

Description

The HSBA100P04 is the high cell density trenched P-ch MOSFETs, which provide excellent R_{DS(ON)} and gate charge for most of the synchronous buck converter applications.

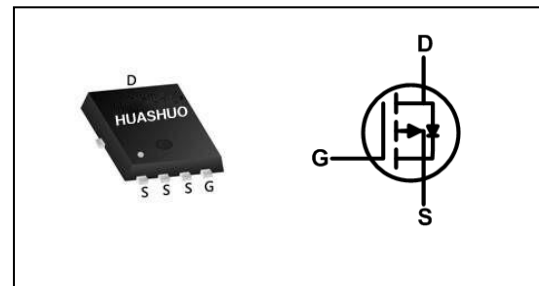
The HSBA100P04 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

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

Product Summary

V _{DS}	-40	V
R _{DS(ON),max}	5.8	mΩ
I _D	-100	A

PRPAK5*6 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-40	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ -10V ¹	-100	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ -10V ¹	-64	A
I _{DM}	Pulsed Drain Current ²	-295	A
EAS	Single Pulse Avalanche Energy ³	380	mJ
I _{AS}	Avalanche Current	-50	A
P _D @T _C =25°C	Total Power Dissipation ⁴	52.1	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 _{θJA}	Thermal Resistance Junction-Ambient ¹	---	25	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	1.8	°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	-40	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.023	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-20A	---	4.6	5.8	mΩ
		V _{GS} =-4.5V, I _D =-10A	---	6	9.1	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.2	-1.8	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	4.74	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-32V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =-32V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-15V, I _D =-18A	---	50	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	7	14	Ω
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V, I _D =-12A	---	115	---	nC
Q _{gs}	Gate-Source Charge		---	24	---	
Q _{gd}	Gate-Drain Charge		---	26	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-20V, V _{GS} =-10V, R _G =3Ω, I _D =-12A	---	19	---	ns
T _r	Rise Time		---	12	---	
T _{d(off)}	Turn-Off Delay Time		---	80	---	
T _f	Fall Time		---	18	---	
C _{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1MHz	---	7090	---	pF
C _{oss}	Output Capacitance		---	930	---	
C _{rss}	Reverse Transfer Capacitance		---	722	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	-100	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 inch² 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_{DD}=-32V, V_{GS}=-10V, L=0.1mH, I_{AS}=-50A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.



Typical Characteristics

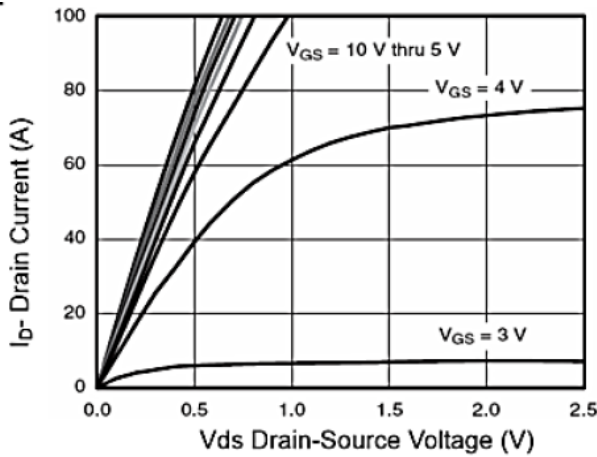


Figure 1 Output Characteristics

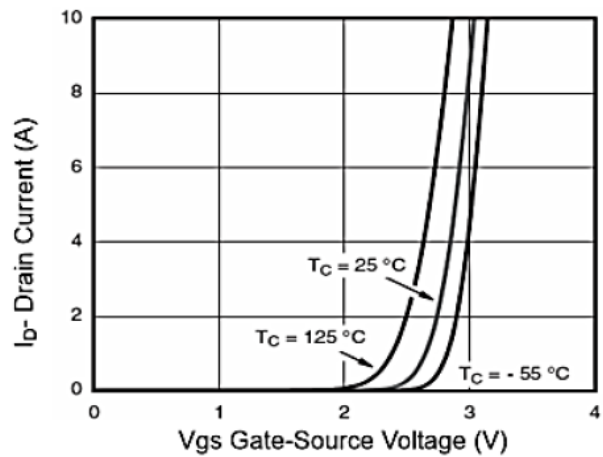


Figure 2 Transfer Characteristics

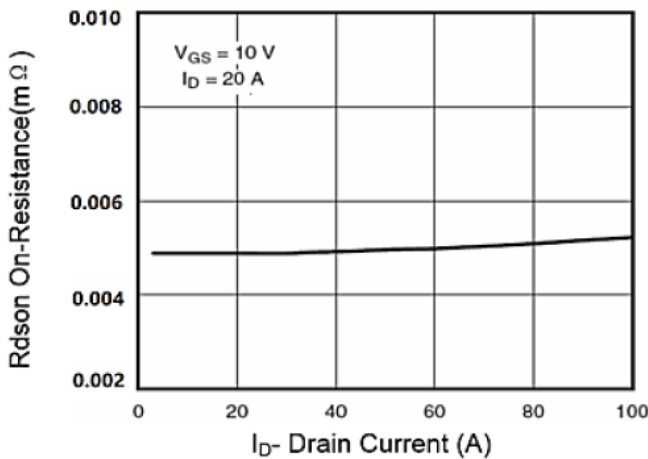


Figure 3 Rdson- Drain Current

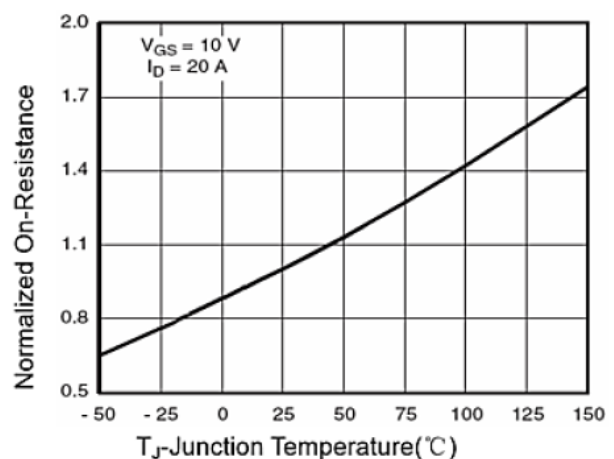


Figure 4 Rdson-Junction Temperature

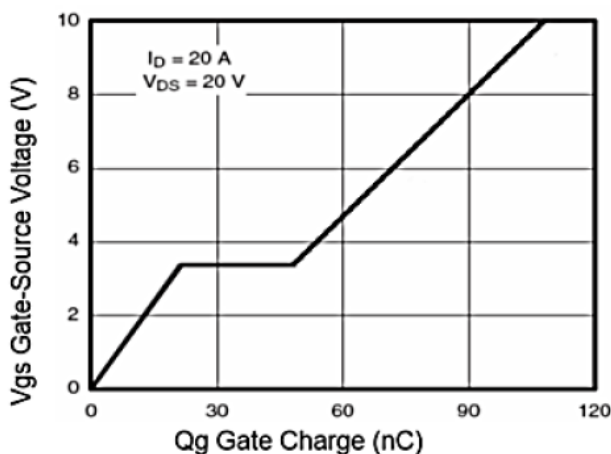


Figure 5 Gate Charge

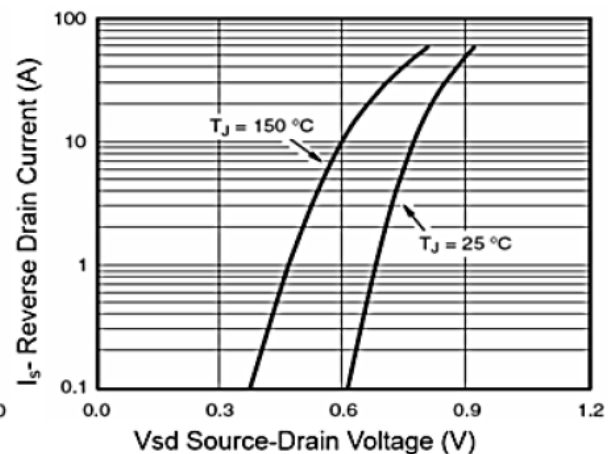


Figure 6 Source- Drain Diode Forward

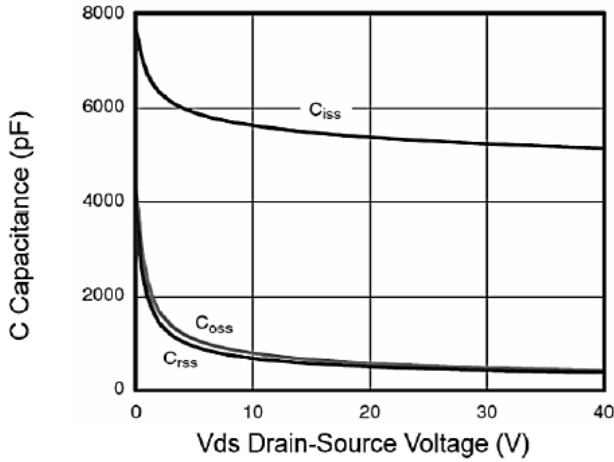


Figure 7 Capacitance vs Vds

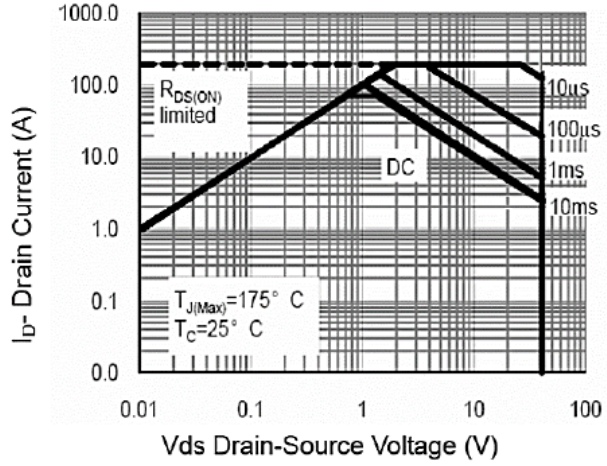


Figure 8 Safe Operation Area

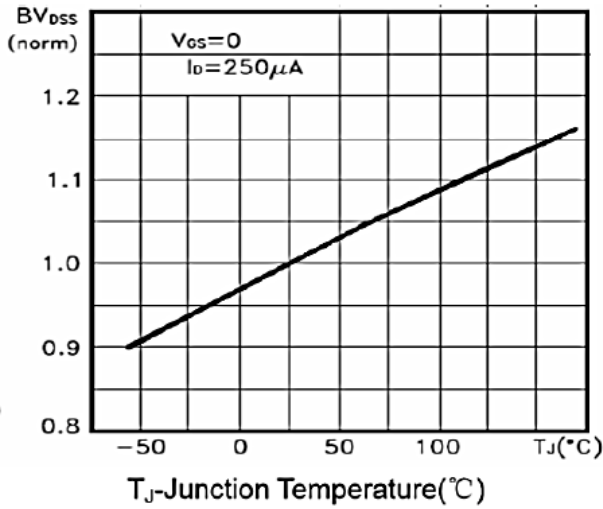


Figure 9 BV_{DSS} vs Junction Temperature

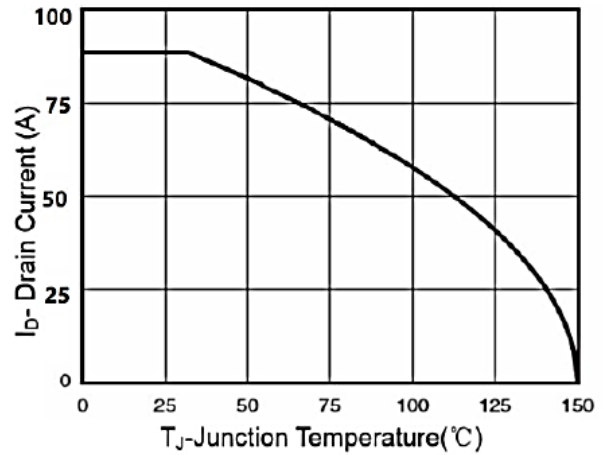


Figure 10 I_D Current Derating vs Junction Temperature

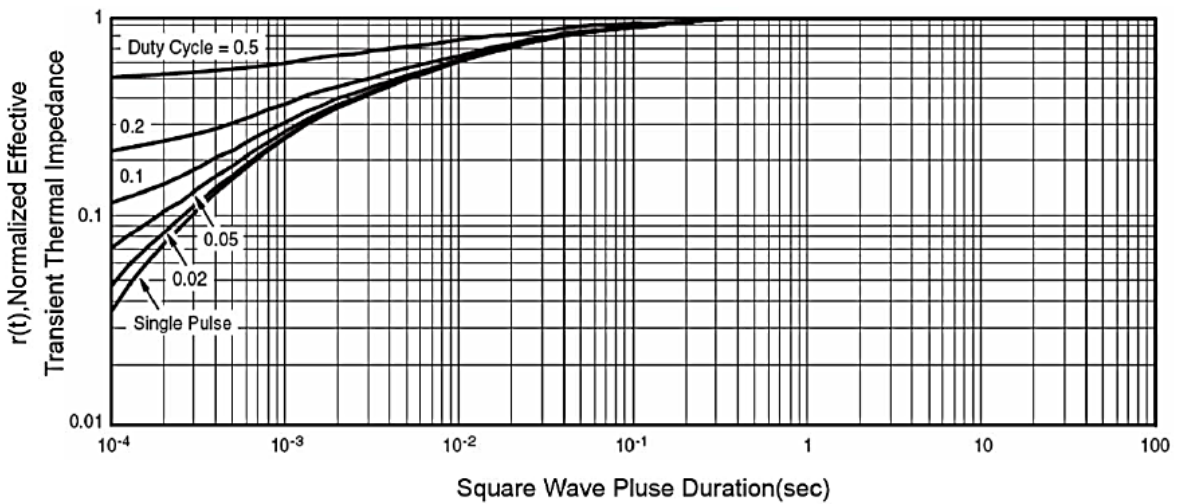
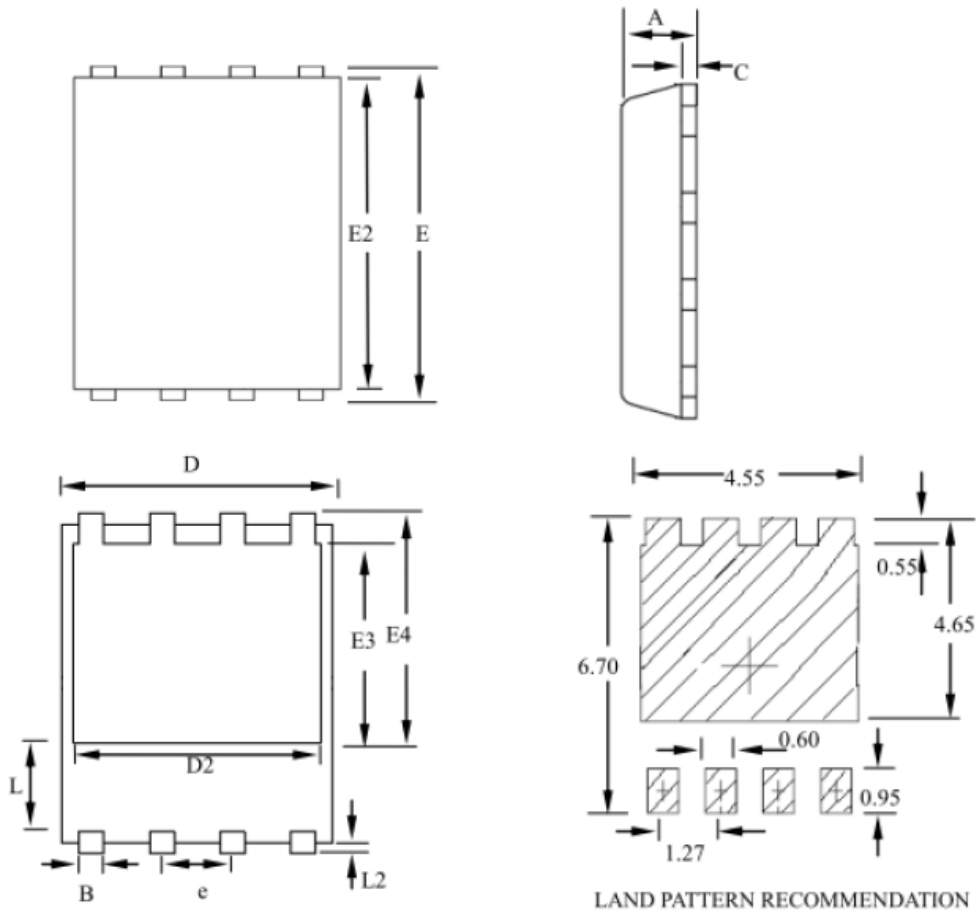


Figure 11 Normalized Maximum Transient Thermal Impedance

PRPAK5X6 Package Outline Dimensions



SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	--	1.20	0.031	--	0.047
B	0.30	--	0.51	0.012	--	0.020
C	0.15	--	0.35	0.006	--	0.014
D	4.80	--	5.30	0.189	--	0.209
D2	3.61	--	4.35	0.142	--	0.171
E	5.90	--	6.35	0.232	--	0.250
E2	5.42	--	5.90	0.213	--	0.232
E3	3.23	--	3.90	0.127	--	0.154
E4	3.69	--	4.55	0.145	--	0.179
L	0.61	--	1.80	0.024	--	0.071
L2	0.05	--	0.36	0.002	--	0.014
e	--	1.27	--	--	0.050	--