

# XP04654 (XP4654)

Silicon NPN epitaxial planer transistor (Tr1)  
 Silicon PNP epitaxial planer transistor (Tr2)

For high speed switching

**■ Features**

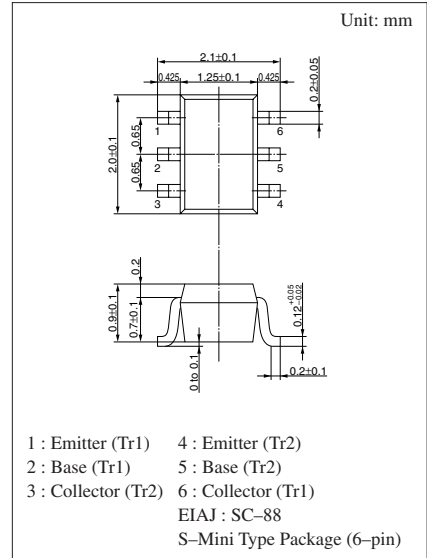
- Two elements incorporated into one package.
- Reduction of the mounting area and assembly cost by one half.

**■ Basic Part Number of Element**

- 2SC3757 + 2SA1738

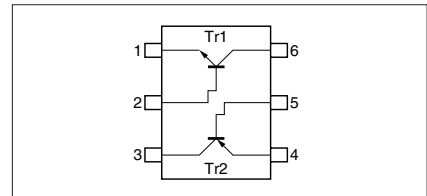
**■ Absolute Maximum Ratings (Ta=25°C)**

|         | Parameter                    | Symbol    | Ratings     | Unit |
|---------|------------------------------|-----------|-------------|------|
| Tr1     | Collector to base voltage    | $V_{CBO}$ | 40          | V    |
|         | Collector to emitter voltage | $V_{CES}$ | 40          | V    |
|         | Emitter to base voltage      | $V_{EBO}$ | 5           | V    |
|         | Collector current            | $I_C$     | 100         | mA   |
|         | Peak collector current       | $I_{CP}$  | 300         | mA   |
| Tr2     | Collector to base voltage    | $V_{CBO}$ | -15         | V    |
|         | Collector to emitter voltage | $V_{CES}$ | -15         | V    |
|         | Emitter to base voltage      | $V_{EBO}$ | -4          | V    |
|         | Collector current            | $I_C$     | -50         | mA   |
|         | Peak collector current       | $I_{CP}$  | -100        | mA   |
| Overall | Total power dissipation      | $P_T$     | 150         | mW   |
|         | Junction temperature         | $T_j$     | 150         | °C   |
|         | Storage temperature          | $T_{stg}$ | -55 to +150 | °C   |



Marking Symbol: ED

Internal Connection



Note.) The Part number in the Parenthesis shows conventional part number.

■ Electrical Characteristics (Ta=25°C)

● Tr1

| Parameter                               | Symbol        | Conditions                              | min | typ  | max  | Unit    |
|---|---------------|---|-----|------|------|---------|
| Collector cutoff current                | $I_{CBO}$     | $V_{CB} = 40V, I_E = 0$                 |     |      | 0.1  | $\mu A$ |
| Emitter cutoff current                  | $I_{EBO}$     | $V_{EB} = 4V, I_C = 0$                  |     |      | 0.1  | $\mu A$ |
| Forward current transfer ratio          | $h_{FE}$      | $V_{CE} = 1V, I_C = 10mA$               | 60  |      | 320  |         |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 10mA, I_B = 1mA$                 |     | 0.17 | 0.25 | V       |
| Base to emitter saturation voltage      | $V_{BE(sat)}$ | $I_C = 10mA, I_B = 1mA$                 |     |      | 1.0  | V       |
| Transition frequency                    | $f_T$         | $V_{CB} = 10V, I_E = -10mA, f = 200MHz$ |     | 450  |      | MHz     |
| Collector output capacitance            | $C_{ob}$      | $V_{CB} = 10V, I_E = 0, f = 1MHz$       |     | 2    | 6    | pF      |
| Turn-on time                            | $t_{on}$      | *1                                      |     | 17   |      | ns      |
| Turn-off time                           | $t_{off}$     |   |     | 17   |      | ns      |
| Storage time                            | $t_{stg}$     |   |     | 10   |      | ns      |

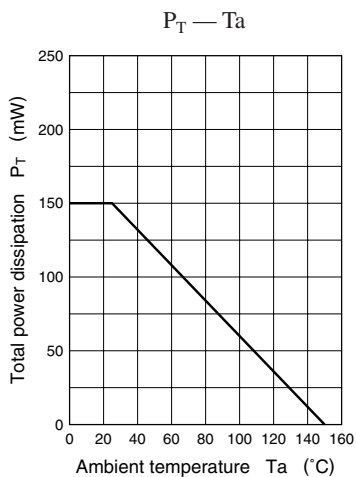
● Tr2

| Parameter                               | Symbol        | Conditions                              | min | typ  | max  | Unit    |    |
|---|---------------|---|-----|------|------|---------|----|
| Collector cutoff current                | $I_{CBO}$     | $V_{CB} = -8V, I_E = 0$                 |     |      | -0.1 | $\mu A$ |    |
| Emitter cutoff current                  | $I_{EBO}$     | $V_{EB} = -3V, I_C = 0$                 |     |      | -0.1 | $\mu A$ |    |
| Forward current transfer ratio          | $h_{FE1}$     | $V_{CE} = -1V, I_C = -10mA$             | 50  |      | 150  |         |    |
|   | $h_{FE2}$     | $V_{CE} = -1V, I_C = -1mA$              | 30  |      |      |         |    |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | $I_C = -10mA, I_B = -1mA$               |     | -0.1 | -0.2 | V       |    |
| Transition frequency                    | $f_T$         | $V_{CB} = -10V, I_E = 10mA, f = 200MHz$ | 800 | 1500 |      | MHz     |    |
| Collector output capacitance            | $C_{ob}$      | $V_{CB} = -5V, I_E = 0, f = 1MHz$       |     | 1    |      | pF      |    |
| Turn-on time                            | $t_{on}$      | *2                                      |     | 12   |      | ns      |    |
| Turn-off time                           | $t_{off}$     |   |     |      | 20   |         | ns |
| Storage time                            | $t_{stg}$     |   |     |      | 19   |         | ns |

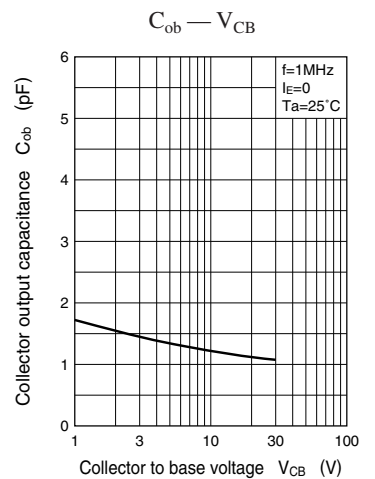
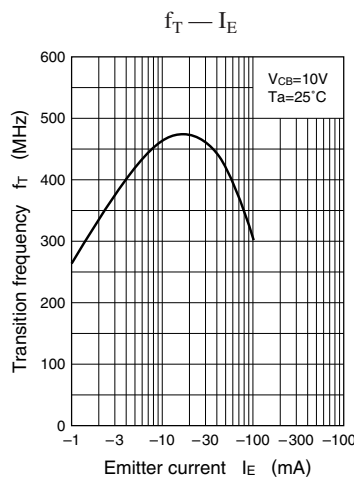
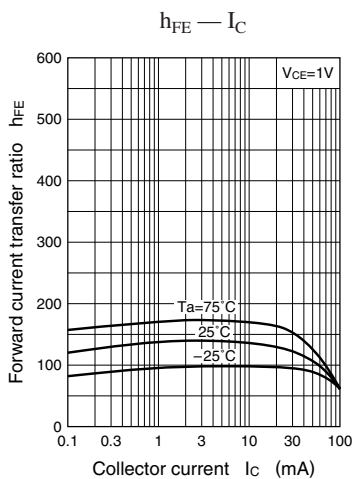
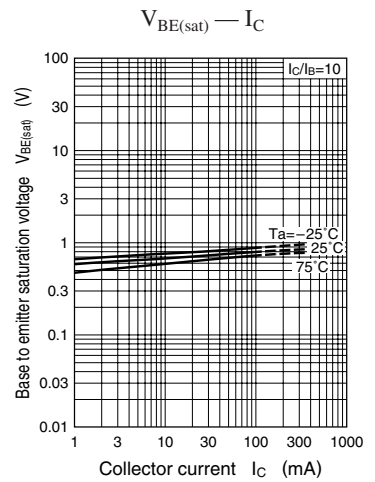
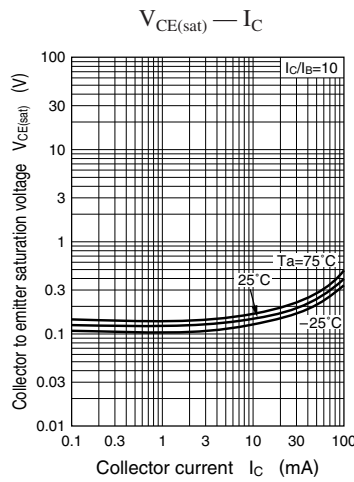
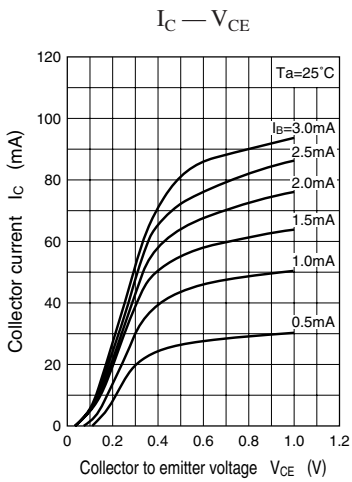
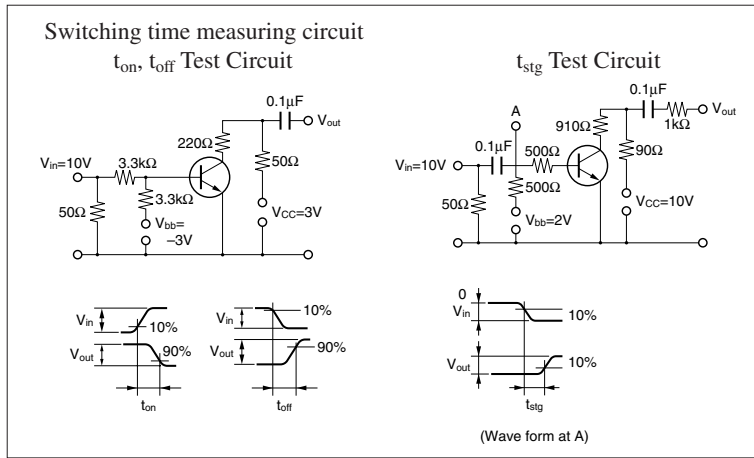
\*1 Refer to the test circuit (page 459)

\*2 Refer to the test circuit (page 460)

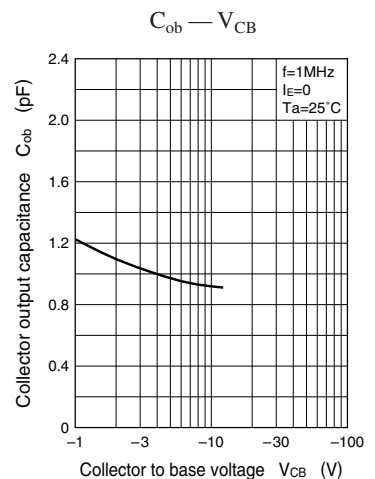
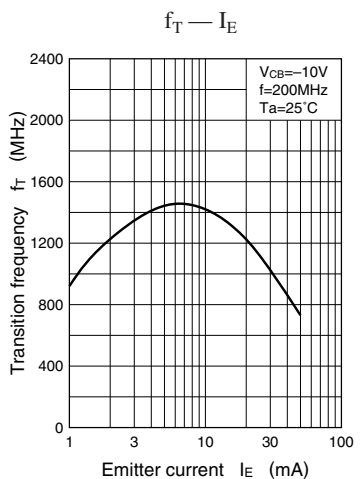
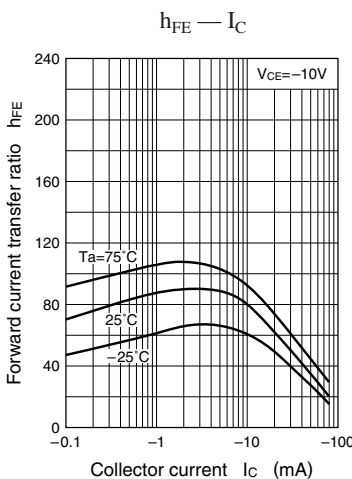
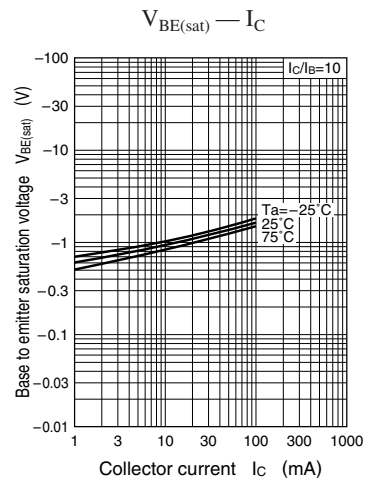
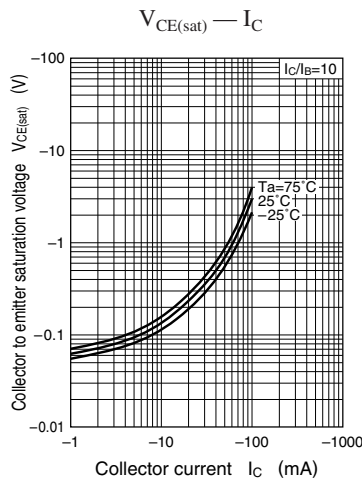
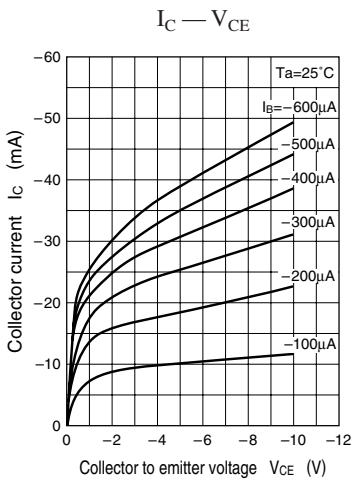
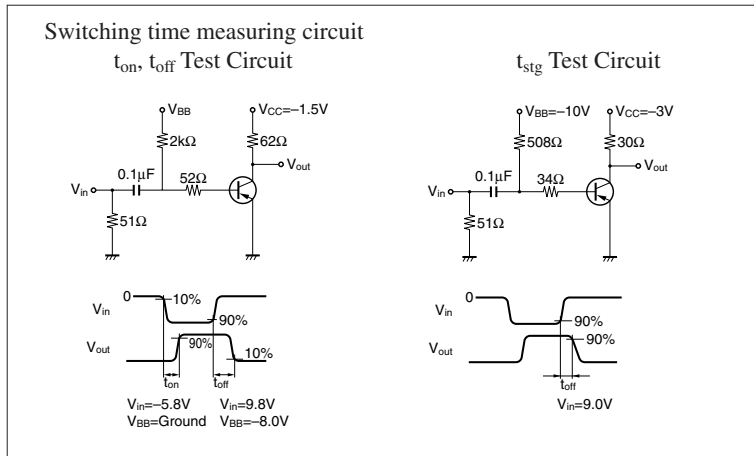
Common characteristics chart



Characteristics charts of Tr1



Characteristics charts of Tr2



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