



### Description

The HSCB20N06 is the high cell density trench N-ch MOSFETs, which provide excellent R<sub>DS(ON)</sub> and gate charge for most of the synchronous buck converter applications.

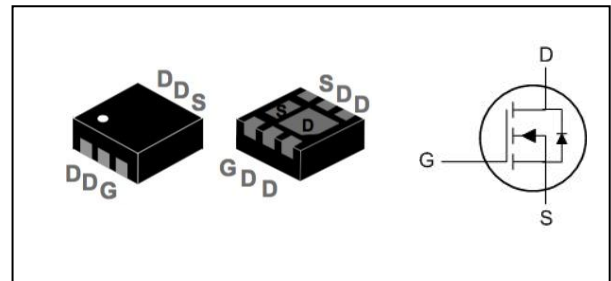
The HSCB20N06 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

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

### Product Summary

V <sub>DS</sub>	60	V
R <sub>DS(ON),typ</sub>	12	mΩ
I <sub>D</sub>	20	A

### DFN2\*2-6L Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	60	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	20	A
I <sub>D</sub> @T <sub>C</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	16	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	80	A
I <sub>AS</sub>	Avalanche Current	14	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	49	mJ
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>4</sup>	3	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-ambient <sup>1</sup>	---	65	°C/W



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BVDSS Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.044	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =10A	---	12	16	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A	---	16	22	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0	1.6	2.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-4.8	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =5A	---	13	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	2.5	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	3.1	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω I <sub>D</sub> =5A	---	9	---	ns
T <sub>r</sub>	Rise Time		---	34	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	21.2	---	
T <sub>f</sub>	Fall Time		---	5.6	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz	---	807	---	pF
C <sub>oss</sub>	Output Capacitance		---	265	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	36	---	

**Diode Characteristics**

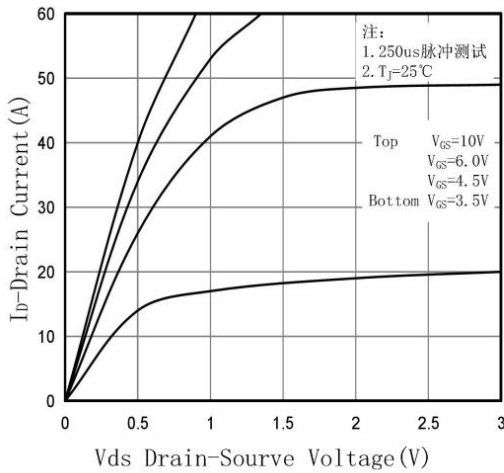
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,6</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	20	A
I <sub>SM</sub>	Pulsed Source Current <sup>2,6</sup>		---	---	28	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1.2	V

Note :

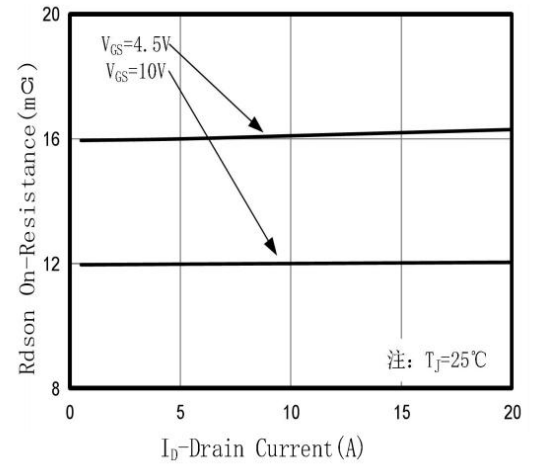
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=14A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.



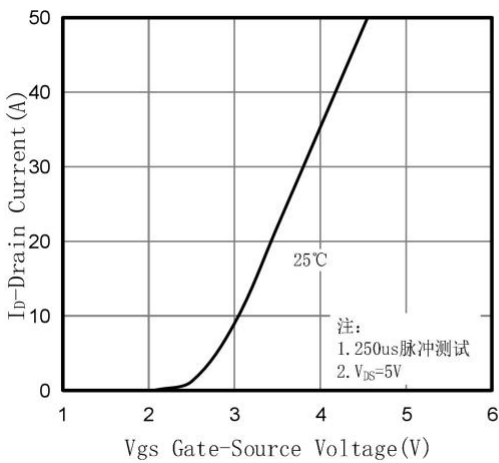
**Typical Characteristics**



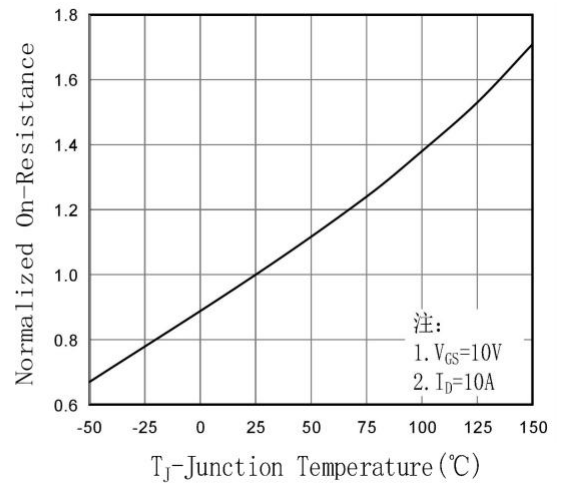
**Fig.1 Output Characteristic**



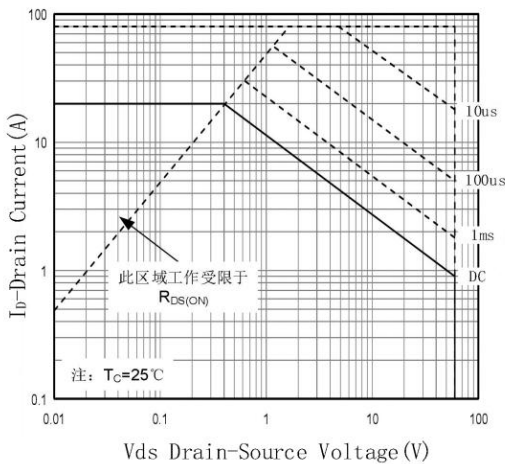
**Fig.2 On-Resistance vs. Drain Current**



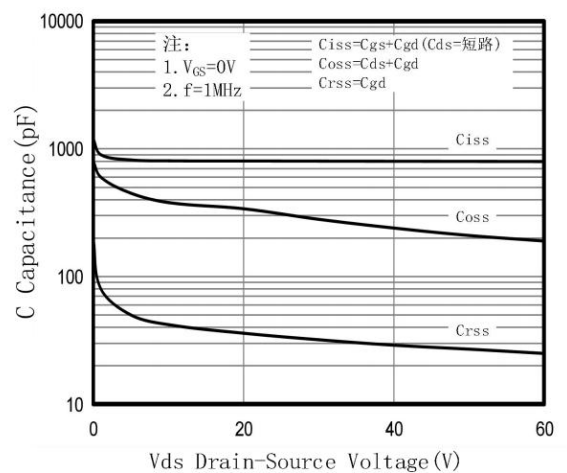
**Fig.3 Transfer Characteristic**



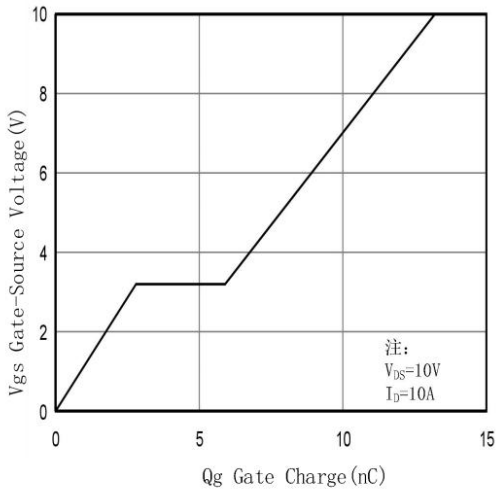
**Fig.4 On-Resistance vs. Junction Temperature**



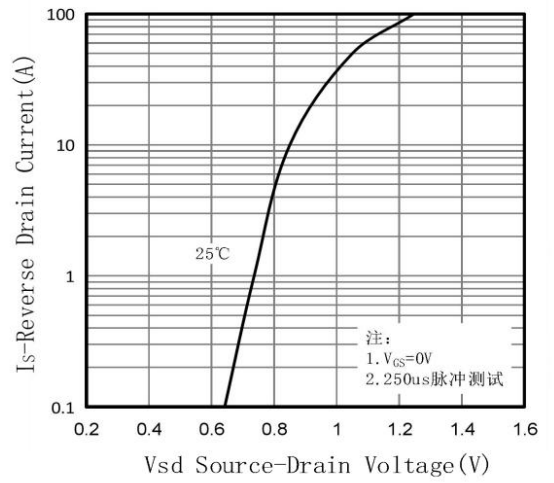
**Fig.5 Safe Operation Area**



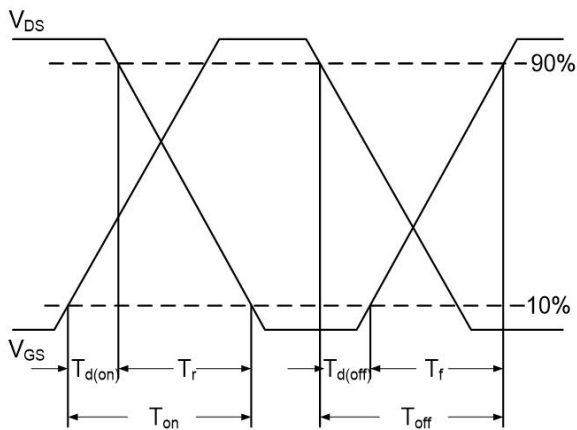
**Fig.6 Capacitance Characteristic**



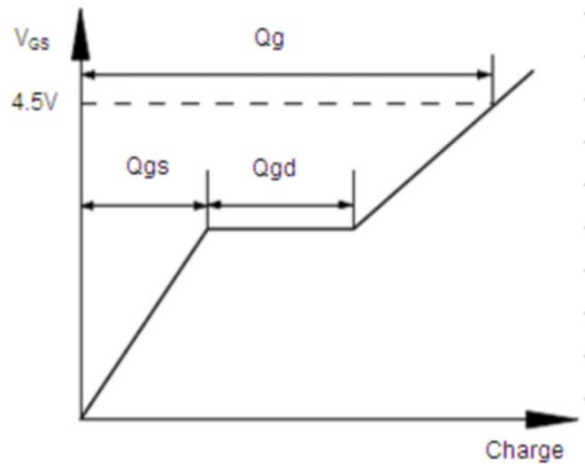
**Fig.7 Gate-Charge Characteristic**



**Fig.8 Body Diode Characteristic**



**Fig.9 Switching Time Waveform**

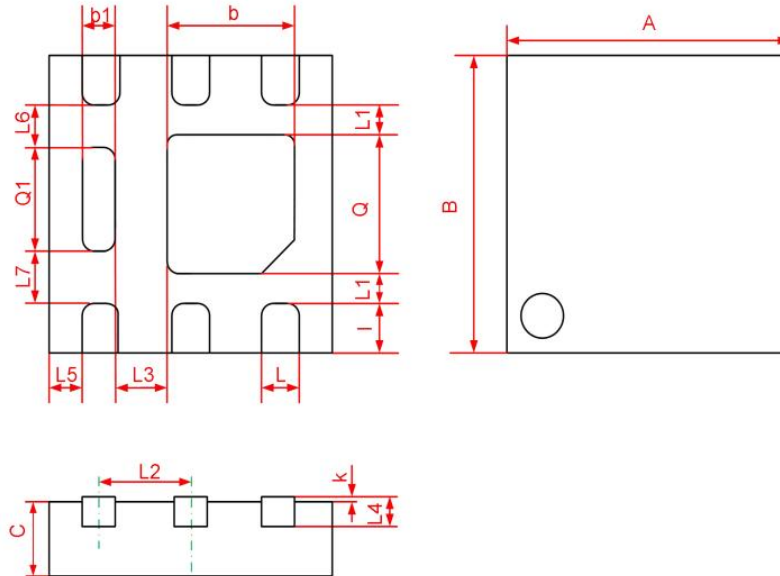


**Fig.10 Gate Charge Waveform**



**PACKAGE INFORMATION**

- DFN2×2-6L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.950	2.050	0.077	0.081
a	0.900	1.100	0.035	0.043
a1	0.720	0.920	0.028	0.036
B	1.950	2.050	0.077	0.081
b	0.850	1.050	0.033	0.041
b1	0.130	0.330	0.005	0.013
C	0.450	0.550	0.018	0.022
l	0.250	0.350	0.010	0.014
k	0.000	0.050	0.000	0.002
L	0.250	0.350	0.010	0.014
L1	0.100	0.300	0.004	0.012
L2	0.650 TYP.		0.026 TYP.	
L3	0.300	0.500	0.012	0.020
L4	0.152 TYP.		0.006 TYP.	
L5	0.120	0.320	0.005	0.013
L6	0.150	0.350	0.006	0.014
L7	0.230	0.430	0.009	0.017