



AF9926N

N-Channel Enhancement Mode Power MOSFET

■ Features

- Capable of 2.5V Gate Drive
- Low On-resistance
- Low Drive Current
- Surface Mount Package

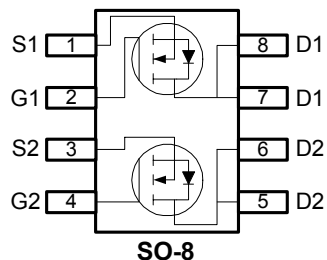
■ General Description

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)	$R_{DS(ON)}$ (m Ω)	I_D (A)
20	30	6

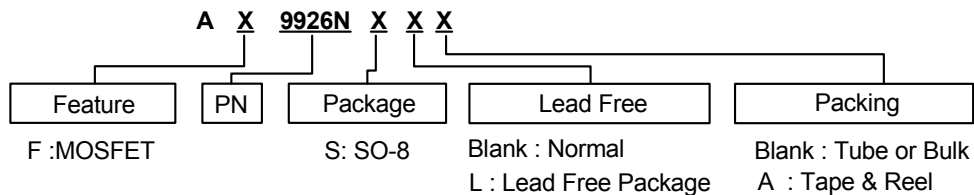
■ Pin Assignments



■ Pin Descriptions

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

■ Ordering information



**AF9926N****N-Channel Enhancement Mode Power MOSFET****■ Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current (Note 1)	$T_A=25^\circ\text{C}$	6
		$T_A=70^\circ\text{C}$	4.8
I_{DM}	Pulsed Drain Current (Note 2)	26	A
P_D	Total Power Dissipation	$T_A=25^\circ\text{C}$	2
	Linear Derating Factor		0.016
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

■ Thermal Data

Symbol	Parameter	Maximum	Units
$R_{thj-amb}$	Thermal Resistance Junction-ambient (Note 1) Max.	62.5	$^\circ\text{C/W}$

■ Electrical Characteristics at $T_J=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	20	-	-	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	-	0.03	-	$\text{V}/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance (Note 3)	$V_{GS}=4.5\text{V}, I_D=6\text{A}$	-	-	30	m Ω
		$V_{GS}=2.5\text{V}, I_D=5.2\text{A}$	-	-	45	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	-	-	1.2	V
g_{fs}	Forward Transconductance	$V_{DS}=10\text{V}, I_D=6\text{A}$	-	20	-	S
I_{DSS}	Drain-Source Leakage Current ($T_J=25^\circ\text{C}$)	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$	-	-	25	μA
	Drain-Source Leakage Current ($T_J=70^\circ\text{C}$)	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$	-	-	250	
I_{GSS}	Gate-Source Forward Leakage	$V_{GS}=12\text{V}$	-	-	100	nA
	Gate-Source Reverse Leakage	$V_{GS}=-12\text{V}$	-	-	-100	
Q_g	Total Gate Charge (Note 3)	$I_D=6\text{A}$	-	23	35	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=20\text{V}$	-	4.5	7	
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=5\text{V}$	-	7	11	
$t_{d(on)}$	Turn-On Delay Time (Note 3)	$V_{DS}=10\text{V}$	-	30	60	ns
t_r	Rise Time	$I_D=1\text{A}$	-	70	140	
$t_{d(off)}$	Turn-Off Delay Time	$R_G=6\Omega, V_{GS}=5\text{V}$	-	40	80	
t_f	Fall-Time	$R_D=10\Omega$	-	65	130	
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$	-	1035	-	pF
C_{oss}	Output Capacitance	$V_{DS}=20\text{V}$	-	320	-	
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	150	-	

■ Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current (Body Diode)	$V_D=V_G=0\text{V}, V_S=1.3\text{V}$	-	-	1.54	V
V_{SD}	Forward On Voltage (Note 3)	$T_J=25^\circ\text{C}, I_S=1.7\text{A}, V_{GS}=0\text{V}$	-	0.78	1.2	V

Note 1: Surface mounted on 1 in² copper pad of FR4 board, 135 $^\circ\text{C/W}$ when mounted on Min. copper pad.**Note 2:** Pulse width limited by Max. junction temperature.**Note 3:** Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

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■ Typical Performance Characteristics

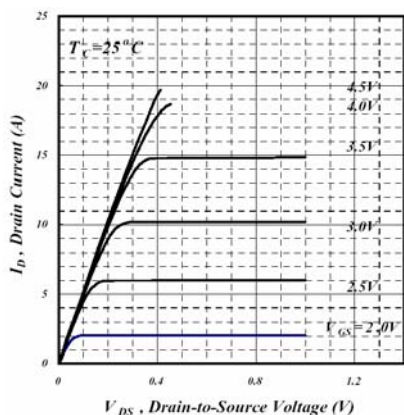


Fig 1. Typical Output Characteristics

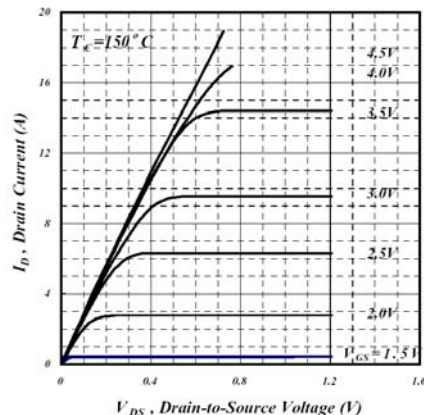


Fig 2. Typical Output Characteristics

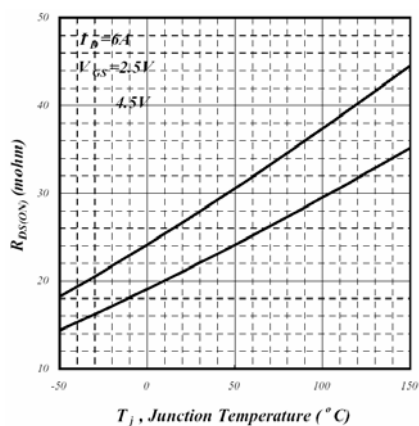


Fig 3. $R_{DS(on)}$ v.s. Junction Temperature

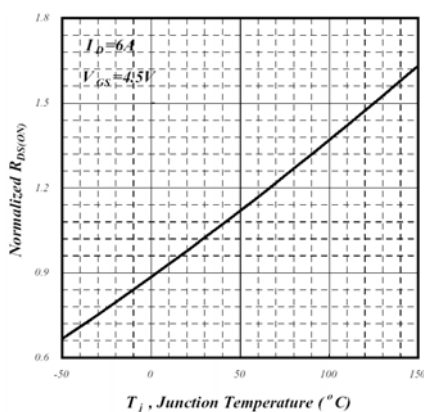


Fig 4. Normalized On-Resistance v.s. Junction Temperature

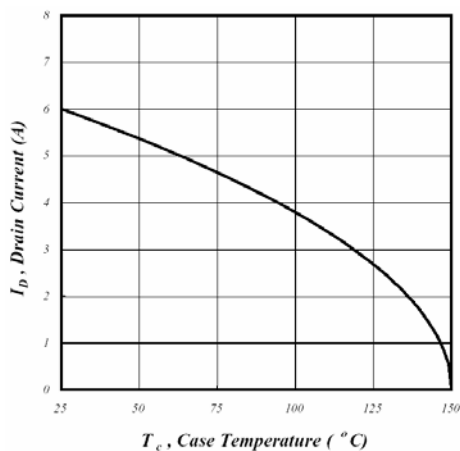


Fig 5. Maximum Drain Current v.s. Case Temperature

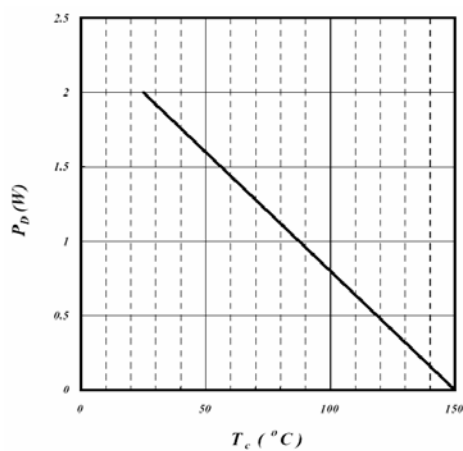


Fig 6. Typical Power Dissipation

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■ Typical Performance Characteristics (Continued)

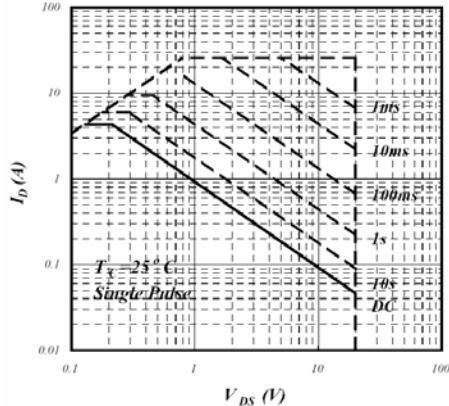


Fig 7. Maximum Safe Operating Area

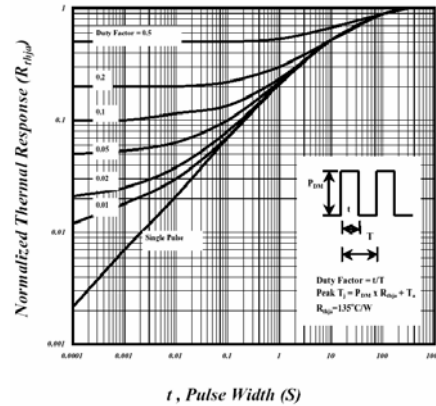


Fig 8. Effective Transient Thermal Impedance

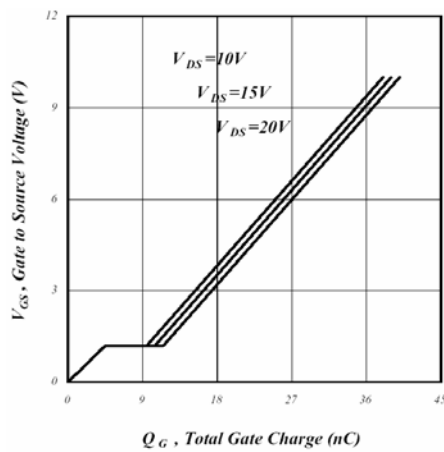


Fig 9. Typical Gate Charge v.s. V_{GS}

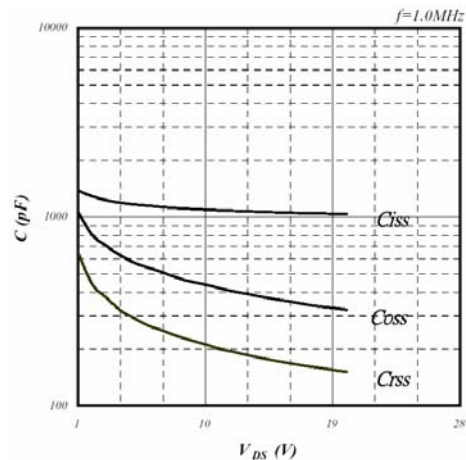


Fig 10. Typical Capacitance v.s. V_{DS}

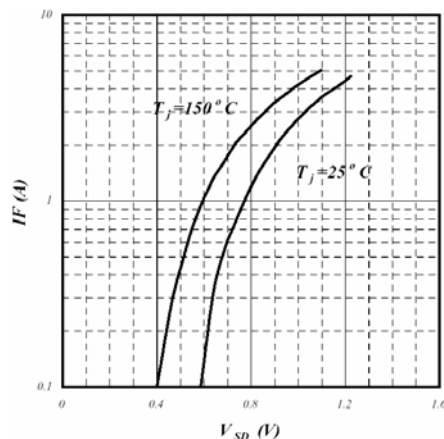


Fig 11. Forward Characteristic of Reverse Diode

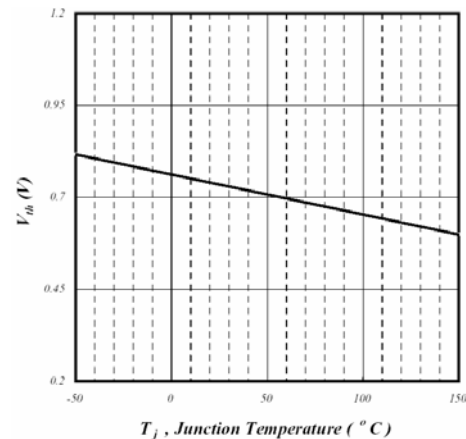


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

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■ Typical Performance Characteristics (Continued)

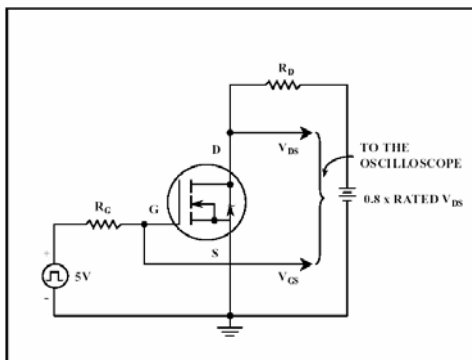


Fig 13. Switching Time Circuit

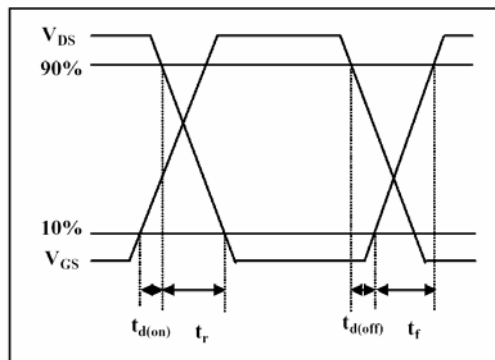


Fig 14. Switching Time Waveform

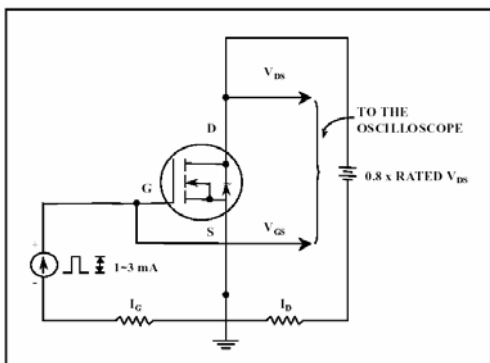


Fig 15. Gate Charge Circuit

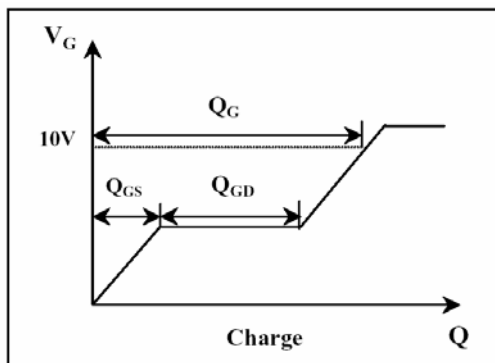
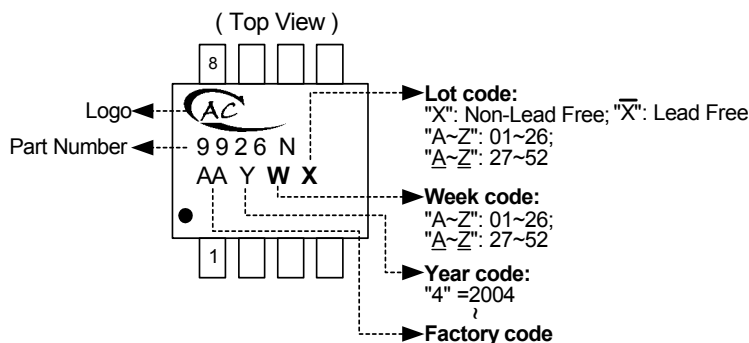


Fig 16. Gate Charge Waveform

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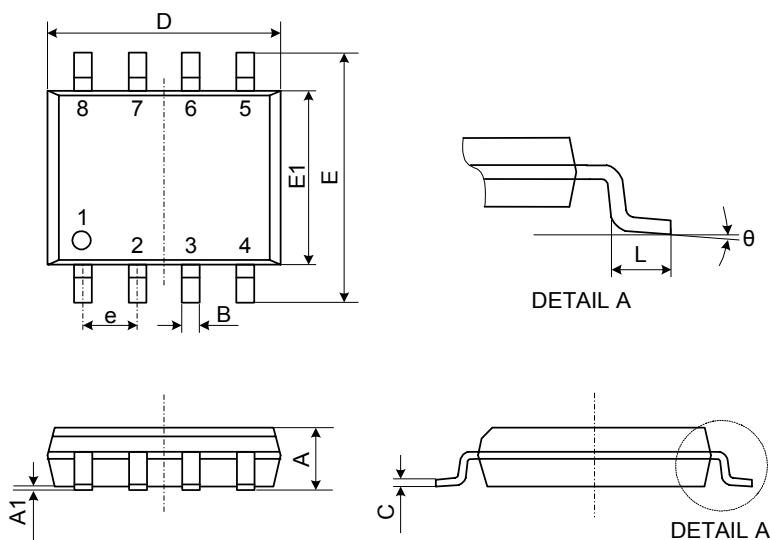
■ Marking Information

SO-8



■ 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°	4°	8°
e	1.27 TYP.		