

Description

The HSS2012 is the high cell density trench N-ch MOSFETs, which provides excellent $R_{DS(on)}$ and efficiency for most of the small power switching and load switch applications.

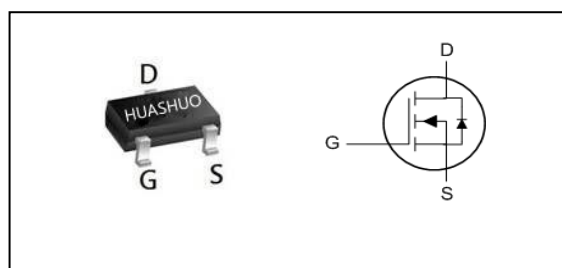
The HSS2012 meet the RoHS and Green Product requirement with full function reliability approved.

- Green Device Available
- Super Low Gate Charge
- Excellent C_{dv}/dt effect decline
- Advanced high cell density Trench technology

Product Summary

V_{DS}	20	V
$R_{DS(ON),typ}$	10	m Ω
I_D	6.8	A

SOT23 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5V_1$	6.8	A
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5V_1$	5.3	A
I_{DM}	Pulsed Drain Current ²	26	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation ³	1.25	W
$P_D@T_A=70^\circ\text{C}$	Total Power Dissipation ³	0.76	W
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	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	100	$^\circ\text{C}/\text{W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.018	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=4.5V$, $I_D=6A$	---	10	14	$m\Omega$
		$V_{GS}=2.5V$, $I_D=5A$	---	---	21	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	0.5	---	1.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-3.1	---	$mV/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=16V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=16V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V$, $I_D=4A$	---	30	---	S
Q_g	Total Gate Charge (4.5V)	$V_{DS}=15V$, $V_{GS}=4.5V$, $I_D=4A$	---	13	---	nC
Q_{gs}	Gate-Source Charge		---	1.5	---	
Q_{gd}	Gate-Drain Charge		---	2.6	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=10V$, $V_{GS}=4.5V$, $R_G=3.3\Omega$ $I_D=4A$	---	9	---	ns
T_r	Rise Time		---	28	---	
$T_{d(off)}$	Turn-Off Delay Time		---	33	---	
T_f	Fall Time		---	36	---	
C_{iss}	Input Capacitance	$V_{DS}=10V$, $V_{GS}=0V$, $f=1MHz$	---	960	---	pF
C_{oss}	Output Capacitance		---	140	---	
C_{rss}	Reverse Transfer Capacitance		---	110	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	6.8	A
I_{SM}	Pulsed Source Current ^{2,4}		---	---	26	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1.2	V

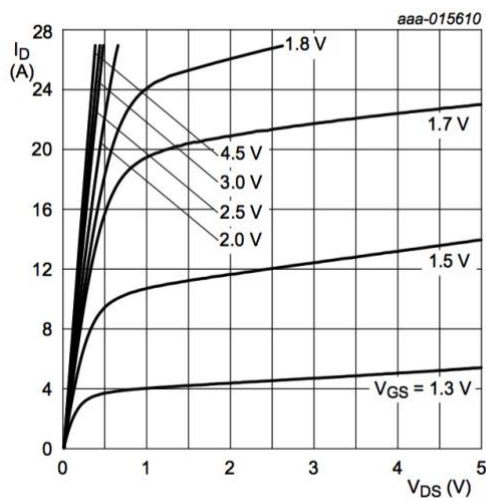
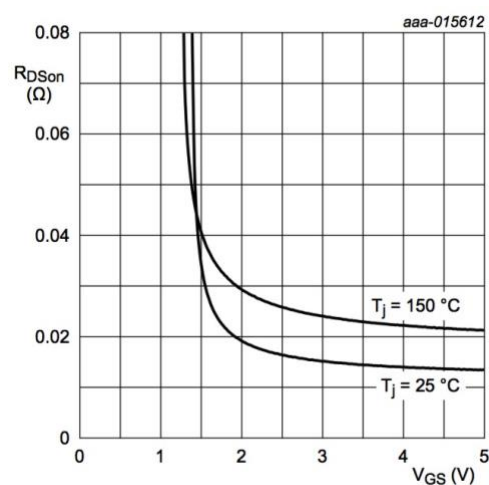
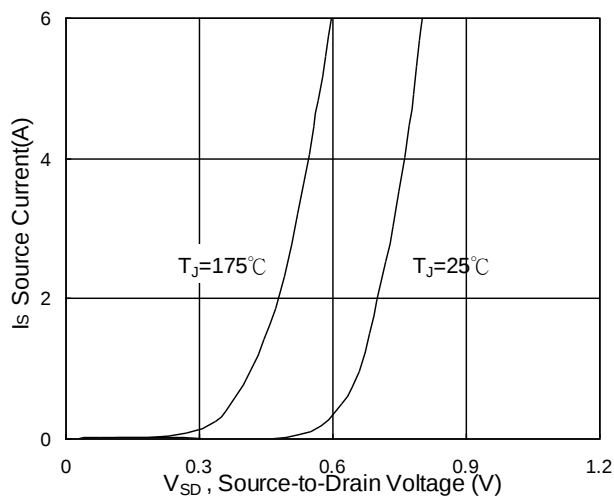
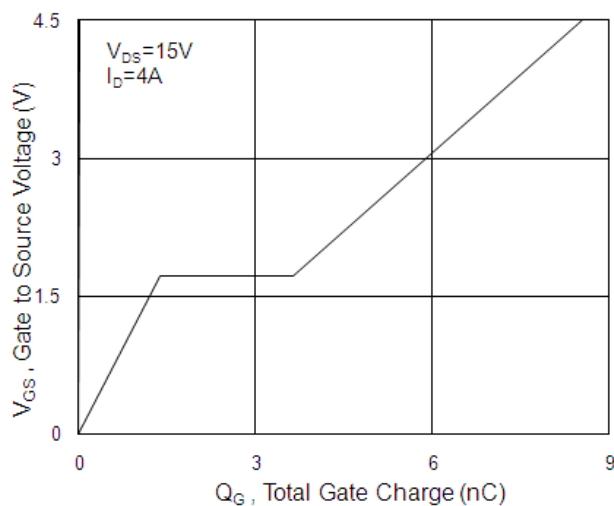
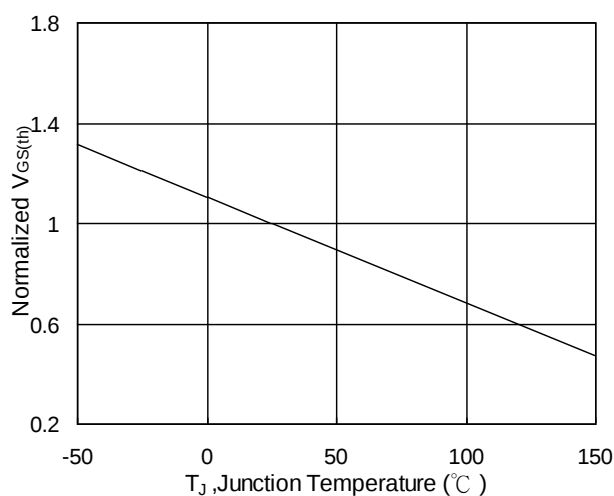
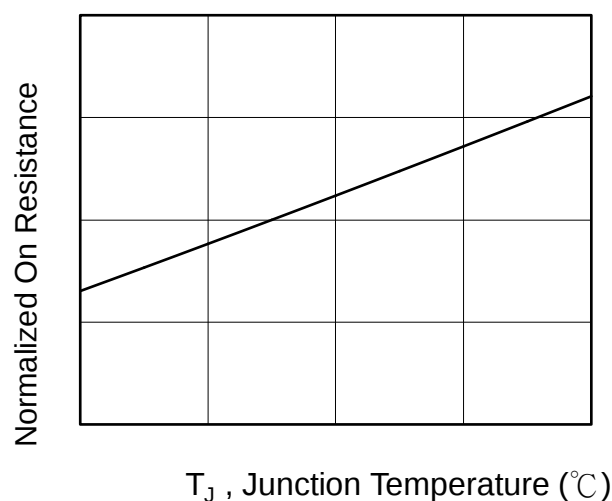
Note :

1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.

2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

3.The power dissipation is limited by 150°C junction temperature

4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

 $T_J = 25\text{ }^{\circ}\text{C}$
Fig.1 Typical Output Characteristics

 $I_D = 6.8\text{ A}$
Fig.2 On-Resistance vs. Gate-Source

Fig.3 Forward Characteristics Of Reverse

Fig.4 Gate-Charge Characteristics

Fig.5 Normalized $V_{GS(th)}$ vs. T_J

Fig.6 Normalized $R_{DS(on)}$ vs. T_J

N-Ch 20V Fast Switching MOSFETs

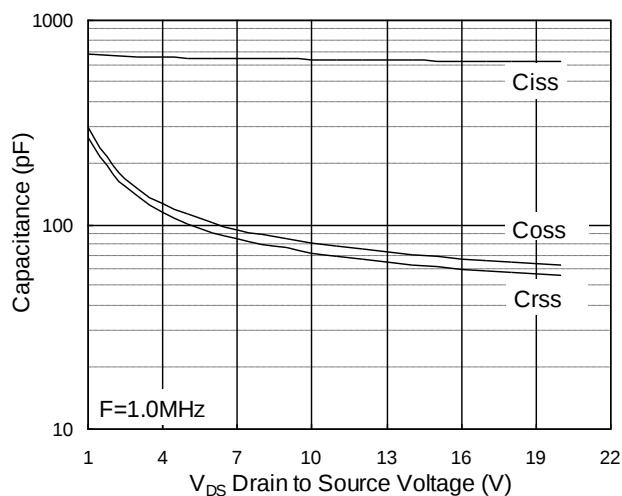


Fig.7 Capacitance

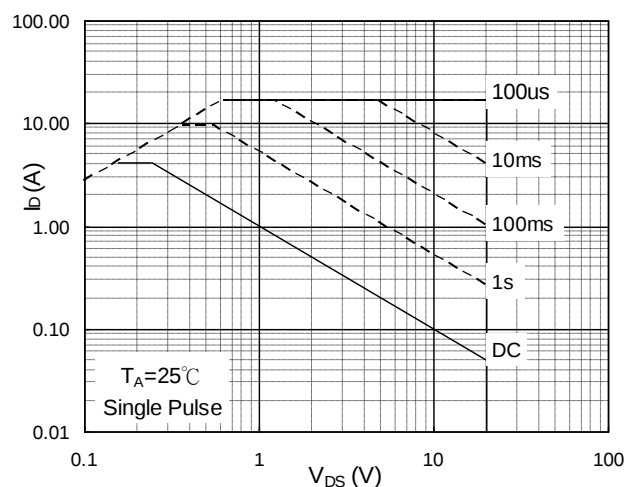


Fig.8 Safe Operating Area

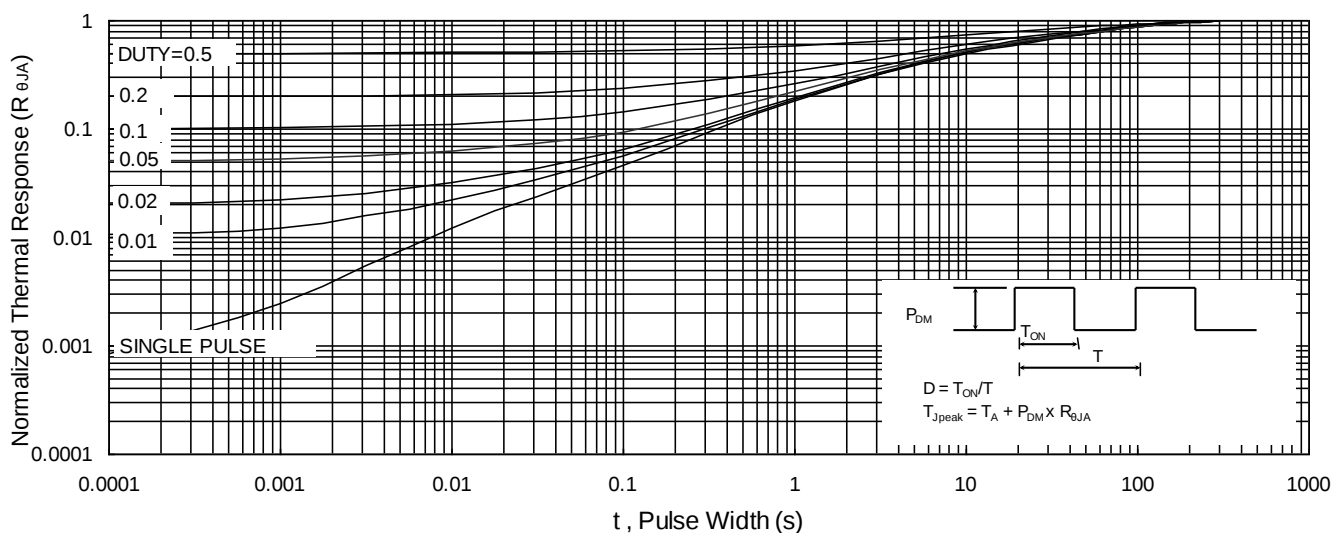


Fig.9 Normalized Maximum Transient Thermal Impedance

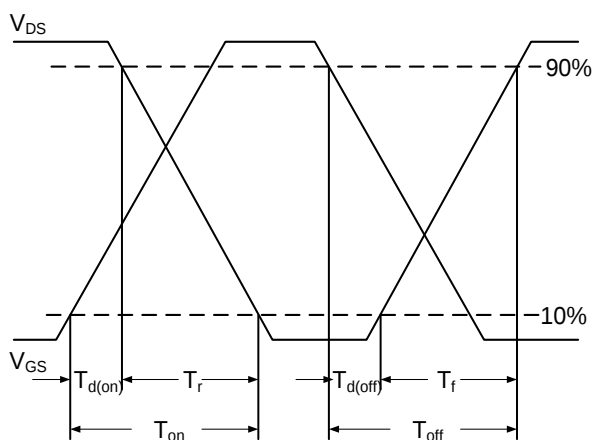


Fig.10 Switching Time Waveform

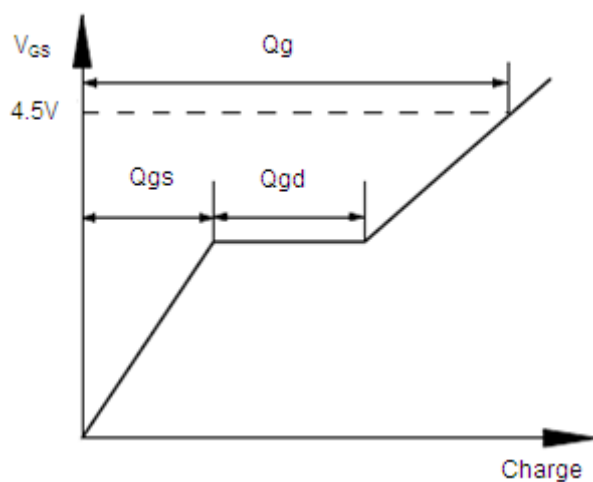
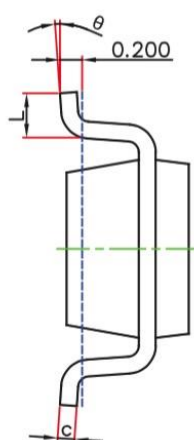
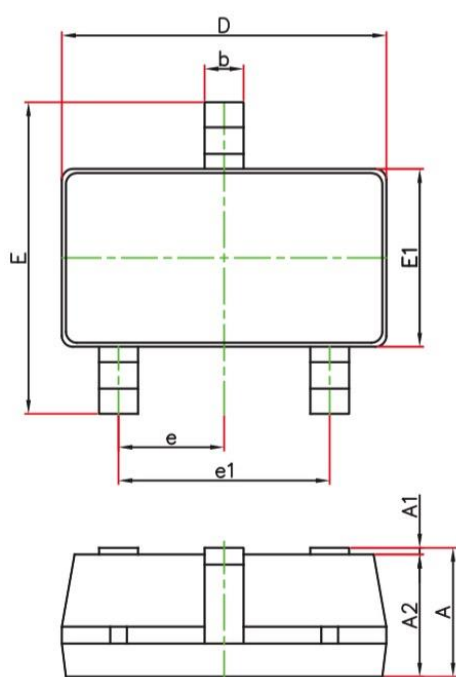


Fig.11 Gate Charge Waveform

Ordering Information

Part Number	Package code	Packaging
HSS2012	SOT-23L	3000/Tape&Reel



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°