Ordering number:ENN6280

NPN Epitaxial Planar Silicon Transistor

2SC5540

UHF to S Band Low-Noise Amplifier and OSC Applications

Features

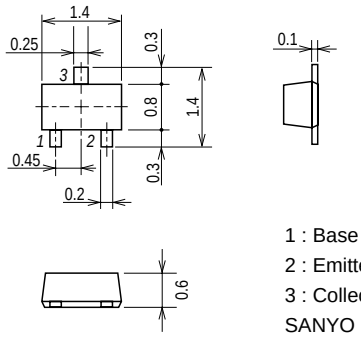
- High cutoff frequency : f_T=10GHz typ.
- High gain : $|S21e|^2$=13dB typ (f=1GHz).
- Low noise : NF=1.3dB typ (f=1GHz).
- Small Cob : Cob=0.4pF typ.
- Ultrasmall, slim flat-lead package. (1.4mm × 0.8mm × 0.6mm)

Package Dimensions

unit:mm

2159

[2SC5540]



1 : Base
2 : Emitter
3 : Collector
SANYO : SSFP

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		16	V
Collector-to-Emitter Voltage	V_{CEO}		8	V
Emitter-to-Base Voltage	V_{EBO}		1.5	V
Collector Current	I_C		20	mA
Collector Dissipation	P_C		100	mW
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

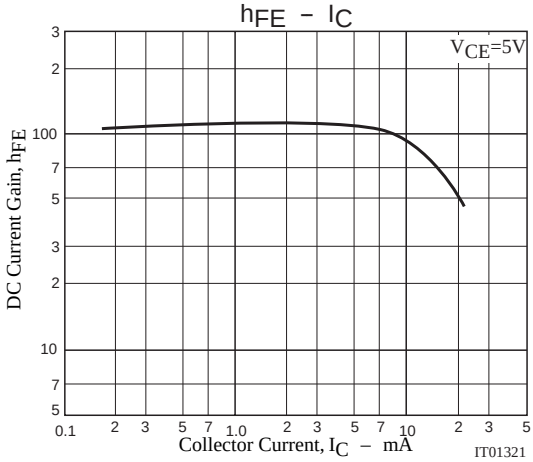
Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=10V, I_E=0			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=1V, I_C=0			10	μA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=4mA	90		200	
Gain-Bandwidth Product	f_T	V_{CE}=5V, I_C=4mA		10		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.4	0.7	pF
Forward Transfer Gain	$\|S21e\|^2$	V_{CE}=5V, I_C=7mA, f=1GHz	10	13		dB
Noise Figure	NF	V_{CE}=5V, I_C=4mA, f=1GHz		1.3	2.8	dB

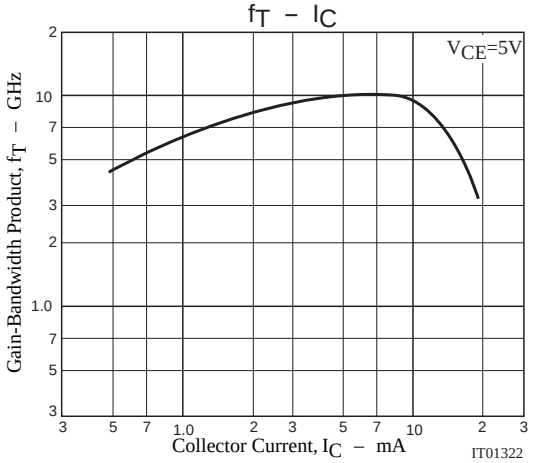
Marking : HN

SANYO Electric Co.,Ltd. Semiconductor Company
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

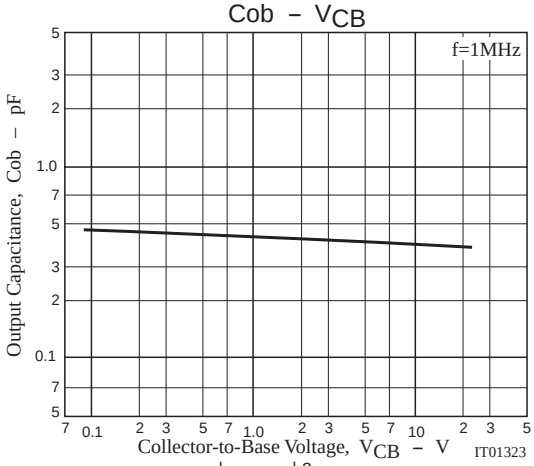
h_{FE} – I_C



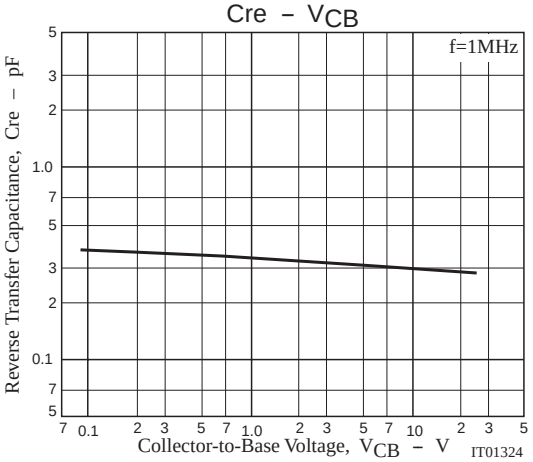
f_T – I_C



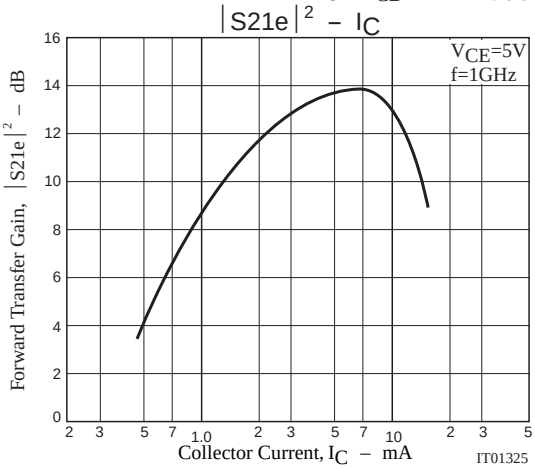
Cob – V_{CB}



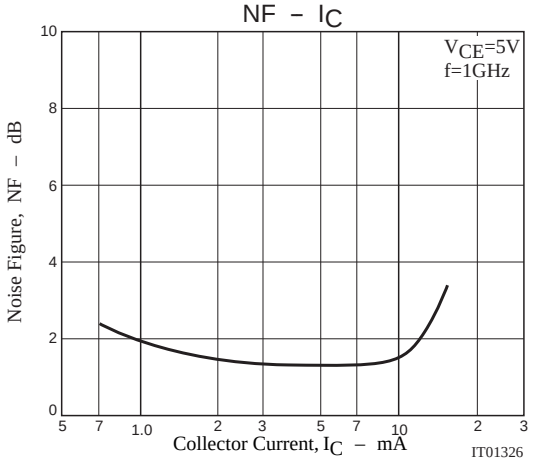
Cre – V_{CB}



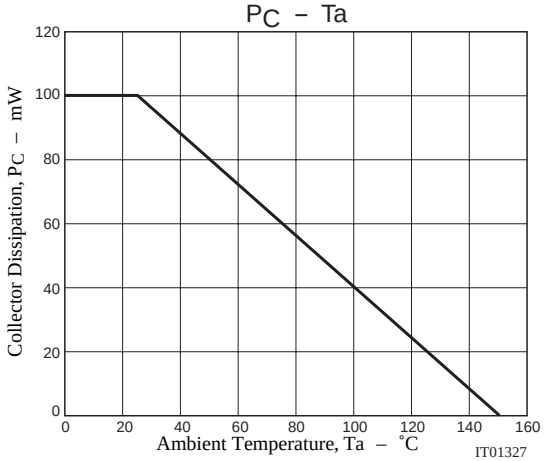
$|S21e|^2$ – I_C



NF – I_C



P_C – Ta



S Parameters (Common emitter)

V_{CE}=5V, I_C=2mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.918	–17.4	5.729	162.1	0.038	78.2	0.965	–11.1
400	0.854	–33.9	5.503	146.5	0.069	68.8	0.908	–19.6
600	0.758	–48.8	4.667	133.9	0.091	61.3	0.825	–27.2
800	0.674	–60.6	4.171	122.8	0.109	56.7	0.754	–32.3
1000	0.622	–68.1	3.839	113.0	0.125	53.8	0.703	–35.8
1200	0.561	–76.3	3.443	104.9	0.136	51.6	0.660	–38.4
1400	0.510	–83.5	3.104	97.9	0.146	50.2	0.627	–40.8
1600	0.465	–89.9	2.844	92.0	0.155	49.7	0.602	–42.6
1800	0.411	–97.7	2.589	86.6	0.161	49.7	0.579	–44.3
2000	0.375	–103.0	2.390	81.6	0.169	49.6	0.565	–45.7

V_{CE}=5V, I_C=7mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.745	–37.3	12.779	147.8	0.032	70.2	0.881	–18.6
400	0.592	–64.0	9.874	126.1	0.053	61.9	0.730	–27.9
600	0.471	–83.5	7.650	112.6	0.066	59.6	0.621	–31.5
800	0.395	–97.1	6.143	102.8	0.078	59.7	0.559	–32.7
1000	0.348	–106.6	5.115	95.2	0.089	60.3	0.523	–33.5
1200	0.311	–115.0	4.361	89.2	0.100	61.3	0.501	–34.3
1400	0.284	–122.2	3.792	84.1	0.111	62.2	0.486	–35.4
1600	0.263	–128.8	3.382	79.8	0.123	63.0	0.478	–36.4
1800	0.245	–135.6	3.065	75.8	0.135	63.7	0.474	–37.5
2000	0.229	–141.4	2.791	72.0	0.146	64.2	0.473	–38.8