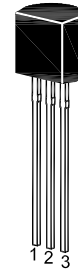


# ST 9013

## NPN Silicon Epitaxial Planar Transistor

for switching and amplifier applications. Especially suitable for AF-driver stages and low power output stages.

The transistor is subdivided into three groups, G, H and I, according to its DC current gain. As complementary type the PNP transistor 9012 is recommended.



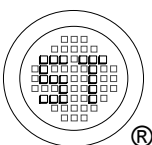
1. Emitter 2. Base 3. Collector  
TO-92 Plastic Package

### Absolute Maximum Ratings ( $T_a = 25\text{ }^\circ\text{C}$ )

| Parameter                 | Symbol    | Value         | Unit             |
|---------------------------|-----------|---------------|------------------|
| Collector Base Voltage    | $V_{CBO}$ | 40            | V                |
| Collector Emitter Voltage | $V_{CEO}$ | 30            | V                |
| Emitter Base Voltage      | $V_{EBO}$ | 5             | V                |
| Collector Current         | $I_C$     | 500           | mA               |
| Power Dissipation         | $P_{tot}$ | 625           | mW               |
| Junction Temperature      | $T_j$     | 150           | $^\circ\text{C}$ |
| Storage Temperature Range | $T_{stg}$ | - 55 to + 150 | $^\circ\text{C}$ |

### Characteristics at $T_a = 25\text{ }^\circ\text{C}$

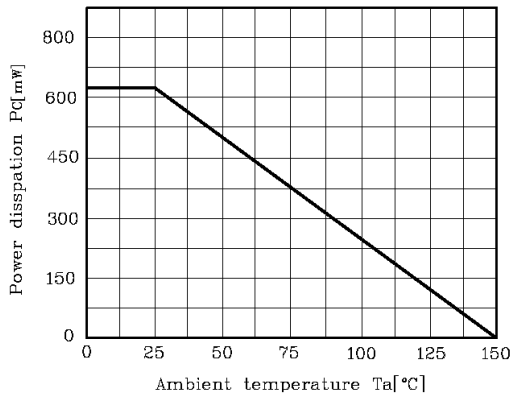
| Parameter  | Symbol               | Min.     | Max. | Unit |   |
|--|----------------------|----------|------|------|---|
| DC Current Gain<br>at $V_{CE} = 1\text{ V}$ , $I_C = 50\text{ mA}$<br><br>at $V_{CE} = 1\text{ V}$ , $I_C = 500\text{ mA}$ | Current Gain Group G | $h_{FE}$ | 110  | 183  | - |
|  | H                    | $h_{FE}$ | 177  | 250  | - |
|  | I                    | $h_{FE}$ | 250  | 380  | - |
|  |                      | $h_{FE}$ | 40   | -    | - |
| Collector Base Cutoff Current<br>at $V_{CB} = 35\text{ V}$   | $I_{CBO}$            | -        | 100  | nA   |   |
| Emitter Base Cutoff Current<br>at $V_{EB} = 5\text{ V}$  | $I_{EBO}$            | -        | 100  | nA   |   |
| Collector Base Breakdown Voltage<br>at $I_C = 100\text{ }\mu\text{A}$  | $V_{(BR)CBO}$        | 40       | -    | V    |   |
| Collector Emitter Breakdown Voltage<br>at $I_C = 1\text{ mA}$  | $V_{(BR)CEO}$        | 30       | -    | V    |   |
| Emitter Base Breakdown Voltage<br>at $I_E = 100\text{ }\mu\text{A}$  | $V_{(BR)EBO}$        | 5        | -    | V    |   |
| Collector Emitter Saturation Voltage<br>at $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$                                    | $V_{CE(sat)}$        | -        | 0.6  | V    |   |
| Base Emitter Saturation Voltage<br>at $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$   | $V_{BE(sat)}$        | -        | 1.2  | V    |   |
| Base Emitter Voltage<br>at $V_{CE} = 1\text{ V}$ , $I_C = 100\text{ mA}$   | $V_{BE}$             | -        | 1    | V    |   |
| Gain Bandwidth Product<br>at $V_{CE} = 6\text{ V}$ , $I_C = 20\text{ mA}$  | $f_T$                | 100      | -    | MHz  |   |



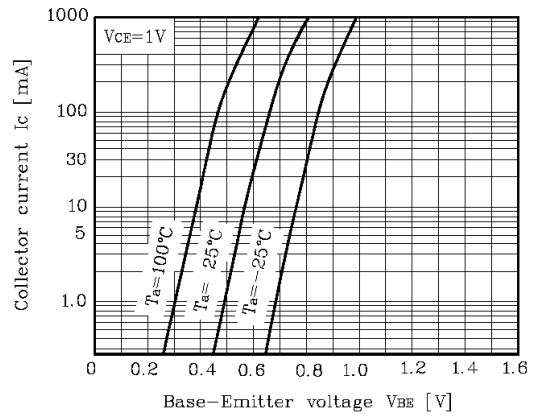
**SEMTECH ELECTRONICS LTD.**  
Subsidiary of Sino-Tech International (BVI) Limited



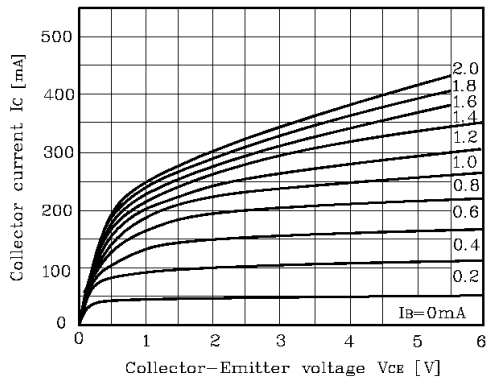
**Fig. 1**  $P_{tot} - T_a$



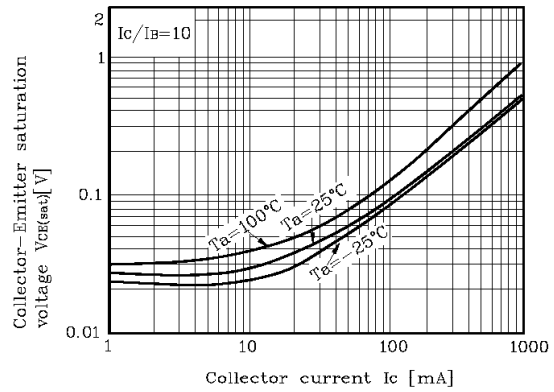
**Fig. 2**  $I_C - V_{BE}$



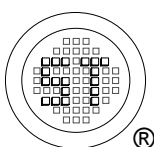
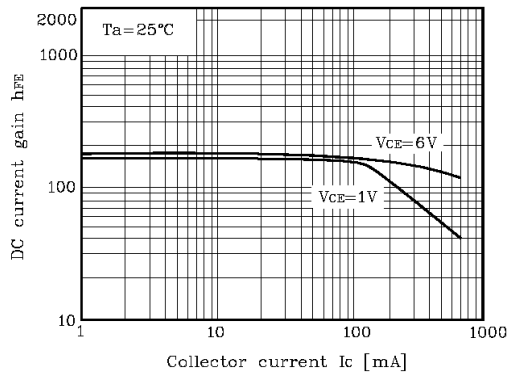
**Fig. 3**  $I_C - V_{CE}$



**Fig. 4**  $V_{CE(SAT)} - I_C$



**Fig. 5**  $h_{FE} - I_C$



**SEMTECH ELECTRONICS LTD.**  
Subsidiary of Sino-Tech International (BVI) Limited

