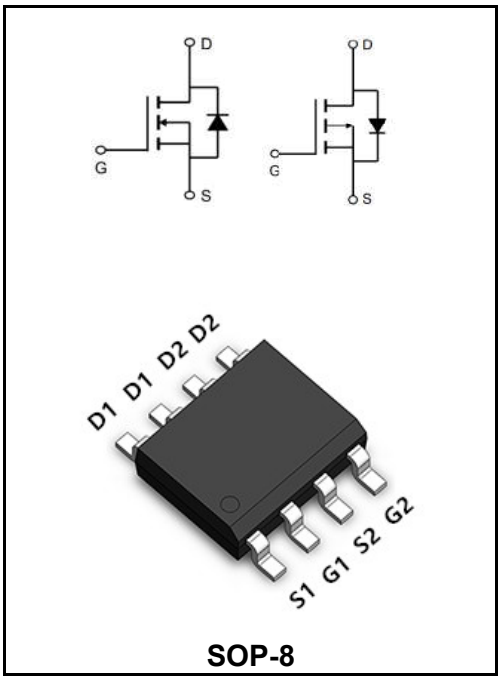
60V N+P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	12.5A
V_{DSS}	60V
R_{DSON}-typ(@V_{GS}=10V)	< 36mΩ(Type:28 mΩ)
I_D	-9.7A
V_{DSS}	-60V
R_{DSON}-typ(@V_{GS}=-10V)	< 70mΩ(Type:48 mΩ)



SOP-8

Application

- Boost driver
- Brushless motor

Product Specification Classification

Part Number	Package	Marking	Pack
YFW10G06S	SOP-8	YFW 10G06S XXXXX	3000PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value		Units
		N-Ch	P-Ch	
Drain-Source Voltage	V_{DS}	60	-60	V
Gate - Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current, V_{GS} @ 10V[1]@T_A=25℃	I_D	12.5	-9.7	A
Continuous Drain Current, V_{GS} @ 10V[1]@T_A=70℃	I_D	5.8	-5	A
Pulsed Drain Current[2]	I_{DM}	37.5	22.5	A
Single Pulse Avalanche Energy[3]	E_{AS}	25.5	35.3	mJ
Avalanche Current	I_{AS}	22.6	-26.6	A
Total Power Dissipation[4]@T_A=25℃	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

N-Channel Electrical Characteristics (TJ=25 ℃, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	BV_{DSS}	60	66	-	V
BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	$\Delta BV_{DSS/\Delta TJ}$	-	0.063	-	V/℃
Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=4A	$R_{DS(ON)}$	-	28	36	mΩ
	V_{GS}=4.5V, I_D=2A		-	32	38	
Gate -Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	$V_{GS(th)}$	1.2	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	-5.24	-	mV/℃
Drain-Source Leakage Current	V_{DS}=48V, V_{GS}=0V T_J=25℃	I_{DSS}	-	-	1	uA
	V_{DS}=48V , V_{GS}=0V , T_J=55℃		-	-	5	
Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	-	-	±100	nA
Forward Transconductance	V_{DS} = 5V, I_D = 4A	g_{fs}	-	21	-	S
Gate Resistance	VDS=0V , VGS=0V , f=1MHz	R_g		3.2		Ω
Total Gate Charge(4.5V)	V_{DS}=48V V_{GS}=4.5V I_D=4A	Q_g	-	12.6	-	nC
Gate-Source Charge		Q_{gs}	-	3.2	-	
Gate-Drain Charge		Q_{gd}	-	6.3	-	
Turn-on delay time	V_{DD} =30V V_{GS}=10V R_G = 3.3 I_D= 4A	$t_{d(on)}$	-	8	-	ns
Rise Time		T_r	-	14.2	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	24.4	-	
Fall Time		t_f	-	4.6	-	
Input Capacitance	V_{DS}=15V V_{GS}=0V f=1MHz	C_{iss}	-	1378	-	pF
Output Capacitance		C_{oss}	-	86	-	
Reverse Transfer Capacitance		C_{rss}	-	64	-	
Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	I_S	-	-	4.8	A
Pulsed Source Current[2,5]		I_{SM}	-	-	9.6	A
Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	V_{SD}	-	-	1.2	V

Note :
1、The data tested by surface mounted on a 1 inch 2 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℃ 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 (TJ=25 ℃, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	BV_{DSS}	-60	-	-	V
BVDSS Temperature Coefficient	Reference to 25℃ , I_D=-1mA	$\Delta BV_{DSS/\Delta TJ}$	-	-0.03	-	V/℃
Static Drain-Source On-Resistance[2]	V_{GS}=-10V, I_D=-3A	$R_{DS(ON)}$	-	48	70	mΩ
	V_{GS}=-4.5V, I_D=-2A		-	75	85	
Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	$V_{GS(th)}$	-1.2	-1.6	-2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	4.56	-	mV/℃
Drain-Source Leakage Current	V_{DS}=-48V, V_{GS}=0V T_J=25℃	I_{DSS}	-	-	1	uA
	V_{DS}=-48V , V_{GS}=0V , T_J=55℃		-	-	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}	-	15	-	S
Gate Resistance	VDS=0V , VGS=0V , f=1MHz	R_g		13.5	-	Ω
Total Gate Charge(-4.5V)	V_{DS}=-48V V_{GS}=-4.5V I_D=-3A	Q_g	-	9.86	-	nC
Gate-Source Charge		Q_{gs}	-	3.1	-	
Gate-Drain Charge		Q_{gd}	-	2.95	-	
Turn-on delay time	V_{DD} =-15V V_{GS}=-10V R_G = 3.3 I_D=-1A	$t_{d(on)}$	-	28.8	-	ns
Rise Time		T_r	-	19.8	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	60.8	-	
Fall Time		t_f	-	7.2	-	
Input Capacitance	V_{DS}=-15V V_{GS}=0V f=1MHz	C_{iss}	-	1447	-	pF
Output Capacitance		C_{oss}	-	97.3	-	
Reverse Transfer Capacitance		C_{rss}	-	70	-	
Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	I_S	-	-	-3.7	A
Pulsed Source Current[2,5]		I_{SM}	-	-	-7.5	A
Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	V_{SD}	-	-	-1.2	V

Note :
1、The data tested by surface mounted on a 1 inch 2 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℃ 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

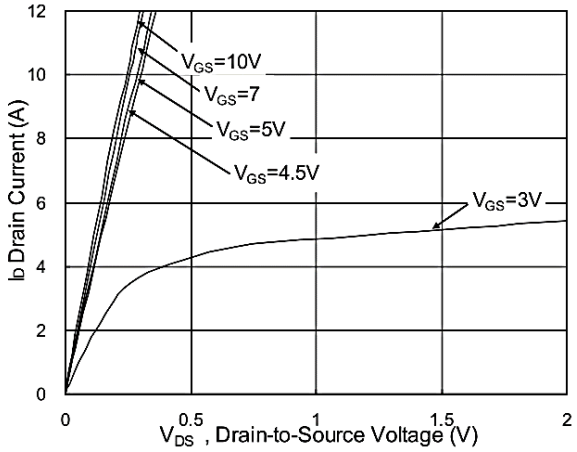


Fig.1 Typical Output Characteristics

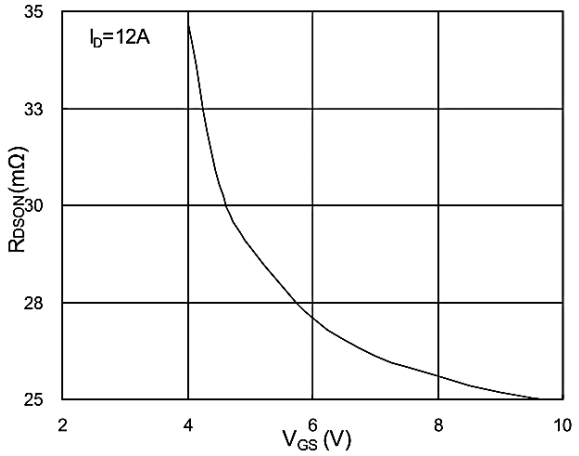


Fig.2 On-Resistance v.s Gate-Source

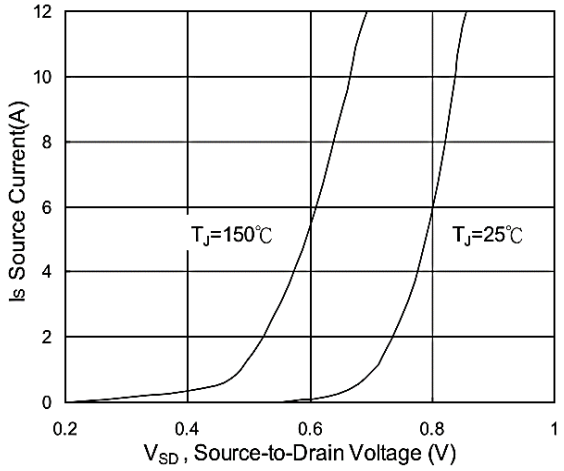


Fig.3 Forward Characteristics of Reverse

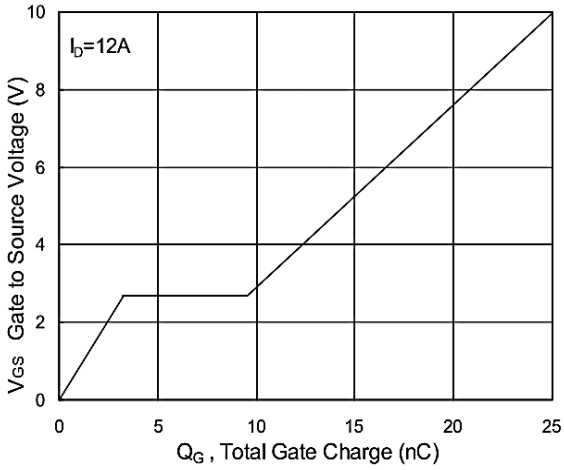


Fig.4 Gate-Charge Characteristics

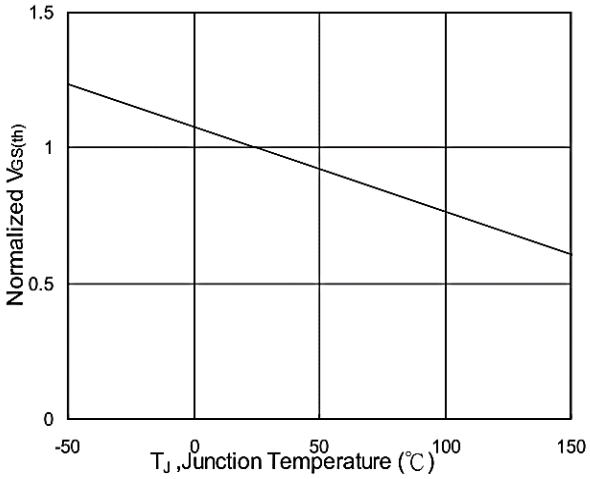


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

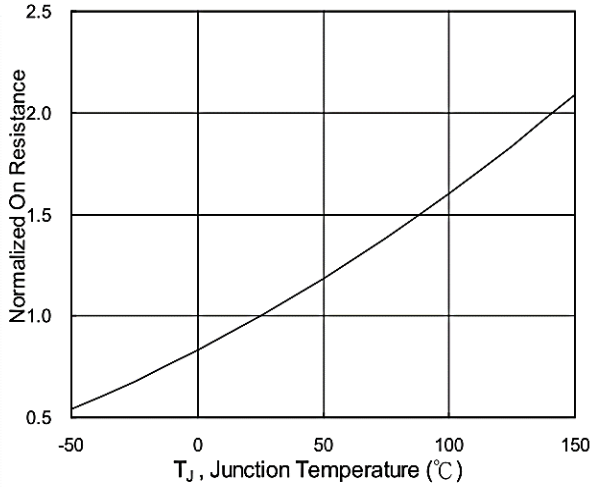


Fig.6 Normalized R_{DSON} v.s T_J

Ratings and Characteristic Curves

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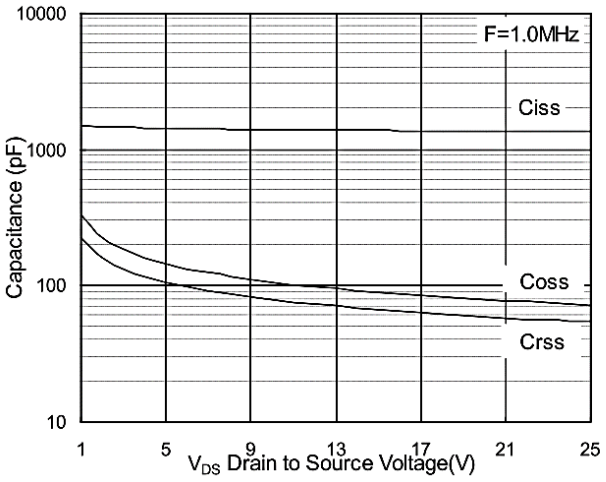


Fig.7 Capacitance

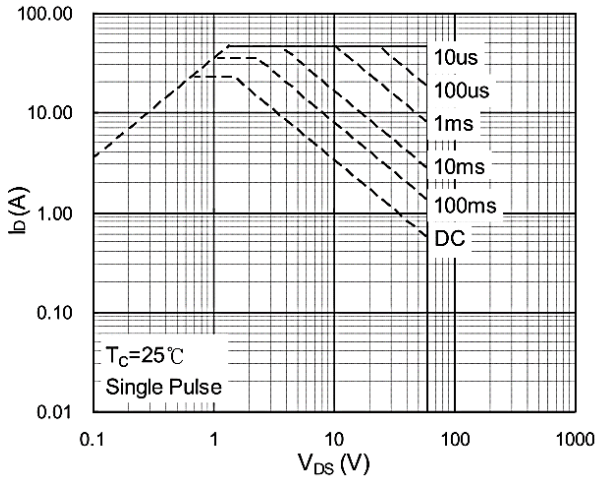


Fig.8 Safe Operating Area

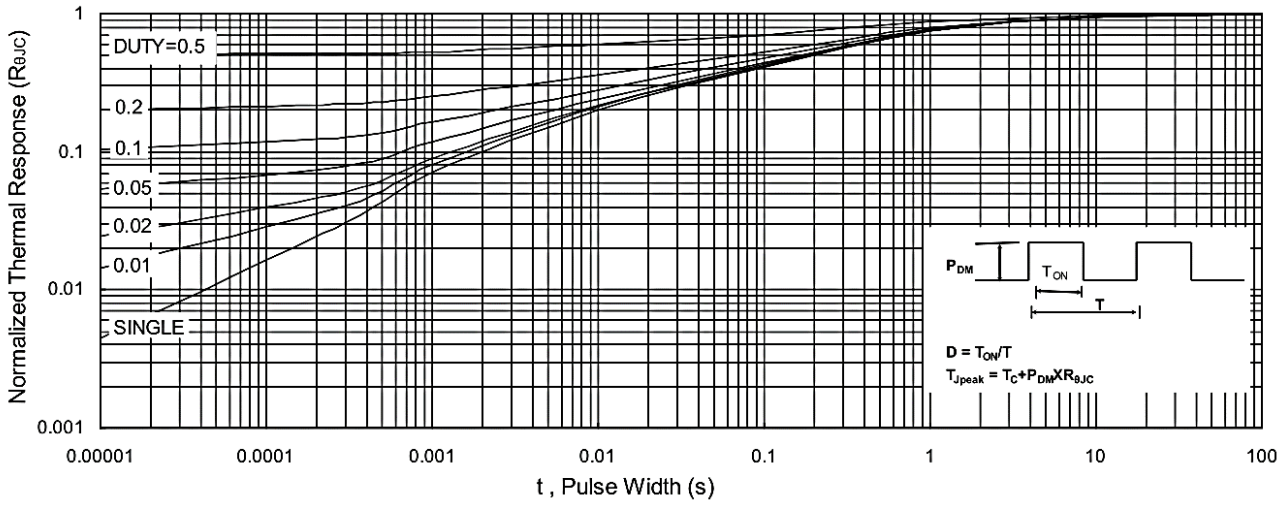


Fig.9 Normalized Maximum Transient Thermal Impedance

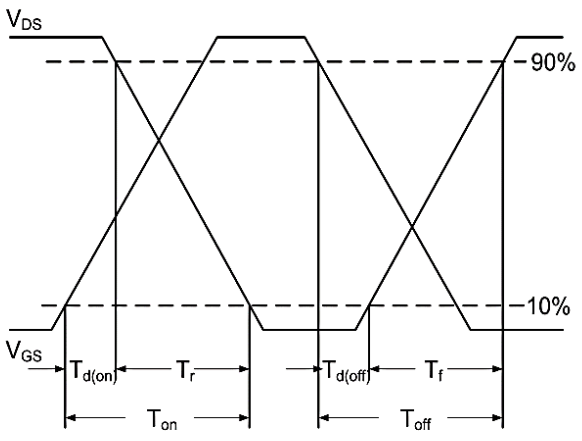


Fig.10 Switching Time Waveform

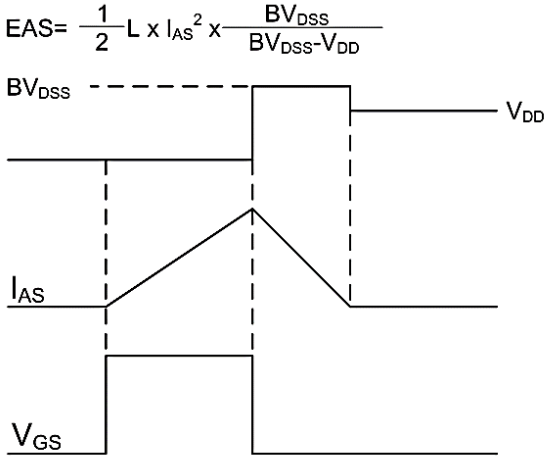


Fig.11 Unclamped Inductive Waveform

Ratings and Characteristic Curves

P-Channel Typical Characteristics

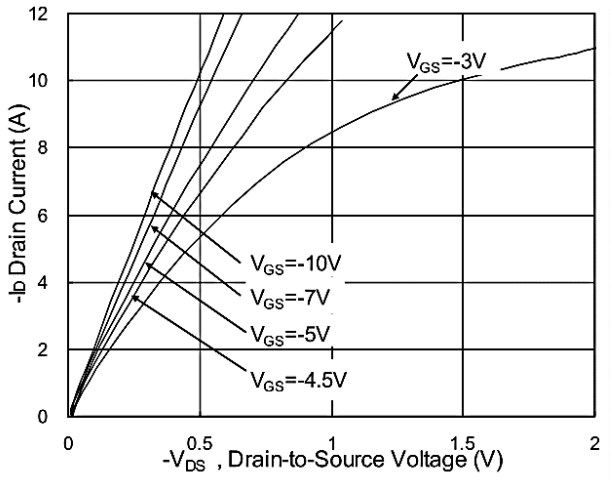


Fig.1 Typical Output Characteristics

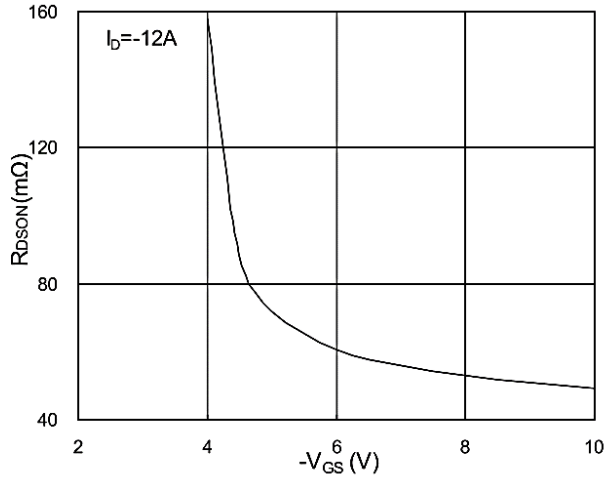


Fig.2 On-Resistance v.s Gate-Source

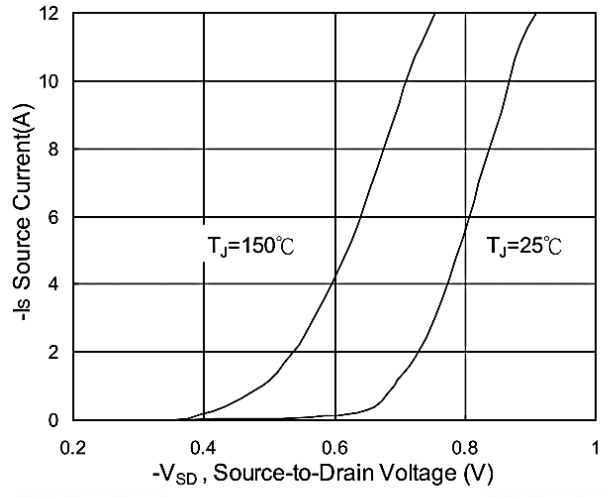


Fig.3 Forward Characteristics of Reverse

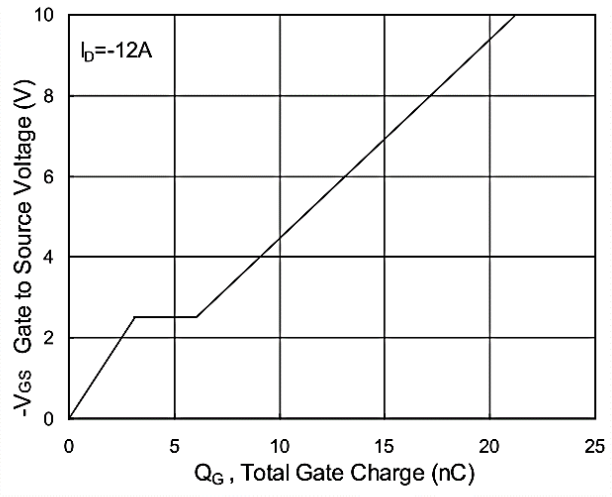


Fig.4 Gate-Charge Characteristics

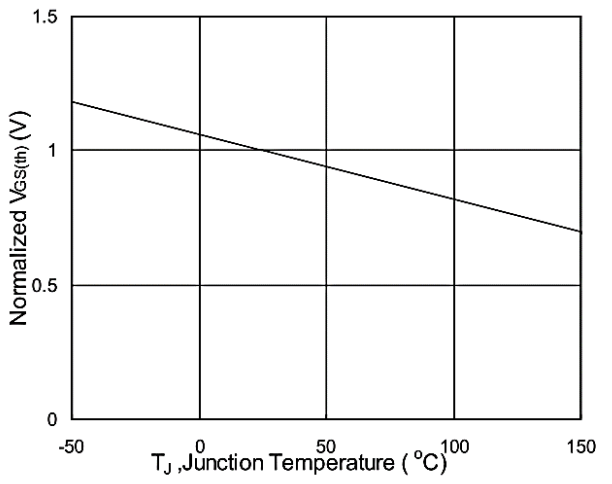


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

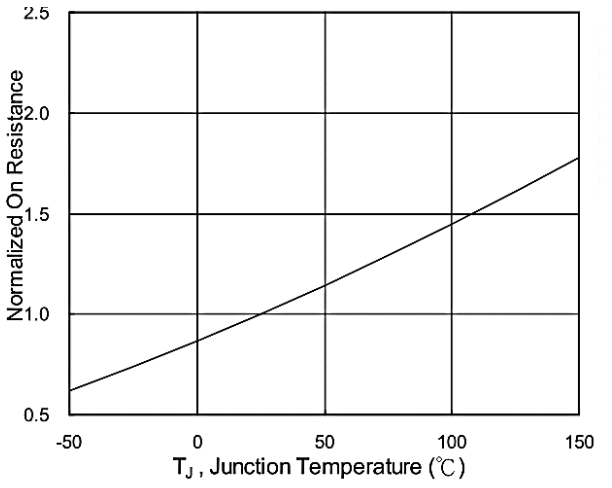


Fig.6 Normalized R_{DSON} v.s T_J

Ratings and Characteristic Curves

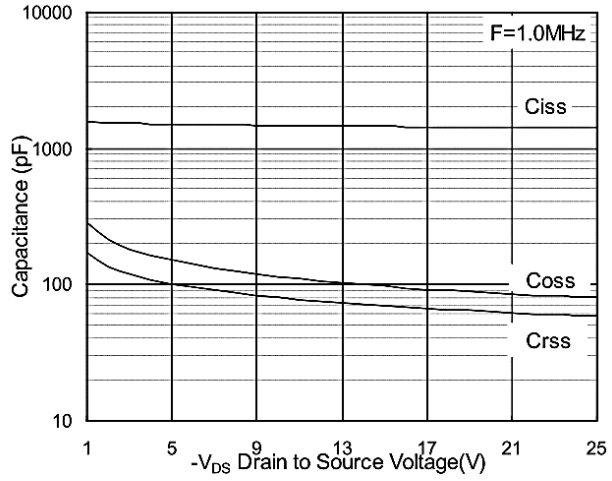


Fig.7 Capacitance

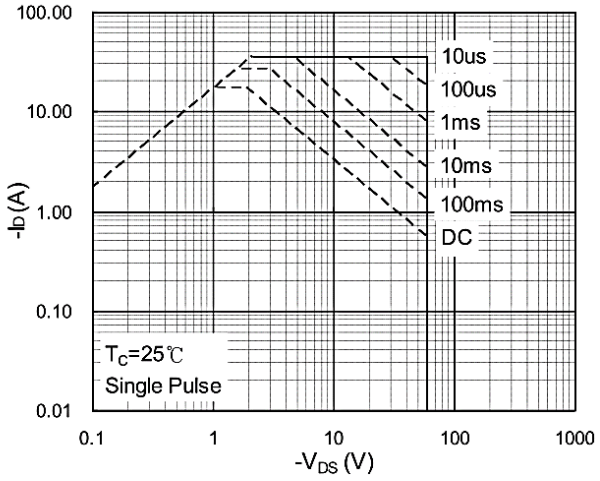
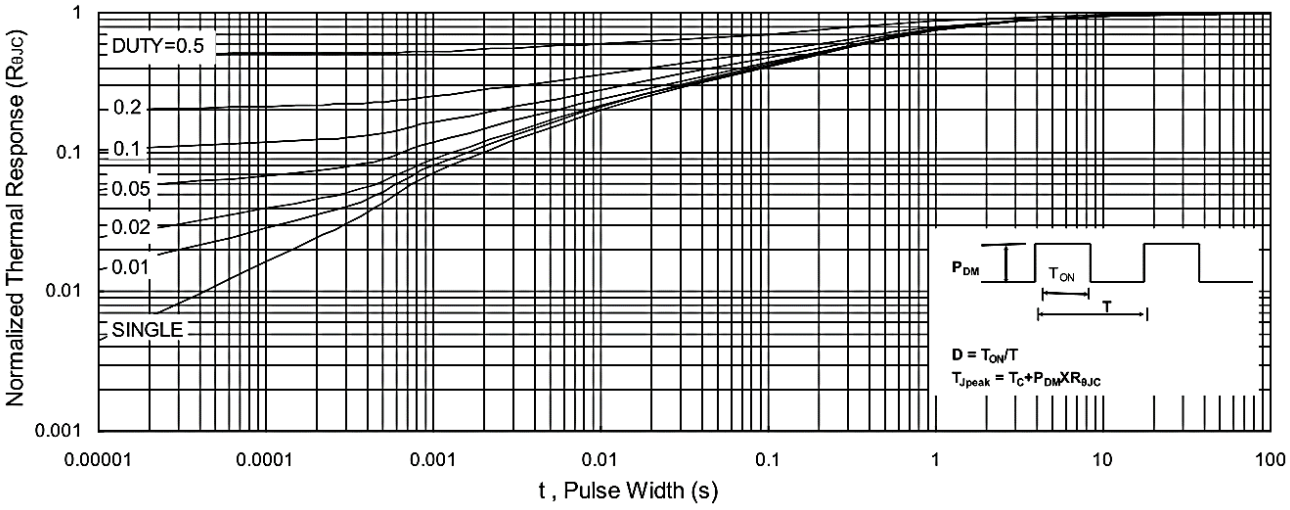


Fig.8 Safe Operating Area



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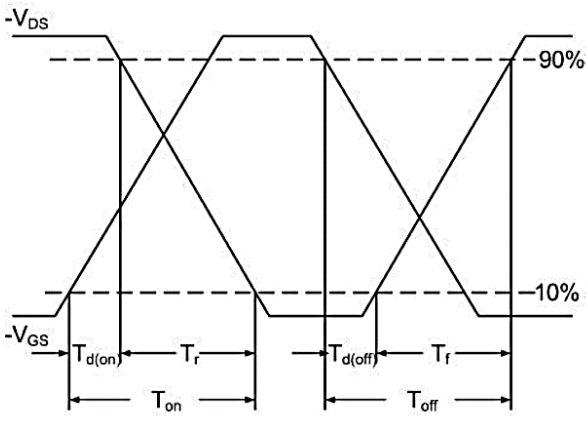


Fig.10 Switching Time Waveform

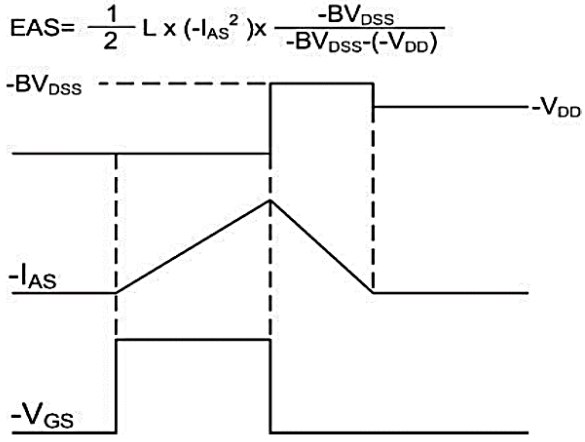
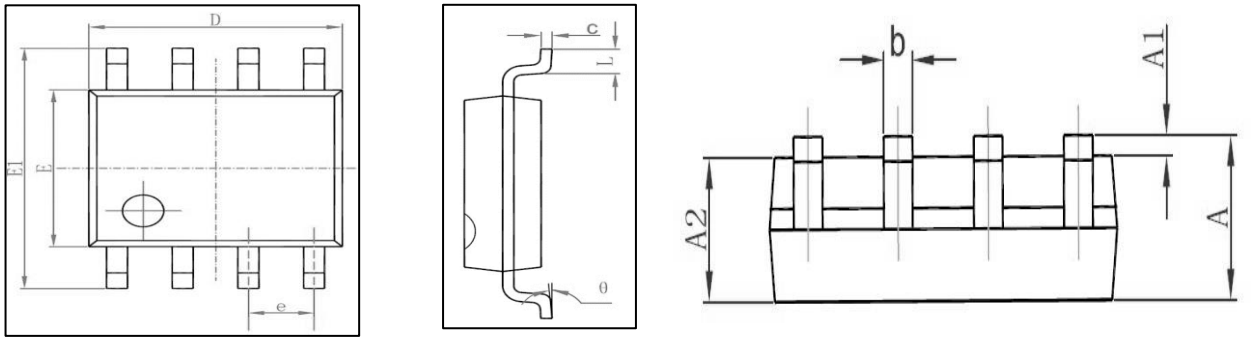


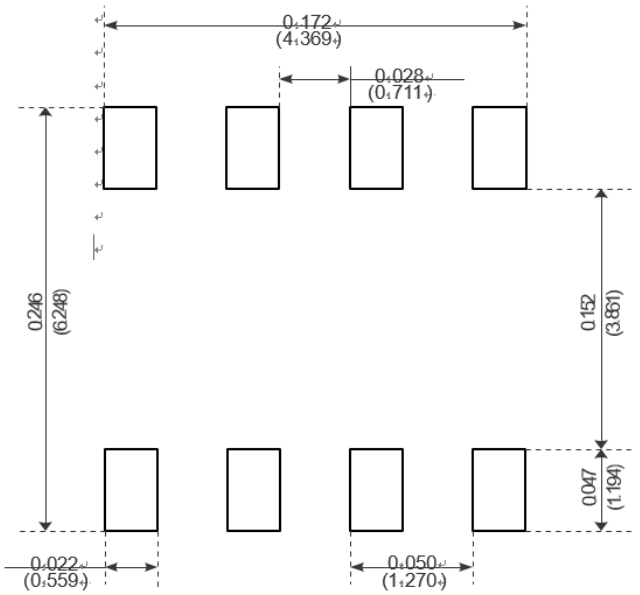
Fig.11 Unclamped Inductive Waveform

Package Outline Dimensions Millimeters

SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Recommended Minimum Pads