

# BFN18

NPN Silicon High-Voltage Transistors

## Data Sheet

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**Revision History**

| Page or Item                    | Subjects (major changes since previous revision) |
|---------------------------------|--|
| <b>Revision 1.0, 2010-10-13</b> |  |
|                                 | Converted to the new IFX Template.               |
|                                 |  |
|                                 |  |

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Last Trademarks Update 2010-06-09

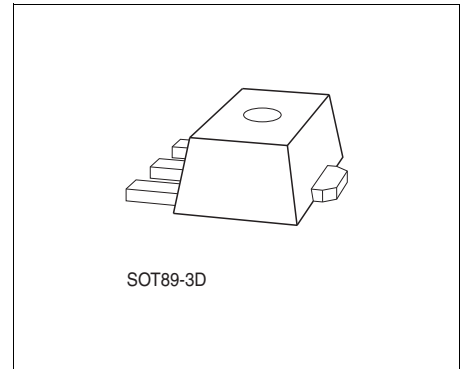
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## 1 Features

Main features:

- Suitable for video output stages TV sets and switching power supplies
- High breakdown voltage
- Low collector-emitter saturation voltage
- Complementary types: BFN19 (PNP)
- Pb-free (RoHS compliant) package<sup>1)</sup>
- Qualified according AEC Q101



1) Pb-containing package may be available upon special request

| Product Name | Package | Pin Configuration |       |       |       | Marking |
|--------------|---------|-------------------|-------|-------|-------|---------|
|              |         | 1 = B             | 2 = C | 3 = E | 4 = C |         |
| BFN18        | SOT89   | 1 = B             | 2 = C | 3 = E | 4 = C | DE      |

## 2 Electrical Characteristics

**Table 1 Absolute Maximum Ratings**

| Parameter   | Symbol    | Values |      |      | Unit | Note / Test Condition |
|---|-----------|--------|------|------|------|-----------------------|
|   |           | Min.   | Typ. | Max. |      |                       |
| Collector-emitter voltage                         | $V_{CEO}$ | –      | –    | 300  | V    | –                     |
| Collector-base voltage                            | $V_{CBO}$ | –      | –    | 300  | V    | –                     |
| Emitter-base voltage                              | $V_{EBO}$ | –      | –    | 5    | V    | –                     |
| Collector current                                 | $I_C$     | –      | –    | 200  | mA   | –                     |
| Peak collector current                            | $I_{CM}$  | –      | –    | 500  | mA   | –                     |
| Base current                                      | $I_B$     | –      | –    | 100  | mA   | –                     |
| Peak base current                                 | $I_{BM}$  | –      | –    | 200  | mA   | –                     |
| Total power dissipation-<br>$T_S = 120\text{ °C}$ | $P_{tot}$ | –      | –    | 1.5  | W    | –                     |
| Junction temperature                              | $T_j$     | –      | –    | 150  | °C   | –                     |
| Storage temperature                               | $T_{stg}$ | -65    | –    | 150  | °C   | –                     |

**Attention: Stresses above the max. values listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the device.**

**Table 2 Thermal Resistance**

| Parameter                                | Symbol     | Values |      |      | Unit | Note / Test Condition |
|--|------------|--------|------|------|------|-----------------------|
|  |            | Min.   | Typ. | Max. |      |                       |
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ | –      | –    | ≤ 20 | K/W  | –                     |

1) For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance.

**Table 3 DC Characteristics at  $T_A = 25\text{ °C}$ , Unless Otherwise Specified**

| Parameter  | Symbol        | Values |      |      | Unit          | Note / Test Condition                      |
|--|---------------|--------|------|------|---------------|--|
|  |               | Min.   | Typ. | Max. |               |  |
| Collector emitter breakdown voltage                | $V_{(BR)CEO}$ | 300    | –    | –    | V             | $I_C = 1\text{ mA}, I_B = 0$               |
| Collector-base breakdown voltage                   | $V_{(BR)CBO}$ | 300    | –    | –    | V             | $I_C = 100\text{ }\mu\text{A}, I_E = 0$    |
| Emitter-base breakdown voltage                     | $V_{(BR)EBO}$ | 5      | –    | –    | V             | $I_E = 100\text{ }\mu\text{A}, I_C = 0$    |
| Collector-base cutoff current                      | $I_{CBO}$     | –      | –    | 0.1  | $\mu\text{A}$ | $V_{CB} = 250\text{ V}, I_E = 0$           |
|  |               | –      | –    | 20   |               |  |
| Emitter-base cutoff current                        | $I_{EBO}$     | –      | –    | 100  | nA            | $V_{EB} = 5\text{ V}, I_C = 0$             |
| DC current gain <sup>1)</sup>                      | $h_{FE}$      | 25     | –    | –    |               | $I_C = 1\text{ mA}, V_{CE} = 10\text{ V}$  |
|  |               | 40     | –    | –    |               | $I_C = 10\text{ mA}, V_{CE} = 10\text{ V}$ |
|  |               | 30     | –    | –    |               | $I_C = 30\text{ mA}, V_{CE} = 10\text{ V}$ |
| Collector-emitter saturation voltage <sup>1)</sup> | $V_{CEsat}$   | –      | –    | 0.5  | V             | $I_C = 20\text{ mA}, I_B = 2\text{ mA}$    |
| Base emitter saturation voltage <sup>1)</sup>      | $V_{BEsat}$   | –      | –    | 0.9  | V             | $I_C = 20\text{ mA}, I_B = 2\text{ mA}$    |

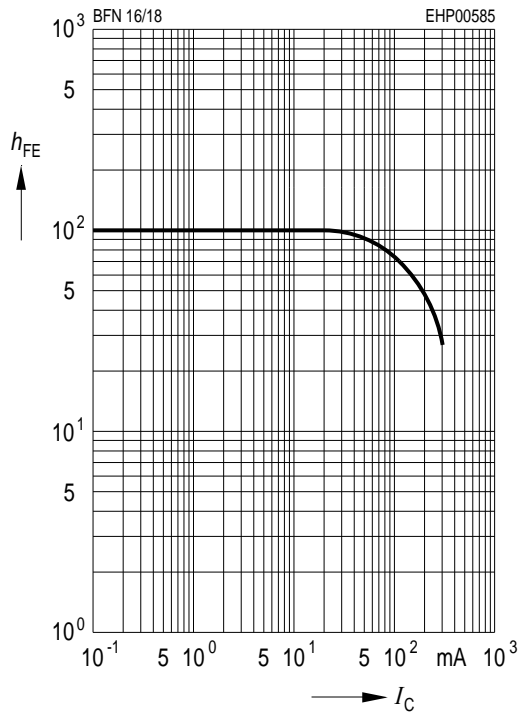
1)Pulse test:  $t < 300\text{ }\mu\text{s}$ ;  $D < 2\%$

**Table 4 AC Characteristics at  $T_A = 25\text{ °C}$** 

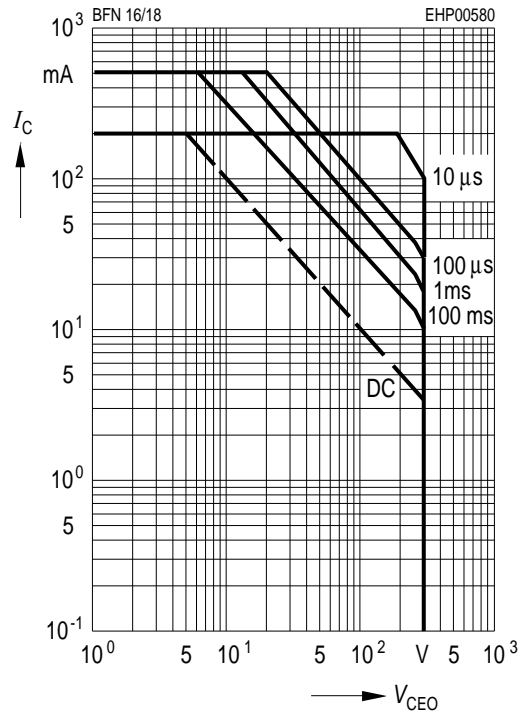
| Parameter                  | Symbol   | Values |      |      | Unit | Note / Test Condition   |
|----------------------------|----------|--------|------|------|------|---|
|                            |          | Min.   | Typ. | Max. |      |   |
| Transition frequency       | $f_T$    | –      | 70   | –    | MHz  | $I_C = 20\text{ MHz}, V_{CE} = 10\text{ V},$<br>$f = 20\text{ MHz}$ |
| Collector base capacitance | $C_{Cb}$ | –      | 1.5  | –    | pF   | $V_{CB} = 30\text{ V}, f = 1\text{ MHz}$                            |

### 3 Characteristic DC Diagrams

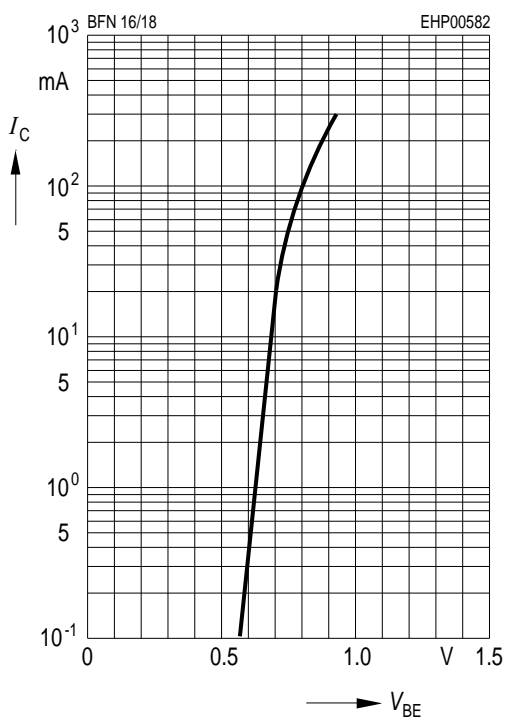
**DC Current Gain**  
 $h_{FE} = f(I_C), V_{CE} = 10\text{ V}$



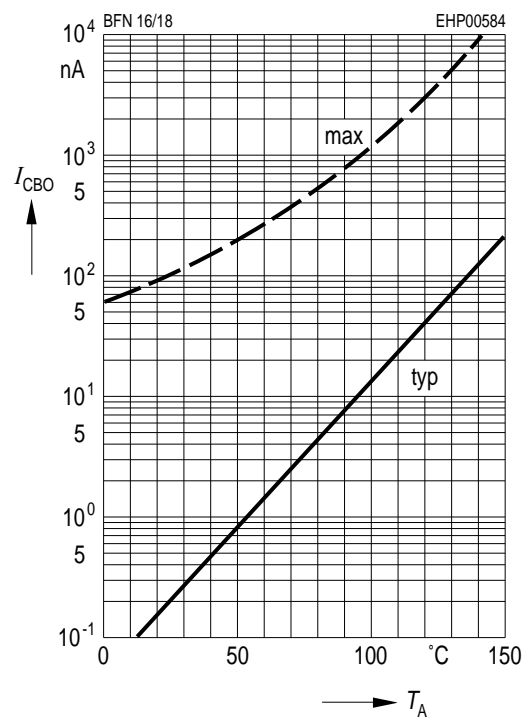
**Operating Range**  
 $I_C = f(V_{CEO}), T_A = 25^\circ\text{C}, D = 0$



**Collector Current**  
 $I_C = f(V_{BE}), V_{CE} = 10\text{ V}$

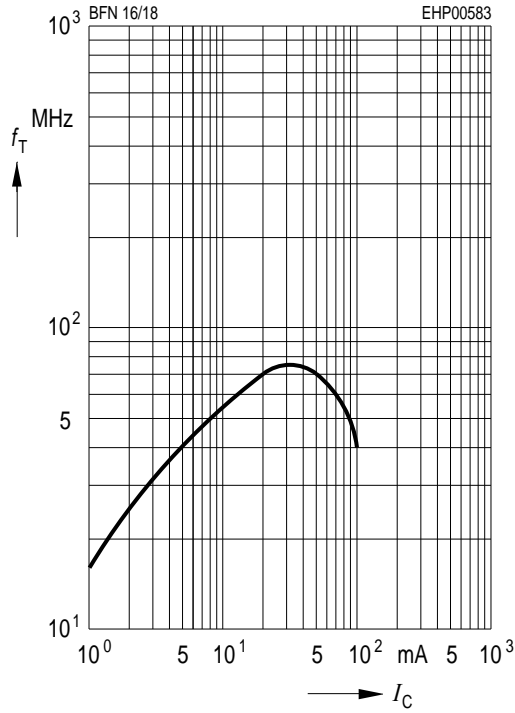


**Collector Cutoff Current**  
 $I_{CBO} = f(T_A), V_{CBO} = 200\text{ V}$

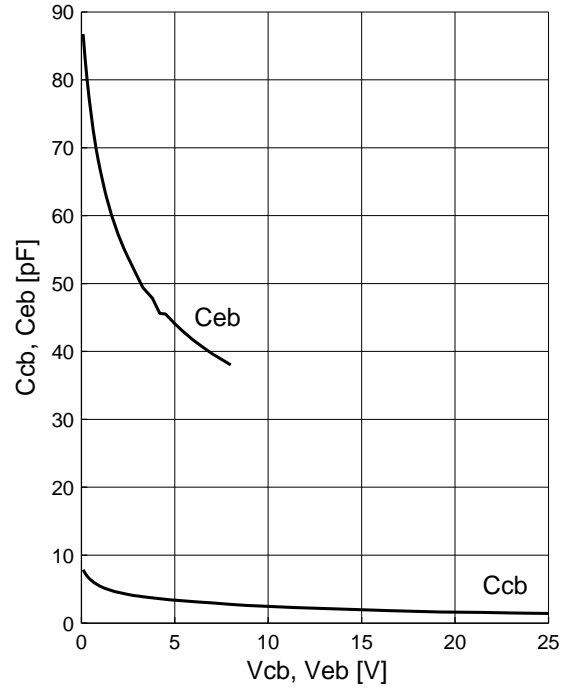




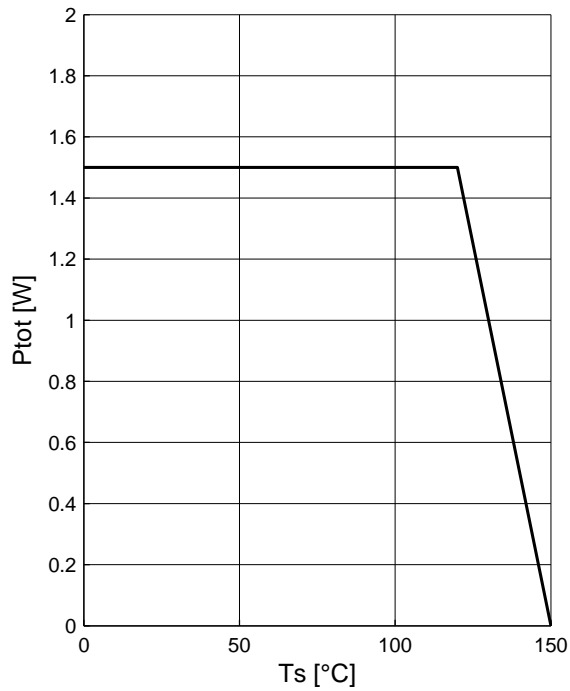
**Transition Frequency**  
 $f_T = f(I_C), V_{CE} = 10\text{ V}$



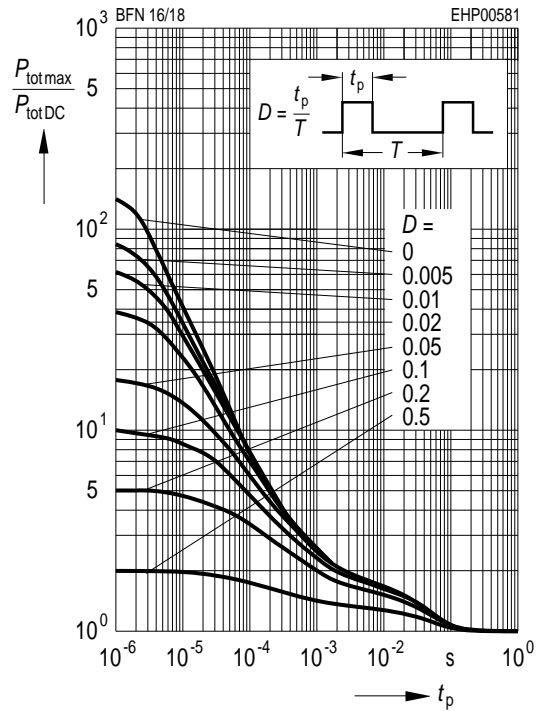
**Collector Base Capacitance  $C_{cb} = f(V_{CB})$**   
**Emitter Base Capacitance  $C_{eb} = f(V_{EB})$**



**Total Power Dissipation**  
 $P_{tot} = f(T_S)$



**Permissible Pulse Load**  
 $P_{totmax} / P_{totDC} = f(T_S)$



## 4 Package Information SOT89

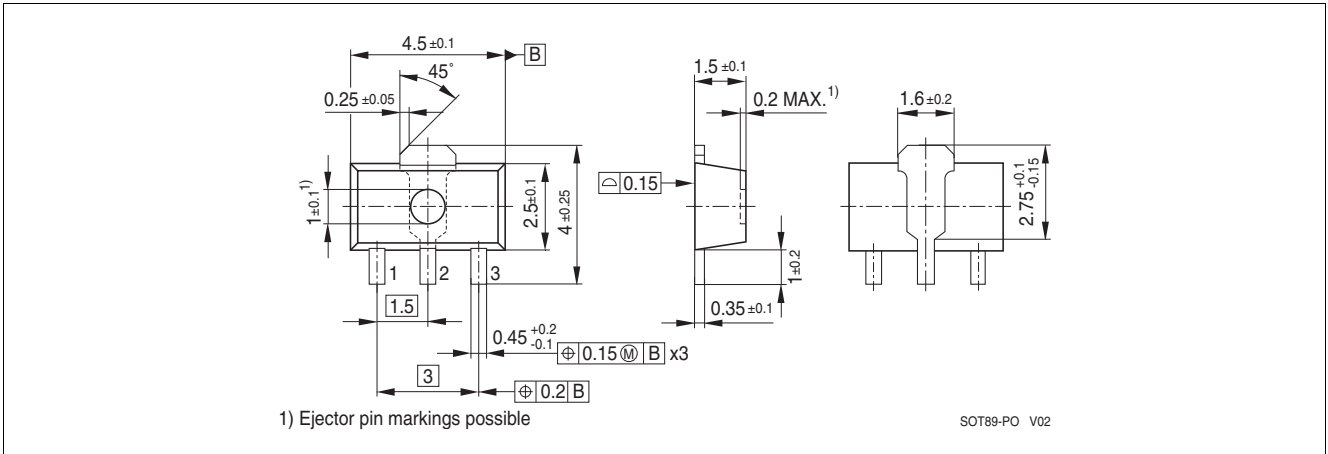


Figure 1 Package Outline

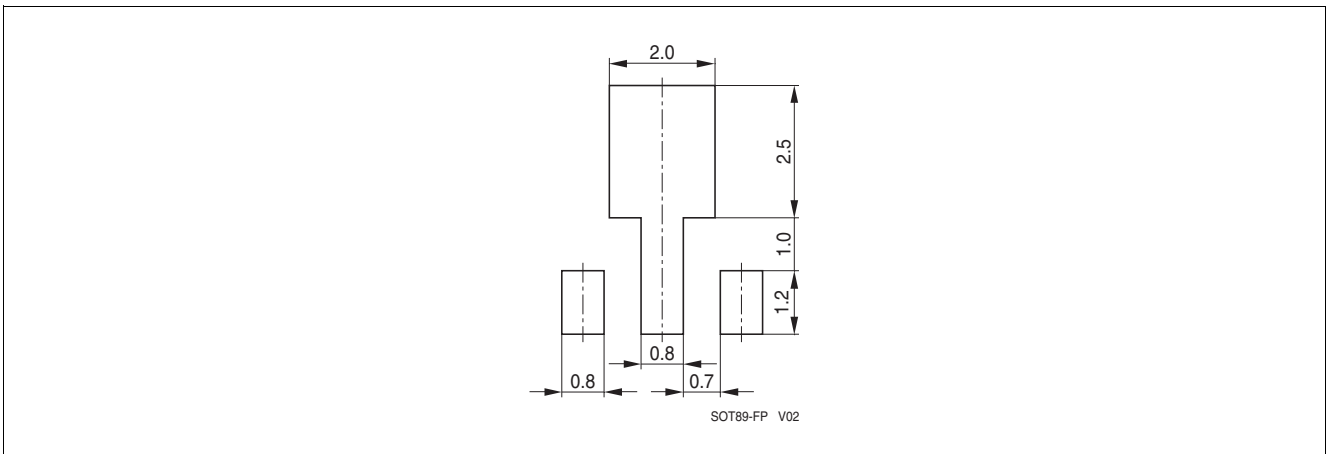


Figure 2 Package Foot Print

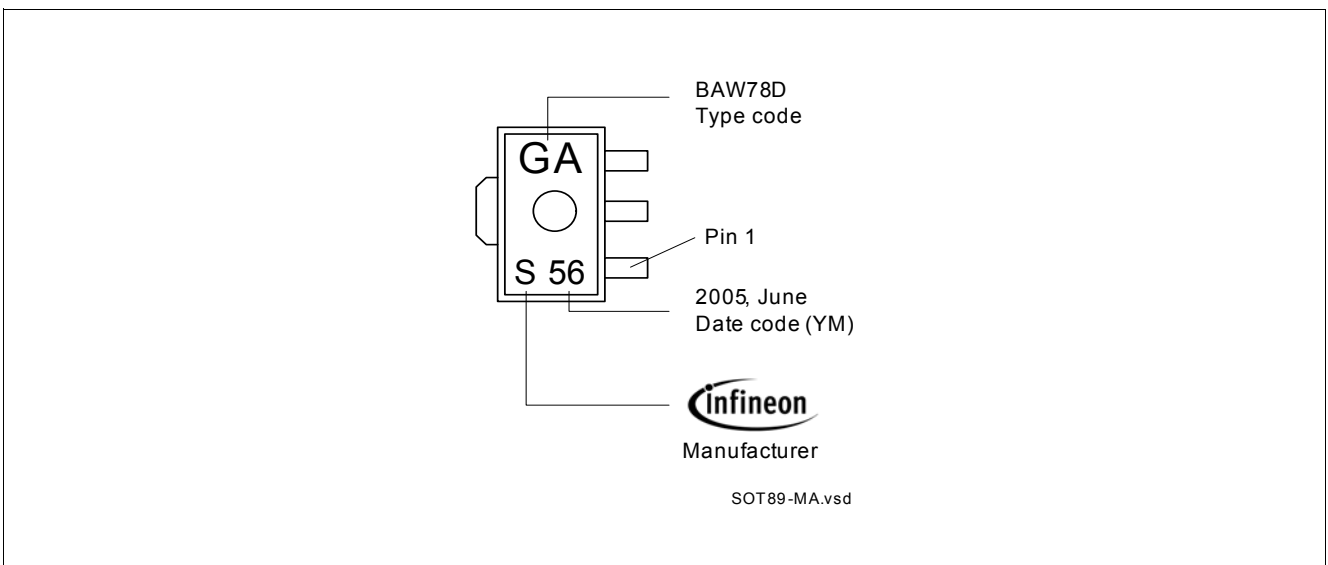
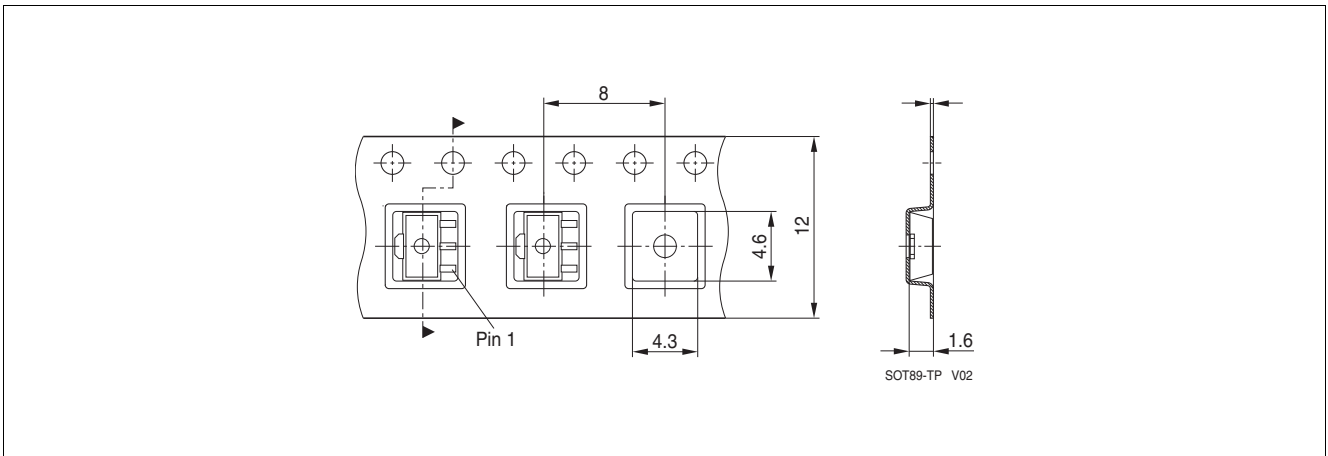


Figure 3 Marking Example



**Figure 4 Tape Dimensions**

**Packing Description**

Reel Ø180 mm = 1.000 Pieces/Reel

Reel Ø330 mm = 4.000 Pieces/Reel

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