

Power Schottky rectifier

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capability specified

Description

Schottky rectifier suited for switch mode power supply and high frequency DC to DC converters.

Packaged in TO-220 full pack, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

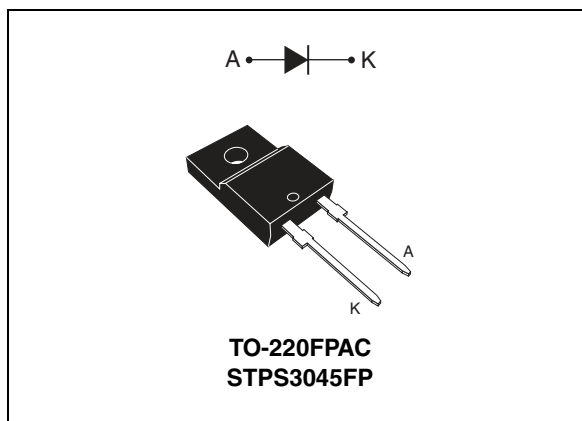


Table 1. Device summary

| Symbol | Value |
|--------------|--------|
| $I_{F(AV)}$ | 30 A |
| V_{RRM} | 45 V |
| $T_{j(max)}$ | 175 °C |
| $V_F(max)$ | 0.51 V |

1 Characteristics

Table 2. Absolute ratings (limiting values)

| Symbol | Parameter | Value | Unit | |
|---------------------|---|--|-------|---|
| V _{RRM} | Repetitive peak reverse voltage | 45 | V | |
| I _{F(RMS)} | Forward rms current | 45 | A | |
| I _{F(AV)} | Average forward current $\delta = 0.5$ | T _c = 85 °C | 30 | A |
| I _{FSM} | Surge non repetitive forward current | t _p = 10 ms sinusoidal, T _c = 25 °C | 300 | A |
| P _{ARM} | Repetitive peak avalanche power | t _p = 1 μ s, T _j = 25 °C | 12500 | W |
| T _{stg} | Storage temperature range | -65 to + 175 | °C | |
| T _j | Maximum operating junction temperature ⁽¹⁾ | + 175 | °C | |

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance parameters

| Symbol | Parameter | Value | Unit |
|----------------------|------------------|-------|------|
| R _{th(j-c)} | Junction to case | 4.0 | °C/W |

Table 4. Static electrical characteristics

| Symbol | Parameter | Tests conditions | Min. | Typ. | Max. | Unit | |
|-------------------------------|-------------------------|-------------------------|-----------------------------------|------|------|------|---------|
| I _R ⁽¹⁾ | Reverse leakage current | T _j = 25 °C | V _R = V _{RRM} | | | 300 | μ A |
| | | T _j = 125 °C | | | 20 | 60 | mA |
| V _F ⁽¹⁾ | Forward voltage drop | T _j = 25 °C | I _F = 30 A | | | 0.62 | V |
| | | T _j = 125 °C | | | 0.51 | 0.57 | |
| | | T _j = 25 °C | I _F = 60 A | | | 0.79 | |
| | | T _j = 125 °C | | | 0.65 | 0.72 | |

1. Pulse test: t_p = 380 μ s, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.42 \times I_{F(AV)} + 0.0050 \times I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

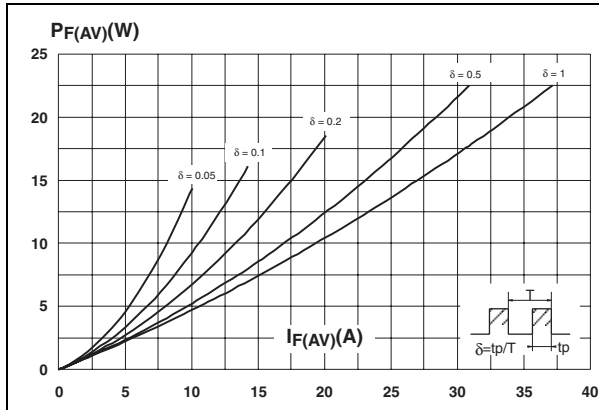


Figure 2. Average forward current versus ambient temperature (delta = 0.5)

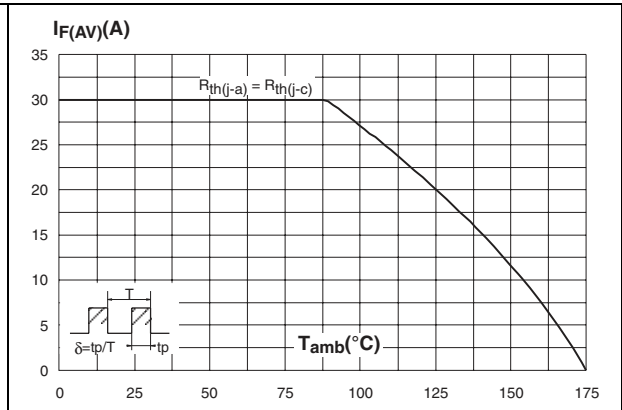


Figure 3. Normalized avalanche power derating versus pulse duration

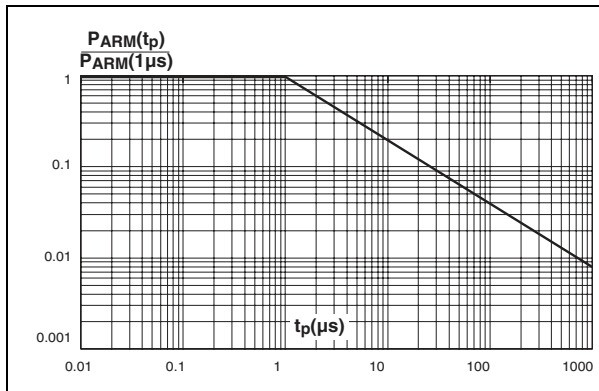


Figure 4. Normalized avalanche power derating versus junction temperature

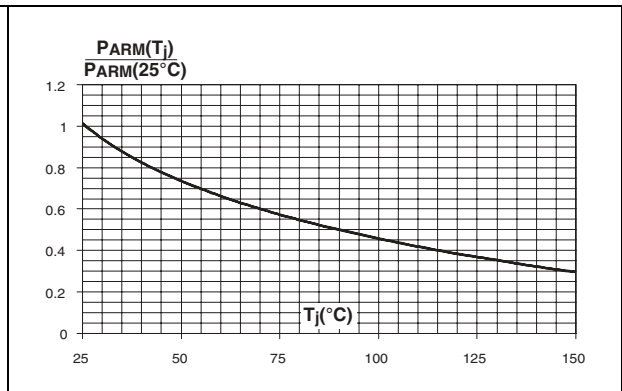


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

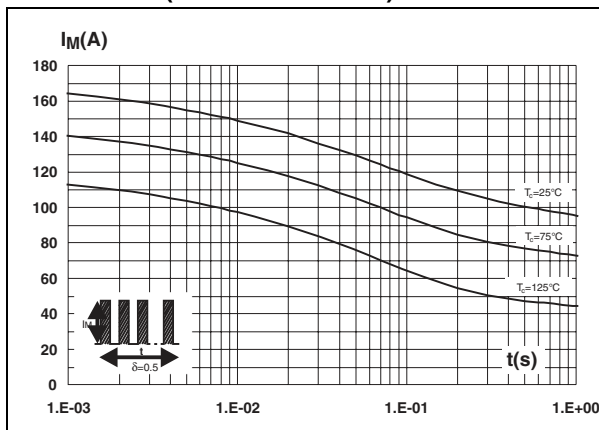


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

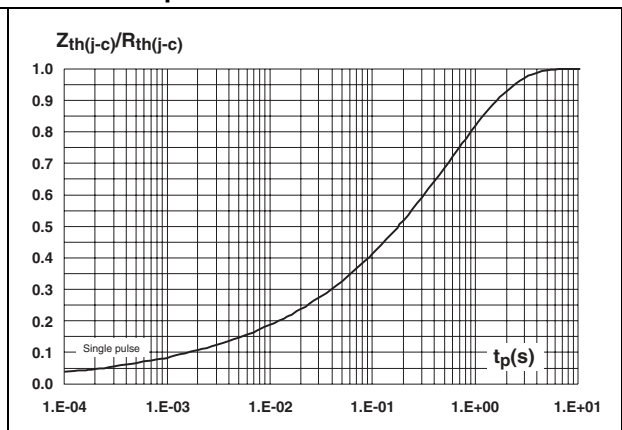


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

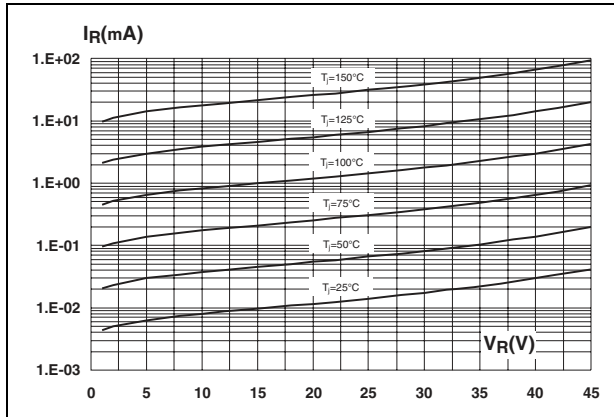


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

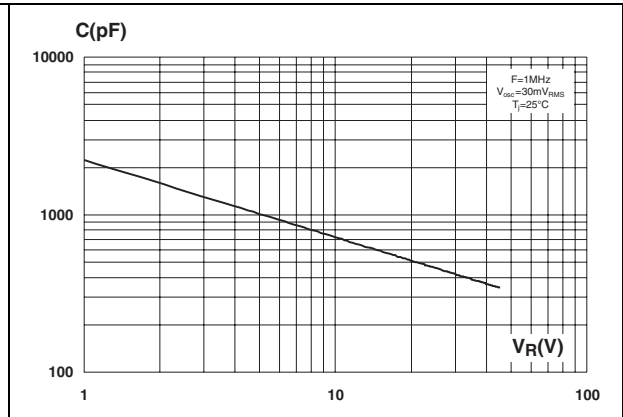
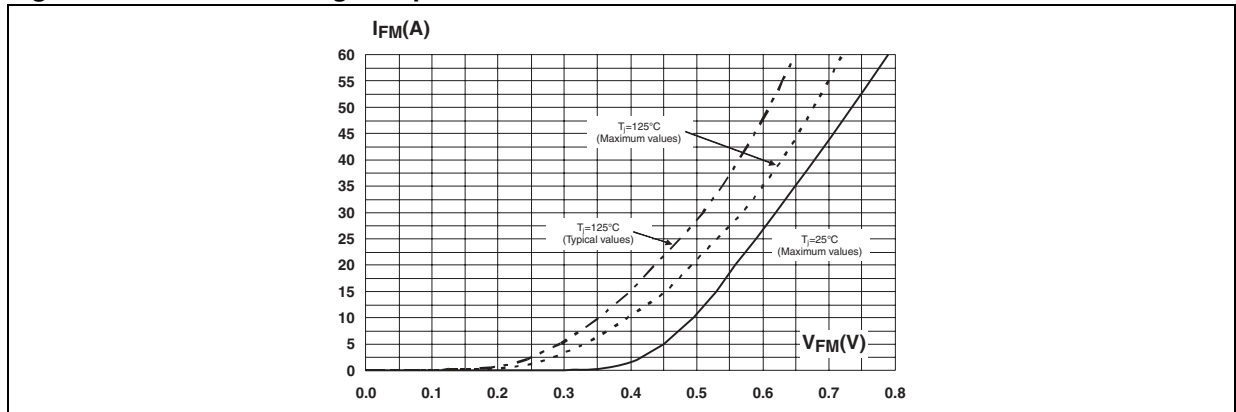


Figure 9. Forward voltage drop versus forward current



2 Package information

- Epoxy meets UL94,V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 5. TO-220FPAC dimensions

| Ref. | Dimensions | | | |
|------|-------------|------|-----------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.4 | 4.6 | 0.173 | 0.181 |
| B | 2.5 | 2.7 | 0.098 | 0.106 |
| D | 2.5 | 2.75 | 0.098 | 0.108 |
| E | 0.45 | 0.70 | 0.018 | 0.027 |
| F | 0.75 | 1 | 0.030 | 0.039 |
| F1 | 1.15 | 1.70 | 0.045 | 0.067 |
| G | 4.95 | 5.20 | 0.195 | 0.205 |
| G1 | 2.4 | 2.7 | 0.094 | 0.106 |
| H | 10 | 10.4 | 0.393 | 0.409 |
| L2 | 16 Typ. | | 0.63 Typ. | |
| L3 | 28.6 | 30.6 | 1.126 | 1.205 |
| L4 | 9.8 | 10.6 | 0.386 | 0.417 |
| L5 | 2.9 | 3.6 | 0.114 | 0.142 |
| L6 | 15.9 | 16.4 | 0.626 | 0.646 |
| L7 | 9.00 | 9.30 | 0.354 | 0.366 |
| Dia. | 3.00 | 3.20 | 0.118 | 0.126 |

3 Ordering information

Table 6. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|------------|------------|------------|--------|----------|---------------|
| STPS3045FP | STPS3045FP | TO-220FPAC | 2.2 g | 50 | Tube |

4 Revision history

Table 7. Document revision history

| Date | Revision | Changes |
|-------------|----------|---------------|
| 30-Mar-2011 | 1 | Initial issue |

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