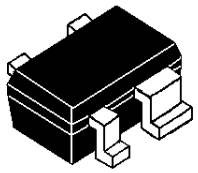
# SMA540B

## Active Biased RF Transistor

**PRELIMINARY DATA**

- HIGH GAIN LOW NOISE AMPLIFIERS $G_{ms}$ = 19 dB at 1.8 GHz
- CURRENT EASY ADJUSTABLE BY AN EXTERNAL RESISTOR
- OPEN COLLECTOR OUTPUT
- TYPICAL SUPPLY VOLTAGE: 1.4-3.3 V
- TRANSITION FREQUENCY 42 GHz
- ULTRA MINIATURE SOT323-4L PACKAGE (LEAD FREE)

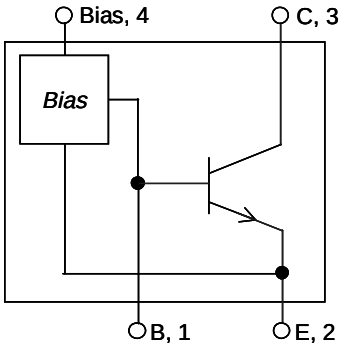


**SOT323-4L (SC70)**

| ORDER CODE | BRANDING |
|---|---|
| SMA540BTR | TBD |

### APPLICATIONS

- WIDEBAND APPLICATIONS
- CELLULAR AND CORDLESS TELEPHONES
- HIGH FREQUENCY OSCILLATORS




### DESCRIPTION

The SMA540B is a NPN Transistor integrating a current mirror as biasing. In this way the IC (collector current) can be controlled setting the current at Bias pin according to IC = 10 * IBIAS. The IBIAS current is easy adjustable using an external resistor. SMA540B is housed in ultra miniature SOT323-4L package(LEAD FREE), the relative dimensions are 1.15mmx1.8mm with 0.8mm thickness.

### ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{ceo}$ | Collector emitter voltage | 4.5 | V |
| $V_{ebo}$ | Emitter base voltage | 1.5 | V |
| $I_c$ | Collector current | 40 | mA |
| $I_b$ | Base current | 4 | mA |
| $I_{BIAS}$ | BIAS Current | 4 | mA |
| $P_{tot}$ | Total dissipation, $T_s$ = 107 $^oC$ | 120 | mW |
| $T_{op}$ | Operating temperature | -40 to +85 | $^oC$ |
| $T_{stg}$ | Storage temperature | -65 to +150 | $^oC$ |
| $T_j$ | Max. operating junction temperature | 150 | $^oC$ |

### THERMAL RESISTANCE

| | | | |
|---|---|---|---|
| $R_{thjs}$ | Thermal Resistance Junction soldering point | < 270 | $^oC/W$ |

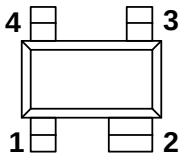
## ELECTRICAL CHARACTERISTICS

($T_A$=25 $^oC$,$Z_{L/S}$ = 50Ω, tested in circuit shown in fig.1, unless otherwise specified )

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Gms (1) | Maximum stable gain | Vd = 2V, Ic = 20mA | f = 1.8GHz | | 19 | | dB |
| $\|S21\|^2$ | Insertion power gain | Vd = 2V, Ic = 20mA | f = 1.8GHz | | 17.5 | | dB |
| $F_{50\Omega}$ | Noise Figure | Vd = 2V, Ic = 5mA, Zs = 50Ω | f = 1.8GHz | | 1.3 | | dB |
| $P_{-1dB}$ | Output Power at 1dB Compression Point | Vd = 2V, Ic = 20mA, | f = 1.8GHz | | 9 | | dBm |
| OIP3 | Ouput third order intercept point | Vd = 2V, Ic = 20mA | f = 1.8GHz | | 19 | | dBm |
| $C_{CB}$ | Collector-base capacitance | Vcb = 2V, f = 1MHz | | | 0.13 | | pF |
| CR | Current Ratio ($Ic/I_{Bias}$) | $I_{Bias}$ = 0.5mA, Vd = 2V | | | 10 | | |

Note(1): Gms = | $S_{21}$ / $S_{12}$ |

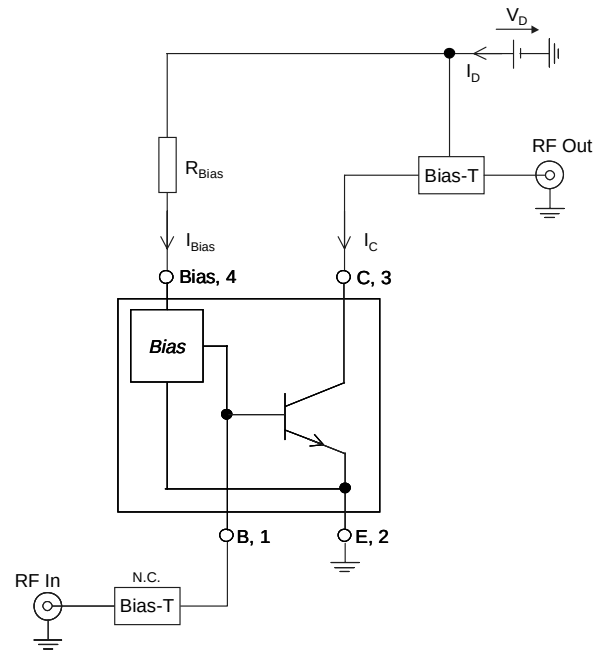
## PIN CONNECTION




SOT343

| Pin No. | Description |
|---|---|
| 1 | BASE |
| 2 | EMITTER |
| 3 | COLLECTOR |
| 4 | BIAS |

## Typical configuration (Fig. 1)



**PACKAGE DIMENSIONS SOT323-4L (SC-70 4 leads)**