

## N-CHANNEL SILICON POWER MOS-FET

### Features

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

### Applications

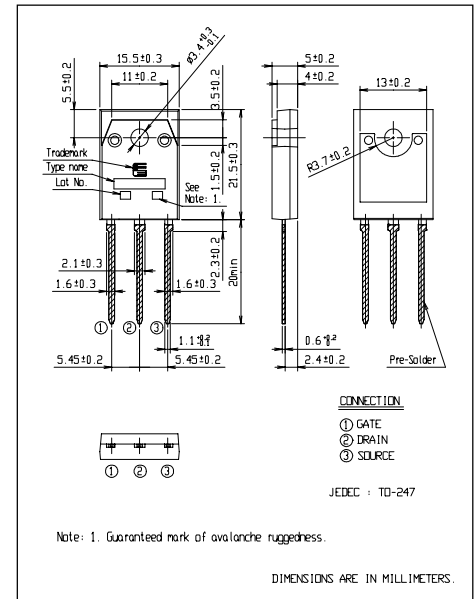
- Switching regulators
- UPS (Uninterruptible Power Supply)
- DC-DC converters

### Maximum ratings and characteristic Absolute maximum ratings

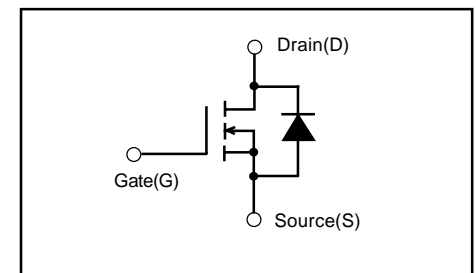
(T<sub>c</sub>=25°C unless otherwise specified)

| Item                                    | Symbol                              | Rating              | Unit |
|---|-------------------------------------|---------------------|------|
| Drain-source voltage                    | V <sub>DS</sub>                     | 500                 | V    |
| Continuous drain current                | I <sub>D</sub>                      | ±27                 | A    |
| Pulsed drain current                    | I <sub>D</sub> (puls)               | ±108                | A    |
| Gate-source voltage                     | V <sub>GS</sub>                     | ±30                 | V    |
| Repetitive or non-repetitive            | IAR *2                              | 27                  | A    |
| Maximum Avalanche Energy                | EAV *1                              | 914                 | mJ   |
| Max. power dissipation                  | P <sub>D</sub>                      | 400                 | W    |
| Operating and storage temperature range | T <sub>ch</sub><br>T <sub>stg</sub> | +150<br>-55 to +150 | °C   |

\*1 L=2.30mH, V<sub>CC</sub>=50V \*2 T<sub>ch</sub> ≤ 150°C



### Equivalent circuit schematic



### Electrical characteristics (T<sub>c</sub> =25°C unless otherwise specified)

| Item                             | Symbol               | Test Conditions   | Min.                   | Typ. | Max. | Units |
|----------------------------------|----------------------|---|------------------------|------|------|-------|
| Drain-source breakdown voltage   | V <sub>(BR)DSS</sub> | I <sub>D</sub> =1mA V <sub>GS</sub> =0V                                     | 500                    |      |      | V     |
| Gate threshold voltage           | V <sub>GS(th)</sub>  | I <sub>D</sub> =1mA V <sub>DS</sub> =V <sub>GS</sub>                        | 2.5                    | 3.0  | 3.5  | V     |
| Zero gate voltage drain current  | I <sub>DSS</sub>     | V <sub>DS</sub> =500V<br>V <sub>GS</sub> =0V                                | T <sub>ch</sub> =25°C  | 10   | 500  | μA    |
|                                  |                      |   | T <sub>ch</sub> =125°C | 0.2  | 1.0  | mA    |
| 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> =13.5A V <sub>GS</sub> =10V                                  |                        | 0.16 | 0.2  | Ω     |
| Forward transconductance         | g <sub>fs</sub>      | I <sub>D</sub> =13.5A V <sub>DS</sub> =25V                                  | 11                     | 22   |      | S     |
| Input capacitance                | C <sub>iss</sub>     | V <sub>DS</sub> =25V  |                        | 4300 | 6450 | pF    |
| Output capacitance               | C <sub>oss</sub>     | V <sub>GS</sub> =0V   |                        | 630  | 945  | pF    |
| Reverse transfer capacitance     | C <sub>rss</sub>     | f=1MHz  |                        | 285  | 430  | pF    |
| Turn-on time t <sub>on</sub>     | td(on)               | V <sub>CC</sub> =300V I <sub>D</sub> =27A                                   |                        | 40   | 60   | ns    |
|                                  | t <sub>r</sub>       | V <sub>GS</sub> =10V  |                        | 145  | 220  |       |
| Turn-off time t <sub>off</sub>   | td(off)              | R <sub>GS</sub> =10Ω  |                        | 315  | 475  | ns    |
|                                  | t <sub>f</sub>       |   |                        | 150  | 225  |       |
| Total gate charge                | Q <sub>G</sub>       | V <sub>CC</sub> =250V   |                        | 198  | 300  | nC    |
| Gate-Source charge               | Q <sub>GS</sub>      | I <sub>D</sub> =27A   |                        | 38   | 60   |       |
| Gate-Drain charge                | Q <sub>GD</sub>      | V <sub>GS</sub> =10V  |                        | 81   | 125  |       |
| Avalanche capability             | I <sub>AV</sub>      | L=2.30mH T <sub>ch</sub> =25°C  | 27                     |      |      | A     |
| Diode forward on-voltage         | V <sub>SD</sub>      | I <sub>F</sub> =2xI <sub>DR</sub> V <sub>GS</sub> =0V T <sub>ch</sub> =25°C |                        | 1.2  | 1.8  | V     |
| Reverse recovery time            | t <sub>rr</sub>      | I <sub>F</sub> =I <sub>DR</sub> V <sub>GS</sub> =0V                         |                        | 660  |      | ns    |
| Reverse recovery charge          | Q <sub>rr</sub>      | -di/dt=100A/μs T <sub>ch</sub> =25°C  |                        | 15.0 |      | μC    |

### Thermal characteristics

| Item               | Symbol                | Test Conditions    | Min. | Typ. | Max.   | Units |
|--------------------|-----------------------|--------------------|------|------|--------|-------|
| Thermal resistance | R <sub>th(ch-c)</sub> | channel to case    |      |      | 0.3125 | °C/W  |
|                    | R <sub>th(ch-a)</sub> | channel to ambient |      |      | 50.0   | °C/W  |

Characteristics

