

Power Schottky rectifier

Features

- High reverse voltage (200 V)
- Low forward voltage drop
- High frequency operation

Description

The STPS60SM200C is a dual Schottky rectifier suited for high frequency switched-mode power supply.

Housed in TO-247, this device is especially suited for use in telecom base station SMPS, providing these applications with a good efficiency at both low and high load.

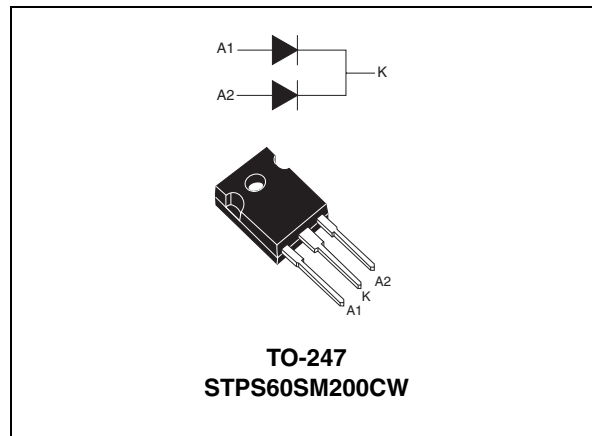


Table 1. Device summary

| Symbol | Value |
|-------------|----------|
| $I_{F(AV)}$ | 2 x 30 A |
| V_{RRM} | 200 V |
| T_j (max) | 175 °C |
| V_F (typ) | 640 mV |

1 Characteristics

Table 2. Absolute ratings (limiting values per diode at 25 °C, unless otherwise specified)

| Symbol | Parameter | | Value | Unit |
|---------------------|---|---|-------------------------|------|
| V _{RRM} | Repetitive peak reverse voltage | | 200 | V |
| I _{F(RMS)} | Forward current rms | | 50 | A |
| I _{F(AV)} | Average forward current δ = 0.5 | Per diode, δ = 0.5 | T _c = 155 °C | A |
| | | per device, δ = 0.5 | T _c = 150 °C | |
| I _{FSM} | Surge non repetitive forward current | t _p = 10 ms sinusoidal, T _c = 25 °C | | A |
| T _{stg} | Storage temperature range | | -65 to + 175 | °C |
| T _j | Maximum operating junction temperature ⁽¹⁾ | | -40 to + 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

| Symbol | Parameter | | Value | Unit |
|----------------------|------------------|-----------|-------|------|
| R _{th(j-c)} | Junction to case | Per diode | 0.7 | °C/W |
| | | Total | 0.5 | |
| R _{th(c)} | Coupling | | 0.3 | |

When the two 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} | | | 0.05 | mA |
| | | T _j = 125 °C | | | 6 | 13 | |
| V _F ⁽²⁾ | Forward voltage drop | T _j = 25 °C | I _F = 7.5 A | | 0.67 | 0.70 | V |
| | | T _j = 125 °C | | | 0.51 | 0.55 | |
| | | T _j = 25 °C | I _F = 15 A | | 0.73 | 0.77 | |
| | | T _j = 125 °C | | | 0.57 | 0.61 | |
| | | T _j = 25 °C | I _F = 30 A | | 0.79 | 0.83 | |
| | | T _j = 125 °C | | | 0.64 | 0.69 | |

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:

$$P = 0.58 \times I_{F(AV)} + 0.0037 \times I_{F(RMS)}^2$$

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

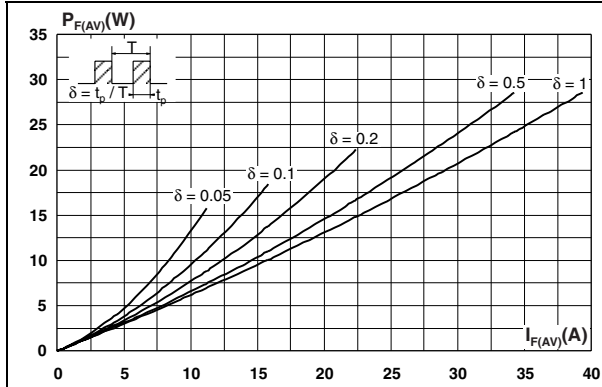


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

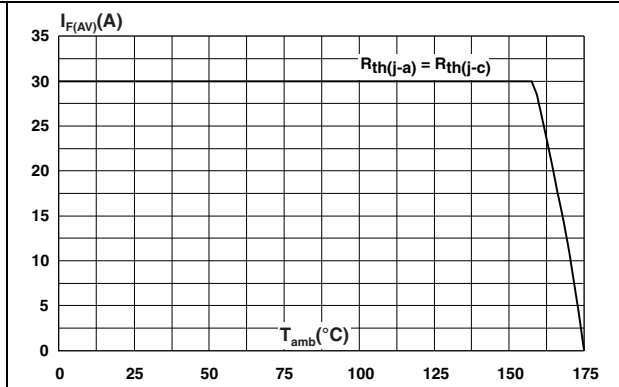


Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

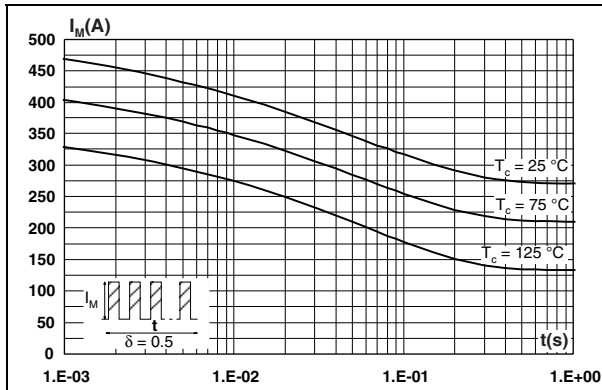


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

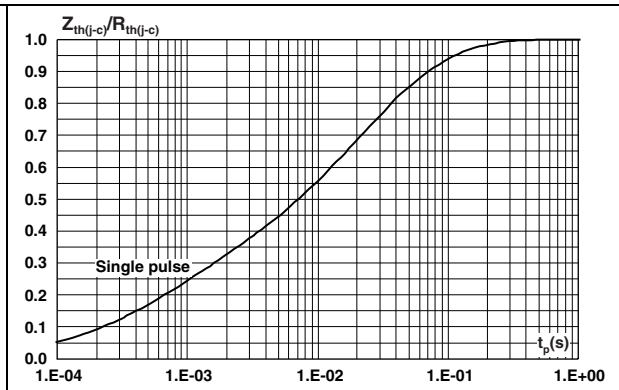


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

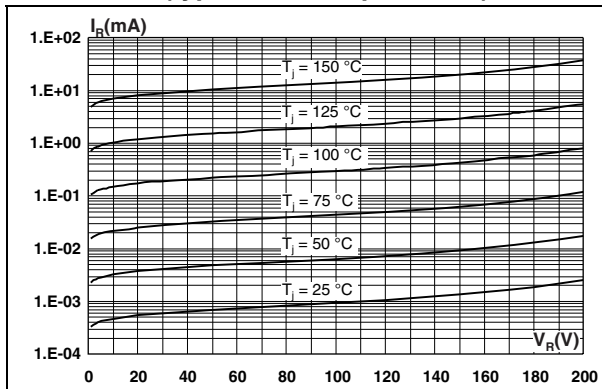


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

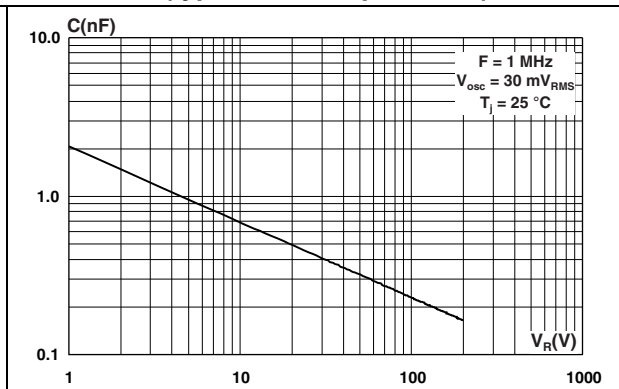


Figure 7. Forward voltage drop versus forward current (per diode, low level)

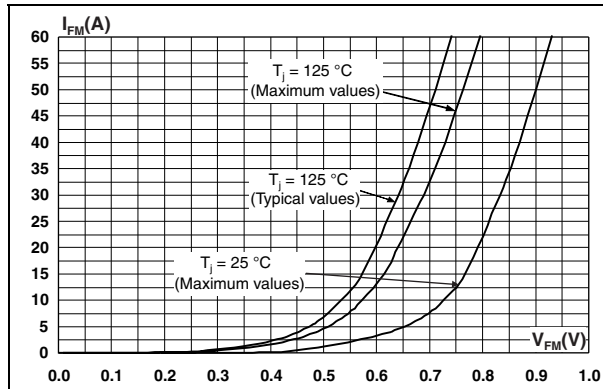
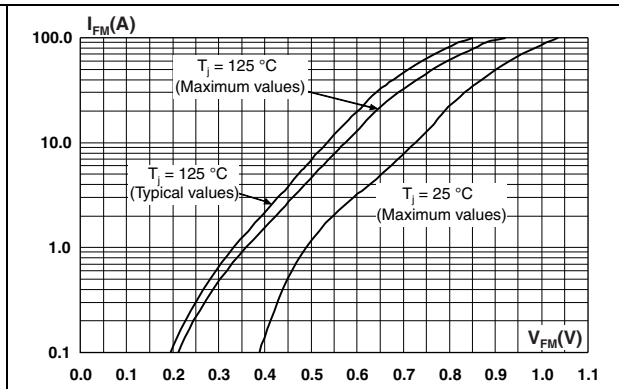


Figure 8. Forward voltage drop versus forward current (per diode, high level)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 to 1.0 N·m

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Table 5. TO-247 dimensions

| Ref. | Dimensions | | | |
|------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.85 | 5.16 | 0.191 | 0.203 |
| D | 2.20 | 2.60 | 0.086 | 0.102 |
| E | 0.40 | 0.80 | 0.015 | 0.031 |
| F | 1.00 | 1.40 | 0.039 | 0.055 |
| F1 | 3.00 typ. | | 0.118 typ. | |
| F2 | 2.00 typ. | | 0.079 typ. | |
| F3 | 1.90 | 2.40 | 0.075 | 0.094 |
| F4 | 3.00 | 3.40 | 0.118 | 0.134 |
| G | 10.90 typ. | | 0.429 typ. | |
| H | 15.45 | 16.03 | 0.608 | 0.631 |
| L | 19.85 | 21.09 | 0.781 | 0.830 |
| L1 | 3.70 | 4.30 | 0.146 | 0.169 |
| L2 | 18.30 | 19.13 | 0.720 | 0.753 |
| L3 | 14.20 | 20.30 | 0.559 | 0.799 |
| L4 | 34.05 | 41.38 | 1.341 | 1.629 |
| L5 | 5.35 | 6.30 | 0.211 | 0.248 |
| M | 2.00 | 3.00 | 0.079 | 0.118 |
| V | 5° typ. | | 5° typ. | |
| V2 | 60° typ. | | 60° typ. | |
| Dia. | 3.55 | 3.65 | 0.140 | 0.144 |

3 Ordering information

Table 6. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------------|---------|--------|----------|---------------|
| STPS60SM200CW | STPS60SM200CW | TO-247 | 4.45 g | 30 | Tube |

4 Revision history

Table 7. Document revision history

| Date | Revision | Changes |
|-------------|----------|--------------|
| 17-May-2011 | 1 | First issue. |

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