

**2SC5551**

## High-Frequency Medium-Output Amplifier Applications

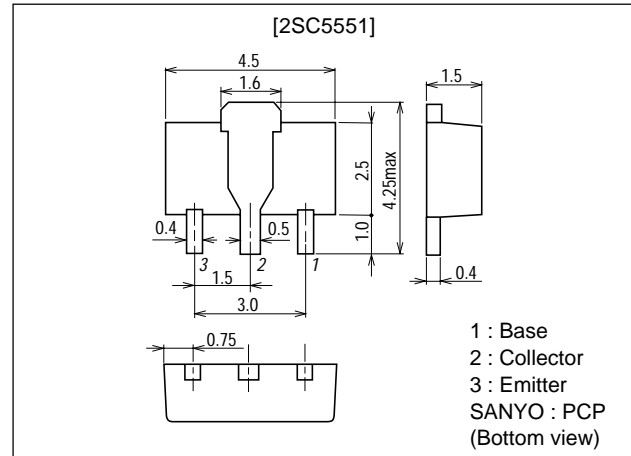
### Features

- High  $f_T$  : ( $f_T=3.5\text{GHz}$  typ).
- Large current : ( $I_C=300\text{mA}$ ).
- Large allowable collector dissipation (1.3W max).

### Package Dimensions

unit:mm

2038A



### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		40	V
Collector-to-Emitter Voltage	$V_{CE0}$		30	V
Emitter-to-Base Voltage	$V_{EB0}$		2	V
Collector Current	$I_C$		300	mA
Collector Current (pulse)	$I_{CP}$		600	mA
Collector Dissipation	$P_C$	Mounted on a ceramic board (250mm <sup>2</sup> ×0.8mm)	1.3	W
Junction Temperature	$T_J$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

#### Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CB0}$	$V_{CB}=20\text{V}, I_E=0$			1.0	$\mu\text{A}$
Emitter Cutoff Current	$I_{EB0}$	$V_{EB}=1\text{V}, I_C=0$			5.0	$\mu\text{A}$
DC Current Gain	$h_{FE1}$	$V_{CE}=5\text{V}, I_C=50\text{mA}$	90		270	
	$h_{FE2}$	$V_{CE}=5\text{V}, I_C=300\text{mA}$	20			

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\* : The 2SC5551 is classified by 50mA  $h_{FE}$  as follows :

Marking	EB	
	E	F
Rank		
$h_{FE}$	90 to 180	135 to 270

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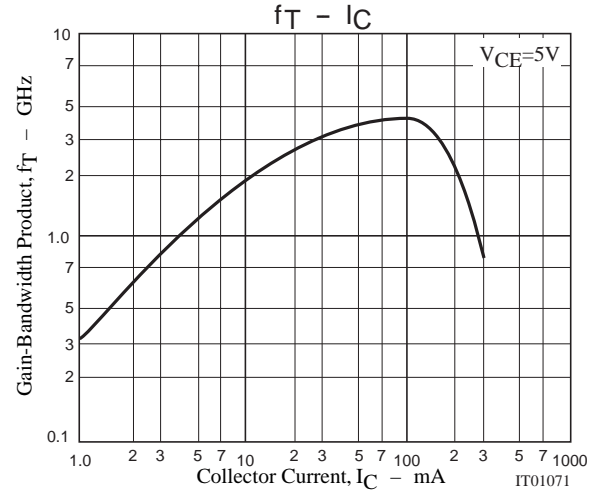
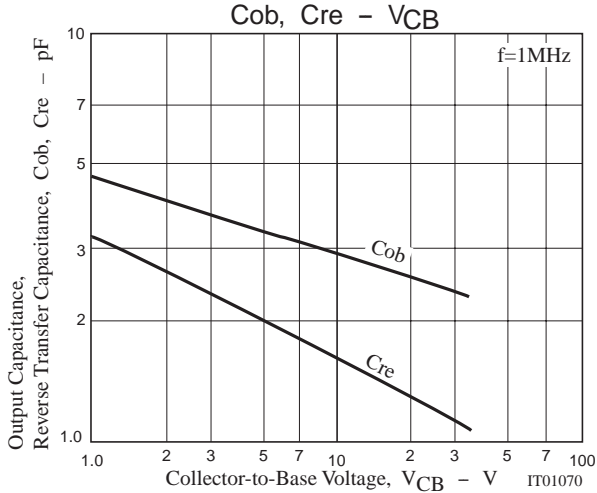
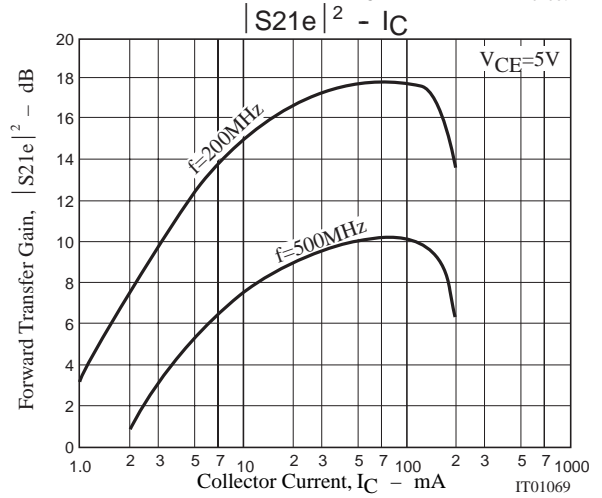
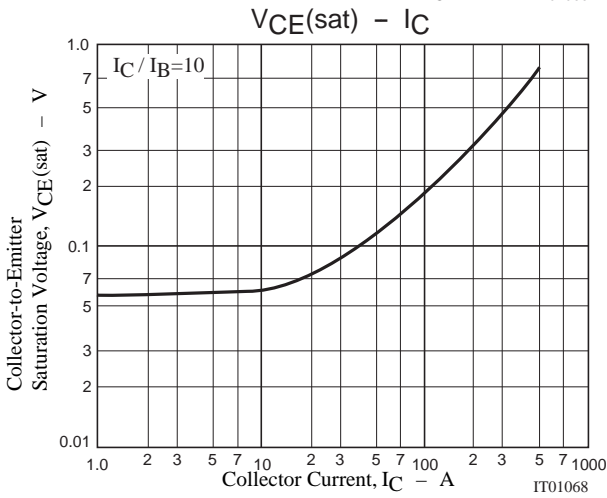
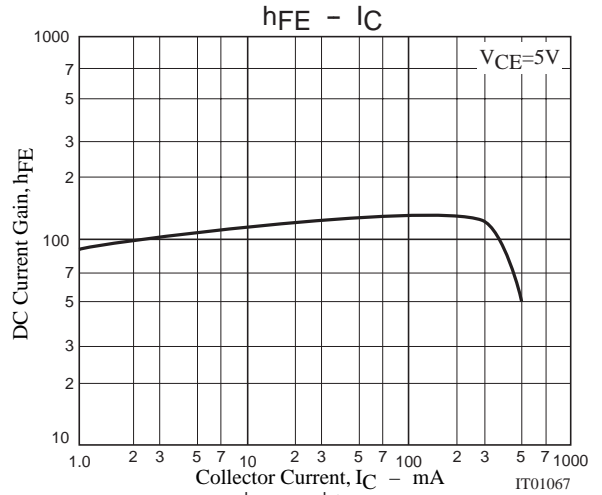
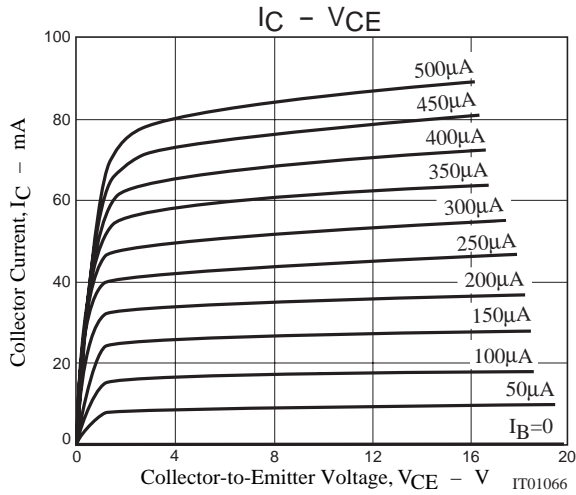
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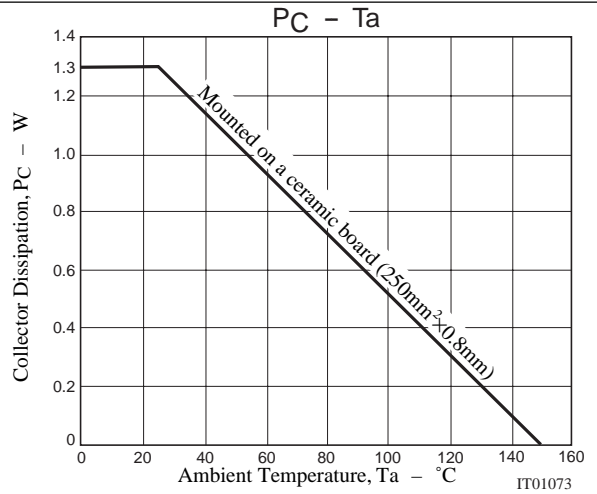
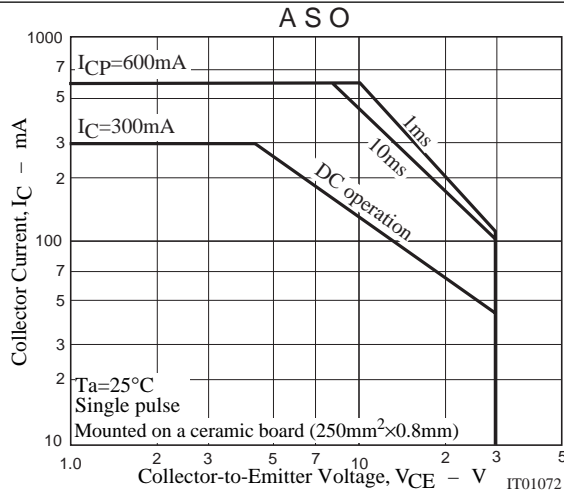
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Gain-Bandwidth Product	$f_T$	$V_{CE}=5V, I_C=50mA$		3.5		GHz
Output Capacitance	$C_{ob}$	$V_{CB}=10V, f=1MHz$		2.9	4.0	pF
Reverse Transfer Capacitance	$C_{re}$	$V_{CB}=10V, f=1MHz$		1.5		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=50mA, I_B=5mA$		0.15	0.3	V
Collector-to-Base Saturation Voltage	$V_{BE(sat)}$	$I_C=50mA, I_B=5mA$		0.9	1.2	V



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## S Parameters (Common emitter)

$V_{CE}=5V$ ,  $I_C=1mA$ ,  $Z_0=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.941	-101.1	2.373	119.9	0.088	38.7	0.884	-17.8
200	0.859	-141.0	1.425	93.8	0.097	18.3	0.821	-25.2
300	0.829	-158.6	0.990	79.4	0.088	12.0	0.755	-33.8
400	0.831	-169.5	0.845	69.2	0.074	10.7	0.766	-41.9
500	0.840	-178.6	0.715	61.1	0.058	25.2	0.798	-49.9
600	0.816	172.3	0.638	54.7	0.055	51.6	0.790	-58.4
700	0.816	164.9	0.507	49.8	0.064	78.4	0.771	-66.7
800	0.814	157.3	0.466	47.0	0.098	87.3	0.813	-75.0
900	0.800	150.9	0.443	45.7	0.134	90.2	0.792	-82.8
1000	0.804	145.0	0.388	47.3	0.173	92.2	0.782	-90.0

$V_{CE}=5V$ ,  $I_C=5mA$ ,  $Z_0=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.803	-114.9	7.414	115.7	0.068	41.3	0.635	-36.3
200	0.724	-151.3	4.172	93.7	0.076	31.5	0.472	-41.7
300	0.701	-165.9	2.952	82.3	0.078	35.0	0.431	-45.4
400	0.700	-175.1	2.286	73.9	0.082	42.9	0.432	-50.2
500	0.693	177.1	1.857	66.6	0.091	51.9	0.437	-56.6
600	0.689	170.2	1.559	60.0	0.100	58.6	0.443	-63.4
700	0.695	164.3	1.371	54.3	0.117	64.7	0.451	-70.3
800	0.691	158.3	1.174	48.8	0.137	69.1	0.463	-77.3
900	0.693	153.0	1.067	44.5	0.161	71.4	0.479	-84.1
1000	0.705	147.9	0.988	40.9	0.189	72.3	0.496	-90.3

$V_{CE}=5V$ ,  $I_C=10mA$ ,  $Z_0=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.718	-127.2	10.489	111.3	0.059	43.0	0.509	-50.8
200	0.658	-157.9	5.747	92.2	0.069	41.0	0.329	-58.8
300	0.639	-170.4	3.882	82.7	0.079	47.7	0.286	-61.0
400	0.632	-178.7	2.954	75.4	0.092	52.8	0.271	-65.2
500	0.628	174.6	2.405	68.8	0.107	57.4	0.273	-70.5
600	0.627	168.5	2.040	62.8	0.124	60.5	0.280	-76.9
700	0.626	162.9	1.778	57.4	0.143	62.9	0.296	-81.6
800	0.629	157.4	1.571	52.3	0.162	64.7	0.306	-87.9
900	0.631	152.7	1.405	47.9	0.185	64.8	0.318	-93.9
1000	0.633	148.0	1.292	43.7	0.209	64.8	0.339	-98.4

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$V_{CE}=5V, I_C=20mA, Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.653	-137.8	13.042	107.6	0.051	46.8	0.423	-68.5
200	0.608	-163.6	6.841	91.3	0.067	50.0	0.252	-84.4
300	0.591	-174.4	4.610	83.0	0.083	56.1	0.201	-91.5
400	0.584	178.4	3.504	76.4	0.102	59.2	0.186	-95.7
500	0.580	172.2	2.852	70.5	0.122	61.1	0.186	-100.2
600	0.579	166.7	2.427	65.3	0.144	62.2	0.195	-104.0
700	0.576	161.2	2.100	60.1	0.165	62.4	0.205	-107.4
800	0.576	156.1	1.871	55.5	0.186	62.3	0.215	-111.9
900	0.578	151.6	1.684	51.1	0.209	61.5	0.229	-115.4
1000	0.581	147.2	1.542	47.2	0.231	60.4	0.241	-118.7

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

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.611	-147.0	14.987	104.6	0.047	51.3	0.371	-88.8
200	0.573	-168.9	7.700	90.4	0.066	57.3	0.241	-115.9
300	0.556	-177.8	5.174	83.1	0.088	61.8	0.205	-128.4
400	0.551	175.7	3.932	77.4	0.111	63.4	0.192	-135.3
500	0.545	169.9	3.202	72.0	0.136	63.8	0.190	-138.5
600	0.542	164.5	2.710	67.1	0.160	63.3	0.195	-140.7
700	0.540	159.3	2.347	62.7	0.184	62.3	0.200	-142.5
800	0.537	154.2	2.096	58.4	0.207	61.1	0.207	-144.8
900	0.540	149.9	1.882	54.4	0.230	59.4	0.215	-146.8
1000	0.541	145.6	1.729	50.5	0.254	57.9	0.223	-148.4

$V_{CE}=5V, I_C=100mA, Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.606	-159.9	15.141	100.1	0.046	50.9	0.369	-102.2
200	0.572	-174.1	7.687	88.9	0.066	59.1	0.254	-129.7
300	0.558	179.3	5.186	82.6	0.090	63.0	0.223	-142.0
400	0.551	174.1	3.952	77.1	0.116	64.3	0.213	-148.5
500	0.542	168.6	3.229	72.1	0.141	64.4	0.210	-151.5
600	0.536	163.0	2.738	67.4	0.167	63.3	0.213	-153.0
700	0.531	157.4	2.375	62.6	0.192	62.0	0.219	-154.5
800	0.528	152.2	2.114	58.5	0.215	60.3	0.226	-156.5
900	0.529	147.7	1.900	54.8	0.239	58.5	0.234	-158.6
1000	0.530	143.5	1.737	51.1	0.262	57.0	0.239	-160.3

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