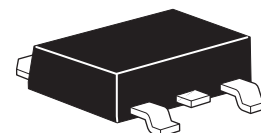


# ZXMP6A16K

## 60V DPAK P-channel enhancement mode MOSFET

### Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
-60	0.085 @ $V_{GS} = -10V$	8.2
	0.125 @ $V_{GS} = -4.5V$	6.75



### Description

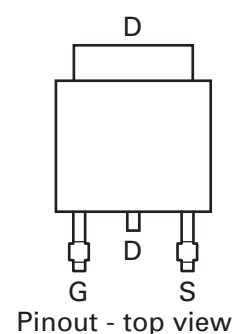
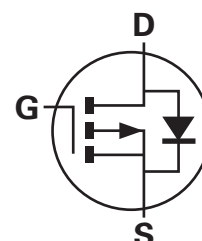
This new generation trench MOSFET from Zetex features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

### 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



### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP6A16KTC	13	16	2500

### Device marking

ZXMP  
6A16

# ZXMP6A16K

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-source voltage	$V_{DS}$	-60	V
Gate-source voltage	$V_{GS}$	$\pm 20$	V
Continuous drain current @ $V_{GS} = 10V$ ; $T_{amb}=25^{\circ}C^{(b)}$ @ $V_{GS} = 10V$ ; $T_{amb}=70^{\circ}C^{(b)}$ @ $V_{GS} = 10V$ ; $T_{amb}=25^{\circ}C^{(a)}$	$I_D$	8.2 6.5 5.4	A
Pulsed drain current <sup>(c)</sup>	$I_{DM}$	27.2	A
Continuous source current (body diode) <sup>(b)</sup>	$I_S$	10	A
Pulsed source current (body diode) <sup>(c)</sup>	$I_{SM}$	27.2	A
Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$ Linear derating factor	$P_D$	4.24 33.9	W mW/°C
Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$ Linear derating factor	$P_D$	9.76 78	W mW/°C
Power dissipation at $T_{amb} = 25^{\circ}C^{(d)}$ Linear derating factor	$P_D$	2.11 16.8	W mW/°C
Operating and storage temperature range	$T_j, T_{stg}$	-55 to +150	°C

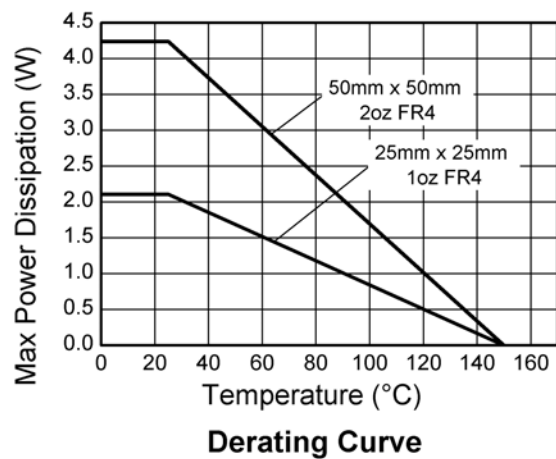
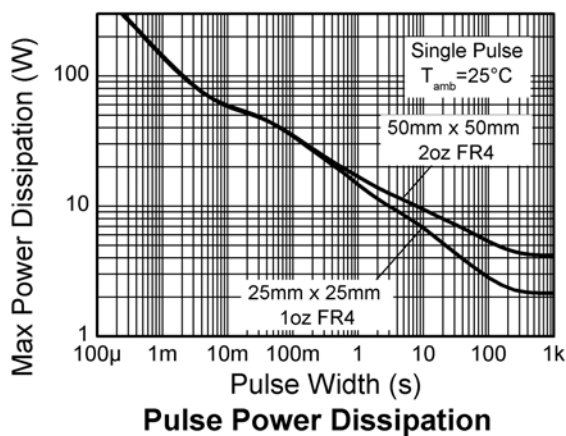
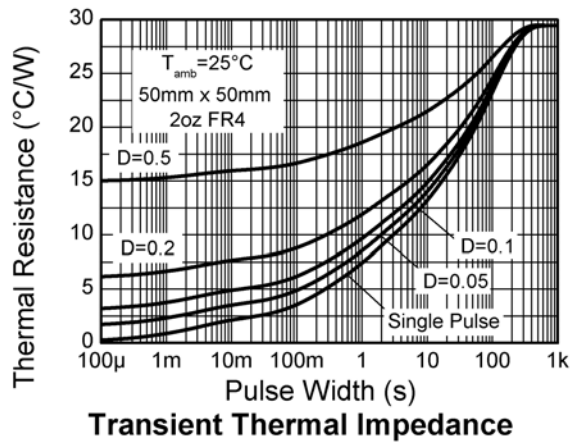
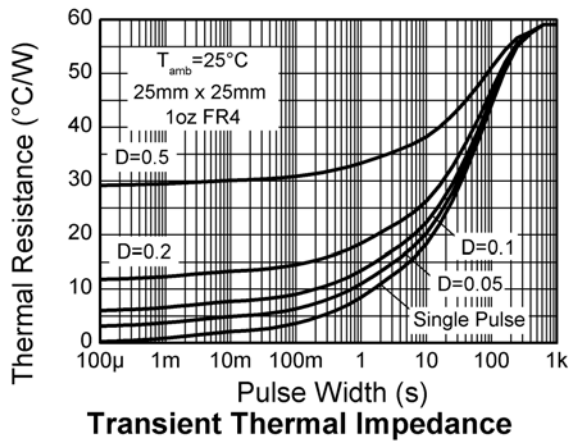
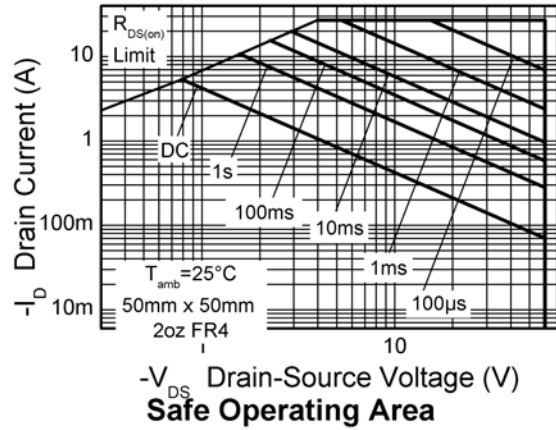
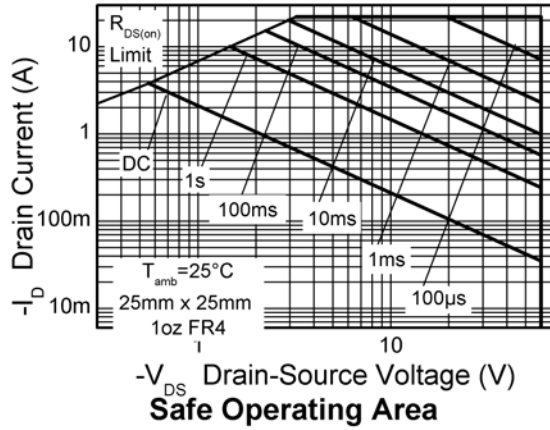
## Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	29.45	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	12.8	°C/W
Junction to ambient <sup>(d)</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.

## Thermal characteristics



# ZXMP6A16K

## 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>	-60			V	I <sub>D</sub> = -250μA, V <sub>GS</sub> =0V
Zero gate voltage drain current	I <sub>DSS</sub>			-1.0	μA	V <sub>DS</sub> = -60V, 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>			0.085	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.9A
				0.125	Ω	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.4A
Forward transconductance <sup>(*)</sup> (‡)	g <sub>fs</sub>		7.2		S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -2.9A
Dynamic <sup>(‡)</sup>						
Input capacitance	C <sub>iss</sub>		1021		pF	V <sub>DS</sub> = -30V, V <sub>GS</sub> =0V f=1MHz
Output capacitance	C <sub>oss</sub>		83		pF	
Reverse transfer capacitance	C <sub>rss</sub>		56		pF	
Switching <sup>(†)</sup> (‡)						
Turn-on-delay time	t <sub>d(on)</sub>		3.5		ns	V <sub>DD</sub> = -30V, I <sub>D</sub> = -1A R <sub>G</sub> ≅6.0Ω, V <sub>GS</sub> = -10V
Rise time	t <sub>r</sub>		4.1		ns	
Turn-off delay time	t <sub>d(off)</sub>		35		ns	
Fall time	t <sub>f</sub>		10		ns	
Gate charge	Q <sub>g</sub>		12.1		nC	V <sub>DS</sub> = -30V, V <sub>GS</sub> = -5V I <sub>D</sub> = -2.9A
Total gate charge	Q <sub>g</sub>		24.2		nC	V <sub>DS</sub> = -30V, V <sub>GS</sub> = -10V I <sub>D</sub> = -2.9A
Gate-source charge	Q <sub>gs</sub>		2.5		nC	
Gate drain charge	Q <sub>gd</sub>		3.7		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> = -3.4A, V <sub>GS</sub> =0V
Reverse recovery time <sup>(‡)</sup>	t <sub>rr</sub>		29.2		ns	T <sub>J</sub> =25°C, I <sub>S</sub> = -2A, di/dt=100A/μs
Reverse recovery charge <sup>(‡)</sup>	Q <sub>rr</sub>		39.6		nC	

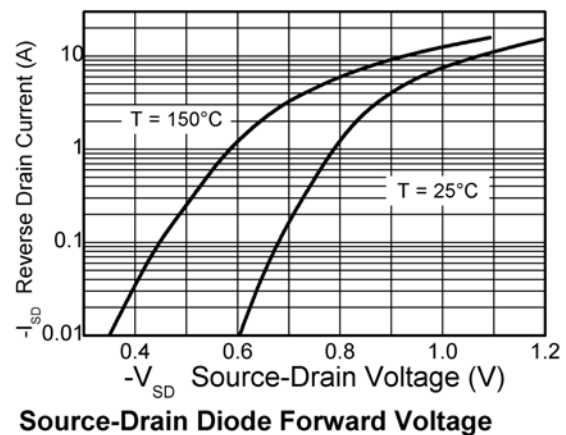
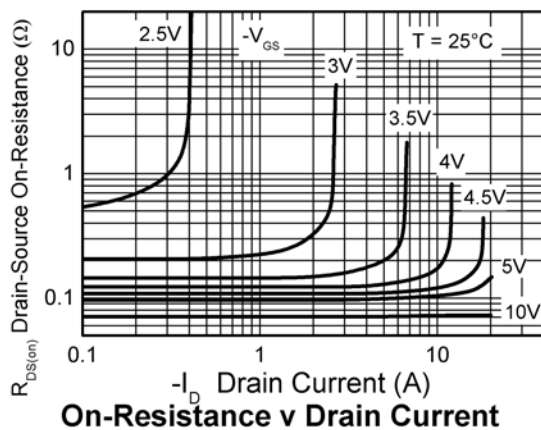
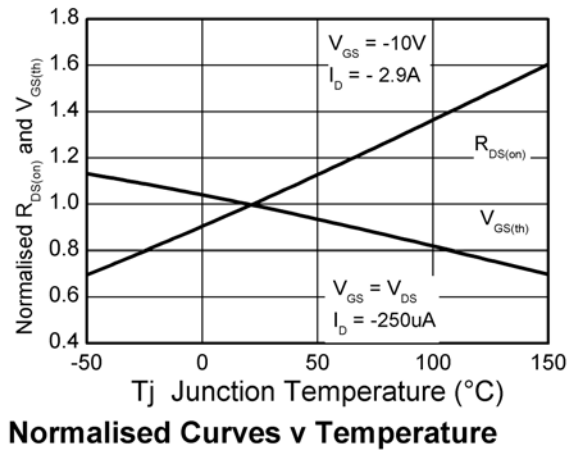
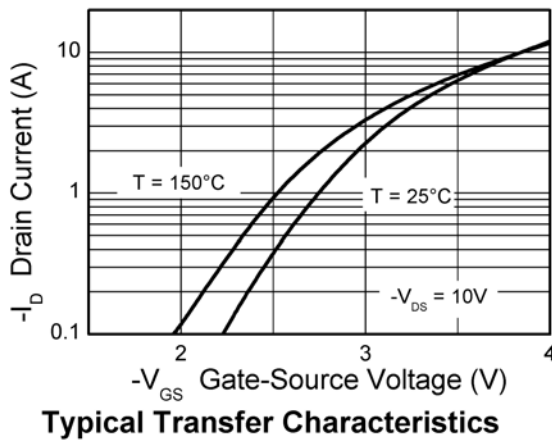
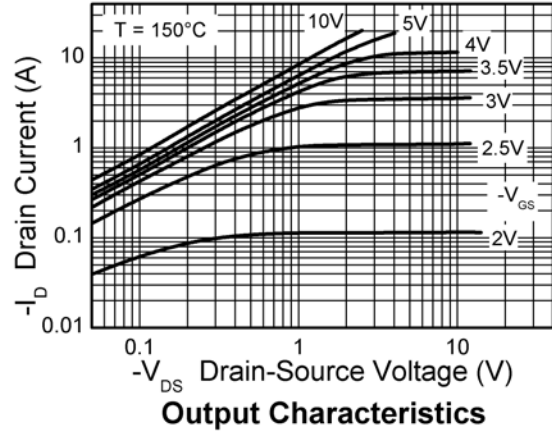
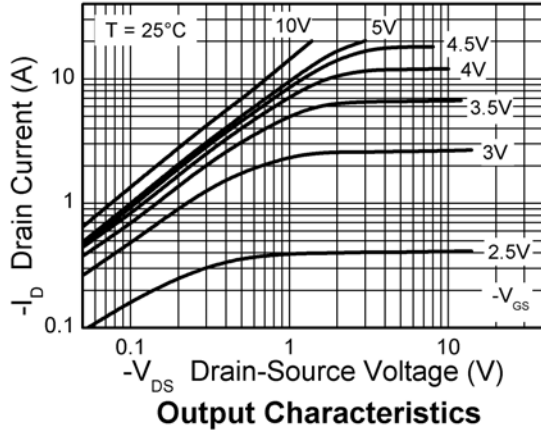
### NOTES:

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

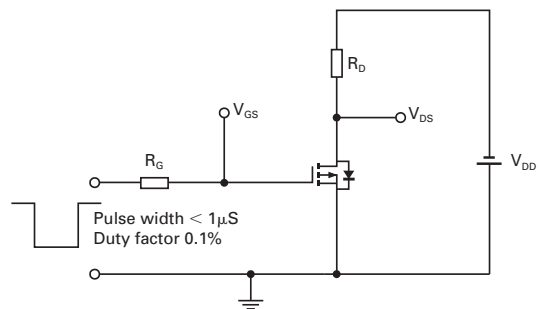
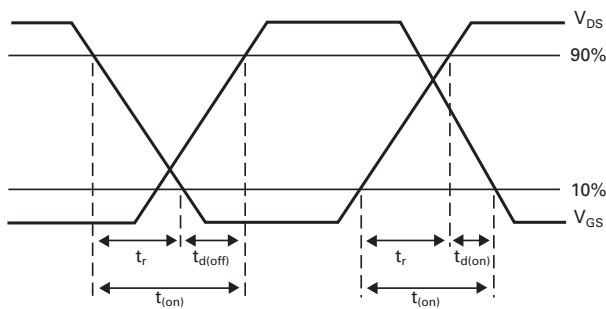
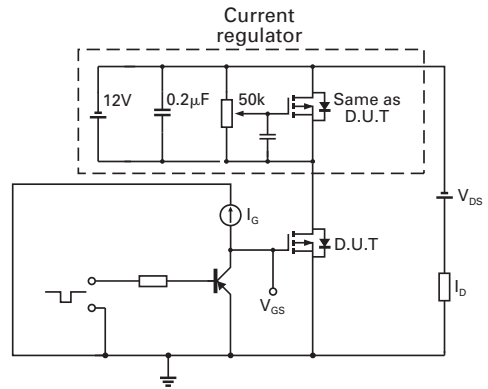
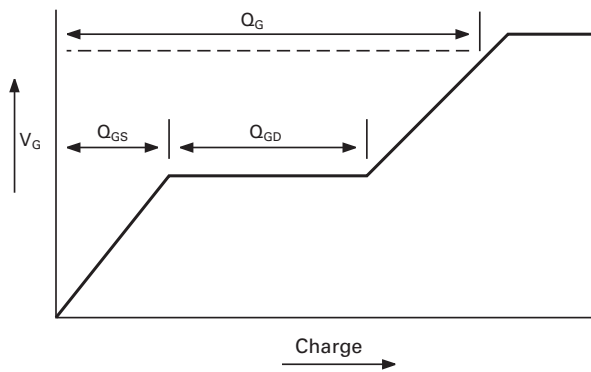
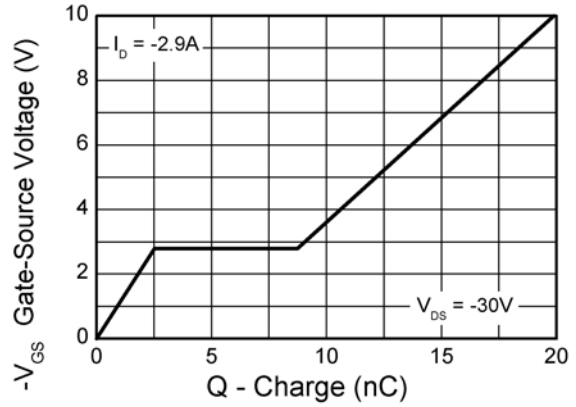
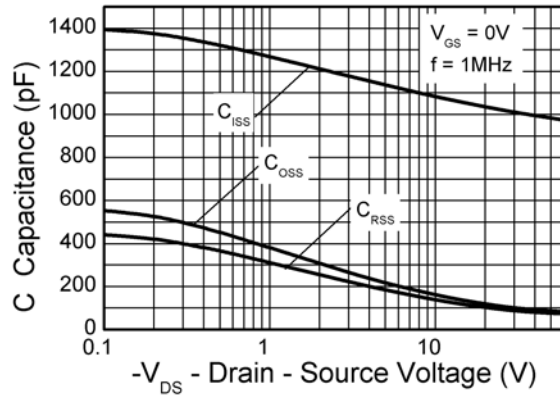
(†) Switching characteristics are independent of operating junction temperature.

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

## Typical characteristics

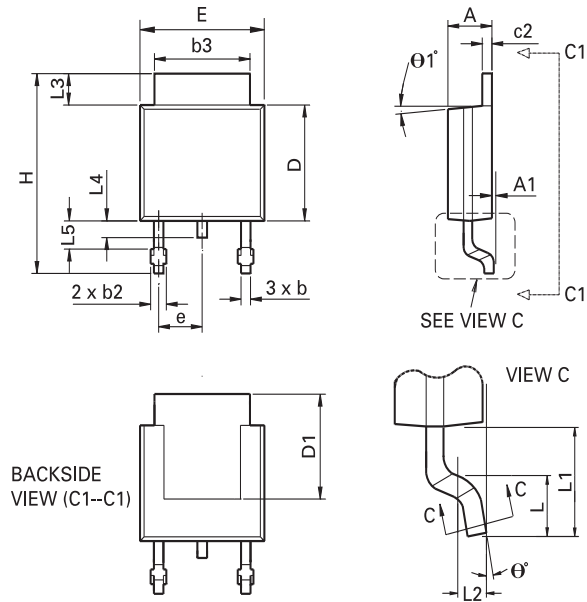


## Typical characteristics



# ZXMP6A16K

## 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	-	theta1°	0°	10°	0°	10°
E	0.250	0.265	6.35	6.73	theta°	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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