

ZXMC3A16DN8

COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET

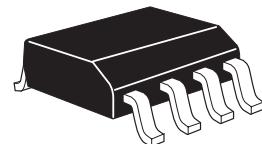
SUMMARY

N-Channel $V_{(BR)DSS} = 30V$; $R_{DS(ON)} = 0.035\Omega$; $I_D = 6.4A$

P-Channel $V_{(BR)DSS} = -30V$; $R_{DS(ON)} = 0.048\Omega$; $I_D = -5.4A$

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.



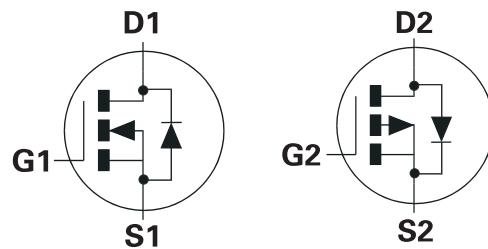
SO8

FEATURES

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

APPLICATIONS

- Motor Drive
- LCD backlighting



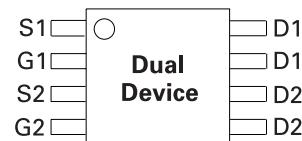
Q1 = N-CHANNEL

Q2 = P-CHANNEL

ORDERING INFORMATION

DEVICE	REEL	TAPE WIDTH	QUANTITY PER REEL
ZXMC3A16DN8TA	7"	12mm	500 units
ZXMC3A16DN8TC	13"	12mm	2500 units

PINOUT



Top view

ZXMC3A16DN8

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	N-Channel	P-Channel	UNIT
Drain-Source Voltage	V_{DSS}	30	-30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current@ $V_{GS}=10V$; $T_A=25^\circ C$ (b)(d) @ $V_{GS}=10V$; $T_A=70^\circ C$ (b)(d) @ $V_{GS}=10V$; $T_A=25^\circ C$ (a)(d)	I_D	6.4 5.1 4.9	-5.4 -4.3 -4.1	A A A
Pulsed Drain Current ^(c)	I_{DM}	30	-25	A
Continuous Source Current (Body Diode) ^(b)	I_S	3.4	-3.2	A
Pulsed Source Current (Body Diode) ^(c)	I_{SM}	30	-25	A
Power Dissipation at $T_A=25^\circ C$ (a)(d) Linear Derating Factor	P_D	1.25 10		W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (a)(e) Linear Derating Factor	P_D	1.8 14		W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (b)(d) Linear Derating Factor	P_D	2.1 17		W 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)(d)}	$R_{\theta JA}$	100	$^\circ C/W$
Junction to Ambient ^{(b)(e)}	$R_{\theta JA}$	70	$^\circ C/W$
Junction to Ambient ^{(b)(d)}	$R_{\theta JA}$	60	$^\circ C/W$

Notes

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

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

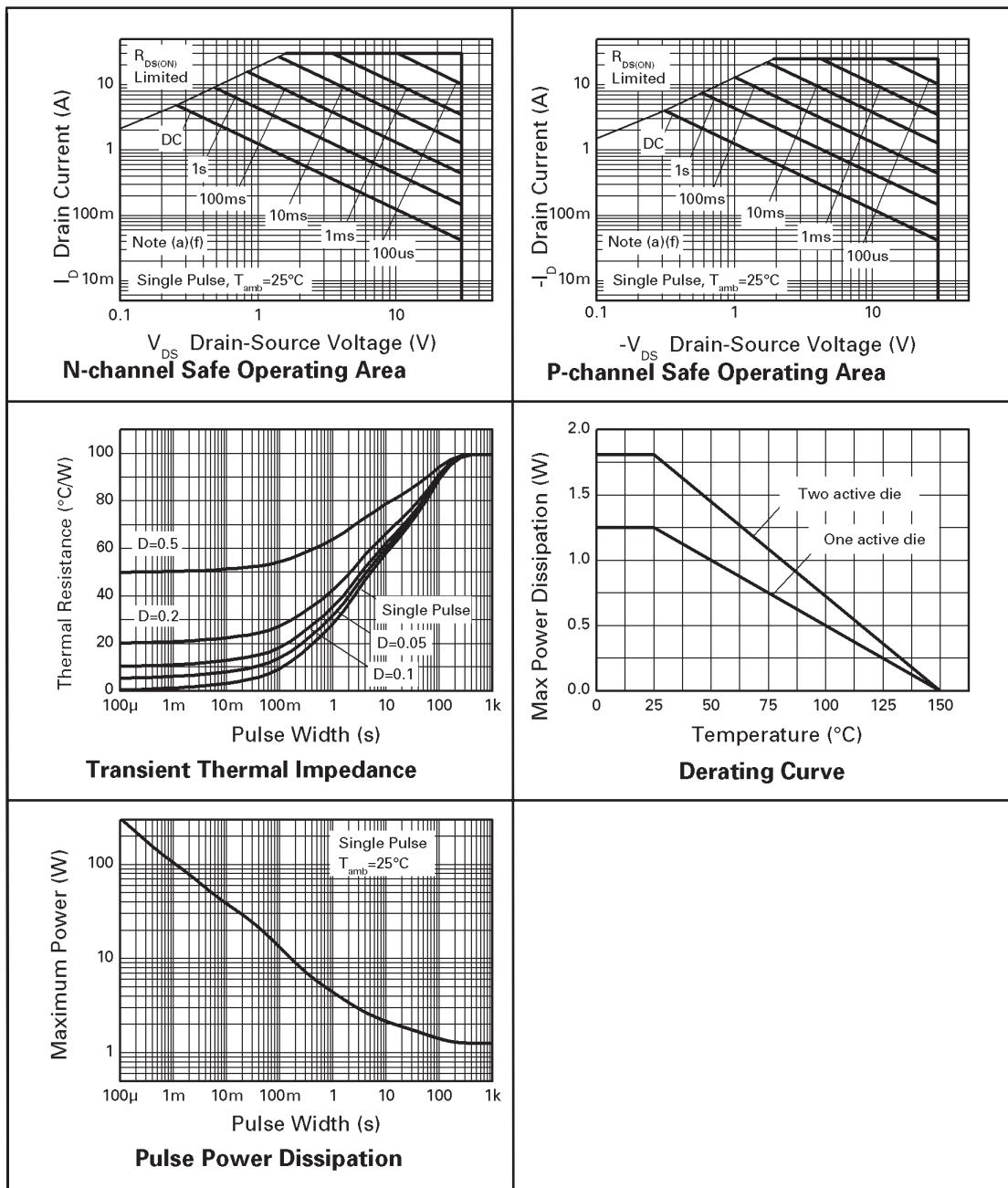
(c) Repetitive rating 25mm x 25mm FR4 PCB, $D=0.02$ pulse width=300 μs - pulse width limited by maximum junction temperature.

(d) For a dual device with one active die.

(e) For dual device with 2 active die running at equal power.

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CHARACTERISTICS



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N-CHANNEL

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	30			V	$I_D=250\mu A, V_{GS}=0V$
Zero Gate Voltage Drain Current	I_{DSS}			0.5	μA	$V_{DS}=30V, V_{GS}=0V$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Gate-Source Threshold Voltage	$V_{GS(th)}$	1			V	$I_D=250\mu A, V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance ⁽¹⁾	$R_{DS(on)}$			0.035 0.050	Ω	$V_{GS}=10V, I_D=9A$ $V_{GS}=4.5V, I_D=7.4A$
Forward Transconductance ⁽¹⁾⁽³⁾	g_{fs}		13.5		S	$V_{DS}=15V, I_D=9A$
DYNAMIC ⁽³⁾						
Input Capacitance	C_{iss}		796		pF	$V_{DS}=25V, V_{GS}=0V,$ $f=1MHz$
Output Capacitance	C_{oss}		137		pF	
Reverse Transfer Capacitance	C_{rss}		84		pF	
SWITCHING ^{(2) (3)}						
Turn-On Delay Time	$t_{d(on)}$		3.0		ns	$V_{DD}=15V, I_D=3.5A$ $R_G=6.0\Omega, V_{GS}=10V$
Rise Time	t_r		6.4		ns	
Turn-Off Delay Time	$t_{d(off)}$		21.6		ns	
Fall Time	t_f		9.4		ns	
Gate Charge	Q_g		9.2		nC	$V_{DS}=15V, V_{GS}=5V,$ $I_D=3.5A$
Total Gate Charge	Q_g		17.5		nC	$V_{DS}=15V, V_{GS}=10V,$ $I_D=3.5A$
Gate-Source Charge	Q_{gs}		2.3		nC	
Gate-Drain Charge	Q_{gd}		3.1		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage ⁽¹⁾	V_{SD}		0.85	0.95	V	$T_J=25^\circ C, I_S=5.1A,$ $V_{GS}=0V$
Reverse Recovery Time ⁽³⁾	t_{rr}		17.8		ns	$T_J=25^\circ C, I_F=3.5A,$ $di/dt= 100A/\mu s$
Reverse Recovery Charge ⁽³⁾	Q_{rr}		11.6		nC	

NOTES

(1) Measured under pulsed conditions. Width $\leq 300\mu s$. 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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P-CHANNEL

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-30			V	$I_D=-250\mu A, V_{GS}=0V$
Zero Gate Voltage Drain Current	I_{DSS}			-1.0	μA	$V_{DS}=-30V, V_{GS}=0V$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Gate-Source Threshold Voltage	$V_{GS(th)}$	1.0			V	$I_D=-250\mu A, V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance ⁽¹⁾	$R_{DS(on)}$			0.048 0.070	Ω	$V_{GS}=-10V, I_D=-4.2A$ $V_{GS}=-4.5V, I_D=-3.4A$
Forward Transconductance ⁽¹⁾⁽³⁾	g_{fs}		9.2		S	$V_{DS}=-15V, I_D=-4.2A$
DYNAMIC ⁽³⁾						
Input Capacitance	C_{iss}		970		pF	
Output Capacitance	C_{oss}		166		pF	$V_{DS}=-15V, V_{GS}=0V,$ $f=1MHz$
Reverse Transfer Capacitance	C_{rss}		116		pF	
SWITCHING ⁽²⁾⁽³⁾						
Turn-On Delay Time	$t_{d(on)}$		3.8		ns	
Rise Time	t_r		6.1		ns	
Turn-Off Delay Time	$t_{d(off)}$		35		ns	$V_{DD}=-15V, I_D=-1A$ $R_G=6.0\Omega, V_{GS}=-10V$
Fall Time	t_f		19		ns	
Gate Charge	Q_g		12.9		nC	$V_{DS}=-15V, V_{GS}=-5V,$ $I_D=-4.2A$
Total Gate Charge	Q_g		24.9		nC	
Gate-Source Charge	Q_{gs}		2.67		nC	$V_{DS}=-15V, V_{GS}=-10V,$ $I_D=-4.2A$
Gate-Drain Charge	Q_{gd}		3.86		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage ⁽¹⁾	V_{SD}		-0.85	-0.95	V	$T_J=25^\circ C, I_S=-3.6A,$ $V_{GS}=0V$
Reverse Recovery Time ⁽³⁾	t_{rr}		21.2		ns	$T_J=25^\circ C, I_F=-2A,$ $di/dt= 100A/\mu s$
Reverse Recovery Charge ⁽³⁾	Q_{rr}		18.7		nC	

NOTES

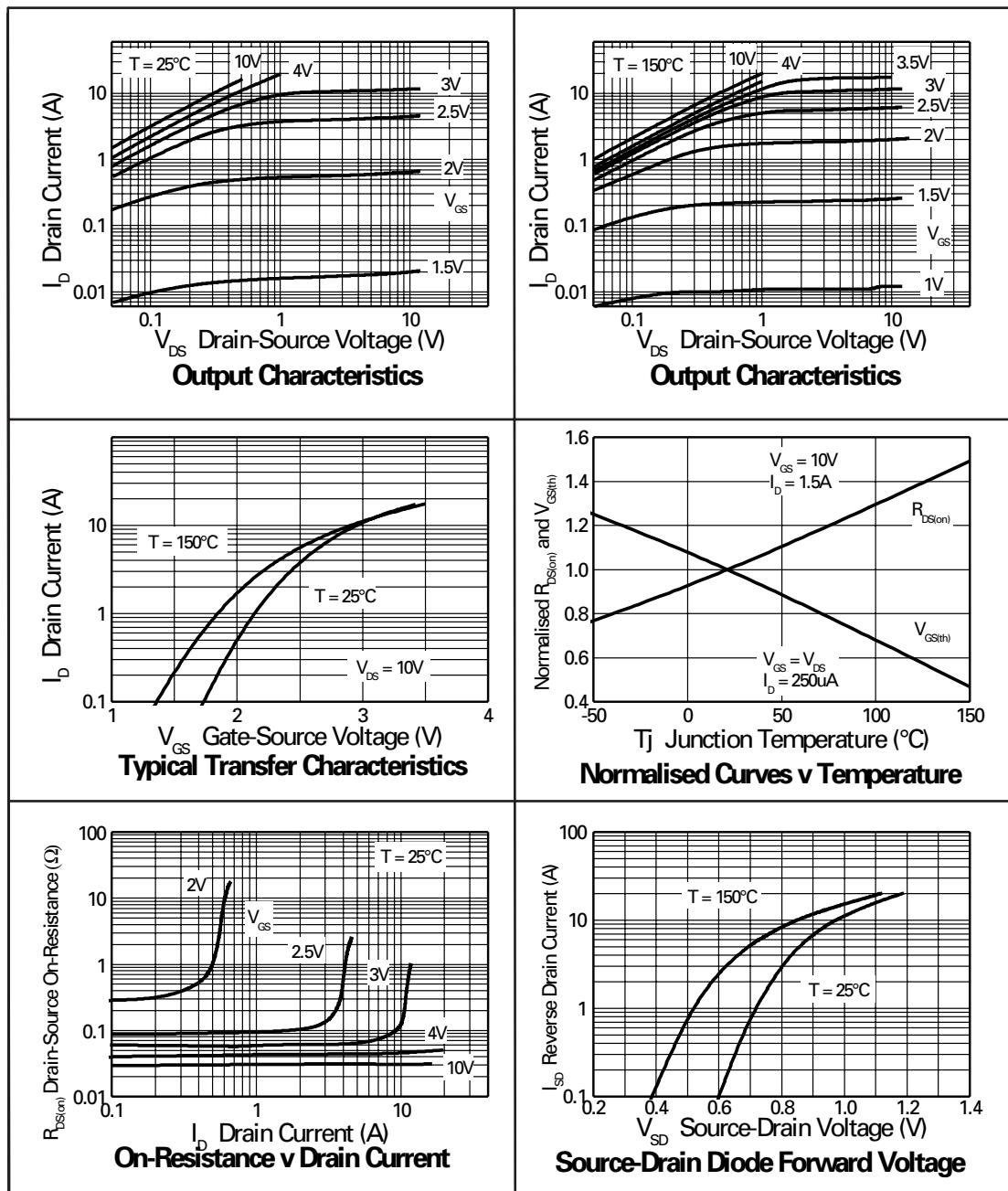
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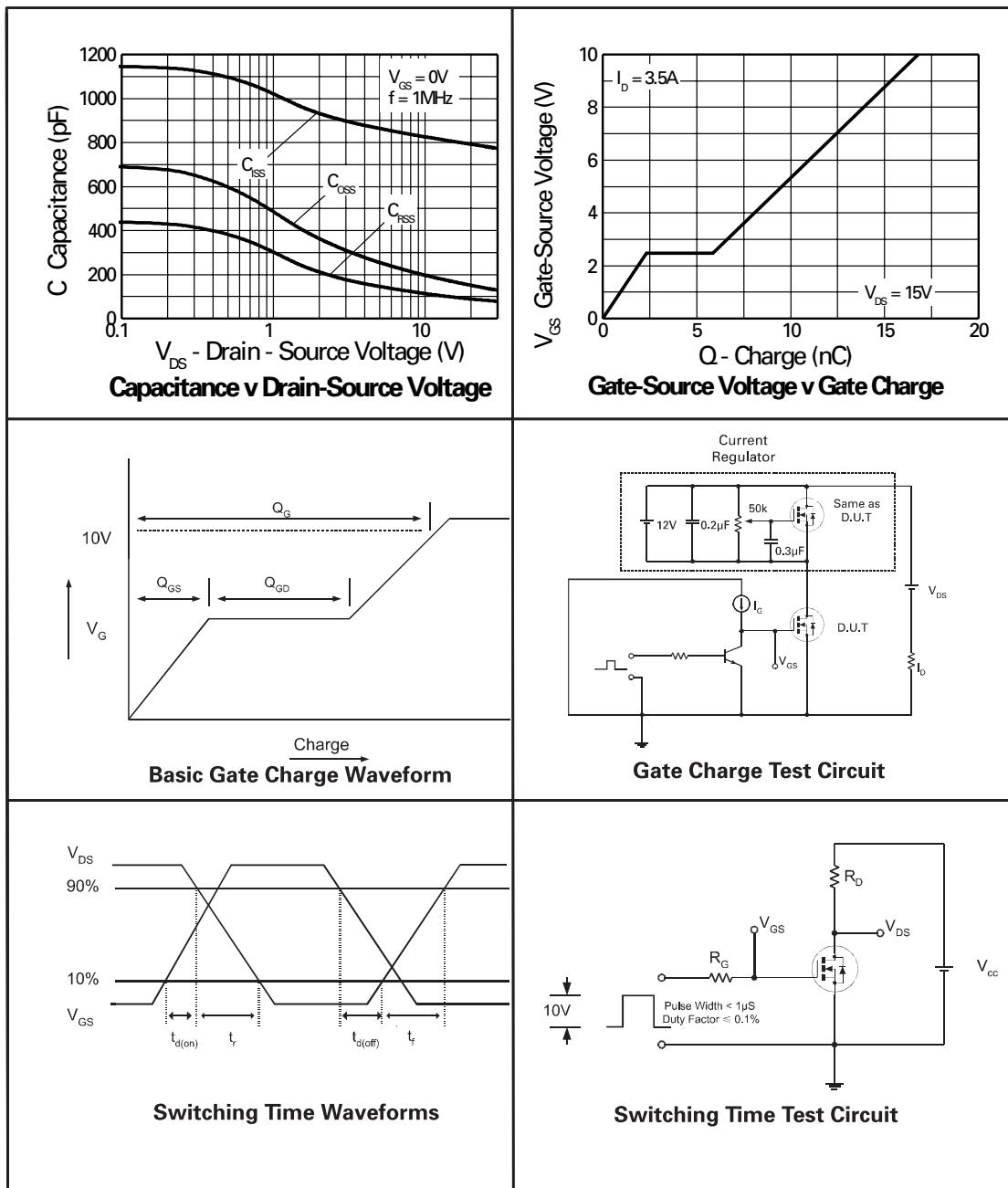
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N-CHANNEL TYPICAL CHARACTERISTICS



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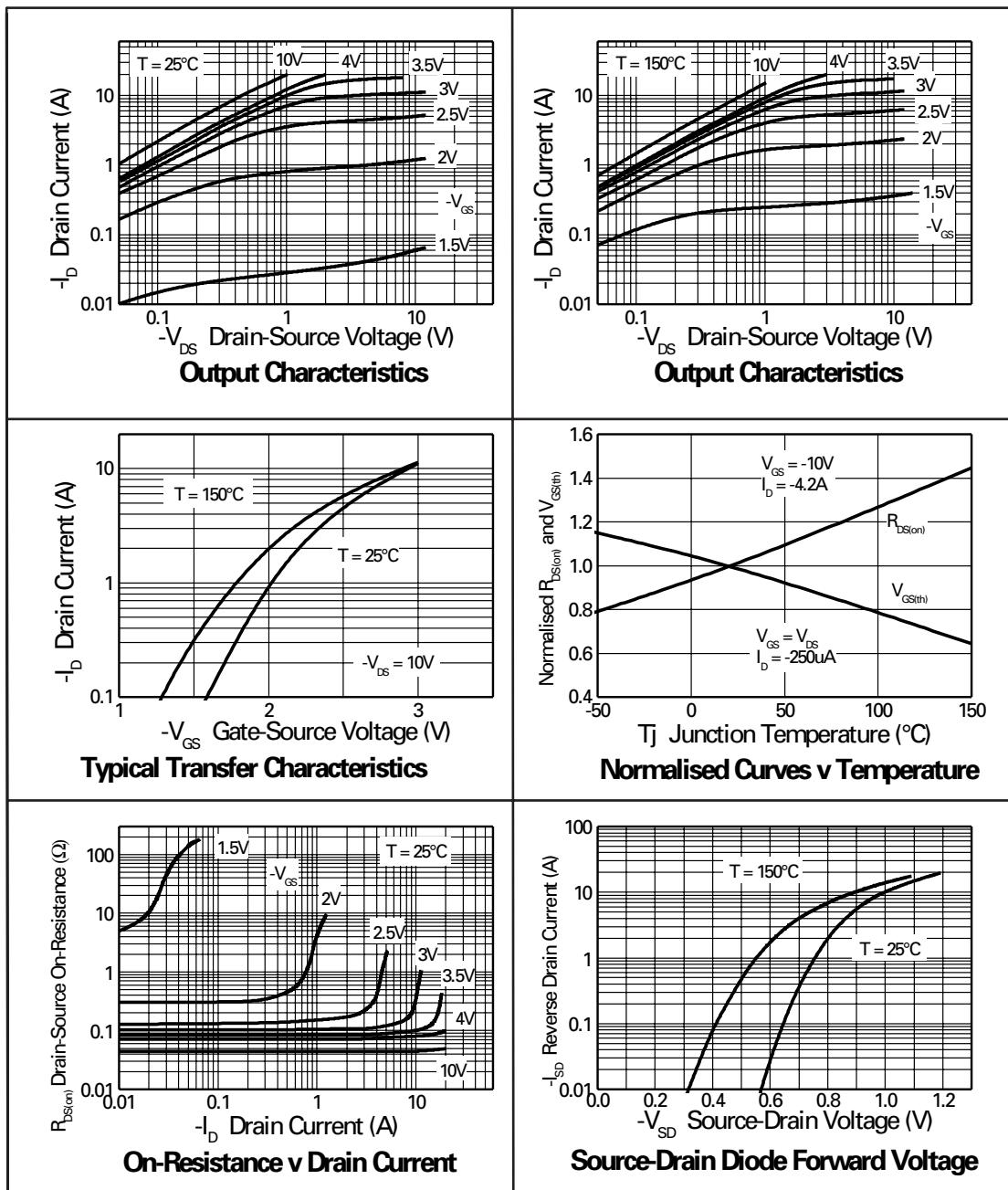
N-CHANNEL TYPICAL CHARACTERISTICS



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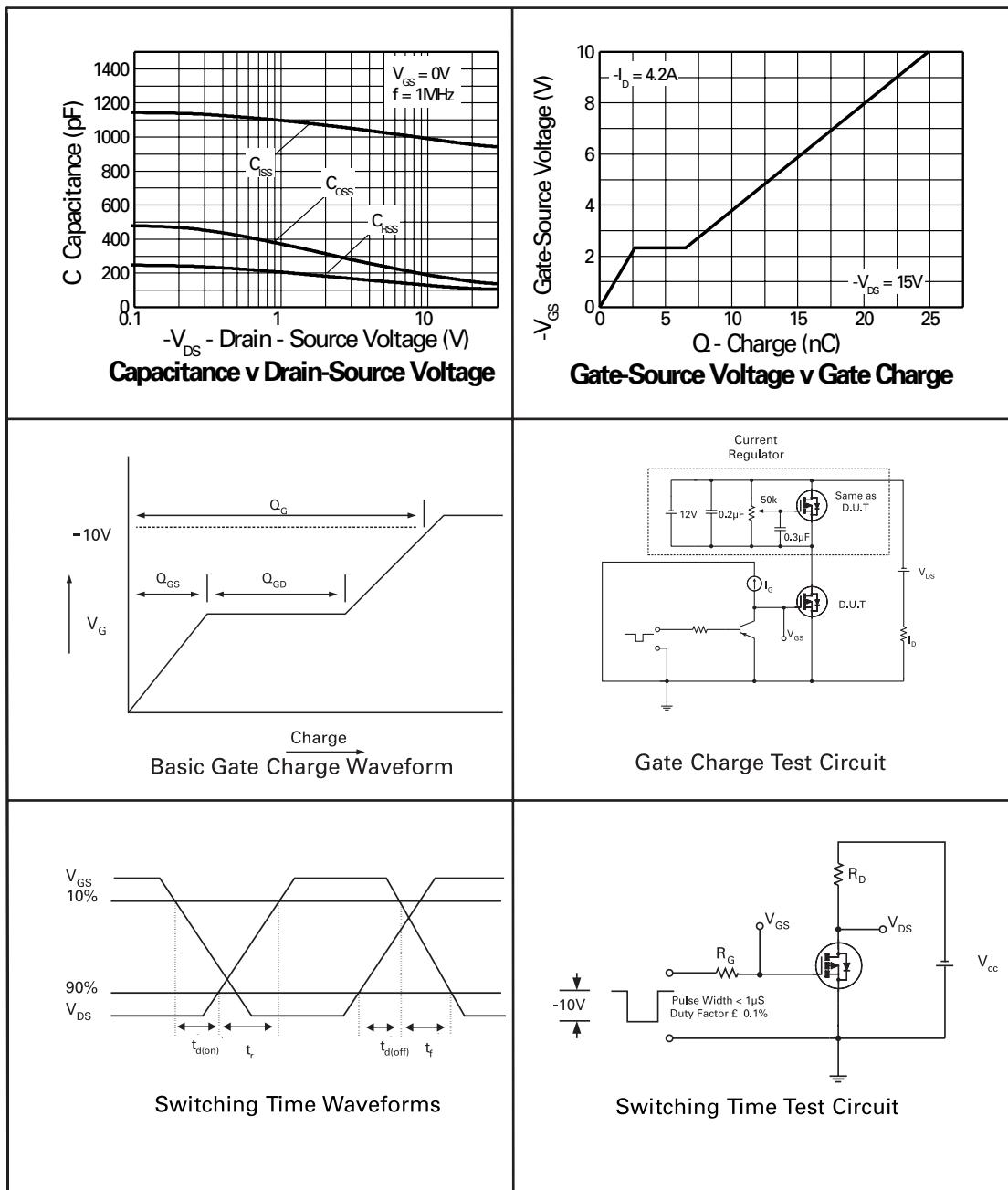
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P-CHANNEL TYPICAL CHARACTERISTICS



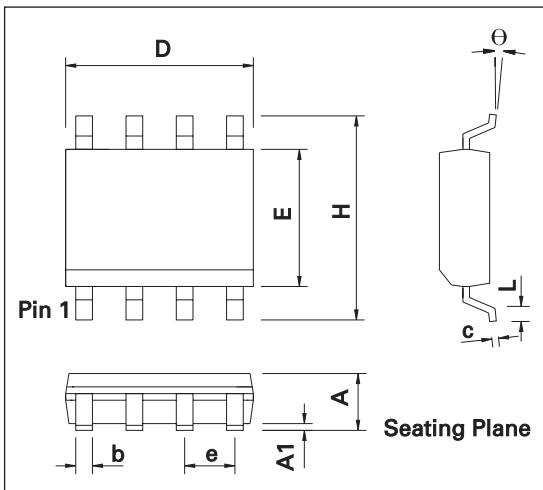
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P-CHANNEL TYPICAL CHARACTERISTICS



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PACKAGE OUTLINE



CONTROLLING DIMENSIONS ARE IN INCHES
APPROX IN MILLIMETERS

PACKAGE DIMENSIONS

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

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