



NPN SiGe RF Transistor

DESCRIPTION

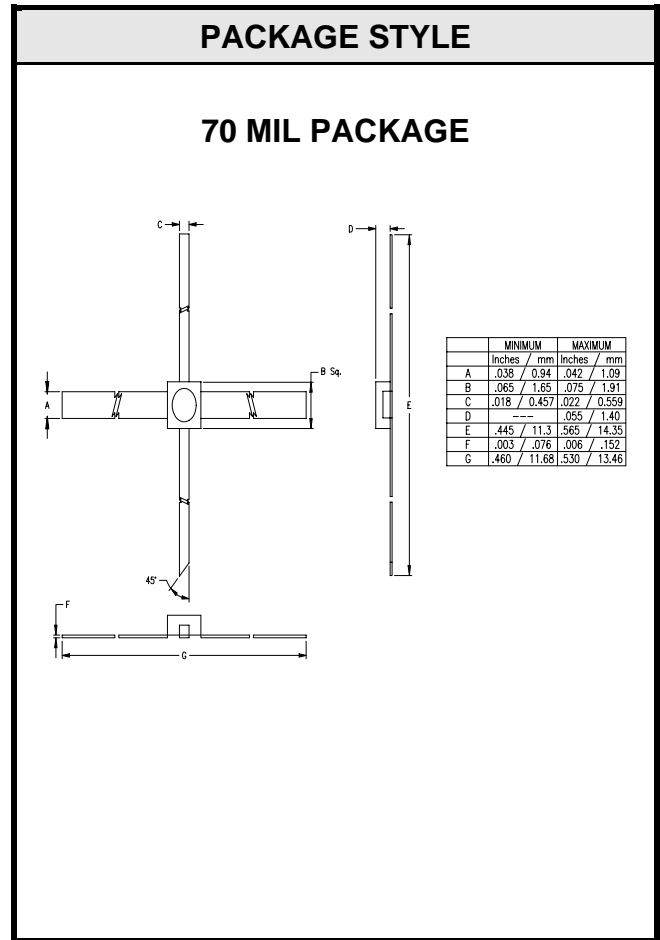
The CTS6002 is a high gain low noise SiGe RF transistor suitable for a number of high reliability applications. The CTS6002 is fabricated in a 70 GHz f_T Silicon-Germanium technology. This device is available in a 70 mil hermetically sealed package.

FEATURES

- Outstanding NF, F = 0.65 dB @ 1.8GHz
 F = 1.2 dB @ 6 GHz
- $G_{ms} = 24\text{dB}$ @ 1.8GHz
- OIP3 = 26.5 dBm @ 1.8GHz
- High Reliability/Space grade screening available
- Available in a hermetically sealed package

MAXIMUM RATINGS

RATING	LIMITS	UNITS
V_{CEO}	4	V
V_{EBO}	1.2	V
V_{CBO}	13	V
V_{CES}	13	V
I_C	50	mA
I_B	3	mA
P_{TOT}	200	mW
T_{STG}, T_A	-65 to +150	°C
T_J	+150	°C



DC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$

SYMBOL	TEST CONDITIONS	MINIMUM	TYPICAL	MAXIMUM	UNITS
$V_{(BR)CEO}$	$I_C = 1\text{ mA}, I_B = 0$	4	4.5	---	V
I_{CES}	$V_{CE} = 13\text{V}, V_{BE} = 0$	---	---	30	μA
I_{CBO}	$V_{CB} = 13\text{V}, I_E = 0$	---	---	100	nA
I_{EBO}	$V_{EB} = 0.5\text{V}, I_C = 0$	---	---	3	μA
h_{FE}	$I_C = 30\text{ mA}, V_{CE} = 3\text{V}$, pulse measured	110	180	270	---



RF CHARACTERISTICS

PARAMETER	SYMBOL	VALUES			UNITS
		Min.	Typ.	Max	
Transition Frequency $I_C = 30 \text{ mA}, V_{CE} = 3\text{V}, f = 1 \text{ GHz}$	f_T	30	40	---	GHz
Collector-Base Capacitance $V_{CB} = 3\text{V}, f = 1 \text{ MHz}$	C_{CB}	---	0.09	0.2	pF
Collector-Emitter Capacitance $V_{CE} = 3\text{V}, f = 1 \text{ MHz}$	C_{CE}	---	0.23	---	pF
Emitter-Base Capacitance $V_{EB} = 0.5\text{V}, f = 1 \text{ MHz}$	C_{EB}	---	0.5	---	pF
Noise Figure $I_C = 5\text{mA}, V_{CE} = 3\text{V}, f = 1.8 \text{ GHz}, Z_s = Z_{opt}$ $I_C = 5\text{mA}, V_{CE} = 3\text{V}, f = 1.8 \text{ GHz}, Z_s = Z_{opt}$	F	---	0.65 1.2	---	dB
Power Gain, Maximum Stable $I_C = 30 \text{ mA}, V_{CE} = 3\text{V}, Z_s = Z_{opt}$ $Z_L = Z_{opt}, f = 1.8 \text{ GHz}$	G_{MS}	---	24	---	dB
Power Gain, Maximum Available $I_C = 30 \text{ mA}, V_{CE} = 3\text{V}, Z_s = Z_{opt}$ $Z_L = Z_{opt}, f = 6 \text{ GHz}$	G_{MA}	---	12.5	---	dB
Transducer Gain $I_C = 30 \text{ mA}, V_{CE} = 3\text{V}, Z_s = Z_L = 50 \Omega, f = 1.8\text{GHz}$ $I_C = 30 \text{ mA}, V_{CE} = 3\text{V}, Z_s = Z_L = 50 \Omega, f = 6 \text{ GHz}$	$ S_{21e} ^2$	---	21 10.5	---	dB
Output Third Order Intercept Point $I_C = 30 \text{ mA}, V_{CE} = 3\text{V}, f = 1.8\text{GHz}, Z_s = Z_L = 50 \Omega$	OIP_3	---	26.5	---	dBm
1 dB Compressed Output Power $I_C = 30 \text{ mA}, V_{CE} = 3\text{V}, f = 1.8\text{GHz}, Z_s = Z_L = 50 \Omega$	P_{-1dB}	---	13	---	dBm



TYPICAL COMMON EMITTER SCATTERING PARAMETERS

V_{CE} = 3v, I_C = 30mA (Die Form)

Frequency (MHZ)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2.0000	.422	-144.8	11.565	96.2	.046	57.1	.318	-51.9
3.0000	.406	-164.7	7.926	86.2	.061	59.5	.244	-50.5
4.0000	.406	-178.1	6.029	78.6	.076	60.5	.207	-49.8
5.0000	.412	171.6	4.869	72.1	.092	60.4	.184	-50.7
6.0000	.422	163.0	4.090	66.1	.108	59.4	.165	-52.9
7.0000	.434	155.5	3.527	60.3	.124	58.0	.148	-56.7
8.0000	.447	148.6	3.106	54.9	.141	56.1	.132	-61.6
9.0000	.463	142.3	2.776	49.6	.157	53.9	.115	-68.6
10.0000	.479	136.4	2.514	44.4	.174	51.6	.100	-76.7
11.0000	.494	131.0	2.298	39.4	.190	49.1	.086	-89.1
12.0000	.513	126.0	2.115	34.5	.207	46.4	.075	-105.5
13.0000	.531	121.2	1.961	29.7	.223	43.6	.069	-126.7
14.0000	.551	117.1	1.830	25.1	.239	40.8	.071	-150.7
15.0000	.572	112.7	1.713	20.6	.255	37.9	.084	-170.7
16.0000	.589	109.1	1.613	16.1	.271	34.9	.102	172.9
17.0000	.613	105.2	1.520	11.7	.286	31.8	.126	160.6
18.0000	.629	101.8	1.441	7.8	.300	28.7	.152	151.0
19.0000	.656	98.7	1.370	3.5	.315	25.6	.178	143.1
20.0000	.674	94.8	1.310	- .8	.330	22.1	.209	137.2

V_{CE} = 3v, I_C = 40mA (Die From)

Frequency (MHZ)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2.0000	.406	-156.9	11.749	93.1	.042	65.0	.258	-46.8
3.0000	.403	-170.8	7.984	84.9	.058	67.3	.207	-42.6
4.0000	.406	-180.0	6.059	78.5	.075	67.9	.182	-40.1
5.0000	.412	173.2	4.891	72.9	.092	67.3	.165	-39.8
6.0000	.419	167.1	4.115	67.6	.110	66.2	.151	-41.0
7.0000	.428	161.7	3.557	62.6	.127	64.6	.137	-43.0
8.0000	.438	156.7	3.141	57.8	.145	62.7	.124	-46.2
9.0000	.448	151.7	2.815	53.1	.163	60.6	.108	-50.3
10.0000	.459	147.3	2.560	48.5	.181	58.5	.094	-54.8
11.0000	.471	143.0	2.349	44.0	.199	56.0	.078	-62.8
12.0000	.482	139.0	2.172	39.6	.217	53.6	.063	-74.0
13.0000	.499	134.9	2.025	35.3	.235	50.9	.050	-92.3
14.0000	.512	131.0	1.899	31.1	.253	48.3	.041	-120.8
15.0000	.530	127.8	1.790	27.0	.272	45.6	.045	-155.5
16.0000	.547	123.8	1.693	22.9	.290	42.8	.059	-179.8
17.0000	.560	121.1	1.605	18.9	.307	39.9	.080	163.6
18.0000	.579	117.3	1.529	15.2	.325	36.9	.104	152.9
19.0000	.596	114.1	1.466	11.2	.342	33.9	.129	145.0
20.0000	.621	111.3	1.411	7.4	.361	30.9	.157	139.3

Contact Teledyne Microwave Solutions:
 650-691-9800
 650-962-6845 fax

Check for updates:
www.teledynemicrowave.com