

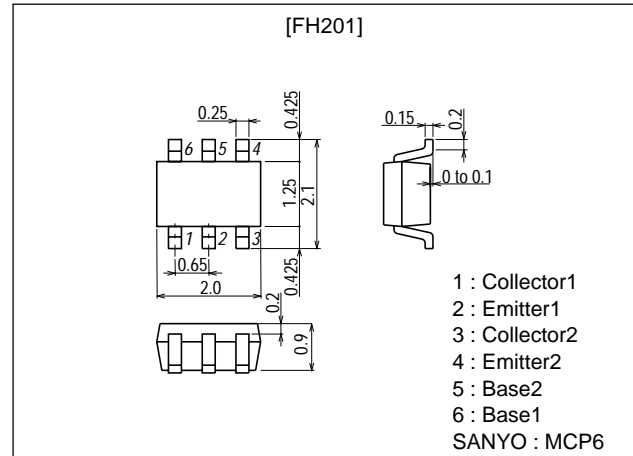
**FH201****VCO OSC Circuit Applications****Features**

- Composite type with a buffer transistor (2SC4871) and an oscillator transistor (2SC4867) contained in the currently provided MCP package as a VCO oscillator, improving the mounting efficiency greatly.
- The FH201 is formed with two chips, being equivalent to the 2SC4871 and 2SC4867, placed in one package.
- Optimal for use in UHF band oscillator circuit.

Package Dimensions

unit:mm

2149

**Specifications****Absolute Maximum Ratings** at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Tr1 [2SC4871]				
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		150	mW
Tr2 [2SC4867]				
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		50	mA
Collector Dissipation	P_C		150	mW
[Common specifications]				
Total Dissipation	P_T		200	mW
Junction Temperature	T_J		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

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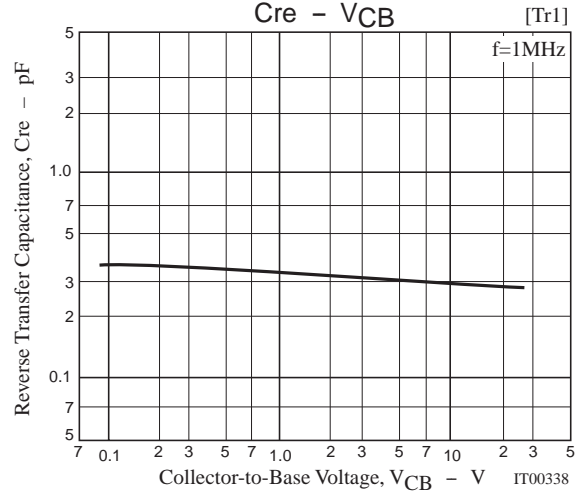
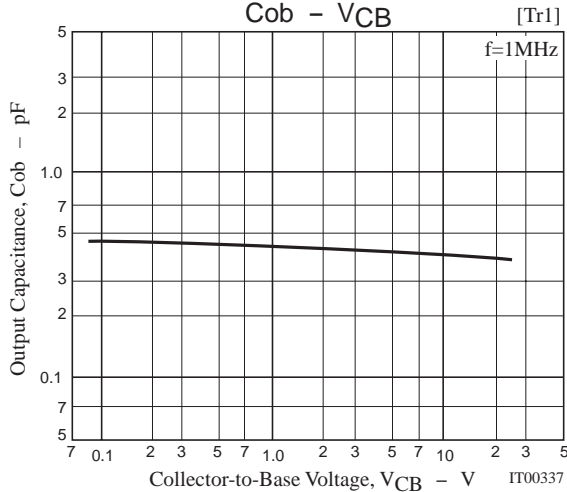
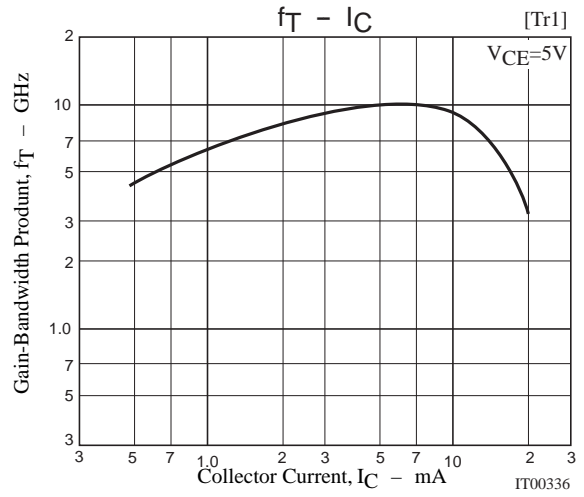
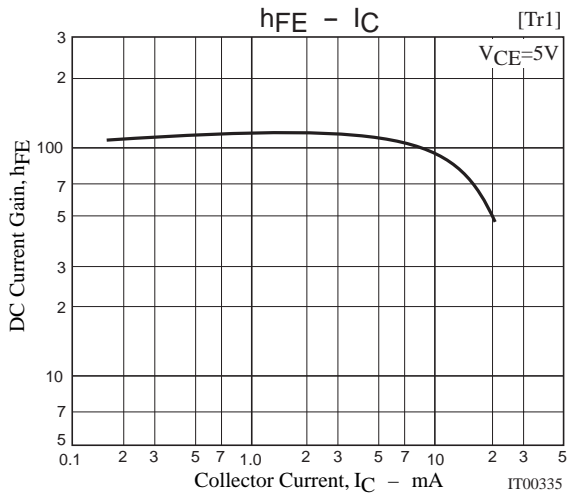
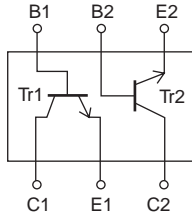
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Electrical Characteristics at Ta = 25°C

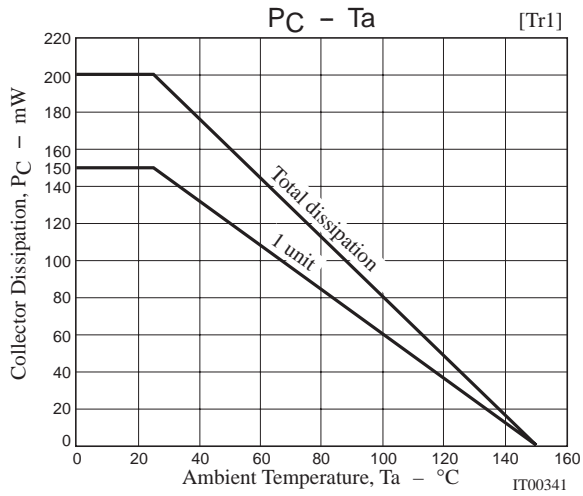
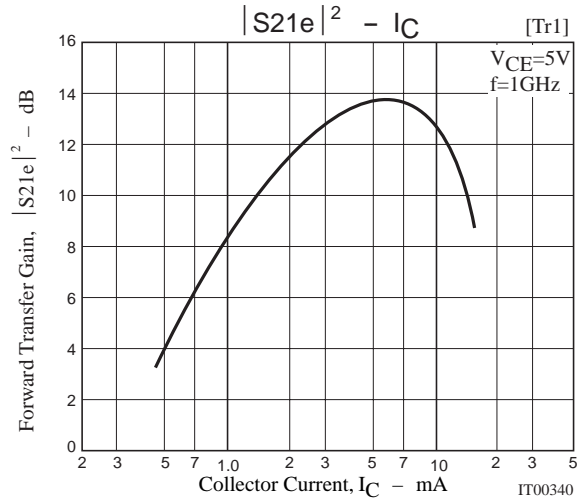
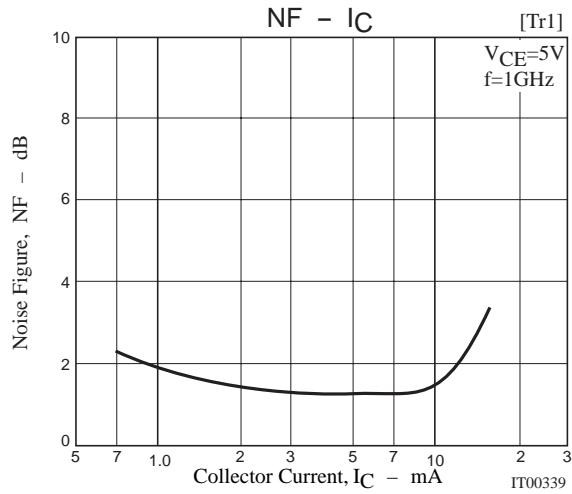
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Tr1 [2SC4871]						
Collector Cutoff Current	I_{CBO}	$V_{CB}=10V, I_E=0$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1V, I_C=0$			10	μA
DC Current Gain	h_{FE}	$V_{CE}=5V, I_C=4mA$	90		180	
Gain-Bandwidth Product	f_T	$V_{CE}=5V, I_C=4mA$		10		GHz
Output Capacitance	C_{ob}	$V_{CB}=10V, f=1MHz$		0.4	0.7	pF
Forward Transfer Gain	$ S_{21e} ^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
Tr2 [2SC4867]						
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}	$V_{CE}=5V, I_C=15mA$	90		180	
Gain-Bandwidth Product	f_T	$V_{CE}=5V, I_C=15mA$		9.0		GHz
Output Capacitance	C_{ob}	$V_{CB}=10V, f=1MHz$		0.6	1.1	pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=5V, I_C=15mA, f=1GHz$	10	13		dB
Noise Figure	NF	$V_{CE}=5V, I_C=5mA, f=1GHz$		1.2	2.5	dB

Marking : 201

Electrical Connection

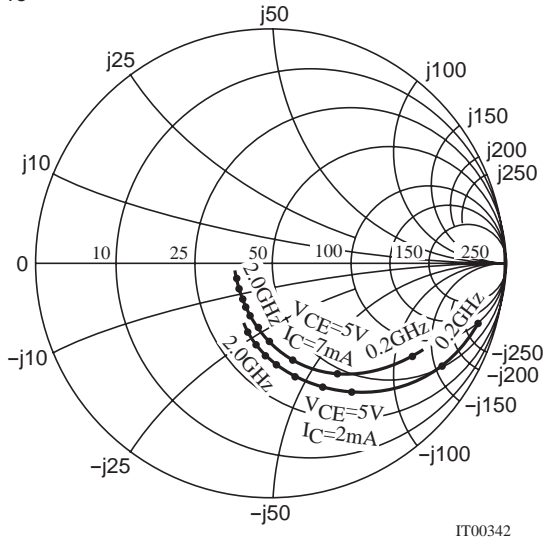


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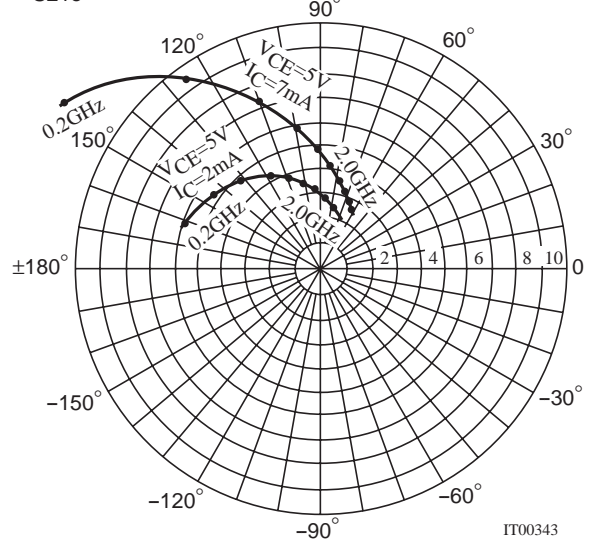


S parameter [Tr1]

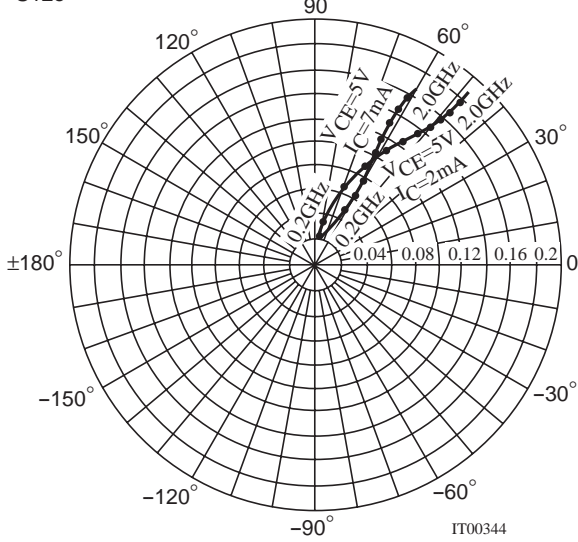
$V_{CE}=5V$
 $f=200MHz$ to $2000MHz(200MHz$ Step)
 S_{11e}



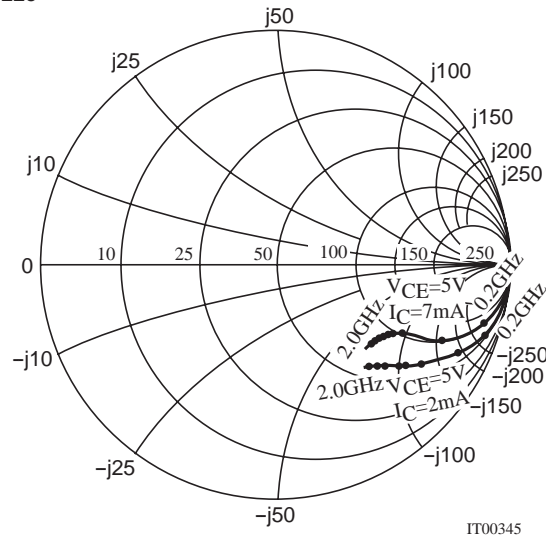
$V_{CE}=5V$
 $f=200MHz$ to $2000MHz(200MHz$ Step)
 S_{21e}



$V_{CE}=5V$
 $f=200MHz$ to $2000MHz(200MHz$ Step)
 S_{12e}



$V_{CE}=5V$
 $f=200MHz$ to $2000MHz(200MHz$ Step)
 S_{22e}



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S Parameters (Common emitter) [Tr1]

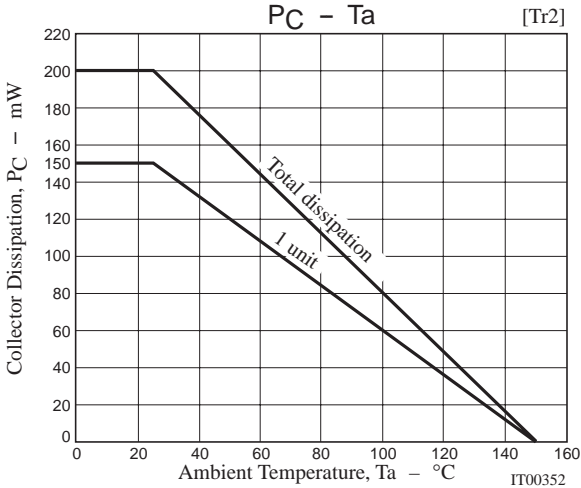
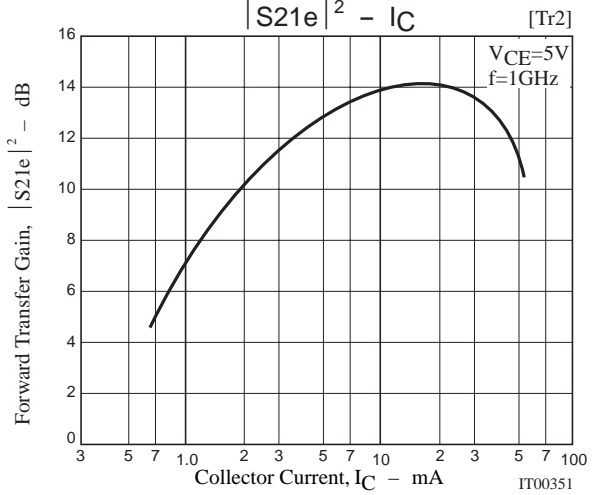
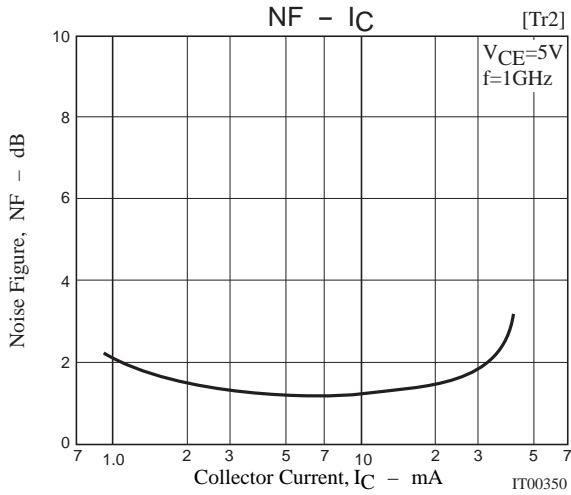
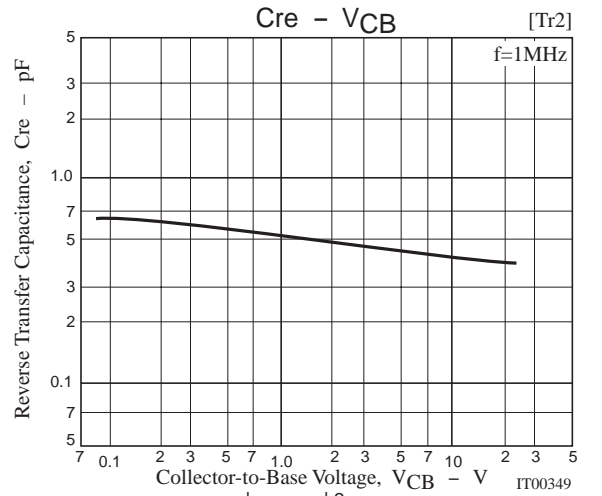
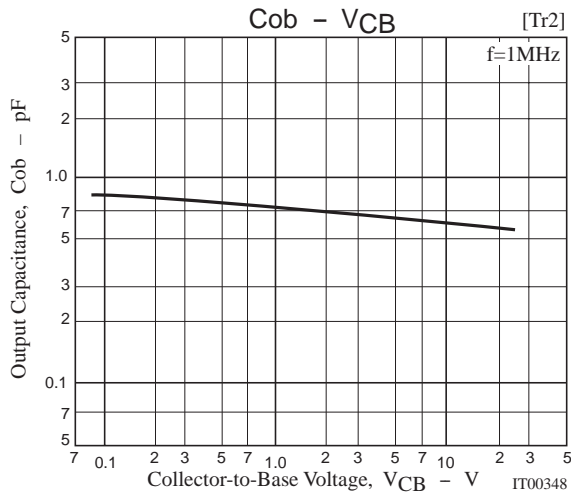
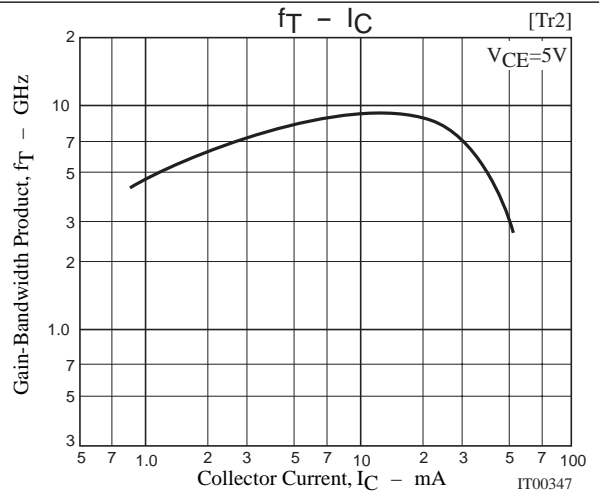
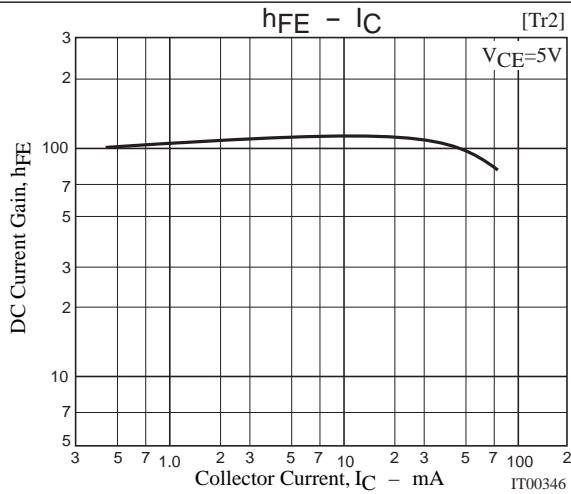
$V_{CE}=5V$, $I_C=2mA$, $Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.912	-17.6	5.764	161.5	0.034	79.0	0.974	-10.3
400	0.835	-33.0	5.282	145.5	0.065	69.9	0.919	-19.2
600	0.742	-46.9	4.753	131.2	0.088	62.8	0.850	-26.3
800	0.649	-58.9	4.268	119.4	0.107	57.9	0.789	-31.6
1000	0.578	-68.7	3.840	109.4	0.121	54.5	0.740	-35.5
1200	0.512	-78.1	3.440	100.5	0.134	52.2	0.698	-38.9
1400	0.445	-86.3	3.123	92.5	0.145	50.3	0.664	-41.6
1600	0.400	-93.0	2.836	85.2	0.154	49.2	0.638	-44.3
1800	0.359	-98.5	2.588	79.0	0.164	48.4	0.615	-46.3
2000	0.319	-106.6	2.297	73.0	0.174	47.9	0.601	-48.3

$V_{CE}=5V$, $I_C=7mA$, $Z_O=50\Omega$

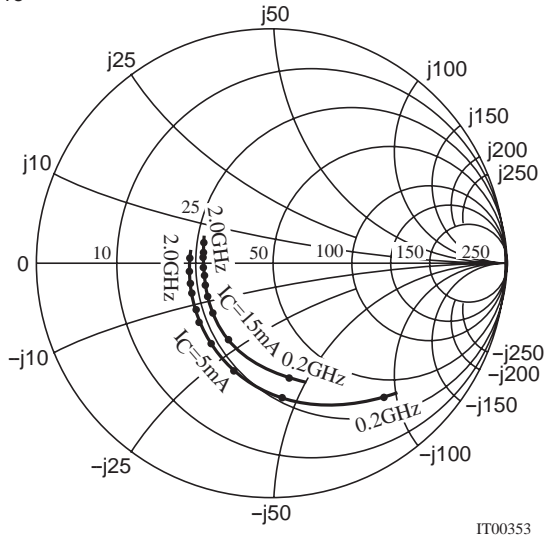
Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.721	-35.1	12.262	147.1	0.030	72.8	0.900	-16.9
400	0.555	-59.9	9.445	124.9	0.050	64.4	0.763	-25.6
600	0.428	-77.5	7.290	110.2	0.065	61.9	0.666	-29.3
800	0.344	-89.9	5.877	100.1	0.078	61.5	0.611	-31.1
1000	0.291	-100.6	4.911	92.1	0.091	61.7	0.583	-32.5
1200	0.254	-110.9	4.223	85.1	0.104	61.5	0.563	-34.1
1400	0.221	-121.4	3.703	79.0	0.117	61.6	0.551	-35.7
1600	0.197	-128.9	3.294	73.6	0.129	61.6	0.540	-37.8
1800	0.178	-136.7	2.946	68.5	0.143	61.1	0.530	-39.7
2000	0.171	-148.6	2.692	63.8	0.157	60.7	0.529	-41.7

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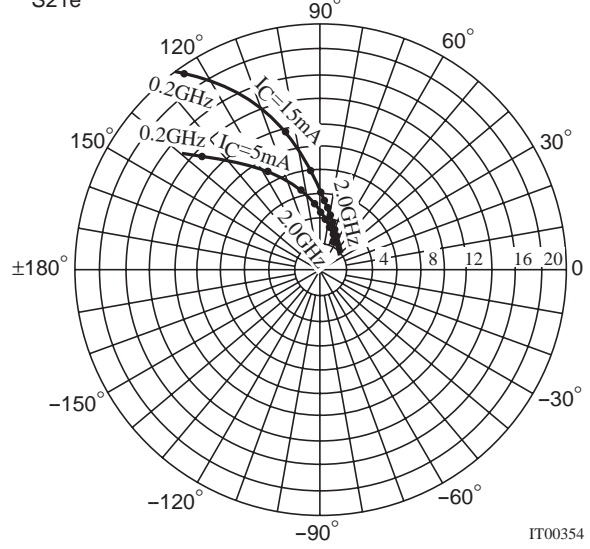


S parameter [Tr2]

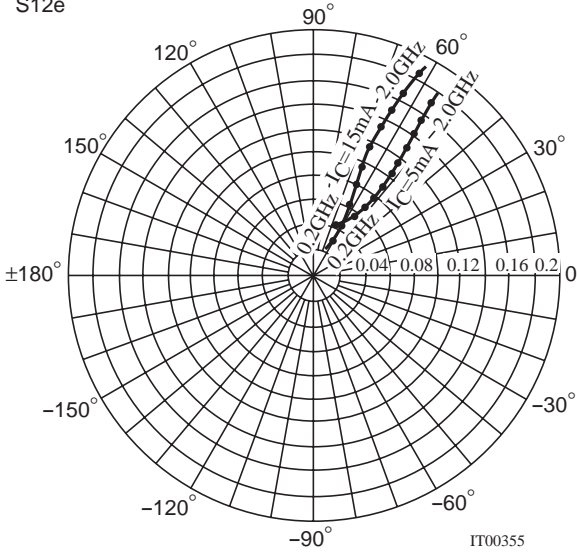
$V_{CE}=5V$
 $f=200MHz$ to $2000MHz(200MHz$ Step)
 S_{11e}



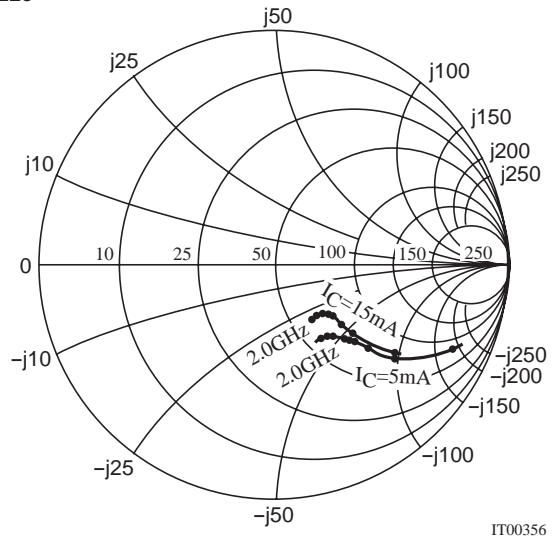
$V_{CE}=5V$
 $f=200MHz$ to $2000MHz(200MHz$ Step)
 S_{21e}



$V_{CE}=5V$
 $f=200MHz$ to $2000MHz(200MHz$ Step)
 S_{12e}



$V_{CE}=5V$
 $f=200MHz$ to $2000MHz(200MHz$ Step)
 S_{22e}



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S Parameters (Common emitter) [Tr2]

$V_{CE}=5V, I_C=5mA, Z_O=50\Omega$

Freq (MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.749	-50.7	12.229	141.6	0.044	65.4	0.847	-25.4
400	0.583	-85.7	8.900	118.1	0.068	54.3	0.655	-37.4
600	0.487	-109.6	6.636	103.7	0.081	51.6	0.538	-42.3
800	0.428	-126.6	5.276	93.9	0.093	51.6	0.473	-44.4
1000	0.405	-139.3	4.379	85.9	0.106	52.6	0.443	-46.2
1200	0.387	-150.6	3.731	78.7	0.117	53.6	0.421	-48.1
1400	0.377	-160.1	3.258	72.6	0.130	54.4	0.405	-49.6
1600	0.365	-166.8	2.924	67.5	0.142	55.2	0.393	-52.1
1800	0.362	-174.3	2.589	61.9	0.156	55.6	0.387	-54.3
2000	0.361	178.3	2.363	56.8	0.171	55.9	0.383	-56.4

$V_{CE}=5V, I_C=7mA, Z_O=50\Omega$

Freq (MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.507	-81.6	19.422	124.2	0.033	61.9	0.650	-36.9
400	0.382	-119.5	11.595	103.8	0.050	61.0	0.445	-43.0
600	0.341	-140.9	8.046	93.3	0.065	63.3	0.365	-43.5
800	0.332	-154.0	6.182	86.4	0.081	65.1	0.330	-43.3
1000	0.320	-163.0	5.063	79.8	0.099	65.6	0.318	-43.8
1200	0.316	-170.9	4.263	74.1	0.116	65.7	0.311	-45.9
1400	0.315	-178.0	3.716	69.2	0.134	65.0	0.304	-47.4
1600	0.314	176.7	3.270	64.3	0.150	64.4	0.297	-50.3
1800	0.311	171.2	2.922	60.0	0.167	63.3	0.293	-52.6
2000	0.313	165.4	2.656	55.9	0.186	62.1	0.295	-54.8

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