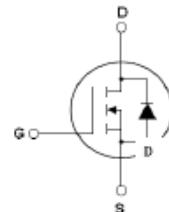


## Main Product Characteristics

$V_{DSS}$	100V
$R_{DS(on)}$	0.15 Ω(typ)
$I_D$	3A



SOT-223



Schematic Diagram

## Description

The SSF0115 is a new generation of high voltage and low current N-Channel enhancement mode trench power MOSFET. This new technology increases the device reliability and electrical parameter repeatability.

## Features and Benefits

- Advanced trench process technology
- Avalanche energy, 100% tested
- Fully characterized avalanche voltage and current

## Application

- IEEE802.3AF Compatible

## Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
$I_D@T_c=25^\circ C$	Continuous Drain Current, $V_{GS}@10V$	3	A
$I_D@T_c=100^\circ C$	Continuous Drain Current, $V_{GS}@10V$	2.3	
$I_{DM}$	Pulsed Drain Current ①	12	
$P_D@T_c=25^\circ C$	Power Dissipation	2.1	W
	Linear Derating Factor	0.019	W/ $^\circ C$
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single pulse Avalanche Energy ②	79	mJ
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +175	$^\circ C$

## Thermal Resistance

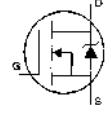
Symbol	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient	—	—	69	$^\circ C/W$

\*When mounted on the minimum pad size recommended (PCB Mount)

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

Sym.	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$\text{BV}_{\text{DSS}}$	Drain-to-Source Breakdown Voltage	100	—	—	V	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_D=250\mu\text{A}$
$\text{R}_{\text{DS(on)}}$	Static Drain-to-Source On-resistance	—	0.09	0.15	$\Omega$	$\text{V}_{\text{GS}}=10\text{V}, \text{I}_D=2\text{A}$
$\text{V}_{\text{GS(th)}}$	Gate Threshold Voltage	2.0	—	4.0	V	$\text{V}_{\text{DS}}=\text{V}_{\text{GS}}, \text{I}_D=250\mu\text{A}$
$\text{I}_{\text{DSS}}$	Drain-to-Source Leakage Current	—	—	1	$\mu\text{A}$	$\text{V}_{\text{DS}}=30\text{V}, \text{V}_{\text{GS}}=0\text{V}$
		—	—	10		$\text{V}_{\text{DS}}=100\text{V}, \text{V}_{\text{GS}}=0\text{V}, \text{T}_J=150^\circ\text{C}$
$\text{I}_{\text{GSS}}$	Gate-to-Source Forward Leakage	—	—	100	$\text{nA}$	$\text{V}_{\text{GS}}=20\text{V}$
	Gate-to-Source reverse Leakage	—	—	-100		$\text{V}_{\text{GS}}=-20\text{V}$
$\text{Q}_g$	Total Gate Charge	—	18	22	$\text{nC}$	$\text{I}_D=9.2\text{A}, \text{V}_{\text{GS}}=10\text{V}$ $\text{V}_{\text{DD}}=80\text{V}, \text{R}_L=8.6\Omega$
$\text{Q}_{\text{gs}}$	Gate-to-Source Charge	—	2.7	—		
$\text{Q}_{\text{gd}}$	Gate-to-Drain("Miller") Charge	—	7.8	—		
$t_{\text{d(on)}}$	Turn-on Delay Time	—	12	40	$\text{nS}$	$\text{V}_{\text{DD}}=50\text{V}$ $\text{I}_D=9.2\text{A}, \text{R}_L=5.4\Omega$
$t_r$	Rise Time	—	12	40		$\text{R}_G=18\Omega$
$t_{\text{d(off)}}$	Turn-Off Delay Time	—	33	85		$\text{V}_{\text{GS}}=10\text{V}$
$t_f$	Fall Time	—	26	68		
$\text{C}_{\text{iss}}$	Input Capacitance	—	350	480	$\text{pF}$	$\text{V}_{\text{GS}}=0\text{V}$
$\text{C}_{\text{oss}}$	Output Capacitance	—	90	110		$\text{V}_{\text{DS}}=25\text{V}$
$\text{C}_{\text{rss}}$	Reverse Transfer Capacitance	—	35	45		$f=1.0\text{MHz}$

## Source-Drain Ratings and Characteristics

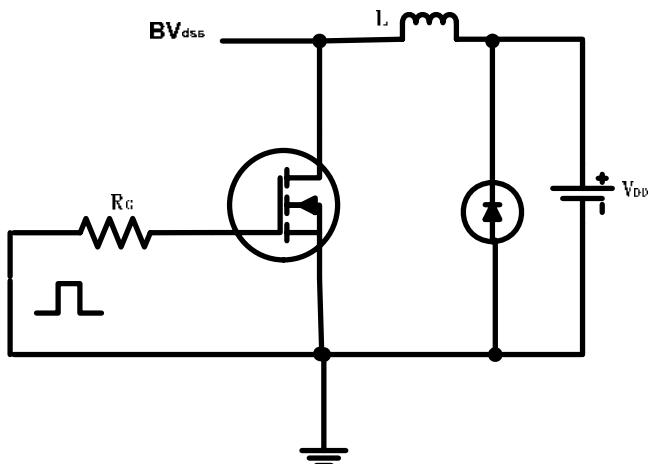
Sym.	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$\text{I}_s$	Continuous Source Current (Body Diode)	—	—	3	A	MOSFET symbol showing the integral reverse p-n junction diode.
$\text{I}_{\text{SM}}$	Pulsed Source Current (Body Diode) ①	—	—	18		
$\text{V}_{\text{SD}}$	Diode Forward Voltage	—	—	1.3	V	$\text{T}_J=25^\circ\text{C}, \text{I}_s=3\text{A}, \text{V}_{\text{GS}}=0\text{V}$ ③
$t_{\text{rr}}$	Reverse Recovery Time	—	98	—	nS	$\text{T}_J=25^\circ\text{C}, \text{I}_F=9.2\text{A}$
$\text{Q}_{\text{rr}}$	Reverse Recovery Charge	—	0.34	—	$\mu\text{C}$	$d\text{i}/dt=100\text{A}/\mu\text{s}$ ③
$t_{\text{on}}$	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_s + L_D$ )				

### Notes:

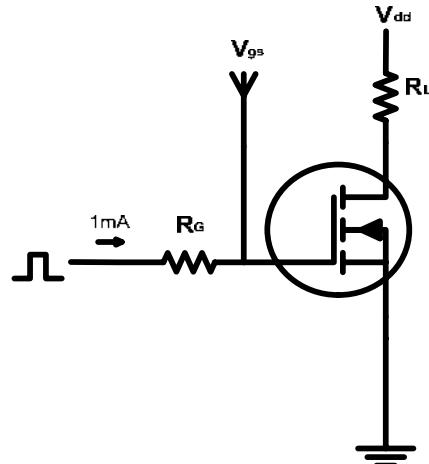
- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition:  $L=30\text{mH}, \text{V}_{\text{DD}}=50\text{V}, \text{I}_d=2.3\text{A}$
- ③ Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 1.5\%$ ;  $\text{R}_G = 25\Omega$  Starting  $\text{T}_J = 25^\circ\text{C}$

## Test Circuits and Waveforms

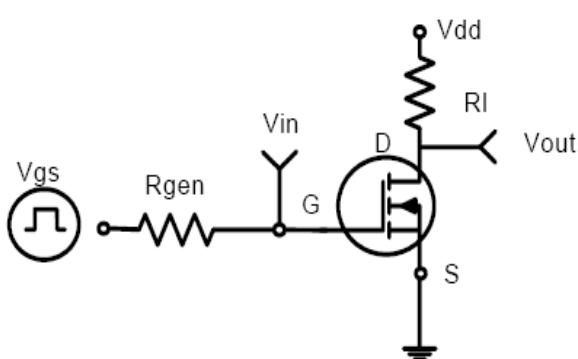
**E<sub>AS</sub> Test Circuit**



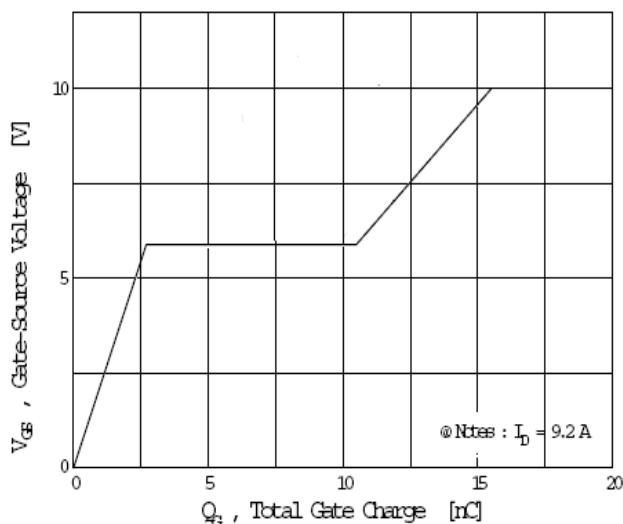
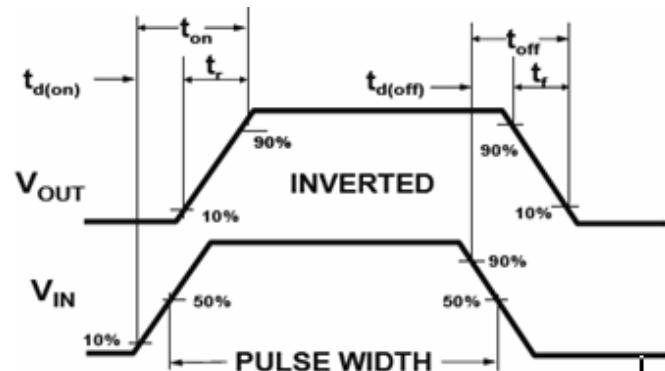
**Gate Charge Test Circuit**



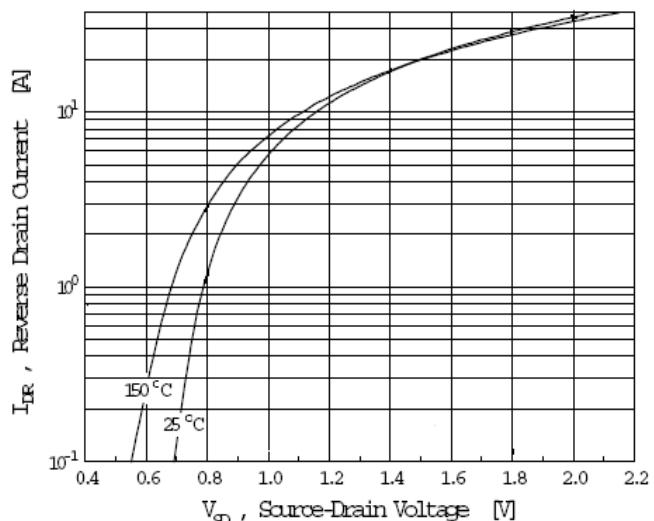
**Switching Time Test Circuit**



**Switching Waveform**

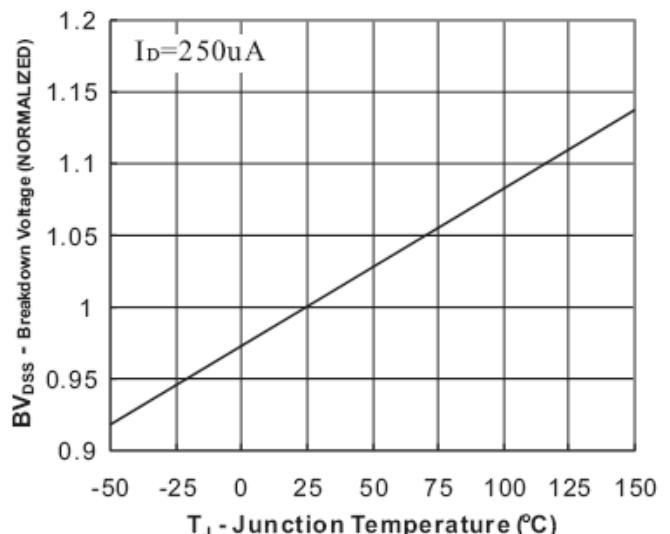
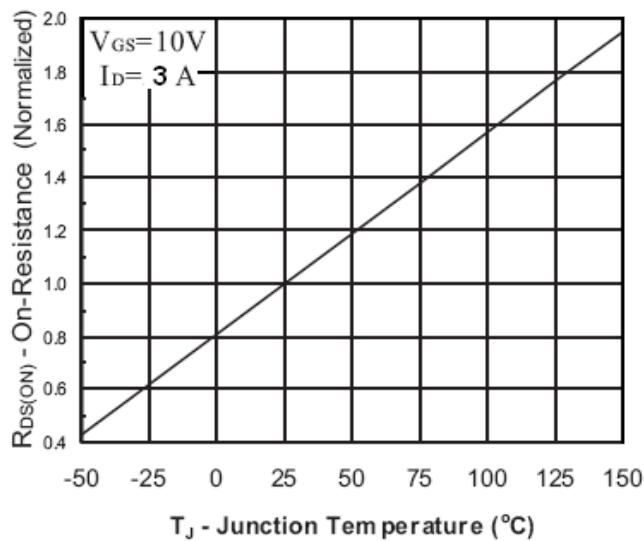


Gate Source Voltage vs Total Gate Charge

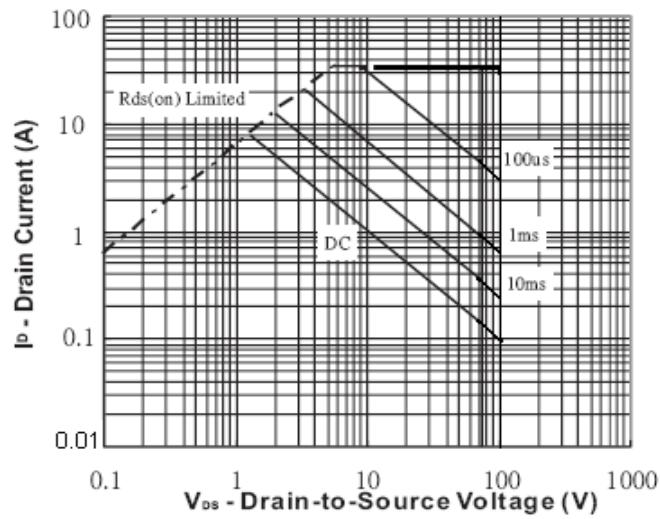


Source-Drain Diode Forward Voltage

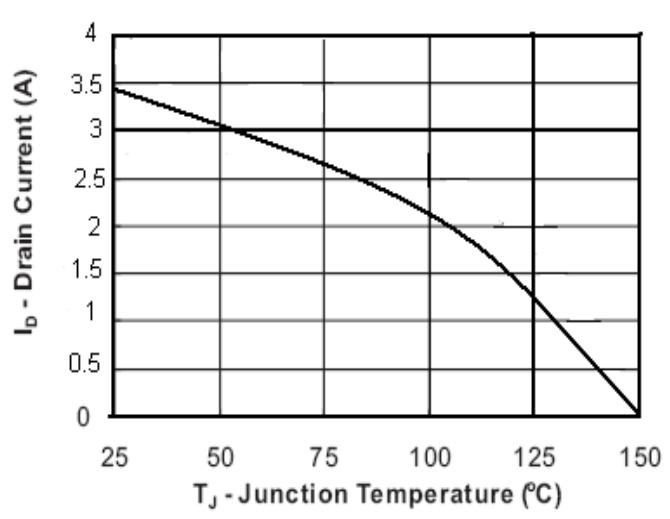
## Typical Electrical and Thermal Characteristics



On Resistance vs Junction Temperature

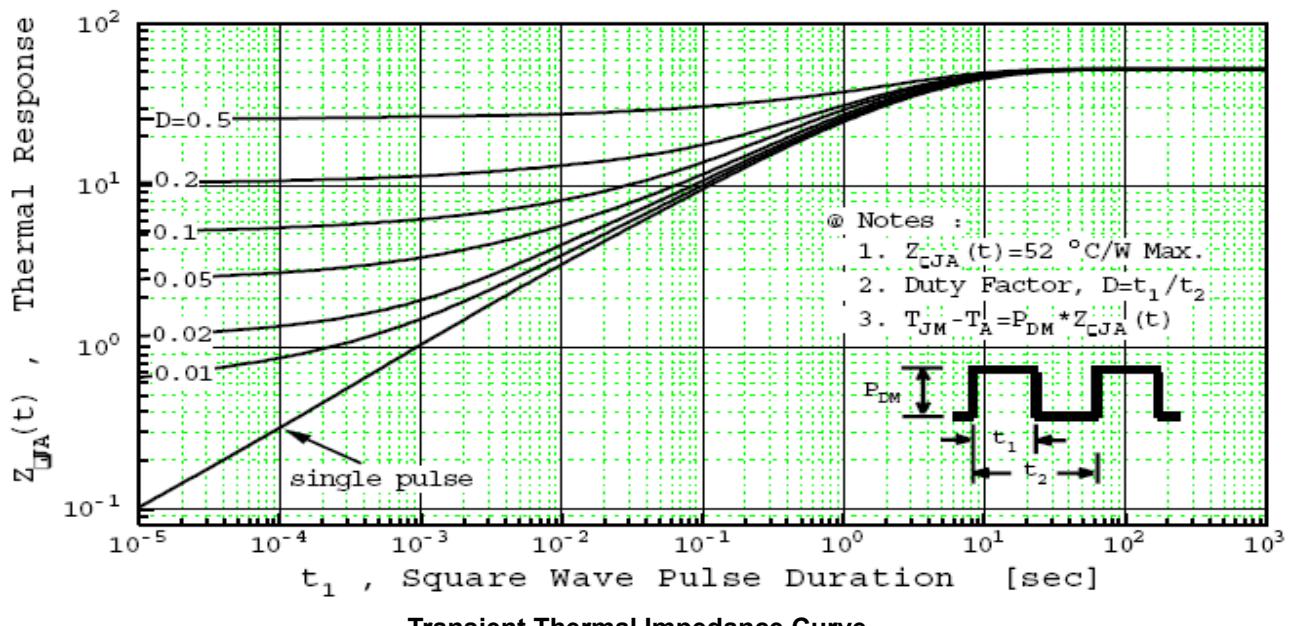


Breakdown Voltage vs Junction Temperature



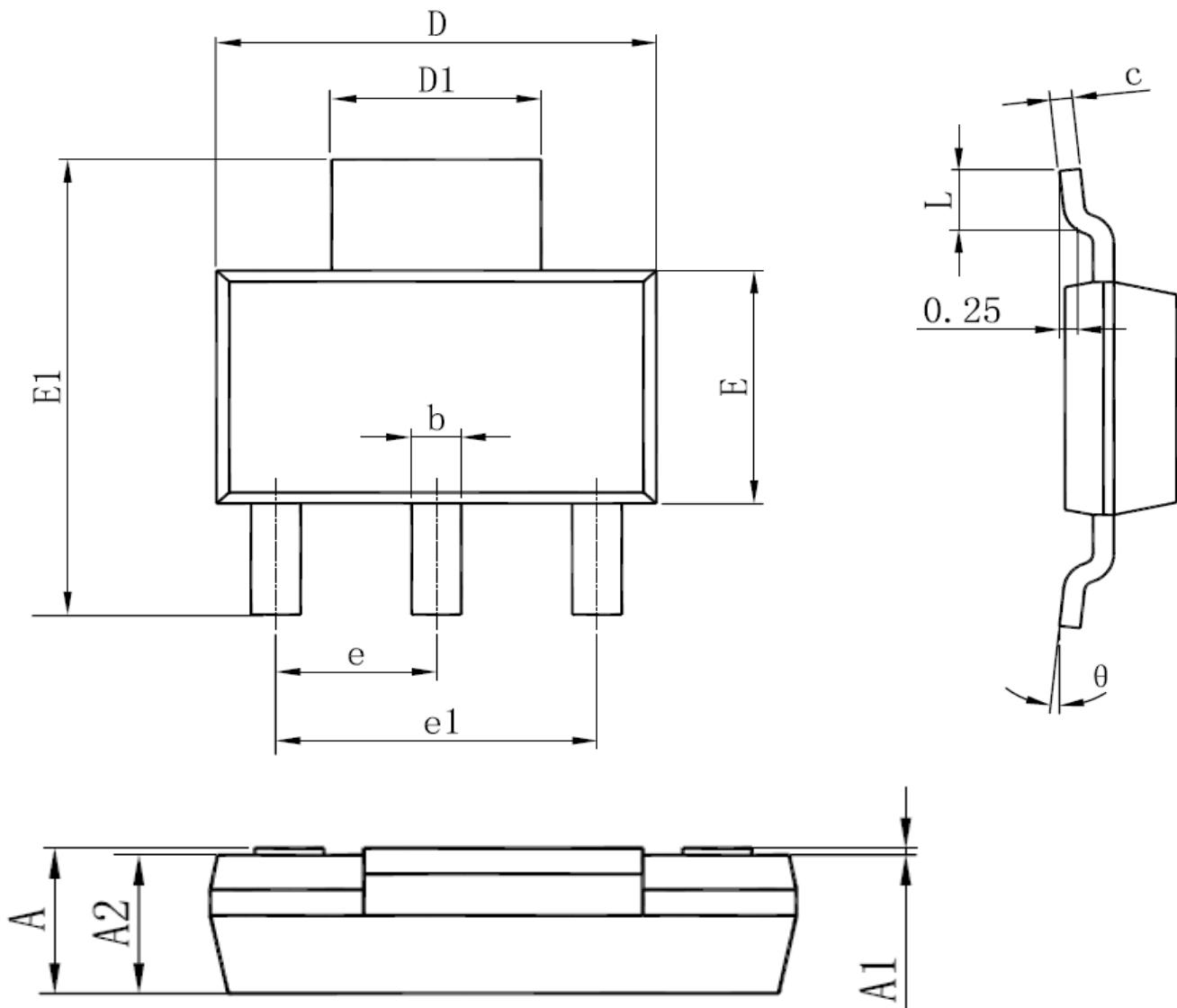
Safe Operation Area

Max Drain Current vs Junction Temperature



Transient Thermal Impedance Curve

**SOT-223 MECHANICAL DATA**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°