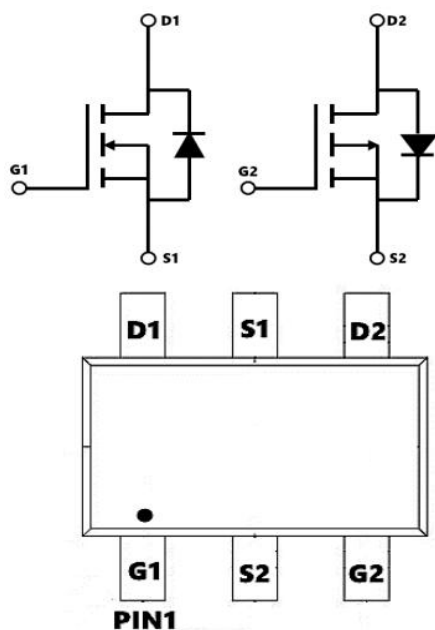


Description

The SX6G03LI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

$V_{DS} = 30V$ $I_D = 6.8A$

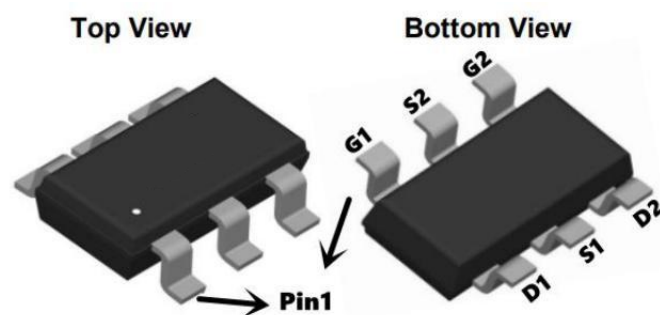
$R_{DS(ON)} < 25m\Omega$ @ $V_{GS}=10V$

$V_{DS} = -30V$ $I_D = -5.8A$

$R_{DS(ON)} < 52m\Omega$ @ $V_{GS}=-10V$

Application

BLDC



Absolute Maximum Ratings ($T_c=25^\circ C$ unless otherwise noted)

Symbol	Parameter	N-Ch	P-Ch	Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
$I_D @ T_A=25^\circ C$	Continuous Drain Current, V_{GS} @ 10V ¹	6.8	-5.8	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current, V_{GS} @ 10V ¹	3.8	-3	A
I_{DM}	Pulsed Drain Current ²	52	-40	A
EAS	Single Pulse Avalanche Energy ³	22	22	mJ
$P_D @ T_A=25^\circ C$	Total Power Dissipation ⁴	1.5	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150		$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150		$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	105		$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	36		$^\circ C/W$

N-Channel Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	30	34	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C , I _D =1mA	---	0.023	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =5A	---	18	25	mΩ
		V _{GS} =4.5V , I _D =3A	---	28	40	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.6	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-4.2	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =24V , V _{GS} =0V , T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V , I _D =6A	---	5.8	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	2.3	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =20V , V _{GS} =4.5V , I _D =6A	---	5	---	nC
Q _{gs}	Gate-Source Charge		---	1.11	---	
Q _{gd}	Gate-Drain Charge		---	2.61	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =12V , V _{GS} =10V , R _G =3.3Ω I _D =6A	---	7.7	---	ns
T _r	Rise Time		---	46	---	
T _{d(off)}	Turn-Off Delay Time		---	11	---	
T _f	Fall Time		---	3.6	---	
C _{iss}	Input Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	416	---	pF
C _{oss}	Output Capacitance		---	62	---	
C _{rss}	Reverse Transfer Capacitance		---	51	---	
I _S	Continuous Source Current ^{1,6}	V _G =V _D =0V , Force Current	---	---	6.2	A
I _{SM}	Pulsed Source Current ^{2,6}		---	---	24	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

P-Channel Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =-250uA	-30	-35	---	V
ΔBVDSS/ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C , I _D =-1mA	---	-0.02	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =-10V , I _D =-4.1A	---	42	52	mΩ
		V _{GS} =-4.5V , I _D =-3.5A	---	58	70	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-1.7	-2.5	V
ΔVGS(th)	V _{GS(th)} Temperature Coefficient		---	4.32	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =-24V , V _{GS} =0V , T _J =25°C	---	---	-1	uA
		V _{DS} =-24V , V _{GS} =0V , T _J =55°C	---	---	-5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =-5V , I _D =-3A	---	4.7	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	24	---	Ω
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-20V , V _{GS} =-4.5V , I _D =-5A	---	5.22	---	nC
Q _{gs}	Gate-Source Charge		---	1.25	---	
Q _{gd}	Gate-Drain Charge		---	2.3	---	
Td(on)	Turn-On Delay Time	V _{DD} =-15V, V _{GS} =-10V , R _G =3.3Ω I _D =-1A	---	18.4	---	ns
T _r	Rise Time		---	11.4	---	
Td(off)	Turn-Off Delay Time		---	39.4	---	
T _f	Fall Time		---	5.2	---	
C _{iss}	Input Capacitance	V _{DS} =-15V , V _{GS} =0V , f=1MHz	---	463	---	pF
C _{oss}	Output Capacitance		---	82	---	
C _{rss}	Reverse Transfer Capacitance		---	68	---	
I _s	Continuous Source Current ^{1,6}	V _G =V _D =0V , Force Current	---	---	-4	A
ISM	Pulsed Source Current ^{2,6}		---	---	-24	A
VSD	Diode Forward Voltage ²	V _{GS} =0V , I _S =-1A , T _J =25°C	---	---	-1	V

Note :

- 1、The data tested by surface mounted on a 1 inch FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

N-Channel Typical Characteristics

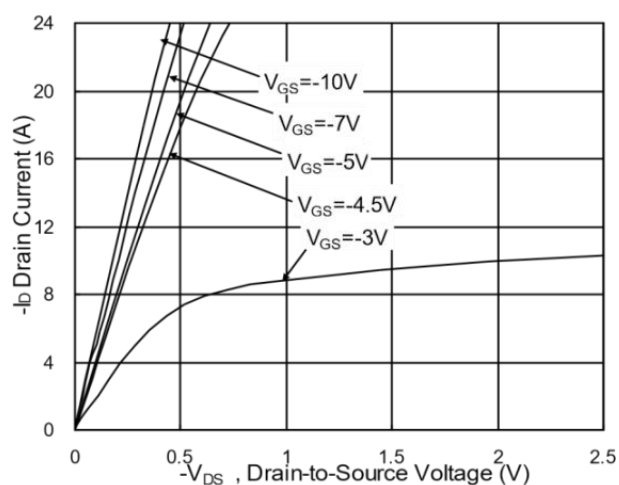


Fig.1 Typical Output Characteristics

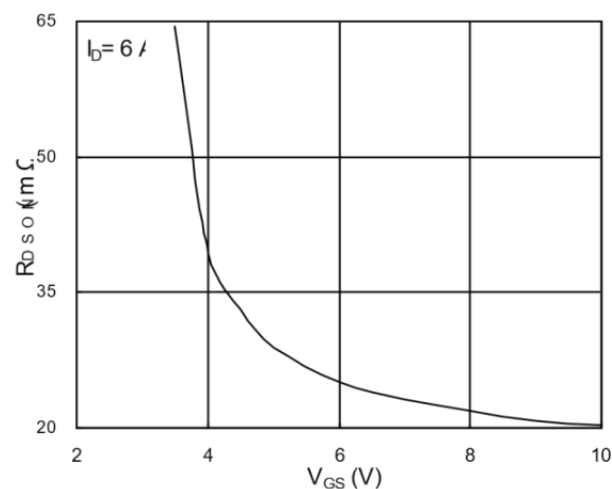


Fig.2 On-Resistance vs. Gate-Source

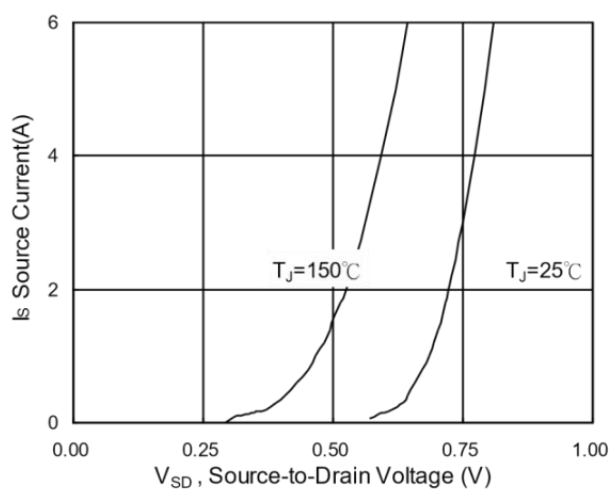


Fig.3 Forward Characteristics Of Reverse

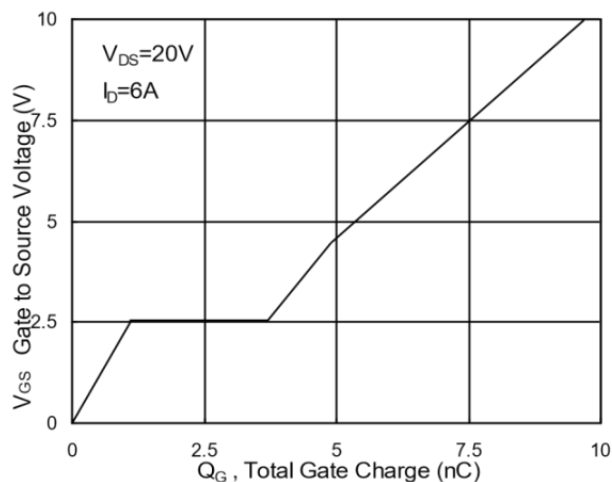


Fig.4 Gate-Charge Characteristics

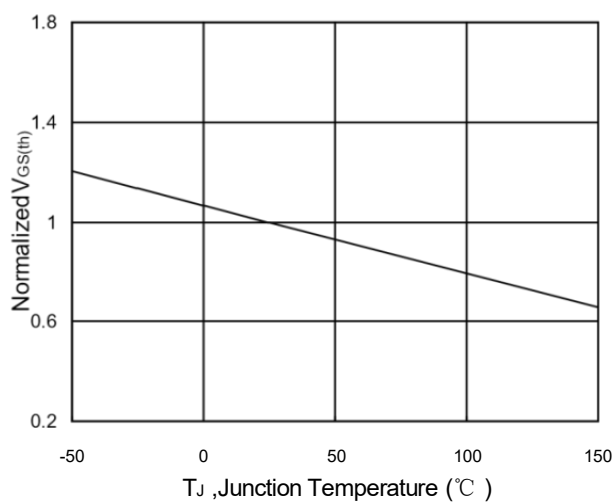


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

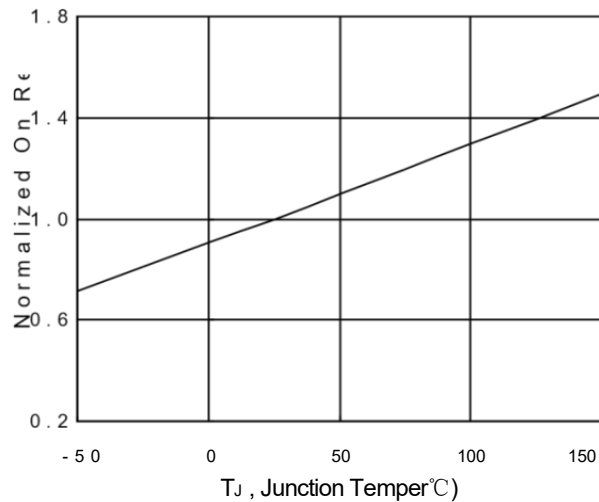


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

N-Channel Typical Characteristics

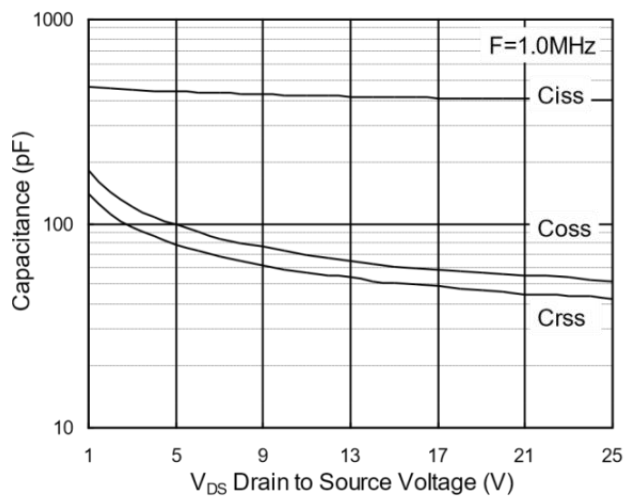


Fig.7 Capacitance

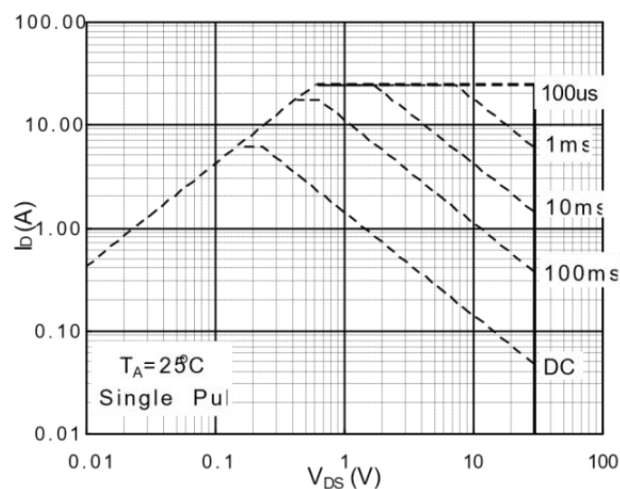


Fig.8 Safe Operating Area

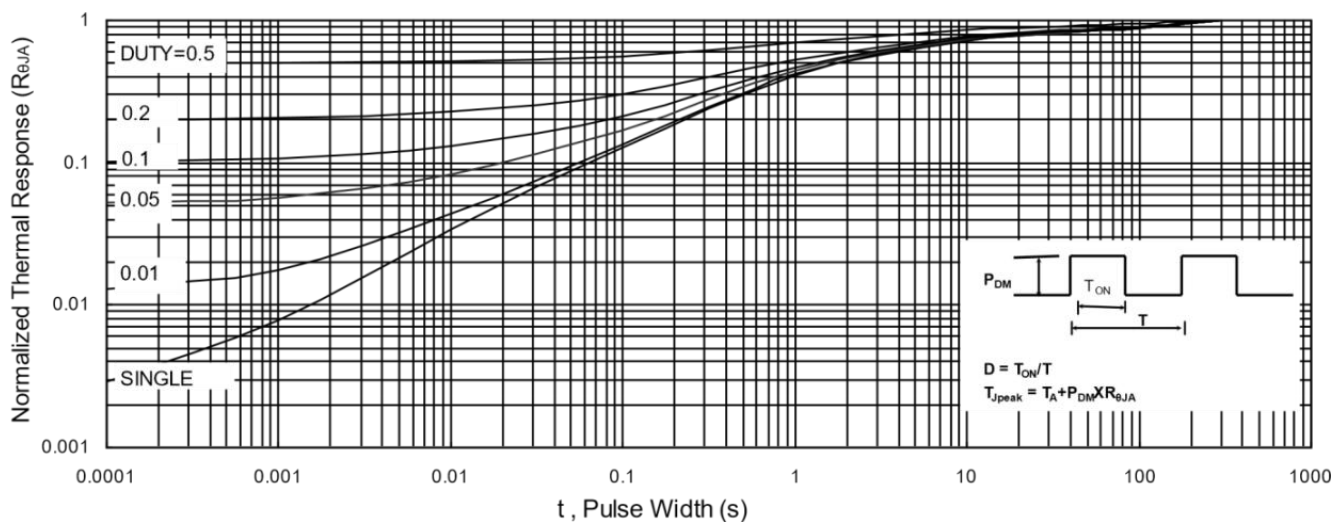


Fig.9 Normalized Maximum Transient Thermal Impedance

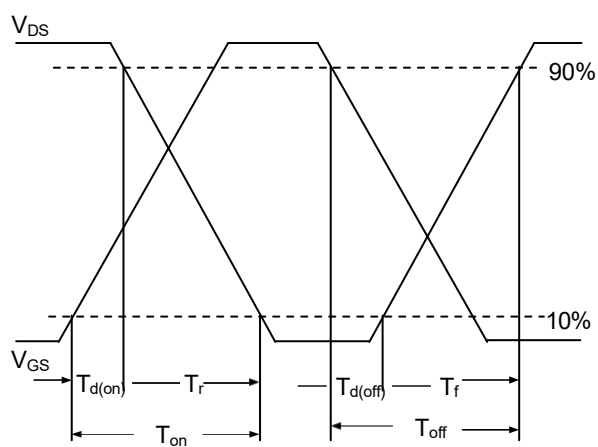


Fig.10 Switching Time Waveform

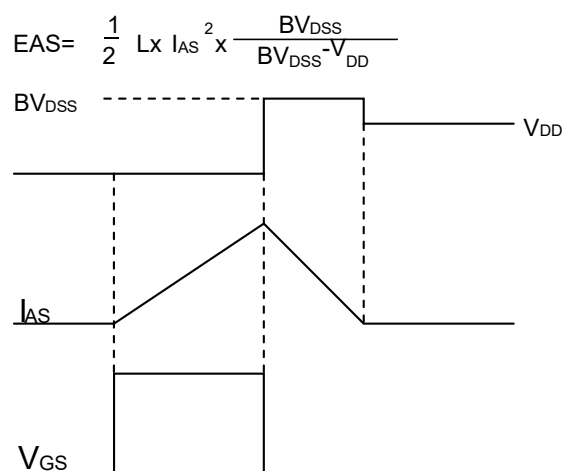


Fig.11 Unclamped Inductive Switching Waveform

P-Channel Typical Characteristics

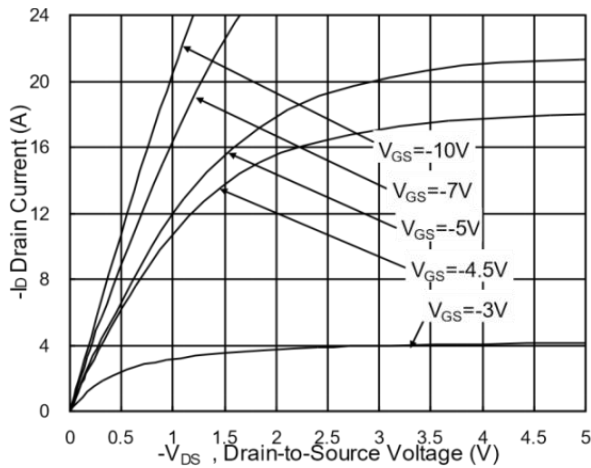


Fig.1 Typical Output Characteristics

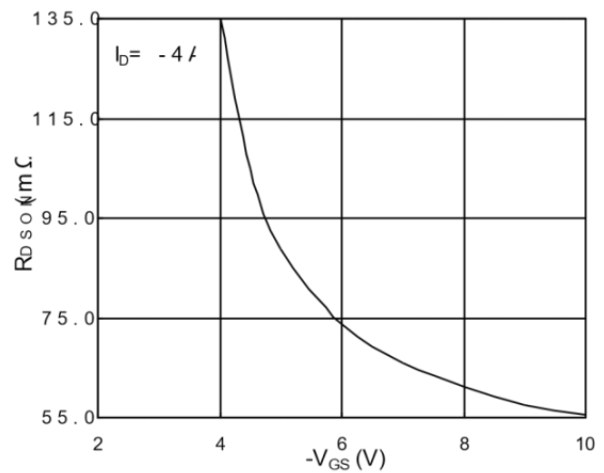


Fig.2 On-Resistance vs. G-S Voltage

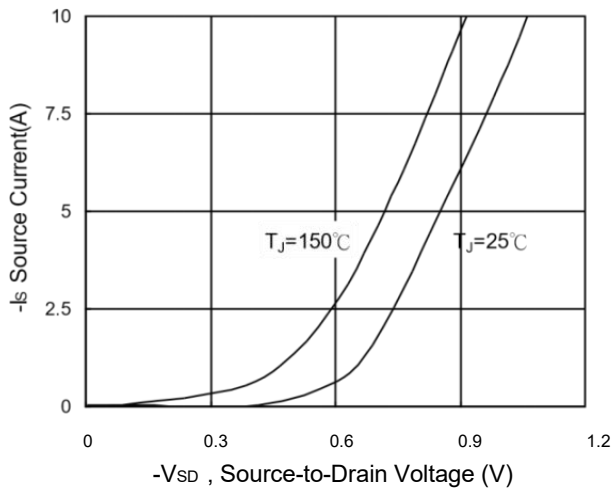


Fig.3 Forward Characteristics of Reverse

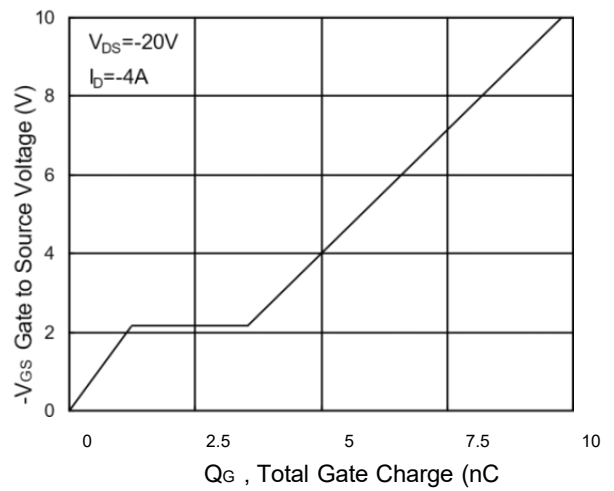


Fig.4 Gate-Charge Characteristics

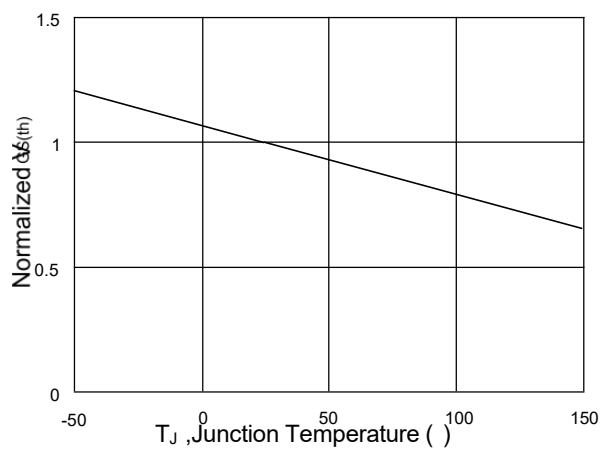


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

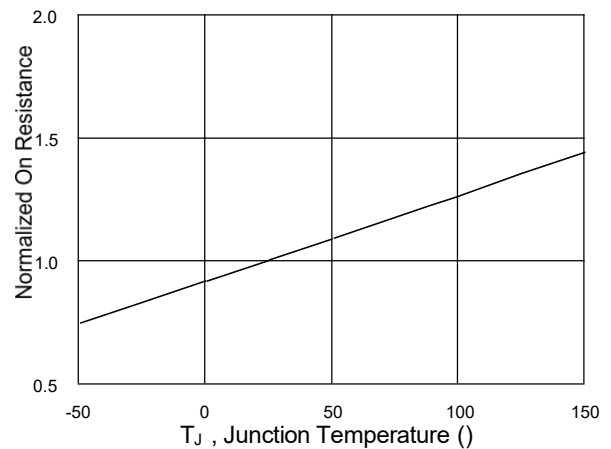


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

P-Channel Typical Characteristics

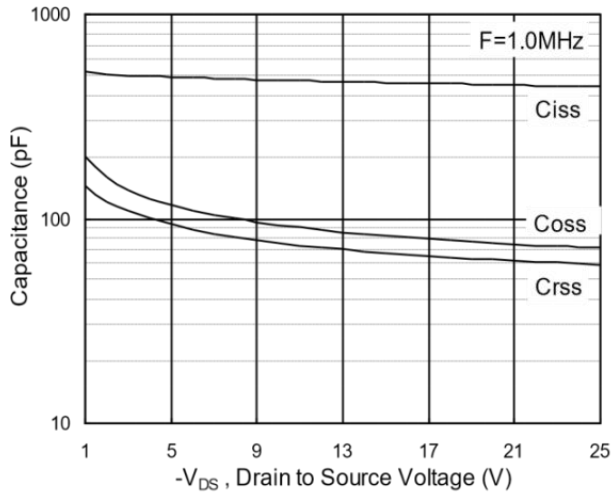


Fig.7 Capacitance

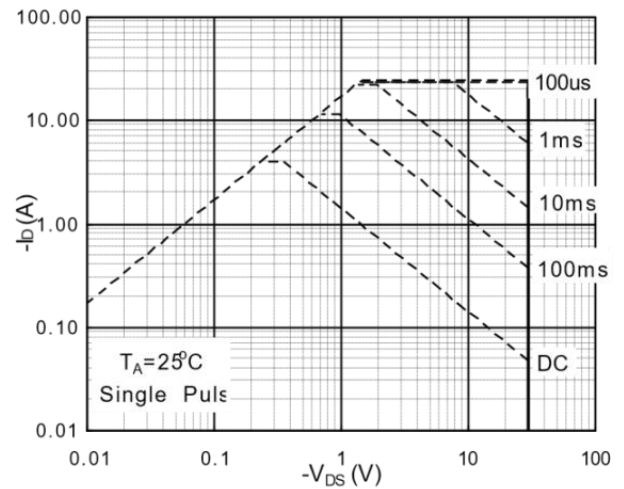


Fig.8 Safe Operating Area

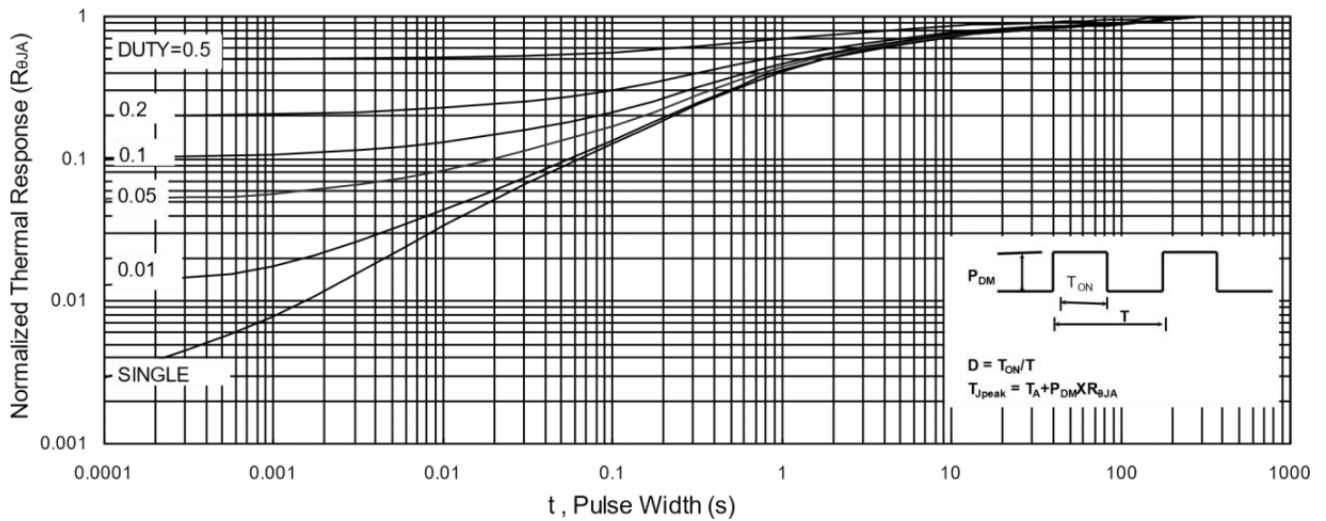


Fig.9 Normalized Maximum Transient Thermal Impedance

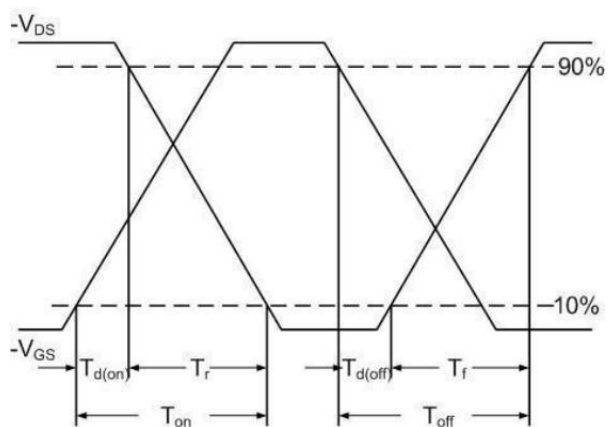


Fig.10 Switching Time Waveform

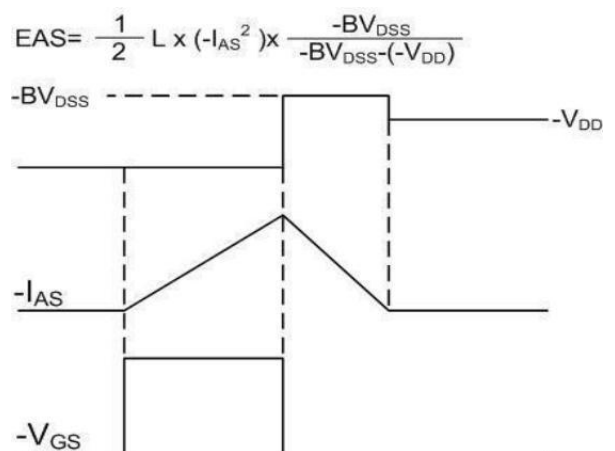
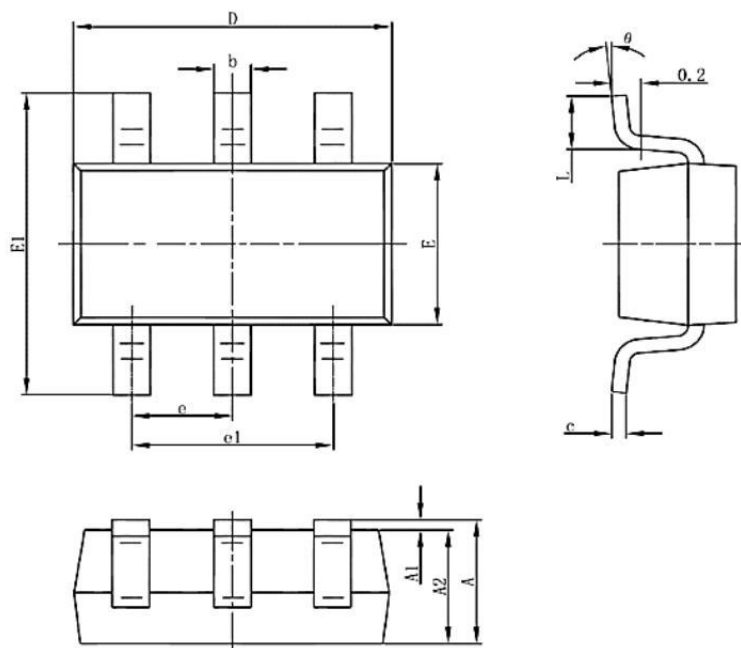


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-SOT23-6-Double



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
C	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 (BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0	8	0	8

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOT23-6L		3000