

General Description

The HSK6113 is the high cell density trench P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The HSK6113 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

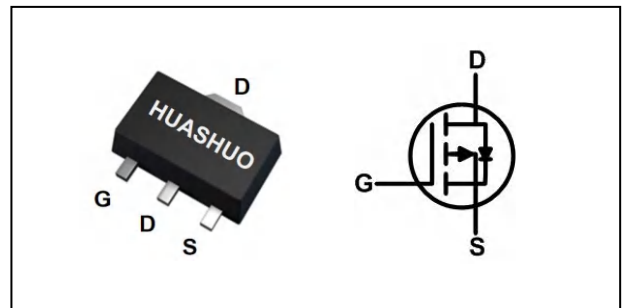
Product Summary

V_{DS}	-60	V
$R_{DS(ON),max}$	90	mΩ
I_D	-4	A

Features

- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench Technology

SOT-89 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	±20	V
$I_D@T_A=25^{\circ}C$	Continuous Drain Current, V_{GS} @ -10V ¹	-4	A
$I_D@T_A=70^{\circ}C$	Continuous Drain Current, V_{GS} @ -10V ¹	-3	A
I_{DM}	Pulsed Drain Current ²	-8.2	A
EAS	Single Pulse Avalanche Energy ³	29.7	mJ
I_{AS}	Avalanche Current	24.4	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation ⁴	1.8	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	85	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	24	°C/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	$V_{GS}=0V$, $I_D=-250\mu A$	-60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1mA$	---	-0.03	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-3A$	---	---	90	$m\Omega$
		$V_{GS}=-4.5V$, $I_D=-2A$	---	---	115	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.2	-1.6	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.56	---	$mV/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-48V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=-48V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=-5V$, $I_D=-3A$	---	8.7	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	15	---	Ω
Q_g	Total Gate Charge (-4.5V)	$V_{DS}=-48V$, $V_{GS}=-4.5V$, $I_D=-3A$	---	11.8	---	nC
Q_{gs}	Gate-Source Charge		---	1.9	---	
Q_{gd}	Gate-Drain Charge		---	6.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V$, $V_{GS}=-10V$, $R_G=3.3\Omega$, $I_D=-1A$	---	8.8	---	ns
T_r	Rise Time		---	19.6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	47.2	---	
T_f	Fall Time		---	9.6	---	
C_{iss}	Input Capacitance	$V_{DS}=-15V$, $V_{GS}=0V$, $f=1MHz$	---	1080	---	pF
C_{oss}	Output Capacitance		---	73	---	
C_{rss}	Reverse Transfer Capacitance		---	50	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-4	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	-8.2	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 2OZ copper.

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

3.The EAS data shows Max. rating . The test condition is $V_{DD}=-25V$, $V_{GS}=-10V$, $L=0.1mH$, $I_{AS}=-24.4A$

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

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

Typical Characteristics

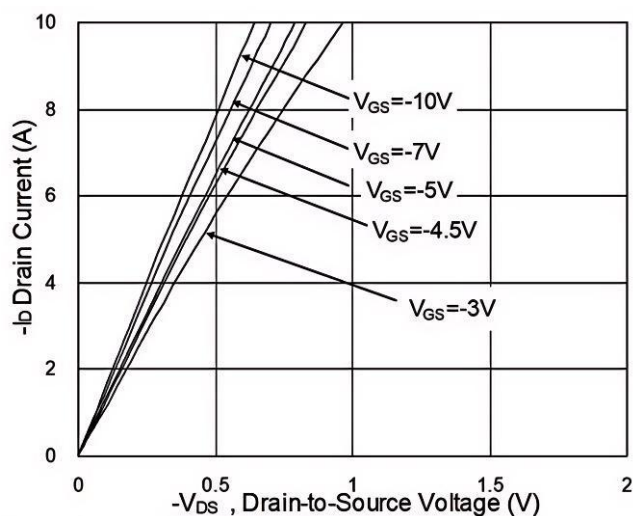


Fig.1 Typical Output Characteristics

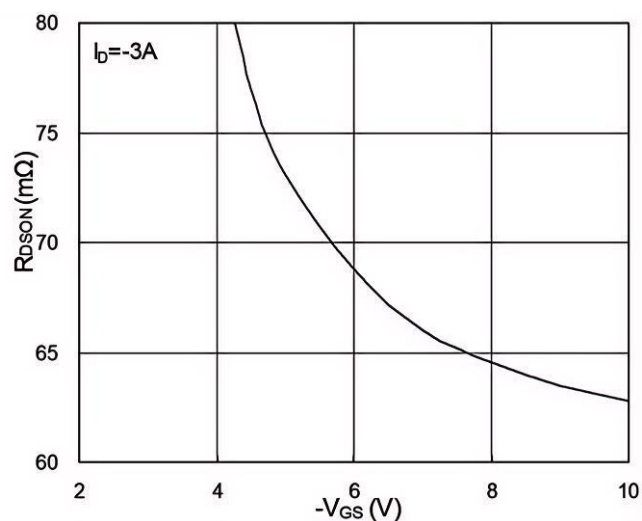


Fig.2 On-Resistance v.s Gate-Source

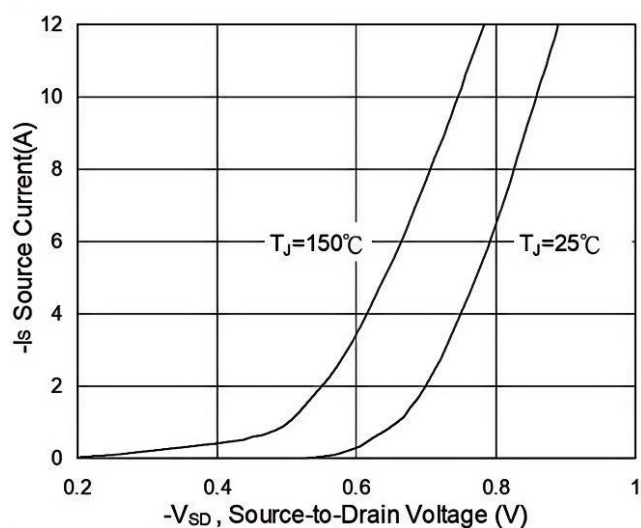


Fig.3 Forward Characteristics of Reverse

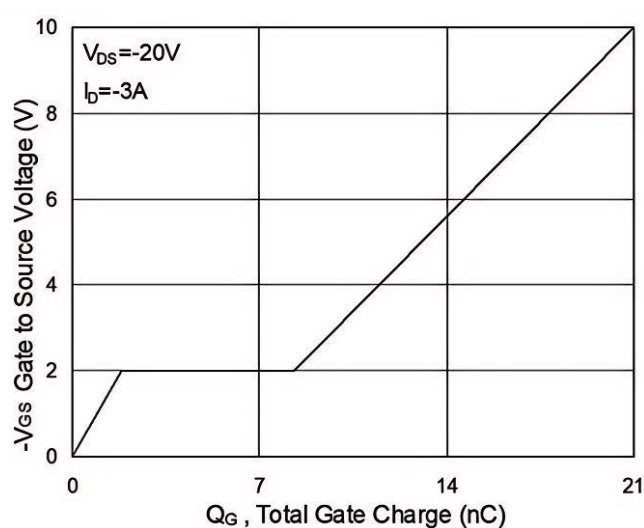


Fig.4 Gate-Charge Characteristics

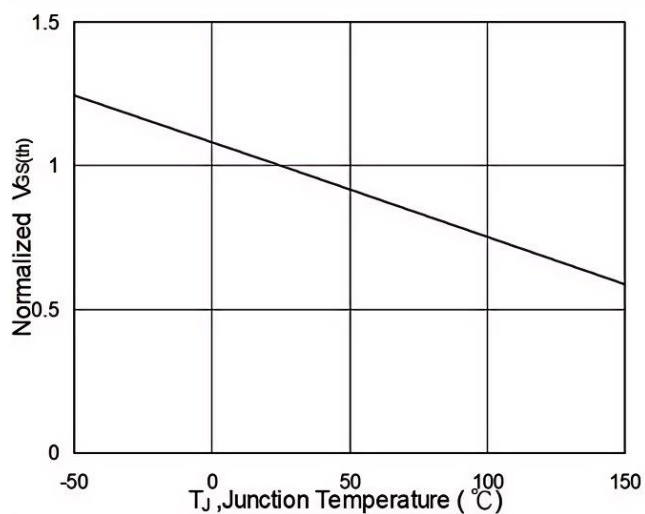


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

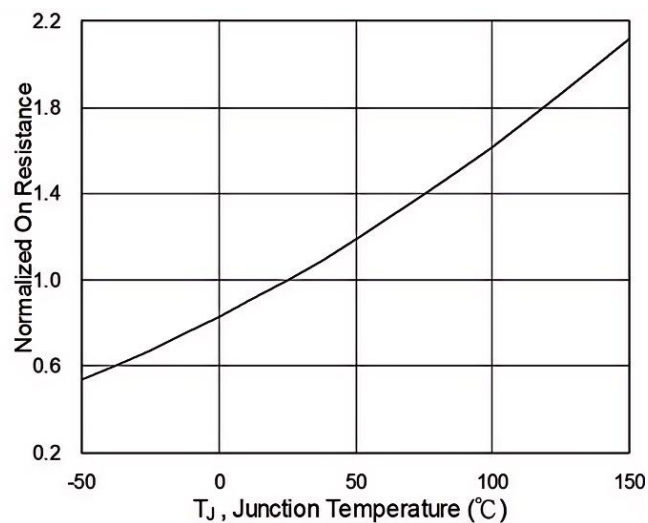
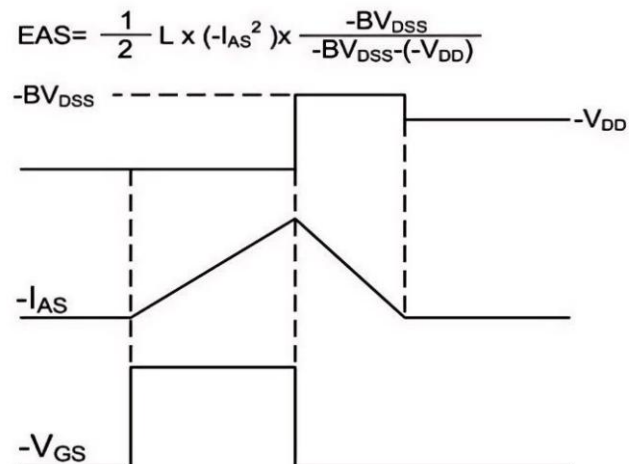
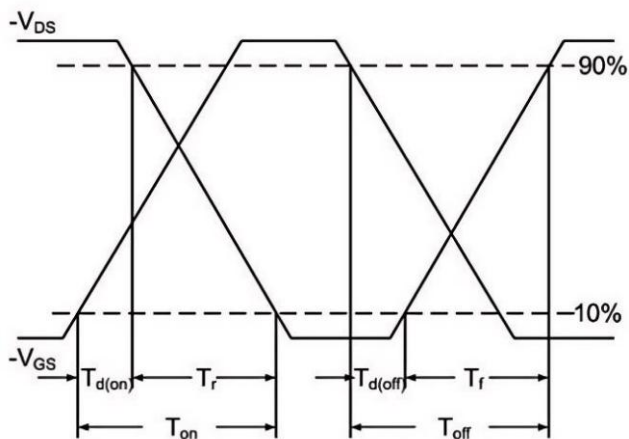
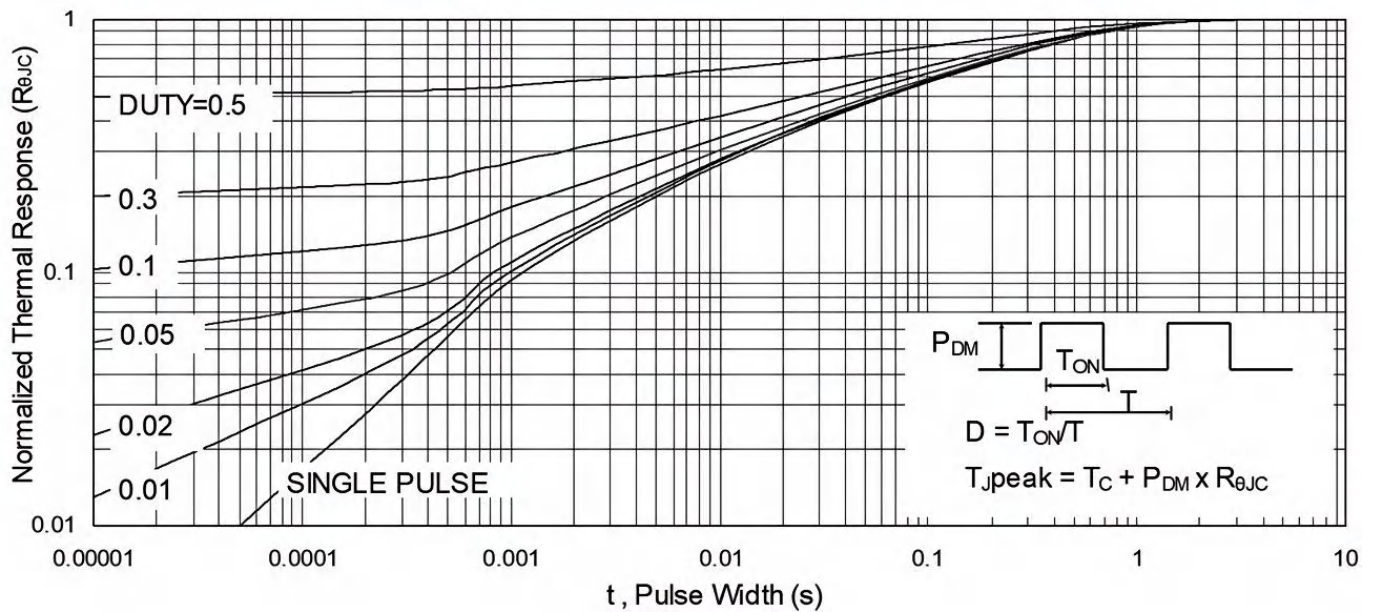
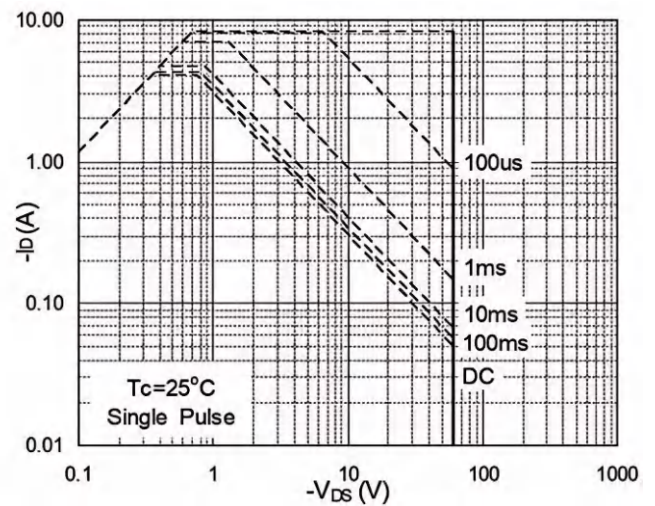
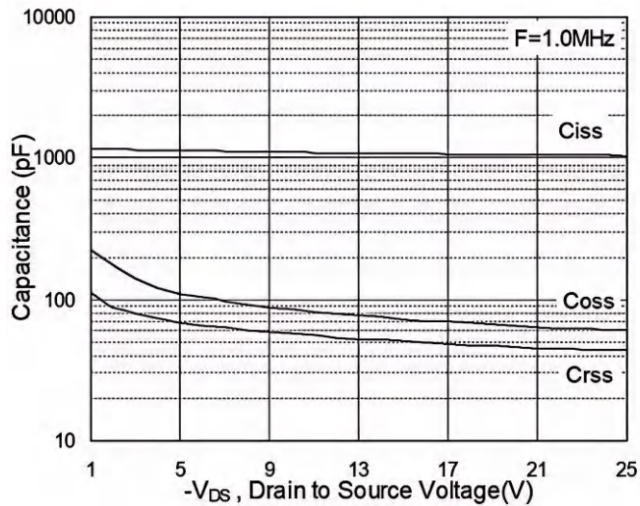


Fig.6 Normalized $R_{DS(on)}$ vs. T_J



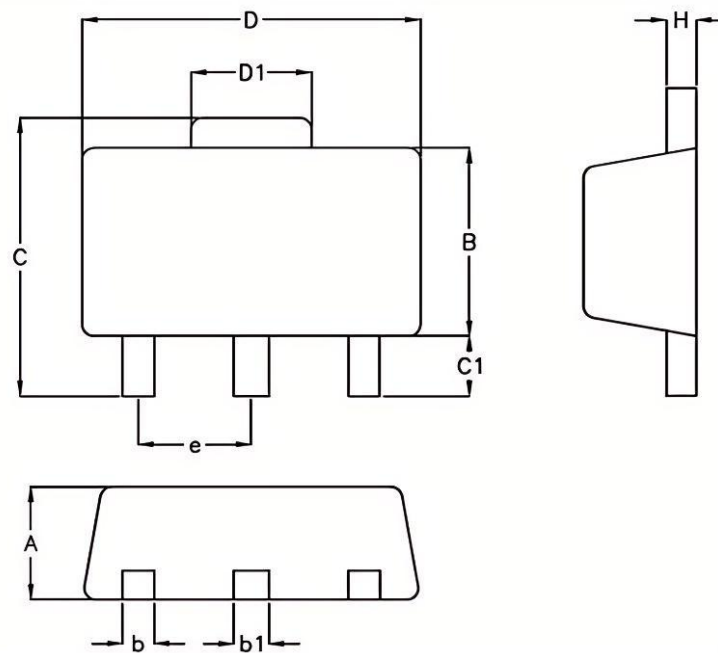
P-Ch 60V Fast Switching MOSFETs



Ordering Information

Part Number	Package code	Packaging
HSK6113	SOT-89	1000/Tape&Reel

SOT-89 Package Outline



SYMBOLS	MILLIMETERS		NCHES	
	MIN	MAX	MIN	MAX
A	1.397	1.600	0.055	0.063
b	0.420	0.540	0.017	0.021
b1	0.420	0.540	0.017	0.021
B	2.388	2.591	0.094	0.102
C	3.937	4.242	0.155	0.167
C1	0.787	1.194	0.031	0.047
D	4.394	4.597	0.173	0.181
D1	1.397	1.753	0.055	0.069
e	1.448	1.549	0.057	0.061
H	0.350	0.44	0.014	0.017

HSK6113 Marking:

