

## N-Channel Enhancement Mode Power MOSFET

### ■ Features

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

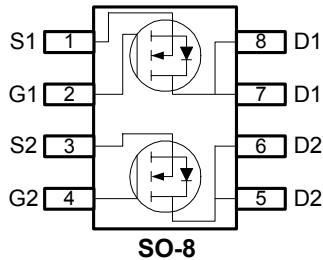
### ■ General Description

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 <sub>DSS</sub> (V)	R <sub>DS(ON)</sub> (mΩ)	I <sub>D</sub> (A)
30	50	5

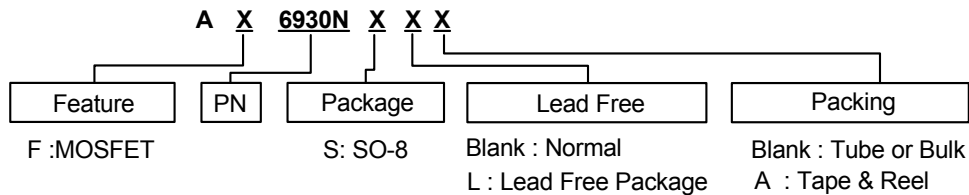
### ■ Pin Assignments



### ■ Pin Descriptions

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

### ■ Ordering information





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### ■ Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current (Note 1)	$T_A=25^\circ\text{C}$	5
		$T_A=70^\circ\text{C}$	4
$I_{DM}$	Pulsed Drain Current (Note 2)	20	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

### ■ 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	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	30	-	-	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	-	0.037	-	$\text{V}/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance (Note 3)	$V_{GS}=10\text{V}, I_D=5\text{A}$	-	-	50	m $\Omega$
		$V_{GS}=4.5\text{V}, I_D=3.9\text{A}$	-	-	80	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1	-	3	V
$g_{fs}$	Forward Transconductance	$V_{DS}=15\text{V}, I_D=5\text{A}$	-	6	-	S
$I_{DSS}$	Drain-Source Leakage Current ( $T_J=25^\circ\text{C}$ )	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$	-	-	1	uA
	Drain-Source Leakage Current ( $T_J=70^\circ\text{C}$ )	$V_{DS}=24\text{V}, V_{GS}=0\text{V}$	-	-	25	
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 20\text{V}$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge (Note 3)	$I_D=5\text{A},$ $V_{DS}=15\text{V},$ $V_{GS}=5\text{V}$	-	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)	$V_{DS}=15\text{V},$ $I_D=1.5\text{A},$ $R_G=3.3\Omega, V_{GS}=10\text{V}$ $R_D=10\Omega$	-	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	$V_{GS}=0\text{V},$	-	240	-	pF
$C_{oss}$	Output Capacitance	$V_{DS}=25\text{V},$	-	145	-	
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	55	-	

### ■ Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current (Body Diode)	$V_D=V_G=0\text{V}, V_S=1.2\text{V}$	-	-	1.67	V
$V_{SD}$	Forward On Voltage (Note 3)	$T_J=25^\circ\text{C}, I_S=1.7\text{A},$ $V_{GS}=0\text{V}$	-	-	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  $\leq 2\%$ .

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### Typical Performance Characteristics

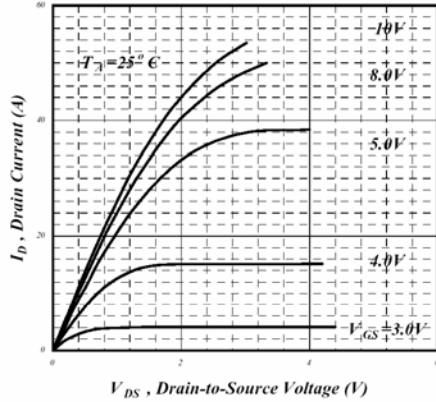


Fig 1. Typical Output Characteristics

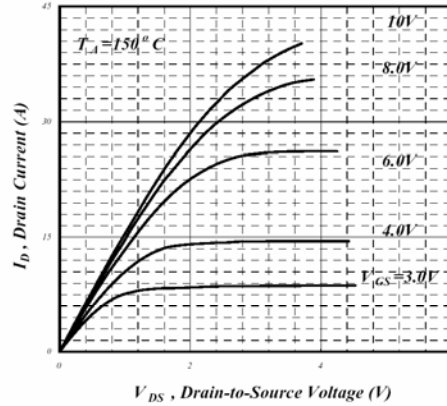


Fig 2. Typical Output Characteristics

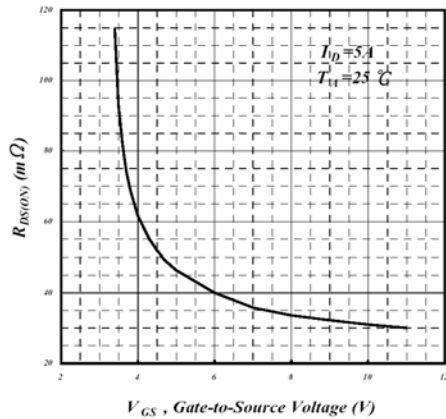


Fig 3. On-Resistance v.s. Gate Voltage

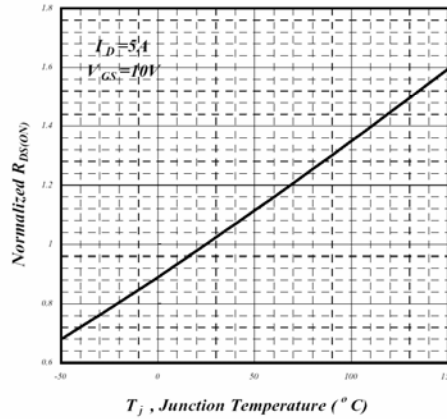


Fig 4. Normalized On-Resistance v.s. Junction Temperature

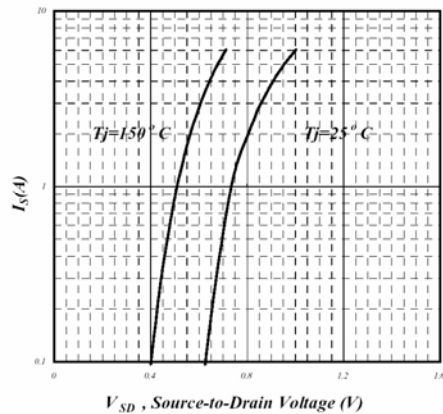


Fig 5. Forward Characteristic of Reverse Diode

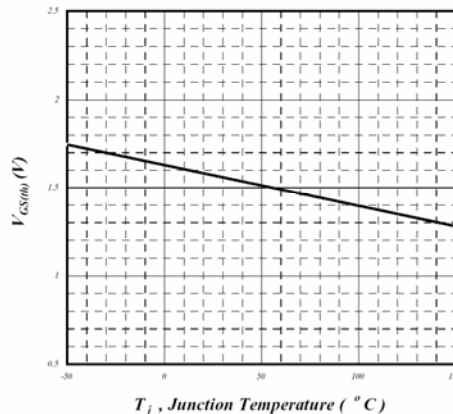


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

## N-Channel Enhancement Mode Power MOSFET

### ■ Typical Performance Characteristics (Continued)

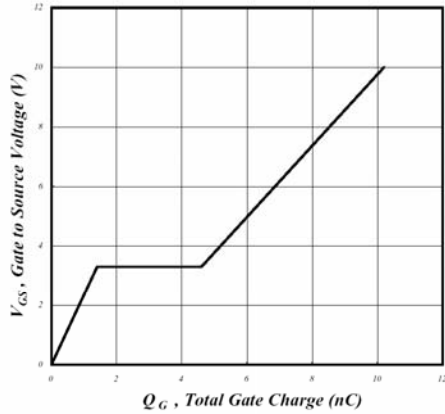


Fig7. Gate Charge Characteristics

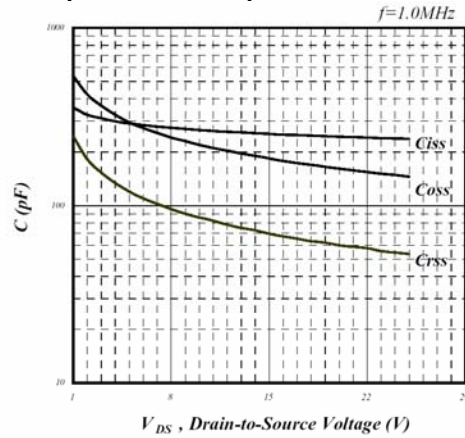


Fig 8 . Typical Capacitance Characteristics

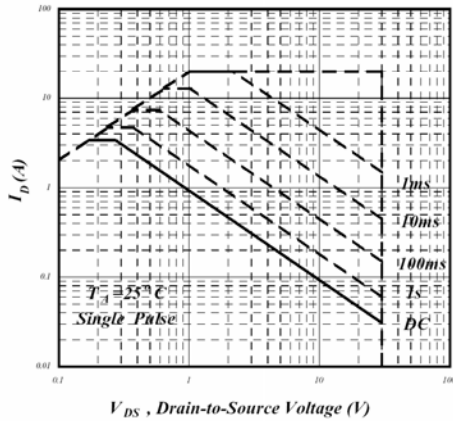


Fig 9. Maximum Safe Operating Area

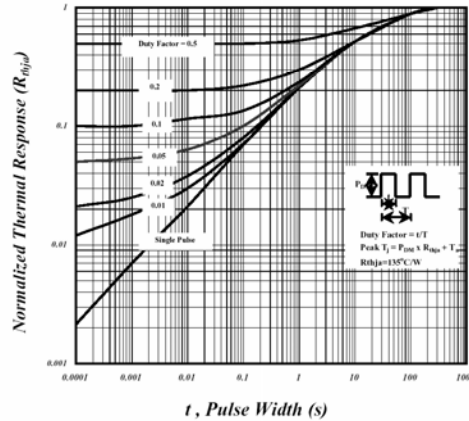


Fig10. Effective Transient Thermal Impedance

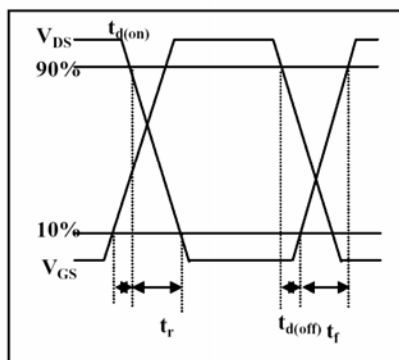


Fig 11. Switching Time Waveform

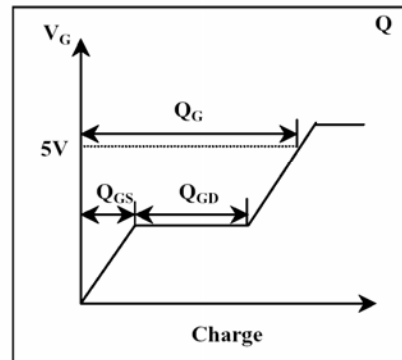
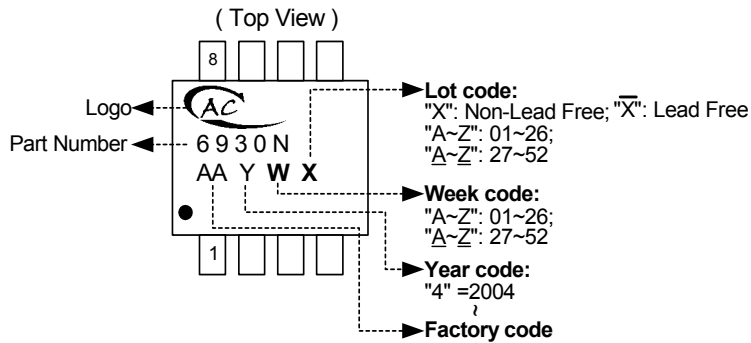


Fig 12. Gate Charge Waveform

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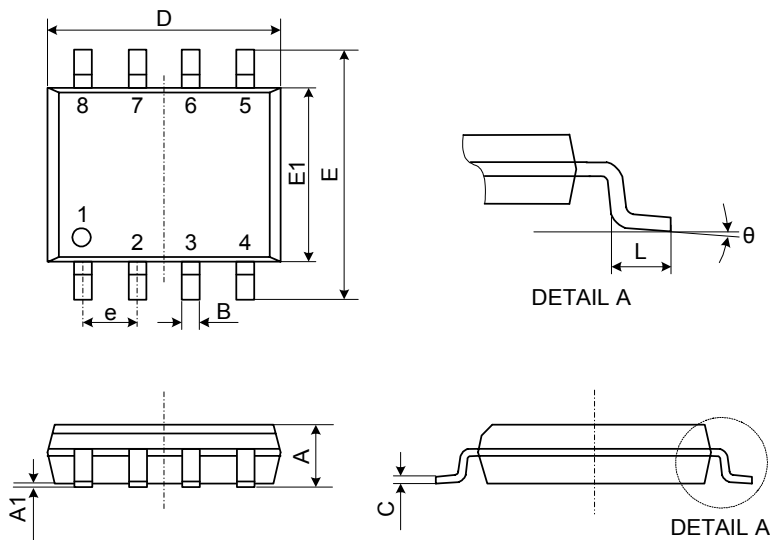
### ■ Marking Information

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
$\theta$	0°	4°	8°
e	1.27 TYP.		