARY

N-Channel :  $V_{(BR)DSS} = 30V$  ;  $R_{DS(on)} = 0.050\Omega$  ;  $I_D = 5.4A$

P-Channel :  $V_{(BR)DSS} = -30V$  ;  $R_{DS(on)} = 0.070\Omega$  ;  $I_D = -4.4A$

### 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.



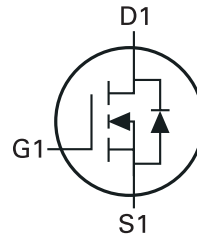
SO8

### FEATURES

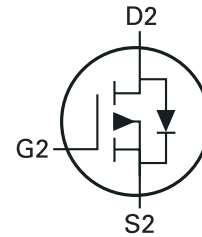
- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

### APPLICATIONS

- Motor drive
- LCD backlighting



Q1 = N-channel

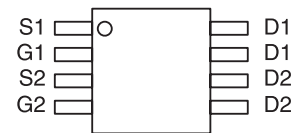


Q2 = P-channel

### ORDERING INFORMATION

| DEVICE        | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|---------------|-----------|------------|-------------------|
| ZXMC3A17DN8TA | 7"        | 12mm       | 500 units         |
| ZXMC3A17DN8TC | 13"       | 12mm       | 2500 units        |

### PINOUT



Top View

### DEVICE MARKING

- ZXMC  
3A17

# ZXMC3A17DN8

## ADVANCE INFORMATION

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER   | SYMBOL         | N-channel         | P-channel            | UNIT                |
|---|----------------|-------------------|----------------------|---------------------|
| Drain-Source Voltage  | $V_{DSS}$      | 30                | -30                  | V                   |
| Gate-Source Voltage   | $V_{GS}$       | $\pm 20$          | $\pm 20$             | V                   |
| Continuous Drain Current<br>( $V_{GS} = 10V$ ; $T_A = 25^\circ C$ ) <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> | $I_D$          | 5.4<br>4.3<br>4.1 | -4.4<br>-3.6<br>-3.4 | A                   |
| Pulsed Drain Current <sup>(c)</sup>   | $I_{DM}$       | 23                | -20                  | A                   |
| Continuous Source Current (Body Diode) <sup>(b)</sup>   | $I_S$          | 2.6               | -2.5                 | A                   |
| Pulsed Source Current (Body Diode) <sup>(c)</sup>   | $I_{SM}$       | 23                | -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       |                      | $^\circ C$          |

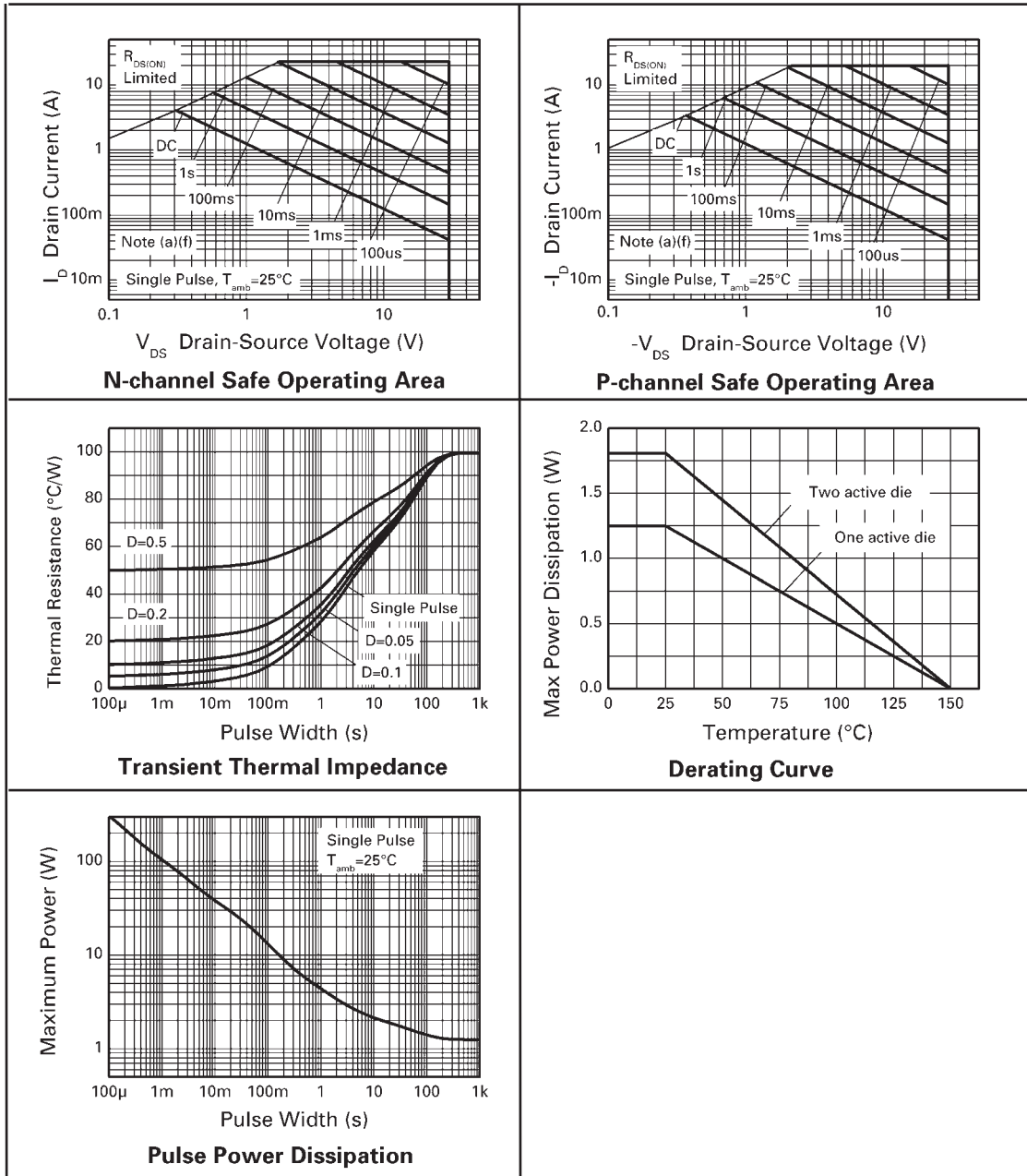
### THERMAL RESISTANCE

| PARAMETER                              | SYMBOL          | VALUE | UNIT         |
|--|-----------------|-------|--------------|
| Junction to Ambient <sup>(a) (d)</sup> | $R_{\theta JA}$ | 100   | $^\circ C/W$ |
| Junction to Ambient <sup>(a) (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 high 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,  $D = 0.02$ , pulse width = 300 $\mu s$  - pulse width limited by maximum junction temperature.
- (d) For a dual device with one active die.
- (e) For dual device with two active die running at equal power.

CHARACTERISTICS



# ZXMC3A17DN8

## ADVANCE INFORMATION

### N-CHANNEL

#### 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                        | $I_{DSS}$     |      |      | 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                          | $V_{GS(th)}$  | 1.0  |      |       | V             | $I_D = 250\mu\text{A}$ , $V_{DS} = V_{GS}$  |
| Static Drain-Source On-State Resistance <sup>(1)</sup> | $R_{DS(on)}$  |      |      | 0.050 | $\Omega$      | $V_{GS} = 10\text{V}$ , $I_D = 7.8\text{A}$   |
|  |               |      |      | 0.065 | $\Omega$      | $V_{GS} = 4.5\text{V}$ , $I_D = 6.8\text{A}$  |
| Forward Transconductance <sup>(1) (3)</sup>            | $g_{fs}$      |      | 10   |       | S             | $V_{DS} = 10\text{V}$ , $I_D = 7.8\text{A}$   |
| <b>DYNAMIC <sup>(3)</sup></b>                          |               |      |      |       |               |   |
| Input Capacitance                                      | $C_{iss}$     |      | 600  |       | pF            | $V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$<br>$f = 1\text{MHz}$                               |
| Output Capacitance                                     | $C_{oss}$     |      | 104  |       | pF            |   |
| Reverse Transfer Capacitance                           | $C_{rss}$     |      | 58.5 |       | pF            |   |
| <b>SWITCHING <sup>(2) (3)</sup></b>                    |               |      |      |       |               |   |
| Turn-On-Delay Time                                     | $t_{d(on)}$   |      | 2.9  |       | ns            | $V_{DD} = 15\text{V}$ , $I_D = 3.5\text{A}$<br>$R_G \cong 6.0\Omega$ ,<br>$V_{GS} = 10\text{V}$ |
| Rise Time  | $t_r$         |      | 6.4  |       | ns            |   |
| Turn-Off Delay Time                                    | $t_{d(off)}$  |      | 16   |       | ns            |   |
| Fall Time  | $t_f$         |      | 11.2 |       | ns            |   |
| Gate Charge  | $Q_g$         |      | 6.9  |       | nC            | $V_{DS} = 15\text{V}$ , $V_{GS} = 5\text{V}$<br>$I_D = 3.5\text{A}$                             |
| Total Gate Charge                                      | $Q_g$         |      | 12.2 |       | nC            | $V_{DS} = 15\text{V}$ , $V_{GS} = 10\text{V}$<br>$I_D = 3.5\text{A}$                            |
| Gate-Source Charge                                     | $Q_{gs}$      |      | 1.7  |       | nC            |   |
| Gate-Drain Charge                                      | $Q_{gd}$      |      | 2.4  |       | nC            |   |
| <b>SOURCE-DRAIN DIODE</b>                              |               |      |      |       |               |   |
| Diode Forward Voltage <sup>(1)</sup>                   | $V_{SD}$      |      | 0.85 | 0.95  | V             | $T_j = 25^{\circ}\text{C}$ , $I_S = 3.2\text{A}$ ,<br>$V_{GS} = 0\text{V}$                      |
| Reverse Recovery Time <sup>(3)</sup>                   | $t_{rr}$      |      | 18.8 |       | ns            | $T_j = 25^{\circ}\text{C}$ , $I_F = 3.5\text{A}$ ,<br>$di/dt = 100\text{A}/\mu\text{s}$         |
| Reverse Recovery Charge <sup>(3)</sup>                 | $Q_{rr}$      |      | 14.1 |       | nC            |   |

(1) Measured under pulsed conditions. Pulse width  $\leq 300\text{ms}$ ; Duty cycle  $\leq 2\%$ .

(2) Switching characteristics are independent of operating junction temperature.

(3) For design aid only, not subject to production testing.

# ZXMC3A17DN8

## ADVANCE INFORMATION

### P-CHANNEL

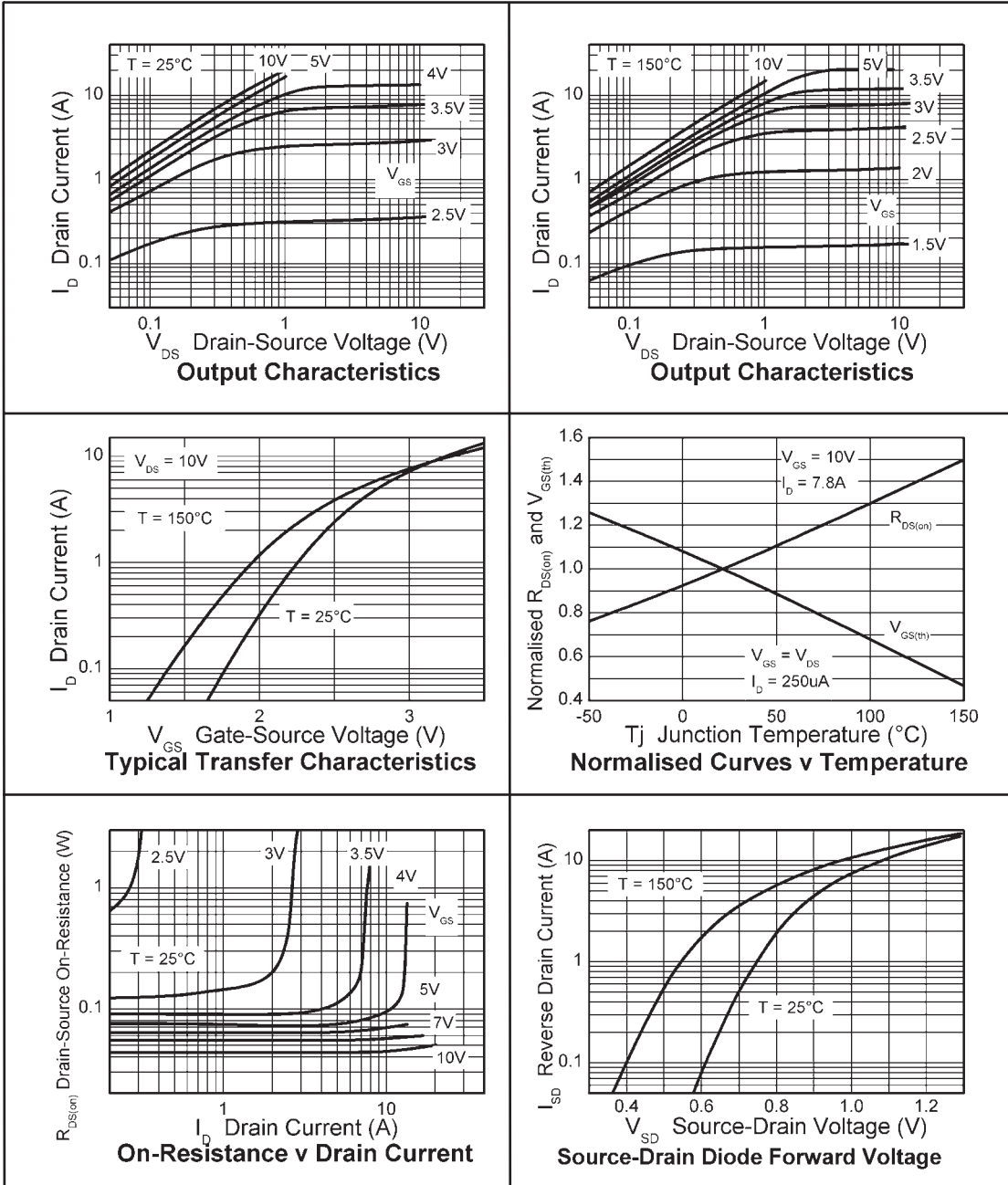
#### ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

| 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             | $I_D = -250\mu\text{A}$ , $V_{DS} = V_{GS}$  |
| Static Drain-Source On-State Resistance <sup>(1)</sup> | $R_{DS(on)}$  |      |       | 0.070 | $\Omega$      | $V_{GS} = -10\text{V}$ , $I_D = -3.2\text{A}$  |
|  |               |      |       | 0.110 | $\Omega$      | $V_{GS} = -4.5\text{V}$ , $I_D = -2.5\text{A}$   |
| Forward Transconductance <sup>(1) (3)</sup>            | $g_{fs}$      |      | 6.4   |       | S             | $V_{DS} = -15\text{V}$ , $I_D = -3.2\text{A}$  |
| <b>DYNAMIC <sup>(3)</sup></b>                          |               |      |       |       |               |  |
| Input Capacitance                                      | $C_{iss}$     |      | 630   |       | pF            | $V_{DS} = -15\text{V}$ , $V_{GS} = 0\text{V}$<br>$f = 1\text{MHz}$                               |
| Output Capacitance                                     | $C_{oss}$     |      | 113   |       | pF            |  |
| Reverse Transfer Capacitance                           | $C_{rss}$     |      | 78    |       | pF            |  |
| <b>SWITCHING <sup>(2) (3)</sup></b>                    |               |      |       |       |               |  |
| Turn-On-Delay Time                                     | $t_{d(on)}$   |      | 1.7   |       | ns            | $V_{DD} = -15\text{V}$ , $I_D = -1\text{A}$<br>$R_G \cong 6.0\Omega$ ,<br>$V_{GS} = -10\text{V}$ |
| Rise Time  | $t_r$         |      | 2.9   |       | ns            |  |
| Turn-Off Delay Time                                    | $t_{d(off)}$  |      | 29.2  |       | ns            |  |
| Fall Time  | $t_f$         |      | 8.7   |       | ns            |  |
| Gate Charge  | $Q_g$         |      | 8.3   |       | nC            | $V_{DS} = -15\text{V}$ , $V_{GS} = -5\text{V}$<br>$I_D = -3.2\text{A}$                           |
| Total Gate Charge                                      | $Q_g$         |      | 15.8  |       | nC            | $V_{DS} = -15\text{V}$ , $V_{GS} = -10\text{V}$<br>$I_D = -3.2\text{A}$                          |
| Gate-Source Charge                                     | $Q_{gs}$      |      | 1.8   |       | nC            |  |
| Gate Drain Charge                                      | $Q_{gd}$      |      | 2.8   |       | nC            |  |
| <b>SOURCE-DRAIN DIODE</b>                              |               |      |       |       |               |  |
| Diode Forward Voltage <sup>(1)</sup>                   | $V_{SD}$      |      | -0.85 | -0.95 | V             | $T_j = 25^{\circ}\text{C}$ , $I_S = -2.5\text{A}$ ,<br>$V_{GS} = 0\text{V}$                      |
| Reverse Recovery Time <sup>(3)</sup>                   | $t_{rr}$      |      | 19.5  |       | ns            | $T_j = 25^{\circ}\text{C}$ , $I_S = -1.7\text{A}$ ,<br>$di/dt = 100\text{A}/\mu\text{s}$         |
| Reverse Recovery Charge <sup>(3)</sup>                 | $Q_{rr}$      |      | 16.3  |       | nC            |  |

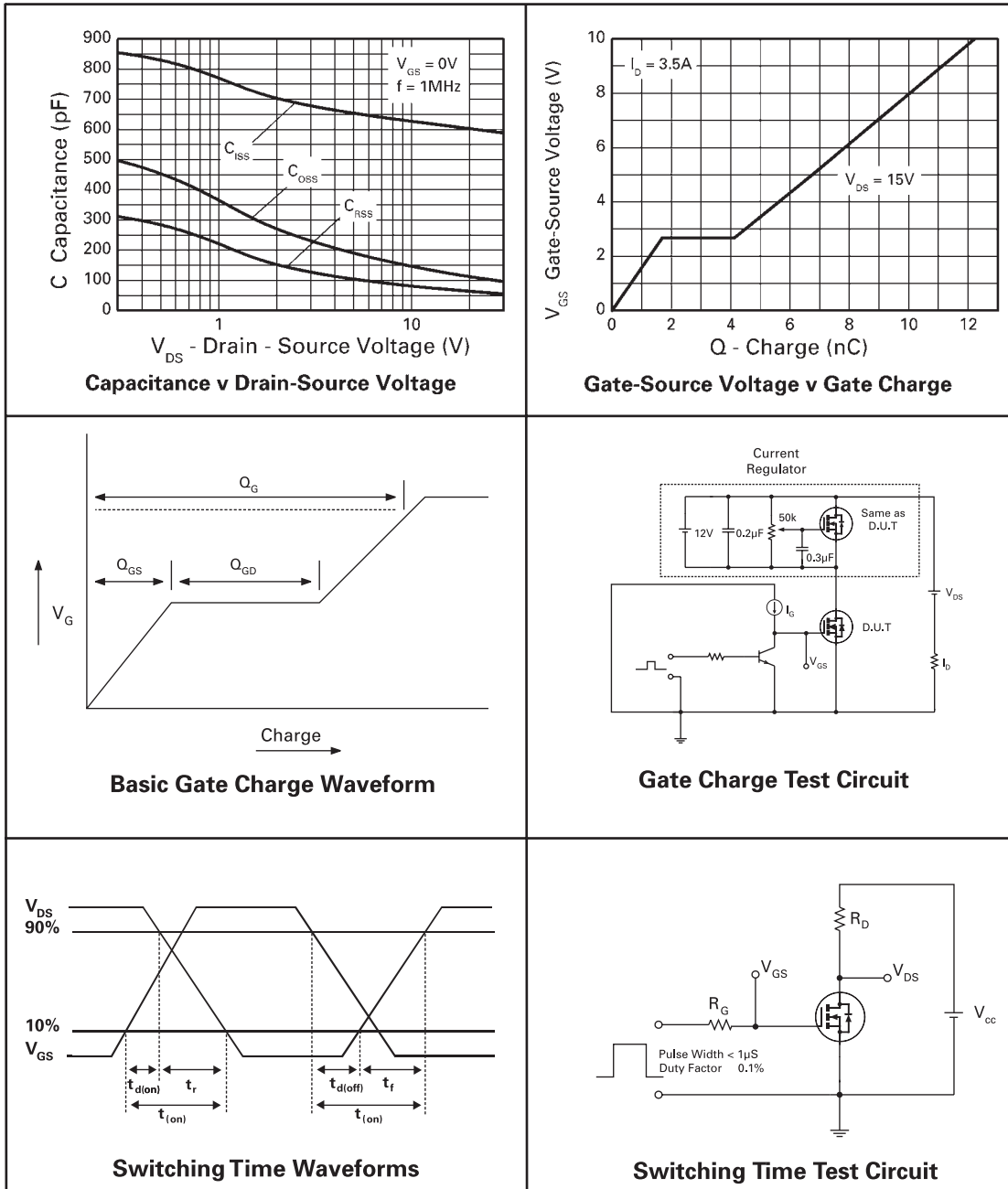
NOTES:

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

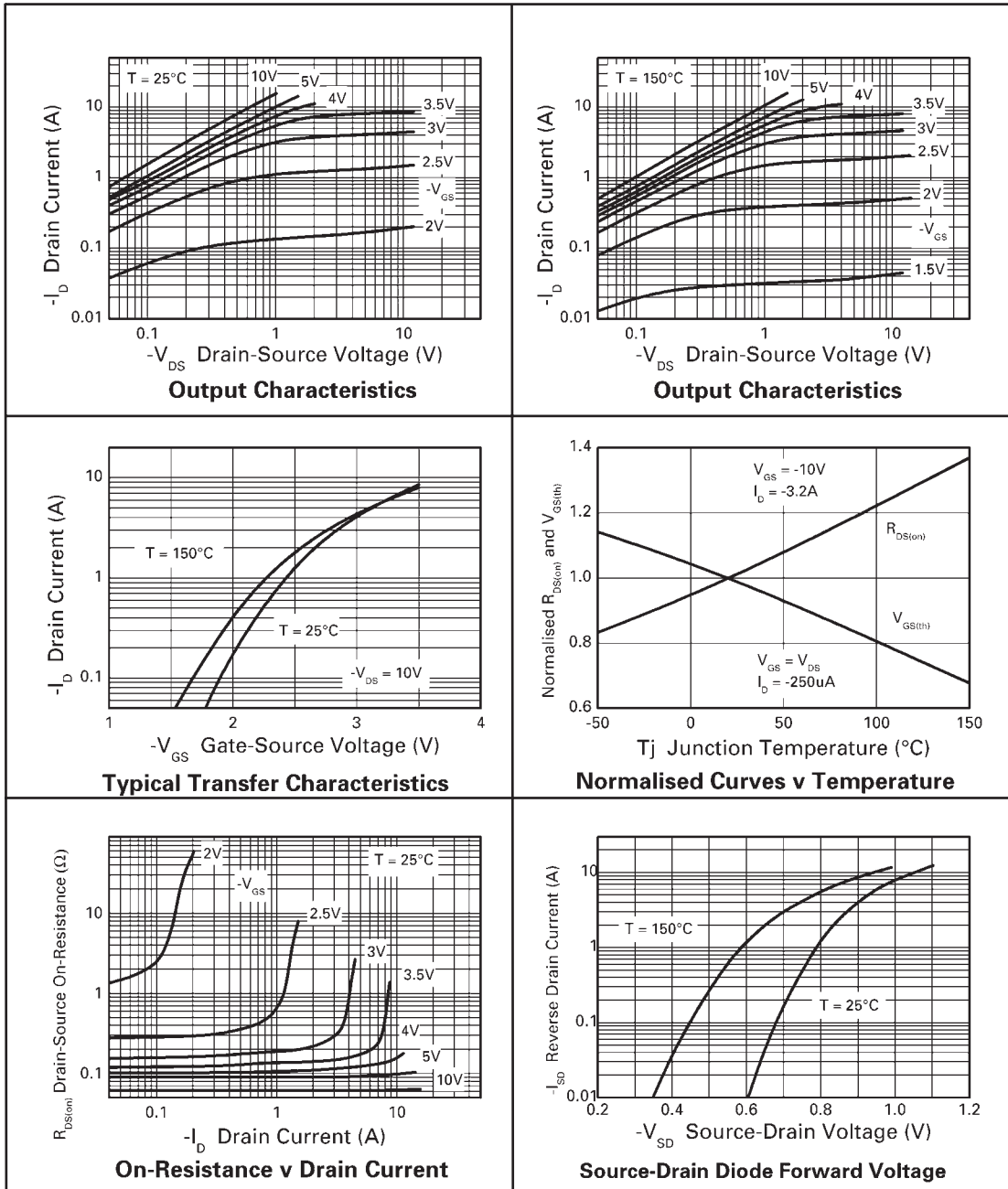
N-CHANNEL TYPICAL CHARACTERISTICS



N-CHANNEL TYPICAL CHARACTERISTICS

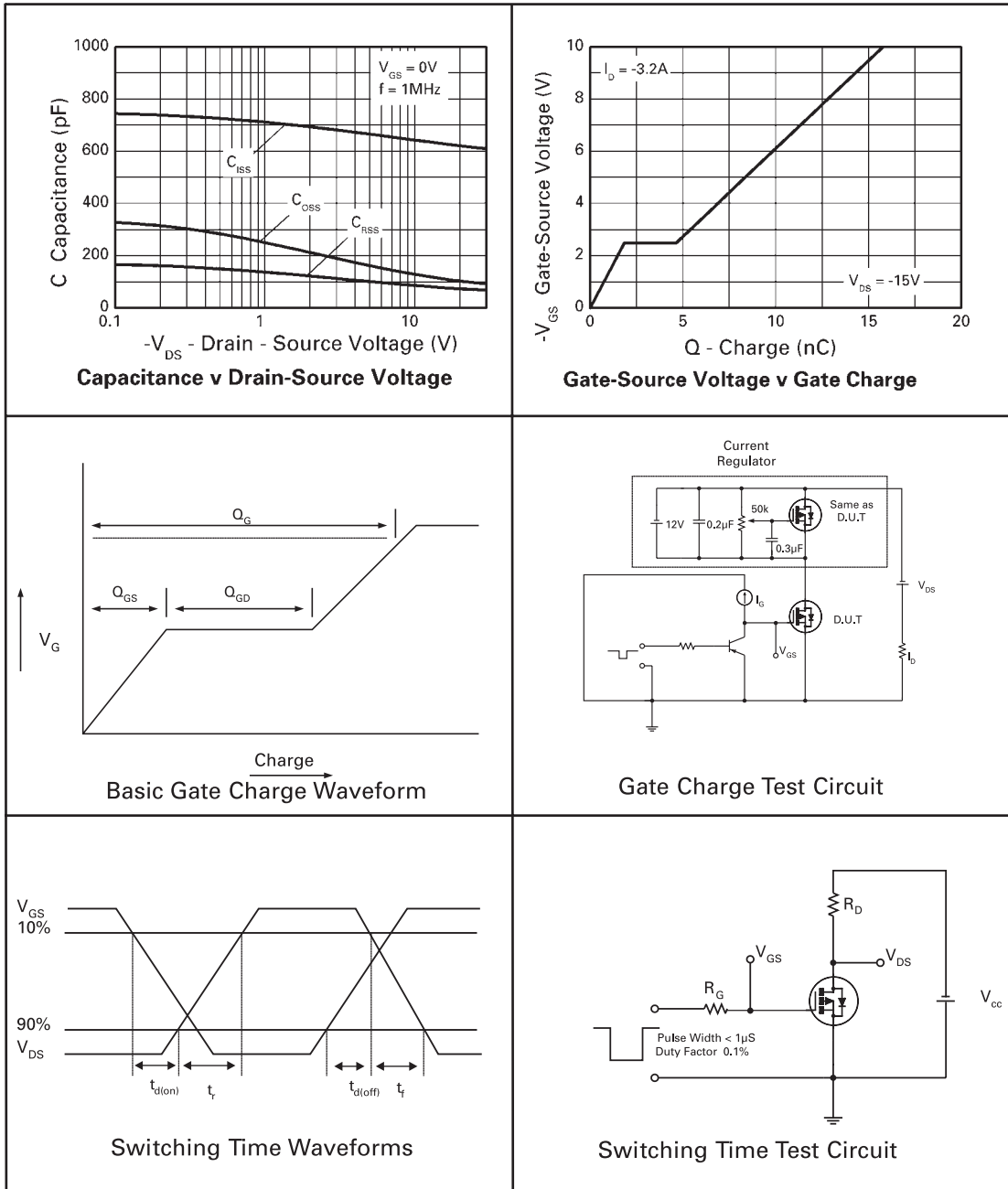


### P-CHANNEL TYPICAL CHARACTERISTICS



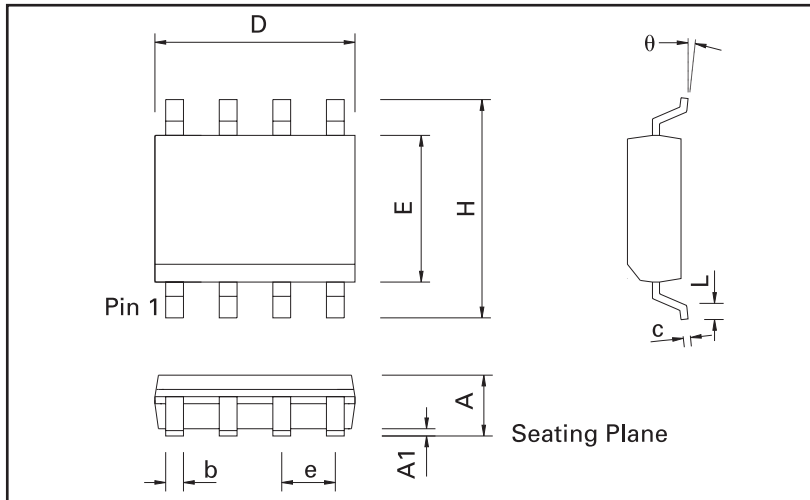


P-CHANNEL TYPICAL CHARACTERISTICS



# ZXMC3A17DN8

## SO8 PACKAGE OUTLINE (Conforms to JEDEC MS-012AA Iss. C)



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

### 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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