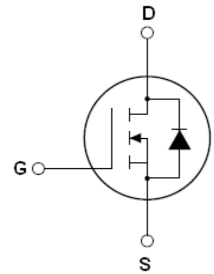
SILIKRON

SSF7N60

Features

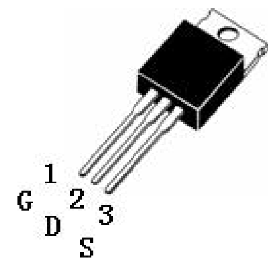
- Extremely high dv/dt capability
- Low Gate Charge Qg results in Simple Drive Requirement
- 100% avalanche tested
- Gate charge minimized
- Very low intrinsic capacitances
- Very good manufacturing repeatability

VDSS = 600V
ID = 7A
Rdson = 0.9Ω (typ.)



Description

The SSF7N60 is a new generation of high voltage N–Channel enhancement mode power MOSFETs and is obtained through an extreme optimization layout design, in additional to pushing on-resistance significantly down, special care is taken to ensure a very good dv/dt capability, provide superior switching performance, withstand high energy pulse in the avalanche, and increases packing density.



SSF7N60 TOP View (TO220)

Application

- High current, high speed switching
- Ideal for off-line power supply, adaptor, PFC

Absolute Maximum Ratings

	Parameter	Max.	Units
ID@Tc=25 ℃	Continuous Drain Current,VGS@10V	7.2	A
ID@Tc=100℃	Continuous Drain Current,VGS@10V	4.8	
IDM	Pulsed Drain Current ①	28.8	
PD@TC=25℃	Power Dissipation	145	W
	Linear derating Factor	0.8	W/ ℃
VGS	Gate-to-Source Voltage	±30	V
EAS	Single Pulse Avalanche Energy ②	586	mJ
IAR	Avalanche Current ①	4	A
EAR	Repetitive Avalanche Energy ①	15	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.5	V/ns
TJ TSTG	Operating Junction and Storage Temperature Range	–55 to +150	℃

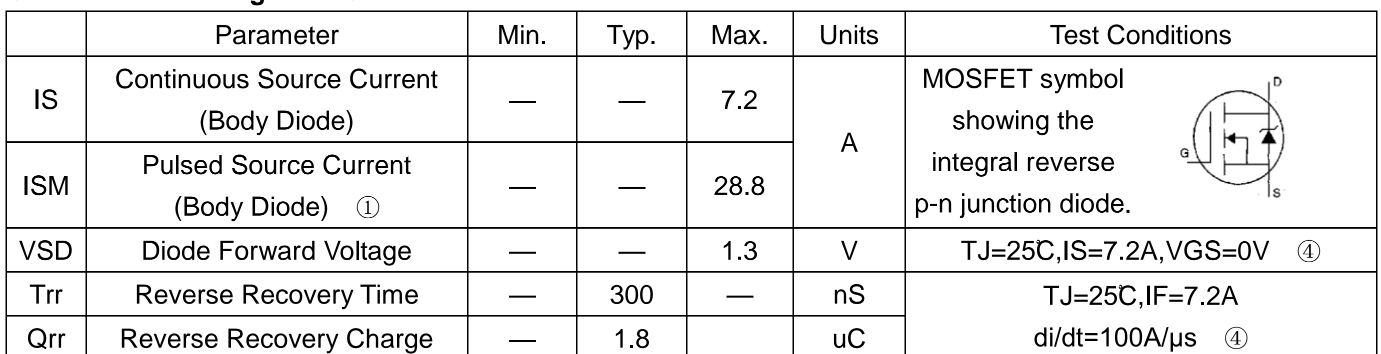
Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
RθJC	Junction-to-case	—	—	0.86	℃/W
RθCS	Case-to-Sink,Flat,Greased Surface	—	0.50	—	
RθJA	Junction-to-Ambient	—	—	62.5	

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V(BR)DSS	Drain-to-Source Breakdown Voltage	600	—	—	V	VGS=0V,ID=250μA
△ V(BR)DSS/ △ TJ	Breakdown Voltage Temp.Coefficient	—	0.6	—	V/℃	Reference to 25℃,ID=250μA
RDS(on)	Static Drain-to-Source On-resistance	—	0.9	1.1	Ω	VGS=10V,ID=3.8A ④
VGS(th)	Gate Threshold Voltage	2.0	—	4.0	V	VDS=VGS,ID=250μA
gfs	Forward Transconductance	—	6.4	—	S	VDS=40V,ID=3.8A
IDSS	Drain-to-Source Leakage current	—	—	1	uA	VDS=600V,VGS=0V
		—	—	10		VDS=480V,VGS=0V,TJ=150℃
IGSS	Gate-to-Source Forward leakage	—	—	0.5	uA	VGS=30V
	Gate-to-Source Reverse leakage	—	—	-0.5		VGS=-30V
Qg	Total Gate Charge	—	28.5	15	nC	ID=7.5A VDS=480V VGS=10V
Qgs	Gate-to-Source charge	—	7	—		
Qgd	Gate-to-Drain("Miller") charge	—	14.6	—		
td(on)	Turn-on Delay Time	—	29	70	nS	VDD=300V ID=7.5A RG=25Ω
tr	Rise Time	—	78	160		
td(off)	Turn-Off Delay Time	—	65	130		
tf	Fall Time	—	60	128		
Ciss	Input Capacitance	—	1000	1350	pF	VGS=0V VDS=25V f=1.0MHZ
Coss	Output Capacitance	—	125	165		
Crss	Reverse Transfer Capacitance	—	16	21		

Source-Drain Ratings and Characteristics



	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current (Body Diode)	—	—	7.2	A	MOSFET symbol showing the integral reverse p-n junction diode.
ISM	Pulsed Source Current (Body Diode) ①	—	—	28.8		
VSD	Diode Forward Voltage	—	—	1.3	V	TJ=25℃,IS=7.2A,VGS=0V ④
Trr	Reverse Recovery Time	—	300	—	nS	TJ=25℃,IF=7.2A di/dt=100A/μs ④
Qrr	Reverse Recovery Charge	—	1.8		uC	

Notes:

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

② L = 23.5mH, IAS =6.5A, VDD = 50V, RG = 25Ω, Starting, TJ = 25°C

③ ISD≤4A, di/dt≤200A/μs, VDD≤V(BR)DSS, TJ≤25°C

④ Pulse width≤300μS; duty cycle≤2%

Typical Performance Characteristics

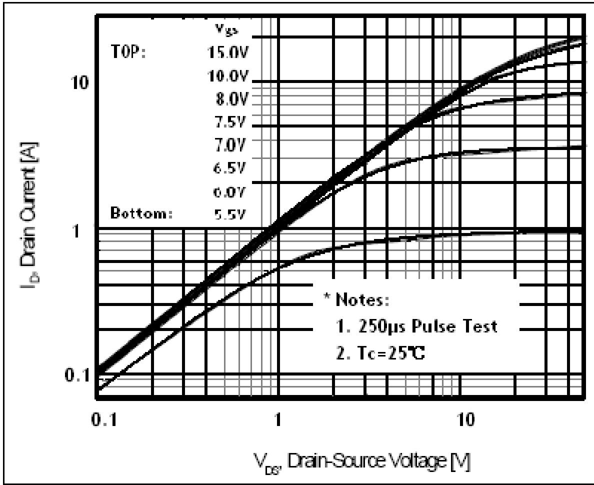


Figure 1 On-Region Characteristics

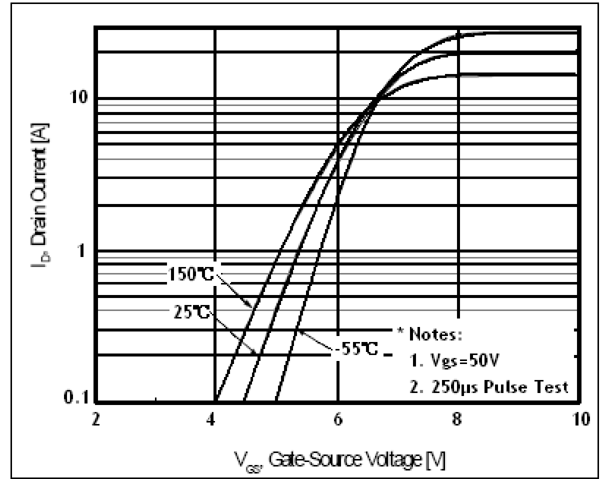


Figure 2 Transfer Characteristics

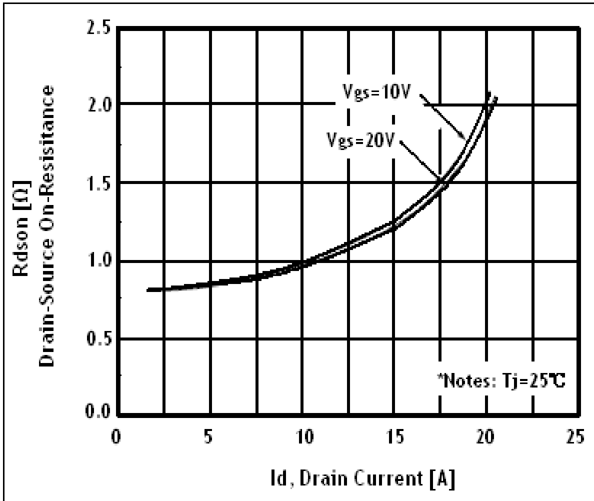


Figure 3 On-Resistance Variation vs. Drain Current and Gate Voltage

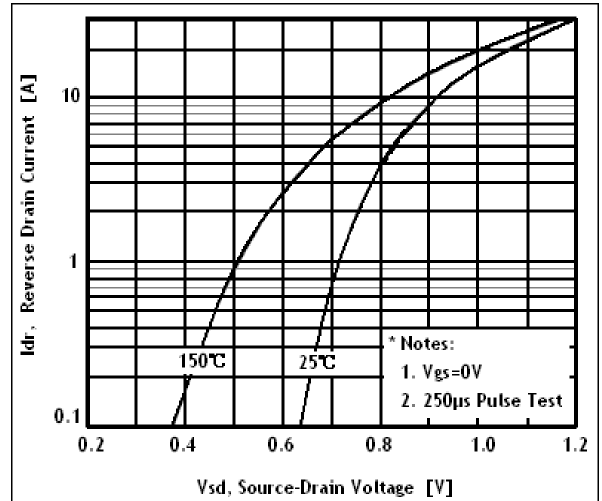


Figure 4 Body diode forward Voltage Variation vs. Source Current and temperature

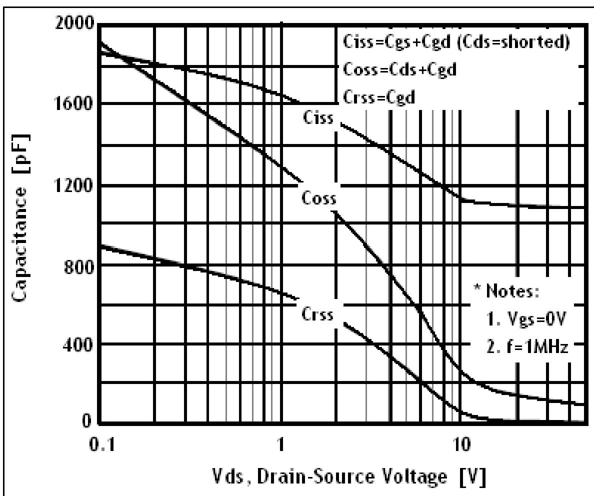


Figure 5 Capacitance Characteristics

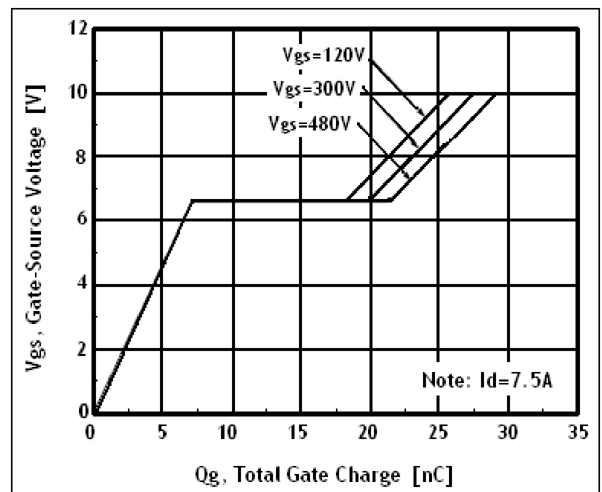


Figure 6 Gate Charge Characteristics

Typical Performance Characteristics

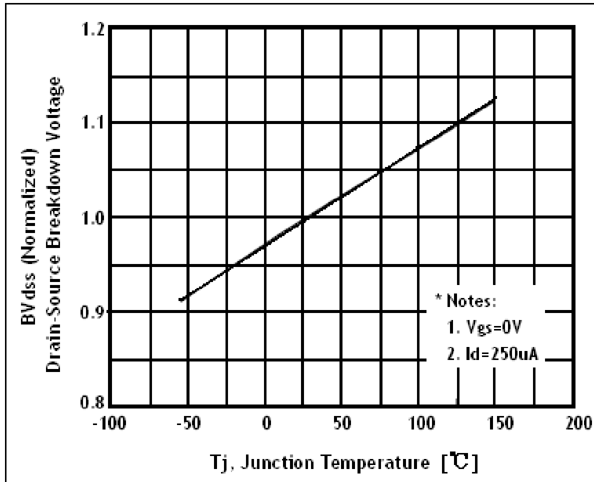


Figure 7 Breakdown Voltage Variation vs. Temperature

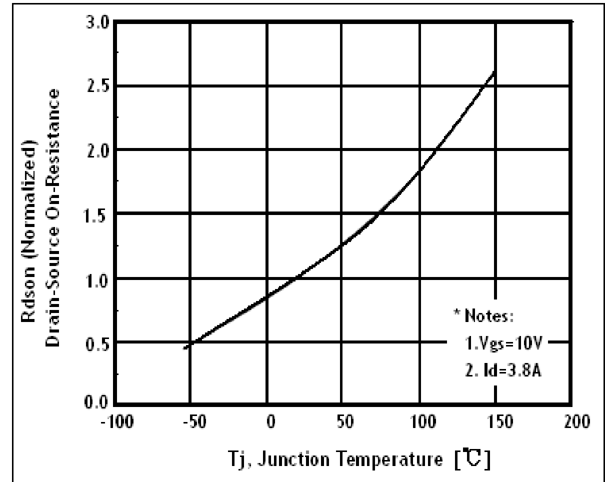


Figure 8 On-Resistance Variation vs. Temperature

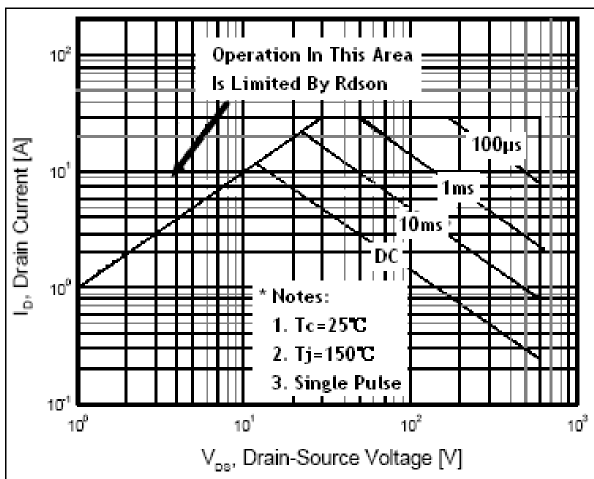


Figure 9 Maximum Safe Operation Area

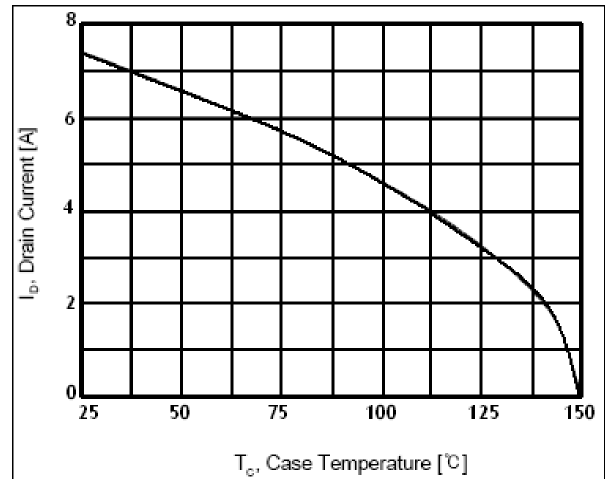


Figure 10 Maximum Drain Current vs. Case Temperature

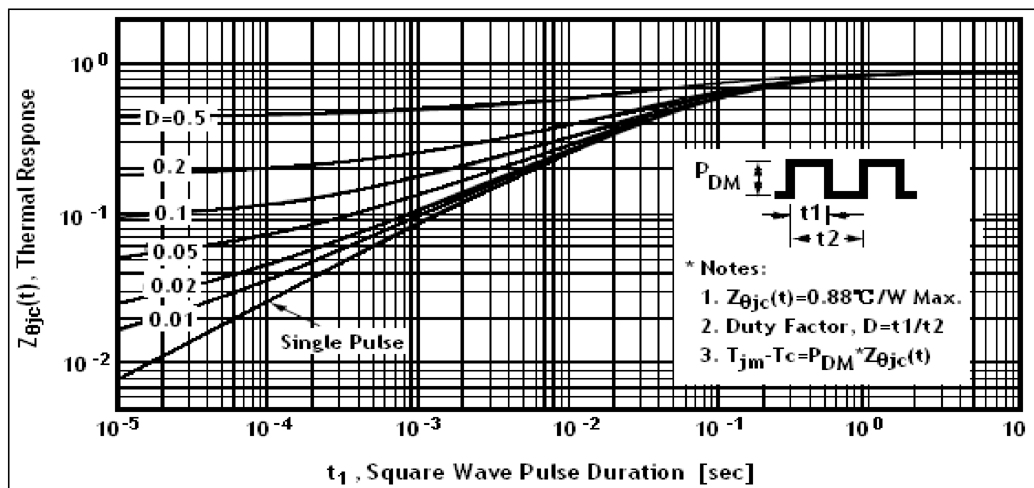
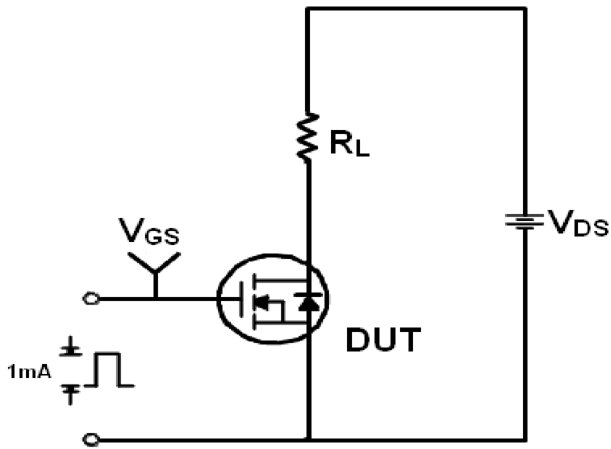
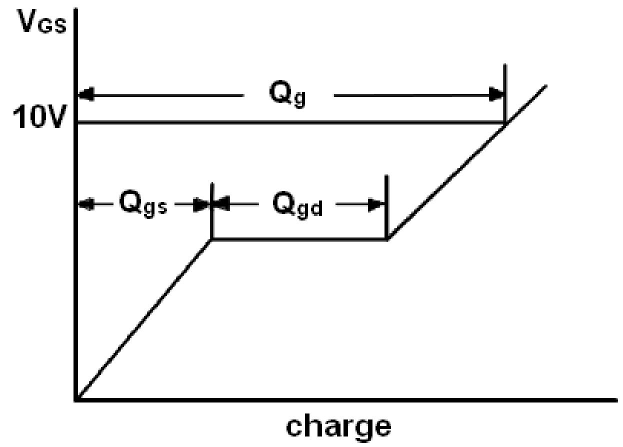


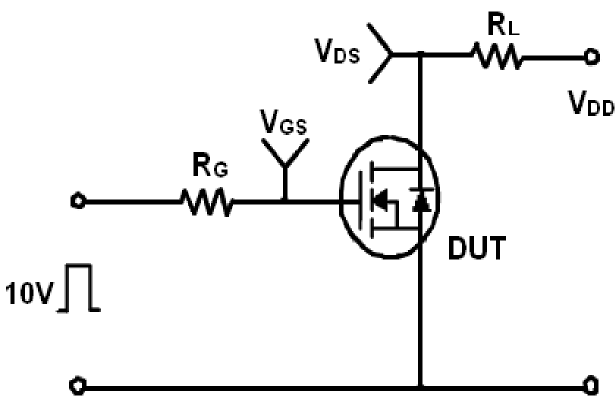
Figure 12 Transient Thermal Response Curve

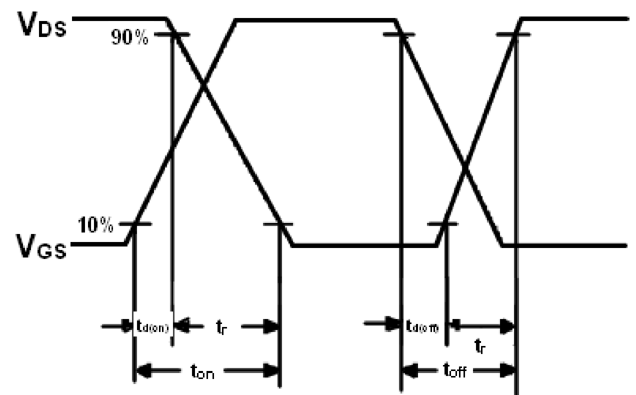
Test Circuit and Waveform



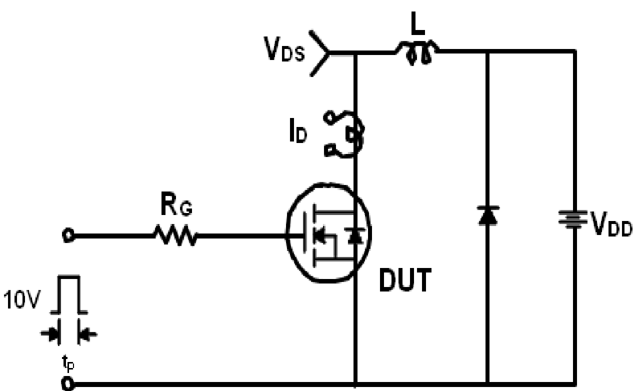


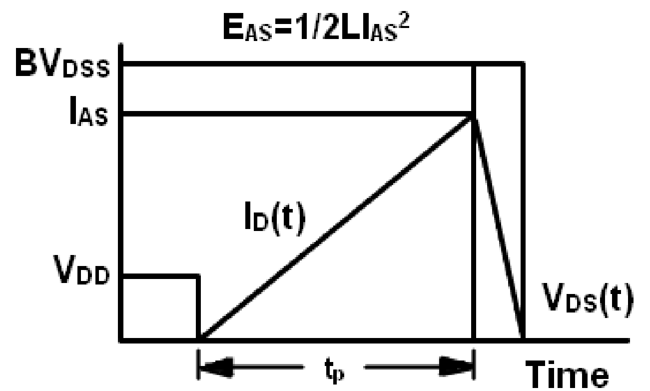
Gate Charge Test Circuit & Waveform





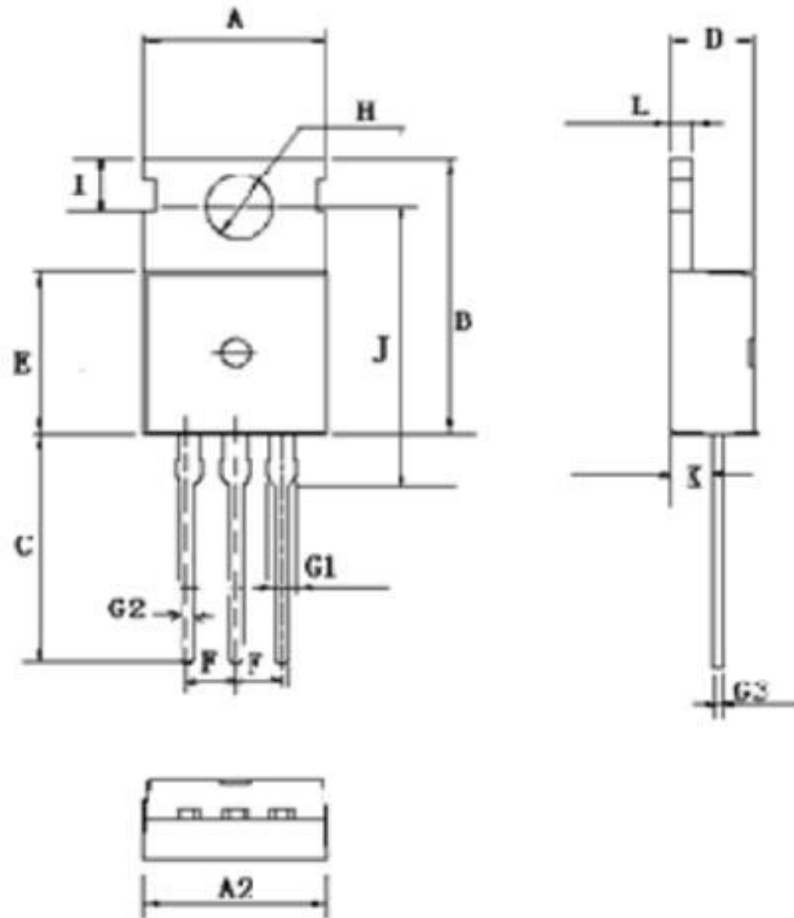
Resistive Switching Test Circuit & Waveform





Unclamped Inductive Switching Test Circuit & Waveform

TO-220 MECHANICAL DATA:



TO-220 3L

图形对应符号	产品外形尺寸
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