

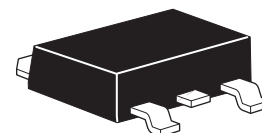
# ZXMN7A11K

## 70V N-channel enhancement mode MOSFET

### Summary

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

$I_D=6.1A$

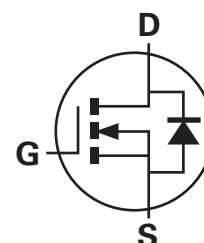


### Description

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.

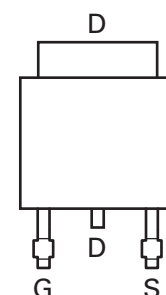
### Features

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



### Applications

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



Pinout - top view

### Ordering information

| Device      | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|--------------------|-----------------|-------------------|
| ZXMN7A11KTC | 13                 | 16              | 2,500             |

### Device marking

ZXMN  
7A11

## 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) | $I_D$          | 6.1<br>4.9<br>4.2 | A                   |
| Pulsed drain current (c)                                                                                                                         | $I_{DM}$       | 17                | A                   |
| Continuous source current (body diode) (b)                                                                                                       | $I_S$          | 8.7               | A                   |
| Pulsed source current (body diode) (c)                                                                                                           | $I_{SM}$       | 17                | A                   |
| Power dissipation at $T_A = 25^\circ C$ (a)<br>Linear derating factor                                                                            | $P_D$          | 4.06<br>32.4      | W<br>mW/ $^\circ C$ |
| Power dissipation at $T_A = 25^\circ C$ (b)<br>Linear derating factor                                                                            | $P_D$          | 8.5<br>68         | W<br>mW/ $^\circ C$ |
| Power dissipation at $T_A = 25^\circ C$ (d)<br>Linear derating factor                                                                            | $P_D$          | 2.11<br>16.8      | W<br>mW/ $^\circ C$ |
| Operating and storage temperature range                                                                                                          | $T_j, T_{stg}$ | -55 to +150       | $^\circ C$          |

## Thermal resistance

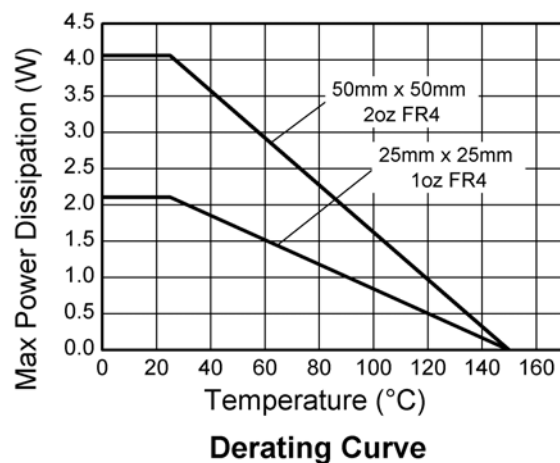
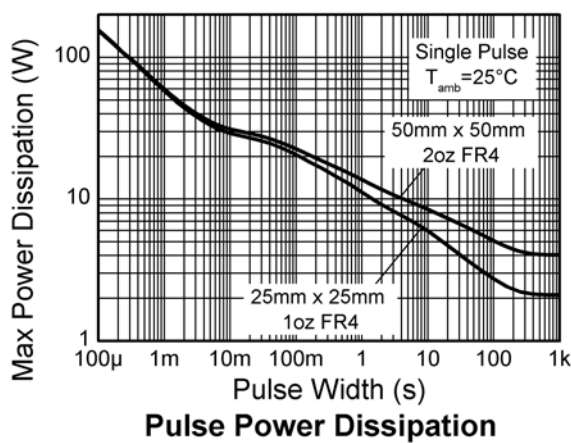
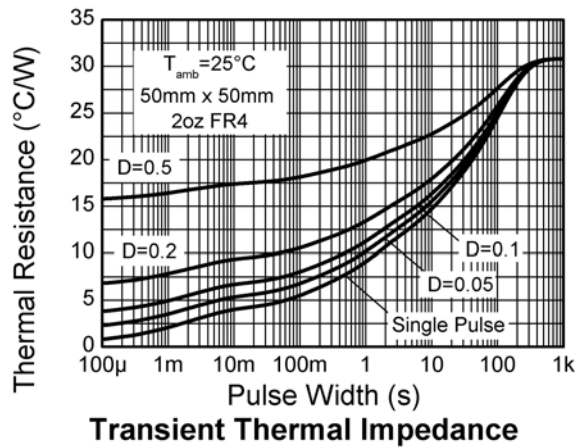
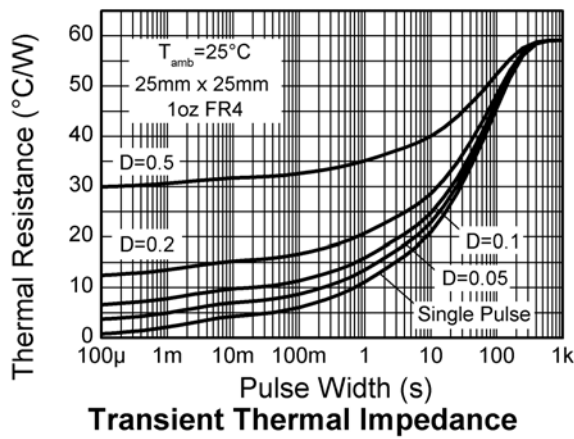
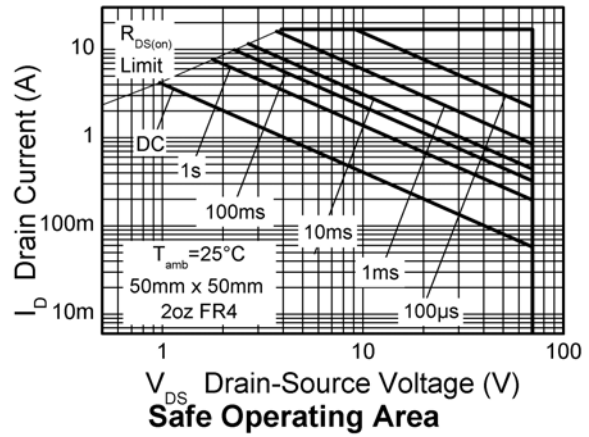
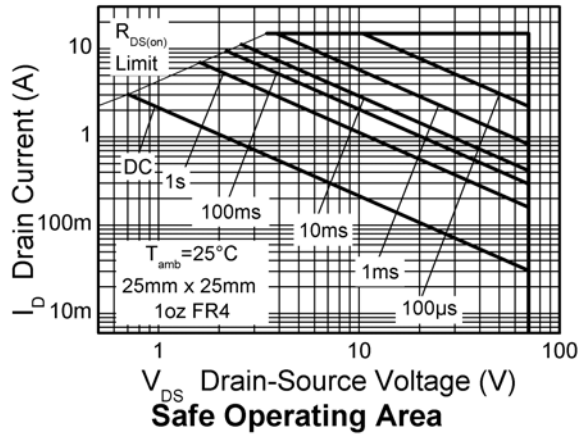
| Parameter           | Symbol          | Limit | Unit         |
|---------------------|-----------------|-------|--------------|
| Junction to ambient | $R_{\theta JA}$ | 30.8  | $^\circ C/W$ |
| Junction to ambient | $R_{\theta JA}$ | 14.7  | $^\circ C/W$ |
| Junction to ambient | $R_{\theta JA}$ | 59.1  | $^\circ C/W$ |

### NOTES:

- (a) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
- (b) For a device surface mounted on FR4 PCB measured at  $t \leq 10$  sec.
- (c) Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB,  $D=0.02$  pulse width=300 $\mu s$  - pulse width limited by maximum junction temperature.
- (d) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

# ZXMN7A11K

## Characteristics



# ZXMN7A11K

## Electrical characteristics (at Tamb = 25°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   |                                                                                           |

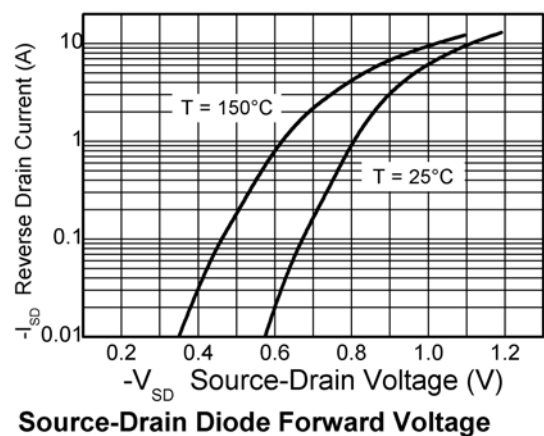
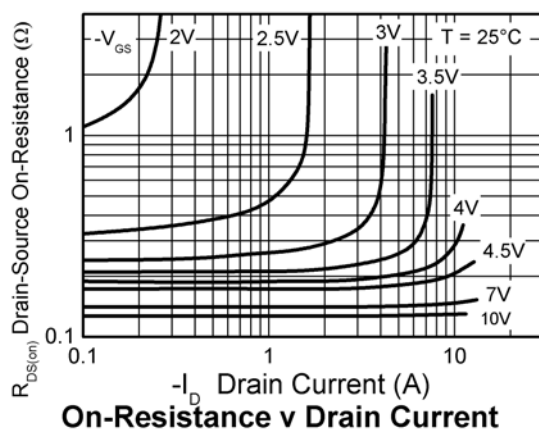
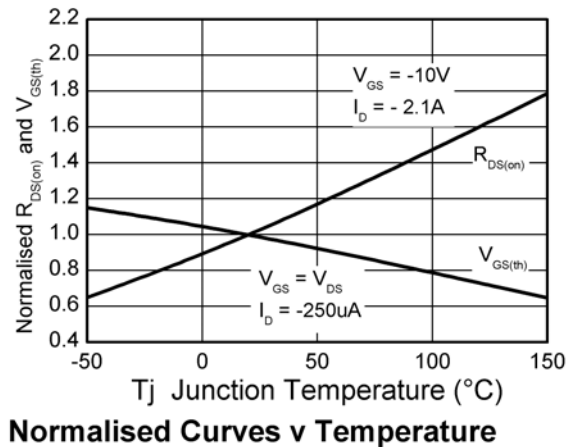
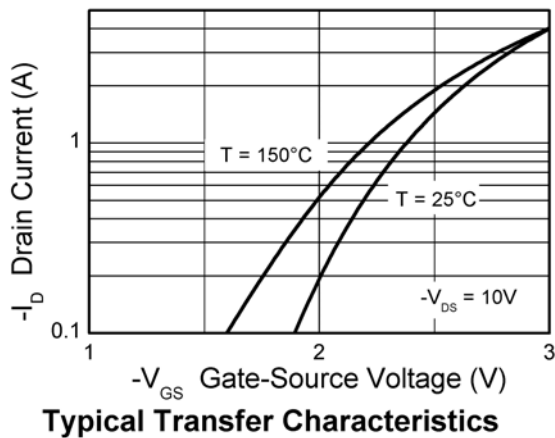
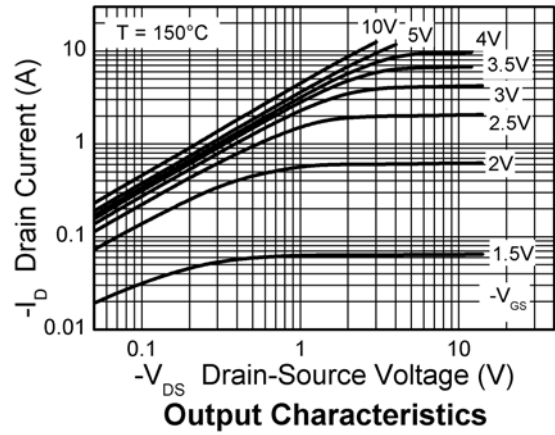
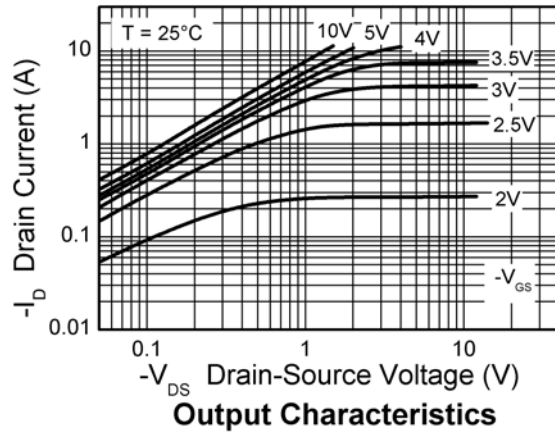
### NOTES:

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

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

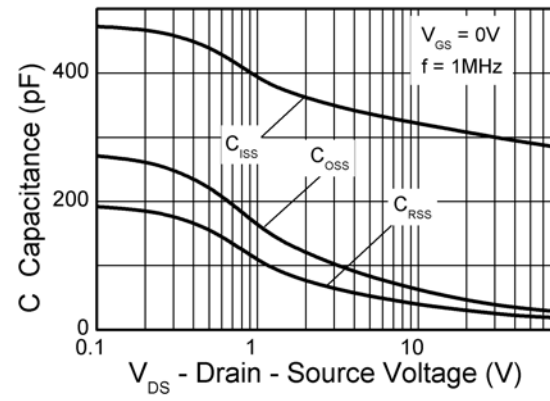
(‡) For design aid only, not subject to production testing.

## Typical characteristics

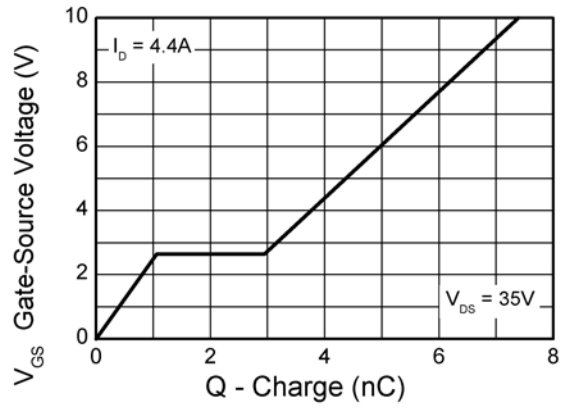


# ZXMN7A11K

## Typical characteristics



Capacitance v Drain-Source Voltage



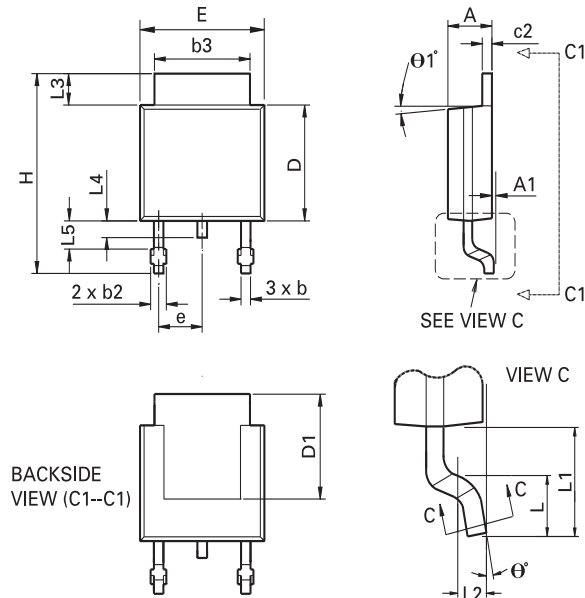
Gate-Source Voltage v Gate Charge

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# ZXMN7A11K

## Package outline - DPAK



| DIM | Inches |       | Millimeters |       | DIM | Inches    |       | Millimeters |       |
|-----|--------|-------|-------------|-------|-----|-----------|-------|-------------|-------|
|     | Min    | Max   | Min         | Max   |     | Min       | Max   | Min         | Max   |
| A   | 0.086  | 0.094 | 2.18        | 2.39  | e   | 0.090 BSC |       | 2.29 BSC    |       |
| A1  | -      | 0.005 | -           | 0.127 | H   | 0.370     | 0.410 | 9.40        | 10.41 |
| b   | 0.020  | 0.035 | 0.508       | 0.89  | L   | 0.055     | 0.070 | 1.40        | 1.78  |
| b2  | 0.030  | 0.045 | 0.762       | 1.14  | L1  | 0.108 REF |       | 2.74 REF    |       |
| b3  | 0.205  | 0.215 | 5.21        | 5.46  | L2  | 0.020 BSC |       | 0.508 BSC   |       |
| c   | 0.018  | 0.024 | 0.457       | 0.61  | L3  | 0.035     | 0.065 | 0.89        | 1.65  |
| c2  | 0.018  | 0.023 | 0.457       | 0.584 | L4  | 0.025     | 0.040 | 0.635       | 1.016 |
| D   | 0.213  | 0.245 | 5.41        | 6.22  | L5  | 0.045     | 0.060 | 1.14        | 1.52  |
| D1  | 0.205  | -     | 5.21        | -     | 10° | 0°        | 10°   | 0°          | 10°   |
| E   | 0.250  | 0.265 | 6.35        | 6.73  | 0°  | 0°        | 15°   | 0°          | 15°   |
| E1  | 0.170  | -     | 4.32        | -     | -   | -         | -     | -           | -     |

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

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