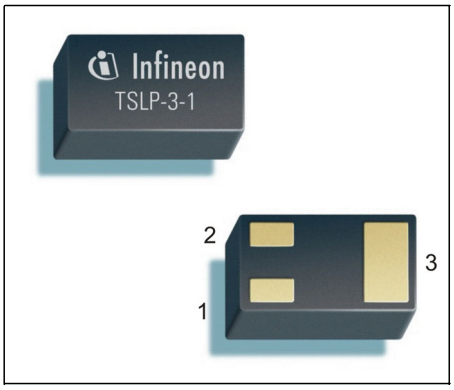
## Low Noise Silicon Bipolar RF Transistor




- Low voltage/ Low current operation
- Transition frequency of 14 GHz
- High insertion gain
- Ideal for low current amplifiers and oscillators
- Pb-free (RoHS compliant) and halogen-free thin small leadless package
- Qualification report according to AEC-Q101 available

RoHS HAL

**ESD** (**E**lectro**s**tatic **d**ischarge) sensitive device, observe handling precaution!

| Type | Marking | Pin Configuration | | | Package |
|---|---|---|---|---|---|
| BFR340L3 | FA | 1 = B | 2 = E | 3 = C | TSLP-3-1 |

**Maximum Ratings** at $T_A$ = 25 °C, unless otherwise specified

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Collector-emitter voltage | $V_{CEO}$ | 6 | V |
| Collector-emitter voltage | $V_{CES}$ | 15 | |
| Collector-base voltage | $V_{CBO}$ | 15 | |
| Emitter-base voltage | $V_{EBO}$ | 2 | |
| Collector current | $I_C$ | 10 | mA |
| Base current | $I_B$ | 2 | |
| Total power dissipation[1)] $T_S \leq 120$°C | $P_{tot}$ | 60 | mW |
| Junction temperature | $T_J$ | 150 | °C |
| Storage temperature | $T_{Stg}$ | -55 ... 150 | |

**Thermal Resistance**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction - soldering point[2)] | $R_{thJS}$ | 500 | 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 °C, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **DC Characteristics** | | | | | |
| Collector-emitter breakdown voltage<br>$I_C$ = 1 mA, $I_B$ = 0 | $V_{(BR)CEO}$ | 6 | 9 | - | V |
| Collector-emitter cutoff current<br>$V_{CE}$ = 15 V, $V_{BE}$ = 0 | $I_{CES}$ | - | - | 10 | µA |
| Collector-base cutoff current<br>$V_{CB}$ = 5 V, $I_E$ = 0 | $I_{CBO}$ | - | - | 100 | nA |
| Emitter-base cutoff current<br>$V_{EB}$ = 1 V, $I_C$ = 0 | $I_{EBO}$ | - | - | 1 | µA |
| DC current gain<br>$I_C$ = 5 mA, $V_{CE}$ = 3 V, pulse measured | $h_{FE}$ | 90 | 120 | 160 | - |

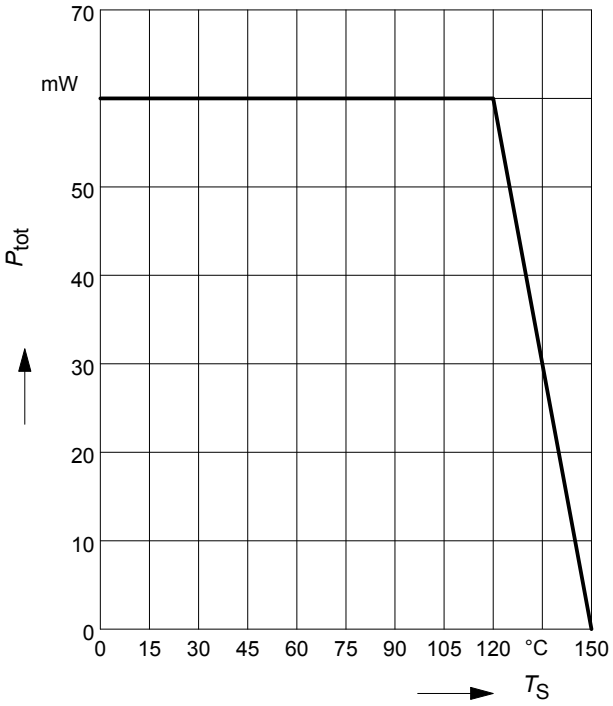
**Electrical Characteristics** at $T_A$ = 25 °C, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **AC Characteristics** (verified by random sampling) | | | | | |
| Transition frequency<br>$I_C$ = 6 mA, $V_{CE}$ = 3 V, $f$ = 1 GHz | $f_T$ | 10 | 14 | - | GHz |
| Collector-base capacitance<br>$V_{CB}$ = 5 V, $f$ = 1 MHz, $V_{BE}$ = 0 ,<br>emitter grounded | $C_{cb}$ | - | 0.17 | 0.4 | pF |
| Collector emitter capacitance<br>$V_{CE}$ = 5 V, $f$ = 1 MHz, $V_{BE}$ = 0 ,<br>base grounded | $C_{ce}$ | - | 0.13 | - | |
| Emitter-base capacitance<br>$V_{EB}$ = 0.5 V, $f$ = 1 MHz, $V_{CB}$ = 0 ,<br>collector grounded | $C_{eb}$ | - | 0.12 | - | |
| Minimum noise figure<br>$I_C$ = 1 mA, $V_{CE}$ = 3 V, $Z_S$ = $Z_{Sopt}$ , $f$ = 1.8 GHz | $NF_{min}$ | - | 1.15 | - | dB |
| Power gain, maximum stable[1)]<br>$I_C$ = 5 mA, $V_{CE}$ = 3 V, $Z_S$ = $Z_{Sopt}$ ,<br>$Z_L$ = $Z_{Lopt}$, $f$ = 1.8 GHz | $G_{ms}$ | - | 17.5 | - | - |
| Power gain, maximum available[1)]<br>$I_C$ = 5 mA, $V_{CE}$ = 3 V, $Z_S$ = $Z_{Sopt}$ ,<br>$Z_L$ = $Z_{Lopt}$ , $f$ = 3 GHz | $G_{ma}$ | - | 13 | - | dB |
| Transducer gain<br>$I_C$ = 5 mA, $V_{CE}$ = 3 V, $Z_S$ = $Z_L$ = 50Ω ,<br>$f$ = 1.8 GHz<br>$f$ = 3 GHz | $\lvert S_{21e}\rvert^2$ | <br><br>-<br>- | <br><br>14<br>10 | <br><br>-<br>- | dB |
| Third order intercept point at output[2)]<br>$V_{CE}$ = 3 V, $I_C$ = 5 mA, $f$ = 1.8 GHz,<br>$Z_S$ = $Z_L$ = 50Ω | $IP3$ | - | 12.5 | - | dBm |
| 1dB compression point at output<br>$I_C$ = 5 mA, $V_{CE}$ = 3 V, $Z_S$ = $Z_L$ = 50Ω ,<br>$f$ = 1.8 GHz | $P_{-1dB}$ | - | -1 | - | |

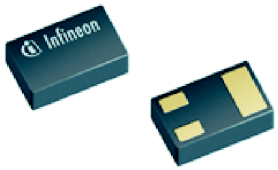
[1] $G_{ma} = |S_{21e} / S_{12e}| (k-(k^2-1)^{1/2})$, $G_{ms} = |S_{21e} / S_{12e}|$

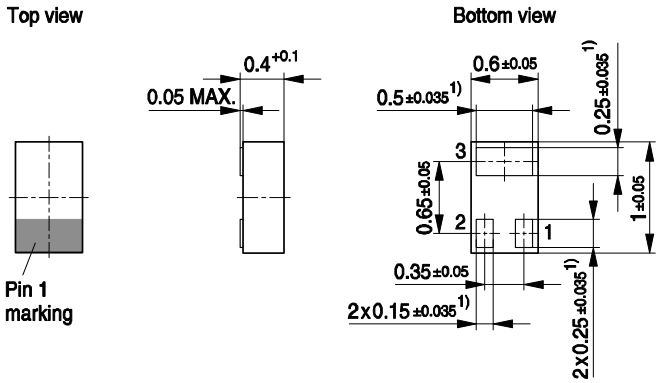
[2] IP3 value depends on termination of all intermodulation frequency components.
Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz

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



## Package Outline

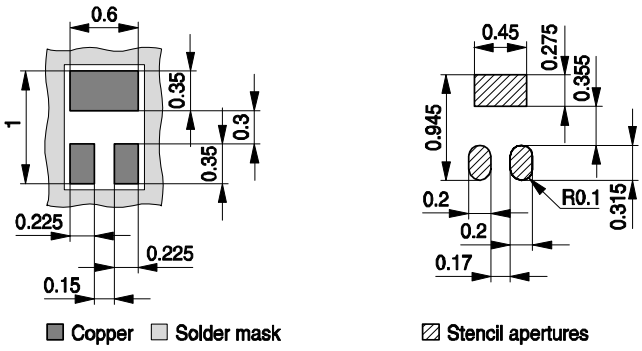





1) Dimension applies to plated terminal

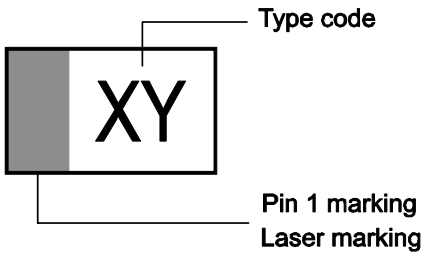
TSLP-3-1-PO V03

## Foot Print



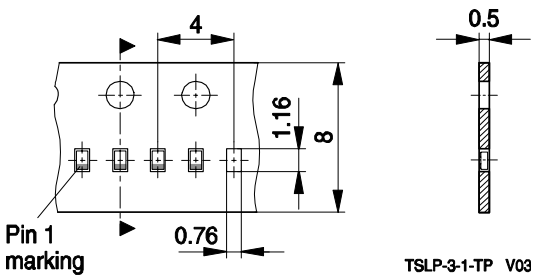

TSLP-3-1-FP V01

## Marking Layout (Example)




## Standard Packing

Reel Ø 330 mm: 15.000 Pieces/ Reel




TSLP-3-1-TP V03

**Edition 2009-11-16**

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



## Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

## Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (<www.infineon.com>).

## Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.
Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.