

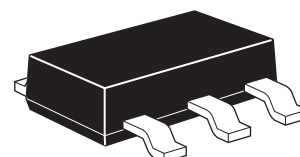
# ZXMN7A11G

## 70V N-channel enhancement mode MOSFET

### Summary

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

$I_D=3.8A$

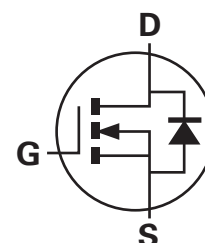


### Description

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.

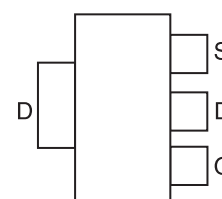
### Features

- 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 @ $V_{GS}=10V$ ; $T_A=25^{\circ}C^{(b)}$<br>@ $V_{GS}=10V$ ; $T_A=70^{\circ}C^{(b)}$<br>@ $V_{GS}=10V$ ; $T_A=25^{\circ}C^{(a)}$ | $I_D$          | 3.8<br>3.0<br>2.7 | A<br>A<br>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 $T_A = 25^{\circ}C^{(a)}$<br>Linear derating factor                                                                                  | $P_D$          | 2<br>16           | W<br>mW/ $^{\circ}C$ |
| Power dissipation at $T_A = 25^{\circ}C^{(b)}$<br>Linear derating factor                                                                                  | $P_D$          | 3.9<br>31         | W<br>mW/ $^{\circ}C$ |
| Operating and storage temperature range                                                                                                                   | $T_j, T_{stg}$ | -55 to<br>+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:

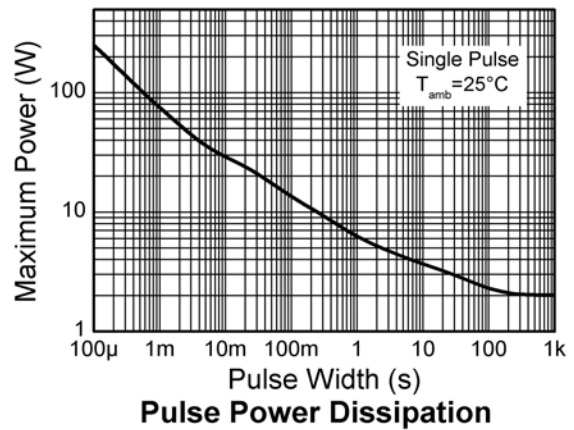
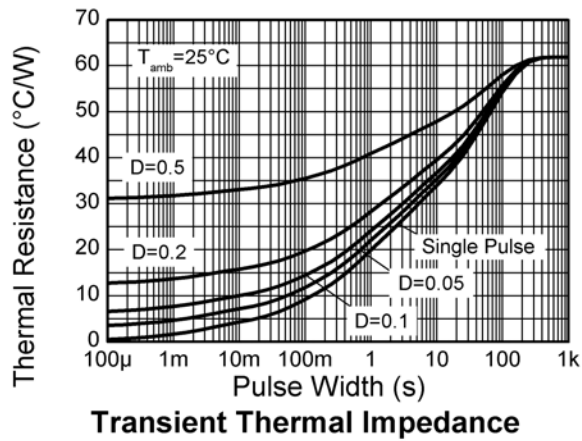
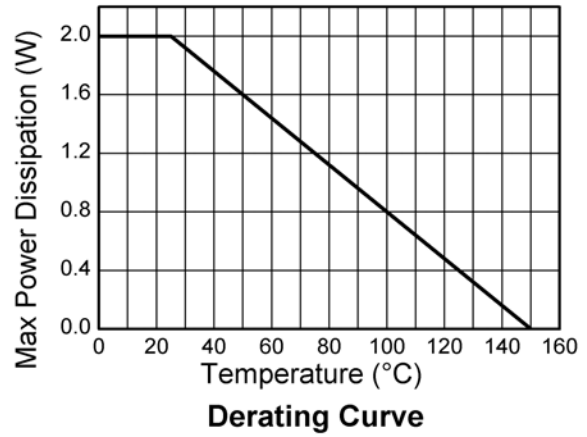
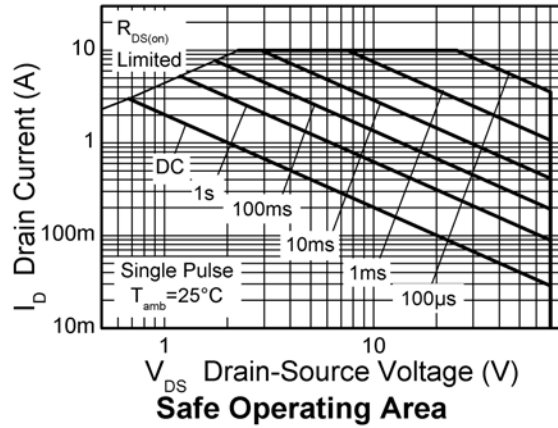
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(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   |                                                                                           |

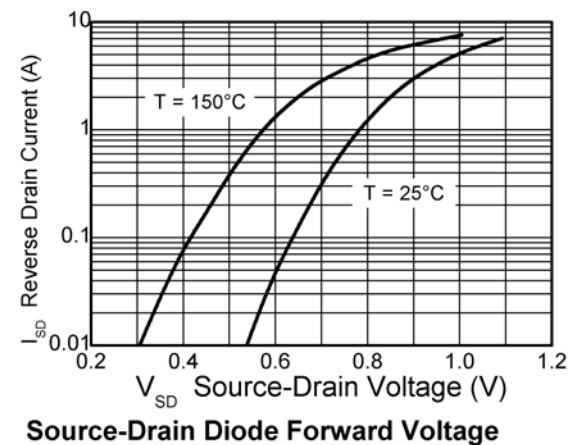
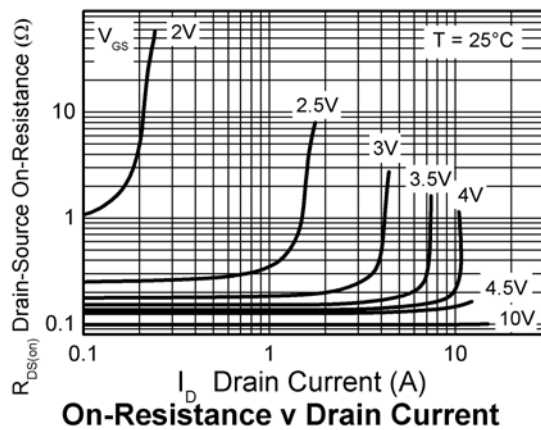
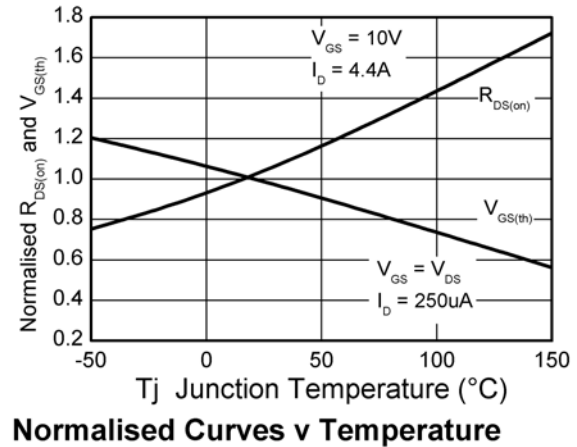
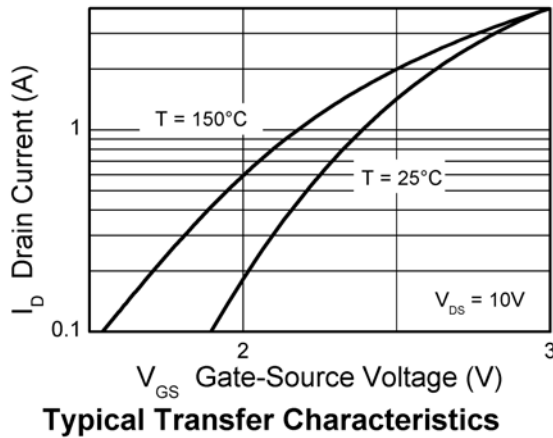
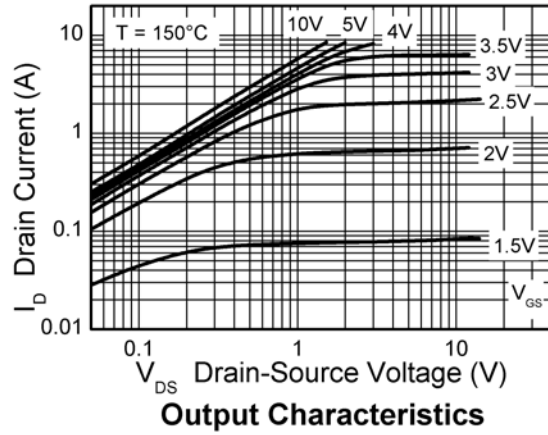
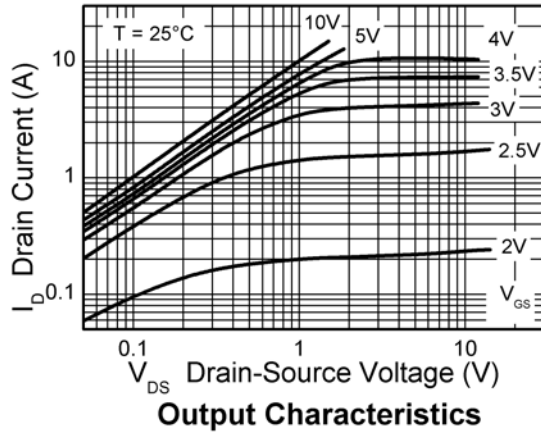
### NOTES:

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

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

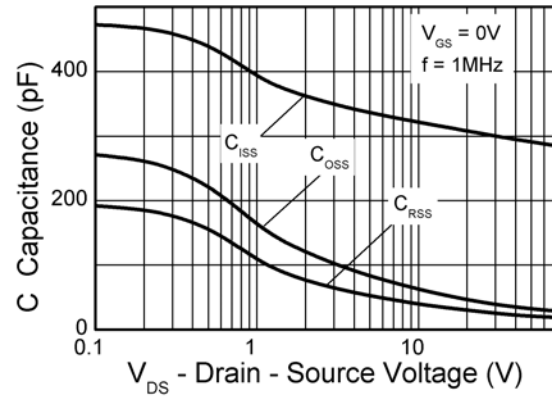
(‡) For design aid only, not subject to production testing.

## Typical characteristics

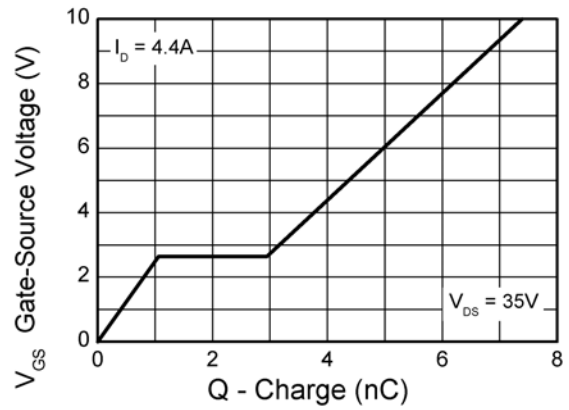


# ZXMN7A11G

## Typical characteristics



Capacitance v Drain-Source Voltage



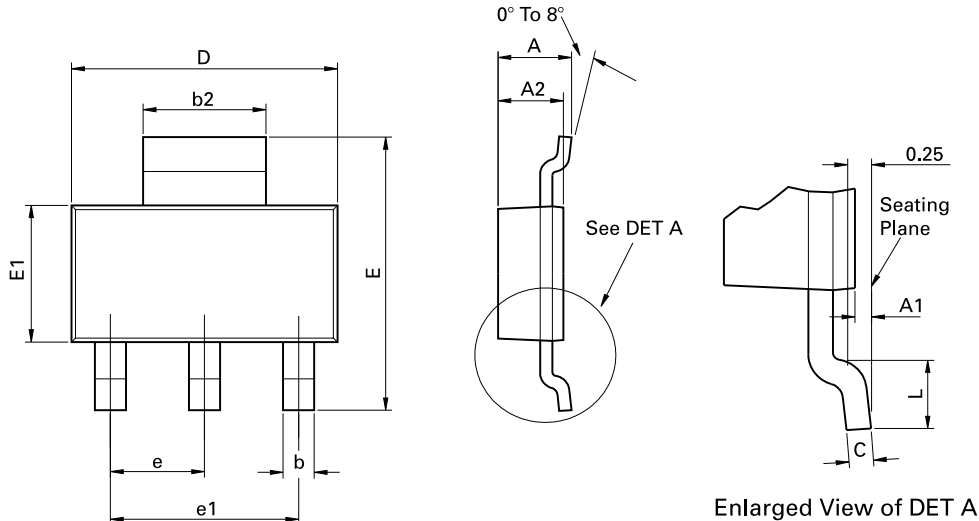
Gate-Source Voltage v Gate Charge

# ZXMN7A11G

Intentionally left blank

# 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

| Europe                                                                            | Americas                                                                    | Asia Pacific                                                                             | Corporate Headquarters                                                                             |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Zetex GmbH<br>Streitfeldstraße 19<br>D-81673 München<br>Germany                   | Zetex Inc<br>700 Veterans Memorial Highway<br>Hauppauge, NY 11788<br>USA    | Zetex (Asia Ltd)<br>3701-04 Metroplaza Tower 1<br>Hing Fong Road, Kwai Fong<br>Hong Kong | Zetex Semiconductors plc<br>Zetex Technology Park, Chadderton<br>Oldham, OL9 9LL<br>United Kingdom |
| Telefon: (49) 89 45 49 49 0<br>Fax: (49) 89 45 49 49 49<br>europe.sales@zetex.com | Telephone: (1) 631 360 2222<br>Fax: (1) 631 360 8222<br>usa.sales@zetex.com | Telephone: (852) 26100 611<br>Fax: (852) 24250 494<br>asia.sales@zetex.com               | Telephone: (44) 161 622 4444<br>Fax: (44) 161 622 4446<br>hq@zetex.com                             |

For international sales offices visit [www.zetex.com/offices](http://www.zetex.com/offices)

Zetex products are distributed worldwide. For details, see [www.zetex.com/salesnetwork](http://www.zetex.com/salesnetwork)

This publication is issued to provide outline information only which (unless agreed by the company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contact or be regarded as a representation relating to the products or services concerned. The company reserves the right to alter without notice the specification, design, price or conditions of supply of any product or service.