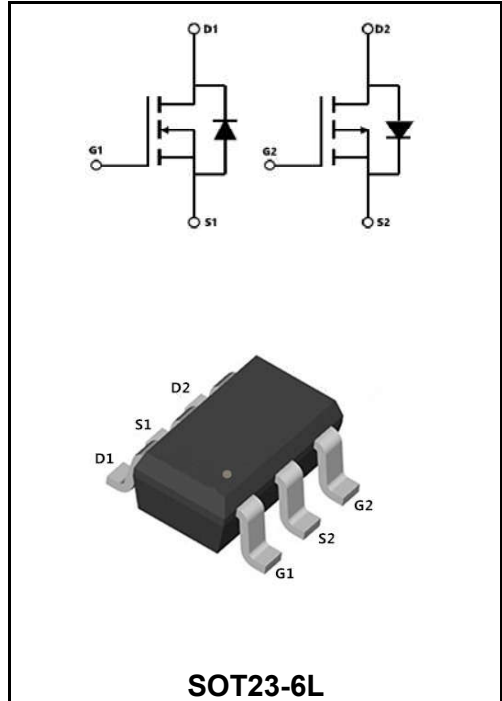


30V N+P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	6.8A
V_{DSS}	30V
$R_{DS(on)-typ}(@V_{GS}=10V)$	< 25mΩ (Type:18 mΩ)
I_D	-5.8A
V_{DSS}	-30V
$R_{DS(on)-typ}(@V_{GS}=-10V)$	< 52mΩ (Type:42 mΩ)



Application

◆BLDC

Product Specification Classification

Part Number	Package	Marking	Pack
YFW6G03LI	SOT23-6L	YFW 6G03LI	3000PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value		Units
		N-Ch	P-Ch	
Drain-Source Voltage	VDS	30	-30	V
Gate - Source Voltage	VGS	±20	±20	V
Continuous Drain Current, $V_{GS} @ 10V^1 @ T_A=25^\circ C$	I_D	6.8	-5.8	A
Continuous Drain Current, $V_{GS} @ 10V^1 @ T_A=70^\circ C$	I_D	3.8	-3	A
Pulsed Drain Current ²	I_{DM}	52	-40	A
Single Pulse Avalanche Energy ³	E_{AS}	22	22	mJ
Total Power Dissipation ⁴ @T _A =25°C	P_D	1.5	1.5	W
Storage Temperature Range	T_{STG}	-55 to +150		°C
Operating Junction Temperature Range	T_J	-55 to +150		°C
Thermal Resistance Junction-Ambient ¹	R_{θJA}	105		°C/W
Thermal Resistance Junction-Case ¹	R_{θJC}	36		°C/W

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

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	BV_{DSS}	30	34	-	V
BVDSS Temperature Coefficient	Reference to 25 °C, I _D =1mA	ΔBV_{DSS}/ΔT_J	-	0.023	-	V/°C
Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =5A	R_{DS(ON)}	-	18	25	mΩ
	V _{GS} =4.5V, I _D =3A		-	28	40	mΩ
Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	V_{GS(th)}	1.0	1.6	2.5	V
V _{GS(th)} Temperature Coefficient		ΔV_{GS(th)}	-	-4.2	-	mV/°C
Drain-Source Leakage Current	V _{DS} =24V, V _{GS} =0V, T _J =25°C	I_{DSS}	-	-	1	uA
	V _{DS} =24V, V _{GS} =0V, T _J =55°C		-	-	5	
Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	I_{GSS}	-	-	±100	nA
Forward Transconductance	V _{DS} = 5V, I _D = 6A	g_{fs}	-	5.8	-	S
Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	R_g	-	2.3	-	Ω
Total Gate Charge(4.5V)	V _{DS} =20V V _{GS} =4.5V I _D =6A	Q_g	-	5	-	nC
Gate-Source Charge		Q_{gs}	-	1.11	-	
Gate-Drain Charge		Q_{gd}	-	2.61	-	
Turn-on delay time	V _{DD} =12V V _{GS} =10V R _G = 3.3Ω I _D = 6A	t_{d(on)}	-	7.7	-	ns
Rise Time		T_r	-	46	-	
Turn-Off Delay Time		t_{d(OFF)}	-	11	-	
Fall Time		t_f	-	3.6	-	
Input Capacitance	V _{DS} =15V V _{GS} =0V f=1MHz	C_{iss}	-	416	-	pF
Output Capacitance		C_{oss}	-	62	-	
Reverse Transfer Capacitance		C_{rss}	-	51	-	
Continuous Source Current ^{1,6}	V _G =V _D =0V, Force Current	I_S	-	-	6.2	A
Pulsed Source Current ^{2,6}		I_{SM}	-	-	24	A
Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	V_{SD}	-	-	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)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	BV_{DSS}	-30	-35	-	V
BVDSS Temperature Coefficient	Reference to 25 °C , I _D =-1mA	ΔBV_{DSS}/ΔT_J	-	-0.02	-	V/°C
Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-4.1A	R_{DS(ON)}	-	42	52	mΩ
	V _{GS} =-4.5V, I _D =-3.5A		-	58	70	mΩ
Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250uA	V_{GS(th)}	-1.0	-1.7	-2.5	V
V _{GS(th)} Temperature Coefficient		ΔV_{GS(th)}	-	4.32	-	mV/°C
Drain-Source Leakage Current	V _{DS} =-24V, V _{GS} =0V T _J =25 °C	I_{DSS}	-	-	-1	uA
	V _{DS} =-24V , V _{GS} =0V , T _J =55 °C		-	-	-5	
Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	I_{GSS}	-	-	±100	nA
Forward Transconductance	V _{DS} = -5V, I _D =- 3A	g_{fs}	-	4.7	-	S
Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	R_g	-	24	-	Ω
Total Gate Charge(-4.5V)	V _{DS} =-20V V _{GS} =-4.5V I _D =-5A	Q_g	-	5.22	-	nC
Gate-Source Charge		Q_{gs}	-	1.25	-	
Gate-Drain Charge		Q_{gd}	-	2.3	-	
Turn-on delay time	V _{DD} =-15V V _{GS} =-10V R _G = 3.3Ω I _D =-1A	t_{d(on)}	-	18.4	-	ns
Rise Time		T_r	-	11.4	-	
Turn-Off Delay Time		t_{d(OFF)}	-	39.4	-	
Fall Time		t_f	-	5.2	-	
Input Capacitance	V _{DS} =15V V _{GS} =0V f=1MHz	C_{iss}	-	463	-	pF
Output Capacitance		C_{oss}	-	82	-	
Reverse Transfer Capacitance		C_{rss}	-	68	-	
Continuous Source Current ^{1,6}	V _G =V _D =0V , Force Current	I_S	-	-	-4	A
Pulsed Source Current ^{2,6}		I_{SM}	-	-	-24	A
Diode Forward Voltage ²	V _{GS} =0V , I _S =-1A , T _J =25 °C	V_{SD}	-	-	-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.

Ratings and Characteristic Curves

N-Channel Typical Characteristics

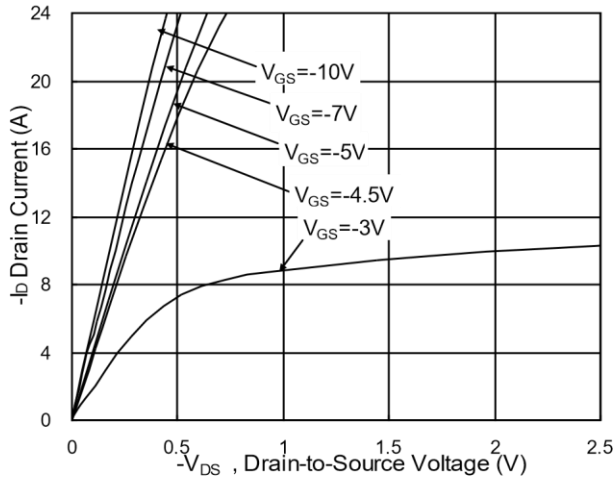


Fig.1 Typical Output Characteristics

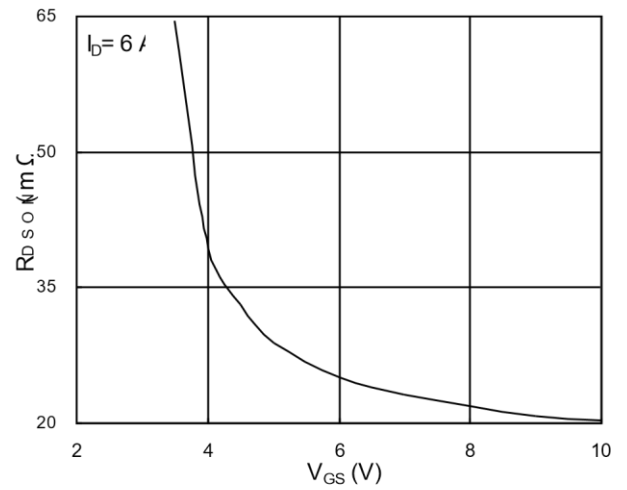


Fig.2 On-Resistance vs. Gate-Source

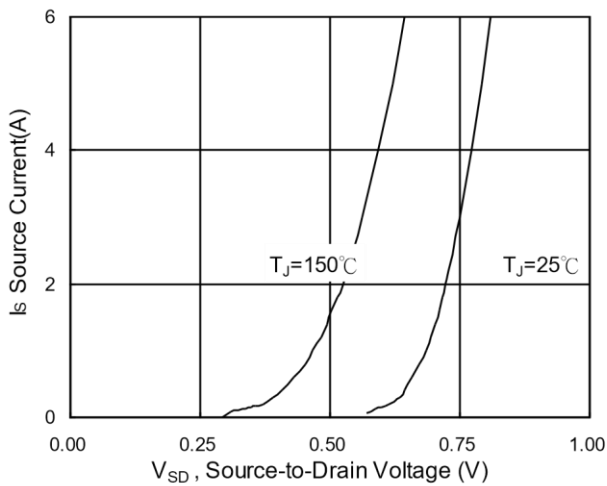


Fig.3 Forward Characteristics Of Reverse

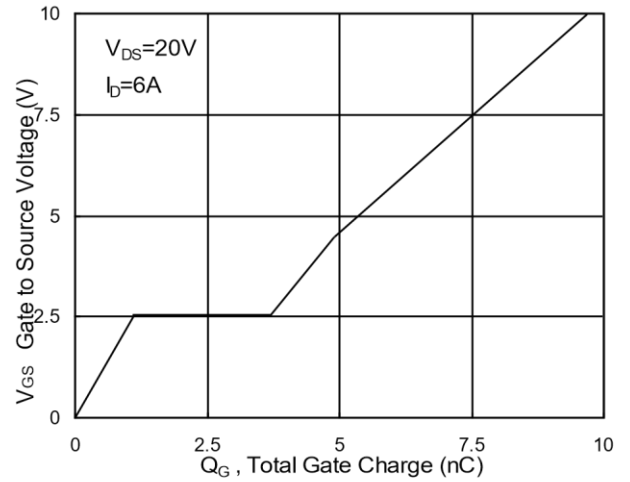


Fig.4 Gate-Charge Characteristics

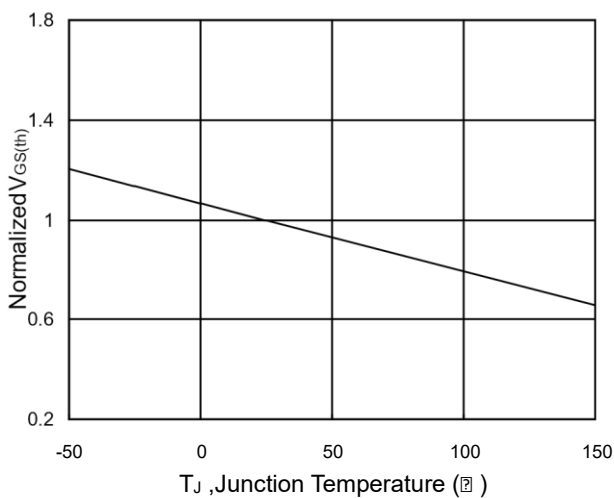


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

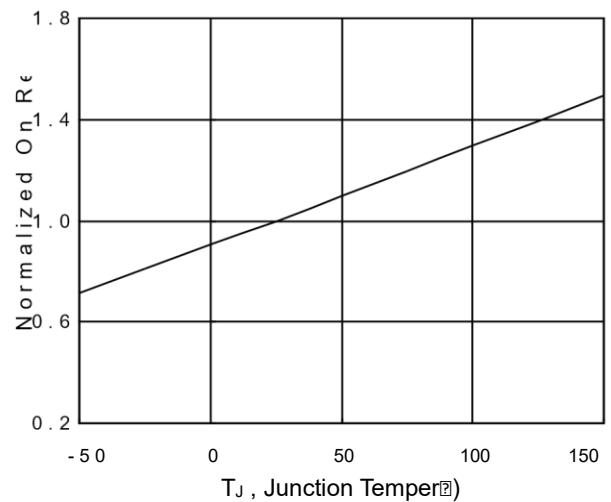


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Ratings and Characteristic Curves

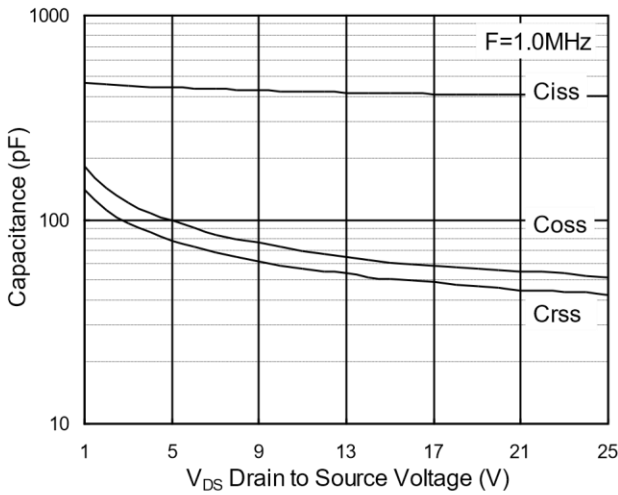


Fig.7 Capacitance

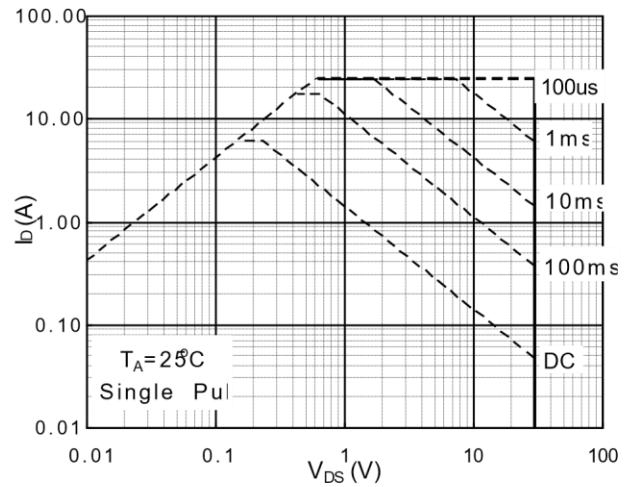


Fig.8 Safe Operating Area

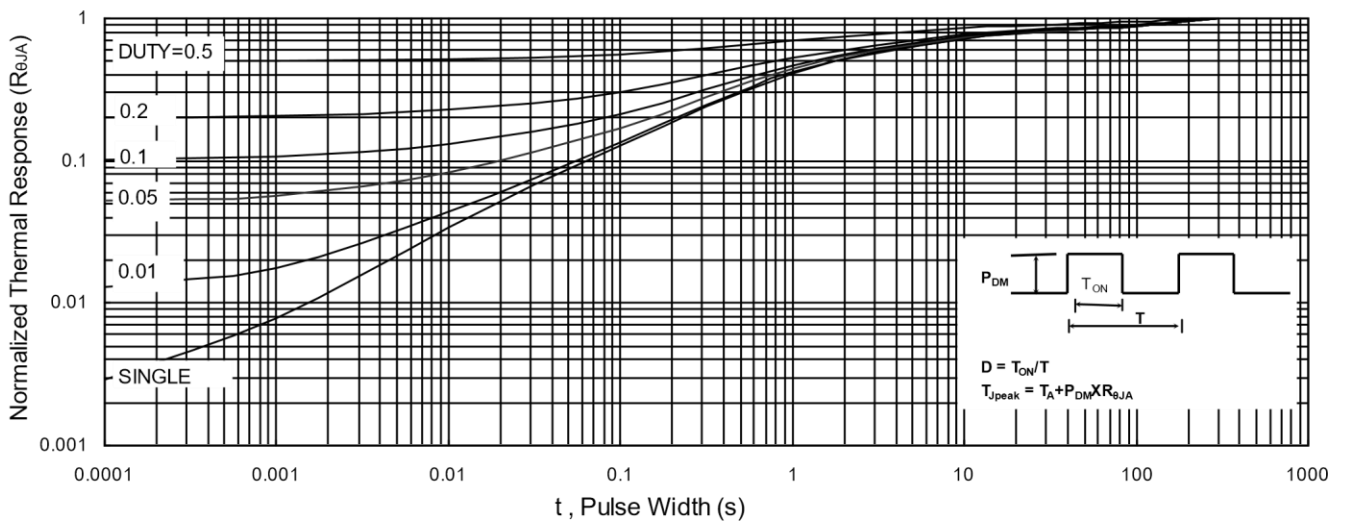


Fig.9 Normalized Maximum Transient Thermal Impedance

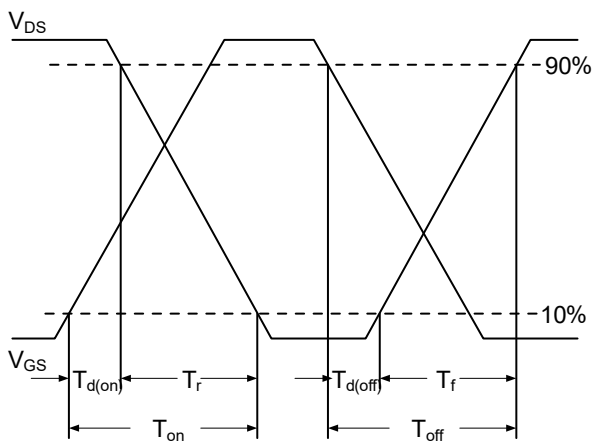


Fig.10 Switching Time Waveform

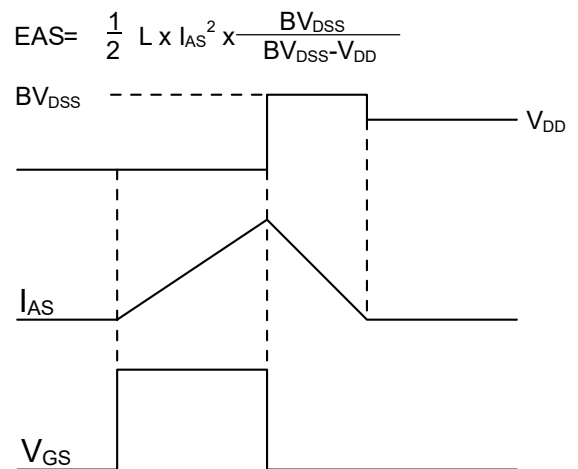


Fig.11 Unclamped Inductive Switching Waveform

Ratings and Characteristic Curves

P-Channel Typical Characteristics

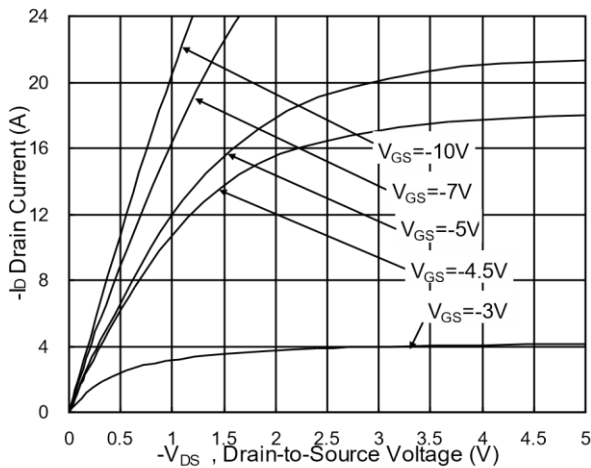


Fig.1 Typical Output Characteristics

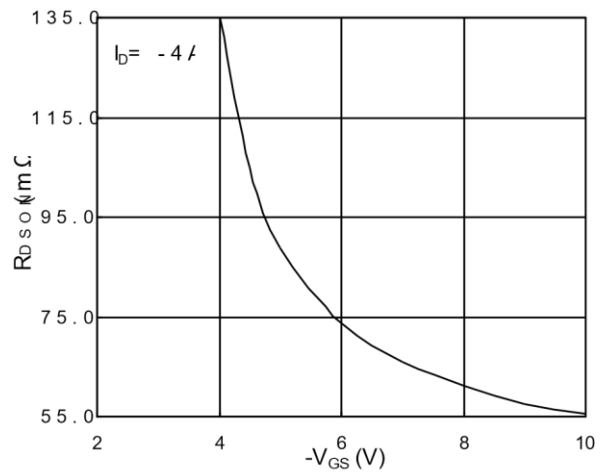


Fig.2 On-Resistance vs. G-S Voltage

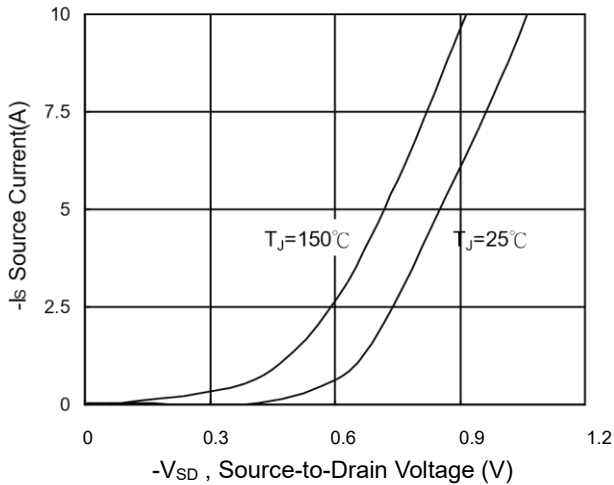


Fig.3 Forward Characteristics of Reverse

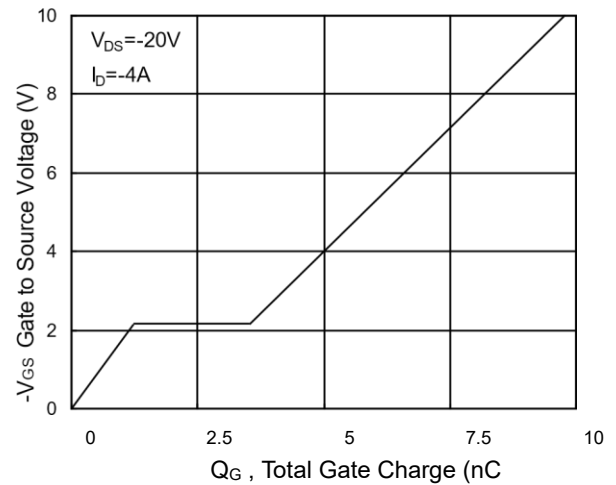


Fig.4 Gate-Charge Characteristics

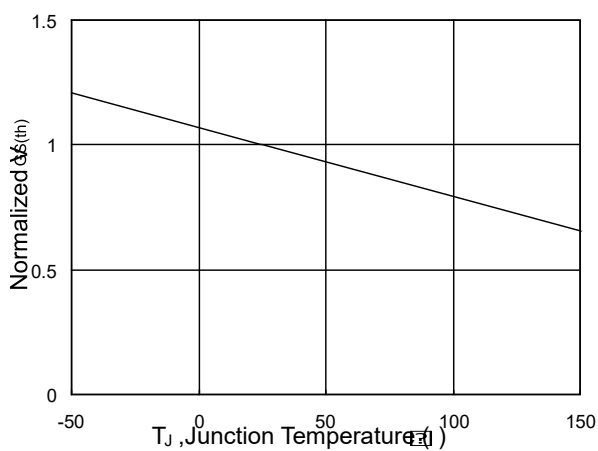


Fig.5 Normalized V_{GS(th)} vs. T_J

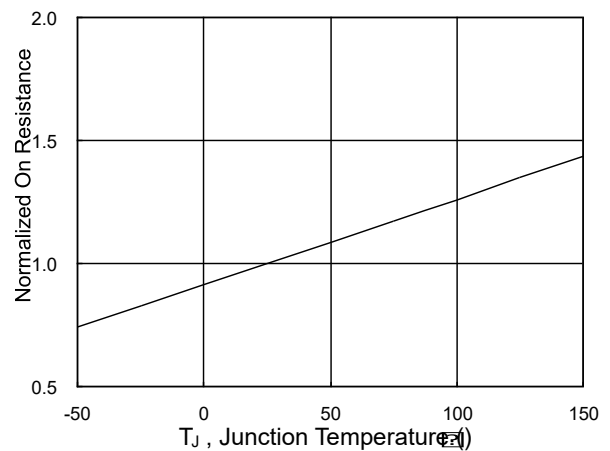


Fig.6 Normalized R_{DS(on)} vs. T_J

Ratings and Characteristic Curves

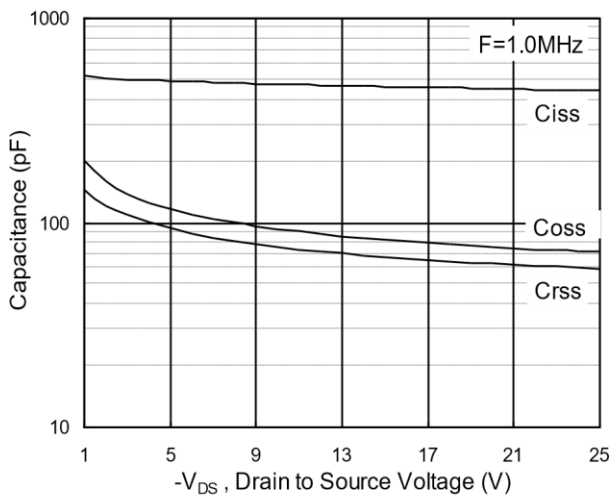


Fig.7 Capacitance

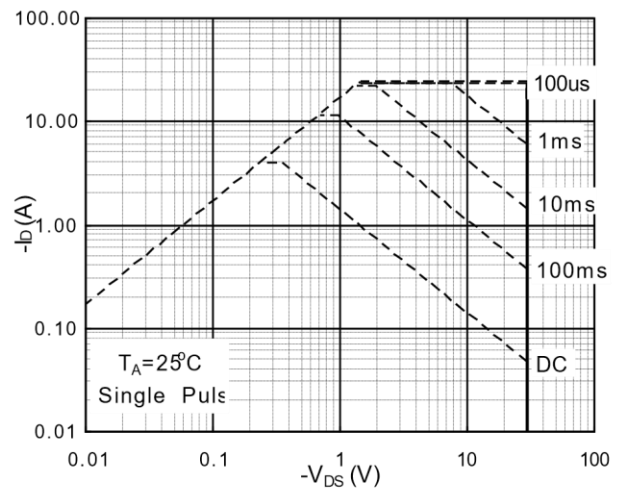


Fig.8 Safe Operating Area

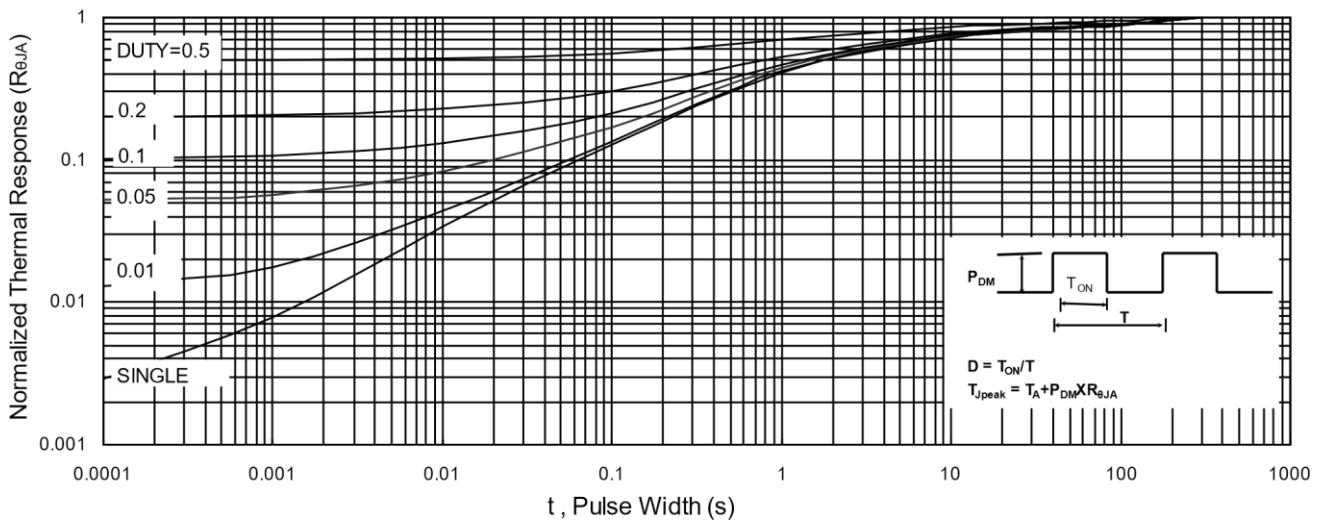


Fig.9 Normalized Maximum Transient Thermal Impedance

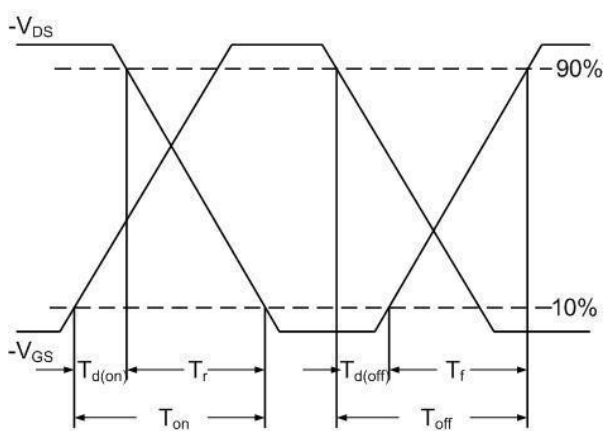


Fig.10 Switching Time Waveform

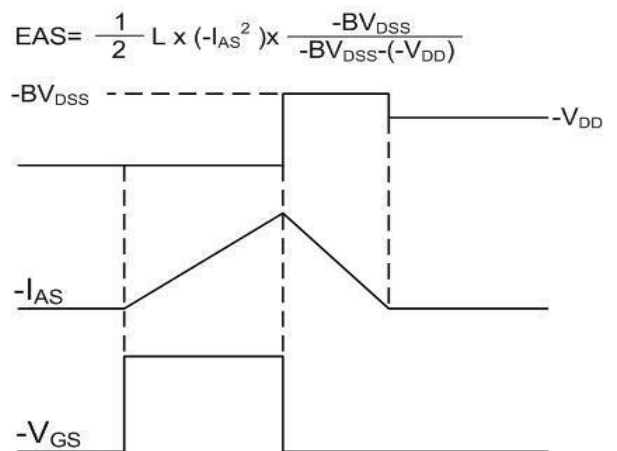
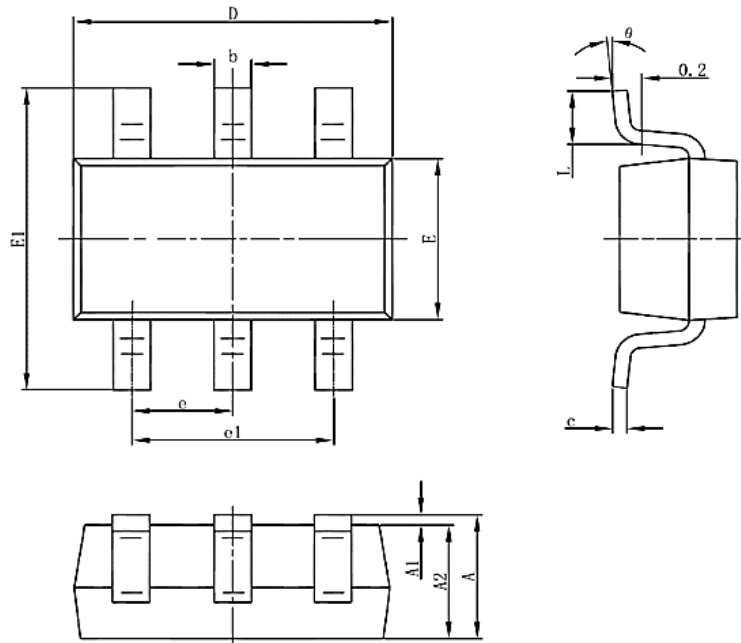


Fig.11 Unclamped Inductive Switching Waveform

Package Outline Dimensions Millimeters

SOT23-6L



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