

20V N-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

$V_{(BR)DSS}=20V$; $R_{DS(ON)}= 0.1\Omega$; $I_D=3.2A$

DESCRIPTION

This new generation of high density MOSFETs from Zetex utilise 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
- SOT23-6 package

APPLICATIONS

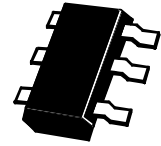
- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control

ORDERING INFORMATION

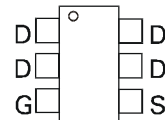
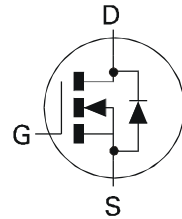
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXM62N02E6TA	7	8mm embossed	3000 units
ZXM62N02E6TC	13	8mm embossed	10000 units

DEVICE MARKING

- 2N02



SOT23-6



Top View

ZXM62N02E6

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DSS}	20	V
Gate Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ($V_{GS}=4.5V$; $T_A=25^\circ C$)(b) ($V_{GS}=4.5V$; $T_A=70^\circ C$)(b)	I_D	3.2 2.6	A
Pulsed Drain Current (c)	I_{DM}	18	A
Continuous Source Current (Body Diode) (b)	I_S	2.1	A
Pulsed Source Current (Body Diode)	I_{SM}	18	A
Power Dissipation at $T_A=25^\circ C$ (a) Linear Derating Factor	P_D	1.1 8.8	W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (b) Linear Derating Factor	P_D	1.7 13.6	W mW/ $^\circ C$

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)	$R_{\theta JA}$	113	$^\circ C/W$
Junction to Ambient (b)	$R_{\theta JA}$	73	$^\circ C/W$

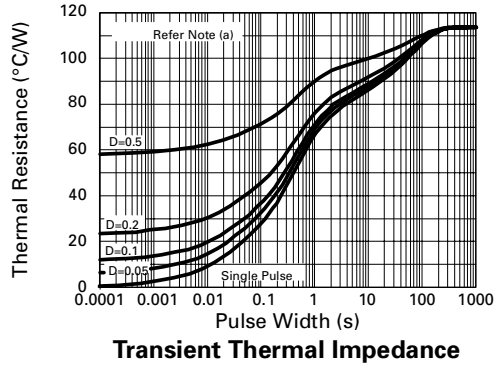
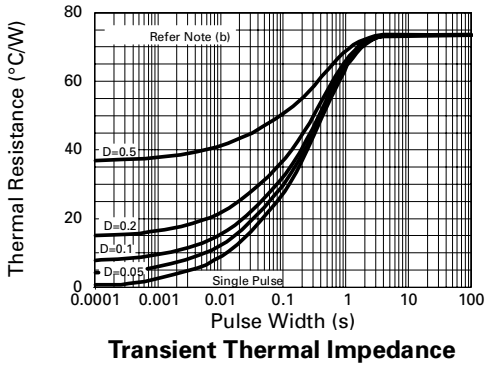
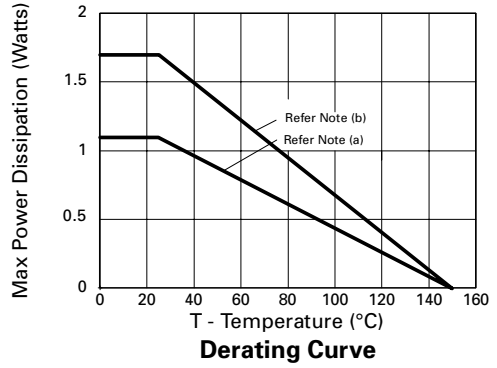
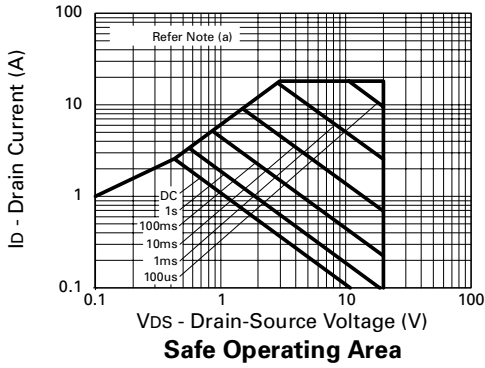
NOTES

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(b) For a device surface mounted on FR4 PCB measured at $t \leq 5$ secs.

(c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

CHARACTERISTICS



ZXM62N02E6

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

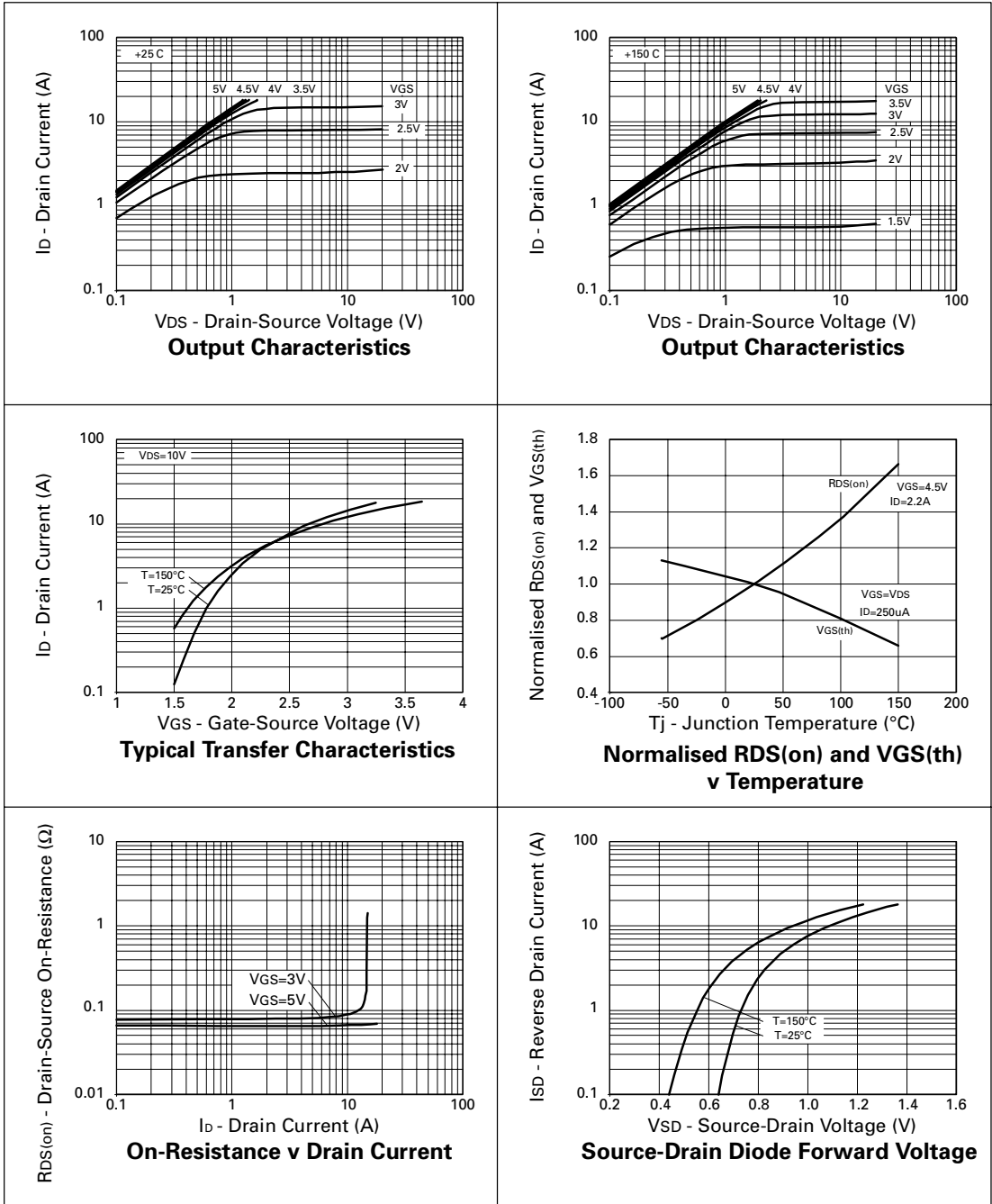
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	20			V	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			1	μA	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS}=\pm 12\text{V}, V_{DS}=0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.7			V	$I_D=250\mu\text{A}, V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.1 0.125	Ω Ω	$V_{GS}=4.5\text{V}, I_D=2.2\text{A}$ $V_{GS}=2.7\text{V}, I_D=1.1\text{A}$
Forward Transconductance	g_{fs}	3.2			S	$V_{DS}=10\text{V}, I_D=1.1\text{A}$
DYNAMIC (3)						
Input Capacitance	C_{iss}		460		pF	$V_{DS}=15\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$
Output Capacitance	C_{oss}		150		pF	
Reverse Transfer Capacitance	C_{rss}		50		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	$t_{d(on)}$		4.0		ns	$V_{DD}=10\text{V}, I_D=2.2\text{A}$ $R_G=6.0\Omega, R_D=4.4\Omega$ (refer to test circuit)
Rise Time	t_r		10.4		ns	
Turn-Off Delay Time	$t_{d(off)}$		16.9		ns	
Fall Time	t_f		8.0		ns	
Total Gate Charge	Q_g			6.3	nC	$V_{DS}=16\text{V}, V_{GS}=4.5\text{V},$ $I_D=2.2\text{A}$ (refer to test circuit)
Gate-Source Charge	Q_{gs}			1.5	nC	
Gate Drain Charge	Q_{gd}			2.5	nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}			0.95	V	$T_j=25^{\circ}\text{C}, I_S=2.2\text{A},$ $V_{GS}=0\text{V}$
Reverse Recovery Time (3)	t_{rr}		17.5		ns	$T_j=25^{\circ}\text{C}, I_F=2.2\text{A},$ $di/dt=100\text{A}/\mu\text{s}$
Reverse Recovery Charge (3)	Q_{rr}		8.6		nC	

(1) Measured under pulsed conditions. Width=300 μs . Duty cycle $\leq 2\%$.

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

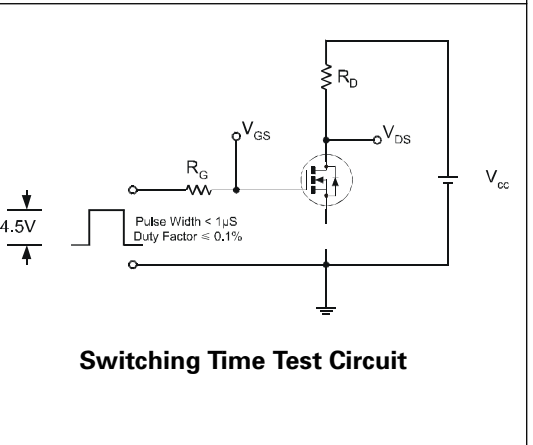
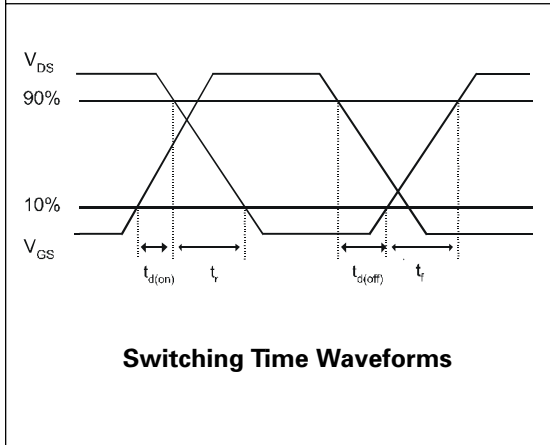
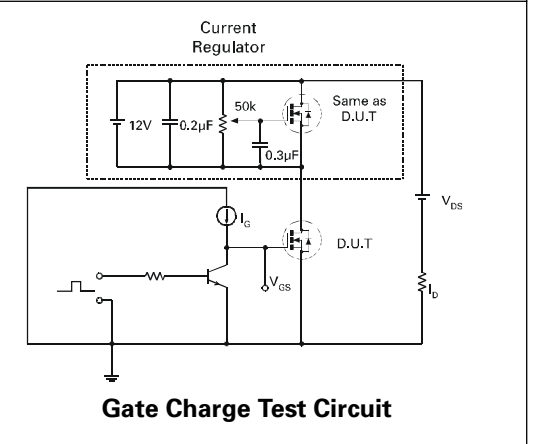
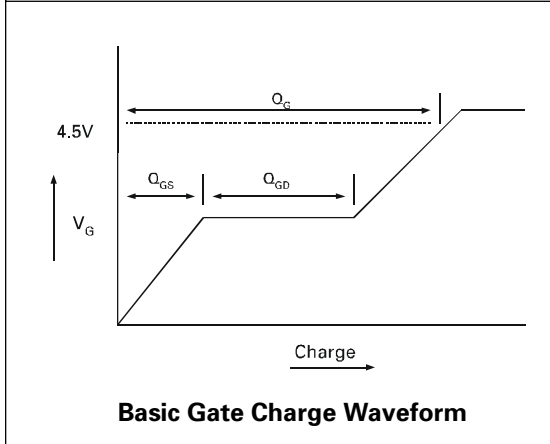
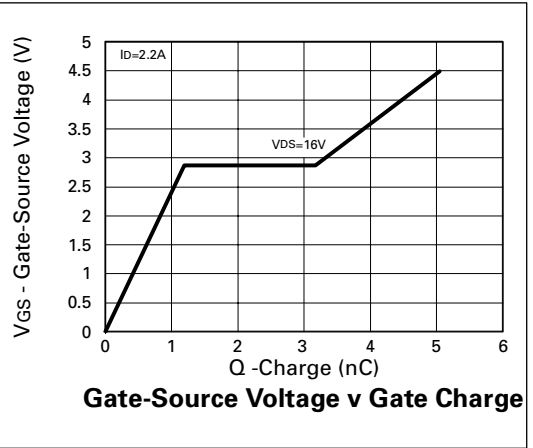
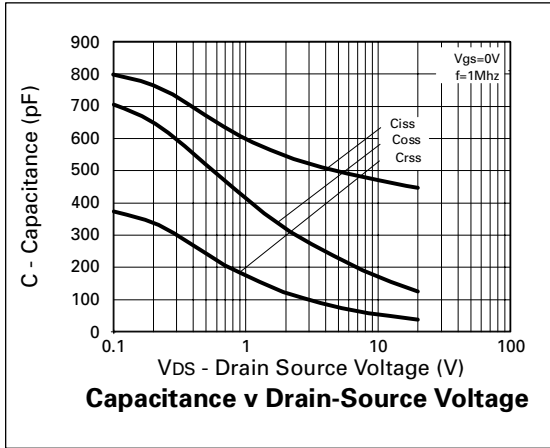
(3) For design aid only, not subject to production testing.

TYPICAL CHARACTERISTICS



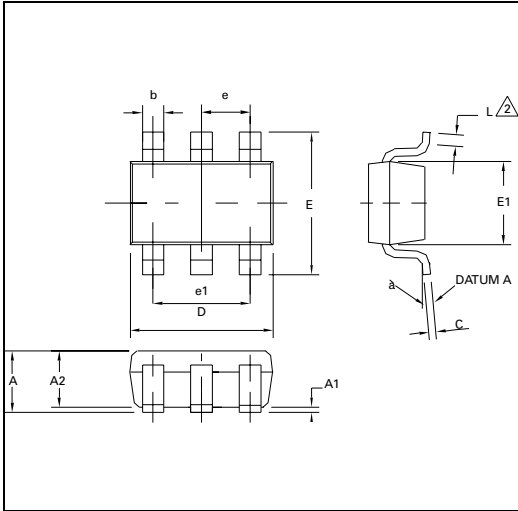
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TYPICAL CHARACTERISTICS



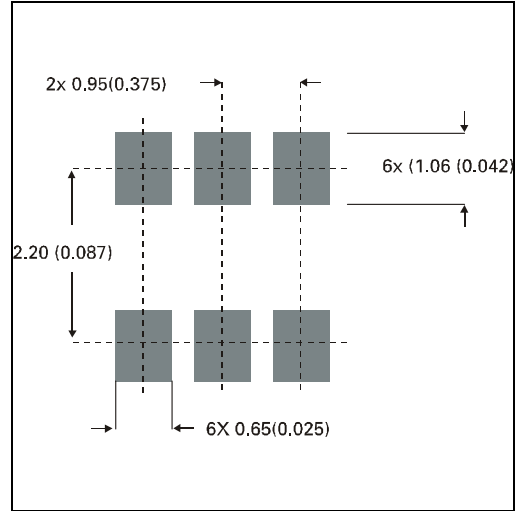
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PACKAGE DIMENSIONS



DIM	Millimetres		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.35	0.057
A1	0.00	0.15	0	0.006
A2	0.90	1.30	0.035	0.051
b	0.35	0.50	0.014	0.019
C	0.09	0.20	0.0035	0.008
D	2.80	3.00	0.110	0.118
E	2.60	3.00	0.102	0.118
E1	1.50	1.75	0.059	0.069
L	0.10	0.60	0.004	0.002

PAD LAYOUT DETAILS



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