SSF1090

100V N-Channel MOSFET

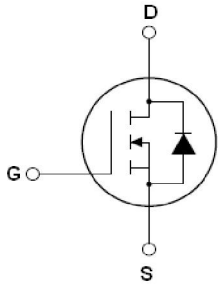
FEATURES

- Advanced trench process technology
- Special designed for Convertors and power controls
- High density cell design for ultra low $R_{DS\ (ON)}$
- Fully characterized Avalanche voltage and current
- Avalanche Energy 100% test
- Lead free product

ID =15A

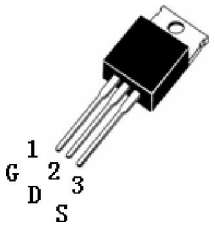
BV=100V

$R_{DS\ (ON)}$ =0.06Ω (Typ.)



DESCRIPTION

The SSF1090 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. SSF1090 is assembled in high reliability and qualified assembly house.



SSF1090 Top View (TO-220)

APPLICATIONS

- Power switching application

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D@T_c=25℃	Continuous drain current,VGS@10V	15	A
I_D@T_c=100℃	Continuous drain current,VGS@10V	10	
I_{DM}	Pulsed drain current ①	60	
P_D@T_C=25℃	Power dissipation	42	W
	Linear derating factor	0.4	W/℃
V_{GS}	Gate-to-Source voltage	±20	V
E_{AS}	Single pulse avalanche energy ②	240	mJ
E_{AR}	Repetitive avalanche energy	TBD	mJ
dv/dt	Peak diode recovery voltage	28	v/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	–55 to +175	℃

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	3.6	—	C/W
$R_{\theta JA}$	Junction-to-ambient	—	—	69	

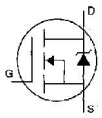
***When mounted on the minimum pas size recommended（PCB Mount）**

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source breakdown voltage	100	—	—	V	V_{GS}=0V,I_D=250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	0.06	0.09	Ω	V_{GS}=10V,I_D=2A
$V_{GS(th)}$	Gate threshold voltage	2.0	—	4.0	V	V_{DS}=V_{GS},I_D=250μA
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	V_{DS}=30V,V_{GS}=0V
		—	—	10		V_{DS}=100V, 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	—	21.18		nC	I_D=9.2A,V_{GS}=10V V_{DD}=80V,RL=8.6Ω
Q_{gs}	Gate-to-Source charge	—	4.7	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	8.5	—		
$t_{d(on)}$	Turn-on delay time	—	10		nS	V_{DD}=50V I_D=9.2A ,R_L=5.4Ω R_G=18Ω V_{GS}=10V
t_r	Rise time	—	9.5			
$t_{d(off)}$	Turn-Off delay time	—	18.3			
t_f	Fall time	—	4.2			
C_{iss}	Input capacitance	—	697	750	pF	V_{GS}=0V V_{DS}=25V f=1.0MHZ
C_{oss}	Output capacitance	—	59	110		
C_{rss}	Reverse transfer capacitance	—	43	45		

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	18		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J=25℃,I_S=3A,V_{GS}=0V ③
t_{rr}	Reverse Recovery Time	—	35	—	nS	T_J=25℃,I_F=9.2A di/dt=100A/μs ③
Q_{rr}	Reverse Recovery Charge	—	67.2	—	μC	
t_{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by Ls + LD)				

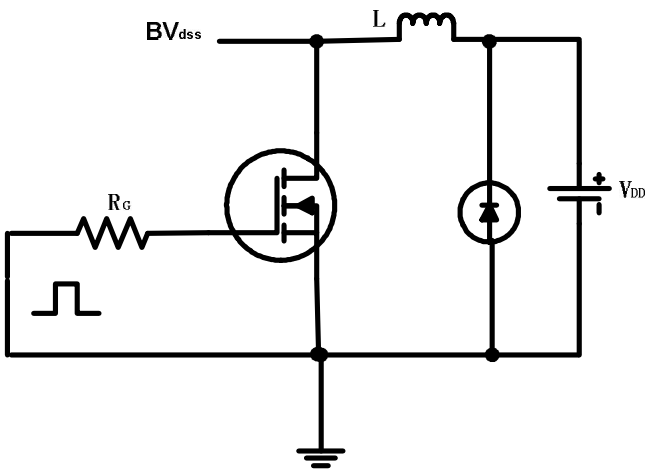
Notes:

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

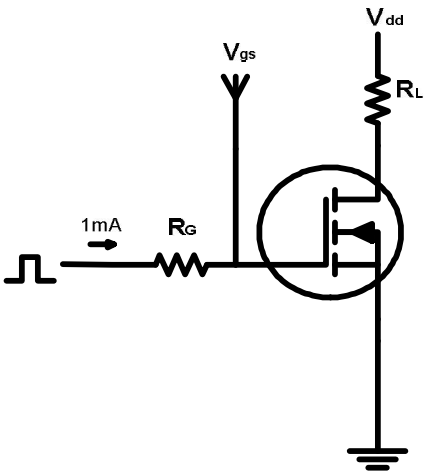
② Test condition: L =30mH, VDD = 50V, Id=4A.

③ Pulse width≤300μS, duty cycle≤1.5% ; RG = 25Ω Starting T_J = 25°C

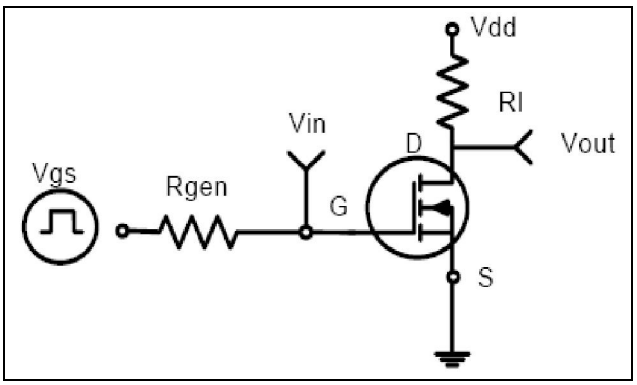
EAS Test Circuit



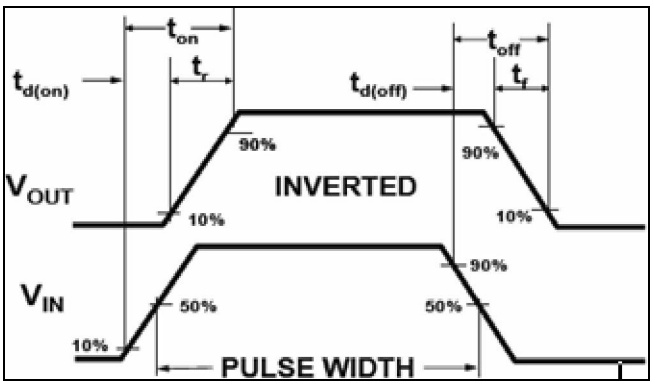
Gate Charge Test Circuit

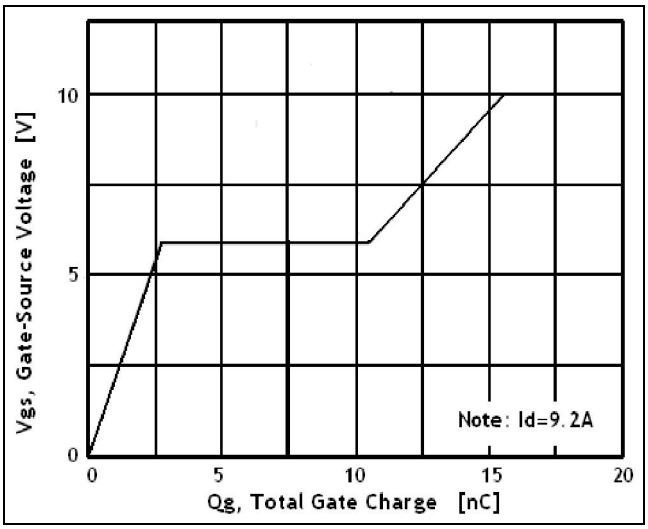


Switch Time Test Circuit

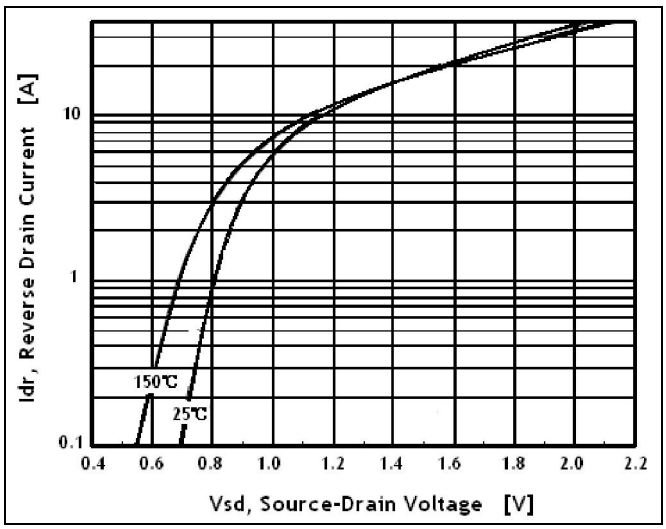


Switch Waveform

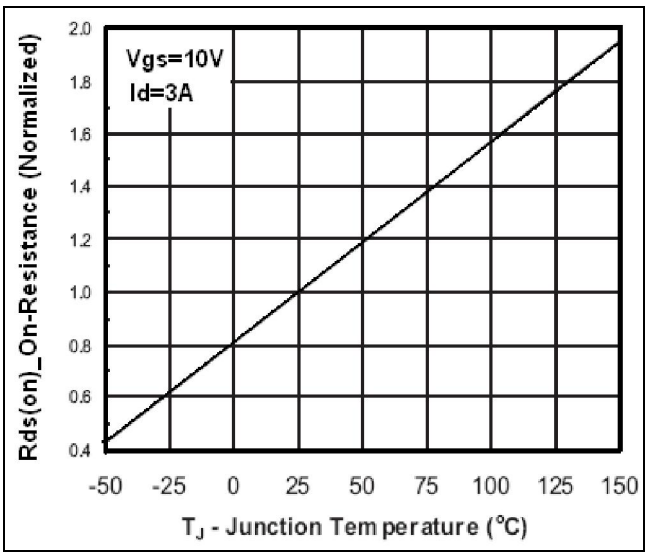




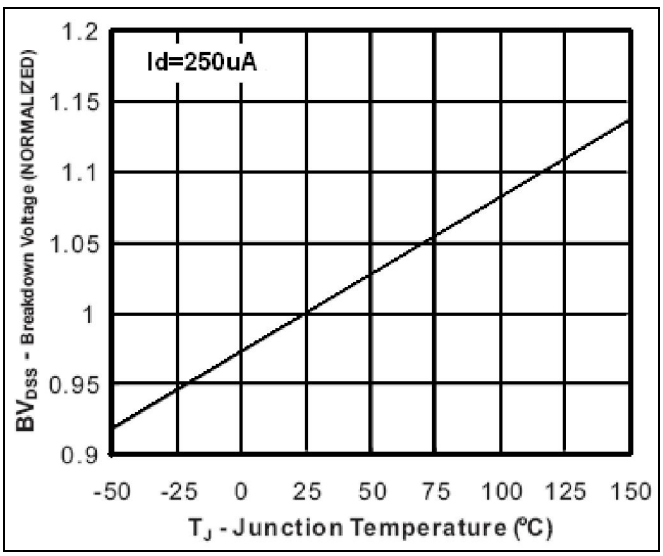
Gate Charge



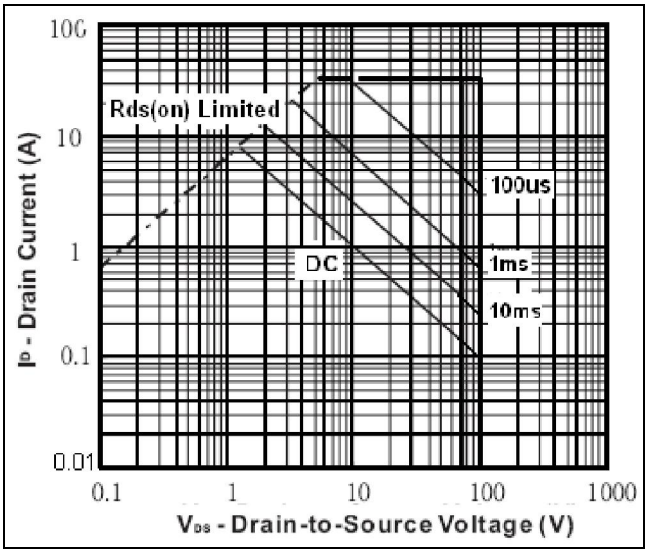
Source-Drain Diode Forward Voltage



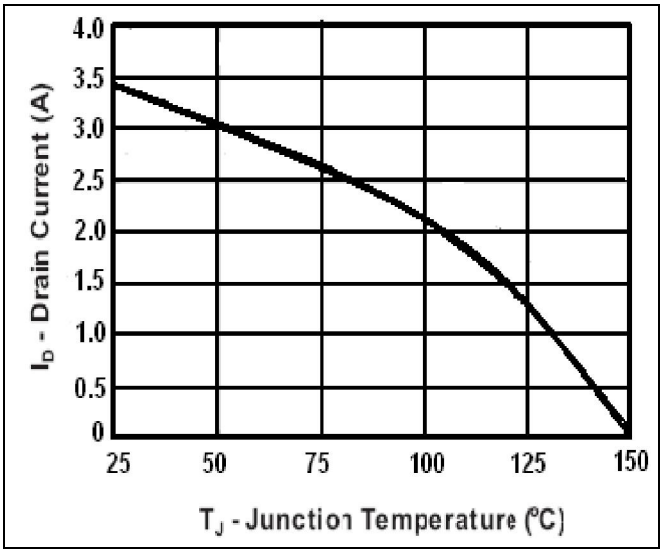
On Resistance vs. Junction Temperature



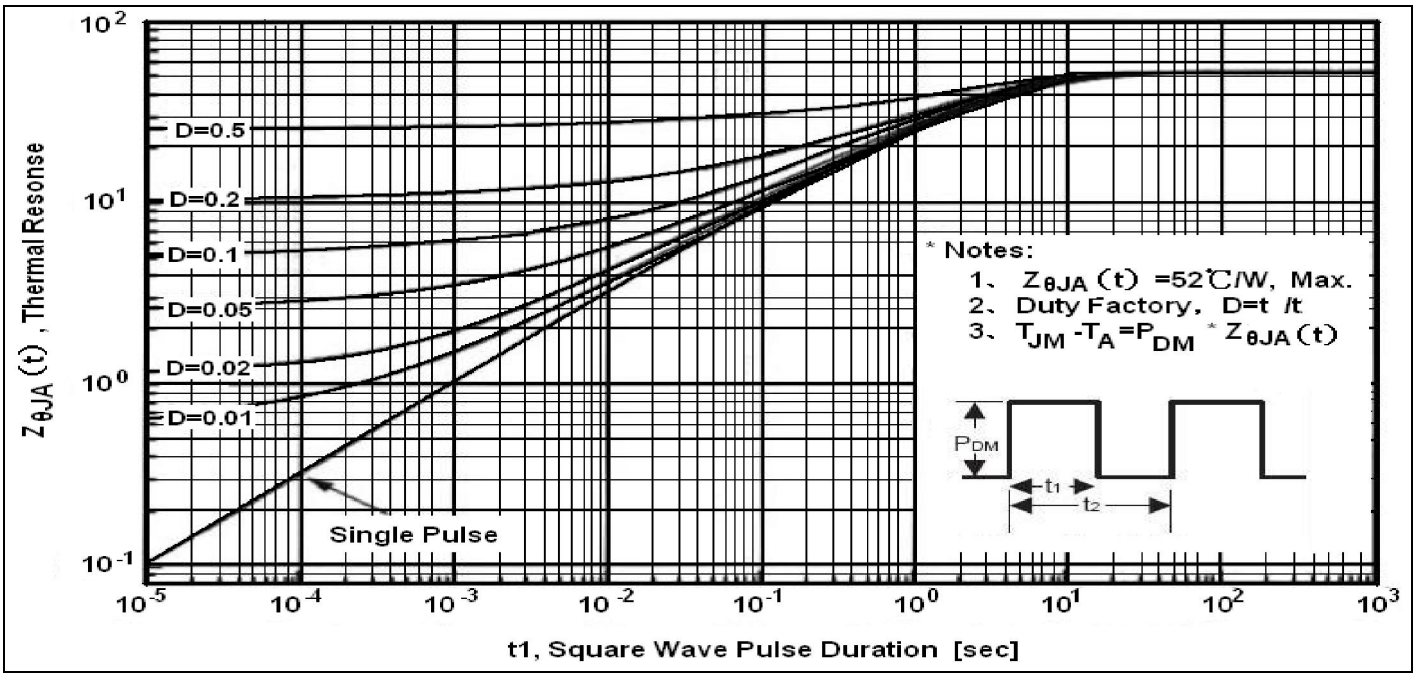
Breakdown Voltage vs. Junction Temperature



Safe Operation Area

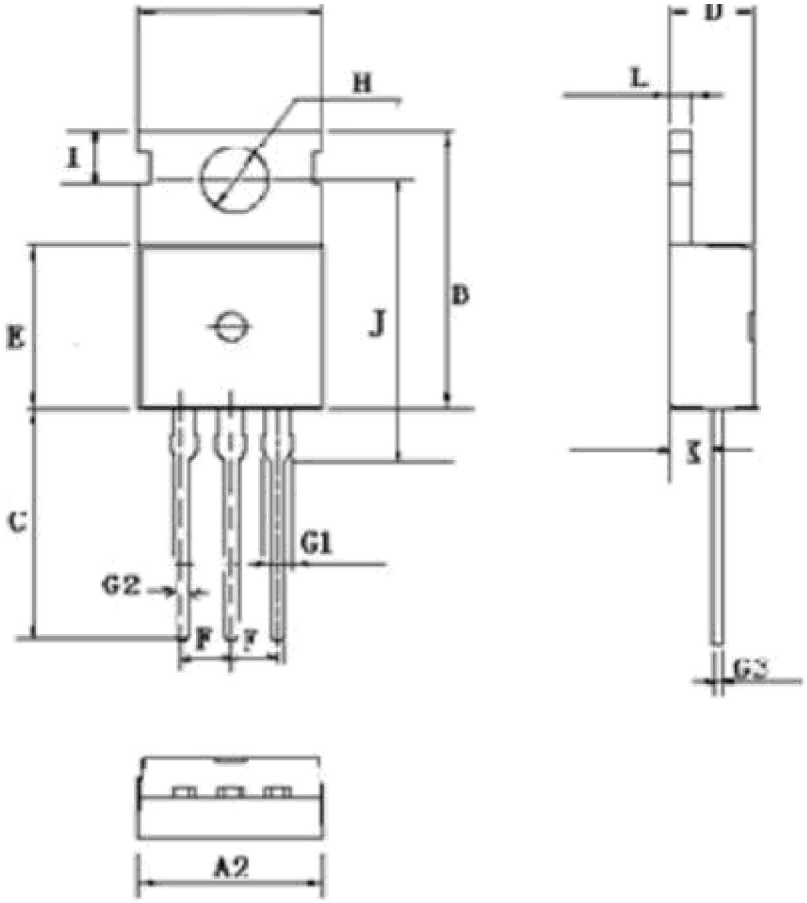


Max Drain Current vs. Junction Temperature



Transient Thermal Impedance Curve

TO220 MECHANICAL DATA



TO-220 3L

SYMBOL	DIMENSIONS
A(mm)	9.66~10.28
A2(mm)	9.80~10.20
B(mm)	15.6~15.8
C(mm)	12.70~14.27
D(mm)	4.30~4.70
E(mm)	8.59~9.40
F(mm)	2.54 (nom)
G1(mm)	1.42~1.62
G2(mm)	0.70~0.95
G3(mm)	0.45~0.60
H(mm) dia.	3.50~3.70
I(mm)	2.7~2.9
J(mm)	15.70~16.25
K(mm)	2.20~2.90
L(mm)	1.15~1.40
M(mm)	0.5