

GSM3712S

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.

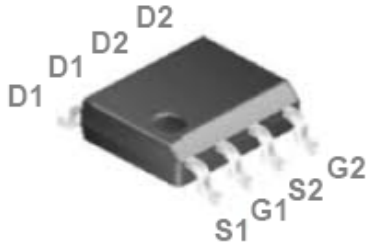
Features

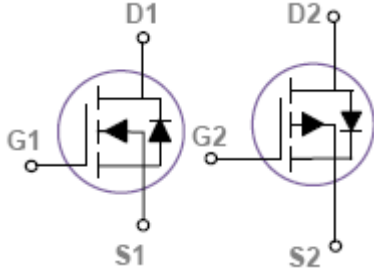
- N-Channel
30V, 8A, $R_{DS(ON)}=20m\Omega@V_{GS}=10V$
- P-Channel
-30V, -5.5A, $R_{DS(ON)}=50m\Omega@V_{GS}=-10V$
- Fast switching
- Suit for 4.5V / -4.5V Gate Drive Applications
- Green Device Available

Applications

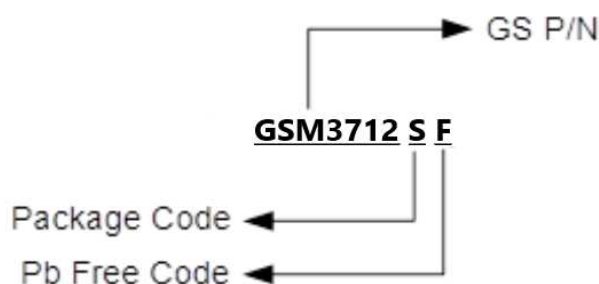
- DC Fan
- Motor Drive Applications
- Networking
- Half / Full Bridge Topology

Packages & Pin Assignments

GSM3712SF (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

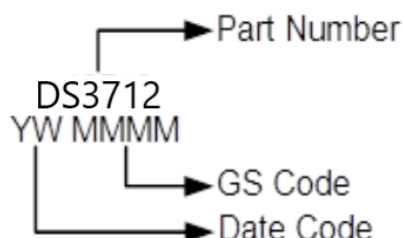


Ordering Information



Part Number	Package	Quantity Reel
GSM3712SF	SOP-8	4000 PCS

Marking Information



Absolute Maximum Ratings

$T_C=25^{\circ}\text{C}$ 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	$T_C=25^{\circ}\text{C}$	8	-5.5	A
		$T_C=100^{\circ}\text{C}$	5	-3.5	
I_{DM}	Pulsed Drain Current ¹	32	-22	A	
EAS	Single Pulse Avalanche Energy ²	14	5	mJ	
IAS	Single Pulse Avalanche Current ²	17	10	A	
P_D	Power Dissipation	$T_C=25^{\circ}\text{C}$	2.5	W	
		Derate above 25°C	0.02	W/ $^{\circ}\text{C}$	
T_J	Operating Junction Temperature Range	-55 to +150		$^{\circ}\text{C}$	
T_{STG}	Storage Temperature Range	-55 to +150		$^{\circ}\text{C}$	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62.5		$^{\circ}\text{C}/\text{W}$	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	50		$^{\circ}\text{C}/\text{W}$	

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 =250μA	30			V
V _{GS(th)}	Gate Threshold Voltage		1.2	1.5	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{DS} =V _{GS} , I _D =250μA		-4		mV/°C
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Drain-Source Leakage 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			8	A
I _{SM}	Pulsed Source Current				16	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =8A		15	20	mΩ
		V _{GS} =4.5V, I _D =5A		21	30	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =3A		3		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A			1	V
Dynamic						
Q _g	Total Gate Charge ^{3,4}	V _{DS} =15V, V _{GS} =4.5V, I _D =8A		4.1	6	nC
Q _{gs}	Gate-Source Charge ^{3,4}			1	1.4	
Q _{gd}	Gate-Drain Charge ^{3,4}			2.1	4	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		345	500	pF
C _{oss}	Output Capacitance			55	80	
C _{rss}	Reverse Transfer Capacitance			32	55	
t _{d(on)}	Turn-On Time ^{3,4}	V _{DD} =15V, I _D =1A, V _{GS} =10V, R _G =6Ω		2.8	5	ns
t _r				7.2	14	
t _{d(off)}	Turn-Off Time ^{3,4}			15.8	30	
t _f				4.6	9	
R _g	Gate Resistance		V _{GS} =0V, V _{DS} =0V, f=1MHz		3.2	

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=17A., R_G=25Ω Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. 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	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.6	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			4		mV/°C
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Drain-Source Leakage 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			-5.5	A
I _{SM}	Pulsed Source Current				-11	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =-10V, I _D =-5A		40	50	mΩ
		V _{GS} =-4.5V, I _D =-3A		65	90	
g _{FS}	Forward Transconductance	V _{DS} =-10V, I _D =-3A		3.5		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A			-1	V
Dynamic						
Q _g	Total Gate Charge ^{3,4}	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-3A		5.1	7	nC
Q _{gs}	Gate-Source Charge ^{3,4}			2	3	
Q _{gd}	Gate-Drain Charge ^{3,4}			2.2	4	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz		560	810	pF
C _{oss}	Output Capacitance			55	80	
C _{rss}	Reverse Transfer Capacitance			40	60	
t _{d(on)}	Turn-On Time ^{3,4}	V _{DD} =-15V, I _D =-1A, V _{GS} =-10V, R _G =6Ω		3.4	6	ns
t _r				10.8	21	
t _{d(off)}	Turn-Off Time ^{3,4}			26.9	51	
t _f				6.9	13	

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-10A., R_G=25Ω, Starting T_J=25°C
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

Typical Performance Characteristics (N-Channel)

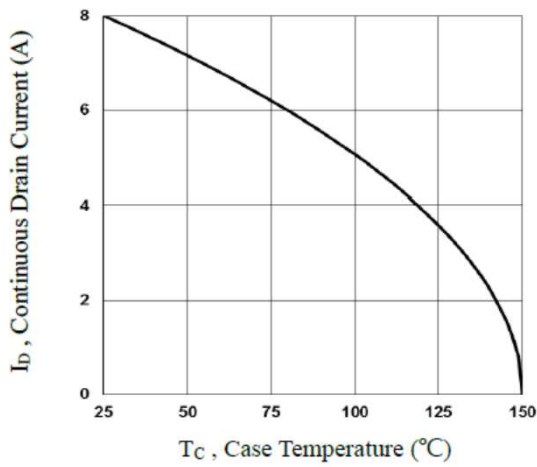


Fig.1 Continuous Drain Current vs. T_c

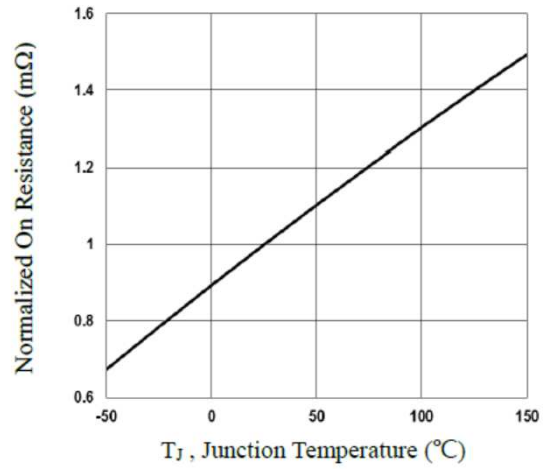


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

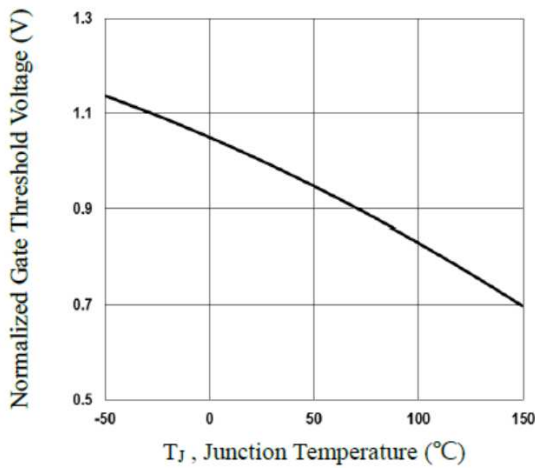


Fig.3 Normalized V_{th} vs. T_j

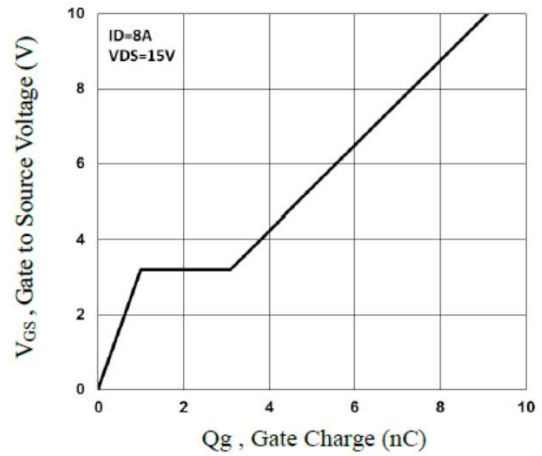


Fig.4 Gate Charge Waveform

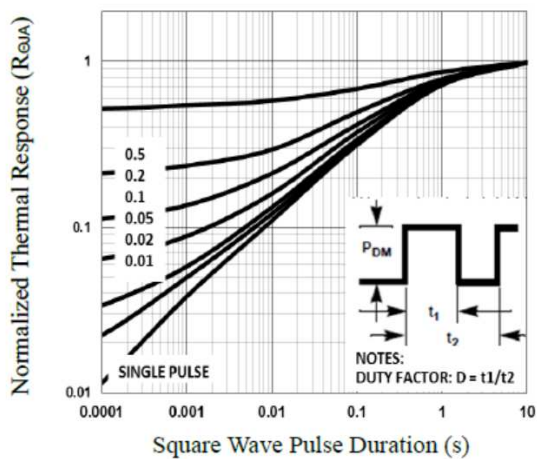


Fig.5 Normalized Transient Response

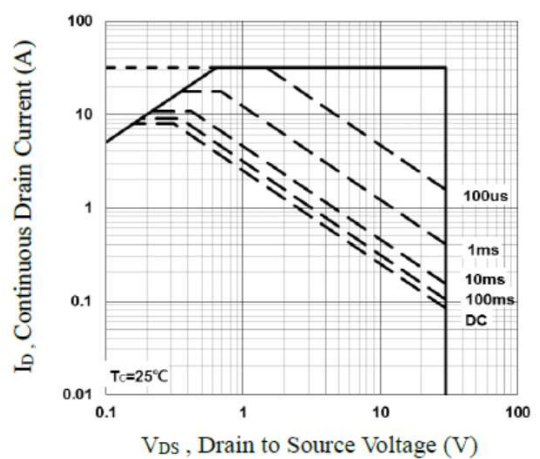
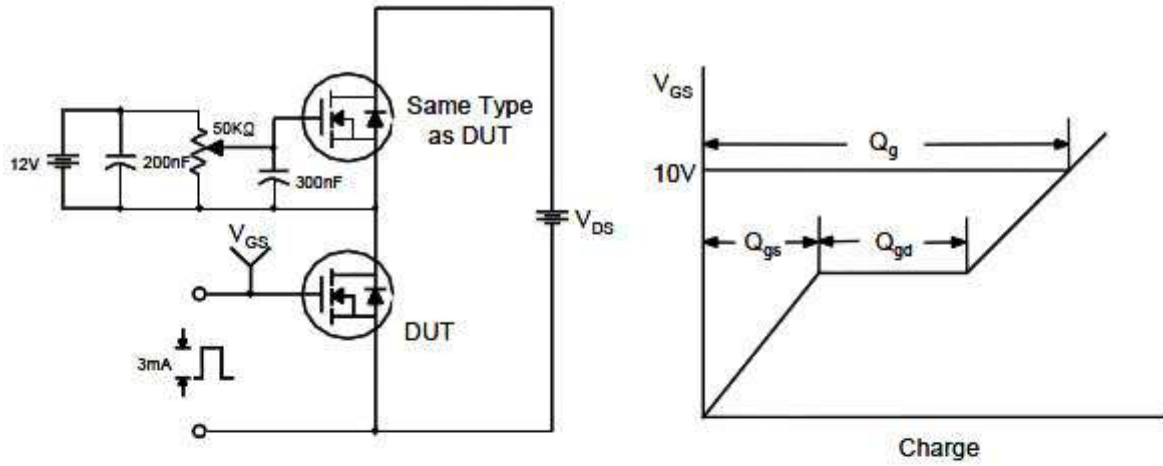


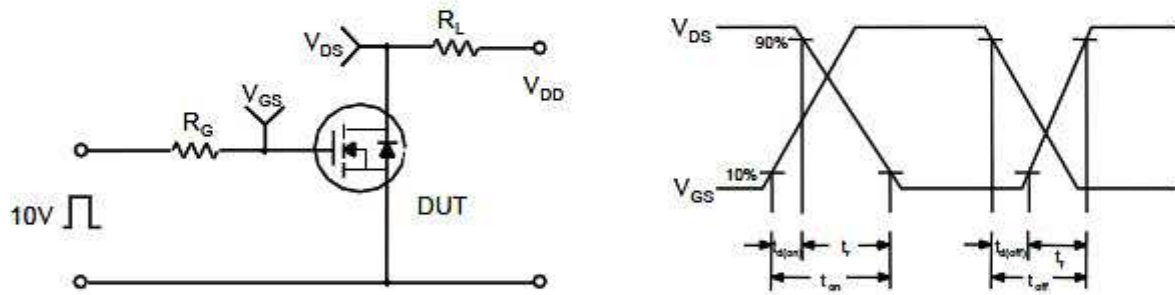
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (N-Channel)

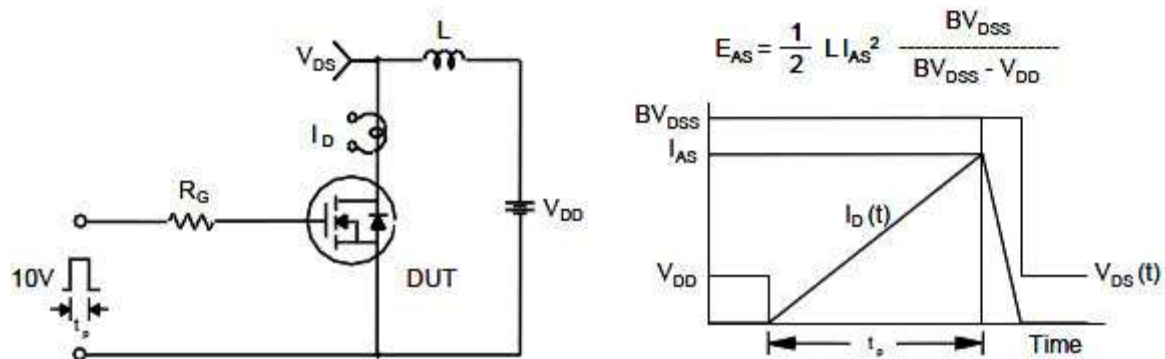
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Typical Performance Characteristics (P-Channel)

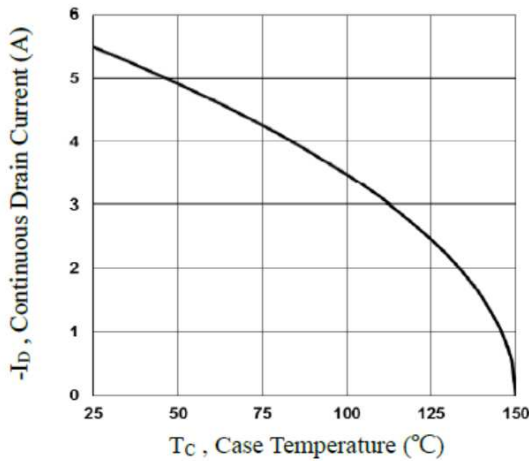


Fig.1 Continuous Drain Current vs. T_c

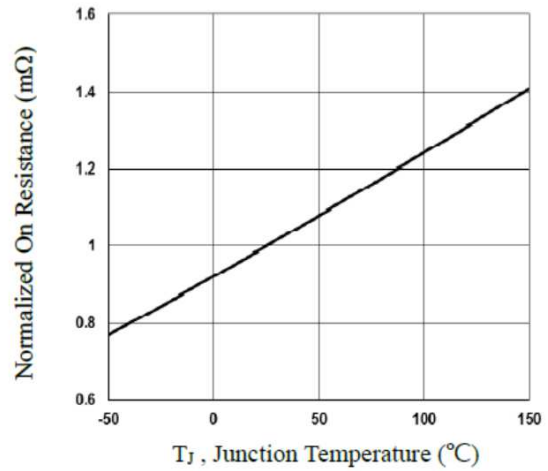


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

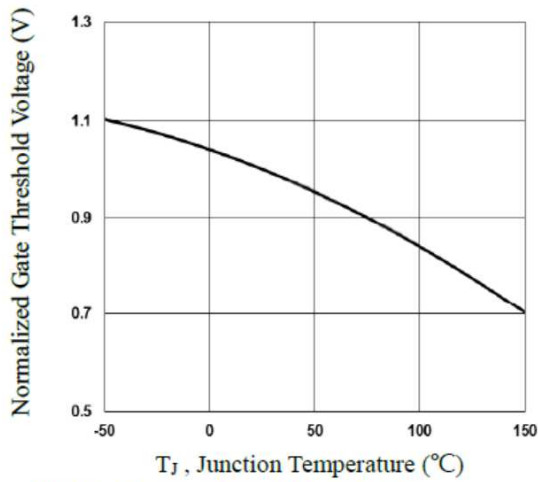


Fig.3 Normalized V_{th} vs. T_j

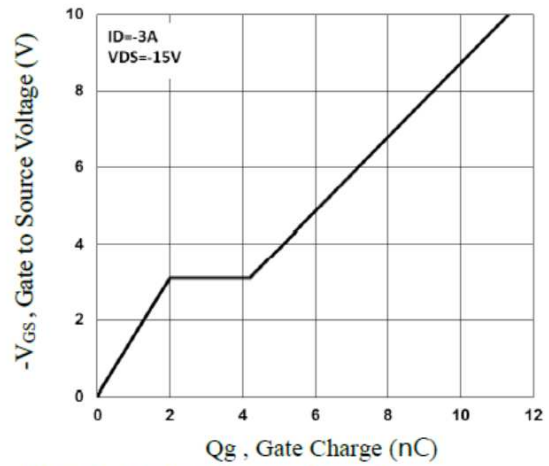


Fig.4 Gate Charge Waveform

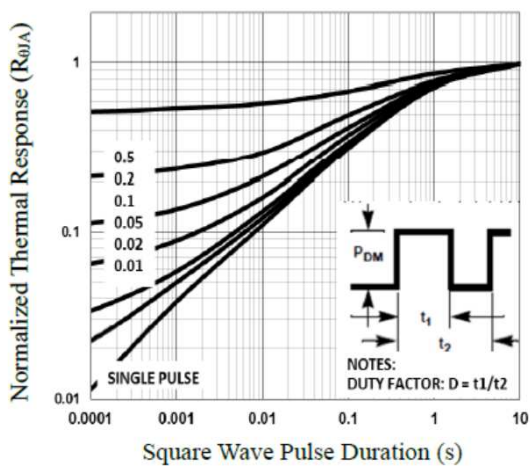


Fig.5 Normalized Transient Impedance

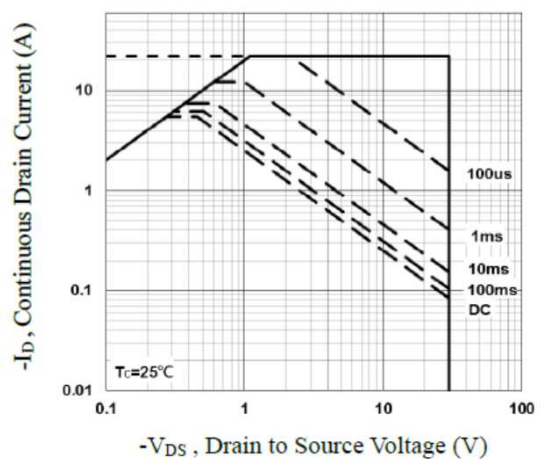
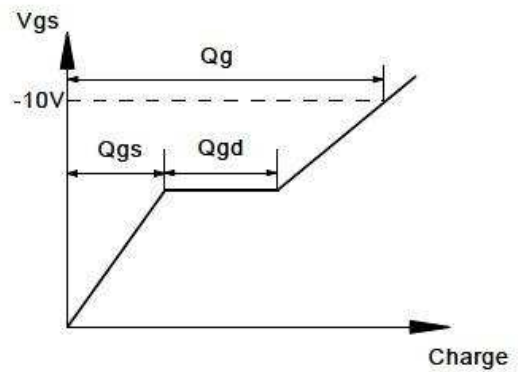
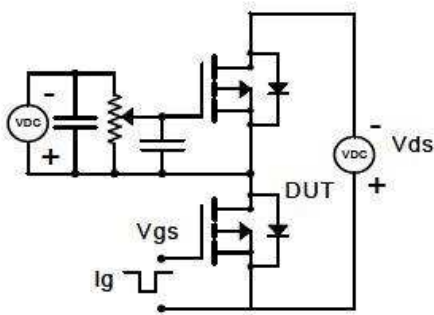


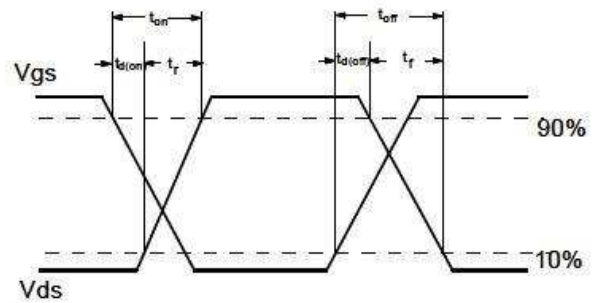
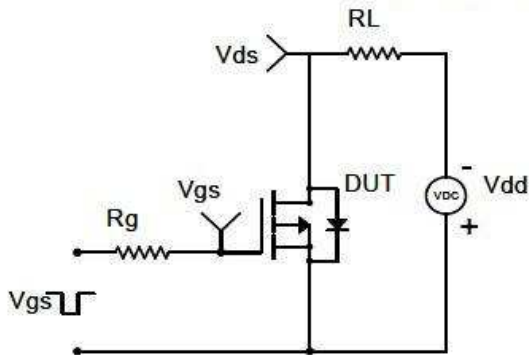
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (P-Channel)

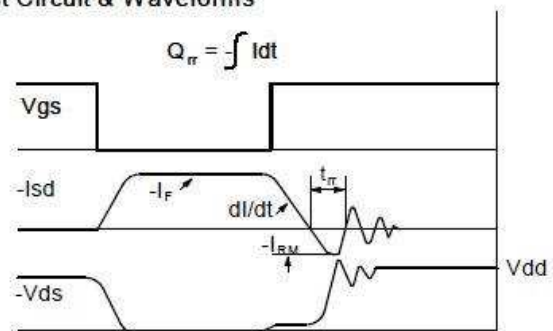
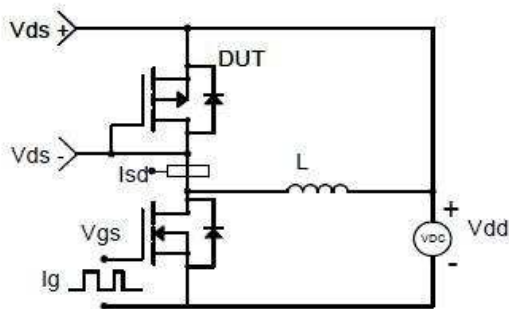
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

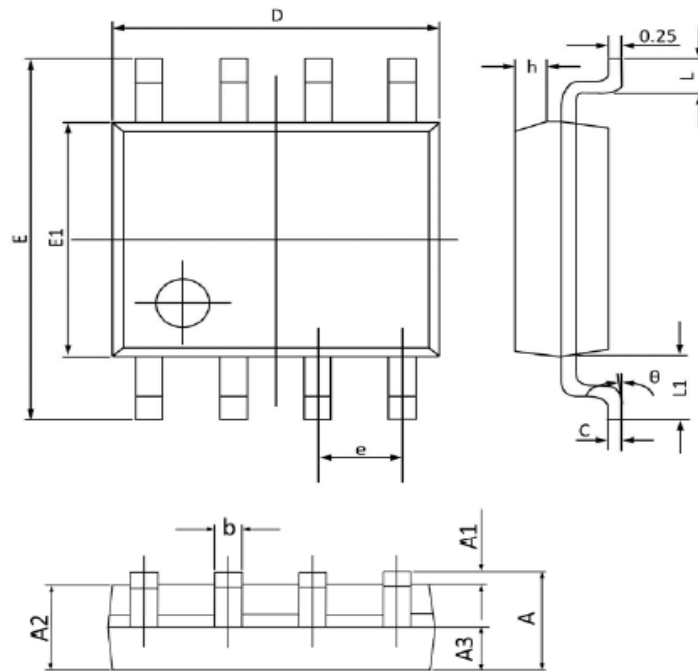


Diode Recovery Test Circuit & Waveforms



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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