

ZXMHC6A07T8

COMPLEMENTARY 60V ENHANCEMENT MODE MOSFET H-BRIDGE

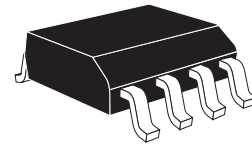
SUMMARY

N-Channel $V_{(BR)DSS} = 60V$; $R_{DS(ON)} = 0.300\Omega$; $I_D = 1.8A$

P-Channel $V_{(BR)DSS} = -60V$; $R_{DS(ON)} = 0.425\Omega$; $I_D = -1.5A$

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.

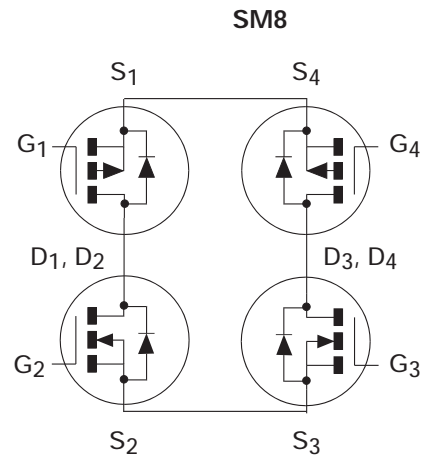


FEATURES

- Low On - Resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SM8 package

APPLICATIONS

- Motor drive



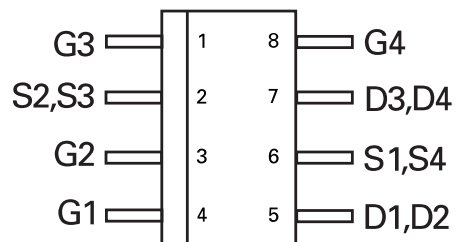
ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMHC6A07T8TA	7"	12mm	1000 units
ZXMHC6A07T8TC	13"	12mm	4000 units

DEVICE MARKING

- ZXMH
C6A07

PINOUT DIAGRAM



Top View

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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	N-Channel	P-Channel	UNIT
Drain-Source Voltage	V_{DSS}	60	-60	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	1.8	-1.5	A
		1.4	-1.2	A
		1.6	-1.3	A
Pulsed Drain Current (c)	I_{DM}	8.4	-7.2	A
Continuous Source Current (Body Diode) (b)	I_S	2.3	-2.1	A
Pulsed Source Current (Body Diode) (c)	I_{SM}	8.4	-7.2	A
Power Dissipation at $T_A=25^\circ C$ (a)(d) Linear Derating Factor	P_D	1.3 10.4		W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (b)(d) Linear Derating Factor	P_D	1.7 13.6		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)	$R_{\theta JA}$	94.5	$^\circ C/W$
Junction to Ambient (b)(d)	$R_{\theta JA}$	73.3	$^\circ C/W$

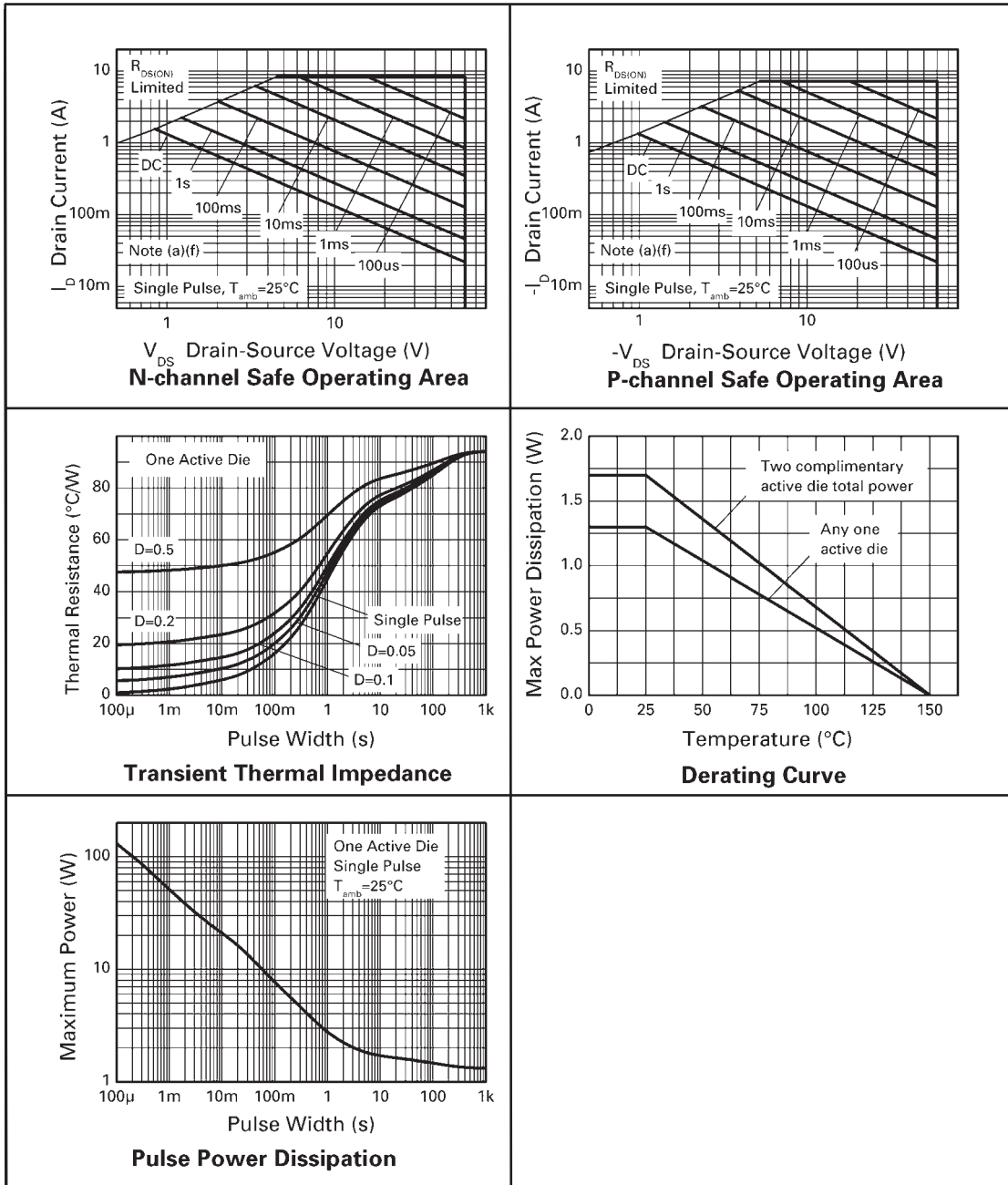
Notes:

- (a) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions with the heatsink split into two equal areas, one for each drain connection.
- (b) For a device surface mounted on FR4 PCB measured 1.6mm at $t \leq 10$ sec.
- (c) Repetitive rating - 50mm x 50mm x 1.6mm FR4 PCB, $D = 0.02$, pulse width 300 μs pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
- (d) For device with one active die.

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TYPICAL 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	$V_{(BR)DSS}$	60			V	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			1	μA	$V_{DS}=60\text{V}, V_{GS}=0\text{V}$
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		3.0	V	$I_D=250\mu\text{A}, V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance ⁽¹⁾	$R_{DS(on)}$			0.300 0.450	Ω Ω	$V_{GS}=10\text{V}, I_D=1.8\text{A}$ $V_{GS}=4.5\text{V}, I_D=1.3\text{A}$
Forward Transconductance ⁽¹⁾⁽³⁾	g_{fs}		2.3		S	$V_{DS}=15\text{V}, I_D=1.8\text{A}$
DYNAMIC ⁽³⁾						
Input Capacitance	C_{iss}		166		pF	$V_{DS}=40\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$
Output Capacitance	C_{oss}		19.5		pF	
Reverse Transfer Capacitance	C_{rss}		8.7		pF	
SWITCHING ^{(2) (3)}						
Turn-On Delay Time	$t_{d(on)}$		1.8		ns	$V_{DD}=30\text{V}, I_D=1.8\text{A}$ $R_G=6.0\Omega, V_{GS}=10\text{V}$
Rise Time	t_r		1.4		ns	
Turn-Off Delay Time	$t_{d(off)}$		4.9		ns	
Fall Time	t_f		2.0		ns	
Gate Charge	Q_g		1.65		nC	$V_{DS}=30\text{V}, V_{GS}=5\text{V},$ $I_D=1.8\text{A}$
Total Gate Charge	Q_g		3.2		nC	$V_{DS}=30\text{V}, V_{GS}=10\text{V},$ $I_D=1.8\text{A}$
Gate-Source Charge	Q_{gs}		0.67		nC	
Gate-Drain Charge	Q_{gd}		0.82		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage ⁽¹⁾	V_{SD}		0.85	0.95	V	$T_J=25^{\circ}\text{C}, I_S=0.45\text{A},$ $V_{GS}=0\text{V}$
Reverse Recovery Time ⁽³⁾	t_{rr}		20.5		ns	$T_J=25^{\circ}\text{C}, I_F=1.8\text{A},$ $di/dt=100\text{A}/\mu\text{s}$
Reverse Recovery Charge ⁽³⁾	Q_{rr}		21.3		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	$V_{(BR)DSS}$	-60			V	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			-1	μA	$V_{DS} = -60\text{V}$, $V_{GS} = 0\text{V}$
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⁾	$R_{DS(on)}$			0.425 0.630	Ω Ω	$V_{GS} = -10\text{V}$, $I_D = -0.9\text{A}$ $V_{GS} = -4.5\text{V}$, $I_D = -0.8\text{A}$
Forward Transconductance ⁽¹⁾⁽³⁾	g_{fs}		1.8		S	$V_{DS} = -15\text{V}$, $I_D = -0.9\text{A}$
DYNAMIC ⁽³⁾						
Input Capacitance	C_{iss}		233		pF	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$
Output Capacitance	C_{oss}		17.4		pF	
Reverse Transfer Capacitance	C_{rss}		9.6		pF	
SWITCHING ^{(2) (3)}						
Turn-On Delay Time	$t_{d(on)}$		1.6		ns	$V_{DD} = -30\text{V}$, $I_D = -1\text{A}$ $R_G = 6.0\Omega$, $V_{GS} = -10\text{V}$
Rise Time	t_r		2.3		ns	
Turn-Off Delay Time	$t_{d(off)}$		13		ns	
Fall Time	t_f		5.8		ns	
Gate Charge	Q_g		2.4		nC	$V_{DS} = -30\text{V}$, $V_{GS} = -5\text{V}$, $I_D = -0.9\text{A}$
Total Gate Charge	Q_g		5.1		nC	$V_{DS} = -30\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -0.9\text{A}$
Gate-Source Charge	Q_{gs}		0.7		nC	
Gate-Drain Charge	Q_{gd}		0.7		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage ⁽¹⁾	V_{SD}		-0.85	-0.95	V	$T_J = 25^{\circ}\text{C}$, $I_S = -0.8\text{A}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time ⁽³⁾	t_{rr}		22.6		ns	$T_J = 25^{\circ}\text{C}$, $I_F = -0.9\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge ⁽³⁾	Q_{rr}		23.2		nC	

NOTES

(1) Measured under pulsed conditions. Width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

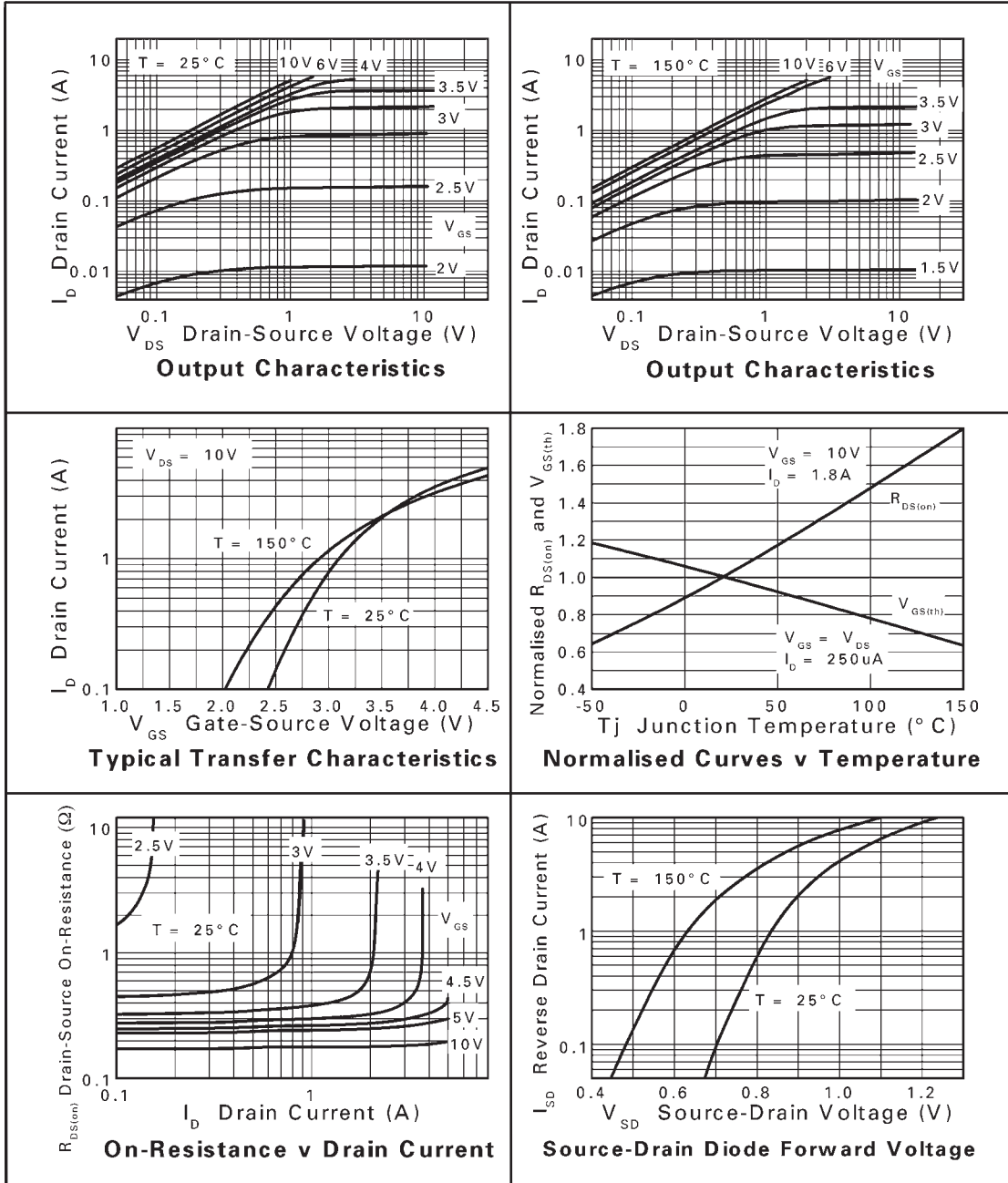
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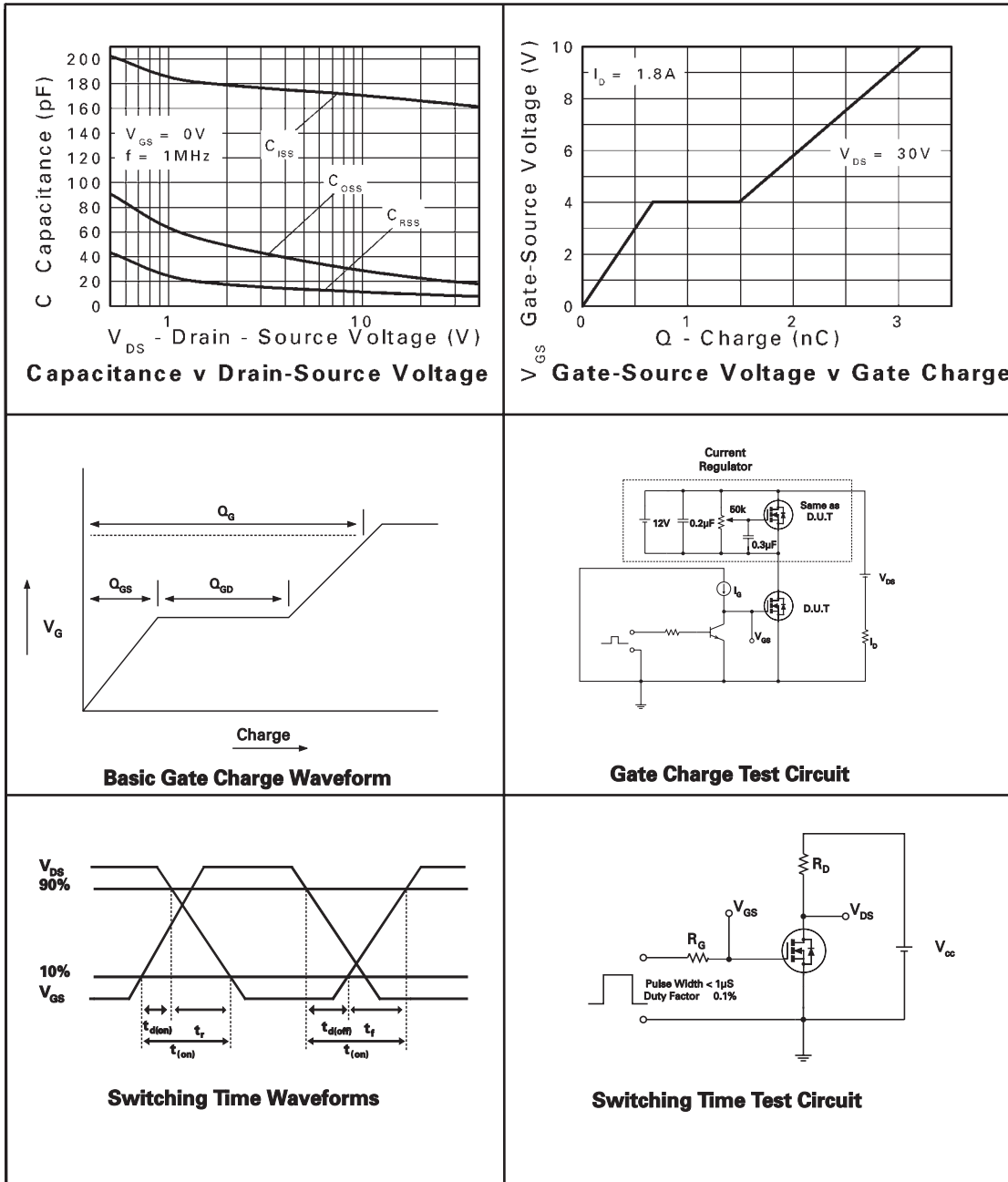
N-CHANNEL TYPICAL CHARACTERISTICS



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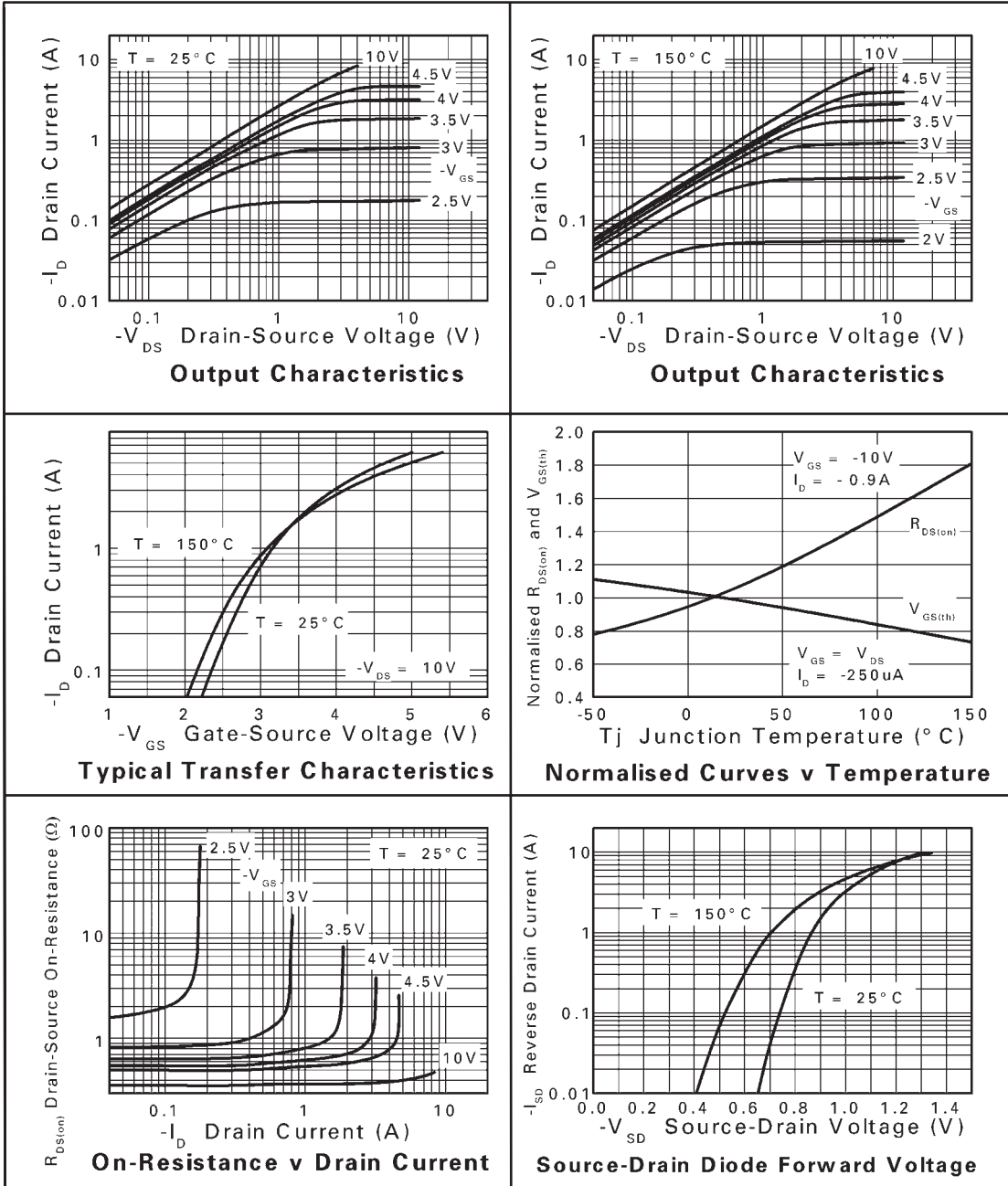
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N-CHANNEL TYPICAL CHARACTERISTICS



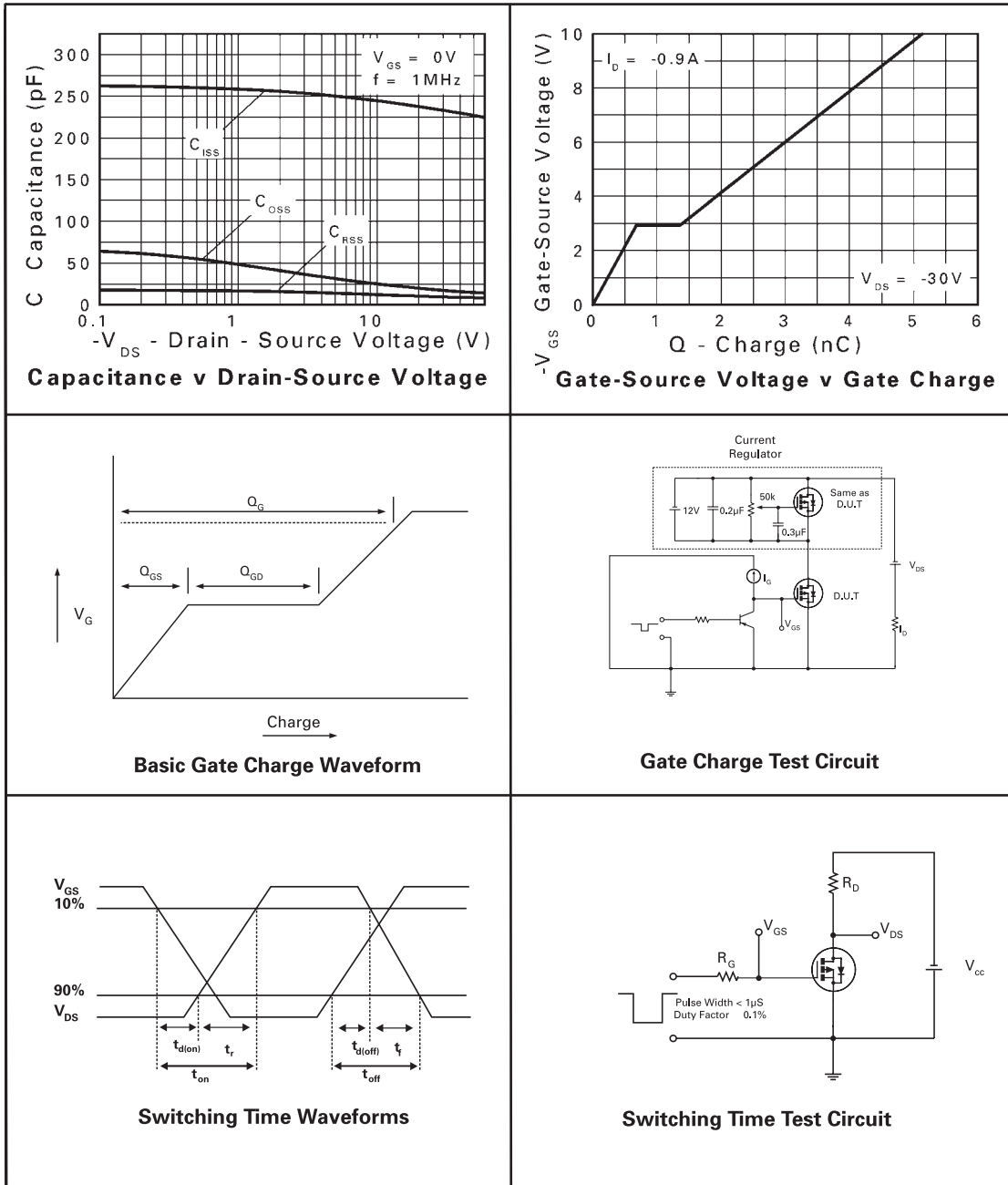
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P-CHANNEL TYPICAL CHARACTERISTICS



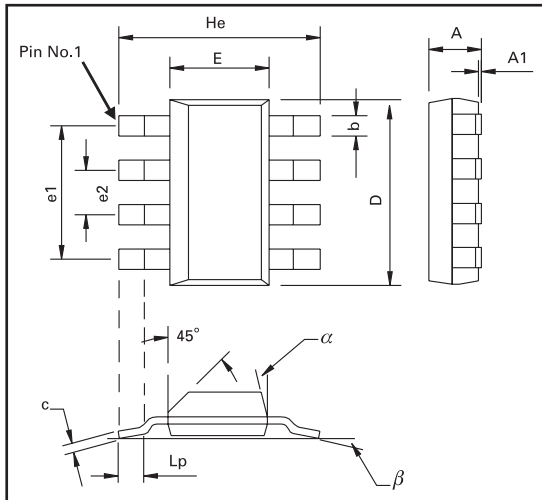
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P-CHANNEL TYPICAL CHARACTERISTICS



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PACKAGE OUTLINE



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

PACKAGE DIMENSIONS

DIM	Millimeters			Inches			DIM	Millimeters			Inches		
	Min	Max	Typ.	Min	Max	Typ.		Min	Max	Typ.	Min	Max	Typ.
A	-	1.7	-	-	0.067	-	e1	-	-	4.59	-	-	0.1807
A1	0.02	0.1	-	0.008	0.004	-	e2	-	-	1.53	-	-	0.0602
b	-	-	0.7	-	-	0.0275	He	6.7	7.3	-	0.264	0.287	-
c	0.24	0.32	-	0.009	0.013	-	Lp	0.9	-	-	0.035	-	-
D	6.3	6.7	-	0.248	0.264	-	α	-	15°	-	-	15°	-
E	3.3	3.7	-	0.130	0.145	-	β	-	-	10°	-	-	10°

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