

## N-Channel Enhancement Mode Power MOSFET

### ■ Features

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

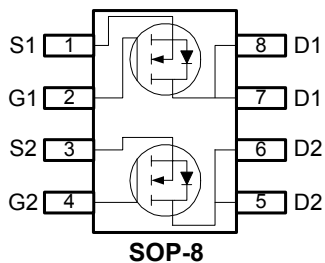
### ■ General Description

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 <sub>DSS</sub> (V)	R <sub>DS(ON)</sub> (mΩ)	I <sub>D</sub> (A)
20	30	6

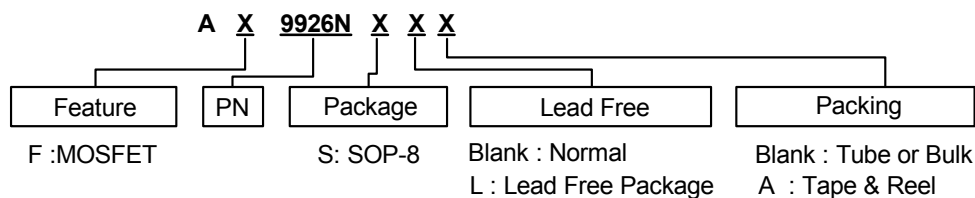
### ■ Pin Assignments



### ■ Pin Descriptions

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

### ■ Ordering information





## 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	$\pm 12$	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	2	W
	Linear Derating Factor	0.016	W/ $^\circ\text{C}$
$T_{STG}$	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	$^\circ\text{C}/\text{W}$

### ■ 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
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	-	0.03	-	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 $\Omega$
		$V_{GS}=2.5\text{V}, I_D=5.2\text{A}$	-	-	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	$\mu\text{A}$
	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 in<sup>2</sup> copper pad of FR4 board, 135 $^\circ\text{C}/\text{W}$  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  $\leq 2\%$ .

## N-Channel Enhancement Mode Power MOSFET

### ■ Typical Performance Characteristics

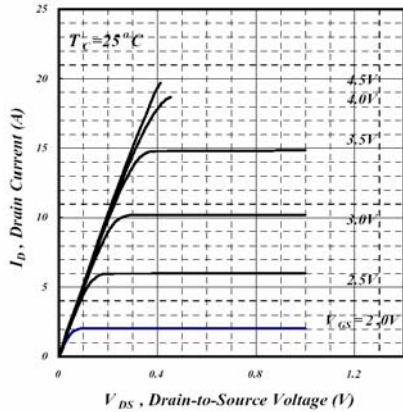


Fig 1. Typical Output Characteristics

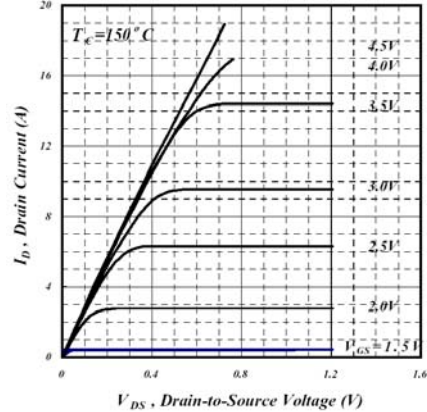


Fig 2. Typical Output Characteristics

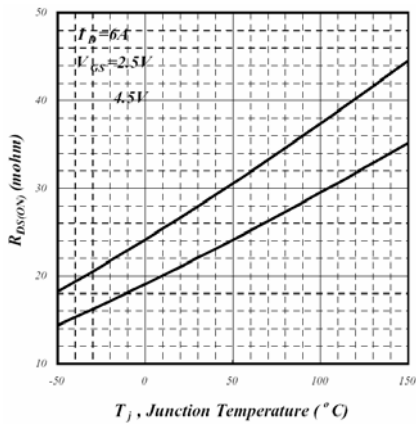


Fig 3.  $R_{DS(on)}$  v.s. Junction Temperature

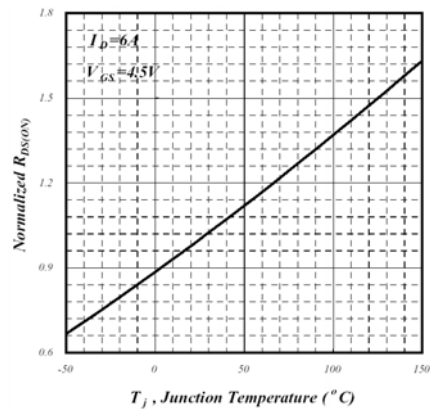


Fig 4. Normalized On-Resistance v.s. Junction Temperature

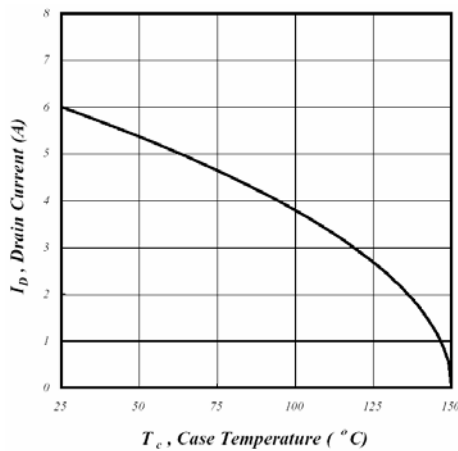


Fig 5. Maximum Drain Current v.s. Case Temperature

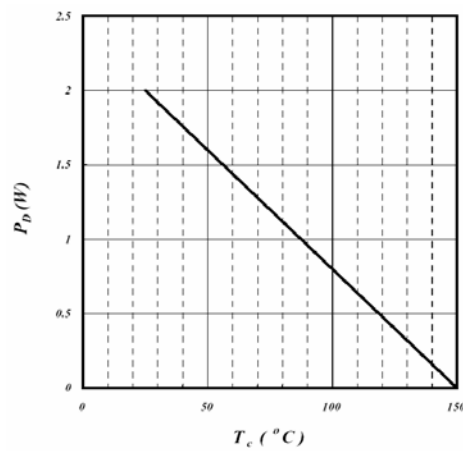


Fig 6. Typical Power Dissipation

## N-Channel Enhancement Mode Power MOSFET

### Typical Performance Characteristics (Continued)

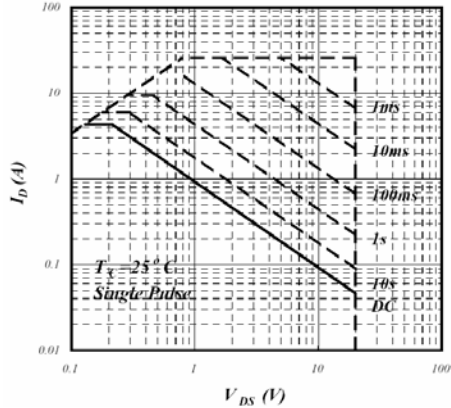


Fig 7. Maximum Safe Operating Area

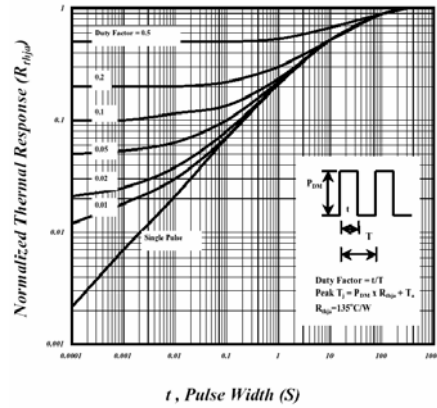


Fig 8. Effective Transient Thermal Impedance

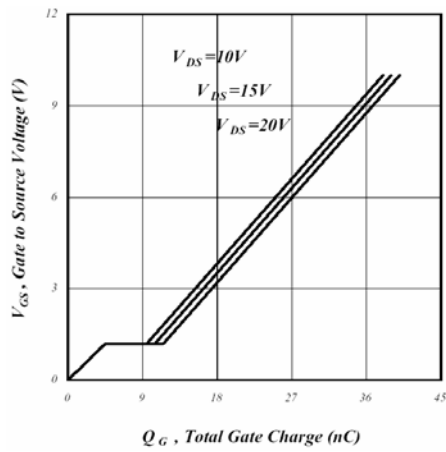


Fig 9. Typical Gate Charge v.s. VGS

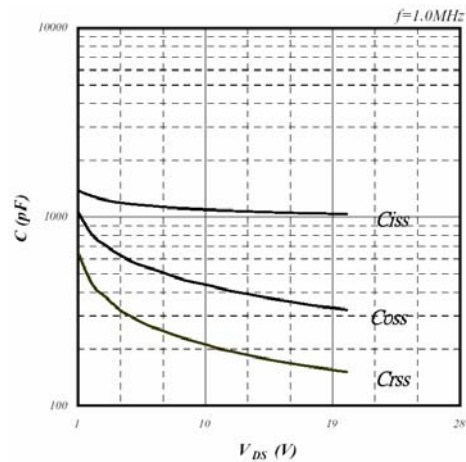


Fig 10. Typical Capacitance v.s. VDS

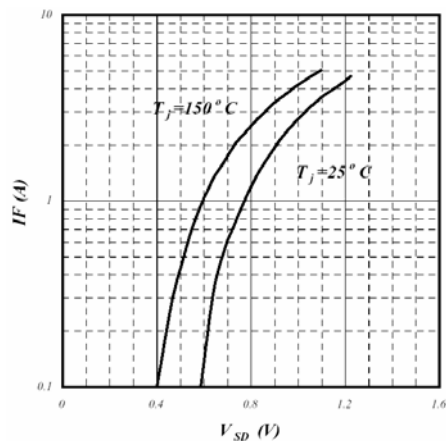


Fig 11. Forward Characteristic of Reverse Diode

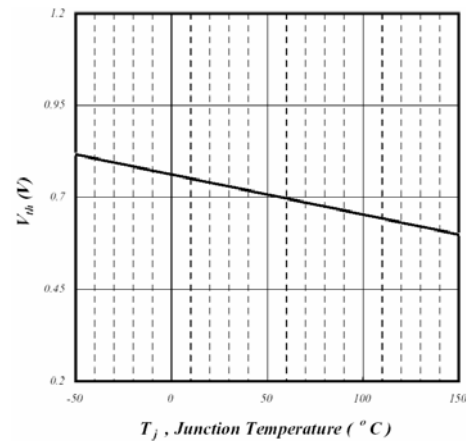


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

## N-Channel Enhancement Mode Power MOSFET

### ■ Typical Performance Characteristics (Continued)

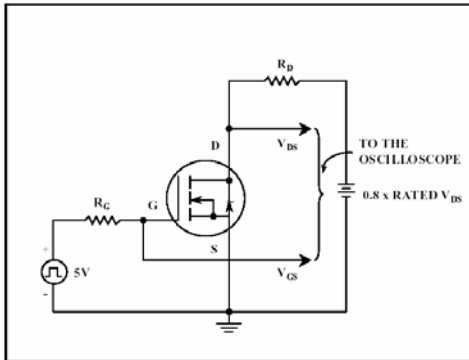


Fig 13. Switching Time Circuit

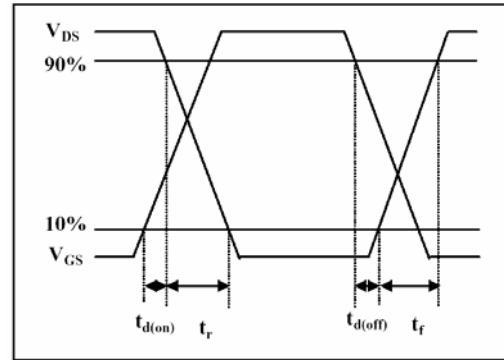


Fig 14. Switching Time Waveform

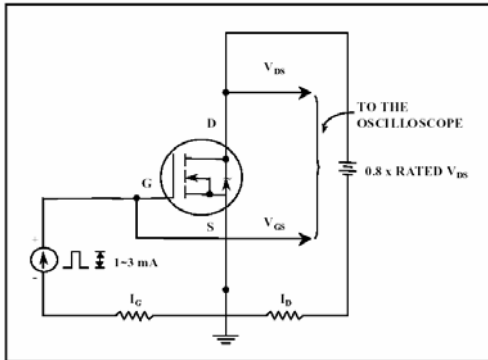


Fig 15. Gate Charge Circuit

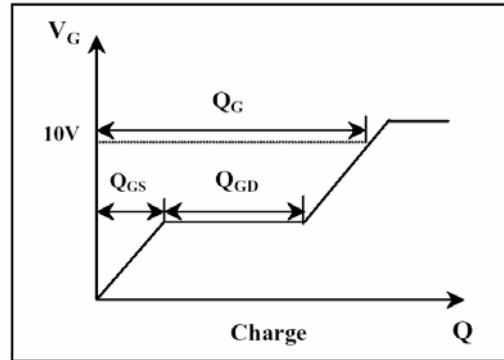
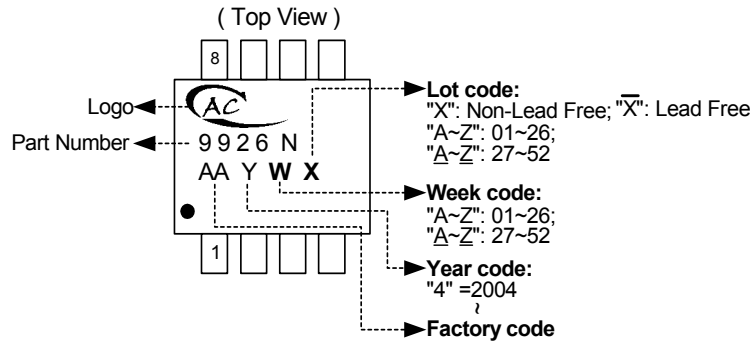


Fig 16. Gate Charge Waveform

## N-Channel Enhancement Mode Power MOSFET

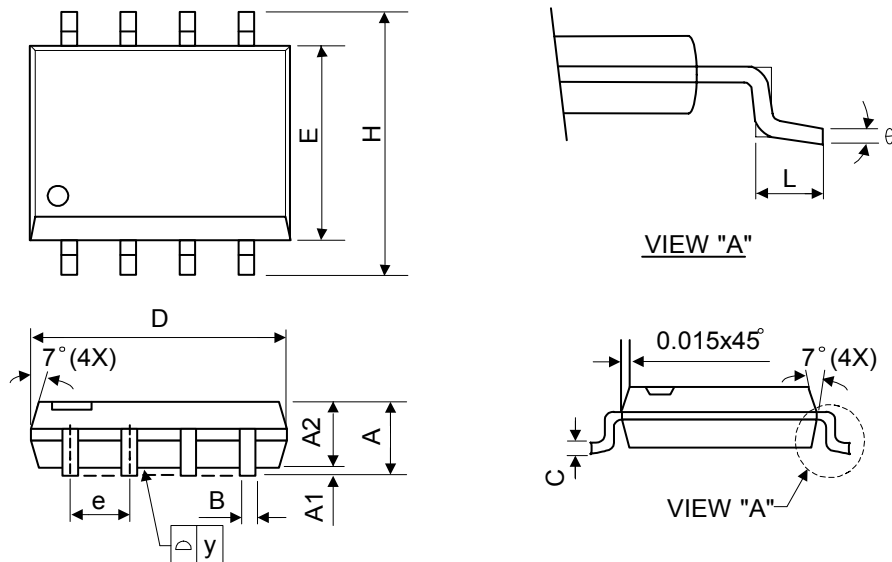
### ■ Marking Information

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°	-	8°	0°	-	8°



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