HSCB3103

P-Ch 30V Fast Switching MOSFETs

Description

The HSCB3103 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The HSCB3103 meet the RoHS and Green Product requirement, 100% EAS guaranteed 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}	-30	V
$R_{DS(ON),typ}$	20	mΩ
I_D	-9	A

DFN2*2-6L Pin Configuration
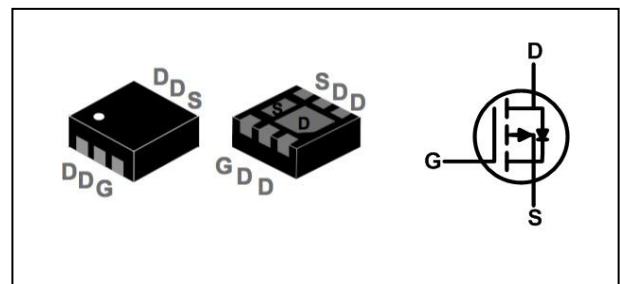
Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-9	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -10V[1]	-6.8	A
I_{DM}	Pulsed Drain Current[2]	-36	A
P_D@T_A=25℃	Total Power Dissipation[4]	3	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-Ambient [1]	---	36	℃/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	---	6.5	℃/W

Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=-250uA	-30	---	---	V
$\triangle$BV$_{DSS}$/$\triangle$T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=-1mA	---	-0.022	---	V/℃
R$_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V$_{GS}$=-10V , I$_D$=-8A	---	20	25	mΩ
		V$_{GS}$=-4.5V , I$_D$=-6A	---	28	35	
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1.0	-1.4	-2.5	V
$\triangle$V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	4.6	---	mV/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=-24V , V$_{GS}$=0V , T$_J$=25℃	---	---	-1	uA
		V$_{DS}$=-24V , V$_{GS}$=0V , T$_J$=55℃		---	-5	
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$= ± 20V , V$_{DS}$=0V	---	---	± 100	nA
gfs	Forward Transconductance	V$_{DS}$=-5V , I$_D$=-5A	---	19	---	S
R$_g$	Gate Resistance	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz	---	13	---	Ω
Q$_g$	Total Gate Charge (-4.5V)	V$_{DS}$=-15V , V$_{GS}$=-4.5V , I$_D$=-5A	---	12.5	---	nC
Q$_{gs}$	Gate-Source Charge		---	5.4	---	
Q$_{gd}$	Gate-Drain Charge		---	5	---	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=-15V , V$_{GS}$=-10V , R$_G$=3.3Ω, I$_D$=-5A	---	4.4	---	ns
T$_r$	Rise Time		---	11.2	---	
T$_{d(off)}$	Turn-Off Delay Time		---	34	---	
T$_f$	Fall Time		---	18	---	
C$_{iss}$	Input Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , f=1MHz	---	1345	---	pF
C$_{oss}$	Output Capacitance		---	194	---	
C$_{rss}$	Reverse Transfer Capacitance		---	158	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current[1,5]	V$_G$=V$_D$=0V , Force Current	---	---	-32	A
I$_{SM}$	Pulsed Source Current[2,5]		---	---	-65	A
V$_{SD}$	Diode Forward Voltage[2]	V$_{GS}$=0V , I$_S$=-1A , T$_J$=25℃	---	---	-1.2	V
t$_{rr}$	Reverse Recovery Time		---	12.4	---	nS
Q$_{rr}$	Reverse Recovery Charge	I$_F$=-5A , dI/dt=100A/μs , T$_J$=25℃	---	5	---	nC

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℃ 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.
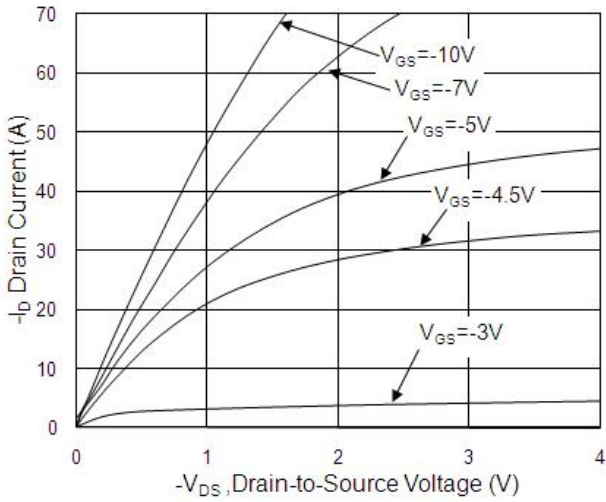
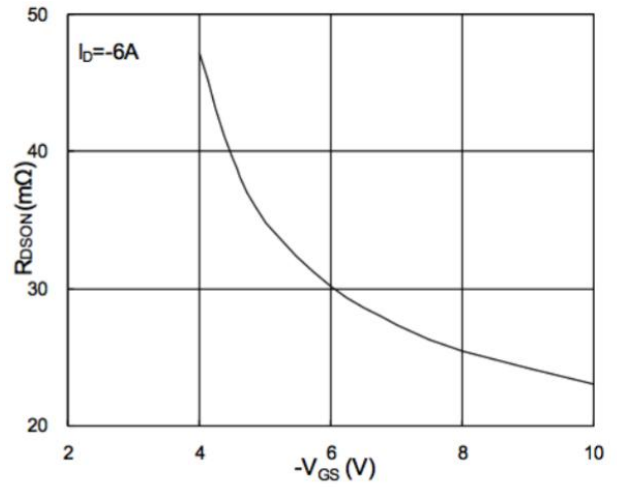## Typical Characteristics

Fig.1 Typical Output Characteristics

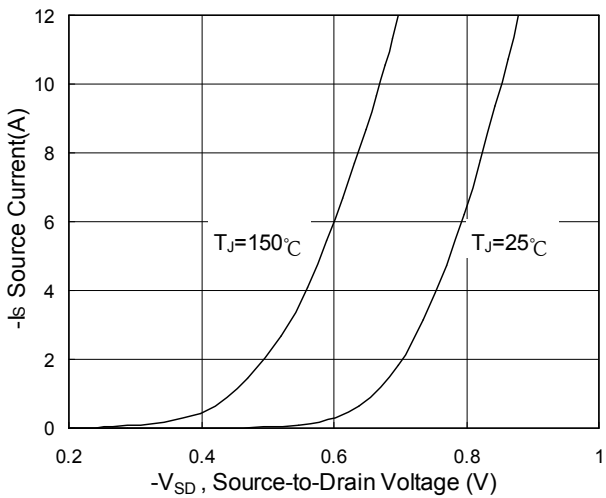

Fig.2 On-Resistance v.s Gate-Source

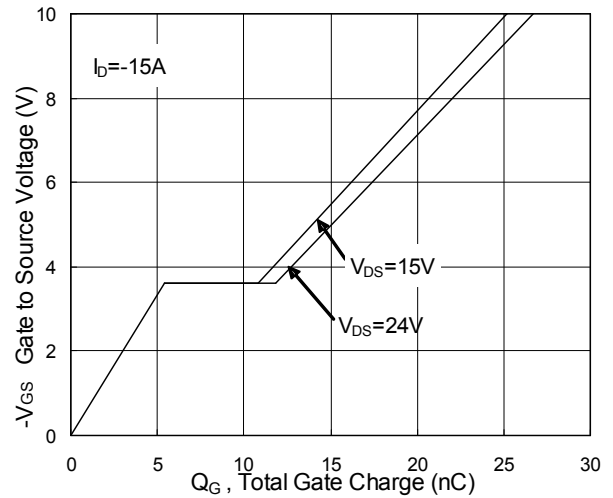**Fig.3 Forward Characteristics of Reverse**
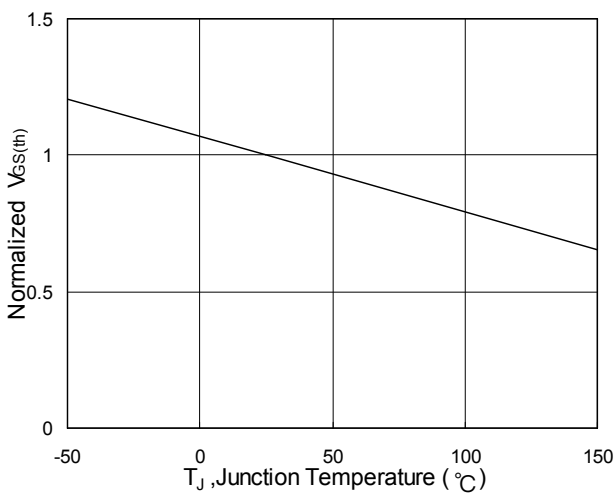

Fig.4 Gate-Charge Characteristics

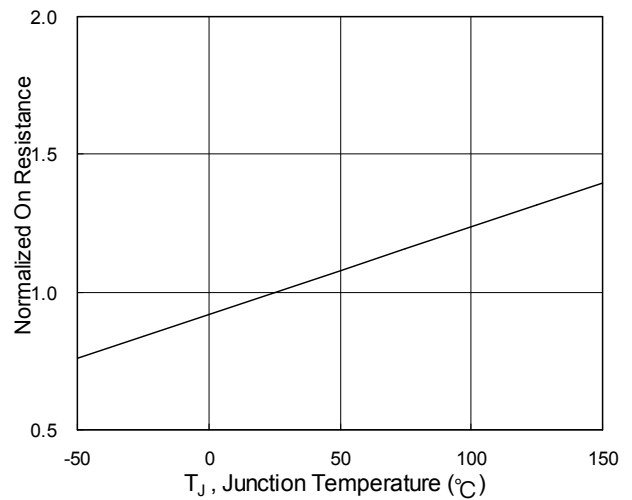**Fig.5 Normalized $V_{GS(th)}$ vs. T_J**

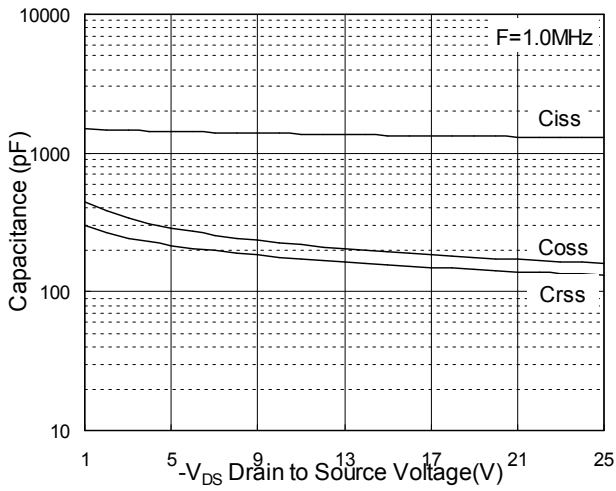
Fig.6 Normalized R_{DSON} vs. T_J

Fig.7 Capacitance
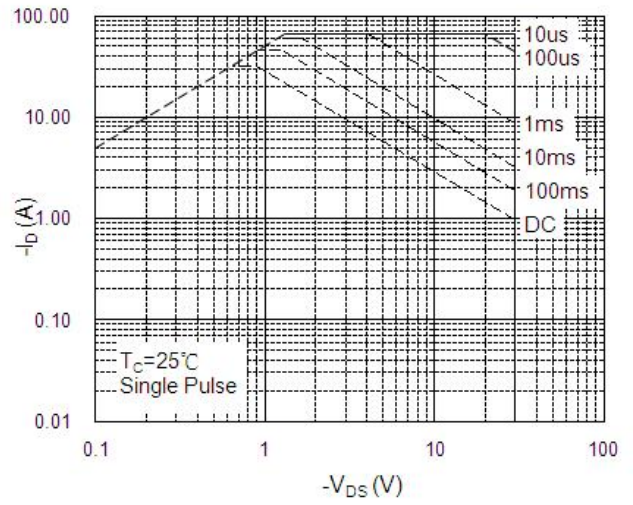
Fig.8 Safe Operating Area
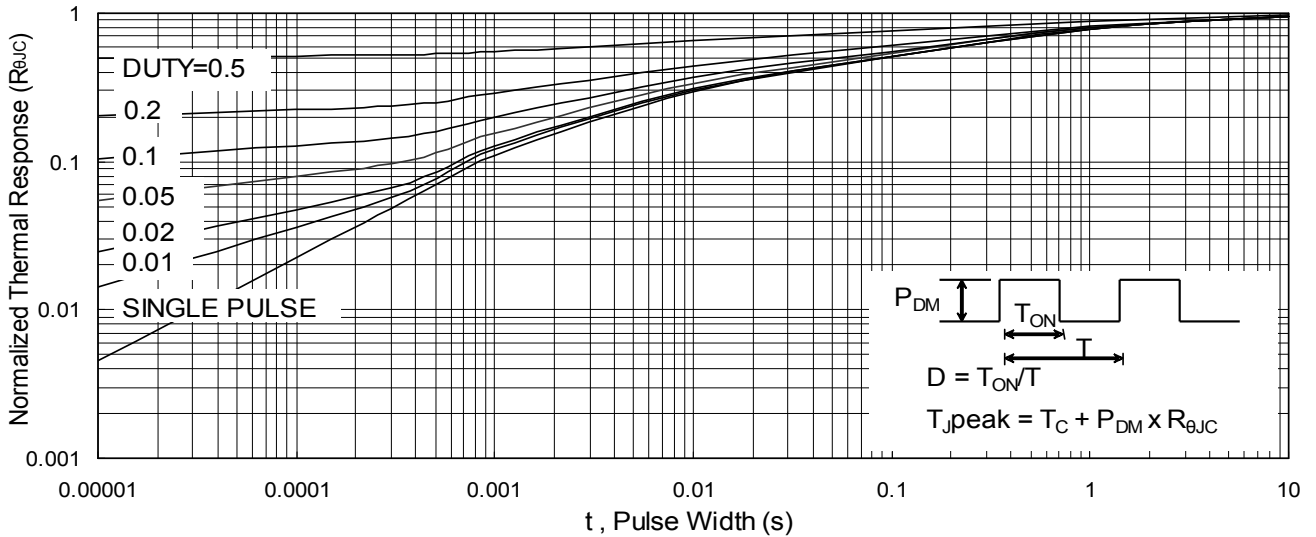
Fig.9 Normalized Maximum Transient Thermal Impedance

$$D = T_{ON}/T$$

$$T_J peak = T_C + P_{DM} \times R_{\theta JC}$$
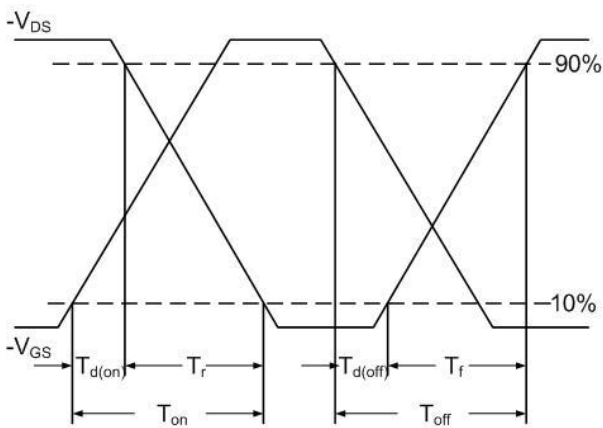
Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times (-I_{AS}^2) \times \frac{-BV_{DSS}}{-BV_{DSS}-(-V_{DD})}$$
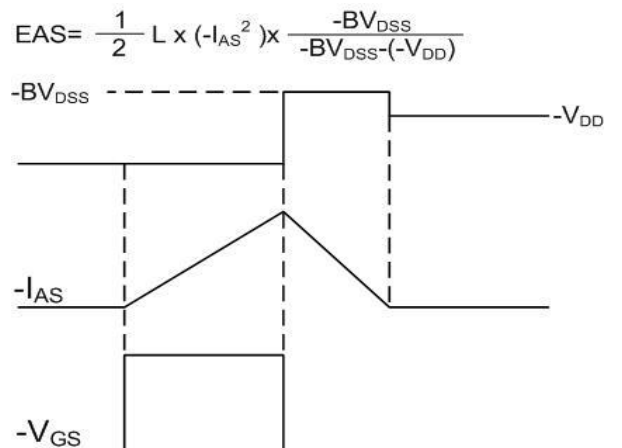
Fig.11 Unclamped Inductive Switching

DFN2x2-6L 2EP PACKAGE INFORMATION

BOTTOM VIEW

TOP VIEW

PIN 1
INDICATOR
(LASER MARK)

SIDE VIEW

SEATING
PLANE
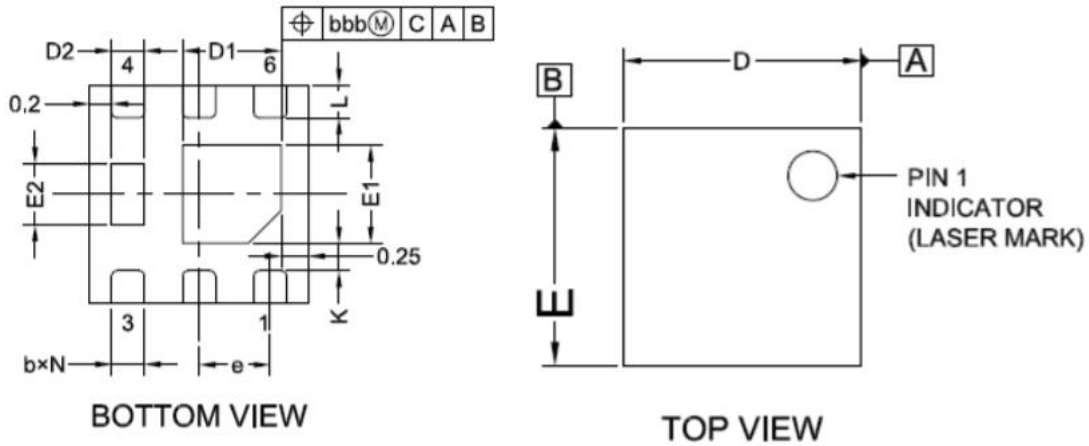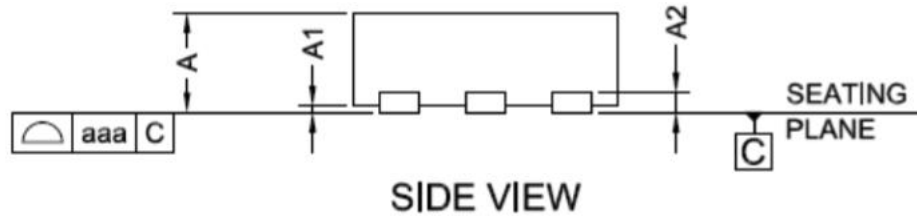
COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

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	