SSF7509

Feathers:

- Advanced trench process technology
- Special designed for Convertors and power controls
- High density cell design for ultra low Rdson
- Fully characterized Avalanche voltage and current
- Avalanche Energy 100% test

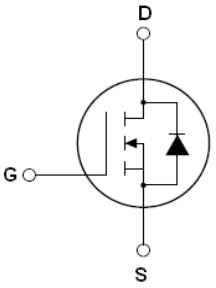
Description:

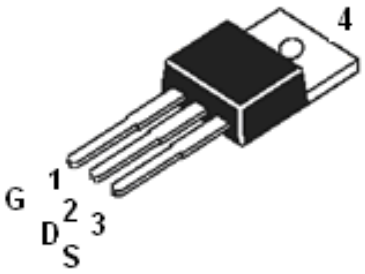
The SSF7509 is a new generation of middle voltage and high current N–Channel enhancement mode trench power MOSFET. This new technology increases the cell density and reduces the on-resistance; its typical Rdson can reduce to 6.2mohm.

Application:

- Power switching application

ID=80A
BV=80V
Rdson=8mohm





SSF7509 TOP View (TO220)

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D@T_c=25℃	Continuous drain current,VGS@10V	80	A
I_D@T_c=100℃	Continuous drain current,VGS@10V	72	
I_{DM}	Pulsed drain current ①	320	
P_D@T_C=25℃	Power dissipation	165	W
	Linear derating factor	2.0	W/℃
V_{GS}	Gate-to-Source voltage	±20	V
dv/dt	Peak diode recovery voltage	31	v/ns
E_{AS}	Single pulse avalanche energy ②	500	mJ
E_{AR}	Repetitive avalanche energy	TBD	
T_J T_{STG}	Operating Junction and Storage Temperature Range	–55 to +150	℃

Thermal Resistance

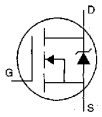
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	0.75	—	℃/W
$R_{\theta JA}$	Junction-to-ambient	—	—	62	

Electrical Characteristics @TJ=25 ℃(unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source breakdown voltage	80	—	—	V	V_{GS}=0V,I_D=250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	0.0067	0.008	Ω	V_{GS}=10V,I_D=40A
$V_{GS(th)}$	Gate threshold voltage	2.0		4.0	V	V_{DS}=V_{GS},I_D=250μA
g_{fs}	Forward transconductance	-	58	—	S	V_{DS}=5V,I_D=30A
I_{DSS}	Drain-to-Source leakage current	—	—	2	μA	V_{DS}=80V,V_{GS}=0V
		—	—	10		V_{DS}=80V, V_{GS}=0V,T_J=150℃
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS}=20V

	Gate-to-Source reverse leakage	—	—	-100		V_{GS}=-20V
Q_g	Total gate charge	—	100	—	nC	I_D=30A
Q_{gs}	Gate-to-Source charge	—	18	—		V_{DD}=30V
Q_{gd}	Gate-to-Drain("Miller") charge	—	28	—		V_{GS}=10V
$t_{d(on)}$	Turn-on delay time	—	20	—	nS	V_{DD}=30V
t_r	Rise time	—	17.8	—		I_D=2A ,R_L=15Ω
$t_{d(off)}$	Turn-Off delay time	—	76.8	—		R_G=2.5Ω
t_f	Fall time	—	15.7	—		V_{GS}=10V
C_{iss}	Input capacitance	—	3200	—	pF	V_{GS}=0V
C_{oss}	Output capacitance	—	330	—		V_{DS}=25V
C_{rss}	Reverse transfer capacitance	—	260	—		f=1.0MHZ

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	80	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	320		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J=25℃,I_S=40A,V_{GS}=0V ③
t_{rr}	Reverse Recovery Time	—	57	—	nS	T_J=25℃,I_F=75A
Q_{rr}	Reverse Recovery Charge	—	108	—	nC	di/dt=100A/μs ③
t_{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by Ls + LD)				

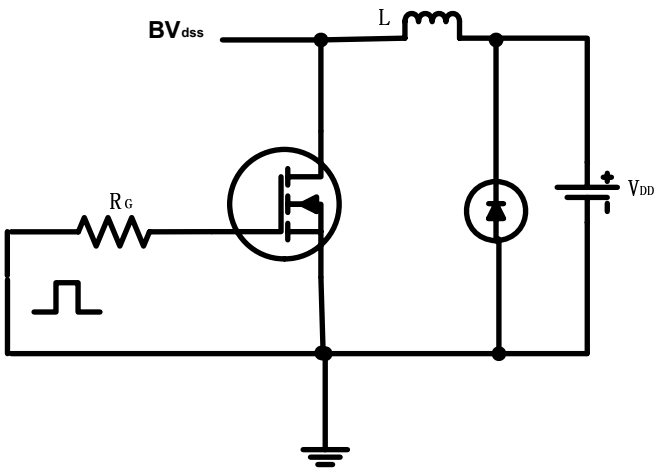
Notes:

① Repetitive rating; pulse width limited by max junction temperature.

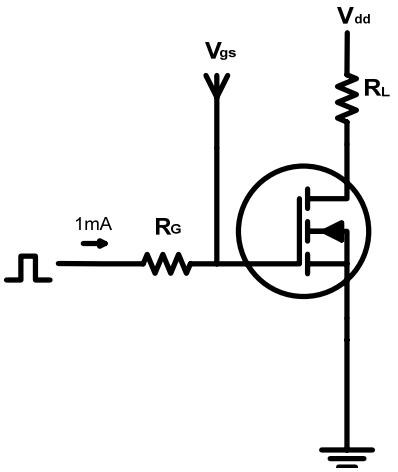
② Test condition: L =0.3mH, ID = 57A, VDD = 47V

③ Pulse width≤300μS; duty cycle≤1.5% RG = 25ΩStarting TJ = 25°C

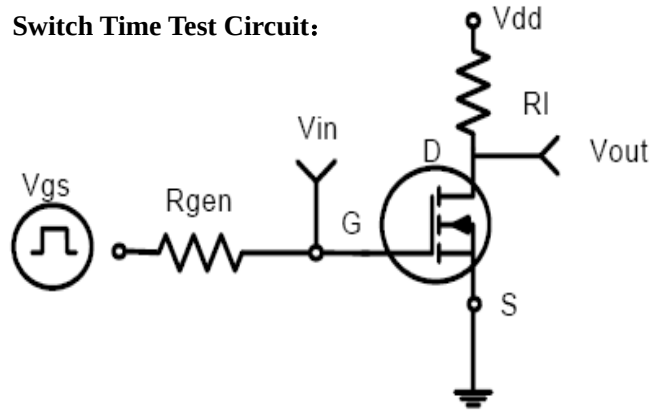
EAS test circuits:



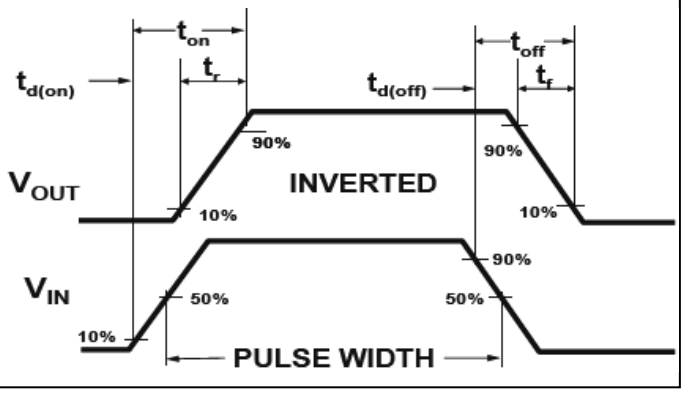
Gate charge test circuit:

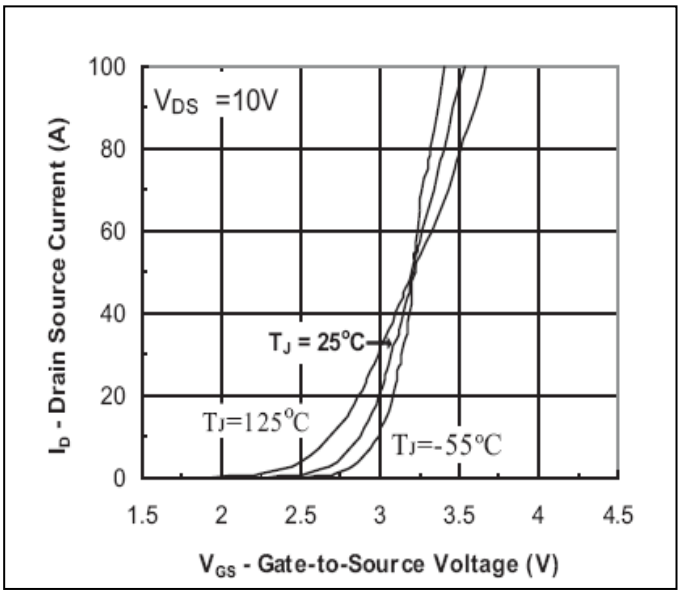


Switch Time Test Circuit:

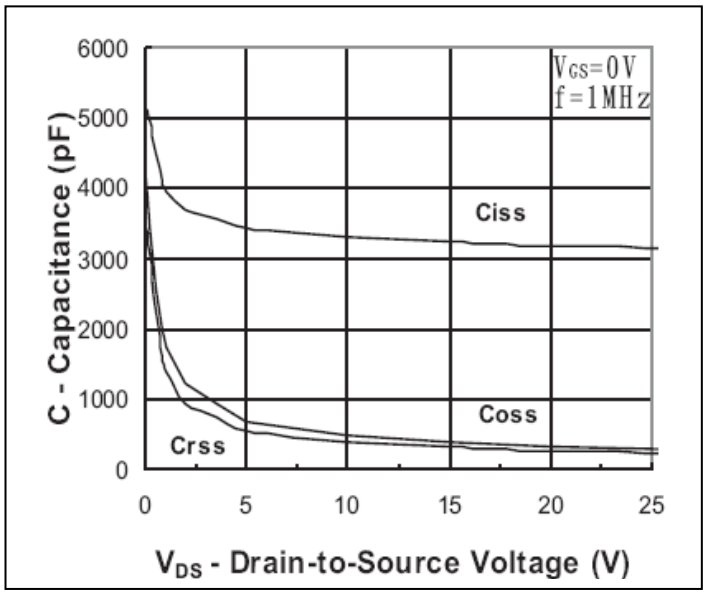


Switch Waveforms:

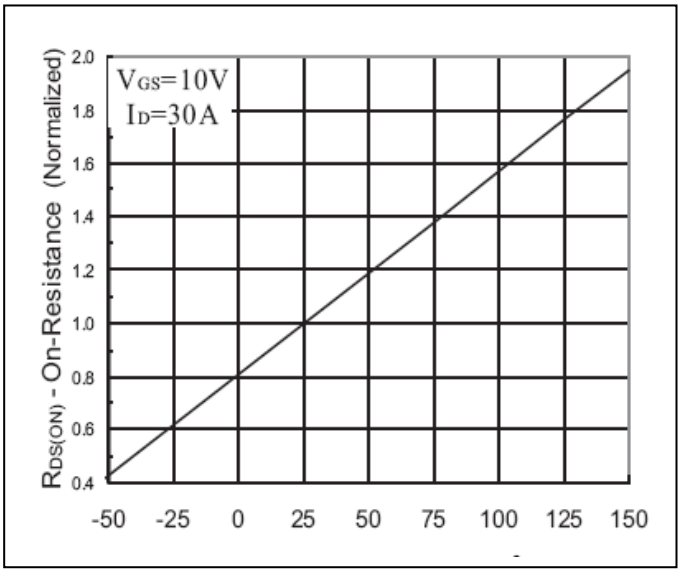




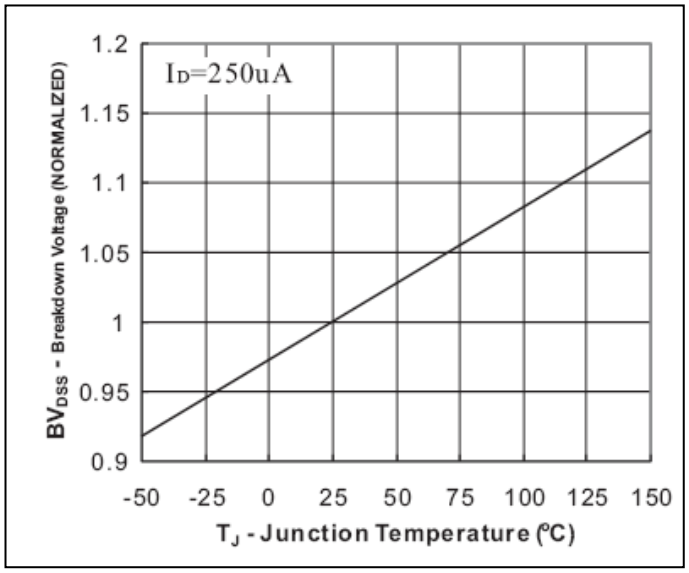
Transfer Characteristic



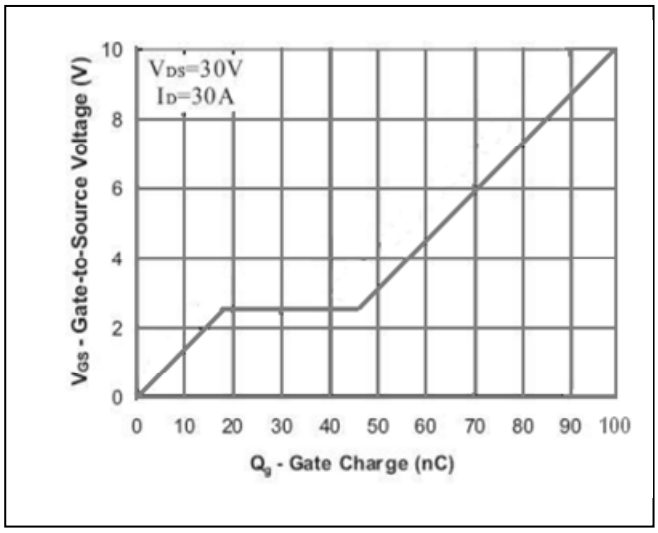
Capacitance



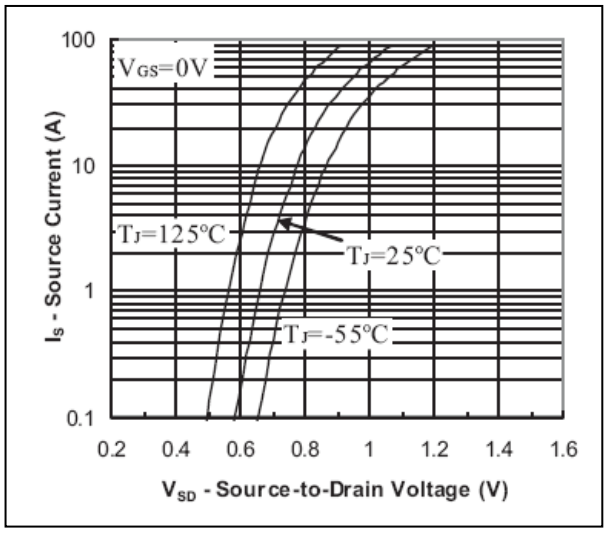
On Resistance vs Junction Temperature



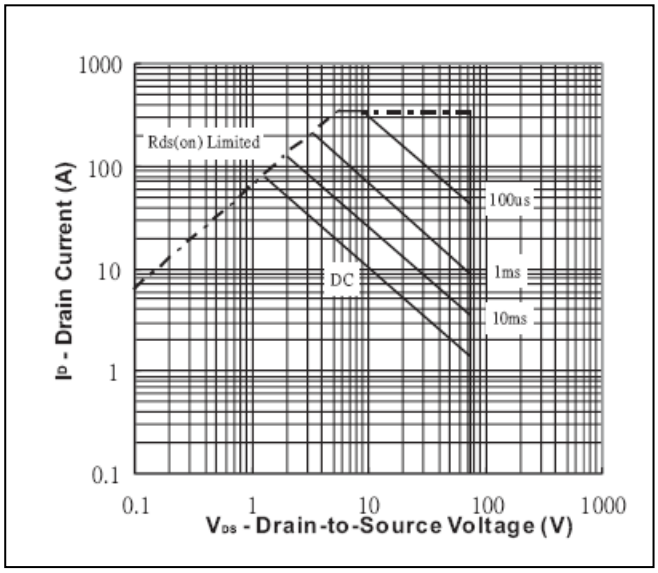
Breakdown Voltage vs Junction Temperature



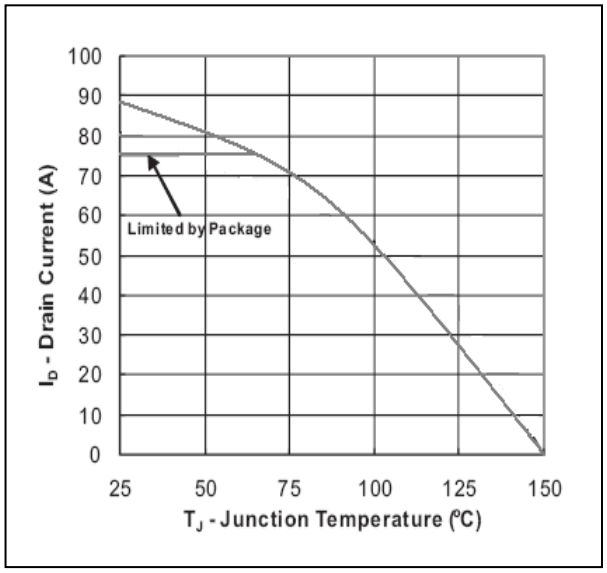
Gate Charge



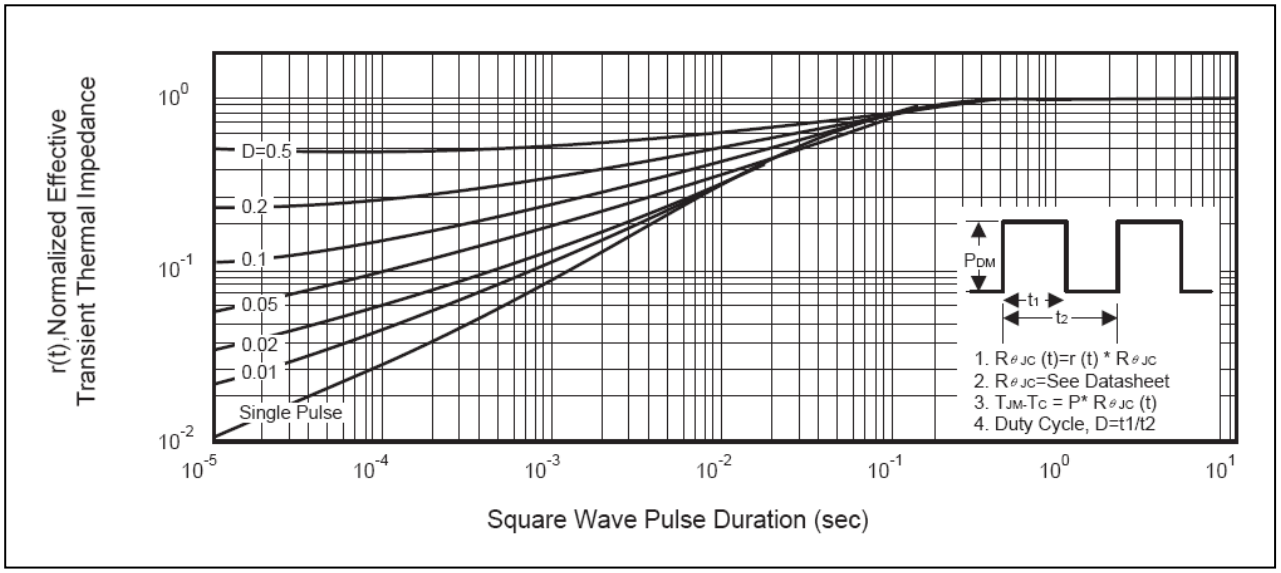
Source-Drain Diode Forward Voltage



Safe Operation Area



Max Drain Current vs Junction Temperature



Transient Thermal Impedance Curve

TO220 MECHANICAL DATA: