

ZXMD63C03X

30V DUAL N AND P-CANNEL ENHANCEMENT MODE MOSFET

SUMMARY

N-CHANNEL: $V_{(BR)DSS}=30V$; $R_{DS(ON)}=0.135\Omega$; $I_D=2.3A$

P-CHANNEL: $V_{(BR)DSS}=-30V$; $R_{DS(ON)}=0.185\Omega$; $I_D=-2.0A$

DESCRIPTION

This new generation of high density 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.



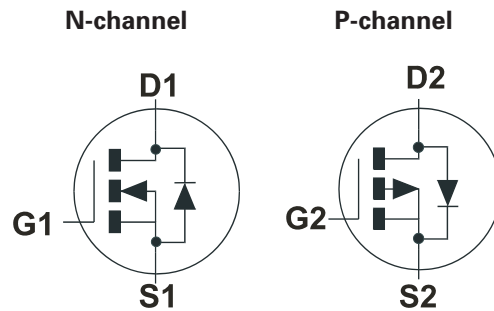
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FEATURES

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

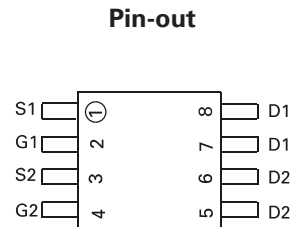
APPLICATIONS

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



ORDERING INFORMATION

DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXMD63C03XTA	7	12 embossed	1,000
ZXMD63C03XTC	13	12 embossed	4,000



Top view

DEVICE MARKING

ZXM63C03

ZXMD63C03X

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	N-CHANNEL	P-CHANNEL	UNIT
Drain-Source Voltage	V_{DSS}	30	-30	V
Gate- Source Voltage	V_{GS}	±20		V
Continuous Drain Current ($V_{GS}=4.5V$; $T_A=25^{\circ}C$)(b)(d) ($V_{GS}=4.5V$; $T_A=70^{\circ}C$)(b)(d)	I_D	2.3	-2.0	A
		1.8	-1.6	A
Pulsed Drain Current (c)(d)	I_{DM}	14	-9.6	A
Continuous Source Current (Body Diode)(b)(d)	I_S	1.5	-1.4	A
Pulsed Source Current (Body Diode)(c)(d)	I_{SM}	14	-9.6	A
Power Dissipation at $T_A=25^{\circ}C$ (a)(d) Linear Derating Factor	P_D	0.87		W
		6.9		mW/°C
Power Dissipation at $T_A=25^{\circ}C$ (a)(e) Linear Derating Factor	P_D	1.04		W
		8.3		mW/°C
Power Dissipation at $T_A=25^{\circ}C$ (b)(d) Linear Derating Factor	P_D	1.25		W
		10		mW/°C
Operating and Storage Temperature Range	$T_J:T_{stg}$	-55 to +150		°C

THERMAL RESISTANCE

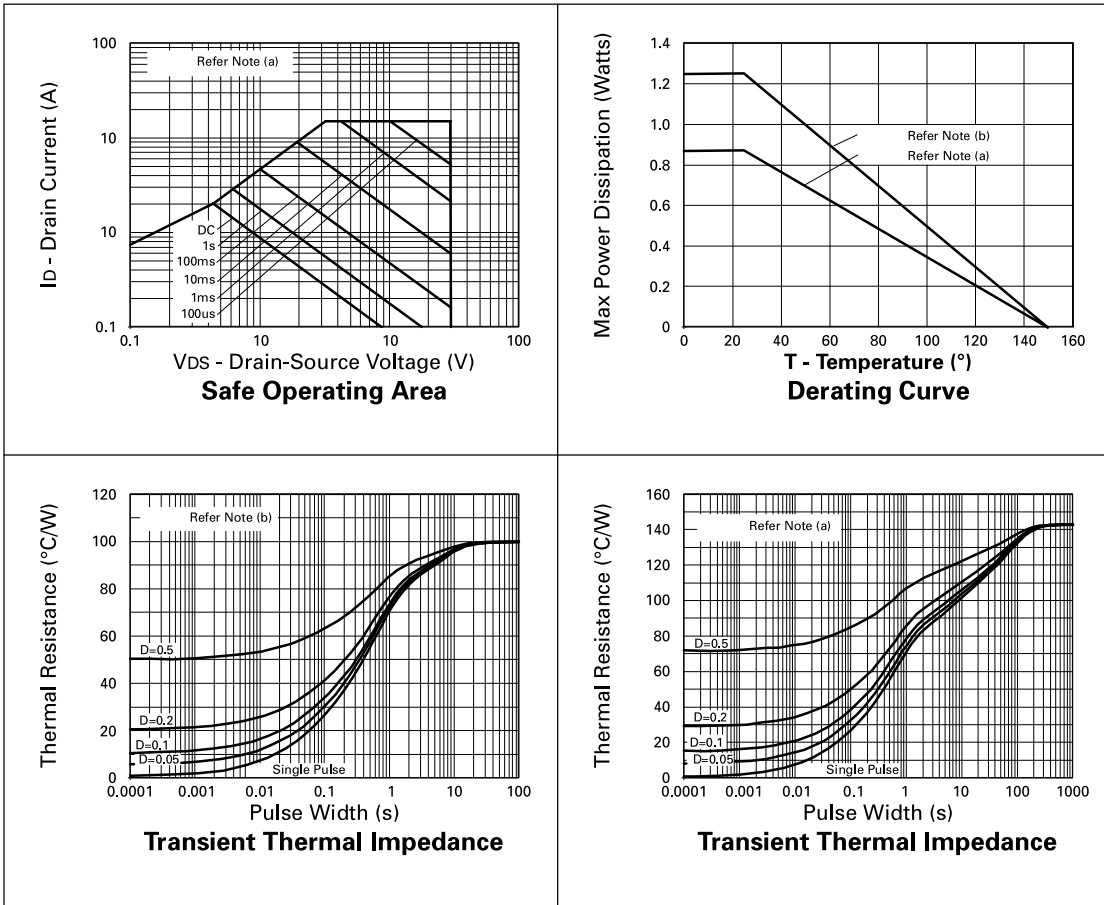
PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)(d)	$R_{\theta JA}$	143	°C/W
Junction to Ambient (b)(d)	$R_{\theta JA}$	100	°C/W
Junction to Ambient (a)(e)	$R_{\theta JA}$	120	°C/W

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 $t \leq 10$ secs.
- (c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
- (d) For device with one active die.
- (e) For device with two active die running at equal power.

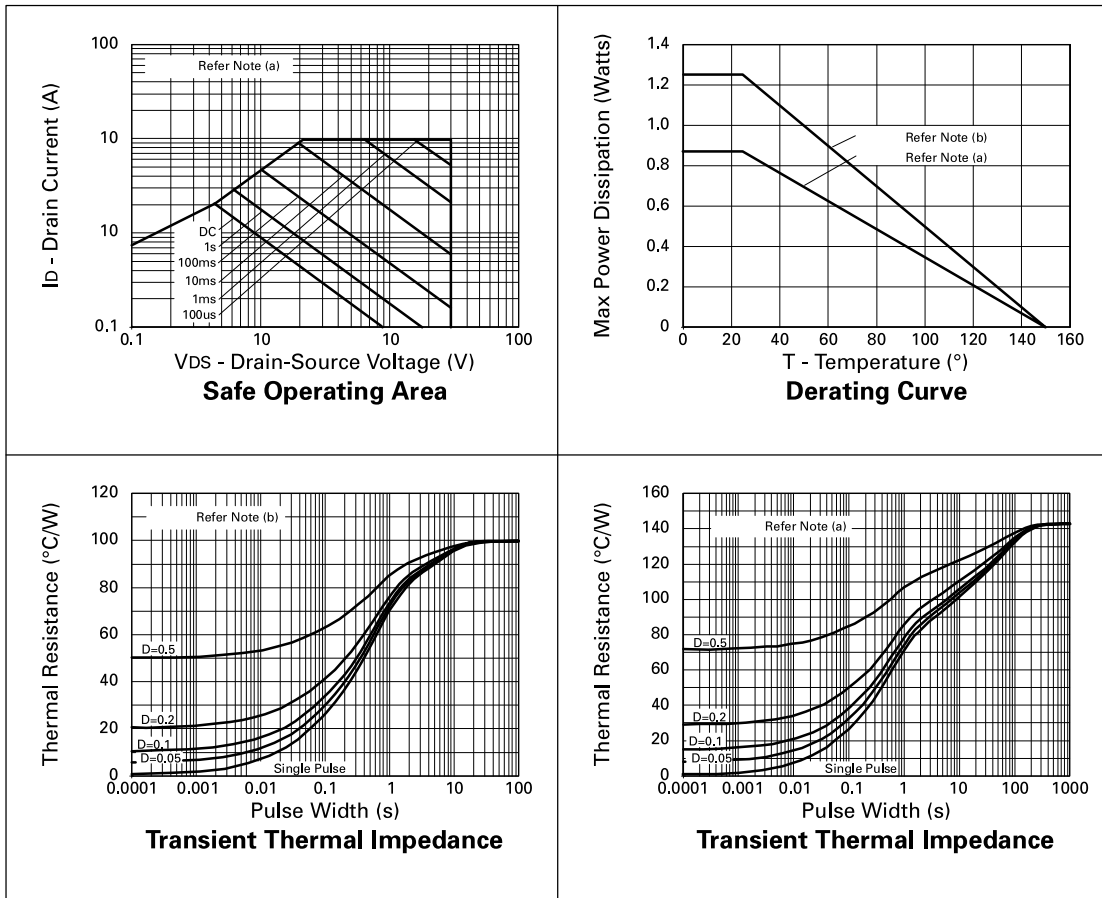
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N-CHANNEL CHARACTERISTICS



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P-CHANNEL CHARACTERISTICS



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

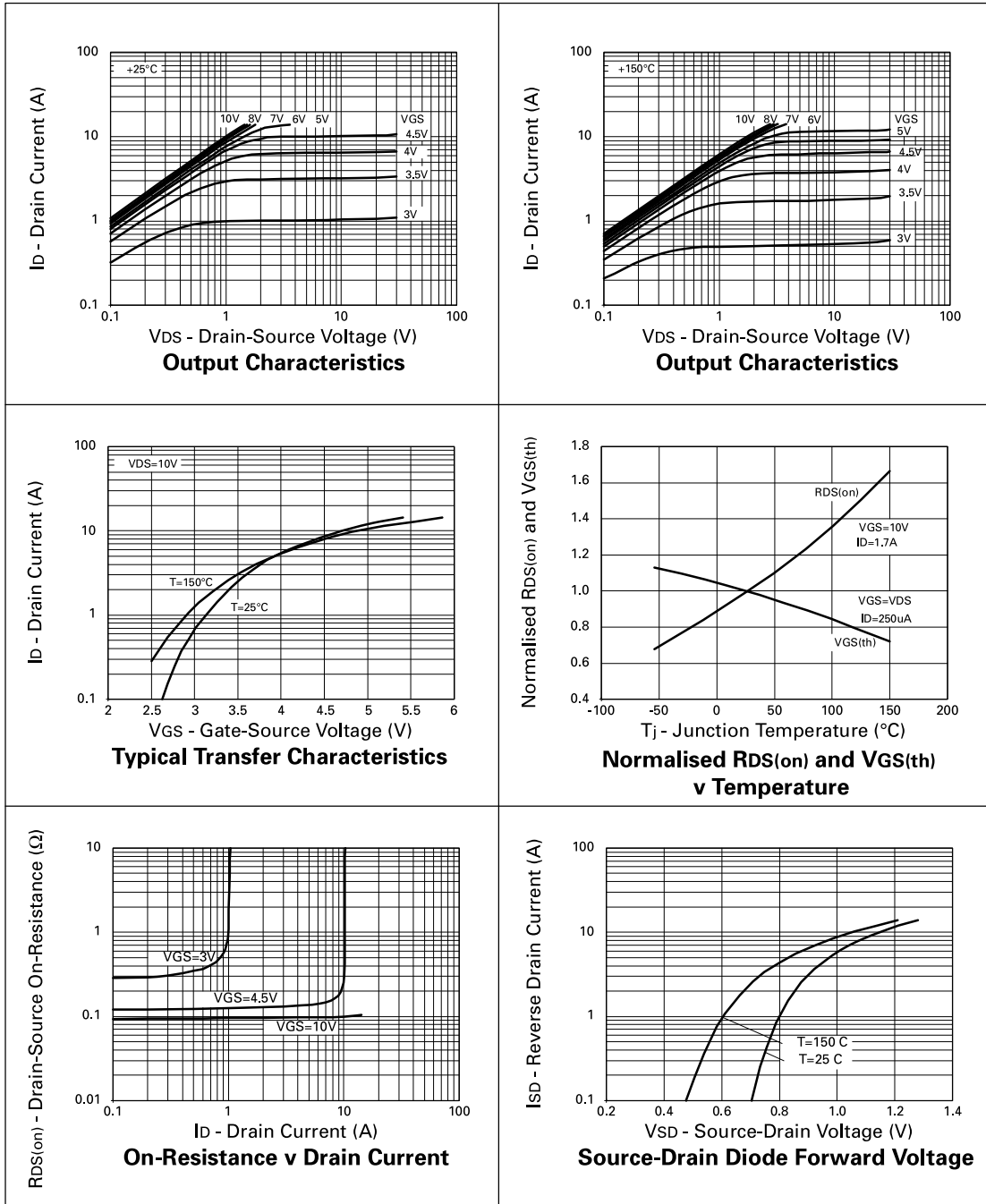
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	30			V	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			1	μA	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	1.0			V	$I_D=250\mu\text{A}, V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.135 0.200	Ω	$V_{GS}=10\text{V}, I_D=1.7\text{A}$ $V_{GS}=4.5\text{V}, I_D=0.85\text{A}$
Forward Transconductance (3)	g_{fs}	1.9			S	$V_{DS}=10\text{V}, I_D=0.85\text{A}$
DYNAMIC (3)						
Input Capacitance	C_{iss}		290		pF	$V_{DS}=25\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$
Output Capacitance	C_{oss}		70		pF	
Reverse Transfer Capacitance	C_{rss}		20		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	$t_{d(on)}$		2.5		ns	$V_{DD}=15\text{V}, I_D=1.7\text{A}$ $R_G=6.1\Omega, R_D=8.7\Omega$ (Refer to test circuit)
Rise Time	t_r		4.1		ns	
Turn-Off Delay Time	$t_{d(off)}$		9.6		ns	
Fall Time	t_f		4.4		ns	
Total Gate Charge	Q_g			8	nC	$V_{DS}=24\text{V}, V_{GS}=10\text{V},$ $I_D=1.7\text{A}$ (Refer to test circuit)
Gate-Source Charge	Q_{gs}			1.2	nC	
Gate Drain Charge	Q_{gd}			2	nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}			0.95	V	$T_j=25^{\circ}\text{C}, I_S=1.7\text{A},$ $V_{GS}=0\text{V}$
Reverse Recovery Time (3)	t_{rr}		16.9		ns	$T_j=25^{\circ}\text{C}, I_F=1.7\text{A},$ $di/dt=100\text{A}/\mu\text{s}$
Reverse Recovery Charge(3)	Q_{rr}		9.5		nC	

NOTES:

- (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.

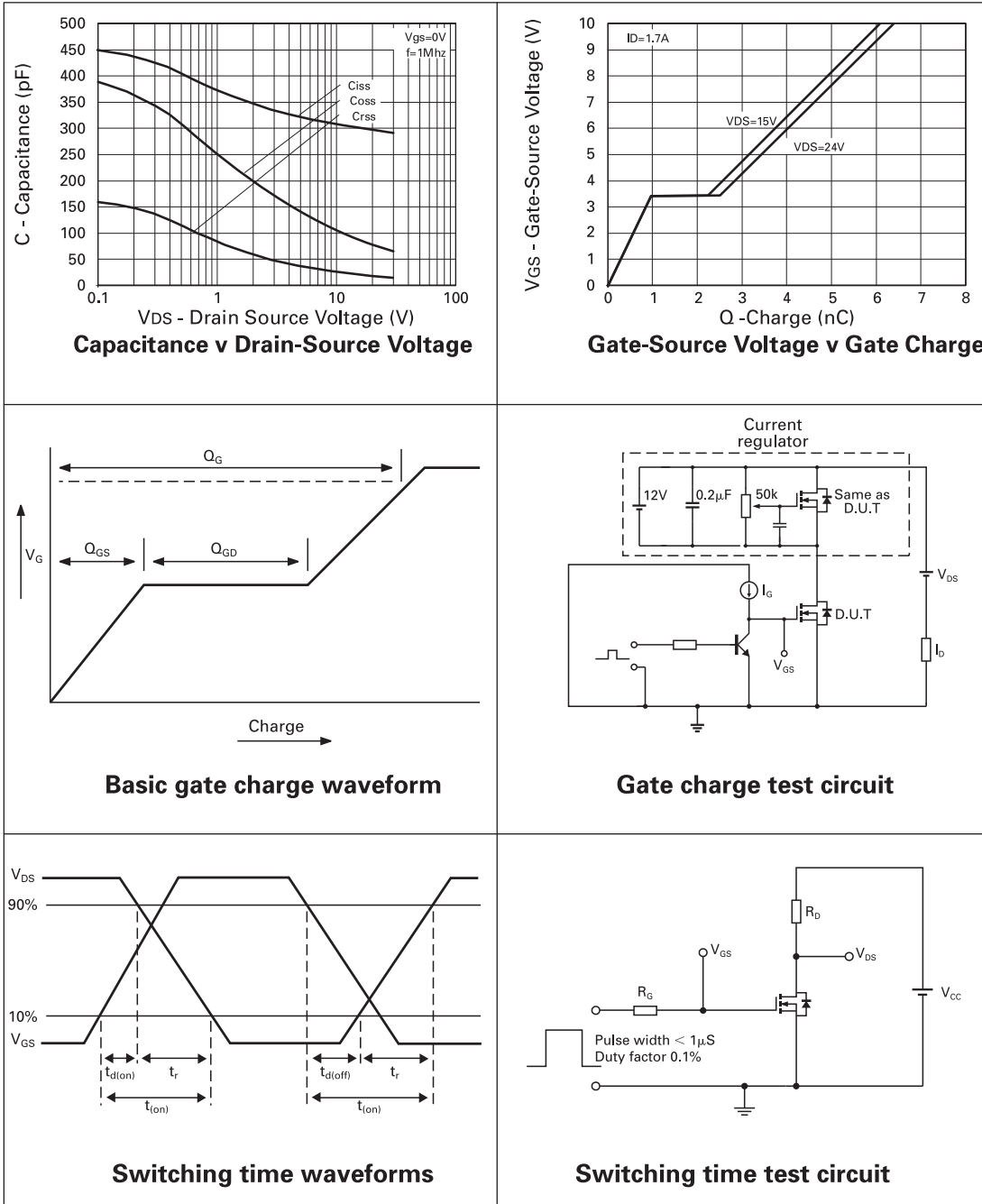
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N-CHANNEL TYPICAL CHARACTERISTICS



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N-CHANNEL CHARACTERISTICS



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

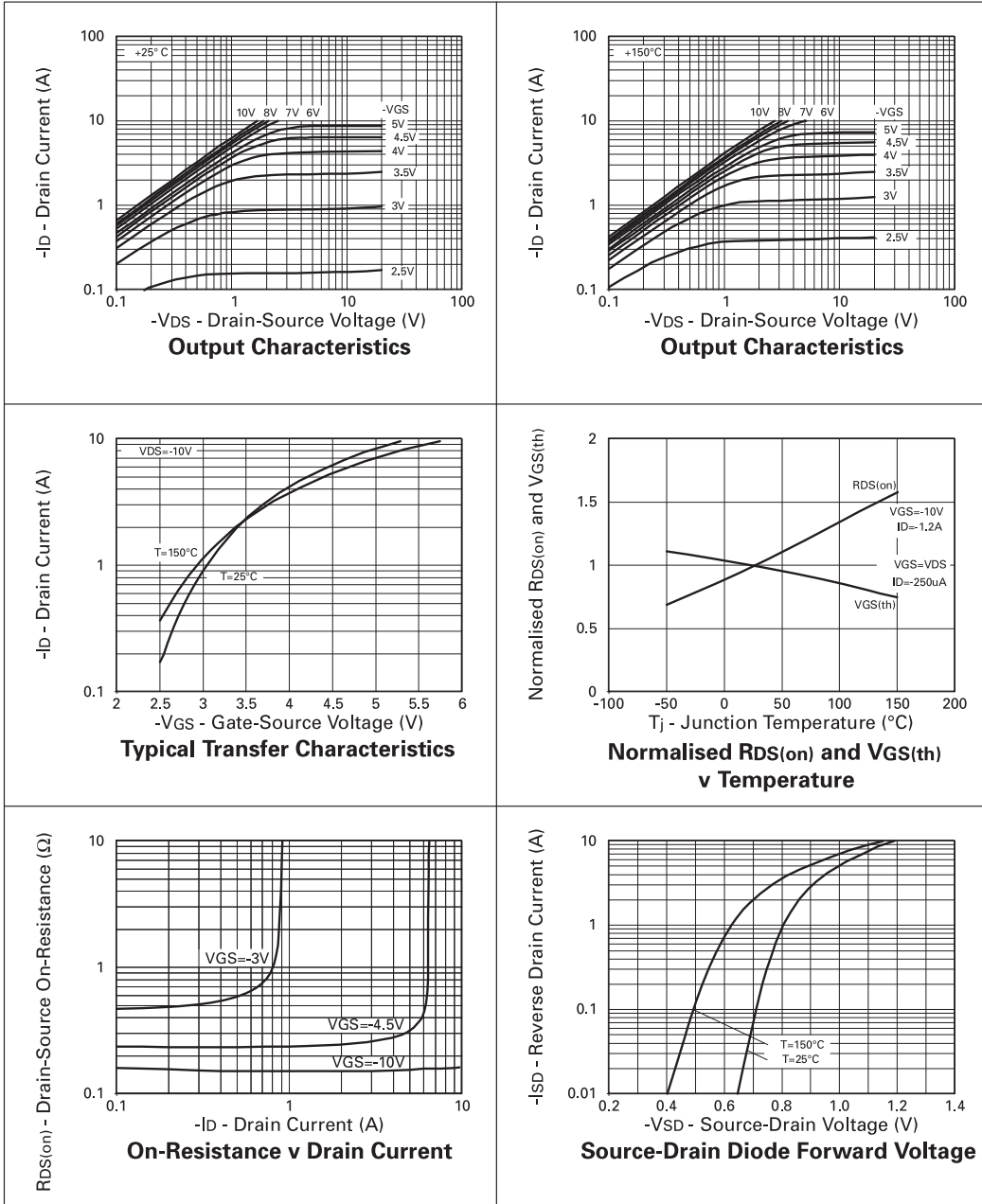
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-30			V	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			-1	μA	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}			± 100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	-1.0			V	$I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.185 0.27	Ω Ω	$V_{GS} = -10\text{V}$, $I_D = -1.2\text{A}$ $V_{GS} = -4.5\text{V}$, $I_D = -0.6\text{A}$
Forward Transconductance (3)	g_{fs}	0.92			S	$V_{DS} = -10\text{V}$, $I_D = -0.6\text{A}$
DYNAMIC (3)						
Input Capacitance	C_{iss}		270		pF	$V_{DS} = -25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$
Output Capacitance	C_{oss}		80		pF	
Reverse Transfer Capacitance	C_{rss}		30		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	$t_{d(on)}$		2.6		ns	$V_{DD} = -15\text{V}$, $I_D = -1.2\text{A}$ $R_G = 6.2\Omega$, $R_D = 6.2\Omega$ (Refer to test circuit)
Rise Time	t_r		4.8		ns	
Turn-Off Delay Time	$t_{d(off)}$		13.1		ns	
Fall Time	t_f		9.3		ns	
Total Gate Charge	Q_g			7	nC	$V_{DS} = -24\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -1.2\text{A}$ (Refer to test circuit)
Gate-Source Charge	Q_{gs}			1.2	nC	
Gate Drain Charge	Q_{gd}			2	nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}			-0.95	V	$T_j = 25^{\circ}\text{C}$, $I_S = -1.2\text{A}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time (3)	t_{rr}		21.4		ns	$T_j = 25^{\circ}\text{C}$, $I_F = -1.2\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge(3)	Q_{rr}		15.7		nC	

NOTES:

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- (2) Switching characteristics are independent of operating junction temperature.
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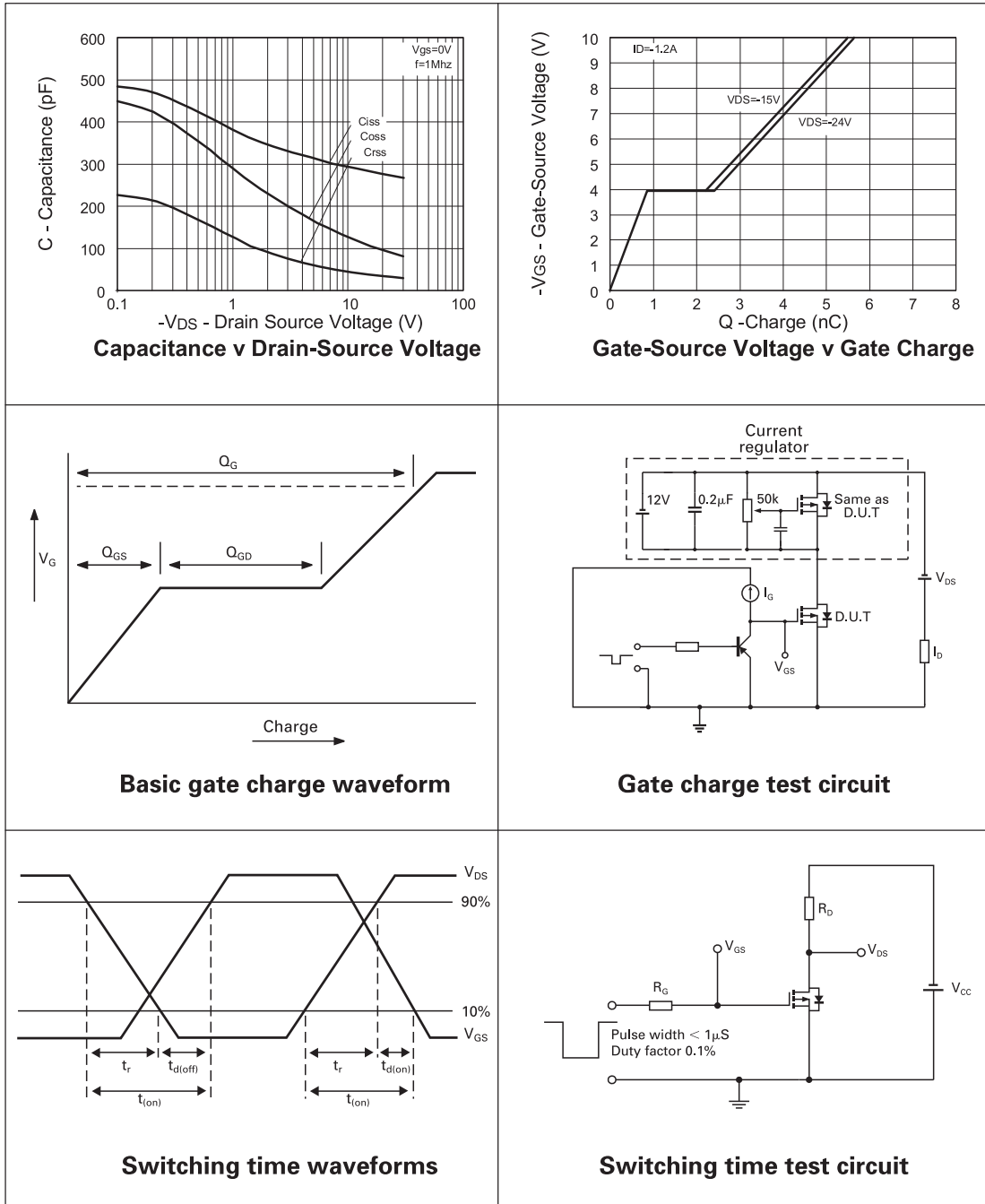
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P-CHANNEL CHARACTERISTICS



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P-CHANNEL TYPICAL CHARACTERISTICS



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ISSUE 2 - SEPTEMBER 2007

ZXMD63C03X

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"Preview"Future device intended for production at some point. Samples may be available

"Active"Product status recommended for new designs

"Last time buy (LTB)"Device will be discontinued and last time buy period and delivery is in effect

"Not recommended for new designs"Device is still in production to support existing designs and production

"Obsolete"Production has been discontinued

Datasheet status key:

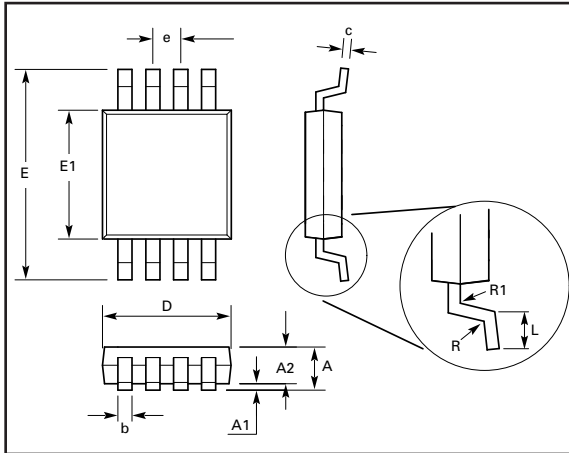
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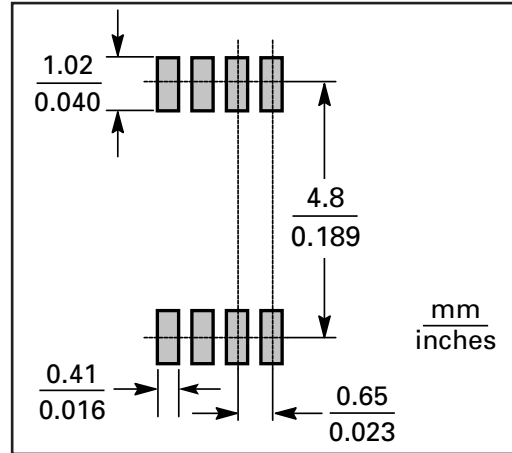
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PACKAGE DIMENSIONS



PAD LAYOUT DETAILS



DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	-	1.10	-	0.0433
A1	0.05	0.15	0.002	0.006
A2	0.75	0.95	0.0295	0.0374
b	0.25	0.40	0.010	0.0157
c	0.13	0.23	0.005	0.009
D	2.90	3.10	0.114	0.122
E	4.90 BSC		0.193 BSC	
E1	2.90	3.10	0.114	0.122
e	0.65 BSC		0.025 BSC	
L	0.40	0.70	0.0157	0.0192
R	0.07	-	0.0027	-
R1	0.07	-	0.0027	-

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