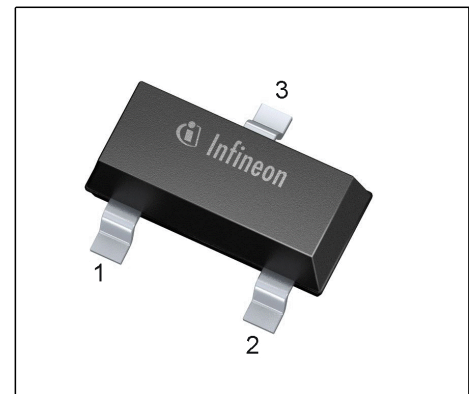


Low Noise Silicon Bipolar RF Transistor

- For low noise, high-gain broadband amplifiers at collector currents from 2 mA to 30 mA
- $f_T = 8 \text{ GHz}$, $NF_{\min} = 0.9 \text{ dB}$ at 900 MHz
- Pb-free (RoHS compliant) package
- Qualification report according to AEC-Q101 available



ESD (Electrostatic discharge) sensitive device, observe handling precaution!

| Type | Marking | Pin Configuration | | | Package |
|--------|---------|-------------------|-----|-----|---------|
| BFR183 | RHs | 1=B | 2=E | 3=C | SOT23 |

Maximum Ratings at $T_A = 25 \text{ °C}$, unless otherwise specified

| 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 | 65 | mA |
| Base current | I_B | 5 | |
| Total power dissipation ¹⁾ $T_S \leq 60 \text{ °C}$ | P_{tot} | 450 | mW |
| Junction temperature | T_J | 150 | °C |
| Storage temperature | T_{Stg} | -55 ... 150 | |

Thermal Resistance

| Parameter | Symbol | Value | Unit |
|--|-------------------|-------|------|
| Junction - soldering point ²⁾ | R_{thJS} | 200 | K/W |

¹⁾ T_S is measured on the collector lead at the soldering point to the pcb

²⁾ For the definition of R_{thJS} please refer to Application Note AN077 (Thermal Resistance Calculation)

Electrical Characteristics at $T_A = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|--|---------------|--------|------|------|---------------|
| | | min. | typ. | max. | |
| DC Characteristics | | | | | |
| Collector-emitter breakdown voltage $I_C = 1\text{ mA}$, $I_B = 0$ | $V_{(BR)CEO}$ | 12 | - | - | V |
| Collector-emitter cutoff current $V_{CE} = 20\text{ V}$, $V_{BE} = 0$ | I_{CES} | - | - | 100 | μA |
| Collector-base cutoff current $V_{CB} = 10\text{ V}$, $I_E = 0$ | I_{CBO} | - | - | 100 | nA |
| Emitter-base cutoff current $V_{EB} = 1\text{ V}$, $I_C = 0$ | I_{EBO} | - | - | 1 | μA |
| DC current gain $I_C = 15\text{ mA}$, $V_{CE} = 8\text{ V}$, pulse measured | h_{FE} | 70 | 100 | 140 | - |

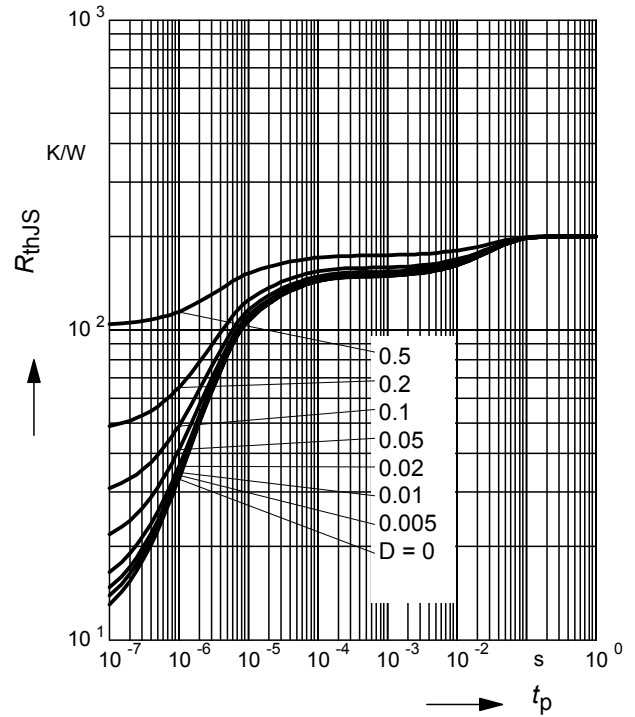
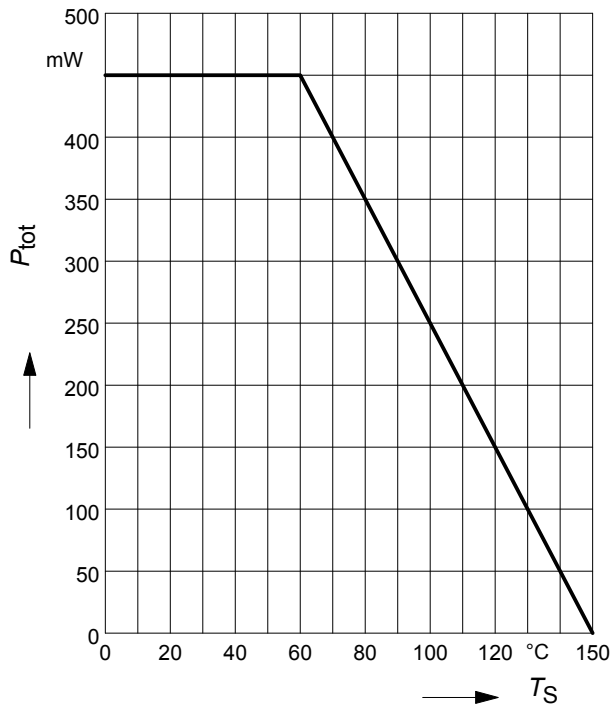
Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---------------|--------|------------|--------|------|
| | | min. | typ. | max. | |
| AC Characteristics (verified by random sampling) | | | | | |
| Transition frequency $I_C = 25\text{ mA}$, $V_{CE} = 8\text{ V}$, $f = 500\text{ MHz}$ | f_T | 6 | 8 | - | GHz |
| Collector-base capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, emitter grounded | C_{cb} | - | 0.37 | 0.57 | pF |
| Collector emitter capacitance $V_{CE} = 10\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, base grounded | C_{ce} | - | 0.2 | - | |
| Emitter-base capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$, $V_{CB} = 0$, collector grounded | C_{eb} | - | 1.1 | - | |
| Minimum noise figure $I_C = 5\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_{Sopt}$, $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$ | NF_{min} | - - | 0.9 1.4 | - - | dB |
| Power gain, maximum stable ¹⁾ $I_C = 15\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 900\text{ MHz}$ | G_{ms} | - | 17.5 | - | dB |
| Power gain, maximum available ¹⁾ $I_C = 15\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$ | G_{ma} | - | 11.5 | - | dB |
| Transducer gain $I_C = 15\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_L = 50\text{ }\Omega$, $f = 900\text{ MHz}$ $f = 1.8\text{ MHz}$ | $ S_{21e} ^2$ | - - | 14.5 9 | - - | dB |

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

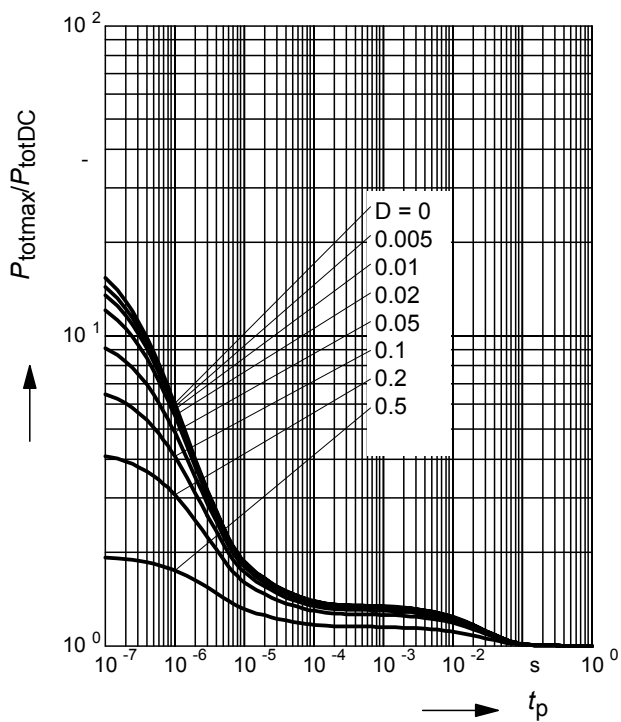
Total power dissipation $P_{\text{tot}} = f(T_S)$

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

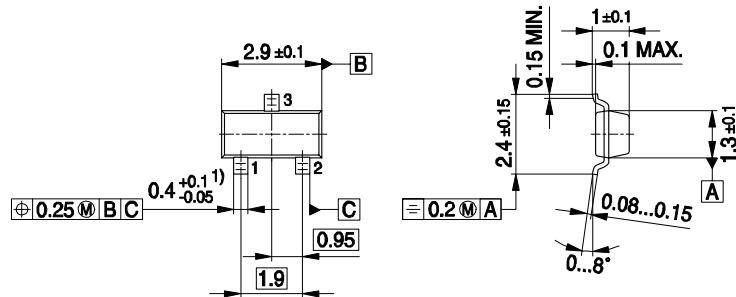
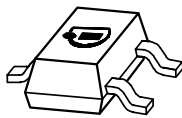


Permissible Pulse Load

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



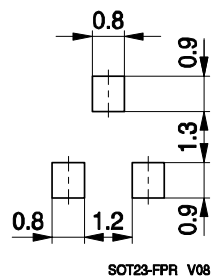
Package Outline



1) Lead width can be 0.6 max. in dambar area

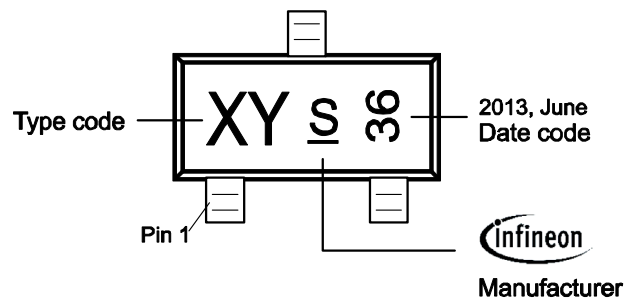
SOT23-PO V08

Foot Print



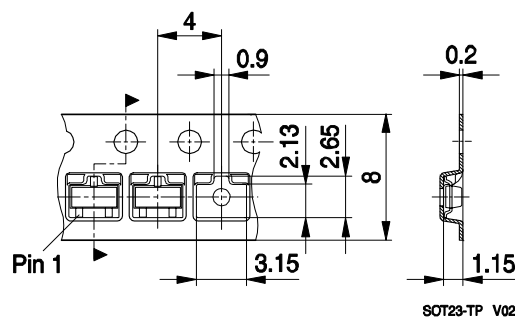
SOT23-FPR V08

Marking Layout



Standard Packing

Reel o 180 mm: 3.000 Pieces / Reel
Reel o 330 mm = 10.000 Pieces / Reel



SOT23-TP V02

Edition 2009-11-16

**Published by
Infineon Technologies AG
81726 Munich, Germany**

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