THE DATASHEET OF

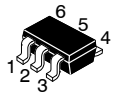
NSVF6003SB6T1G

RF Transistor, NPN Single

12 V, 150 mA, f_T = 7 GHz

NSVF6003SB6

12 V, 150 mA
f_T = 7 GHz typ.
RF Transistor



CPH6
CASE 318BD

Description

This RF Transistor is designed for low noise amplifier applications. CPH package is suitable for use under high temperature environment because it has superior heat radiation characteristics. This RF transistor is AEC−Q101 qualified and PPAP capable for automotive applications.

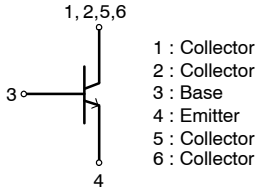
Features

- High Gain (f_T = 7 GHz typ)
- High Current (I_C = 150 mA)
- Miniature and Thin 6 pin Package
- Large Collector Dissipation (800 mW)
- AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free and are RoHS Compliant

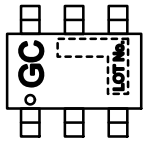
Typical Applications

- Low Noise Amplifier for FM Radio
- Low Noise Amplifier for TV

ELECTRICAL CONNECTION NPN



MARKING DIAGRAM



SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector−to−Base Voltage	20	V
V_{CEO}	Collector−to−Emitter Voltage	12	V
V_{EBO}	Emitter−to− Base Voltage	2	V
I_C	Collector Current	150	mA
P_C	Collector Dissipation (Note 1)	800	mW
Tj, Tstg	Operating Junction and Storage Temperature	−55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface mounted on ceramic substrate (250 mm^2 x 0.8 mm).

ORDERING INFORMATION

Device	Package	Shipping†
NSVF6003SB6T1G	CPH6 (Pb−Free, Halogen Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

ELECTRICAL CHARACTERISTICS (T_A = 25°C) (Note 3)

Symbol	Parameter	Conditions	Value			Unit
			Min	Typ	Max	
I_{CBO}	Collector Cutoff Current	V_{CB} = 10 V, I_E = 0 A	–	–	1.0	μA
I_{EBO}	Emitter Cutoff Current	V_{EB} = 1 V, I_C = 0 A	–	–	10	μA
h_{FE}	DC Current Gain	V_{CE} = 5 V, I_C = 50 mA	100	–	180	–
f_T	Gain−Bandwidth Product		–	7	–	GHz
Cob	Output Capacitance	V_{CB} = 10 V, f = 1 MHz	–	1.3	2.0	pF
Cre	Reverse Transfer Capacitance		–	0.9	–	pF
$\|S21e\|^2$	Forward Transfer Gain	V_{CE} = 5 V, I_C = 50 mA, f = 1 GHz	–	9.0	–	dB
NF	Noise Figure	V_{CE} = 5 V, I_C = 5.0 mA, f = 1 GHz	–	1.8	3.0	dB

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Pay attention to handling since it is liable to be affected by static electricity due to the high−frequency process adopted.

TYPICAL CHARACTERISTICS

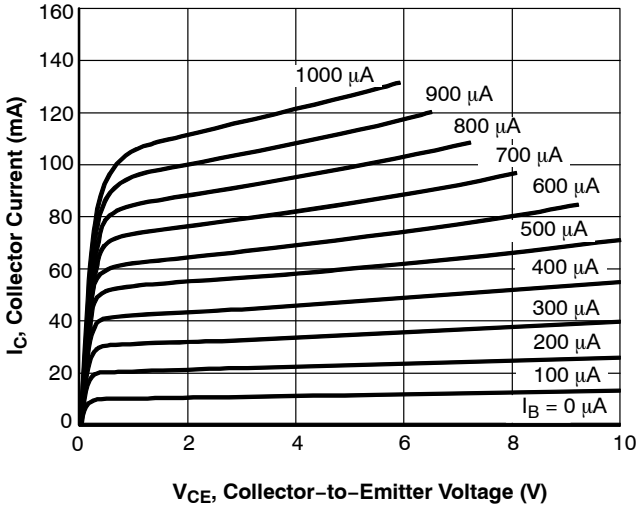


Figure 1. I_C – V_{CE}

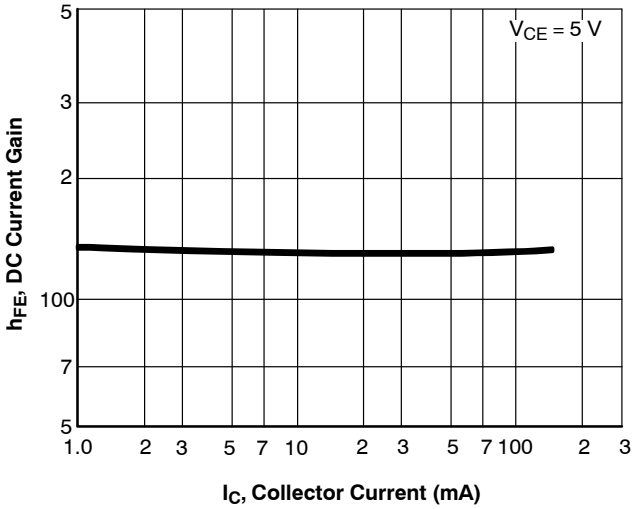


Figure 2. h_{FE} – I_C

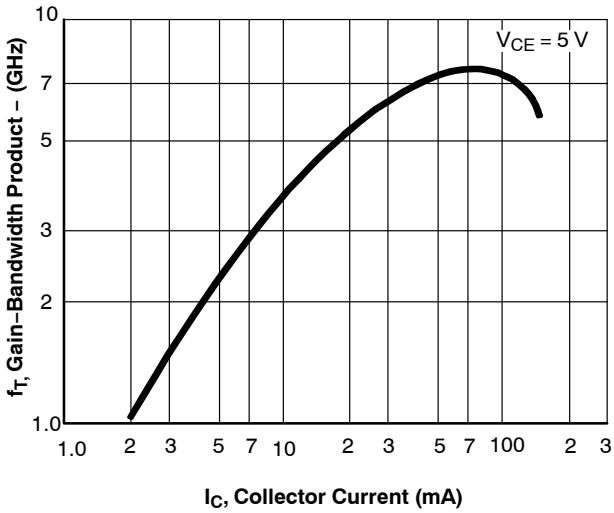


Figure 3. f_T – I_C

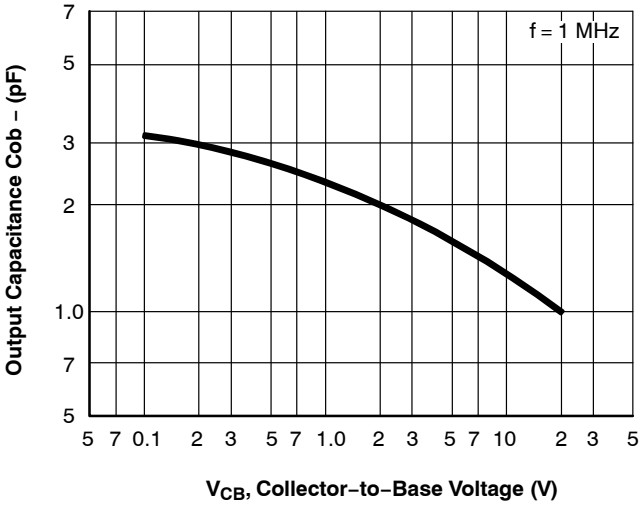


Figure 4. Cob – V_{CB}

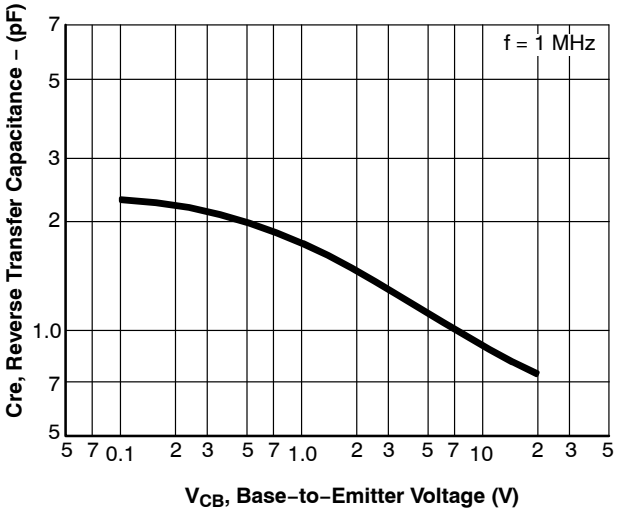


Figure 5. Cre – V_{CB}

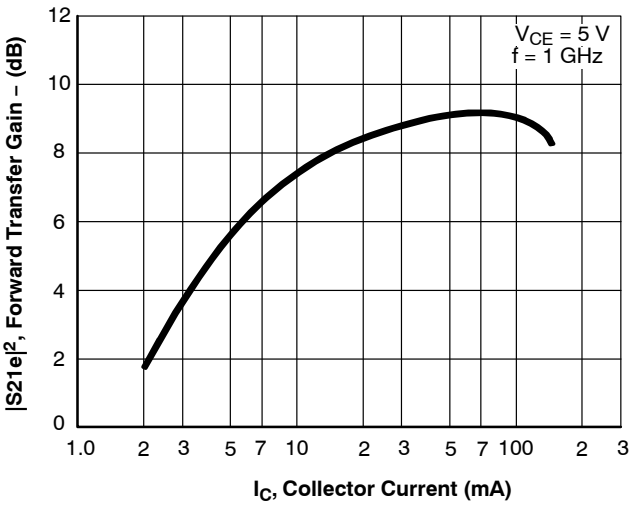


Figure 6. $|S21e|^2$ – I_C

TYPICAL CHARACTERISTICS (CONTINUED)

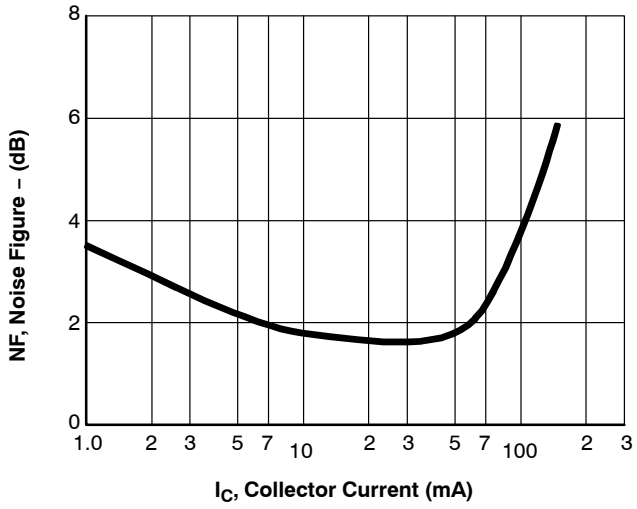


Figure 7. NF – I_C

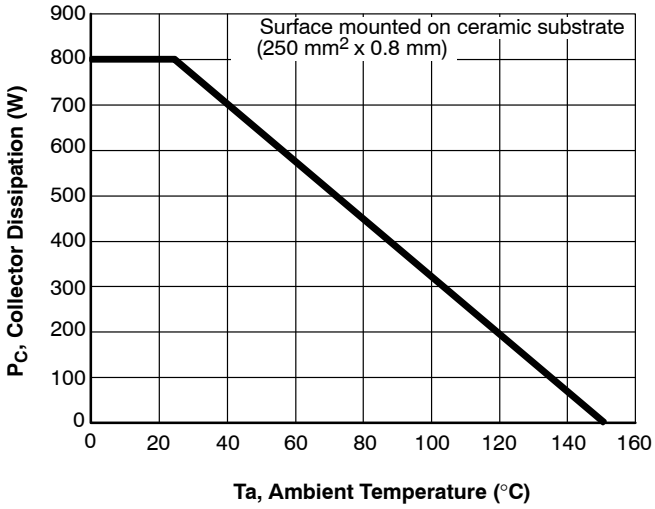


Figure 8. P_C – Ta

S Parameters (Common emitter)

V_{CE} = 5 V, I_C = 20 mA, Z_O = 50 Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.550	254.1	21.532	119.9	0.036	54.6	0.527	-62.8
200	0.492	218.1	12.273	103.0	0.050	56.5	0.332	-80.3
300	0.477	201.9	8.448	95.3	0.063	61.7	0.267	-88.3
400	0.470	192.4	6.427	90.4	0.078	65.3	0.242	268.1
500	0.518	181.0	5.015	86.8	0.089	68.2	0.217	245.3
600	0.513	175.8	4.221	83.9	0.104	70.2	0.216	245.8
700	0.510	171.5	3.658	81.3	0.120	71.7	0.214	247.2
800	0.508	167.6	3.234	78.9	0.135	72.7	0.220	249.3
900	0.503	163.7	2.900	76.7	0.150	73.2	0.225	251.3
1000	0.497	160.1	2.636	74.4	0.166	73.7	0.231	254.6
1100	0.493	156.8	2.419	72.5	0.181	73.9	0.239	256.3
1200	0.489	153.4	2.243	70.5	0.196	74.1	0.247	258.8

V_{CE} = 5 V, I_C = 50 mA, Z_O = 50 Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.465	231.1	25.203	111.9	0.029	59.2	0.413	-79.9
200	0.449	203.4	13.519	98.7	0.045	65.7	0.269	259.6
300	0.445	191.6	9.177	92.7	0.061	70.4	0.230	250.7
400	0.443	184.2	6.947	88.8	0.078	72.8	0.218	247.3
500	0.502	175.0	5.407	86.1	0.092	74.7	0.231	224.3
600	0.497	170.3	4.550	83.7	0.110	75.6	0.229	225.5
700	0.494	166.4	3.944	81.5	0.127	76.2	0.225	227.1
800	0.490	162.8	3.483	79.4	0.144	76.4	0.228	229.9
900	0.485	159.1	3.127	77.4	0.161	76.2	0.230	232.4
1000	0.478	155.5	2.845	75.5	0.178	76.1	0.230	236.1
1100	0.473	152.3	2.608	73.6	0.195	75.9	0.236	238.6
1200	0.468	149.0	2.423	71.9	0.211	75.5	0.239	242.0

V_{CE} = 5 V, I_C = 100 mA, Z_O = 50 Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.451	219.5	25.808	108.5	0.026	62.4	0.359	-86.7
200	0.448	196.7	13.593	96.8	0.043	69.8	0.240	253.1
300	0.448	187.0	9.193	91.4	0.060	73.8	0.212	244.9
400	0.446	180.7	6.953	87.8	0.078	75.5	0.205	242.3
500	0.508	172.6	5.408	85.5	0.093	76.9	0.228	219.9
600	0.503	168.3	4.550	83.1	0.110	77.5	0.226	221.5
700	0.500	164.6	3.944	81.0	0.128	77.8	0.223	223.4
800	0.497	161.2	3.480	79.0	0.145	77.8	0.226	226.5
900	0.490	157.6	3.132	77.0	0.163	77.4	0.228	229.1
1000	0.484	154.2	2.842	75.0	0.180	77.1	0.227	233.1
1100	0.479	151.0	2.614	73.3	0.197	76.7	0.232	235.8
1200	0.473	147.8	2.423	71.6	0.214	76.3	0.236	239.3

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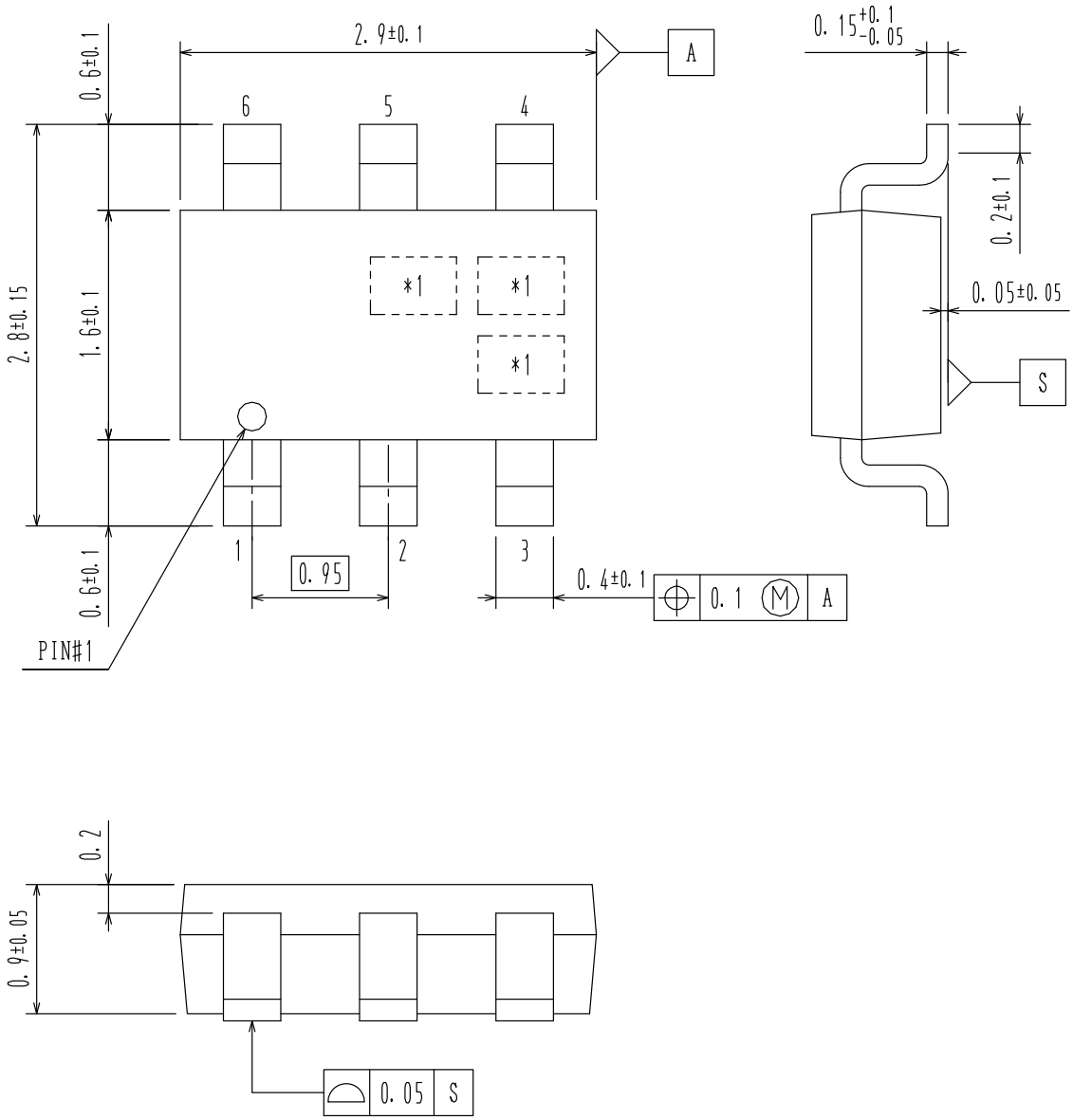

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