

GSMDS3710

30V N+P Dual Channel MOSFETs

Product Description

These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications.

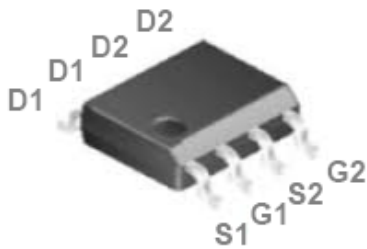
Features

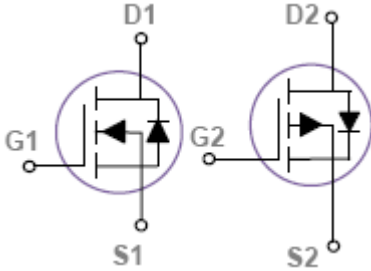
- N-Channel
30V, 10A, $R_{DS(ON)}=13m\Omega@V_{GS}=10V$
- P-Channel
-30V, -6.5A, $R_{DS(ON)}=30m\Omega@V_{GS}=-10V$
- Fast switching
- Suit for 4.5V / -4.5V Gate Drive Applications
- Green Device Available
- SOP-8 package design

Applications

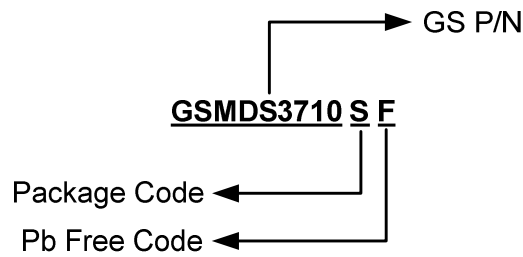
- DC Fan
- Motor Drive Applications
- Networking
- Half / Full Bridge Topology

Packages & Pin Assignments

GSMDS3710SF (SOP-8)	
 <p style="text-align: center;">Top View</p>	
Pin	Description
1	Source 1
2	Gate 1
3	Source 2
4	Gate 2
5	Drain 2
6	Drain 2
7	Drain 1
8	Drain 1

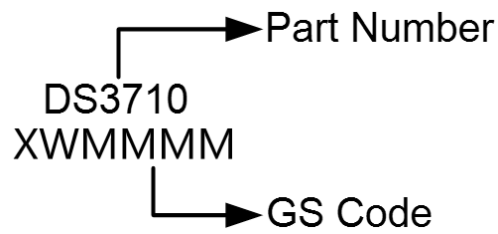


Ordering Information



Part Number	Package	Quantity Reel
GSMDS3710SF	SOP-8	4000 PCS

Marking Information



Absolute Maximum Ratings

T_C=25°C Unless otherwise noted

Symbol	Parameter	Typical		Unit	
		N-Channel	P-Channel		
V _{DS}	Drain-Source Voltage	30	-30	V	
V _{GS}	Gate-Source Voltage	±20	±20	V	
I _D	Continuous Drain Current	T _C =25°C	10	-6.5	A
		T _C =100°C	6.3	-4.1	A
I _{DM}	Pulsed Drain Current (Note 1)	36	-26	A	
P _D	Power Dissipation	T _C =25°C	5	W	
		Derate above 25°C	0.04	W/°C	
T _J	Operating Junction Temperature Range	-55 to +150		°C	
T _{STG}	Storage Temperature Range	-55 to +150		°C	
R _{θJA}	Thermal Resistance-Junction to Ambient	62.5		°C/W	
R _{θJC}	Thermal Resistance-Junction to Case	25		°C/W	

Note 1: Repetitive Rating: Pulsed width limited by maximum junction temperature.

Electrical Characteristics (N-Channel)

T_J=25°C Unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30			V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA		0.03		V/°C
V _{GS(th)}	Gate Threshold Voltage		1.2	1.6	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{DS} =V _{GS} , I _D =250uA		-4		mV/°C
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±110	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V			1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C			10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			10	A
I _{SM}	Pulsed Source Current				20	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =8A			13	mΩ
		V _{GS} =4.5V, I _D =4A			18	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =3A		6		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A			1	V
Dynamic						
Q _g	Total Gate Charge (Note 2,3)			7.4	12	nC
Q _{gs}	Gate-Source Charge (Note 2,3)	V _{DS} =15V, V _{GS} =4.5V, I _D =5A		2.3	5	
Q _{gd}	Gate-Drain Charge (Note 2,3)			3	6	
C _{iss}	Input Capacitance			620	900	pF
C _{oss}	Output Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		85	125	
C _{rss}	Reverse Transfer Capacitance			60	90	
t _{d(on)}	Turn-On Time (Note 2,3)			3.8	7	ns
t _r				10	19	
t _{d(off)}	Turn-Off Time (Note 2,3)	V _{DD} =15V, I _D =1A, V _{GS} =10V, R _G =6Ω		22	42	
t _f				6.6	13	
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		2.8	5.6	Ω

Note 2: The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.

Note 3: Essentially independent of operating temperature.

Electrical Characteristics (P-Channel)

T_J=25°C Unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-30			V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA		-0.03		V/°C
V _{GS(th)}	Gate Threshold Voltage		-1	-1.6	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{DS} =V _{GS} , I _D =-250μA		4		mV/°C
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±110	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V			-1	μA
		V _{DS} =-24V, V _{GS} =0V, T _J =125°C			-10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			-6.5	A
I _{SM}	Pulsed Source Current				-13	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =-10V, I _D =-6A			30	mΩ
		V _{GS} =-4.5V, I _D =-4A			46	
g _{FS}	Forward Transconductance	V _{DS} =-10V, I _D =-3A		9		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A			-1	V
Dynamic						
Q _g	Total Gate Charge (Note 2,3)			8	15	nC
Q _{gs}	Gate-Source Charge (Note 2,3)	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-5A		3.3	6	
Q _{gd}	Gate-Drain Charge (Note 2,3)			2.3	5	
C _{iss}	Input Capacitance			757	1280	pF
C _{oss}	Output Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz		122	210	
C _{rss}	Reverse Transfer Capacitance			88	175	
t _{d(on)}	Turn-On Time (Note 2,3)			4.6	9	ns
t _r				14	26	
t _{d(off)}	Turn-Off Time (Note 2,3)	V _{DD} =-15V, I _D =-1A, V _{GS} =-10V, R _G =6Ω		34	58	
t _f				18	35	
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		2.8	5.6	Ω

Note 2: The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.

Note 3: Essentially independent of operating temperature.

Typical Performance Characteristics (N-Channel)

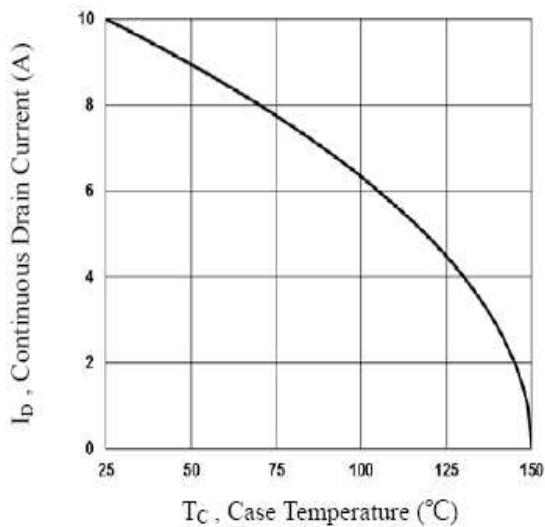


Fig.1 Continuous Drain Current vs. T_c

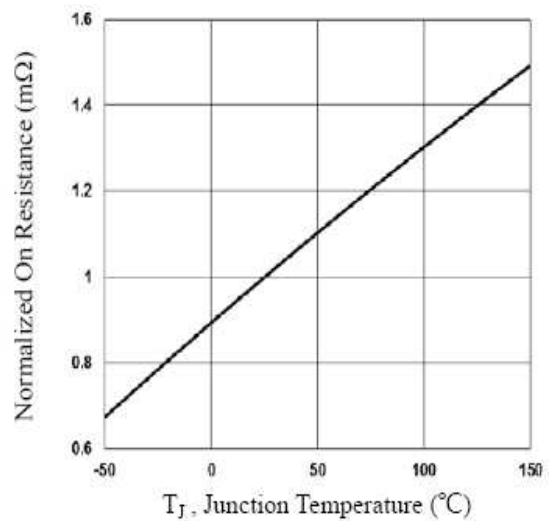


Fig.2 Normalized RDSON vs. T_j

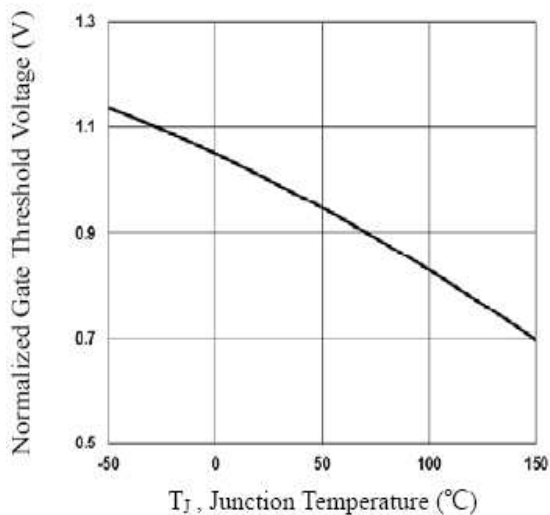


Fig.3 Normalized V_{th} vs. T_j

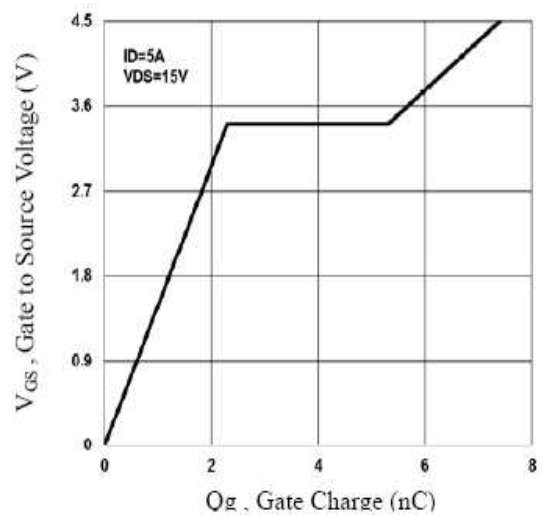


Fig.4 Gate Charge Waveform

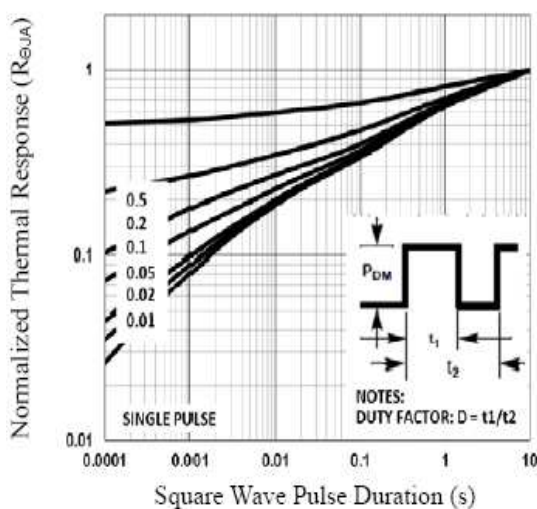


Fig.5 Normalized Transient Response

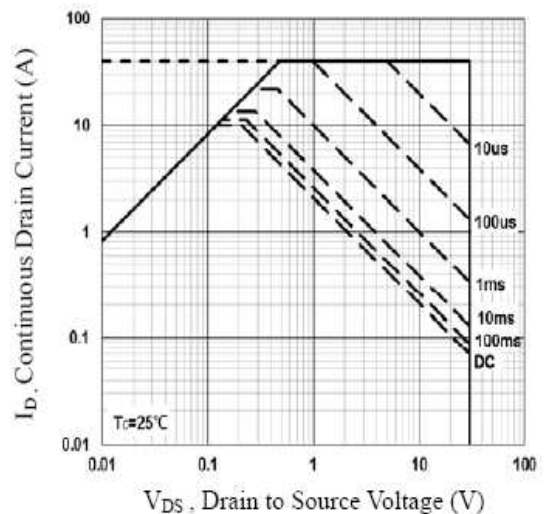
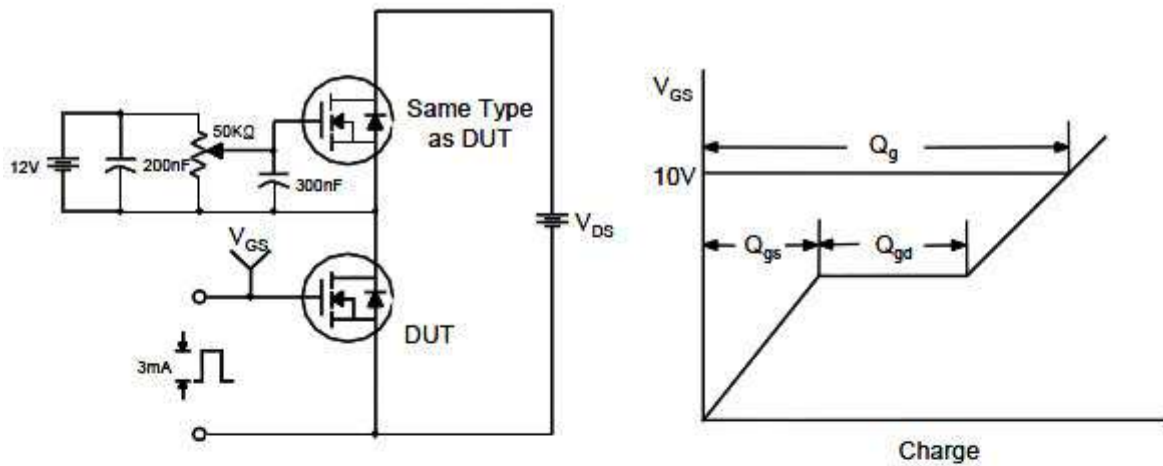


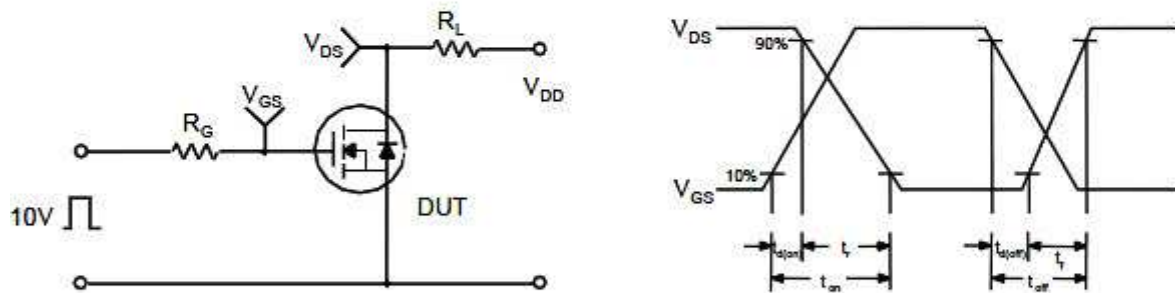
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (N-Channel)

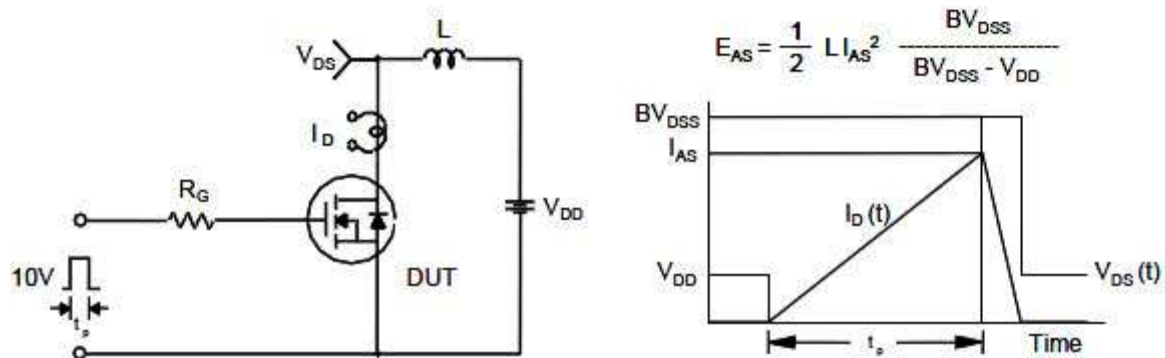
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Typical Performance Characteristics (P-Channel)

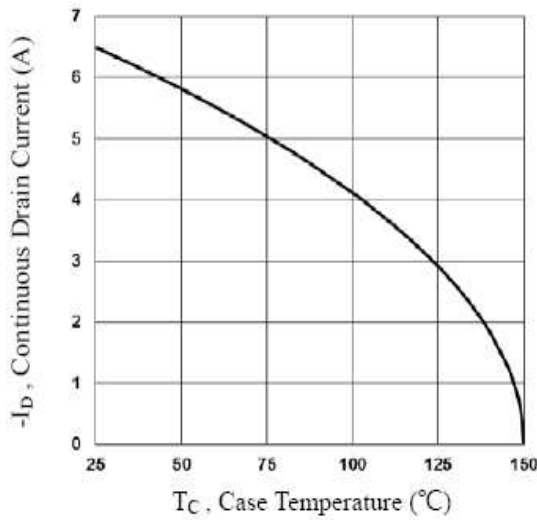


Fig.1 Continuous Drain Current vs. T_c

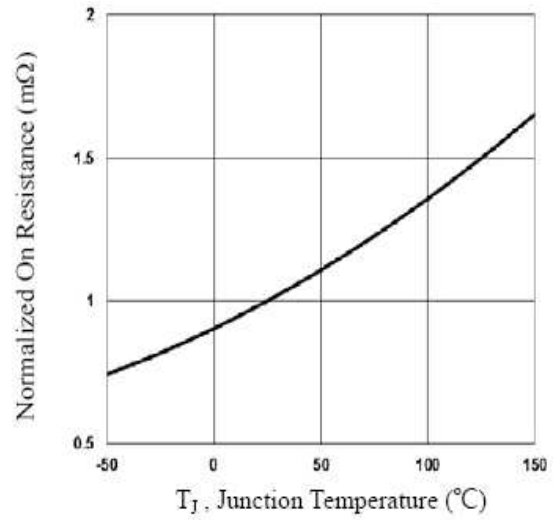


Fig.2 Normalized RDSON vs. T_j

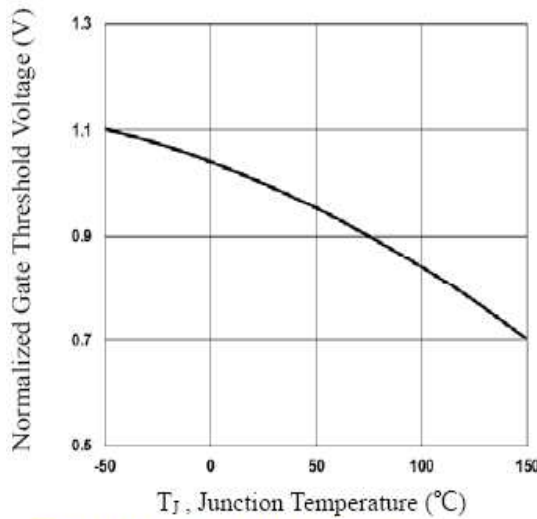


Fig.3 Normalized V_{th} vs. T_j

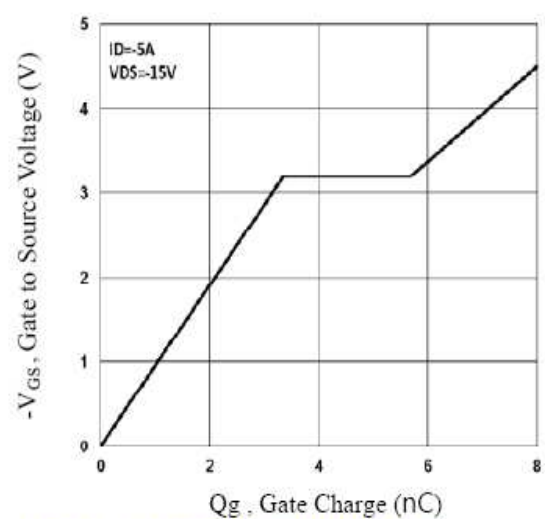


Fig.4 Gate Charge Waveform

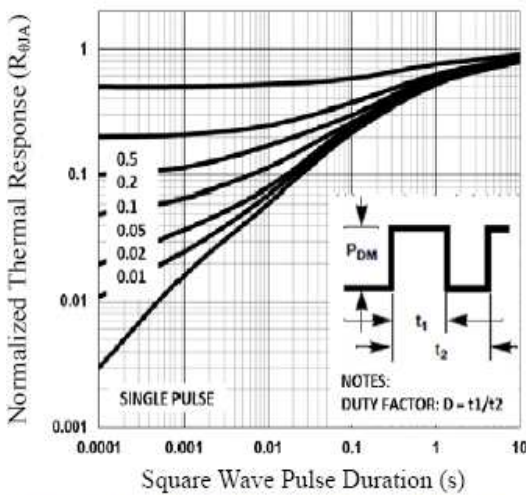


Fig.5 Normalized Transient Impedance

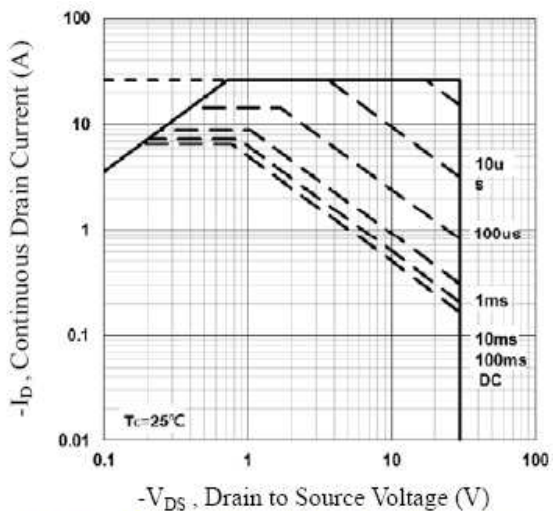
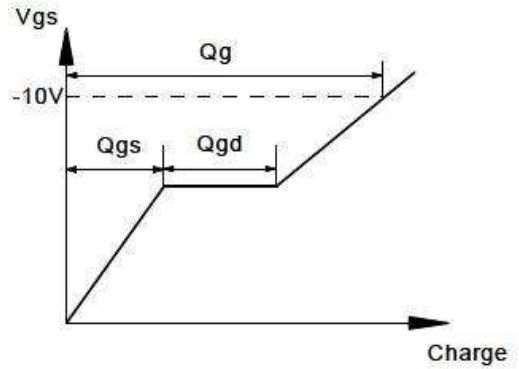
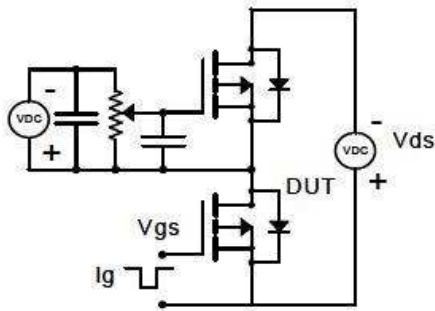


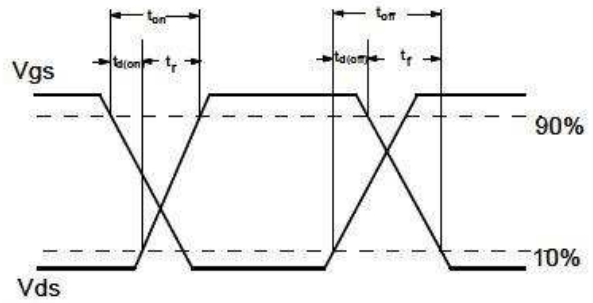
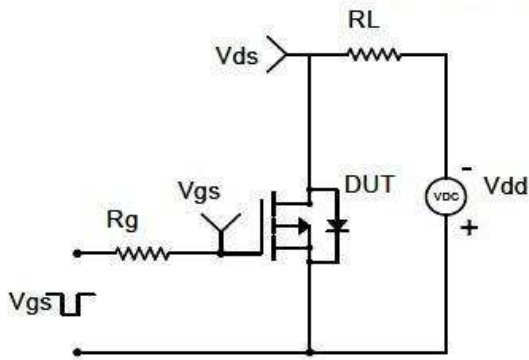
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (P-Channel)

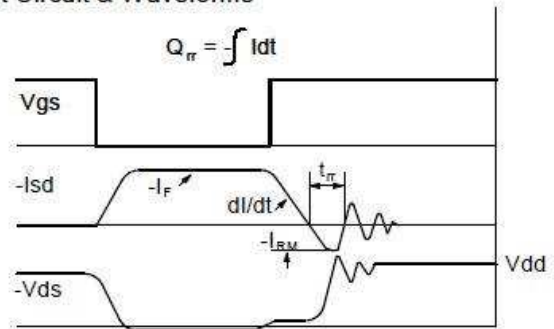
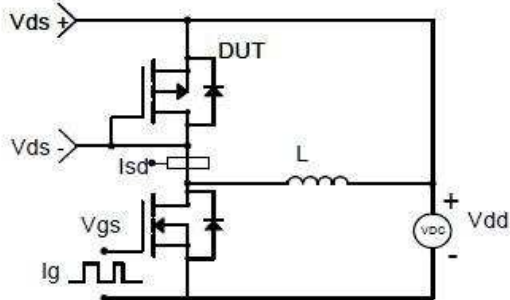
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

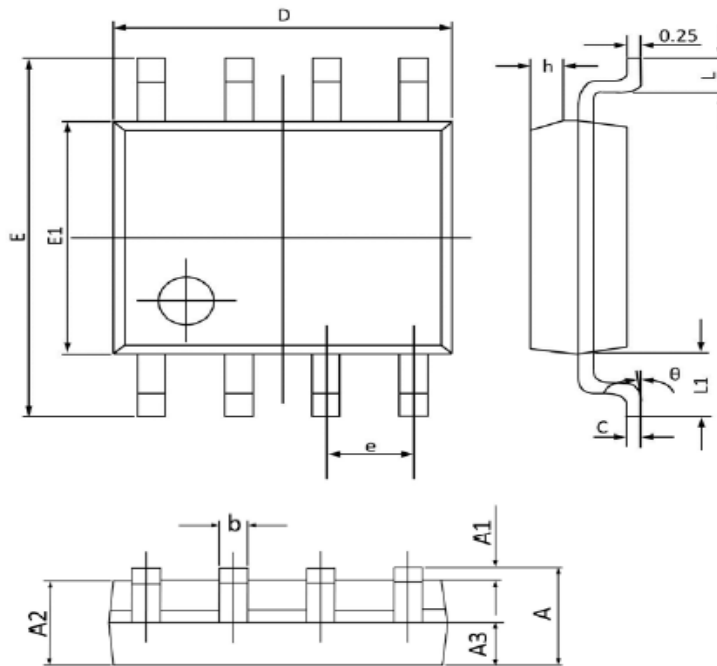


Diode Recovery Test Circuit & Waveforms



Package Dimension

SOP-8









Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270 (BSC)		0.050 (BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050 (BSC)		0.041 (BSC)	
θ	0°	8°	0°	8°

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