# SMTYF

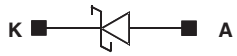
## Low forward voltage TVS Transky™

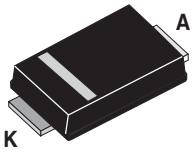
### Features

- High peak pulse power:
  - 600 W (10/1000 µs)
  - 4000 W (8/20 µs)
- Stand-off voltage 5 or 12 V
- Low forward voltage: 0.48 V @ 0.85 A @ 25 °C
- Low clamping factor $V_{CL}/V_{BR}$
- Fast response time
- Very thin package (1.0 mm overall component height)
- ECOPACK2® halogen-free package

#### Complies with the following standards:

- IEC 61000-4-2 level 4:
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883E- Method 3015-7: class 3C
  - Human body model




**Unidirectional**

**SMAflat**

### Description

The Transky is designed specifically for portable equipment and miniaturized electronic devices subject to ESD transient overvoltages.

The Transky combines the performance of a Transil™ or TVS (transient voltage supressor) and low forward voltage Schottky diode in a monolithic structure.

**TM**: Transky is a trademark of STMicroelectronics.

**TM**: Transil is a trademark of STMicroelectronics.

# 1 Characteristics

**Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{PP}$ | IEC 61000-4-2 standard | Air discharge<br>Contact discharge | 15<br>8 | kV |
| $P_{PP}$ | Peak pulse power dissipation(1) | $T_{j\ initial} = T_{amb}$ | 600 | W |
| $I_{FSM}$ | Non repetitive surge peak forward current | $t_p$ = 10 ms<br>$T_j = T_{initial} = T_{amb}$ | 25 | A |
| $T_{stg}$ | Storage temperature range | | -65 to +175 | °C |
| Tj | Operating junction temperature range | | -40 to +175 | °C |

1. 10/1000 µs pulse waveform

**Table 2. Thermal resistance**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{th(j-l)}$ | Junction to leads | 20 | °C/W |

**Table 3. Electrical characteristics - parameters ($T_{amb}$ = 25 °C)**

| Symbol | Parameter |
|---|---|
| $V_{BR}$ | Breakdown voltage |
| $I_{RM}$ | Leakage current @ $V_{RM}$ |
| $V_{RM}$ | Stand-off voltage |
| $V_{CL}$ | Clamping voltage |
| $R_d$ | Dynamic resistance |
| $I_{PP}$ | Peak pulse current |
| C | Capacitance |

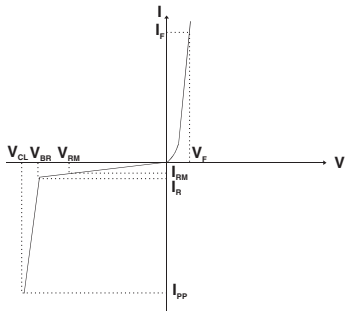



**Table 4. Electrical characteristics - values ($T_{amb}$ = 25 °C)**

| Type | $V_F$ max ($I_F$ = 0.85 A) | $I_{RM}$ max@$V_{RM}$ | | | $V_{BR}$ @$I_R$(1) | | | | $V_{CL}$ @$I_{PP}$ 10/1000 µs | | $R_D$(2) 10/1000 µs | $V_{CL}$ @$I_{PP}$ 8/20 µs | | $R_D$(2) 8/20 µs | $\alpha T$(3) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 25 °C | 85 °C | | min | typ | max | | max | | | max | | | max |
| | V | µA (max) | | V | V | | | mA | V | A | Ω | V | A | Ω | 10-4/°C |
| SMTYF5.0A | 0.48 | 10 | 500 | 5 | 6.40 | 6.74 | 7.07 | 10 | 9.2 | 68 | 0.029 | 13.4 | 298 | 0.021 | 5.7 |
| SMTYF12A | 0.48 | 20 | 1200 | 12 | 13.2 | 13.7 | 14.3 | 1 | 18.5 | 31 | 0.129 | 22.9 | 157 | 0.055 | 7.8 |

1. Pulse test: $t_p$ <50ms.
2. To calculate maximum clamping voltage at other surge currents, use the following formula
   $V_{CLmax} = R_D \times I_{PP} + V_{BRmax}$
3. To calculate $V_{BR}$ versus junction temperature, use the following formula:

   $V_{BR}$ @ $T_j = V_{BR}$ @ 25 °C x (1 + $\alpha T$ x ($T_j$ - 25))

**Figure 1. Definition of Ipp pulse**

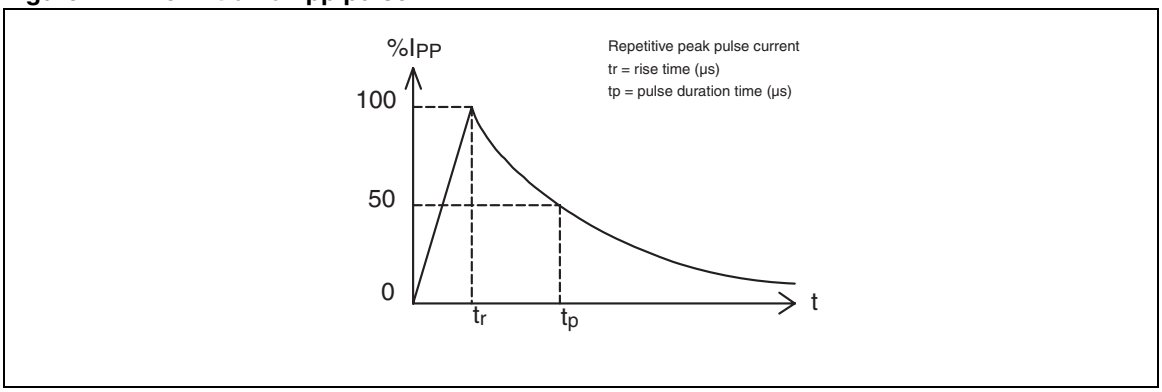



**Figure 2. Relative peak power dissipation versus initial junction temperature**

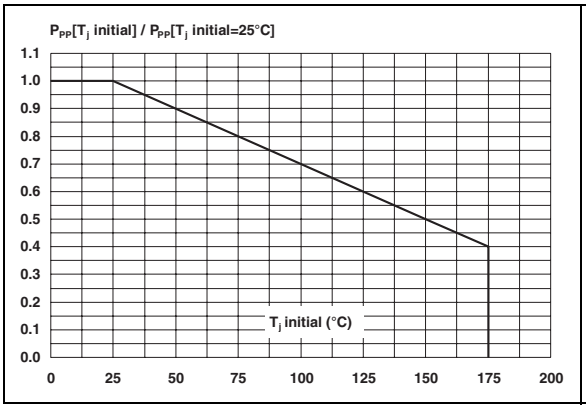



**Figure 3. Peak pulse power versus exponential pulse duration ($T_j$ initial = 25 °C)**

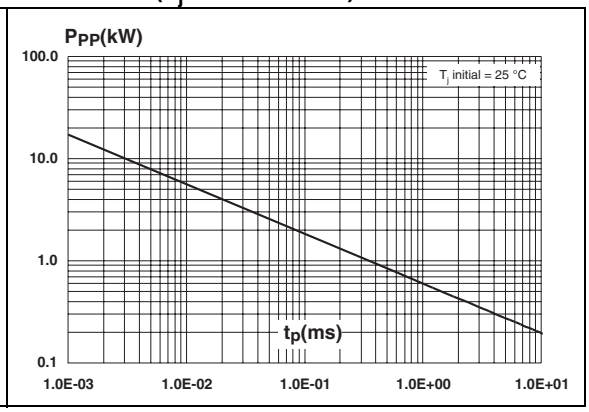


**Figure 4. Clamping voltage versus peak pulse current (exponential waveform, maximum values)**

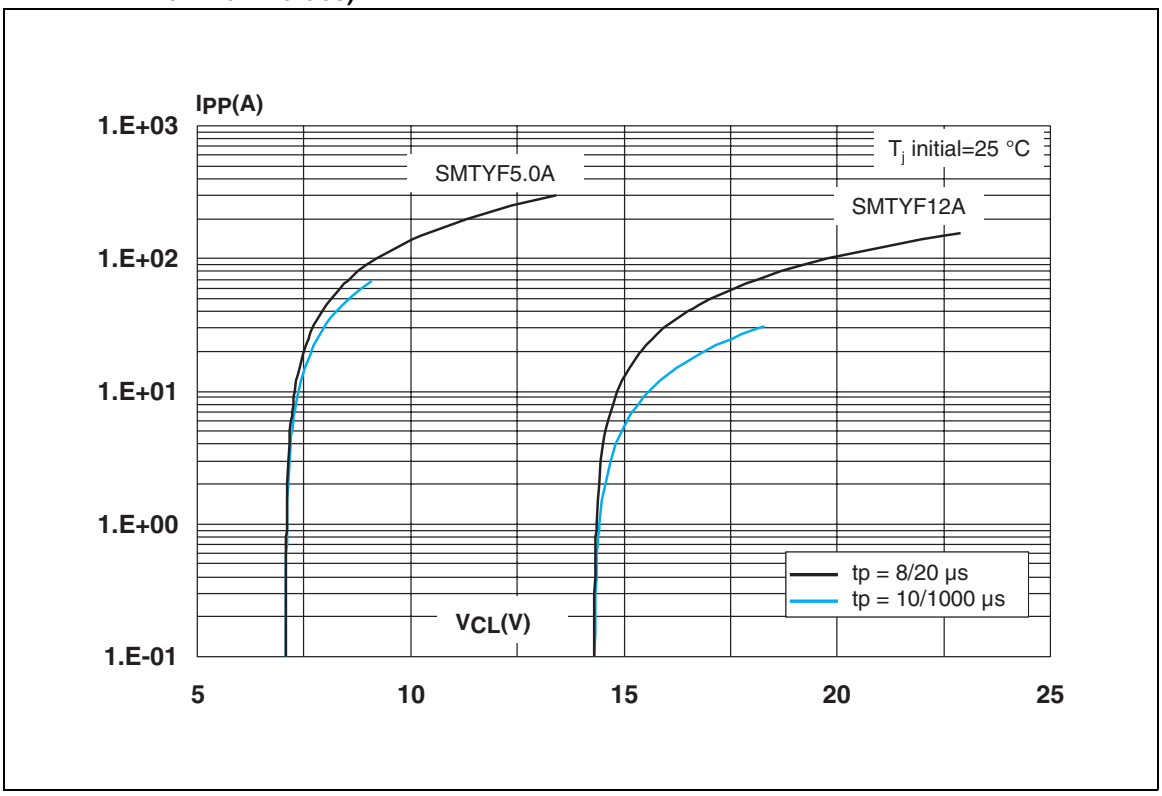



**Figure 5. Junction capacitance versus reverse applied voltage (typical values)**

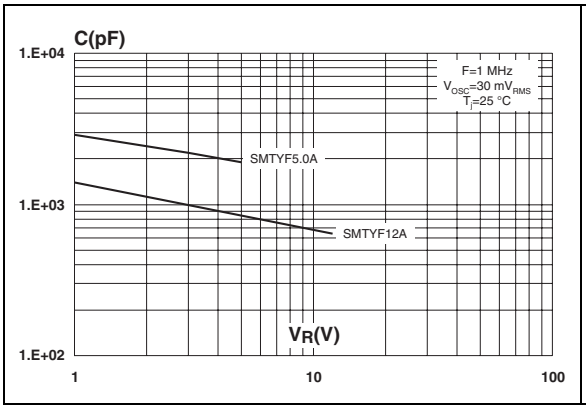



**Figure 6. Forward voltage drop versus forward current (typical values)**

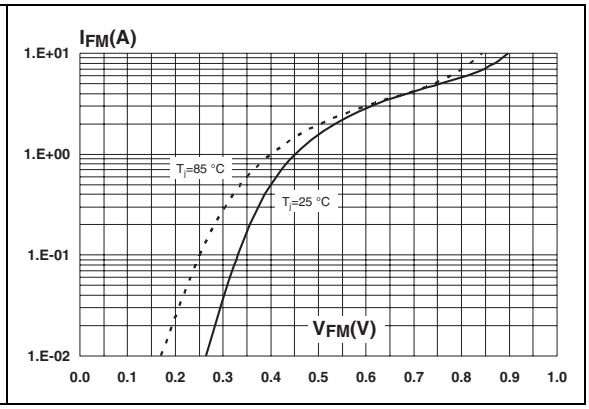


**Figure 7. Average power dissipation versus ambient temperature**

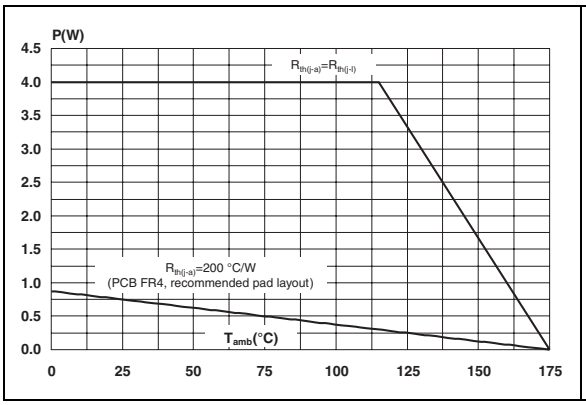



**Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (printed ciruit board FR4, $S_{Cu}$ = 1 $cm^2$)**

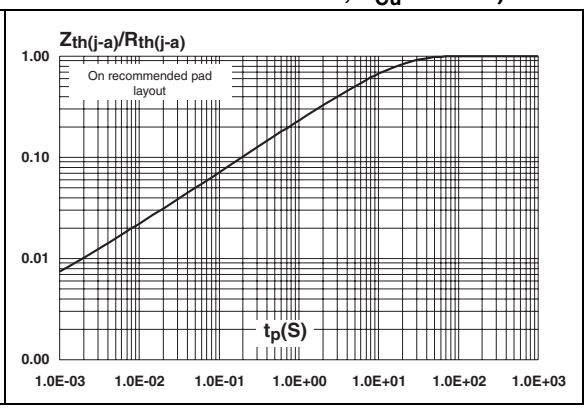



**Figure 9. Thermal resistance junction to ambient versus copper surface under each lead (printed circuit board FR4, copper thickness = 35 µm)**

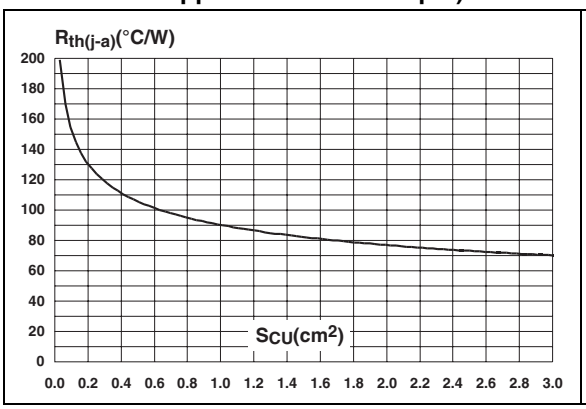
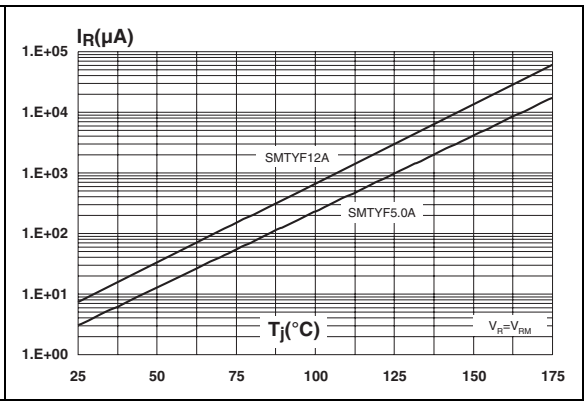



**Figure 10. Leakage current versus junction temperature (typical values)**

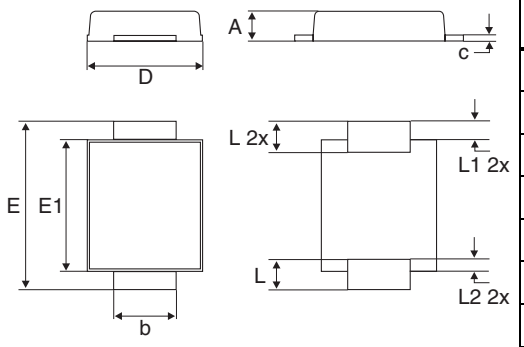


# 2 Package information

- Case: JEDEC DO-221AC molded plastic over Planar junction
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Band indicates cathode
- Flammability: Epoxy rated UL94V-0
- RoHS package

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*.

**Table 5. SMAflat dimensions**




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.90 | | 1.10 | 0.035 | | 0.043 |
| b | 1.25 | | 1.65 | 0.049 | | 0.065 |
| c | 0.15 | | 0.40 | 0.006 | | 0.016 |
| D | 2.25 | | 2.95 | 0.088 | | 0.116 |
| E | 4.80 | | 5.60 | 0.189 | | 0.220 |
| E1 | 3.95 | | 4.60 | 0.156 | | 0.181 |
| L | 0.75 | | 1.50 | 0.030 | | 0.059 |
| L1 | | 0.50 | | | 0.019 | |
| L2 | | 0.50 | | | 0.019 | |

**Figure 11. SMAflat footprint dimensions optimized for SMAflat(1)**

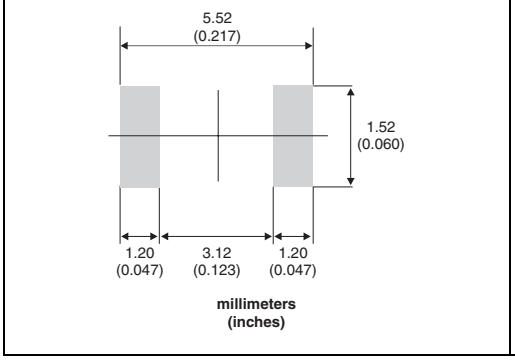
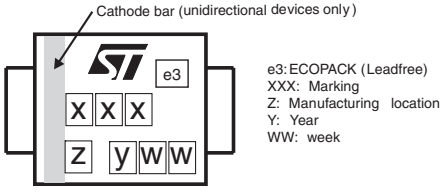



**Figure 12. Marking information**




1. SMA footprint may also be used.

# 3 Ordering information

**Table 6. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| SMTYF5.0A | YF5.0 | SMAflat | 0.035 g | 10 000 | Tape and reel |
| SMTYF12A | YF12 | | | | |

# 4 Revision history

**Table 7. Document revision history**

| Date | Revision | Description of changes |
|---|---|---|
| 04-Sep-2008 | 1 | First issue |

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