

**/ Descriptions**

TO-220FL      N      700V

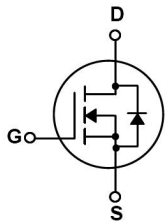
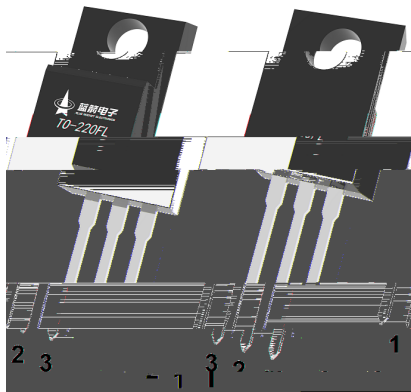
N-CHANNEL 700V Super-Junction Power MOSFET in a TO-220FL Plastic Package.

**/ Features** $R_{DS(on)} \times Q_g$  100%

RoHS

Very low  $R_{DS(on)} \times Q_g$ , 100% avalanche tested, RoHS compliant, HF product.**/ Applications**

For switch mode power supply, uninterruptible power supply, power factor correction.

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

PIN1 G

PIN 2 D

PIN 3 S

**/ Marking**

See Marking Instructions.

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

| Parameter                               | Symbol                      | Rating     | Unit               |
|-----------------------------------------|-----------------------------|------------|--------------------|
| Drain-Source Voltage                    | $V_{DS}$                    | 700        | V                  |
| Drain Current                           | $I_D(T_c=25^\circ\text{C})$ | 3.6        | A                  |
| Drain Current - Pulsed                  | $I_{DM}$                    | 14.5       | A                  |
| Gate-Source Voltage                     | $V_{GS}$                    | $\pm 30$   | V                  |
| Single Pulsed Avalanche Energy          | $E_{AS}$                    | 23.7       | mJ                 |
| Avalanche Current                       | $I_{AS}$                    | 2.1        | A                  |
| Power Dissipation                       | $P_D(T_c=25^\circ\text{C})$ | 30         | W                  |
| Operating and Storage Temperature Range | $T_J, T_{STG}$              | -55 to 150 |                    |
| Junction-to-Case                        | $R_{\theta JC}$             | 4.2        | $^\circ\text{C/W}$ |
| Junction-to-Ambient                     | $R_{\theta JA}$             | 80         | $^\circ\text{C/W}$ |

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

| Parameter                          | Symbol       | Test Conditions                                         | Min | Typ  | Max       | Unit       |
|------------------------------------|--------------|---------------------------------------------------------|-----|------|-----------|------------|
| Drain-Source Breakdown Voltage     | $BV_{DS}$    | $V_{GS}=0V$ $I_D=250\mu A$                              | 700 | 750  |           | V          |
| Zero Gate Voltage Drain Current    | $I_{DSS}$    | $V_{DS}=700V$ $V_{GS}=0V$<br>$T_J=25^\circ\text{C}$     |     |      | 1.0       | $\mu A$    |
| Gate-Body Leakage Current, Forward | $I_{GSS}$    | $V_{GS}=\pm 30V$                                        |     |      | $\pm 100$ | nA         |
| Gate Threshold Voltage             | $V_{GS(th)}$ | $V_{DS}=V_{GS}$ $I_D=250\mu A$                          | 2.5 | 3.5  | 4.5       | V          |
| Static Drain-Source On-Resistance  | $R_{DS(on)}$ | $V_{GS}=10V$ $I_D=2.5A$                                 |     | 770  | 900       | m $\Omega$ |
| Drain-Source Diode Forward Voltage | $V_{SD}$     | $V_{GS}=0V$ $I_{SD}=5A$<br>$T_J=25^\circ\text{C}$       |     |      | 1.4       | V          |
| Gate Resistance                    | $R_g$        | $V_{GS}=0V$ $f=1.0\text{MHz}$                           |     | 6.5  |           | $\Omega$   |
| Input Capacitance                  | $C_{iss}$    | $V_{DS}=100V$ $V_{GS}=0V$<br>$f=1.0\text{MHz}$          |     | 435  |           | pF         |
| Output Capacitance                 | $C_{oss}$    |                                                         |     | 20   |           | pF         |
| Reverse Transfer Capacitance       | $C_{rss}$    |                                                         |     | 0.55 |           | pF         |
| Turn-On Delay Time                 | $t_{d(on)}$  | $V_{DS}=350V$ $I_D=5.0A$<br>$V_{GS}=10V$ $R_G=24\Omega$ |     | 13   |           | ns         |
| Turn-On Rise Time                  | $t_r$        |                                                         |     | 28   |           | ns         |
| Turn-Off Delay Time                | $t_{d(off)}$ |                                                         |     | 30   |           | ns         |
| Turn-Off Fall Time                 | $t_f$        |                                                         |     | 24   |           | ns         |

### / Electrical Characteristics(Ta=25 )

| Parameter                        | Symbol   | Test Conditions                              | Min | Typ | Max | Unit |
|----------------------------------|----------|----------------------------------------------|-----|-----|-----|------|
| Continuous Diode Forward Current | $I_S$    |                                              |     |     | 5.5 | A    |
| Total Gate Charge                | $Q_g$    | $V_{DS}=560V \quad I_D=5.0A$<br>$V_{GS}=10V$ |     | 13  |     | nC   |
| Gate-Source Charge               | $Q_{gs}$ |                                              |     | 4.3 |     | nC   |
| Gate-Drain Charge                | $Q_{gd}$ |                                              |     | 6.1 |     | nC   |
| Reverse recovery time            | $T_{rr}$ | $I_F=5.0A,$<br>$dI_F/dt=100 A/\mu s$         |     | 223 |     | ns   |
| Reverse recovery charge          | $Q_{rr}$ |                                              |     | 1.9 |     | uC   |

/ Electrical Characteristic Curve

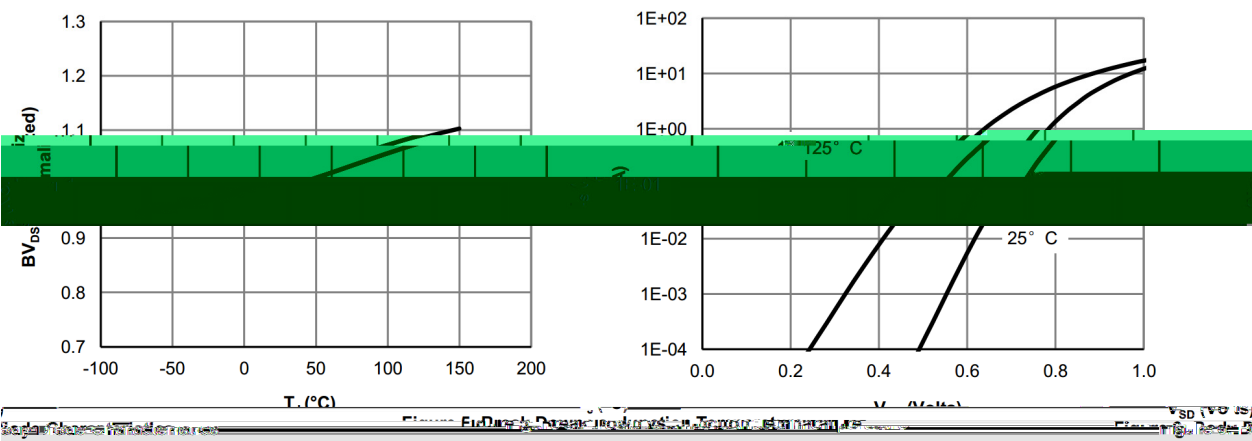
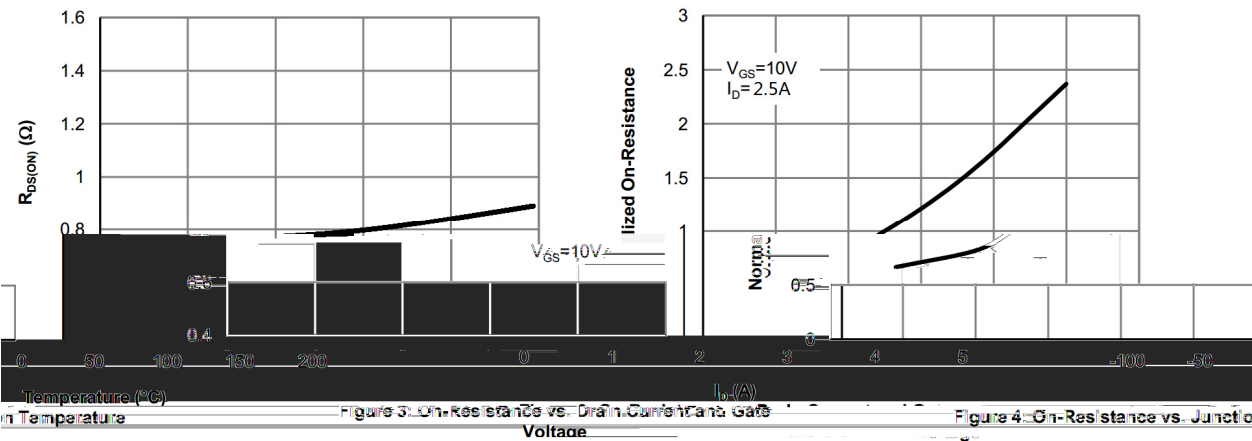
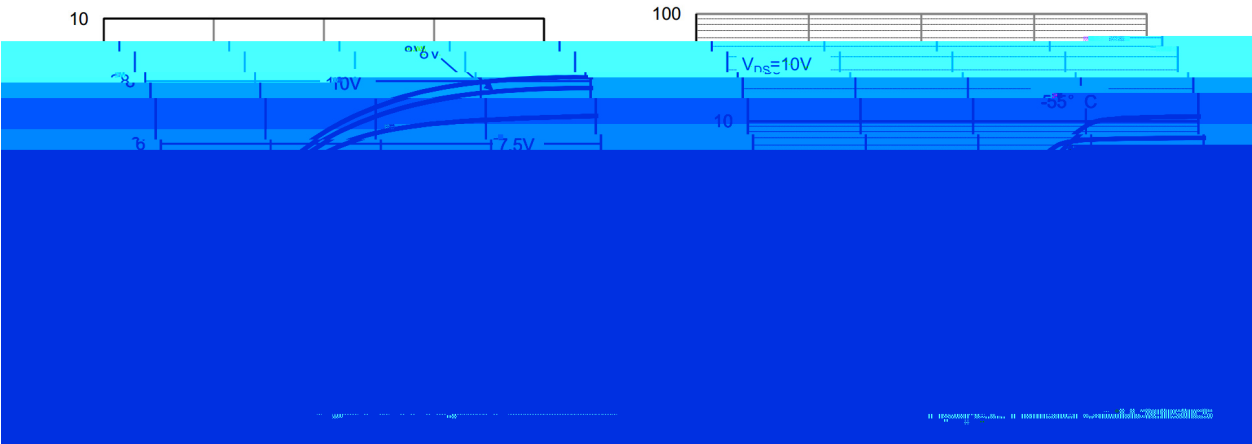
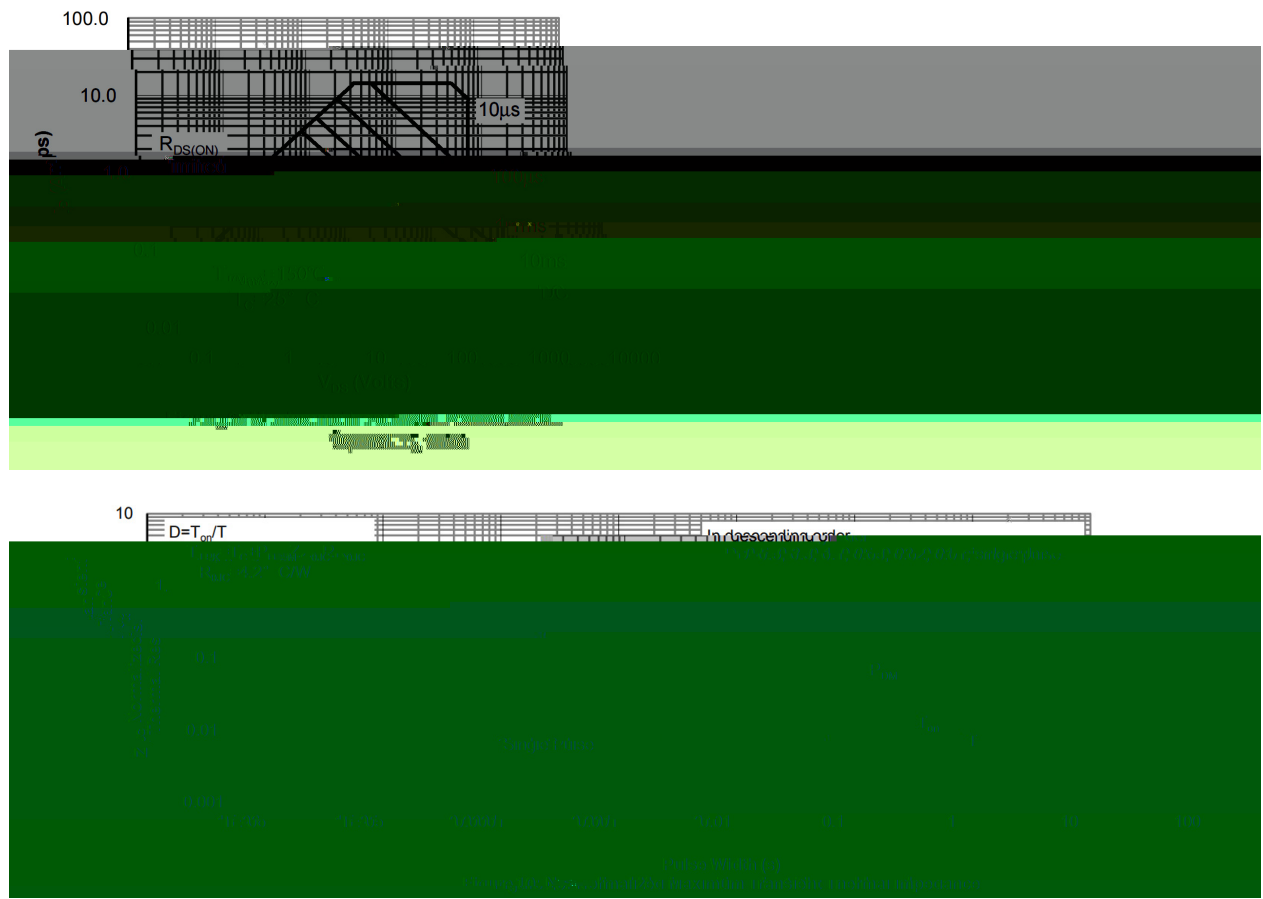
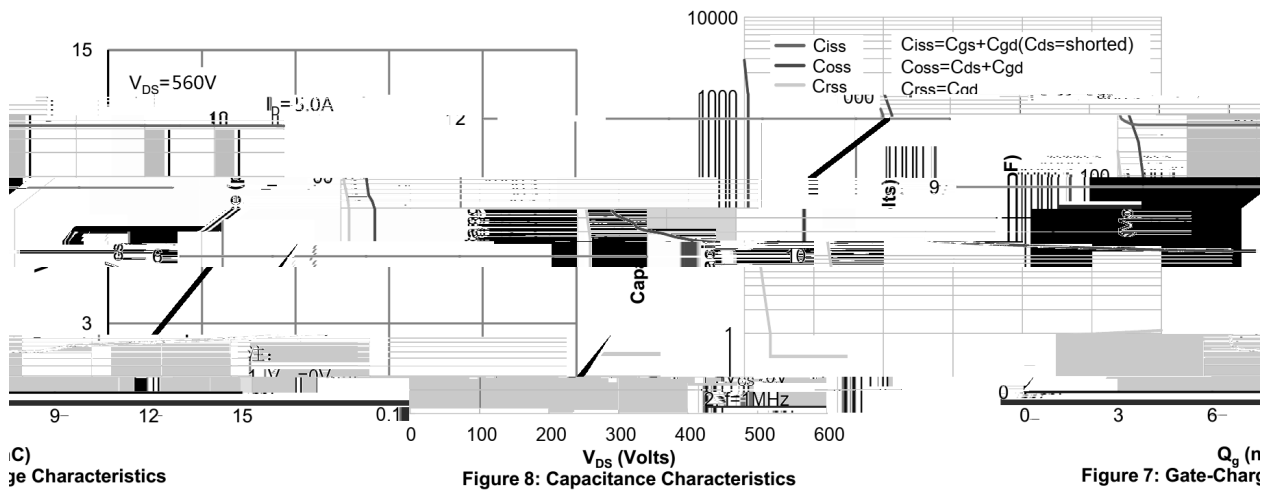


Figure 1: Transfer Characteristics  
Figure 3: On-Resistance vs. Drain Current at Gate Voltage  
Figure 4: On-Resistance vs. Junction Temperature  
Figure 5: Drain-Source Breakdown Voltage vs. Temperature  
Figure 6: Forward Bias Safe Operating Area (FBSOA)

/ Electrical Characteristic Curve



**BRFL70R900C**



/ Marking Instructions



BR

70R900C

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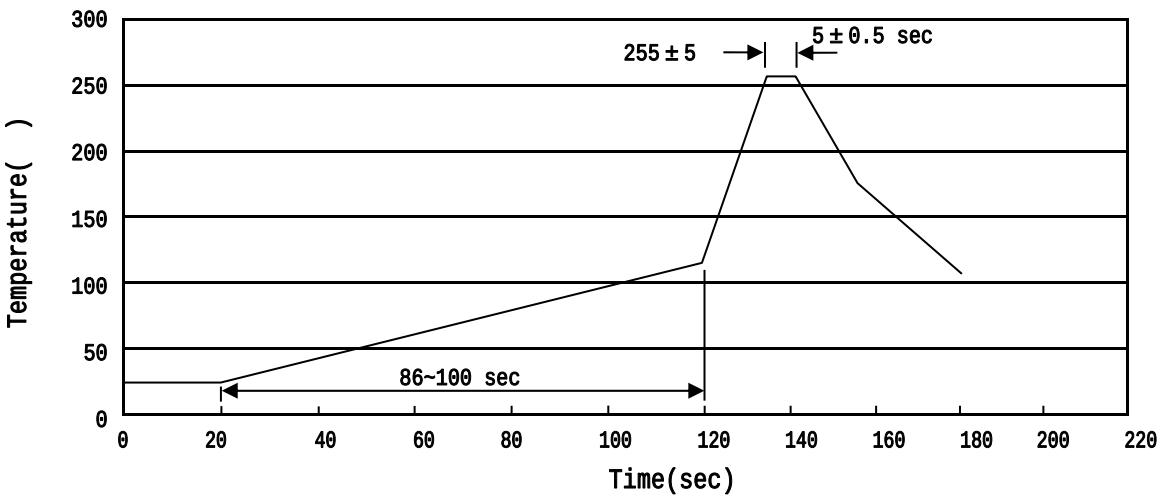
Note:

BR: Company Code

70R900C: Product Type Code

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

(     ) / Temperature Profile for Dip Soldering(Pb-Free)



Note:

- 1

25 150

60 90sec;

1.Preheating:25~150 °C , Time:60~90sec.
- 2

255±5

5±0.5sec;

2.Peak Temp.:255±5 °C , Duration:5±0.5sec.
- 3

2 10

/sec.

3. Cooling Speed: 2~10 °C /sec.

/ Resistance to Soldering Heat Test Conditions

270±5                      10±1 sec.                      Temp.:270±5                      Time:10±1 sec

/ Packaging SPEC.

/ TUBE

| Package Type | Units           |                      |                      |                            |                      | Dimension (unit mm <sup>3</sup> ) |            |             |
|--------------|-----------------|----------------------|----------------------|----------------------------|----------------------|-----------------------------------|------------|-------------|
|              | Units/Tube<br>/ | Tubes/Inner Box<br>/ | Units/Inner Box<br>/ | Inner Boxes/Outer Box<br>/ | Units/Outer Box<br>/ | Tube                              | Inner Box  | Outer Box   |
| TO-220FL     | 50              | 20                   | 1,000                | 5                          | 5,000                | 532×33×7.0                        | 555×164×50 | 575×290×180 |

/ Notices