

## Super FAP-G Series

## ■ Features

- High speed switching
- Low on-resistance
- No secondary breakdown
- Low driving power
- Avalanche-proof

## ■ Applications

- Switching regulators
- DC-DC converters
- UPS (Uninterruptible Power Supply)

## ■ Maximum ratings and characteristic Absolute maximum ratings

● (T<sub>c</sub>=25°C unless otherwise specified)

| Item                                    | Symbol               | Ratings     | Unit  | Remarks                 |
|-----------------------------------------|----------------------|-------------|-------|-------------------------|
| Drain-source voltage                    | V <sub>DS</sub>      | 500         | V     |                         |
|                                         | V <sub>DSX</sub>     | 500         | V     | V <sub>GS</sub> =-30V   |
| Continuous drain current                | I <sub>D</sub>       | ±19         | A     |                         |
| Pulsed drain current                    | I <sub>D(puls)</sub> | ±76         | A     |                         |
| Gate-source voltage                     | V <sub>GS</sub>      | ±30         | V     |                         |
| Non-Repetitive                          | I <sub>AS</sub>      | 19          | A     | T <sub>ch</sub> ≤150°C  |
| Maximum avalanche current               |                      |             |       |                         |
| Non-Repetitive                          | E <sub>AS</sub>      | 245.3       | mJ    | L=1.25mH                |
| Maximum avalanche energy                |                      |             |       | V <sub>CC</sub> =50V *2 |
| Maximum Drain-Source dV/dt              | dV <sub>DS</sub> /dt | 20          | kV/s  | V <sub>DS</sub> ≤500V   |
| Peak diode recovery dV/dt               | dV/dt                | 5           | kV/μs | *3                      |
| Max. power dissipation                  | P <sub>D</sub>       | 2.16        | W     | T <sub>a</sub> =25°C    |
|                                         |                      | 97          |       | T <sub>c</sub> =25°C    |
| Operating and storage temperature range | T <sub>ch</sub>      | +150        | °C    |                         |
|                                         | T <sub>stg</sub>     | -55 to +150 | °C    |                         |
| Isolation voltage                       | V <sub>ISO</sub>     | 2           | kVrms | t=60sec, f=60Hz         |

\*2 See to Avalanche Energy Graph

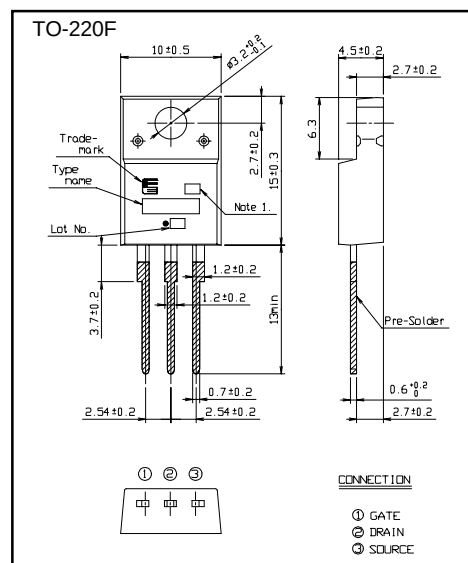
\*3 I<sub>F</sub>≤-I<sub>D</sub>, -di/dt=50A/μs, V<sub>CC</sub>≤BV<sub>DSS</sub>, T<sub>ch</sub>≤150°C● Electrical characteristics (T<sub>c</sub>=25°C unless otherwise specified)

| Item                             | Symbol               | Test Conditions                                                  | Min. | Typ. | Max. | Units |
|----------------------------------|----------------------|------------------------------------------------------------------|------|------|------|-------|
| Drain-source breakdown voltage   | V(BR) <sub>DSS</sub> | I <sub>D</sub> =250μA V <sub>GS</sub> =0V                        | 500  |      |      | V     |
| Gate threshold voltage           | V <sub>GS(th)</sub>  | I <sub>D</sub> =250μA V <sub>DS</sub> =V <sub>GS</sub>           | 3.0  |      | 5.0  | V     |
| Zero gate voltage drain current  | I <sub>DSS</sub>     | V <sub>DS</sub> =500V V <sub>GS</sub> =0V T <sub>ch</sub> =25°C  |      |      | 25   | μA    |
|                                  |                      | V <sub>DS</sub> =400V V <sub>GS</sub> =0V T <sub>ch</sub> =125°C |      |      | 250  |       |
| Gate-source leakage current      | I <sub>GSS</sub>     | V <sub>GS</sub> =±30V V <sub>DS</sub> =0V                        |      | 10   | 100  | nA    |
| Drain-source on-state resistance | R <sub>DS(on)</sub>  | I <sub>D</sub> =9.5A V <sub>GS</sub> =10V                        |      | 0.29 | 0.38 | Ω     |
| Forward transconductance         | g <sub>fs</sub>      | I <sub>D</sub> =9.5A V <sub>DS</sub> =25V                        | 7.5  | 15   |      | S     |
| Input capacitance                | C <sub>iss</sub>     | V <sub>DS</sub> =25V                                             |      | 1560 | 2340 | pF    |
| Output capacitance               | C <sub>oss</sub>     | V <sub>GS</sub> =0V                                              |      | 230  | 345  |       |
| Reverse transfer capacitance     | C <sub>rss</sub>     | f=1MHz                                                           |      | 8    | 12   |       |
| Turn-on time t <sub>on</sub>     | td(on)               | V <sub>CC</sub> =300V I <sub>D</sub> =9.5A                       |      | 29   | 43.5 | ns    |
|                                  | t <sub>r</sub>       | V <sub>GS</sub> =10V                                             |      | 13   | 19.5 |       |
| Turn-off time t <sub>off</sub>   | td(off)              | R <sub>GS</sub> =10 Ω                                            |      | 56   | 84   |       |
|                                  | t <sub>f</sub>       |                                                                  |      | 8    | 12   |       |
| Total Gate Charge                | Q <sub>G</sub>       | V <sub>CC</sub> =250V                                            |      | 34   | 51   | nC    |
| Gate-Source Charge               | Q <sub>GS</sub>      | I <sub>D</sub> =19A                                              |      | 13   | 19.5 |       |
| Gate-Drain Charge                | Q <sub>GD</sub>      | V <sub>GS</sub> =10V                                             |      | 10   | 15   |       |
| Avalanche capability             | I <sub>AV</sub>      | L=1.25mH T <sub>ch</sub> =25°C                                   | 19   |      |      | A     |
| Diode forward on-voltage         | V <sub>SD</sub>      | I <sub>F</sub> =19A V <sub>GS</sub> =0V T <sub>ch</sub> =25°C    |      | 1.20 | 1.50 | V     |
| Reverse recovery time            | t <sub>rr</sub>      | I <sub>F</sub> =19A V <sub>GS</sub> =0V                          |      | 0.57 |      | μs    |
| Reverse recovery charge          | Q <sub>rr</sub>      | -di/dt=100A/μs T <sub>ch</sub> =25°C                             |      | 7.0  |      | μC    |

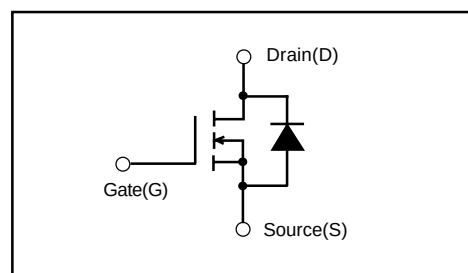
## ● Thermal characteristics

| Item               | Symbol                | Test Conditions    | Min. | Typ. | Max.  | Units |
|--------------------|-----------------------|--------------------|------|------|-------|-------|
| Thermal resistance | R <sub>th(ch-c)</sub> | channel to case    |      |      | 1.289 | °C/W  |
|                    | R <sub>th(ch-a)</sub> | channel to ambient |      |      | 58.0  | °C/W  |

## ■ Outline Drawings [mm]



## ■ Equivalent circuit schematic



## Characteristics

