

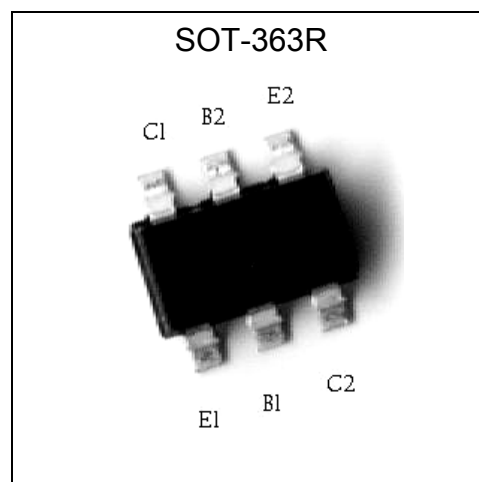
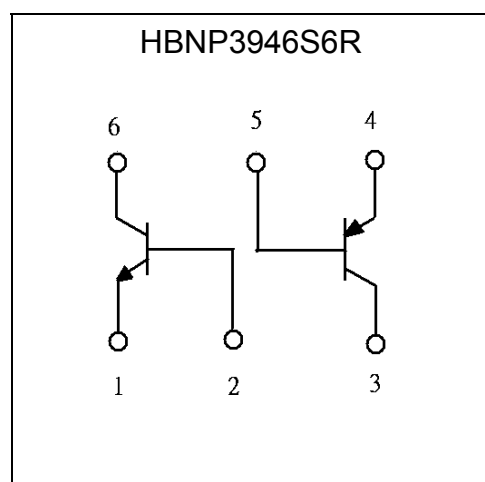
## General Purpose NPN / PNP Epitaxial Planar Transistors (dual transistors)

# HBNP3946S6R

### Features

- Includes a 2N3904 chip and 2N3906 chip in a SOT-363R package.
- Mounting possible with SOT-323 automatic mounting machines.
- Transistor elements are independent, eliminating interference.
- Mounting cost and area can be cut in half.

### Equivalent Circuit



### Absolute Maximum Ratings (Ta=25°C)

| Parameter                 | Symbol | Limits        |           | Unit |
|---------------------------|--------|---------------|-----------|------|
|                           |        | TR1 (NPN)     | TR2 (PNP) |      |
| Collector-Base Voltage    | VCBO   | 60            | -40       | V    |
| Collector-Emitter Voltage | VCEO   | 40            | -40       | V    |
| Emitter-Base Voltage      | VEBO   | 6             | -5        | V    |
| Collector Current         | IC     | 200           | -200      | mA   |
| Power Dissipation         | Pd     | 300(total) *1 |           | mW   |
| Junction Temperature      | Tj     | 150           |           | °C   |
| Storage Temperature       | Tstg   | -55~+150      |           | °C   |

Note: \*1 200mW per element must not be exceeded.

**Characteristics** (Ta=25°C)**• TR1 (NPN)**

| Symbol   | Min. | Typ. | Max. | Unit | Test Conditions            |
|----------|------|------|------|------|----------------------------|
| BVCBO    | 60   | -    | -    | V    | IC=10uA                    |
| BVCEO    | 40   | -    | -    | V    | IC=1mA                     |
| BVEBO    | 6    | -    | -    | V    | IE=10uA                    |
| ICBO     | -    | -    | 100  | nA   | VCB=50V                    |
| ICEX     | -    | -    | 50   | nA   | VCE=30V, VEB=3V            |
| IEBO     | -    | -    | 100  | nA   | VEB=5V                     |
| VCE(sat) | -    | -    | 0.2  | V    | IC=10mA, IB=1mA            |
| VCE(sat) | -    | -    | 0.3  | V    | IC=50mA, IB=5mA            |
| hFE      | 40   | -    | -    | -    | VCE=1V, IC=100uA           |
| hFE      | 70   | -    | -    | -    | VCE=1V, IC=1mA             |
| hFE      | 100  | -    | 300  | -    | VCE=1V, IC=10mA            |
| hFE      | 60   | -    | -    | -    | VCE=1V, IC=50mA            |
| *hFE     | 30   | -    | -    | -    | VCE=1V, IC=100mA           |
| fT       | 300  | -    | -    | MHz  | VCE=20V, IC=10mA, f=100MHz |
| Cob      | -    | -    | 4    | pF   | VCB=5V, f=1MHz             |

\*Pulse Test: Pulse Width ≤380us, Duty Cycle≤2%

**• TR2 (PNP)**

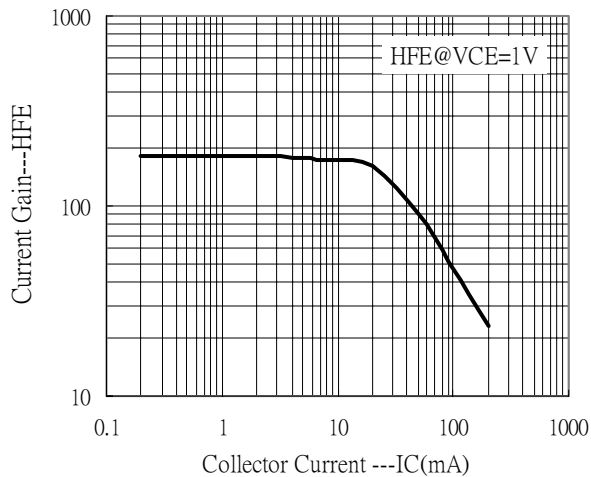
| Symbol    | Min. | Typ. | Max.  | Unit | Test Conditions              |
|-----------|------|------|-------|------|------------------------------|
| BVCBO     | -40  | -    | -     | V    | IC=-10uA                     |
| BVCEO     | -40  | -    | -     | V    | IC=-1mA                      |
| BVEBO     | -5   | -    | -     | V    | IE=-10uA                     |
| ICBO      | -    | -    | -100  | nA   | VCB=-30V                     |
| ICEX      | -    | -    | -50   | nA   | VCE=-30V, VEB=-3V            |
| IEBO      | -    | -    | -100  | nA   | VEB=-4V                      |
| VCE(sat)  | -    | -    | -0.25 | V    | IC=-10mA, IB=-1mA            |
| *VCE(sat) | -    | -    | -0.4  | V    | IC=-50mA, IB=-5mA            |
| hFE       | 60   | -    | -     | -    | VCE=-1V, IC=-100uA           |
| hFE       | 80   | -    | -     | -    | VCE=-1V, IC=-1mA             |
| hFE       | 100  | -    | 300   | -    | VCE=-1V, IC=-10mA            |
| hFE       | 60   | -    | -     | -    | VCE=-1V, IC=-50mA            |
| *hFE      | 30   | -    | -     | -    | VCE=-1V, IC=-100mA           |
| fT        | 300  | -    | -     | MHz  | VCE=-20V, IC=-10mA, f=100MHz |
| Cob       | -    | -    | 4.5   | pF   | VCB=-5V, f=1MHz              |

\*Pulse Test: Pulse Width ≤380us, Duty Cycle≤2%

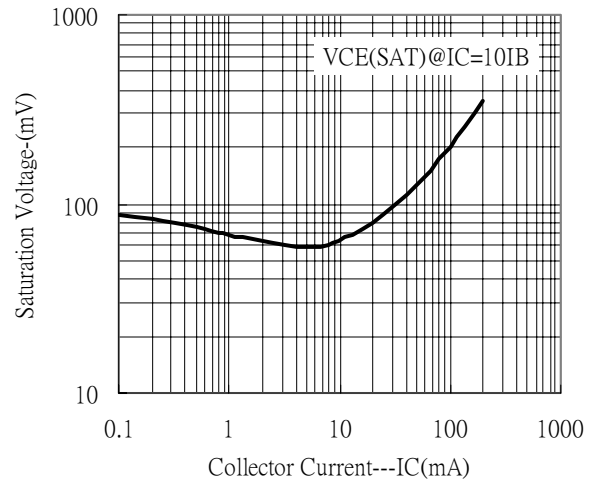
## Characteristic curves

### • TR1 (NPN)

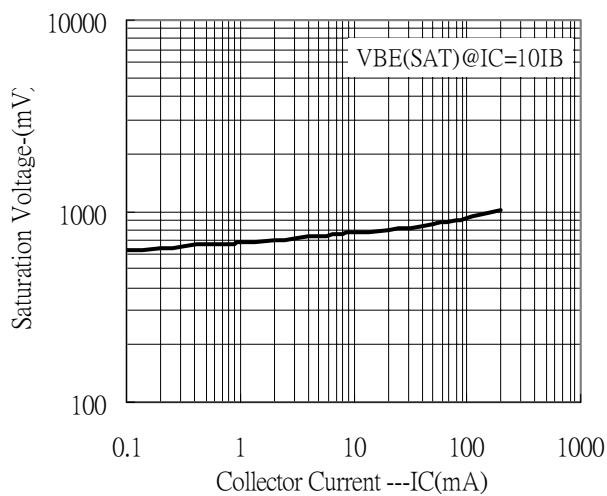
Current Gain vs Collector Current



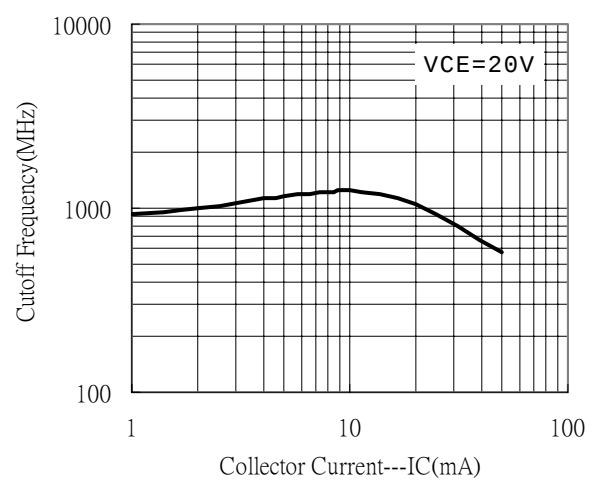
Saturation Voltage vs Collector Current



Saturation Voltage vs Collector Current

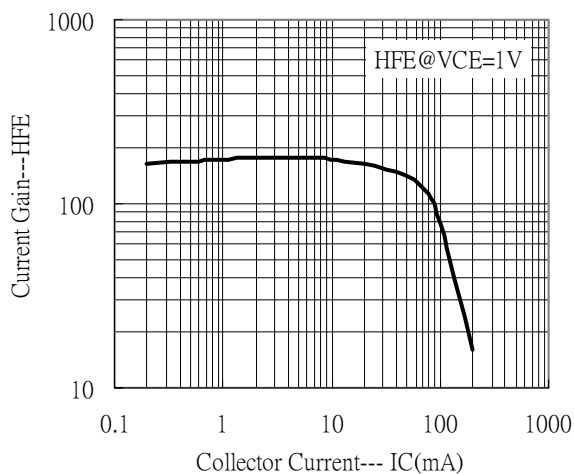


Cutoff Frequency vs Collector Current

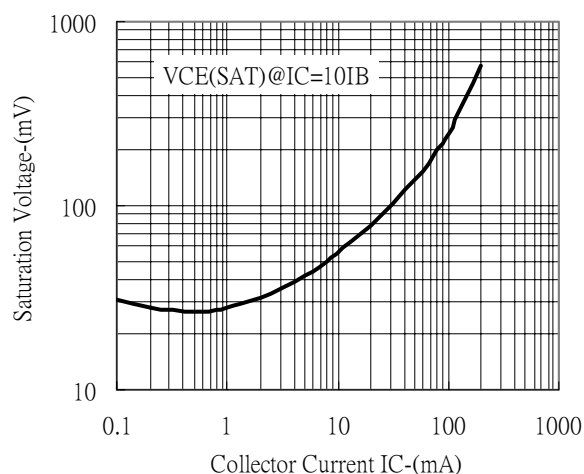


## • TR2 (PNP)

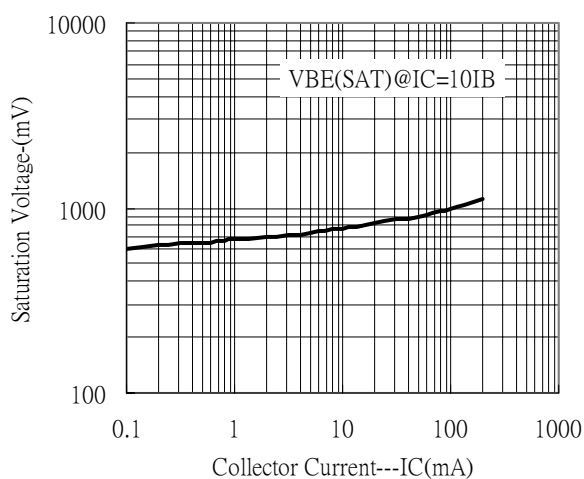
Current Gain vs Collector Current



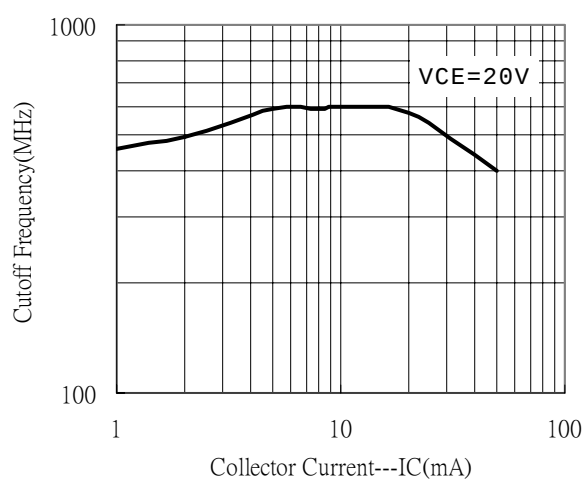
Saturation Voltage vs Collector Current



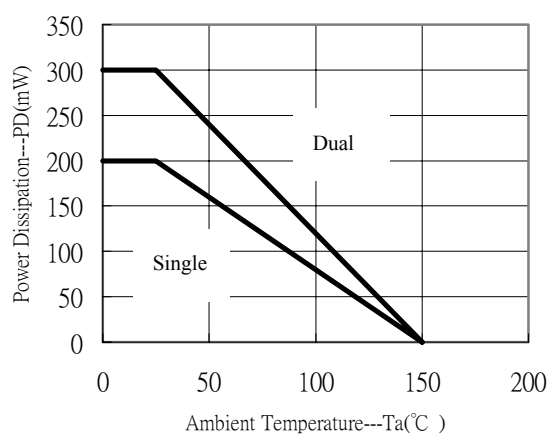
Saturation Voltage vs Collector Current



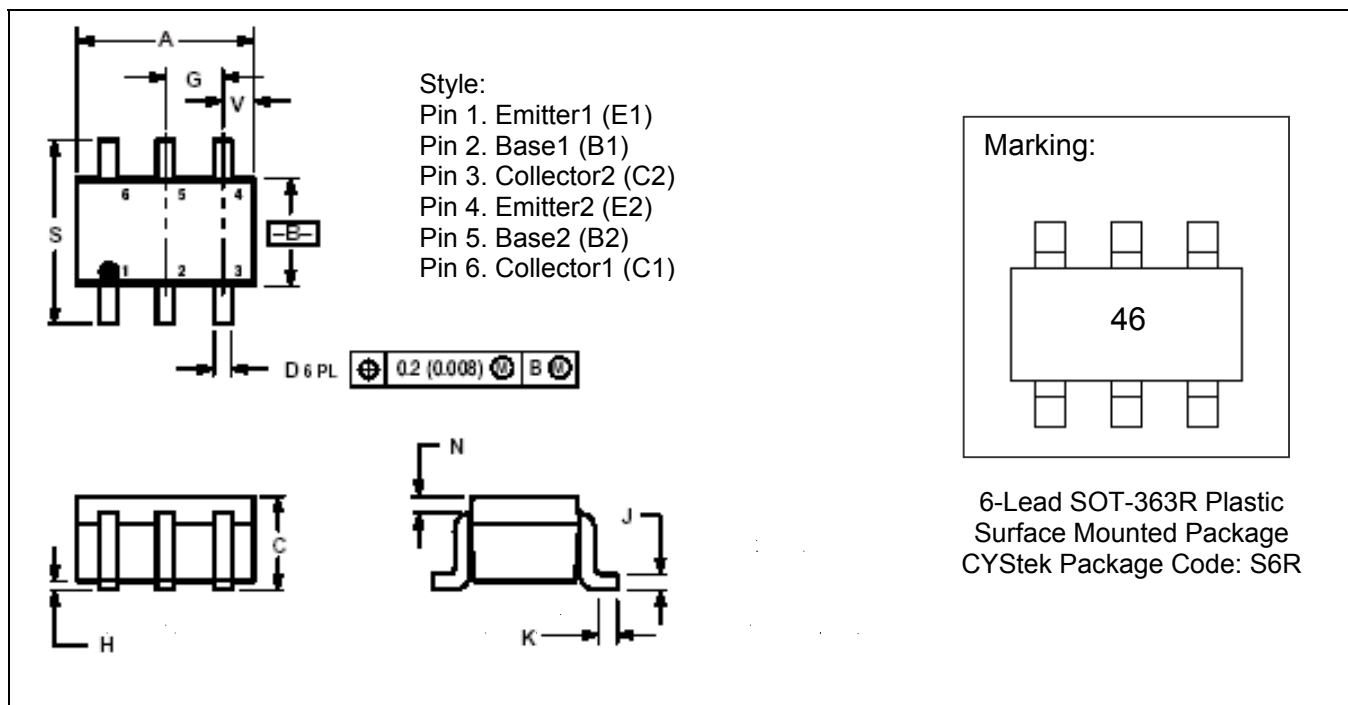
Cutoff Frequency vs Collector Current



PD - Ta



## SOT-363R Dimension



\*:Typical

| DIM | Inches   |       | Millimeters |      | DIM | Inches    |       | Millimeters |      |
|-----|----------|-------|-------------|------|-----|-----------|-------|-------------|------|
|     | Min.     | Max.  | Min.        | Max. |     | Min.      | Max.  | Min.        | Max. |
| A   | 0.071    | 0.087 | 1.8         | 2.2  | J   | 0.004     | 0.010 | 0.1         | 0.25 |
| B   | 0.045    | 0.053 | 1.15        | 1.35 | K   | 0.004     | 0.012 | 0.1         | 0.30 |
| C   | 0.031    | 0.043 | 0.8         | 1.1  | N   | 0.008 REF |       | 0.20 REF    |      |
| D   | 0.004    | 0.012 | 0.1         | 0.3  | S   | 0.079     | 0.087 | 2.00        | 2.40 |
| G   | 0.026BSC |       | 0.65BSC     |      | Y   | 0.012     | 0.016 | 0.30        | 0.40 |
| H   | -        | 0.004 | -           | 0.1  |     |           |       |             |      |

Notes : 1. Controlling dimension : millimeters.

2. Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.

3. If there is any question with packing specification or packing method, please contact your local CYStek sales office.

### Material :

- Lead : 42 Alloy ; solder plating
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0

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