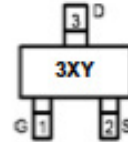


Main Product Characteristics

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

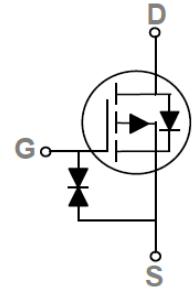


SOT-723



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 ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 8	V
Drain Current-Continuous($T_c=25^\circ\text{C}$)	I_D	-400	mA
Drain Current-Continuous($T_c=100^\circ\text{C}$)	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	$^\circ\text{C}$

Thermal Resistance

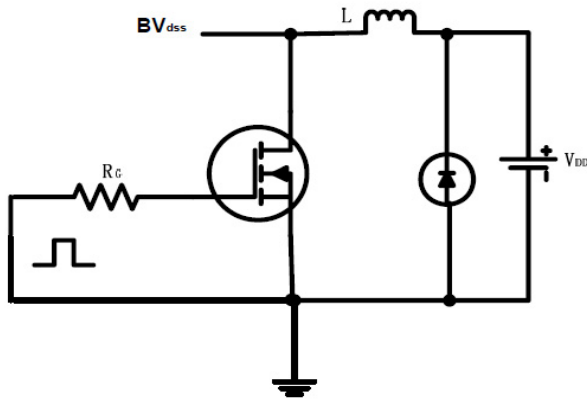
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	450	$^\circ\text{C/W}$
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Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

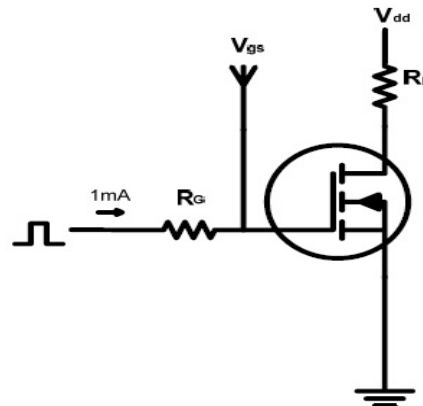
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	-20			V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS} / \Delta T_J$	Reference to 25°C , $I_D = -1\text{mA}$		-0.01		$\text{V}/^{\circ}\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20V, V_{GS} = 0V$			-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 6V, V_{DS} = 0V$			± 20	μA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.3	-0.6	-1.0	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$		3		$\text{mV}/^{\circ}\text{C}$
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -0.3A$		440	600	m Ω
		$V_{GS} = -2.5V, I_D = -0.2A$		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_{iss}	$V_{DS} = -10V, V_{GS} = 0V,$ $F = 1.0\text{MHz}$		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	$t_{d(on)}$	$V_{DD} = -10V, I_D = 0.2A$ $V_{GS} = -4.5V, R_{GEN} = 10\Omega$		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	$V_G = V_b = 0V$, Force Current			-400	mA

Test Circuits and Waveforms

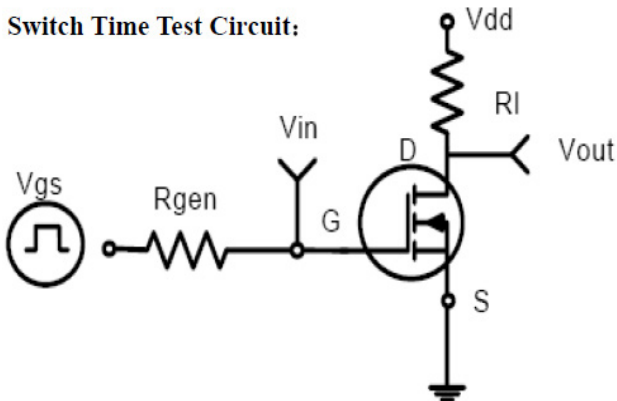
EAS test circuits:



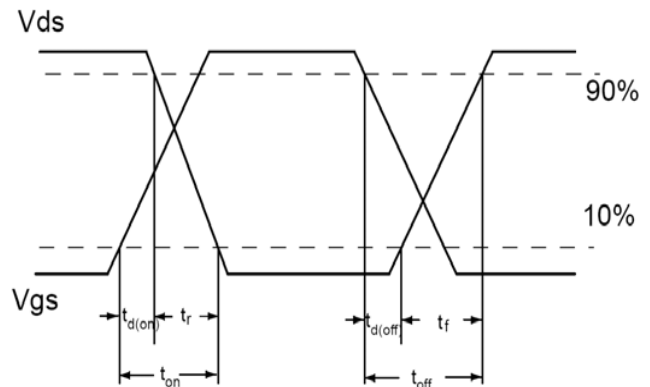
Gate charge test circuit:



Switch Time Test Circuit:



Switch Waveforms:



NOTES:

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

Typical Electrical and Thermal Characteristics

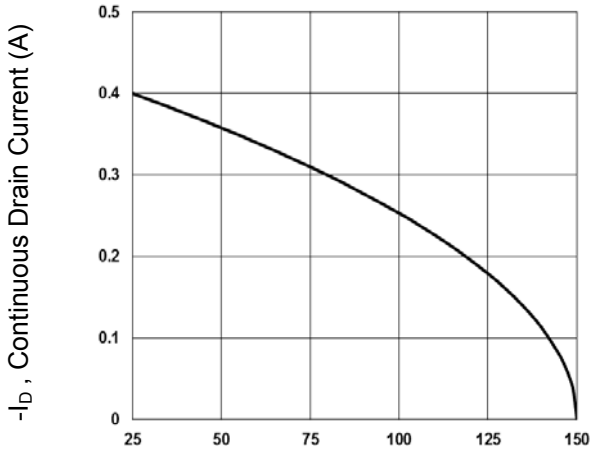


Figure 1: Drain Current vs. T_c

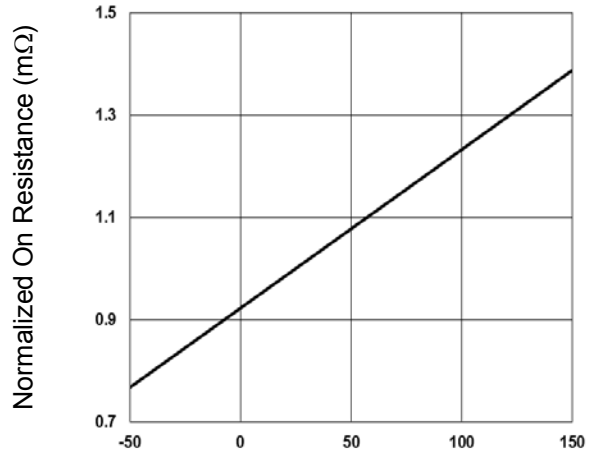


Figure 2: Normalized R_{DSon} vs. T_j

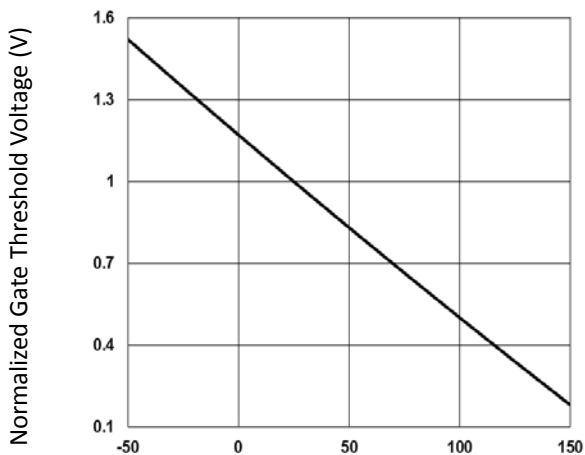


Figure 3: Normalized V_{th} vs. T_j

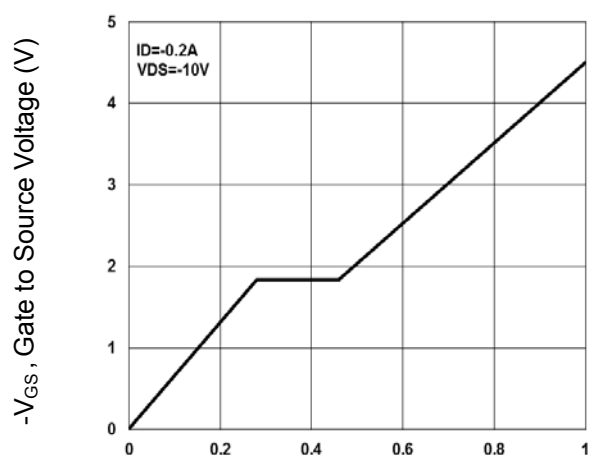


Figure 4: Gate Charge Waveform

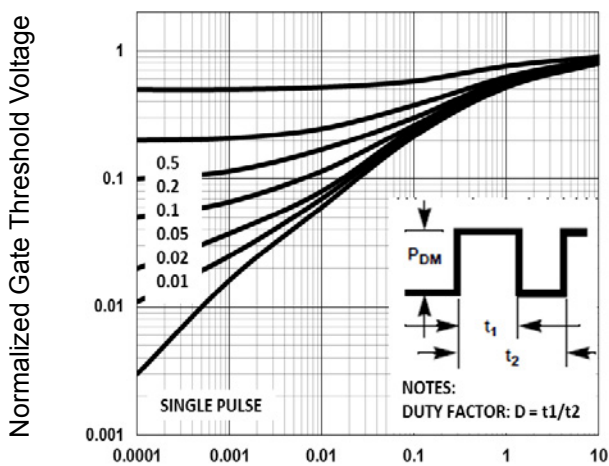


Figure 5 : Normalized Transient Response

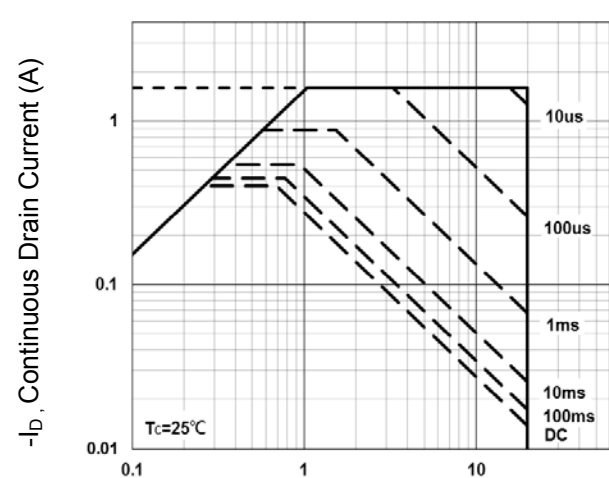
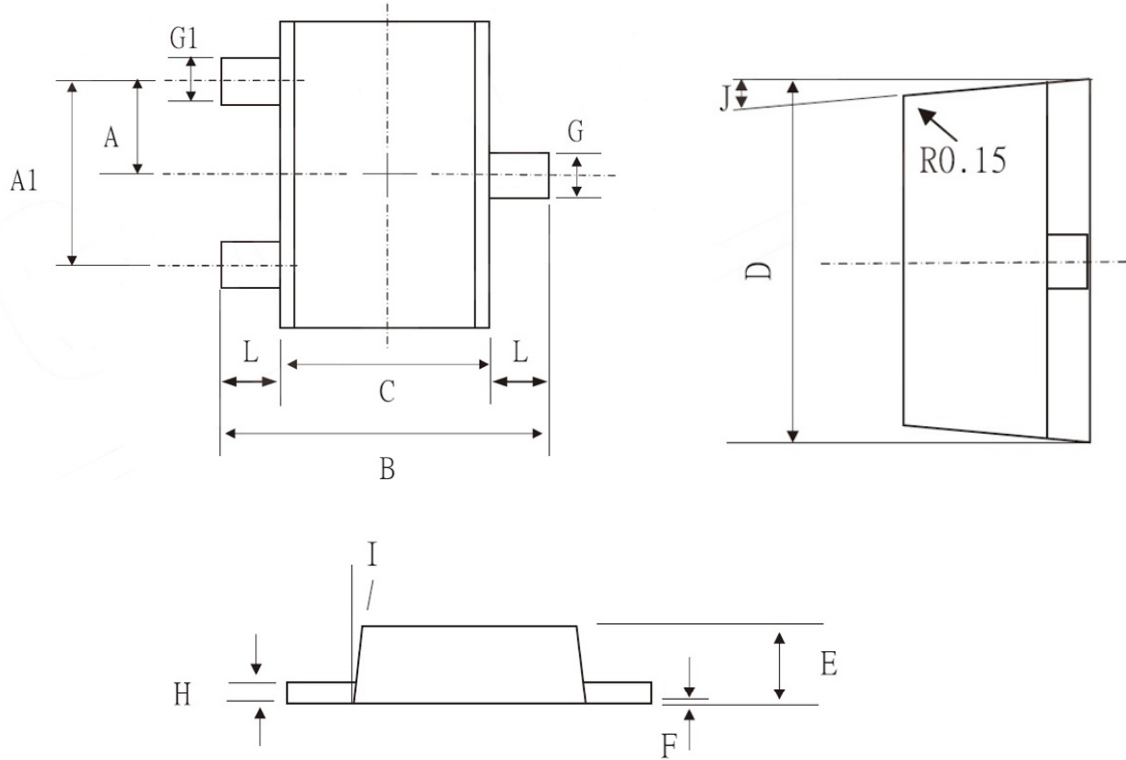


Figure 6: Safe Operation Area

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 °C
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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)	$T_J=125^{\circ}\text{C}$ to 150°C @ 80% of Max $V_{DSS}/V_{CES}/V_R$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	$T_J=125^{\circ}\text{C}$ or 150°C @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices