

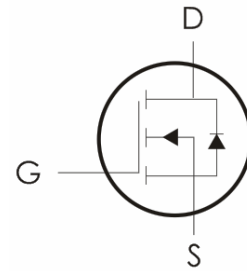
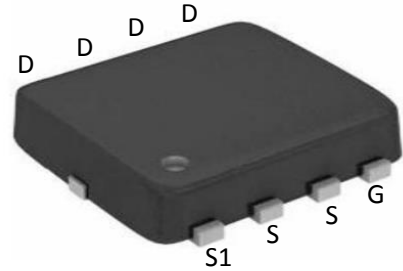
## Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge.

It can be used in a wide variety of applications.

## Features:

- 1)  $V_{DS}=30V, I_D=70A, R_{DS(on)} < 6.5 \text{ m}\Omega @ V_{GS}=10V$
- 2) Improved  $dv/dt$  capability
- 3) Fast switching
- 4) 100% EAS Guaranteed
- 5) Green Device Available.



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

| Symbol         | Parameter                                                      | Ratings     | Units               |
|----------------|----------------------------------------------------------------|-------------|---------------------|
| $V_{DS}$       | Drain-Source Voltage                                           | 30          | V                   |
| $V_{GS}$       | Gate-Source Voltage                                            | $\pm 20$    | V                   |
| $I_D$          | Continuous Drain Current-Continuous ( $T_C=25^\circ\text{C}$ ) | 70          | A                   |
|                | Continuous Drain Current- $T_C=100^\circ\text{C}$              | 38          |                     |
| $I_{DM}$       | Drain Current – Pulsed <sup>1</sup>                            | 240         | A                   |
| $E_{AS}$       | Single Pulse Avalanche Energy <sup>2</sup>                     | 88          | mJ                  |
| $P_D$          | Power Dissipation ( $T_C=25^\circ\text{C}$ )                   | 45          | W                   |
|                | Power Dissipation – Derate above $25^\circ\text{C}$            | 0.36        | W/ $^\circ\text{C}$ |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range               | -55 to +150 | $^\circ\text{C}$    |

## Thermal Characteristics:

| Symbol          | Parameter                               | Max | Units                     |
|-----------------|-----------------------------------------|-----|---------------------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case    | 62  | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 2.8 |                           |

## Package Marking and Ordering Information:

| Part NO. | Marking | Package  |
|----------|---------|----------|
| FKBB3016 | BB3016  | DFN3*3-8 |

## Electrical Characteristics: ( $T_C=25^{\circ}\text{C}$ unless otherwise noted)

| Symbol                    | Parameter                                 | Conditions                                                                                  | Min | Typ  | Max  | Units |
|---------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------|-----|------|------|-------|
| Off Characteristics       |                                           |                                                                                             |     |      |      |       |
| BV <sub>DSS</sub>         | Drain-Sourctce Breakdown Voltage          | V <sub>GS</sub> =0V,I <sub>D</sub> =250 μ A                                                 | 30  | ---  | ---  | V     |
| I <sub>DSS</sub>          | Drain-Source Leakage Current              | V <sub>GS</sub> =0V, V <sub>DS</sub> =30V, T <sub>J</sub> =25℃                              | --- | ---  | 1    | μ A   |
|                           |                                           | V <sub>GS</sub> =0V, V <sub>DS</sub> =24V, T <sub>J</sub> =125℃                             |     |      | 10   | μ A   |
| I <sub>GSS</sub>          | Gate-Source Leakage Current               | V <sub>GS</sub> =± 20V, V <sub>DS</sub> =0A                                                 | --- | ---  | ±100 | nA    |
| On Characteristics        |                                           |                                                                                             |     |      |      |       |
| V <sub>GS(th)</sub>       | GATE-Source Threshold Voltage             | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250 μ A                                  | 1.2 | 1.6  | 2.5  | V     |
| R <sub>DS(ON)</sub>       | Drain-Source On Resistance <sup>3</sup>   | V <sub>GS</sub> =10V,I <sub>D</sub> =20A                                                    | --- | 5.1  | 6.5  | m Ω   |
|                           |                                           | V <sub>GS</sub> =4.5V,I <sub>D</sub> =10A                                                   | --- | 7.5  | 12   |       |
| G <sub>FS</sub>           | Forward Transconductance                  | V <sub>DS</sub> =10V, I <sub>D</sub> =10A                                                   | --- | 23   | ---  | S     |
| Dynamic Characteristics   |                                           |                                                                                             |     |      |      |       |
| C <sub>iss</sub>          | Input Capacitance                         | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz                                           | --- | 1210 | 1800 | pF    |
| C <sub>oss</sub>          | Output Capacitance                        |                                                                                             | --- | 190  | 280  |       |
| C <sub>rss</sub>          | Reverse Transfer Capacitance              |                                                                                             | --- | 100  | 150  |       |
| Switching Characteristics |                                           |                                                                                             |     |      |      |       |
| t <sub>d(on)</sub>        | Turn-On Delay Time <sup>3.4</sup>         | V <sub>DD</sub> =15V , V <sub>GS</sub> =10V , R <sub>G</sub> =<br>=3.3Ω,I <sub>D</sub> =15A | --- | 7.5  | 14   | ns    |
| t <sub>r</sub>            | Rise Time <sup>3.4</sup>                  |                                                                                             | --- | 14.5 | 28   | ns    |
| t <sub>d(off)</sub>       | Turn-Off Delay Time <sup>3.4</sup>        |                                                                                             | --- | 32.5 | 67   | ns    |
| t <sub>f</sub>            | Fall Time <sup>3.4</sup>                  |                                                                                             | --- | 9.6  | 18   | ns    |
| Q <sub>g</sub>            | Total Gate Charge <sup>3.4</sup>          | V <sub>DS</sub> =15V , V <sub>GS</sub> =4.5V ,<br>I <sub>D</sub> =20A                       | --- | 11.1 | 18   | nC    |
| Q <sub>gs</sub>           | Gate-Source Charge <sup>3.4</sup>         |                                                                                             | --- | 1.85 | 3.8  | nC    |
| Q <sub>gd</sub>           | Gate-Drain “Miller” Charge <sup>3.4</sup> |                                                                                             | --- | 6.8  | 12   | nC    |

| Drain-Source Diode Characteristics |                                                 |                                                        |     |     |   |    |
|------------------------------------|-------------------------------------------------|--------------------------------------------------------|-----|-----|---|----|
| $V_{SD}$                           | Source-Drain Diode Forward Voltage <sup>2</sup> | $V_{GS}=0V, I_S=1A, T_J=25^{\circ}C$                   | --- | --- | 1 | V  |
| $t_{rr}$                           | Reverse Recovery Time                           | $V_{GS}=0V, I_S=1A, di/dt=100A/\mu s, T_J=25^{\circ}C$ |     | --- |   | nS |
| $Q_{rr}$                           | Reverse Recovery Charge                         |                                                        |     | --- |   | nC |

## Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=42A, R_G=25, \text{Starting } T_J=25^{\circ}C$ .
3. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

## Typical Characteristics: ( $T_C=25^{\circ}C$ unless otherwise noted)

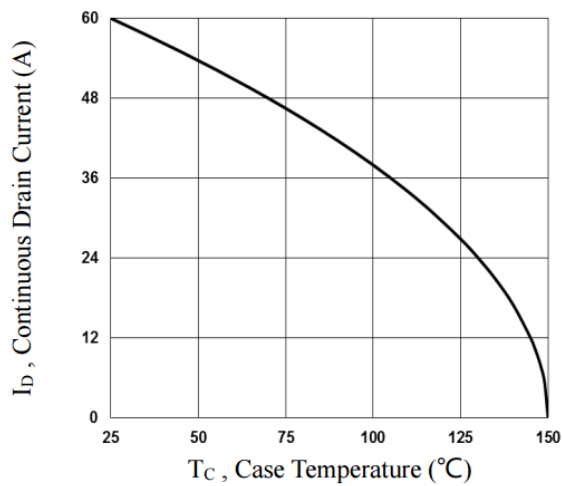


Fig.1 Continuous Drain Current vs.  $T_C$

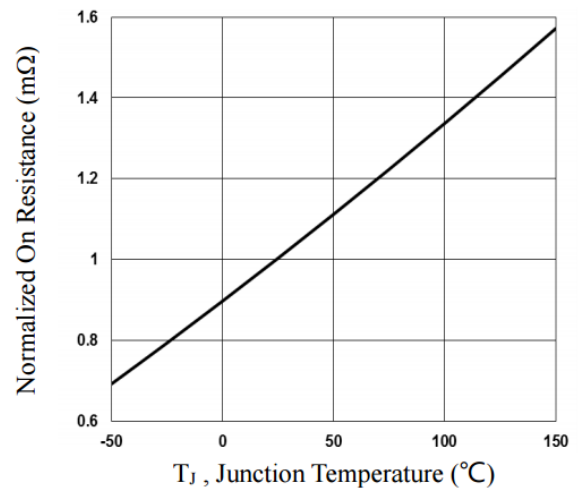


Fig.2 Normalized  $R_{DSON}$  vs.  $T_J$

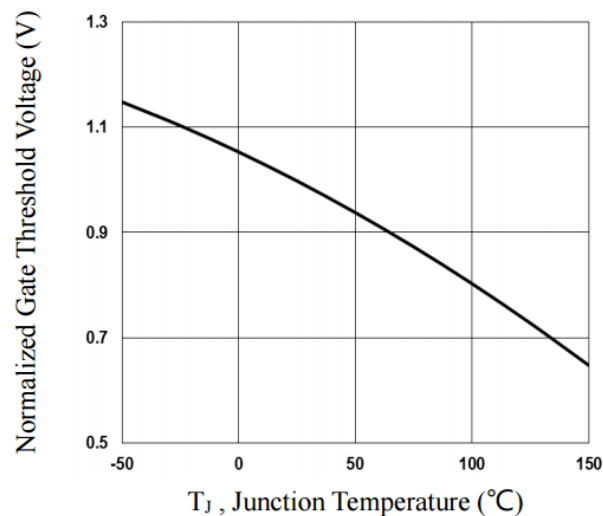


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

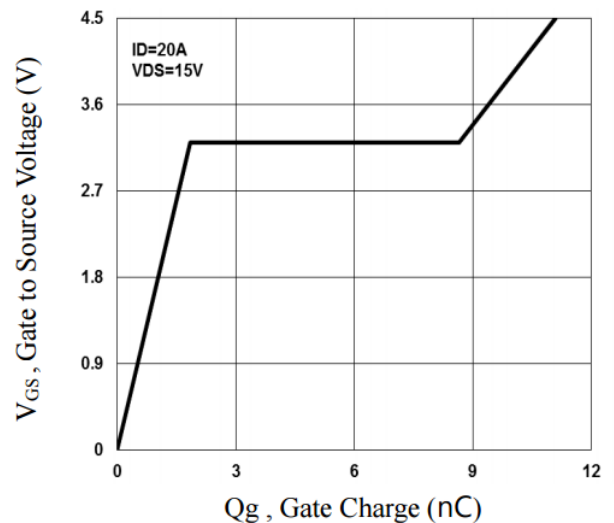


Fig.4 Gate Charge Waveform

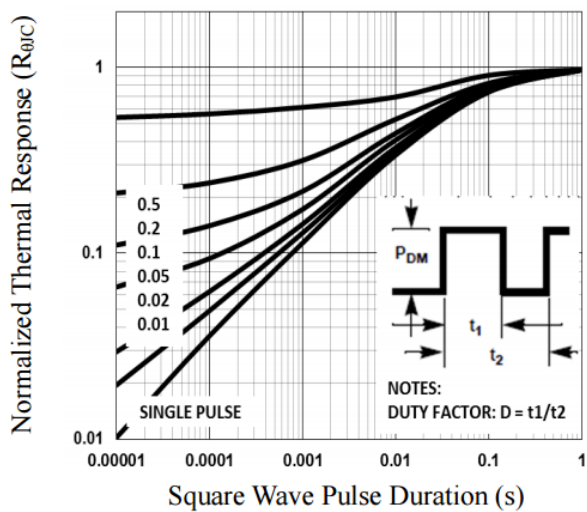


Fig.5 Normalized Transient Response

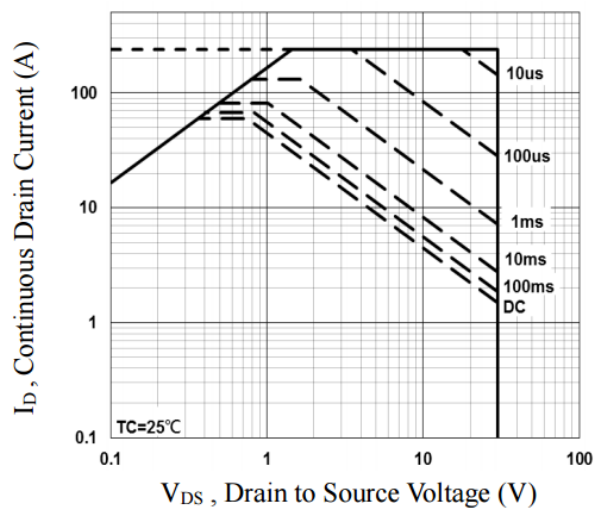


Fig.6 Maximum Safe Operation Area

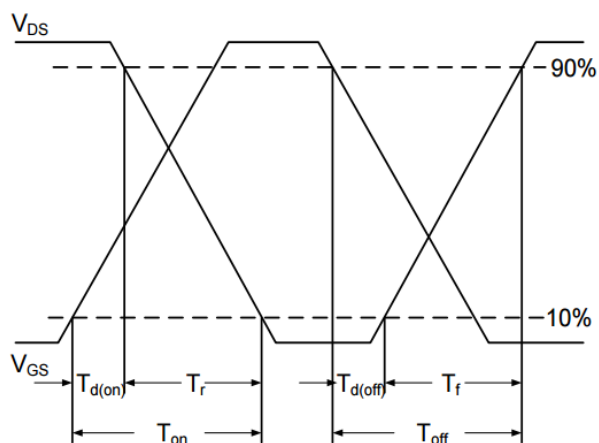


Fig.7 Switching Time Waveform

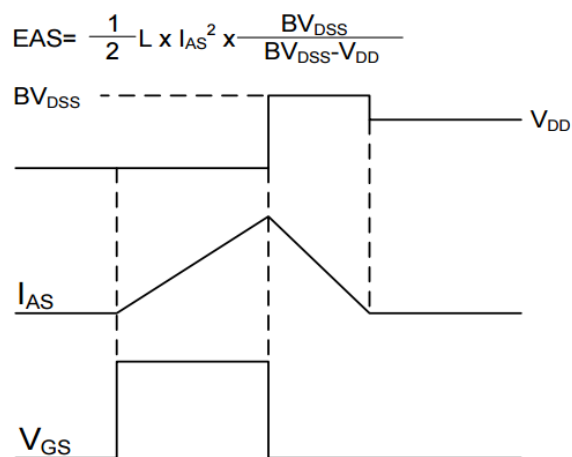


Fig.8 EAS Waveform