GOOD-ARK SEMICONDUCTOR

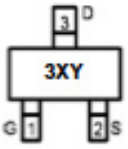
SSF2319GE

20V P-Channel MOSFET

Main Product Characteristics

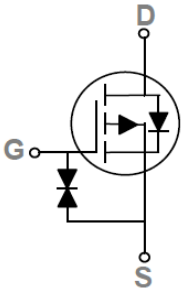
V_{DSS}	- 20V
R_{DS}(on)	440mΩ (typ.)
I_D	- 400mA

SOT-723



3: Part Marking
X: Year
Y: Lot

Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced trench MOSFET process technology
- Ideal for PWM, load switching and general power management
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature
- Main applications: notebooks, load switching, battery protection, hand-held instruments.

Description

The SSF2319GE utilizes the latest 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 Max Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±8	V
Drain Current-Continuous(Tc=25°C)	I_D	-400	mA
Drain Current-Continuous(Tc=100°C)	I_D	-250	mA
Drain Current-Pulsed (Note 1)	I_{DM}	-1.6	A
Maximum Power Dissipation	P_D	275	mW
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To +150	°C

Thermal Resistance

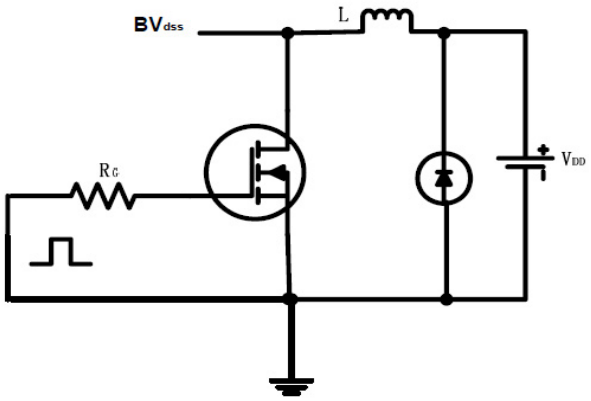
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	450	°C/W

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

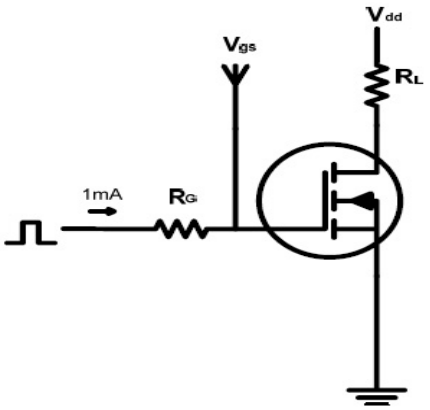
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	-20			V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}$ /$\triangle T_J$	Reference to 25℃, I_D= -1mA		-0.01		V/℃
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= -20V,V_{GS}=0V			-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±6V,V_{DS}=0V			±20	uA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D= -250μA	-0.3	-0.6	-1.0	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$	V_{DS}=V_{GS},I_D= -250μA		3		mV/℃
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}= -4.5V, I_D= -0.3A		440	600	mΩ
		V_{GS}= -2.5V, I_D= -0.2A		610	850	
		V_{GS}= -1.8V, I_D= -0.1A		810	1200	
		V_{GS}= -1.5V, I_D= -0.1A		1020	1600	
		V_{GS}= -1.2V, I_D= -0.1A		1800	3000	
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{lss}	V_{DS}= -10V,V_{GS}=0V, F=1.0MHz		40	78	PF
Output Capacitance	C_{oss}			15	30	PF
Reverse Transfer Capacitance	C_{rss}			6.5	13	PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= -10V,I_D= 0.2A V_{GS}= -4.5V,R_{GEN}=10Ω		8	16	nS
Turn-on Rise Time	t_r			5.2	10	nS
Turn-Off Delay Time	$t_{d(off)}$			30	60	nS
Turn-Off Fall Time	t_f			18	36	nS
Total Gate Charge	Q_g	V_{DS}= -10V,I_D= -0.2A, V_{GS}= -4.5V		1	2	nC
Gate-Source Charge	Q_{gs}			0.28	0.5	nC
Gate-Drain Charge	Q_{gd}			0.18	0.4	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S= -0.2A		-0.8	-1.0	V
Diode Forward Current (Note 2)	I_S	V_G=V_D=0V , Force Current			-400	mA

Test Circuits and Waveforms

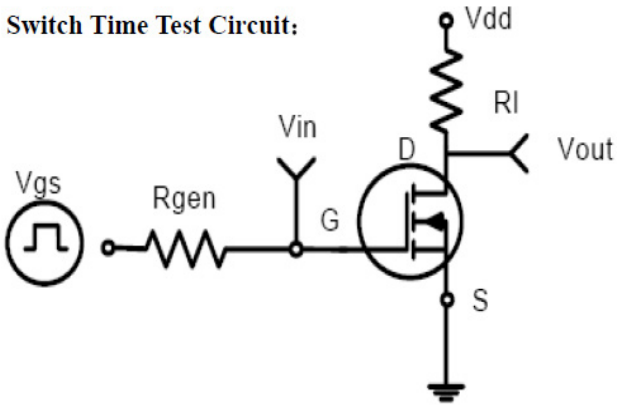
EAS test circuits:



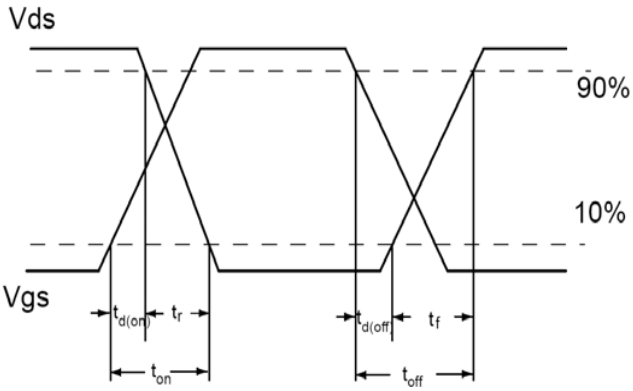
Gate charge test circuit:



Switch Time Test Circuit:



Switch Waveforms:



NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

Typical Electrical and Thermal Characteristics

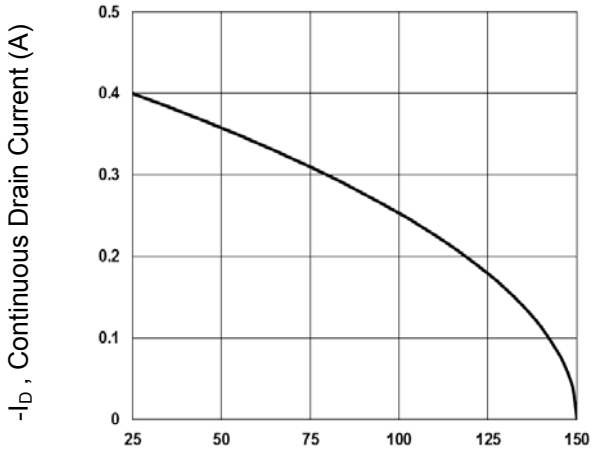


Figure 1: Drain Current vs. Tc

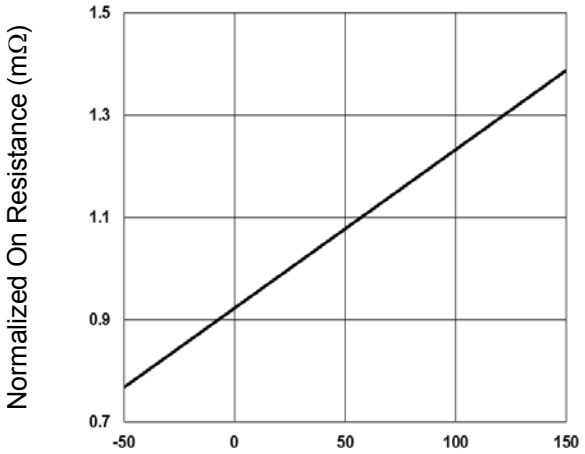


Figure 2: Normalized RDSon vs. TJ

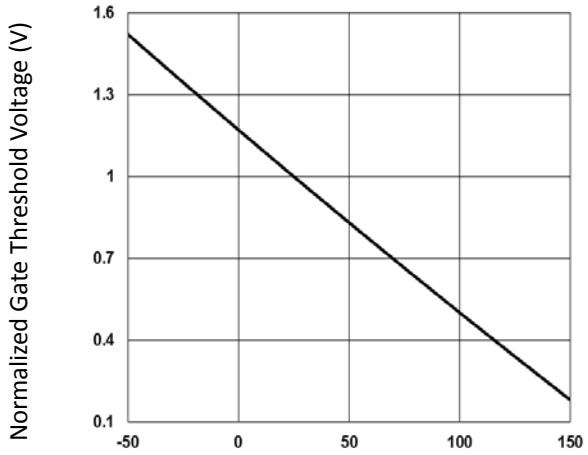


Figure 3: Normalized Vth vs. TJ

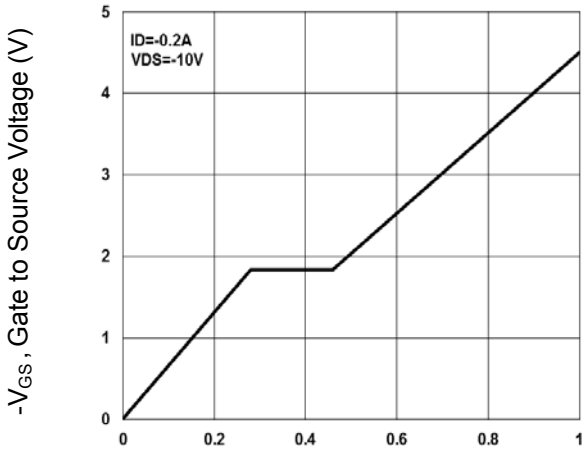


Figure 4： Gate Charge Waveform

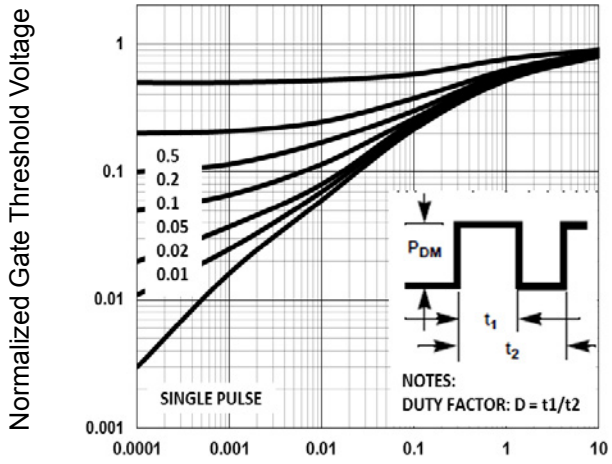


Figure 5 : Normalized Transient Response

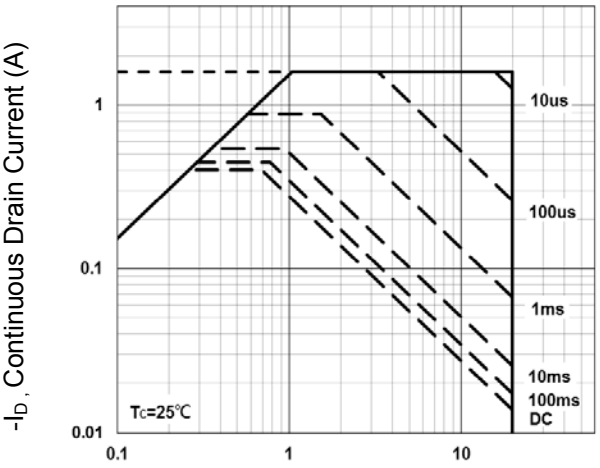
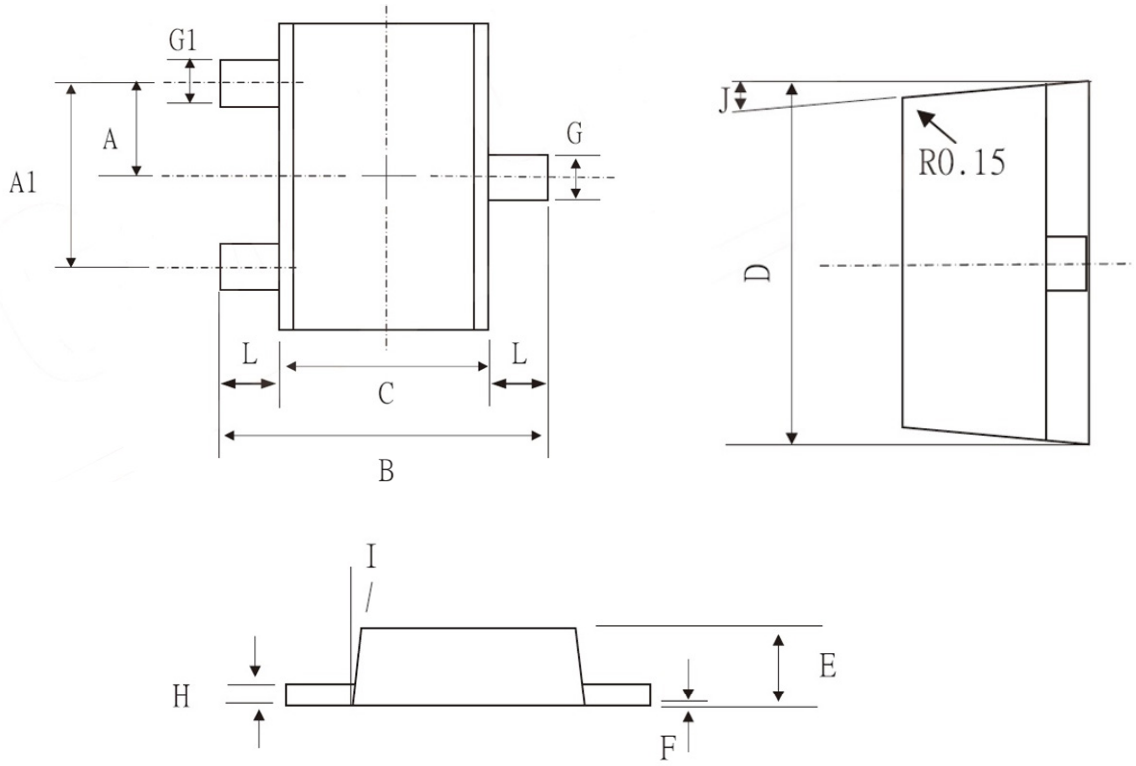


Figure 6: Safe Operation Area

Mechanical Data

SOT-723 Dimensions in Millimeters (Unit:mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.4BSC		0.016BSC	
A1	0.8BSC		0.031BSC	
B	1.250	1.150	0.049	0.045
C	0.850	0.750	0.033	0.030
D	1.250	1.150	0.049	0.045
E	0.390	0.370	0.015	0.015
F	0.050	0.000	0.002	0.000
G	0.270	0.220	0.011	0.009
G1	0.220	0.170	0.009	0.007
H	0.110	0.009	0.004	0.000
I	13°	9°	13°	9°
L	0.250	0.150	0.010	0.006
J	11°	7°	11°	7°

Ordering and Marking Information

Device Marking: 3

Package (Available)
SOT-723
Operating Temperature Range
C : -55 to 150 ºC

Devices per Unit

Package Type	Units/ Tape	Tapes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
SOT-723	8000pcs	15pcs	120000pcs	4pcs	480000pcs

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T_J=125ºC to 150ºC @ 80% of Max V_{DSS}/V_{CES}/VR	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	T_J=125ºC or 150ºC @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices