

## Technical Information

### Characteristics and Maximum Ratings

The electrical performance of a semiconductor device is usually expressed in terms of its characteristics and maximum ratings.

**Characteristics** are those which can be measured by use of suitable measuring instruments and circuits, and provide information on the performance of the device under specified operating conditions (at a given bias, for example). Depending on requirements, they are quoted either as **typical (Typ.)** values or **guaranteed (Min., Max.)** values.

Typical values are expressed as figures or as one or more curves, and are subject to spreads. Occasionally a typical curve is accompanied by another curve, this being a 95%, or, in a few cases, a maximum spread limit curve.

**Maximum Ratings** give the values which cannot be exceeded without risk of damage to the device. Changes in supply voltage and in the tolerances of other components in the circuit must also be taken into consideration. No single maximum rating should ever be exceeded, even when the device is operated well within the other maximum ratings. The inclusion of the word "admissible" in a title means that the associated curve defines the maximum ratings.

An exception to this rule are data on collector current. The collector current, quoted as one of the critical transistor values, is a maximum value recommended by the manufacturer which should be noted in connection with the other characteristics valid for this collector current (e.g. collector and saturation voltages, current gain etc.) when selecting a transistor. In certain cases, the quoted collector current may be exceeded without the transistor being destroyed. The absolute limit for the collector current is determined by the maximum admissible power dissipation of the transistor.

### Assembly and Soldering Instructions

To prevent transistors from being damaged during mounting, observe the following points:

All semiconductor devices are extremely sensitive to their maximum admissible junction temperature being exceeded. When planning the layout of the equipment, the distance between heat sources and semiconductor elements should be sufficiently large.

Semiconductor elements may be mounted in any desired position.

From the experience gained in soldering semiconductor elements the following rules have emerged:

For Transistors in plastic case TO-92 the maximum soldering time is 8 s, at soldering temperatures between 230 and 260°C. Here, the distance between soldering joint and case should be at least 4 mm. During soldering, the leads should not be subjected to mechanical stress.