GOOD-ARK SEMICONDUCTOR

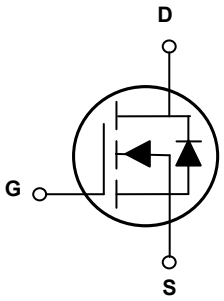
SSF8970

80V N-Channel MOSFET

Main Product Characteristics

V_{DSS}	80V
R_{DS}(on)	2.6mΩ (typ.)
I_D	200A

TO-220



Schematic Diagram

Description

The SSF8970 utilizes the latest trench processing techniques to achieve high cell density, low on-resistance and high repetitive avalanche rating. These features make this device extremely efficient and reliable for use in battery protection, power switching and a wide variety of other applications.

Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	80	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current – Continuous (T_C=25°C)	I_D	200	A
Drain Current – Continuous (T_C=100°C)		126	A
Drain Current – Pulsed[1]	I_{DM}	800	A
Single Pulse Avalanche Energy[2]	E_{AS}	1280	mJ
Single Pulse Avalanche Current[2]	I_{AS}	160	A
Power Dissipation (T_C=25°C)	P_D	208	W
Power Dissipation – Derate above 25°C		1.66	W/°C
Storage Temperature Range	T_{STG}	-50 to 150	°C
Operating Junction Temperature Range	T_J	-50 to 150	°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction to ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	0.6	°C/W

Electrical Characteristics (T_A=25°C unless otherwise specified)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B_{VDSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	80	-	-	V
B_{VDSS}/T_J	BVDSS Temperature Coefficient	Reference to 25°C , I_D=1mA	-	0.05	-	V/°C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25°C V_{DS}=64V , V_{GS}=0V , T_J=125°C	-	-	1 10	uA uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±25V , V_{DS}=0V	-	-	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=20A	-	2	2.6	mW
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.5	2.2	3.5	V
$V_{GS(th)}$	VGS(th) Temperature Coefficient		-	-5	-	mV/°C
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A	-	18	-	S

Dynamic and Switching Characteristics

Qg	Total Gate Charge[3,4]		-	247	360	
Qgs	Gate-Source Charge[3,4]	V_{DS}=40V , V_{GS}=10V , I_D=10A	-	63.5	125	nC
Qgd	Gate-Drain Charge[3,4]		-	56	110	
Td(on)	Turn-On Delay Time[3,4]		-	71	140	
Tr	Rise Time[3,4]	V_{DD}=40V,V_{GS}=10V,R_G=10W. I_D=10A	-	103	200	
Td(off)	Turn-Off Delay Time[3,4]		-	291	580	ns
Tf	Fall Time[3,4]		-	170	340	
Ciss	Input Capacitance		-	15010	23000	
Coss	Output Capacitance	V_{DS}=30V , V_{GS}=0V , F=1MHz	-	772	1200	pF
Crss	Reverse Transfer Capacitance		-	81	160	
Rg	Gate Resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	1.8	3.6	W

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current		-	-	200	A
I_{SM}	Pulsed Source Current	V_G=V_D=0V , Force Current	-	-	400	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25°C	-	-	1	V
trr	Reverse Recovery Time	V_{GS}=0V,I_S=20A , di/dt=100A/μs	-	54	-	ns
Qrr	Reverse Recovery Charge	T_J=25°C	-	78	-	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. VDD=50V,VGS=10V,L=0.1mH,IAS=160A., Starting TJ=25℃
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristics

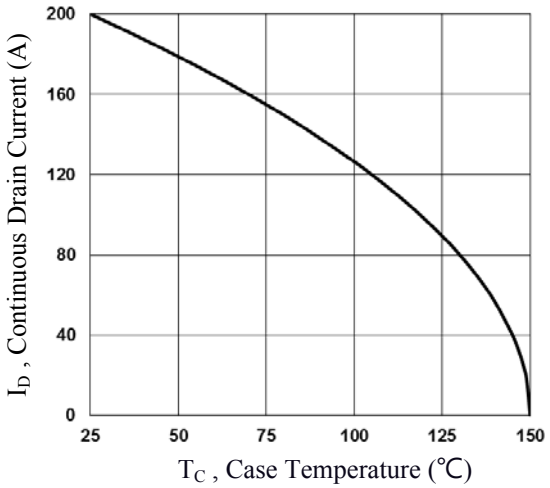


Fig.1 Continuous Drain Current vs. T_C

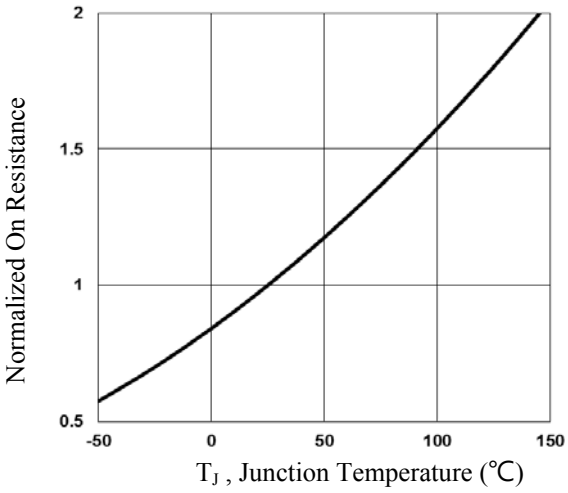


Fig.2 Normalized RDSON vs. T_J

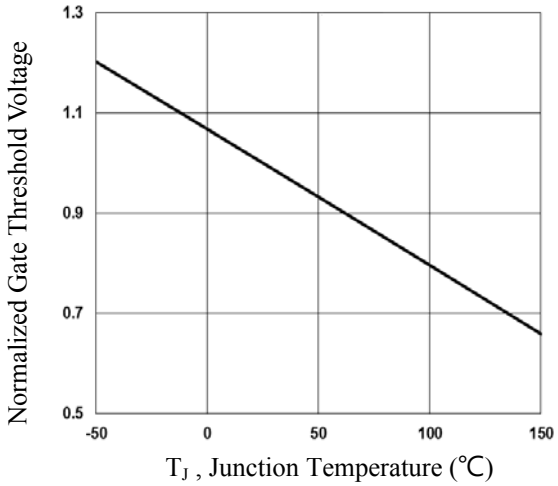


Fig.3 Normalized Vth vs. T_J

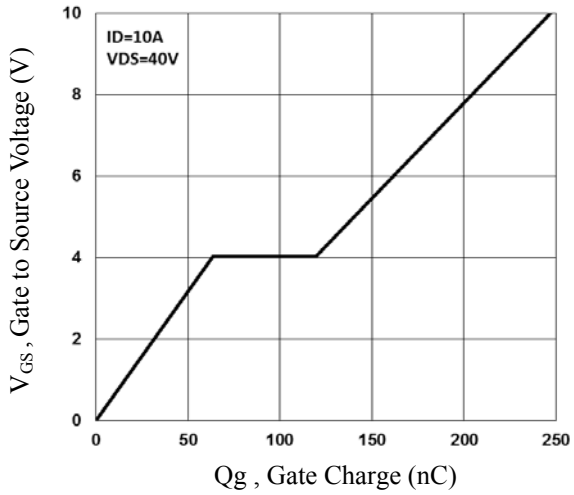


Fig.4 Gate Charge Characteristics

Typical Electrical and Thermal Characteristics

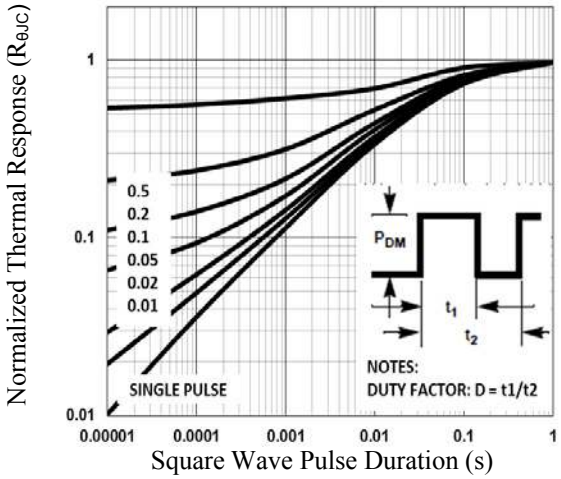


Fig.5 Normalized Transient Impedance

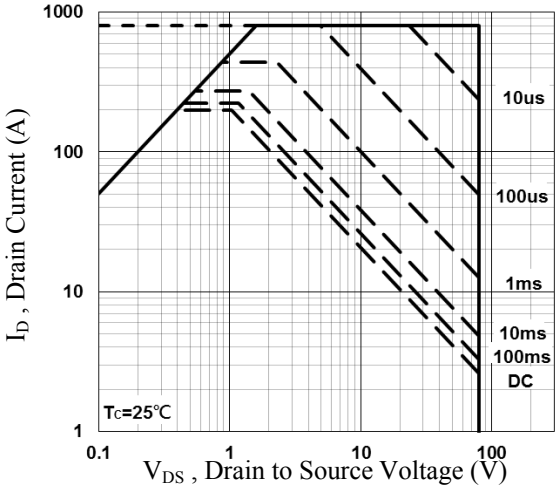


Fig.6 Maximum Safe Operation Area

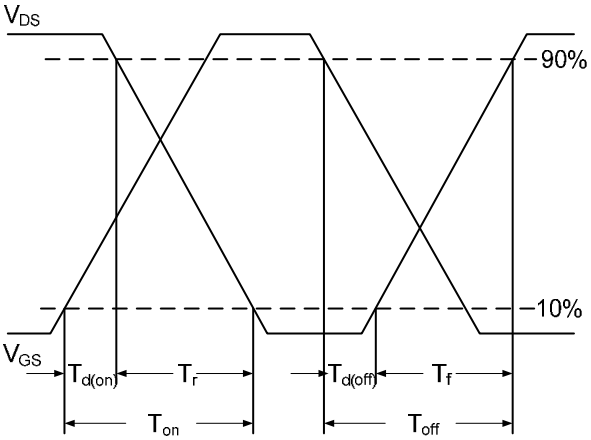


Fig.7 Switching Time Waveform

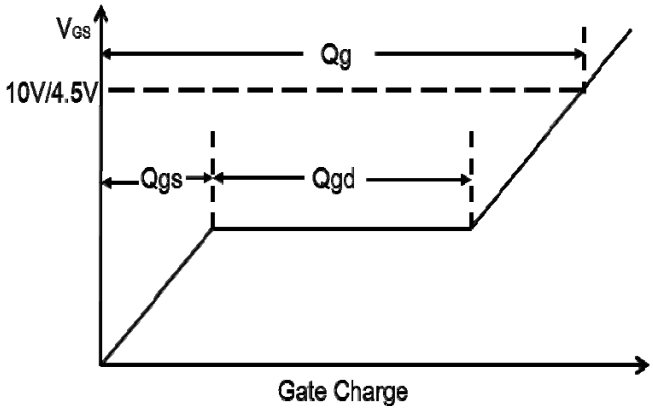
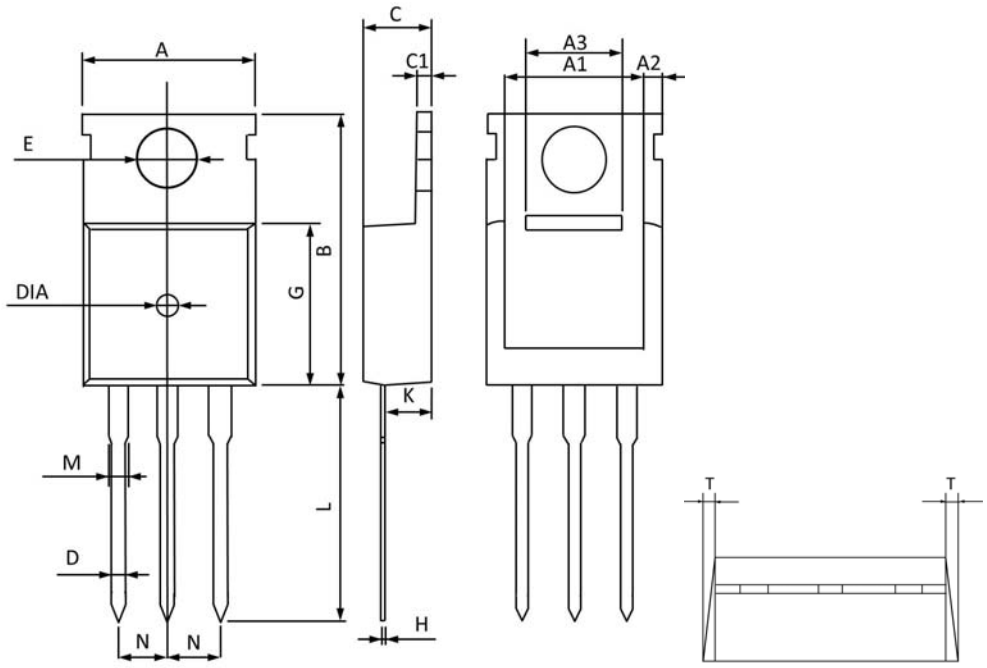


Fig.8 Gate Charge Waveform

Package Outline Dimensions TO-220



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	10.300	9.700	0.406	0.382
A1	8.840	8.440	0.348	0.332
A2	1.250	1.050	0.049	0.041
A3	5.300	5.100	0.209	0.201
B	16.200	15.400	0.638	0.606
C	4.680	4.280	0.184	0.169
C1	1.500	1.100	0.059	0.043
D	1.000	0.600	0.039	0.024
E	3.800	3.400	0.150	0.134
G	9.300	8.700	0.366	0.343
H	0.600	0.400	0.024	0.016
K	2.700	2.100	0.106	0.083
L	13.600	12.800	0.535	0.504
M	1.500	1.100	0.059	0.043
N	2.590	2.490	0.102	0.098
T	W0.35		W0.014	
DIA	Φ1.5 TYP.	deep0.2 TYP.	Φ0.059 TYP.	deep0.008 TYP.