

ZXMC3A16DN8

COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET

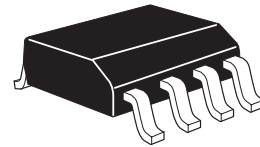
SUMMARY

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.



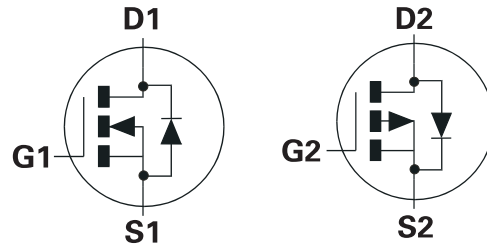
SO8

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

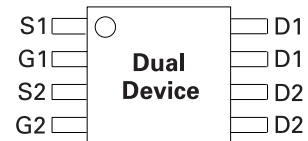
ORDERING INFORMATION

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

DEVICE MARKING

ZXMC
3A16

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

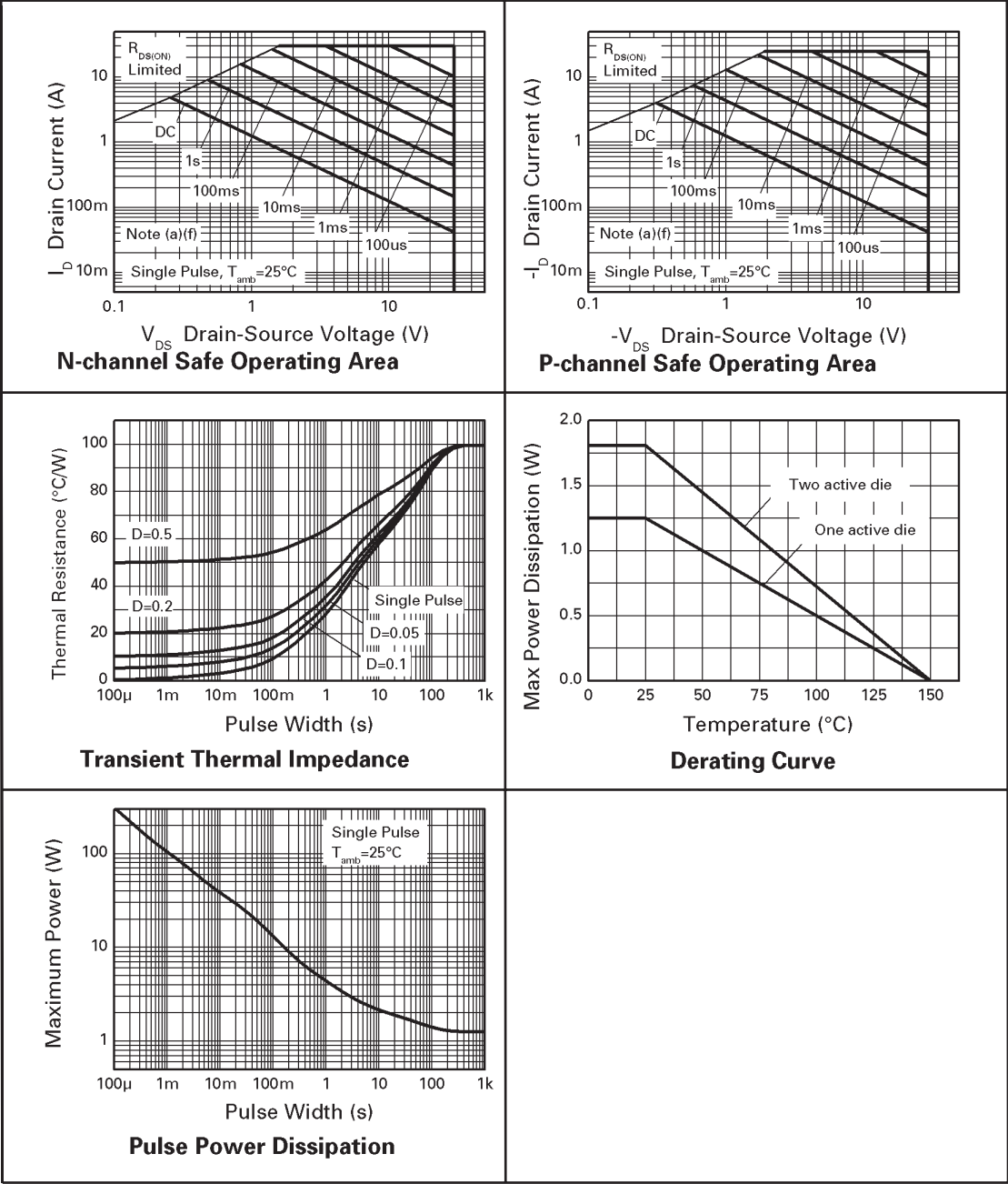
PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient ^{(a)(d)}	$R_{\theta JA}$	100	$^\circ C/W$
Junction to Ambient ^{(b)(e)}	$R_{\theta JA}$	70	$^\circ C/W$
Junction to Ambient ^{(b)(d)}	$R_{\theta JA}$	60	$^\circ C/W$

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 $T_{amb} = 25^{\circ}\text{C}$ 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} =±20V, V _{DS} =0V
Gate-Source Threshold Voltage	V _{GS(th)}	1			V	I _D =250μA, V _{DS} = V _{GS}
Static Drain-Source On-State Resistance ⁽¹⁾	R _{DS(on)}			0.035 0.050	Ω 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} =25 V, 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 =6.0Ω, 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°C, I _S =5.1A, V _{GS} =0V
Reverse Recovery Time ⁽³⁾	t _{rr}		17.8		ns	T _J =25°C, I _F =3.5A, di/dt= 100A/μs
Reverse Recovery Charge ⁽³⁾	Q _{rr}		11.6		nC	

NOTES

(1) Measured under pulsed conditions. Width $\leq 300\mu\text{s}$. 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 $T_{amb} = 25^{\circ}\text{C}$ 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}			-1.0	μA	V _{DS} =-30V, 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 ⁽¹⁾	R _{DS(on)}			0.048 0.070	Ω 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	V _{DS} =-15 V, V _{GS} =0V, f=1MHz
Output Capacitance	C _{oss}		166		pF	
Reverse Transfer Capacitance	C _{rss}		116		pF	
SWITCHING ^{(2) (3)}						
Turn-On Delay Time	t _{d(on)}		3.8		ns	V _{DD} =-15V, I _D =-1A R _G =6.0Ω, V _{GS} =-10V
Rise Time	t _r		6.1		ns	
Turn-Off Delay Time	t _{d(off)}		35		ns	
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	V _{DS} =-15V,V _{GS} =-10V, I _D =-4.2A
Gate-Source Charge	Q _{gs}		2.67		nC	
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°C, I _S =-3.6A, V _{GS} =0V
Reverse Recovery Time ⁽³⁾	t _{rr}		21.2		ns	T _J =25°C, I _F =-2A, di/dt= 100A/μs
Reverse Recovery Charge ⁽³⁾	Q _{rr}		18.7		nC	

NOTES

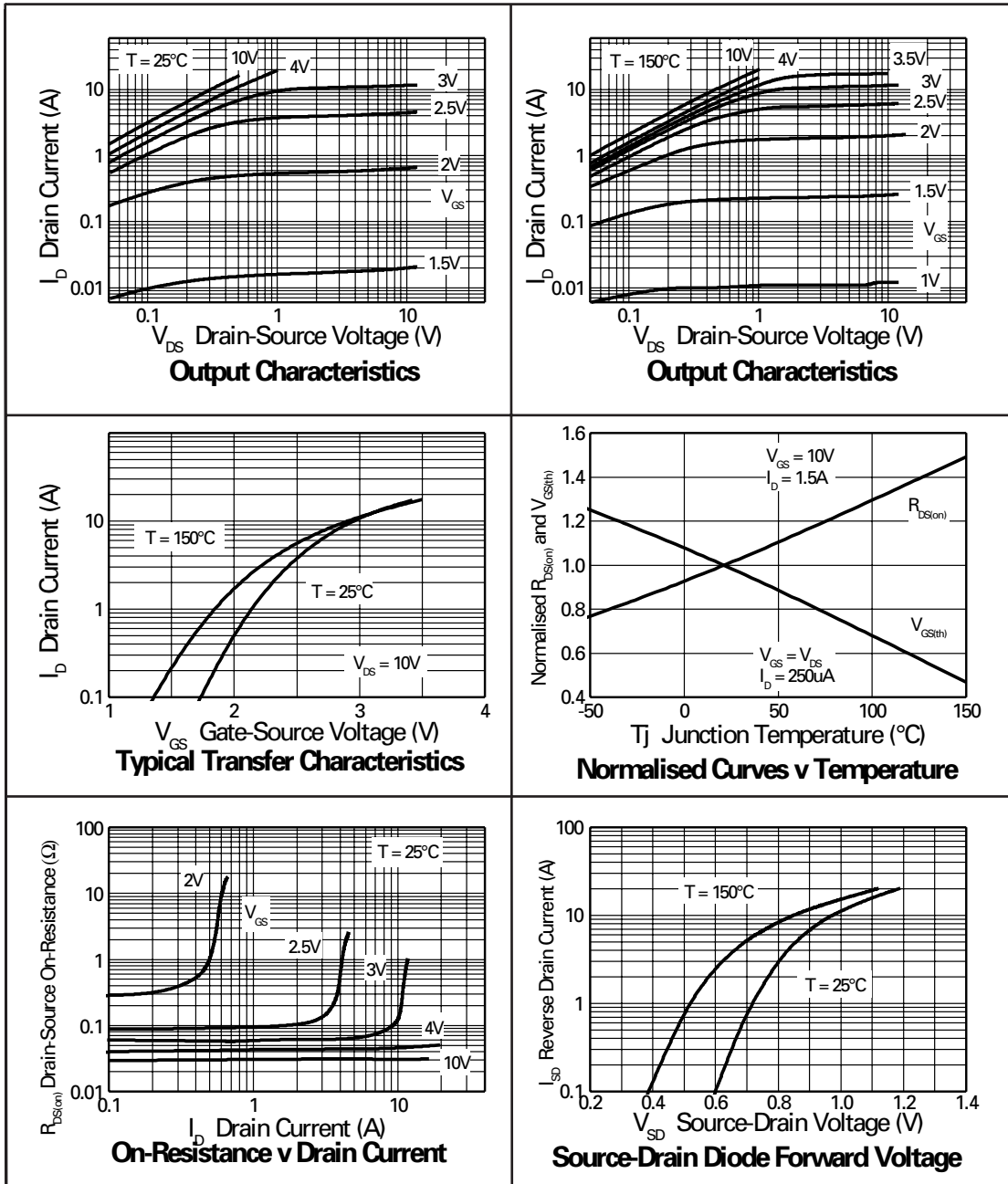
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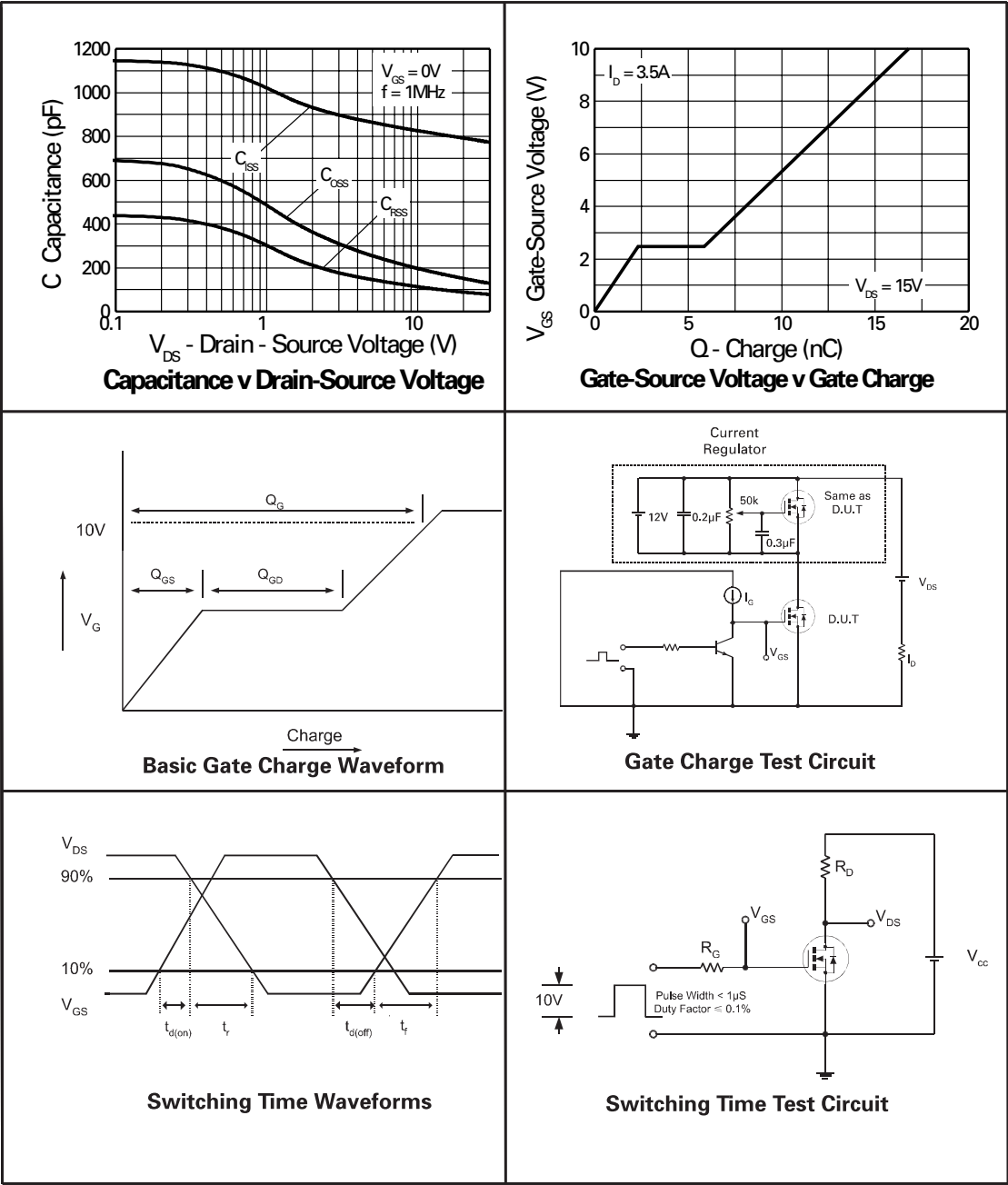
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N-CHANNEL TYPICAL CHARACTERISTICS



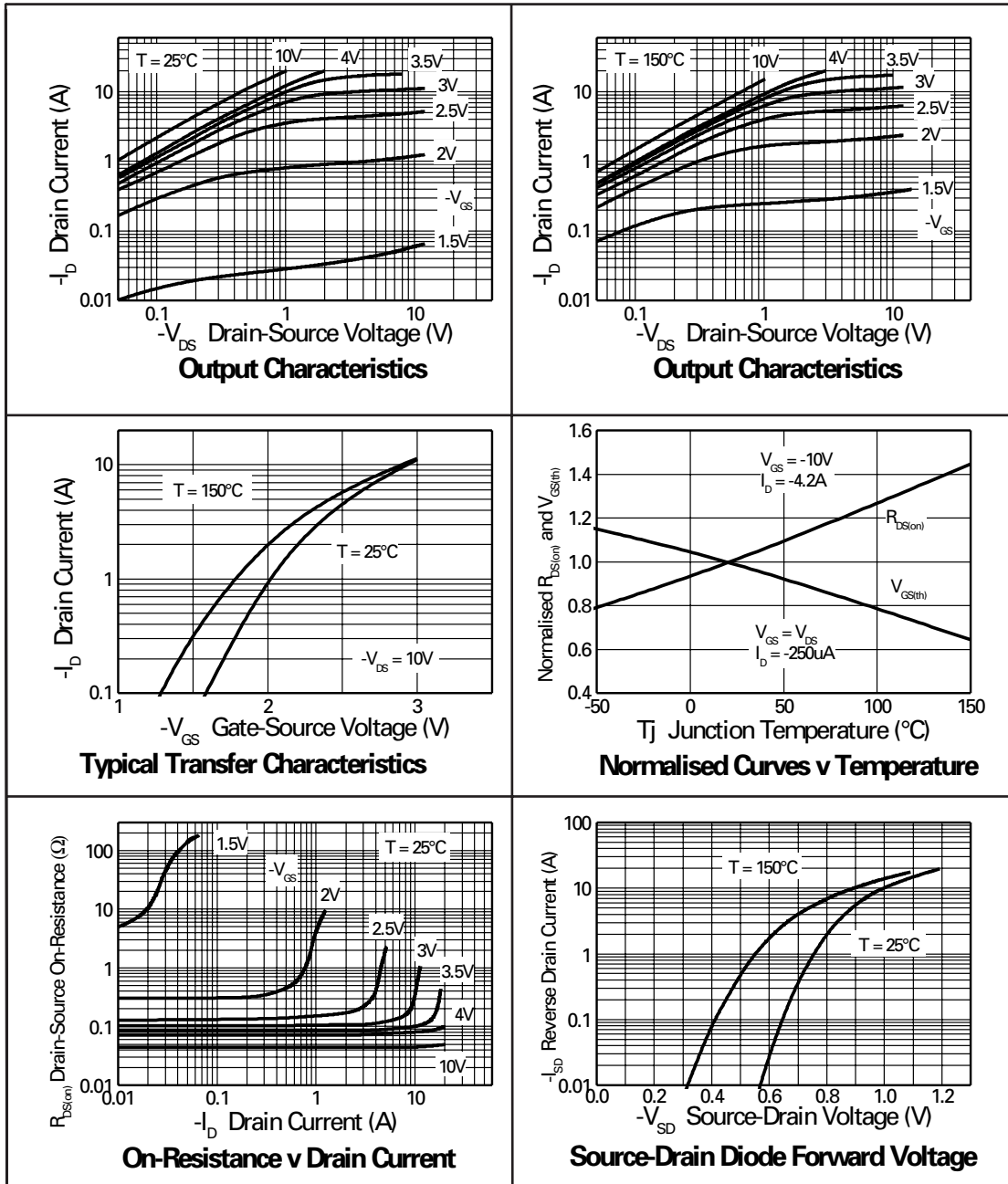
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N-CHANNEL TYPICAL CHARACTERISTICS



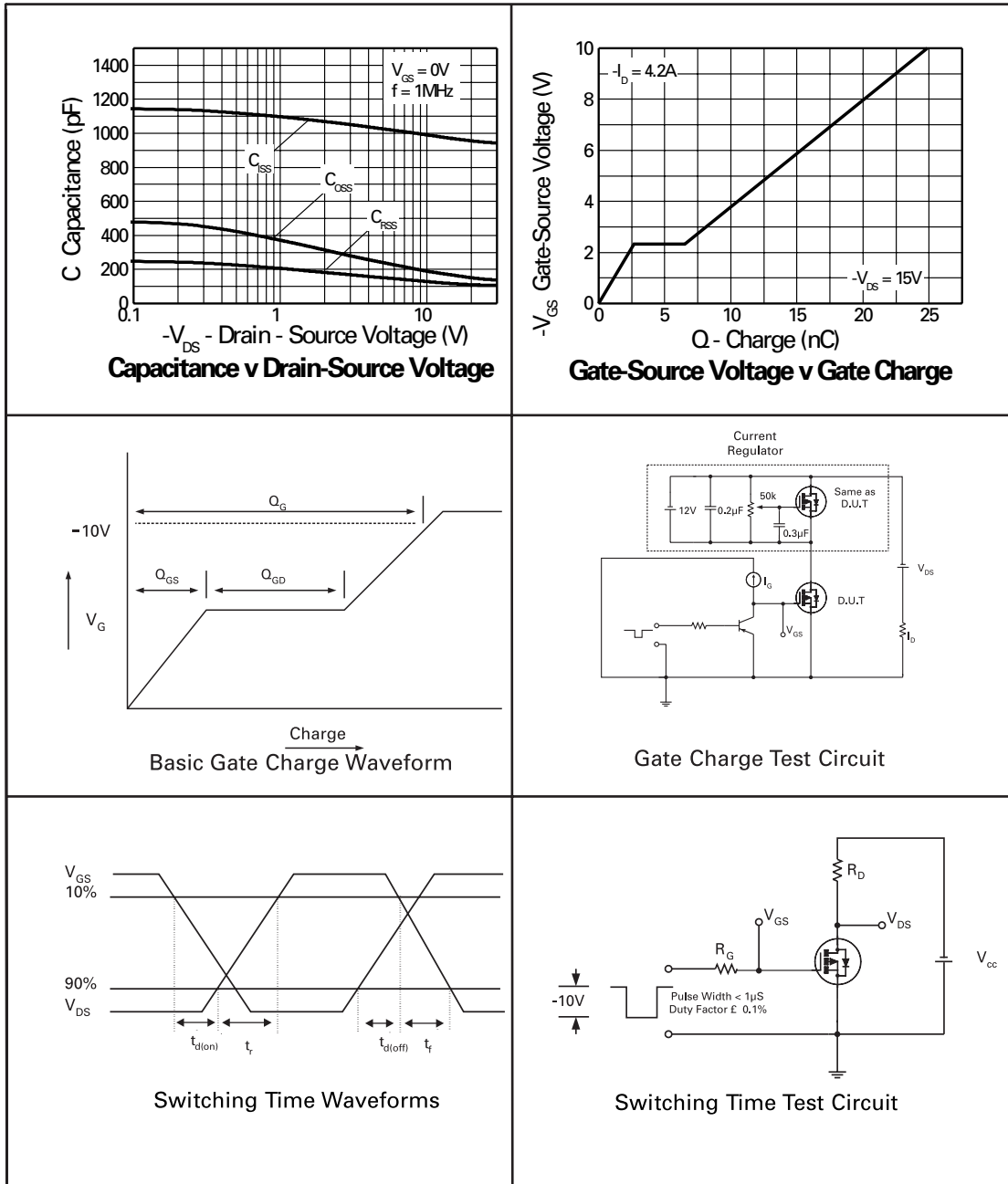
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P-CHANNEL TYPICAL CHARACTERISTICS



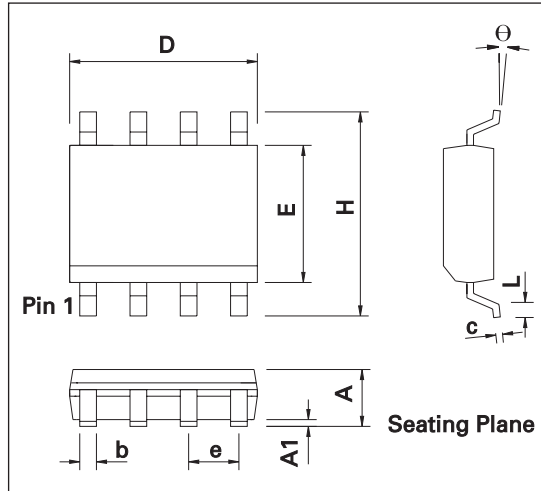
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P-CHANNEL TYPICAL CHARACTERISTICS



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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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