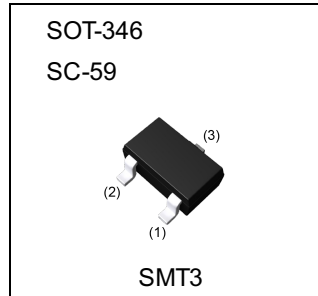


| Parameter | Value |
|-----------|-------|
| V_{CEO} | 11V |
| I_C | 50mA |

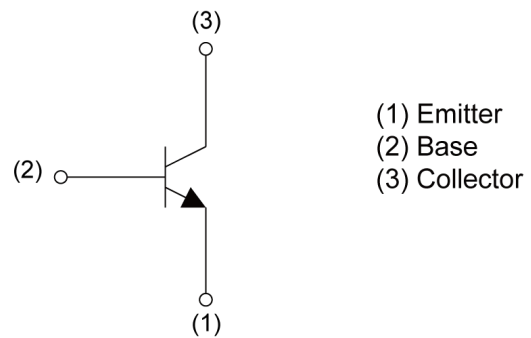
● **Outline**



● **Features**

- 1) High transition frequency. (Typ. $f_T=3.2\text{GHz}$)
- 2) Small $r_{bb'} \cdot C_c$ and high gain. (Typ. 4ps)
- 3) Small NF.

● **Inner circuit**



● **Application**

UHF FREQUENCY CONVERTER, LOCAL OSCILLATOR

● **Packaging specifications**

| Part No. | Package | Package size | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit.(pcs) | Marking |
|----------|----------------|--------------|-------------|----------------|-----------------|---------------------------|---------|
| 2SC3838K | SOT-346 (SMT3) | 2928 | T146 | 180 | 8 | 3000 | AD |

● **Notice**

This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit.

● Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Values | Unit |
|------------------------------|------------|-------------|------------------|
| Collector-base voltage | V_{CBO} | 20 | V |
| Collector-emitter voltage | V_{CEO} | 11 | V |
| Emitter-base voltage | V_{EBO} | 3 | V |
| Collector current | I_C | 50 | mA |
| Power dissipation | P_D^{*1} | 200 | mW |
| Junction temperature | T_j | 150 | $^\circ\text{C}$ |
| Range of storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

● Electrical characteristics ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Conditions | Values | | | Unit |
|--------------------------------------|---------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Collector-base breakdown voltage | BV_{CBO} | $I_C = 10\mu\text{A}$ | 20 | - | - | V |
| Collector-emitter breakdown voltage | BV_{CEO} | $I_C = 1\text{mA}$ | 11 | - | - | V |
| Emitter-base breakdown voltage | BV_{EBO} | $I_E = 10\mu\text{A}$ | 3 | - | - | V |
| Collector cut-off current | I_{CBO} | $V_{CB} = 10\text{V}$ | - | - | 500 | nA |
| Emitter cut-off current | I_{EBO} | $V_{EB} = 2\text{V}$ | - | - | 500 | nA |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 10\text{mA}, I_B = 5\text{mA}$ | - | - | 500 | mV |
| DC current gain | h_{FE} | $V_{CE} = 10\text{V}, I_C = 5\text{mA}$ | 56 | - | 270 | - |
| Transition frequency | f_T | $V_{CE} = 10\text{V}, I_E = -10\text{mA}, f = 500\text{MHz}$ | 1.4 | 3.2 | - | GHz |
| Output capacitance | C_{ob} | $V_{CB} = 10\text{V}, I_E = 0\text{A}, f = 1\text{MHz}$ | - | 0.8 | 1.5 | pF |
| Noise figure | N_F | $V_{CB} = 6\text{V}, I_C = 2\text{mA}, f = 500\text{MHz}, R_g = 50\Omega$ | - | 3.5 | - | dB |

h_{FE} values are classified as follows :

| rank | N | P | Q | - | - |
|----------|--------|--------|---------|---|---|
| h_{FE} | 56-120 | 82-180 | 120-270 | - | - |

*1 Each terminal mounted on a reference land.

● Electrical characteristic curves ($T_a = 25^\circ\text{C}$)

Fig.1 Ground Emitter Propagation Characteristics

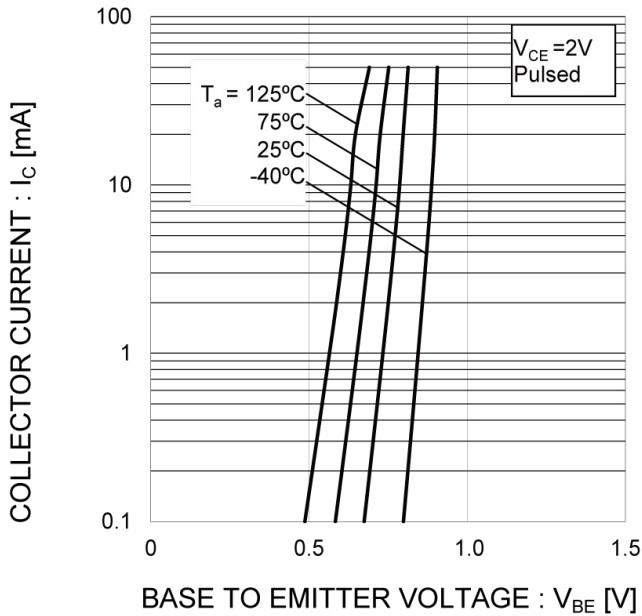


Fig.2 Typical Output Characteristics

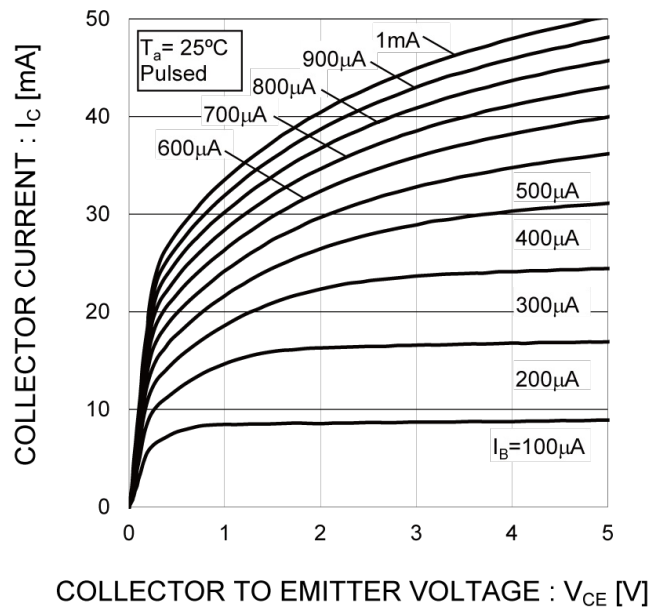


Fig.3 DC Current Gain vs. Collector Current (I)

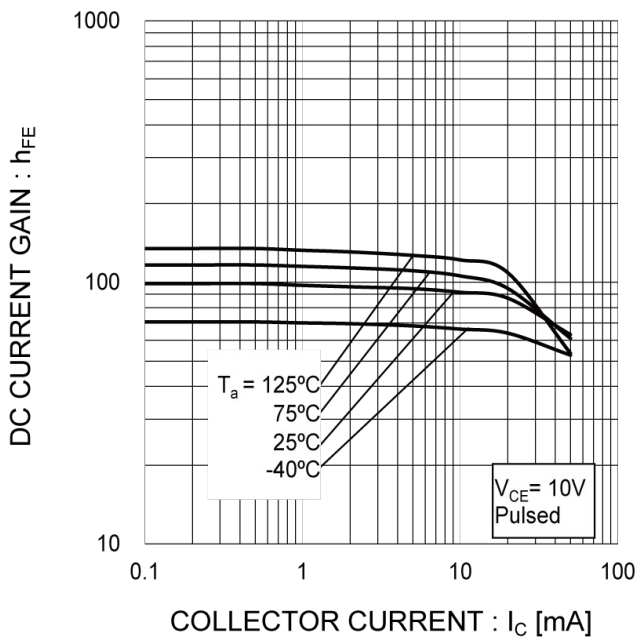
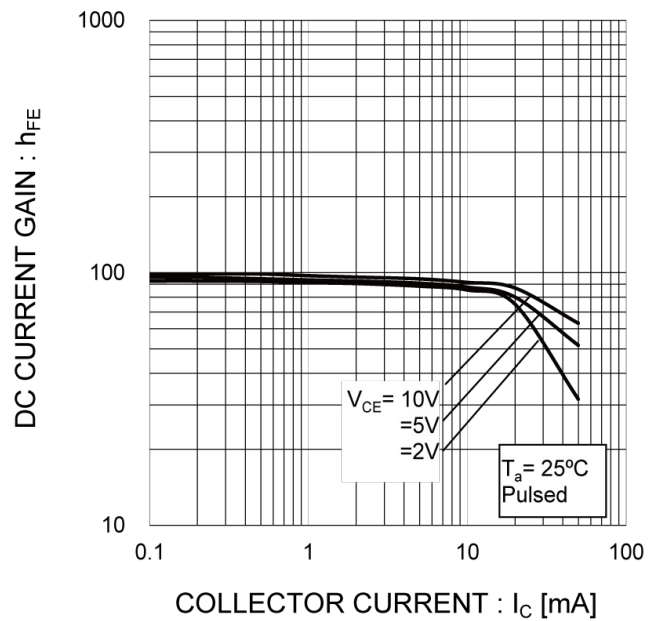


Fig.4 DC Current Gain vs. Collector Current (II)



● Electrical characteristic curves ($T_a = 25^\circ\text{C}$)

Fig.5 Collector to base time constant vs. collector current

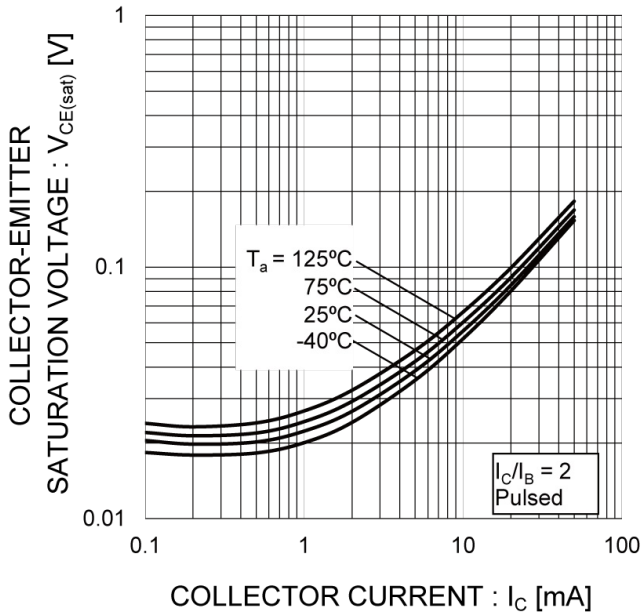


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

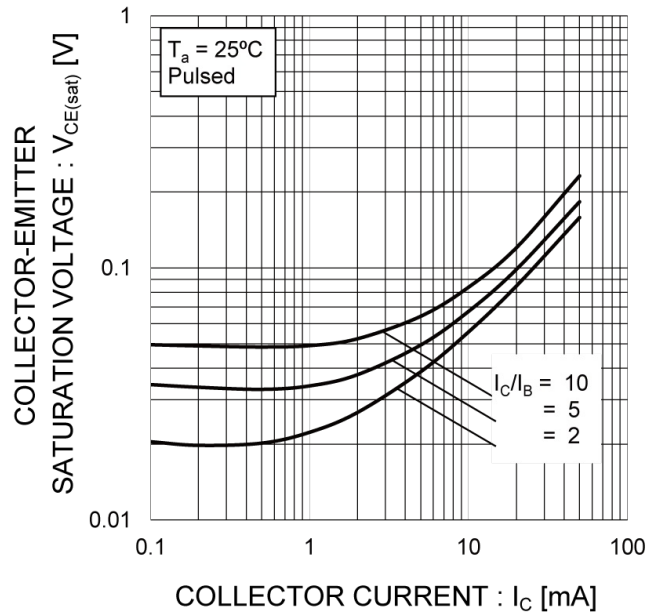


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

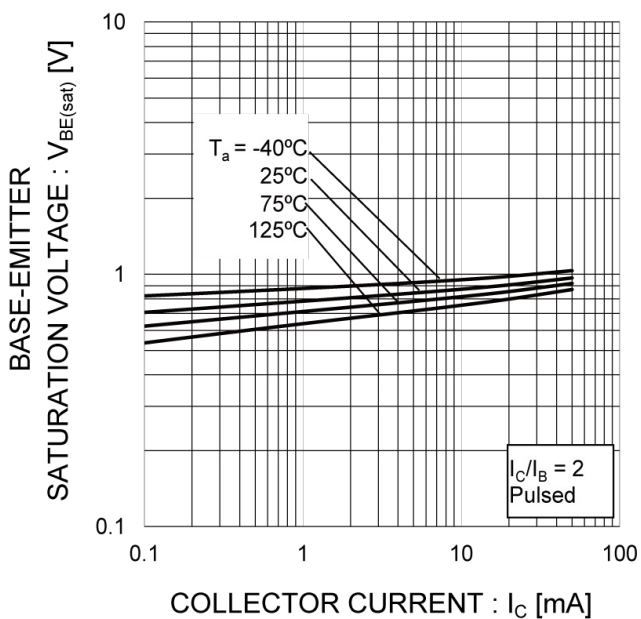
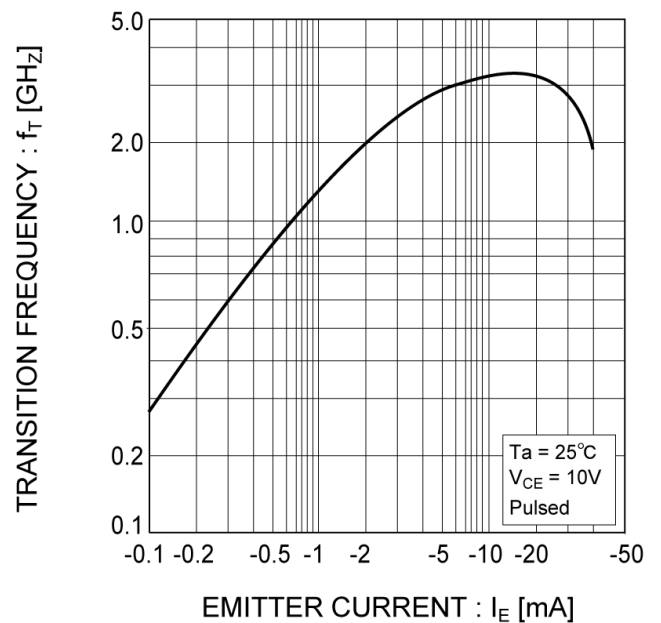


Fig.8 Gain Bandwidth Product vs. Emitter Current



● **Electrical characteristic curves** ($T_a = 25^\circ\text{C}$)

Fig.9 Capacitance vs. Reverse Bias Voltage

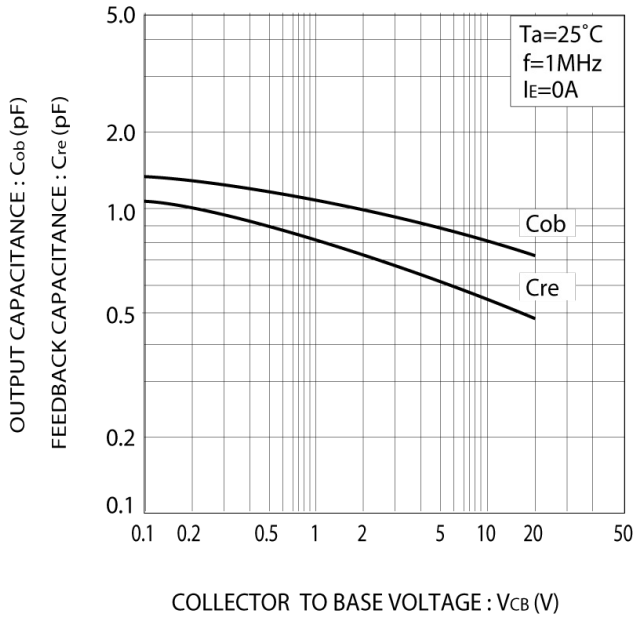


Fig.10 Collector to base time constant vs. collector current

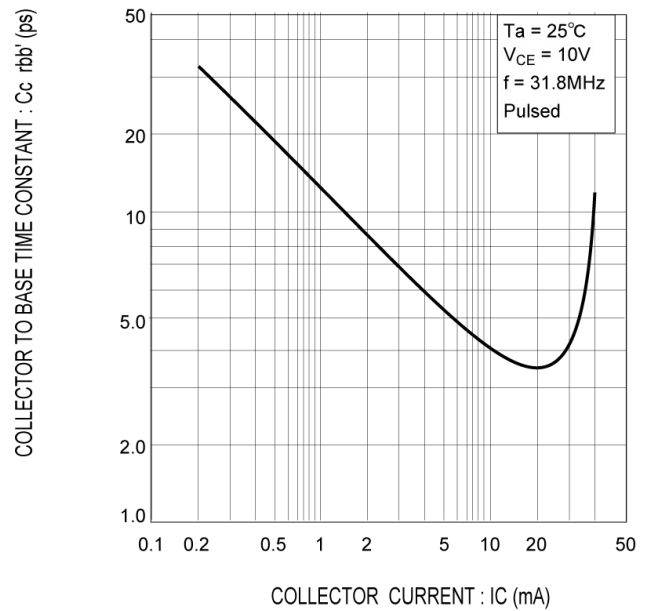
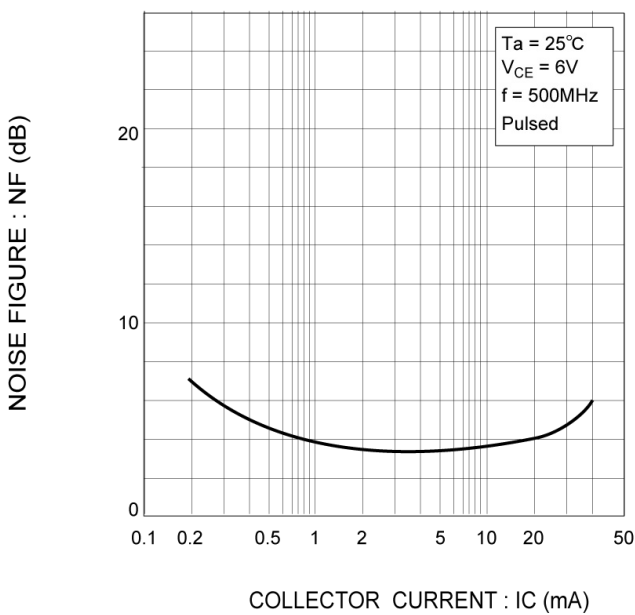
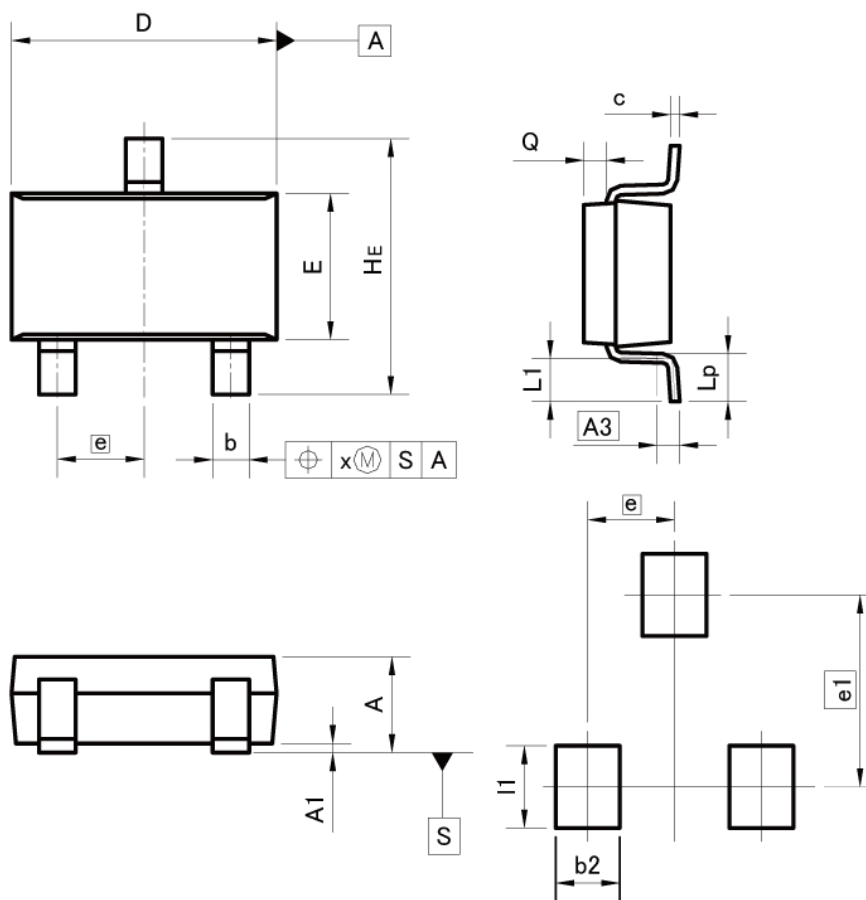


Fig.11 Noise factor vs. collector current characteristics



●Dimensions

SOT-346
SC-59
(SMT3)



Pattern of terminal position areas
[Not a pattern of soldering pads]

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.00 | 1.30 | 0.039 | 0.051 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A3 | 0.25 | | 0.010 | |
| b | 0.35 | 0.50 | 0.014 | 0.020 |
| c | 0.09 | 0.25 | 0.004 | 0.010 |
| D | 2.80 | 3.00 | 0.110 | 0.118 |
| E | 1.50 | 1.80 | 0.059 | 0.071 |
| e | 0.95 | | 0.037 | |
| HE | 2.60 | 3.00 | 0.102 | 0.118 |
| L1 | 0.30 | 0.60 | 0.012 | 0.024 |
| Lp | 0.40 | 0.70 | 0.016 | 0.028 |
| Q | 0.20 | 0.30 | 0.008 | 0.012 |
| x | - | 0.10 | - | 0.004 |
| y | - | 0.10 | - | 0.004 |

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| b2 | - | 0.60 | - | 0.024 |
| e1 | 2.10 | | 0.083 | |
| l1 | - | 0.90 | - | 0.035 |

Dimension in mm/inches