ZXMHC6A07T8

COMPLEMENTARY 60V ENHANCEMENT MODE MOSFET H-BRIDGE

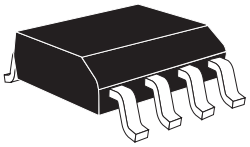
SUMMARY

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

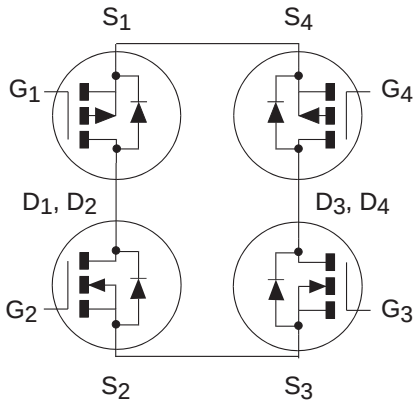
This new generation of trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.



SM8

FEATURES

- Low On - Resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package



APPLICATIONS

- Motor Drive

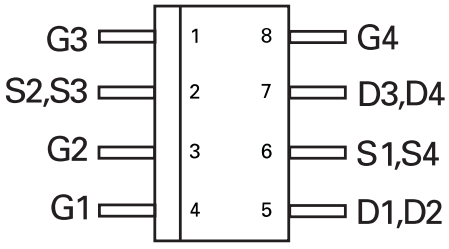
ORDERING INFORMATION

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

ZETEX SEMICONDUCTORS

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°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 TA=25°C (a)(d) Linear Derating Factor	P_D	1.3 10.4		W mW/°C
Power Dissipation at TA=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

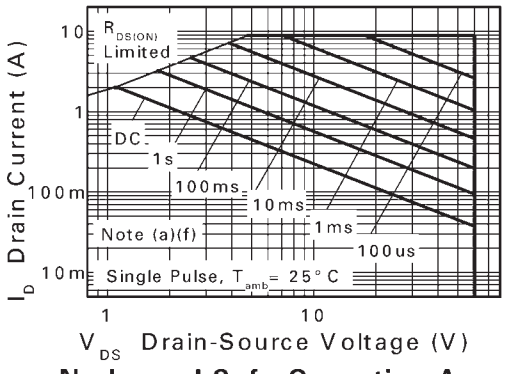
(a) For a device surface mounted on 50mm x 50mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.

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

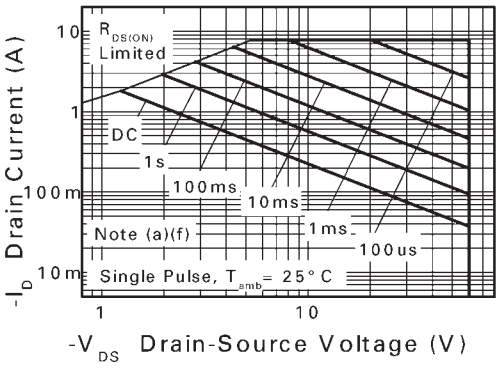
(c) Repetitive rating - 50mm x 50mm x 1.6mm FR4 PCB, D = 0.2, pulse width 300μS pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

(d) For device with one active die.

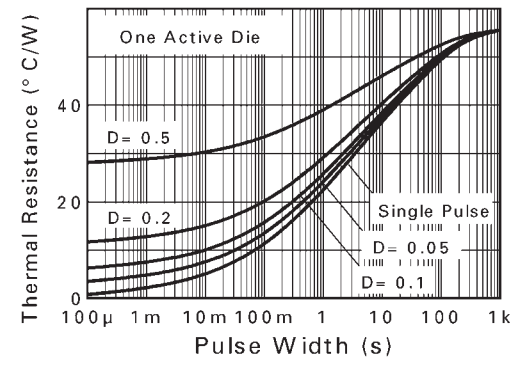
TYPICAL CHARACTERISTICS



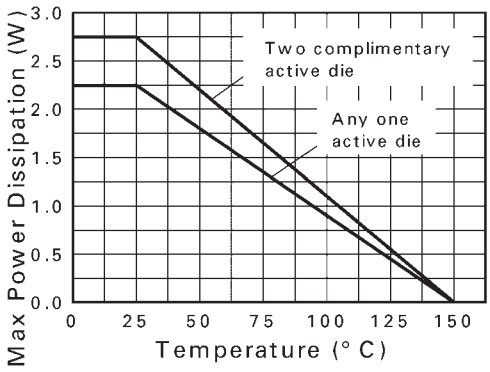
N-channel Safe Operating Area



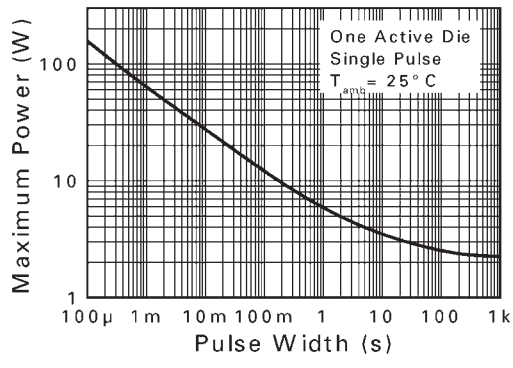
P-channel Safe Operating Area



Transient Thermal Impedance



Derating Curve



Pulse Power Dissipation

ZXMHC6A07T8

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	$t_{d(on)}$		1.3		ns	V_{DD} =-30V, I_D=-1A R_G≅6.0Ω, V_{GS}=-10V
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}=-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	

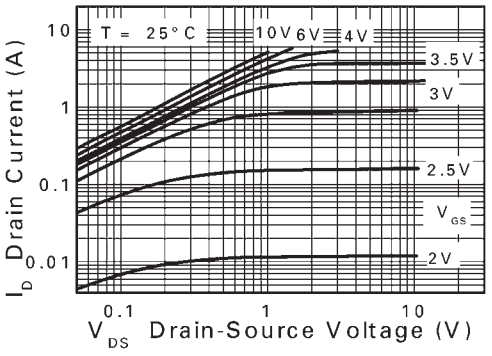
NOTES

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

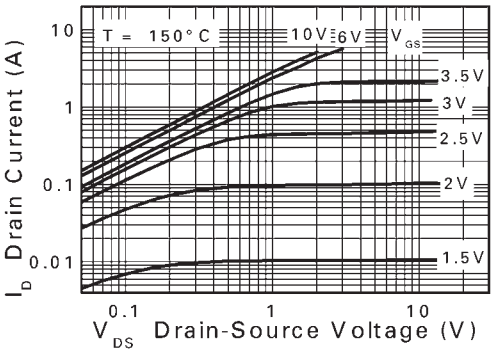
(2) Switching characteristics are independent of operating junction temperature.

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

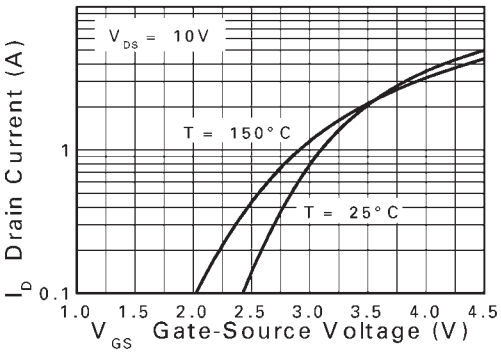
N-CHANNEL TYPICAL CHARACTERISTICS



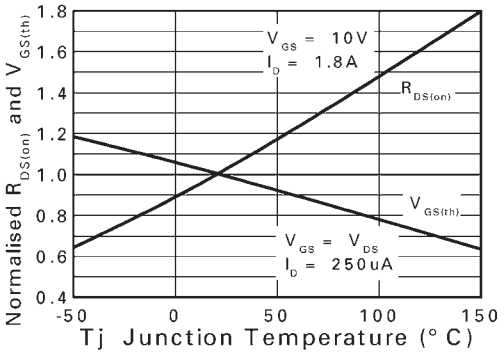
Output Characteristics



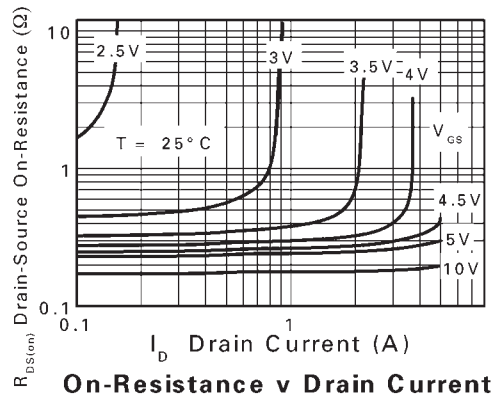
Output Characteristics



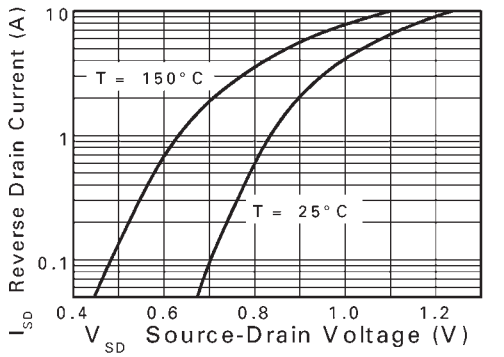
Typical Transfer Characteristics



Normalised Curves v Temperature

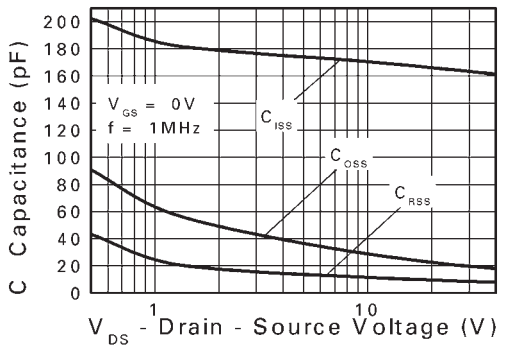


On-Resistance v Drain Current

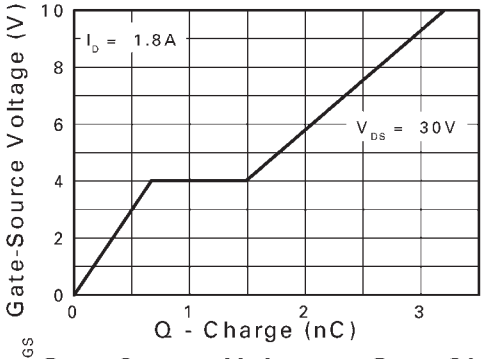


Source-Drain Diode Forward Voltage

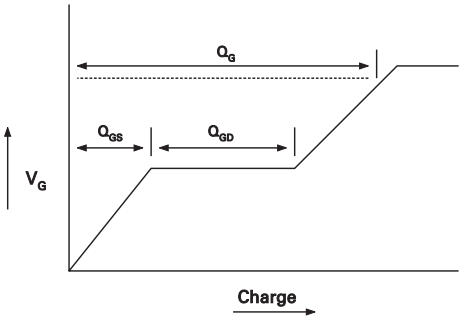
N-CHANNEL TYPICAL CHARACTERISTICS



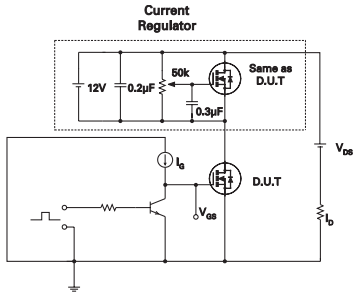
Capacitance v Drain-Source Voltage



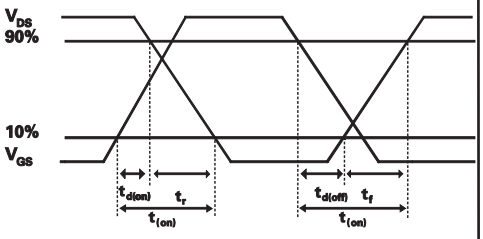
Gate-Source Voltage v Gate Charge



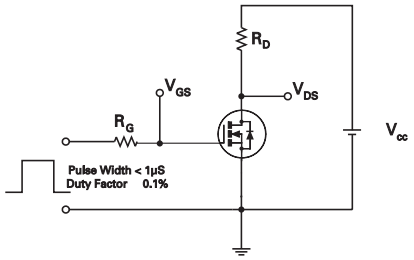
Basic Gate Charge Waveform



Gate Charge Test Circuit

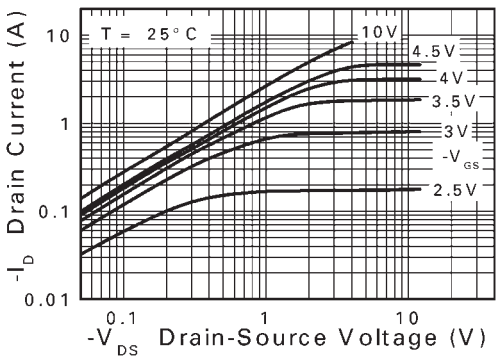


Switching Time Waveforms

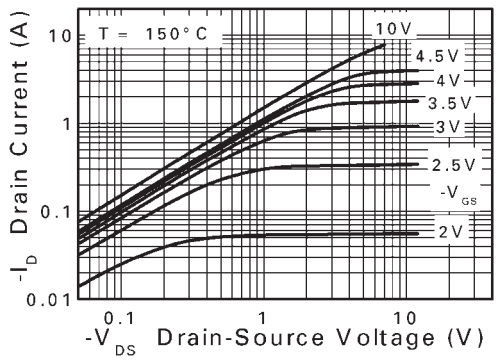


Switching Time Test Circuit

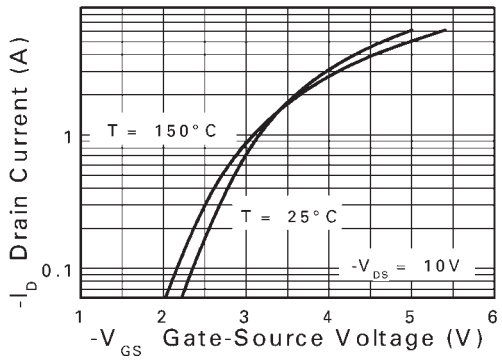
P-CHANNEL TYPICAL CHARACTERISTICS



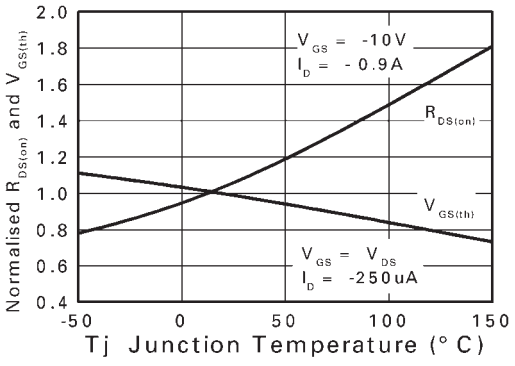
Output Characteristics



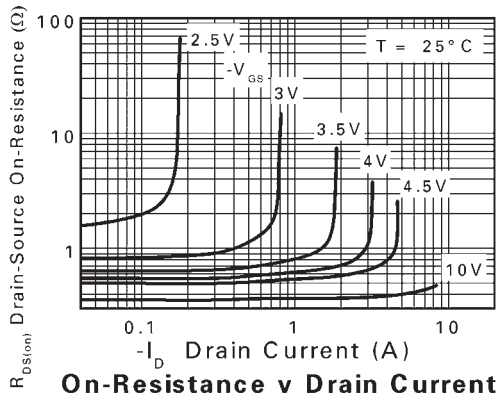
Output Characteristics



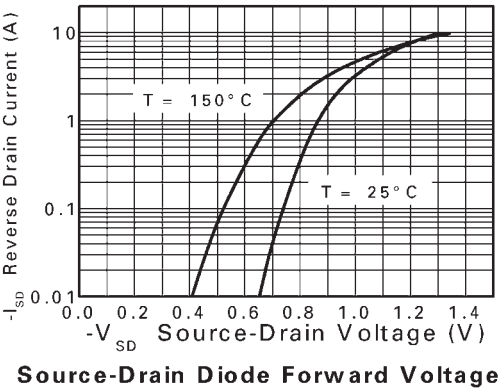
Typical Transfer Characteristics



Normalised Curves v Temperature

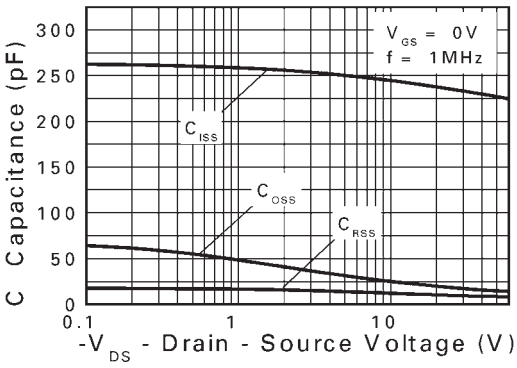


On-Resistance v Drain Current

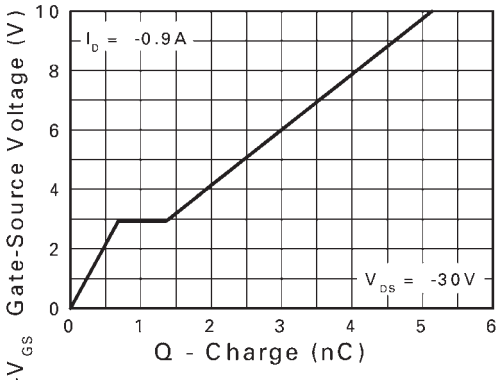


Source-Drain Diode Forward Voltage

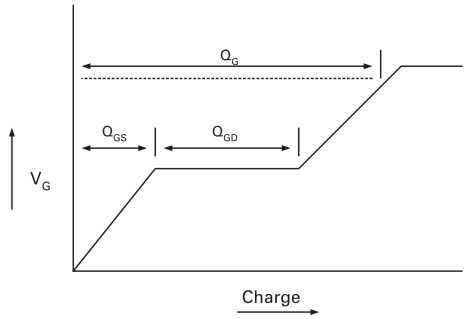
P-CHANNEL TYPICAL CHARACTERISTICS



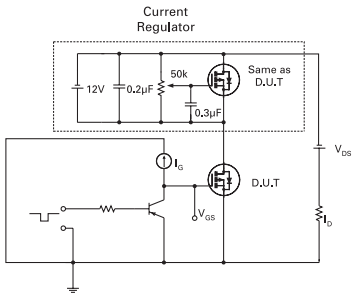
Capacitance v Drain-Source Voltage



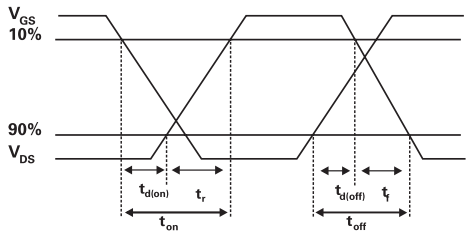
Gate-Source Voltage v Gate Charge



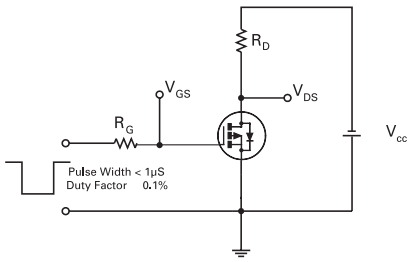
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms



Switching Time Test Circuit

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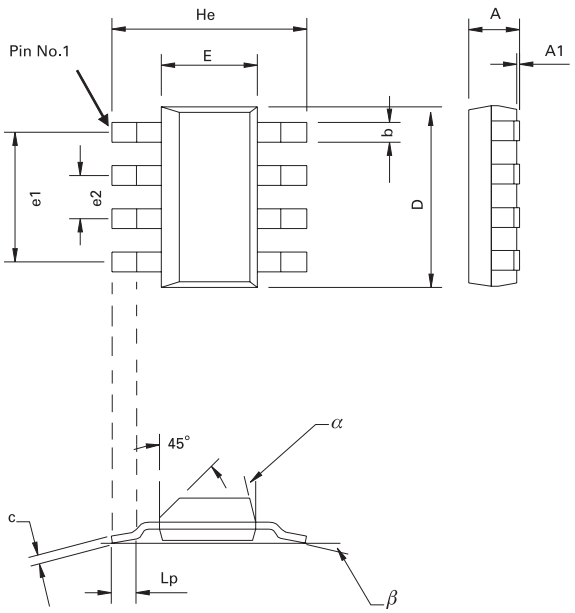

DIM	Millimetres			Inches		
	MIN	TYP	MAX	MIN	TYP	MAX
A	–	–	1.7	–	–	0.067
A1	0.02	–	0.1	0.0008	–	0.004
b	–	0.7	–	–	0.028	–
c	0.24	–	0.32	0.009	–	0.013
D	6.3	–	6.7	0.248	–	0.264
E	3.3	–	3.7	0.130	–	0.145
e1	–	4.59	–	–	0.180	–
e2	–	1.53	–	–	0.060	–
He	6.7	–	7.3	0.264	–	0.287
Lp	0.9	–	–	0.035	–	–
α	–	–	15°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

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