

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.

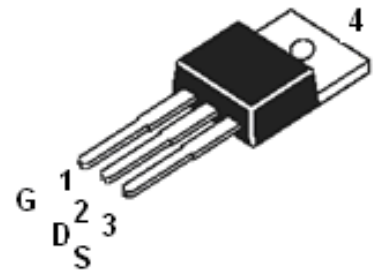
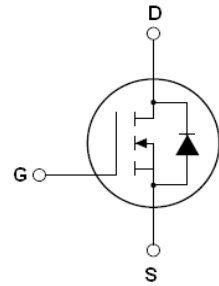
Application:

- Power switching application

ID=80A

BV=80V

Rdson=8mohm



SSF7509 TOP View (TO220)

Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D@T_c=25\text{ }^{\circ}\text{C}$	Continuous drain current,VGS@10V	80	A
$I_D@T_c=100^{\circ}\text{C}$	Continuous drain current,VGS@10V	72	
I_{DM}	Pulsed drain current ①	320	
$P_D@T_c=25^{\circ}\text{C}$	Power dissipation	165	W
	Linear derating factor	2.0	W/ C
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	$^{\circ}\text{C}$

Thermal Resistance

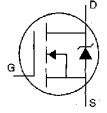
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	0.75	—	$^{\circ}\text{C/W}$
$R_{\theta JA}$	Junction-to-ambient	—	—	62	

Electrical Characteristics @TJ=25 °C(unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source breakdown voltage	80	—	—	V	$V_{GS}=0V, I_D=250\mu A$
$R_{DS(on)}$	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	$V_{DS}=V_{GS}, I_D=250\mu A$
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		$V_{DS}=80V, V_{GS}=0V, T_J=150^{\circ}\text{C}$
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	—		$I_D = 2A, R_L = 15\Omega$
$t_{d(off)}$	Turn-Off delay time	—	76.8	—		$R_G = 2.5\Omega$
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	—		$f = 1.0MHz$

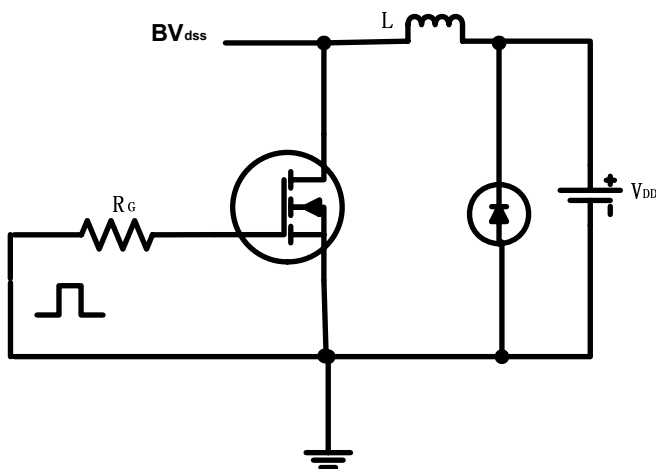
Source-Drain Ratings and Characteristics

	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	$T_J = 25^\circ C, I_S = 40A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	57	—	nS	$T_J = 25^\circ C, I_F = 75A$
Q_{rr}	Reverse Recovery Charge	—	108	—	nC	$di/dt = 100A/\mu s$ ③
t_{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

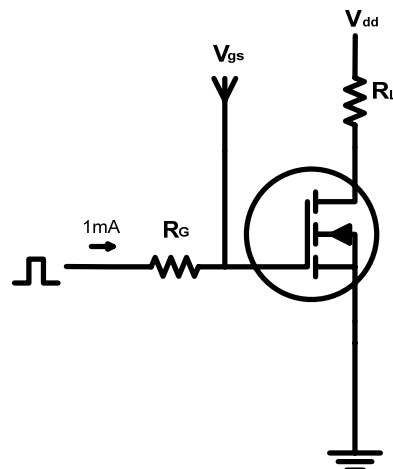
Notes:

- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition: $L = 0.3mH, I_D = 57A, V_{DD} = 47V$
- ③ Pulse width $\leq 300\mu s$; duty cycle $\leq 1.5\%$ $R_G = 25\Omega$ Starting $T_J = 25^\circ C$

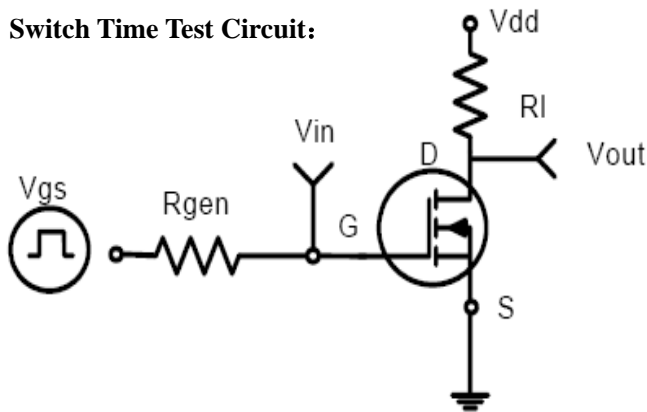
EAS test circuits:



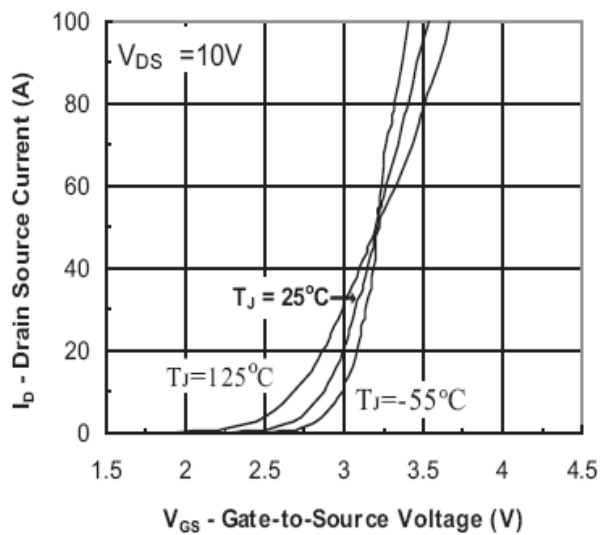
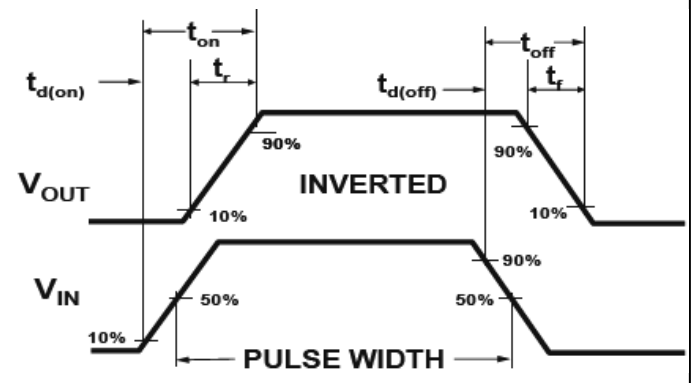
Gate charge test circuit:



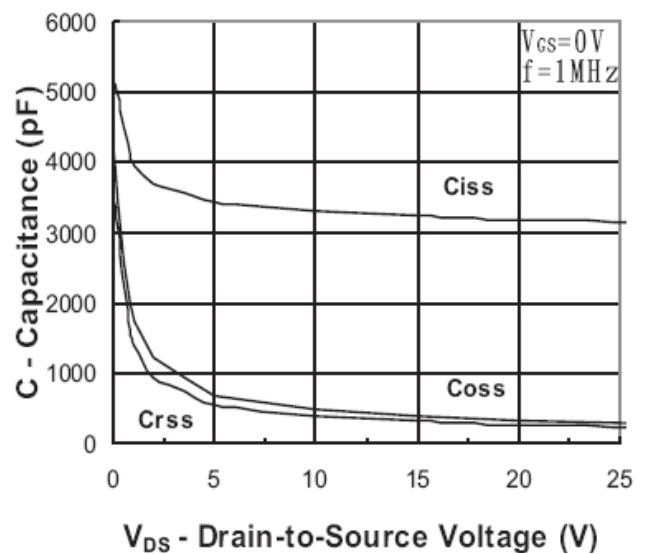
Switch Time Test Circuit:



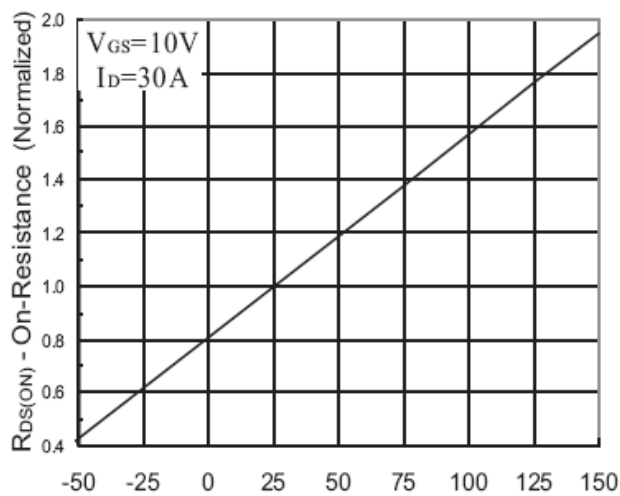
Switch Waveforms:



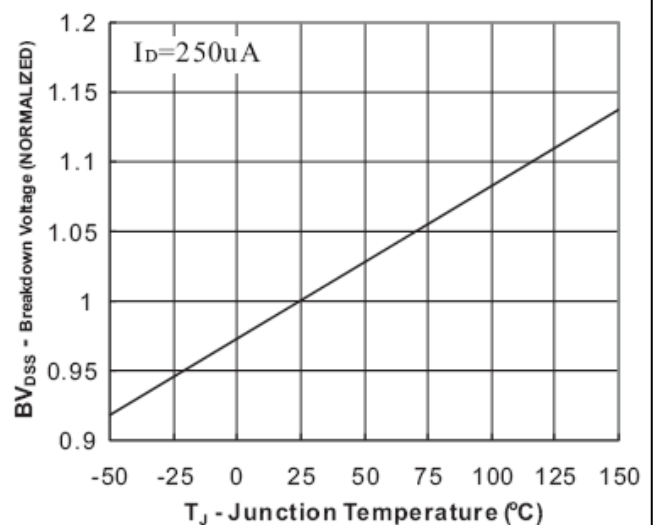
Transfer Characteristic



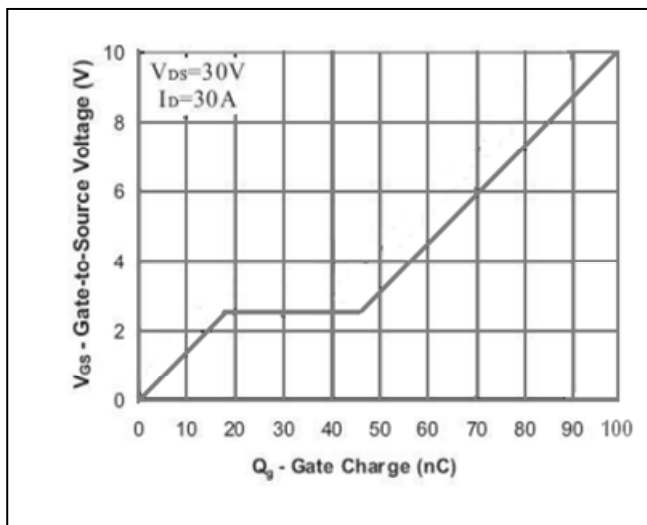
Capacitance



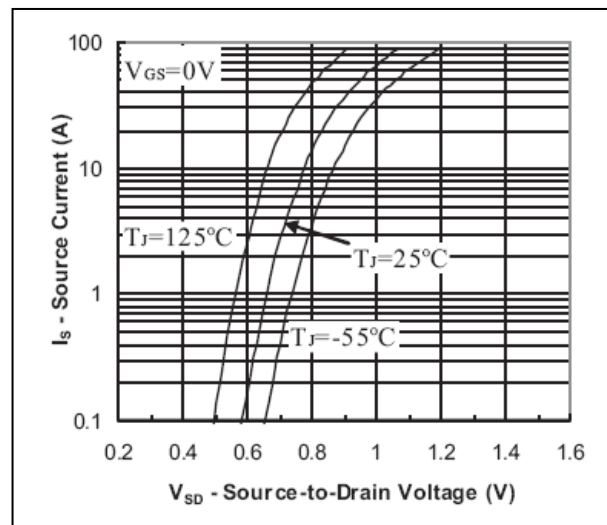
On Resistance vs Junction Temperature



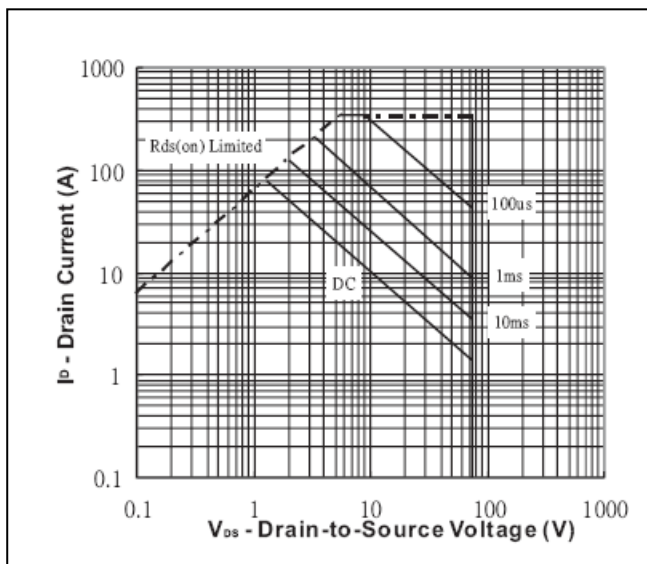
Breakdown Voltage vs Junction Temperature



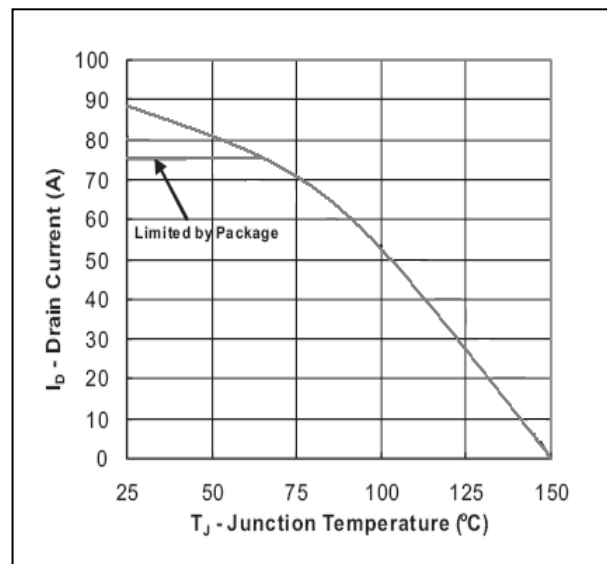
Gate Charge



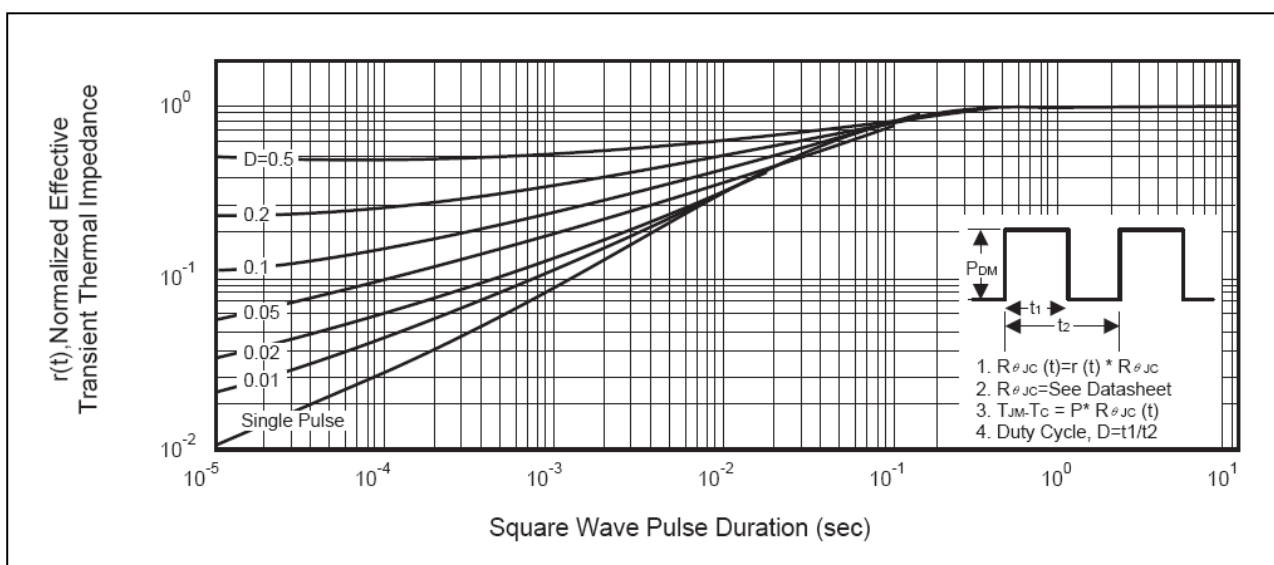
Source-Drain Diode Forward Voltage



Safe Operation Area



Max Drain Current vs Junction Temperature



Transient Thermal Impedance Curve

TO220 MECHANICAL DATA:

