AF9410N

N-Channel Enhancement Mode Power MOSFET

■ Features

- Simple Drive Requirement
- Low On-resistance
- Fast Switching Characteristic

■ General Description

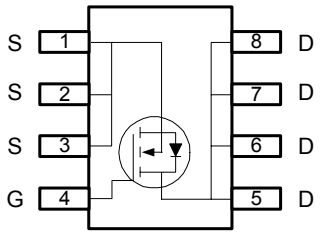
The advanced power MOSFET provides the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

■ Product Summary

BV_{DSS} (V)	$R_{DS(ON)}$ (mΩ)	I_D (A)
30	18	9.6

■ Pin Assignments



SOP-8

■ Pin Descriptions

Pin Name	Description
S	Source
G	Gate
D	Drain

■ Ordering information

A X 9410N X X X

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

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■ Absolute Maximum Ratings

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		30	V
V_{GS}	Gate-Source Voltage		±25	V
I_D	Continuous Drain Current **(Note 1)**	T_A=25ºC	9.6	A
		T_A=70ºC	7.7	
I_{DM}	Pulsed Drain Current **(Note 2)**		40	A
P_D	Total Power Dissipation	T_A=25ºC	2.5	W
	Linear Derating Factor		0.02	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.	50	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	-	0.04	-	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance **(Note 3)**	V_{GS}=10V, I_D=9A	-	-	18	mΩ
		V_{GS}=4.5V, I_D=7A	-	-	28	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	3	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=9A	-	13	-	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}=±25V	-	-	±100	nA
Q_g	Total Gate Charge **(Note 3)**	I_D=9A, V_{DS}=20V, V_{GS}=4.5V	-	11	18	nC
Q_{gs}	Gate-Source Charge		-	3	-	
Q_{gd}	Gate-Drain ("Miller") Charge		-	7	-	
$t_{d(on)}$	Turn-On Delay Time **(Note 3)**	V_{DS}=15V, I_D=1A, R_G=3.3Ω, V_{GS}=10V R_D=15Ω	-	10	-	ns
t_r	Rise Time		-	6	-	
$t_{d(off)}$	Turn-Off Delay Time		-	23	-	
t_f	Fall-Time		-	7	-	
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1.0MHz	-	840	1350	pF
C_{oss}	Output Capacitance		-	190	-	
C_{rss}	Reverse Transfer Capacitance		-	140	-	
R_G	Gate Resistance	f=1.0MHz	-	1.4	-	Ω

■ Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Forward On Voltage **(Note 3)**	I_S=2.1A, V_{GS}=0V	-	-	1.2	V
t_{rr}	Reverse Recovery Time	I_S=9A, V_{GS}=0V, dI/dt=100A/μs	-	18	-	ns
Q_{rr}	Reverse Recovery Charge		-	8	-	nC

Note 1: Surface mounted on 1 in^2 copper pad of FR4 board, t ≤ 10 sec; 125°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%.

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■ Typical Performance Characteristics

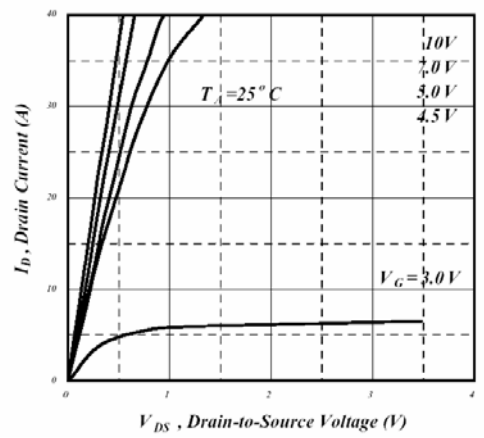

Fig 1. Typical Output Characteristics

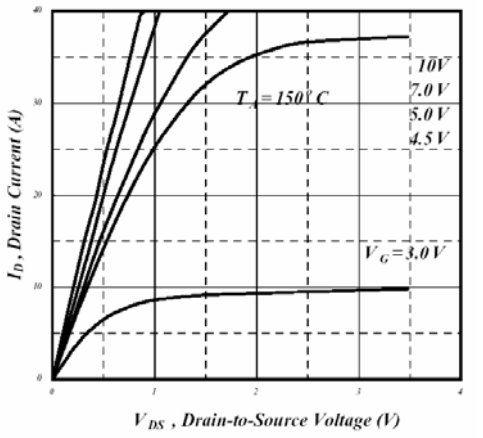

Fig 2. Typical Output Characteristics

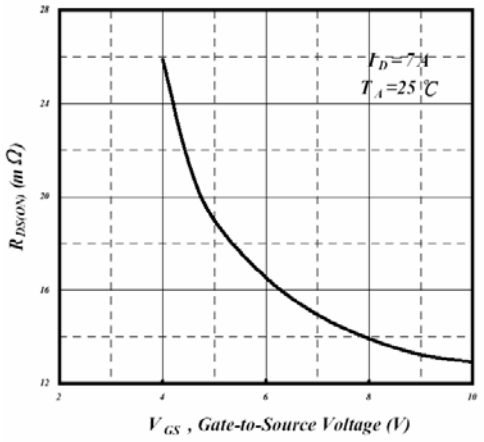

Fig 3. On-Resistance v.s. Gate Voltage

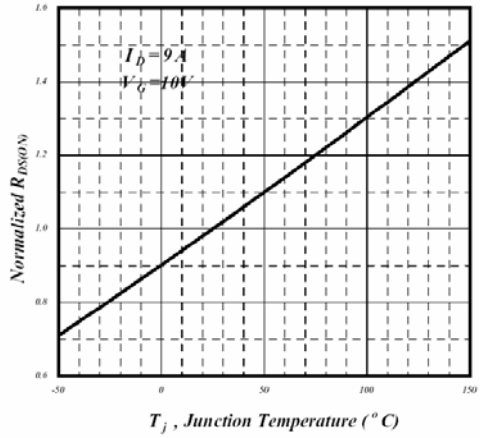

Fig 4. Normalized On-Resistance v.s. Junction Temperature

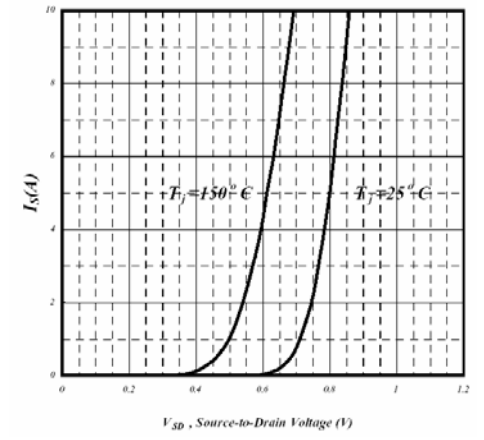

Fig 5. Forward Characteristic of Reverse Diode

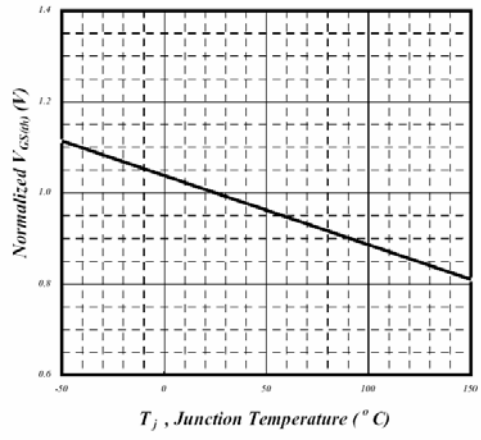

Fig 6. Gate Threshold Voltage v.s. Junction Temperature

■ Typical Performance Characteristics

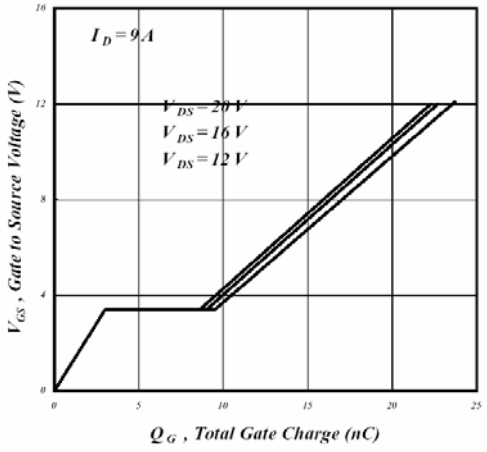

Fig 7. Gate Charge Characteristics

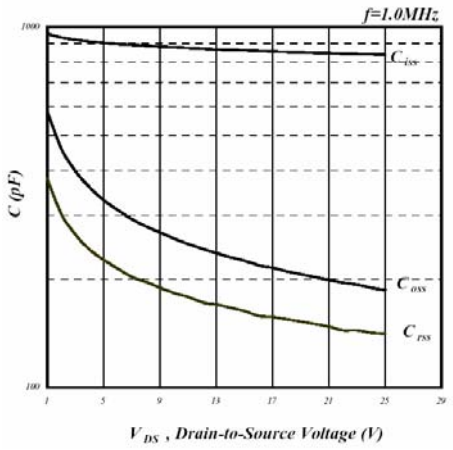

Fig 8. Typical Capacitance Characteristics

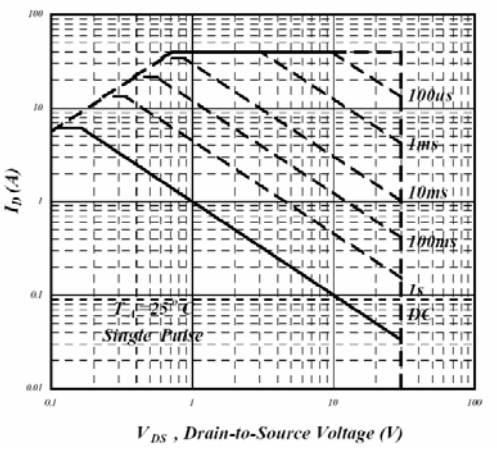

Fig 9. Maximum Safe Operating Area

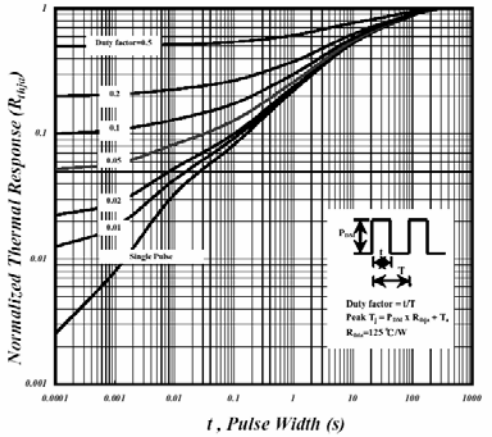

Fig 10. Effective Transient Thermal Impedance

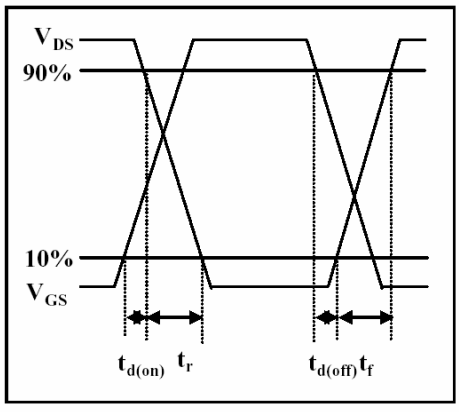

Fig 11. Switching Time Waveform

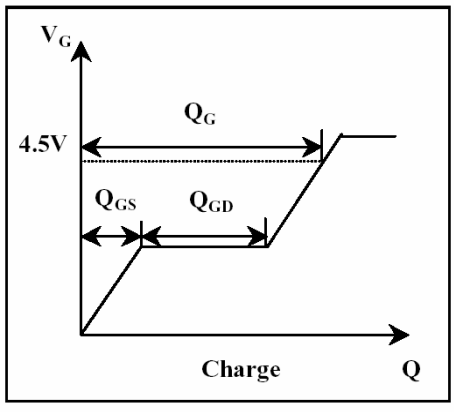

Fig 12. Gate Charge Waveform

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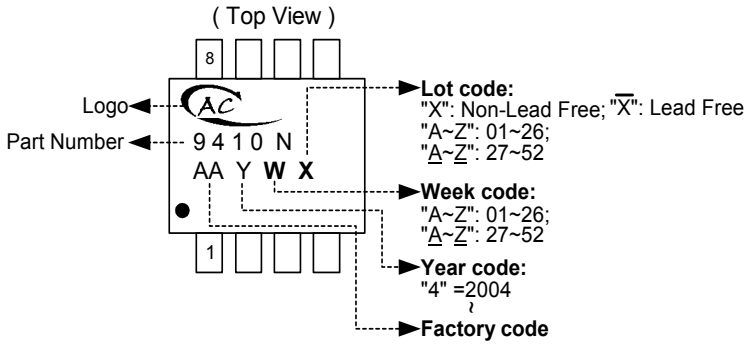
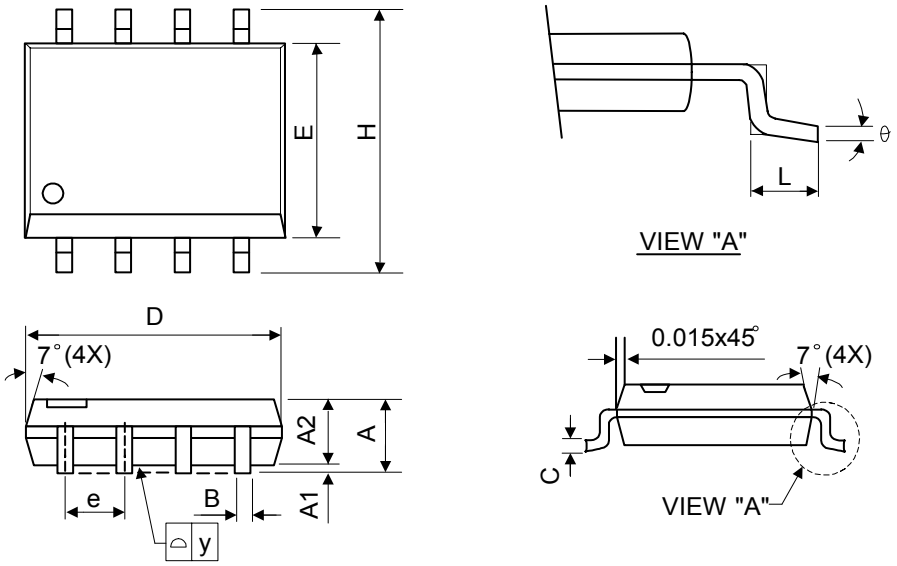
■ Marking Information

SOP-8L



■ Package Information

Package Type: SOP-8L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.40	1.60	1.75	0.055	0.063	0.069
A1	0.10	-	0.25	0.040	-	0.100
A2	1.30	1.45	1.50	0.051	0.057	0.059
B	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.010
D	4.80	5.05	5.30	0.189	0.199	0.209
E	3.70	3.90	4.10	0.146	0.154	0.161
e	-	1.27	-	-	0.050	-
H	5.79	5.99	6.20	0.228	0.236	0.244
L	0.38	0.71	1.27	0.015	0.028	0.050
y	-	-	0.10	-	-	0.004
θ	0^{O}	-	8^{O}	0^{O}	-	8^{O}