ZXMHC6A07T8

COMPLEMENTARY 60V ENHANCEMENT MODE MOSFET H-BRIDGE

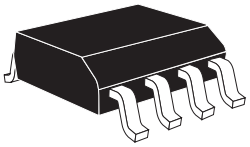
SUMMARY

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

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

DESCRIPTION

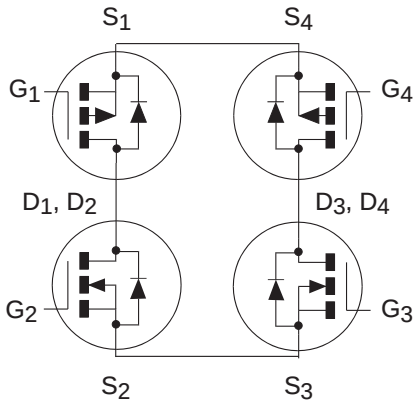
This new generation of trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.



SM8

FEATURES

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



APPLICATIONS

- Motor drive

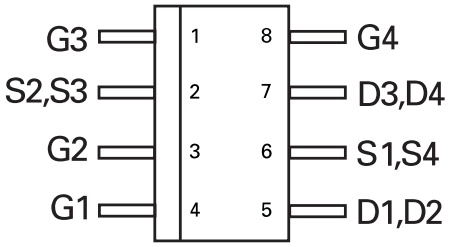
ORDERING INFORMATION

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

ZETEX SEMICONDUCTORS

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°C (b)(d) @V_{GS}=10V; T_A=70°C (b)(d) @V_{GS}=10V; T_A=25°C (a)(d)	I_D	1.8 1.4 1.6	-1.5 -1.2 -1.3	A 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°C (a)(d) Linear Derating Factor	P_D	1.3 10.4		W mW/°C
Power Dissipation at T_A=25°C (b)(d) Linear Derating Factor	P_D	1.7 13.6		W mW/°C
Operating and Storage Temperature Range	T_j:T_{stg}	-55 to +150		°C

THERMAL RESISTANCE

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

Notes

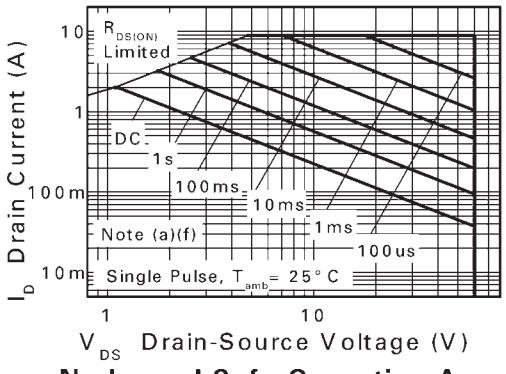
(a) For a device surface mounted on 50mm x 50mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.

(b) For a device surface mounted on FR4 PCB measured 1.6mm at t ≤ 10sec.

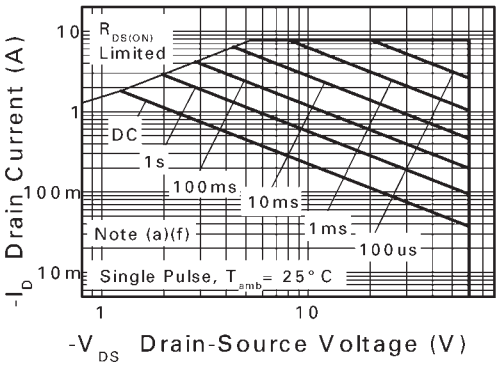
(c) Repetitive rating - 50mm x 50mm x 1.6mm FR4 PCB, D = 0.2, pulse width 300μS pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

(d) For device with one active die.

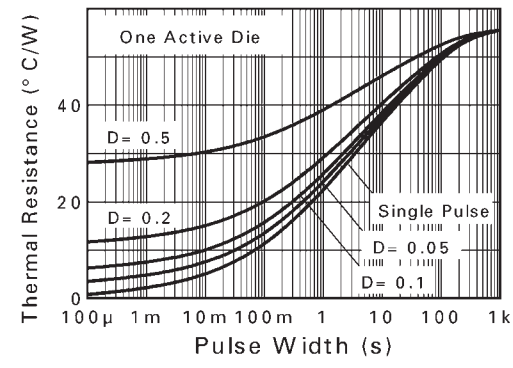
TYPICAL CHARACTERISTICS



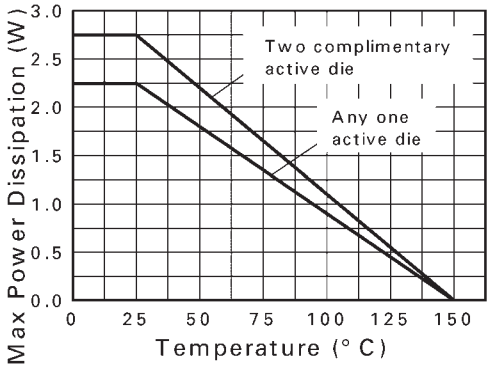
N-channel Safe Operating Area



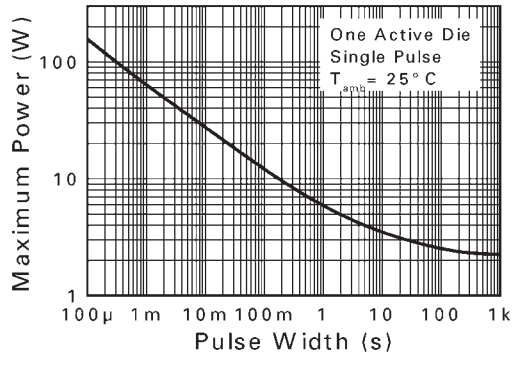
P-channel Safe Operating Area



Transient Thermal Impedance



Derating Curve



Pulse Power Dissipation

N-CHANNEL
ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	60			V	I_D=250µA, V_{GS}=0V
Zero Gate Voltage Drain Current	I_{DSS}			1	µA	V_{DS}=60V, V_{GS}=0V
Gate-Body Leakage	I_{GSS}			100	nA	V_{GS}=±20V, V_{DS}=0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	1		3.0	V	I_D=250µA, V_{DS}= V_{GS}
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.300 0.450	Ω Ω	V_{GS}=10V, I_D=1.8A V_{GS}=4.5V, I_D=1.3A
Forward Transconductance (1)(3)	g_{fs}		2.3		S	V_{DS}=15V,I_D=1.8A
DYNAMIC (3)						
Input Capacitance	C_{iss}		166		pF	V_{DS}=40V, V_{GS}=0V, f=1MHz
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} =30V, I_D=1.8A R_G≅6.0Ω, V_{GS}=10V
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}=30V,V_{GS}=5V, I_D=1.8A
Total Gate Charge	Q_g		3.2		nC	V_{DS}=30V,V_{GS}=10V, I_D=1.8A
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°C, I_S=0.45A, V_{GS}=0V
Reverse Recovery Time (3)	t_{rr}		20.5		ns	T_J=25°C, I_F=1.8A, di/dt= 100A/µs
Reverse Recovery Charge (3)	Q_{rr}		21.3		nC	

NOTES

(1) Measured under pulsed conditions. Width ≤300µs. Duty cycle ≤ 2% .

(2) Switching characteristics are independent of operating junction temperature.

(3) For design aid only, not subject to production testing.

P-CHANNEL
ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-60			V	I_D=-250µA, V_{GS}=0V
Zero Gate Voltage Drain Current	I_{DSS}			-1	µA	V_{DS}=-60V, 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)	$R_{DS(on)}$			0.425 0.630	Ω Ω	V_{GS}=-10V, I_D=-0.9A V_{GS}=-4.5V, I_D=-0.8A
Forward Transconductance (1)(3)	g_{fs}		1.8		S	V_{DS}=-15V,I_D=-0.9A
DYNAMIC (3)						
Input Capacitance	C_{iss}		233		pF	V_{DS}=-30 V, V_{GS}=0V, f=1MHz
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} =-30V, I_D=-1A $R_{G\cong 6.0}\Omega$, V_{GS}=-10V
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}=-30V,V_{GS}=-5V, I_D=-0.9A
Total Gate Charge	Q_g		5.1		nC	V_{DS}=-30V,V_{GS}=-10V, I_D=-0.9A
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°C, I_S=-0.8A, V_{GS}=0V
Reverse Recovery Time (3)	t_{rr}		22.6		ns	T_J=25°C, I_F=-0.9A, di/dt= 100A/µs
Reverse Recovery Charge (3)	Q_{rr}		23.2		nC	

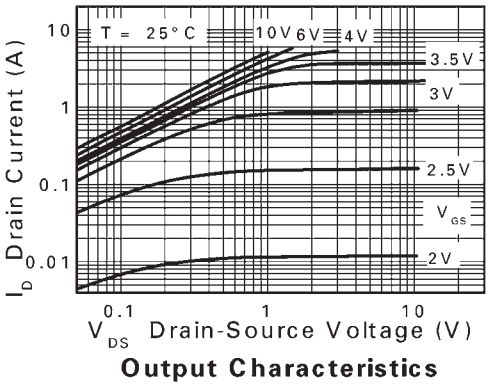
NOTES

(1) Measured under pulsed conditions. Width ≤300µs. Duty cycle ≤ 2% .

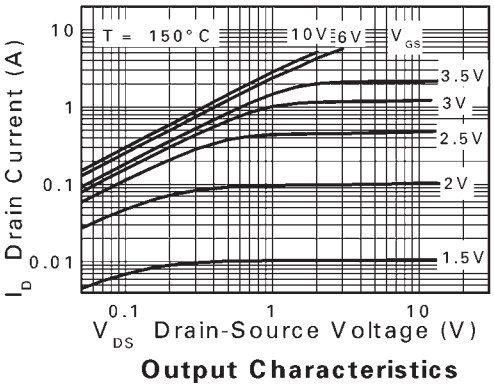
(2) Switching characteristics are independent of operating junction temperature.

(3) For design aid only, not subject to production testing.

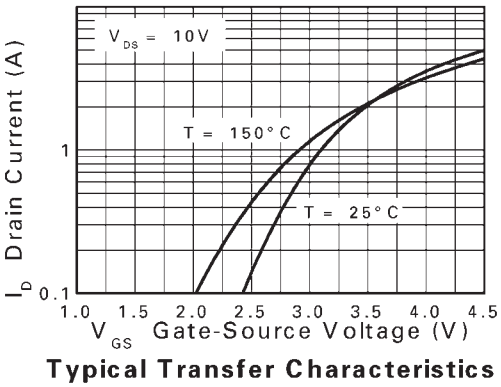
N-CHANNEL TYPICAL CHARACTERISTICS



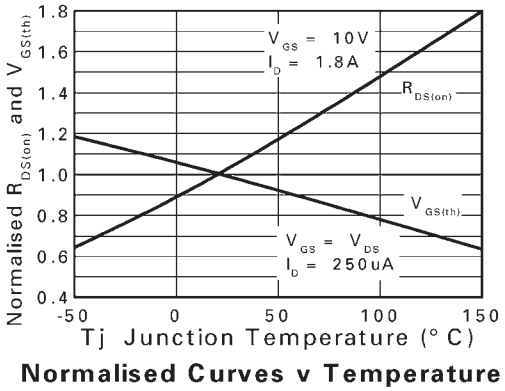
Output Characteristics



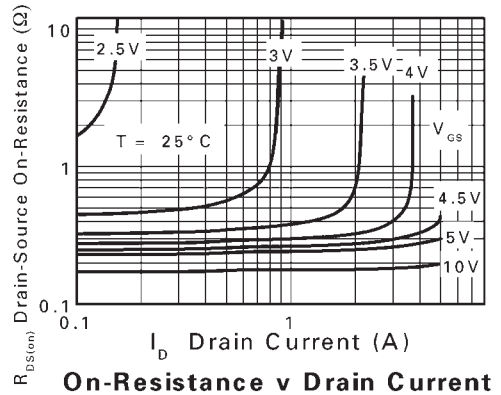
Output Characteristics



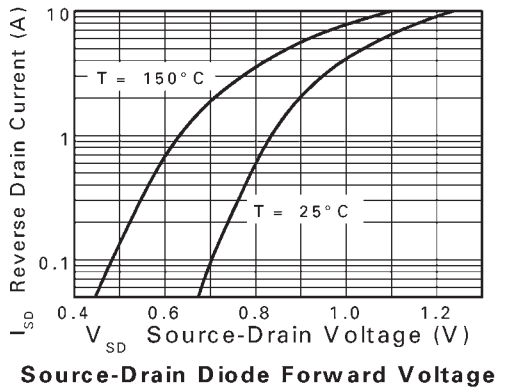
Typical Transfer Characteristics



Normalised Curves v Temperature

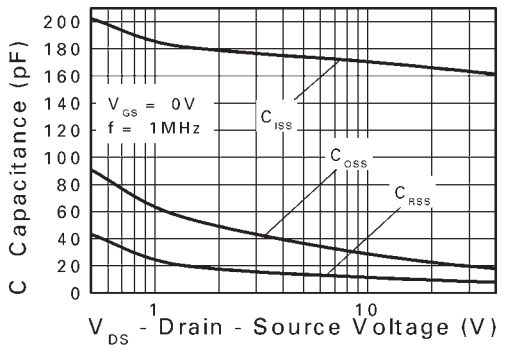


On-Resistance v Drain Current

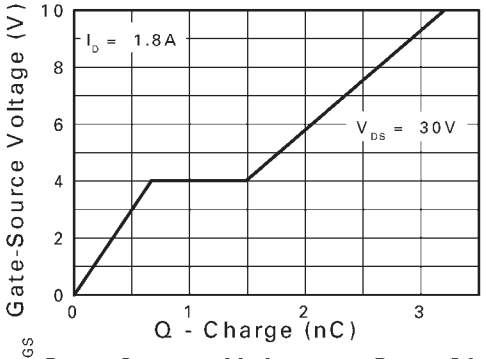


Source-Drain Diode Forward Voltage

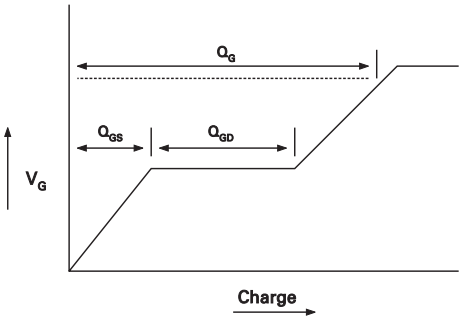
N-CHANNEL TYPICAL CHARACTERISTICS



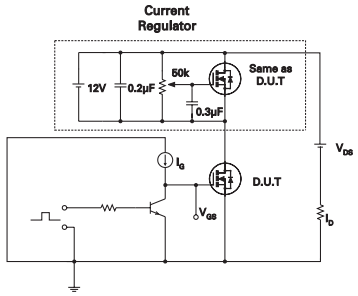
Capacitance v Drain-Source Voltage



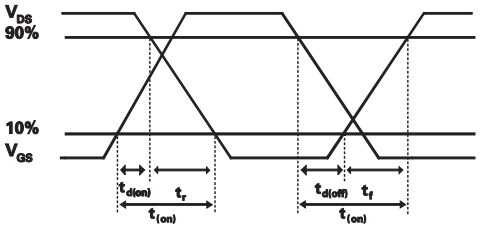
Gate-Source Voltage v Gate Charge



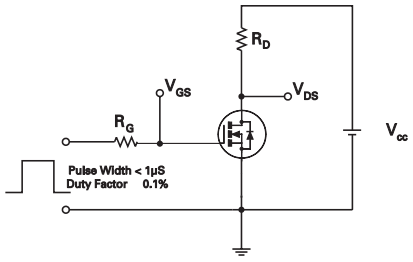
Basic Gate Charge Waveform



Gate Charge Test Circuit

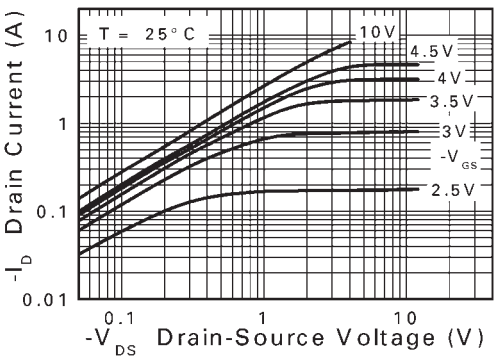


Switching Time Waveforms

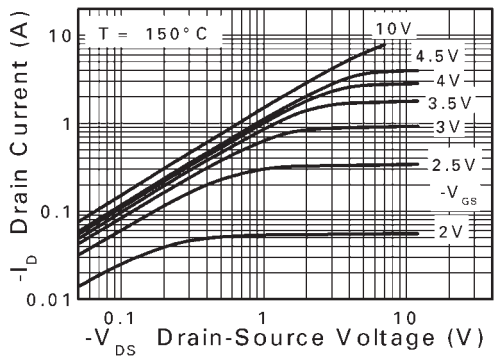


Switching Time Test Circuit

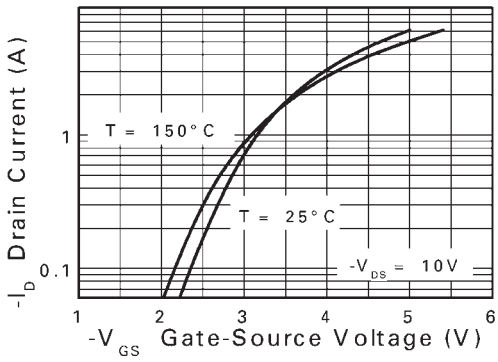
P-CHANNEL TYPICAL CHARACTERISTICS



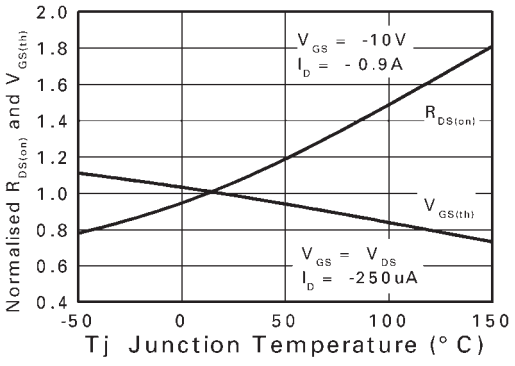
Output Characteristics



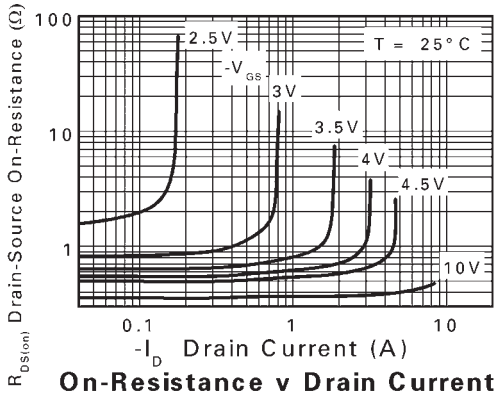
Output Characteristics



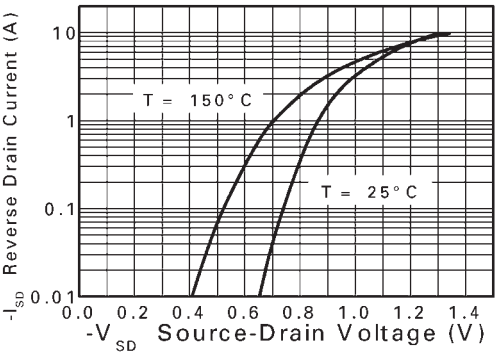
Typical Transfer Characteristics



Normalised Curves v Temperature

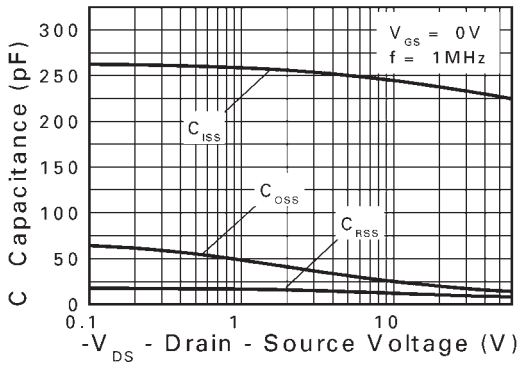


On-Resistance v Drain Current

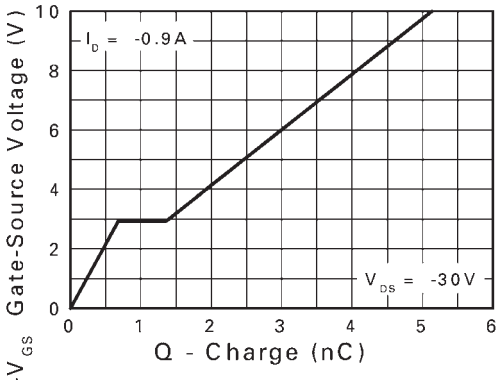


Source-Drain Diode Forward Voltage

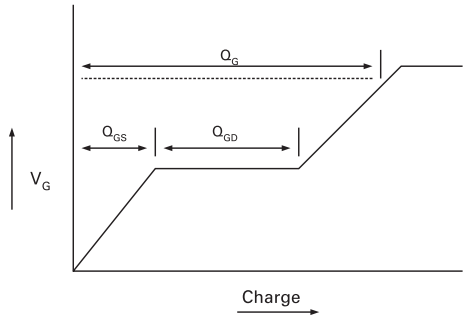
P-CHANNEL TYPICAL CHARACTERISTICS



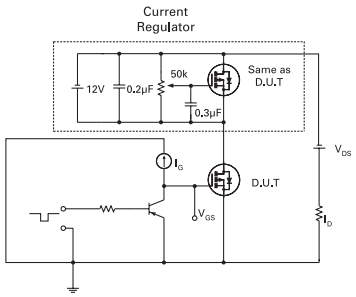
Capacitance v Drain-Source Voltage



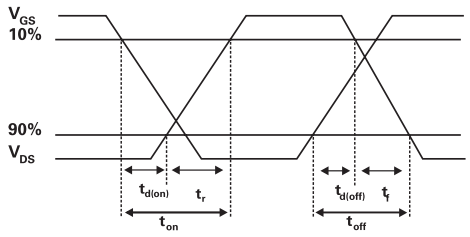
Gate-Source Voltage v Gate Charge



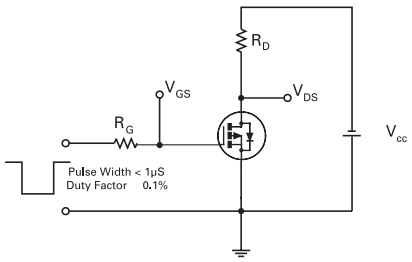
Basic Gate Charge Waveform



Gate Charge Test Circuit



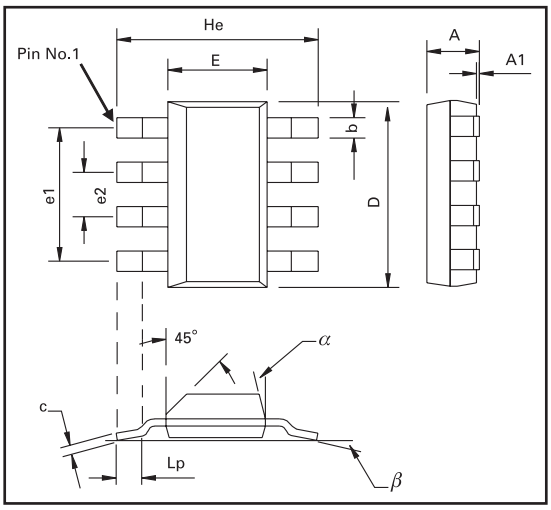
Switching Time Waveforms



Switching Time Test Circuit

ZXMHC6A07T8

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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ISSUE 1 - JULY 2004