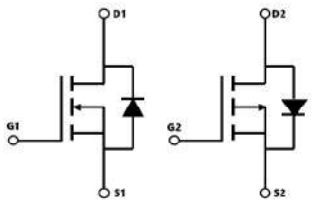
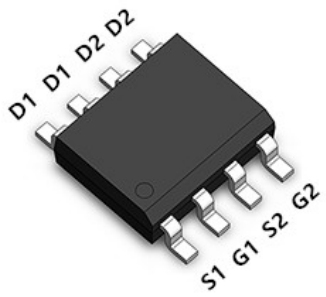
30V N+P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	6.2A
V_{DSS}	30V
R_{DSON}-typ(@V_{GS}=10V)	< 25mΩ(Type:18 mΩ)
I_D	-4.8A
V_{DSS}	-30V
R_{DSON}-typ(@V_{GS}=-10V)	< 60mΩ(Type:48 mΩ)





SOP-8

Application

- Lithium battery protection
- Wireless impact
- Mobile phone fast charging

Product Specification Classification

Part Number	Package	Marking	Pack
YFW4606S	SOP-8	YFW 4606S 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}	30	-30	V
Gate - Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current, V_{GS} @ 10V[1]@T_A=25℃	I_D	6.2	-4.8	A
Continuous Drain Current, V_{GS} @ 10V[1]@T_A=70℃	I_D	5	-3.8	A
Pulsed Drain Current[2]	I_{DM}	24	-24	A
Single Pulse Avalanche Energy[3]	E_{AS}	26.6	37	mJ
Avalanche Current	I_{AS}	12.7	15	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
Thermal Resistance Junction-Ambient [1]	$R_{\theta JA}$	85		°C/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	60		°C/W

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}	30	31.5	-	V
BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	$\Delta BV_{DSS/\Delta TJ}$	-	0.023	-	V/℃
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		-	24	40	
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		$\Delta V_{GS(th)}$	-	-4.2	-	mV/℃
Drain-Source Leakage Current	V_{DS}=24V, V_{GS}=0V T_J=25℃	I_{DSS}	-	-	1	uA
	V_{DS}=24V , 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 = 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[1,5]	V_G=V_D=0V , Force Current	I_S	-	-	6.2	A
Pulsed Source Current[2,5]		I_{SM}	-	-	24	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}	-30	-32	-	V
BVDSS Temperature Coefficient	Reference to 25℃ , I_D=-1mA	$\Delta BV_{DSS/\Delta TJ}$	-	-0.02	-	V/℃
Static Drain-Source On-Resistance[2]	V_{GS}=-10V, I_D=-4.1A	$R_{DS(ON)}$	-	42	55	mΩ
	V_{GS}=-4.5V, I_D=-3.5A		-	68	85	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		$\Delta V_{GS(th)}$	-	4.32	-	mV/℃
Drain-Source Leakage Current	V_{DS}=-24V, V_{GS}=0V T_J=25℃	I_{DSS}	-	-	-1	uA
	V_{DS}=-24V , 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}	-	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[1,5]	V_G=V_D=0V , Force Current	I_S	-	-	-4	A
Pulsed Source Current[2,5]		I_{SM}	-	-	-24	A
Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	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℃ junction temperature
4、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

N-Channel Typical Characteristics

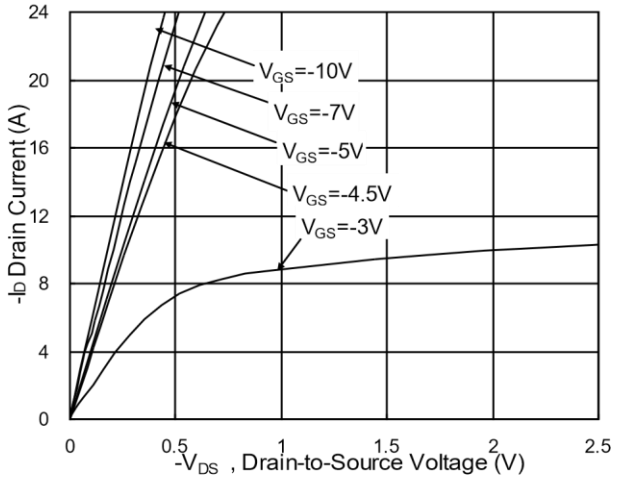


Fig.1 Typical Output Characteristics

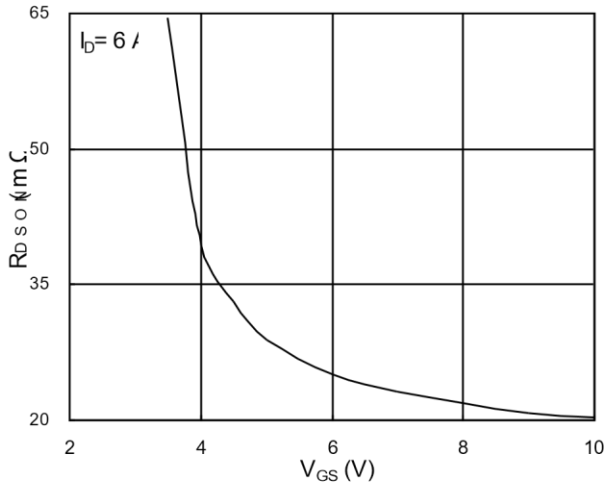


Fig.2 On-Resistance vs. Gate-Source

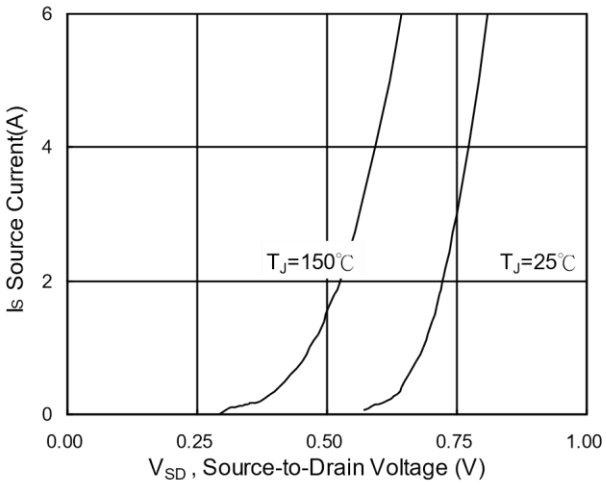


Fig.3 Forward Characteristics Of Reverse

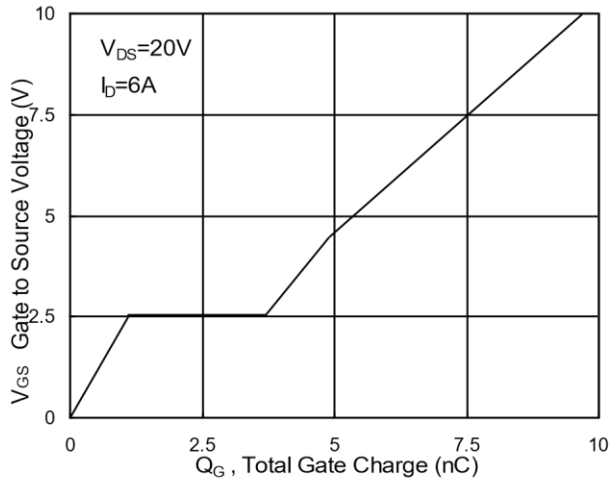


Fig.4 Gate-Charge Characteristics

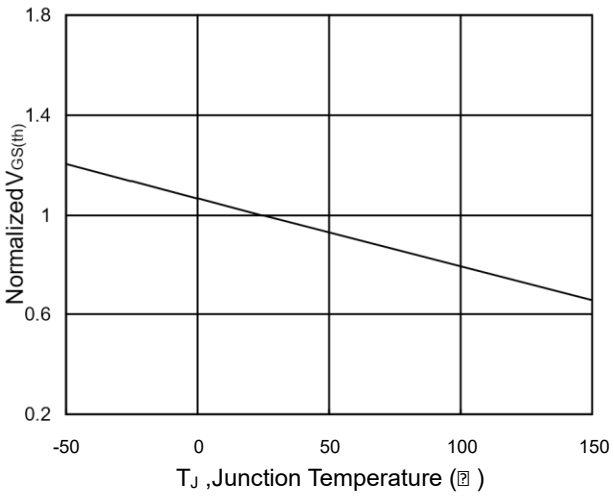


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

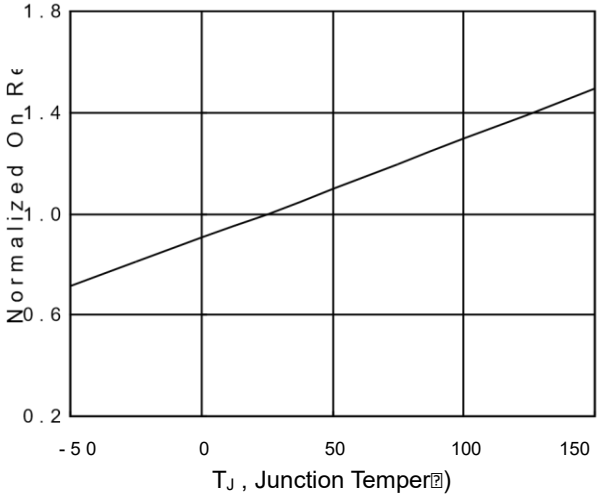


Fig.6 Normalized R_{DSON} vs. T_J

Ratings and Characteristic Curves

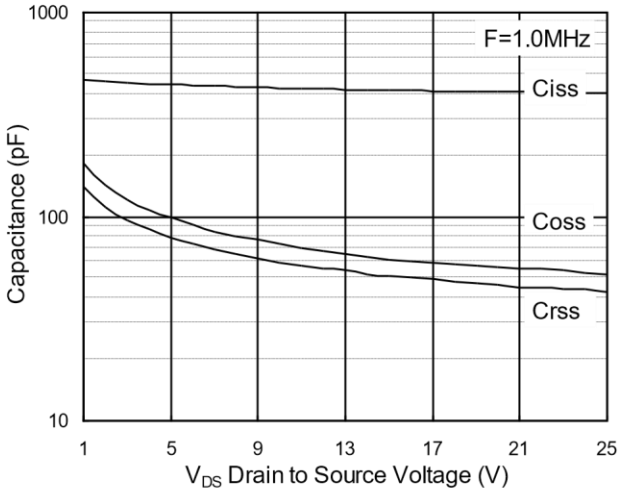


Fig.7 Capacitance

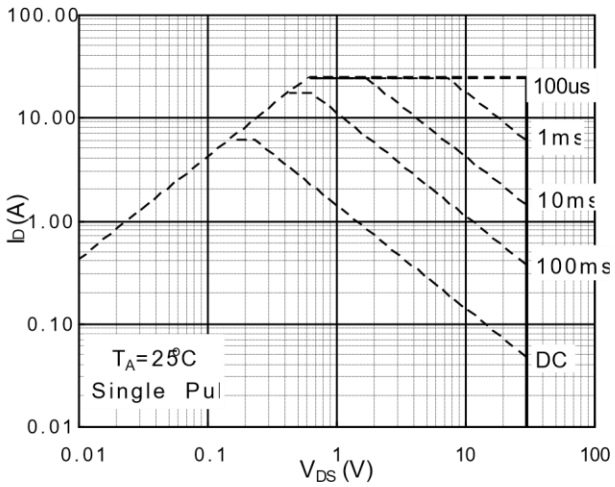


Fig.8 Safe Operating Area

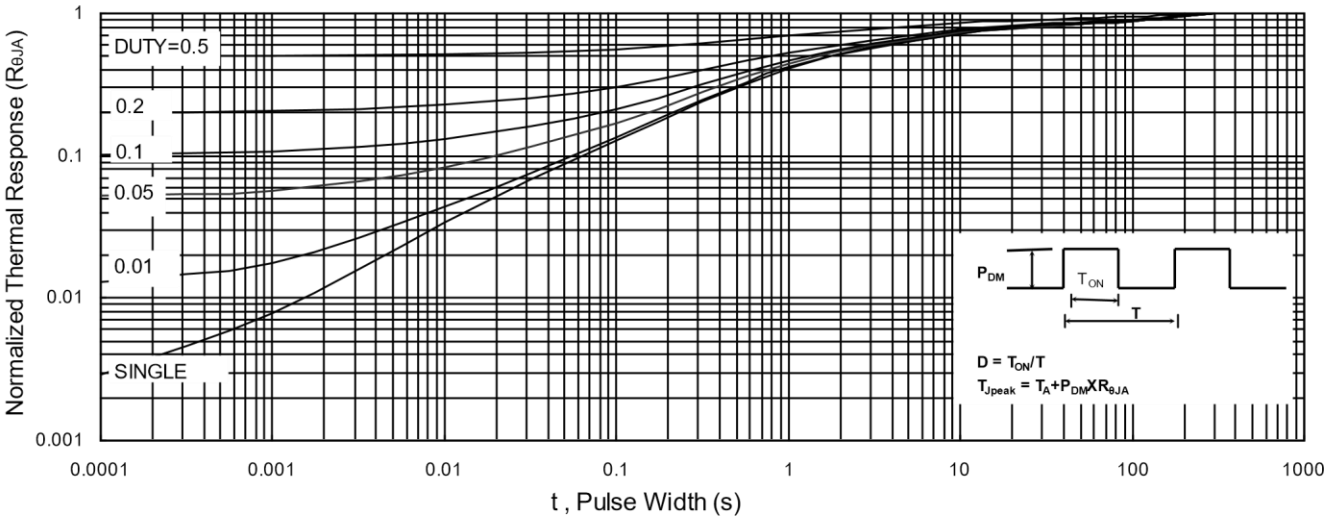


Fig.9 Normalized Maximum Transient Thermal Impedance

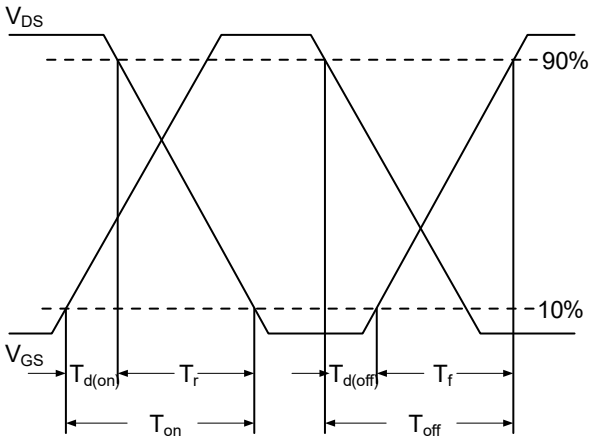


Fig.10 Switching Time Waveform

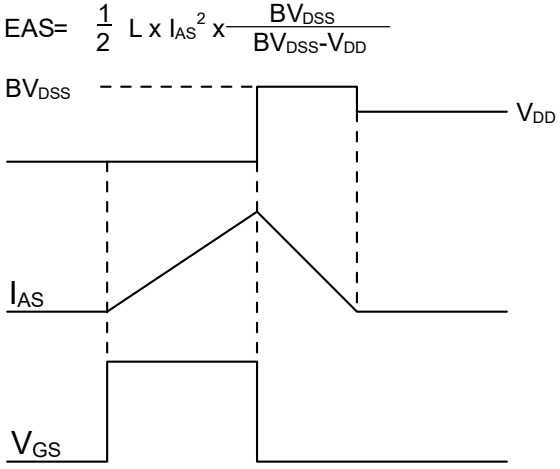


Fig.11 Unclamped Inductive Switching Waveform

Ratings and Characteristic Curves

P-Channel Typical Characteristics

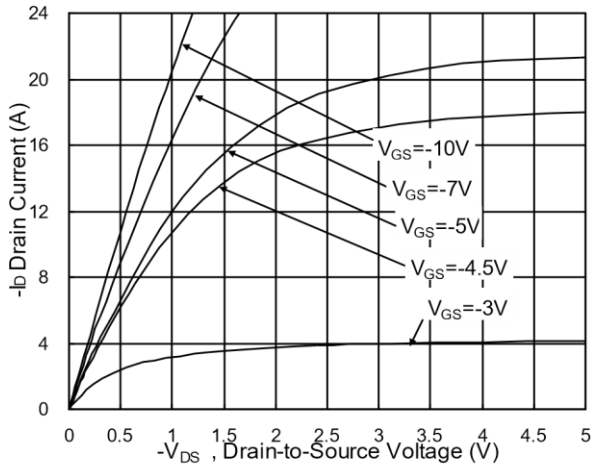


Fig.1 Typical Output Characteristics

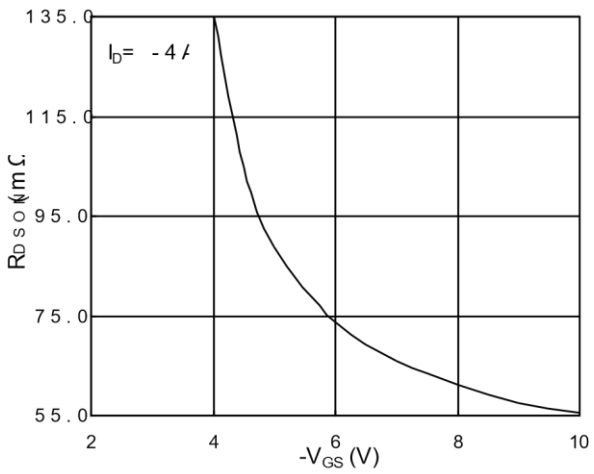


Fig.2 On-Resistance vs. G-S Voltage

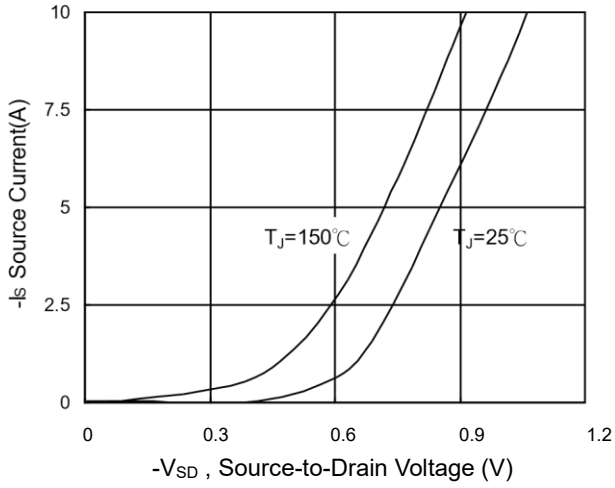


Fig.3 Forward Characteristics ofReverse

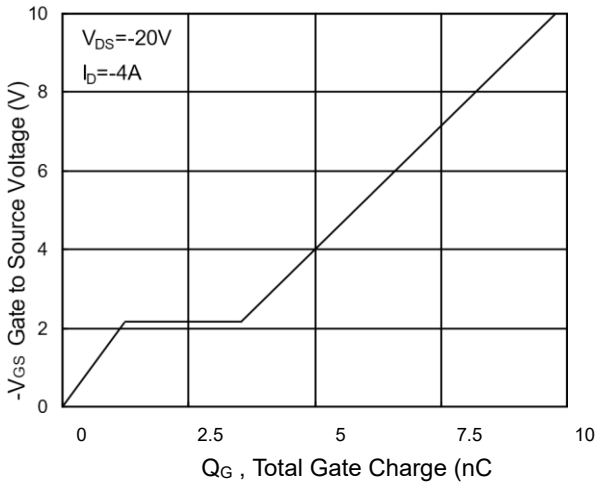


Fig.4 Gate-Charge Characteristics

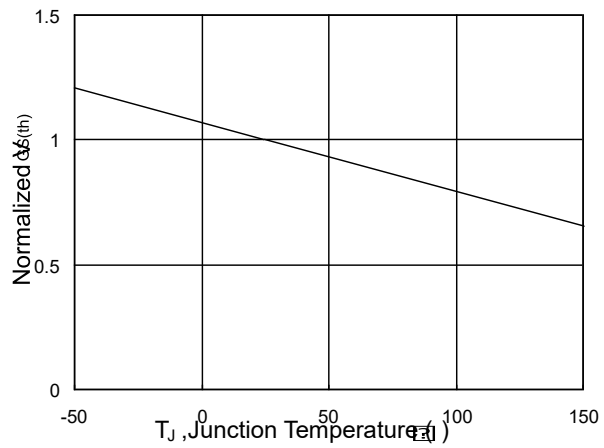


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

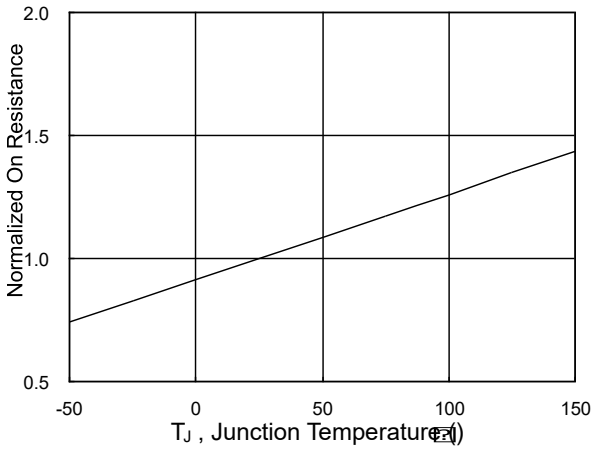


Fig.6 Normalized R_{DSON} vs. T_J

Ratings and Characteristic Curves

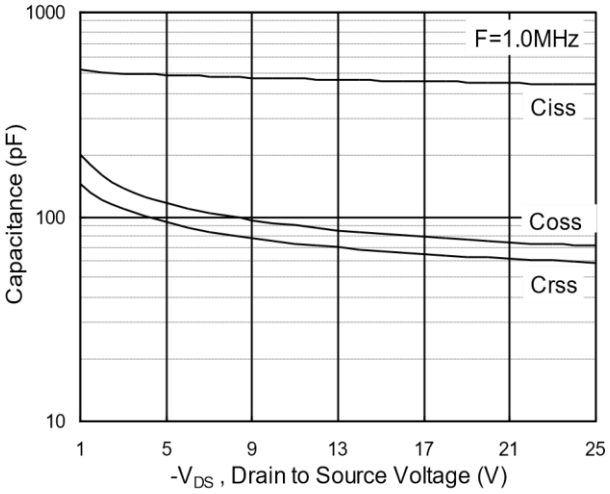


Fig.7 Capacitance

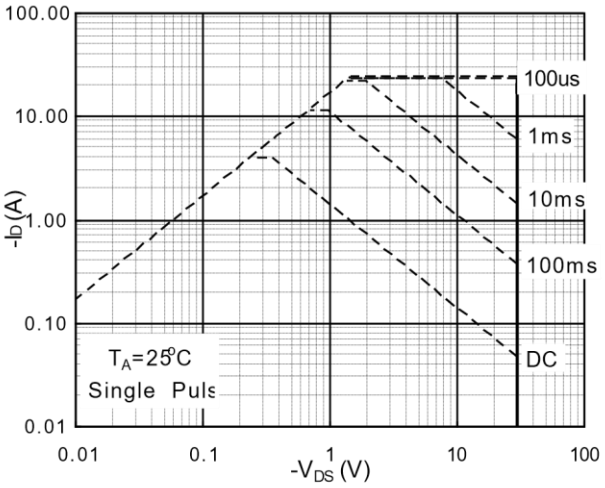


Fig.8 Safe Operating Area

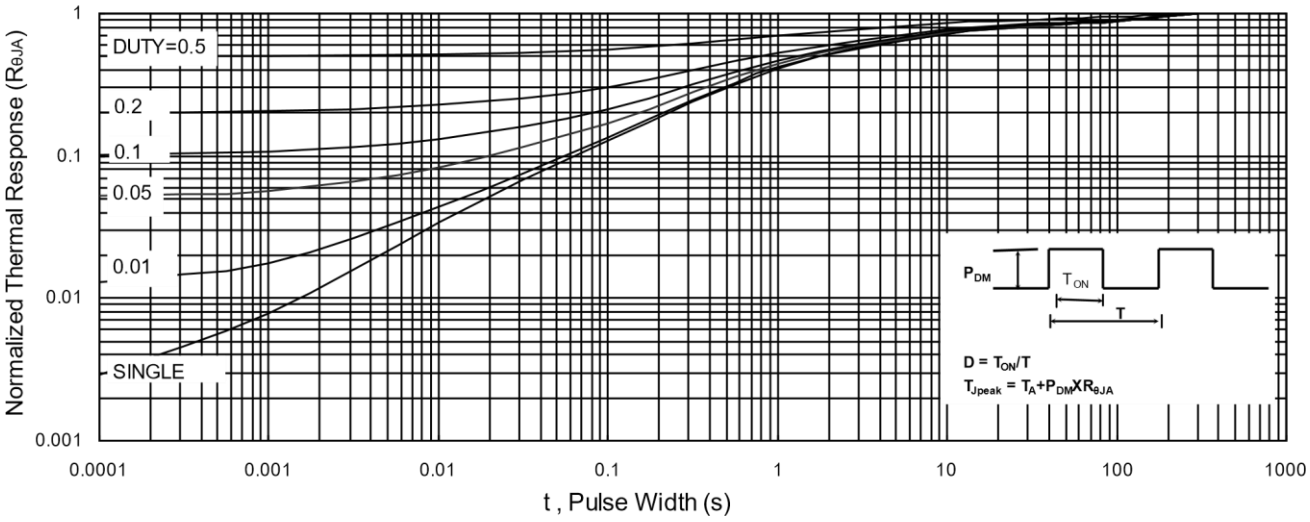


Fig.9 Normalized Maximum Transient Thermal Impedance

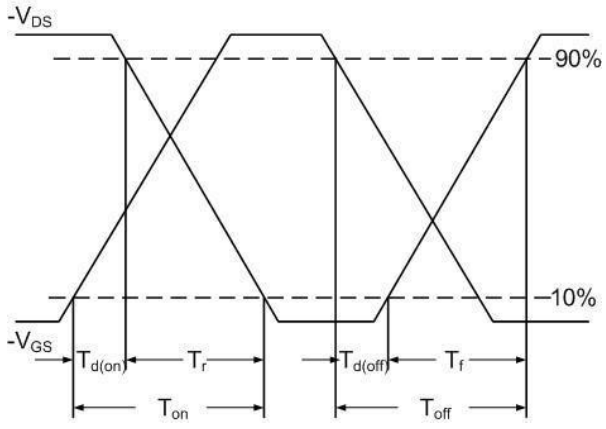


Fig.10 Switching Time Waveform

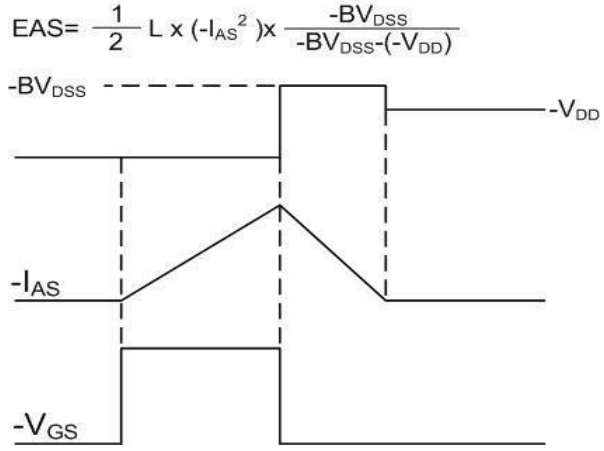


Fig.11 Unclamped Inductive Switching Waveform

Package Outline Dimensions Millimeters

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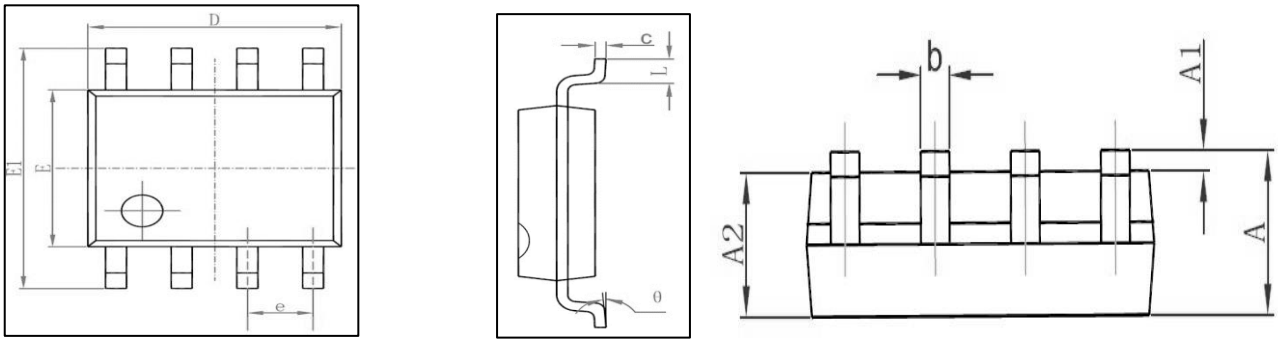
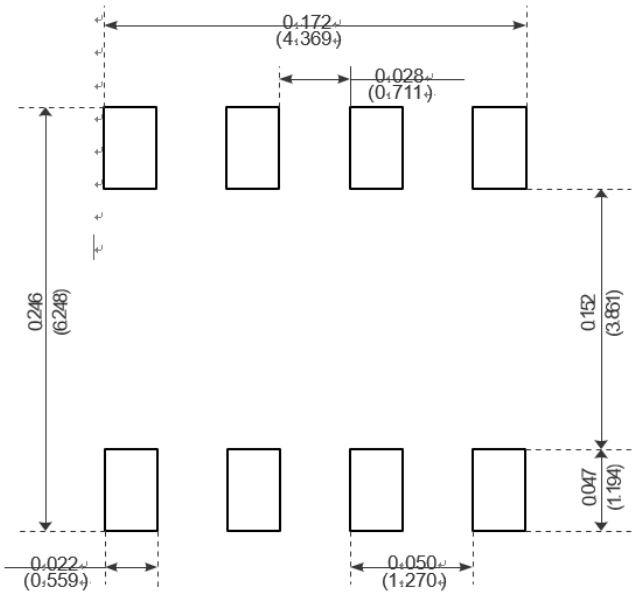


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050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



Recommended Minimum Pads