N-Ch 100V Fast Switching MOSFETs

Description

The HSK10N10 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

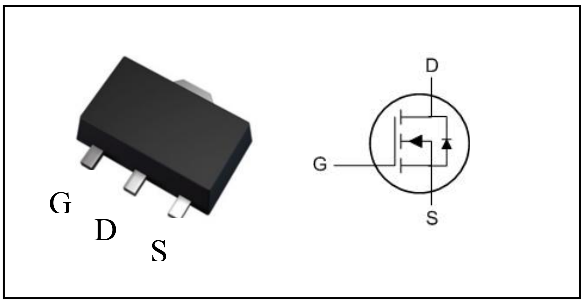
The HSK10N10 meet the RoHS and Green Product requirement with full function reliability approved.

- Green Device Available
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench technology

Product Summary

V_{DS}	100	V
$R_{DS(ON),typ}$	75	mΩ
I_D	10	A

SOT89 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	10	A
I_D@T_A=70˚C	Continuous Drain Current, V_{GS} @ 10V[1]	8	A
I_{DM}	Pulsed Drain Current[2]	30	A
P_D@T_A=25˚C	Total Power Dissipation[3]	1.7	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(steady state)[1]	---	100	˚C/W
	Thermal Resistance Junction-ambient(t<10s)[1]	---	75	˚C/W

Electrical Characteristics (T_J=25 ˚C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25˚C , I_D=1mA	---	0.122	---	V/˚C
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=5A	---	75	85	mΩ
		V_{GS}=4.5V , I_D=4A	---	80	95	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.8	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.84	---	mV/˚C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V , V_{GS}=0V , T_J=25˚C	---	---	1	uA
		V_{DS}=100V , V_{GS}=0V , T_J=55˚C	---	---	10	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=2A	---	15	---	S
Q_g	Total Gate Charge (10V)	V_{DS}=50V , V_{GS}=10V , I_D=1A	---	12	---	nC
Q_{gs}	Gate-Source Charge		---	2.9	---	
Q_{gd}	Gate-Drain Charge		---	1.9	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=50V , V_{GS}=10V , R_G=3.3Ω I_D=1A	---	3.6	---	ns
T_r	Rise Time		---	24	---	
$T_{d(off)}$	Turn-Off Delay Time		---	20	---	
T_f	Fall Time		---	8.4	---	
C_{iss}	Input Capacitance	V_{DS}=50V , V_{GS}=0V , f=1MHz	---	1190	---	pF
C_{oss}	Output Capacitance		---	51	---	
C_{rss}	Reverse Transfer Capacitance		---	40	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	5	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25˚C	---	---	1.2	V

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 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

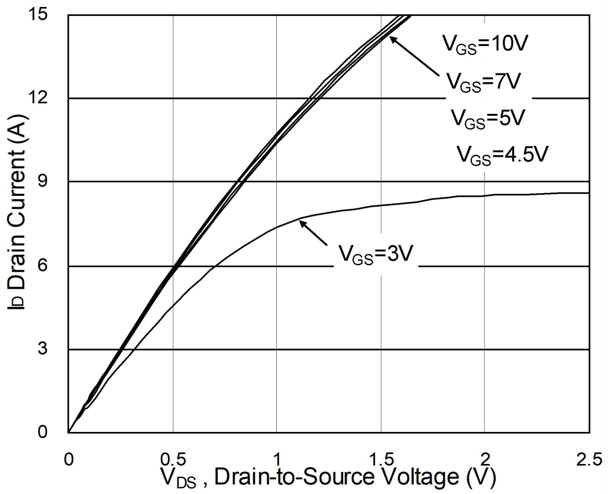


Fig.1 Typical Output Characteristics

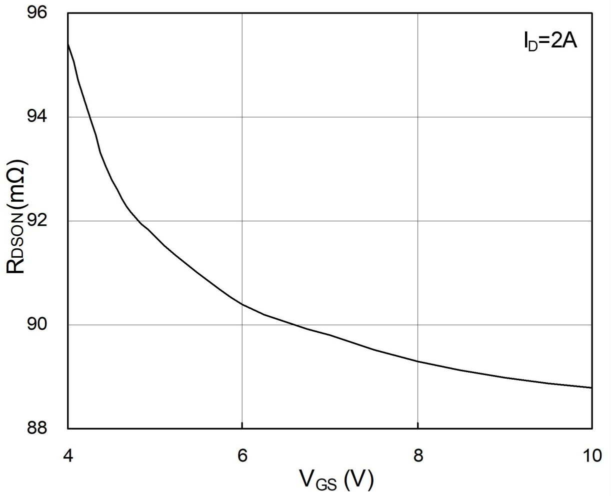


Fig.2 On-Resistance vs G-S Voltage

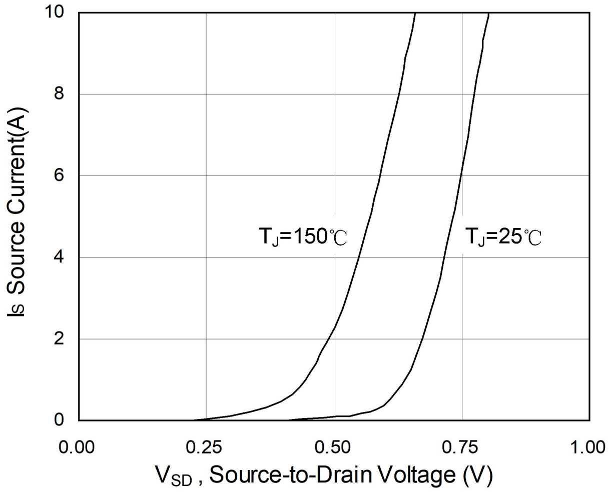


Fig.3 Source Drain Forward Characteristics

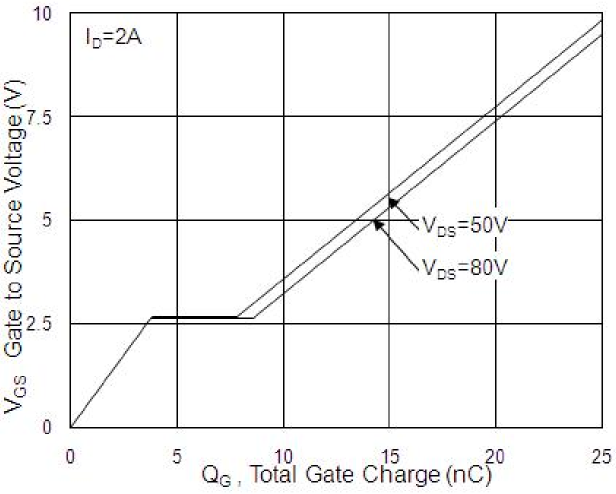


Fig.4 Gate-Charge Characteristics

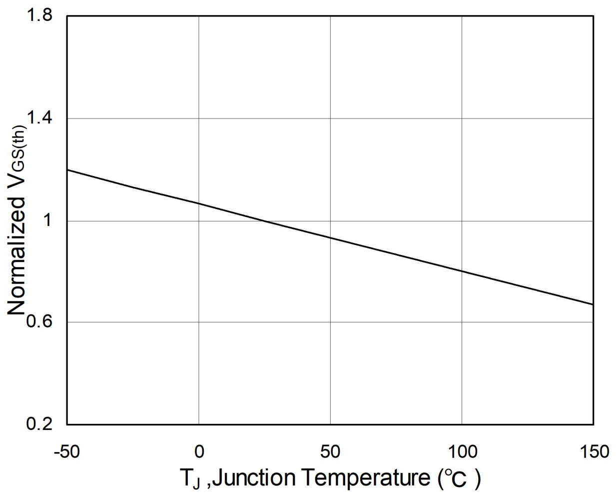


Fig.5 Normalized $V_{GS(th)}$ vs T_J

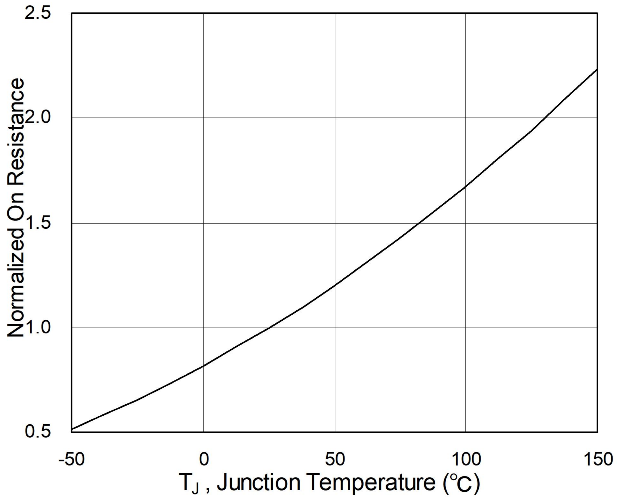


Fig.6 Normalized R_{DSON} vs T_J

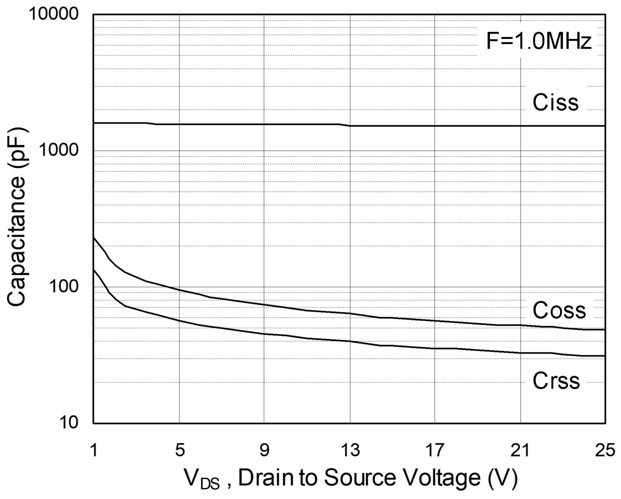


Fig.7 Capacitance

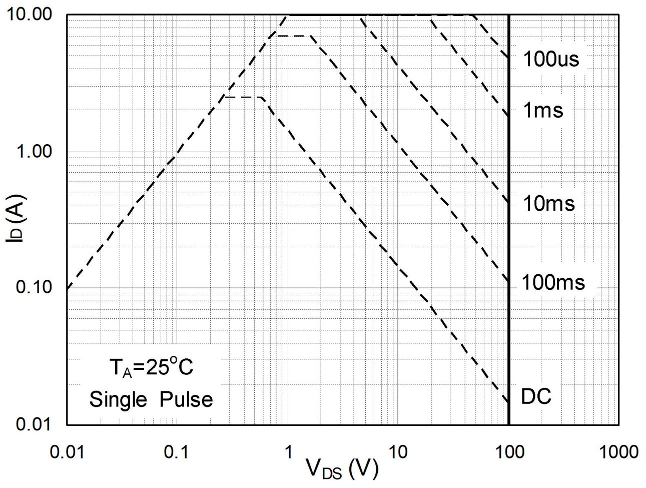


Fig.8 Safe Operating Area

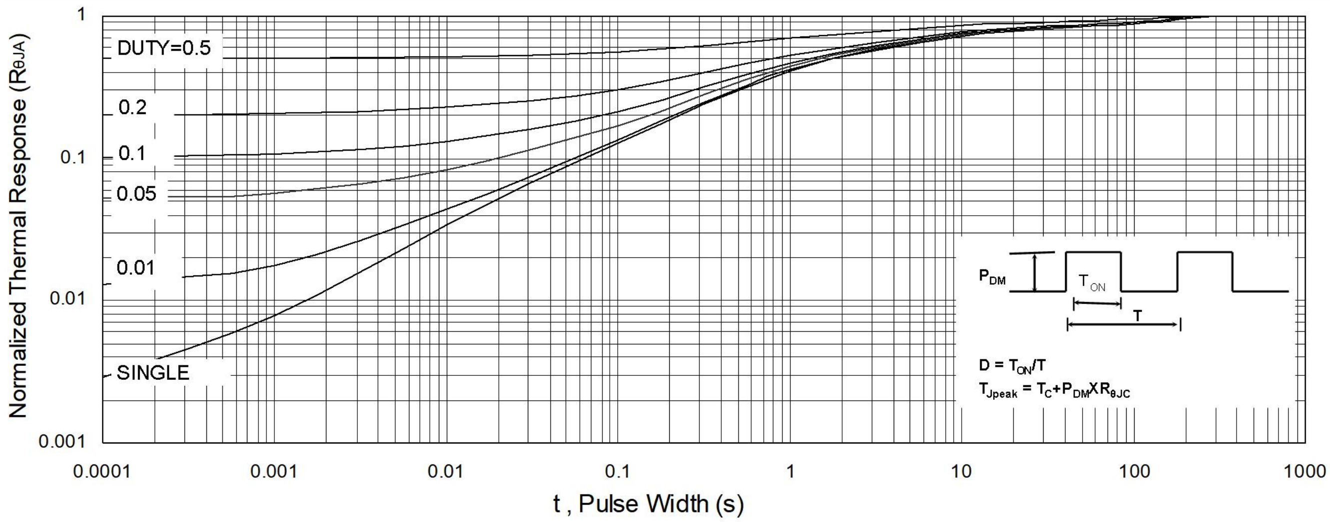


Fig.9 Normalized Maximum Transient Thermal Impedance

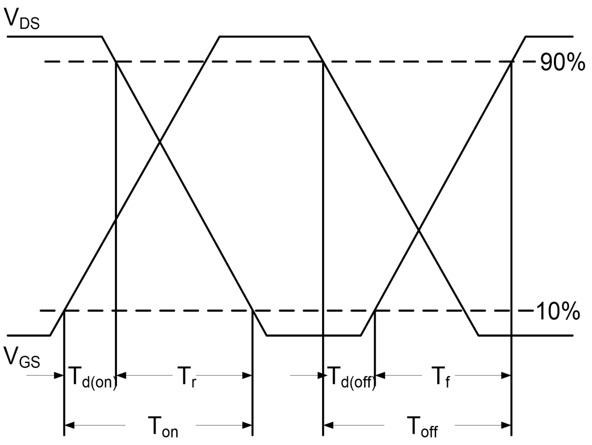


Fig.10 Switching Time Waveform

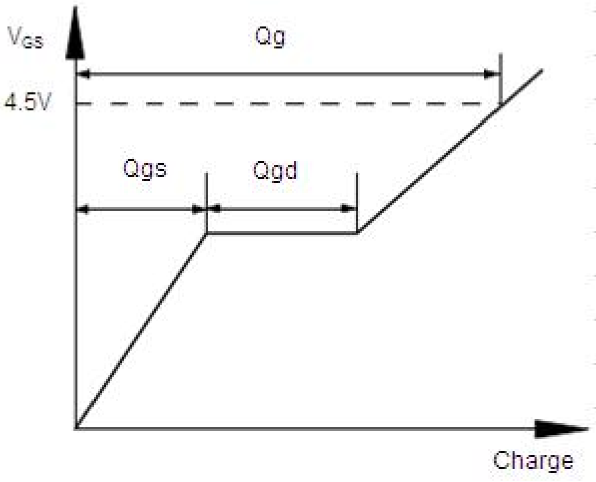
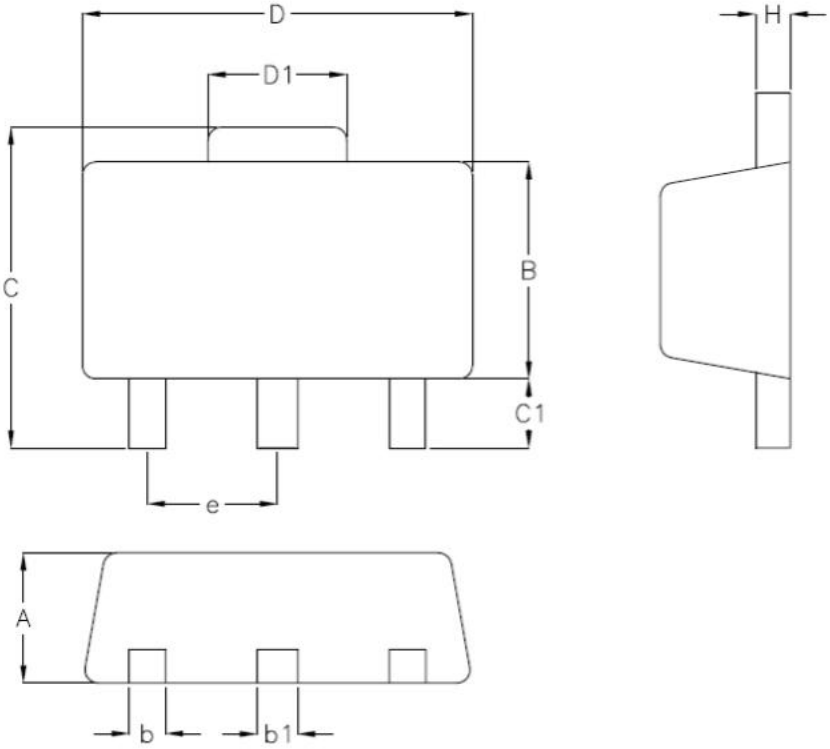


Fig.11 Gate Charge Waveform

Ordering Information

Part Number	Package code	Packaging
HSK10N10	SOT-89	1000/Tape&Reel



SYMBOLS	MILLIMETERS		INCHES	
	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