

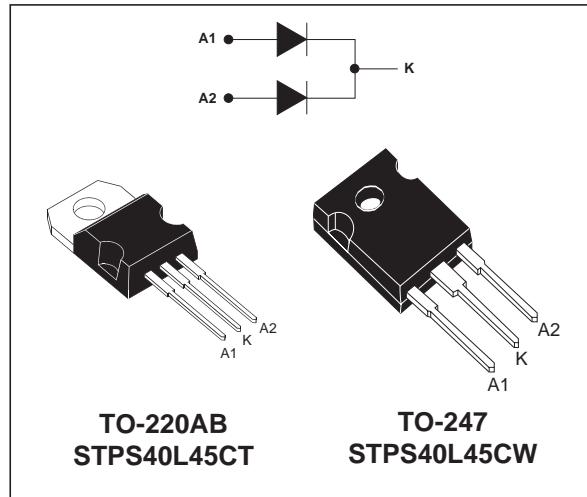
## LOW DROP POWER SCHOTTKY RECTIFIER

### MAIN PRODUCTS CHARACTERISTICS

|                   |          |
|-------------------|----------|
| $I_{F(AV)}$       | 2 x 20 A |
| $V_{RRM}$         | 45 V     |
| $T_j(\text{max})$ | 150 °C   |
| $V_F(\text{max})$ | 0.49 V   |

### FEATURES AND BENEFITS

- LOW FORWARD VOLTAGE DROP MEANING VERY SMALL CONDUCTION LOSSES
- LOW DYNAMIC LOSSES AS A RESULT OF THE SCHOTTKY BARRIER
- AVALANCHE RATED



### DESCRIPTION

Dual center tap Schottky barrier rectifier designed for high frequency Switched Mode Power Supplies and DC to DC converters.

Packaged in TO-220AB and TO-247 this device is intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection applications.

### ABSOLUTE RATINGS (limiting values, per diode)

| Symbol       | Parameter                                |  |            | Value         | Unit             |  |  |
|--------------|--|--|------------|---------------|------------------|--|--|
| $V_{RRM}$    | Repetitive peak reverse voltage          |  |            | 45            | V                |  |  |
| $I_{F(RMS)}$ | RMS forward current                      |  |            | 30            | A                |  |  |
| $I_{F(AV)}$  | Average forward current                  | $T_c = 130^\circ\text{C}$                      | Per diode  | 20            | A                |  |  |
|              |  | $\delta = 0.5$                                 | Per device | 40            |                  |  |  |
| $I_{FSM}$    | Surge non repetitive forward current     |  |            | 230           | A                |  |  |
| $I_{IRRM}$   | Repetitive peak reverse current          | $t_p = 2 \mu\text{s}$ square $F = 1\text{kHz}$ |            | 2             | A                |  |  |
| $I_{IRSM}$   | Non repetitive peak reverse current      | $t_p = 100 \mu\text{s}$ square                 |            | 3             | A                |  |  |
| $T_{stg}$    | Storage temperature range                |  |            | - 65 to + 150 | °C               |  |  |
| $T_j$        | Maximum operating junction temperature * |  |            | 150           | °C               |  |  |
| $dV/dt$      | Critical rate of rise of reverse voltage |  |            | 10000         | V/ $\mu\text{s}$ |  |  |

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

## STPS40L45CT/CW

### THERMAL RESISTANCES

| Symbol        | Parameter        | Value     | Unit     |
|---------------|------------------|-----------|----------|
| $R_{th(j-c)}$ | Junction to case | Per diode | 1.5 °C/W |
|               |                  | Total     | 0.8 °C/W |
| $R_{th(c)}$   | Coupling         | 0.1       | °C/W     |

When the diodes 1 and 2 are used simultaneously :

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

### STATIC ELECTRICAL CHARACTERISTICS (per diode)

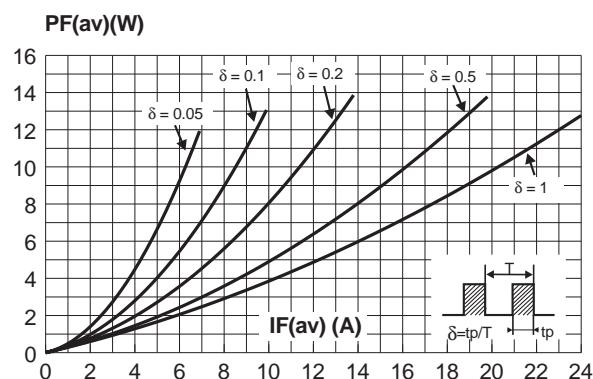
| Symbol  | Parameter               | Tests Conditions          |                      | Min. | Typ. | Max. | Unit |
|---------|-------------------------|---------------------------|----------------------|------|------|------|------|
| $I_R^*$ | Reverse leakage current | $T_j = 25^\circ\text{C}$  | $V_R = V_{RRM}$      |      |      | 0.8  | mA   |
|         |                         | $T_j = 100^\circ\text{C}$ |                      |      | 40   | 130  | mA   |
| $V_F^*$ | Forward voltage drop    | $T_j = 25^\circ\text{C}$  | $I_F = 20 \text{ A}$ |      |      | 0.53 | V    |
|         |                         | $T_j = 125^\circ\text{C}$ | $I_F = 20 \text{ A}$ |      |      | 0.42 |      |
|         |                         | $T_j = 25^\circ\text{C}$  | $I_F = 40 \text{ A}$ |      |      | 0.69 |      |
|         |                         | $T_j = 125^\circ\text{C}$ | $I_F = 40 \text{ A}$ |      |      | 0.6  |      |

Pulse test : \*  $t_p = 380 \mu\text{s}$ ,  $\delta < 2\%$

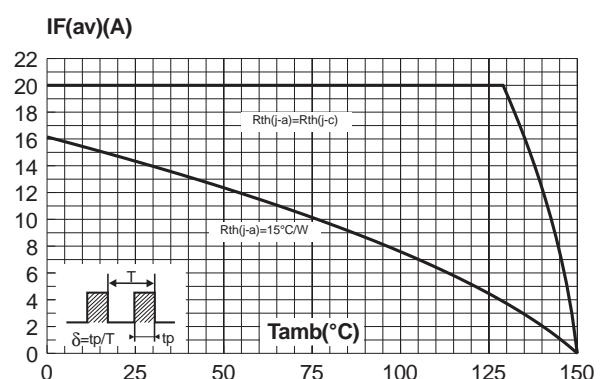
To evaluate the conduction losses use the following equation :

$$P = 0.28 \times I_{F(AV)} + 0.0105 I_{F}^2(\text{RMS})$$

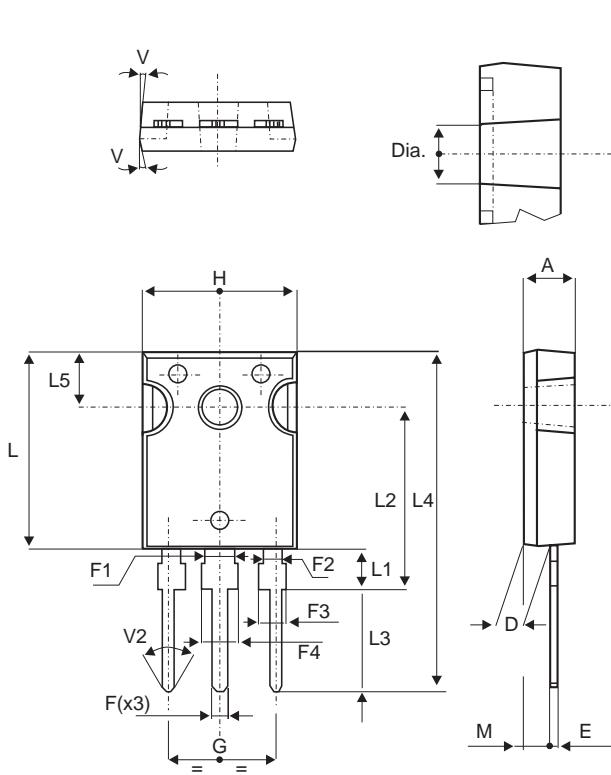
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



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



**PACKAGE MECHANICAL DATA**  
TO-247



| REF. | DIMENSIONS  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| A    | 4.85        |       | 5.15  | 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  |       |        | 0.118 |       |
| F2   |             | 2.00  |       |        | 0.078 |       |
| F3   | 2.00        |       | 2.40  | 0.078  |       | 0.094 |
| F4   | 3.00        |       | 3.40  | 0.118  |       | 0.133 |
| G    | 10.90       |       |       |        | 0.429 |       |
| H    | 15.45       |       | 15.75 | 0.608  |       | 0.620 |
| L    | 19.85       |       | 20.15 | 0.781  |       | 0.793 |
| L1   | 3.70        |       | 4.30  | 0.145  |       | 0.169 |
| L2   |             | 18.50 |       |        | 0.728 |       |
| L3   | 14.20       |       | 14.80 | 0.559  |       | 0.582 |
| L4   |             | 34.60 |       |        | 1.362 |       |
| L5   |             | 5.50  |       |        | 0.216 |       |
| M    | 2.00        |       | 3.00  | 0.078  |       | 0.118 |
| V    |             | 5°    |       |        | 5°    |       |
| V2   |             | 60°   |       |        | 60°   |       |
| Dia. | 3.55        |       | 3.65  | 0.139  |       | 0.143 |

- Cooling method : C
- Recommended torque value : 0.8m.N
- Maximum torque value : 1.0m.N

| Ordering type | Marking     | Package  | Weight | Base qty | Delivery mode |
|---------------|-------------|----------|--------|----------|---------------|
| STPS40L45CT   | STPS40L45CT | TO-220AB | 2g     | 50       | Tube          |
| STPS40L45CW   | STPS40L45CW | TO-247   | 4.4g   | 30       | Tube          |

- Epoxy meets UL94,V0