

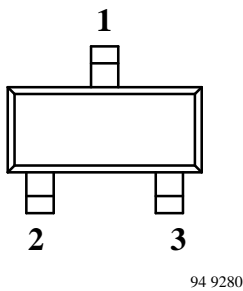
## Silicon NPN Planar RF Transistor

### Applications

RF-amplifier up to 2GHz especially for wide band antenna amplifier mixers and oscillators in TV-sat-tuners.

### Features

- High power gain
- Low noise figure
- High transition frequency



BF775 Marking: LO

Plastic case (SOT 23)

1= Collector; 2= Base; 3= Emitter

### Absolute Maximum Ratings

Parameters	Symbol	Value	Unit
Collector-base voltage	$V_{CBO}$	20	V
Collector-emitter voltage	$V_{CEO}$	15	V
Emitter-base voltage	$V_{EBO}$	2	V
Collector current	$I_C$	30	mA
Total power dissipation $T_{amb} \leq 60^\circ\text{C}$	$P_{tot}$	200	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-65 to +150	$^\circ\text{C}$

### Maximum Thermal Resistance

Parameters	Symbol	Value	Unit
Junction ambient on glass fibre printed board (25 x 20 x 1.5) mm <sup>3</sup> plated with 35 $\mu\text{m}$ Cu	$R_{thJA}$	450	K/W

### Electrical DC Characteristics

$T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified

Parameters / Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector cut-off current $V_{CB} = 10\text{ V}, I_E = 0\text{ A}$	$I_{CBO}$			50	nA
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$	$V_{(BR)CBO}$	20			V
Collector-emitter breakdown voltage $I_C = 2\text{ mA}$	$V_{(BR)CEO}$	15			V
Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}$	$V_{(BR)EBO}$	2			V
DC forward current transfer ratio $I_C = 5\text{ mA}, V_{CE} = 6\text{ V}$ $I_C = 20\text{ mA}, V_{CE} = 6\text{ V}$	$h_{FE}$ $h_{FE}$	40 40	90 100	200	

### Electrical AC Characteristics

$T_{amb} = 25^{\circ}\text{C}$

Parameters / Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Transition frequency $I_C = 5\text{ mA}, V_{CE} = 6\text{ V}, f = 500\text{ MHz}$ $I_C = 20\text{ mA}, V_{CE} = 6\text{ V}, f = 500\text{ MHz}$	$f_T$ $f_T$		4.2 5.2		GHz GHz
Collector-emitter capacitance $V_{CE} = 10\text{ V}, f = 1\text{ MHz}$	$C_{ce}$		0.15		pF
Collector-base capacitance $V_{CB} = 10\text{ V}, f = 1\text{ MHz}$	$C_{cb}$		0.38		pF
Emitter-base capacitance $V_{EB} = 0.5\text{ V}, f = 1\text{ MHz}$	$C_{eb}$		1.3		pF
Noise figure $I_C = 2\text{ mA}, V_{CE} = 6\text{ V}, f = 500\text{ MHz}, Z_G = 50\text{ }\Omega$	F		2.0		dB
Power gain $I_C = 14\text{ mA}, V_{CE} = 6\text{ V}, Z_L = Z_{Lopt}$ $f = 500\text{ MHz}$ $f = 800\text{ MHz}$	$G_{pe}$ $G_{pe}$		19.5 14		dB dB
Linear output voltage – two tone intermodulation test $I_C = 14\text{ mA}, V_{CE} = 6\text{ V}, d_{IM} = 60\text{ dB}$ $Z_G = Z_L = 50\text{ }\Omega, f_1 = 806\text{ MHz}, f_2 = 810\text{ MHz}$	$V_1 = V_2$		110		mV
Third order intercept point $I_C = 14\text{ mA}, V_{CE} = 6\text{ V}, f = 800\text{ MHz}$	$IP_3$		23.5		dBm

## Common Emitter S-Parameters

$V_{CE} = 6 \text{ V}$ ,  $I_C = 5 \text{ mA}$ ,  $Z_0 = 50 \text{ Ohm}$

f/MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG
		deg		deg		deg		deg
100	0.791	-29.65	13.23	154.8	0.024	74.9	0.927	-14.2
300	0.531	-75.1	9.15	120.5	0.053	60.4	0.684	-27.3
500	0.357	-105.6	6.34	102.6	0.069	58.5	0.554	-27.8
800	0.245	-135.5	4.23	87.8	0.092	61.7	0.495	-25.0
1000	0.221	-150.8	3.49	80.8	0.108	63.5	0.492	-25.5
1200	0.210	-164.1	3.00	74.4	0.125	64.5	0.490	-27.9
1500	0.225	177.2	2.48	65.5	0.152	65.2	0.476	-32.5
1800	0.235	158.5	2.13	57.9	0.180	65.1	0.466	-36.4
2000	0.245	149.0	1.97	53.3	0.200	64.8	0.466	-39.7

## Common Emitter S-Parameters

$V_{CE} = 6 \text{ V}$ ,  $I_C = 10 \text{ mA}$ ,  $Z_0 = 50 \text{ Ohm}$

f/MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG
		deg		deg		deg		deg
100	0.641	-43.0	20.27	144.5	0.021	71.1	0.854	-19.4
300	0.358	-95.3	11.14	109.5	0.043	64.2	0.567	-27.6
500	0.247	-127.4	7.20	95.3	0.061	66.8	0.472	-24.2
800	0.190	-159.6	4.64	83.0	0.089	69.3	0.447	-20.3
1000	0.178	-171.7	3.79	77.2	0.109	69.8	0.454	-21.1
1200	0.180	177.8	3.24	71.5	0.128	69.5	0.458	-24.2
1500	0.202	164.3	2.67	63.6	0.158	68.7	0.446	-29.3
1800	0.219	147.7	2.29	56.6	0.187	67.6	0.439	-33.4
2000	0.236	139.1	2.11	52.2	0.209	66.2	0.440	-36.9

## Common Emitter S-Parameters

$V_{CE} = 6 \text{ V}$ ,  $I_C = 15 \text{ mA}$ ,  $Z_0 = 50 \text{ Ohm}$

f/MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG
		deg		deg		deg		deg
100	0.534	-53.0	24.01	137.9	0.019	70.6	0.800	-21.8
300	0.290	-108.6	11.70	104.8	0.040	67.7	0.523	-25.7
500	0.218	-141.6	7.40	92.1	0.059	70.5	0.450	-21.4
800	0.182	-171.9	4.73	81.2	0.088	72.1	0.438	-17.8
1000	0.172	177.9	3.86	75.5	0.109	72.1	0.450	-19.1
1200	0.179	169.1	3.28	70.3	0.129	71.3	0.453	-22.5
1500	0.207	158.9	2.71	62.7	0.159	70.2	0.443	-27.8
1800	0.227	144.5	2.31	55.9	0.189	68.6	0.437	-32.0
2000	0.241	136.4	2.13	51.6	0.210	67.1	0.438	-35.7

### Common Emitter S-Parameters

$V_{CE} = 6 \text{ V}$ ,  $I_C = 20 \text{ mA}$ ,  $Z_0 = 50 \text{ Ohm}$

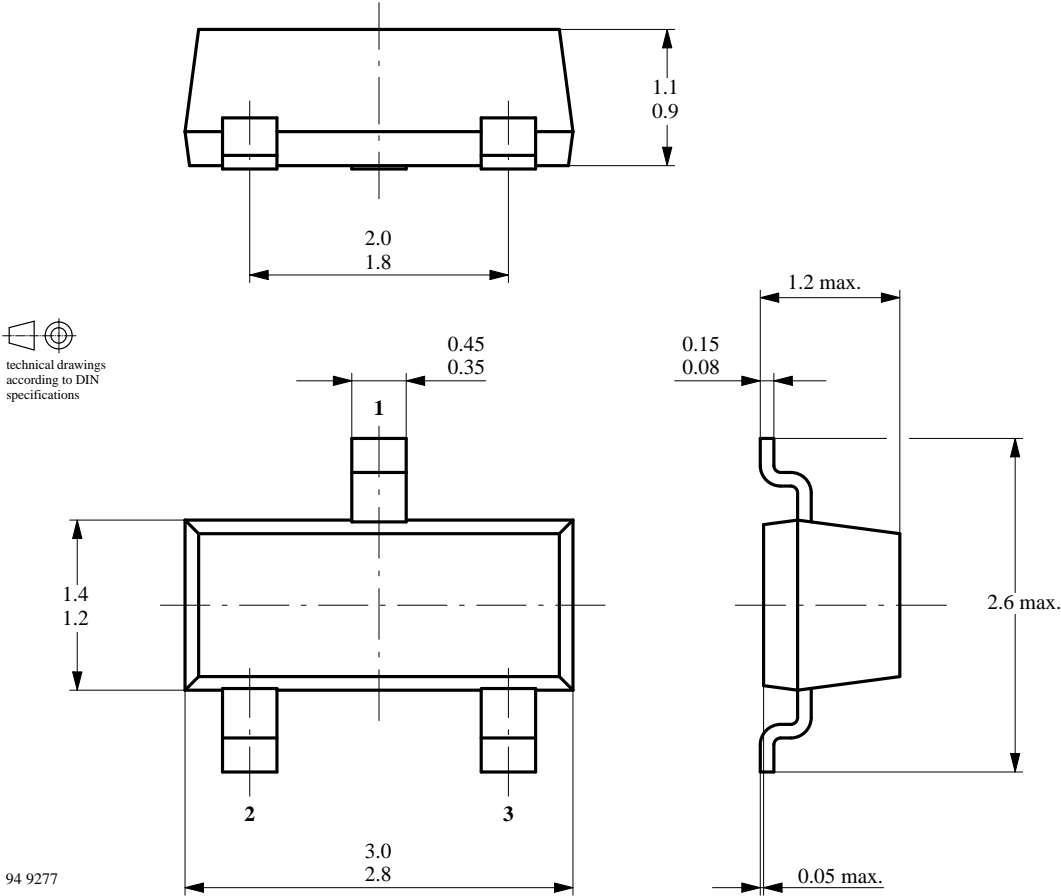
f/MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG
		deg		deg		deg		deg
100	0.468	-61.0	26.03	133.4	0.018	70.4	0.761	-22.8
300	0.259	-119.0	11.80	101.9	0.038	70.6	0.503	-23.6
500	0.214	-151.7	7.38	90.3	0.057	72.6	0.445	-19.2
800	0.189	-179.5	4.71	79.8	0.088	73.6	0.441	-16.3
1000	0.181	170.9	3.83	74.3	0.108	73.5	0.454	-18.0
1200	0.188	165.0	3.26	69.1	0.128	72.5	0.458	-21.6
1500	0.218	155.7	2.68	61.7	0.158	70.9	0.448	-27.1
1800	0.236	142.6	2.29	54.9	0.188	69.4	0.442	-31.4
2000	0.255	135.1	2.11	50.9	0.209	68.0	0.444	-35.3

### Common Emitter S-Parameters

$V_{CE} = 6 \text{ V}$ ,  $I_C = 30 \text{ mA}$ ,  $Z_0 = 50 \text{ Ohm}$

f/MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG
		deg		deg		deg		deg
100	0.379	-79.7	26.29	126.5	0.016	68.5	0.708	-22.2
300	0.252	-139.5	10.98	98.1	0.035	72.9	0.503	-19.4
500	0.241	-166.8	6.81	87.5	0.055	75.2	0.465	-16.3
800	0.227	170.7	4.33	77.8	0.085	75.7	0.466	-15.3
1000	0.225	163.1	3.52	72.3	0.105	75.3	0.479	-17.6
1200	0.232	158.1	3.01	67.0	0.125	74.3	0.483	-21.6
1500	0.260	150.7	2.47	59.5	0.154	72.8	0.474	-27.5
1800	0.282	138.7	2.11	52.7	0.185	71.3	0.468	-32.4
2000	0.304	132.0	1.95	48.7	0.206	69.9	0.469	-36.3

### Dimensions in mm



## Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

**TEMIC TELEFUNKEN microelectronic GmbH** semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

**TEMIC** can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

**We reserve the right to make changes to improve technical design without further notice.**

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use TEMIC products for any unintended or unauthorized application, the buyer shall indemnify TEMIC against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany  
Telephone: 49 (0)7131 67 2831, Fax Number: 49 (0)7131 67 2423