



8 GHz Wideband NPN Chip – 2SC5635

Silicon NPN Low Power Planar RF Transistor in bare die form

Rev 1.0
02/07/19

Description

NPN transistor in unencapsulated chip form. It is primarily intended for use in RF wideband amplifiers, such as in aerial amplifiers, radar systems, oscilloscopes, spectrum analyzers, etc. The transistor features low intermodulation distortion and high power gain; due to its very high transition frequency, it also has excellent wideband properties and low noise up to high frequencies. Closest available PNP complement is BFT92.

Features:

- High Power Gain
- Low Operating Voltage
- Low Noise
- Wide Transition Frequency

Ordering Information

The following part suffixes apply:

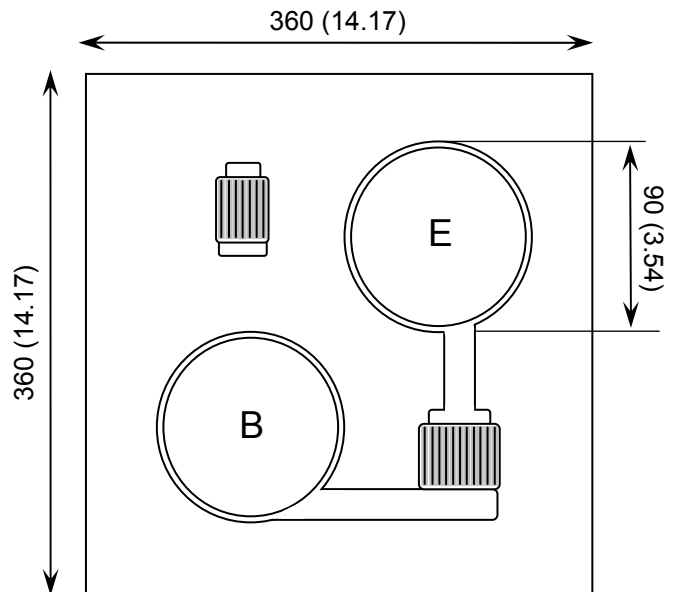
- No suffix - MIL-STD-750 /2072 Visual Inspection
- "H" - MIL-STD-750 /2072 Visual Inspection + MIL-PRF-38534 Class H LAT
- "K" - MIL-STD-750 /2072 Visual Inspection + MIL-PRF-38534 Class K LAT

LAT = Lot Acceptance Test.

For further information on LAT process flows see below.

www.siliconsupplies.com/quality/bare-die-lot-qualification

Die Dimensions in μm (mils)



E = EMITTER, B = BASE
CHIP BACKSIDE IS COLLECTOR

Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – By specific request
- Unsawn Wafer – By specific request
- With additional electrical selection – Specific request
- Sawn as pairs or adjacent pair pick – Specific request

Mechanical Specification

Die Size (Unsawn)	360 x 360 14.17 x 14.17	μm mils
Base & Emitter Bond Pad Size	90 \varnothing 3.54 \varnothing	μm mils
Die Thickness	180 (± 20) 7.09 (± 0.78)	μm mils
Top Metal Composition	Al-Si	
Back Metal Composition	AuAsAu	





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Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
V_{CBO}	Collector-Base Voltage	Open Emitter	-	15	V
V_{CEO}	Collector-Emitter Voltage	Open Base	-	6	V
V_{EBO}	Emitter-Base Voltage	Open Collector	-	1.5	V
I_C	DC Collector Current	-	-	50	mA
P_{tot}^1	Total Power Dissipation	-	-	125	mW
T_{stg}	Storage Temperature	-	-65	150	$^\circ\text{C}$
T_J	Junction Temperature	-	-	175	$^\circ\text{C}$

1. Measured in plastic SC-70 package, results in die form are dependent on die attach and assembly method.

Electrical Characteristics $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	SYMBOL
I_{CBO}	Collector Cut-off Current	$I_E = 0; V_{CB} = 10\text{V}$	-	-	1	μA
I_{EBO}	Emitter Cut-off Current	$I_C = 0; V_{EB} = 1\text{V}$	-	-	1	μA
h_{FE}	DC Current Gain	$I_C = 10\text{mA}; V_{CE} = 5\text{V}$	50	-	250	-
f_T	Transition Frequency	$I_E = 10\text{mA}; V_{CE} = 5\text{V}$	5	8	-	GHz
$ S_{21e} ^2$	Insertion Power Gain	$I_C = 10\text{mA}; V_{CE} = 5\text{V};$ $f = 1\text{GHz}$	9	12	-	dB
NF	Noise Figure	$I_C = 5\text{mA}; V_{CE} = 5\text{V};$ $f = 1\text{GHz}$	-	1.4	-	dB
C_{ob}	Collector Output Capacitance	$I_E = 0; V_{CB} = 5\text{V}$ $f = 1\text{MHz}$	-	1	-	pF

Typical Characteristics

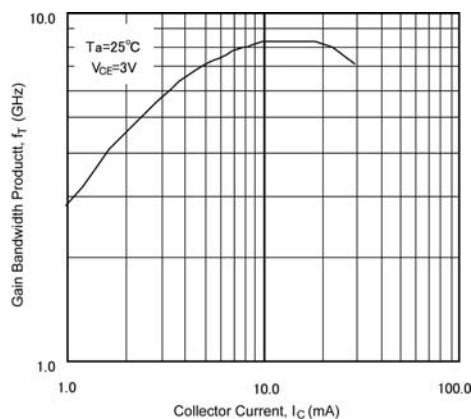


FIGURE 1. Gain Bandwidth Product versus Collector Current

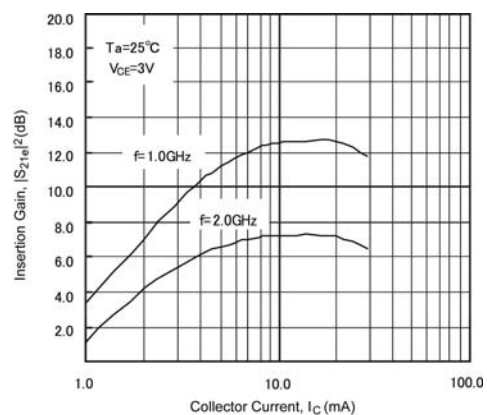


FIGURE 2. Insertion Power Gain versus Collector Current – 3V





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Typical Characteristics continued

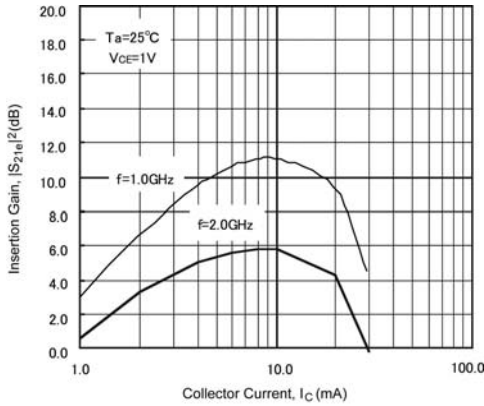


FIGURE 3. Insertion Power Gain versus Collector Current – 1V

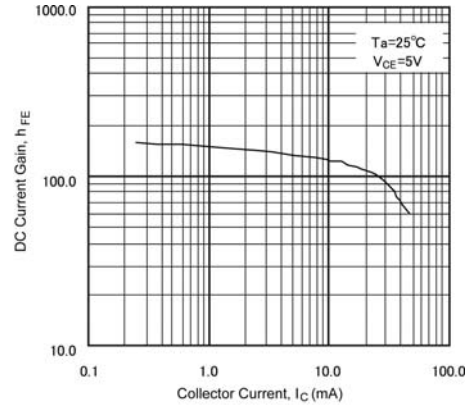


FIGURE 4. DC Current Gain versus Collector Current

S-Parameters

$V_{CE} = 1V, I_C = 1mA$

FREQUENCY	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
500	0.462	-121.3	6.597	102.5	0.087	48.1	0.352	-84.5
600	0.440	-131.7	5.854	97.0	0.094	48.9	0.32	-87.7
700	0.434	-143.9	5.029	91.8	0.102	48.7	0.278	-100.6
800	0.423	-149.9	4.569	88.0	0.109	49.7	0.254	-101.8
900	0.413	-155.5	4.031	84.1	0.117	51.0	0.233	-107.1
1000	0.407	-159.7	3.685	82.1	0.124	51.3	0.220	-109.7
1100	0.407	-164.6	3.367	78.5	0.133	51.8	0.211	-114.9
1200	0.397	-167.5	3.141	76.4	0.140	52.3	0.201	-116.5
1300	0.395	-171.3	2.88	73.7	0.150	52.8	0.192	-120.3
1400	0.393	-173.3	2.712	72.2	0.157	53.0	0.187	-122.0
1500	0.389	-175.7	2.574	69.9	0.164	53.2	0.181	-122.4
1600	0.392	-179.0	2.435	67.0	0.173	53.2	0.176	-124.9
1700	0.384	179.1	2.307	65.3	0.180	53.0	0.178	-126.3
1800	0.386	177.0	2.178	63.8	0.189	52.8	0.174	-128.4
1900	0.383	174.5	2.089	61.8	0.197	52.8	0.175	-130.4
2000	0.379	173.1	2.011	60.4	0.204	52.4	0.177	-131.1





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S-Parameters continued

$V_{CE} = 3V, I_C = 10mA$

FREQUENCY	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
500	0.473	-102.1	7.745	108.2	0.076	52.4	0.420	-60.1
600	0.434	-113.7	6.955	102.1	0.082	53.1	0.389	-62.1
700	0.410	-127.8	6.038	95.9	0.089	52.5	0.325	-69.8
800	0.391	-134.7	5.488	92.5	0.096	53.4	0.302	-69.2
900	0.375	-141.5	4.872	87.9	0.104	54.4	0.273	-71.5
1000	0.365	-146.5	4.457	85.6	0.110	54.7	0.258	-71.7
1100	0.361	-152.6	4.073	82.1	0.118	55.1	0.242	-74.8
1200	0.350	-155.8	3.805	79.7	0.125	55.7	0.232	-74.9
1300	0.345	-160.2	3.486	77.1	0.133	56.0	0.219	-76.7
1400	0.342	-162.7	3.279	75.5	0.140	56.1	0.213	-77.0
1500	0.337	-165.4	3.106	73.8	0.147	56.4	0.211	-77.1
1600	0.337	-169.4	2.928	70.3	0.155	56.2	0.205	-78.4
1700	0.330	-171.3	2.772	69.2	0.161	56.2	0.205	-79.9
1800	0.332	-174.0	2.617	67.0	0.170	56.3	0.198	-80.6
1900	0.328	-176.5	2.511	65.2	0.176	56.0	0.197	-82.2
2000	0.325	-178.4	2.413	63.4	0.184	55.6	0.200	-84.2

$V_{CE} = 5V, I_C = 10mA$

FREQUENCY	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
500	0.483	-94.6	8.003	110.1	0.071	54.4	0.458	-52.0
600	0.436	-106.1	7.231	104.2	0.077	54.8	0.428	-52.8
700	0.405	-120.3	6.321	97.7	0.085	54.0	0.360	-59.2
800	0.381	-127.6	5.738	94.0	0.091	54.8	0.340	-58.2
900	0.361	-134.6	5.103	89.6	0.099	55.8	0.312	-59.8
1000	0.349	-139.9	4.683	87.0	0.104	56.3	0.297	-59.2
1100	0.342	-146.3	4.290	83.4	0.112	56.5	0.280	-61.4
1200	0.330	-149.6	3.990	81.2	0.119	57.0	0.270	-61.6
1300	0.323	-154.5	3.669	78.4	0.126	57.5	0.256	-61.7
1400	0.321	-157.2	3.455	76.2	0.133	57.4	0.254	-62.9
1500	0.314	-160.0	3.273	74.3	0.140	57.6	0.252	-62.7
1600	0.313	-164.3	3.086	71.2	0.147	57.8	0.245	-63.3
1700	0.305	-166.2	2.915	70.4	0.153	57.4	0.244	-65.4
1800	0.308	-169.1	2.765	67.9	0.162	57.4	0.240	-66.2
1900	0.304	-171.9	2.648	65.9	0.169	57.3	0.237	-67.3
2000	0.299	-173.6	2.538	64.7	0.175	57.0	0.239	-69.1





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