

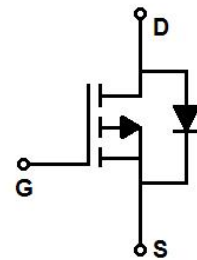
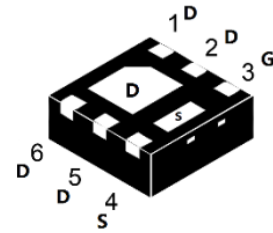
## Description:

This P-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)  $V_{DS}=-20V, I_D=-12A, R_{DS(ON)}<16m\Omega @V_{GS}=-4.5V$  (Typ:  $12m\Omega$ )
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra  $R_{DS(ON)}$ .
- 5) Excellent package for good heat dissipation.
- 6) MSL3



## Package Marking and Ordering Information:

| Part NO. | Marking | Package  | Packing      |
|----------|---------|----------|--------------|
| RB016PG  | B016P   | DFN2*2-6 | 3000pcs/Reel |

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

| Symbol         | Parameter                                           | Ratings     | Units            |
|----------------|-----------------------------------------------------|-------------|------------------|
| $V_{DS}$       | Drain-Source Voltage                                | -20         | V                |
| $V_{GS}$       | Gate-Source Voltage                                 | $\pm 12$    | V                |
| $I_D$          | Continuous Drain Current- $T_A=25^\circ\text{C}^1$  | -12         | A                |
|                | Continuous Drain Current- $T_A=100^\circ\text{C}^1$ | -8.4        |                  |
| $I_{DM}$       | Drain Current – Pulsed <sup>2</sup>                 | -48         | A                |
| $P_D$          | Power Dissipation - $T_A=25^\circ\text{C}$          | 2.6         | W                |
| $E_{AS}$       | Single pulse avalanche energy <sup>3</sup>          | 25          | mJ               |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range    | -55 to +150 | $^\circ\text{C}$ |

## Thermal Characteristics:

| Symbol          | Parameter                               | Max | Units                     |
|-----------------|-----------------------------------------|-----|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 49  | $^\circ\text{C}/\text{W}$ |

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

| Symbol                             | Parameter                               | Conditions                                                                                     | Min  | Typ   | Max   | Units |
|------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------|------|-------|-------|-------|
| Off Characteristics                |                                         |                                                                                                |      |       |       |       |
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage          | V <sub>GS</sub> =0V, I <sub>D</sub> =250 μ A                                                   | -20  | ---   | ---   | V     |
| I <sub>DSS</sub>                   | Drain-Source Leakage Current            | V <sub>GS</sub> =0V, V <sub>DS</sub> =-20V                                                     | ---  | ---   | 1     | μ A   |
| I <sub>GSS</sub>                   | Gate-Source Leakage Current             | V <sub>GS</sub> = ± 12V, 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                                     | -0.4 | -0.65 | -1    | V     |
| R <sub>DS(ON)</sub>                | Drain-Source On Resistance <sup>4</sup> | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A                                                   | ---  | 12    | 16    | m Ω   |
|                                    |                                         | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-5A                                                    | ---  | 17    | 24    |       |
| Dynamic Characteristics            |                                         |                                                                                                |      |       |       |       |
| C <sub>iss</sub>                   | Input Capacitance                       | V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHz                                             | ---  | 1797  | ---   | pF    |
| C <sub>Oss</sub>                   | Output Capacitance                      |                                                                                                | ---  | 223   | ---   |       |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance            |                                                                                                | ---  | 189   | ---   |       |
| Switching Characteristics          |                                         |                                                                                                |      |       |       |       |
| t <sub>d(on)</sub>                 | Turn-On Delay Time                      | V <sub>DD</sub> =-10V , V <sub>GS</sub> =-4.5V ,<br>R <sub>G</sub> =3 Ω , I <sub>D</sub> =-10A | ---  | 8     | ---   | ns    |
| t <sub>r</sub>                     | Rise Time                               |                                                                                                | ---  | 36    | ---   | ns    |
| t <sub>d(off)</sub>                | Turn-Off Delay Time                     |                                                                                                | ---  | 74    | ---   | ns    |
| t <sub>f</sub>                     | Fall Time                               |                                                                                                | ---  | 73    | ---   | ns    |
| Q <sub>g</sub>                     | Total Gate Charge                       | V <sub>DS</sub> =-10V , V <sub>GS</sub> =-4.5V ,<br>I <sub>D</sub> =-10A                       | ---  | 16    | ---   | nC    |
| Q <sub>gs</sub>                    | Gate-Source Charge                      |                                                                                                | ---  | 4     | ---   | nC    |
| Q <sub>gd</sub>                    | Gate-Drain “Miller” Charge              |                                                                                                | ---  | 3     | ---   | nC    |
| Drain-Source Diode Characteristics |                                         |                                                                                                |      |       |       |       |
| V <sub>SD</sub>                    | Source-Drain Diode Forward Voltage      | V <sub>GS</sub> =0V , I <sub>SD</sub> =-15A, T <sub>J</sub> =25 °C                             | ---  | ---   | 1.2   | V     |
| I <sub>S</sub>                     | Continuous Drain Curren                 | V <sub>D</sub> =V <sub>G</sub> =0V                                                             | ---  | ---   | -12   | A     |
| I <sub>SM</sub>                    | Pulsed Drain Current                    |                                                                                                | ---  | ---   | -48   | A     |
| T <sub>rr</sub>                    | Reverse Recovery Time <sup>3</sup>      | I <sub>f</sub> =-10A, T <sub>J</sub> =25 °C                                                    | ---  | 10    | ---   | ns    |
| Q <sub>rr</sub>                    | Reverse Recovery Charge                 | di/dt=100A/us                                                                                  | ---  | 3     | ---   | nC    |

## Notes:

1. Computed continuous current assumes the condition of  $T_{j,Max}$  while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition :  $T_J=25^{\circ}C, V_{DD}=-10V, V_G=-4.5V, L=0.5mH$
4. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 0.5\%$

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

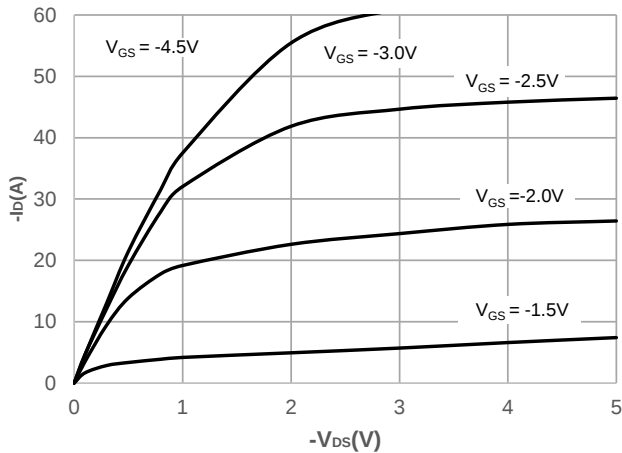


Figure 1: Output Characteristics

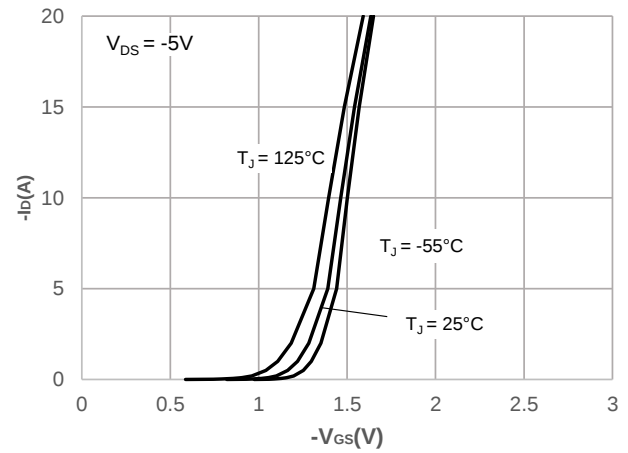


Figure 2: Typical Transfer Characteristics

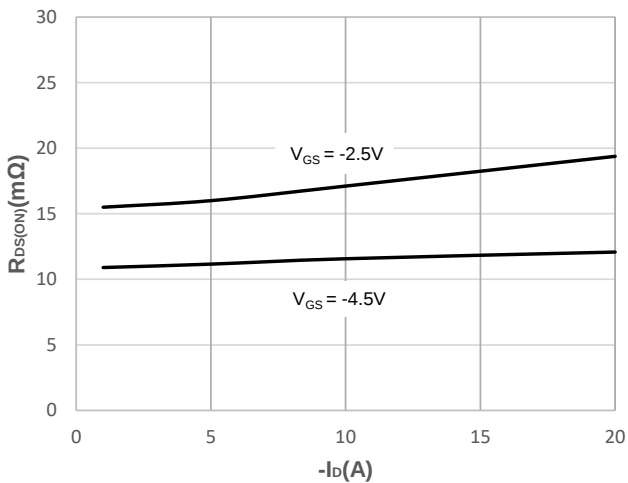


Figure 3: On-resistance vs. Drain Current

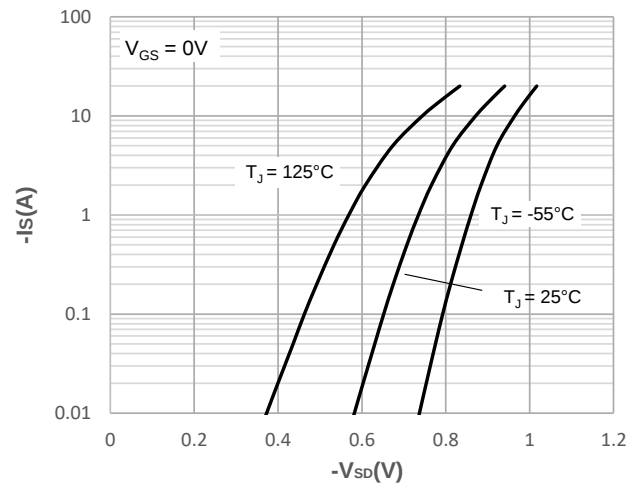


Figure 4: Body Diode Characteristics

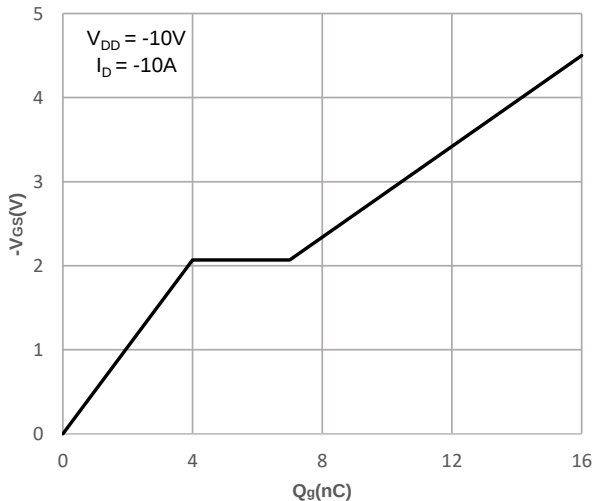


Figure 5: Gate Charge Characteristics

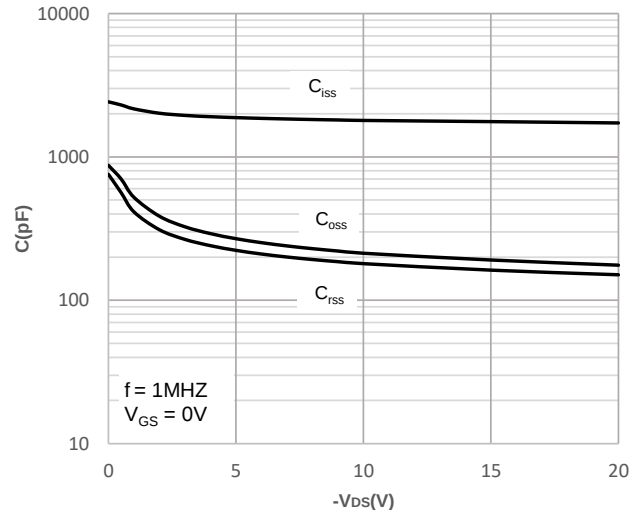
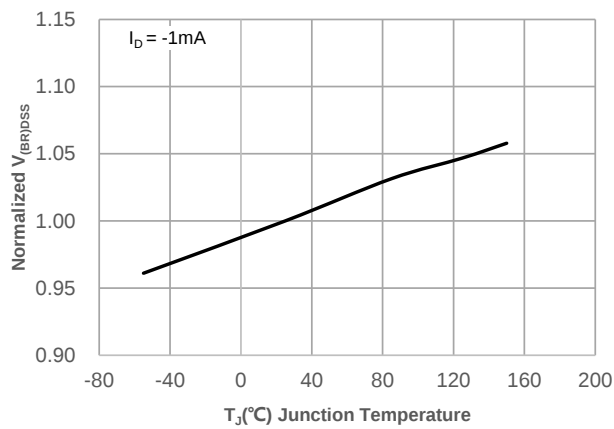
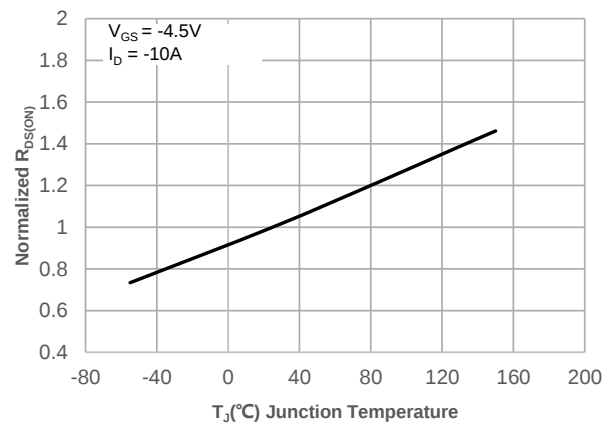


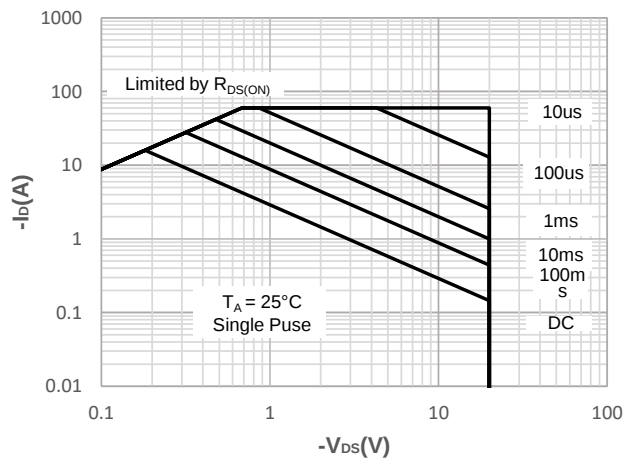
Figure 6: Capacitance Characteristics



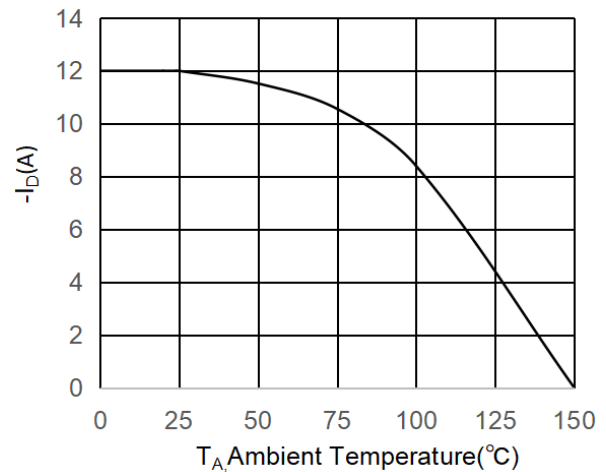
**Figure 7: Normalized Breakdown voltage vs. Junction Temperature**



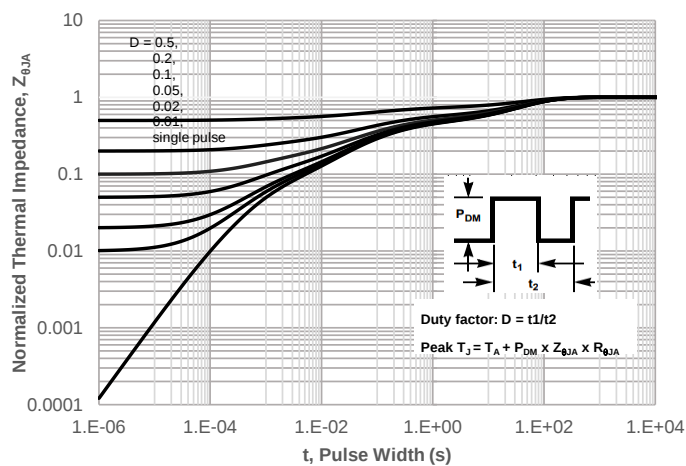
**Figure 8: Normalized on Resistance vs. Junction Temperature**



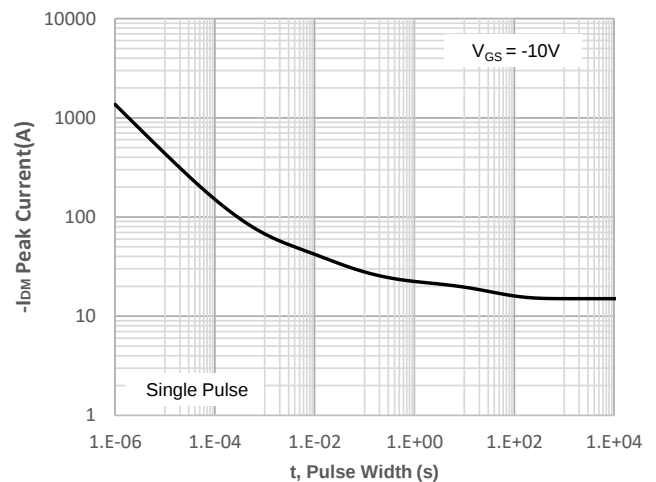
**Figure 9: Maximum Safe Operating Area**



**Figure 10: Maximum Continuous Driand Current vs. Ambient Temperature**

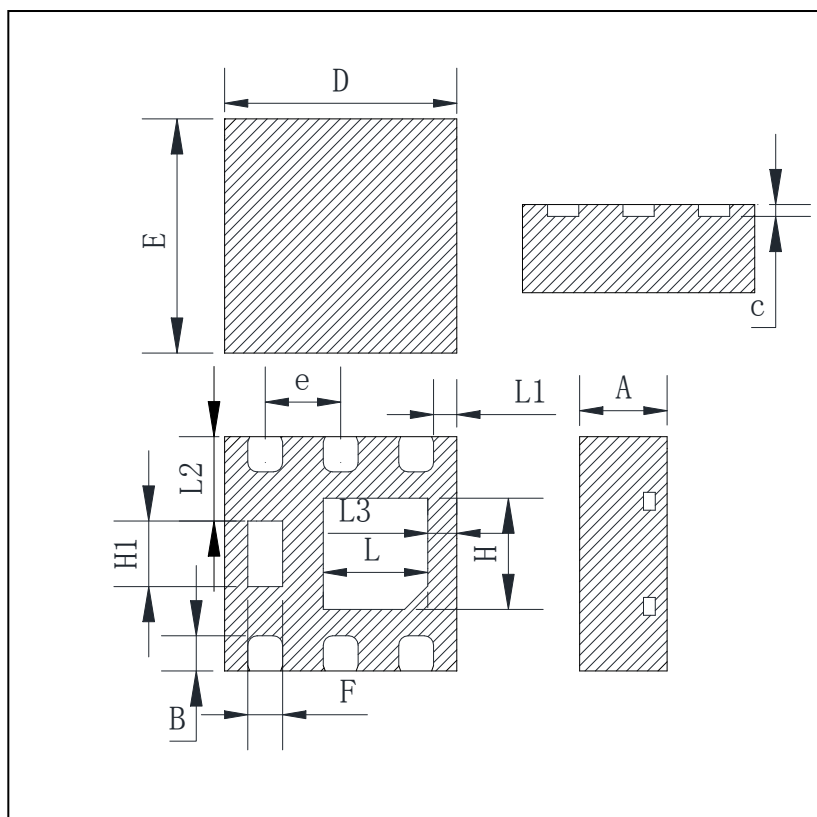


**Figure 11: Normalized Maximum Transient Thermal Impedance**



**Figure 12: Peak Current Capacity**

## DFN2X2-6 Package Outline Data



| Symbol | Min   | Typ   | Max   |
|--------|-------|-------|-------|
| A      | 0.70  | 0.75  | 0.80  |
| B      | 0.25  | 0.30  | 0.35  |
| C      | 0.153 | 0.203 | 0.253 |
| D      | 1.90  | 2.00  | 2.10  |
| E      | 1.90  | 2.00  | 2.10  |
| e      | 0.60  | 0.65  | 0.70  |
| F      | 0.25  | 0.30  | 0.35  |
| H      | 0.90  | 1.00  | 1.10  |
| H1     | 0.50  | 0.60  | 0.65  |
| L      | 0.80  | 0.90  | 1.00  |
| L1     | 0.15  | 0.20  | 0.25  |
| L2     | 0.60  | 0.70  | 0.80  |
| L3     | 0.25  | 0.30  | 0.35  |

UNIT: mm

## Marking Information:

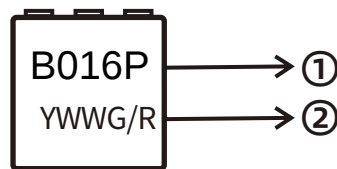
①: Part NO.

②: Date Code (YWWG / R)

Y: Year Code , last digit of the year

WW : Week Code (01-53)

G/R: G(Green) /R(Lead Free)



## Previous Version

| Version | Date       | Subjects (major changes since last revision) |
|---------|------------|----------------------------------------------|
| 1.1     | 2026-01-21 | Release of final version                     |

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