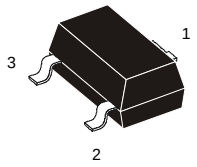
# PLANETA BFR93A/BFR93AR

## The RF Line
## NPN Silicon
## High-Frequency Transistor




| BFR93A | BFR93AR |
|---|---|
| 1 – Collector | 1 – Collector |
| 2 – Emitter | 2 – Base |
| 3 – Base | 3 – Emitter |

### DESCRIPTION

The BFR93A/BFR93AR is an NPN silicon epitaxial transistor designed for low noise amplifier at VHF, UHF and CATV band.

It has dynamic range and good current characteristic.

This small-signal transistor in 3-Pin surface-mountable plastic package SOT23 offers superior quality and performance at low cost.

### FEATURES

- High Gain-Bandwidth Products
  $f_T$=6 GHz (Typ) @ 30 mA
- Low Noise Figure
  $N_F$=1.6 dB (Typ) @ 800 MHz
- High Gain
  $G_{PS}$= 14.0 dB (Typ) @ 800 MHz

| | SOT23 |
|---|---|
| JEDEC | TO-236 |
| EIAJ | SC-59 |
| GOST | ÊÒ-46 |
| Weight: | 0.01g |

### ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25 °C)

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector – Emitter Voltage | $V_{CEO}$ | **12** | V |
| Collector – Base Voltage | $V_{CBO}$ | **20** | V |
| Emitter – Base Voltage | $V_{EBO}$ | **2** | V |
| Collector Current | $I_C$ | **50** | mA |
| Power Dissipation | $P_{tot}$ | **200** | mW |
| Junction Temperature | $T_{JMAX}$ | **150** | °C |
| Operating Junction Temperature Range | $T_J$ | **-45** to **+70** | °C |
| Storage Temperature Range | $T_{STG}$ | **-65** to **+150** | °C |

### THERMAL CHARACTERISTIC

| | | | |
|---|---|---|---|
| Thermal Resistance, Junction to Case | $R_{\Theta JC}$ | **450** | °C/W |

### ORDERING INFORMATION

| Device | Marking | Package | Quantity | Packing Style |
|---|---|---|---|---|
| BFR93A-T1 | R2 | SOT-23 | 3 Kpcs / Reel | Embossed tape 8-mm wide 7" dia. Pin 1 (Collector) face to perforation side of the tape. |
| BFR93A-T3 | R2 | SOT-23 | 10 Kpcs / Reel | Embossed tape 8-mm wide 13" dia. Pin 1 (Collector) face to perforation side of the tape. |
| BFR93AR-T1 | R5 | SOT-23 | 3 Kpcs / Reel | Embossed tape 8-mm wide 7" dia. Pin 1 (Collector) face to perforation side of the tape. |
| BFR93AR-T3 | R5 | SOT-23 | 10 Kpcs / Reel | Embossed tape 8-mm wide 13" dia. Pin 1 (Collector) face to perforation side of the tape. |

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## ELECTRICAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **DC CHARACTERISTICS** | | | | | |
| Collector – Base Cutoff Current, $I_E$= 0mA, $V_{CB}$=10V | $I_{CBO}$ | – | – | **100** | nA |
| Emitter – Base Cutoff Current, $I_C$= 0mA, $V_{EB}$= 2V | $I_{EBO}$ | – | – | **10.0** | µA |
| Collector – Emitter Breakdown Voltage, $I_C$= 1mA, $I_B$= 0mA | $V_{(BR)CEO}$ | **12** | – | – | V |
| Collector – Emitter Saturation Voltage, $I_C$=50mA, $I_B$= 5mA | $V_{CE(sat)}$ | – | **100** | **400** | mV |
| DC Current Gain, $I_E$=30mA, $V_{CB}$= 5V | $h_{FE}$ | **40** | **90** | **150** | – |
| **AC CHARACTERISTICS** | | | | | |
| Transition Frequency, $I_C$=30mA, $V_{CB}$= 5V, f=300MHz | $f_T$ | **4.6** | **6.0** | – | GHz |
| Collector-Base Capacitance, $I_E$= 0mA, $V_{CB}$=10V, f= 1MHz | $C_{cb}$ | – | **0.45** | **0.9** | pF |
| Noise Figure, $I_E$= 5mA, $V_{CE}$= 8V, f=800MHz, $Z_S$=50Ω | $N_F$ | – | **1.6** | – | dB |
| Power Gain, $I_E$=30mA, $V_{CE}$= 8V, f=800MHz, $Z_S$=50Ω, $Z_L$=$Z_{Lopt}$ | $G_{PS}$ | **12.5** | **14.0** | – | dB |

## TIPICAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted)

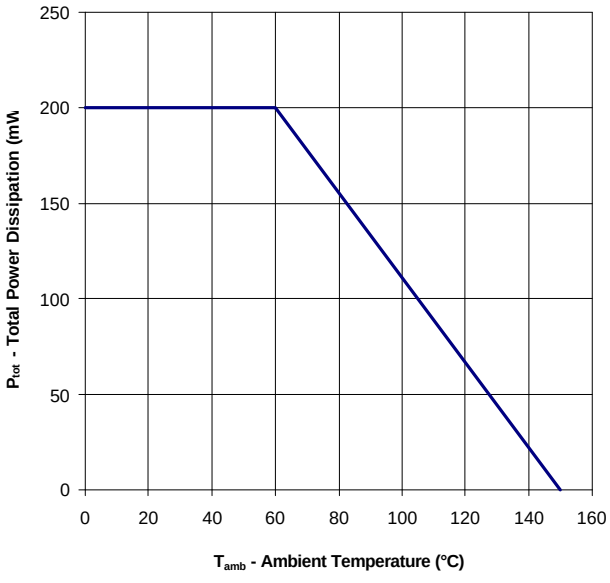


**Figure 1**. Total Power Dissipation vs. Ambient Temperature

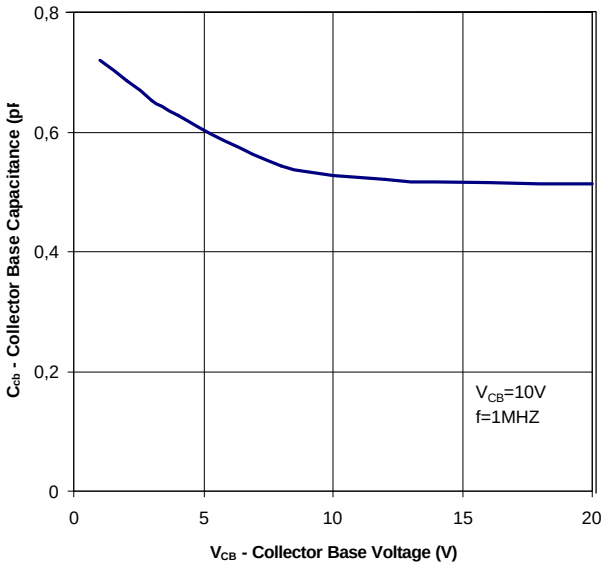


**Figure 2**. Collector – Base Capacitance vs. Collector – Base Voltage

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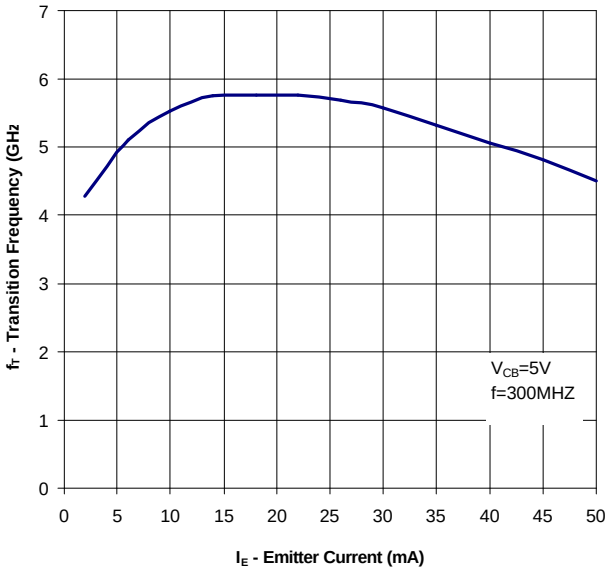


**Figure 3.** Transition Frequency vs. Emitter Current

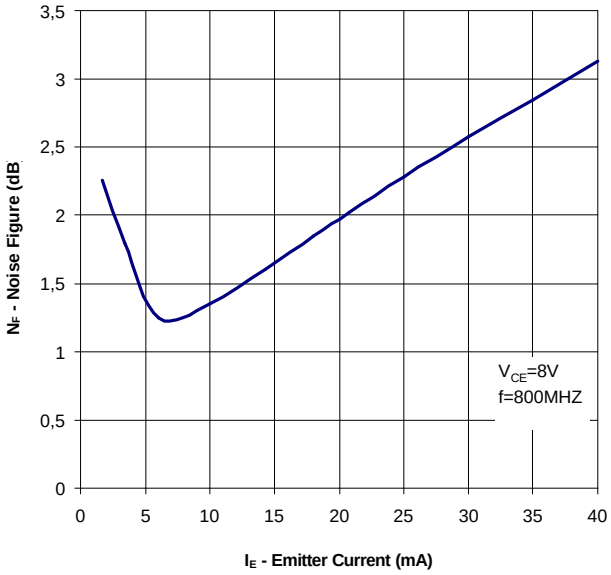


**Figure 4.** Noise Figure vs. Emitter Current

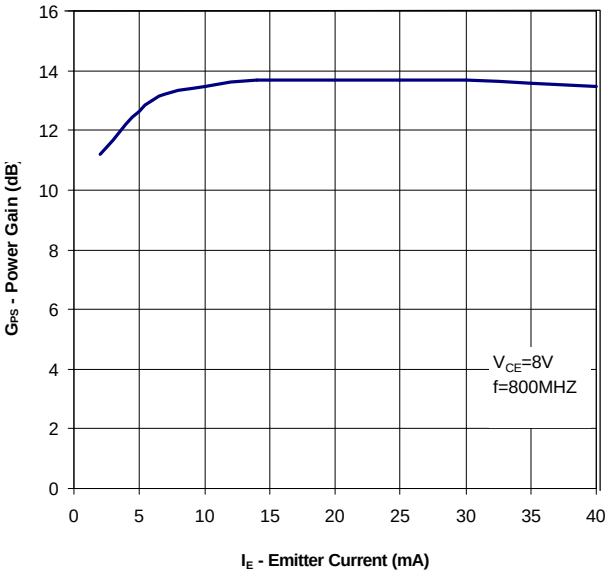


**Figure 5.** Power Gain vs. Emitter Current

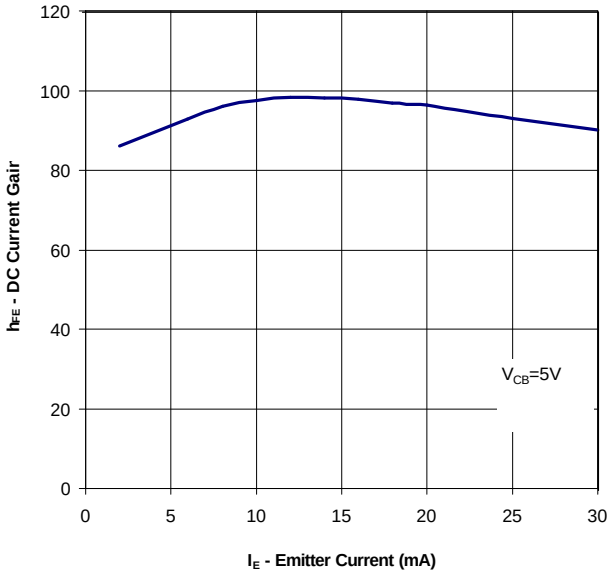


**Figure 6.** DC Current Gain vs. Emitter Current

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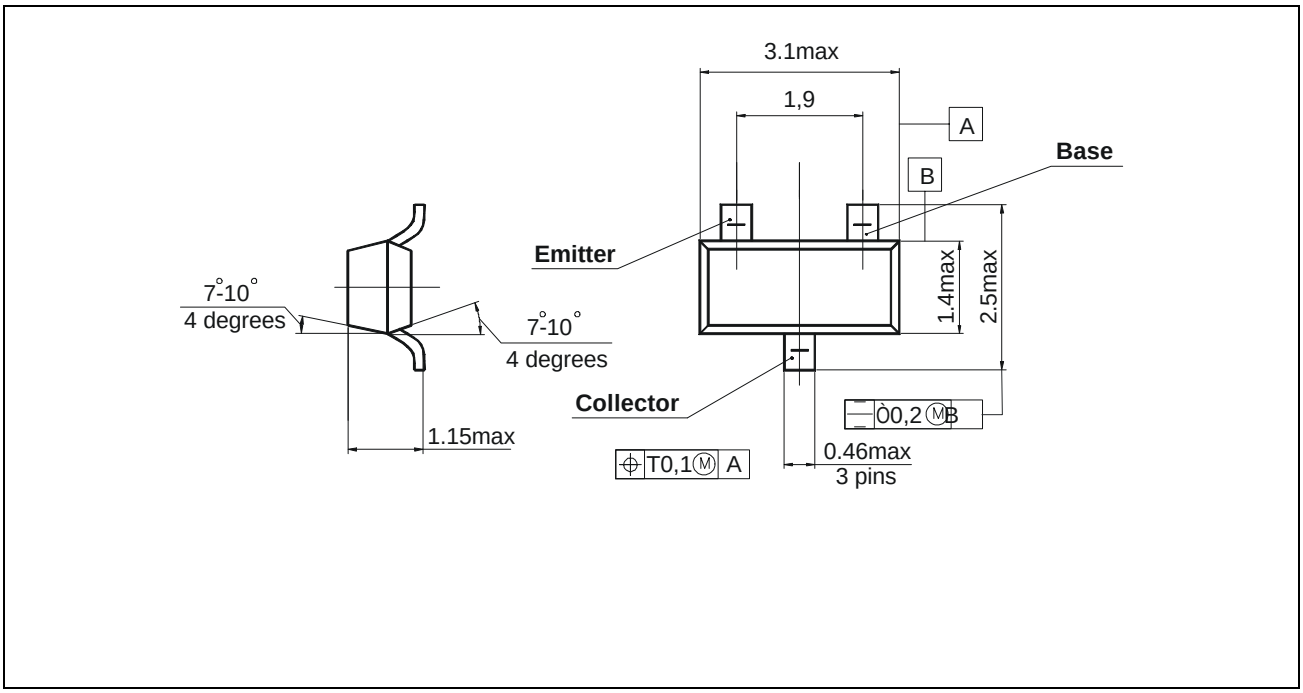
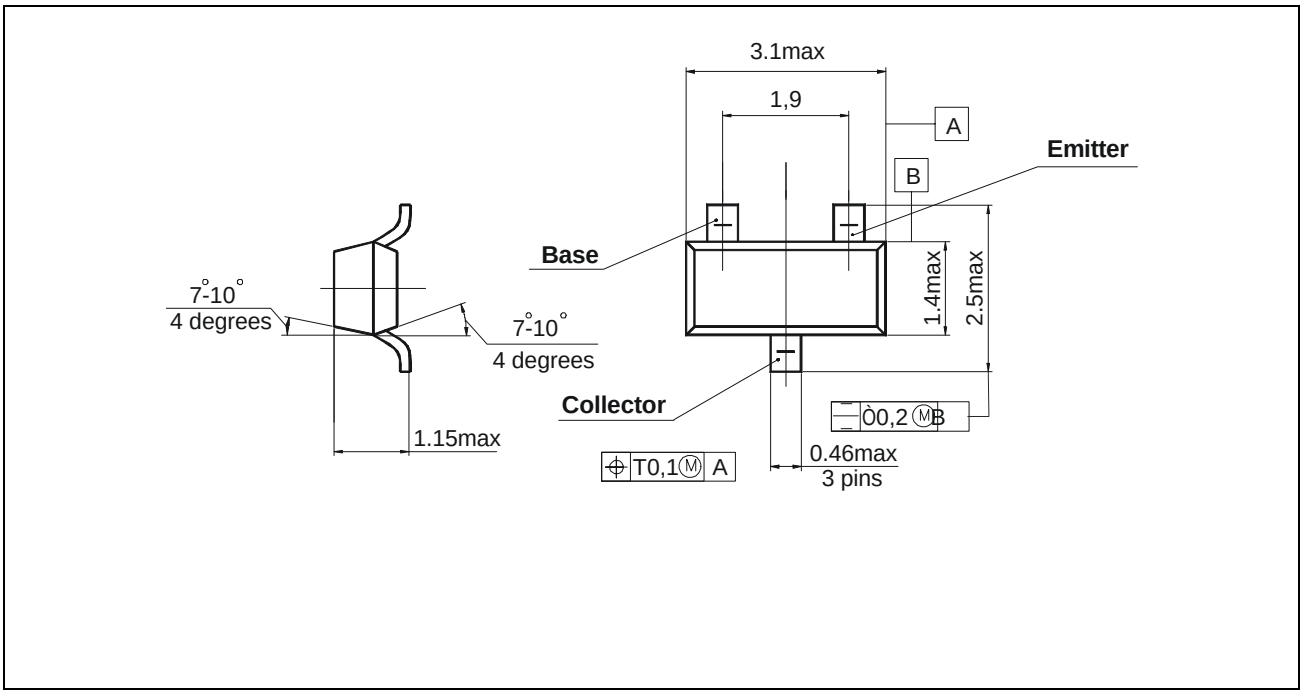
## PACKAGE DIMENSIONS of BFR93A in mm




**PLASTIC CASE KT-46**

## PACKAGE DIMENSIONS of BFR93AR in mm




**PLASTIC CASE KT-46**

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