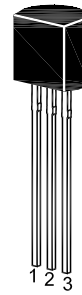


2SA1013-HAF

PNP Silicon Epitaxial Planar Transistor

Features

- The transistor is subdivided into three groups, R, O and Y, according to its DC current gain
- On special request, these transistors can be manufactured in different pin configurations
- Halogen and Antimony Free(HAF), RoHS compliant



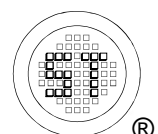
1. Emitter 2. Collector 3. Base
TO-92 Plastic Package

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

| Parameter | Symbol | Value | Unit |
|---------------------------|------------|---------------|------------------|
| Collector Base Voltage | $-V_{CB0}$ | 160 | V |
| Collector Emitter Voltage | $-V_{CEO}$ | 160 | V |
| Emitter Base Voltage | $-V_{EBO}$ | 6 | V |
| Collector Current | $-I_C$ | 1 | A |
| Base Current | $-I_B$ | 0.5 | A |
| Power Dissipation | P_{tot} | 900 | mW |
| Junction Temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | - 55 to + 150 | $^\circ\text{C}$ |

Thermal Characteristics

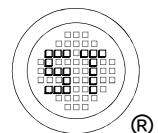
| Parameter | Symbol | Max. | Unit |
|---|-----------------|------|--------------------|
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 139 | $^\circ\text{C/W}$ |



2SA1013-HAF

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

| Parameter | Symbol | Min. | Max. | Unit | |
|---|-----------------------------------|----------|------|---------------|---|
| DC Current Gain at $-V_{CE} = 5\text{ V}$, $-I_C = 200\text{ mA}$ | Current Gain Group R O Y | h_{FE} | 60 | 120 | - |
| | | h_{FE} | 100 | 200 | - |
| | | h_{FE} | 160 | 320 | - |
| Collector Base Cutoff Current at $-V_{CB} = 150\text{ V}$ | $-I_{CBO}$ | - | 1 | μA | |
| Emitter Base Cutoff Current at $-V_{EB} = 6\text{ V}$ | $-I_{EBO}$ | - | 1 | μA | |
| Collector Base Breakdown Voltage at $-I_C = 100\text{ }\mu\text{A}$ | $-V_{(BR)CBO}$ | 160 | - | V | |
| Collector Emitter Breakdown Voltage at $-I_C = 10\text{ mA}$ | $-V_{(BR)CEO}$ | 160 | - | V | |
| Emitter Base Breakdown Voltage at $-I_E = 100\text{ }\mu\text{A}$ | $-V_{(BR)EBO}$ | 5 | - | V | |
| Collector Emitter Saturation Voltage at $-I_C = 500\text{ mA}$, $-I_B = 50\text{ mA}$ | $-V_{CE(sat)}$ | - | 1.5 | V | |
| Base Emitter On Voltage at $-I_C = 5\text{ mA}$, $-V_{CE} = 5\text{ V}$ | $-V_{BE(on)}$ | 0.45 | 0.75 | V | |
| Current Gain Bandwidth Product at $-V_{CE} = 5\text{ V}$, $-I_C = 200\text{ mA}$ | f_T | 15 | - | MHz | |
| Output Capacitance at $-V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$ | C_{ob} | - | 35 | pF | |



2SA1013-HAF

Electrical Characteristics Curves

Fig. 1 Output Characteristics Curve

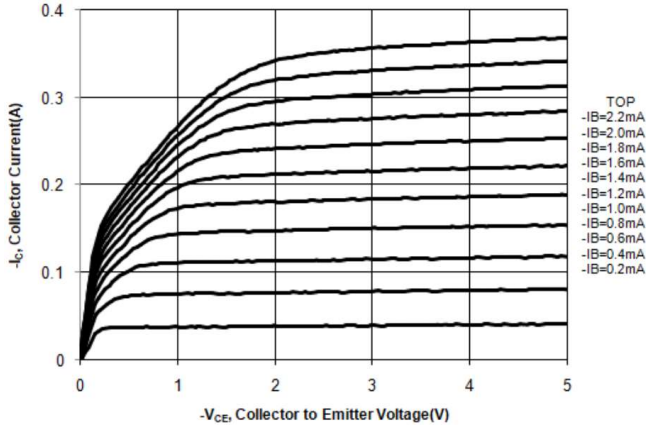


Fig. 2 Collector Current vs. Base to Emitter Voltage

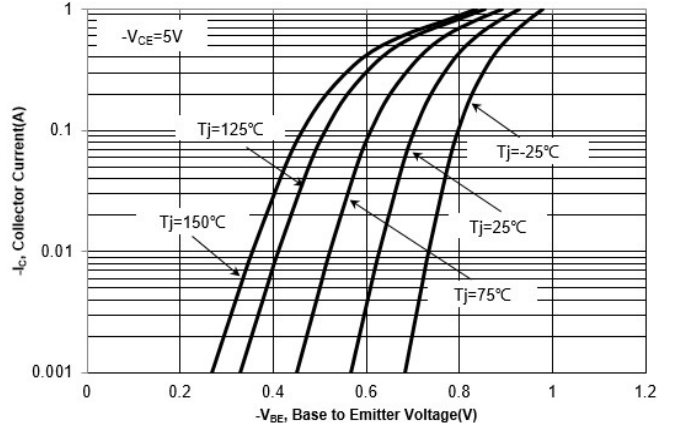


Fig. 3 DC Current Gain vs. Collector Current

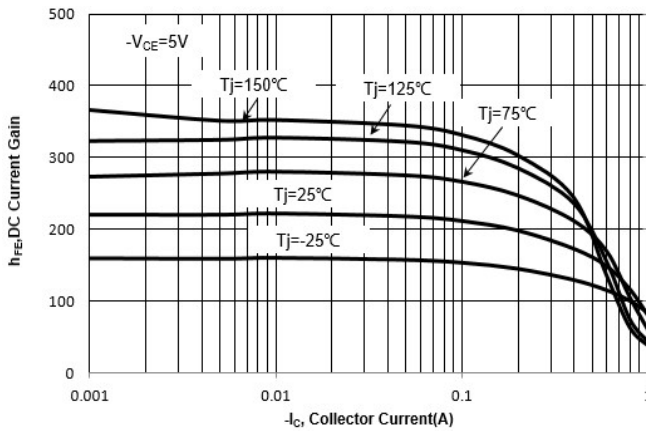
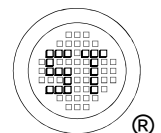
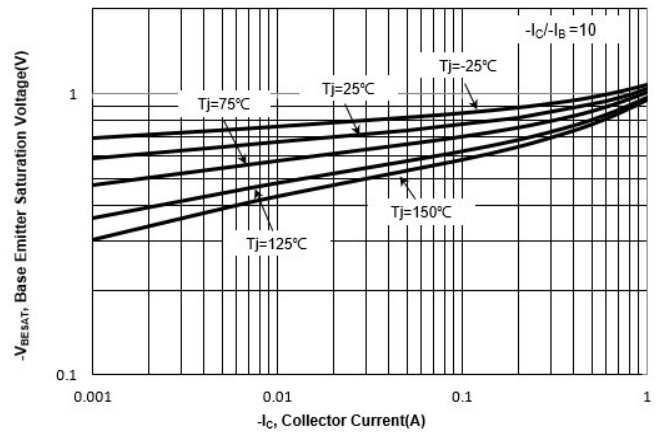


Fig. 4 V_{BESAT} vs. Collector Current



2SA1013-HAF

Electrical Characteristics Curves

Fig. 5 V_{CESAT} vs. Collector Current

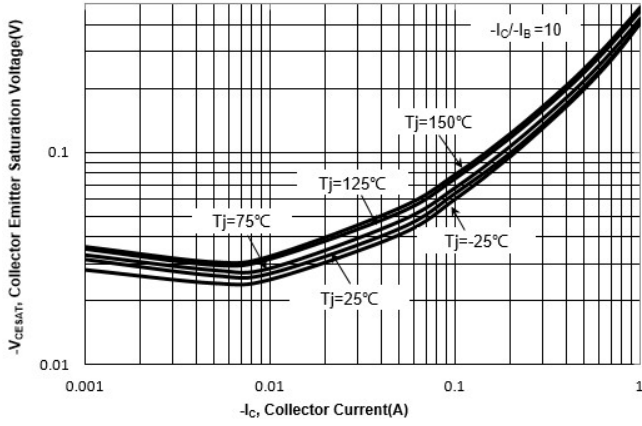


Fig. 6 Output Capacitance

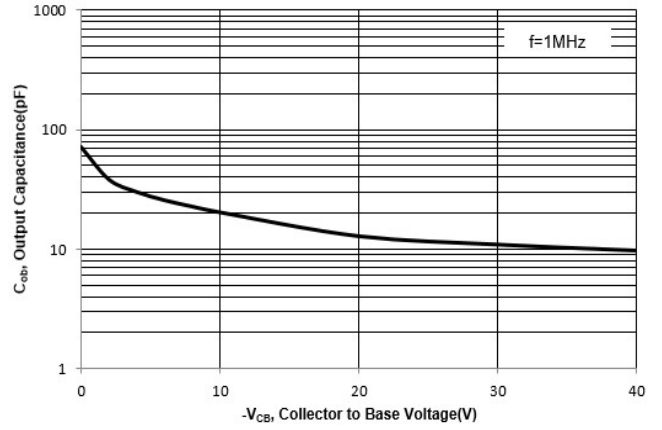
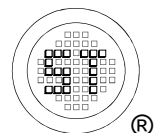
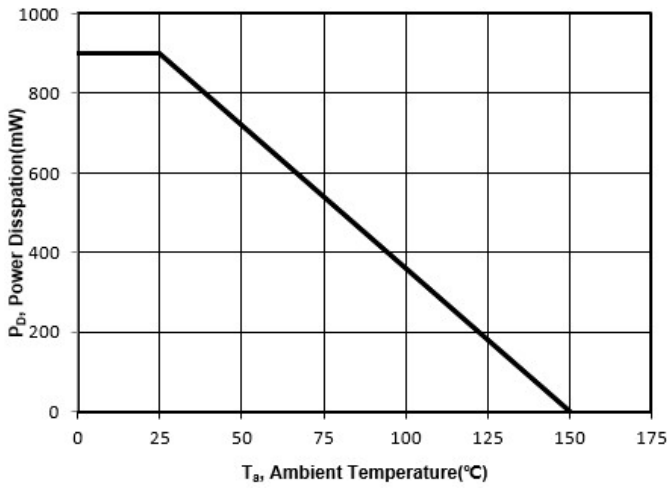
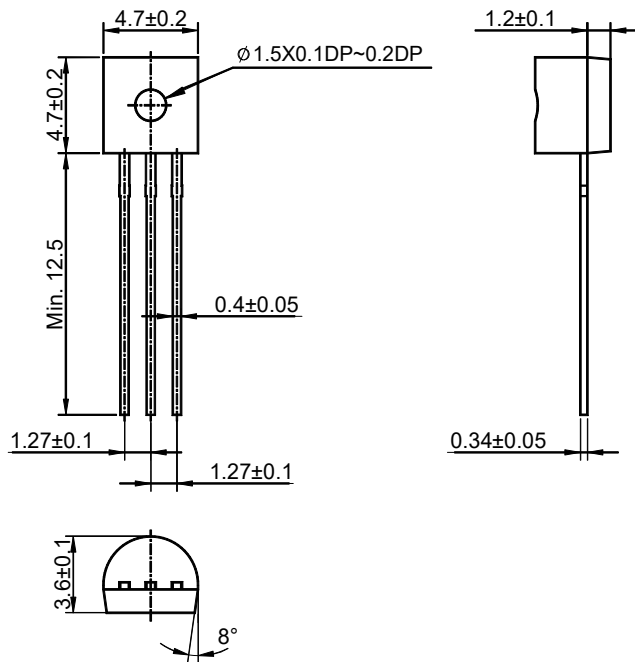


Fig. 7 Power Derating Curve

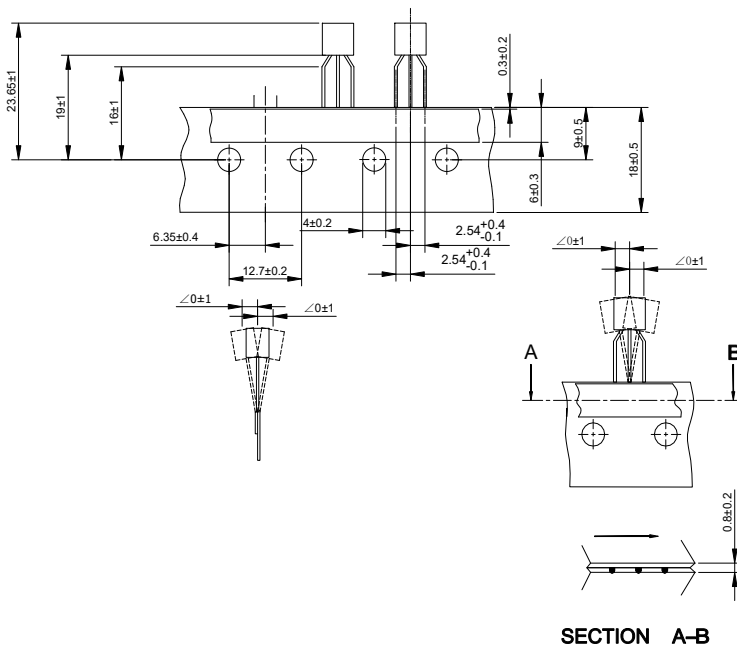


2SA1013-HAF

TO-92 Package Outline (Dimensions in millimeters)



TO-92 Ammo-Pack Outline (Dimensions in millimeters)



Packing information

| Package | Bulk Packing | | | Ammo-Packing | |
|---------|--------------|-------------|----------------|--------------|----------------|
| | Per Bag Qty | Per Box Qty | Per Carton Qty | Per Box Qty | Per Carton Qty |
| TO-92 | 1,000 | 5,000 | 50,000 | 4,000 | 20,000 |

