

# 2SA1012R-HAF

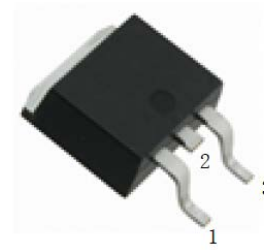
## PNP Silicon Epitaxial Planar Transistor

for power switching and amplifier applications

The transistor is subdivided into two group, O and Y, according to its DC current gain.

### Features

- Halogen and Antimony Free(HAF),  
RoHS compliant



1.Base 2.Collector 3.Emitter  
TO-252 Plastic Package

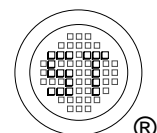
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

| Parameter                 | Symbol     | Value         | Unit             |
|---------------------------|------------|---------------|------------------|
| Collector Base Voltage    | $-V_{CBO}$ | 60            | V                |
| Collector Emitter Voltage | $-V_{CEO}$ | 50            | V                |
| Emitter Base Voltage      | $-V_{EBO}$ | 5             | V                |
| Collector Current         | $-I_C$     | 5             | A                |
| Power Dissipation         | $P_{tot}$  | 15            | W                |
| 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 Case                  | $R_{\theta JC}$ | 8.3  | $^\circ\text{C/W}$ |
| Thermal Resistance from Junction to Ambient <sup>1)</sup> | $R_{\theta JA}$ | 62.5 | $^\circ\text{C/W}$ |

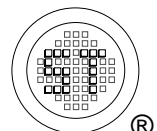
<sup>1)</sup> Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.



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

| Parameter  | Symbol                           | Min.            | Typ.        | Max.            | Unit          |
|--|----------------------------------|-----------------|-------------|-----------------|---------------|
| DC Current Gain<br>at $-V_{CE} = 1\text{ V}$ , $-I_C = 1\text{ A}$<br><br>at $-V_{CE} = 1\text{ V}$ , $-I_C = 3\text{ A}$                | O                                |                 |             |                 |               |
|  | Y                                |                 |             |                 |               |
|  | $h_{FE}$<br>$h_{FE}$<br>$h_{FE}$ | 70<br>120<br>30 | -<br>-<br>- | 140<br>280<br>- | -<br>-<br>-   |
| Collector Base Breakdown Voltage<br>at $-I_C = 100\text{ }\mu\text{A}$   | $-V_{(BR)CBO}$                   | 60              | -           | -               | V             |
| Collector Emitter Breakdown Voltage<br>at $-I_C = 10\text{ mA}$  | $-V_{(BR)CEO}$                   | 50              | -           | -               | V             |
| Emitter Base Breakdown Voltage<br>at $-I_C = 100\text{ }\mu\text{A}$   | $-V_{(BR)EBO}$                   | 5               | -           | -               | V             |
| Collector Cutoff Current<br>at $-V_{CB} = 50\text{ V}$   | $-I_{CBO}$                       | -               | -           | 1               | $\mu\text{A}$ |
| Emitter Cutoff Current<br>at $-V_{EB} = 5\text{ V}$  | $-I_{EBO}$                       | -               | -           | 1               | $\mu\text{A}$ |
| Collector Emitter Saturation Voltage<br>at $-I_C = 3\text{ A}$ , $-I_B = 0.15\text{ A}$  | $-V_{CE(sat)}$                   | -               | -           | 0.4             | V             |
| Base Emitter Saturation Voltage<br>at $-I_C = 3\text{ A}$ , $-I_B = 0.15\text{ A}$   | $-V_{BE(sat)}$                   | -               | -           | 1.2             | V             |
| Transition Frequency<br>at $-V_{CE} = 4\text{ V}$ , $-I_C = 1\text{ A}$  | $f_T$                            | -               | 60          | -               | MHz           |
| Collector Output Capacitance<br>at $-V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$  | $C_{ob}$                         | -               | 170         | -               | pF            |
| Transition Frequency<br>at $-V_{CC} = 30\text{ V}$ , $-I_C = 1\text{ A}$ , $-I_{B1} = I_{B2} = 0.15\text{ A}$ , $R_L = 10\text{ }\Omega$ | $t_{on}$                         | -               | 0.1         | -               | $\mu\text{s}$ |
| Transition Frequency<br>at $-V_{CC} = 30\text{ V}$ , $-I_C = 1\text{ A}$ , $-I_{B1} = I_{B2} = 0.15\text{ A}$ , $R_L = 10\text{ }\Omega$ | $t_{stg}$                        | -               | 1           | -               | $\mu\text{s}$ |
| Transition Frequency<br>at $-V_{CC} = 30\text{ V}$ , $-I_C = 1\text{ A}$ , $-I_{B1} = I_{B2} = 0.15\text{ A}$ , $R_L = 10\text{ }\Omega$ | $t_r$                            | -               | 0.1         | -               | $\mu\text{s}$ |



## Electrical Characteristics Curves

Fig. 1 Output Characteristics

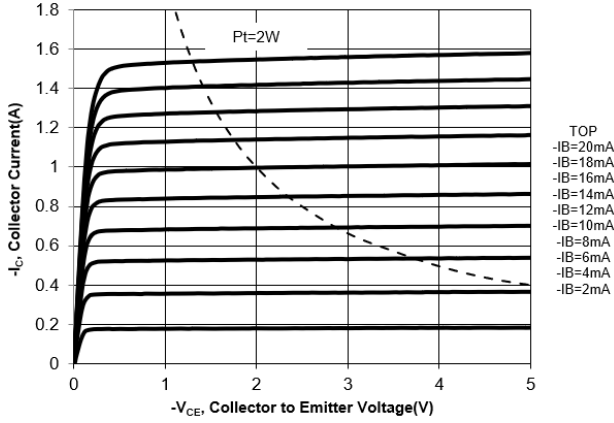


Fig. 2 Output Characteristics

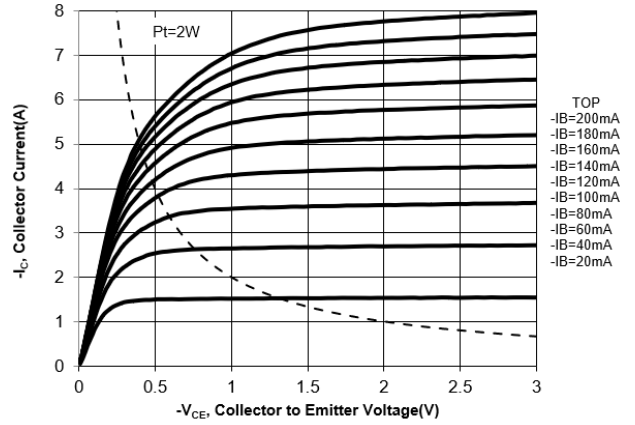


Fig. 3 Collector Current Vs Base Emitter Voltage

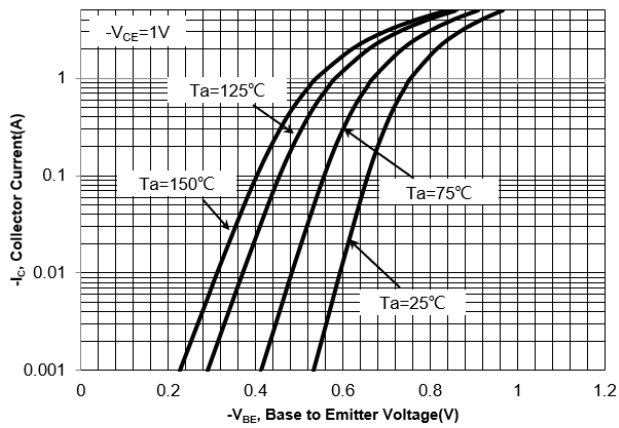
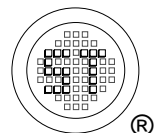
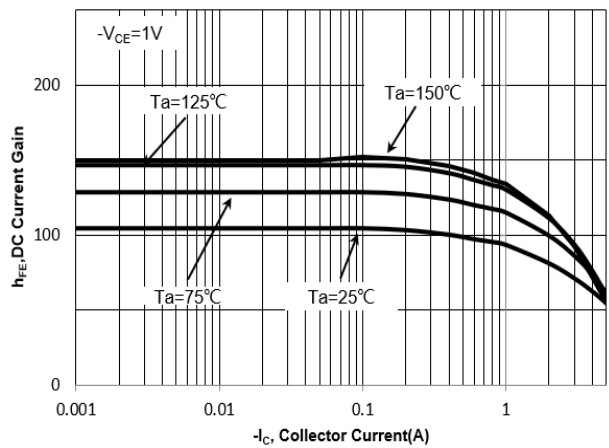


Fig. 4 DC Current Gain Vs Collector Current



## Electrical Characteristics Curves

Fig. 5  $V_{BESAT}$  Vs Collector Current

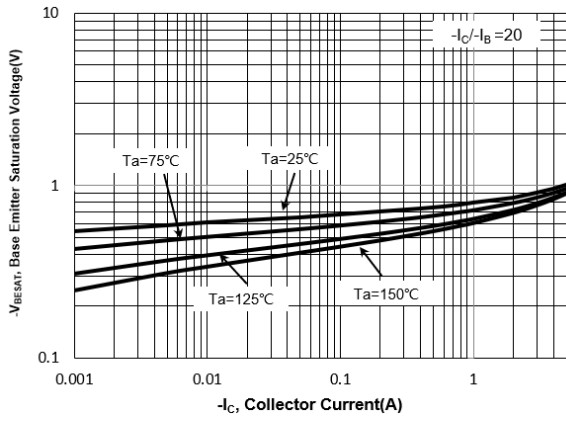


Fig. 6  $V_{CESAT}$  Vs Collector Current

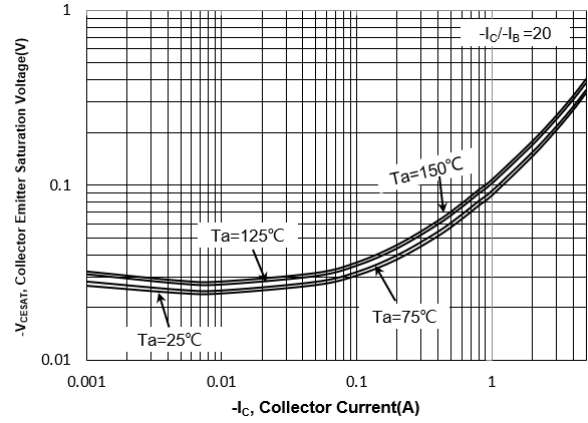
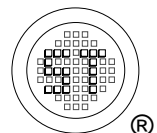
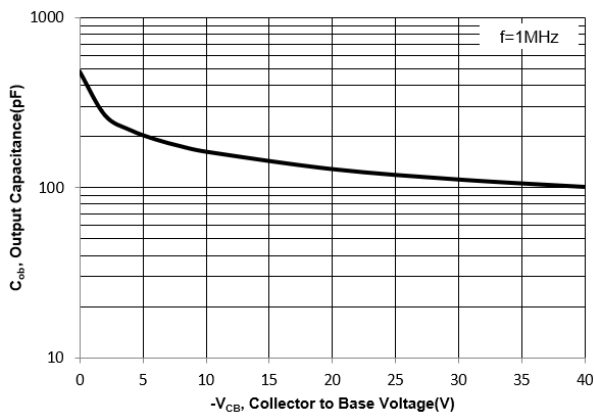


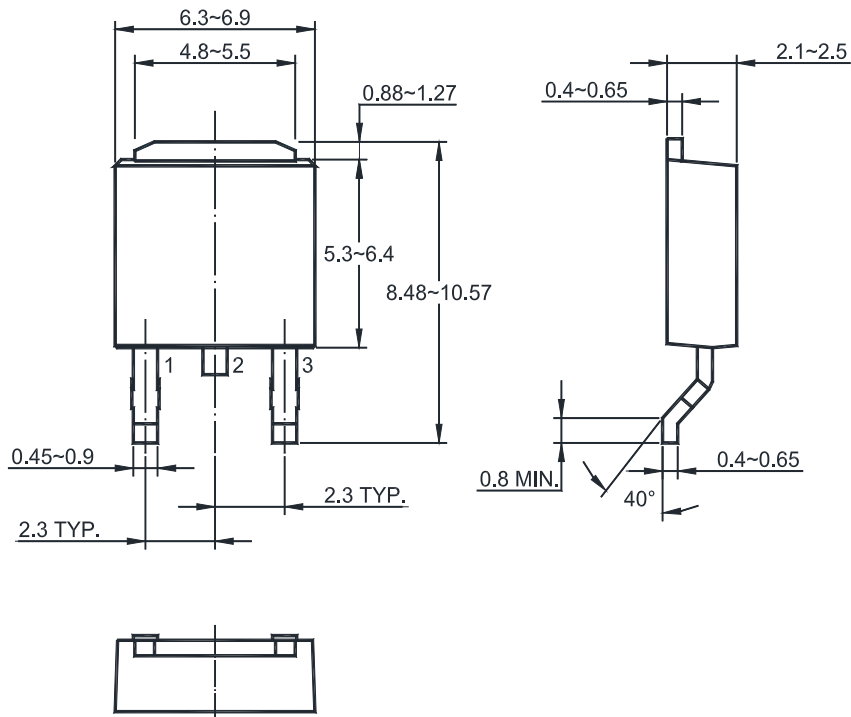
Fig. 7 Capacitance Characteristics



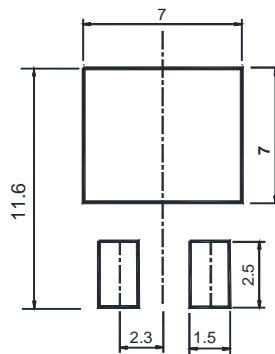
# 2SA1012R-HAF

## Package Outline (Dimensions in mm)

TO-252



## Recommended Soldering Footprint



## Packing information

| Package | Tape Width (mm) | Pitch   |               | Reel Size |      | Per Reel Packing Quantity |
|---------|-----------------|---------|---------------|-----------|------|---------------------------|
|         |                 | mm      | inch          | mm        | inch |                           |
| TO-252  | 12              | 8 ± 0.1 | 0.315 ± 0.004 | 330       | 13   | 2,500                     |

## Marking information

" 2SA1012\*R " = Part No. ( " \* " DC Current Gain Grouping)

" \*\*\*\*\* " = Date Code Marking

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