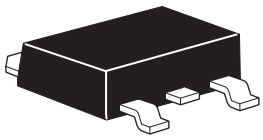
ZXMN4A06K
40V N-channel enhancement mode MOSFET

Summary

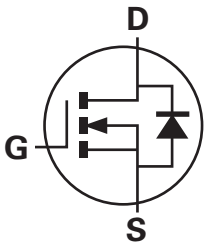


$V_{(BR)DSS}$= -40V; $R_{DS(ON)}$ = 0.05Ω; I_D = 10.9A

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



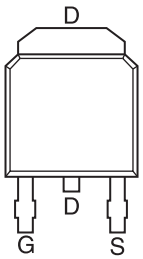
- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- DPAK package

Applications

- DC - DC converters
- Audio output stages
- Relay and solenoid driving
- Motor control

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN4A06KTC	13	16	2,500



Pinout - Top view

Device marking

ZXMN
4A06

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DSS}	40	V
Gate-source voltage	V_{GS}	±20	V
Continuous drain current: V_{GS}=10V; T_A=25°C (b) V_{GS}=10V; T_A=70°C (b) V_{GS}=10V; T_A=25°C (a)	I_D	 10.9 8.7 7.2	 A A A
Pulsed drain current (c)	I_{DM}	35.3	A
Continuous source current (body diode) (b)	I_S	10.8	A
Pulsed source current (body diode) (c)	I_{SM}	35.3	A
Power dissipation at T_A=25°C (a) Linear derating factor	P_D	4.2 33.6	W mW/°C
Power dissipation at T_A=25°C (b) Linear derating factor	P_D	9.5 76	W mW/°C
Power dissipation at T_A=25°C (d) Linear derating factor	P_D	2.15 17.2	W mW/°C
Operating and storage temperature range	T_j:T_{stg}	-55 to +150	°C

Thermal resistance

Parameter	Symbol	Value	Unit
Junction to ambient (a)	$R_{\Theta JA}$	30	°C/W
Junction to ambient (b)	$R_{\Theta JA}$	13.2	°C/W
Junction to ambient (d)	$R_{\Theta JA}$	58	°C/W

NOTES:

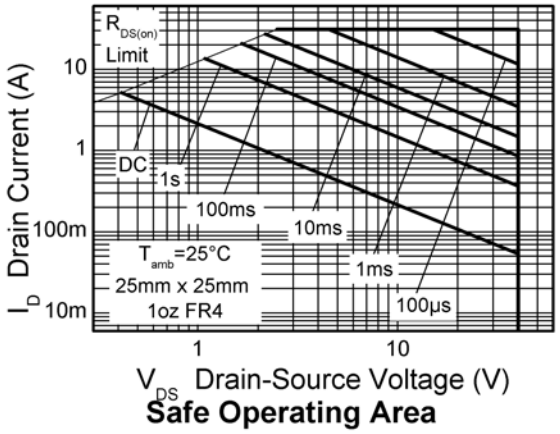
(a) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.

(b) For a device surface mounted on FR4 PCB measured at t 10 sec.

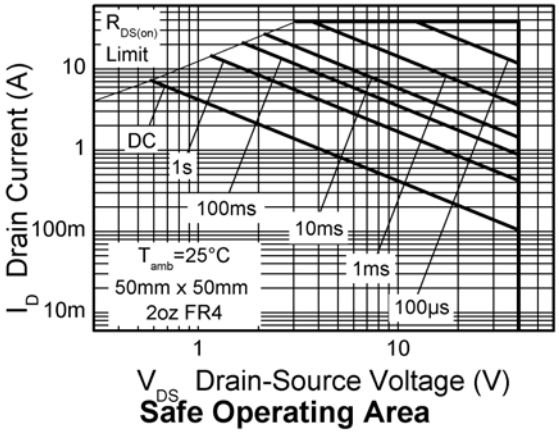
(c) Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, D=0.02 pulse width=300 s - pulse width limited by maximum junction temperature.

(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.

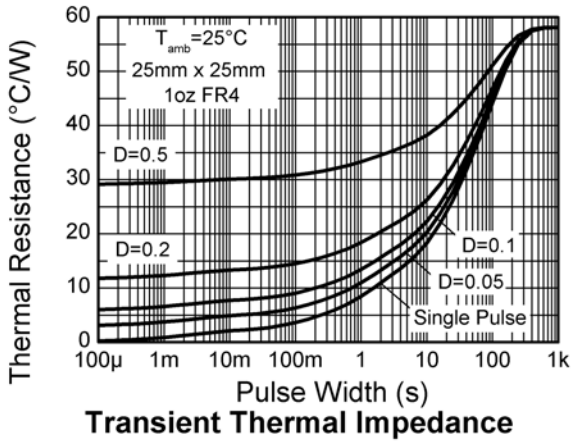
Characteristics



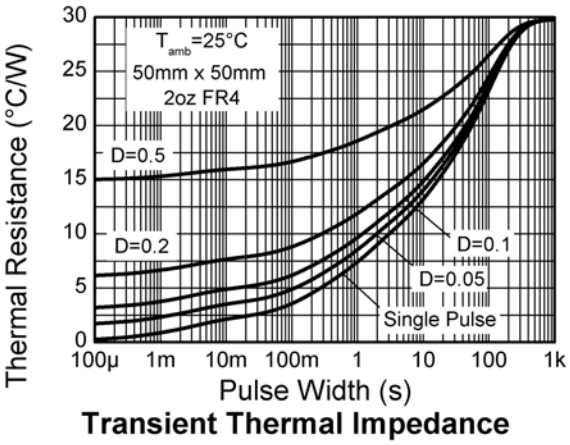
Safe Operating Area



Safe Operating Area



Transient Thermal Impedance



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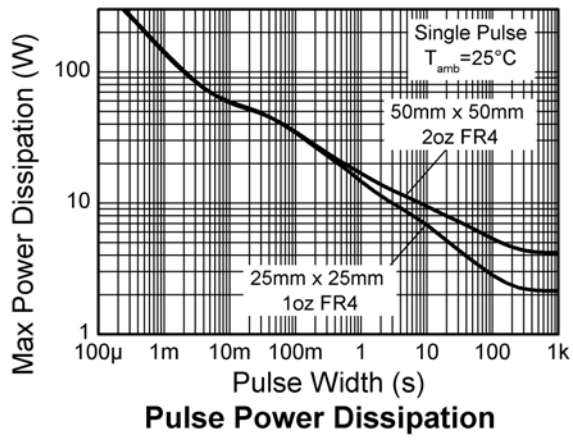
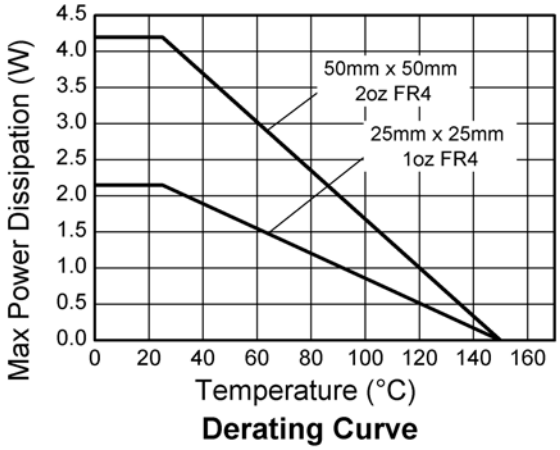


Pulse Power Dissipation



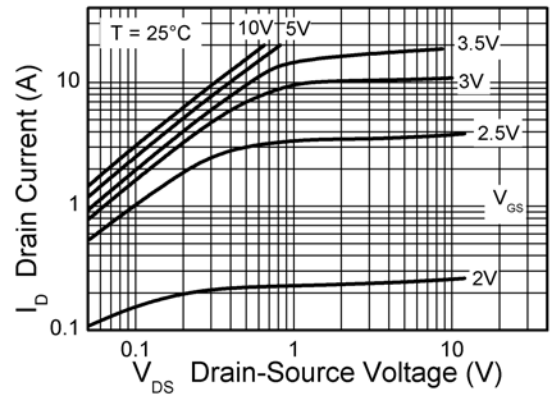
Derating Curve

Electrical characteristics (at T_A = 25°C unless otherwise stated)

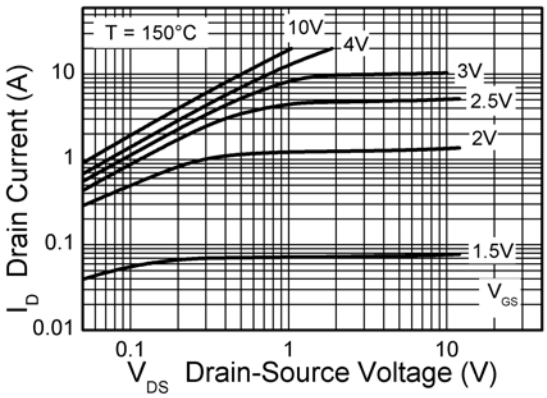
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	40			V	I_D=250μA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}			1	μA	V_{DS}=40V, V_{GS}=0V
Gate-body leakage	I_{GSS}			100	nA	V_{GS}=±20V, V_{DS}=0V
Gate-source threshold voltage	$V_{GS(th)}$	1.0			V	I_D=250μA, V_{DS}= V_{GS}
Static drain-source on-state resistance (*)	$R_{DS(on)}$			0.050 0.075	Ω Ω	V_{GS}=10V, I_D=4.5A V_{GS}=4.5V, I_D=3.2A
Forward transconductance(‡)	g_{fs}		11.5		S	V_{DS}=15V,I_D=4.5A
Dynamic (‡)						
Input capacitance	C_{iss}		827		pF	V_{DS}=20 V, V_{GS}=0V, f=1MHz
Output capacitance	C_{oss}		133		pF	
Reverse transfer capacitance	C_{rss}		84		pF	
Switching (†) (‡)						
Turn-on delay time	$t_{d(on)}$		3.2		ns	V_{DD} =20V, I_D=1A R_G=6.0Ω, V_{GS}=10V (refer to test circuit)
Rise time	t_r		3.8		ns	
Turn-off delay time	$t_{d(off)}$		23.3		ns	
Fall time	t_f		10.9		ns	
Total gate charge	Q_g		17.1		nC	V_{DS}=20V,V_{GS}=10V, I_D=4.5A (refer to test circuit)
Gate-source charge	Q_{gs}		2.41		nC	
Gate-drain charge	Q_{gd}		3.4		nC	
Source-drain diode						
Diode forward voltage(*)	V_{SD}		0.83	0.95	V	T_J=25°C, I_S=4.5A, V_{GS}=0V
Reverse recovery time(†)	t_{rr}		16		ns	T_J=25°C, I_F=4A, di/dt= 100A/μs
Reverse recovery charge(‡)	Q_{rr}		9		nC	

NOTES:
(*) Measured under pulsed conditions. Width ≤300μs. Duty cycle ≤2%.
(†) Switching characteristics are independent of operating junction temperature.
(‡) For design aid only, not subject to production testing.

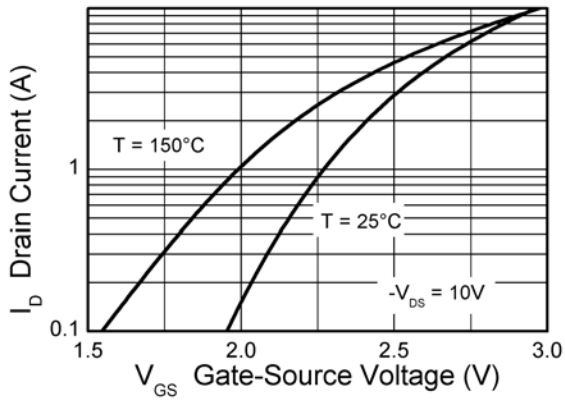
Typical charactersitics



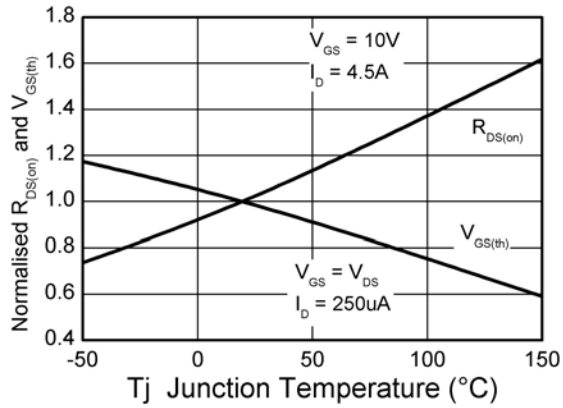
Output Characteristics



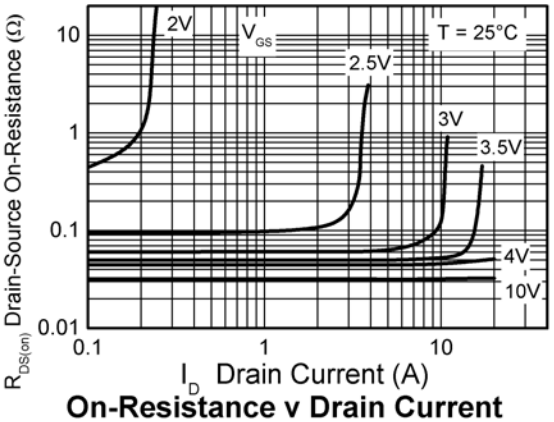
Output Characteristics



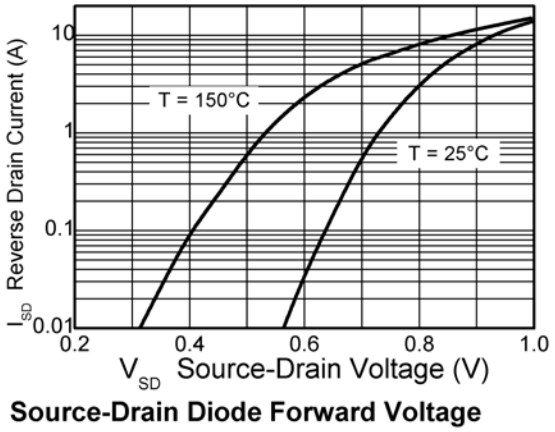
Typical Transfer Characteristics



Normalised Curves v Temperature

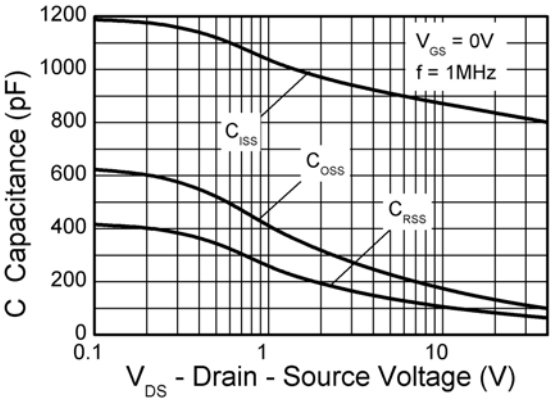


On-Resistance v Drain Current

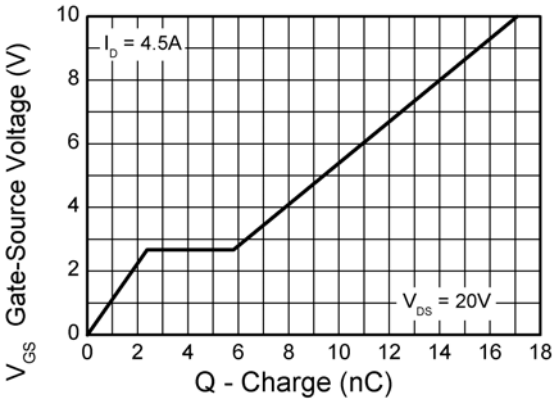


Source-Drain Diode Forward Voltage

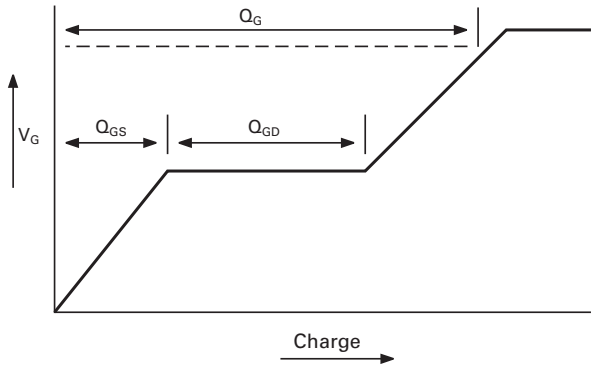
Typical characteristics



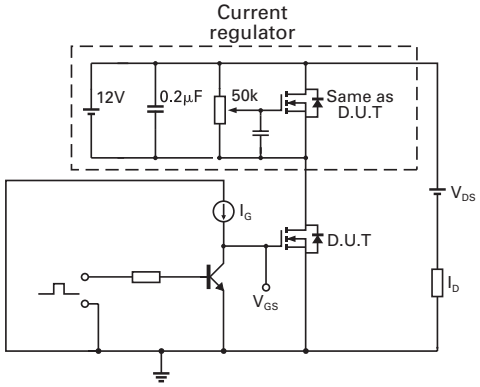
Capacitance v Drain-Source Voltage



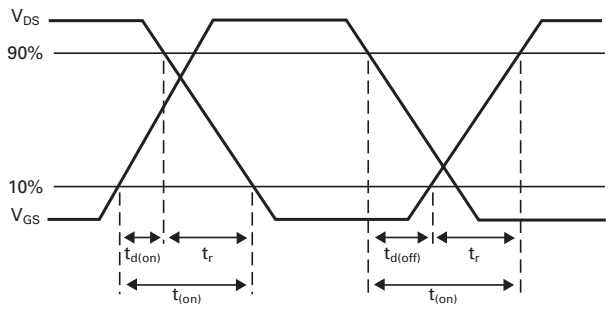
Gate-Source Voltage v Gate Charge



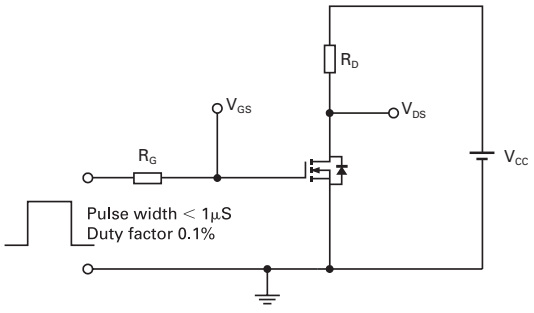
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



Switching time test circuit

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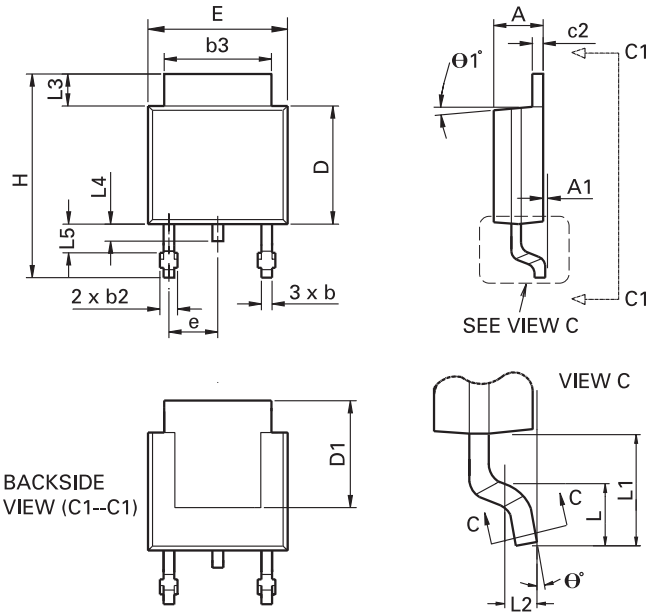
Package details - DPAK



Package dimensions

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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