

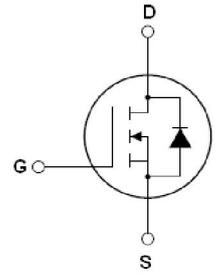
### FEATURES

- 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
- Lead free product

**VDSS = 600V**

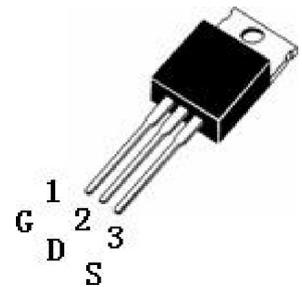
**ID = 8A**

**Rdson = 0.85Ω (typ.)**



### DESCRIPTION

The SSF8N60 is a new generation of high voltage N-Channel enhancement mode power MOSFETs and is obtained through an extreme optimization layout design, in addition 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.



**SSF8N60 TOP View (TO220)**

### APPLICATIONS

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

### Absolute Maximum Ratings

	Parameter	Max.	Units
ID@Tc=25°C	Continuous Drain Current, VGS@10V	8.2	A
ID@Tc=100°C	Continuous Drain Current, VGS@10V	5.5	
IDM	Pulsed Drain Current ①	32.8	
PD@TC=25°C	Power Dissipation	145	W
	Linear derating Factor	0.8	W/°C
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	°C

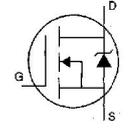
### Thermal Resistance

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

### Electrical Characteristics @T<sub>J</sub>=25 °C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V(BR)DSS	Drain-to-Source Breakdown Voltage	600	—	—	V	VGS=0V, ID=250μA
$\frac{\Delta V(BR)DSS}{\Delta T_J}$	Breakdown Voltage Temp. Coefficient	—	0.6	—	V/C	Reference to 25°C, ID=250μA
RDS(on)	Static Drain-to-Source On-resistance	—	0.85	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, T <sub>J</sub> =150°C
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
Qgs	Gate-to-Source charge	—	7	—		VDS=480V
Qgd	Gate-to-Drain("Miller") charge	—	14.6	—		VGS=10V
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
Coss	Output Capacitance	—	125	165		VDS=25V
Crss	Reverse Transfer Capacitance	—	16	21		f=1.0MHZ

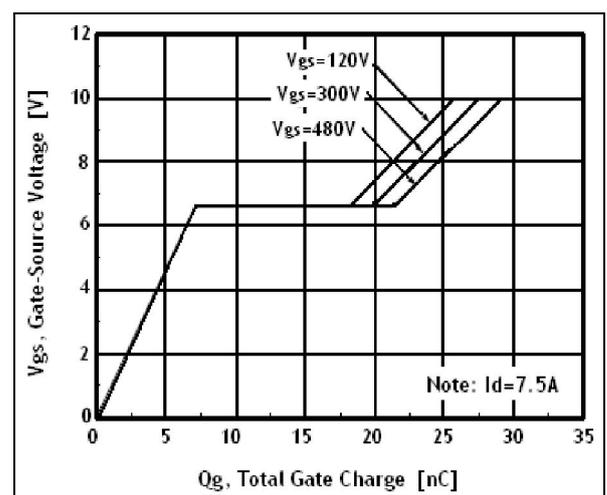
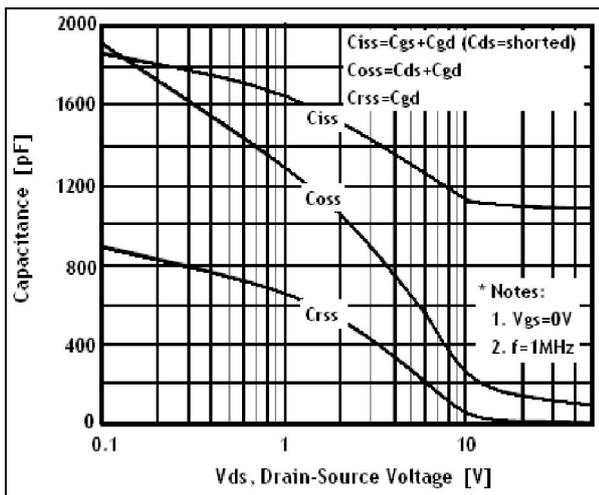
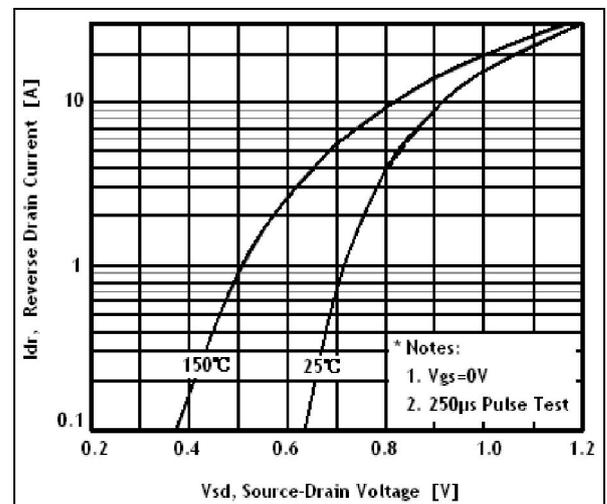
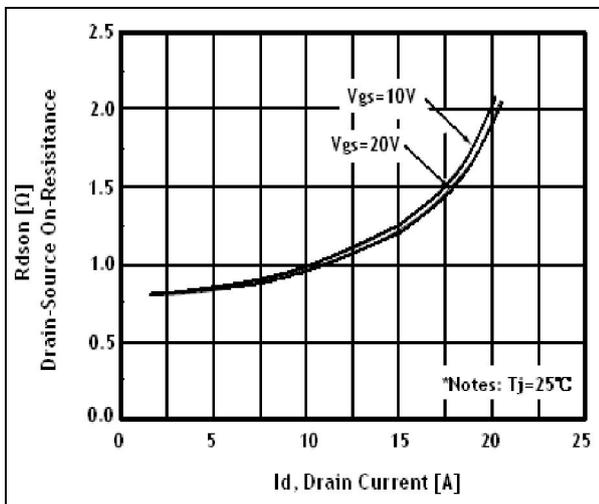
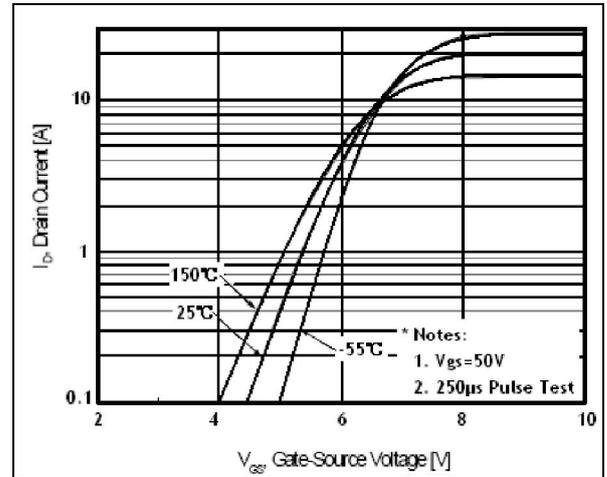
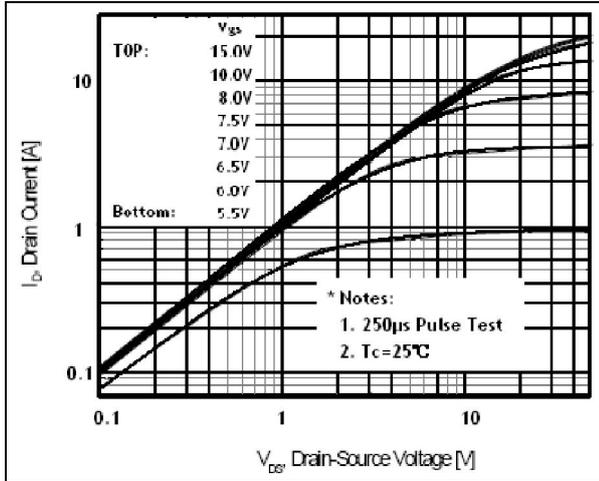
### Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current (Body Diode)	—	—	8.2	A	MOSFET symbol showing the integral reverse p-n junction diode. 
ISM	Pulsed Source Current (Body Diode) ①	—	—	32.8		
VSD	Diode Forward Voltage	—	—	1.3	V	T <sub>J</sub> =25°C, IS=7.2A, VGS=0V ④
Trr	Reverse Recovery Time	—	300	—	nS	T <sub>J</sub> =25°C, IF=7.2A di/dt=100A/μs ④
Qrr	Reverse Recovery Charge	—	1.8	—	uC	

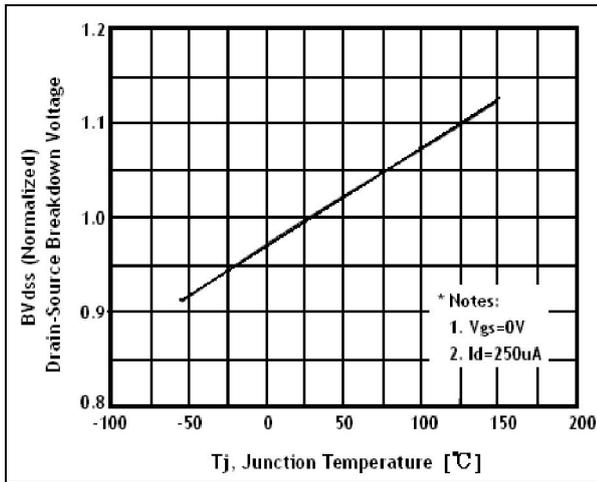
#### Notes:

- ① Repetitive rating; pulse width limited by maximum junction temperature
- ② L = 23.5mH, IAS = 6.5A, VDD = 50V, RG = 25Ω Starting, T<sub>J</sub> = 25°C
- ③ ISD ≤ 4A, di/dt ≤ 200A/μs, VDD ≤ V(BR)DSS, T<sub>J</sub> ≤ 25°C
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%

### Typical Performance Characteristics

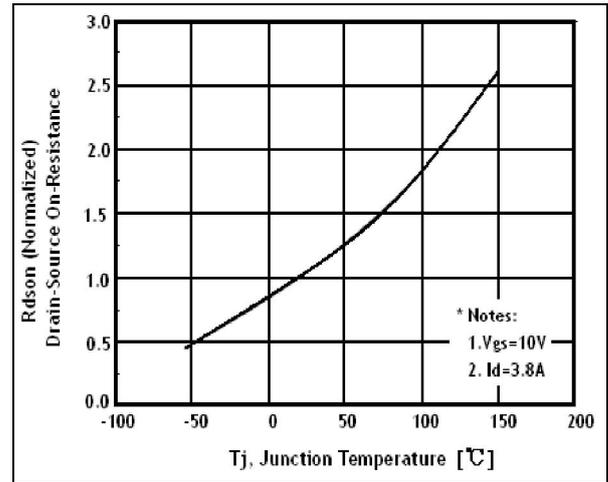


**Figure 5 Capacitance Characteristics**  
Typical Performance Characteristics

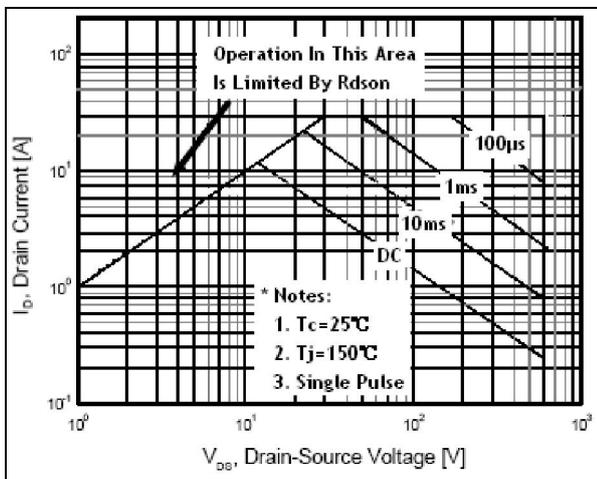


**Figure 7 Breakdown Voltage Variation vs. Temperature**

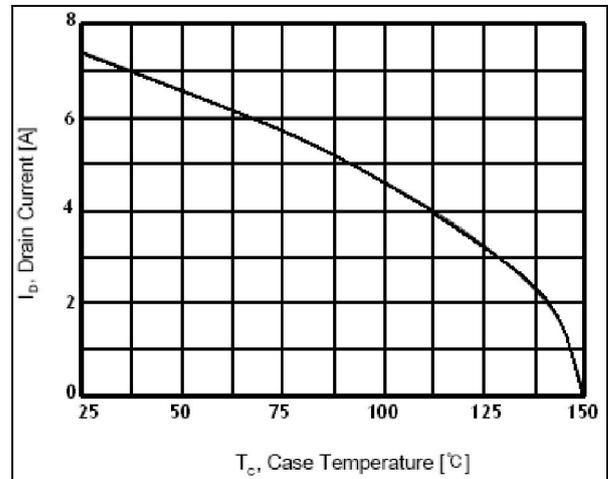
**Figure 6 Gate Charge Characteristics**



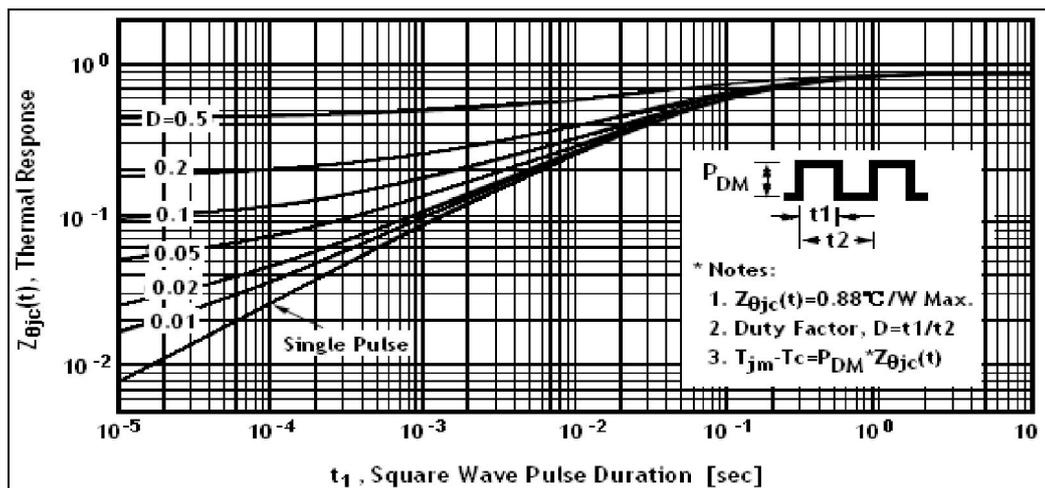
**Figure 8 On-Resistance Variation vs. Temperature**



**Figure 9 Maximum Safe Operation Area**

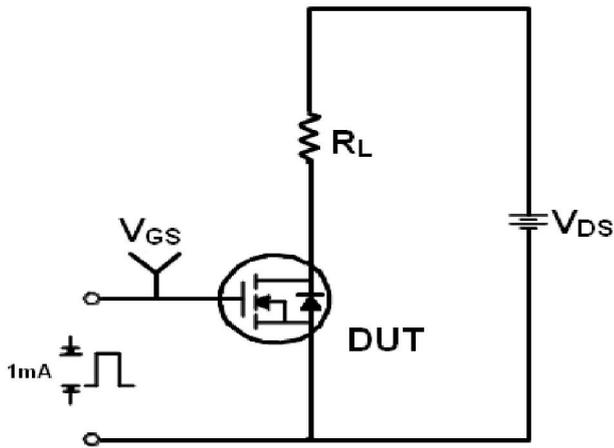


**Figure 10 Maximum Drain Current vs. Case Temperature**

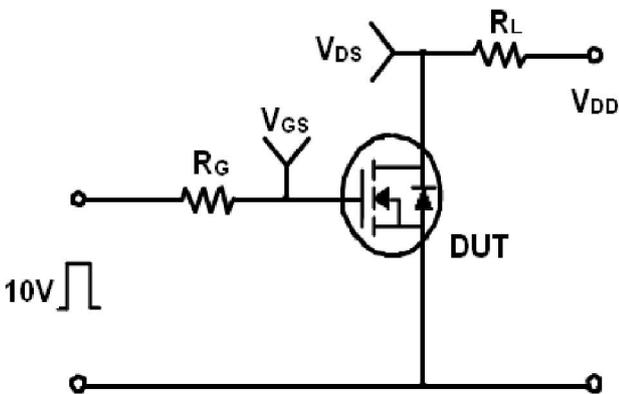


**Figure 12 Transient Thermal Response Curve**

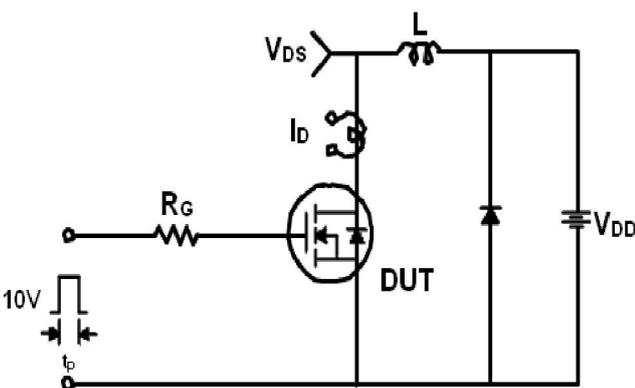
### Test Circuit and Waveform



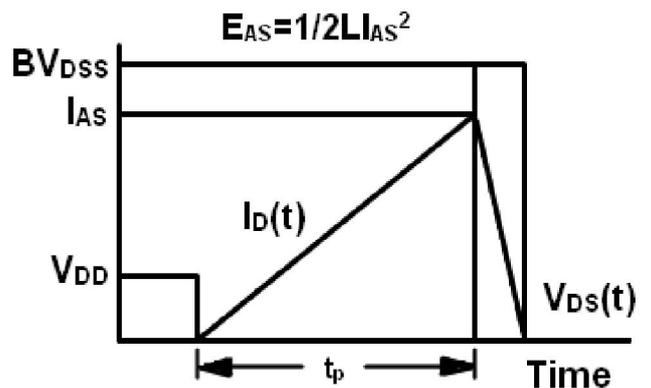
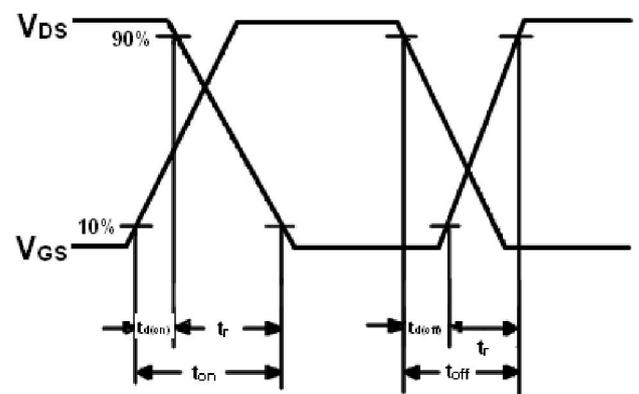
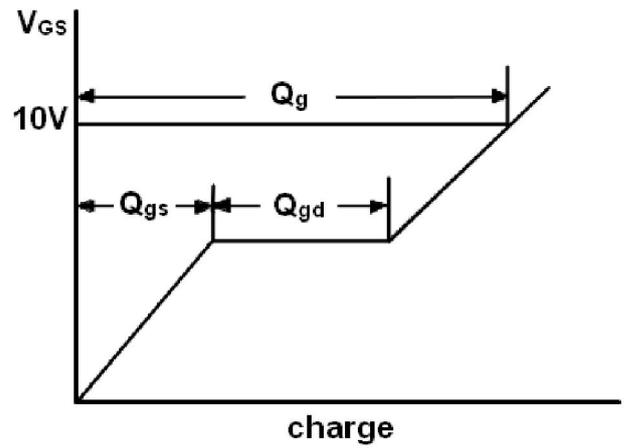
Gate Charge Test Circuit & Waveform



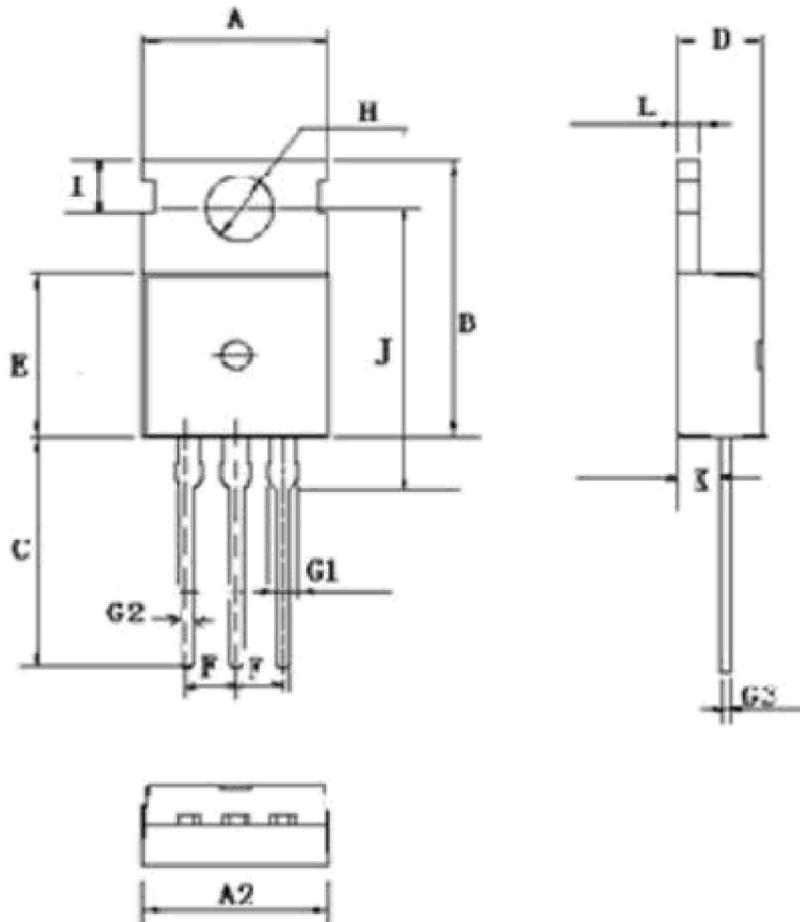
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



## TO-220 MECHANICAL DATA



TO-220 3L

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



# SSF8N60

600V N-Channel MOSFET

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