



SANYO Semiconductors

## DATA SHEET

# 2SC4853A

NPN Epitaxial Planar Silicon Transistor

## Low-Voltage, Low-Current High-Frequency Amplifier Applications

### Features

- Low-voltage, low-current operation :  $f_T=5\text{GHz}$  typ.  
( $V_{CE}=1\text{V}$ ,  $I_C=1\text{mA}$ ) :  $|S_{21e}|^2=7\text{dB}$  typ ( $f=1\text{GHz}$ ).  
:  $NF=2.6\text{dB}$  typ ( $f=1\text{GHz}$ ).

### Specifications

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

| Parameter                    | Symbol    | Conditions | Ratings     | Unit             |
|------------------------------|-----------|------------|-------------|------------------|
| Collector-to-Base Voltage    | $V_{CBO}$ |            | 12          | V                |
| Collector-to-Emitter Voltage | $V_{CEO}$ |            | 6           | V                |
| Emitter-to-Base Voltage      | $V_{EBO}$ |            | 1.5         | V                |
| Collector Current            | $I_C$     |            | 15          | mA               |
| Collector Dissipation        | $P_C$     |            | 90          | mW               |
| 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 | $I_{CBO}$ | $V_{CB}=5\text{V}$ , $I_E=0\text{A}$  |         |     | 1.0  | $\mu\text{A}$ |
| Emitter Cutoff Current   | $I_{EBO}$ | $V_{EB}=1\text{V}$ , $I_C=0\text{A}$  |         |     | 10   | $\mu\text{A}$ |
| DC Current Gain          | $h_{FE}$  | $V_{CE}=1\text{V}$ , $I_C=1\text{mA}$ | 60*     |     | 270* |               |

\* : The 2SC4853A is classified by 1mA  $h_{FE}$  as follows :

| Marking  | CN3       | CN4       | CN5        |
|----------|-----------|-----------|------------|
| Rank     | 3         | 4         | 5          |
| $h_{FE}$ | 60 to 120 | 90 to 180 | 135 to 270 |

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SANYO Semiconductor Co., Ltd.

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# 2SC4853A

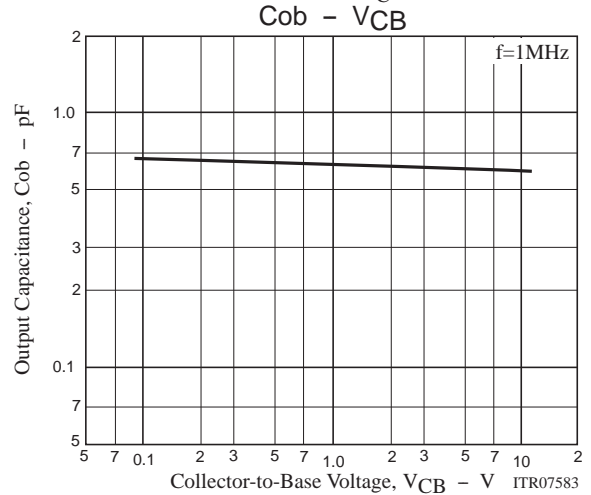
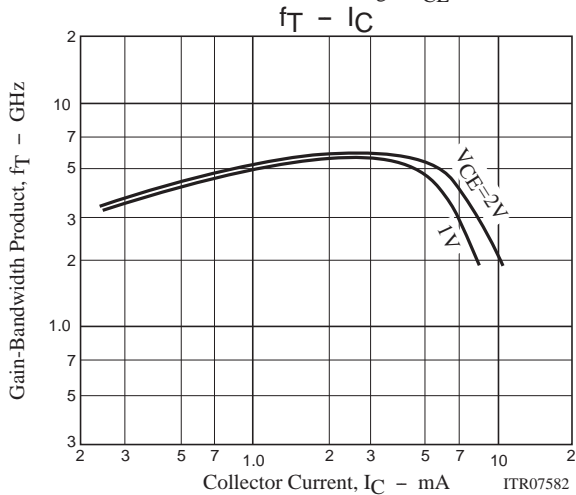
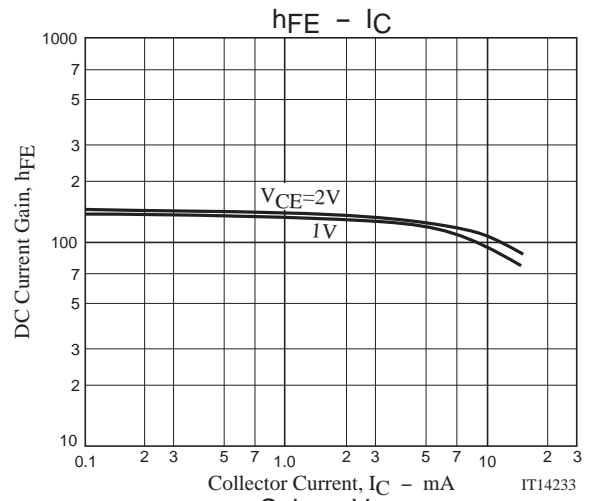
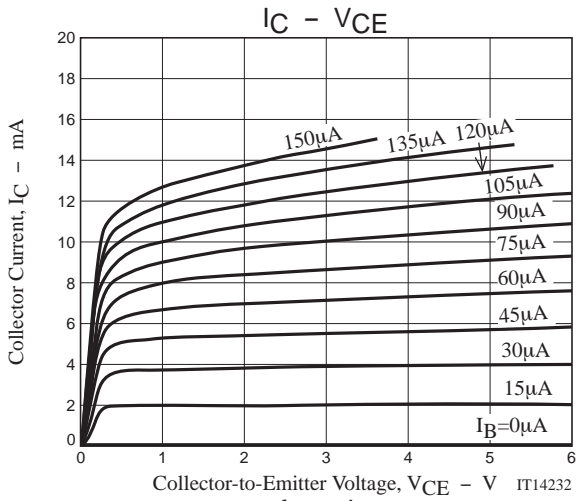
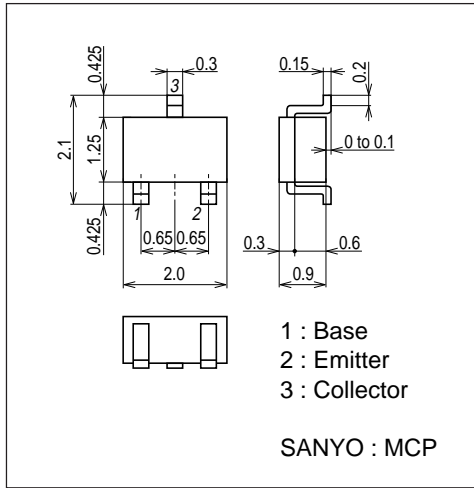
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| Parameter              | Symbol           | Conditions                   | Ratings |      |     | Unit |
|------------------------|------------------|------------------------------|---------|------|-----|------|
|                        |                  |                              | min     | typ  | max |      |
| Gain-Bandwidth Product | $f_T$            | $V_{CE}=1V, I_C=1mA$         |         | 5    |     | GHz  |
| Output Capacitance     | $C_{ob}$         | $V_{CB}=1V, f=1MHz$          |         | 0.6  | 1.0 | pF   |
| Forward Transfer Gain  | $ S_{21e} ^{21}$ | $V_{CE}=1V, I_C=1mA, f=1GHz$ | 4.5     | 7    |     | dB   |
|                        | $ S_{21e} ^{22}$ | $V_{CE}=2V, I_C=3mA, f=1GHz$ |         | 10.5 |     | dB   |
| Noise Figure           | NF1              | $V_{CE}=1V, I_C=1mA, f=1GHz$ |         | 2.6  | 4.5 | dB   |
|                        | NF2              | $V_{CE}=2V, I_C=3mA, f=1GHz$ |         | 1.9  |     | dB   |

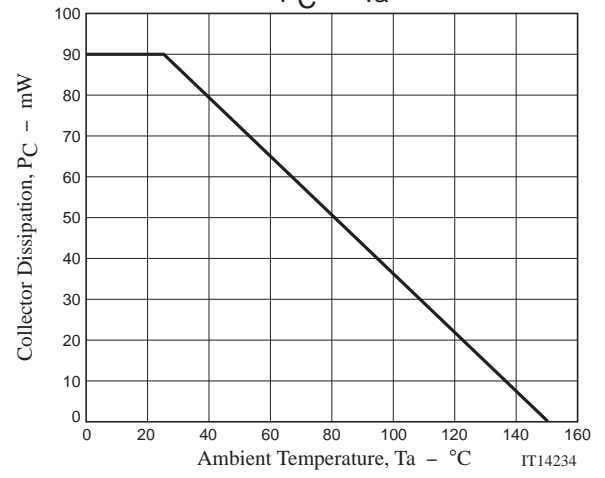
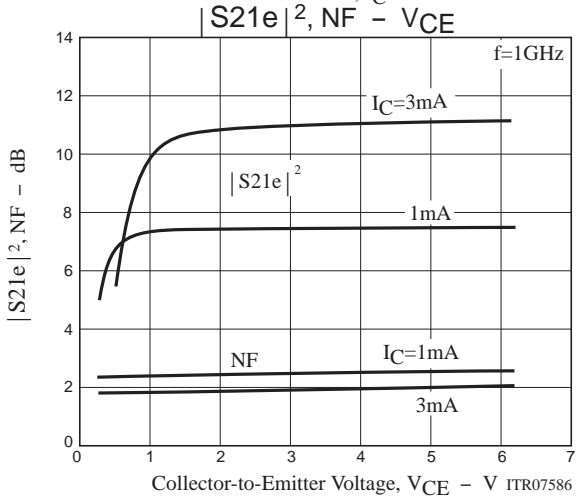
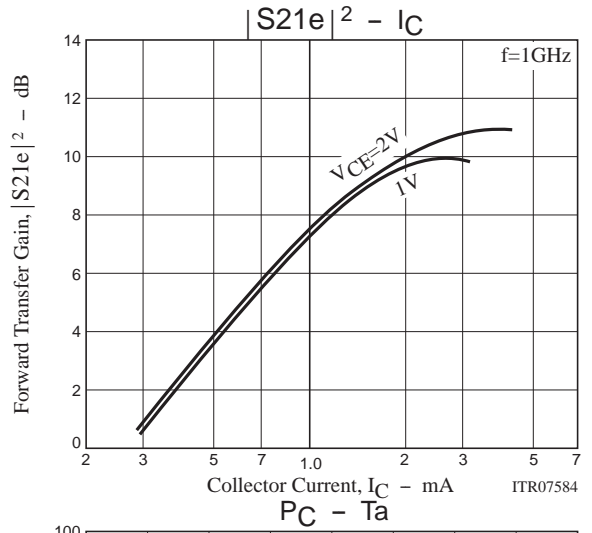
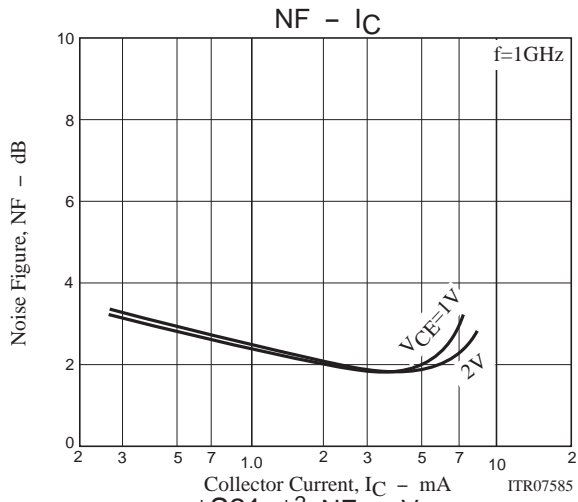
## Package Dimensions

unit : mm (typ)

7023-009



# 2SC4853A

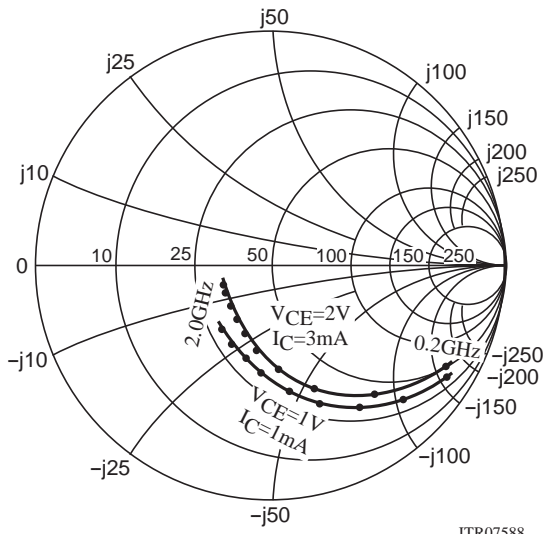


# 2SC4853A

## S Parameters

S11e

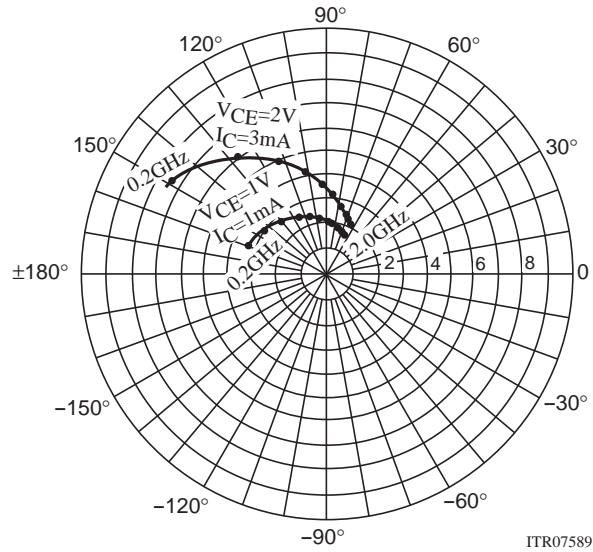
f=200MHz to 2000MHz(200MHz Step)



ITR07588

S21e

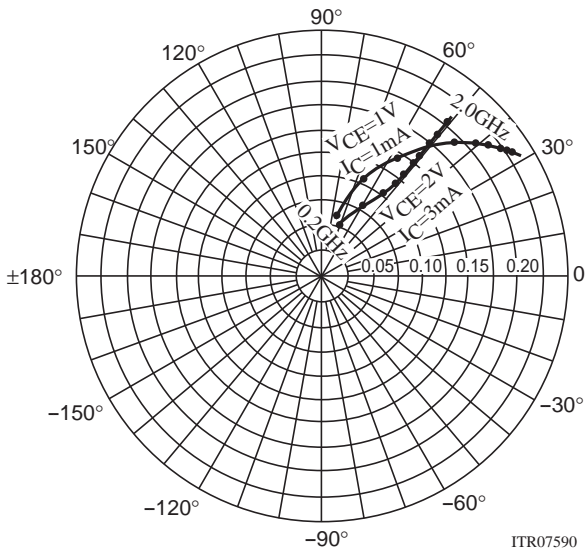
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ITR07589

S12e

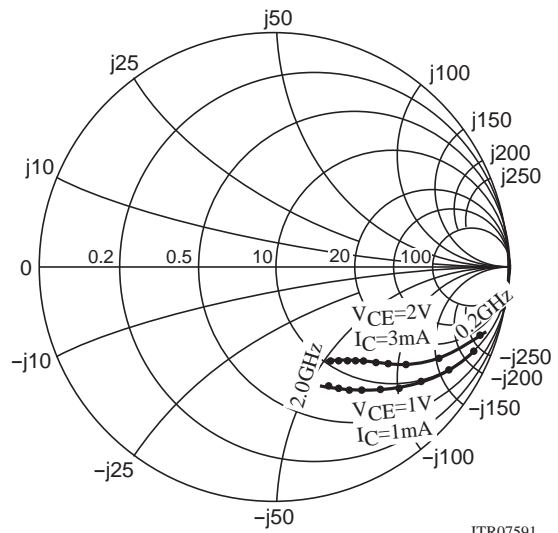
f=200MHz to 2000MHz(200MHz Step)



ITR07590

S22e

f=200MHz to 2000MHz(200MHz Step)



ITR07591

## 2SC4853A

### S Parameters (Common emitter)

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

| Freq(MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|-----------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 200       | 0.940      | -17.9           | 3.228      | 159.6           | 0.058      | 77.1            | 0.972      | -12.2           |
| 400       | 0.863      | -33.7           | 2.983      | 143.7           | 0.107      | 66.6            | 0.914      | -22.7           |
| 600       | 0.778      | -48.0           | 2.732      | 129.9           | 0.145      | 58.1            | 0.844      | -31.7           |
| 800       | 0.698      | -60.5           | 2.469      | 117.7           | 0.173      | 50.9            | 0.773      | -39.6           |
| 1000      | 0.608      | -73.5           | 2.320      | 106.2           | 0.195      | 45.4            | 0.717      | -46.0           |
| 1200      | 0.546      | -84.7           | 2.106      | 96.3            | 0.210      | 40.9            | 0.668      | -51.7           |
| 1400      | 0.470      | -96.2           | 1.977      | 87.1            | 0.129      | 37.6            | 0.624      | -56.5           |
| 1600      | 0.418      | -106.4          | 1.826      | 78.8            | 0.224      | 35.3            | 0.590      | -60.6           |
| 1800      | 0.388      | -117.3          | 1.700      | 72.2            | 0.230      | 33.8            | 0.562      | -64.3           |
| 2000      | 0.354      | -127.0          | 1.615      | 65.9            | 0.234      | 32.9            | 0.546      | -67.5           |

$V_{CE}=2V, I_C=3mA, Z_O=50\Omega$

| Freq(MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|-----------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 200       | 0.839      | -30.6           | 7.428      | 149.3           | 0.050      | 71.4            | 0.916      | -18.3           |
| 400       | 0.672      | -53.7           | 6.016      | 128.5           | 0.083      | 60.6            | 0.778      | -30.2           |
| 600       | 0.536      | -71.7           | 4.908      | 113.6           | 0.105      | 55.1            | 0.672      | -37.1           |
| 800       | 0.431      | -85.7           | 4.073      | 101.9           | 0.121      | 52.5            | 0.597      | -41.9           |
| 1000      | 0.360      | -99.0           | 3.494      | 92.7            | 0.135      | 51.4            | 0.548      | -45.7           |
| 1200      | 0.310      | -111.4          | 3.033      | 84.4            | 0.150      | 50.9            | 0.514      | -49.2           |
| 1400      | 0.265      | -122.6          | 2.694      | 77.4            | 0.162      | 50.9            | 0.492      | -52.3           |
| 1600      | 0.242      | -134.7          | 2.422      | 70.9            | 0.175      | 51.0            | 0.475      | -55.6           |
| 1800      | 0.228      | -148.0          | 2.205      | 65.9            | 0.189      | 51.1            | 0.461      | -59.0           |
| 2000      | 0.217      | -157.2          | 2.061      | 60.8            | 0.205      | 51.0            | 0.456      | -61.8           |

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