

# BRCS120N03YB

Rev.B Oct.-2024

## / Descriptions

PDFN 3×3A-8L N MOS

N-Channel Enhancement Mode Field Effect Transistor in a PDFN3×3A-8L Plastic Package.

## / Features

$V_{DS} (V) = 30V$

$I_D = 20 A (V_{GS} = \pm 20V)$

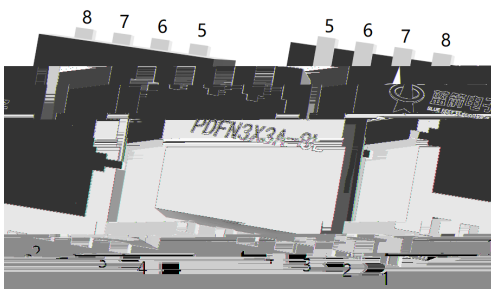
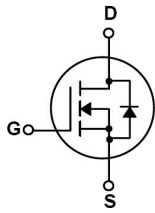
$R_{DS(ON)} @ 10V \quad 13mR (Typ. 11mR)$

HF Product.

## / Applications

DC/DC

These devices are well suited for high efficiency switching DC/DC converters and switch mode power supplies.



## / Marking

See Marking Instructions.

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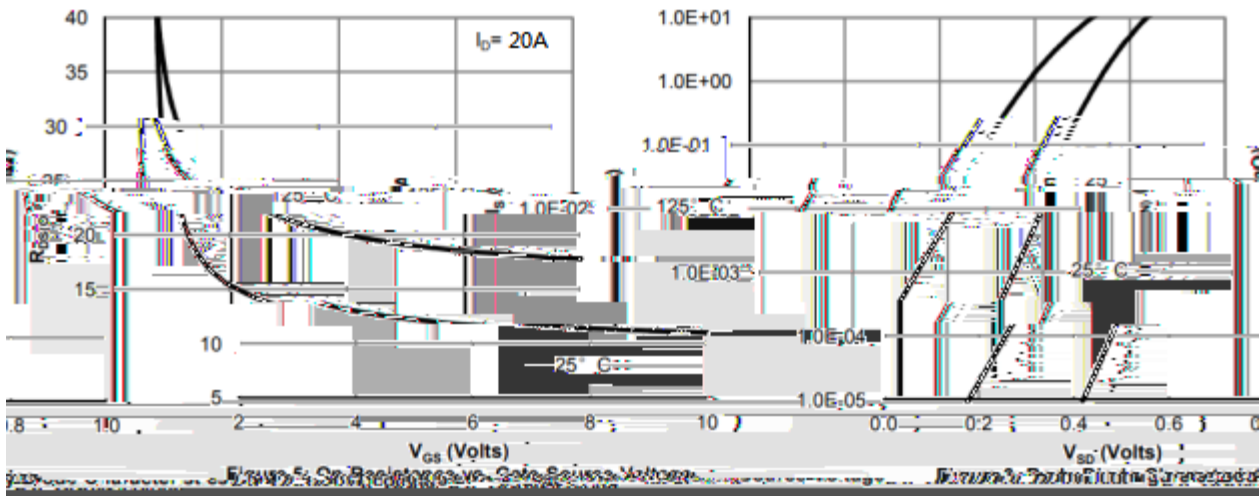
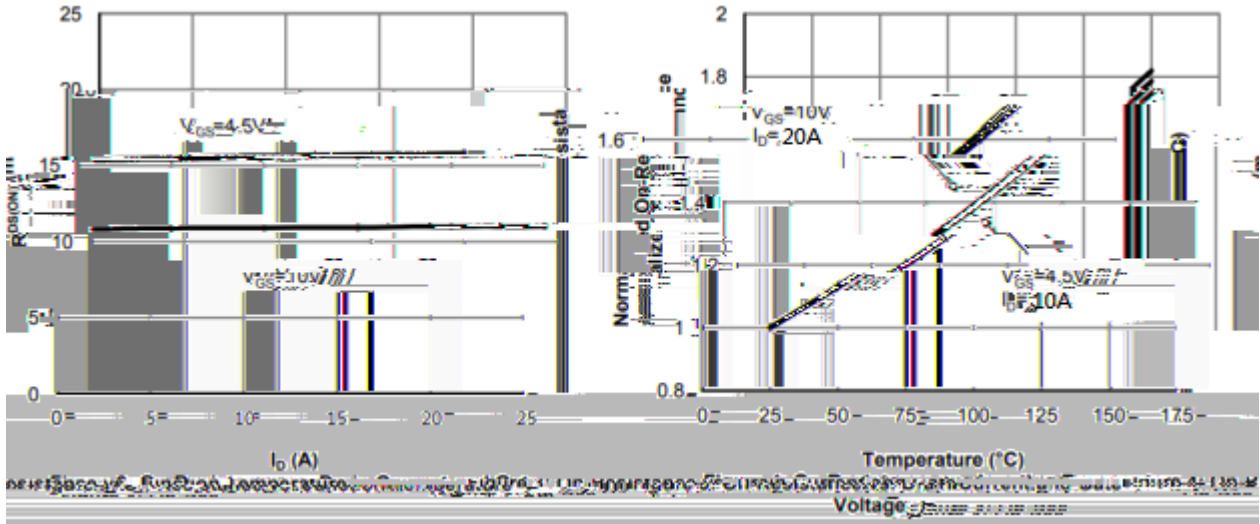
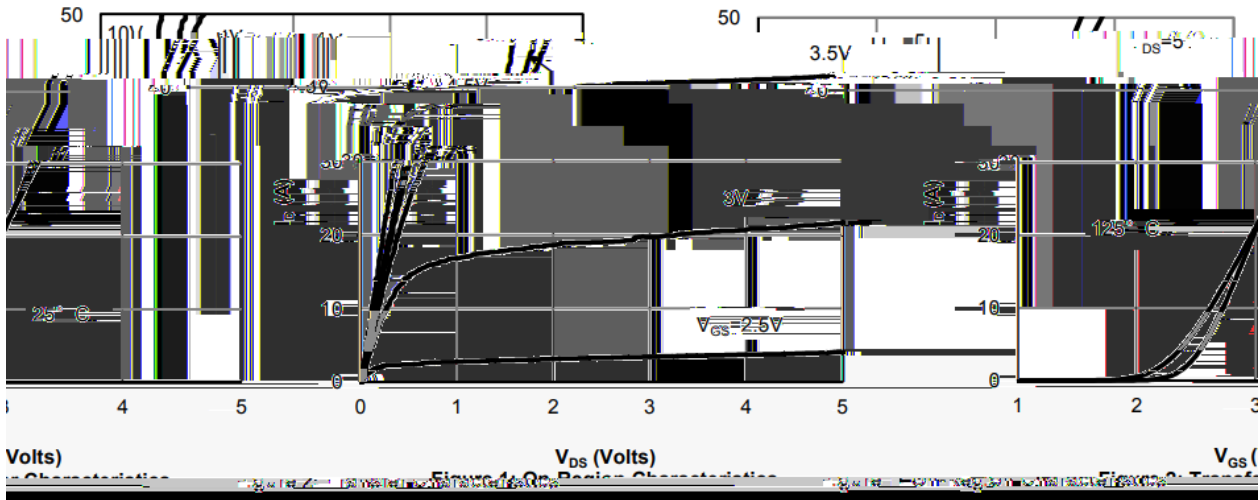
DATA SHEET

| Parameter                               | Symbol                      | Rating     | Unit |
|---|-----------------------------|------------|------|
| Drain-Source Voltage                    | $V_{DSS}$                   | 30         | V    |
| Drain Current                           | $I_D(T_C=25^\circ\text{C})$ | 20         | A    |
| Drain Current - Pulsed                  | $I_{DM}$                    | 55         | A    |
| Gate-Source Voltage                     | $V_{GSS}$                   | $\pm 20$   | V    |
| Single Pulsed Avalanche Energy          | $E_{AS}$                    | 199        | mJ   |
| Avalanche Current                       | $I_{AS}$                    | 12.9       | A    |
| Power Dissipation                       | $P_D(T_C=25^\circ\text{C})$ | 15.5       | W    |
| Operating and Storage Temperature Range | $T_J, T_{stg}$              | -55 to 150 |      |
| Junction-to-Ambient $t = 10$            | $R_{JA}$                    | 30         | /W   |
| Junction-to-Ambient Steady-t            |                             |            |      |

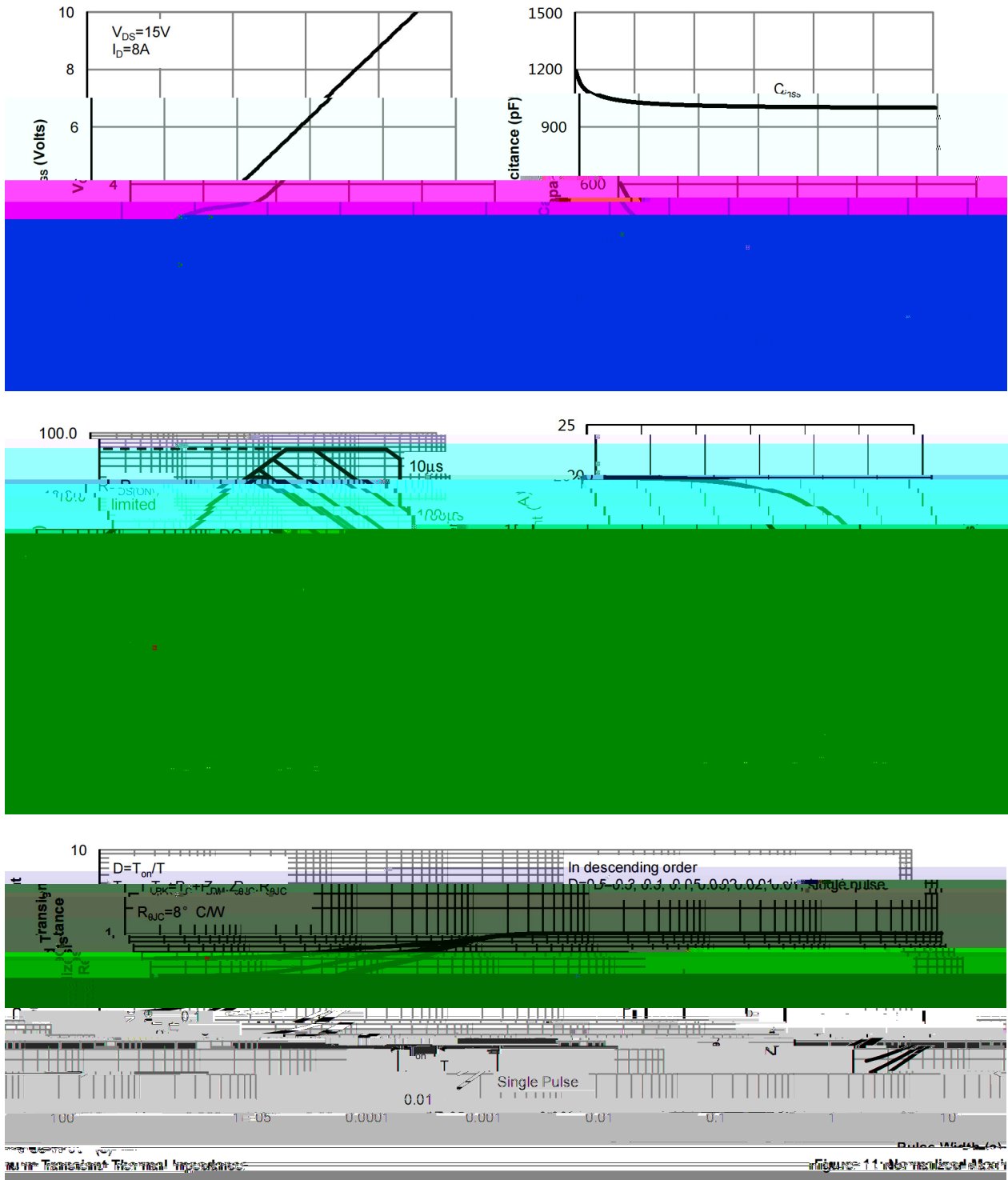
## / Electrical Characteristics(Ta=25 )

| Parameter                          | Symbol        | Test Conditions            |                               | Min | Typ  | Max       | Unit    |
|------------------------------------|---------------|----------------------------|-------------------------------|-----|------|-----------|---------|
| Drain-Source Breakdown Voltage     | $BV_{DSS}$    | $V_{GS}=0V$                | $I_D=250\mu A$                | 30  |      |           | V       |
| Zero Gate Voltage Drain Current    | $I_{DSS}$     | $V_{DS}=30V$               | $V_{GS}=0V$                   |     |      | 1         | $\mu A$ |
| Gate-Body Leakage Current Forward  | $I_{GSS}$     | $V_{GS}=\pm 20V$           | $V_{DS}=0V$                   |     |      | $\pm 0.1$ | $\mu A$ |
| Gate Threshold Voltage             | $V_{GS(th)}$  | $V_{DS}=V_{GS}$            | $I_D=250\mu A$                | 1.0 | 1.8  | 3.0       | V       |
| Static Drain-Source On-Resistance  | $R_{DS(on)}$  | $V_{GS}=10V$               | $I_D=20A$                     |     | 11   | 13        | m       |
|                                    |               | $V_{GS}=4.5V$              | $I_D=10A$                     |     | 16   | 20        | m       |
| Drain-Source Diode Forward Voltage | $V_{SD}$      | $V_{GS}=0V$                | $I_S=1A$                      |     |      | 1.2       | V       |
| Input Capacitance                  | $C_{iss}$     | $V_{DS}=25V$<br>$f=1.0MHz$ | $V_{GS}=0V$                   |     | 666  |           | pF      |
| Output Capacitance                 | $C_{oss}$     |                            |                               |     | 26   |           |         |
| Reverse Transfer Capacitance       | $C_{rss}$     |                            |                               |     | 63   |           |         |
| Gate resistance                    | $R_g$         | $V_{GS}=0V$<br>$f=1MHz$    | $V_{DS}=0V$                   |     | 1.7  |           |         |
| Total Gate Charge                  | $Q_{g(10V)}$  | $V_{GS}=10V$<br>$I_D=8A$   | $V_{DS}=15V$                  |     | 13.6 |           | nC      |
| Total Gate Charge                  | $Q_{g(4.5V)}$ |                            |                               |     | 6.8  |           |         |
| Gate Source Charge                 | $Q_{gs}$      |                            |                               |     | 1.6  |           |         |
| Gate Drain Charge                  | $Q_{gd}$      |                            |                               |     | 3.6  |           |         |
| Turn-On Delay Time                 | $t_{d(on)}$   | $V_{GS}=10V$<br>$R_L=1.87$ | $V_{DS}=15V$<br>$R_{GEN}=4.5$ |     | 5    |           | ns      |
| Turn-On Rise Time                  | $t_r$         |                            |                               |     | 3.5  |           |         |
| Turn-Off Delay Time                | $t_{d(off)}$  |                            |                               |     | 22   |           |         |
| Turn-Off Fall Time                 | $t_f$         |                            |                               |     | 4.5  |           |         |

/ Electrical Characteristic Curve



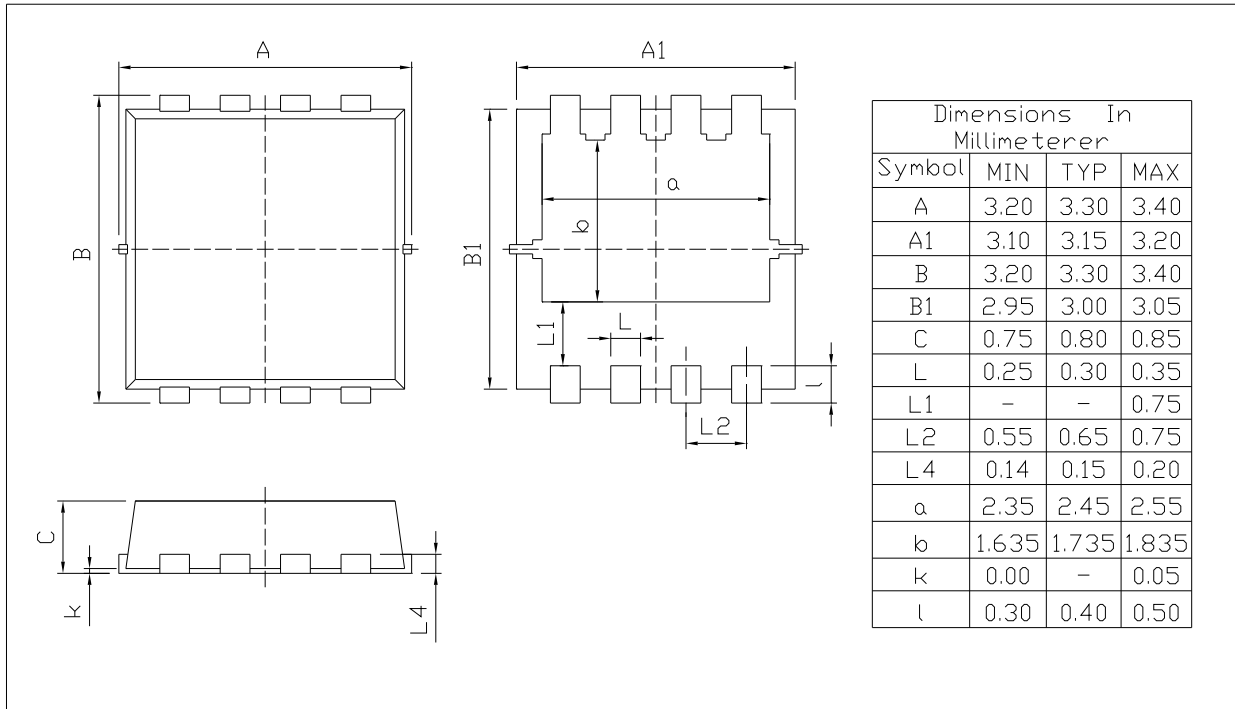
**/ Electrical Characteristic Curve**



**/ Package Dimensions**

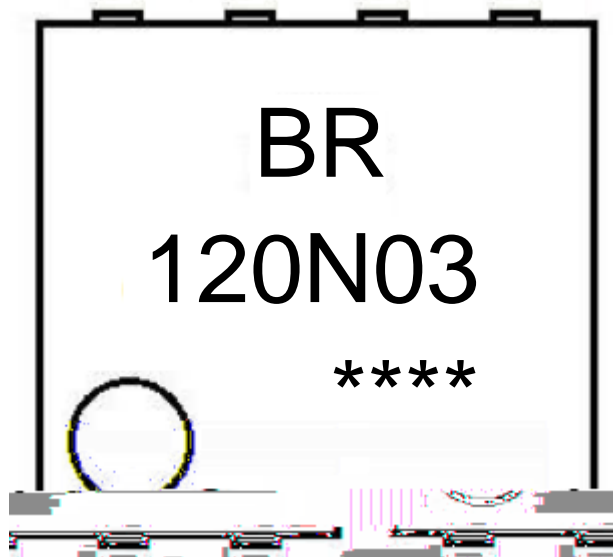
PDFN3X3A-8L

Unit:mm



Rev.00 202011

**/ Marking Instructions**



BR

120N03

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Note:

BR: Company Code

120N03: Product Type Code

\*\*\*\*: Lot No. Code, code change with Lot No



**( ) / 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 | Reels/Inner Box | Units/Inner Box | Inner Boxes/Outer Box | Units/Outer Box | Reel      | Inner Box |                         |
|              |            |                 |                 |                       |                 |           |           |                         |