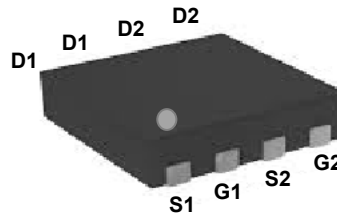
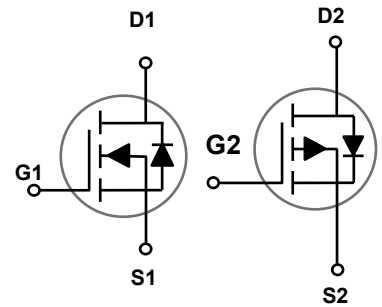


Main Product Characteristics

| | | |
|--------------------|--------------|--------------|
| Polarity | N-Ch | P-Ch |
| V_{DSS} | 20V | -20V |
| $R_{DS(ON)(max.)}$ | 40m Ω | 90m Ω |
| I_D | 3.8A | -2.5A |



DFN 2x3



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for notebook, load switch, networking and hand-held devices
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



Description

The SSFB8116 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | N-Channel | P-Channel | Unit |
|-----------|--|-------------|-----------|---------------------|
| V_{DS} | Drain-Source Voltage | 20 | -20 | V |
| V_{GS} | Gate-Source Voltage | ± 10 | ± 10 | V |
| I_D | Drain Current – Continuous ($T_C=25^\circ\text{C}$) | 3.8 | -2.5 | A |
| | Drain Current – Continuous ($T_C=100^\circ\text{C}$) | 2.3 | -1.5 | A |
| I_{DM} | Drain Current – Pulsed ¹ | 15.2 | -10 | A |
| P_D | Power Dissipation ($T_C=25^\circ\text{C}$) | 1.25 | 1.25 | W |
| | Power Dissipation – Derate above 25°C | 0.01 | 0.01 | W/ $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to +150 | | $^\circ\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to +150 | | $^\circ\text{C}$ |

Thermal Characteristics

| Symbol | Parameter | Max. | Unit |
|-----------------|--|------|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient | 100 | $^\circ\text{C}/\text{W}$ |

N-Channel Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|------------------------------|--|------|------|-----------|----------------------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 20 | --- | --- | V |
| BV_{DSS} Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | Reference to 25°C , $I_D=1\text{mA}$ | --- | 0.02 | --- | $V/^\circ\text{C}$ |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=16V, V_{GS}=0V, T_J=25^\circ\text{C}$ | --- | --- | 1 | μA |
| | | $V_{DS}=16V, V_{GS}=0V, T_J=125^\circ\text{C}$ | --- | --- | 10 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 10V, V_{DS}=0V$ | --- | --- | ± 100 | nA |
| On Characteristics | | | | | | |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}=4.5V, I_D=3A$ | --- | 30 | 40 | m Ω |
| | | $V_{GS}=2.5V, I_D=2A$ | --- | 42 | 55 | |
| | | $V_{GS}=1.8V, I_D=1.5A$ | --- | 55 | 70 | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ | 0.3 | 0.6 | 1 | V |
| $V_{GS(th)}$ Temperature Coefficient | $\Delta V_{GS(th)}$ | | --- | -2 | --- | $\text{mV}/^\circ\text{C}$ |
| Forward Transconductance | g_{fs} | $V_{DS}=10V, I_D=2A$ | --- | 4.4 | --- | S |
| Dynamic and Switching Characteristics | | | | | | |
| Total Gate Charge ^{2, 3} | Q_g | $V_{DS}=10V, V_{GS}=4.5V, I_D=3A$ | --- | 5.8 | 10 | nC |
| Gate-Source Charge ^{2, 3} | Q_{gs} | | --- | 0.6 | 1.5 | |
| Gate-Drain Charge ^{2, 3} | Q_{gd} | | --- | 1.5 | 3 | |
| Turn-On Delay Time ^{2, 3} | $T_{d(on)}$ | $V_{DD}=10V, V_{GS}=4.5V, R_G=25\Omega, I_D=1A$ | --- | 2.9 | 6 | nS |
| Rise Time ^{2, 3} | T_r | | --- | 8.4 | 16 | |
| Turn-Off Delay Time ^{2, 3} | $T_{d(off)}$ | | --- | 19.2 | 38 | |
| Fall Time ^{2, 3} | T_f | | --- | 5.6 | 12 | |
| Input Capacitance | C_{iss} | $V_{DS}=15V, V_{GS}=0V, F=1\text{MHz}$ | --- | 315 | 600 | pF |
| Output Capacitance | C_{oss} | | --- | 50 | 80 | |
| Reverse Transfer Capacitance | C_{rss} | | --- | 40 | 60 | |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| Continuous Source Current | I_S | $V_G=V_D=0V, \text{Force Current}$ | --- | --- | 3.8 | A |
| Pulsed Source Current | I_{SM} | | --- | --- | 7.6 | A |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$ | --- | --- | 1 | V |

Notes:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

P-Channel Electrical Characteristics (T_J=25°C unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|-------------------------------------|--|------|-------|------|-------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V , I _D =-250uA | -20 | --- | --- | V |
| BV _{DSS} Temperature Coefficient | ΔBV _{DSS} /ΔT _J | Reference to 25°C , I _D =-1mA | --- | -0.01 | --- | V/°C |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} =-16V , V _{GS} =0V , T _J =25°C | --- | --- | -1 | uA |
| | | V _{DS} =-16V , V _{GS} =0V , T _J =125°C | --- | --- | -10 | uA |
| Gate-Source Leakage Current | I _{GSS} | V _{GS} =±10V , V _{DS} =0V | --- | --- | ±100 | nA |
| On Characteristics | | | | | | |
| Static Drain-Source On-Resistance | R _{DS(ON)} | V _{GS} =-4.5V , I _D =-3A | --- | 65 | 90 | mΩ |
| | | V _{GS} =-2.5V , I _D =-2A | --- | 85 | 130 | |
| | | V _{GS} =-1.8V , I _D =-1A | --- | 120 | 180 | |
| Gate Threshold Voltage | V _{GS(th)} | V _{GS} =V _{DS} , I _D =-250uA | -0.3 | -0.6 | -1.0 | V |
| V _{GS(th)} Temperature Coefficient | ΔV _{GS(th)} | | --- | 3 | --- | mV/°C |
| Forward Transconductance | g _{fs} | V _{DS} =-10V , I _D =-1A | --- | 2.2 | --- | S |
| Dynamic and Switching Characteristics | | | | | | |
| Total Gate Charge ^{2, 3} | Q _g | V _{DS} =-10V , V _{GS} =-4.5V , I _D =-2A | --- | 4.8 | 10 | nC |
| Gate-Source Charge ^{2, 3} | Q _{gs} | | --- | 0.5 | 1 | |
| Gate-Drain Charge ^{2, 3} | Q _{gd} | | --- | 1.9 | 4 | |
| Turn-On Delay Time ^{2, 3} | T _{d(on)} | V _{DD} =-10V , V _{GS} =-4.5V , R _G =25Ω I _D =-1A | --- | 3.5 | 7 | nS |
| Rise Time ^{2, 3} | T _r | | --- | 12.6 | 24 | |
| Turn-Off Delay Time ^{2, 3} | T _{d(off)} | | --- | 32.6 | 62 | |
| Fall Time ^{2, 3} | T _f | | --- | 8.4 | 16 | |
| Input Capacitance | C _{iss} | V _{DS} =-15V , V _{GS} =0V , F=1MHz | --- | 350 | 510 | pF |
| Output Capacitance | C _{oss} | | --- | 65 | 95 | |
| Reverse Transfer Capacitance | C _{rss} | | --- | 50 | 75 | |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| Continuous Source Current | I _S | V _G =V _D =0V , Force Current | --- | --- | -2.5 | A |
| Pulsed Source Current | I _{SM} | | --- | --- | -5 | A |
| Diode Forward Voltage | V _{SD} | V _{GS} =0V , I _S =-1A , T _J =25°C | --- | --- | -1 | V |

Notes:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300uS, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

N-Channel Typical Characteristic Curves

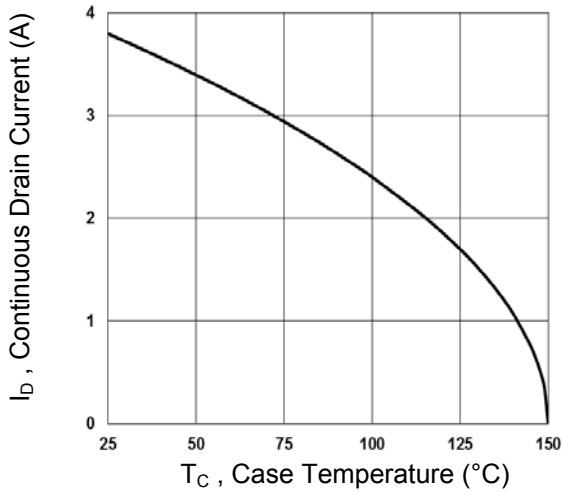


Fig.1 Continuous Drain Current vs. T_C

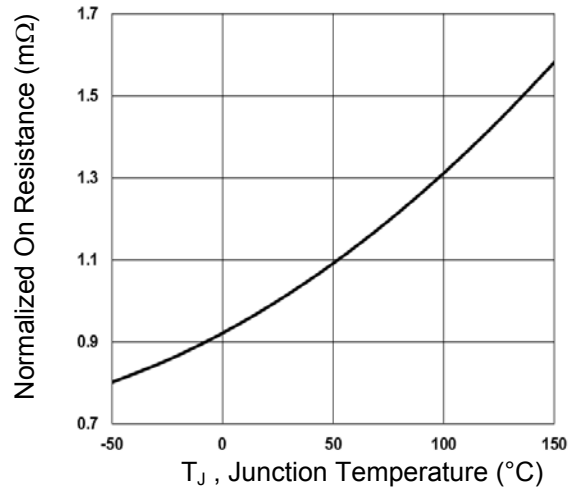


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

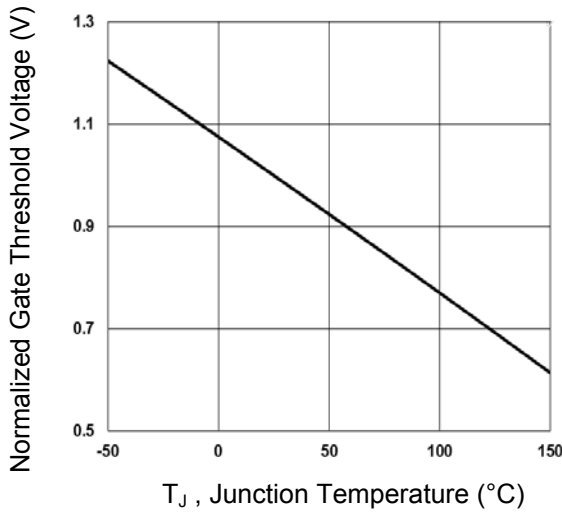


Fig.3 Normalized V_{th} vs. T_J

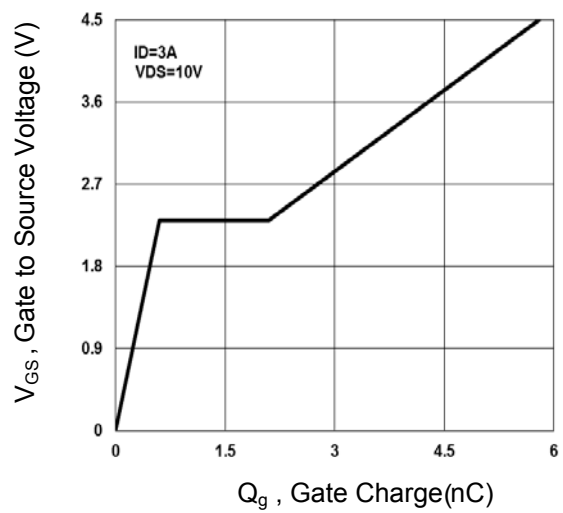


Fig.4 Gate Charge Waveform

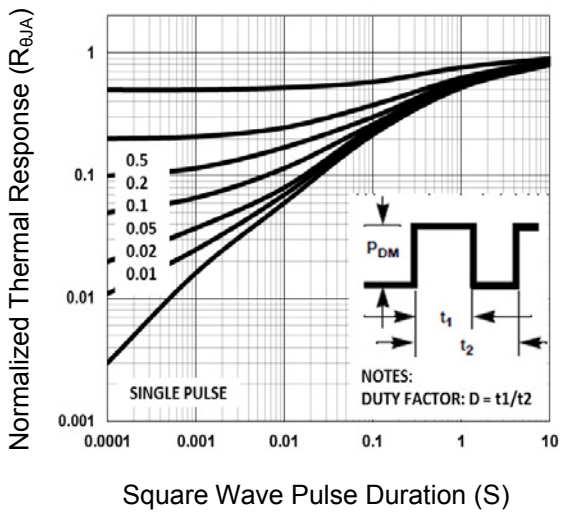


Fig.5 Normalized Transient Impedance

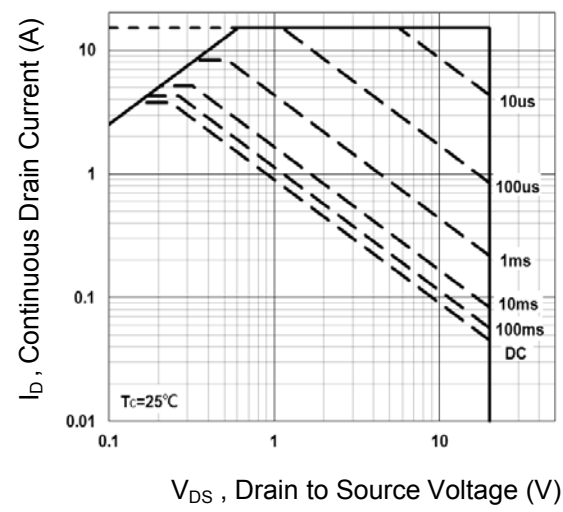


Fig.6 Maximum Safe Operation Area

P-Channel Typical Characteristic Curves

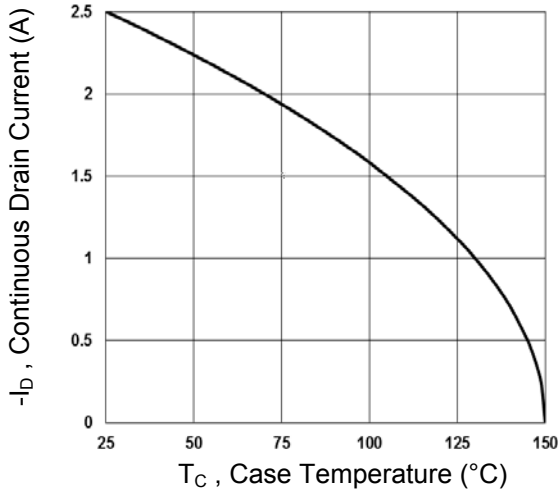


Fig.7 Continuous Drain Current vs. T_C

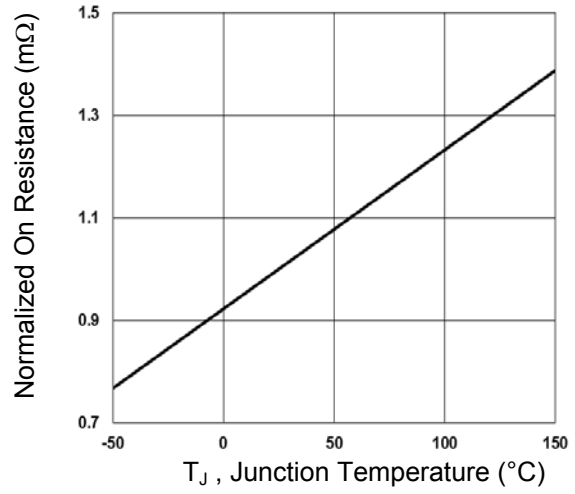


Fig.8 Normalized $R_{DS(ON)}$ vs. T_J

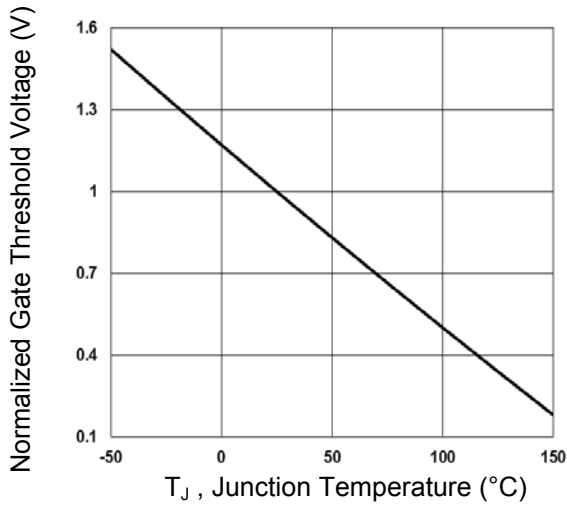


Fig.9 Normalized V_{th} vs. T_J

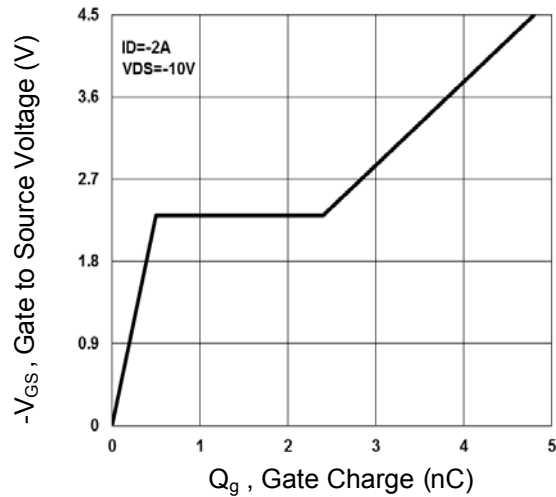


Fig.10 Gate Charge Waveform

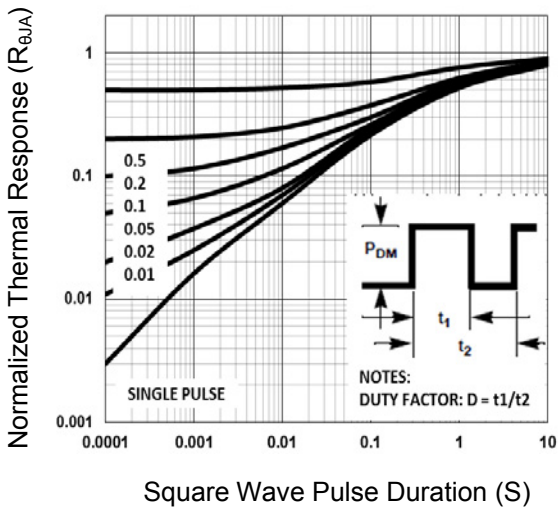


Fig.11 Normalized Transient Impedance

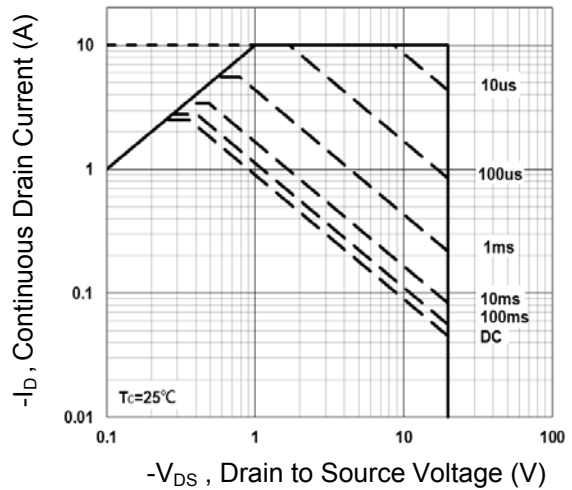
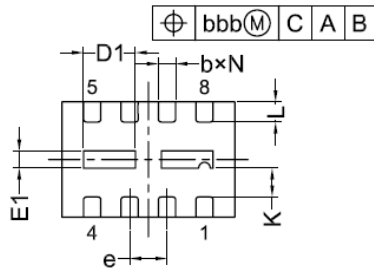


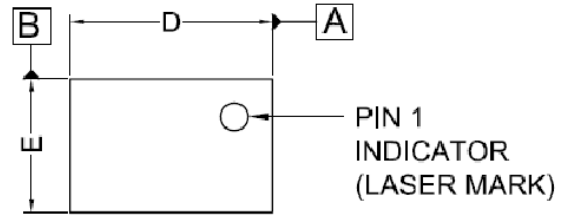
Fig.12 Maximum Safe Operation Area

Package Outline Dimensions

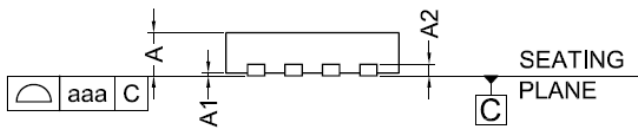
DFN2x3



BOTTOM VIEW



TOP VIEW



SIDE VIEW

| SYMBOL | MIN | TYP | MAX |
|--------|---------|------|------|
| A | 0.70 | 0.75 | 0.80 |
| A1 | 0.00 | 0.02 | 0.05 |
| A2 | 0.203 | | |
| b | 0.25 | 0.30 | 0.35 |
| D | 2.95 | 3.00 | 3.05 |
| D1 | 0.80 | 0.90 | 1.00 |
| E | 195 | 2.00 | 2.05 |
| E1 | 0.20 | 0.30 | 0.40 |
| e | 0.65BSC | | |
| L | 0.30 | 0.35 | 0.40 |
| K | 0.20MIN | | |
| N | 8 | | |
| aaa | 0.08 | | |
| bbb | 0.10 | | |