

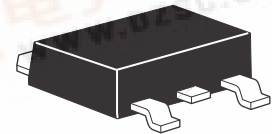


ZXMP10A16K

100V DPAK P-channel enhancement mode MOSFET

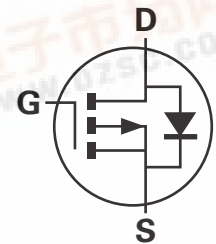
Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
-100	0.235 @ $V_{GS} = -10V$	4.6
	0.285 @ $V_{GS} = -6V$	4.2



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.

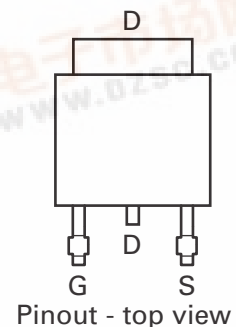


Features

- 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
ZXMP10A16KTC	13	16	2500

Device marking

ZXMP
10A16

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Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DSS}	-100	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current @ $V_{GS} = 10V$; $T_{amb} = 25^{\circ}C^{(b)}$	I_D	4.6	A
@ $V_{GS} = 10V$; $T_{amb} = 70^{\circ}C^{(b)}$		3.7	
@ $V_{GS} = 10V$; $T_{amb} = 25^{\circ}C^{(a)}$		3	
Pulsed drain current ^(c)	I_{DM}	15.4	A
Continuous source current (body diode) ^(b)	I_S	10.6	A
Pulsed source current (body diode) ^(c)	I_{SM}	15.4	A
Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$	P_D	4.24	W
Linear derating factor		34	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$	P_D	9.76	W
Linear derating factor		78	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(d)}$	P_D	2.15	W
Linear derating factor		16.8	mW/ $^{\circ}C$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	$^{\circ}C$

Thermal resistance

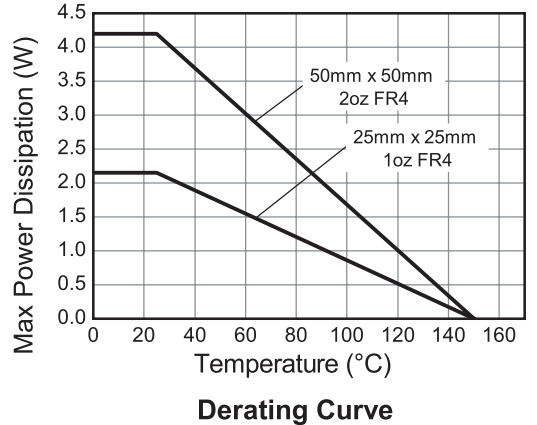
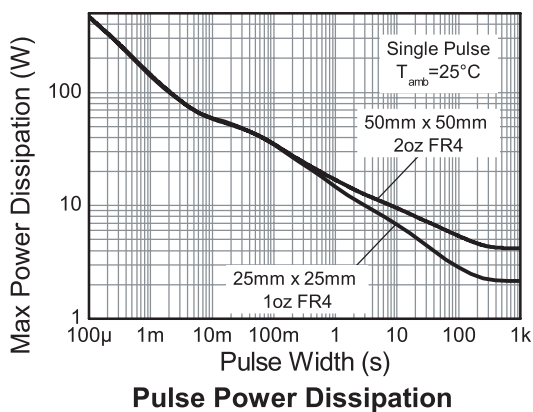
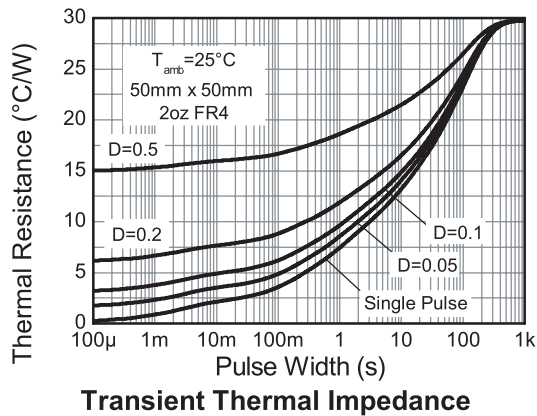
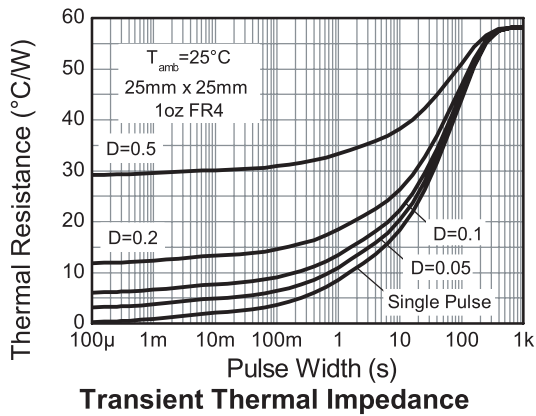
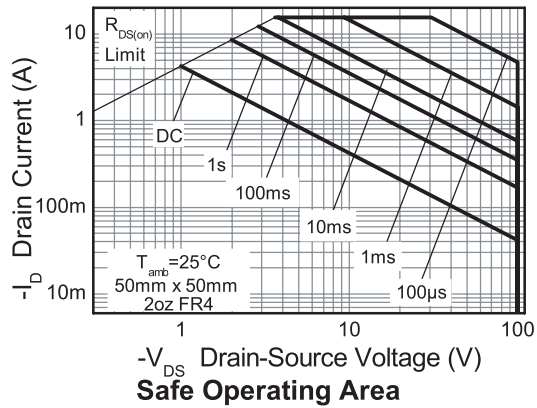
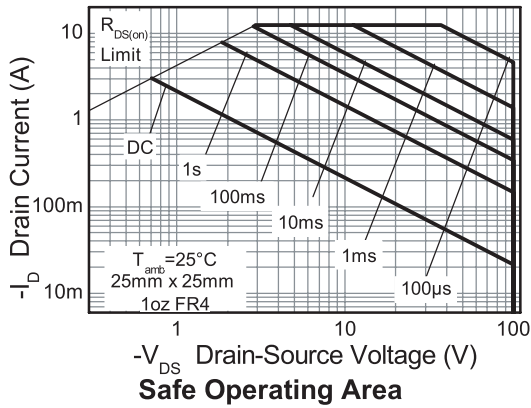
Parameter	Symbol	Limit	Unit
Junction to ambient ^(a)	$R_{\theta JA}$	29.45	$^{\circ}C/W$
Junction to ambient ^(b)	$R_{\theta JA}$	12.8	$^{\circ}C/W$
Junction to ambient ^(d)	$R_{\theta JA}$	58.1	$^{\circ}C/W$

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 μs - 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.

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Typical characteristics



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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	-100			V	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero gate voltage drain current	I_{DSS}			-1	μA	$V_{DS} = -100\text{V}$, $V_{GS} = 0\text{V}$
Gate-body leakage	I_{GSS}			100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
Gate-source threshold voltage	$V_{GS(th)}$	-2.0		-4.0	V	$I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$
Static drain-source on-state resistance ^(*)	$R_{DS(on)}$			0.235 0.285	W	$V_{GS} = -10\text{V}$, $I_D = -2.1\text{A}$ $V_{GS} = -6\text{V}$, $I_D = -1.9\text{A}$
Forward transconductance ^(*) (‡)	g_{fs}		4.7		S	$V_{DS} = -15\text{V}$, $I_D = -2.1\text{A}$
Dynamic (‡)						
Input capacitance	C_{iss}		717		pF	$V_{DS} = -50\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output capacitance	C_{oss}		55.3		pF	
Reverse transfer capacitance	C_{rss}		46.4		pF	
Switching (†) (‡)						
Turn-on-delay time	$t_{d(on)}$		4.3		ns	$V_{DD} = -50\text{V}$, $I_D = -1\text{A}$ $R_G = 6.0\Omega$, $V_{GS} = -10\text{V}$
Rise time	t_r		5.2		ns	
Turn-off delay time	$t_{d(off)}$		20		ns	
Fall time	t_f		12.1		ns	
Total gate charge	Q_g		16.5		nC	$V_{DS} = -50\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -2.1\text{A}$
Gate-source charge	Q_{gs}		2.47		nC	
Gate drain charge	Q_{gd}		5.36		nC	
Source-drain diode						
Diode forward voltage ^(*)	V_{SD}		-0.85	-0.95	V	$T_j = 25^{\circ}\text{C}$, $I_S = -3.35\text{A}$, $V_{GS} = 0\text{V}$
Reverse recovery time ^(‡)	t_{rr}		43.3		ns	$T_j = 25^{\circ}\text{C}$, $I_S = -2.4\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge ^(‡)	Q_{rr}		76.5		nC	

NOTES:

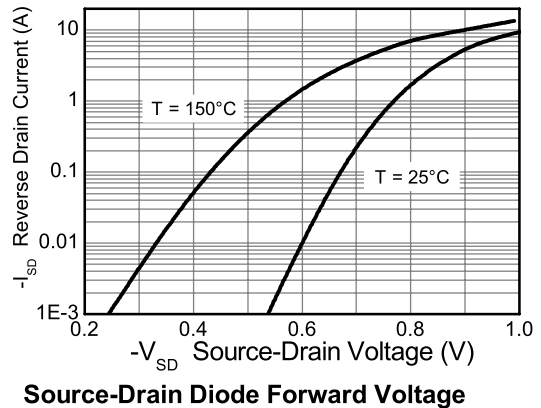
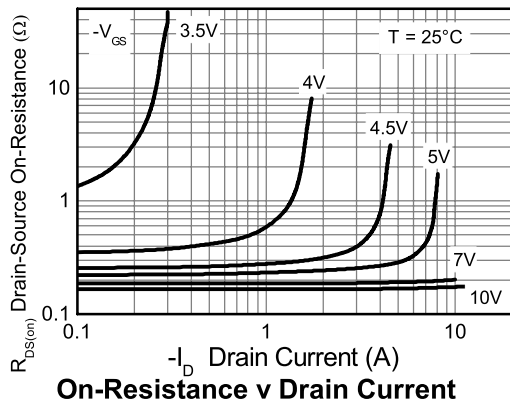
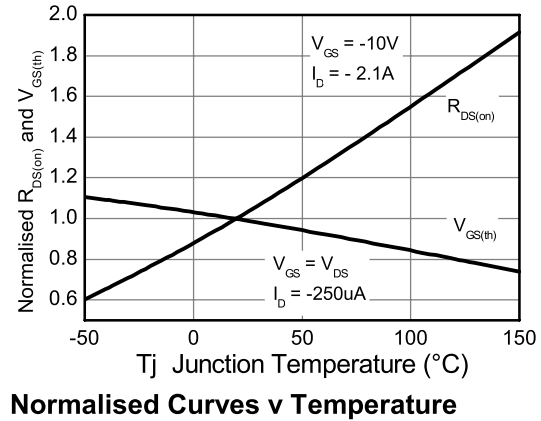
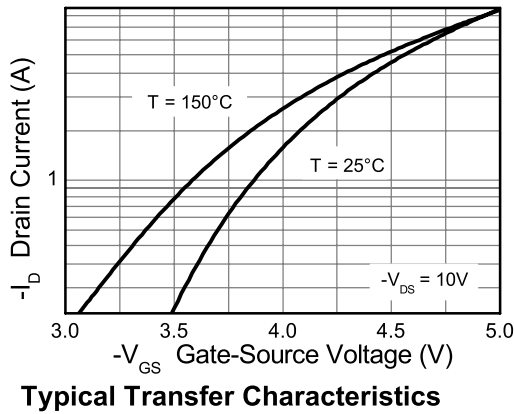
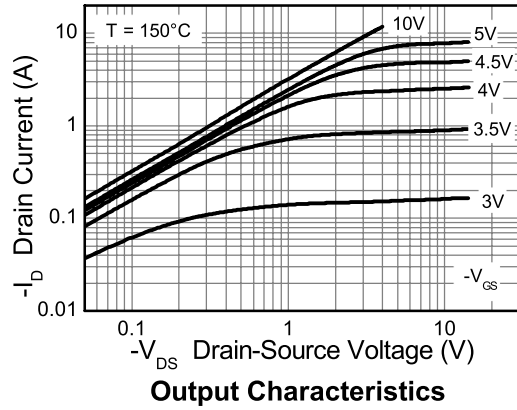
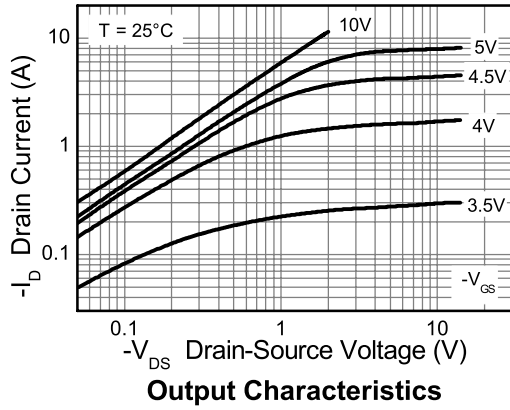
(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

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

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

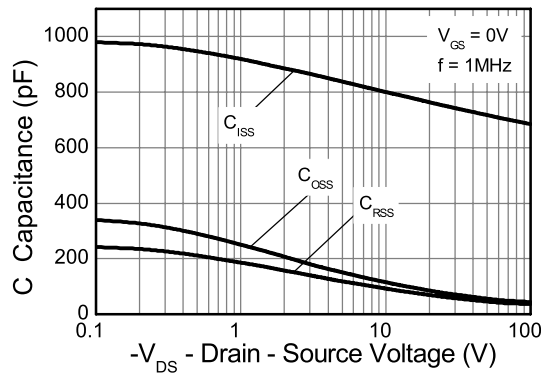
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Typical characteristics

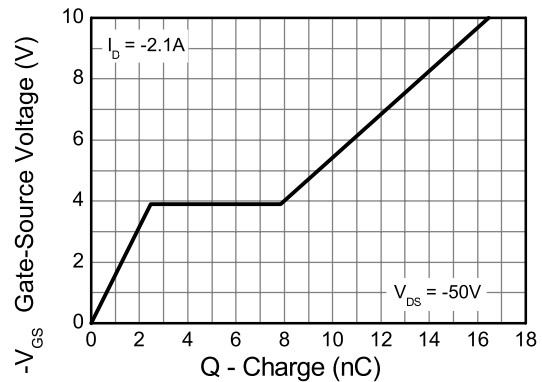


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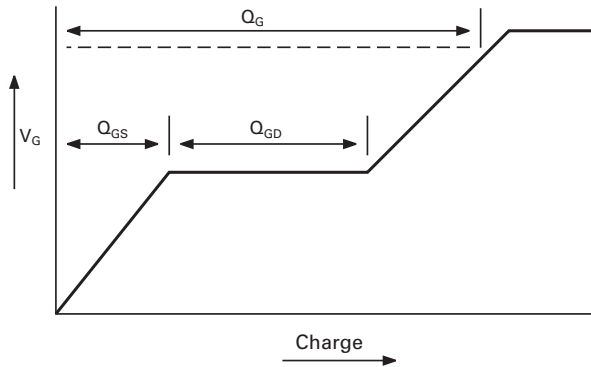
Typical characteristics



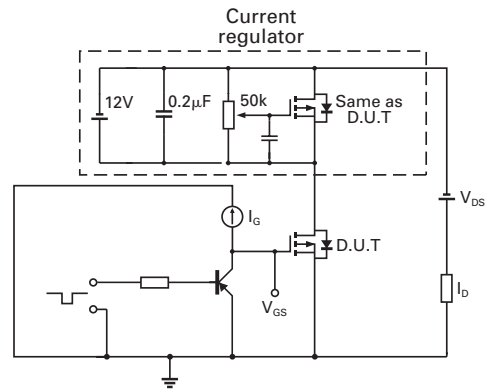
Capacitance v Drain-Source Voltage



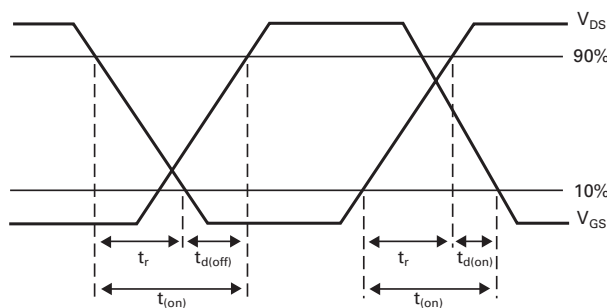
Gate-Source Voltage v Gate Charge



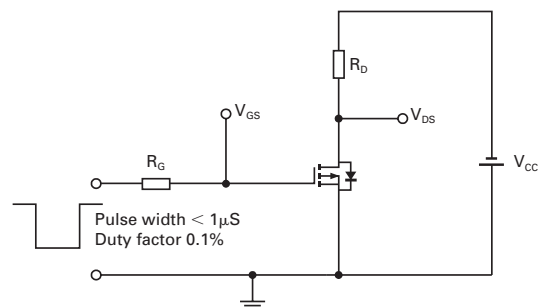
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



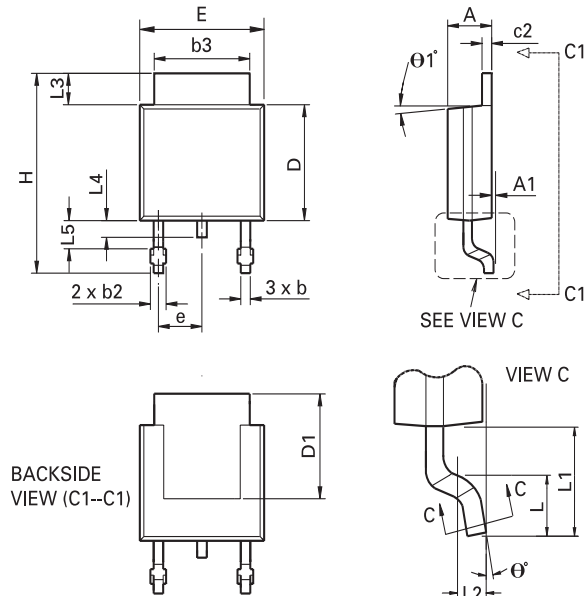
Switching time test circuit

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Package details - 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	-	theta 1°	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

Europe

Zetex GmbH
Kustermann-park
Balanstraße 59
D-81541 München
Germany
Telefon: (49) 89 45 49 49 0
Fax: (49) 89 45 49 49 49
europe.sales@zetex.com

Americas

Zetex Inc
700 Veterans Memorial Highway
Hauppauge, NY 11788
USA
Telephone: (1) 631 360 2222
Fax: (1) 631 360 8222
usa.sales@zetex.com

Asia Pacific

Zetex (Asia Ltd)
3701-04 Metroplaza Tower 1
Hing Fong Road, Kwai Fong
Hong Kong
Telephone: (852) 26100 611
Fax: (852) 24250 494
asia.sales@zetex.com

Corporate Headquarters

Zetex Semiconductors plc
Zetex Technology Park, Chadderton
Oldham, OL9 9LL
United Kingdom
Telephone: (44) 161 622 4444
Fax: (44) 161 622 4446
hq@zetex.com

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