

ZXMP6A17K

60V DPAK P-channel enhancement mode MOSFET

Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
-60	0.125 @ $V_{GS} = -10V$	15.6
	0.190 @ $V_{GS} = -4.5V$	12.6



DPAK

Description

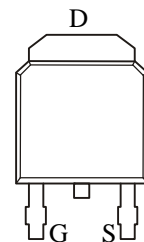
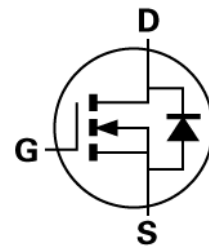
This new generation Trench MOSFET from Zetex features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

Features

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

Applications

- DC-DC Converters
- Power Management functions
- Disconnect switches
- Motor control



Pinout – top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP6A17KTC	13	16	2,500

Device marking

ZXMP
6A17

Absolute maximum ratings

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DSS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current @ $V_{GS}=10V$; $T_C=25^\circ C$ (e) @ $V_{GS}=10V$; $T_C=100^\circ C$ (e)	I_D	15.6 9.9	A
Continuous Drain Current @ $V_{GS}=10V$; $T_A=25^\circ C$ (b) @ $V_{GS}=10V$; $T_A=70^\circ C$ (b) @ $V_{GS}=10V$; $T_A=25^\circ C$ (a)	I_D	6.6 5.3 4.4	A
Pulsed Drain Current (c)	I_{DM}	20.3	A
Continuous Source Current (Body Diode) (b)	I_S	9.3	A
Pulsed Source Current (Body Diode) (c)	I_{SM}	20.3	A
Power Dissipation at $T_A=25^\circ C$ (a) Linear Derating Factor	P_D	4.17 33.3	W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (b) Linear Derating Factor	P_D	9.25 74	W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (d) Linear Derating Factor	P_D	2.11 16.8	W mW/ $^\circ C$
Operating and Storage Temperature Range	T_j, T_{stg}	-55 to +150	$^\circ C$

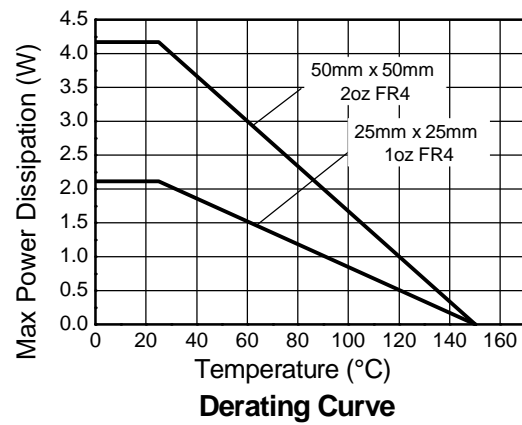
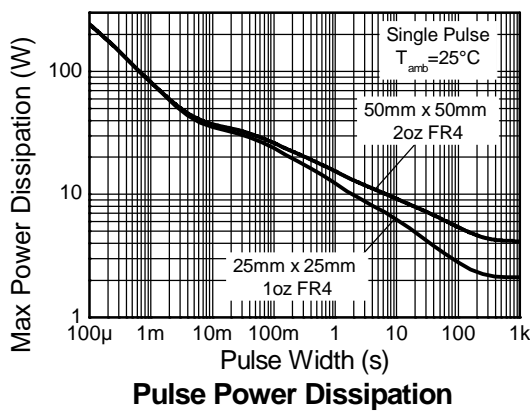
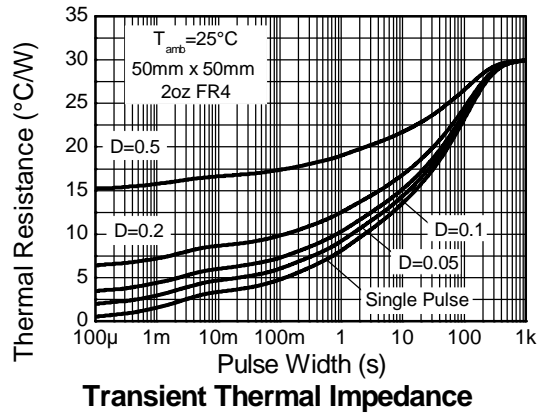
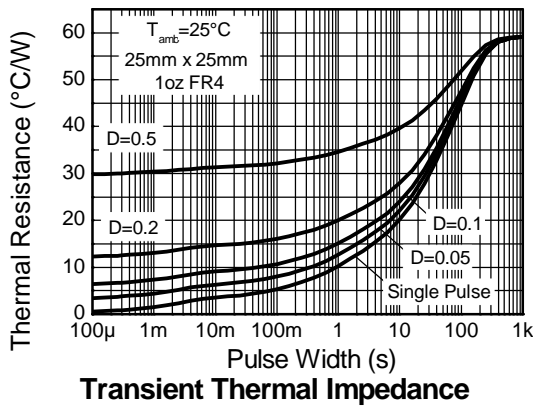
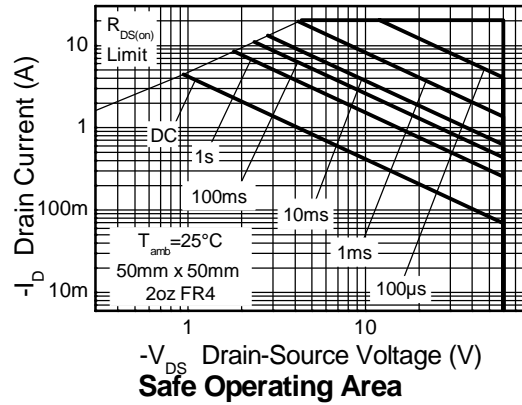
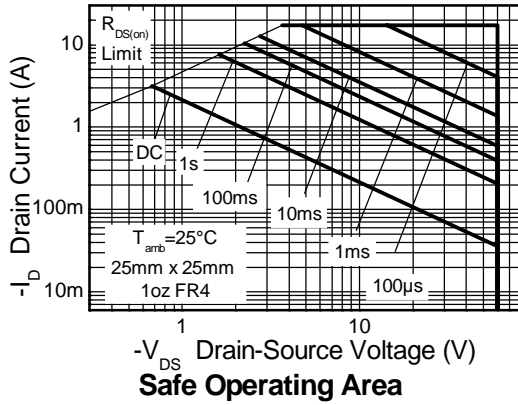
Thermal resistance

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)	$R_{\theta JA}$	30	$^\circ C/W$
Junction to Ambient (b)	$R_{\theta JA}$	13.5	$^\circ C/W$
Junction to Ambient (d)	$R_{\theta JA}$	59.1	$^\circ C/W$
Junction to Case (e)	$R_{\theta JC}$	2.41	$^\circ C/W$

NOTES

- 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.
- For a device surface mounted on FR4 PCB measured at $t \leq 10$ sec.
- Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, $D=0.02$ pulse width=300 μs – pulse width limited by maximum junction temperature.
- 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.
- The terms case and case temperature refer to the exposed metal back face of the package and the drain pin.

Thermal characteristics



ZXMP6A17K

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

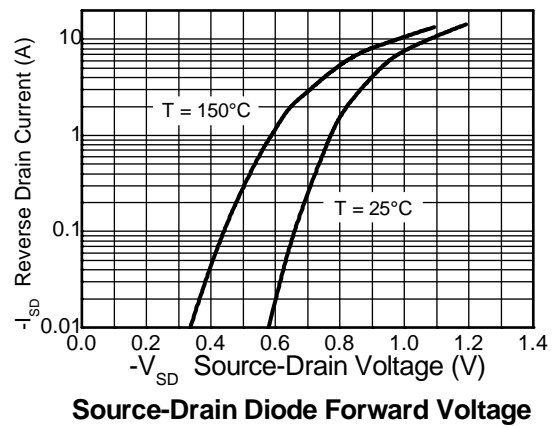
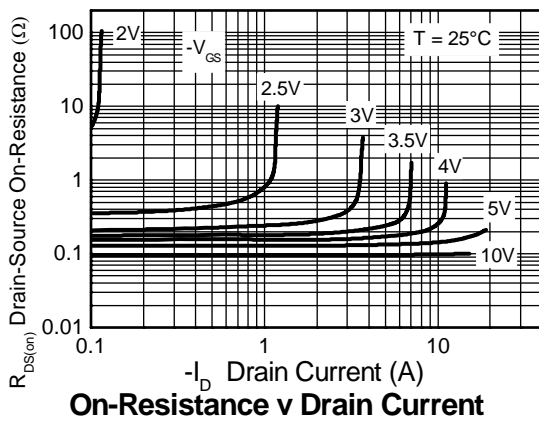
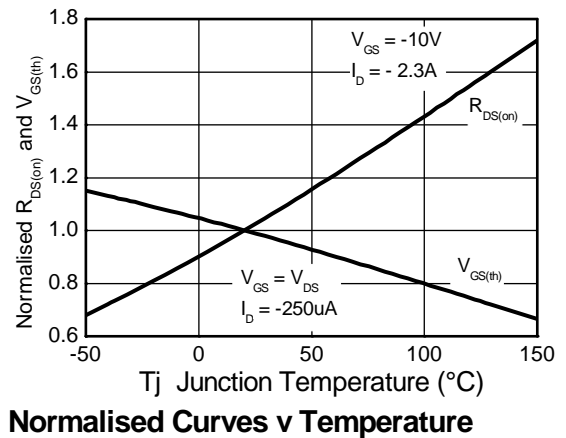
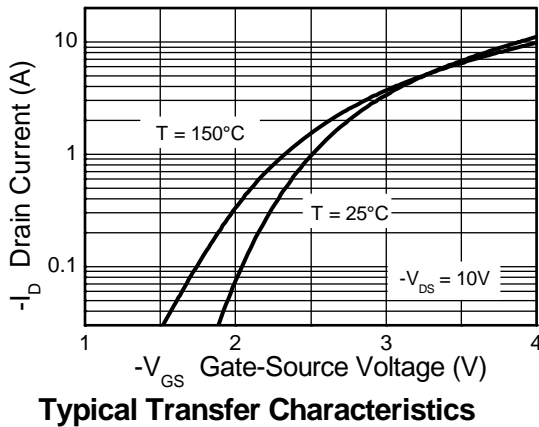
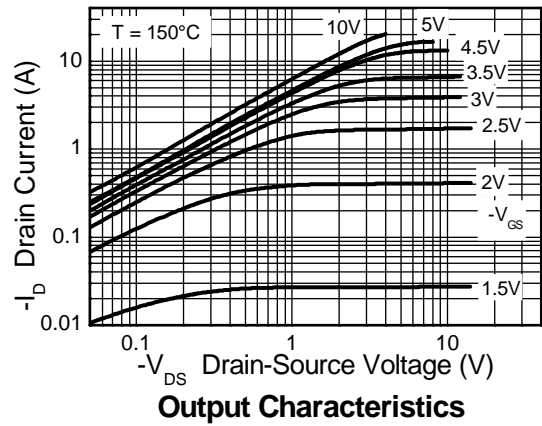
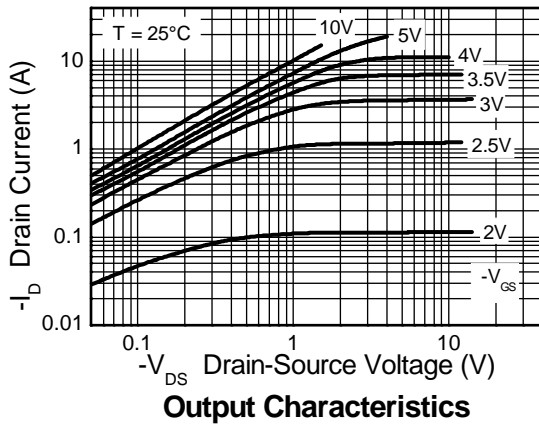
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-60			V	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			-500	nA	$V_{DS} = 60\text{V}$, $V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	-1			V	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.125	Ω	$V_{GS} = -10\text{V}$, $I_D = -2.3\text{A}$
				0.190	Ω	$V_{GS} = -4.5\text{V}$, $I_D = -1.9\text{A}$
Forward Transconductance (1) (3)	g_{fs}		4.7		S	$V_{DS} = -15\text{V}$, $I_D = -2.2\text{A}$
DYNAMIC (3)						
Input Capacitance	C_{iss}		637		pF	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$
Output Capacitance	C_{oss}		70		pF	$f = 1\text{MHz}$
Reverse Transfer Capacitance	C_{rss}		53		pF	
SWITCHING (2) (3)						
Turn-On-Delay Time	$t_{d(on)}$		2.6		ns	$V_{DD} = -30\text{V}$, $I_D = -1.0\text{A}$
Rise Time	t_r		3.4		ns	$R_G = 6.0\Omega$, $V_{GS} = -10\text{V}$
Turn-Off Delay Time	$t_{d(off)}$		26.2		ns	
Fall Time	t_f		11.3		ns	
Gate Charge	Q_g		9.8		nC	$V_{DS} = -30\text{V}$, $V_{GS} = -5\text{V}$ $I_D = -2.2\text{A}$
Total Gate Charge	Q_g		18		nC	$V_{DS} = -30\text{V}$, $V_{GS} = -10\text{V}$
Gate-Source Charge	Q_{gs}		1.6		nC	$I_D = -2.2\text{A}$
Gate Drain Charge	Q_{gd}		4.4		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}		-0.85	-0.95	V	$T_j = 25^{\circ}\text{C}$, $I_S = -2\text{A}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time (3)	t_{rr}		25.1		ns	$T_j = 25^{\circ}\text{C}$, $I_S = -1.7\text{A}$,
Reverse Recovery Charge (3)	Q_{rr}		27.2		nC	$di/dt = 100\text{A}/\mu\text{s}$

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

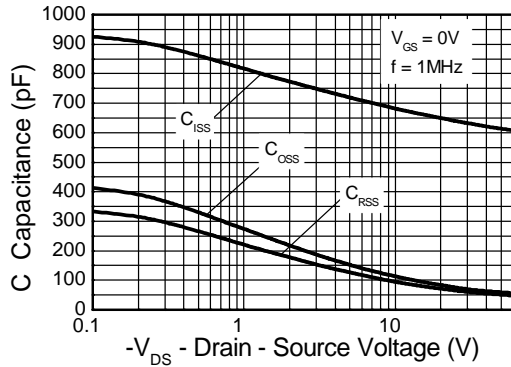
(2) Switching characteristics are independent of operating junction temperature.

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

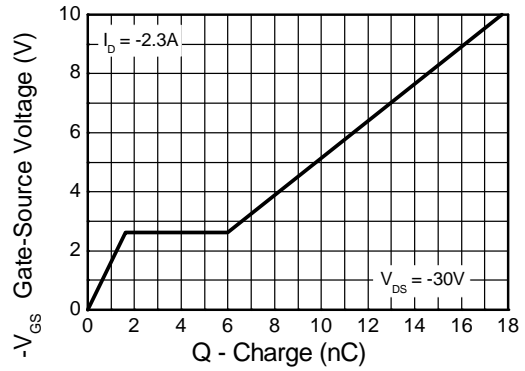
Typical characteristics



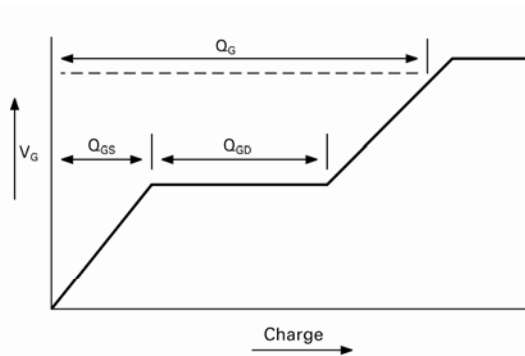
Typical characteristics



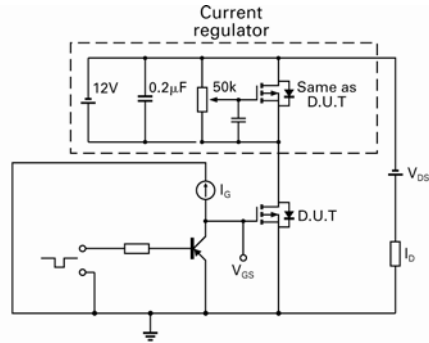
Capacitance v Drain-Source Voltage



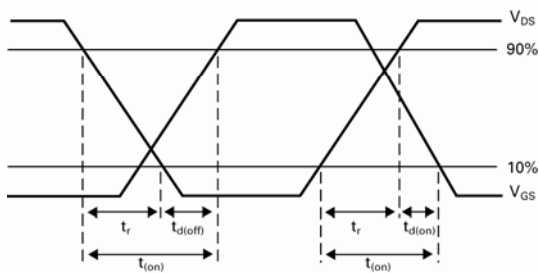
Gate-Source Voltage v Gate Charge



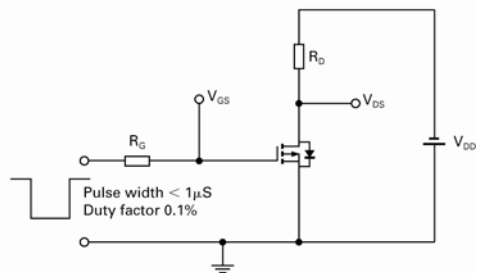
Basic gate charge waveform



Gate charge test circuit



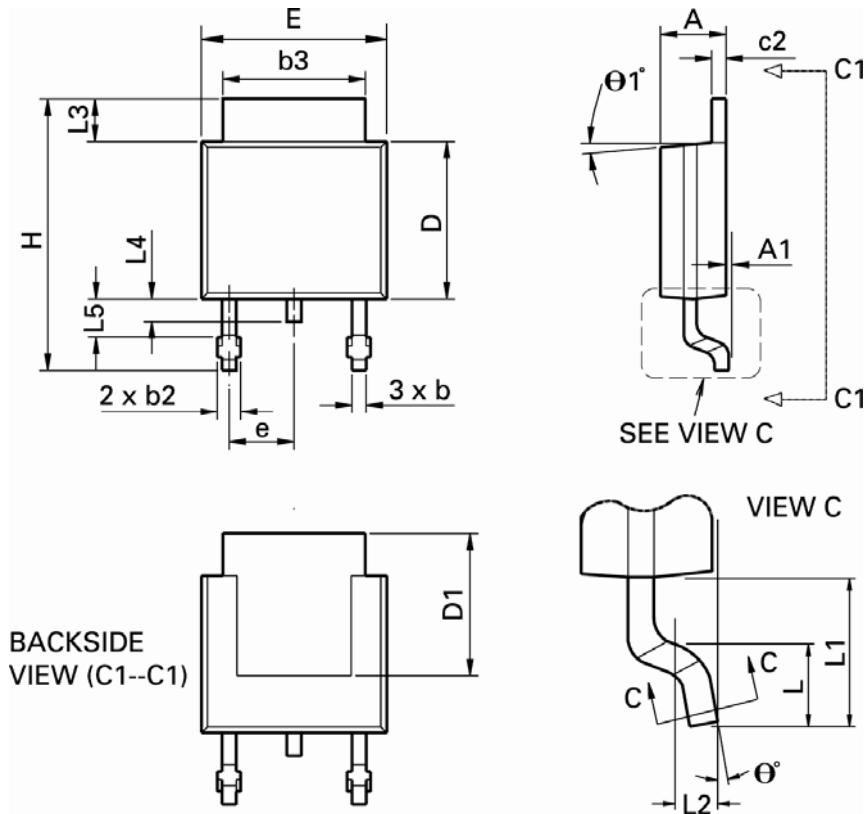
Switching time waveforms



Switching time test circuit

Packaging details – DPAK

Surface mounted, 4 pin package



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	-	q1°	0°	10°	0°	10°
E	0.250	0.265	6.35	6.73	q°	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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"Obsolete"	Production has been discontinued

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