

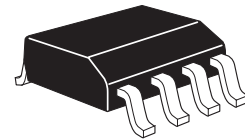
# ZXMHC10A07T8

## COMPLEMENTARY 100V ENHANCEMENT MODE MOSFET H-BRIDGE

### SUMMARY

N-Channel =  $V_{(BR)DSS} = 100V$  ;  $R_{DS(on)} = 0.7\Omega$  ;  $I_D = 1.4A$

P-Channel =  $V_{(BR)DSS} = -100V$  ;  $R_{DS(on)} = 1.0\Omega$  ;  $I_D = -1.3A$



SM8

### DESCRIPTION

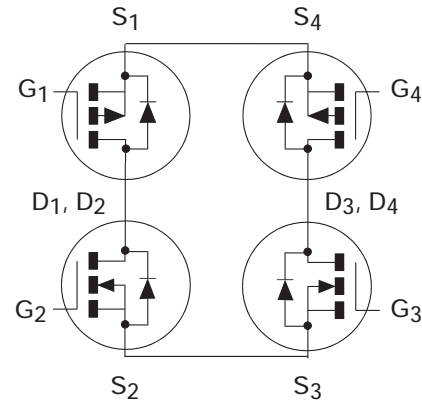
This new generation of trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.

### FEATURES

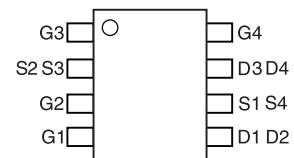
- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Single SM-8 Surface Mount Package

### APPLICATIONS

- Single Phase DC Fan Motor Drive



### PINOUT



### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMHC10A07T8TA	7"	12mm	1000 units
ZXMHC10A07T8TC	13"	12mm	4000 units

### DEVICE MARKING

- ZXMH  
C10A7

# ZXMHC10A07T8

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	N-channel	P-channel	UNIT
Drain-Source Voltage	$V_{DSS}$	100	-100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	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)	$I_D$	1.1	-0.9	A
		0.9	-0.8	A
		1.0	-0.8	A
Pulsed Drain Current (c)	$I_{DM}$	5.2	-4.5	A
Continuous Source Current (Body Diode) (b)	$I_S$	2.3	-2.2	A
Pulsed Source Current (Body Diode) (c)	$I_{SM}$	5.2	-4.5	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)	$P_D$	1.3		W
Linear Derating Factor		10.4		mW/ $^\circ C$
Operating and Storage Temperature Range	$T_j, T_{stg}$	-55 to +150		$^\circ C$

## THERMAL RESISTANCE

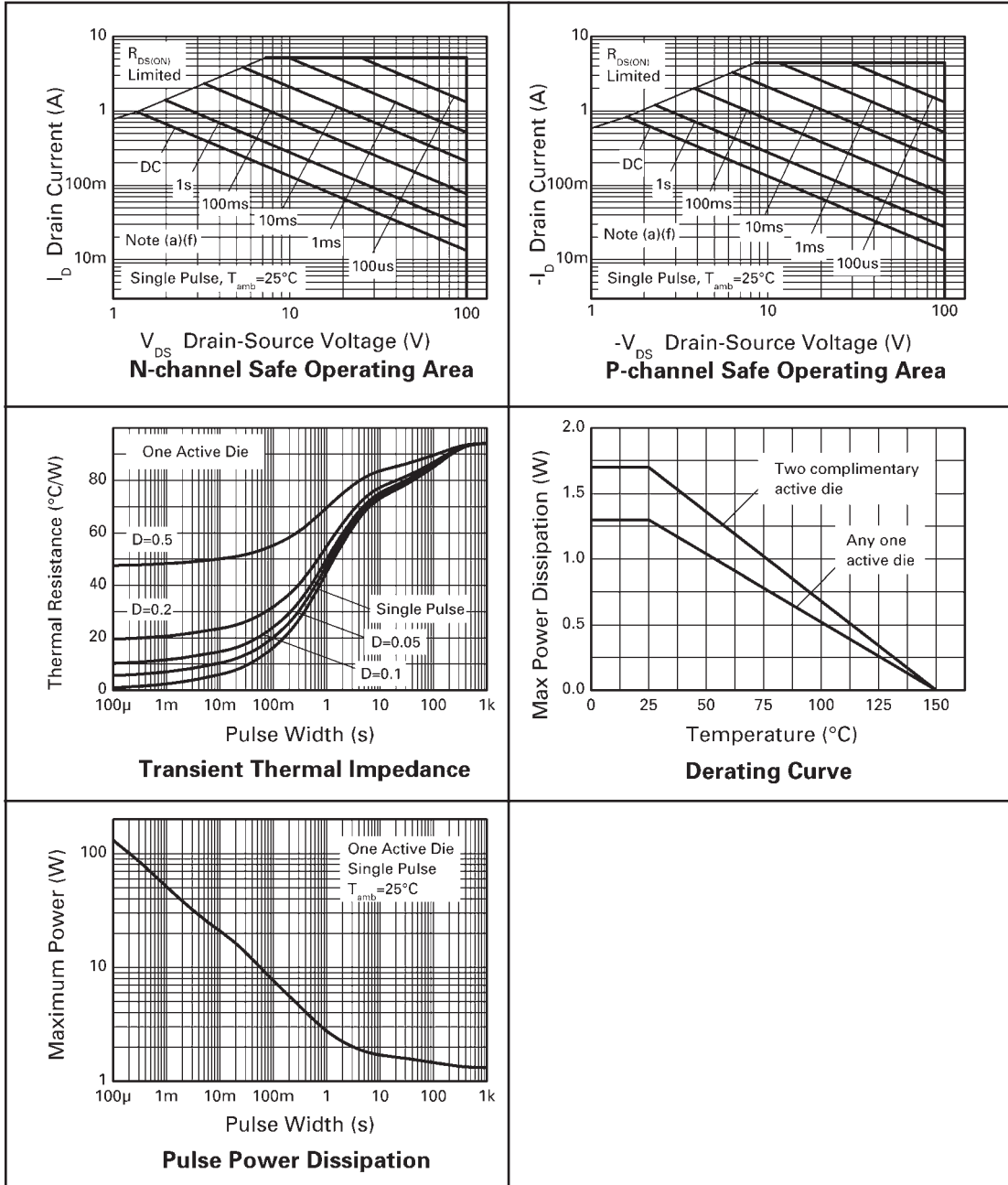
PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a) (d)	$R_{\theta JA}$	94.5	$^\circ C/W$
Junction to Ambient (b) (d)	$R_{\theta JA}$	73.3	$^\circ C/W$

### 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 heat sink split into two equal areas one for each drain connection.
- (b) For a device surface mounted on FR4 PCB measured at  $t \leq 10$  sec.
- (c) Repetitive rating on 50mm x 50mm x 1.6mm FR4 PCB,  $D=0.02$ , pulse width = 300 $\mu s$  - pulse width limited by maximum junction temperature. Refer to transient thermal impedance graph.
- (d) For device with one active die.

# ZXMHC10A07T8

## TYPICAL CHARACTERISTICS



# ZXMHC10A07T8

## N-Channel

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	100			V	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			1	$\mu\text{A}$	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	2.0		4.0	V	$I_D = 250\mu\text{A}, V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance <sup>(1)</sup>	$R_{DS(on)}$			0.7 0.9	$\Omega$ $\Omega$	$V_{GS} = 10\text{V}, I_D = 1.5\text{A}$ $V_{GS} = 6\text{V}, I_D = 1.0\text{A}$
Forward Transconductance <sup>(1) (3)</sup>	$g_{fs}$		1.6		S	$V_{DS} = 15\text{V}, I_D = 1.0\text{A}$
<b>DYNAMIC <sup>(3)</sup></b>						
Input Capacitance	$C_{iss}$		138		pF	$V_{DS} = 60\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$		12		pF	
Reverse Transfer Capacitance	$C_{rss}$		6		pF	
<b>SWITCHING <sup>(2) (3)</sup></b>						
Turn-On-Delay Time	$t_{d(on)}$		1.8		ns	$V_{DD} = 50\text{V}, I_D = 1.0\text{A}$ $R_G \cong 6.0\Omega, V_{GS} = 10\text{V}$
Rise Time	$t_r$		1.5		ns	
Turn-Off Delay Time	$t_{d(off)}$		4.1		ns	
Fall Time	$t_f$		2.1		ns	
Total Gate Charge	$Q_g$		2.9		nC	$V_{DS} = 50\text{V}, V_{GS} = 10\text{V}$ $I_D = 1.0\text{A}$
Gate-Source Charge	$Q_{gs}$		0.7		nC	
Gate Drain Charge	$Q_{gd}$		1.0		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage <sup>(1)</sup>	$V_{SD}$			0.95	V	$T_J = 25^{\circ}\text{C}, I_S = 1.5\text{A}, V_{GS} = 0\text{V}$
Reverse Recovery Time <sup>(3)</sup>	$t_{rr}$		27		ns	$T_J = 25^{\circ}\text{C}, I_S = 1.8\text{A},$
Reverse Recovery Charge <sup>(3)</sup>	$Q_{rr}$		12		nC	$di/dt = 100\text{A}/\mu\text{s}$

#### NOTES

- (1) Measured under pulsed conditions. Pulse 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.

# ZXMHC10A07T8

## P-Channel

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

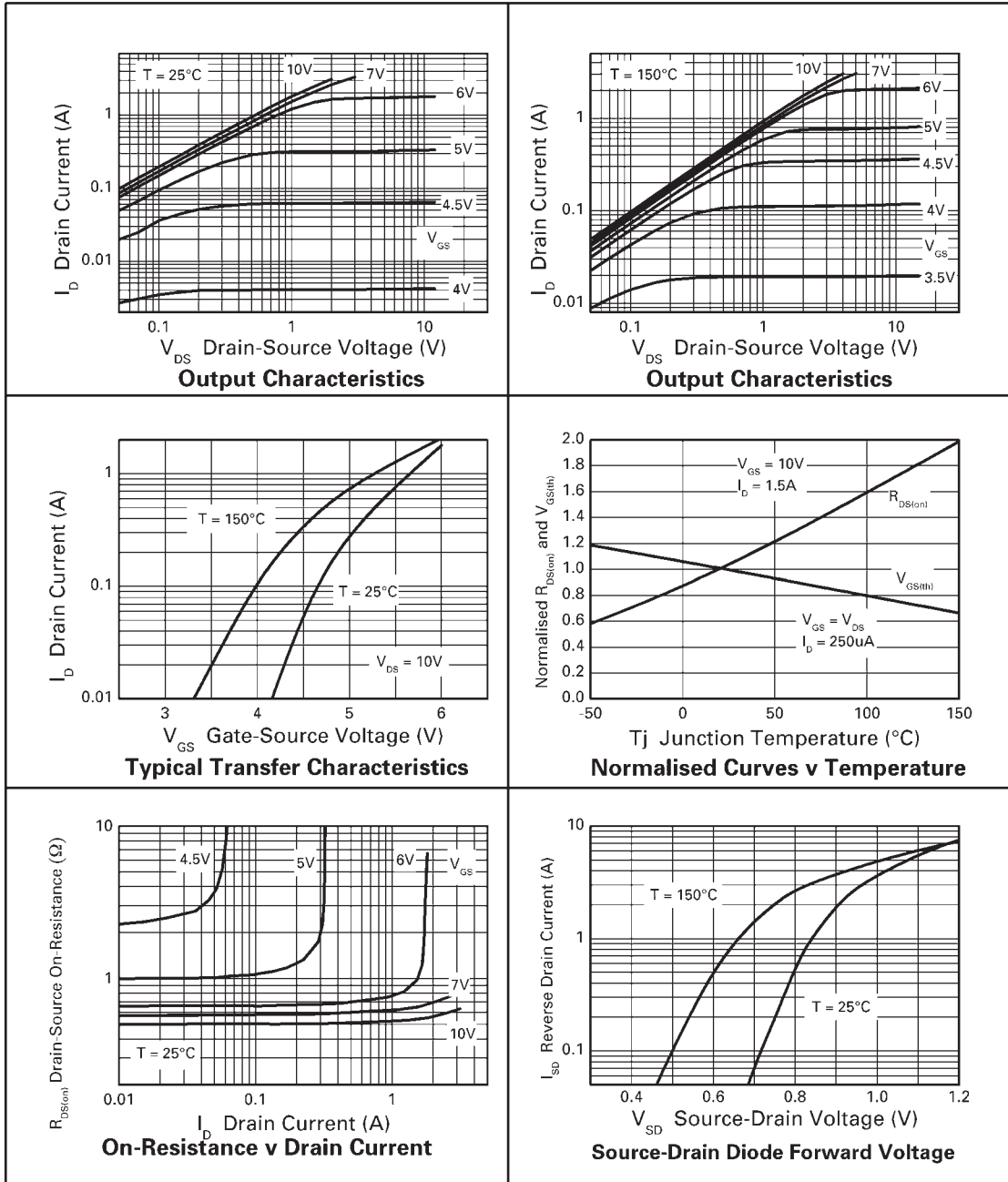
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-100			V	$I_D = -250\mu\text{A}$ , $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			-1.0	$\mu\text{A}$	$V_{DS} = -100\text{V}$ , $V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	-2.0		-4.0	V	$I_D = -250\mu\text{A}$ , $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance <sup>(1)</sup>	$R_{DS(on)}$			1 1.45	$\Omega$	$V_{GS} = -10\text{V}$ , $I_D = -0.6\text{A}$ $V_{GS} = -6\text{V}$ , $I_D = -0.5\text{A}$
Forward Transconductance <sup>(1) (3)</sup>	$g_{fs}$		1.2		S	$V_{DS} = -15\text{V}$ , $I_D = -0.6\text{A}$
<b>DYNAMIC <sup>(3)</sup></b>						
Input Capacitance	$C_{iss}$		141		pF	$V_{DS} = -50\text{V}$ , $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$		13.1		pF	
Reverse Transfer Capacitance	$C_{rss}$		10.8		pF	
<b>SWITCHING <sup>(2) (3)</sup></b>						
Turn-On-Delay Time	$t_{d(on)}$		1.6		ns	$V_{DD} = -50\text{V}$ , $I_D = -1\text{A}$ $R_G \cong 6.0\Omega$ , $V_{GS} = -10\text{V}$
Rise Time	$t_r$		2.1		ns	
Turn-Off Delay Time	$t_{d(off)}$		5.9		ns	
Fall Time	$t_f$		3.3		ns	
Gate Charge	$Q_g$		1.6		nC	
Total Gate Charge	$Q_g$		3.5		nC	$V_{DS} = -50\text{V}$ , $V_{GS} = -10\text{V}$ $I_D = -0.6\text{A}$
Gate-Source Charge	$Q_{gs}$		0.6		nC	
Gate Drain Charge	$Q_{gd}$		1.6		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage <sup>(1)</sup>	$V_{SD}$		-0.85	-0.95	V	$T_J = 25^{\circ}\text{C}$ , $I_S = -0.75\text{A}$ , $V_{GS} = 0\text{V}$
Reverse Recovery Time <sup>(3)</sup>	$t_{rr}$		29		ns	$T_J = 25^{\circ}\text{C}$ , $I_S = -0.9\text{A}$ ,
Reverse Recovery Charge <sup>(3)</sup>	$Q_{rr}$		31		nC	$di/dt = 100\text{A}/\mu\text{s}$

#### NOTES

- (1) Measured under pulsed conditions. Pulse 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.

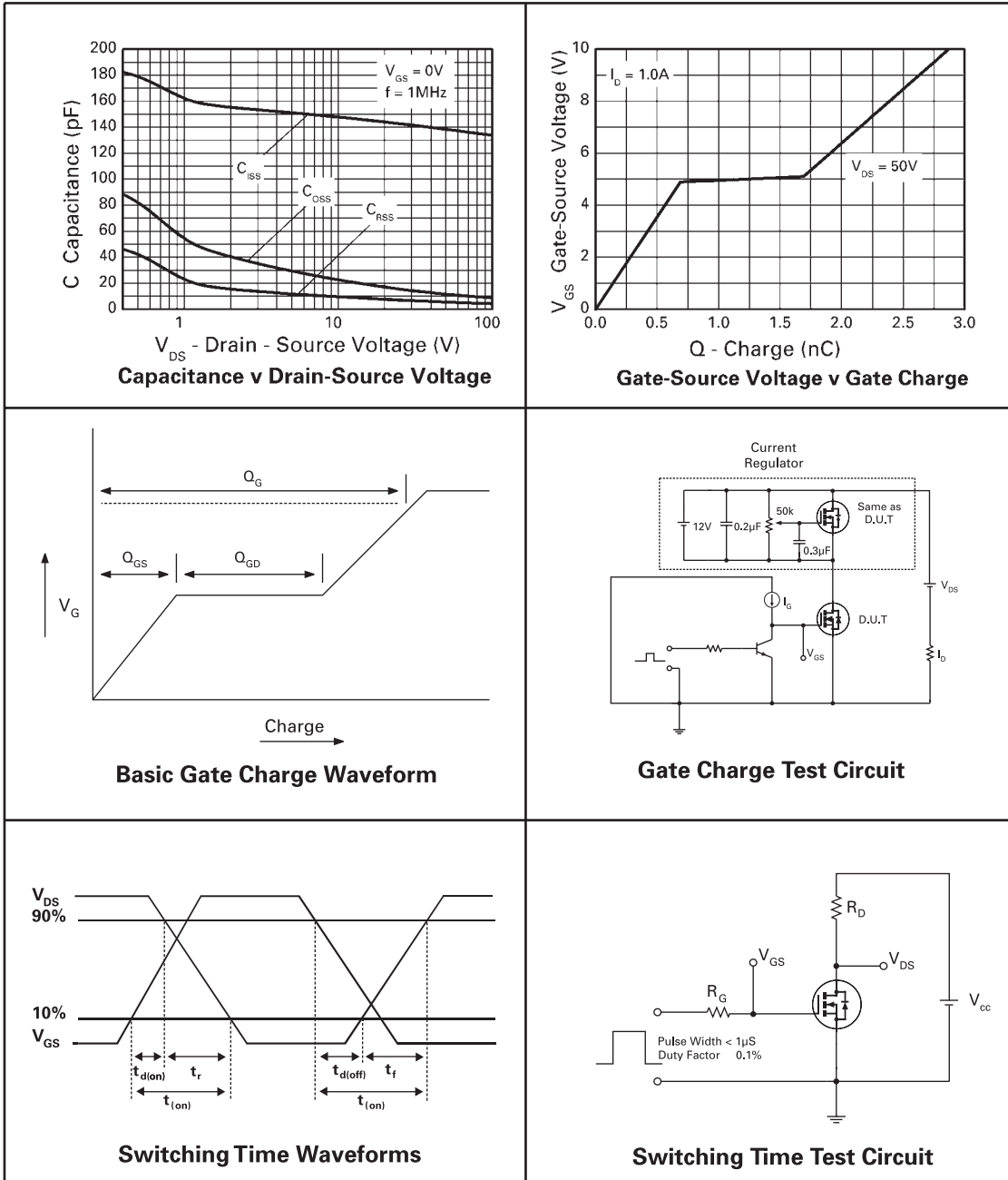
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## N-CHANNEL TYPICAL CHARACTERISTICS



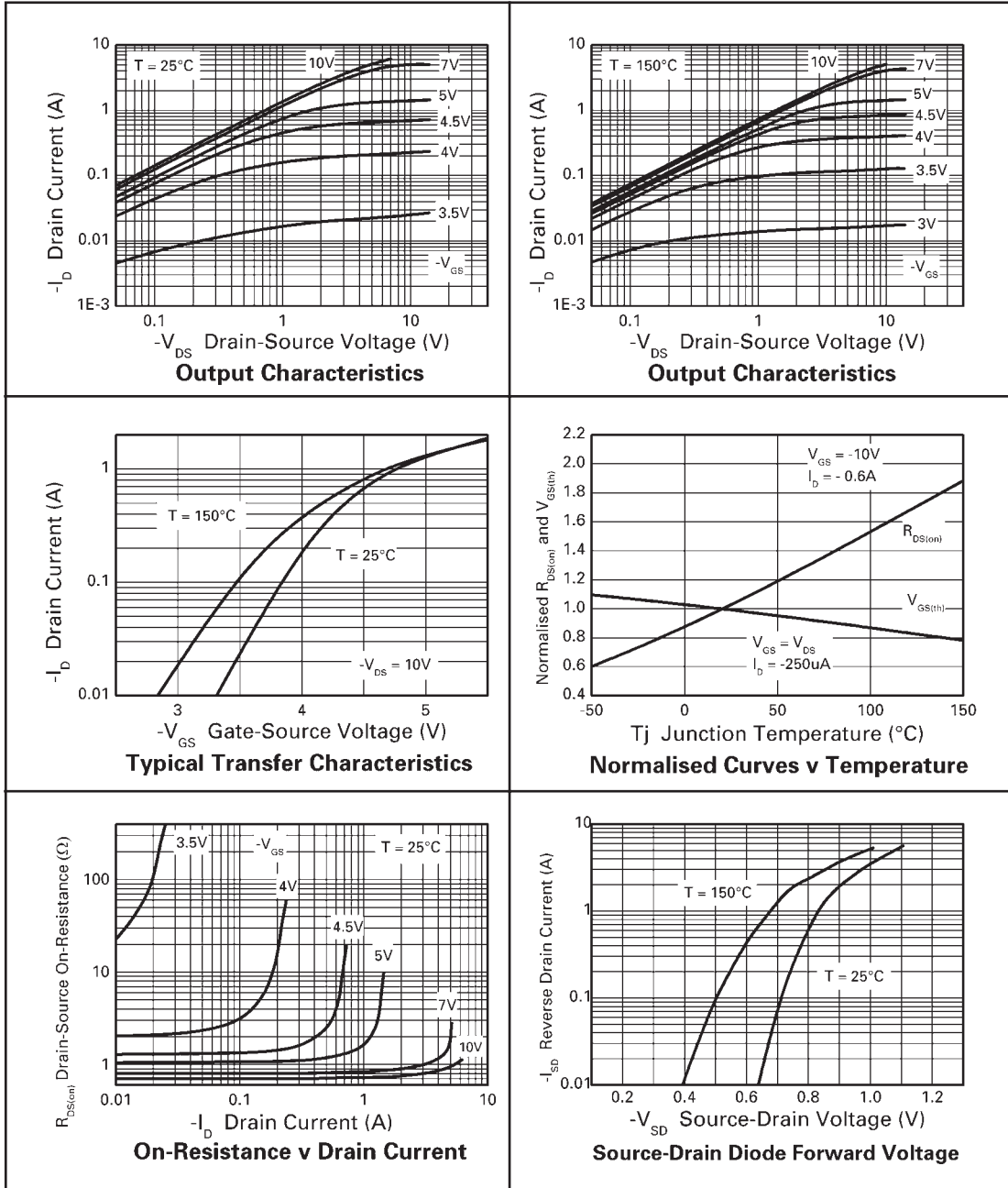
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## N-CHANNEL TYPICAL CHARACTERISTICS



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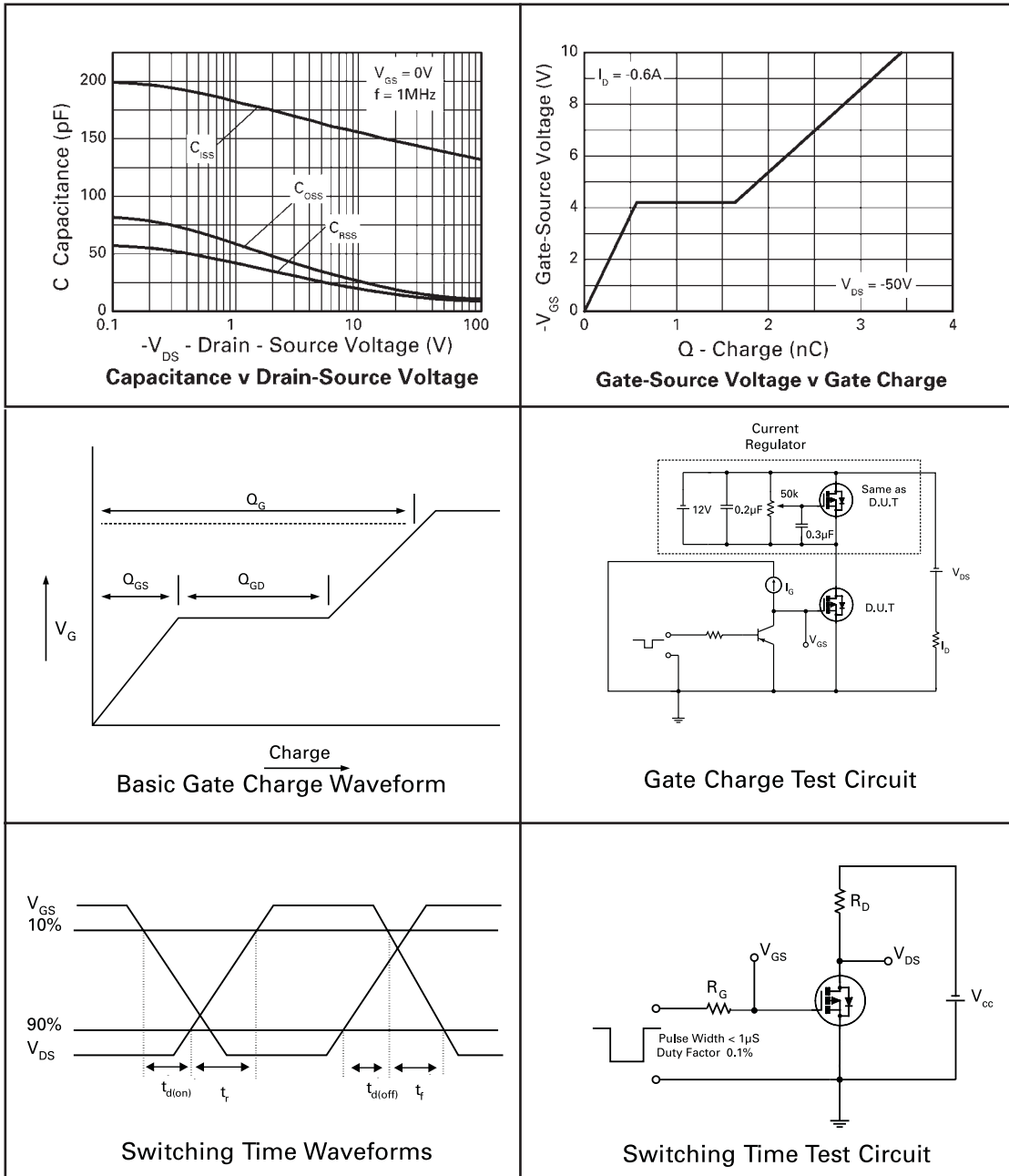
## P-CHANNEL TYPICAL CHARACTERISTICS





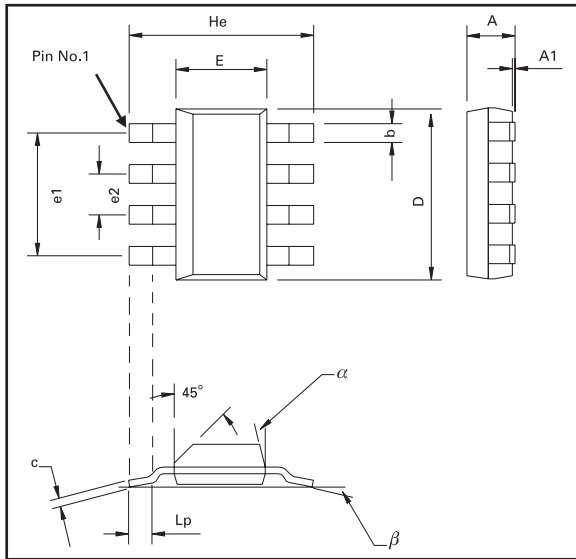
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## P-CHANNEL TYPICAL CHARACTERISTICS



# ZXMHC10A07T8

## PACKAGE OUTLINE



## PACKAGE DIMENSIONS

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	-	-
$\alpha$	-	-	15°	-	-	15°
$\beta$	-	10°	-	-	10°	-

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

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