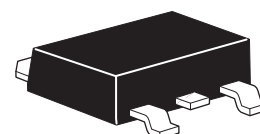


ZXMN4A06K

40V N-channel enhancement mode MOSFET

Summary

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

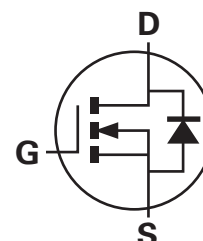


Description

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

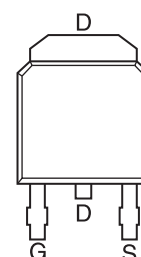
- DC - DC converters
- Audio output stages
- Relay and solenoid driving
- Motor control

Ordering information

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

Device marking

ZXMN
4A06



Pinout - Top view

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DSS}	40	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current: $V_{GS}=10V$; $T_A=25^{\circ}C$ ^(b)	I_D	10.9	A
$V_{GS}=10V$; $T_A=70^{\circ}C$ ^(b)		8.7	A
$V_{GS}=10V$; $T_A=25^{\circ}C$ ^(a)		7.2	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 $T_A=25^{\circ}C$ ^(a)	P_D	4.2	W
Linear derating factor		33.6	mW/ $^{\circ}C$
Power dissipation at $T_A=25^{\circ}C$ ^(b)	P_D	9.5	W
Linear derating factor		76	mW/ $^{\circ}C$
Power dissipation at $T_A=25^{\circ}C$ ^(d)	P_D	2.15	W
Linear derating factor		17.2	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)	$R_{\theta JA}$	13.2	$^{\circ}C/W$
Junction to ambient ^(d)	$R_{\theta JA}$	58	$^{\circ}C/W$

NOTES:

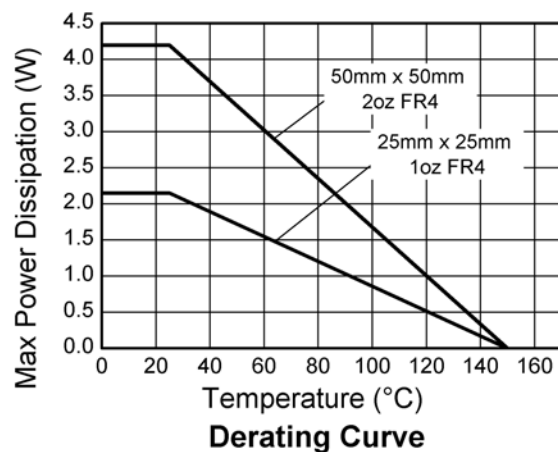
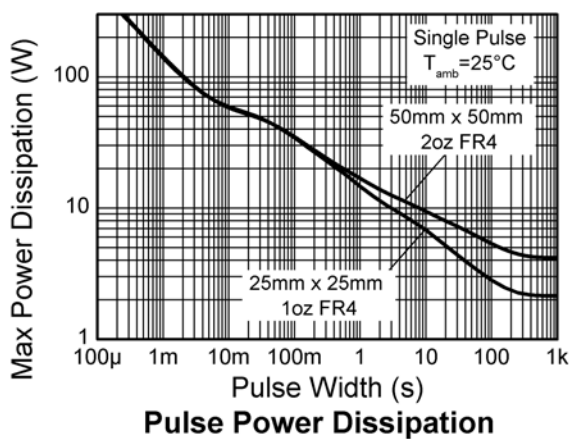
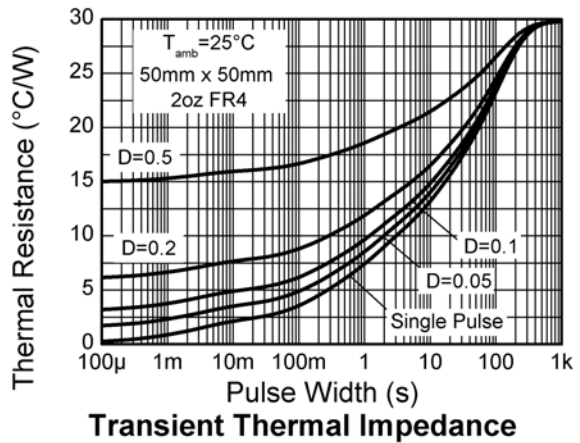
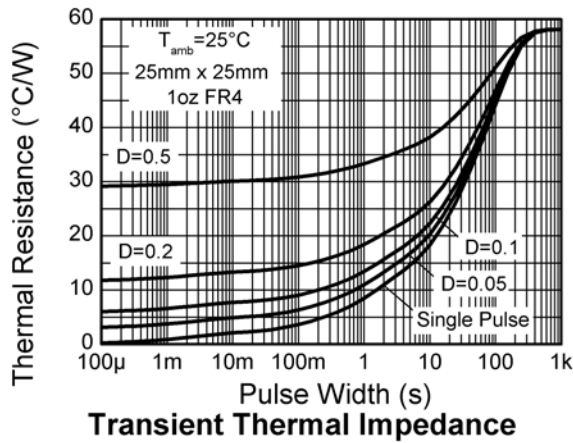
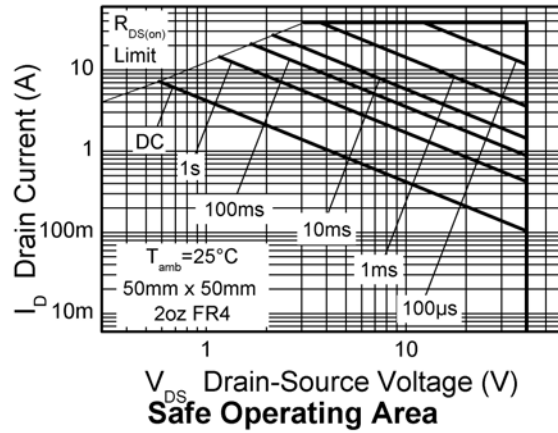
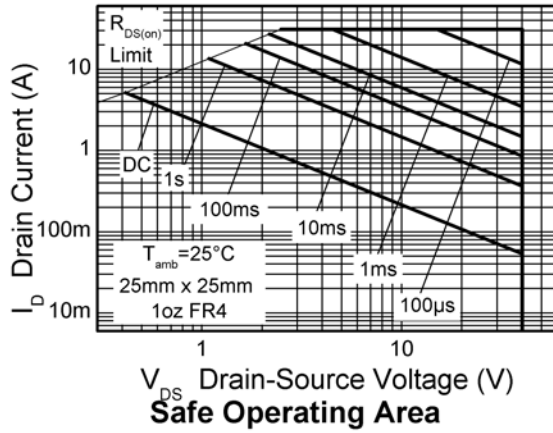
(a) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.

(b) For a device surface mounted on FR4 PCB measured at $t = 10$ 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



ZXMN4A06K

Electrical characteristics (at $T_A = 25^\circ\text{C}$ 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	Ω	V _{GS} =10V, I _D =4.5A
				0.075	Ω	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	

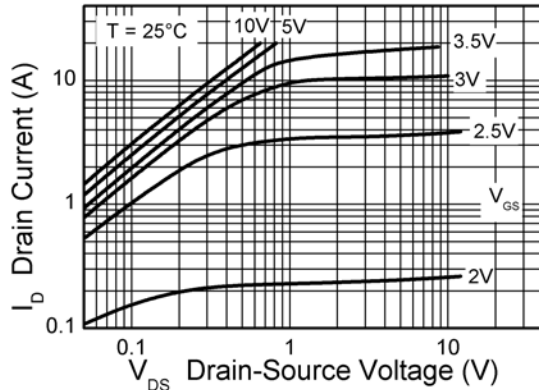
NOTES:

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

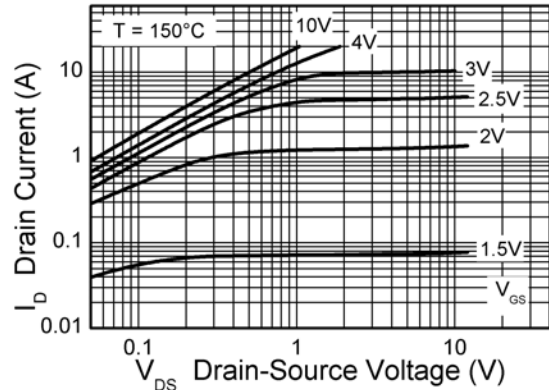
(†) Switching characteristics are independent of operating junction temperature.

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

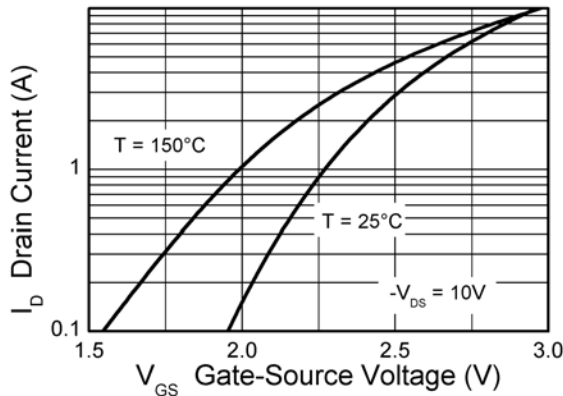
Typical characteristics



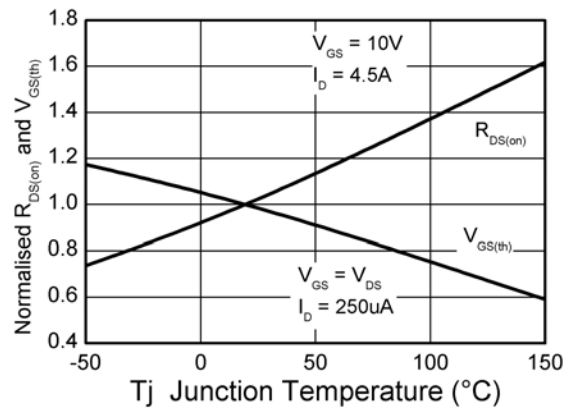
Output Characteristics



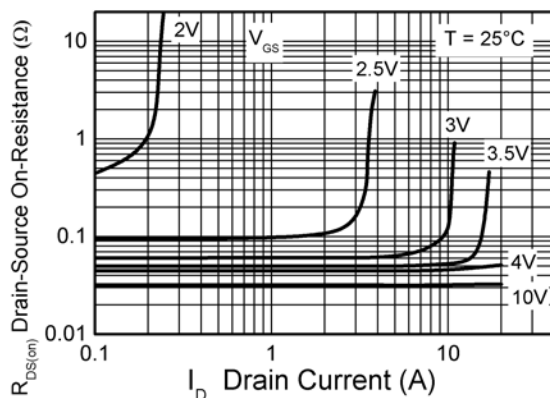
Output Characteristics



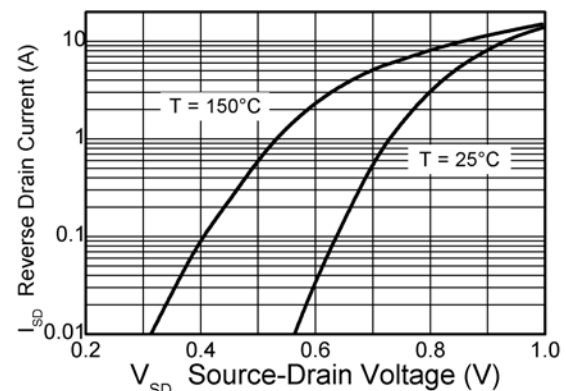
Typical Transfer Characteristics



Normalised Curves v Temperature

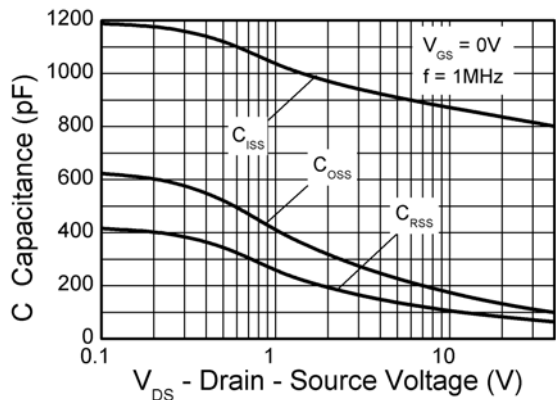


On-Resistance v Drain Current

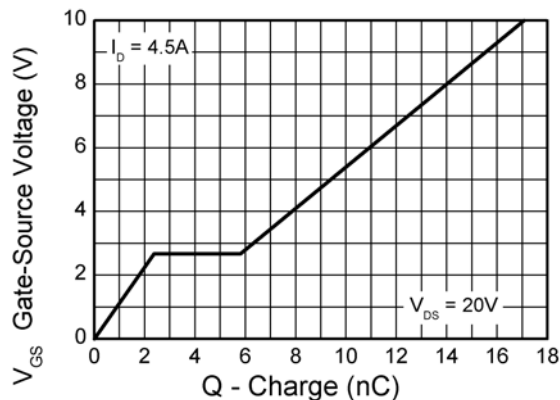


Source-Drain Diode Forward Voltage

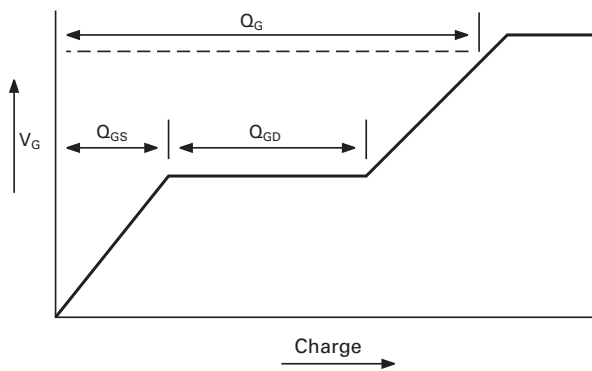
Typical characteristics



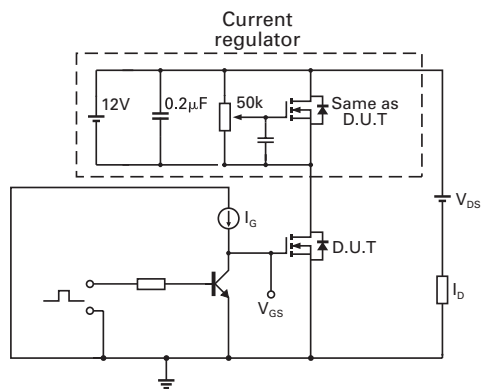
Capacitance v Drain-Source Voltage



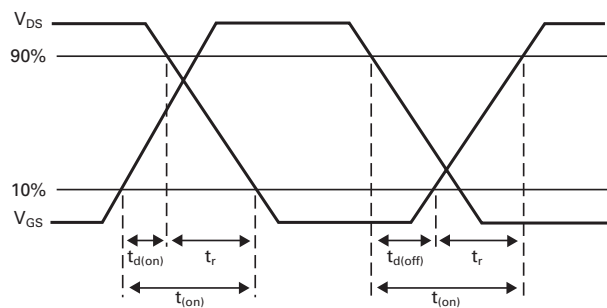
Gate-Source Voltage v Gate Charge



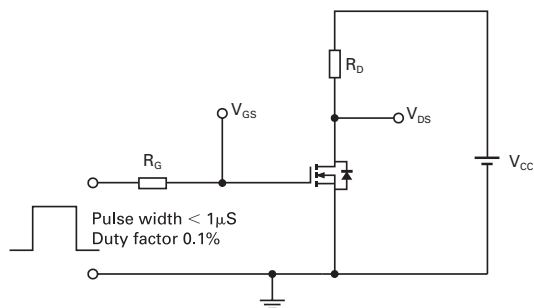
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

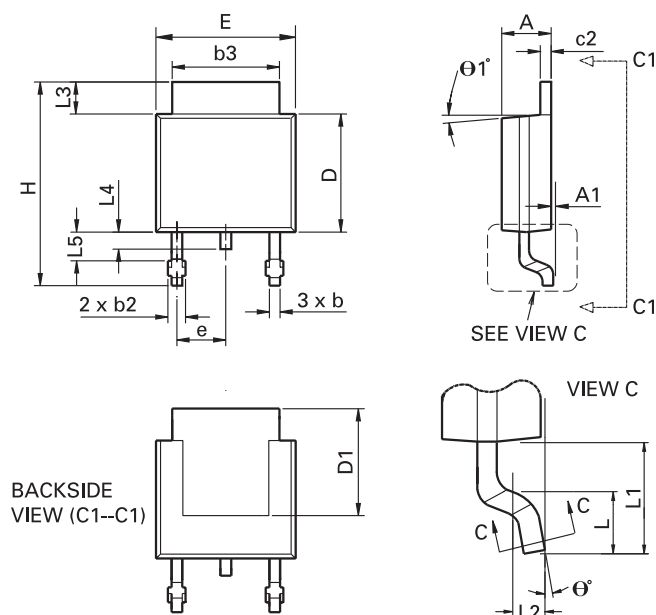


Switching time test circuit

ZXMN4A06K

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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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