

ZXMHC6A07T8

COMPLEMENTARY 60V ENHANCEMENT MODE MOSFET H-BRIDGE

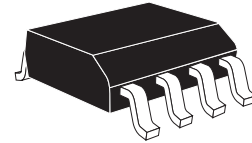
SUMMARY

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
- Low profile SOIC package

APPLICATIONS

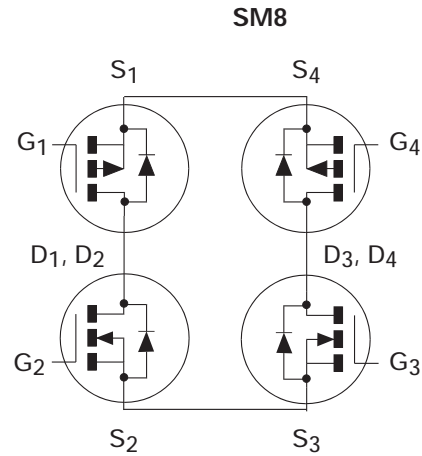
- Motor Drive

ORDERING INFORMATION

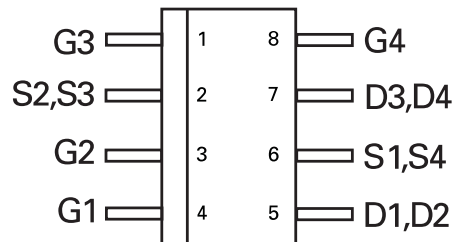
DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMHC6A07T8TA	7"	12mm	1000 units
ZXMHC6A07T8TC	13"	12mm	4000 units

DEVICE MARKING

- ZXMH
C6A07



PINOUT DIAGRAM



Top View

ZXMHC6A07T8

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}	8.7	-7.5	A
Continuous Source Current (Body Diode) (b)	I_S	2.3	-2.1	A
Pulsed Source Current (Body Diode) (c)	I_{SM}	8.7	-7.5	A
Power Dissipation at $T_A=25^\circ C$ (a)(d)	P_D	1.3		W
Linear Derating Factor		10.4		mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (b)(d)	P_D	1.7		W
Linear Derating Factor		13.6		mW/ $^\circ C$
Operating and Storage Temperature Range	$T_j:T_{stg}$	-55 to +150		$^\circ C$

THERMAL RESISTANCE

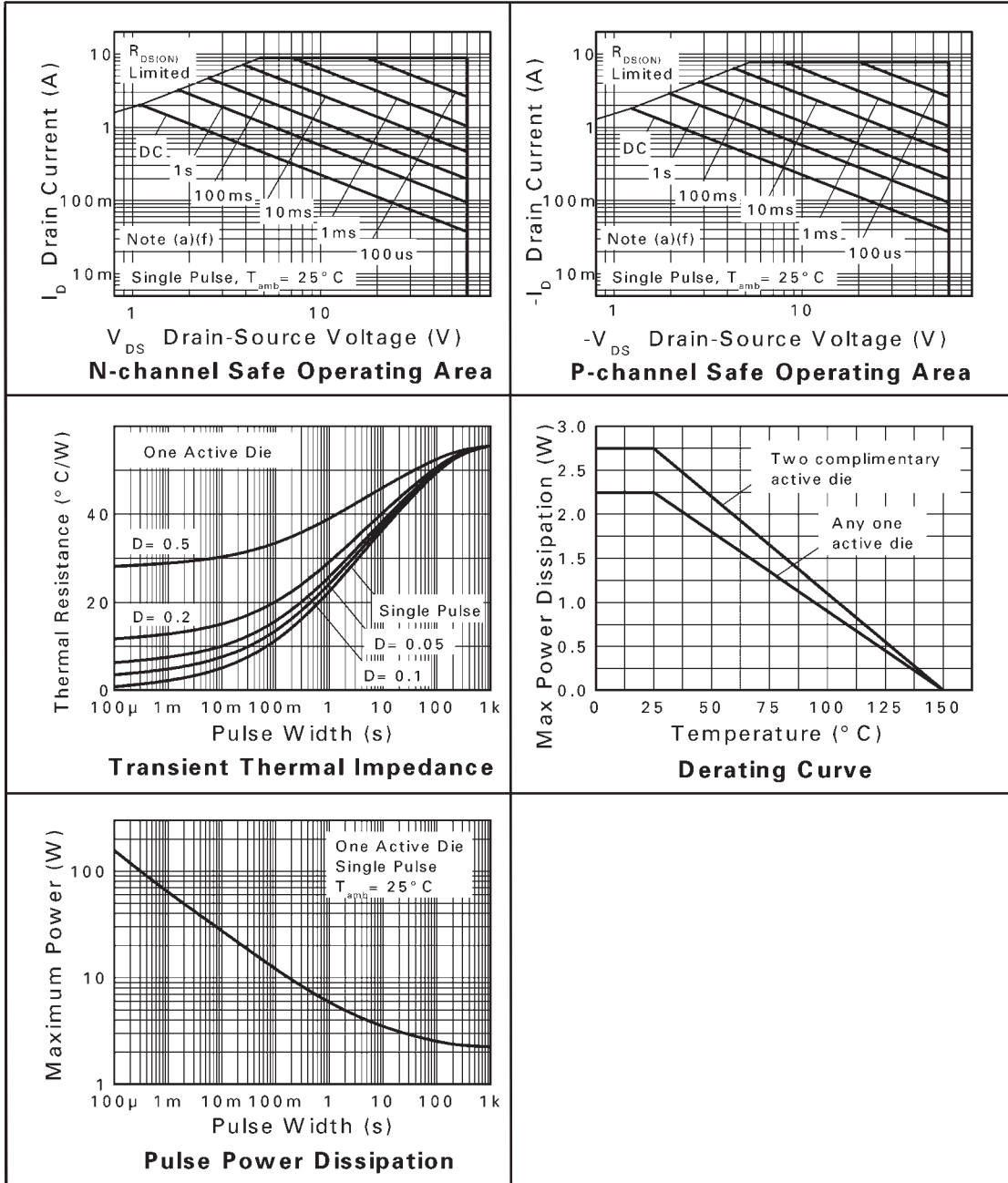
PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)(d)	$R_{\theta JA}$	96	$^\circ C/W$
Junction to Ambient (b)(d)	$R_{\theta JA}$	73	$^\circ C/W$

Notes

- (a) For a device surface mounted on 50mm x 50mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
- (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, $D = 0.2$, pulse width 300 μ S 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).

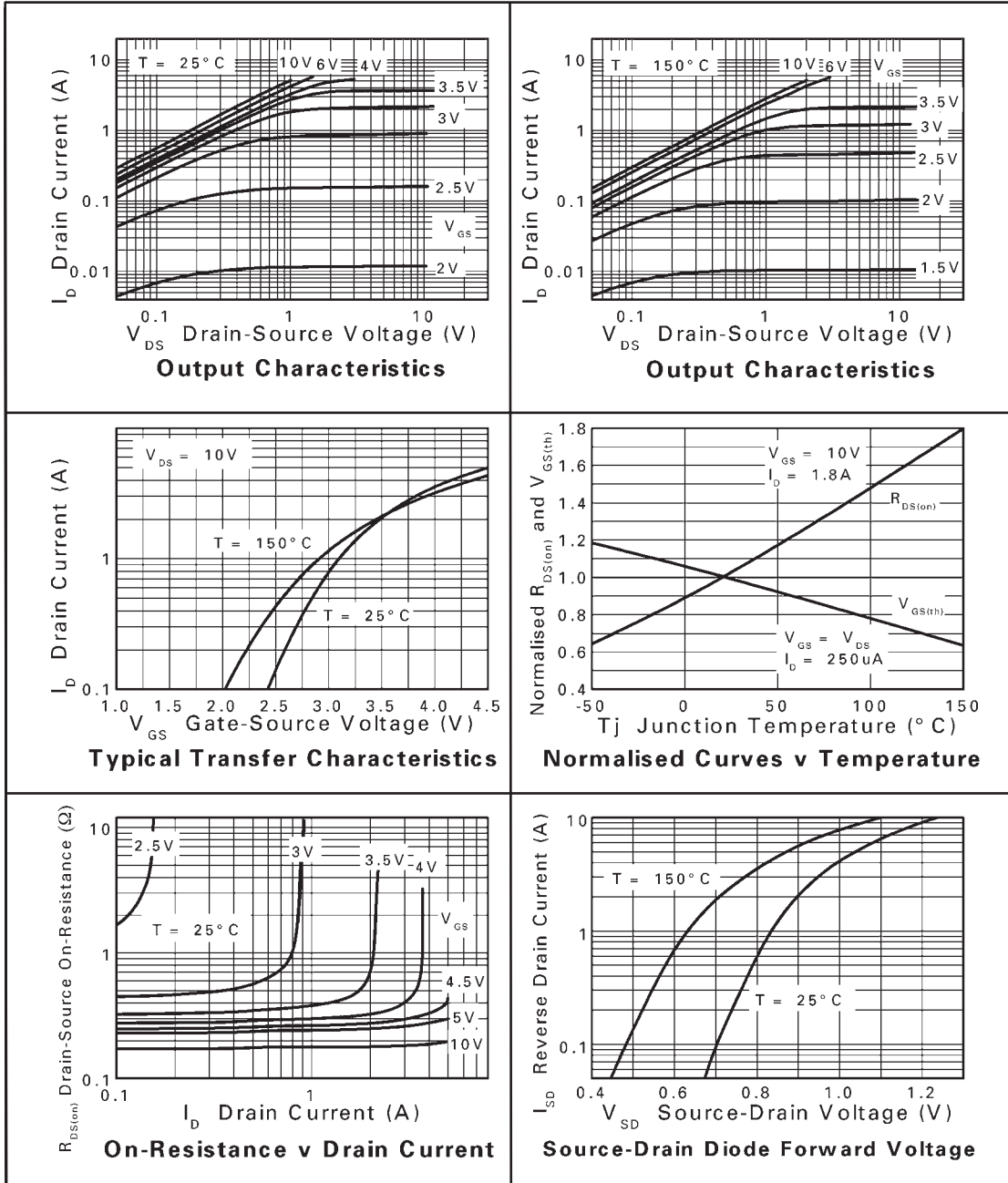
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-60			V	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			-1	μA	$V_{DS} = -60\text{V}$, $V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
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	$t_{d(on)}$		1.3		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		21.3		ns	
Turn-Off Delay Time	$t_{d(off)}$		5.3		ns	
Fall Time	t_f		11.6		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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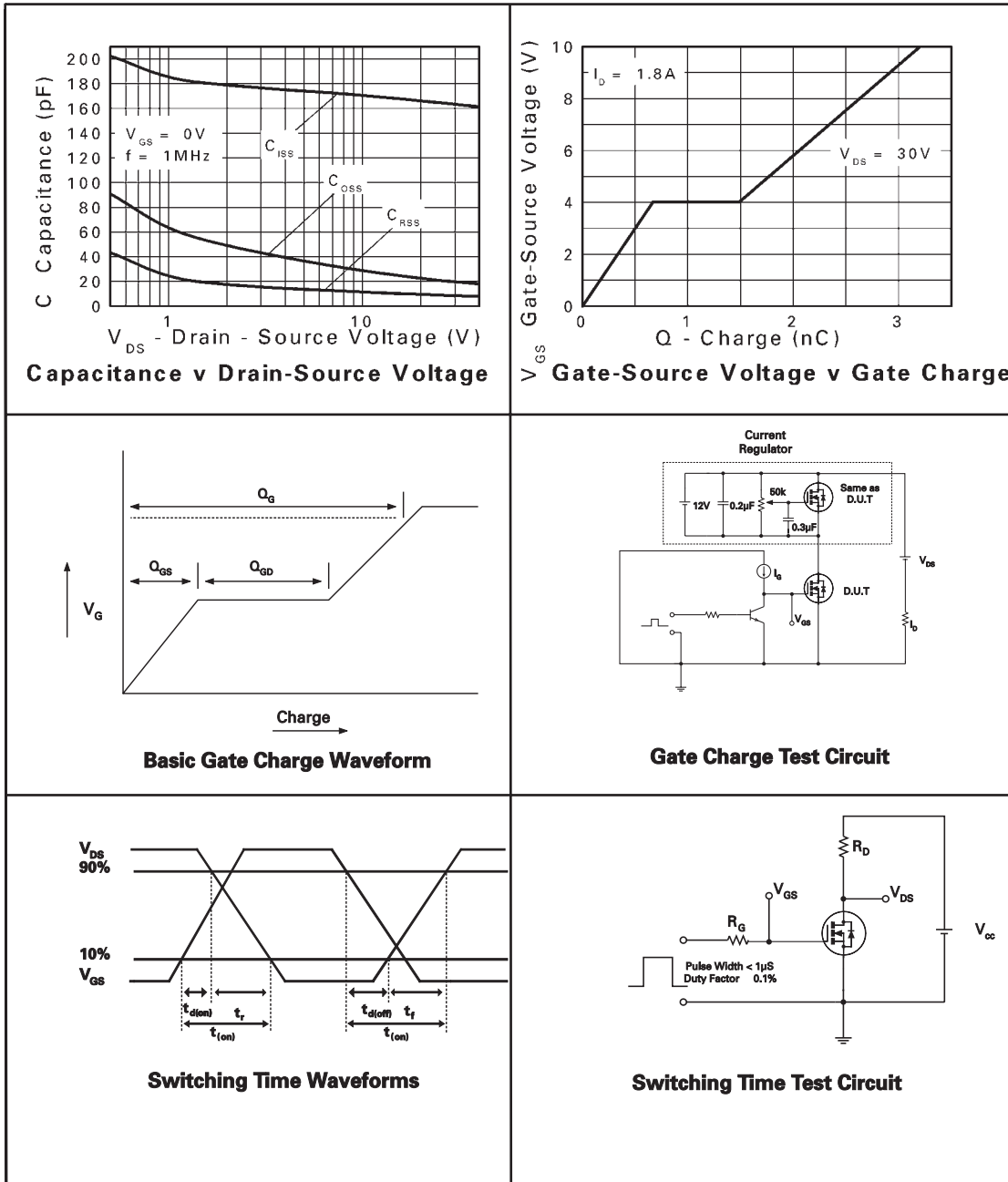
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N-CHANNEL TYPICAL CHARACTERISTICS



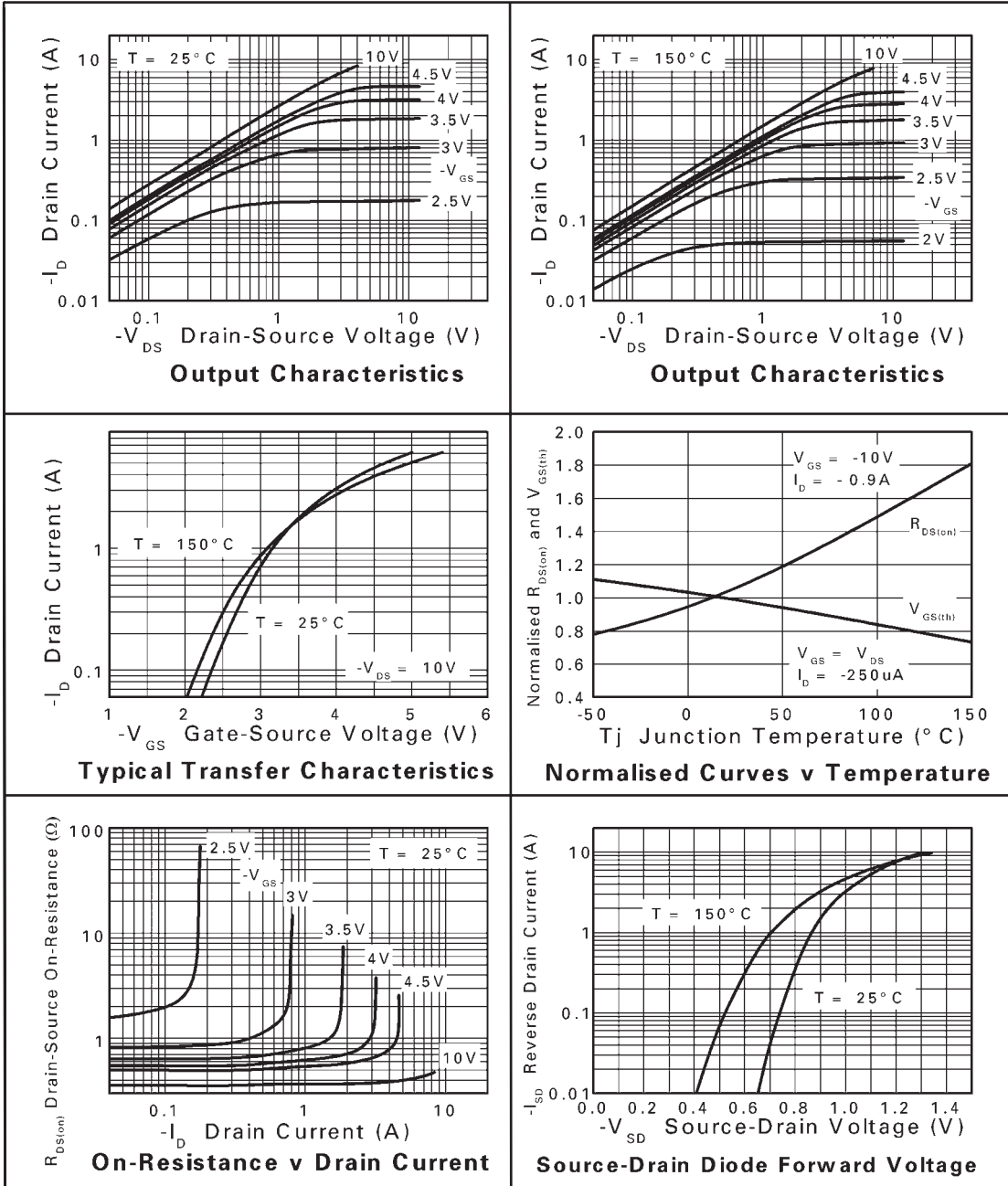
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N-CHANNEL TYPICAL CHARACTERISTICS



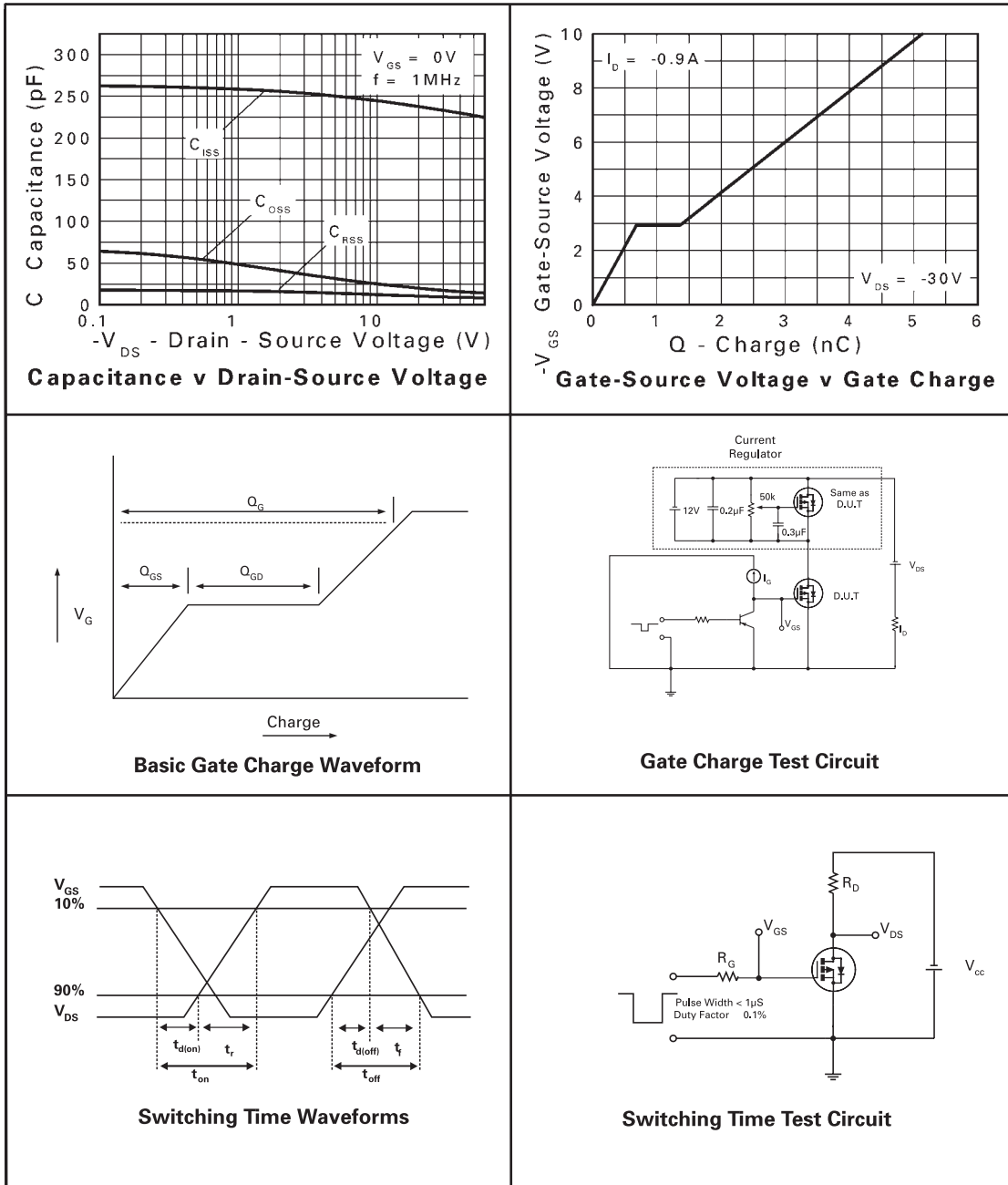
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P-CHANNEL TYPICAL CHARACTERISTICS

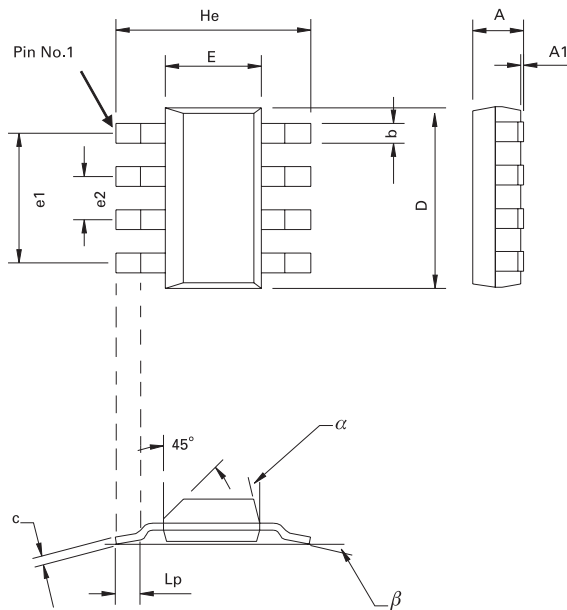


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P-CHANNEL TYPICAL CHARACTERISTICS



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DIM	Millimetres			Inches		
	MIN	TYP	MAX	MIN	TYP	MAX
A	-	-	1.7	-	-	0.067
A1	0.02	-	0.1	0.0008	-	0.004
b	-	0.7	-	-	0.028	-
c	0.24	-	0.32	0.009	-	0.013
D	6.3	-	6.7	0.248	-	0.264
E	3.3	-	3.7	0.130	-	0.145
e1	-	4.59	-	-	0.180	-
e2	-	1.53	-	-	0.060	-
He	6.7	-	7.3	0.264	-	0.287
Lp	0.9	-	-	0.035	-	-
α	-	-	15°	-	-	15°
β	-	10°	-	-	10°	-

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