

## TO-220F Plastic-Encapsulate MOSFETS

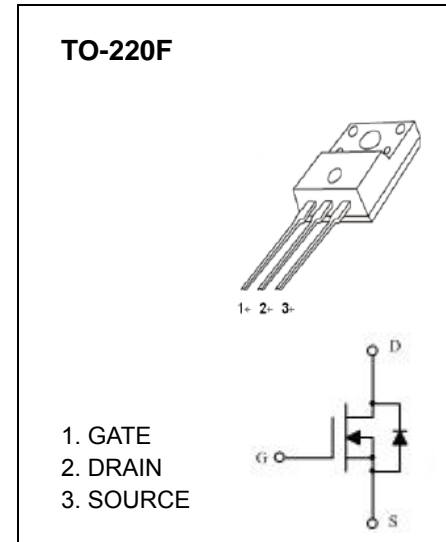
### CJPF04N65A N-Channel Power MOSFET

#### GENERAL DESCRIPTION

This advanced high voltage MOSFET is designed to stand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.

#### FEATURE

- High Current Rating
- Lower  $R_{DS(on)}$
- Lower Capacitance
- Lower Total Gate Charge
- Tighter  $V_{SD}$  Specifications
- Avalanche Energy Specified



#### Maximum ratings ( $T_a=25^\circ\text{C}$ unless otherwise noted)

| Parameter   | Symbol          | Value      | Unit                      |
|---|-----------------|------------|---------------------------|
| Drain-Source Voltage  | $V_{DS}$        | 650        | V                         |
| Gate-Source Voltage   | $V_{GSS}$       | $\pm 30$   |                           |
| Continuous Drain Current  | $I_D$           | 4.0        | A                         |
| Pulsed Drain Current  | $I_{DM}$        | 16         |                           |
| Single Pulsed Avalanche Energy (note1)  | $E_{AS}$        | 280        | mJ                        |
| Power Dissipation   | $P_D$           | 2          | W                         |
| Thermal Resistance from Junction to Ambient                                       | $R_{\theta JA}$ | 62.5       | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range   | $T_J, T_{STG}$  | -55 ~ +150 | $^\circ\text{C}$          |
| Maximum lead temperature for soldering purposes ,<br>1/8" from case for 5 seconds | $T_L$           | 260        |                           |

Electrical characteristics (T<sub>a</sub>=25°C unless otherwise noted)

| Parameter                                 | Symbol               | Test Condition   | Min | Typ | Max  | Unit |
|---|----------------------|--|-----|-----|------|------|
| <b>Off characteristics</b>                |                      |  |     |     |      |      |
| Drain-source breakdown voltage            | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA   | 650 |     |      | V    |
| Drain-source diode forward voltage(note2) | V <sub>SD</sub>      | V <sub>GS</sub> = 0V, I <sub>S</sub> = 4.0A  |     |     | 1.5  |      |
| Zero gate voltage drain current           | I <sub>DSS</sub>     | V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V   |     |     | 25   | μA   |
| Gate-body leakage current (note2)         | I <sub>GSS</sub>     | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±30V   |     |     | ±100 | nA   |
| <b>On characteristics (note2)</b>         |                      |  |     |     |      |      |
| Gate-threshold voltage                    | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                     | 2.0 |     | 4.0  | V    |
| Static drain-source on-resistance         | R <sub>DS(on)</sub>  | V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.0A   |     |     | 3.0  | Ω    |
| <b>Dynamic characteristics (note 3)</b>   |                      |  |     |     |      |      |
| Input capacitance                         | C <sub>iss</sub>     | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz  |     |     | 760  | pF   |
| Output capacitance                        | C <sub>oss</sub>     |  |     |     | 180  |      |
| Reverse transfer capacitance              | C <sub>rss</sub>     |  |     |     | 20   |      |
| <b>Switching characteristics (note 3)</b> |                      |  |     |     |      |      |
| Total gate charge                         | Q <sub>g</sub>       | V <sub>DS</sub> = 480V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.0A                           |     | 5.0 | 10   | nC   |
| Gate-source charge                        | Q <sub>gs</sub>      |  |     | 2.7 |      |      |
| Gate-drain charge                         | Q <sub>gd</sub>      |  |     | 2.0 |      |      |
| Turn-on delay time (note3)                | t <sub>d(on)</sub>   | V <sub>DD</sub> = 300V, V <sub>GS</sub> = 10V,<br>R <sub>G</sub> = 9.1Ω, I <sub>D</sub> = 4.0A |     |     | 20   | ns   |
| Turn-on rise time (note3)                 | t <sub>r</sub>       |  |     |     | 10   |      |
| Turn-off delay time (note3)               | t <sub>d(off)</sub>  |  |     |     | 40   |      |
| Turn-off fall time (note3)                | t <sub>f</sub>       |  |     |     | 20   |      |

**Notes :**

- L=30mH, I<sub>L</sub>=4 A, V<sub>DD</sub>=100V, V<sub>GS</sub>=10V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
- Pulse Test : Pulse width ≤ 300μs, duty cycle ≤ 2%.
- These parameters have no way to verify.