

FEATURES

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

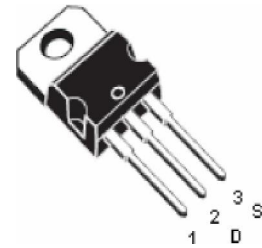
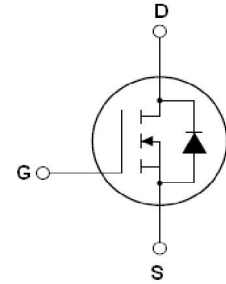
DESCRIPTION

The SSF1116 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. SSF1116 is assembled in high reliability and qualified assembly house.

APPLICATIONS

- Power switching application

ID =75A
BV=110V
Rdson=12mΩ (Typ.)



SSF1116 TOP View (T0-220)

Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D@T_c=25^\circ\text{C}$	Continuous drain current, $V_{GS}@10\text{V}$	75	A
$I_D@T_c=100^\circ\text{C}$	Continuous drain current, $V_{GS}@10\text{V}$	61	
I_{DM}	Pulsed drain current ①	300	
$P_D@T_c=25^\circ\text{C}$	Power dissipation	227	W
	Linear derating factor	1.5	W/°C
V_{GS}	Gate-to-Source voltage	± 20	V
E_{AS}	Single pulse avalanche energy ②	300	mJ
E_{AR}	Repetitive avalanche energy	TBD	mJ
dv/dt	Peak diode recovery voltage	31	v/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

Thermal Resistance

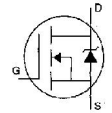
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	0.55	—	°C/W
$R_{\theta JA}$	Junction-to-ambient	—	—	62	

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	110	120	—	V	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	12	16	mΩ	$V_{GS}=10\text{V}, I_D=30\text{A}$
$V_{GS(th)}$	Gate threshold voltage	2.0	—	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
I_{DSS}	Drain-to-Source leakage current	—	—	2	μA	$V_{DS}=110\text{V}, V_{GS}=0\text{V}$
		—	—	10		$V_{DS}=110\text{V}, V_{GS}=0\text{V}, T_J=150^\circ\text{C}$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS}=20\text{V}$
	Gate-to-Source reverse leakage	—	—	-100		$V_{GS}=-20\text{V}$

Q_g	Total gate charge	—	110		nC	$I_D=30A, V_{GS}=10V$ $V_{DD}=30V$
Q_{gs}	Gate-to-Source charge	—	22	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	39	—		
$t_{d(on)}$	Turn-on delay time	—	20		nS	$V_{DD}=30V$ $I_D=2A, R_L=15\Omega$ $R_G=2.5\Omega$ $V_{GS}=10V$
t_r	Rise time	—	16			
$t_{d(off)}$	Turn-Off delay time	—	69			
t_f	Fall time	—	19			
C_{iss}	Input capacitance	—	3150		pF	$V_{GS}=0V$ $V_{DS}=25V$ $f=1.0MHz$
C_{oss}	Output capacitance	—	350			
C_{riss}	Reverse transfer capacitance	—	240			

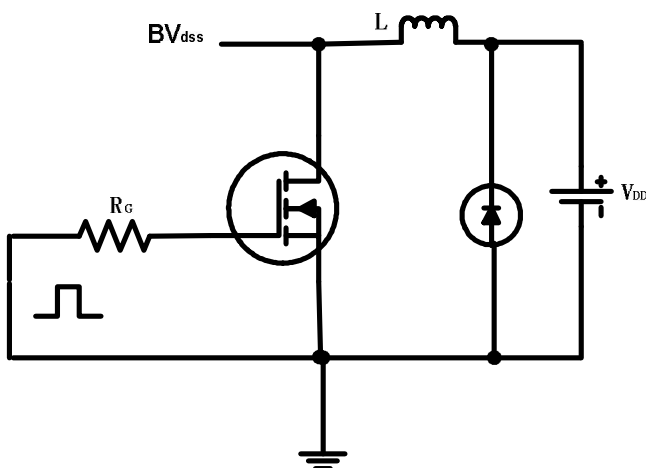
Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	75	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	300		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J=25^\circ C, I_S=60A, V_{GS}=0V$ ③
t_{rr}	Reverse Recovery Time	—	54	—	nS	$T_J=25^\circ C, I_F=75A$ $di/dt=100A/\mu s$ ③
Q_{rr}	Reverse Recovery Charge	—	131	—	μC	
t_{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

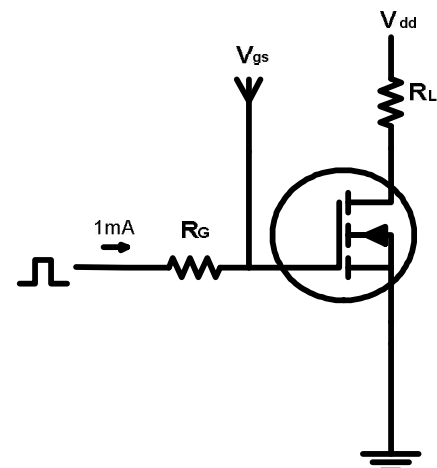
Notes:

- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition: $L = 0.3mH, V_{DD} = 50V, I_D=45A$
- ③ Pulse width $\leq 300\mu s$, duty cycle $\leq 1.5\%$; $R_G = 25\Omega$ Starting $T_J = 25^\circ C$

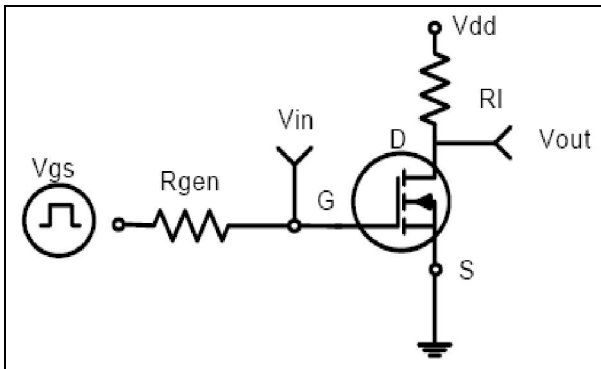
EAS Test Circuit



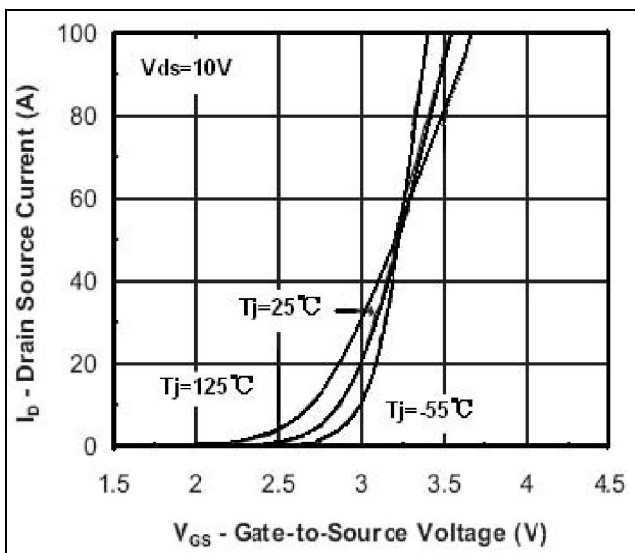
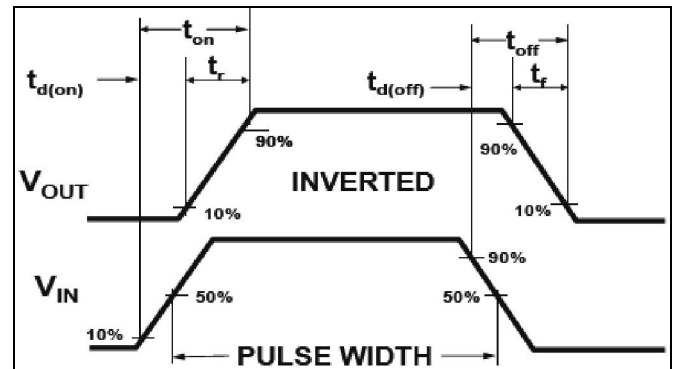
Gate Charge Test Circuit



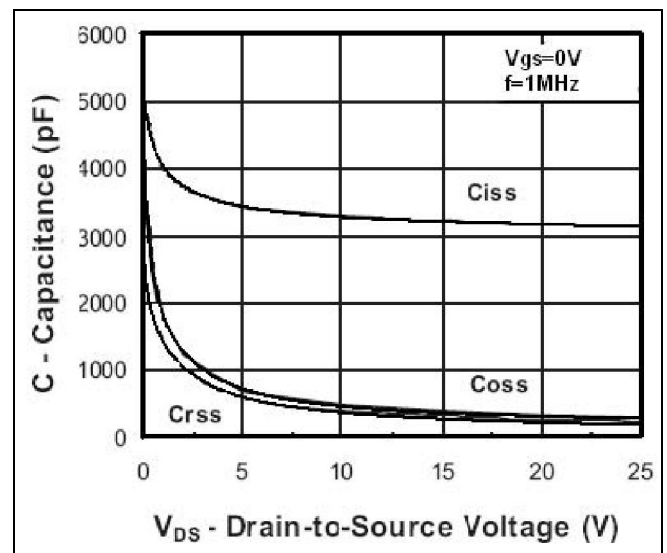
Switch Time Test Circuit



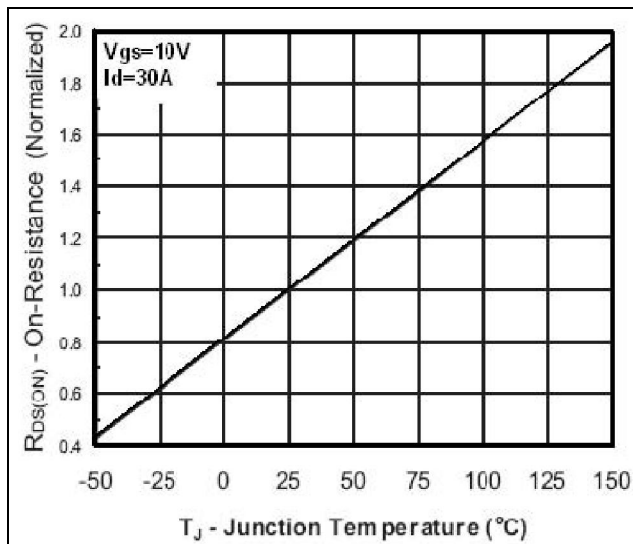
Switch Waveform



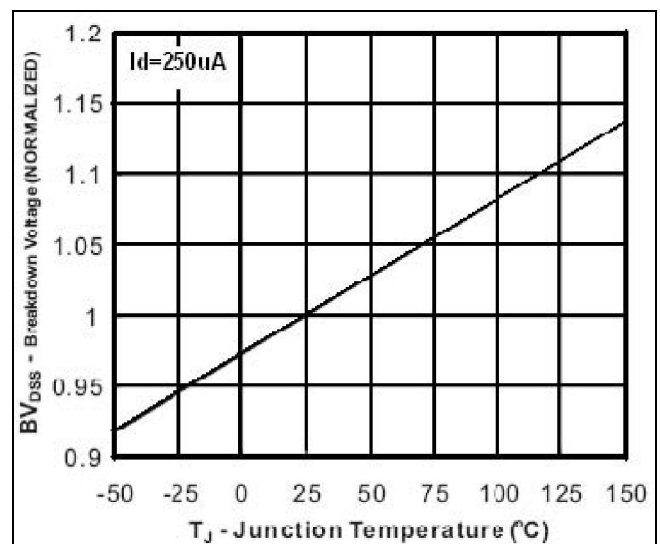
Transfer Characteristic



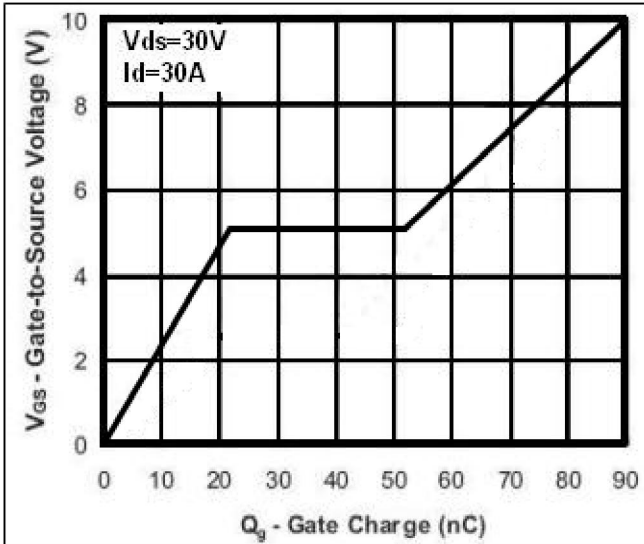
Capacitance



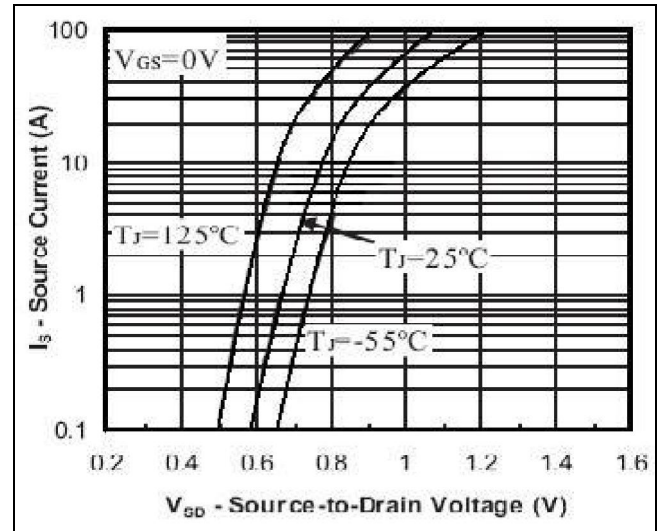
On Resistance vs. Junction Temperature



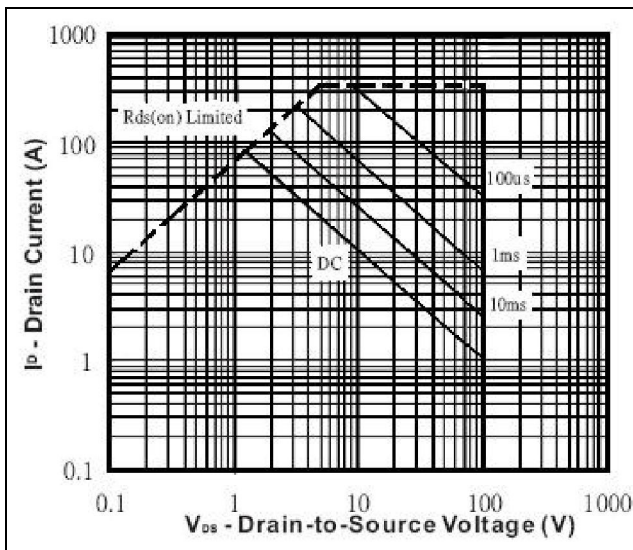
Breakdown Voltage vs. Junction Temperature



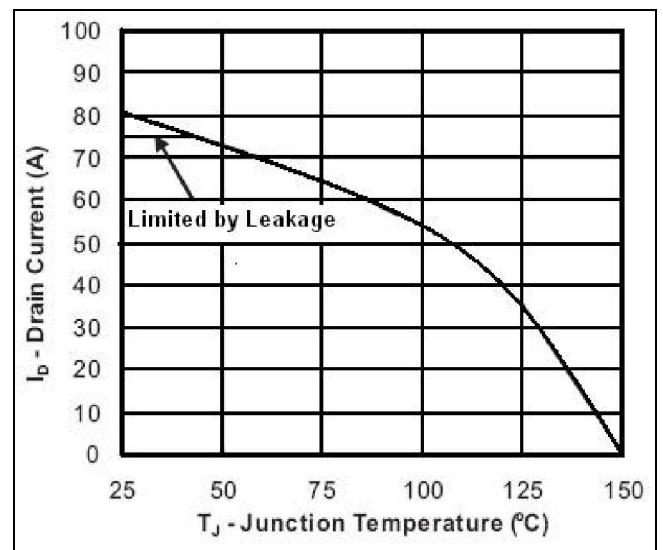
Gate Charge



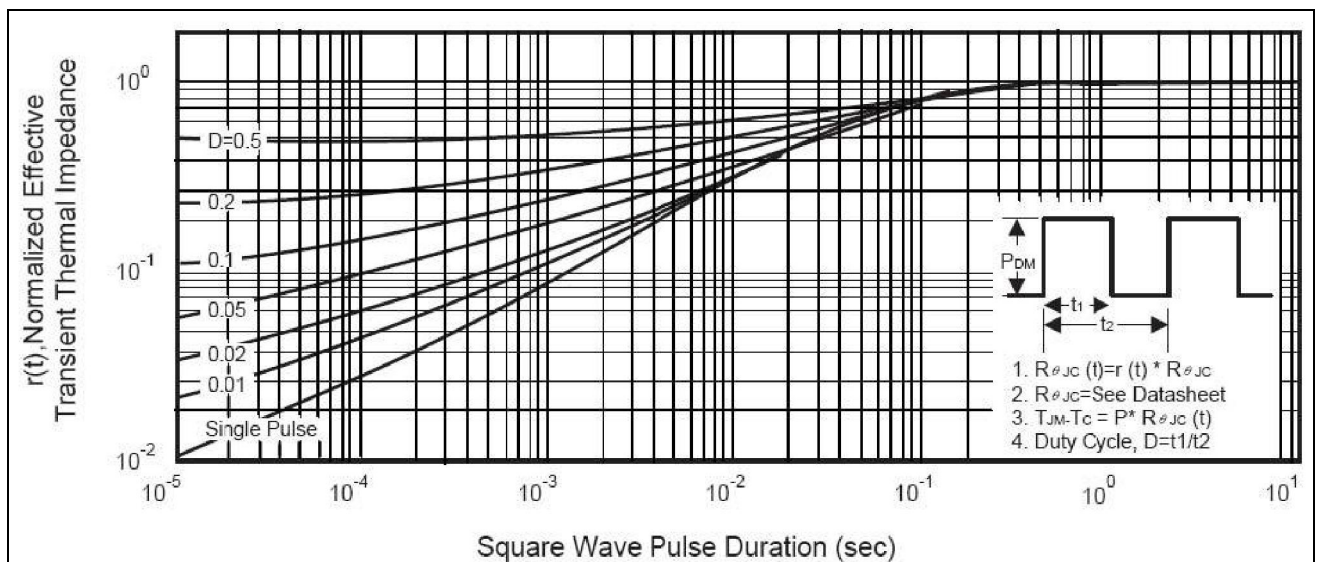
Source-Drain Diode Forward Voltage



Safe Operation Area

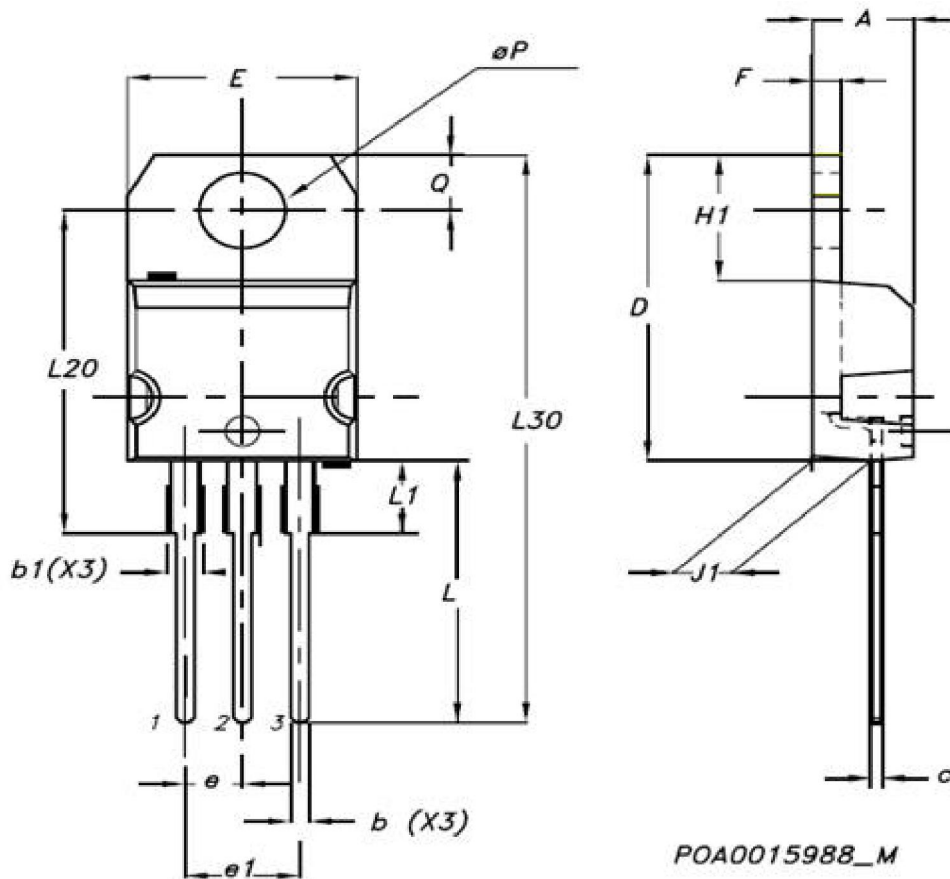


Max Drain Current vs. Junction



Transient Thermal Impedance Curve

TO-220 MECHANICAL DATA



Dim	mm			inch		
	Min	Typ	Max	Min	Typ	Max
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.14		1.70	0.044		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.6		0.62
D1		1.27			0.050	
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.051
H1	6.20		6.60	0.244		0.256
J1	2.40		2.72	0.094		0.107
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L20		16.40			0.645	
L30		28.90			1.137	
∅P	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116