GSM2120P

20V 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.

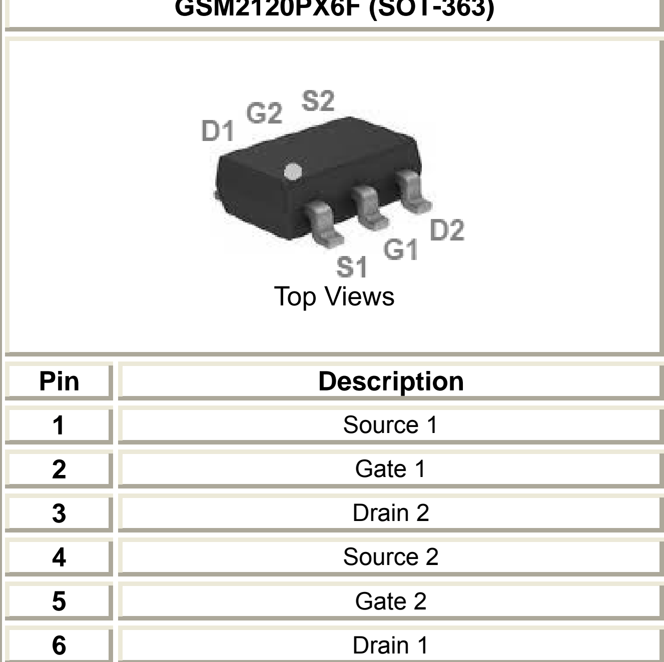
Features

- N-Channel
  20V, 0.8A, $R_{DS(ON)}$=300mΩ@V_{GS}=4.5V
- P-Channel
  -20V, -0.4A, $R_{DS(ON)}$=600mΩ@V_{GS}=-4.5V
- Fast switching
- Suit for 1.5V/-1.5V Gate Drive Applications
- Green Device Available
- SOT-363 package design

Applications

- Notebook
- Load Switch
- Networking
- Hand-held Instruments

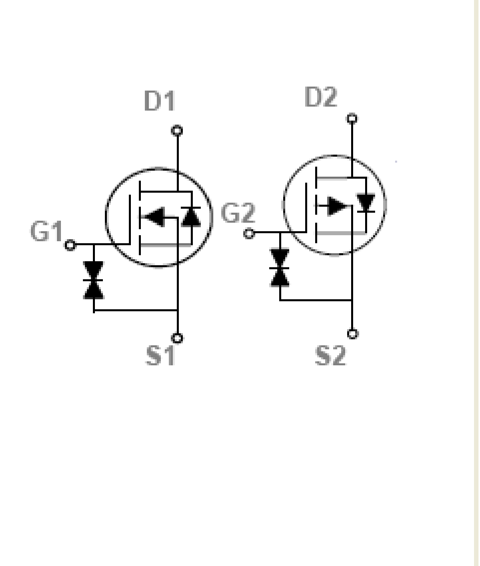
Packages & Pin Assignments



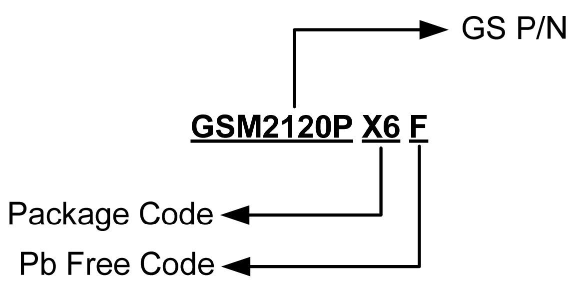
GSM2120PX6F (SOT-363)

Top Views

Pin	Description
1	Source 1
2	Gate 1
3	Drain 2
4	Source 2
5	Gate 2
6	Drain 1



Ordering Information



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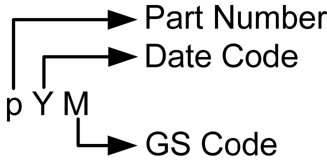


Part Number	Package	Part Marking	Quantity
GSM2120PX6F	SOT-363	pYM	3000pcs

Absolute Maximum Ratings

T_A=25°C Unless otherwise noted

Symbol	Parameter		Typical		Unit
			N-Channel	P-Channel	
V_{DS}	Drain-Source Voltage		20	-20	V
V_{GS}	Gate-Source Voltage		±8	±8	V
I_D	Continuous Drain Current(T_J=150℃)	T_A=25℃	800	-400	mA
		T_A=100℃	510	-250	
I_{DM}	Pulsed Drain Current		3.2	-1.6	A
P_D	Power Dissipation	T_A=25℃	275		mW
		Derate above 25℃	2.2		mW/℃
T_J	Operating Junction Temperature Range		-55 to +150		℃
T_{STG}	Storage Temperature Range		-55 to +150		℃
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		450		℃/W

Electrical Characteristics (N-Channel)

T_A=25℃ Unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250uA	20			V
△BV_{DSS}/△T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=1mA		-0.01		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	0.3	0.6	1.0	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient	V_{DS}=V_{GS},I_D=250uA		3		mV/℃
I_{GSS}	Gate Leakage Current	V_{DS}=0V,V_{GS}=±6V			±20	uA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V,V_{GS}=0V			1	uA
		V_{DS}=16V,V_{GS}=0V, T_J=125℃			10	
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			0.8	A
I_{SM}	Pulsed Source Current				1.6	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=4.5V,I_D=0.5A		200	300	mΩ
		V_{GS}=2.5V,I_D=0.4A		235	400	
		V_{GS}=1.8V,I_D=0.2A		295	550	
		V_{GS}=1.5V,I_D=0.1A		365	800	
		V_{GS}=1.2V,I_D=0.1A		600	1500	
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=0.2A			1	V
Dynamic						
Q_g	Total Gate Charge	V_{DS}=10V,V_{GS}=4.5V, I_D=0.5A		1	2	nC
Q_{gs}	Gate-Source Charge			0.26	0.5	
Q_{gd}	Gate-Drain Charge			0.2	0.4	
C_{iss}	Input Capacitance	V_{DS}=10V,V_{GS}=0V, f=1MHz		38.2	75	pF
C_{oss}	Output Capacitance			14.4	28	
C_{rss}	Reverse Transfer Capacitance			6	12	
$t_{d(on)}$	Turn-On Time	V_{DD}=10V,I_D=0.5A, V_{GS}=4.5V,R_G=10Ω		5	10	ns
t_r				3.5	7	
$t_{d(off)}$	Turn-Off Time			14	28	
t_f				6	12	

Electrical Characteristics (P-Channel)

T_A=25℃ Unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=-250uA	-20			V
△BV_{DSS}/△T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=-1mA		-0.01		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250uA	-0.3	-0.6	-1.0	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			3		mV/℃
I_{GSS}	Gate Leakage Current	V_{DS}=0V,V_{GS}=±8V			±20	uA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V,V_{GS}=0V			-1	uA
		V_{DS}=-16V,V_{GS}=0V, T_J=125℃			-10	
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			-0.4	A
I_{SM}	Pulsed Source Current				-0.8	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=-4.5V,I_D=-0.3A		440	600	mΩ
		V_{GS}=-2.5V,I_D=-0.2A		610	850	
		V_{GS}=-1.8V,I_D=-0.1A		810	1200	
		V_{GS}=-1.5V,I_D=-0.1A		1020	1600	
		V_{GS}=-1.2V,I_D=-0.1A		1800	3000	
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=-0.2A			-1	V
Dynamic						
Q_g	Total Gate Charge	V_{DS}=-10V,V_{GS}=-4.5V, I_D=-0.2A		1	2	nC
Q_{gs}	Gate-Source Charge			0.28	0.5	
Q_{gd}	Gate-Drain Charge			0.18	0.4	
C_{iss}	Input Capacitance	V_{DS}=-10V,V_{GS}=0V, f=1MHz		40	78	pF
C_{oss}	Output Capacitance			15	30	
C_{rss}	Reverse Transfer Capacitance			6.5	13	
$t_{d(on)}$	Turn-On Time	V_{DD}=-10V,I_D=-0.2A, V_{GS}=-4.5V,R_G=10Ω		8	16	ns
t_r				5.2	10	
$t_{d(off)}$	Turn-Off Time			30	60	
t_f				18	36	

Typical Performance Characteristics (N-Channel)

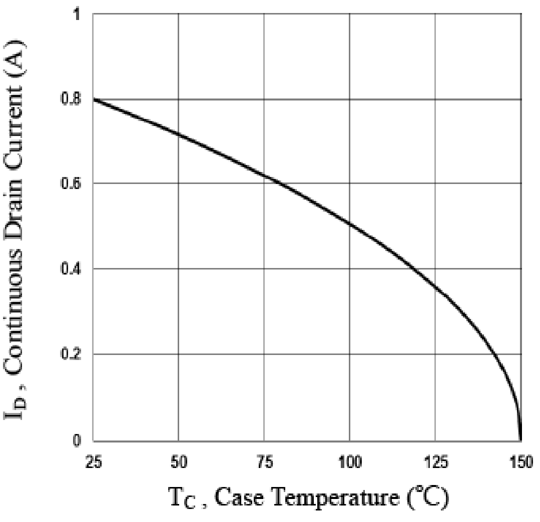


Fig.1 Continuous Drain Current vs. T_c

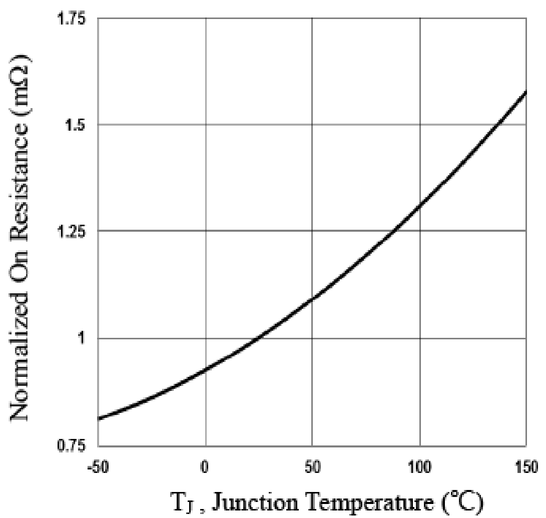


Fig.2 Normalized RDSON vs. T_J

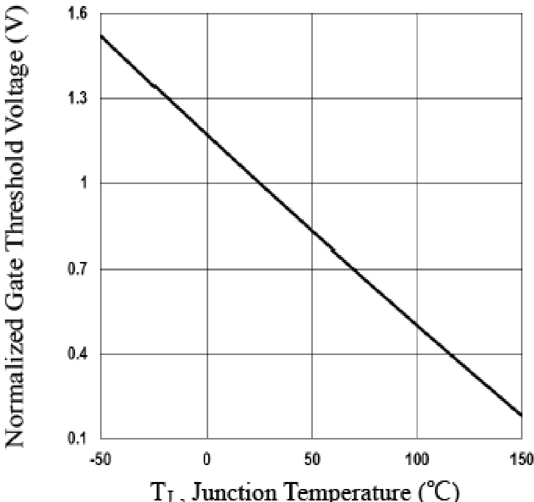


Fig.3 Normalized V_{th} vs. T_J

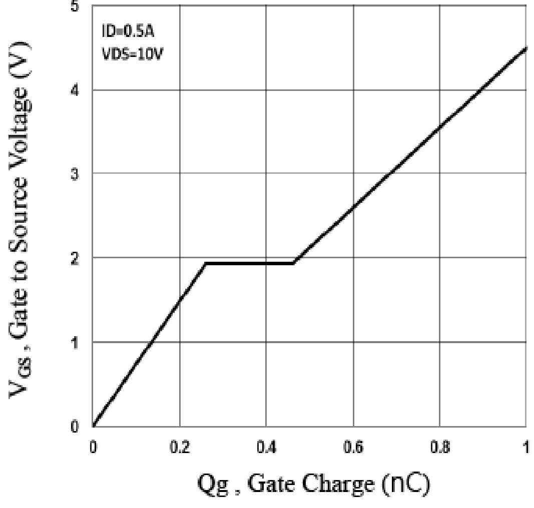


Fig.4 Gate Charge Waveform

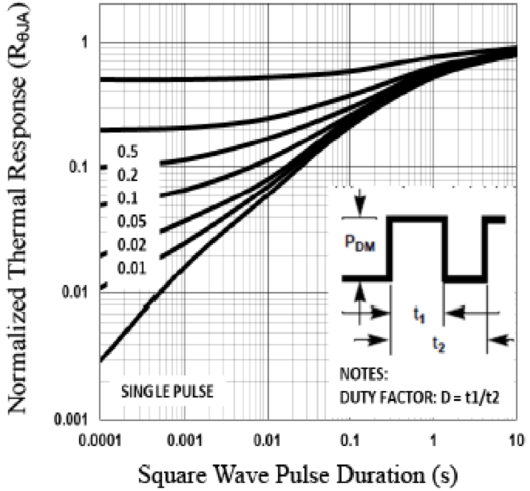


Fig.5 Normalized Transient Impedance

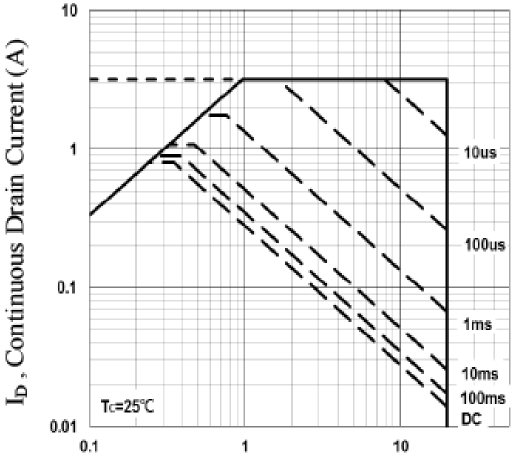
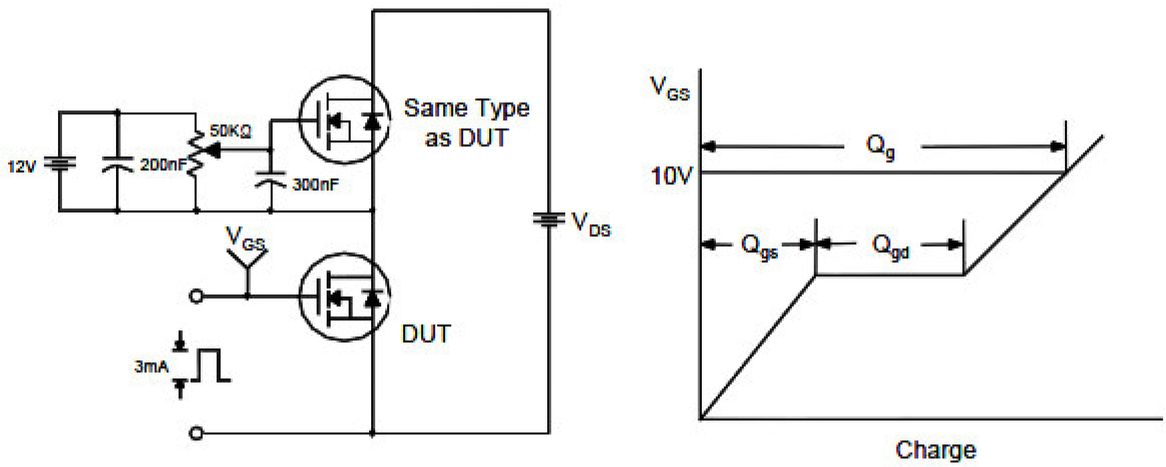


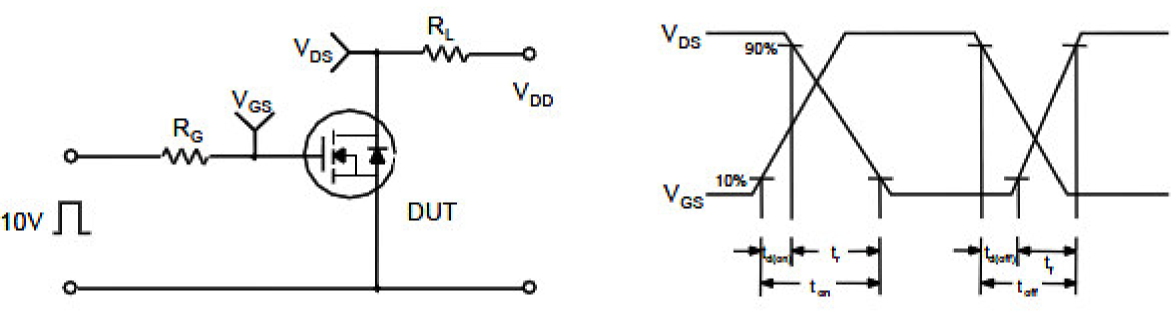
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (N-Channel)

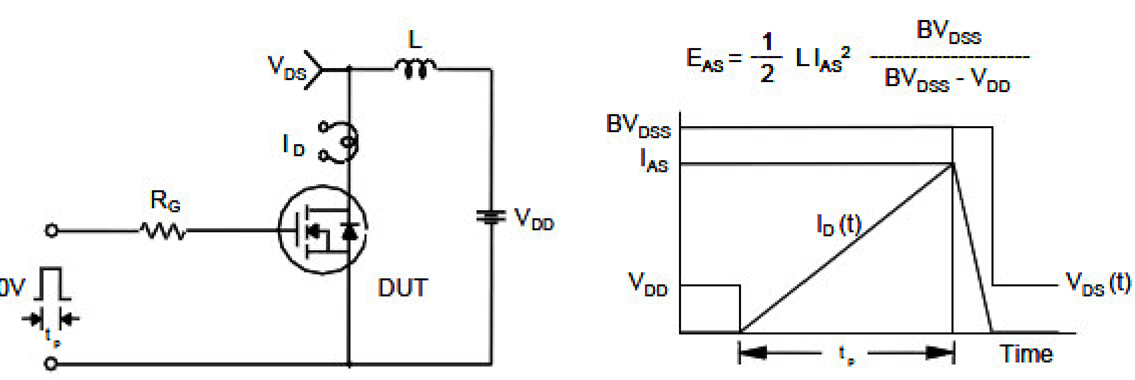
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Typical Performance Characteristics (P-Channel)

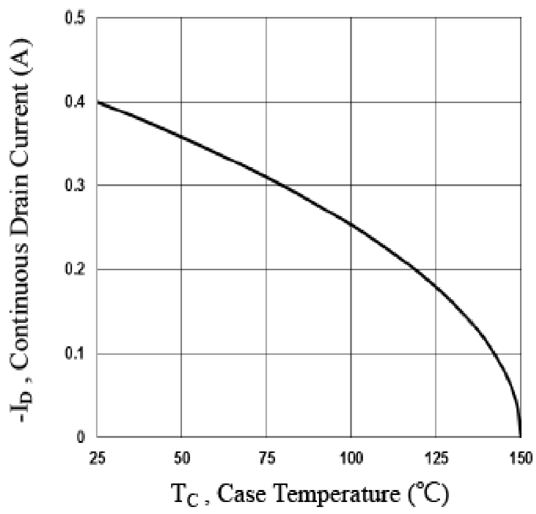


Fig.7 Continuous Drain Current vs. T_c

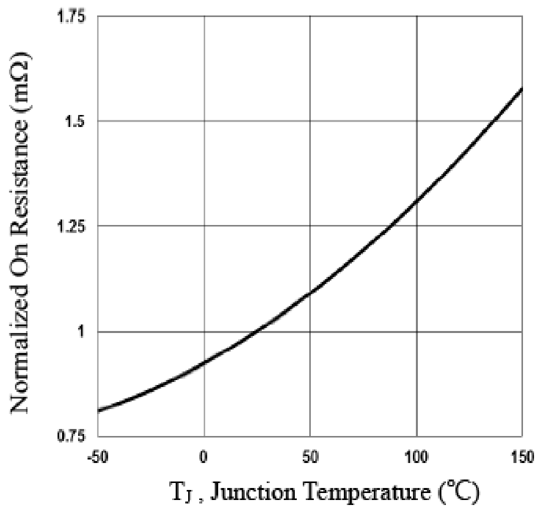


Fig.8 Normalized RDSON vs. T_J

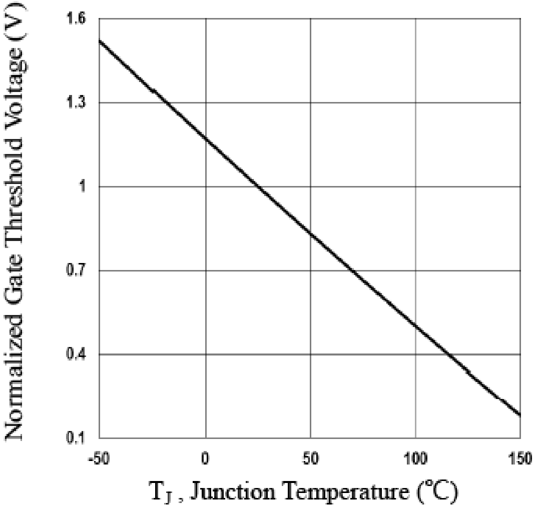


Fig.9 Normalized V_{th} vs. T_J

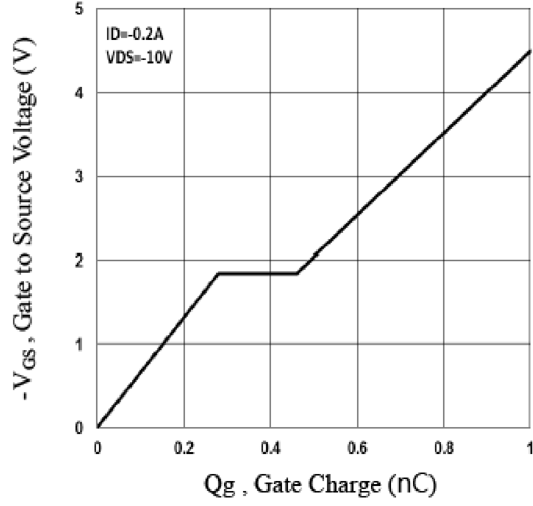


Fig.10 Gate Charge Waveform

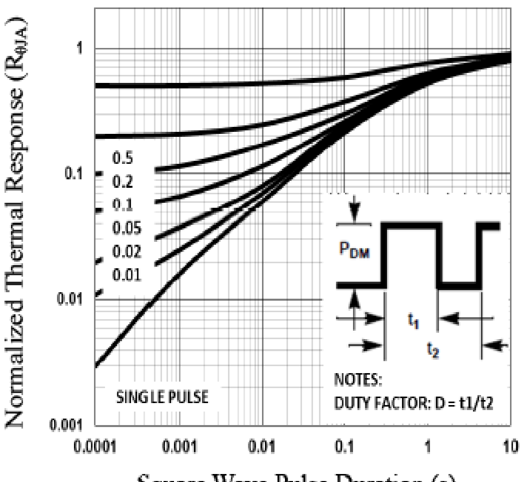


Fig.11 Normalized Transient Impedance

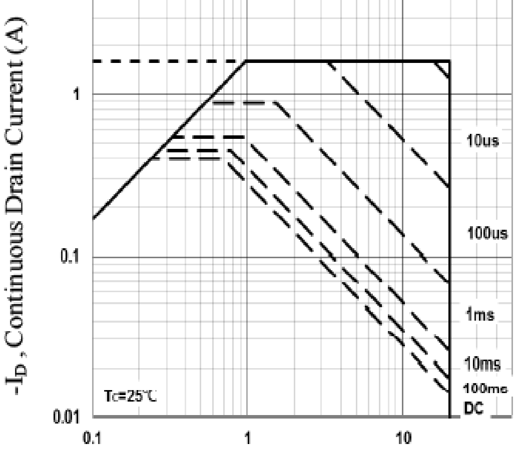
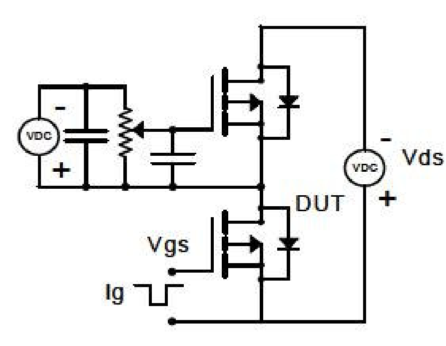
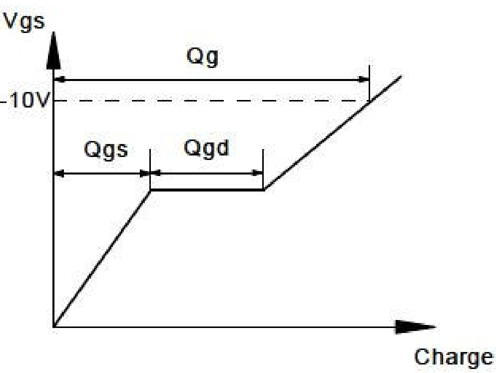


Fig.12 Maximum Safe Operation Area

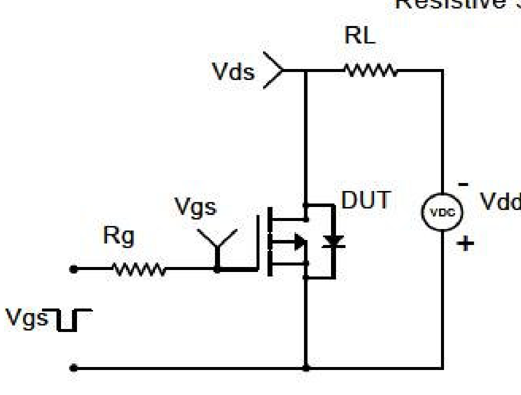
Typical Performance Characteristics (P-Channel)

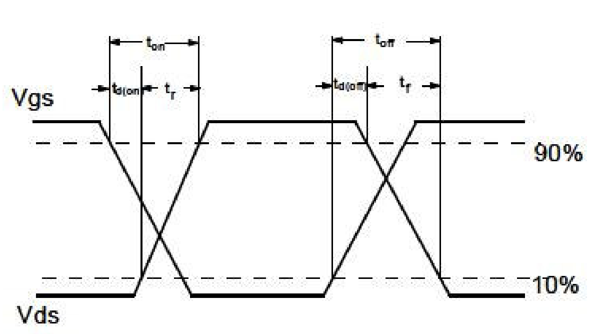
Gate Charge Test Circuit & Waveform



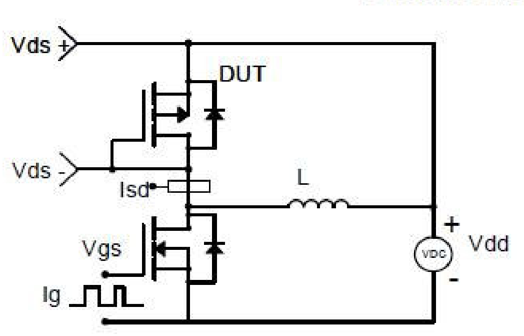


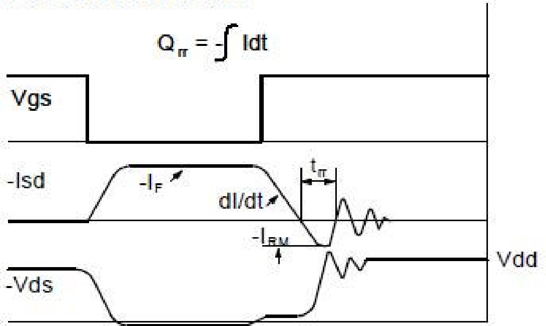
Resistive Switching Test Circuit & Waveforms





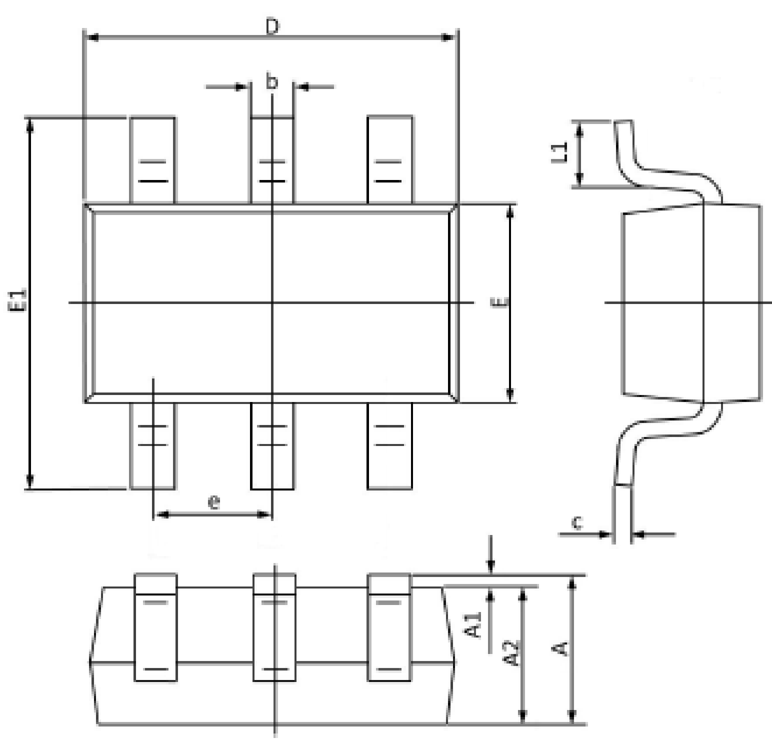
Diode Recovery Test Circuit & Waveforms





Package Dimension

SOT-363



Dimensions					
Symbol	Millimeters		Inches		
	Min	Max	Min	Max	
A	0.800	1.100	0.031	0.043	
A1	0.000	0.100	0.000	0.004	
A2	0.800	1.000	0.031	0.039	
b	0.100	0.330	0.004	0.013	
c	0.100	0.250	0.004	0.010	
D	1.800	2.200	0.071	0.087	
E	1.150	1.350	0.045	0.053	
E1	1.800	2.400	0.071	0.094	
e	0.65 (BSC)		0.026 (BSC)		
L1	0.100	0.350	0.004	0.014	

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