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Stocking Distributor

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[Diodes Incorporated](#)
[ZXMHC6A07N8TC](#)

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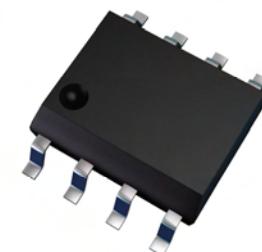


ZXMHC6A07N8

60V SO8 Complementary enhancement mode MOSFET H-Bridge

Summary

Device	$V_{(BR)DSS}$	Q_G	$R_{DS(on)}$	I_D $T_A = 25^\circ C$
N-CH	60V	3.2nC	0.25Ω @ $V_{GS} = 10V$	1.8A
			0.35Ω @ $V_{GS} = 4.5V$	1.5A
P-CH	-60V	5.1nC	0.40Ω @ $V_{GS} = -10V$	-1.4A
			0.60Ω @ $V_{GS} = -4.5V$	-1.2A



Description

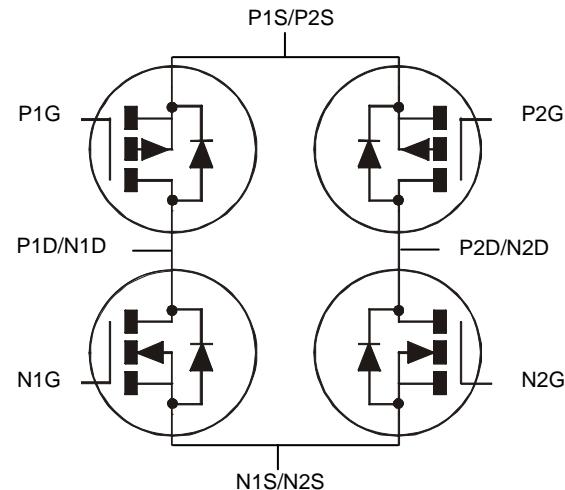
This new generation complementary MOSFET H-Bridge features low on-resistance achievable with low gate drive.

Features

- 2 x N + 2 x P channels in a SOIC package

Applications

- DC Motor control
- DC-AC Inverters

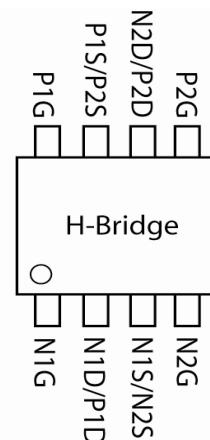


Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMHC6A07N8TC	13	12	2,500

Device marking

ZXMHC
6A07



ZXMHC6A07N8

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) @ $V_{GS}= 10V$; $T_A=70^\circ C$ (b) @ $V_{GS}= 10V$; $T_A=25^\circ C$ (a) @ $V_{GS}= 10V$; $T_L=25^\circ C$ (f)	I_D	1.80 1.40 1.39 1.42	-1.42 -1.28 -1.28 -1.33	A
Pulsed Drain current @ $V_{GS}= 10V$; $T_A=25^\circ C$ (c)	I_{DM}	7.10	-6.03	A
Continuous Source current (Body diode) at $T_A=25^\circ C$ (b)	I_S	1.00	-1.00	A
Pulsed Source current (Body diode) at $T_A=25^\circ C$ (c)	I_{SM}	7.10	-6.03	A
Power dissipation at $T_A=25^\circ C$ (a) Linear derating factor	P_D	0.87 6.94		W mW/°C
Power dissipation at $T_A=25^\circ C$ (b) Linear derating factor	P_D	1.36 10.9		W mW/°C
Power dissipation at $T_L=25^\circ C$ (f) Linear derating factor	P_D	0.90 7.19		W mW/°C
Operating and storage temperature range	T_j , T_{stg}	-55 to 150		°C

Thermal resistance

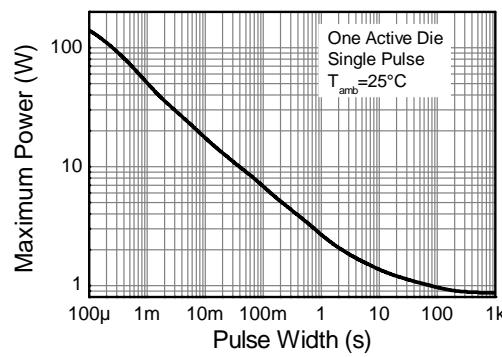
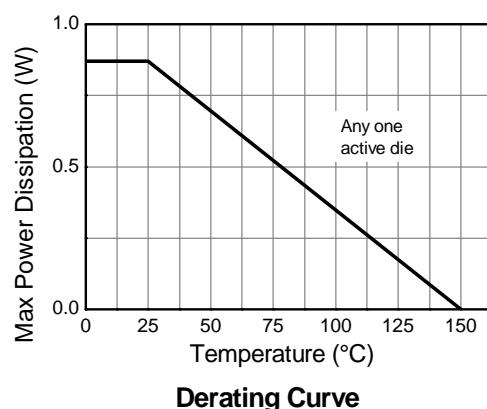
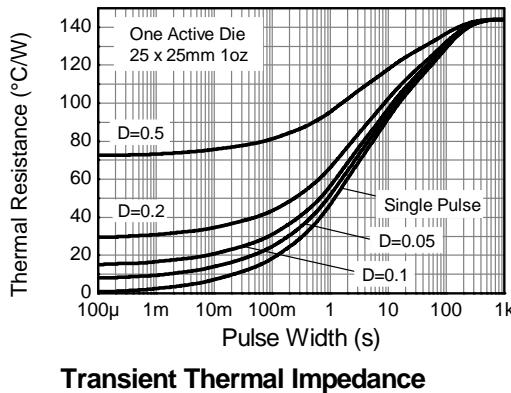
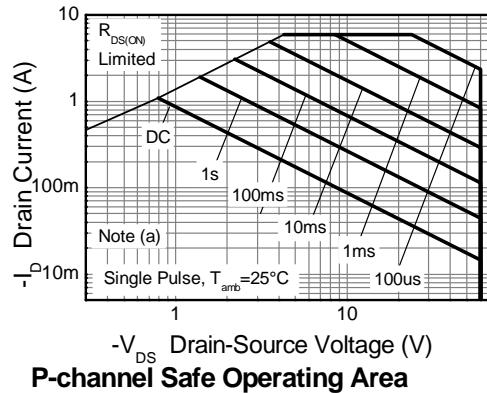
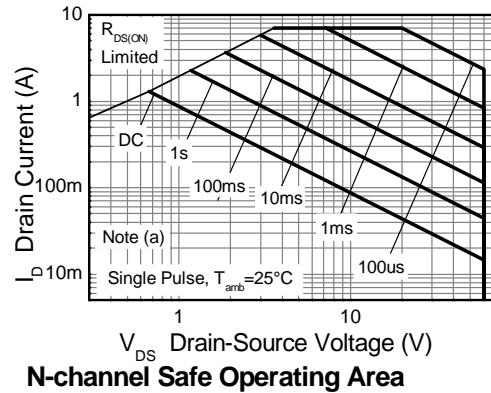
Parameter	Symbol	Value	Unit
Junction to ambient (a)	$R_{\theta JA}$	144	°C/W
Junction to ambient (b)	$R_{\theta JA}$	92	°C/W
Junction to ambient (d)	$R_{\theta JA}$	106	°C/W
Junction to ambient (e)	$R_{\theta JA}$	254	°C/W
Junction to lead (f)	$R_{\theta JL}$	139	°C/W

NOTES:

- (a) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions with the heat-sink split into two equal areas (one for each drain connection); the device is measured when operating in a steady-state condition with one active die.
- (b) Same as note (a), except the device is measured at $t \leq 10$ sec.
- (c) Same as note (a), except the device is pulsed with $D= 0.02$ and pulse width 300 μs . The pulse current is limited by the maximum junction temperature.
- (d) 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); the device is measured when operating in a steady-state condition with one active die.
- (e) For a device surface mounted on minimum copper 1.6mm FR4 PCB, in still air conditions; the device is measured when operating in a steady-state condition with one active die.
- (f) Thermal resistance from junction to solder-point (at the end of the drain lead); the device is operating in a steady-state condition with one active die.

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Thermal characteristics



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N-channel electrical characteristics (at $T_{amb} = 25^\circ C$ unless otherwise stated)

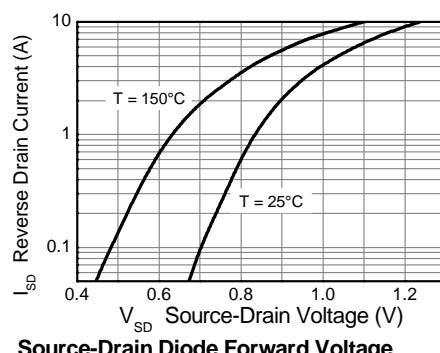
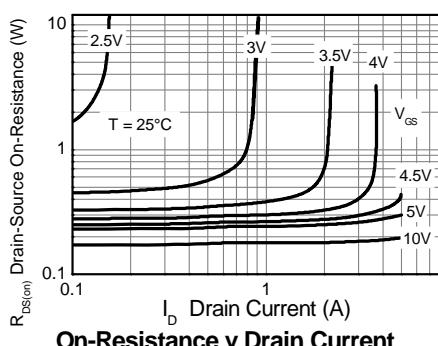
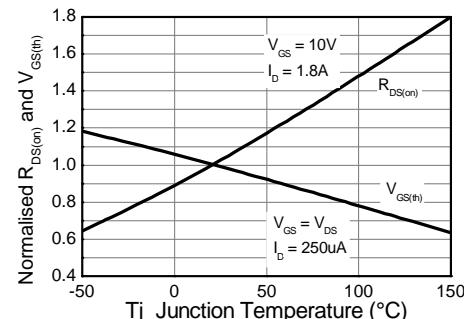
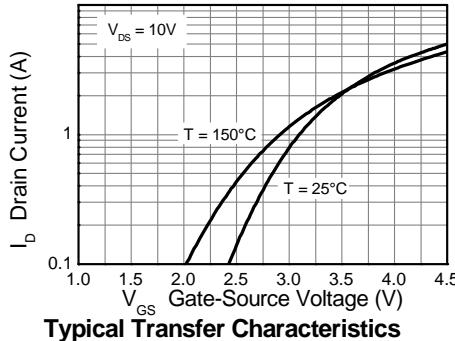
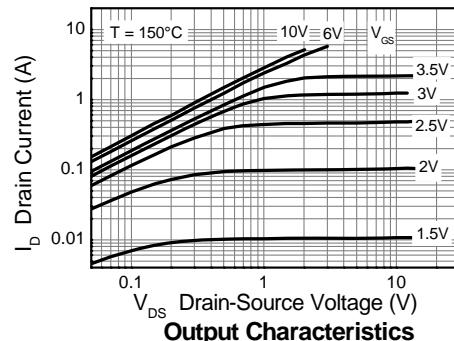
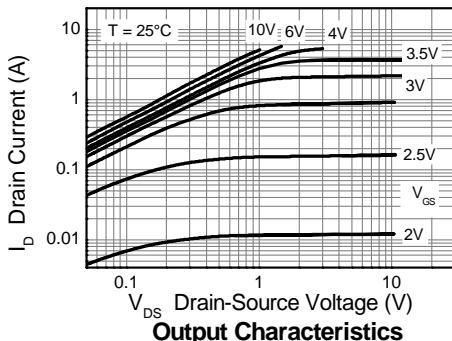
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-Source breakdown voltage	$V_{(BR)DSS}$	60			V	$I_D = 250\mu A, V_{GS} = 0V$
Zero Gate voltage Drain current	I_{DSS}			0.5	μA	$V_{DS} = 60V, V_{GS} = 0V$
Gate-Body leakage	I_{GSS}			± 100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
Gate-Source threshold voltage	$V_{GS(th)}$	1.0		3.0	V	$I_D = 250\mu A, V_{DS} = V_{GS}$
Static Drain-Source on-state resistance ^(a)	$R_{DS(on)}$			0.25 0.35	Ω	$V_{GS} = 10V, I_D = 1.8A$ $V_{GS} = 4.5V, I_D = 1.3A$
Forward Transconductance ^{(a) (c)}	g_{fs}		2.3		S	$V_{DS} = 15V, I_D = 1.8A$
Dynamic						
Capacitance ^(c)						
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 ^{(b) (c)}						
Turn-on-delay time	$t_{d(on)}$		1.8		ns	$V_{DD} = 30V, V_{GS} = 10V$ $I_D = 1.8A$ $R_G \geq 6.0\Omega$,
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 ^(c)						
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 ^(a)	V_{SD}		0.80	0.95	V	$I_S = 0.45A, V_{GS} = 0V$
Reverse recovery time ^(c)	t_{rr}		20.5		ns	$I_S = 1.8A, di/dt = 100A/\mu s$
Reverse recovery charge ^(c)	Q_{rr}		21.3		nC	

NOTES:

- (a) Measured under pulsed conditions. Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- (b) Switching characteristics are independent of operating junction temperature.
- (c) For design aid only, not subject to production testing

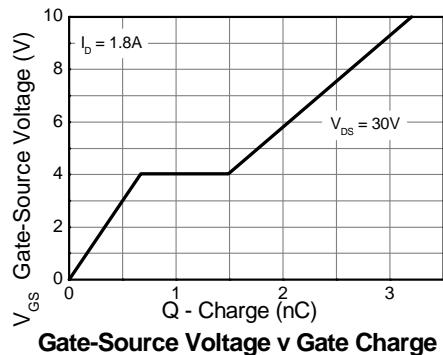
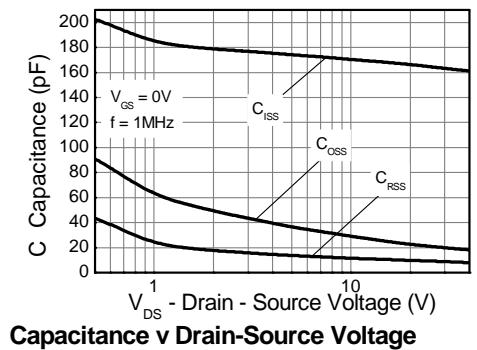
ZXMHC6A07N8

N-channel typical characteristics

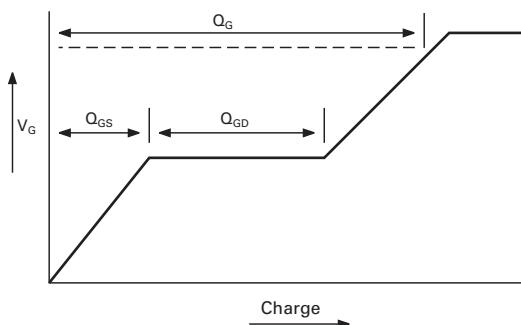


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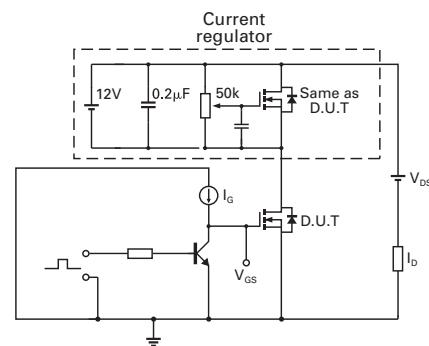
N-channel typical characteristics –continued



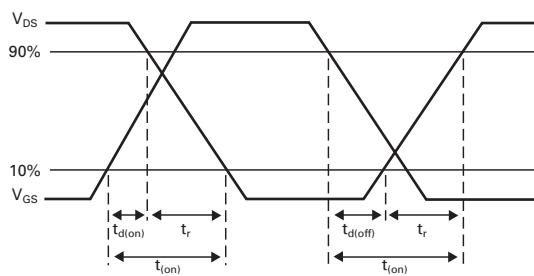
Test circuits



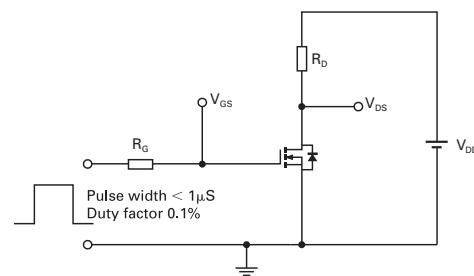
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



Switching time test circuit

ZXMHC6A07N8

P-channel electrical characteristics (at $T_{amb} = 25^\circ C$ unless otherwise stated)

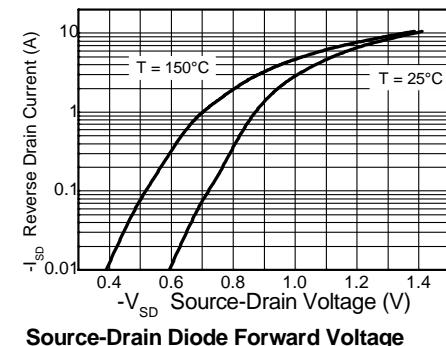
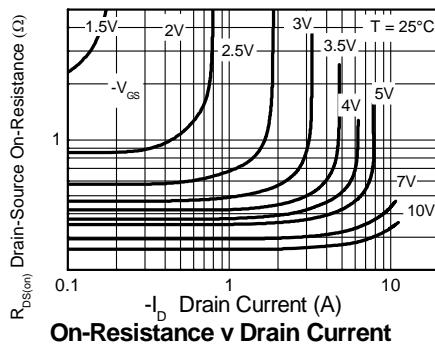
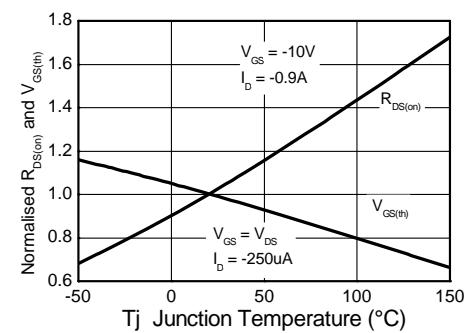
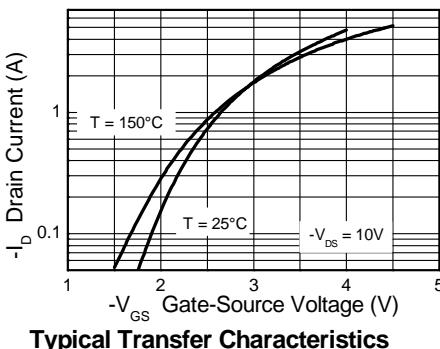
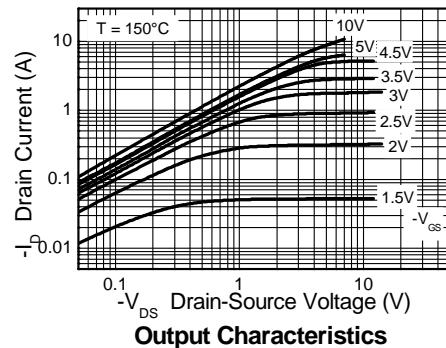
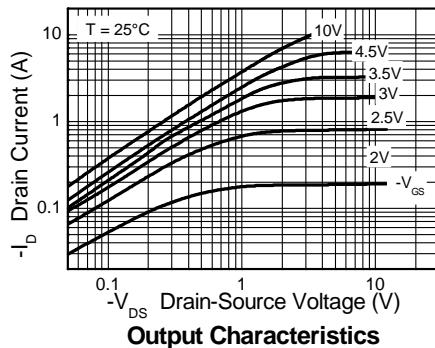
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-Source breakdown voltage	$V_{(BR)DSS}$	-60			V	$I_D = -250\mu A, V_{GS} = 0V$
Zero Gate voltage Drain current	I_{DSS}			-0.5	μA	$V_{DS} = -60V, V_{GS} = 0V$
Gate-Body leakage	I_{GSS}			± 100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
Gate-Source threshold voltage	$V_{GS(th)}$	-1.0		-3.0	V	$I_D = -250\mu A, V_{DS} = V_{GS}$
Static Drain-Source on-state resistance ^(a)	$R_{DS(on)}$			0.40 0.60	Ω	$V_{GS} = -10V, I_D = -0.9A$ $V_{GS} = -4.5V, I_D = -0.8A$
Forward Transconductance ^{(a) (c)}	g_{fs}		1.8		S	$V_{DS} = -15V, I_D = -0.9A$
Dynamic						
Capacitance ^(c)						
Input capacitance	C_{iss}		141		pF	$V_{DS} = -50V, V_{GS} = 0V$ $f = 1MHz$
Output capacitance	C_{oss}		13.1		pF	
Reverse transfer capacitance	C_{rss}		10.8		pF	
Switching ^{(b) (c)}						
Turn-on-delay time	$t_{d(on)}$		1.6		ns	$V_{DD} = -30V, V_{GS} = -10V$ $I_D = -1.0A$ $R_G \geq 6.0\Omega$
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 ^(c)						
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 ^(a)	V_{SD}		-0.85	-0.95	V	$I_S = -0.8A, V_{GS} = 0V$
Reverse recovery time ^(c)	t_{rr}		22.6		ns	$I_S = -0.9A, di/dt = 100A/\mu s$
Reverse recovery charge ^(c)	Q_{rr}		23.2		nC	

NOTES:

- (a) Measured under pulsed conditions. Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- (b) Switching characteristics are independent of operating junction temperature.
- (c) For design aid only, not subject to production testing

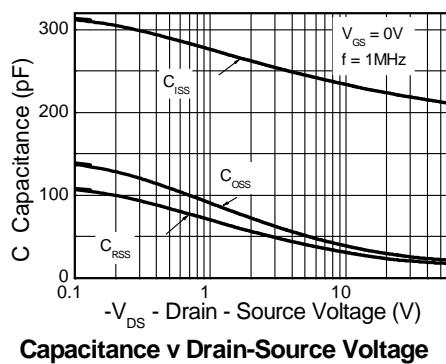
ZXMHC6A07N8

P-channel typical characteristics

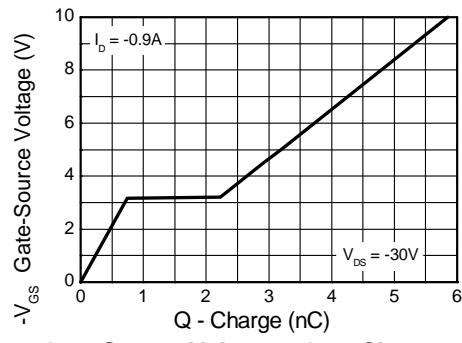


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P-channel typical characteristics –continued

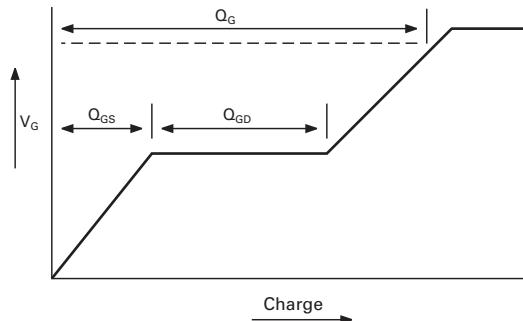


Capacitance v Drain-Source Voltage

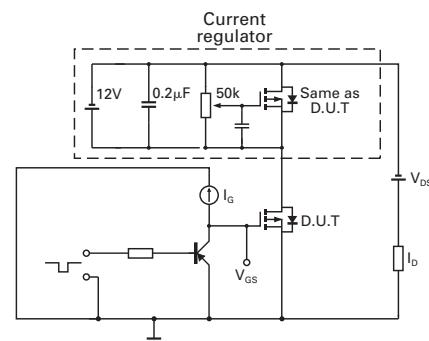


Gate-Source Voltage v Gate Charge

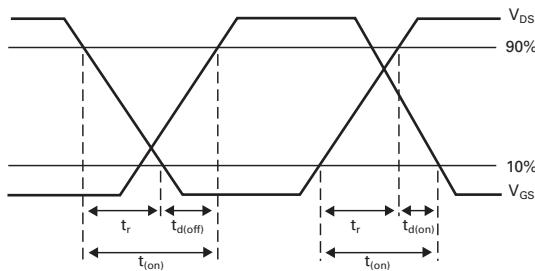
Test circuits



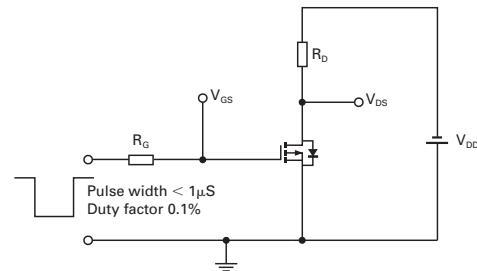
Basic gate charge waveform



Gate charge test circuit



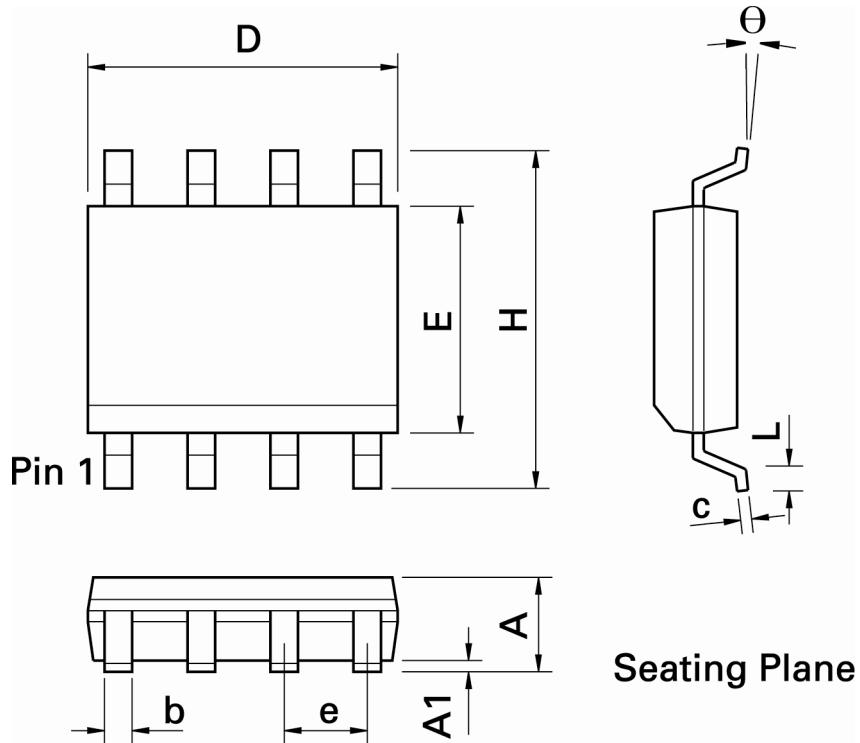
Switching time waveforms



Switching time test circuit

ZXMHC6A07N8

Packaging details - SO8



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.053	0.069	1.35	1.75	e	0.050 BSC		1.27 BSC	
A1	0.004	0.010	0.10	0.25	b	0.013	0.020	0.33	0.51
D	0.189	0.197	4.80	5.00	c	0.008	0.010	0.19	0.25
H	0.228	0.244	5.80	6.20	θ	0°	8°	0°	8°
E	0.150	0.157	3.80	4.00	-	-	-	-	-
L	0.016	0.050	0.40	1.27	-	-	-	-	-

Note: Controlling dimensions are in inches. Approximate dimensions are provided in millimeters

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