AF6930N

N-Channel Enhancement Mode Power MOSFET

■ Features

- DC-DC Application
- Surface Mount Package
- Dual N-channel Device

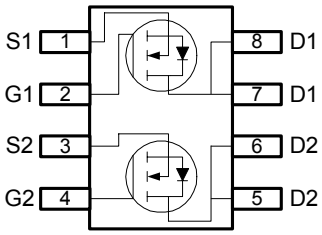
■ General Description

The advanced power MOSFET provides the designer with the best combination of fast switching, ruggedized device design, ultra low on-resistance and cost-effectiveness.

■ Product Summary

BV_{DSS} (V)	$R_{DS(ON)}$ (mΩ)	I_D (A)
30	50	5

■ Pin Assignments



SO-8

■ Pin Descriptions

Pin Name	Description
S1/2	Source
G1/2	Gate
D1/2	Drain

■ Ordering information

A X 6930N X X X

Feature	PN	Package	Lead Free	Packing
F :MOSFET		S: SO-8	Blank : Normal L : Lead Free Package	Blank : Tube or Bulk A : Tape & Reel

N-Channel Enhancement Mode Power MOSFET

■ Absolute Maximum Ratings

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		30	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current **(Note 1)**	T_A=25ºC	5	A
		T_A=70ºC	4	
I_{DM}	Pulsed Drain Current **(Note 2)**		20	A
P_D	Total Power Dissipation	T_A=25ºC	2	W
	Linear Derating Factor		0.016	W/ºC
T_{STG}	Storage Temperature Range		-55 to 150	ºC
T_J	Operating Junction Temperature Range		-55 to 150	ºC

■ Thermal Data

Symbol	Parameter		Maximum	Units
Rthj-amb	Thermal Resistance Junction-ambient **(Note 1)**	Max.	62.5	ºC/W

■ Electrical Characteristics at T_J=25ºC unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	30	-	-	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I_D=1mA	-	0.037	-	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance **(Note 3)**	V_{GS}=10V, I_D=5A	-	-	50	mΩ
		V_{GS}=4.5V, I_D=3.9A	-	-	80	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	3	V
g_{fs}	Forward Transconductance	V_{DS}=15V, I_D=5A	-	6	-	S
I_{DSS}	Drain-Source Leakage Current (T_J=25°C)	V_{DS}=30V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current (T_J=70°C)	V_{DS}=24V, V_{GS}=0V	-	-	25	
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V	-	-	±100	nA
Q_g	Total Gate Charge **(Note 3)**	I_D=5A, V_{DS}=15V, V_{GS}=5V	-	6.1	-	nC
Q_{gs}	Gate-Source Charge		-	1.4	-	
Q_{gd}	Gate-Drain ("Miller") Charge		-	3.3	-	
$t_{d(on)}$	Turn-On Delay Time **(Note 3)**	V_{DS}=15V, I_D=1.5A, R_G=3.3Ω, V_{GS}=10V R_D=10Ω	-	6.7	-	ns
t_r	Rise Time		-	6.4	-	
$t_{d(off)}$	Turn-Off Delay Time		-	22.1	-	
t_f	Fall-Time		-	2.1	-	
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1.0MHz	-	240	-	pF
C_{oss}	Output Capacitance		-	145	-	
C_{rss}	Reverse Transfer Capacitance		-	55	-	

■ Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current (Body Diode)	V_D=V_G=0V, V_S=1.2V	-	-	1.67	V
V_{SD}	Forward On Voltage **(Note 3)**	T_J=25ºC, I_S=1.7A, V_{GS}=0V	-	-	1.2	V

Note 1: Surface mounted on 1 in^2 copper pad of FR4 board; 135°C/W when mounted on Min. copper pad.
Note 2: Pulse width limited by Max. junction temperature.
Note 3: Pulse width ≤ 300us, duty cycle ≤ 2%.

■ Typical Performance Characteristics

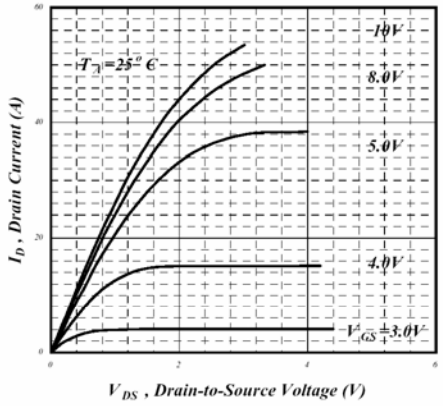


Fig 1. Typical Output Characteristics

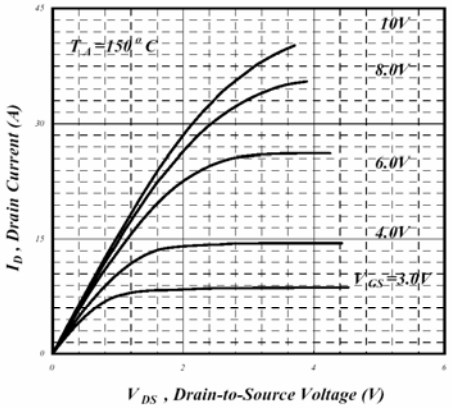


Fig 2. Typical Output Characteristics

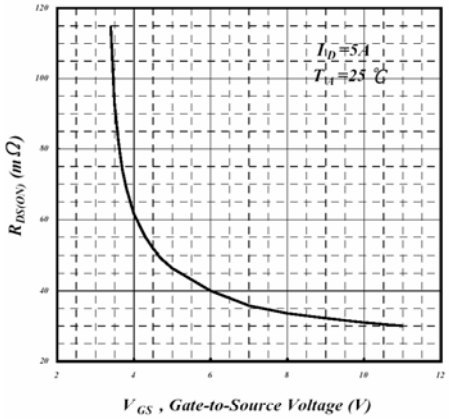


Fig 3. On-Resistance v.s. Gate Voltage

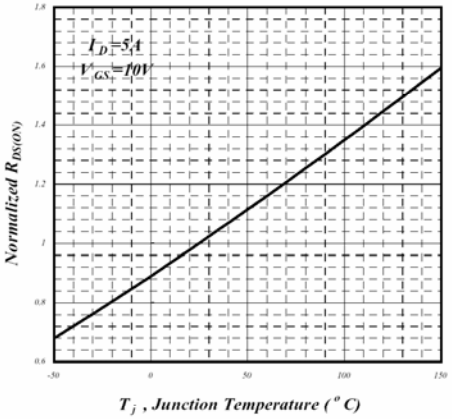


Fig 4. Normalized On-Resistance v.s. Junction Temperature

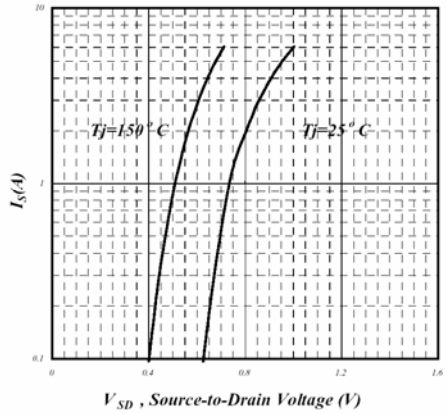


Fig 5. Forward Characteristic of Reverse Diode

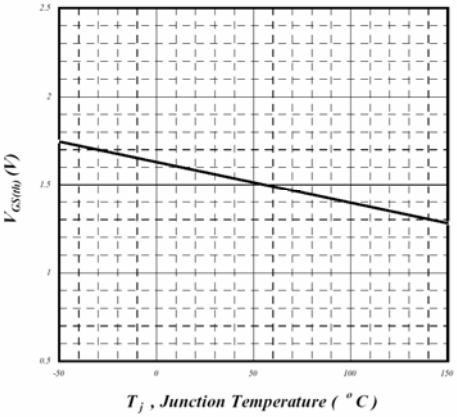


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

■ Typical Performance Characteristics (Continued)

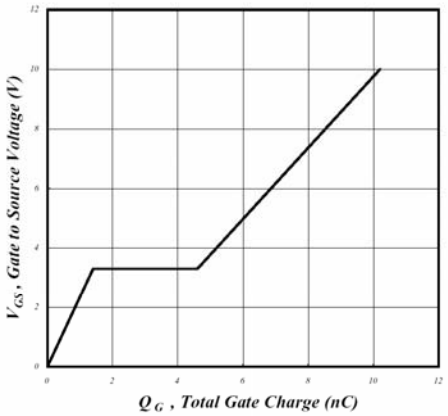


Fig7. Gate Charge Characteristics

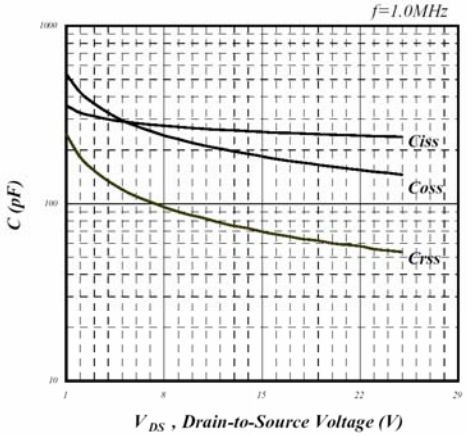


Fig 8 . Typical Capacitance Characteristics

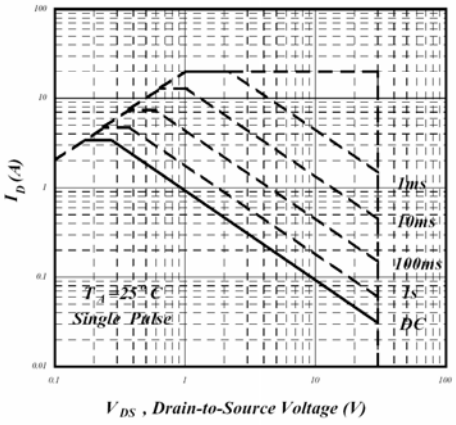


Fig 9. Maximum Safe Operating Area

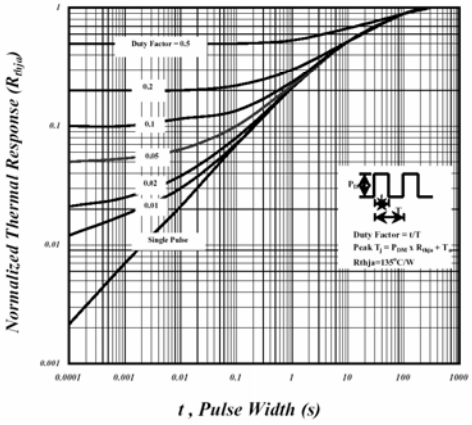


Fig10. Effective Transient Thermal Impedance

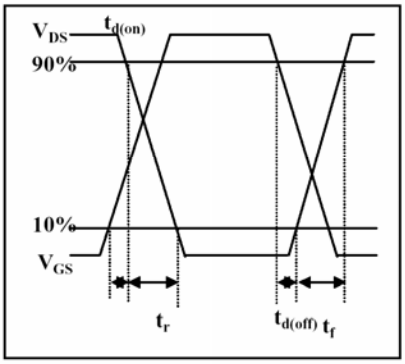


Fig 11. Switching Time Waveform

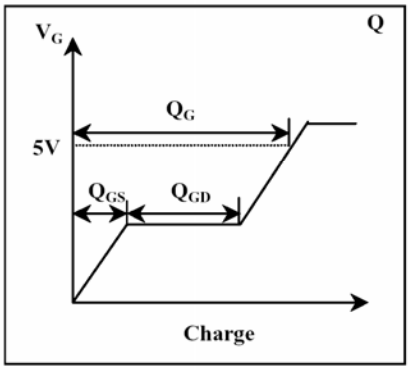


Fig 12. Gate Charge Waveform

■ Marking Information

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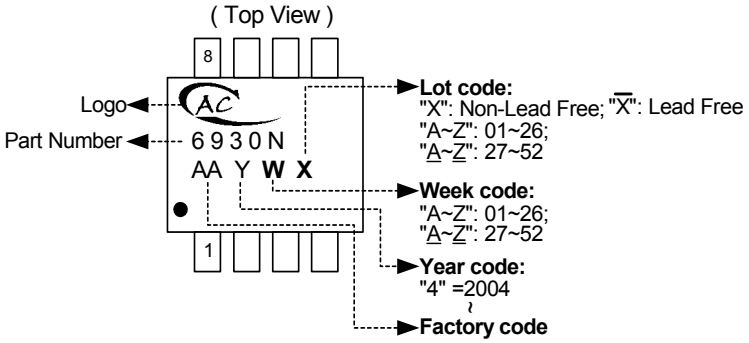
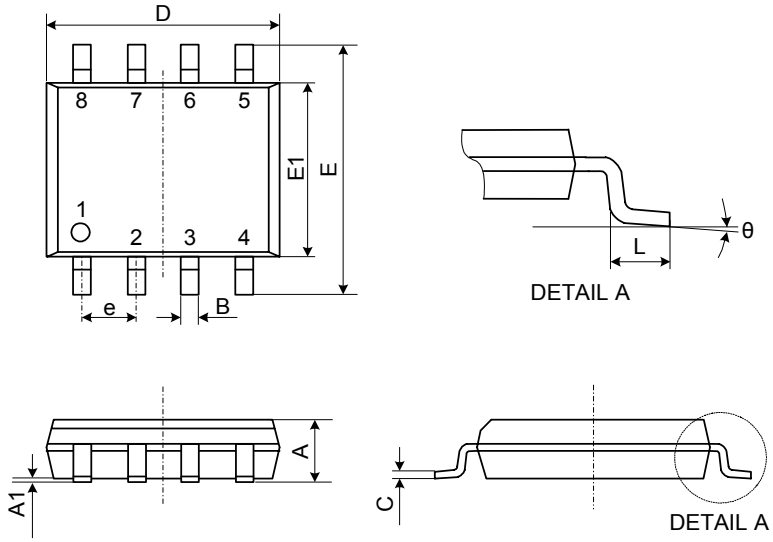


■ Package Information

Package Type: SO-8



1. All Dimensions Are in Millimeters.
2. Dimension Does Not Include Mold Protrusions.

Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	1.35	1.55	1.75
A1	0.10	0.18	0.25
B	0.33	0.41	0.51
C	0.19	0.22	0.25
D	4.80	4.90	5.00
E	5.80	6.15	6.50
E1	3.80	3.90	4.00
L	0.38	0.71	1.27
θ	0^o	4^o	8^o
e	1.27 TYP.		