## Description

The HSBB2627 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

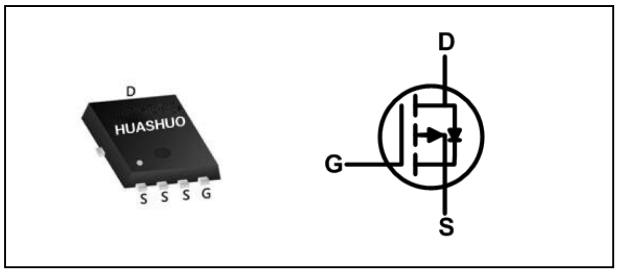
The HSBB2627 meet the RoHS and Green Product requirement with full function reliability approved.

## Product Summary

| | | |
|---|---|---|
| $V_{DS}$ | -20 | V |
| $R_{DS(ON),max}$ | 9 | mΩ |
| $I_D$ | -48 | A |

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

## PRPAK3x3 Pin Configuration




## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -20 | V |
| $V_{GS}$ | Gate-Source Voltage | ±8 | V |
| $I_D$@$T_C$=25°C | Continuous Drain Current, $V_{GS}$ @ -4.5V[1] | -48 | A |
| $I_D$@$T_C$=70°C | Continuous Drain Current, $V_{GS}$ @ -4.5V[1] | -38 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | -100 | A |
| $P_D$@$T_C$=25°C | Total Power Dissipation[3] | 29 | W |
| $P_D$@$T_C$=70°C | Total Power Dissipation[3] | 19 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | °C |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | °C |

## Thermal Data

| Symbol | Parameter | Max. | Unit |
|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient [1] | 75 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient [1] (t ≤10s) | 40 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case[1] | 4.2 | °C/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 | -20 | --- | --- | V |
| $\triangle BV_{DSS}/\triangle T_J$ | $BV_{DSS}$ Temperature Coefficient | Reference to 25℃ , $I_D$=-1mA | --- | -0.012 | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=-4.5V , $I_D$=-10A | --- | --- | 9 | mΩ |
| | | $V_{GS}$=-2.5V , $I_D$=-8A | --- | --- | 11.5 | |
| | | $V_{GS}$=-1.8V , $I_D$=-6A | --- | --- | 15 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =-250uA | -0.3 | --- | -1.0 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | 2.94 | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=-20V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±8V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=-5V , $I_D$=-10A | --- | 43 | --- | S |
| $Q_g$ | Total Gate Charge (-4.5V) | $V_{DS}$=-15V , $V_{GS}$=-4.5V , $I_D$=-10A | --- | 63 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 9.1 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 13 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=-10V , $V_{GS}$=-4.5V , $R_G$=3.3Ω, $I_D$=-10A | --- | 15.8 | --- | ns |
| $T_r$ | Rise Time | | --- | 76.8 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 193 | --- | |
| $T_f$ | Fall Time | | --- | 186.4 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-15V , $V_{GS}$=0V , f=1MHz | --- | 5783 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 509 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 431 | --- | |

## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,4] | $V_G$=$V_D$=0V , Force Current | --- | --- | -10.7 | A |
| $I_{SM}$ | Pulsed Source Current[2,4] | | --- | --- | -60 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=-1A , $T_J$=25℃ | --- | --- | -1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | IF=-10A , dI/dt=100A/μs , $T_J$ =25℃ | --- | 27 | --- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 17.8 | --- | 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

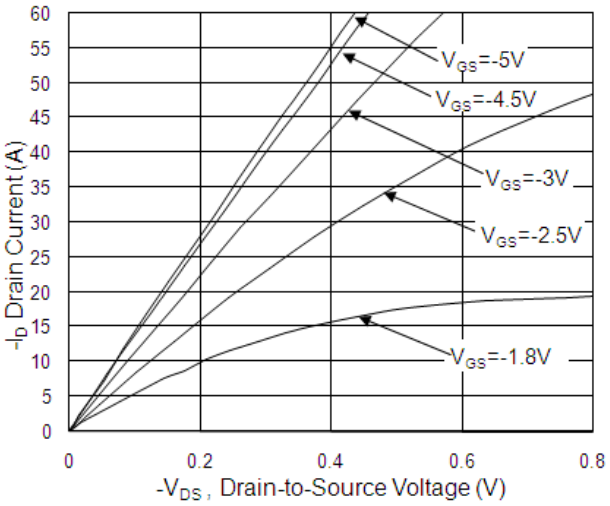



Fig.1 Typical Output Characteristics

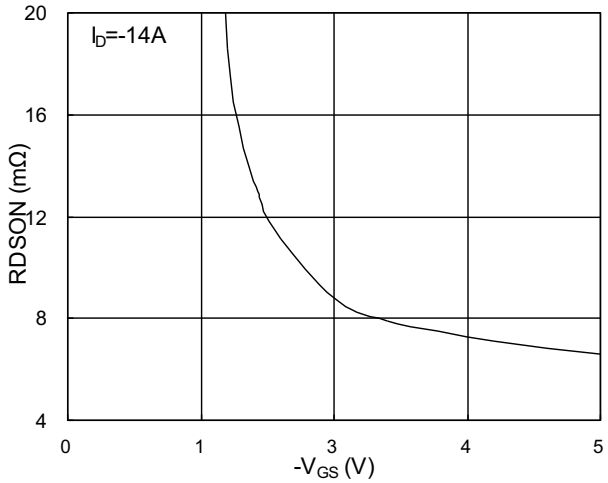



Fig.2 On-Resistance vs. G-S Voltage

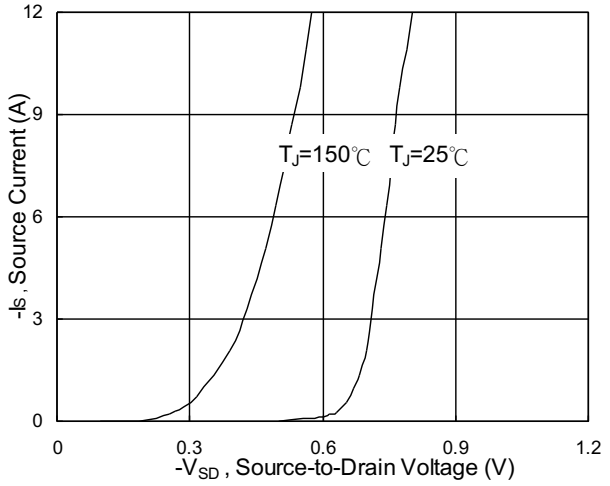



Fig.3 Forward Characteristics of Reverse

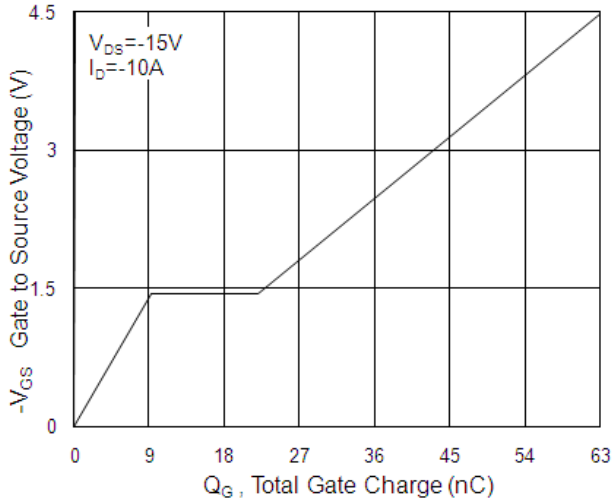



Fig.4 Gate-charge Characteristics

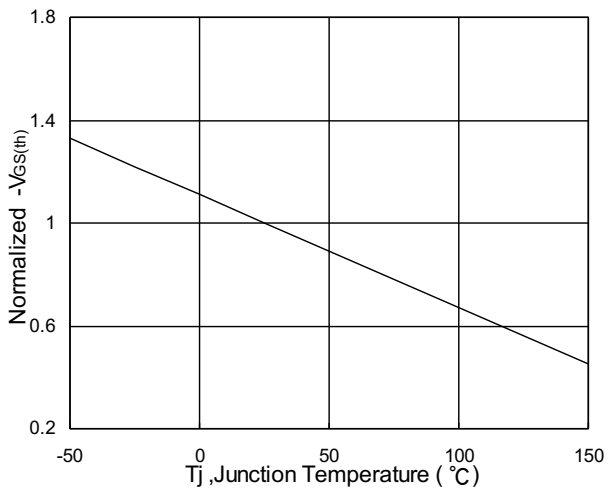



Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$

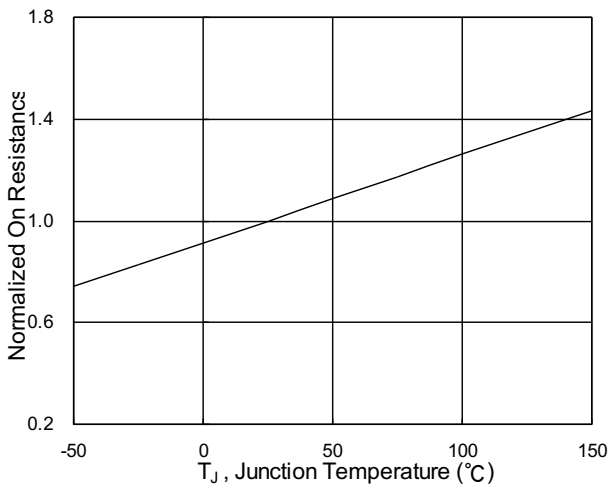



Fig.6 Normalized $R_{DSON}$ vs. $T_J$

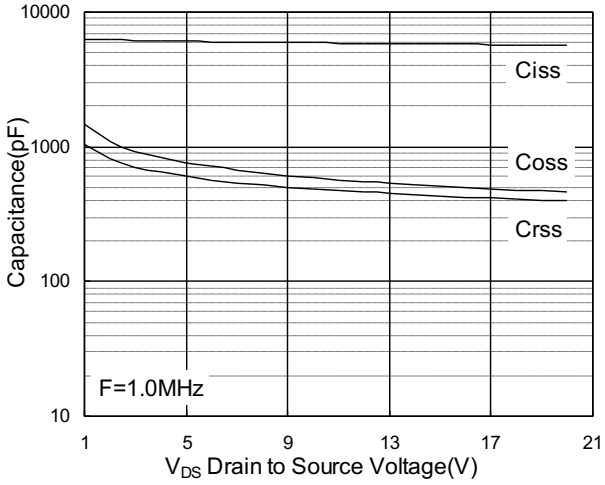



Fig.7 Capacitance

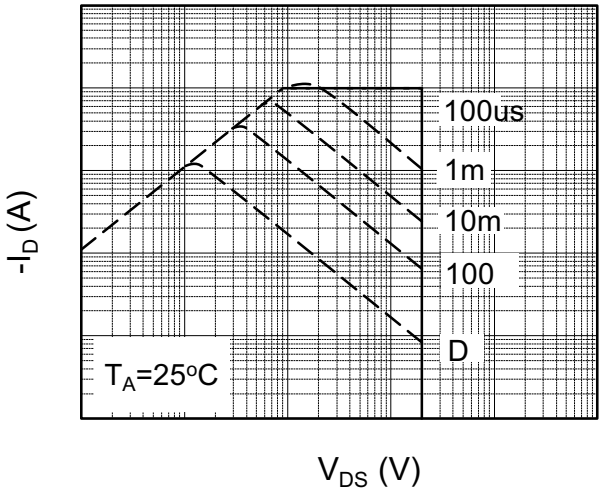



Fig.8 Safe Operating Area

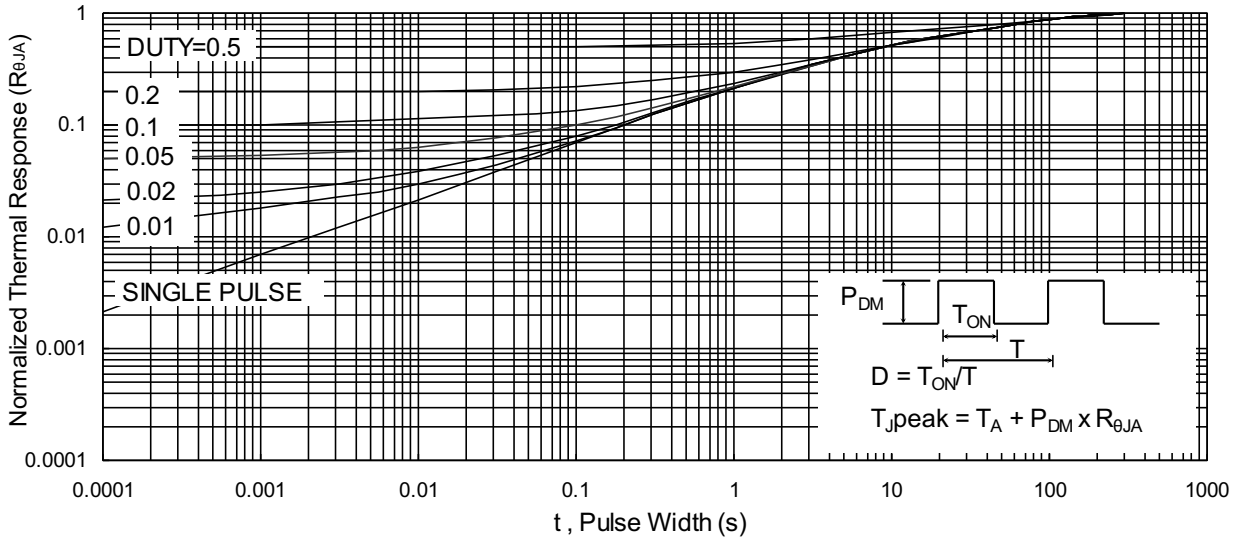



Fig.9 Normalized Maximum Transient Thermal Impedance

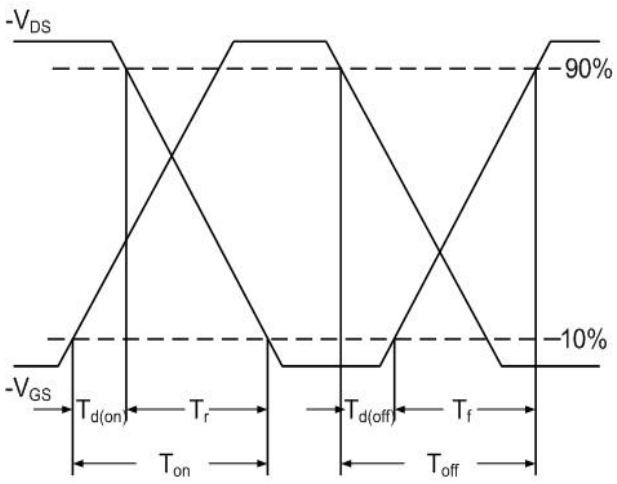



Fig.10 Switching Time Waveform

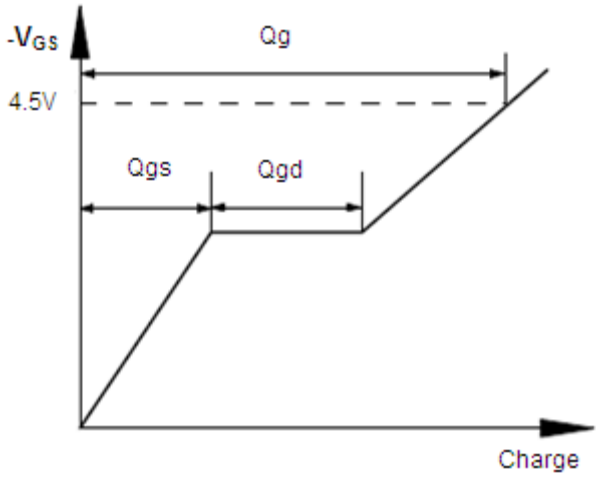



Fig.11 Gate Charge Waveform