

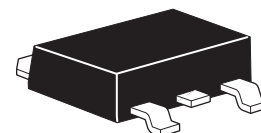
# ZXMP7A17K

## 70V P-channel enhancement mode MOSFET

### Summary

$V_{DSS}=70V$  :  $R_{DS(on)}=0.16\Omega$

$I_D=5.7A$

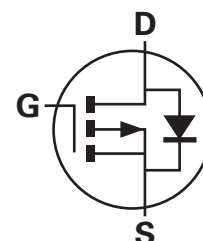


### Description

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.

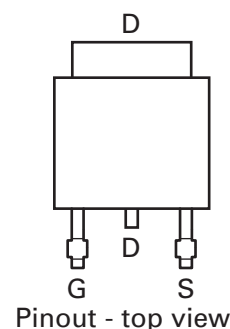
### Features

- 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



### Ordering information

| Device      | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|--------------------|-----------------|-------------------|
| ZXMP7A17KTC | 13                 | 16              | 2,500             |

### Device marking

ZXMP  
7A17

# ZXMP7A17K

## 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 @ $V_{GS}=10V$ ; $T_A=25^\circ C$ <sup>(b)</sup><br>@ $V_{GS}=10V$ ; $T_A=25^\circ C$ <sup>(b)</sup><br>@ $V_{GS}=10V$ ; $T_A=25^\circ C$ <sup>(a)</sup> | $I_D$          | -5.7<br>-4.6<br>-3.8 | A          |
| Pulsed drain current <sup>(c)</sup>                                                                                                                                               | $I_{DM}$       | -17.7                | A          |
| Continuous source current (body diode) <sup>(b)</sup>                                                                                                                             | $I_S$          | -9.2                 | A          |
| Pulsed source current (body diode) <sup>(c)</sup>                                                                                                                                 | $I_{SM}$       | -17.7                | A          |
| Power dissipation at $T_A = 25^\circ C$ <sup>(a)</sup><br>Linear derating factor                                                                                                  | $P_D$          | 4.17<br>33.3         | W<br>mW/°C |
| Power dissipation at $T_A = 25^\circ C$ <sup>(b)</sup><br>Linear derating factor                                                                                                  | $P_D$          | 9.25<br>74           | W<br>mW/°C |
| Power dissipation at $T_A = 25^\circ C$ <sup>(d)</sup><br>Linear derating factor                                                                                                  | $P_D$          | 2.11<br>16.8         | W<br>mW/°C |
| Operating and storage temperature range                                                                                                                                           | $T_j, T_{stg}$ | -55 to +150          | °C         |

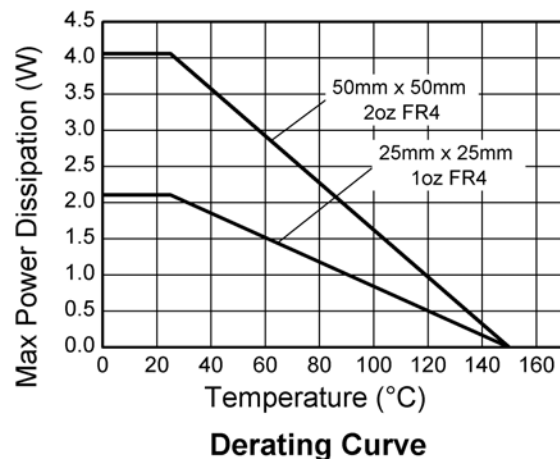
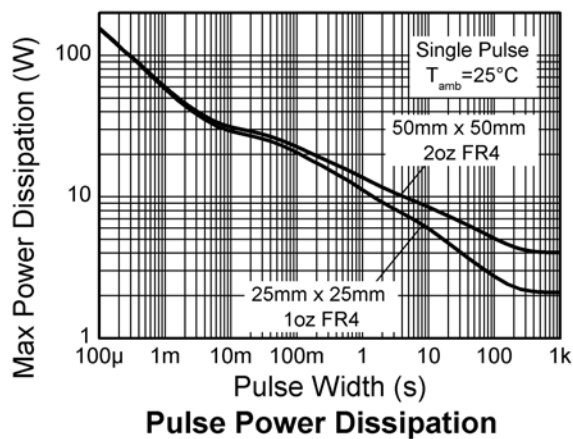
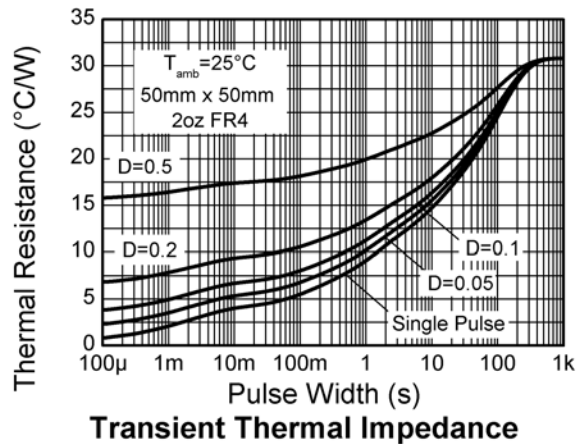
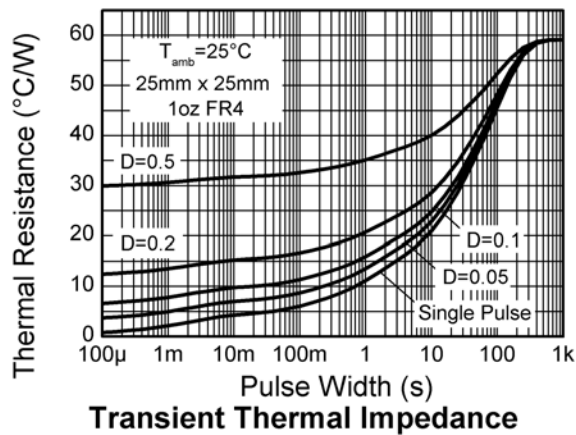
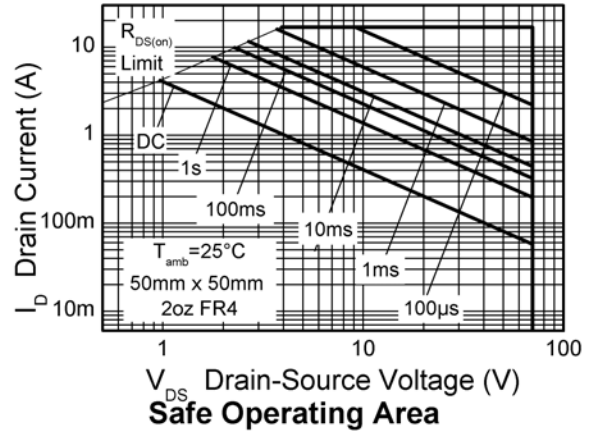
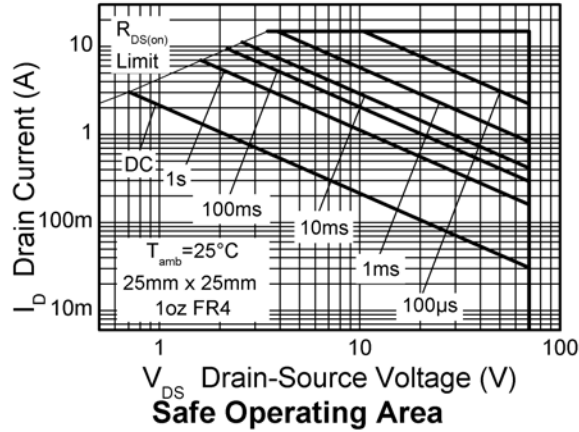
## Thermal resistance

| Parameter                          | Symbol          | Limit | Unit |
|------------------------------------|-----------------|-------|------|
| Junction to ambient <sup>(a)</sup> | $R_{\theta JA}$ | 30    | °C/W |
| Junction to ambient <sup>(b)</sup> | $R_{\theta JA}$ | 13.5  | °C/W |
| Junction to ambient <sup>(c)</sup> | $R_{\theta JA}$ | 59.1  | °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.

## Characteristics



# ZXMP7A17K

## 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>  |      |       | 0.16  | Ω    | V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.1A                                               |
|                                                        |                      |      |       | 0.25  | Ω    | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1.7A                                              |
| Forward transconductance <sup>(*)(‡)</sup>             | g <sub>fs</sub>      |      | 4.4   |       | S    | V <sub>DS</sub> = -15V, I <sub>D</sub> = -2.1A                                               |
| Dynamic <sup>(‡)</sup>                                 |                      |      |       |       |      |                                                                                              |
| Input capacitance                                      | C <sub>iss</sub>     |      | 635   |       | pF   | V <sub>DS</sub> = -40V, V <sub>GS</sub> =0V<br>f=1MHz                                        |
| Output capacitance                                     | C <sub>oss</sub>     |      | 52    |       | pF   |                                                                                              |
| Reverse transfer capacitance                           | C <sub>rss</sub>     |      | 42.5  |       | pF   |                                                                                              |
| Switching <sup>(†)(‡)</sup>                            |                      |      |       |       |      |                                                                                              |
| Turn-on-delay time                                     | t <sub>d(on)</sub>   |      | 2.5   |       | 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>       |      | 3.4   |       | ns   |                                                                                              |
| Turn-off delay time                                    | t <sub>d(off)</sub>  |      | 27.9  |       | ns   |                                                                                              |
| Fall time                                              | t <sub>f</sub>       |      | 8     |       | ns   |                                                                                              |
| Total gate charge                                      | Q <sub>g</sub>       |      | 9.6   |       | nC   | V <sub>DS</sub> = -35V, V <sub>GS</sub> = -5V<br>I <sub>D</sub> = -2.1A                      |
| Total gate charge                                      | Q <sub>g</sub>       |      | 18    |       | nC   | V <sub>DS</sub> = -35V, V <sub>GS</sub> = -10V<br>I <sub>D</sub> = -2.1A                     |
| Gate-source charge                                     | Q <sub>gs</sub>      |      | 1.77  |       | nC   |                                                                                              |
| Gate drain charge                                      | Q <sub>gd</sub>      |      | 3.66  |       | 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> = -2.0A, V <sub>GS</sub> =0V                            |
| Reverse recovery time <sup>(‡)</sup>                   | t <sub>rr</sub>      |      | 29.8  |       | ns   | T <sub>j</sub> =25°C, I <sub>S</sub> = -2.1A, di/dt=100A/μs                                  |
| Reverse recovery charge <sup>(‡)</sup>                 | Q <sub>rr</sub>      |      | 38.5  |       | nC   |                                                                                              |

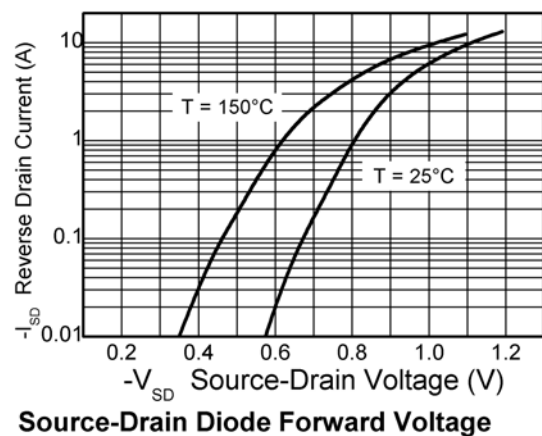
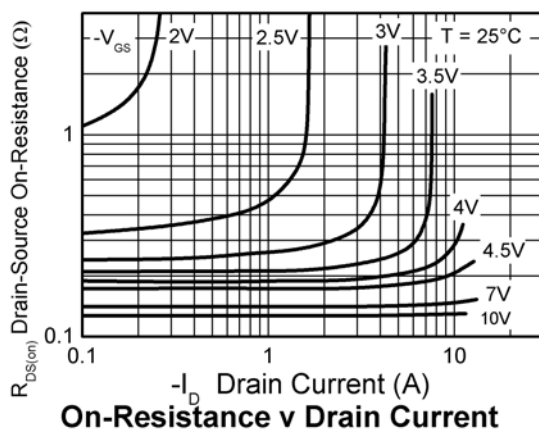
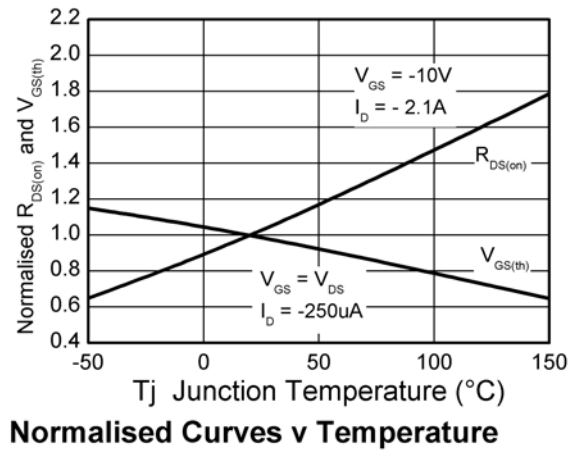
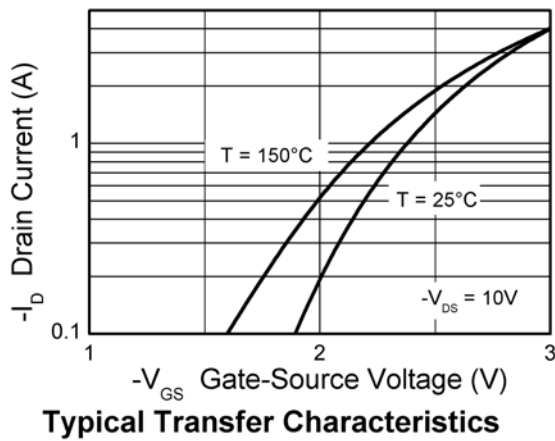
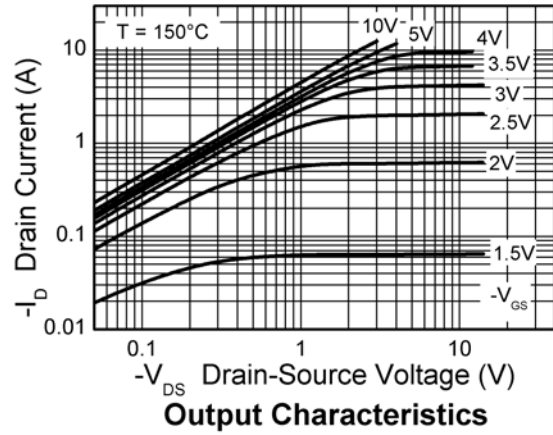
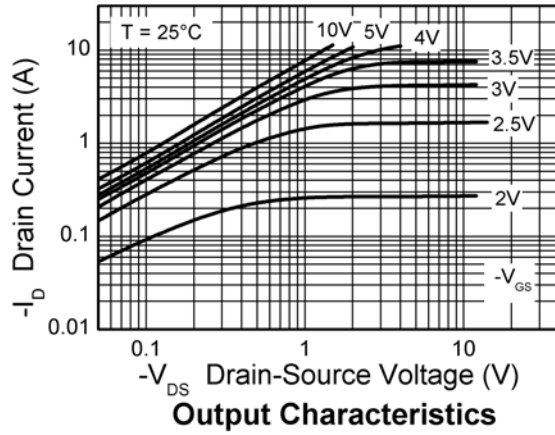
### NOTES:

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

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

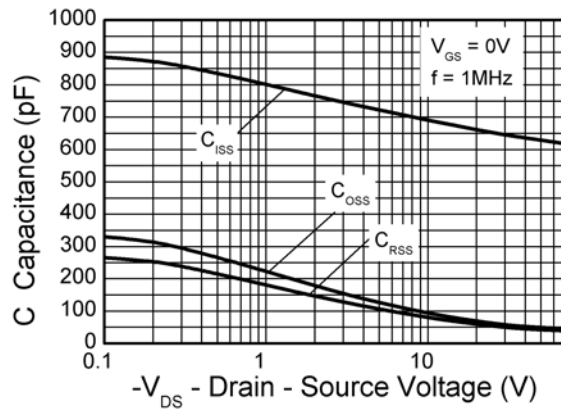
(‡) For design aid only, not subject to production testing.

## Typical characteristics

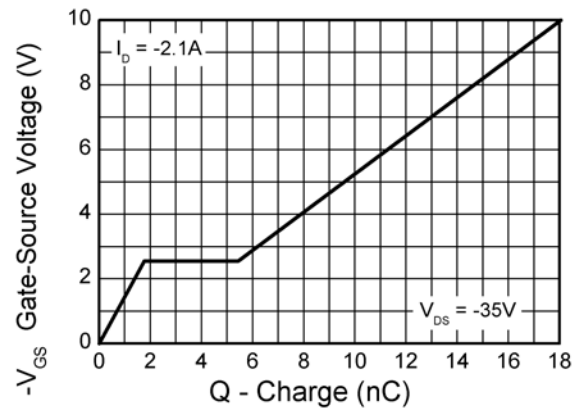


# ZXMP7A17K

## Typical characteristics



Capacitance v Drain-Source Voltage



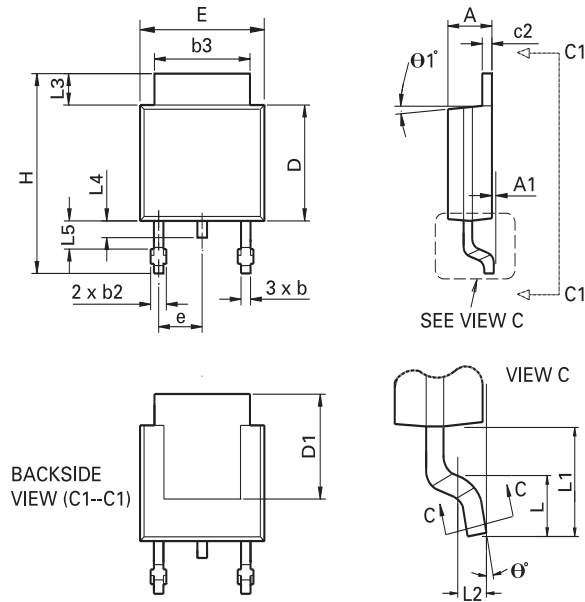
Gate-Source Voltage v Gate Charge

# ZXMP7A17K

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# ZXMP7A17K

## 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        | -     | Θ1° | 0°        | 10°   | 0°          | 10°   |
| E   | 0.250  | 0.265 | 6.35        | 6.73  | Θ°  | 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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