



## Description

The HSCB3014 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

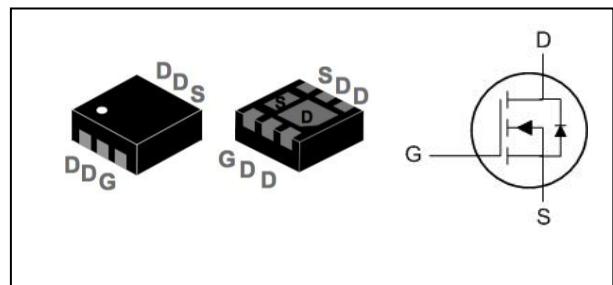
The HSCB3014 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

## Product Summary

V <sub>DS</sub>	30	V
R <sub>DS(ON),typ</sub>	9	mΩ
I <sub>D</sub>	10	A

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

## DFN2\*2-6L Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	± 20	V
I <sub>D</sub> @T <sub>A</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	10	A
I <sub>D</sub> @T <sub>A</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	8	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	40	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	24.2	mJ
I <sub>AS</sub>	Avalanche Current	22	A
P <sub>D</sub> @T <sub>c</sub> =25°C	Total Power Dissipation <sup>4</sup>	26	W
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>4</sup>	1.67	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>	---	75	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	4.8	°C/W



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$\text{BV}_{\text{DSS}}$	Drain-Source Breakdown Voltage	$V_{\text{GS}}=0\text{V}$ , $I_D=250\mu\text{A}$	30	---	---	V
$R_{\text{DS}(\text{ON})}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{\text{GS}}=10\text{V}$ , $I_D=10\text{A}$	---	9	12	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}$ , $I_D=8\text{A}$	---	12	17	
$V_{\text{GS}(\text{th})}$	Gate Threshold Voltage	$V_{\text{GS}}=V_{\text{DS}}$ , $I_D=250\mu\text{A}$	1.2	1.6	2.5	V
$I_{\text{DSS}}$	Drain-Source Leakage Current	$V_{\text{DS}}=24\text{V}$ , $V_{\text{GS}}=0\text{V}$ , $T_J=25^{\circ}\text{C}$	---	---	1	$\text{uA}$
		$V_{\text{DS}}=24\text{V}$ , $V_{\text{GS}}=0\text{V}$ , $T_J=55^{\circ}\text{C}$	---	---	5	
$I_{\text{GSS}}$	Gate-Source Leakage Current	$V_{\text{GS}}=\pm 20\text{V}$ , $V_{\text{DS}}=0\text{V}$	---	---	$\pm 100$	nA
$g_{\text{fs}}$	Forward Transconductance	$V_{\text{DS}}=5\text{V}$ , $I_D=8\text{A}$	---	24	---	S
$R_g$	Gate Resistance	$V_{\text{DS}}=0\text{V}$ , $V_{\text{GS}}=0\text{V}$ , $f=1\text{MHz}$	---	1.8	3	$\Omega$
$Q_g$	Total Gate Charge (4.5V)	$V_{\text{DS}}=15\text{V}$ , $V_{\text{GS}}=4.5\text{V}$ , $I_D=8\text{A}$	---	9.63	---	nC
$Q_{\text{gs}}$	Gate-Source Charge		---	3.88	---	
$Q_{\text{gd}}$	Gate-Drain Charge		---	3.44	---	
$T_{\text{d}(\text{on})}$	Turn-On Delay Time	$V_{\text{DD}}=15\text{V}$ , $V_{\text{GS}}=10\text{V}$ , $R_G=1.5\Omega$	---	4.2	---	ns
$T_r$	Rise Time		---	8.2	---	
$T_{\text{d}(\text{off})}$	Turn-Off Delay Time		---	31	---	
$T_f$	Fall Time		---	4	---	
$C_{\text{iss}}$	Input Capacitance	$V_{\text{DS}}=15\text{V}$ , $V_{\text{GS}}=0\text{V}$ , $f=1\text{MHz}$	---	940	---	pF
$C_{\text{oss}}$	Output Capacitance		---	131	---	
$C_{\text{rss}}$	Reverse Transfer Capacitance		---	109	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_s$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0\text{V}$ , Force Current	---	---	10	A
$I_{\text{SM}}$	Pulsed Source Current <sup>2,5</sup>		---	---	40	A
$V_{\text{SD}}$	Diode Forward Voltage <sup>2</sup>	$V_{\text{GS}}=0\text{V}$ , $I_s=1\text{A}$ , $T_J=25^{\circ}\text{C}$	---	---	1	V
$t_{\text{rr}}$	Reverse Recovery Time	$I_F=8\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$ , $T_J=25^{\circ}\text{C}$	---	8	---	nS
$Q_{\text{rr}}$	Reverse Recovery Charge		---	2.9	---	nC

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  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{\text{DD}}=25\text{V}$ ,  $V_{\text{GS}}=10\text{V}$ ,  $L=0.1\text{mH}$ ,  $I_{\text{AS}}=22\text{A}$
- 4.The power dissipation is limited by  $150^{\circ}\text{C}$  junction temperature
- 5.The data is theoretically the same as  $I_D$  and  $I_{\text{DM}}$  , in real applications , should be limited by total power dissipation.



### Typical Characteristics

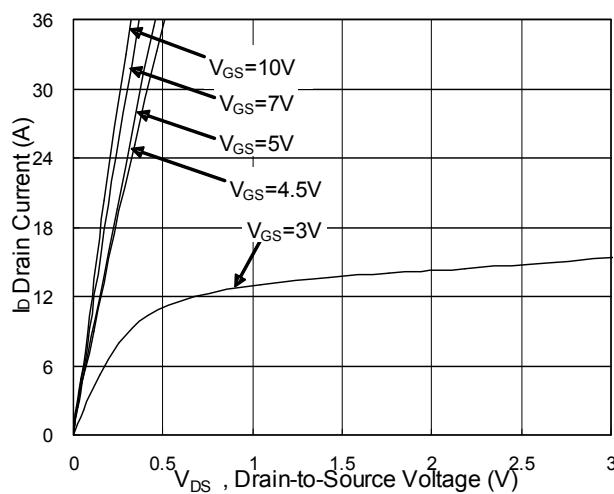


Fig.1 Typical Output Characteristics

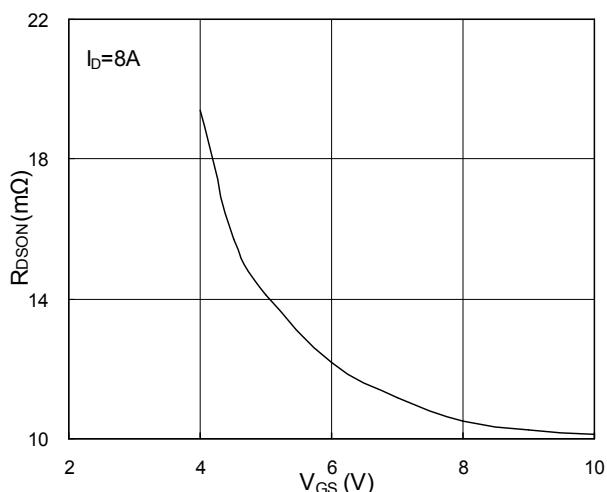


Fig.2 On-Resistance vs. G-S Voltage

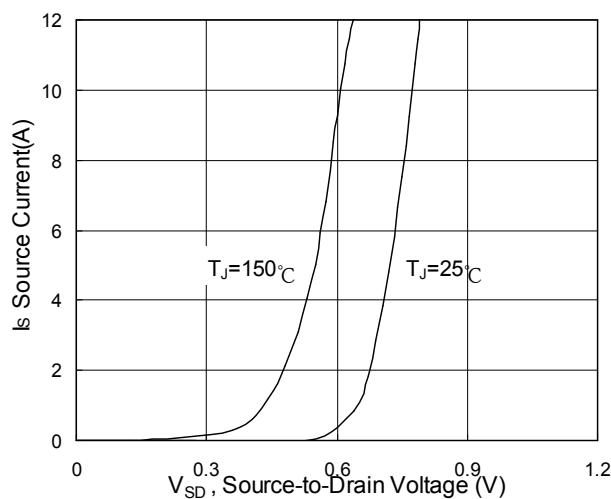


Fig.3 Forward Characteristics of Reverse

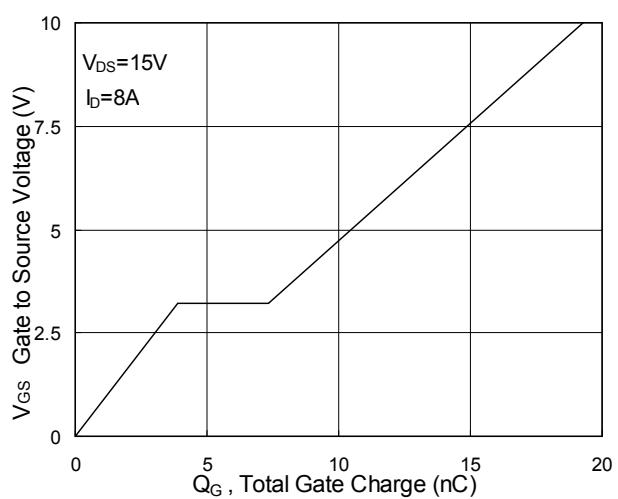


Fig.4 Gate-Charge Characteristics

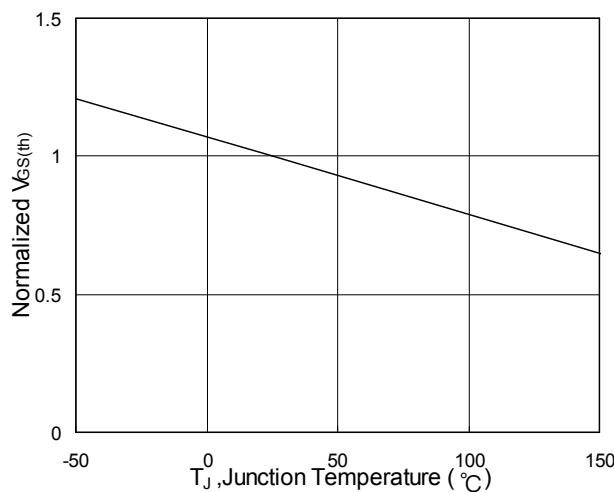


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

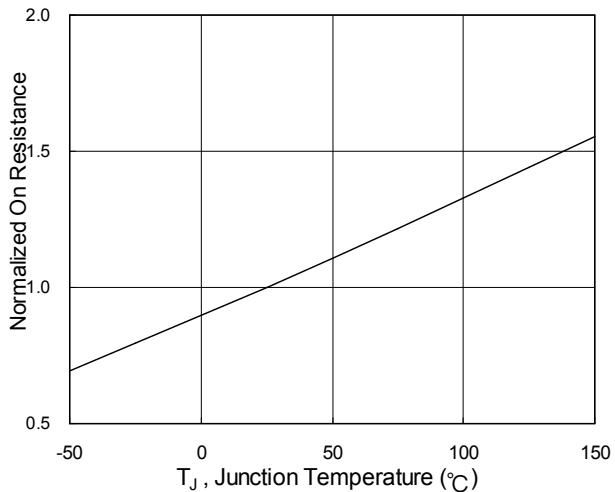
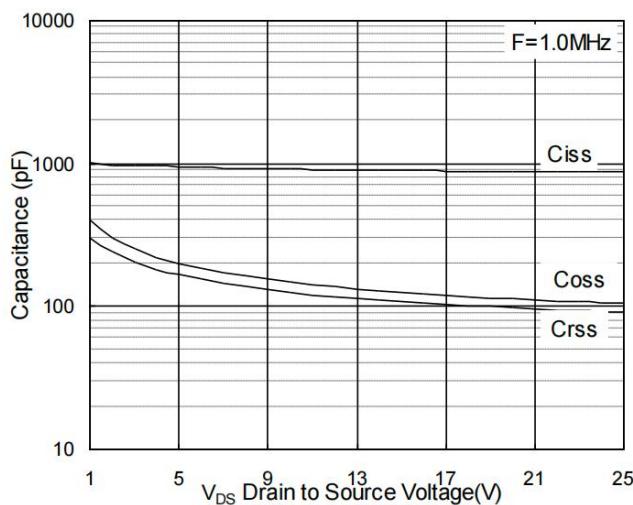


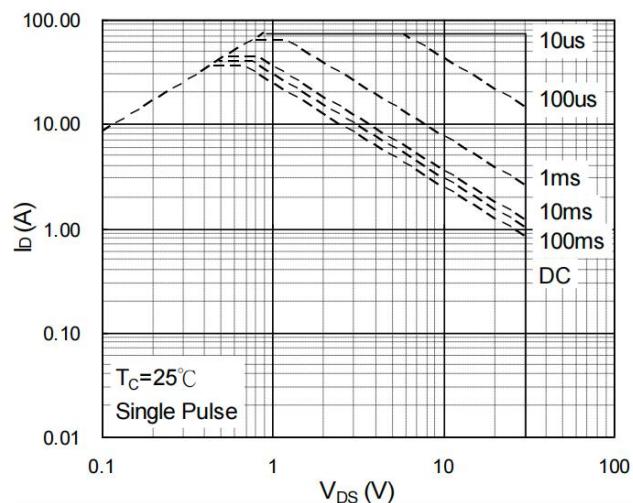
Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$



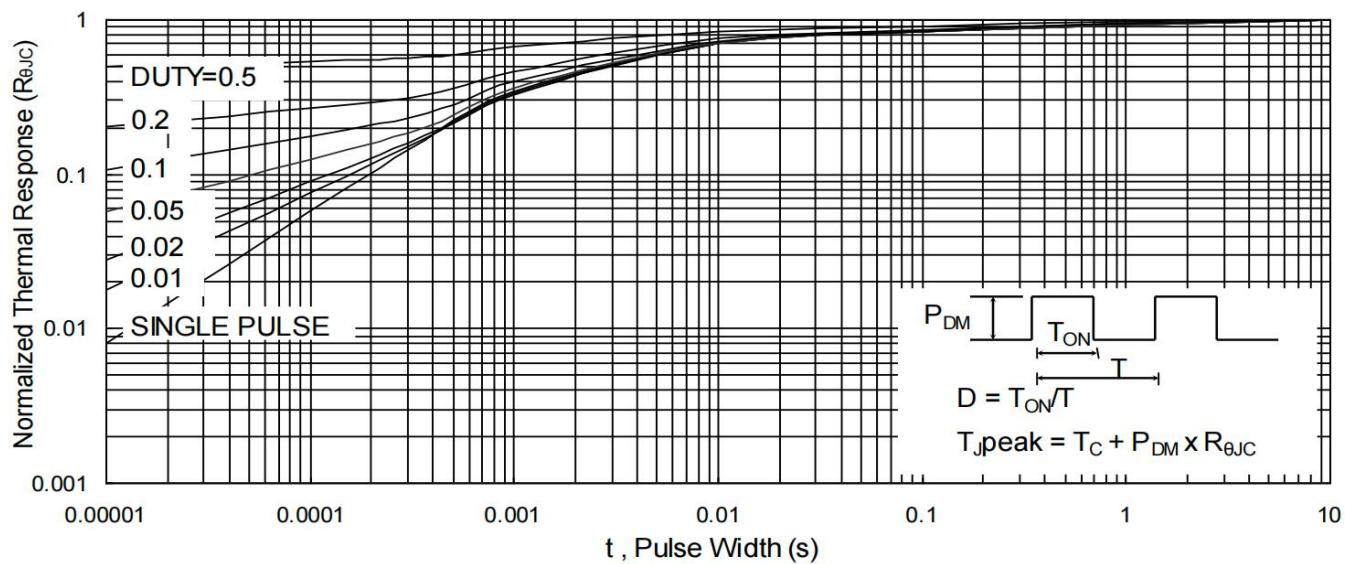
**N-Ch 30V Fast Switching MOSFETs**



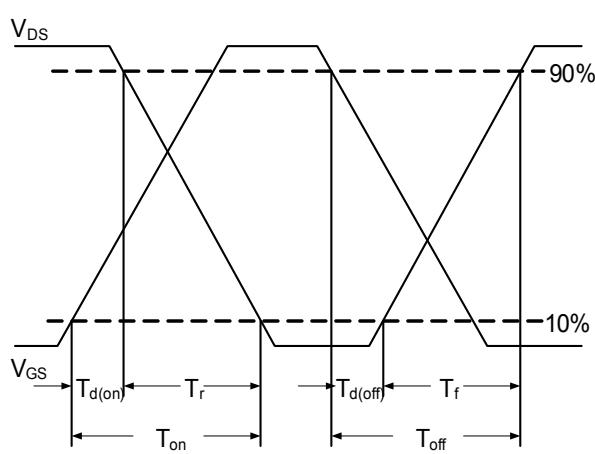
**Fig.7 Capacitance**



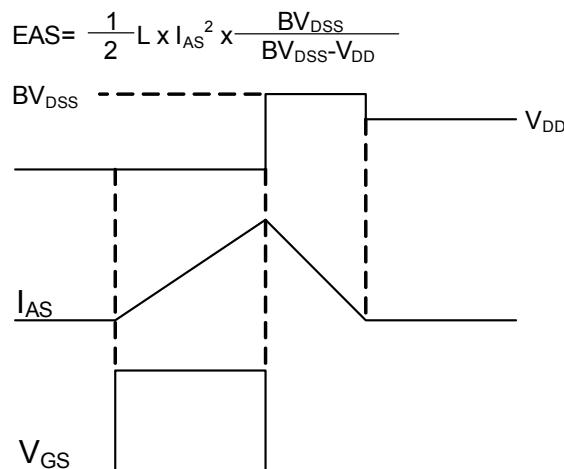
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**

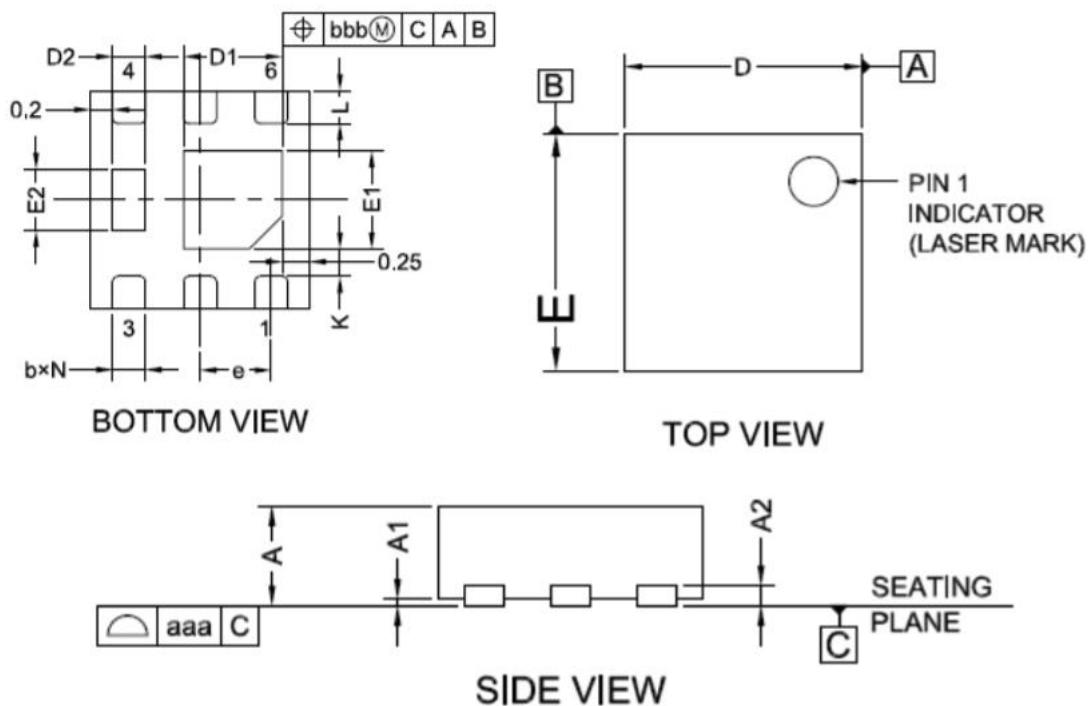


**HUASHUO**  
SEMICONDUCTOR

**HSCB3014**

N-Ch 30V Fast Switching MOSFETs

## DFN2x2-6L 2EP PACKAGE INFORMATION



### COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX
A	0.50	0.55	0.60
A1	0.00	0.02	0.05
A2 0.152REF.			
b	0.25	0.30	0.35
D	1.95	2.00	2.05
D1	0.80	0.90	1.00
D2	0.25	0.30	0.35
E	1.95	2.00	2.05
E1	0.80	0.90	1.00
E2	0.46	0.56	0.66
e	0.65BSC		
L	0.25	0.30	0.35
J	0.40BSC		
K	0.20MIN		
N	6		
aaa	0.08		
bbb	0.10		