

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

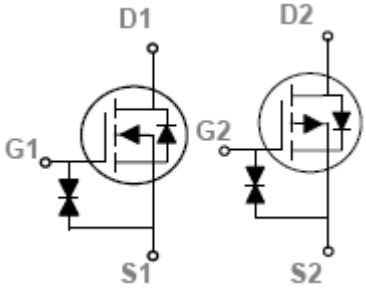
- N-Channel
20V, 0.8A, $R_{DS(ON)}=300m\Omega@V_{GS}=4.5V$
- P-Channel
-20V, -0.4A, $R_{DS(ON)}=600m\Omega@V_{GS}=-4.5V$
- Fast switching
- Suit for 1.5V/-1.5V Gate Drive Applications
- Green Device Available
- SOT-363 package design

Applications

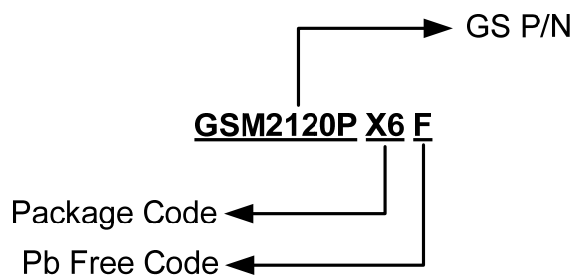
- Notebook
- Load Switch
- Networking
- Hand-held Instruments

Packages & Pin Assignments

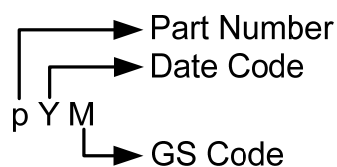
GSM2120PX6F (SOT-363)	
 Top Views	
Pin	Description
1	Source 1
2	Gate 1
3	Drain 2
4	Source 2
5	Gate 2
6	Drain 1



Ordering Information



Marking Information



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

Absolute Maximum Ratings

$T_A=25^{\circ}\text{C}$ 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°C)	T _A =25°C	800	-400	mA
		T _A =100°C	510	-250	
I _{DM}	Pulsed Drain Current		3.2	-1.6	A
P _D	Power Dissipation	T _A =25°C	275		mW
		Derate above 25°C	2.2		mW/°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		450		°C/W

Electrical Characteristics (N-Channel)

T_A=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	20			V
ΔBV _{DSS} /ΔT _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
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			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°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	-20			V
ΔBV _{DSS} /ΔT _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
ΔV _{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)

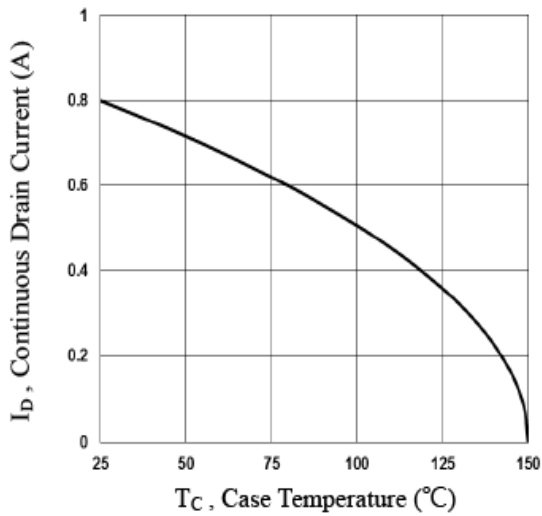


Fig.1 Continuous Drain Current vs. T_C

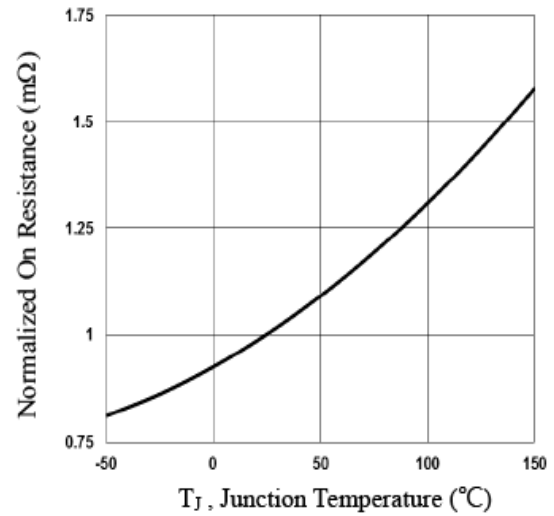


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

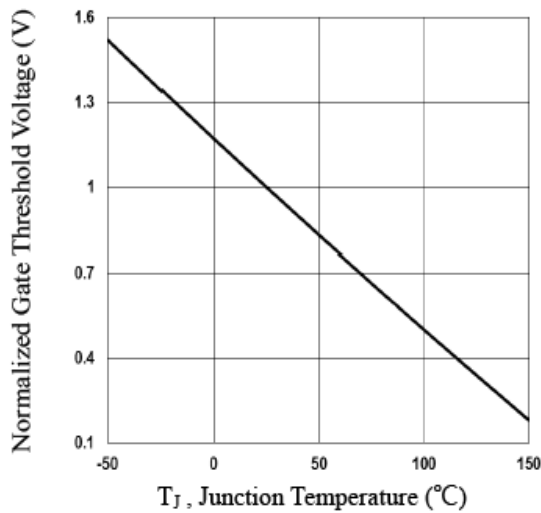


Fig.3 Normalized V_{th} vs. T_J

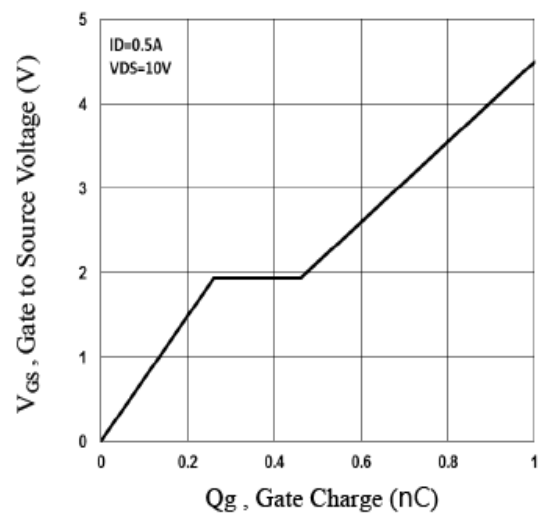


Fig.4 Gate Charge Waveform

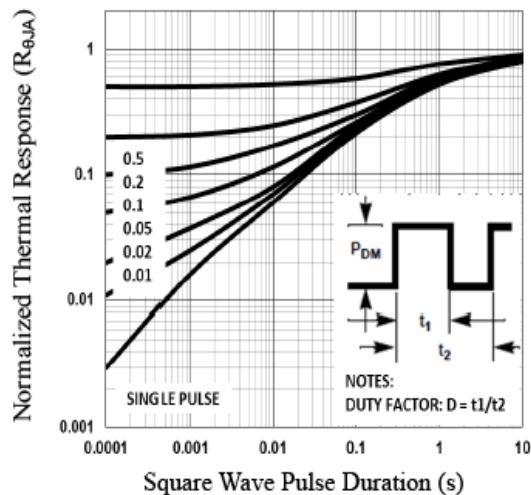


Fig.5 Normalized Transient Impedance

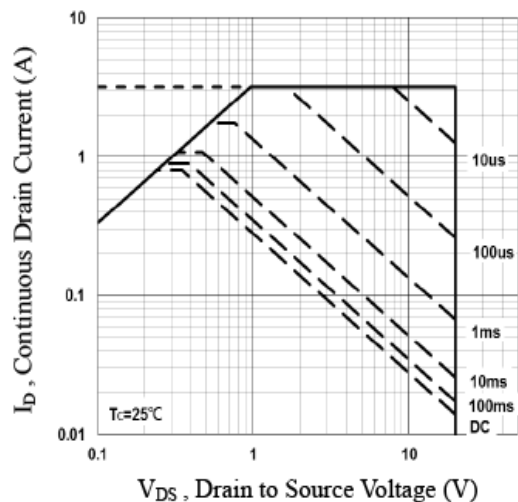
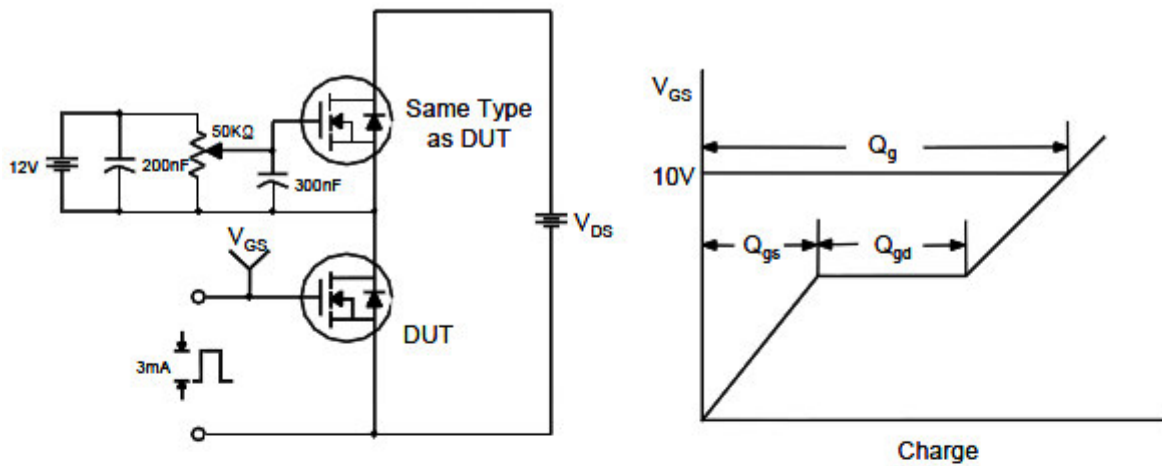


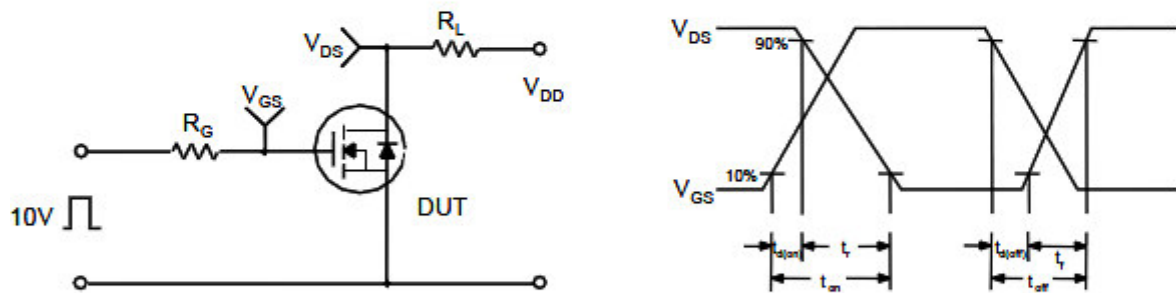
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (N-Channel)

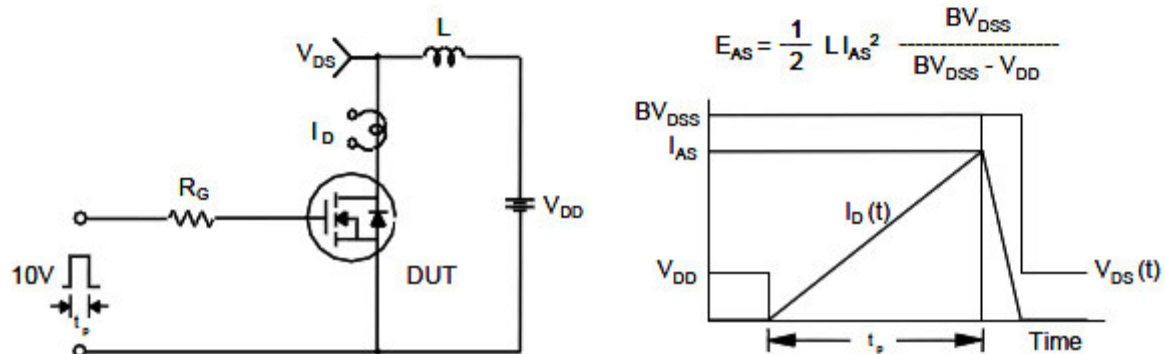
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Typical Performance Characteristics (P-Channel)

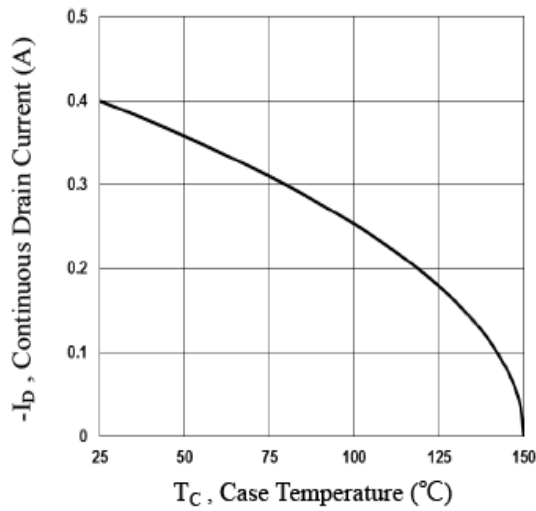


Fig.7 Continuous Drain Current vs. T_C

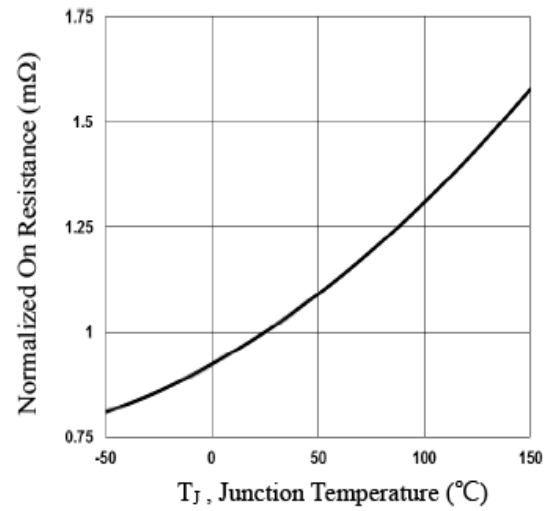


Fig.8 Normalized $R_{DS(on)}$ vs. T_J

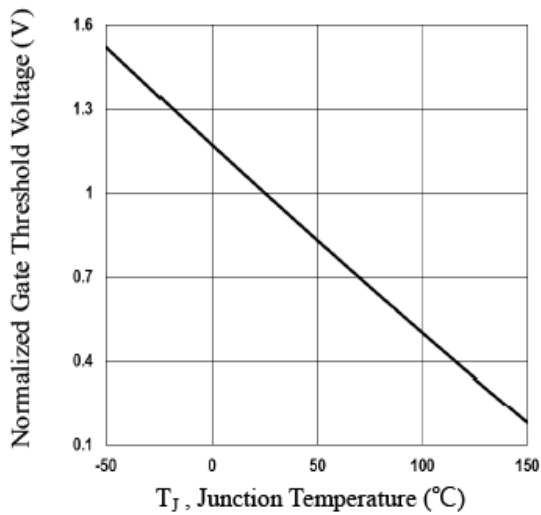


Fig.9 Normalized V_{th} vs. T_J

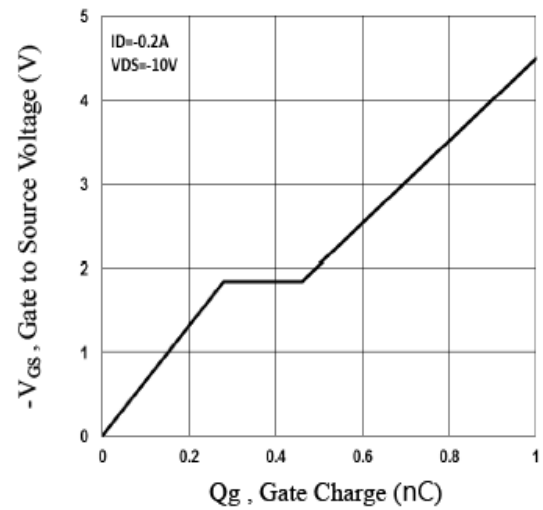


Fig.10 Gate Charge Waveform

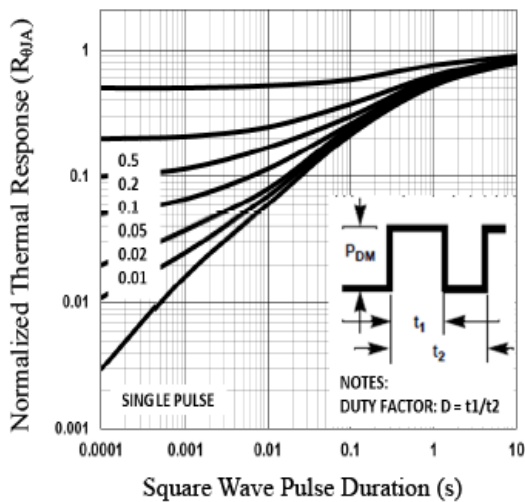


Fig.11 Normalized Transient Impedance

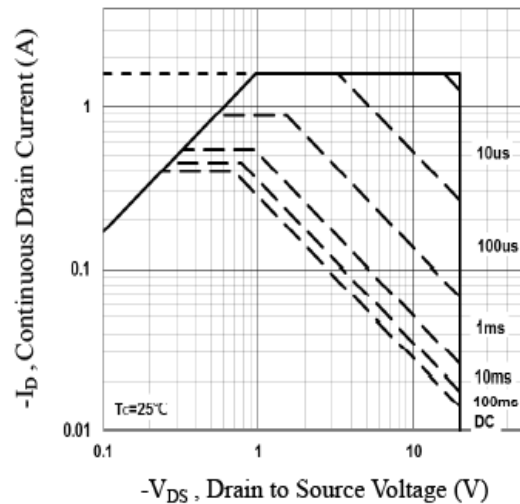
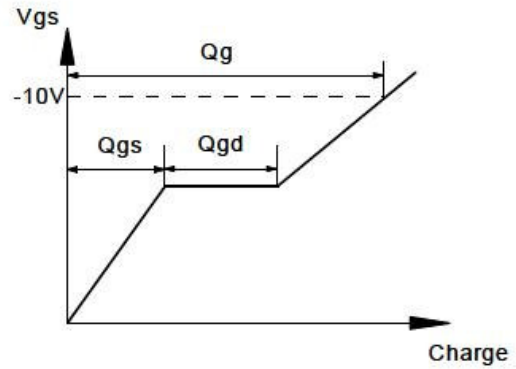
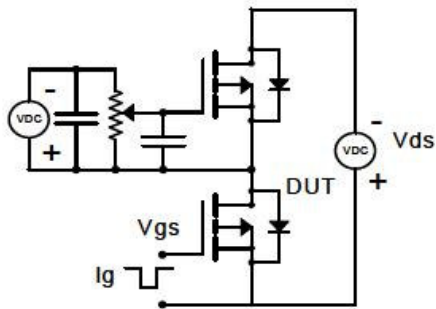


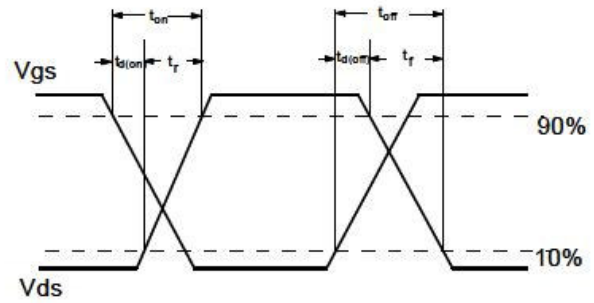
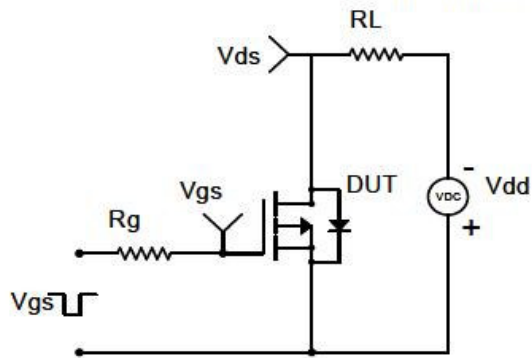
Fig.12 Maximum Safe Operation Area

Typical Performance Characteristics (P-Channel)

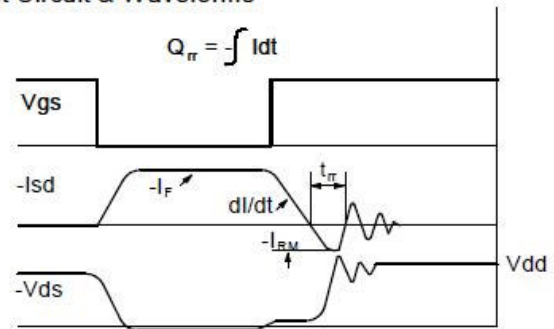
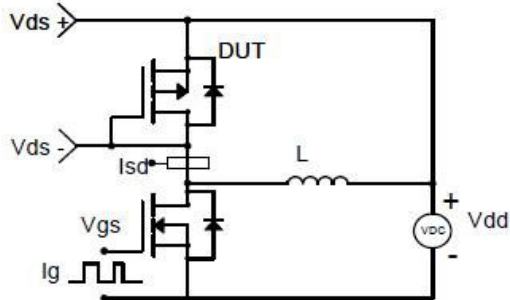
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

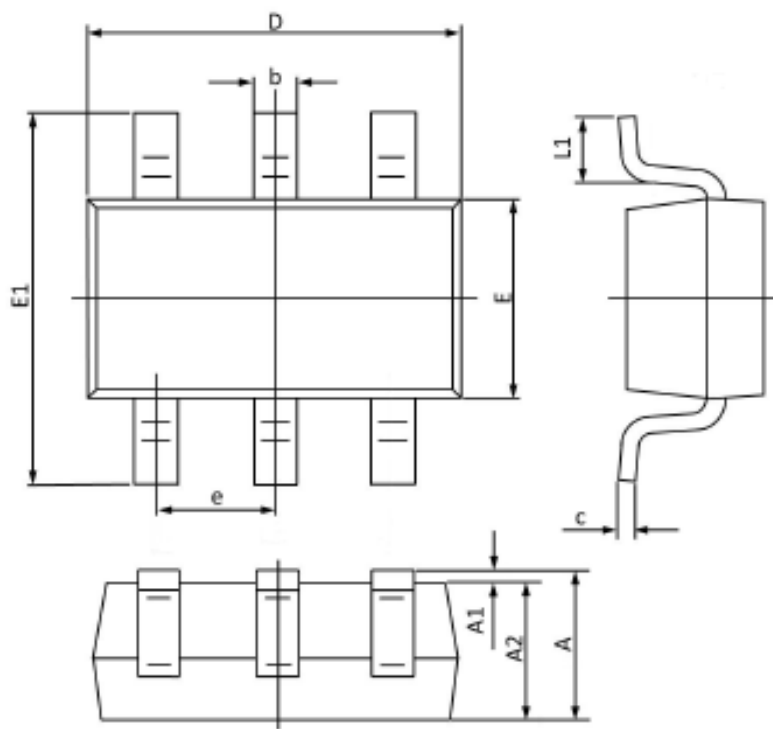


Diode Recovery Test Circuit & Waveforms



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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