

Features

- Negligible switching losses
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Low thermal resistance
- Avalanche capability specified

Description

Dual center tap Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in TO-200AB, TO-220AB narrow leads, TO-247, and I²PAK this device is intended for use in high frequency inverters.

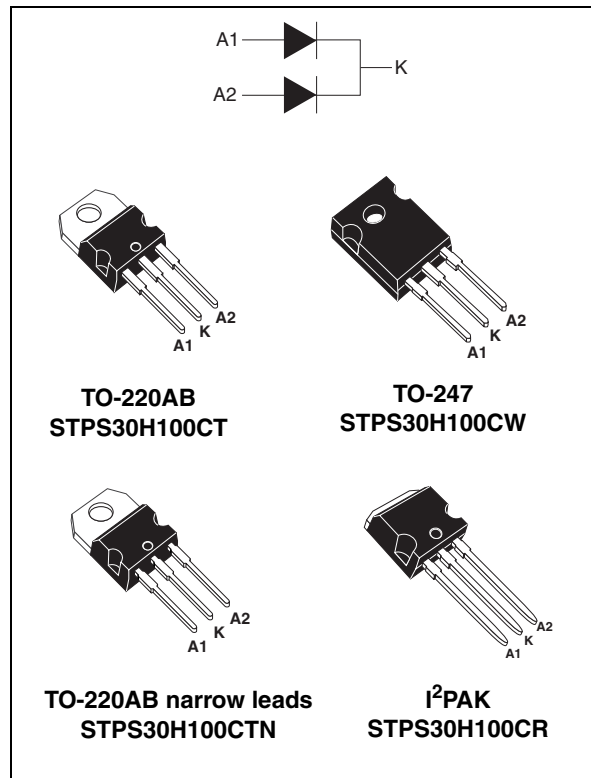


Table 1. Device summary

| Symbol | Value |
|-------------|----------|
| $I_{F(AV)}$ | 2 x 15 A |
| V_{RRM} | 100 V |
| $T_j(max)$ | 175 °C |
| $V_F(max)$ | 0.67 V |

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

| Symbol | Parameter | | Value | Unit |
|---------------------|---|--|---------------------------------|------|
| V _{RRM} | Repetitive peak reverse voltage | | 100 | V |
| I _{F(RMS)} | Forward rms current | | 30 | A |
| I _{F(AV)} | Average forward current | T _c = 155 °C δ = 0.5 | Per diode: 15 Per device: 30 | A |
| I _{FSM} | Surge non repetitive forward current | t _p = 10 ms sinusoidal | 250 | A |
| I _{RRM} | Repetitive peak reverse current | t _p = 2 μs square, F= 1 kHz | 1 | A |
| I _{RSM} | Non repetitive peak reverse current | t _p = 100 μs square | 3 | A |
| P _{ARM} | Repetitive peak avalanche power | t _p = 1 μs T _j = 25 °C | 10800 | W |
| T _{stg} | Storage temperature range | | -65 to + 175 | °C |
| T _j | Operating junction temperature range ⁽¹⁾ | | -40 to +175 | °C |
| dV/dt | Critical rate of rise of reverse voltage | | 10000 | V/μs |

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

| Symbol | Parameter | | Value | Unit |
|----------------------|------------------|-----------|-------|------|
| R _{th(j-c)} | Junction to case | Per diode | 1.6 | °C/W |
| | | Total | 0.9 | |
| R _{th(c)} | Coupling | | 0.1 | |

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j(\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

Table 4. Static electrical characteristics (per diode)

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|-------------------------------|-------------------------|-------------------------|-----------------------------------|------|------|------|------|
| I _R ⁽¹⁾ | Reverse leakage current | T _j = 25 °C | V _R = V _{RRM} | | | 5 | μA |
| | | T _j = 125 °C | | | 2 | 6 | mA |
| V _F ⁽²⁾ | Forward voltage drop | T _j = 25 °C | I _F = 15 A | | | 0.80 | V |
| | | T _j = 125 °C | | | 0.64 | 0.67 | |
| | | T _j = 25 °C | I _F = 30 A | | | 0.93 | |
| | | T _j = 125 °C | | | 0.74 | 0.8 | |

1. Pulse test: t_p = 5 ms, δ < 2%

2. Pulse test: t_p = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation:

$$P = 0.54 \times I_{F(AV)} + 0.0086 I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current (per diode)

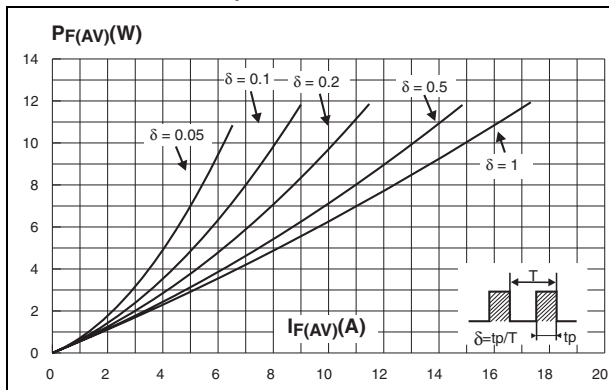


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

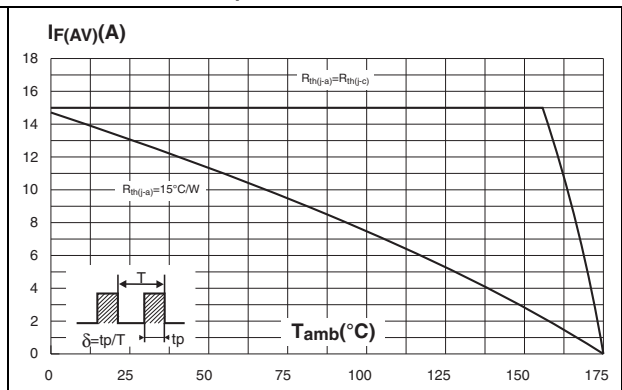


Figure 3. Normalized avalanche power derating versus pulse duration

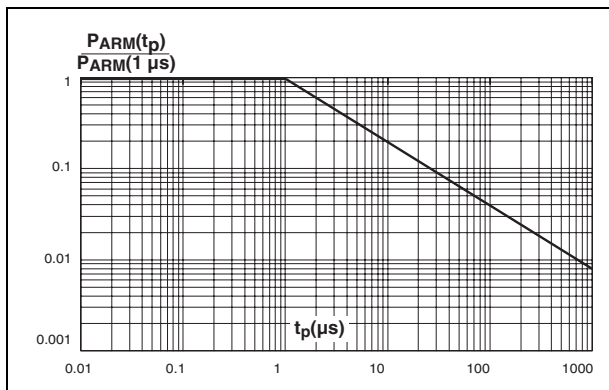


Figure 4. Normalized avalanche power derating versus junction temperature

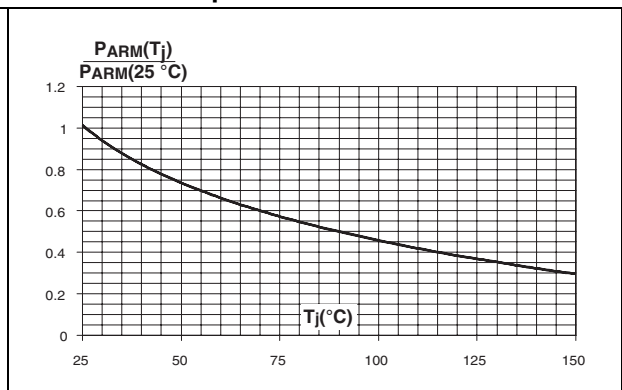


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

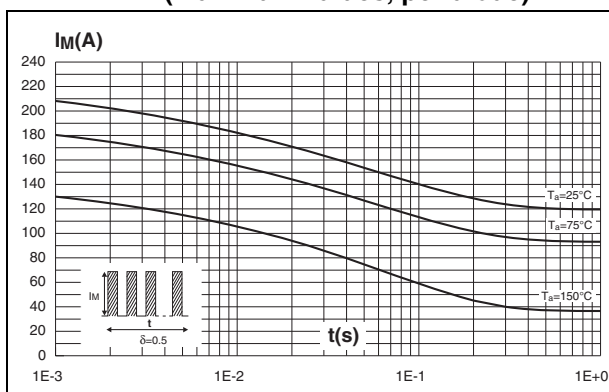


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

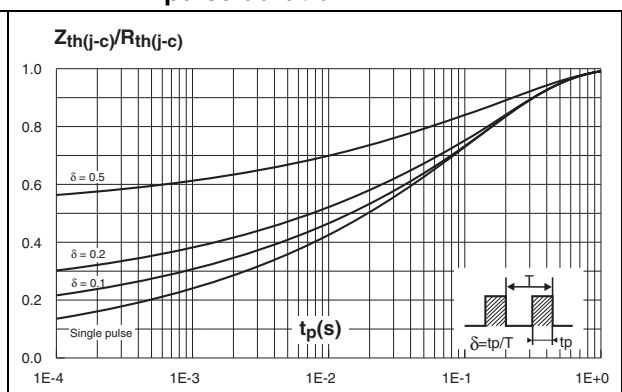


Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)

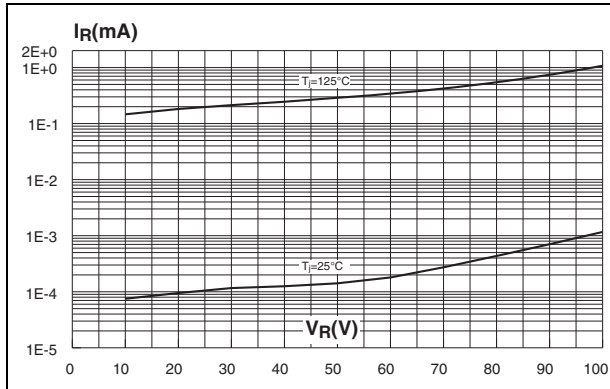


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

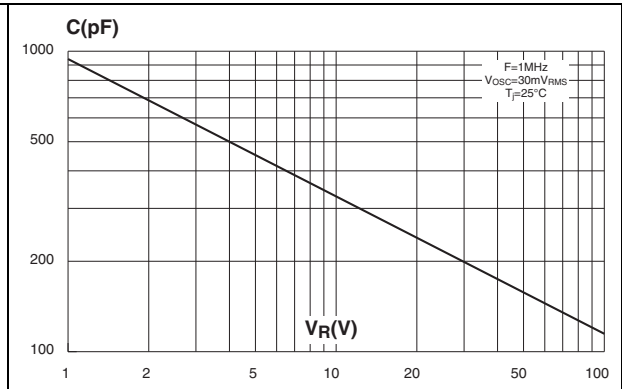
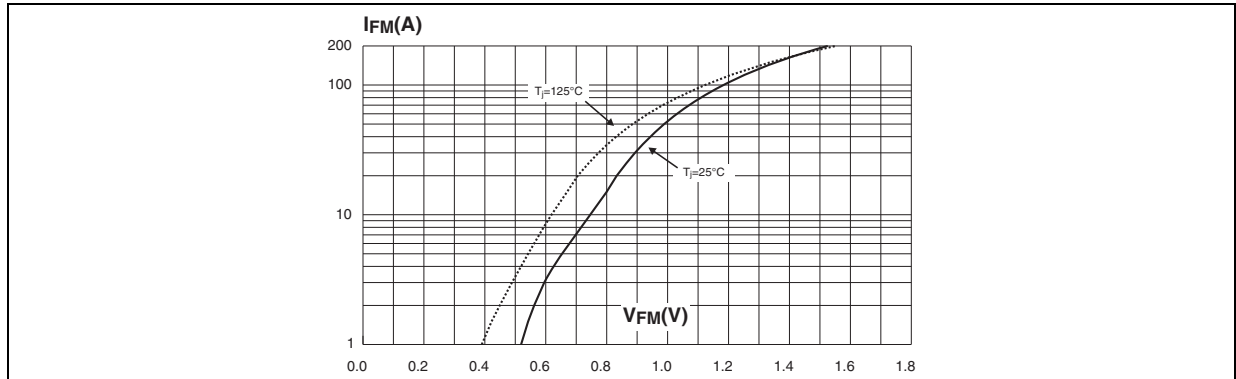


Figure 9. Forward voltage drop versus forward current (maximum values, per diode)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.4 to 0.6 N·m (TO-220AB), 0.55 N·m (TO-247)
- Maximum torque value: 1.0 N·m (TO-247)

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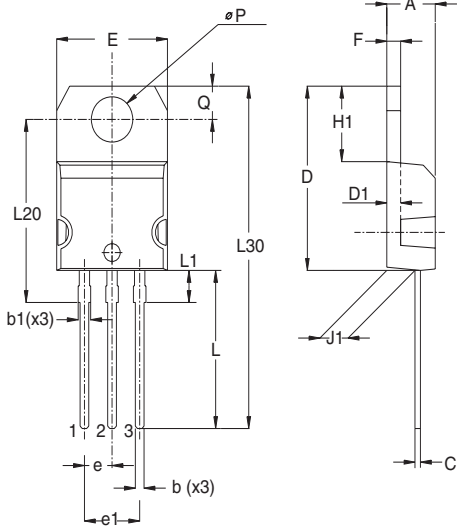
Table 5. TO-247 dimensions

| Ref. | Dimensions | | | | | |
|-------------------|-------------|------|-------|------------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.85 | | 5.15 | 0.191 | | 0.203 |
| A1 | 2.20 | | 2.60 | 0.086 | | 0.102 |
| b | 1.00 | | 1.40 | 0.039 | | 0.055 |
| b1 | 2.00 | | 2.40 | 0.078 | | 0.094 |
| b2 | 3.00 | | 3.40 | 0.118 | | 0.133 |
| c | 0.40 | | 0.80 | 0.015 | | 0.031 |
| D ⁽¹⁾ | 19.85 | | 20.15 | 0.781 | | 0.793 |
| E | 15.45 | | 15.75 | 0.608 | | 0.620 |
| e | 5.30 | 5.45 | 5.60 | 0.209 | 0.215 | 0.220 |
| L | 14.20 | | 14.80 | 0.559 | | 0.582 |
| L1 | 3.70 | | 4.30 | 0.145 | | 0.169 |
| L2 | 18.50 typ. | | | 0.728 typ. | | |
| ØP ⁽²⁾ | 3.55 | | 3.65 | 0.139 | | 0.143 |
| ØR | 4.50 | | 5.50 | 0.177 | | 0.217 |
| S | 5.30 | 5.50 | 5.70 | 0.209 | 0.216 | 0.224 |

1. Dimension D plus gate protrusion does not exceed 20.5 mm
2. Resin thickness around the mounting hole is not less than 0.9 mm

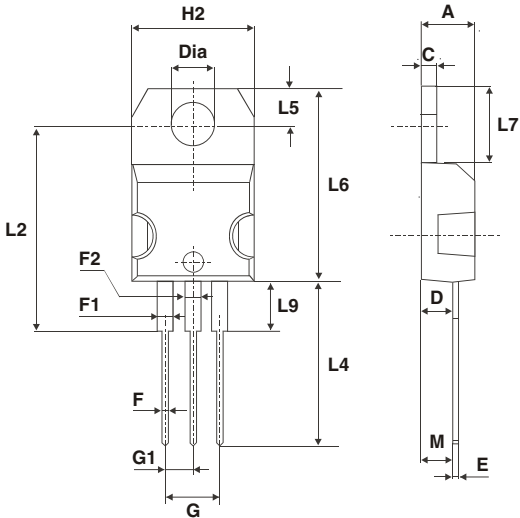
Table 6. TO-220AB narrow leads dimensions

| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.17 | | 0.18 |
| b | 0.61 | | 0.88 | 0.024 | | 0.034 |
| b1 | 0.95 | | 1.20 | 0.037 | | 0.047 |
| c | 0.48 | | 0.70 | 0.019 | | 0.027 |
| D | 15.25 | | 15.75 | 0.60 | | 0.62 |
| D1 | 1.27 | | | 0.05 | | |
| E | 10.00 | | 10.40 | 0.39 | | 0.41 |
| e | 2.40 | | 2.70 | 0.094 | | 0.106 |
| e1 | 4.95 | | 5.15 | 0.19 | | 0.20 |
| F | 1.23 | | 1.32 | 0.048 | | 0.052 |
| H1 | 6.20 | | 6.60 | 0.24 | | 0.26 |
| J1 | 2.40 | | 2.72 | 0.095 | | 0.107 |
| L | 13.00 | | 14.00 | 0.51 | | 0.55 |
| L1 | 2.60 | | 2.90 | 0.102 | | 0.114 |
| L20 | 15.40 | | | 0.61 | | |
| L30 | 28.90 | | | 1.14 | | |
| ØP | 3.75 | | 3.85 | 0.147 | | 0.151 |
| Q | 2.65 | | 2.95 | 0.104 | | 0.116 |



Note: The legs of the TO-220 narrow leads must NOT be bent when mounted on the PCB.

Table 7. TO-220AB dimensions



| Ref. | Dimensions | | | |
|-------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| C | 1.23 | 1.32 | 0.048 | 0.051 |
| D | 2.40 | 2.72 | 0.094 | 0.107 |
| E | 0.49 | 0.70 | 0.019 | 0.027 |
| F | 0.61 | 0.88 | 0.024 | 0.034 |
| F1 | 1.14 | 1.70 | 0.044 | 0.066 |
| F2 | 1.14 | 1.70 | 0.044 | 0.066 |
| G | 4.95 | 5.15 | 0.194 | 0.202 |
| G1 | 2.40 | 2.70 | 0.094 | 0.106 |
| H2 | 10 | 10.40 | 0.393 | 0.409 |
| L2 | 16.4 typ. | | 0.645 typ. | |
| L4 | 13 | 14 | 0.511 | 0.551 |
| L5 | 2.65 | 2.95 | 0.104 | 0.116 |
| L6 | 15.25 | 15.75 | 0.600 | 0.620 |
| L7 | 6.20 | 6.60 | 0.244 | 0.259 |
| L9 | 3.50 | 3.93 | 0.137 | 0.154 |
| M | 2.6 typ. | | 0.102 typ. | |
| Diam. | 3.75 | 3.85 | 0.147 | 0.151 |

Table 8. I²PAK dimensions

| Ref. | Dimensions | | | |
|------|-------------|-------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| A1 | 2.40 | 2.72 | 0.094 | 0.107 |
| b | 0.61 | 0.88 | 0.024 | 0.035 |
| b1 | 1.14 | 1.70 | 0.044 | 0.067 |
| c | 0.49 | 0.70 | 0.019 | 0.028 |
| c2 | 1.23 | 1.32 | 0.048 | 0.052 |
| D | 8.95 | 9.35 | 0.352 | 0.368 |
| e | 2.40 | 2.70 | 0.094 | 0.106 |
| e1 | 4.95 | 5.15 | 0.195 | 0.203 |
| E | 10 | 10.40 | 0.394 | 0.409 |
| L | 13 | 14 | 0.512 | 0.551 |
| L1 | 3.50 | 3.93 | 0.138 | 0.155 |
| L2 | 1.27 | 1.40 | 0.050 | 0.055 |

3 Ordering information

Table 9. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|--------------|--------------------------|--------|----------|---------------|
| STPS30H100CW | STPS30H100CW | TO-247 | 4.36 g | 30 | Tube |
| STPS30H100CT | STPS30H100CT | TO-220AB | 2.20 g | 50 | Tube |
| STPS30H100CR | STPS30H100CR | I ² PAK | 1.49 g | 50 | Tube |
| STPS30H100CTN | PS30H100CTN | TO-220AB narrow leads | 1.9 g | 50 | Tube |

4 Revision history

Table 10. Revision history

| Date | Revision | Changes |
|--------------|----------|--|
| Jul-2003 | 5E | Previous release. |
| 30-Mar-2011 | 6 | Added I ² PAK package. |
| 15-Sep-2011 | 7 | Added TO-220AB narrow leads package. Updated Table 5 . |
| 21-June-2012 | 8 | Added minimum value for T _j in Table 2 . |

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