

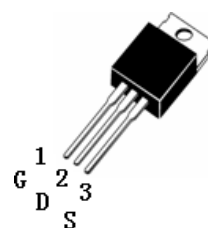
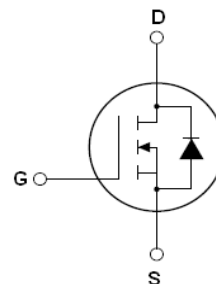
Features

- Advanced trench process technology
- Ideal for convertors and power controls
- High density cell design for ultra low Rdson
- Fully characterized Avalanche voltage and current
- Avalanche Energy 100% tested

$I_D = 15A$

$BV = 100V$

$R_{ds(on)} = 0.06\Omega$ (Typ.)



TO-220

Description

The SSF1090 utilizes the latest processing techniques to achieve high cell density, low on-resistance and high repetitive avalanche rating. These features make this device extremely efficient and reliable device for use in power switching applications and a wide variety of other applications.

Application

- Power switching application

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
$I_D @ T_c = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	15	A
$I_D @ T_c = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	10	
I_{DM}	Pulsed Drain Current ①	60	
$P_D @ T_c = 25^\circ C$	Power Dissipation	42	W
	Linear Derating Factor	0.4	W/ $^\circ C$
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	$^\circ C$

Thermal Resistance

Symbol	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	3.6	—	$^\circ C / W$
$R_{\theta JA}$	Junction-to-Ambient	—	—	69	

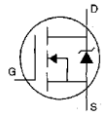
*When mounted on the minimum pad size recommended (PCB Mount)

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

Sym.	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	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	$V_{DS} = V_{GS}, I_D = 250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	1	μA	$V_{DS} = 30V, V_{GS} = 0V$
		—	—	10		$V_{DS} = 100V, V_{GS} = 0V, T_J = 150^\circ C$
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	—	21.18		nC	$I_D=9.2A, V_{GS}=10V$ $V_{DD}=80V, R_L=8.6\Omega$
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	$V_{DD}=50V$ $I_D=9.2A, R_L=5.4\Omega$ $R_G=18\Omega$ $V_{GS}=10V$
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		

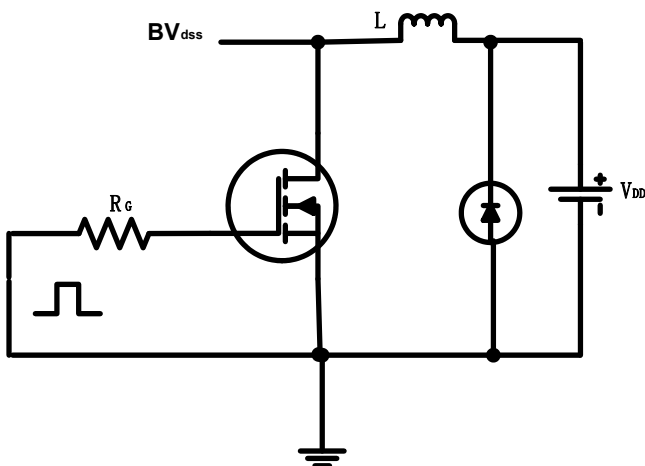
Source-Drain Ratings and Characteristics

Sym.	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°C, I _S =3A, V _{GS} =0V ③
t _{rr}	Reverse Recovery Time	—	35	—	nS	T _J =25°C, 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 L _S + L _D)				

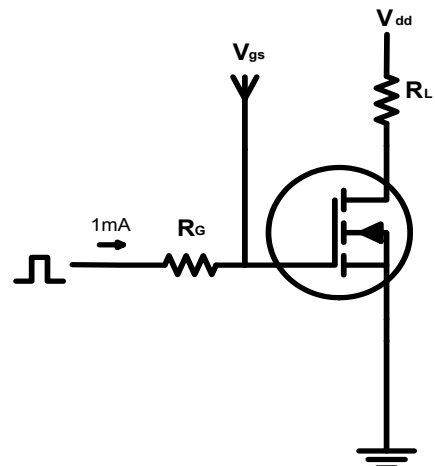
Notes:

- ① Repetitive rating; pulse width limited by max junction temperature
- ② Test condition: $L = 30mH, V_{DD} = 50V, I_d=4A$
- ③ Pulse width $\leq 300\mu s$, duty cycle $\leq 1.5\%$; $R_G = 25\Omega$ Starting $T_J = 25^\circ C$

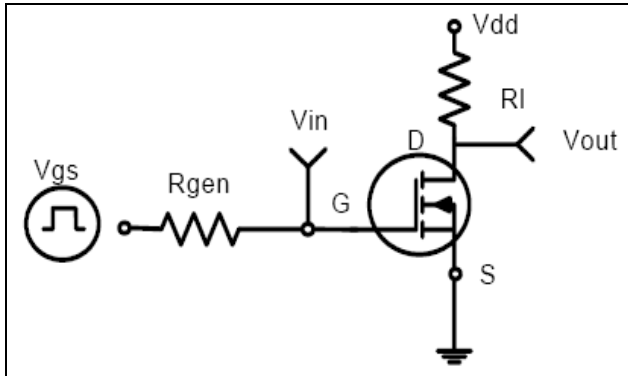
E_{AS} Test Circuit



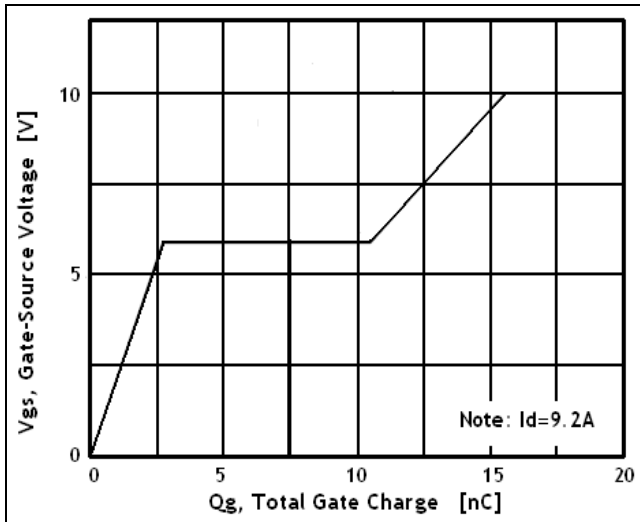
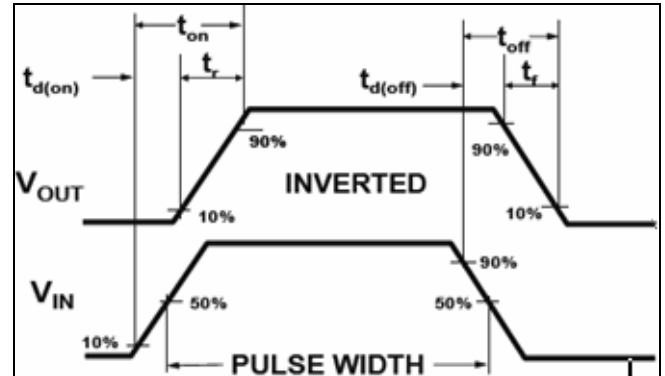
Gate Charge Test Circuit



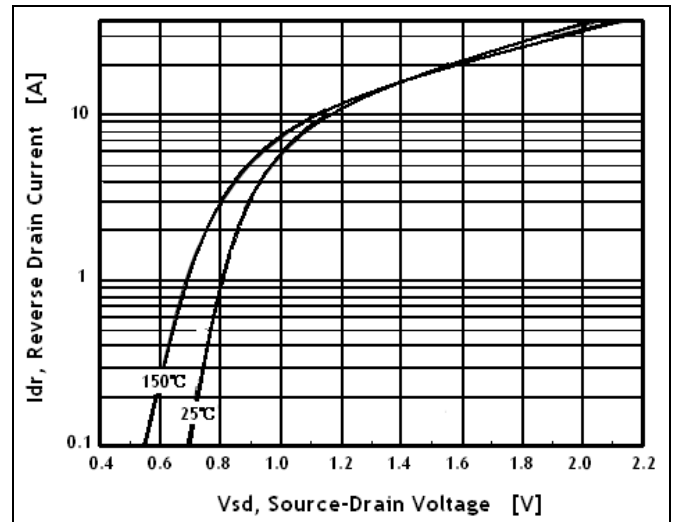
Switch Time Test Circuit



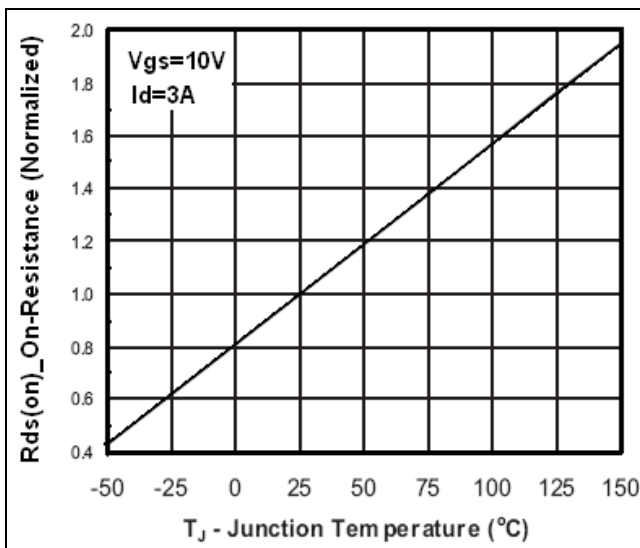
Switch Waveform



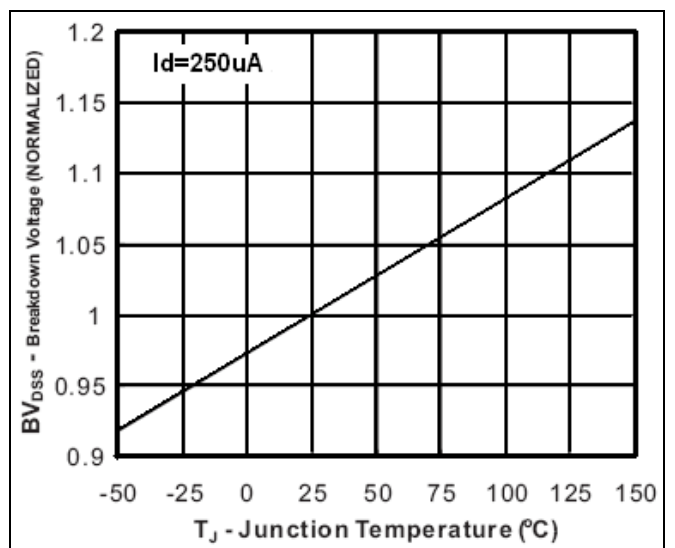
Gate Charge



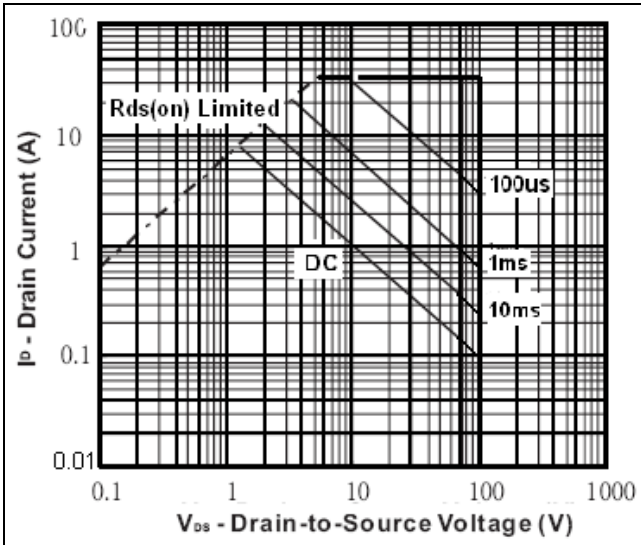
Source-Drain Diode Forward Voltage



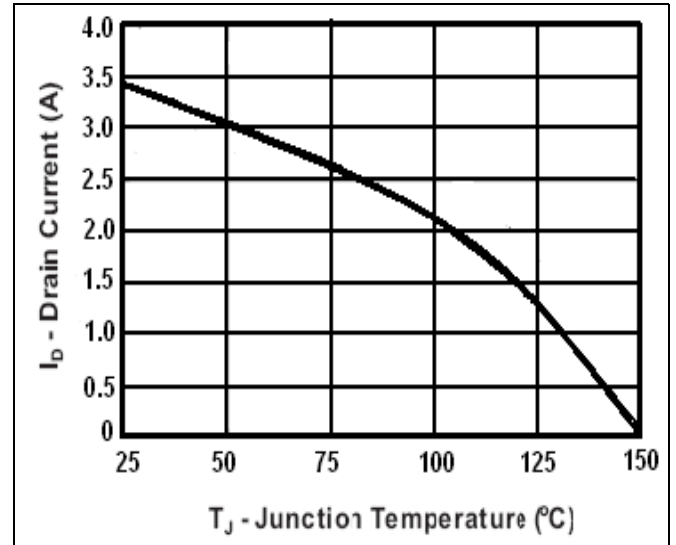
On Resistance vs. Junction Temperature



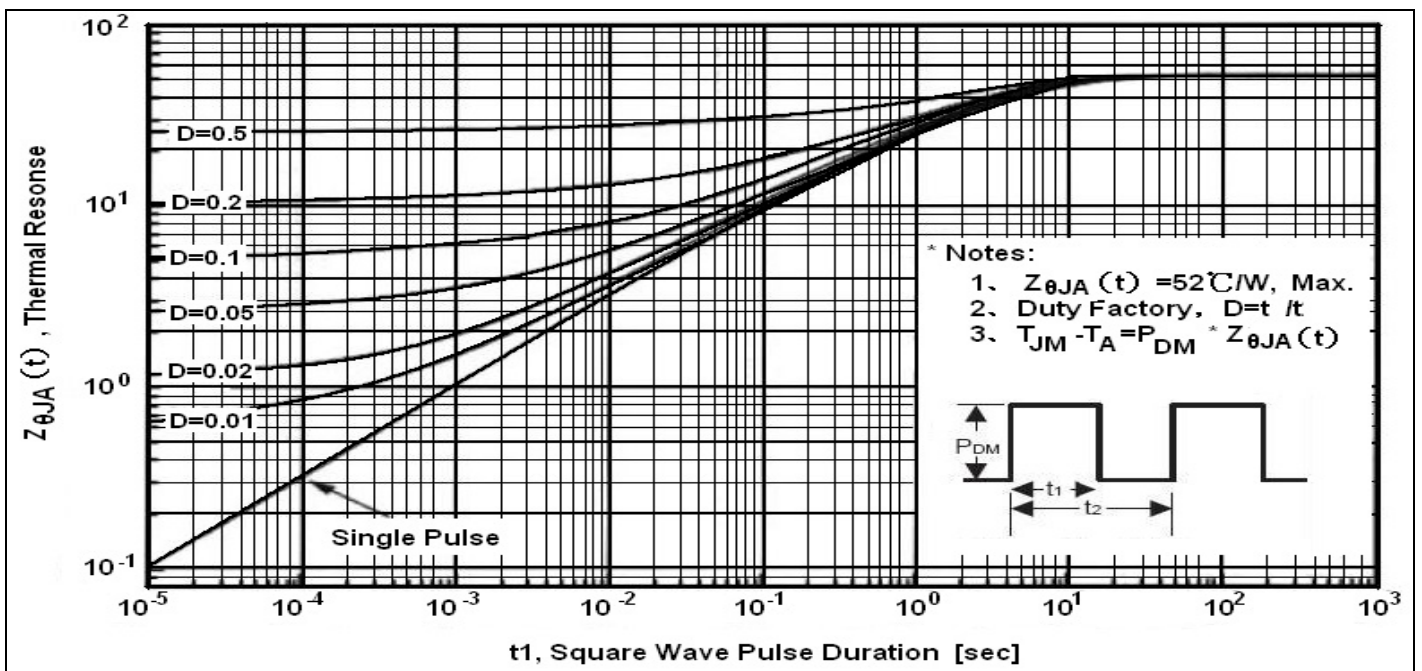
Breakdown Voltage vs. Junction Temperature



Safe Operation Area

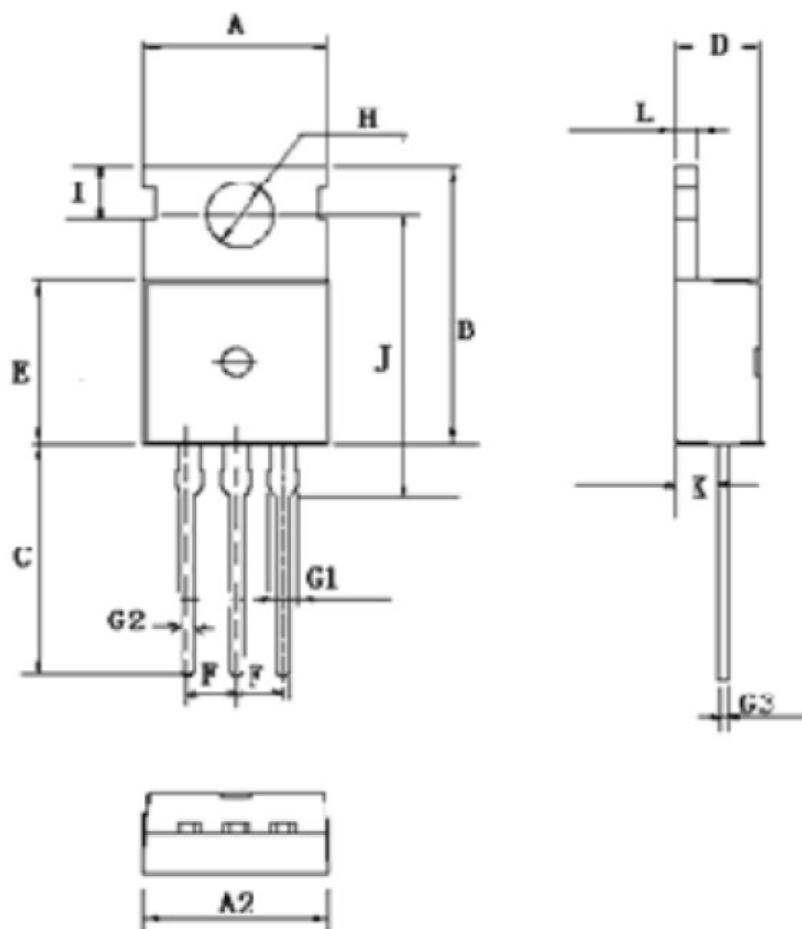


Max Drain Current vs. Junction Temperature



Transient Thermal Impedance Curve

TO-220 MECHANICAL DATA



TO-220 3L

Symbol	Dimensions in mm
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