ZXMN3B04N8

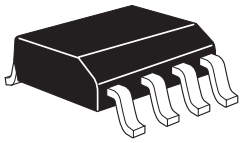
30V N-CHANNEL ENHANCEMENT MODE MOSFET 2.5V GATE DRIVE

SUMMARY

$V_{(BR)DSS}$=30V : $R_{DS(on)}$=0.025Ω; I_D= 8.9A

DESCRIPTION

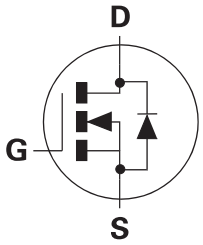
This new generation of Trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.



SO8

FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

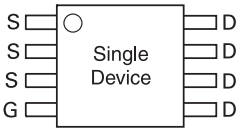


APPLICATIONS

- DC - DC converters
- Power management functions
- Disconnect switches
- Motor control

ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN3B04N8TA	7”	12mm	500 units
ZXMN3B04N8TC	13”	12mm	2500 units



Top View

DEVICE MARKING

- ZXMN
  3B04

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DSS}	30	V
Gate source voltage	V_{GS}	±12	V
Continuous drain current @ V_{GS}=4.5V; T_A=25°C (b)	I_D	8.9	A
@ V_{GS}=4.5V; T_A=70°C (b)		7.3	A
@ V_{GS}=4.5V; T_A=25°C (a)		7.2	A
Pulsed drain current (c)	I_{DM}	45	A
Continuous source current (body diode) (b)	I_S	4.5	A
Pulsed source current (body diode) (c)	I_{SM}	45	A
Power dissipation at T_A=25°C (a)	P_D	2	W
Linear derating factor		16	mW/°C
Power dissipation at T_A=25°C (b)	P_D	3	W
Linear derating factor		24	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)	$R_{\Theta JA}$	62.5	°C/W
Junction to ambient (b)	$R_{\Theta JA}$	41.4	°C/W

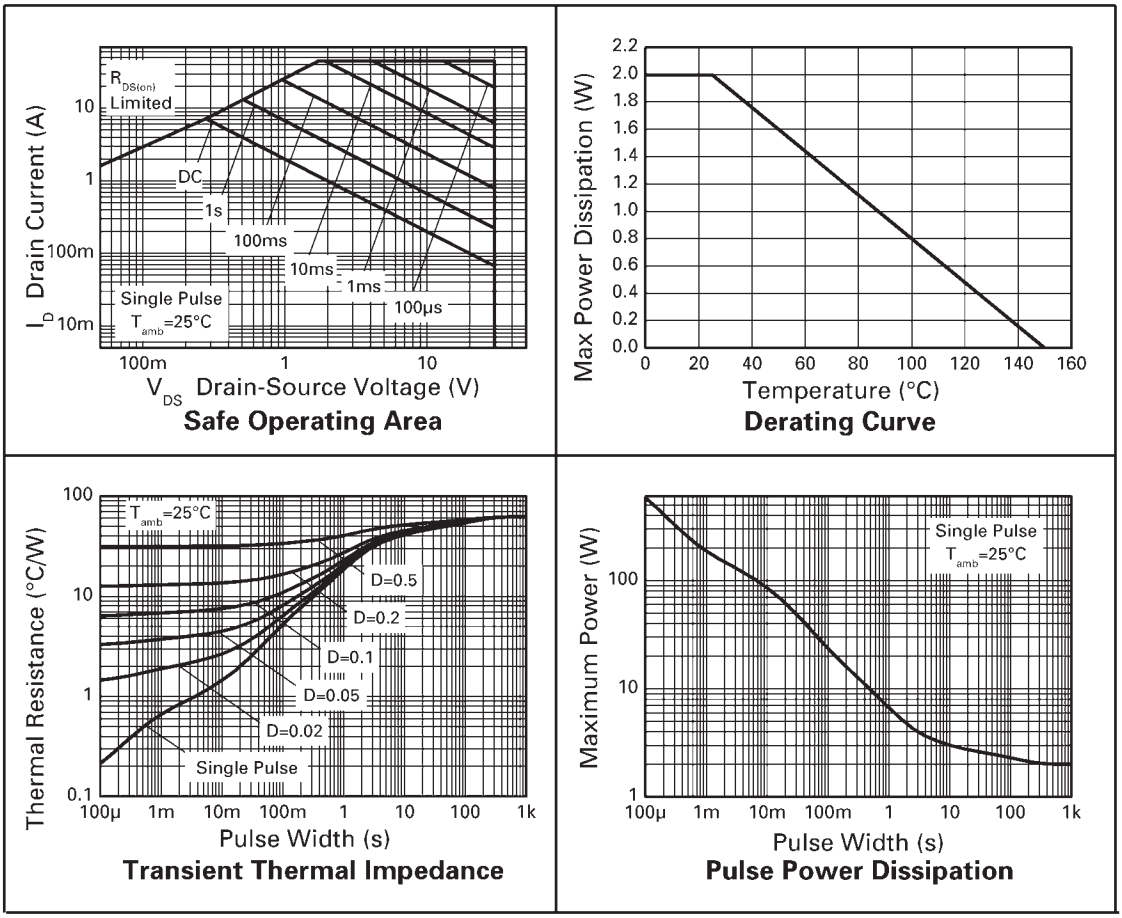
NOTES

(a) For a device surface mounted on 50mm x 50mm 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 - 25mm x 25mm FR4 PCB, D=0.02, pulse width 300μs - pulse width limited by maximum junction temperature.

CHARACTERISTICS



ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-source breakdown voltage	$V_{(BR)DSS}$	30			V	I_D=250μA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}			0.5	μA	V_{DS}=30V, V_{GS}=0V
Gate-body leakage	I_{GSS}			100	nA	V_{GS}=±12V, V_{DS}=0V
Gate-source threshold voltage	$V_{GS(th)}$	0.7			V	I_D=250μA, V_{DS}= V_{GS}
Static drain-source on-state resistance (1)	$R_{DS(on)}$		0.021 0.028	0.025 0.040	Ω Ω	V_{GS}=4.5V, I_D=7.2A V_{GS}=2.5V, I_D=5.7A
Forward transconductance (1) (3)	g_{fs}		24		S	V_{DS}=15V,I_D=7.2A
DYNAMIC (3)						
Input capacitance	C_{iss}		2480		pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
Output capacitance	C_{oss}		318		pF	
Reverse transfer capacitance	C_{rss}		184		pF	
SWITCHING(2) (3)						
Turn-on delay time	$t_{d(on)}$		9		ns	V_{DD} =15V, V_{GS}=4.5V I_D=1A R_G≅6.0Ω,
Rise time	t_r		11.5		ns	
Turn-off delay time	$t_{d(off)}$		40		ns	
Fall time	t_f		16.6		ns	
Total gate charge	Q_g		23.1		nC	V_{DS}=15V,V_{GS}=4.5V, I_D=7.2A
Gate-source charge	Q_{gs}		4.9		nC	
Gate-drain charge	Q_{gd}		6.2		nC	
SOURCE-DRAIN DIODE						
Diode forward voltage (1)	V_{SD}		0.85	0.95	V	T_J=25°C, I_S=8A, V_{GS}=0V
Reverse recovery time (3)	t_{rr}		17.9		ns	T_J=25°C, I_F=3.2A, di/dt= 100A/μs
Reverse recovery charge (3)	Q_{rr}		10		nC	

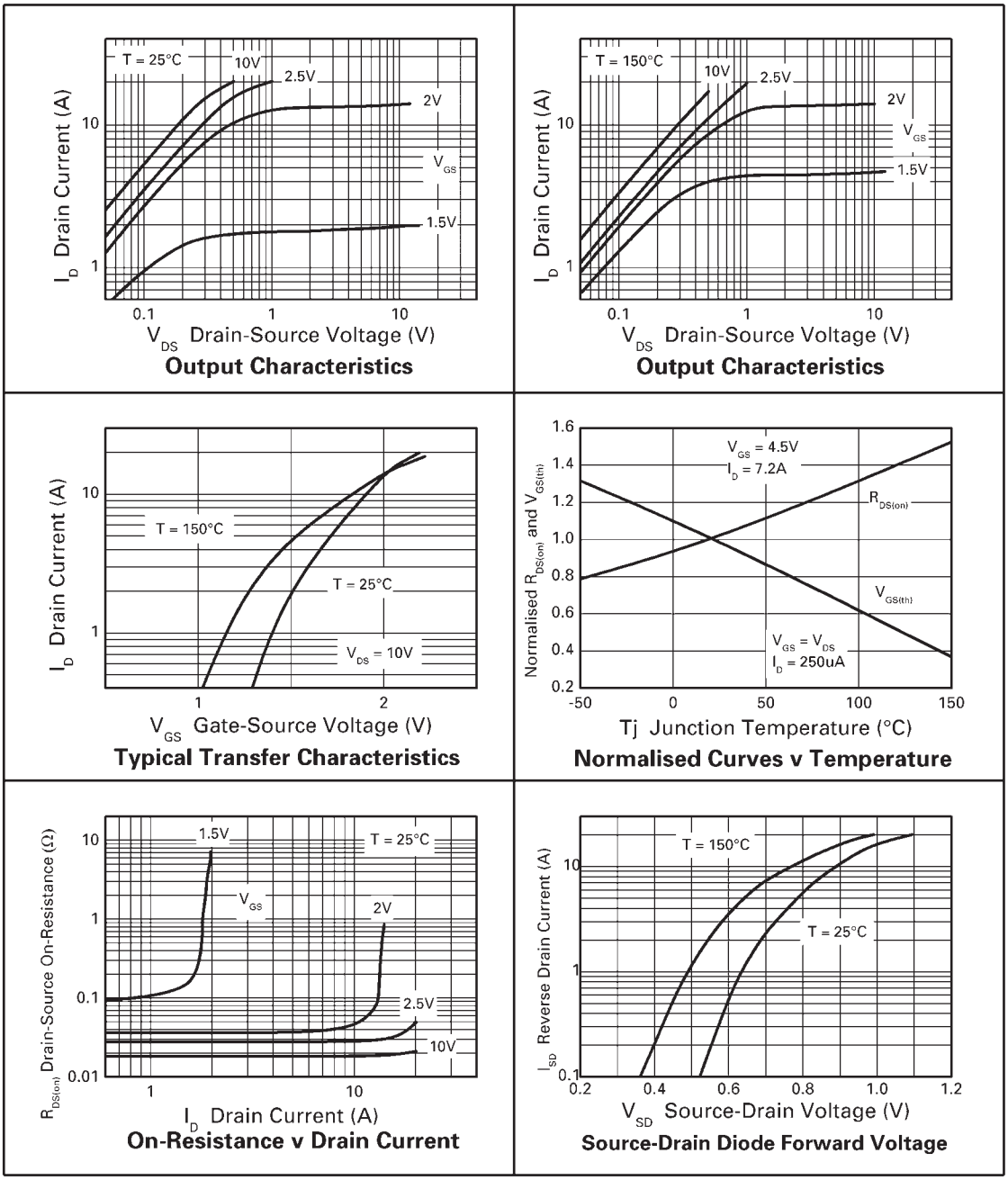
NOTES

(1) Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤2%.

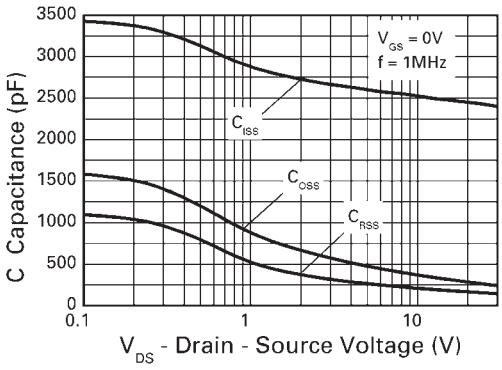
(2) Switching characteristics are independent of operating junction temperature.

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

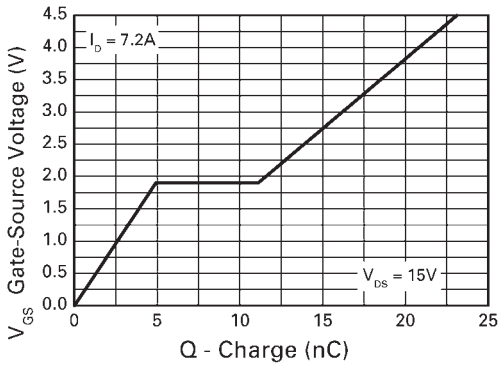
TYPICAL CHARACTERISTICS



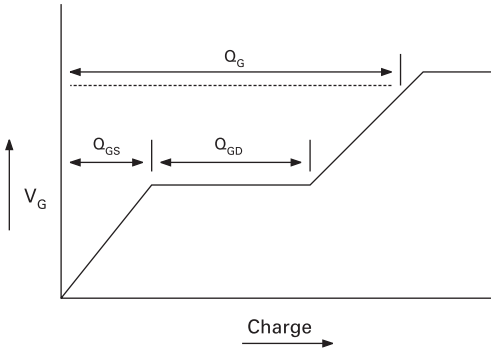
TYPICAL CHARACTERISTICS



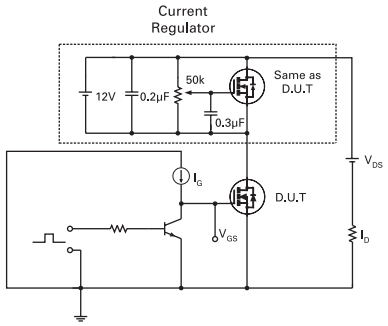
Capacitance v Drain-Source Voltage



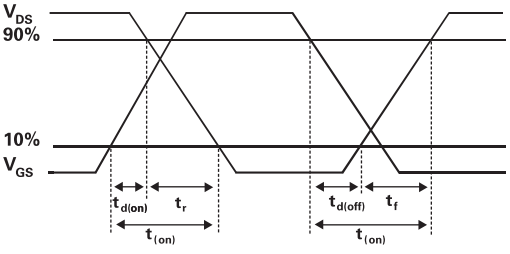
Gate-Source Voltage v Gate Charge



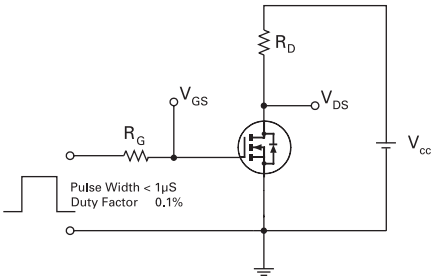
Basic Gate Charge Waveform



Gate Charge Test Circuit

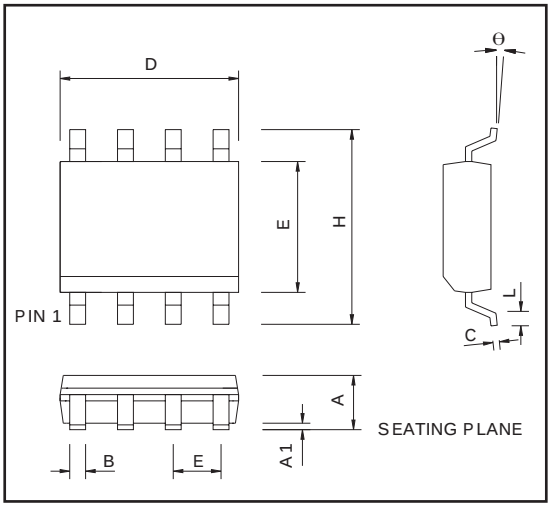


Switching Time Waveforms



Switching Time Test Circuit

PACKAGE OUTLINE



Controlling dimensions are in inches. Approximate conversions are given in millimeters

PACKAGE DIMENSIONS

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.053	0.069	1.35	1.75	e	0.050 BSC		1.27 BSC	
A1	0.004	0.010	0.10	0.25	b	0.013	0.020	0.33	0.51
D	0.189	0.197	4.80	5.00	c	0.008	0.010	0.19	0.25
H	0.228	0.244	5.80	6.20	θ	0°	8°	0°	8°
E	0.150	0.157	3.80	4.00	h	0.010	0.020	0.25	0.50
L	0.016	0.050	0.40	1.27					

Europe

Zetex GmbH
Streitfeldstraße 19
D-81673 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 Hwy
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 plc
Lansdowne Road, Chadderton
Oldham, OL9 9TY
United Kingdom

Telephone (44) 161 622 4444
Fax: (44) 161 622 4446
hq@zetex.com

These offices are supported by agents and distributors in major countries world-wide.

For the latest product information, log on to www.zetex.com

ISSUE 2 - MAY 2004

ZETEX SEMICONDUCTORS