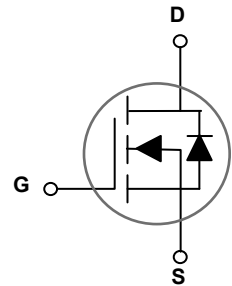


Main Product Characteristics

$V_{(BR)DSS}$	500V
$R_{DS(ON)}$	0.95Ω
I_D	7A



TO-251



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficient switched mode power supplies, TV Power, server power, adapter/charger, and PV inverter/UPS
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



Description

The SSFG07N50 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	500	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current – Continuous ($T_C=25^{\circ}\text{C}$)	I_D	7	A
Drain Current – Continuous ($T_C=100^{\circ}\text{C}$)		4.4	A
Drain Current – Pulsed ¹	I_{DM}	28	A
Single Pulse Avalanche Energy ²	E_{AS}	25	mJ
Single Pulse Avalanche Current ²	I_{AS}	7	A
Power Dissipation ($T_C=25^{\circ}\text{C}$)	P_D	60	W
Power Dissipation – Derate above 25°C		0.48	W/°C
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	2.1	°C/W

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	500	---	---	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$	---	0.5	---	$V/^{\circ}\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=500V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=400V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	---	---	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	± 100	μA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=4A$	---	0.8	0.95	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	3	4	5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	-7	---	$\text{mV}/^{\circ}\text{C}$
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=2A$	---	7	---	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{3,4}	Q_g	$V_{DS}=400V, V_{GS}=10V, I_D=1A$	---	27	41	nC
Gate-Source Charge ^{3,4}	Q_{gs}		---	7.1	11	
Gate-Drain Charge ^{3,4}	Q_{gd}		---	7.4	12	
Turn-On Delay Time ^{3,4}	$T_{d(on)}$	$V_{DD}=300V, V_{GS}=10V, R_G=25\Omega, I_D=1A$	---	30	57	nS
Rise Time ^{3,4}	T_r		---	18	34	
Turn-Off Delay Time ^{3,4}	$T_{d(off)}$		---	38	72	
Fall Time ^{3,4}	T_f		---	33	63	
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	1420	2060	pF
Output Capacitance	C_{oss}		---	95	140	
Reverse Transfer Capacitance	C_{rss}		---	7	15	
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2.3	-4.6	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	$V_G=V_D=0V, \text{Force Current}$	---	---	7	A
Pulsed Source Current	I_{SM}		---	---	28	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	---	1	V
Reverse Recovery Time ³	t_{rr}	$V_{GS}=0V, I_S=1A, dI/dt=100A/\mu S, T_J=25^{\circ}\text{C}$	---	---	---	nS
Reverse Recovery Charge ³	Q_{rr}		---	---	---	μC

Notes:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=50V, V_{GS}=10V, L=1\text{mH}, I_{AS}=7A, R_G=25\Omega, \text{Starting } T_J=25^{\circ}\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu S$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

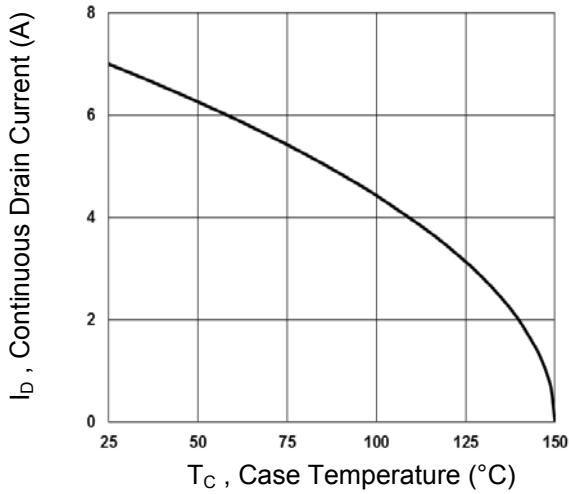


Fig.1 Continuous Drain Current vs. T_c

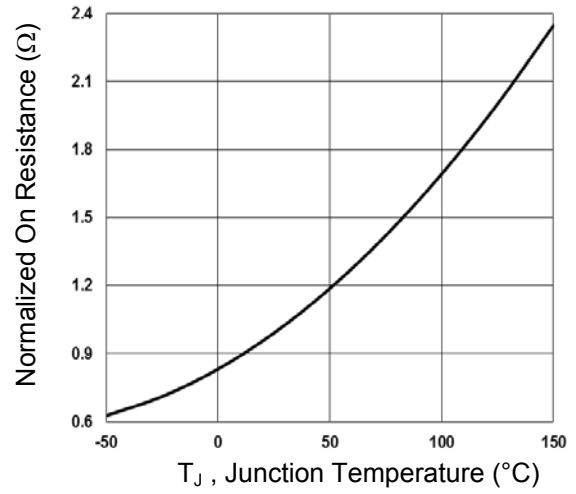


Fig.2 Normalized $R_{DS(ON)}$ vs. T_j

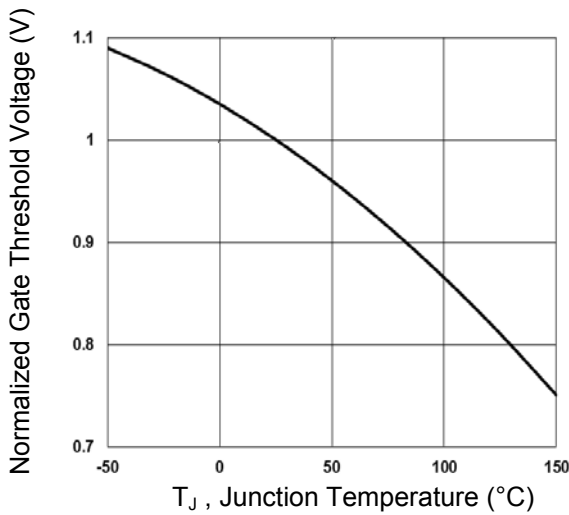


Fig.3 Normalized V_{th} vs. T_j

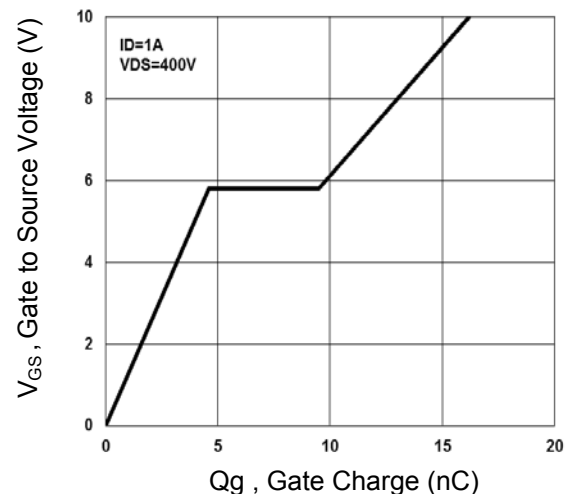


Fig.4 Gate Charge Waveform

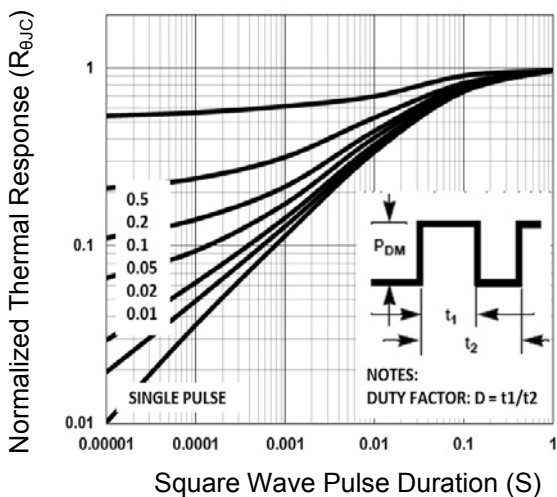


Fig.5 Normalized Transient Impedance

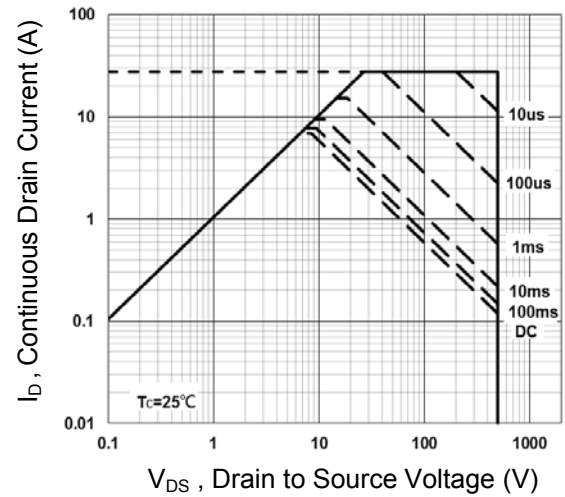


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

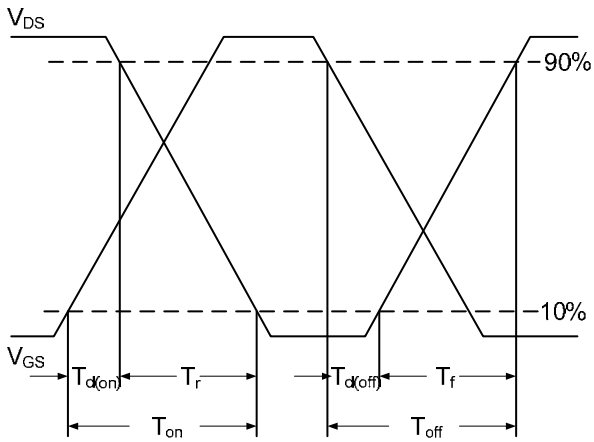


Fig.7 Switching Time Waveform

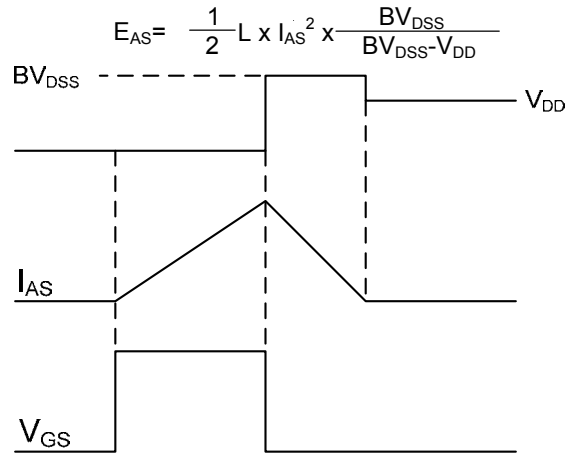
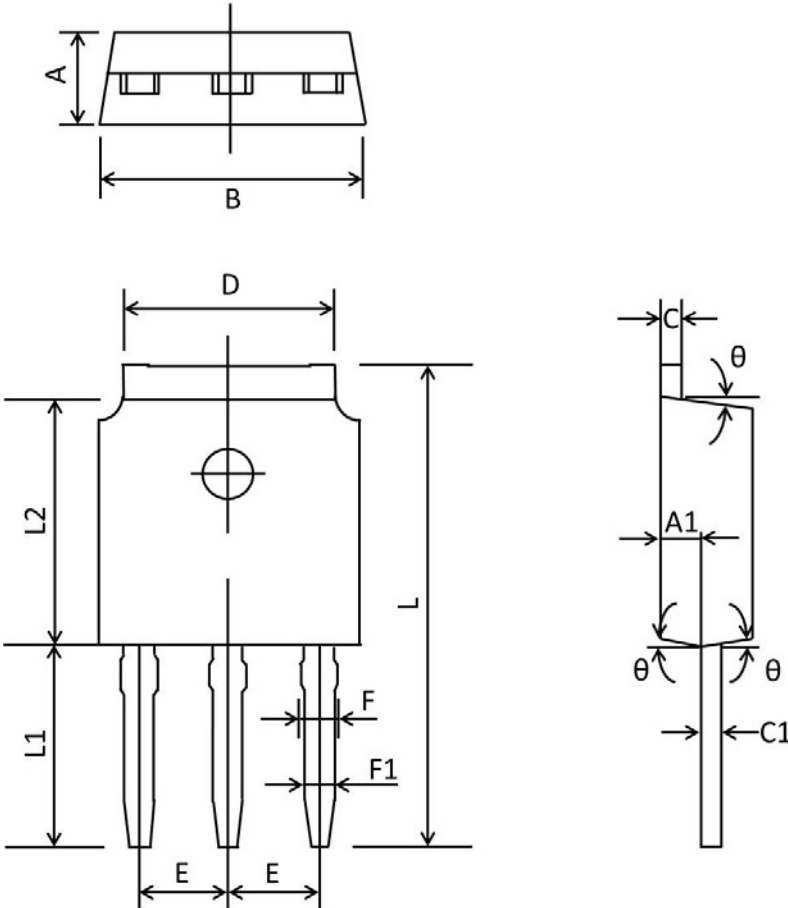


Fig.8 E_{AS} Waveform

Package Outline Dimensions

TO-251



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	11.70	12.30	0.461	0.484
L1	4.8	5.2	0.189	0.205
L2	6.00	6.20	0.236	0.244
θ	3°	9°	3°	9°