

**/ Descriptions**

PDFN5×6 N

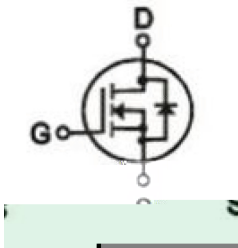
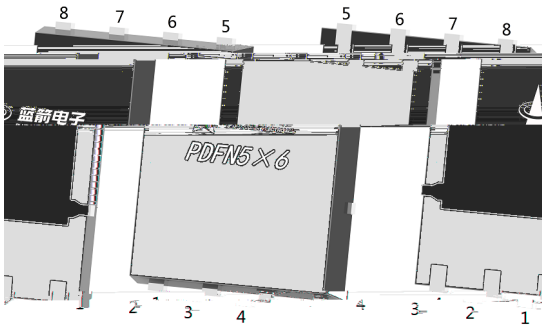
N-Channel MOSFET in a PDFN5×6 Plastic Package.

**/ Features**

Low  $R_{DS(ON)}$  to minimize conductive loss; low Gate Charge for fast switching; Low Thermal resistance;  
HF Product.

**/ Applications**

Battery Management.

**/ Equivalent Circuit****/ Pinning**

PIN1、2、3: S      PIN4: G      PIN5、6、7、8: D

**/ Marking**

See Marking Instructions.

/ Absolute Maximum Ratings( $T_a=25^\circ\text{C}$  - )

| Parameter                                         | Symbol                      | Rating     | Unit |
|---------------------------------------------------|-----------------------------|------------|------|
| Drain-Source Voltage                              | $V_{DS}$                    | 40         | V    |
| Drain Current - Continuous                        | $I_D$                       | 215        | A    |
| Drain Current – Pulsed                            | $I_{DM}$                    | 430        | A    |
| Gate-Source Voltage                               | $V_{GS}$                    | $\pm 20$   | V    |
| Power Dissipation                                 | $P_D(T_c=25^\circ\text{C})$ | 70         | W    |
| Single Pulse Avalanche Energy( $L=0.5\text{mH}$ ) | $E_{AS}$                    | 542        | mJ   |
| Avalanche Current( $L=0.5\text{mH}$ )             | $I_{AS}$                    | 44         | A    |
| Junction and Storage Temperature Range            | $T_j, T_{stg}$              | -55 to 150 |      |
| Thermal resistance, junction - case               | $R_{\theta JC}$             | 1.79       | / W  |
| Thermal resistance, junction - ambient            | $R_{\theta JA}$             | 50         | / W  |

/ Electrical Characteristics( $T_a=25^\circ\text{C}$  - )

| Parameter                         | Symbol             | Test Conditions                                               | Min | Typ  | Max       | Unit          |
|-----------------------------------|--------------------|---------------------------------------------------------------|-----|------|-----------|---------------|
| Drain-Source Breakdown Voltage    | $BV_{DSS}$         | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$                        | 40  | 46   |           | V             |
| Zero Gate Voltage Drain Current   | $I_{DSS}$          | $V_{DS}=40\text{V}, V_{GS}=0\text{V}$                         |     |      | 1.0       | $\mu\text{A}$ |
| Gate-Body leakage current         | $I_{GSS}$          | $V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$                     |     |      | $\pm 100$ | nA            |
| Gate Threshold Voltage            | $V_{GS(th)}$       | $V_{DS}=V_{GS}, I_D=250\mu\text{A}$                           | 1   | 1.5  | 2.5       | V             |
| Static Drain-Source On-Resistance | $R_{DS(on)}$       | $V_{GS}=10\text{V}, I_D=20\text{A}$                           |     | 0.93 | 1.0       | m $\Omega$    |
|                                   |                    | $V_{GS}=4.5\text{V}, I_D=10\text{A}$                          |     | 1.28 | 2.0       |               |
| Input Capacitance                 | $C_{iss}$          | $V_{DS}=25\text{V}, V_{GS}=0\text{V}$<br>$f=1.0\text{MHz}$    |     | 5800 |           | pF            |
| Output Capacitance                | $C_{oss}$          |                                                               |     | 1860 |           |               |
| Reverse Transfer Capacitance      | $C_{rss}$          |                                                               |     | 135  |           |               |
| Gate resistance                   | $R_g$              | $V_{GS}=0\text{V}, V_{DS}=0\text{V}$<br>$f=1\text{MHz}$       |     | 1.0  |           | $\Omega$      |
| Total Gate Charge                 | $Q_g(10\text{V})$  | $V_{GS}=10\text{V}, V_{DS}=20\text{V},$<br>$I_D=20\text{A}$   |     | 70   |           | nC            |
| Total Gate Charge                 | $Q_g(4.5\text{V})$ |                                                               |     | 30   |           |               |
| Gate Source Charge                | $Q_{gs}$           |                                                               |     | 14.5 |           |               |
| Gate Drain Charge                 | $Q_{gd}$           |                                                               |     | 10.5 |           |               |
| Turn-On Delay Time                | $t_{d(on)}$        | $V_{GS}=10\text{V}, V_{DS}=20\text{V},$<br>$R_L=1, R_{GEN}=3$ |     | 15   |           | ns            |
| Turn-On Rise Time                 | $t_r$              |                                                               |     | 5.8  |           |               |
| Turn-Off Delay Time               | $t_{d(off)}$       |                                                               |     | 62   |           |               |
| Turn-Off Fall Time                | $t_f$              |                                                               |     | 10   |           |               |

## / Electrical Characteristic Curve

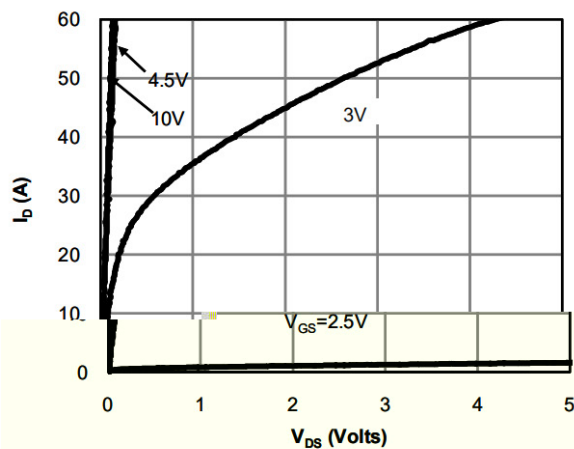


Figure 1: On-Resistance Characteristics

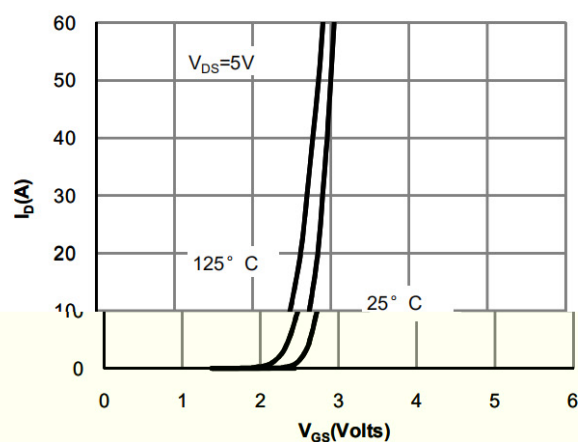


Figure 2: Transfer Characteristics

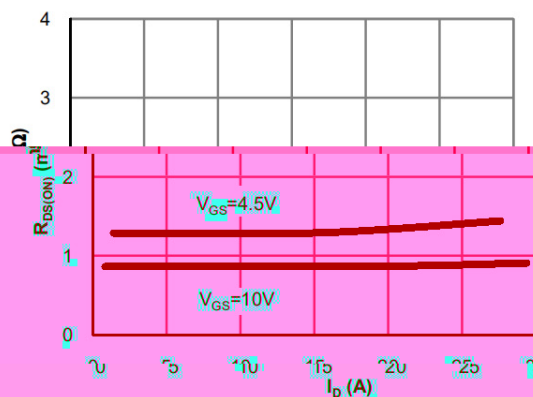


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

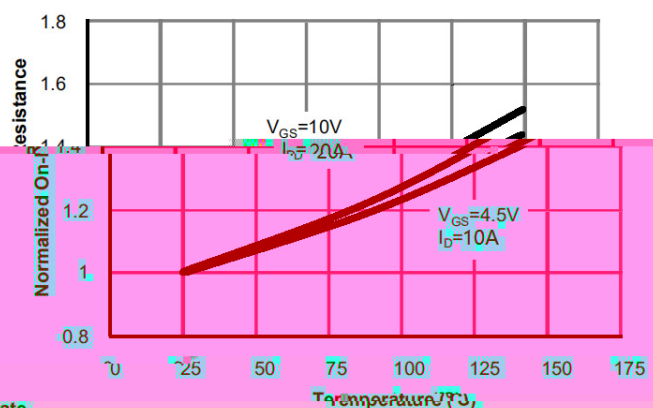


Figure 4: On-Resistance vs. Junction Temperature

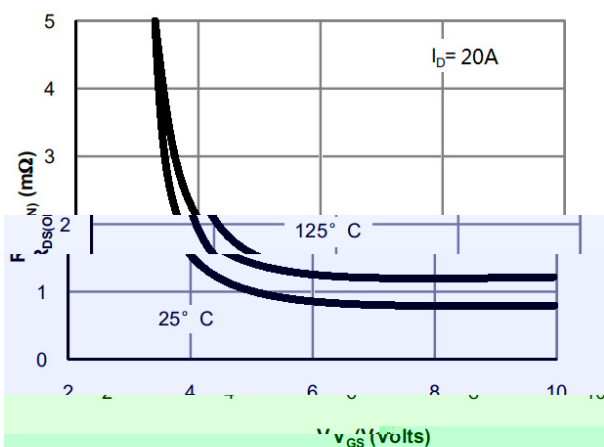


Figure 5: On-Resistance vs. V\_GS

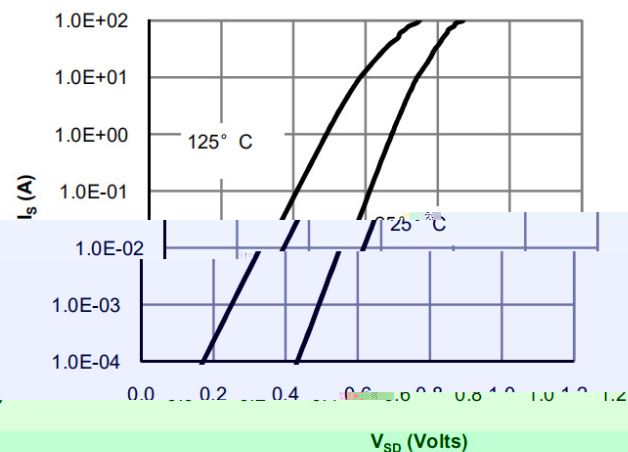


Figure 6: On-Resistance vs. V\_DS



# Electrical Characteristic Curve

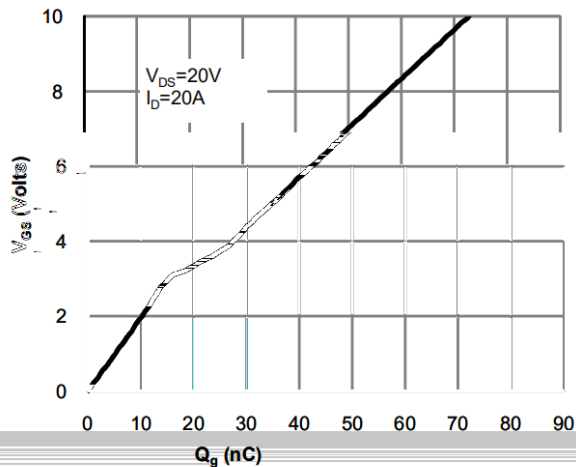


Figure 7: Gate-Charge Characteristics

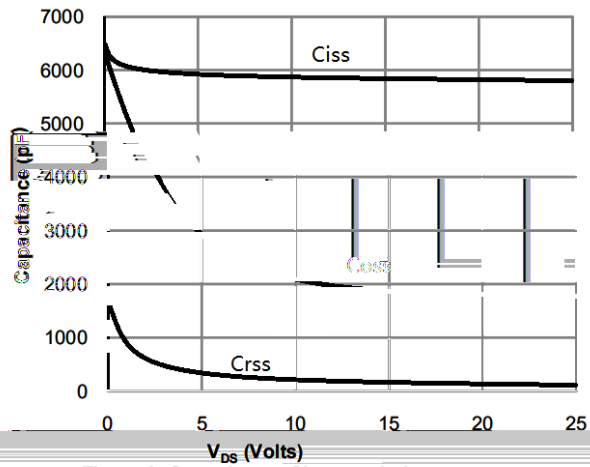


Figure 8: Capacitance Characteristics

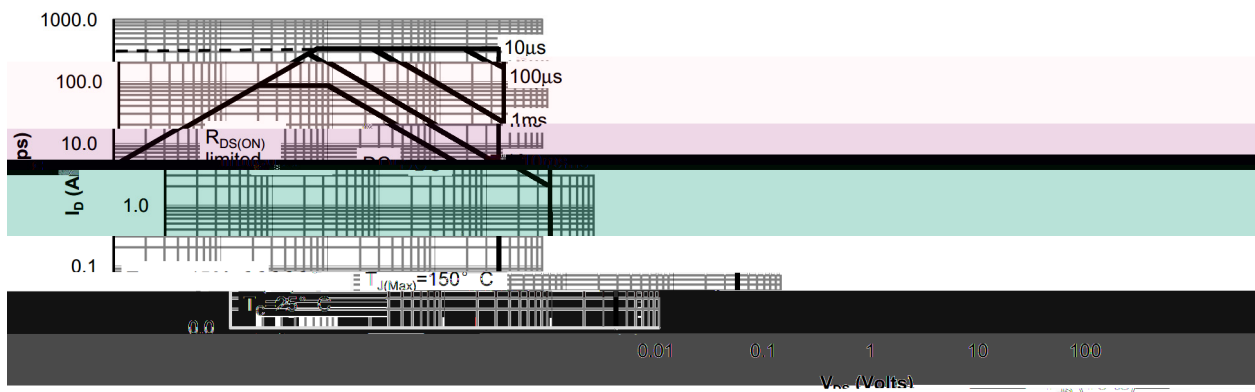


Figure 9: Maximum Forward Biased Safe Operating Area

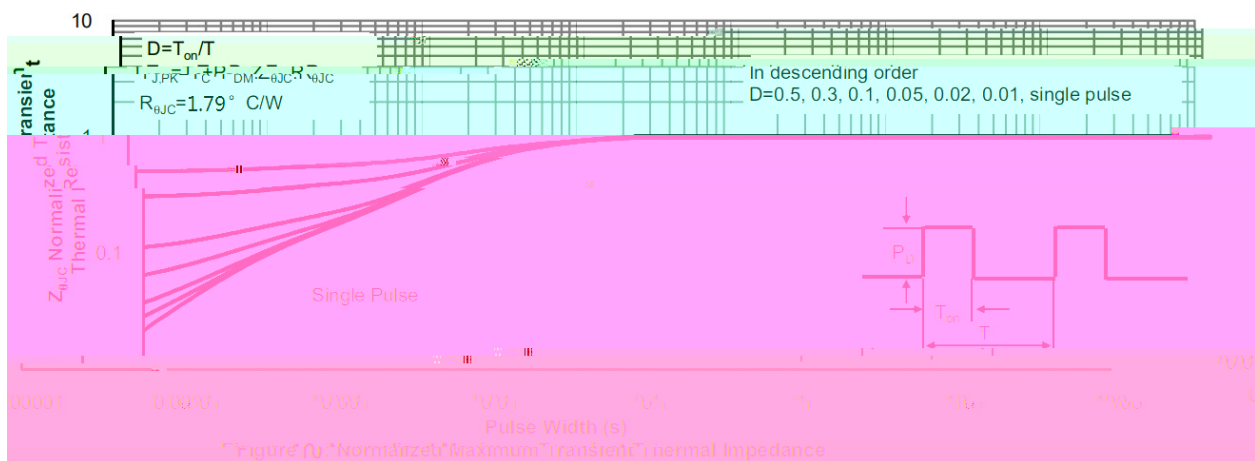
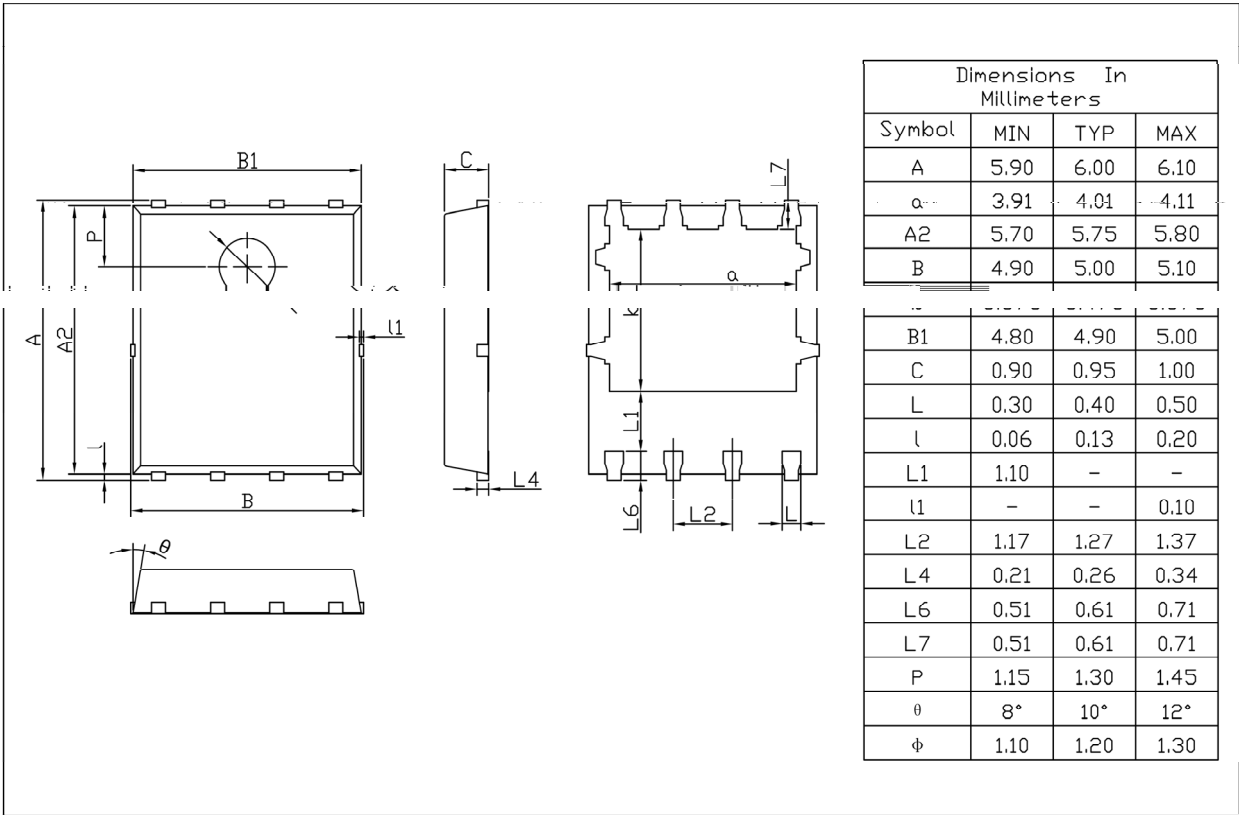


Figure 10: Normalized Maximum Transient Thermal Impedance

I Package Dimensions

PDFN5×6Unit:mm



Rev.01 202209

**BRCS010N04SZC**  
Rev.B May.-2023



## ( ) / Temperature Profile for IR Reflow Soldering(Pb-Free)

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Note:

- |   |       |     |           |        |                                         |
|---|-------|-----|-----------|--------|-----------------------------------------|
| 1 | 150   | 180 | 60        | 90sec; | 1.Preheating:150~180 , Time:60~90sec.   |
| 2 | 245±5 |     | 5±0.5sec; |        | 2.Peak Temp.:245±5 , Duration:5±0.5sec. |
| 3 |       | 2   | 10        | /sec.  | 3. Cooling Speed: 2~10 /sec.            |

## / Resistance to Soldering Heat Test Conditions

|       |           |             |               |
|-------|-----------|-------------|---------------|
| 260±5 | 10±1 sec. | Temp.:260±5 | Time:10±1 sec |
|-------|-----------|-------------|---------------|

## / Packaging SPEC.

/ REEL

| Package Type | Units           |                      |                      |                            |                      | Dimension |            |             | (unit mm <sup>3</sup> ) |
|--------------|-----------------|----------------------|----------------------|----------------------------|----------------------|-----------|------------|-------------|-------------------------|
|              | Units/Reel<br>/ | Reels/Inner Box<br>/ | Units/Inner Box<br>/ | Inner Boxes/Outer Box<br>/ | Units/Outer Box<br>/ | Reel      | Inner Box  | Outer Box   |                         |
| PDFN5 6      | 5000            | 2                    | 10000                | 6                          | 60000                | 13" 12    | 360 360 50 | 380 335 366 |                         |