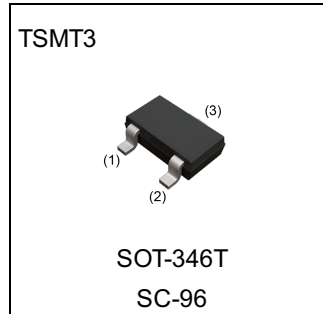


| Parameter | Value |
|-----------|-------|
| V_{CEO} | -50V |
| I_C | -3A |

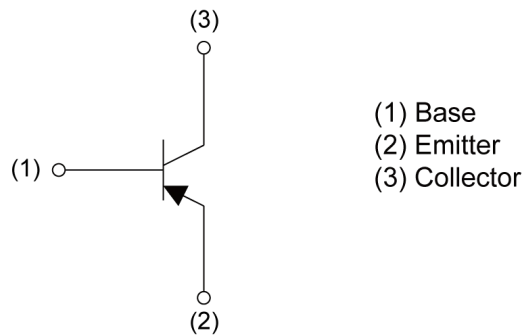
●Outline



●Features

- 1) Suitable for Middle Power Driver
- 2) Complementary NPN Types: 2SCR543R
- 3) Low saturation voltage
 $V_{CE(sat)} = -400\text{mV (Max.)}$
 $(I_C / I_B = -2\text{A} / -100\text{mA})$

●Inner circuit



●Application

LOW FREQUENCY AMPLIFIER, HIGH SPEED SWITCHING

●Packaging specifications

| Part No. | Package | Package size | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit.(pcs) | Marking |
|----------|---------|--------------|-------------|----------------|-----------------|---------------------------|---------|
| 2SAR543R | TSMT3 | 2928 | TL | 180 | 8 | 3000 | MR |

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

| Parameter | Symbol | Values | Unit |
|------------------------------|----------------------|-------------|------------------|
| Collector-base voltage | V_{CBO} | -50 | V |
| Collector-emitter voltage | V_{CEO} | -50 | V |
| Emitter-base voltage | V_{EBO} | -6 | V |
| Collector current | I_{C} | -3 | A |
| | I_{CP}^{*1} | -6 | A |
| Power dissipation | P_{D}^{*2} | 0.5 | W |
| | P_{D}^{*3} | 1.0 | W |
| 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} | $I_{\text{C}} = -100\mu\text{A}$ | -50 | - | - | V |
| Collector-emitter breakdown voltage | BV_{CEO} | $I_{\text{C}} = -1\text{mA}$ | -50 | - | - | V |
| Emitter-base breakdown voltage | BV_{EBO} | $I_{\text{E}} = -100\mu\text{A}$ | -6 | - | - | V |
| Collector cut-off current | I_{CBO} | $V_{\text{CB}} = -50\text{V}$ | - | - | -1.0 | μA |
| Emitter cut-off current | I_{EBO} | $V_{\text{EB}} = -4\text{V}$ | - | - | -1.0 | μA |
| Collector-emitter saturation voltage | $V_{\text{CE(sat)}}$ | $I_{\text{C}} = -2\text{A}, I_{\text{B}} = -100\text{mA}$ | - | -200 | -400 | mV |
| DC current gain | h_{FE} | $V_{\text{CE}} = -3\text{V}, I_{\text{C}} = -100\text{mA}$ | 180 | - | 450 | - |
| Transition frequency | f_{T} | $V_{\text{CE}} = -10\text{V}, I_{\text{E}} = 300\text{mA}, f = 100\text{MHz}$ | - | 300 | - | MHz |
| Output capacitance | C_{ob} | $V_{\text{CB}} = -10\text{V}, I_{\text{E}} = 0\text{mA}, f = 1\text{MHz}$ | - | 35 | - | pF |
| Turn-On time | t_{on} | $I_{\text{C}} = -2\text{A}, I_{\text{B1}} = -200\text{mA},$ | - | 45 | - | ns |
| Storage time | t_{stg} | $I_{\text{B2}} = 200\text{mA}, V_{\text{CC}} \approx -10\text{V},$ | - | 250 | - | ns |
| Fall time | t_{f} | $R_{\text{L}} = 4.7\Omega$ See test circuit | - | 40 | - | ns |

*1 $P_{\text{w}}=10\text{ms}$, Single Pulse

*2 Mounted on a reference land

*3 Mounted on a ceramic board (40×40×0.7mm)

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

Fig.1 Ground Emitter Propagation Characteristics

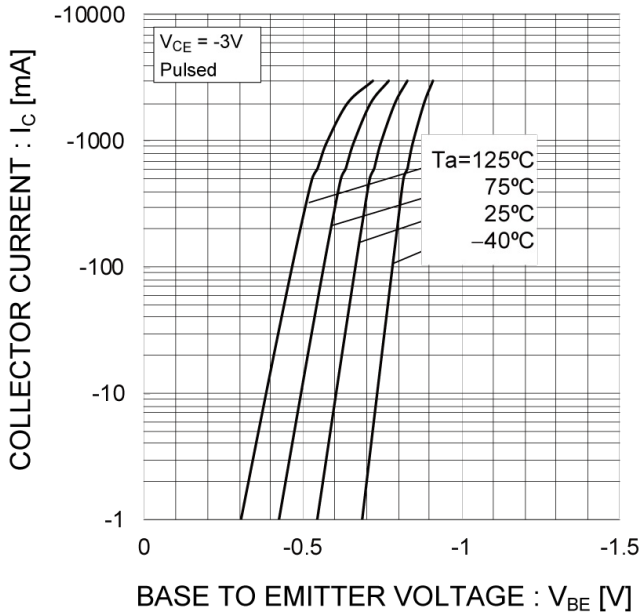


Fig.2 Typical Output Characteristics

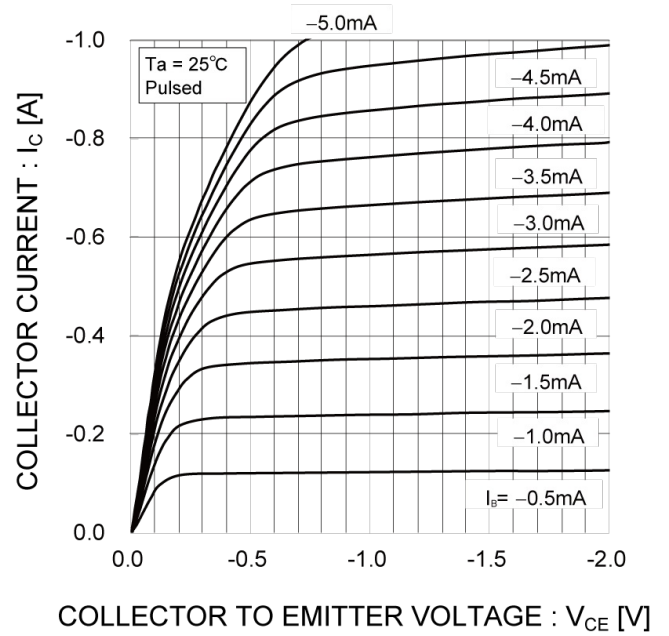


Fig.3 DC Current Gain vs. Collector Current (I)

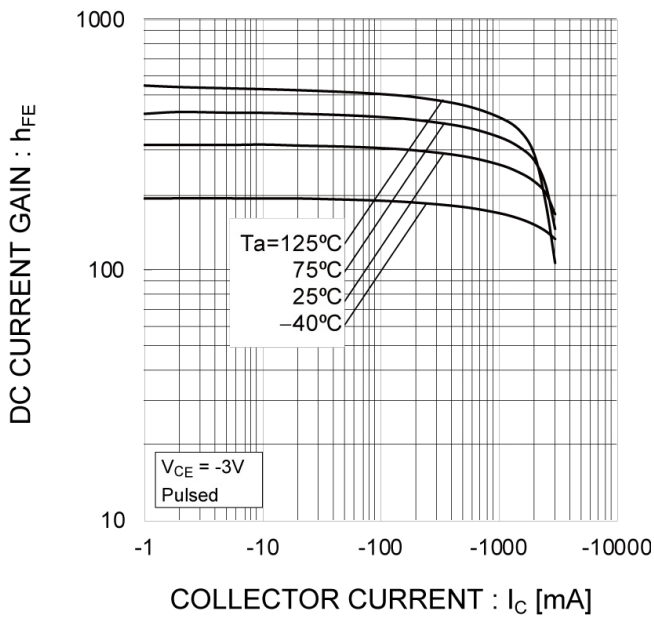
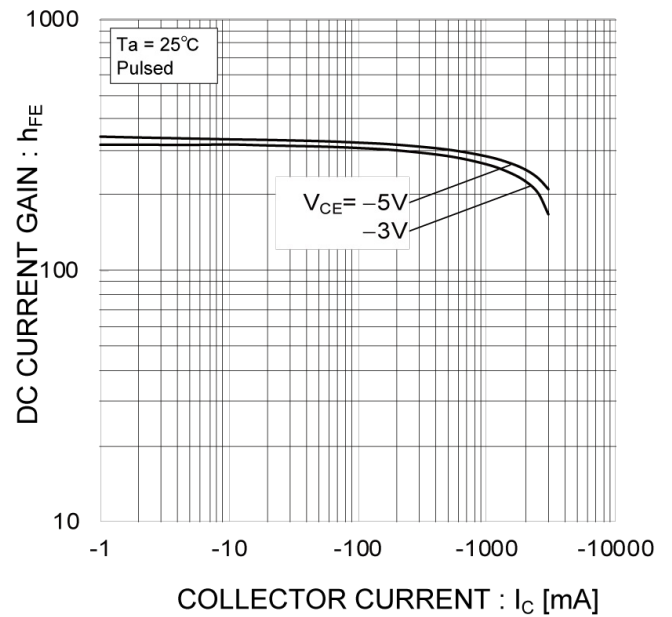


Fig.4 DC Current Gain vs. Collector Current (II)



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

Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current (I)

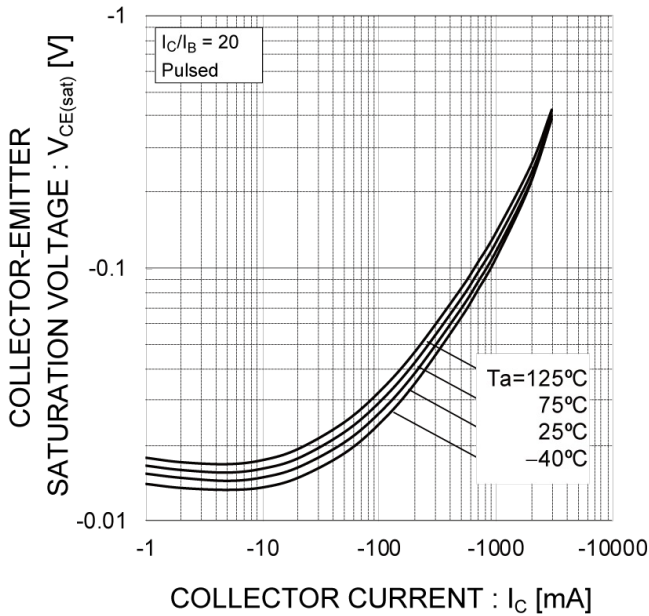


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

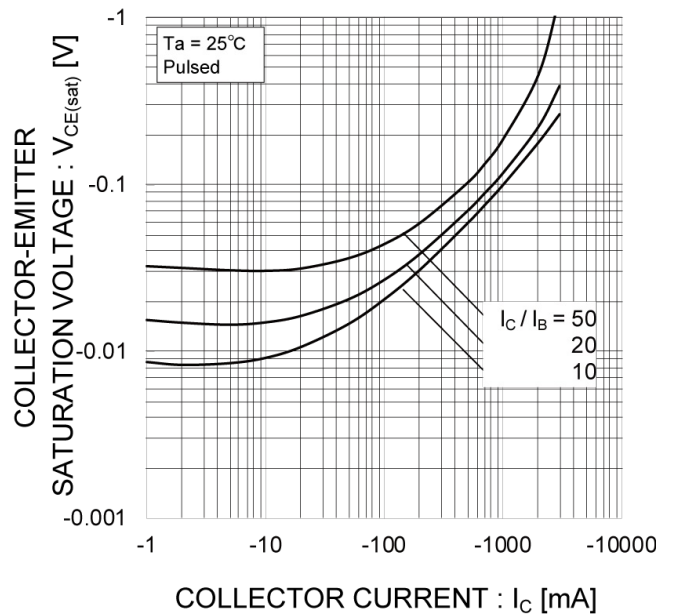


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

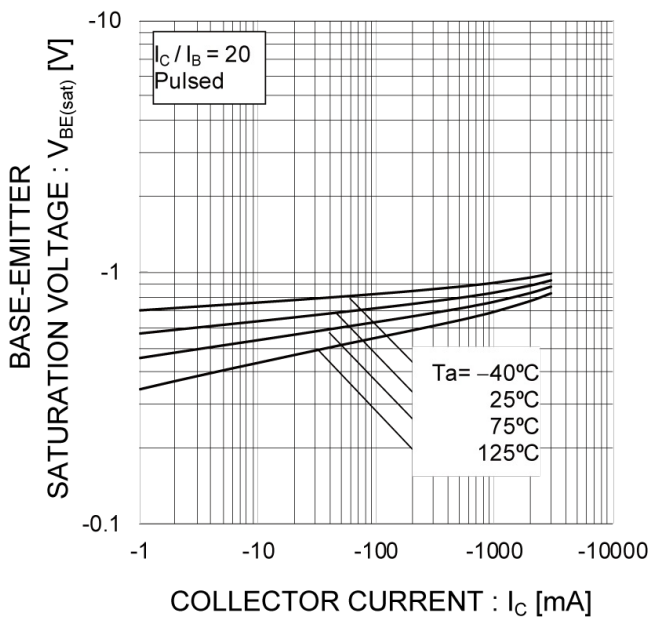
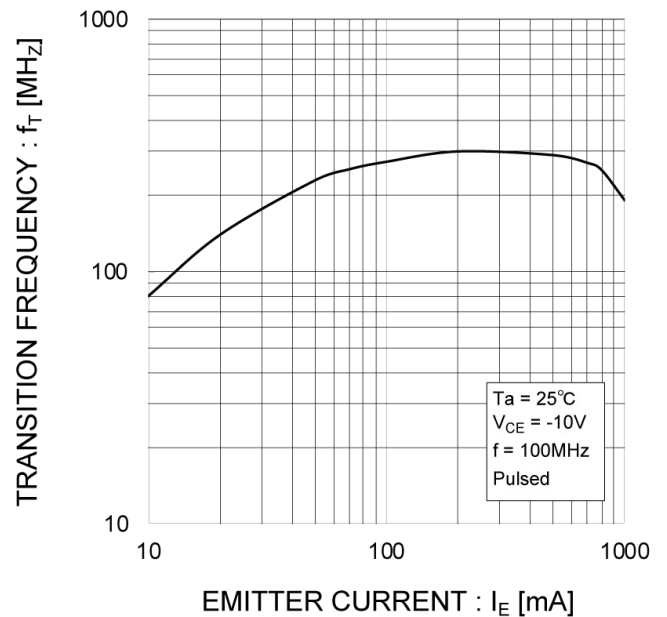


Fig.8 Gain Bandwidth Product vs. Emitter Current



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

Fig.9 Emitter Input Capacitance vs. Emitter-Base Voltage
Collector Output Capacitance vs. Collector-Base Voltage

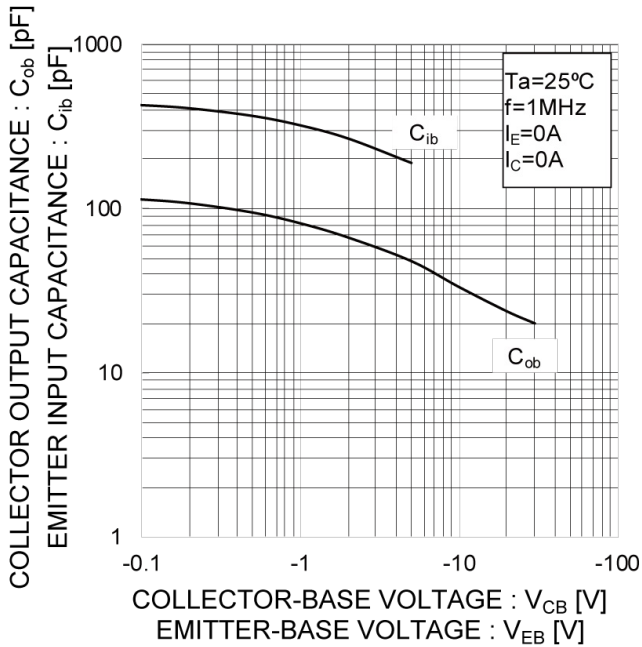
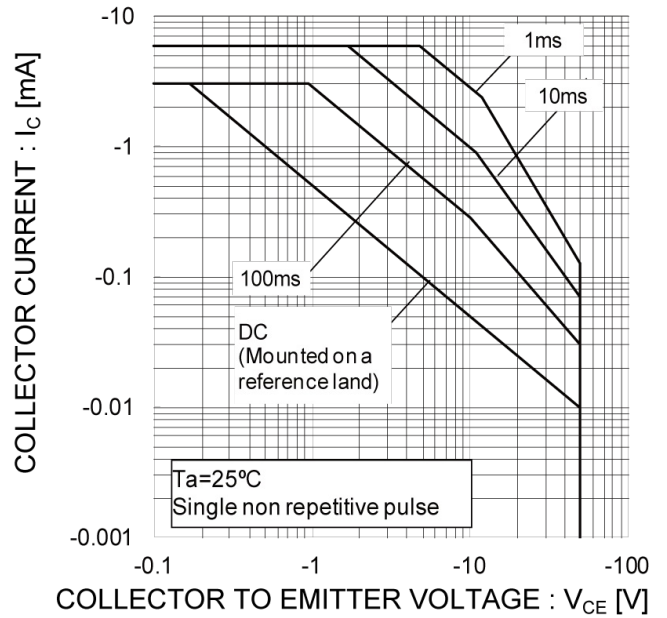


Fig.10 Safe Operating Area



SWITCHING TIME TEST CIRCUIT



●Dimensions

TSMT3



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

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | - | 1.00 | - | 0.039 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A2 | 0.75 | 0.95 | 0.030 | 0.037 |
| A3 | 0.25 | | 0.010 | |
| b | 0.35 | 0.50 | 0.014 | 0.020 |
| c | 0.10 | 0.26 | 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 | 0.05 | 0.25 | 0.002 | 0.010 |
| x | - | 0.20 | - | 0.008 |

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| b2 | - | 0.70 | - | 0.028 |
| e1 | 2.10 | | 0.083 | |
| l1 | - | 0.90 | - | 0.035 |

Dimension in mm/inches

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