

## HC6912

### 60V N-Channel MOSFET

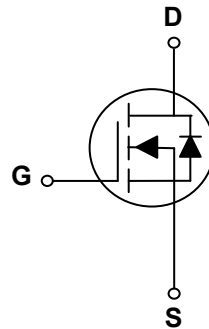
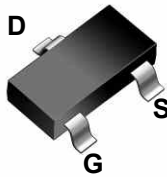
#### General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

#### Features

$V_{DS}$	60V
$I_D$ (at $V_{GS}=10V$ )	3.0A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	85m $\Omega$ (Typ)

#### SOT23



#### Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units	
Drain-Source Voltage	$V_{DS}$	60	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V	
Drain Current-Continuous	TC=25 $^\circ C$	$I_D$	3.0	A
	TC=100 $^\circ C$	$I_D$	1.8	A
Drain Current – Pulsed	$I_{DM}$	12	A	
Maximum Power Dissipation	$P_D$	1.56	W	
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$	

#### Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		1.1	$^\circ C / W$
Thermal Resistance junction-to-Ambient	$R_{\theta JA}$		80	$^\circ C / W$

## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.9	1.3	2.0	V
R <sub>DS(ON)</sub>	Drain-Source	V <sub>GS</sub> =10V, I <sub>D</sub> =3A		85	100	mΩ
	On-State-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A		90	120	mΩ
gfs	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =3A		7		S
<b>DYNAMIC PARAMETERS</b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, F=1.0MHz		409		pF
C <sub>OSS</sub>	Output Capacitance			45		pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			40		pF
<b>SWITCHING PARAMETERS</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =30V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω		2.9		nS
t <sub>r</sub>	Turn-on Rise Time			9.5		nS
t <sub>d(off)</sub>	Turn-Off Delay Time			18.4		nS
t <sub>f</sub>	Turn-Off Fall Time			5.3		nS
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =48V, I <sub>D</sub> =6A, V <sub>GS</sub> =10V		9.3		nC
Q <sub>gs</sub>	Gate-Source Charge			2.1		nC
Q <sub>gd</sub>	Gate-Drain Charge			1.8		nC
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =1A		0.70	1.4	V

Note:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≅ 300us , duty cycle ≅ 2%.
3. Essentially independent of operating temperature.

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

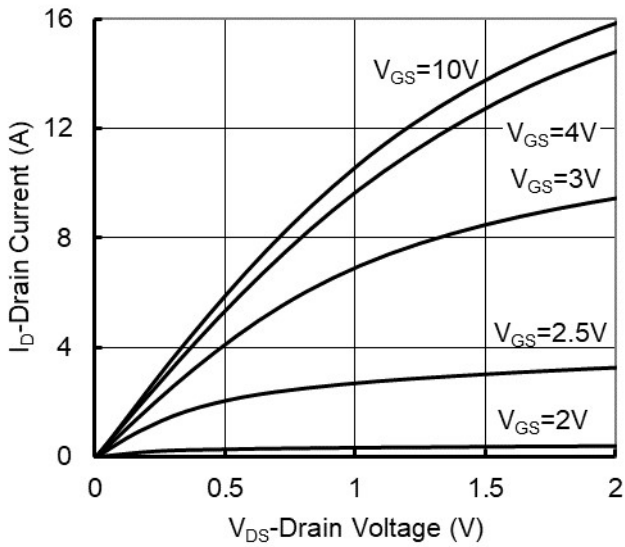


Figure 1. Output Characteristics

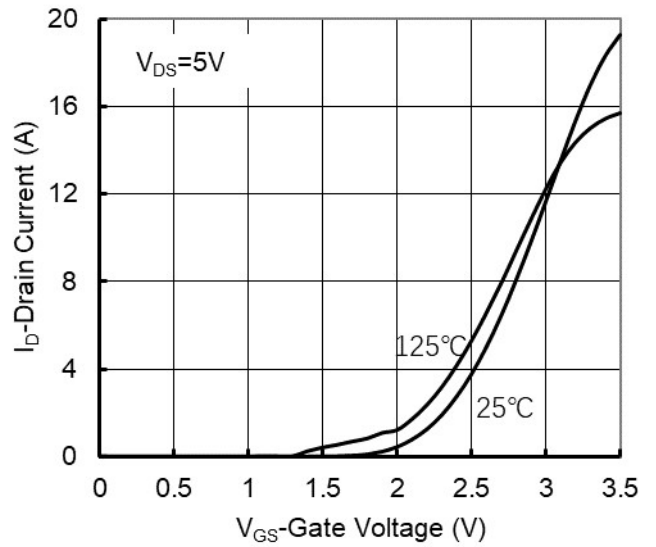


Figure 2. Transfer Characteristics

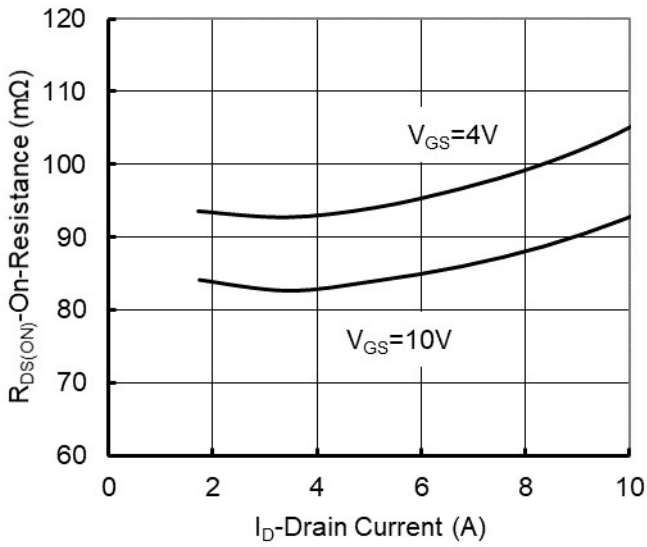


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

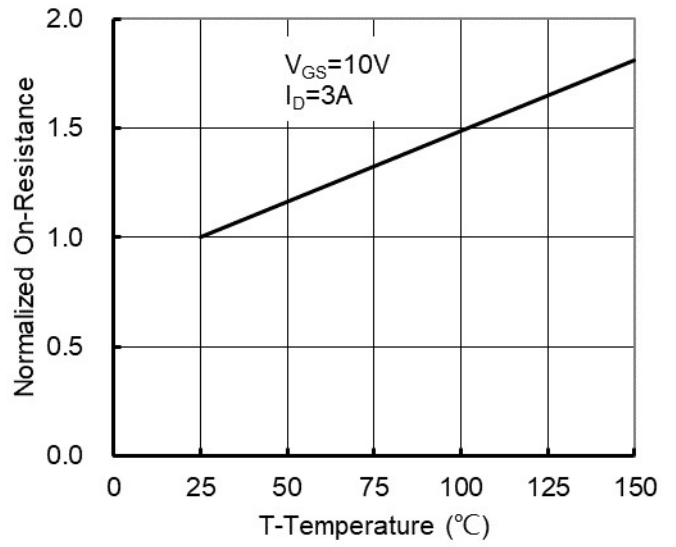


Figure 4: On-Resistance vs. Junction Temperature

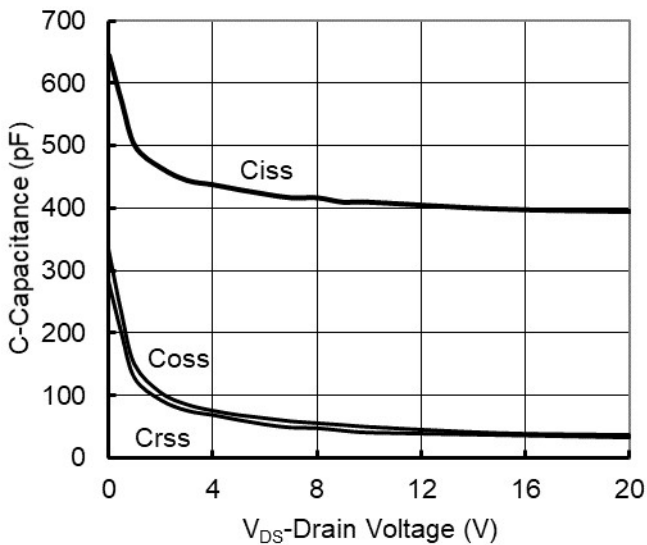


Figure 5. Capacitance Characteristics

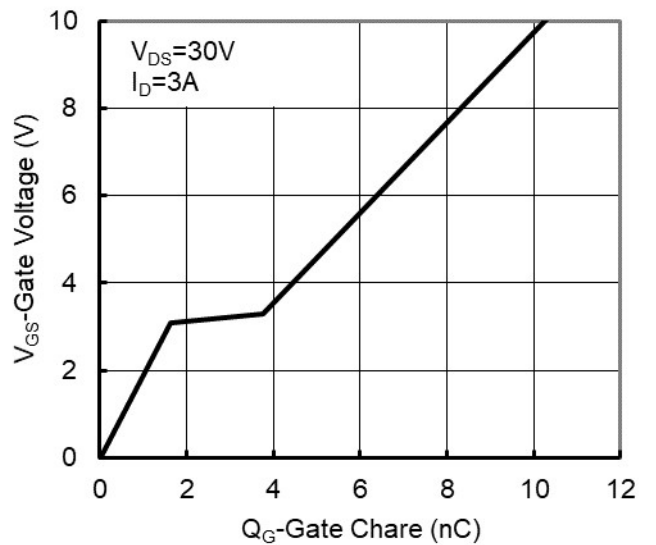


Figure 6. Gate Charge

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

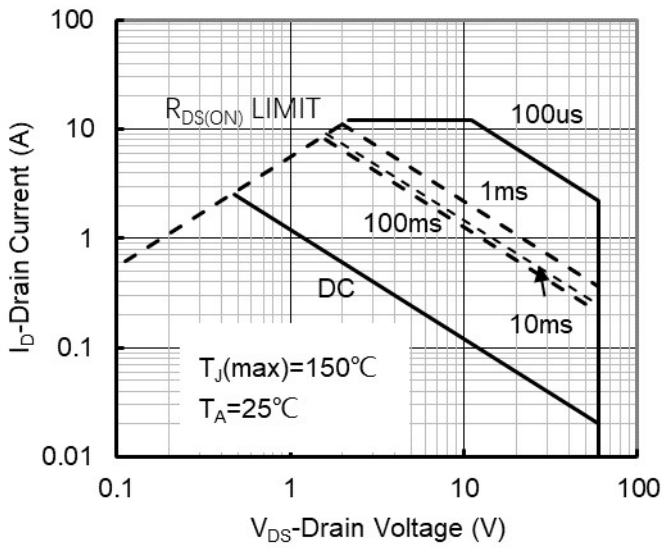


Figure7. Safe Operation Area

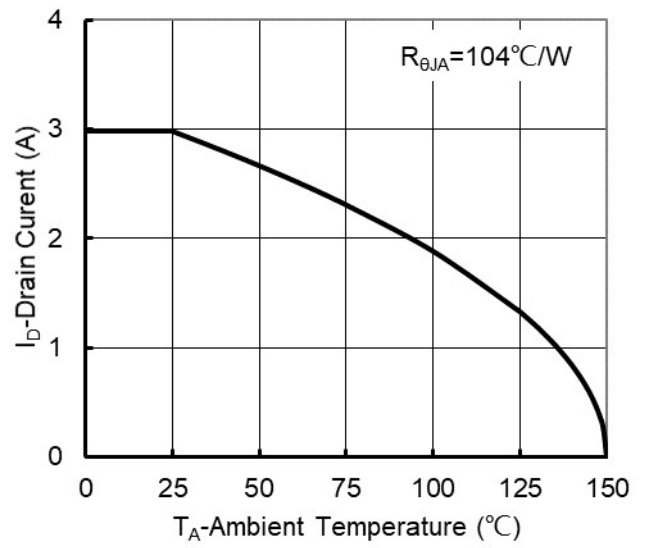


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

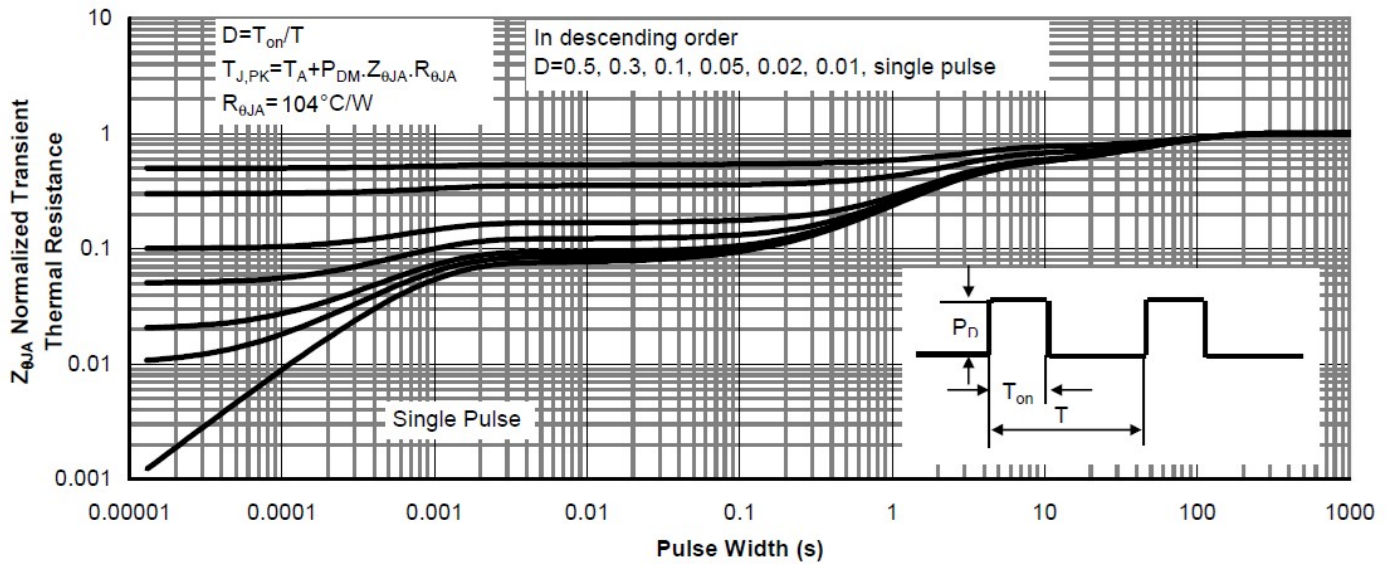
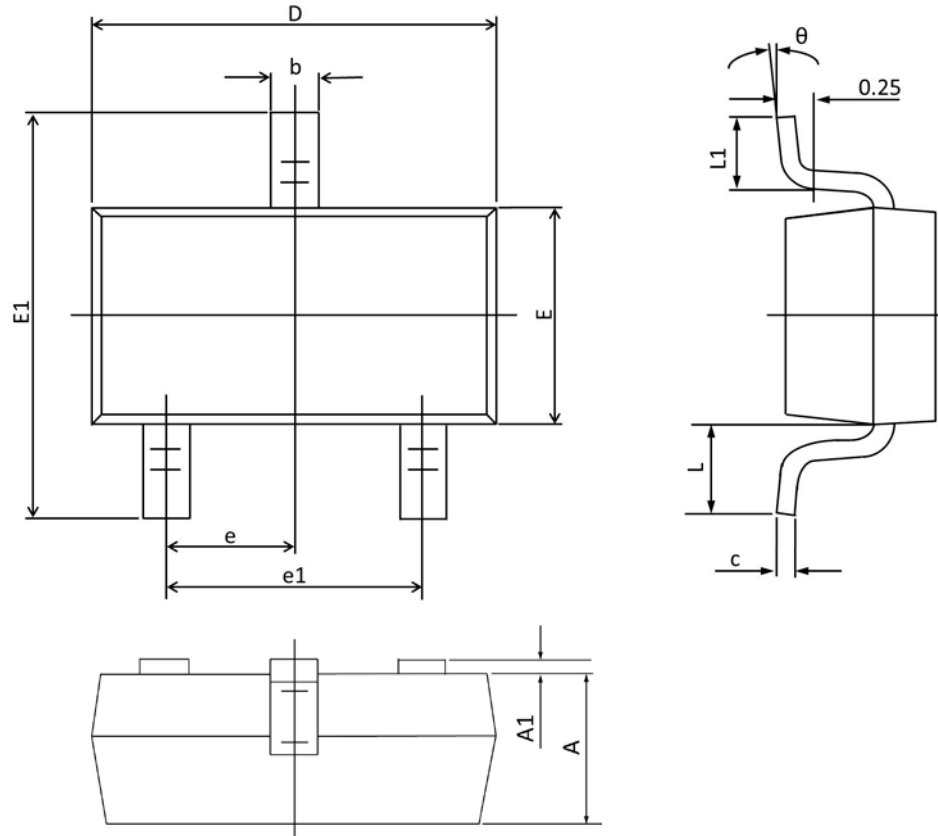


Figure9. Normalized Maximum Transient Thermal Impedance

SOT23 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
$\theta$	1°	7°	1°	7°