



PRELIMINARY

# SOLID STATE DEVICES, INC

14849 Firestone Boulevard · La Mirada, CA 90638  
Phone: (714) 670-SSDI (7734) · Fax: (714) 522-7424

## SFFR250M SFFD250M

**27 AMP  
200 VOLTS  
0.100 Ω**  
**RADIATION HARDENED  
N-CHANNEL MOSFET**  
SFFR250M: 100KRad(Si) Gamma  
SFFD250M: 10KRad (Si) Gamma

### Designer's Data Sheet

#### FEATURES:

- Hermetically Sealed, Isolated Package
- Ceramic Seals
- Available with formed leads
- TX, TXV and S Level
- Replaces: IRFM7250/8450, FRF250 R/H
- Also available in TO-254Z, TO-258, TO-259, TO-61 and MILPACK
  
- Second Generation Radiation Hardened Mosfet results from new design concepts.
- Gamma: A) Meets pre-rad specifications to 100 KRad(Si)  
B) Defined end-point specs at 300 and 1000 KRad(Si)  
C) Performance permits limited use to 3000 KRad(Si)
- Gamma Dot survives 3E9 Rad(Si)/sec at 500 BVDSS typically and survives 2E12 typically if current limited to IDM.
- Photo Current is typically 30nA per Rad(Si)/sec.
- Neutron: A) Pre-rad specifications for 3E12 neutrons/cm<sup>2</sup>  
B) Usable to 3E13 neutrons
- Single Event: typically survives 1E3 ions/cm<sup>2</sup> having an LET < 35 MeV/mg/cm<sup>2</sup> and a range ≥ 30μm at 200 BVDSS

This MOSFET is well suited for applications exposed to radiation environments such as switching regulation, switching converters, synchronous rectification, motor drives, relay drivers and drivers for high-power bipolar switching transistors requiring high speed and low gate drive power. This type can be operated directly from integrated circuits.

This part may be supplied as a die or in other packages. Reliability screening is performed in SSDI's JANS and Space Station Freedom approved facility.

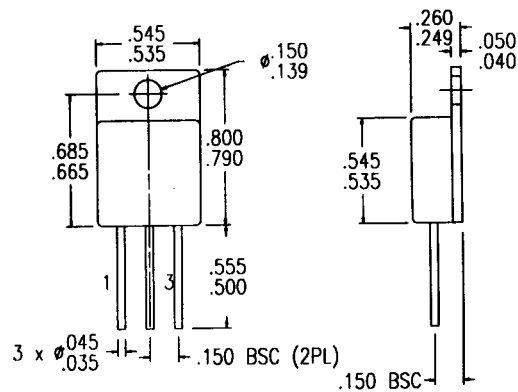
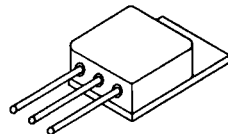
### MAXIMUM RATINGS

| CHARACTERISTIC   | SYMBOL                             | VALUE       | UNIT  |
|--|------------------------------------|-------------|-------|
| Drain to Source Voltage  | V <sub>DS</sub>                    | 200         | Volts |
| Gate to Source Voltage   | V <sub>GS</sub>                    | ± 20        | Volts |
| Continuous Drain Current   | I <sub>D</sub>                     | 27          | Amps  |
| Operating and Storage Temperature                                | T <sub>op</sub> & T <sub>stg</sub> | -55 to +150 | °C    |
| Thermal Resistance, Junction to Case                             | R <sub>θJC</sub>                   | 1.0         | °C/W  |
| Total Device Dissipation @ TA=25°C<br>Derate above 25°C @ 1 W/°C | P <sub>D</sub>                     | 125         | Watts |

#### PACKAGE OUTLINE: TO-254

#### PIN OUT:

- PIN 1: DRAIN
- PIN 2: SOURCE
- PIN 3: GATE



|  |                               |            |
|--|-------------------------------|------------|
| <b>NOTE:</b> All specifications are subject to change without notification. SCD's for these devices should be reviewed by SSDI prior to release. | <b>DATA SHEET #: FR0001 B</b> | <b>MED</b> |
|--|-------------------------------|------------|

**SFFR250M  
SFFD250M**

PRELIMINARY



**SOLID STATE DEVICES, INC**

14849 Firestone Boulevard · La Mirada, CA 90638  
Phone: (714) 670-SSDI (7734) · Fax: (714) 522-7424

| <b>ELECTRICAL CHARACTERISTICS @ T<sub>J</sub>=25 C (Unless Otherwise Specified)</b>  |  |   |                |            |                          |                          |
|--|--|---|----------------|------------|--------------------------|--------------------------|
| <b>RATING</b>  |  | <b>SYMBOL</b>   | <b>MIN</b>     | <b>TYP</b> | <b>MAX</b>               | <b>UNIT</b>              |
| <b>Drain to Source Breakdown Voltage</b><br>(V <sub>GS</sub> =0 V, I <sub>D</sub> =1mA)  |  | <b>BV<sub>DSS</sub></b>   | 200            |            | ---                      | <b>V</b>                 |
| <b>Drain to Source on State Resistance</b><br>(V <sub>GS</sub> =10 V, I <sub>D</sub> =17A)   |  | <b>R<sub>DS(on)</sub></b>   | ---            |            | 0.100                    | <b>Ω</b>                 |
| <b>On State Drain Current</b><br>(V <sub>DS</sub> >I <sub>D(on)</sub> X R <sub>DS(on)</sub> Max., V <sub>GS</sub> =10V)  |  | <b>I<sub>D(on)</sub></b>  | 27             |            | ---                      | <b>A</b>                 |
| <b>Gate Threshold Voltage</b><br>(V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =1mA)  |  | <b>V<sub>GS(th)</sub></b>   | 2.0            |            | 4.0                      | <b>V</b>                 |
| <b>Forward Transconductance</b><br>(V <sub>DS</sub> > I <sub>D(on)</sub> X R <sub>DS(on)</sub> Max,<br>I <sub>DS</sub> =60% rated ID)  |  | <b>g<sub>fs</sub></b>   | 13             |            | ---                      | <b>S(Ω)</b>              |
| <b>Zero Gate Voltage Drain Current</b><br>(V <sub>DS</sub> =max rated voltage, V <sub>GS</sub> =0 V)<br>(V <sub>DS</sub> =80% rated V <sub>DS</sub> , V <sub>GS</sub> =0 V, T <sub>A</sub> =125°C) |  | <b>I<sub>DSS</sub></b>  | ---            |            | 500<br>250               | <b>μA</b>                |
| <b>Gate to Source Leakage Forward</b><br><b>Gate to Source Leakage Reverse</b>   | At rated V <sub>GS</sub>   | <b>I<sub>GSS</sub></b>  | ---            |            | 100<br>100               | <b>nA</b>                |
| <b>Total Gate Charge</b><br><b>Gate to Source Charge</b><br><b>Gate to Drain Charge</b>  | V <sub>GS</sub> =10 Volts<br>50% rated V <sub>DS</sub><br>Rated I <sub>D</sub>   | <b>Q<sub>g</sub></b><br><b>Q<sub>gs</sub></b><br><b>Q<sub>gd</sub></b>                                | 60<br>10<br>30 |            | 250<br>50<br>100         | <b>nC</b>                |
| <b>Turn on Delay Time</b><br><b>Rise Time</b><br><b>Turn Off Delay Time</b><br><b>Fall Time</b>  | V <sub>DD</sub> =50%<br>rated V <sub>DS</sub><br>rated I <sub>D</sub><br>R <sub>G</sub> =25Ω<br>0 ≤ V <sub>GS</sub> ≤ 10 | <b>t<sub>d(on)</sub></b><br><b>t<sub>r</sub></b><br><b>t<sub>d(off)</sub></b><br><b>t<sub>f</sub></b> | ---            |            | 170<br>600<br>580<br>500 | <b>nsec</b>              |
| <b>Diode Forward Voltage</b><br>(I <sub>S</sub> =rated I <sub>D</sub> , V <sub>GS</sub> =0 V, T <sub>J</sub> =25°C)  |  | <b>V<sub>SD</sub></b>   | ---            |            | 2.0                      | <b>V</b>                 |
| <b>Diode Reverse Recovery Time</b><br><b>Reverse Recovery Charge</b>   | T <sub>J</sub> =25°C<br>I <sub>F</sub> =rated I <sub>D</sub><br>di/dt=100 A/μsec   | <b>t<sub>rr</sub></b><br><b>Q<sub>RR</sub></b>  | ---            |            | 1700<br>---              | <b>nsec</b><br><b>μC</b> |

**For thermal derating curves and other characteristic curves please contact SSDI Marketing Department.**