

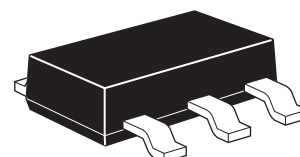
# ZXMN7A11G

## 70V N-channel enhancement mode MOSFET

### Summary

$V_{DSS}=70V$  :  $R_{DS(on)}=0.13\Omega$

$I_D=3.8A$

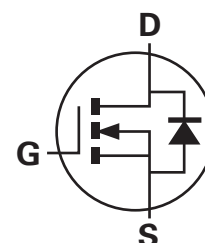


### Description

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.

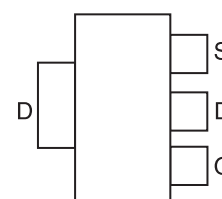
### Features

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT223 package



### Applications

- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control
- Class D audio output stages



### Ordering information

| Device      | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|--------------------|-----------------|-------------------|
| ZXMN7A11GTA | 7                  | 12              | 1,000             |
| ZXMN7A11GTC | 13                 | 12              | 4,000             |

### Device marking

ZXMN  
7A11

# ZXMN7A11G

## Absolute maximum ratings

| Parameter                                                        | Symbol         | Limit       | Unit           |
|------------------------------------------------------------------|----------------|-------------|----------------|
| Drain-source voltage                                             | $V_{DSS}$      | 70          | V              |
| Gate-source voltage                                              | $V_{GS}$       | $\pm 20$    | V              |
| Continuous drain current @ $V_{GS}=10V$ ; $T_A=25^\circ C^{(b)}$ | $I_D$          | 3.8         | A              |
| @ $V_{GS}=10V$ ; $T_A=70^\circ C^{(b)}$                          |                | 3.0         | A              |
| @ $V_{GS}=10V$ ; $T_A=25^\circ C^{(a)}$                          |                | 2.7         | A              |
| Pulsed drain current <sup>(c)</sup>                              | $I_{DM}$       | 10          | A              |
| Continuous source current (body diode) <sup>(b)</sup>            | $I_S$          | 5           | A              |
| Pulsed source current (body diode) <sup>(c)</sup>                | $I_{SM}$       | 10          | A              |
| Power dissipation at $T_A = 25^\circ C^{(a)}$                    | $P_D$          | 2           | W              |
| Linear derating factor                                           |                | 16          | mW/ $^\circ C$ |
| Power dissipation at $T_A = 25^\circ C^{(b)}$                    | $P_D$          | 3.9         | W              |
| Linear derating factor                                           |                | 31          | mW/ $^\circ C$ |
| Operating and storage temperature range                          | $T_j, T_{stg}$ | -55 to +150 | $^\circ C$     |

## Thermal resistance

| Parameter                          | Symbol          | Limit | Unit         |
|------------------------------------|-----------------|-------|--------------|
| Junction to ambient <sup>(a)</sup> | $R_{\theta JA}$ | 62.5  | $^\circ C/W$ |
| Junction to ambient <sup>(b)</sup> | $R_{\theta JA}$ | 32    | $^\circ C/W$ |

### NOTES:

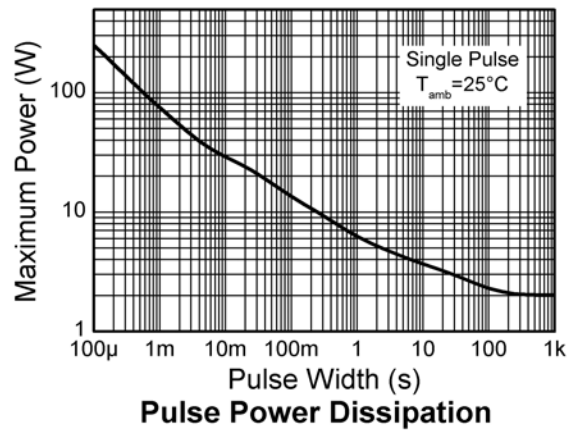
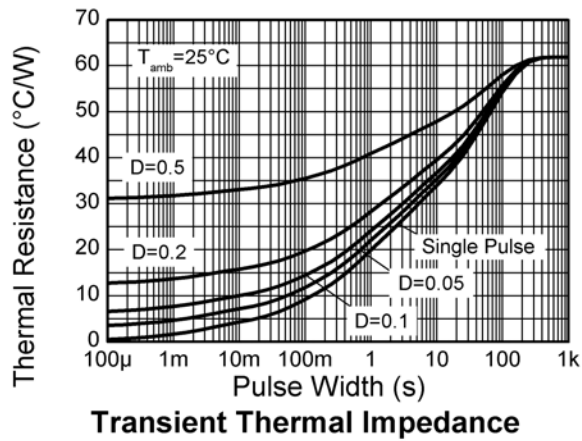
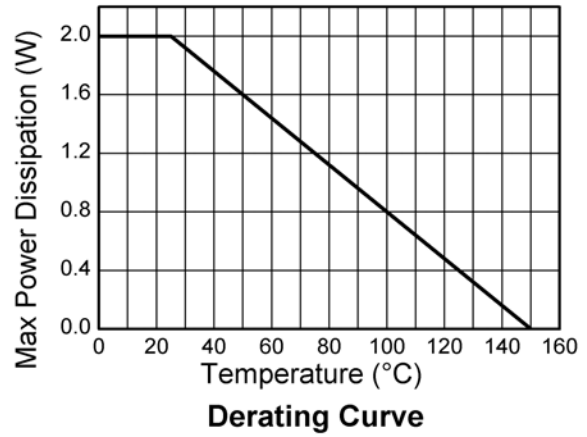
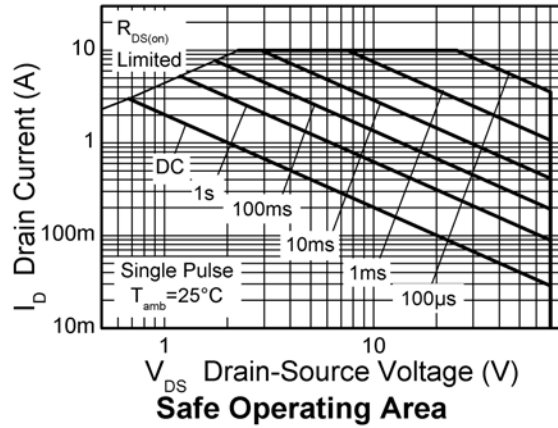
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) For a device surface mounted on FR4 PCB measured at  $t \leq 5$  sec.

(c) Repetitive rating 25mm x 25mm FR4 PCB,  $D=0.05$  pulse width=10 $\mu s$  - pulse width limited by maximum junction temperature.

# ZXMN7A11G

## Characteristics



# ZXMN7A11G

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

| Parameter                                              | Symbol               | Min. | Typ. | Max. | Unit | Conditions                                                                                |
|--------------------------------------------------------|----------------------|------|------|------|------|-------------------------------------------------------------------------------------------|
| Static                                                 |                      |      |      |      |      |                                                                                           |
| Drain-source breakdown voltage                         | V <sub>(BR)DSS</sub> | 70   |      |      | 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> = 70V, V <sub>GS</sub> =0V                                                |
| Gate-body leakage                                      | I <sub>GSS</sub>     |      |      | 100  | nA   | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                |
| Gate-source threshold voltage                          | V <sub>GS(th)</sub>  | 1.0  |      |      | V    | I <sub>D</sub> = 250μA, V <sub>DS</sub> =V <sub>GS</sub>                                  |
| Static drain-source on-state resistance <sup>(*)</sup> | R <sub>DS(on)</sub>  |      |      | 0.13 | Ω    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.4A                                              |
|                                                        |                      |      |      | 0.19 | Ω    | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.8A                                             |
| Forward transconductance <sup>(*)(‡)</sup>             | g <sub>fs</sub>      |      | 4.66 |      | S    | V <sub>DS</sub> = 15V, I <sub>D</sub> = 4.4A                                              |
| Dynamic <sup>(‡)</sup>                                 |                      |      |      |      |      |                                                                                           |
| Input capacitance                                      | C <sub>iss</sub>     |      | 298  |      | pF   | V <sub>DS</sub> = 40V, V <sub>GS</sub> =0V<br>f=1MHz                                      |
| Output capacitance                                     | C <sub>oss</sub>     |      | 35   |      | pF   |                                                                                           |
| Reverse transfer capacitance                           | C <sub>rss</sub>     |      | 21   |      | pF   |                                                                                           |
| Switching <sup>(†)(‡)</sup>                            |                      |      |      |      |      |                                                                                           |
| Turn-on-delay time                                     | t <sub>d(on)</sub>   |      | 1.9  |      | ns   | V <sub>DD</sub> = 35V, I <sub>D</sub> = 1A<br>R <sub>G</sub> ≈6.0Ω, V <sub>GS</sub> = 10V |
| Rise time                                              | t <sub>r</sub>       |      | 2    |      | ns   |                                                                                           |
| Turn-off delay time                                    | t <sub>d(off)</sub>  |      | 11.5 |      | ns   |                                                                                           |
| Fall time                                              | t <sub>f</sub>       |      | 5.8  |      | ns   |                                                                                           |
| Total gate charge                                      | Q <sub>g</sub>       |      | 4.35 |      | nC   | V <sub>DS</sub> = 35V, V <sub>GS</sub> = 5V<br>I <sub>D</sub> = 4.4A                      |
| Total gate charge                                      | Q <sub>g</sub>       |      | 7.4  |      | nC   | V <sub>DS</sub> =35V, V <sub>GS</sub> = 10V<br>I <sub>D</sub> = 4.4A                      |
| Gate-source charge                                     | Q <sub>gs</sub>      |      | 1.06 |      | nC   |                                                                                           |
| Gate drain charge                                      | Q <sub>gd</sub>      |      | 1.8  |      | nC   |                                                                                           |
| Source-drain diode                                     |                      |      |      |      |      |                                                                                           |
| Diode forward voltage <sup>(*)</sup>                   | V <sub>SD</sub>      |      | 0.85 | 0.95 | V    | T <sub>j</sub> =25°C, I <sub>S</sub> = 2.5A,<br>V <sub>GS</sub> =0V                       |
| Reverse recovery time <sup>(‡)</sup>                   | t <sub>rr</sub>      |      | 19.8 |      | ns   | T <sub>j</sub> =25°C, I <sub>S</sub> = 2.5A,<br>di/dt=100A/μs                             |
| Reverse recovery charge <sup>(‡)</sup>                 | Q <sub>rr</sub>      |      | 14   |      | nC   |                                                                                           |

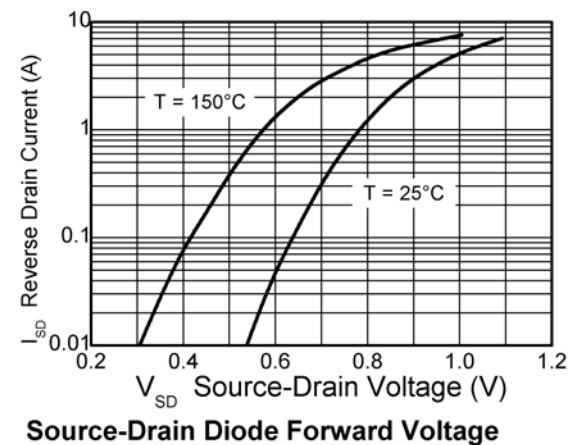
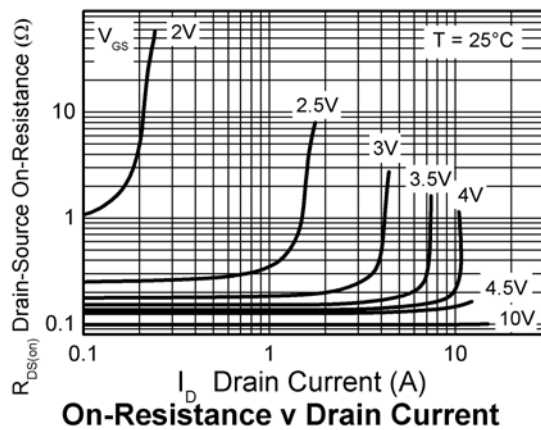
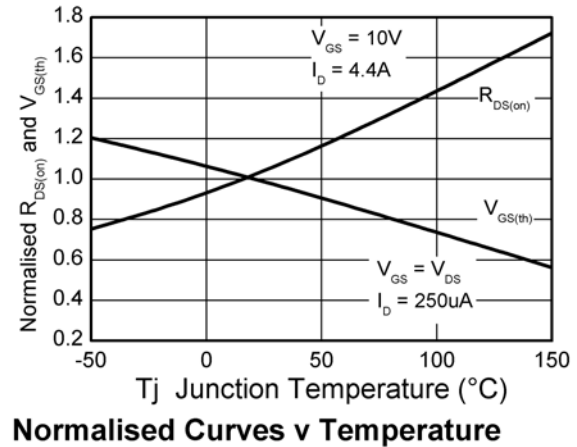
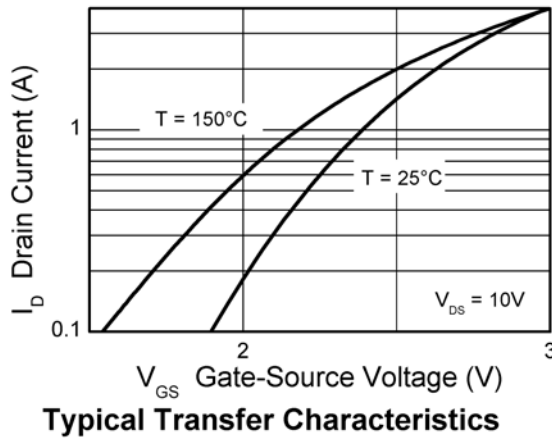
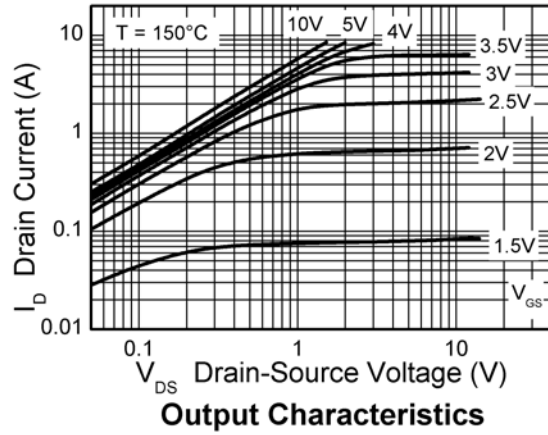
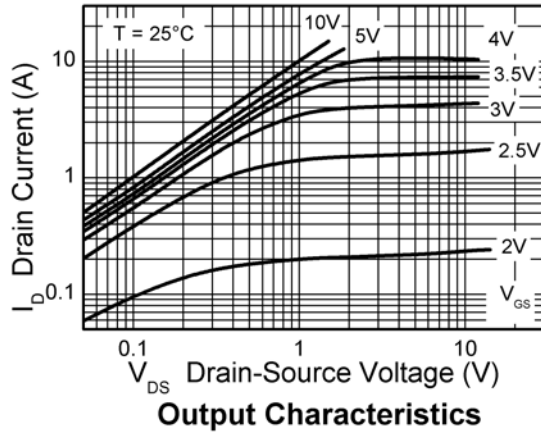
### NOTES:

(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

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

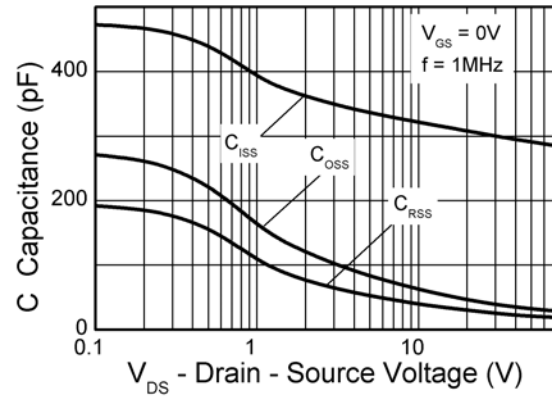
(‡) For design aid only, not subject to production testing.

## Typical characteristics

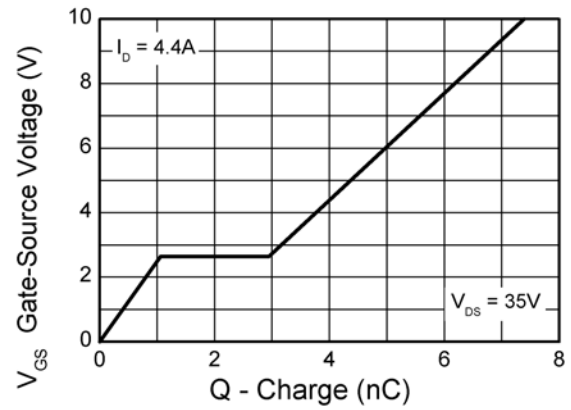


# ZXMN7A11G

## Typical characteristics



Capacitance v Drain-Source Voltage



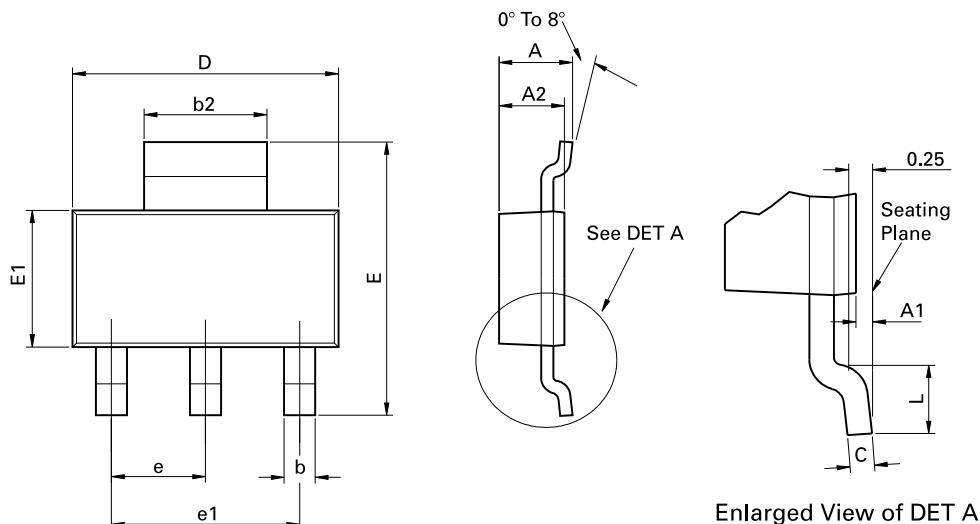
Gate-Source Voltage v Gate Charge

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# ZXMN7A11G

## Package outline - SOT223



Conforms to JEDEC TO-261 AA Issue B

| DIM | Millimeters |      | Inches |       | DIM | Millimeters |      | Inches     |       |
|-----|-------------|------|--------|-------|-----|-------------|------|------------|-------|
|     | Min         | Max  | Min    | Max   |     | Min         | Max  | Min        | Max   |
| A   | -           | 1.80 | -      | 0.071 | e   | 2.30 BSC    |      | 0.0905 BSC |       |
| A1  | 0.02        | 0.10 | 0.0008 | 0.004 | e1  | 4.60 BSC    |      | 0.181 BSC  |       |
| b   | 0.66        | 0.84 | 0.026  | 0.033 | E   | 6.70        | 7.30 | 0.264      | 0.287 |
| b2  | 2.90        | 3.10 | 0.114  | 0.122 | E1  | 3.30        | 3.70 | 0.130      | 0.146 |
| C   | 0.23        | 0.33 | 0.009  | 0.013 | L   | 0.90        | -    | 0.355      | -     |
| D   | 6.30        | 6.70 | 0.248  | 0.264 | -   | -           | -    | -          | -     |

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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