

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 SSF7504 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 2.7mohm.

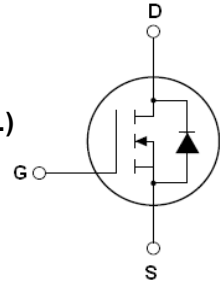
Application:

- Power switching application

ID=220A

BV=75V

Rdson=2.7mΩ(typ.)



SSF7504 TOP View (TO220)

Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D@T_c=25^\circ\text{C}$	Continuous drain current, $V_{GS}@10\text{V}$	220	A
$I_D@T_c=100^\circ\text{C}$	Continuous drain current, $V_{GS}@10\text{V}$	170	
I_{DM}	Pulsed drain current ①	880	
$P_D@T_c=25^\circ\text{C}$	Power dissipation	370	W
	Linear derating factor	2.0	W/°C
V_{GS}	Gate-to-Source voltage	± 20	V
dv/dt	Peak diode recovery voltage	20	v/ns
E_{AS}	Single pulse avalanche energy ②	960	mJ
E_{AR}	Repetitive avalanche energy	TBD	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	°C

Thermal Resistance

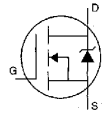
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	0.41	—	°C/W
$R_{\theta JA}$	Junction-to-ambient	—	—	62	

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source breakdown voltage	75	—	—	V	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	2.7	4	mΩ	$V_{GS}=10\text{V}, I_D=40\text{A}$
$V_{GS(th)}$	Gate threshold voltage	2.0	3.1	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
g_{fs}	Forward transconductance	—	65	—	S	$V_{DS}=5\text{V}, I_D=30\text{A}$
I_{DSS}	Drain-to-Source leakage current	—	—	10	μA	$V_{DS}=80\text{V}, V_{GS}=0\text{V}$
		—	—	50		$V_{DS}=80\text{V}, V_{GS}=0\text{V}, T_J=150^\circ\text{C}$

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	—	140	—	nC	$I_D=30A$
Q_{gs}	Gate-to-Source charge	—	30	—		$V_{DD}=30V$
Q_{gd}	Gate-to-Drain("Miller") charge	—	36	—		$V_{GS}=10V$
$t_{d(on)}$	Turn-on delay time	—	22	—	nS	$V_{DD}=30V$
t_r	Rise time	—	35	—		$I_D=2A, R_L=15\Omega$
$t_{d(off)}$	Turn-Off delay time	—	77.8	—		$R_G=2.5\Omega$
t_f	Fall time	—	19.8	—		$V_{GS}=10V$
C_{iss}	Input capacitance	—	7005	—	pF	$V_{GS}=0V$
C_{oss}	Output capacitance	—	600	—		$V_{DS}=25V$
C_{rss}	Reverse transfer capacitance	—	280	—		$f=1.0MHz$

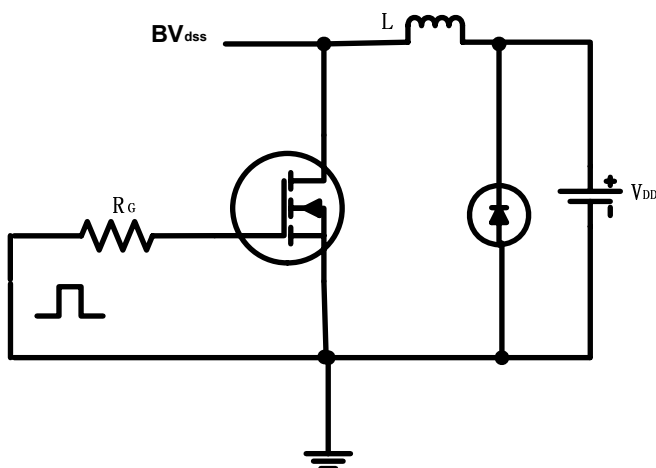
Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	—	—	220	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	880		
V _{SD}	Diode Forward Voltage	—	—	1.3	V	T _J =25°C, I _S =40A, V _{GS} =0V ③
t _{rr}	Reverse Recovery Time	—	80	—	nS	T _J =25°C, I _F =75A di/dt=100A/μs ③
Q _{rr}	Reverse Recovery Charge	—	270	—	nC	
t _{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by L _s + L _D)				

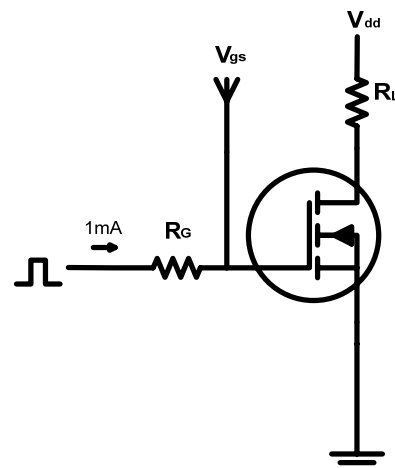
Notes:

- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition: $L=0.3mH, I_D=80A, V_{DD}=37.5V$
- ③ Pulse width $\leq 300\mu s$; duty cycle $\leq 1.5\%$ $R_G=25\Omega$ Starting $T_J=25^\circ C$

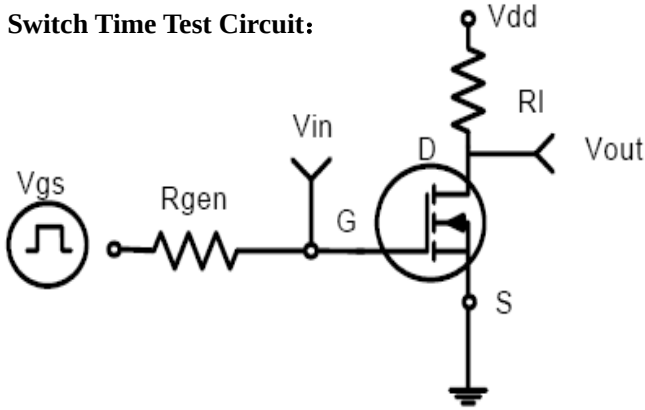
EAS test circuits:



Gate charge test circuit:



Switch Time Test Circuit:



Switch Waveforms:

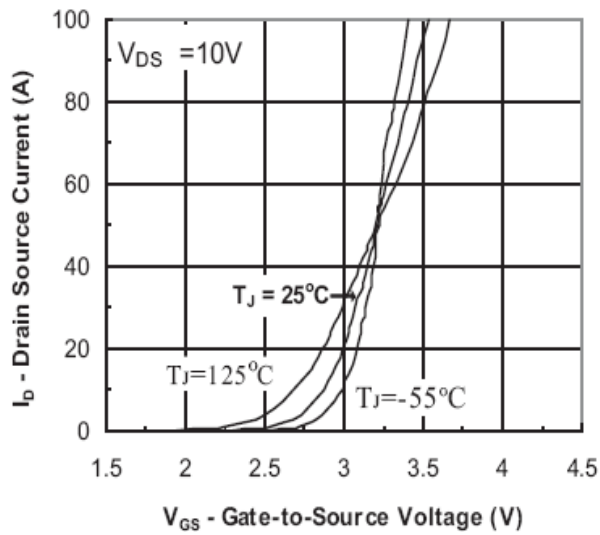
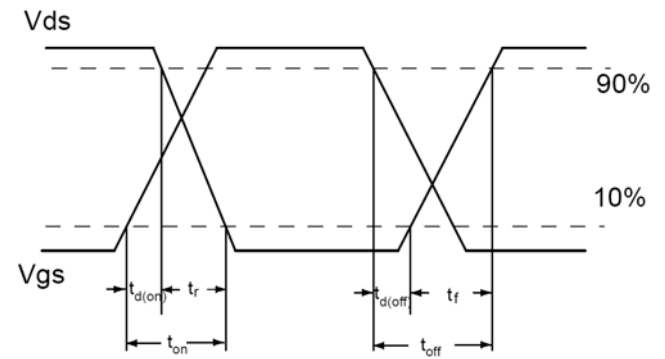


Figure1: Transfer Characteristic

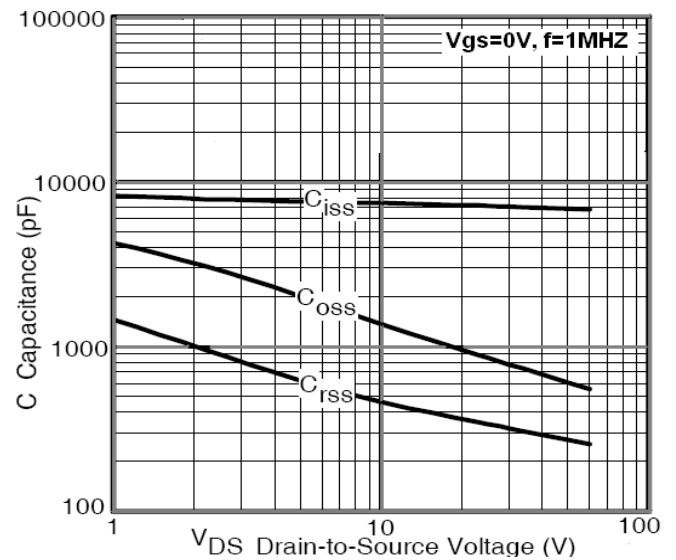


Figure2: Capacitance

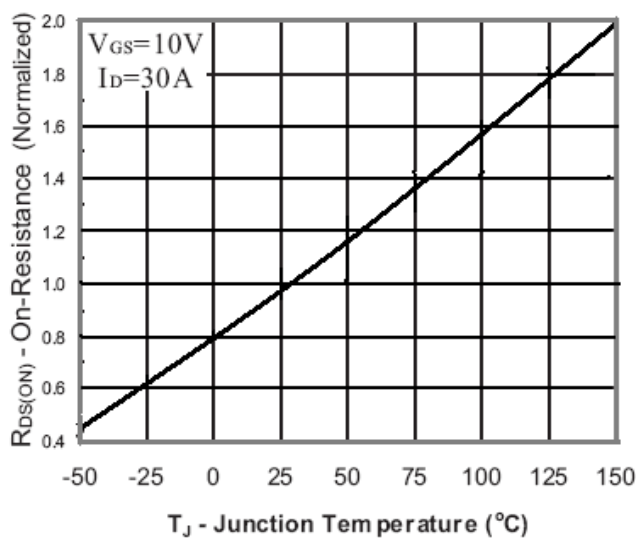


Figure3: On Resistance vs Junction Temperature

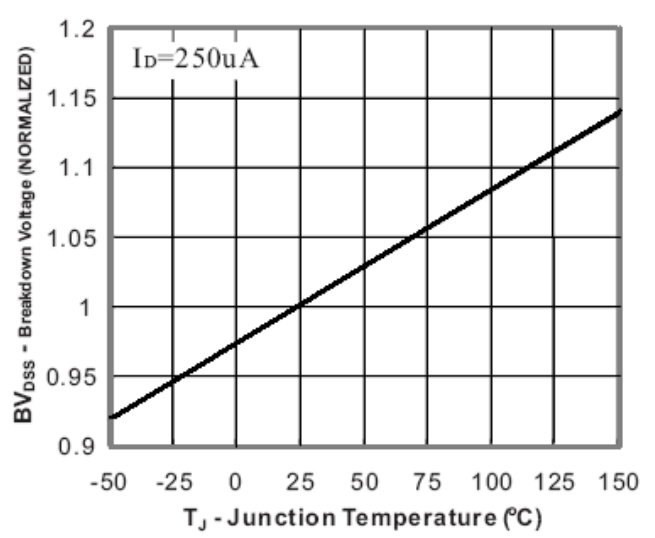


Figure4: Breakdown Voltage vs Junction Temperature

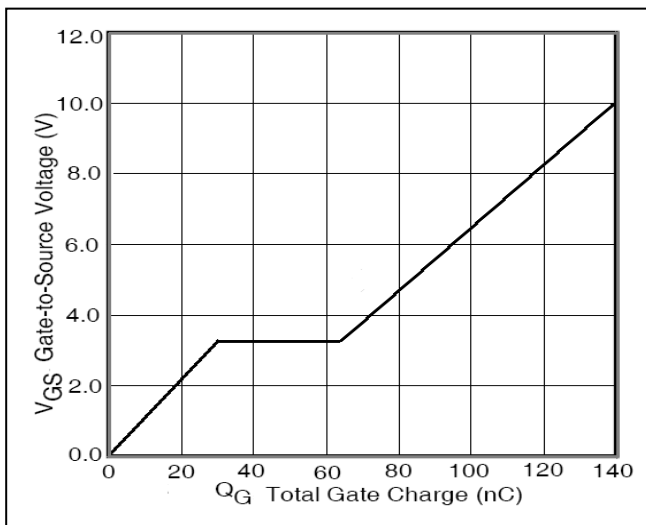


Figure5:Gate Charge

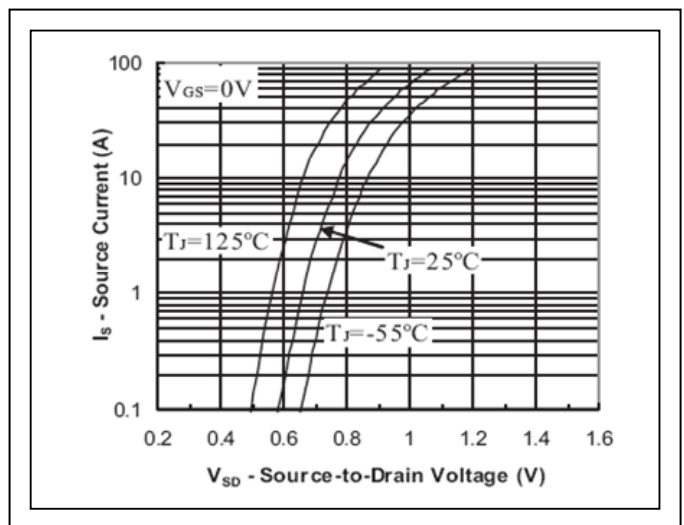


Figure6:Source-Drain Diode Forward Voltage

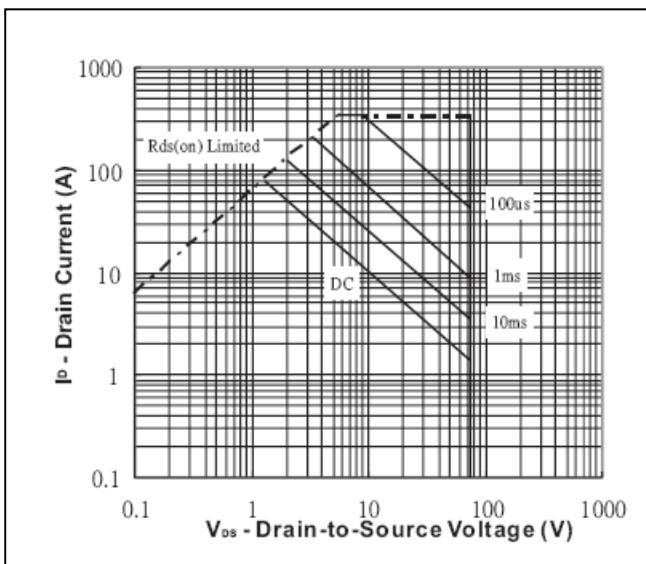


Figure7:Safe Operation Area

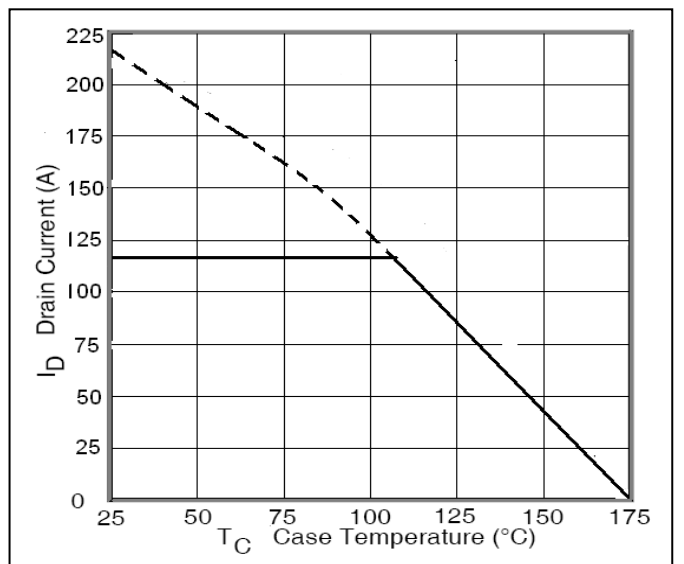


Figure8:Max Drain Current vs Junction Temperature

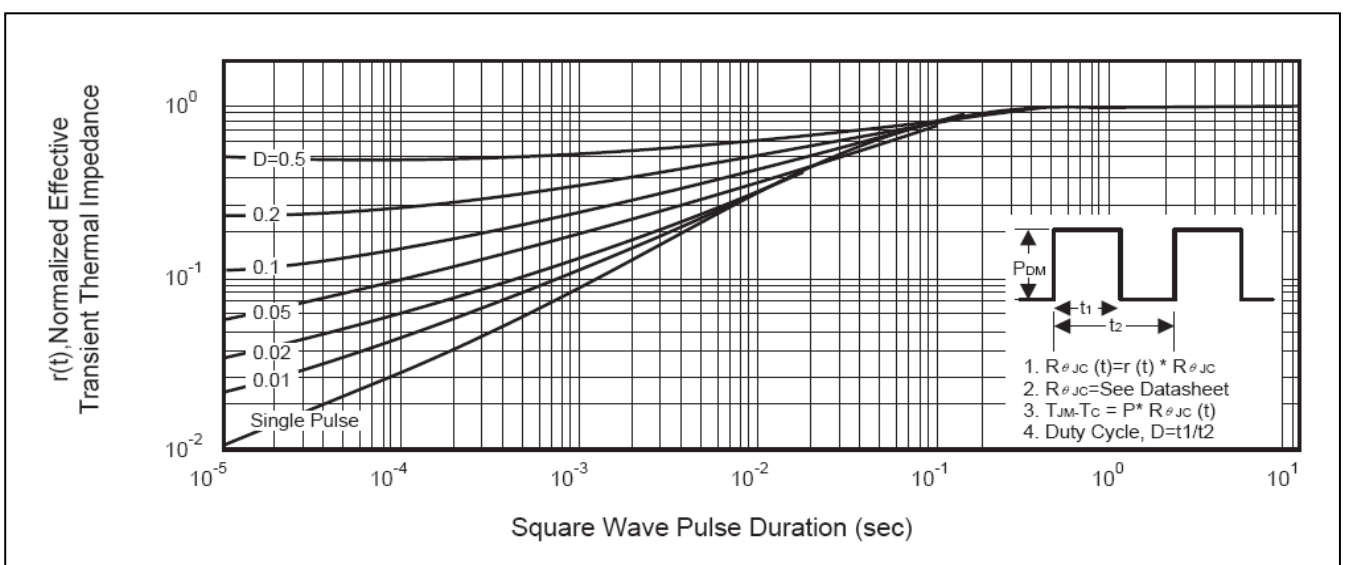


Figure9:Transient Thermal Impedance Curve

TO220 MECHANICAL DATA:

