

## High voltage power Schottky rectifier

### Main product characteristics

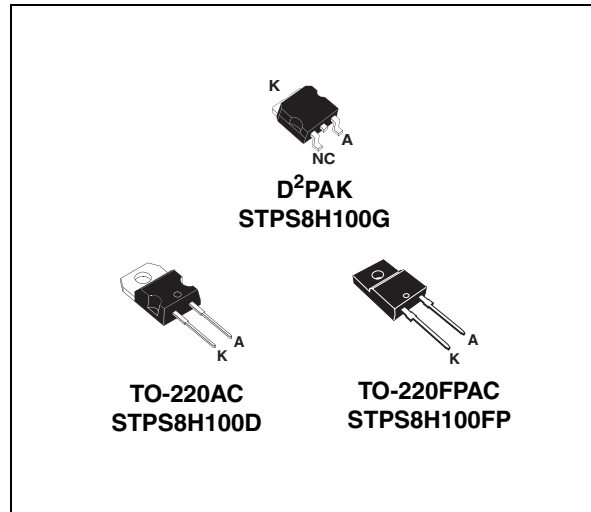
|             |        |
|-------------|--------|
| $I_{F(AV)}$ | 8 A    |
| $V_{RRM}$   | 100 V  |
| $T_j$       | 175° C |
| $V_F(max)$  | 0.58 V |

### Features and benefits

- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Insulated package:
  - TO-220FPAC
  - Insulating voltage = 2000 V DC
  - Typical package capacitance = 12 pF
- Avalanche capability specified

### Description

Schottky barrier rectifier designed for high frequency compact Switched Mode Power Supplies such as adaptators and on board DC/DC converters.



### Order Codes

| Part Number   | Marking     |
|---------------|-------------|
| STPS8H100D    | STPS8H100D  |
| STPS8H100G    | STPS8H100G  |
| STPS8H100G-TR | STPS8H100G  |
| STPS8H100FP   | STPS8H100FP |

**Table 1. Absolute ratings (limiting values)**

| Symbol       | Parameter                                 |                 |                                                     | Value        | Unit |
|--------------|-------------------------------------------|-----------------|-----------------------------------------------------|--------------|------|
| $V_{RRM}$    | Repetitive peak reverse voltage           |                 |                                                     | 100          | V    |
| $I_{F(RMS)}$ | RMS forward current                       |                 |                                                     | 30           | A    |
| $I_{F(AV)}$  | Average forward current<br>$\delta = 0.5$ | TO-220AC, D²PAK | $T_C = 165^\circ \text{C}$                          | 8            | A    |
|              |                                           | DO-15           | $T_C = 150^\circ \text{C}$                          |              |      |
| $I_{FSM}$    | Surge non repetitive forward current      |                 | $t_p = 10 \text{ ms sinusoidal}$                    | 250          | A    |
| $P_{ARM}$    | Repetitive peak avalanche power           |                 | $t_p = 1 \mu\text{s} \quad T_j = 25^\circ \text{C}$ | 10800        | W    |
| $T_{stg}$    | Storage temperature range                 |                 |                                                     | -65 to + 175 | ° C  |
| $T_j$        | Maximum operating junction temperature    |                 |                                                     | 175          | ° C  |

# 1 Characteristics

**Table 2. Thermal resistance**

| Symbol        | Parameter        |                              | Value | Unit |
|---------------|------------------|------------------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case | TO-220AC, D <sup>2</sup> PAK | 1.6   | °C/W |
|               |                  | TO-220FPAC                   | 4     |      |

**Table 3. Static electrical characteristics (per diode)**

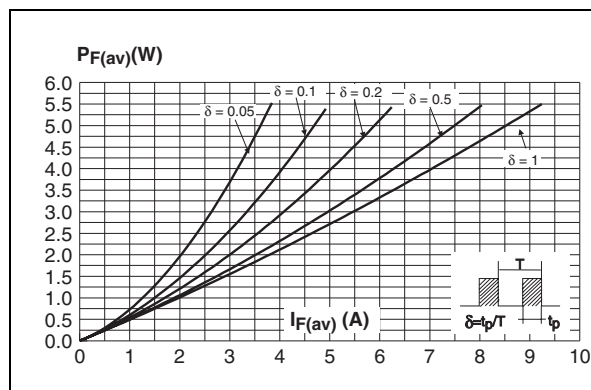
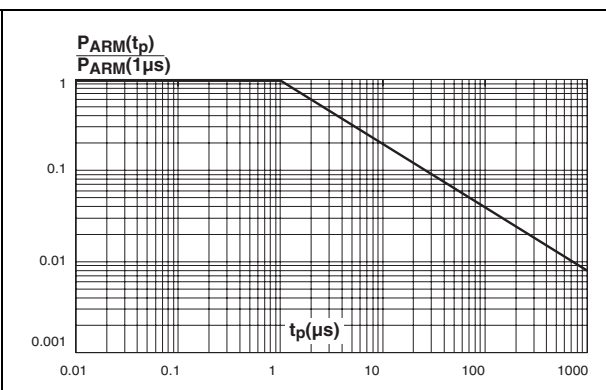
| Symbol      | Parameter               | Tests conditions          |                     | Min. | Typ  | Max. | Unit          |
|-------------|-------------------------|---------------------------|---------------------|------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25^\circ\text{C}$  | $V_R = V_{RRM}$     |      |      | 4.5  | $\mu\text{A}$ |
|             |                         | $T_j = 125^\circ\text{C}$ |                     |      | 2    | 6.0  | mA            |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25^\circ\text{C}$  | $I_F = 8\text{ A}$  |      |      | 0.71 | V             |
|             |                         | $T_j = 125^\circ\text{C}$ |                     |      | 0.56 | 0.58 |               |
|             |                         | $T_j = 25^\circ\text{C}$  | $I_F = 10\text{ A}$ |      |      | 0.77 |               |
|             |                         | $T_j = 125^\circ\text{C}$ |                     |      | 0.59 | 0.64 |               |
|             |                         | $T_j = 25^\circ\text{C}$  | $I_F = 16\text{ A}$ |      |      | 0.81 |               |
|             |                         | $T_j = 125^\circ\text{C}$ |                     |      | 0.65 | 0.68 |               |

1.  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

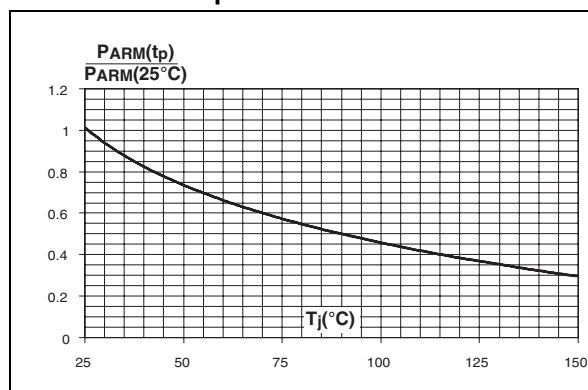
2.  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:

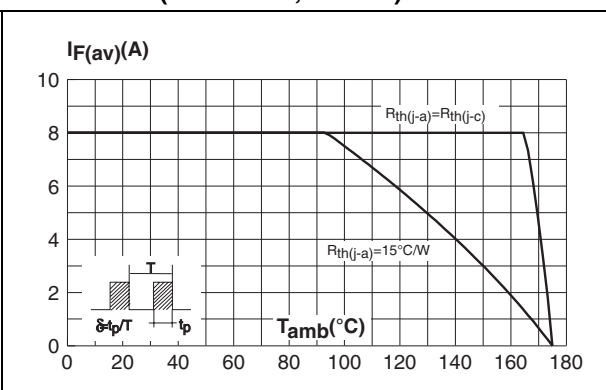
$$P = 0.48 \times I_{F(AV)} + 0.0125 I_{F(RMS)}^2$$

**Figure 1. Average forward power dissipation versus average forward current**

**Figure 2. Normalized avalanche power derating versus pulse duration**


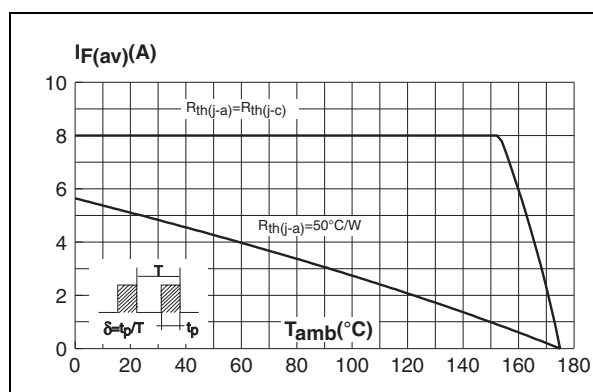
**Figure 3. Normalized avalanche power derating versus junction temperature**



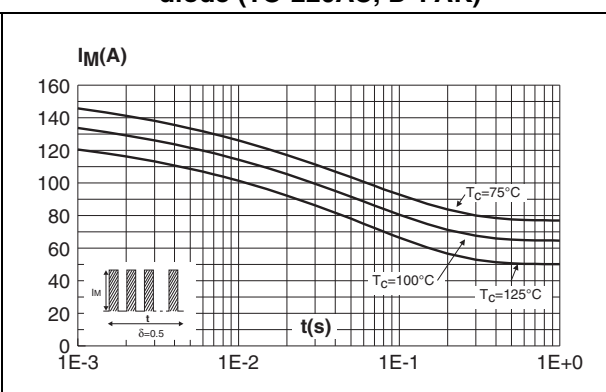
**Figure 4. Average forward current versus ambient temperature,  $\delta = 0.5$ , (TO-220AC, D<sup>2</sup>PAK)**



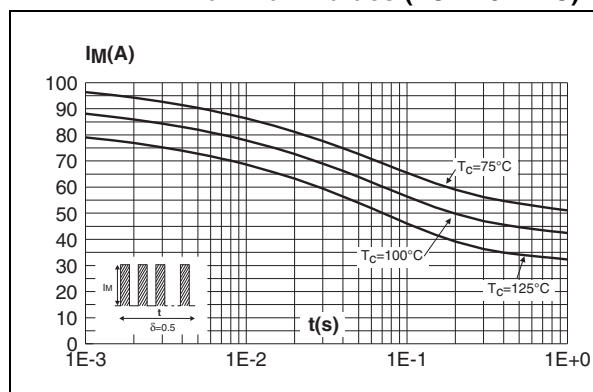
**Figure 5. Average forward current versus ambient temperature,  $\delta = 0.5$ , (TO-220FPAC)**



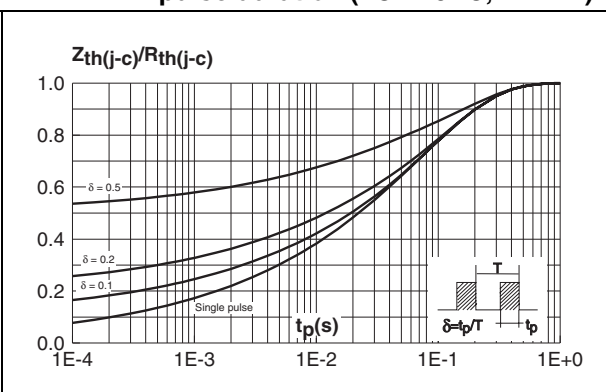
**Figure 6. Non repetitive surge peak forward current versus overload duration - maximum values, per diode (TO-220AC, D<sup>2</sup>PAK)**



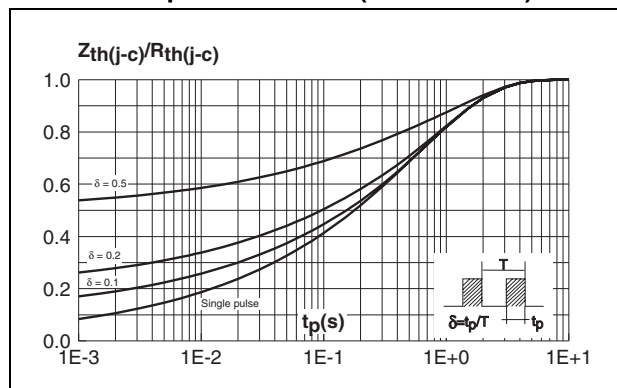
**Figure 7. Non repetitive surge peak forward current versus overload duration - maximum values (TO-220FPAC)**



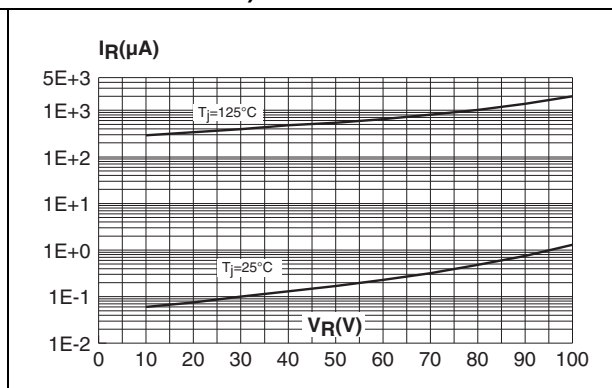
**Figure 8. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC, D<sup>2</sup>PAK)**



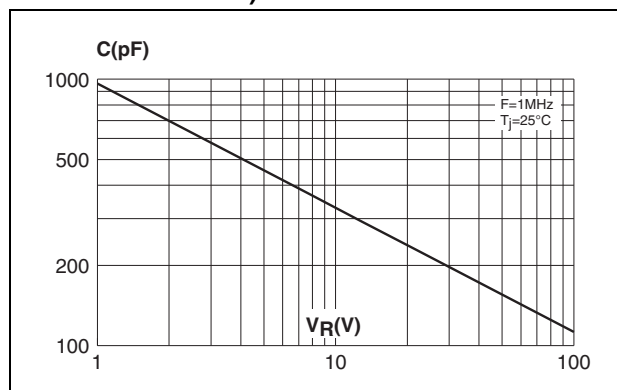
**Figure 9. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAC)**



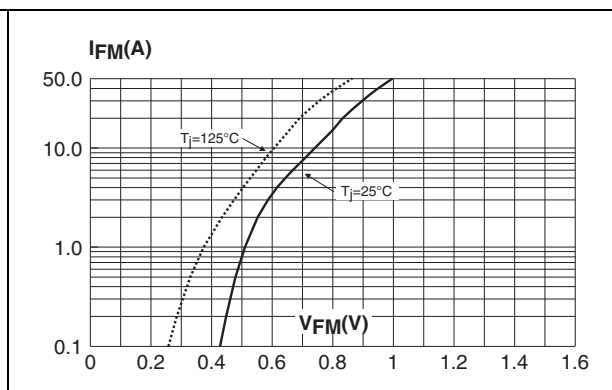
**Figure 10. Reverse leakage current versus reverse voltage applied (typical values)**



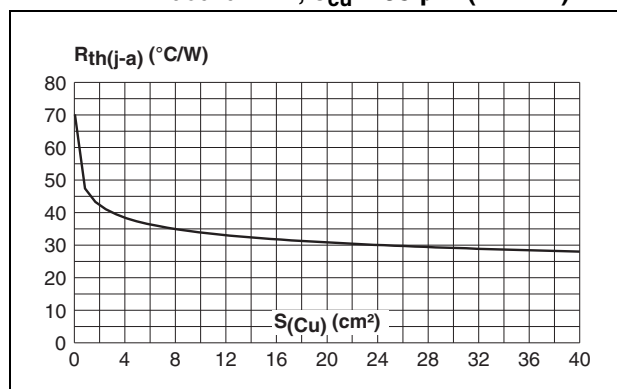
**Figure 11. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 12. Forward voltage drop versus forward current (maximum values)**



**Figure 13. Thermal resistance junction to ambient versus copper surface under tab - Epoxy printed circuit board FR4,  $e_{Cu} = 35 \mu m$  (D<sup>2</sup>PAK)**



# 2 Package information

Epoxy meets UL94, V0.

Table 4. D<sup>2</sup>PAK Dimensions

| REF. | Dimensions  |       |            |       |
|------|-------------|-------|------------|-------|
|      | Millimeters |       | Inches     |       |
|      | Min.        | Max.  | Min.       | Max.  |
| A    | 4.40        | 4.60  | 0.173      | 0.181 |
| A1   | 2.49        | 2.69  | 0.098      | 0.106 |
| A2   | 0.03        | 0.23  | 0.001      | 0.009 |
| B    | 0.70        | 0.93  | 0.027      | 0.037 |
| B2   | 1.14        | 1.70  | 0.045      | 0.067 |
| C    | 0.45        | 0.60  | 0.017      | 0.024 |
| C2   | 1.23        | 1.36  | 0.048      | 0.054 |
| D    | 8.95        | 9.35  | 0.352      | 0.368 |
| E    | 10.00       | 10.40 | 0.393      | 0.409 |
| G    | 4.88        | 5.28  | 0.192      | 0.208 |
| L    | 15.00       | 15.85 | 0.590      | 0.624 |
| L2   | 1.27        | 1.40  | 0.050      | 0.055 |
| L3   | 1.40        | 1.75  | 0.055      | 0.069 |
| M    | 2.40        | 3.20  | 0.094      | 0.126 |
| R    | 0.40 typ.   |       | 0.016 typ. |       |
| V2   | 0°          | 8°    | 0°         | 8°    |

Figure 14. D<sup>2</sup>PAK footprint dimensions (in mm)

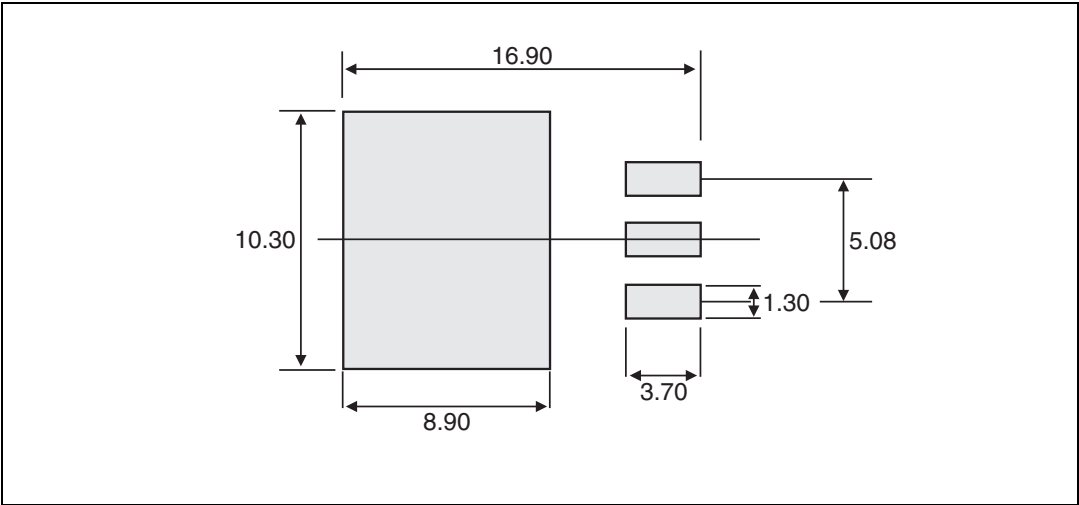


Table 5. TO-220AC Dimensions

| 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 |
| G       | 4.95        | 5.15  | 0.194      | 0.202 |
| H2      | 10.00       | 10.40 | 0.393      | 0.409 |
| L2      | 16.40 typ.  |       | 0.645 typ. |       |
| L4      | 13.00       | 14.00 | 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. I | 3.75        | 3.85  | 0.147      | 0.151 |

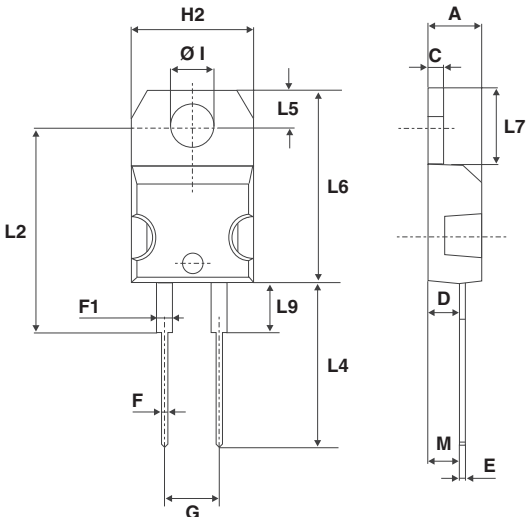


Table 6. TO-220FPAC Dimensions

| 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 |

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

### 3 Ordering information

| Ordering type | Marking     | Package            | Weight | Base qty | Delivery mode |
|---------------|-------------|--------------------|--------|----------|---------------|
| STPS8H100D    | STPS8H100D  | TO-220AC           | 1.86 g | 50       | Tube          |
| STPS8H100FP   | STPS8H100FP | TO-220FPAC         | 1.9 g  | 50       | Tube          |
| STPS8H100G    | STPS8H100G  | D <sup>2</sup> PAK | 1.48 g | 50       | Tube          |
| STPS8H100G-TR | STPS8H100G  | D <sup>2</sup> PAK | 1.48 g | 500      | Tape and reel |

### 4 Revision history

| Date        | Revision | Description of Changes                                                                                                                                  |
|-------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jul-2003    | 6D       | Last update.                                                                                                                                            |
| 1-June-2006 | 10       | Reformatted to current standard. Added ECOPACK statement.<br>Changed nF to pF in Figure 11. Revision number set to 10 to align with on-line versioning. |



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