



# BFR93A/BFR93AR

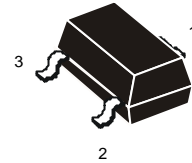
## The RF Line NPN Silicon High-Frequency Transistor

### 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.



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

### 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    | ÉO-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. |

# BFR93A/BFR93AR

## ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

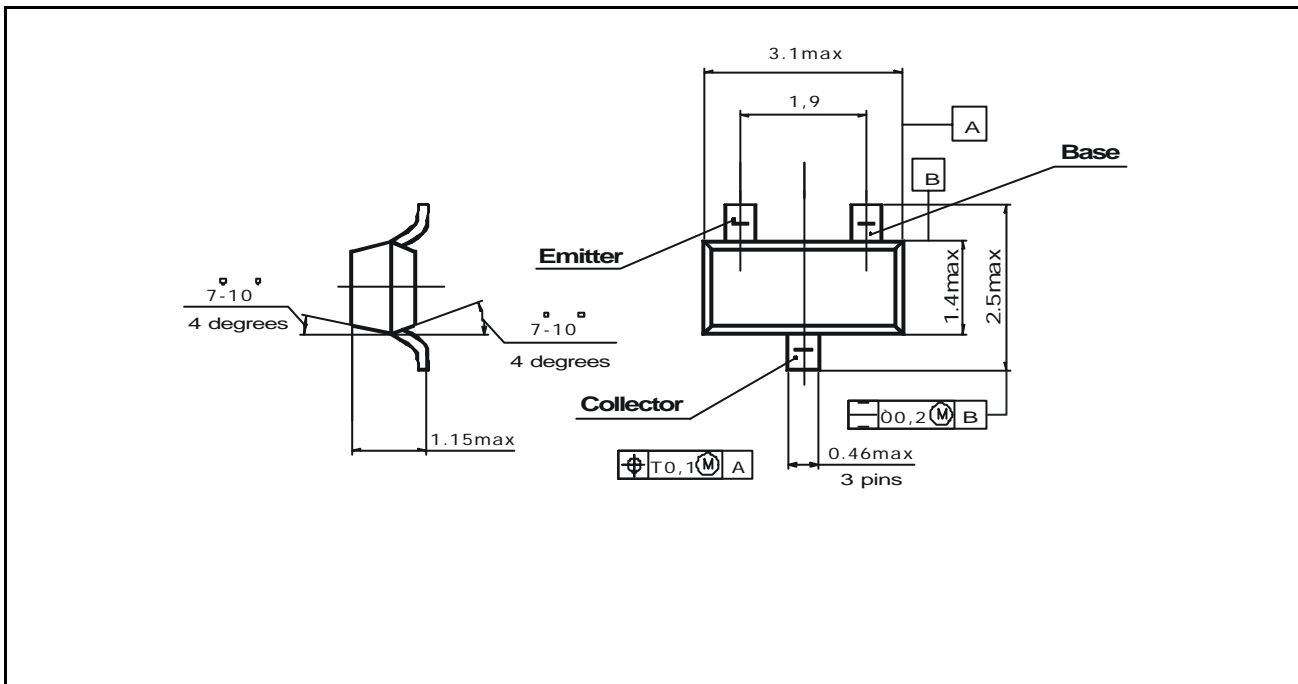
### DC CHARACTERISTICS

|  |           |    |   |     |    |
|--|-----------|----|---|-----|----|
| Collector – Base Cutoff Current,<br>$I_E = 0\text{mA}$ , $V_{CB} = 10\text{V}$ | $I_{CBO}$ | –  | – | 100 | nA |
| DC Current Gain,<br>$I_E = 30\text{mA}$ , $V_{CB} = 5\text{V}$                 | $h_{FE}$  | 50 | – | 170 | –  |

### AC CHARACTERISTICS

|   |          |     |      |     |     |
|---|----------|-----|------|-----|-----|
| Transition Frequency,<br>$I_C = 30\text{mA}$ , $V_{CB} = 5\text{V}$ , $f = 300\text{MHz}$           | $f_T$    | 5.0 | 6.0  | –   | GHz |
| Collector-Base Capacitance,<br>$I_E = 0\text{mA}$ , $V_{CB} = 10\text{V}$ , $f = 1\text{MHz}$       | $C_{cb}$ | –   | 0.45 | 0.9 | pF  |
| Noise Figure,<br>$I_E = 5\text{mA}$ , $V_{CE} = 8\text{V}$ , $f = 800\text{MHz}$ , $Z_L = Z_{Lopt}$ | $N_F$    | –   | 1.6  | –   | dB  |
| Power Gain,<br>$I_E = 25\text{mA}$ , $V_{CE} = 8\text{V}$ , $f = 800\text{MHz}$ , $Z_S = 50\Omega$  | $G_{PS}$ | –   | 14.0 | –   | dB  |

## PACKAGE DIMENSIONS of BFR93A in mm



PLASTIC CASE KT-46