

General Description

The HSK12N02 is the high cell density trench N-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.

The HSK12N02 meet the RoHS and Green Product requirement with full function reliability approved.

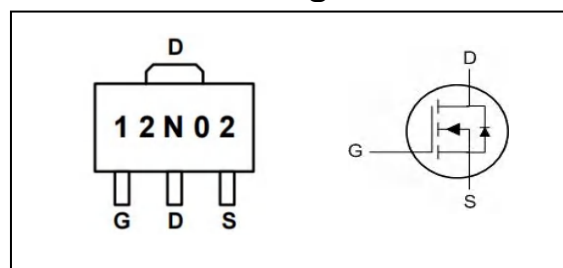
Product Summary

V_{DS}	20	V
$R_{DS(ON),typ}$	8.5	mΩ
I_D	12	A

Features

- 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	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 4.5V^1$	12	A
$I_D@T_C=70^{\circ}C$	Continuous Drain Current, $V_{GS} @ 4.5V^1$	9.3	A
I_{DM}	Pulsed Drain Current ²	48	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation ³	1.7	W
$P_D@T_A=70^{\circ}C$	Total Power Dissipation ³	1.2	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	100	$^{\circ}C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	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	$V_{GS}=4.5V, I_D=12A$	---	8.5	12	$m\Omega$
		$V_{GS}=2.5V, I_D=8A$	---	11	16	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.45	0.75	1.2	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)	$V_{DS}=10V, V_{GS}=4.5V, I_D=4A$	---	15	---	nC
Q_{gs}	Gate-Source Charge		---	2.5	---	
Q_{gd}	Gate-Drain Charge		---	3.6	---	
$T_{d(on)}$	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		---	22	---	
$T_{d(off)}$	Turn-Off Delay Time		---	33	---	
T_f	Fall Time		---	16	---	
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1MHz$	---	1200	---	pF
C_{oss}	Output Capacitance		---	180	---	
C_{rss}	Reverse Transfer Capacitance		---	140	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	12	A
I_{SM}	Pulsed Source Current ^{2,4}		---	---	48	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 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

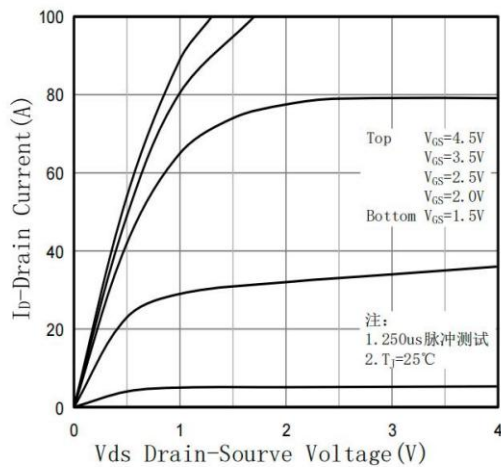


Fig.1 Typical Output Characteristics

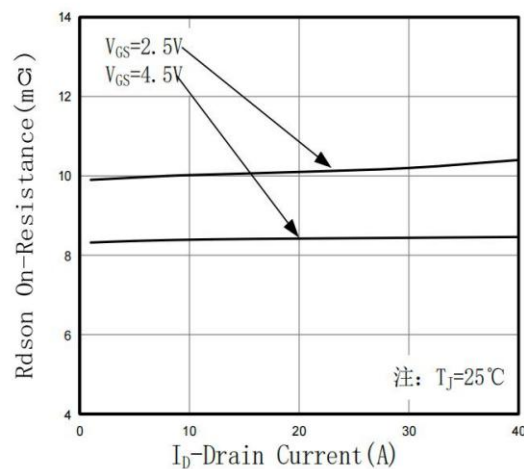


Fig.2 On-Resistance vs. Drain Current

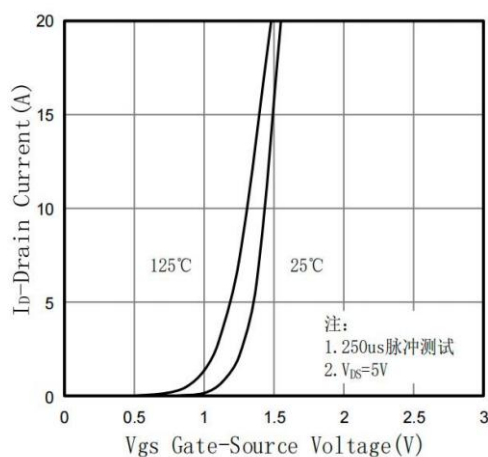


Fig.3 Transfer Characteristic

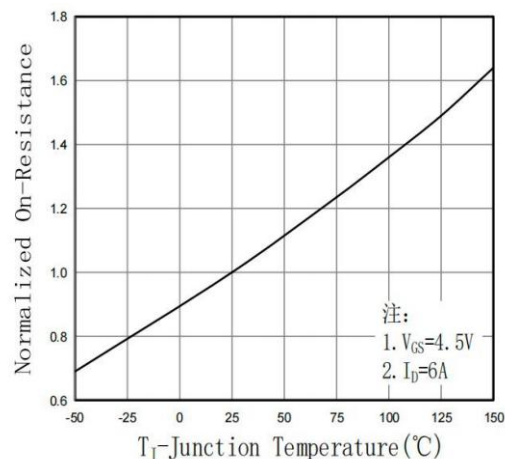


Fig.4 On-Resistance vs. Junction Temperature

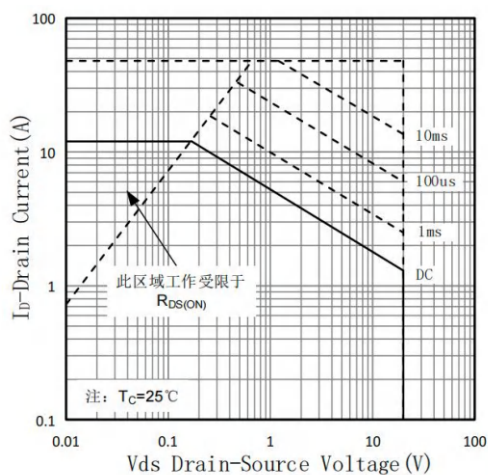


Fig.5 Safe Operation Area

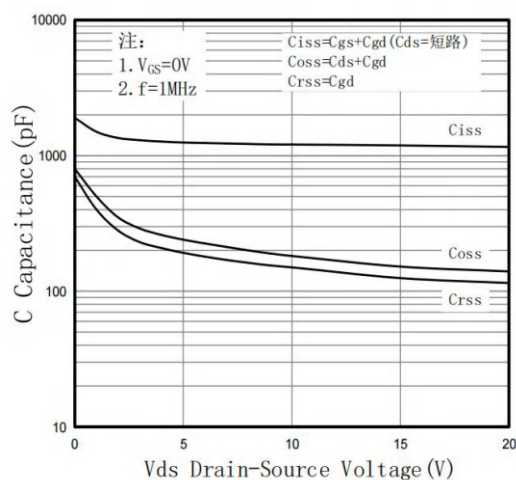


Fig.6 Capacitance Characteristic

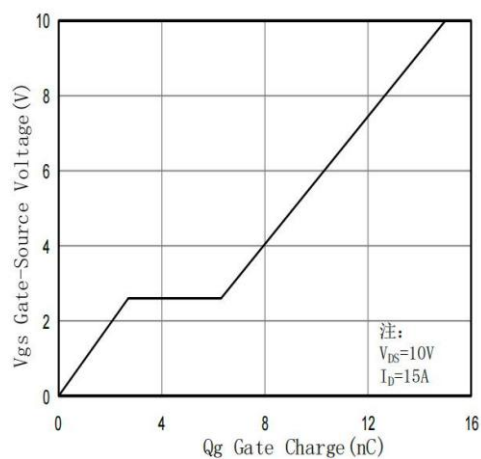


Fig.7 Gate-Charge Characteristic

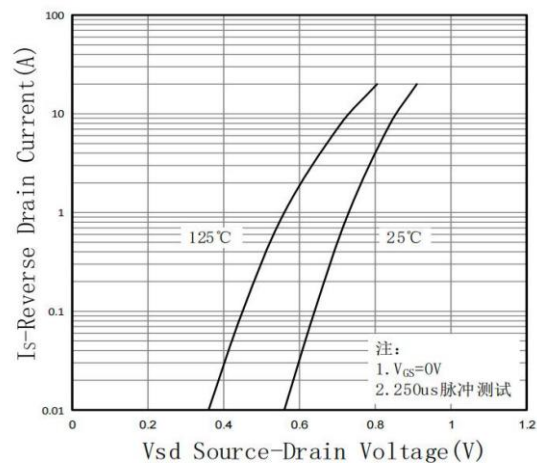
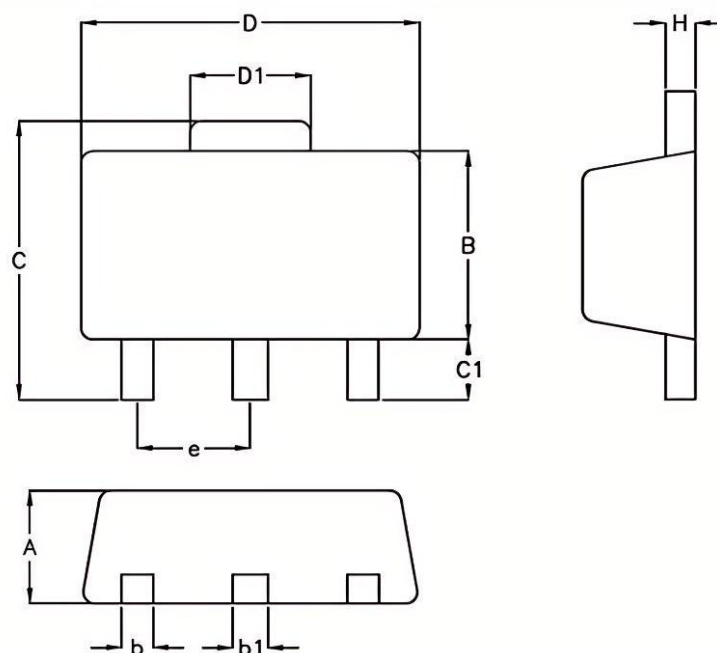


Fig.8 Body Diode Characteristic

Ordering Information

Part Number	Package code	Packaging
HSK12N02	SOT-89	1000/Tape&Reel

SOT-89 Package Outline



SYMBOLS	MILLIMETERS		NCES	
	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

HSK12N02 TOP Marking

