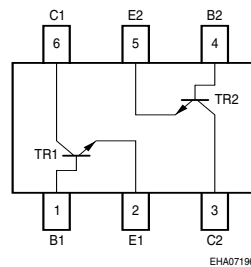
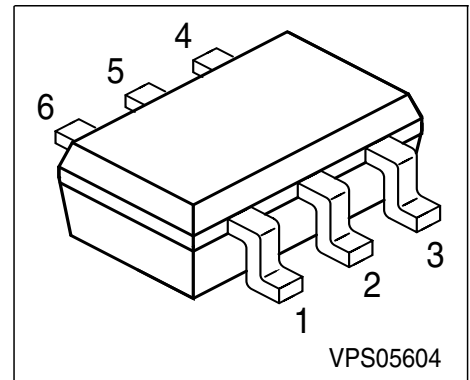


## NPN Silicon RF Transistor

- For low-noise, high-gain broadband amplifiers at collector currents from 0.2 mA to 20 mA
- $f_T = 8 \text{ GHz}$   
 $F = 1.2 \text{ dB at } 900 \text{ MHz}$
- Two (galvanic) internal isolated Transistors in one package



**ESD:** Electrostatic discharge sensitive device, observe handling precaution!

| Type    | Marking | Pin Configuration |     |     |     |     |     | Package |
|---------|---------|-------------------|-----|-----|-----|-----|-----|---------|
| BFS 482 | RGs     | 1=B               | 2=E | 3=C | 4=B | 5=E | 6=C | SOT-363 |

### Maximum Ratings

| Parameter                                               | Symbol    | Value       | Unit             |
|---------------------------------------------------------|-----------|-------------|------------------|
| Collector-emitter voltage                               | $V_{CEO}$ | 12          | V                |
| Collector-emitter voltage                               | $V_{CES}$ | 20          |                  |
| Collector-base voltage                                  | $V_{CBO}$ | 20          |                  |
| Emitter-base voltage                                    | $V_{EBO}$ | 2           |                  |
| Collector current                                       | $I_C$     | 35          | mA               |
| Base current                                            | $I_B$     | 4           |                  |
| Total power dissipation, $T_S \leq 81^\circ\text{C}^1)$ | $P_{tot}$ | 250         | mW               |
| Junction temperature                                    | $T_j$     | 150         | $^\circ\text{C}$ |
| Ambient temperature                                     | $T_A$     | -65 ... 150 |                  |
| Storage temperature                                     | $T_{stg}$ | -65 ... 150 |                  |

### Thermal Resistance

|                            |            |            |     |
|----------------------------|------------|------------|-----|
| Junction - soldering point | $R_{thJS}$ | $\leq 275$ | K/W |
|----------------------------|------------|------------|-----|

<sup>1</sup>  $T_S$  is measured on the collector lead at the soldering point to the pcb

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified.

| Parameter                                                              | Symbol        | Values |      |      | Unit          |
|------------------------------------------------------------------------|---------------|--------|------|------|---------------|
|                                                                        |               | min.   | typ. | max. |               |
| DC characteristics                                                     |               |        |      |      |               |
| Collector-emitter breakdown voltage<br>$I_C = 1\text{ mA}, I_B = 0$    | $V_{(BR)CEO}$ | 12     | -    | -    | V             |
| Collector-emitter cutoff current<br>$V_{CE} = 20\text{ V}, V_{BE} = 0$ | $I_{CES}$     | -      | -    | 100  | $\mu\text{A}$ |
| Collector-base cutoff current<br>$V_{CB} = 10\text{ V}, I_E = 0$       | $I_{CBO}$     | -      | -    | 100  | nA            |
| Emitter-base cutoff current<br>$V_{EB} = 1\text{ V}, I_C = 0$          | $I_{EBO}$     | -      | -    | 1    | $\mu\text{A}$ |
| DC current gain<br>$I_C = 10\text{ mA}, V_{CE} = 8\text{ V}$           | $h_{FE}$      | 50     | 100  | 200  | -             |

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified.

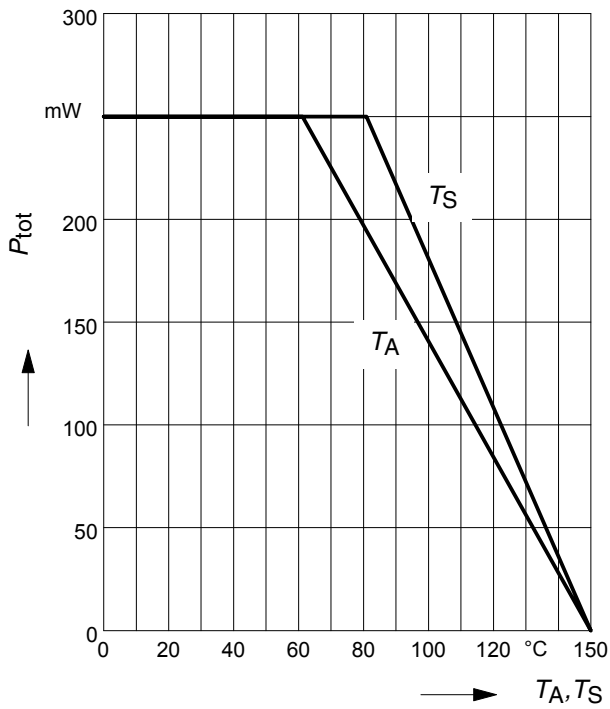
| Parameter                                                                                                                                                   | Symbol        | Values |            |        | Unit |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------|------------|--------|------|
|                                                                                                                                                             |               | min.   | typ.       | max.   |      |
| AC characteristics (verified by random sampling)                                                                                                            |               |        |            |        |      |
| Transition frequency<br>$I_C = 15\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $f = 500\text{ MHz}$                                                                 | $f_T$         | 6      | 8          | -      | GHz  |
| Collector-base capacitance<br>$V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$                                                                                   | $C_{cb}$      | -      | 0.3        | 0.45   | pF   |
| Collector-emitter capacitance<br>$V_{CE} = 10\text{ V}$ , $f = 1\text{ MHz}$                                                                                | $C_{ce}$      | -      | 0.12       | -      |      |
| Emitter-base capacitance<br>$V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$                                                                                    | $C_{eb}$      | -      | 0.65       | -      |      |
| Noise figure<br>$I_C = 3\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{Sopt}$ ,<br>$f = 900\text{ MHz}$<br>$f = 1.8\text{ GHz}$                            | $F$           | -<br>- | 1.2<br>1.9 | -<br>- | dB   |
| Power gain, maximum stable <sup>F)</sup><br>$I_C = 10\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ ,<br>$f = 900\text{ MHz}$    | $G_{ms}$      | -      | 19.5       | -      |      |
| Power gain, maximum available <sup>F)</sup><br>$I_C = 10\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ ,<br>$f = 1.8\text{ GHz}$ | $G_{ma}$      | -      | 13         | -      |      |
| Transducer gain<br>$I_C = 10\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\Omega$ ,<br>$f = 900\text{ MHz}$<br>$f = 1.8\text{ GHz}$                  | $ S_{21e} ^2$ | -<br>- | 15.5<br>10 | -<br>- |      |

$$^1G_{ms} = |S_{21} / S_{12}|$$

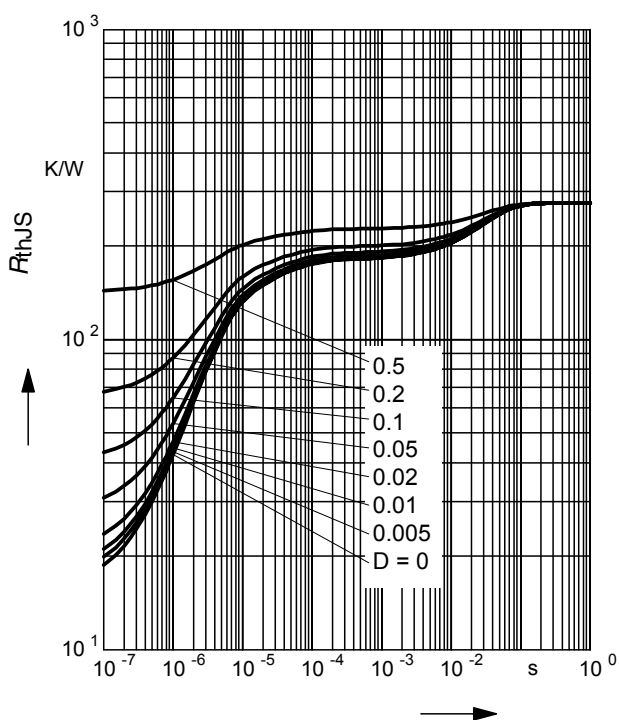
$$^2G_{ma} = |S_{21} / S_{12}| (k - (k^2 - 1)^{1/2})$$

**Total power dissipation**  $P_{\text{tot}} = f(T_A^*, T_S)$

\* Package mounted on epoxy

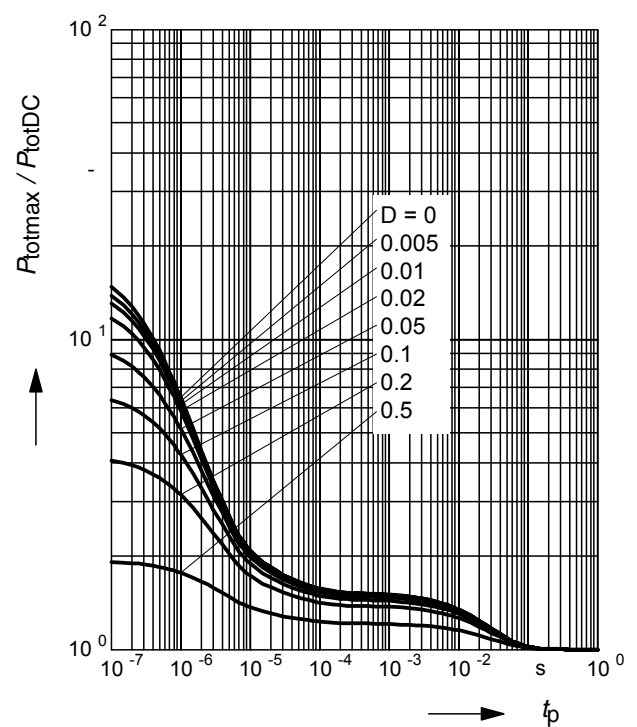


**Permissible Pulse Load**  $R_{\text{thJS}} = f(t_p)$



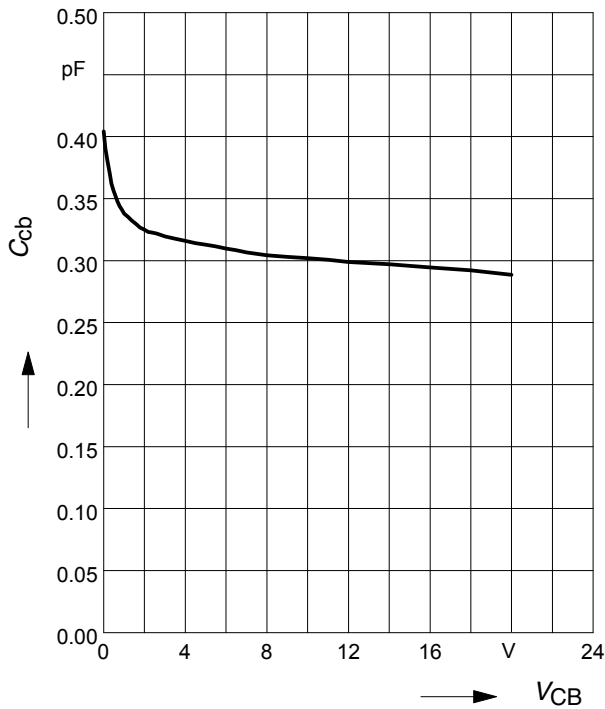
**Permissible Pulse Load**

$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$



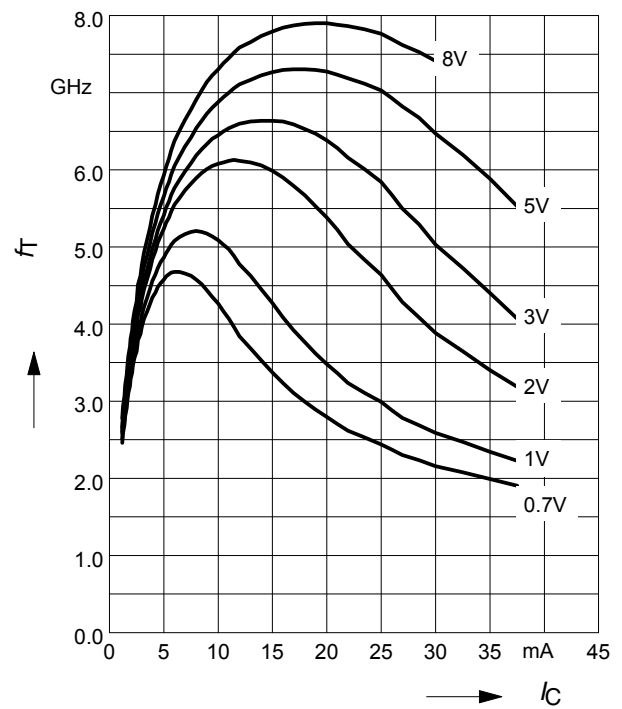
**Collector-base capacitance  $C_{cb} = f(V_{CB})$**

$f = 1\text{MHz}$



**Transition frequency  $f_T = f(I_C)$**

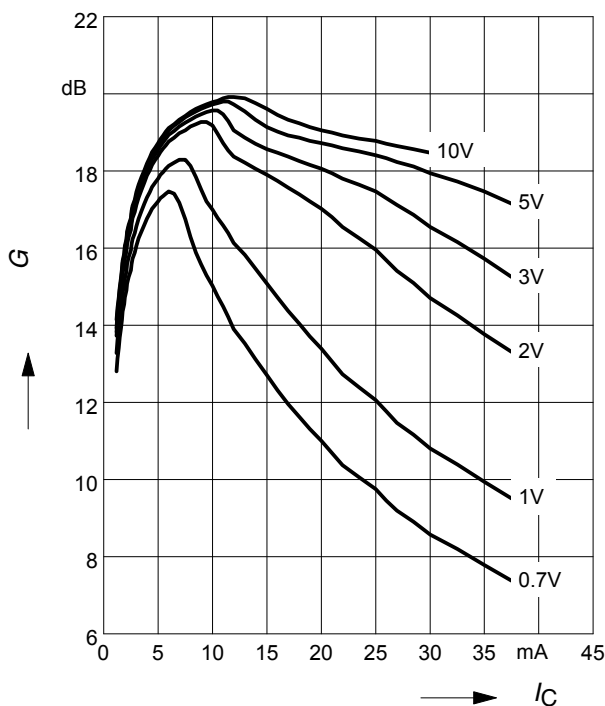
$V_{CE} = \text{Parameter}$



**Power Gain  $G_{ma}, G_{ms} = f(I_C)$**

$f = 0.9\text{GHz}$

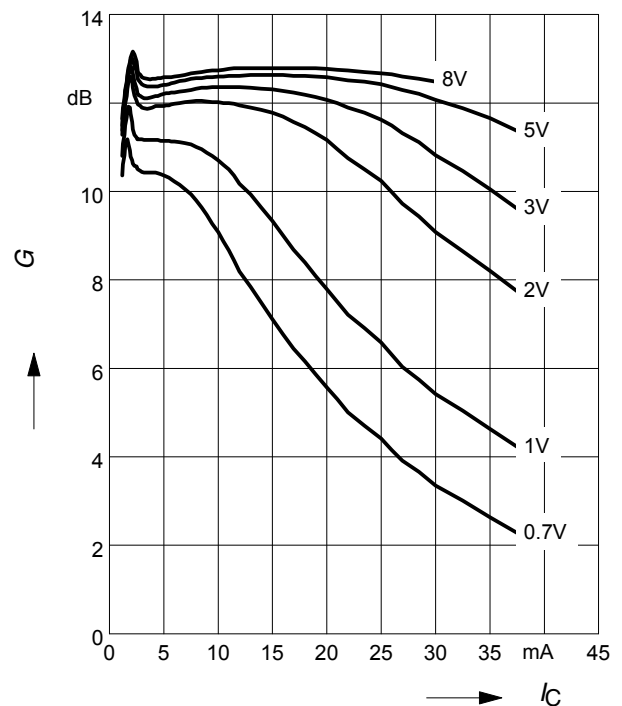
$V_{CE} = \text{Parameter}$



**Power Gain  $G_{ma}, G_{ms} = f(I_C)$**

$f = 1.8\text{GHz}$

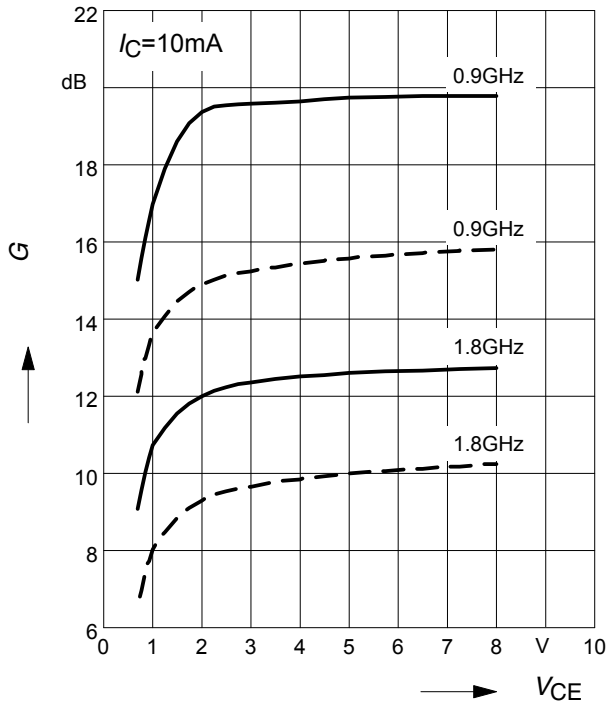
$V_{CE} = \text{Parameter}$



**Power Gain**  $G_{ma}, G_{ms} = f(V_{CE})$ :

$|S_{21}|^2 = f(V_{CE})$ :

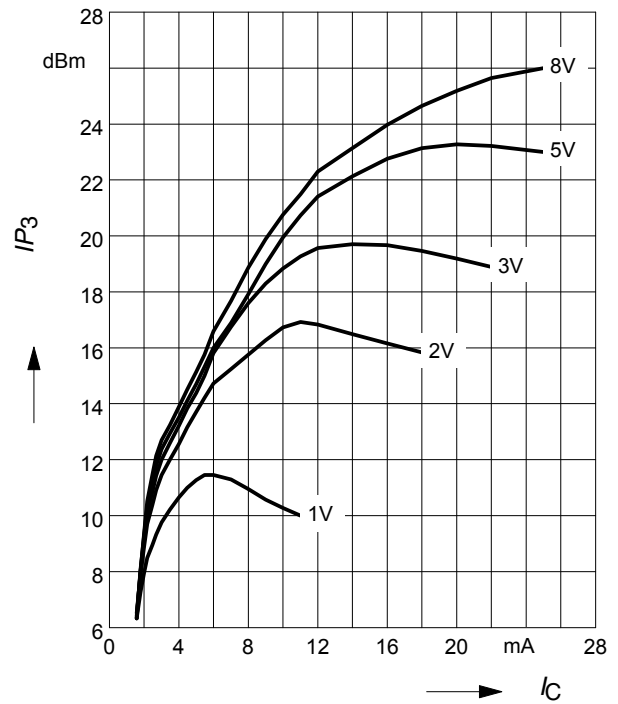
$f$  = Parameter



**Intermodulation Intercept Point**  $IP_3 = f(I_C)$

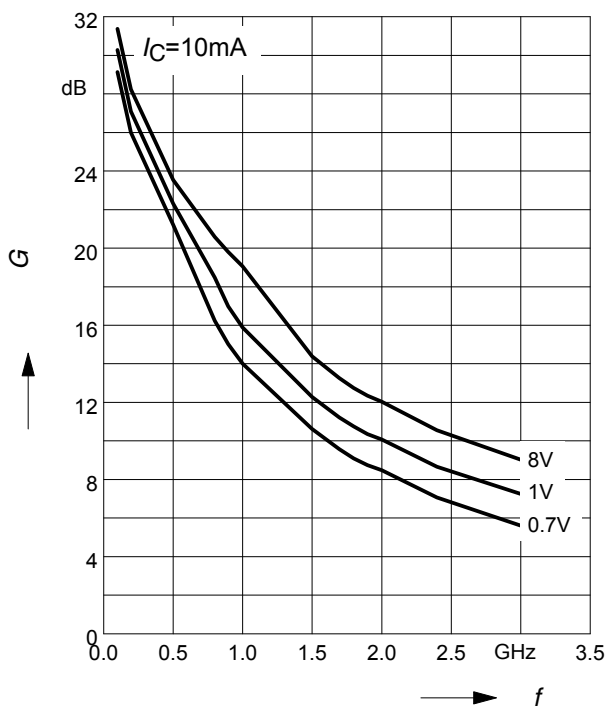
(3rd order, Output,  $Z_S = Z_L = 50\Omega$ )

$V_{CE}$  = Parameter,  $f = 900\text{MHz}$



**Power Gain**  $G_{ma}, G_{ms} = f(f)$

$V_{CE}$  = Parameter



**Power Gain**  $|S_{21}|^2 = f(f)$

$V_{CE}$  = Parameter

