

# DMG20402

Silicon NPN epitaxial planar type (Tr1)  
 Silicon PNP epitaxial planar type (Tr2)

For general amplification

## ■ Features

- High forward current transfer ratio  $h_{FE}$  with excellent linearity
- Low collector-emitter saturation voltage  $V_{CE(sat)}$
- Halogen-free / RoHS compliant  
 (EU RoHS / UL-94 V-0 / MSL: Level 1 compliant)

## ■ Marking Symbol: B7

## ■ Basic Part Number

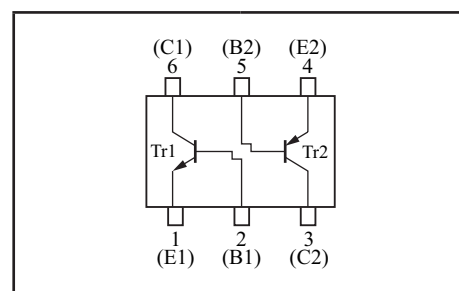
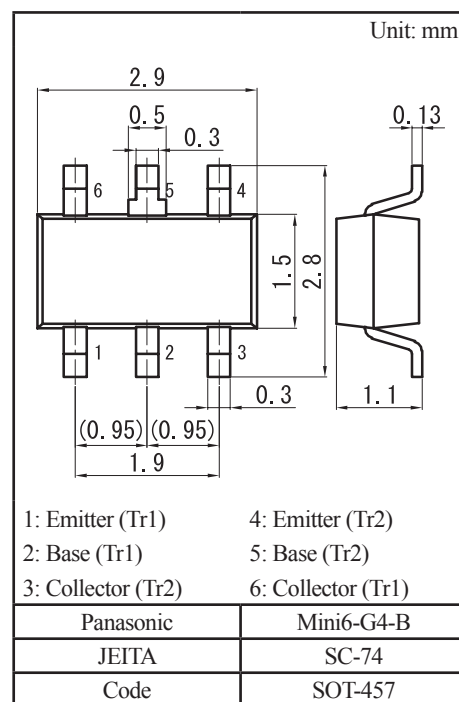
DSC2002 + DSA2002 (Individual)

## ■ Packaging

DMG204020R Embossed type (Thermo-compression sealing): 3 000 pcs / reel (standard)

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

|         | Parameter                             | Symbol    | Rating      | Unit             |
|---------|---------------------------------------|-----------|-------------|------------------|
| Tr1     | Collector-base voltage (Emitter open) | $V_{CBO}$ | 60          | V                |
|         | Collector-emitter voltage (Base open) | $V_{CEO}$ | 50          | V                |
|         | Emitter-base voltage (Collector open) | $V_{EBO}$ | 5           | V                |
|         | Collector current                     | $I_C$     | 500         | mA               |
|         | Peak collector current                | $I_{CP}$  | 1           | A                |
| Tr2     | Collector-base voltage (Emitter open) | $V_{CBO}$ | -60         | V                |
|         | Collector-emitter voltage (Base open) | $V_{CEO}$ | -50         | V                |
|         | Emitter-base voltage (Collector open) | $V_{EBO}$ | -5          | V                |
|         | Collector current                     | $I_C$     | -500        | mA               |
|         | Peak collector current                | $I_{CP}$  | -1          | A                |
| Overall | Total power dissipation               | $P_T$     | 300         | mW               |
|         | Junction temperature                  | $T_j$     | 150         | $^\circ\text{C}$ |
|         | Operating ambient temperature         | $T_{opr}$ | -40 to +85  | $^\circ\text{C}$ |
|         | Storage temperature                   | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |



■ Electrical Characteristics  $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

• Tr1

| Parameter   | Symbol               | Conditions  | Min | Typ | Max | Unit          |
|---|----------------------|---|-----|-----|-----|---------------|
| Collector-base voltage (Emitter open)                               | $V_{\text{CBO}}$     | $I_{\text{C}} = 10 \mu\text{A}, I_{\text{E}} = 0$                   | 60  |     |     | V             |
| Collector-emitter voltage (Base open)                               | $V_{\text{CEO}}$     | $I_{\text{C}} = 2 \text{ mA}, I_{\text{B}} = 0$                     | 50  |     |     | V             |
| Emitter-base voltage (Collector open)                               | $V_{\text{EBO}}$     | $I_{\text{E}} = 10 \mu\text{A}, I_{\text{C}} = 0$                   | 5   |     |     | V             |
| Collector-base cutoff current (Emitter open)                        | $I_{\text{CBO}}$     | $V_{\text{CB}} = 20 \text{ V}, I_{\text{E}} = 0$                    |     |     | 0.1 | $\mu\text{A}$ |
| Forward current transfer ratio *1                                   | $h_{\text{FE1}}$     | $V_{\text{CE}} = 10 \text{ V}, I_{\text{C}} = 150 \text{ mA}$       | 120 |     | 340 | —             |
|   | $h_{\text{FE2}}$     | $V_{\text{CE}} = 10 \text{ V}, I_{\text{C}} = 500 \text{ mA}$       | 40  |     |     |               |
| Collector-emitter saturation voltage *1                             | $V_{\text{CE(sat)}}$ | $I_{\text{C}} = 300 \text{ mA}, I_{\text{B}} = 30 \text{ mA}$       |     | 0.1 | 0.6 | V             |
| Transition frequency  | $f_{\text{T}}$       | $V_{\text{CE}} = 10 \text{ V}, I_{\text{C}} = 50 \text{ mA}$        |     | 160 |     | MHz           |
| Collector output capacitance<br>(Common base, input open circuited) | $C_{\text{ob}}$      | $V_{\text{CB}} = 10 \text{ V}, I_{\text{E}} = 0, f = 1 \text{ MHz}$ |     | 4.8 | 15  | pF            |

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. \*1: Pulse measurement

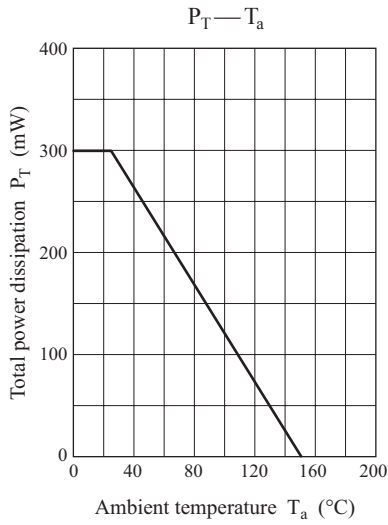
• Tr2

| Parameter   | Symbol               | Conditions   | Min | Typ  | Max  | Unit          |
|---|----------------------|--|-----|------|------|---------------|
| Collector-base voltage (Emitter open)                               | $V_{\text{CBO}}$     | $I_{\text{C}} = -10 \mu\text{A}, I_{\text{E}} = 0$                   | -60 |      |      | V             |
| Collector-emitter voltage (Base open)                               | $V_{\text{CEO}}$     | $I_{\text{C}} = -2 \text{ mA}, I_{\text{B}} = 0$                     | -50 |      |      | V             |
| Emitter-base voltage (Collector open)                               | $V_{\text{EBO}}$     | $I_{\text{E}} = -10 \mu\text{A}, I_{\text{C}} = 0$                   | -5  |      |      | V             |
| Collector-base cutoff current (Emitter open)                        | $I_{\text{CBO}}$     | $V_{\text{CB}} = -20 \text{ V}, I_{\text{E}} = 0$                    |     |      | -0.1 | $\mu\text{A}$ |
| Forward current transfer ratio *1                                   | $h_{\text{FE1}}$     | $V_{\text{CE}} = -10 \text{ V}, I_{\text{C}} = -150 \text{ mA}$      | 120 |      | 340  | —             |
|   | $h_{\text{FE1}}$     | $V_{\text{CE}} = -10 \text{ V}, I_{\text{C}} = -500 \text{ mA}$      | 40  |      |      |               |
| Collector-emitter saturation voltage *1                             | $V_{\text{CE(sat)}}$ | $I_{\text{C}} = -300 \text{ mA}, I_{\text{B}} = -30 \text{ mA}$      |     | -0.2 | -0.6 | V             |
| Base-emitter saturation voltage *1                                  | $V_{\text{BE(sat)}}$ | $I_{\text{C}} = -300 \text{ mA}, I_{\text{B}} = -30 \text{ mA}$      |     | -0.9 | -1.5 | V             |
| Transition frequency  | $f_{\text{T}}$       | $V_{\text{CE}} = -10 \text{ V}, I_{\text{C}} = -50 \text{ mA}$       |     | 130  |      | MHz           |
| Collector output capacitance<br>(Common base, input open circuited) | $C_{\text{ob}}$      | $V_{\text{CB}} = -10 \text{ V}, I_{\text{E}} = 0, f = 1 \text{ MHz}$ |     | 7.3  | 15   | pF            |

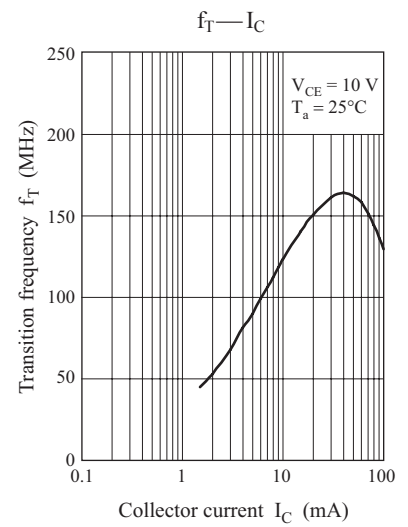
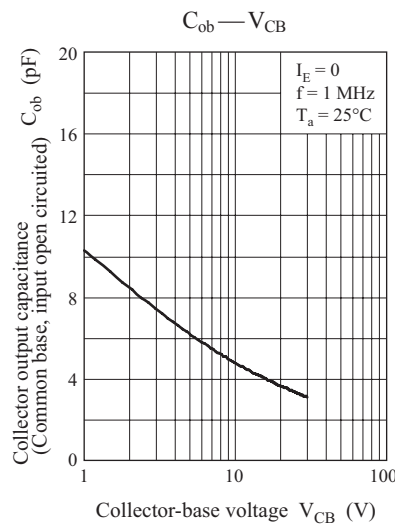
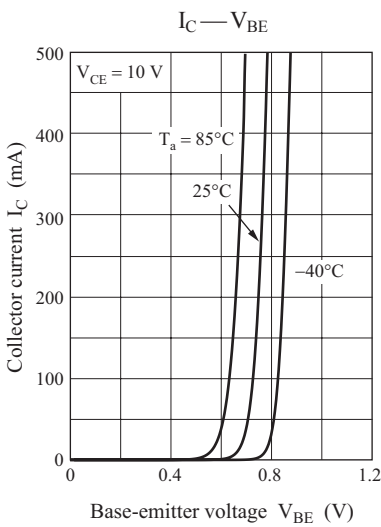
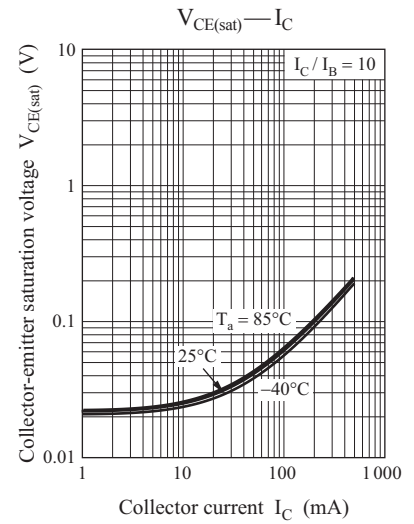
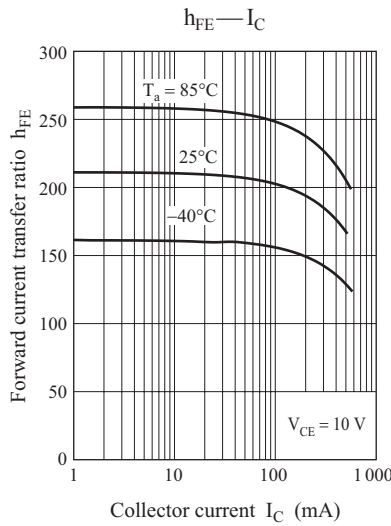
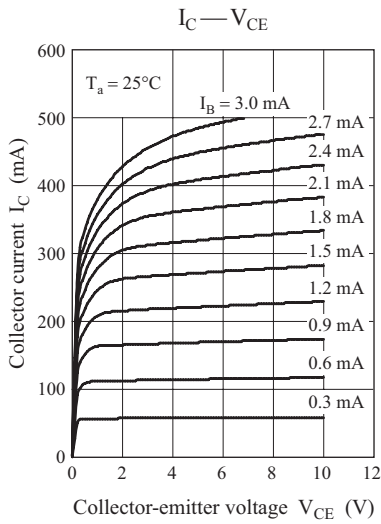
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2. \*1: Pulse measurement

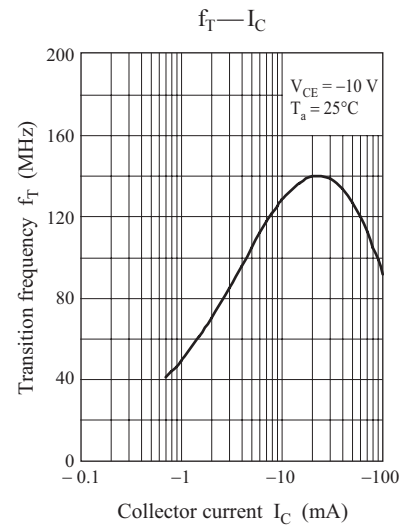
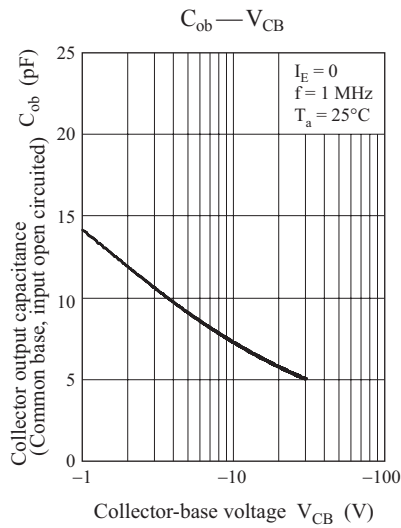
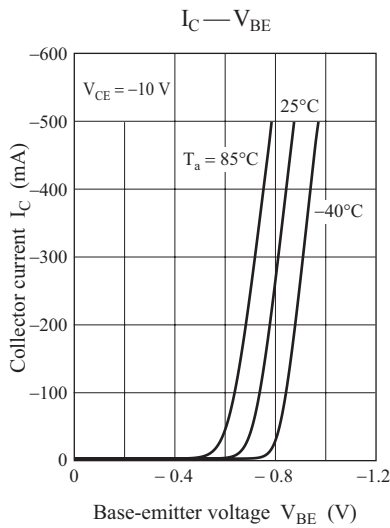
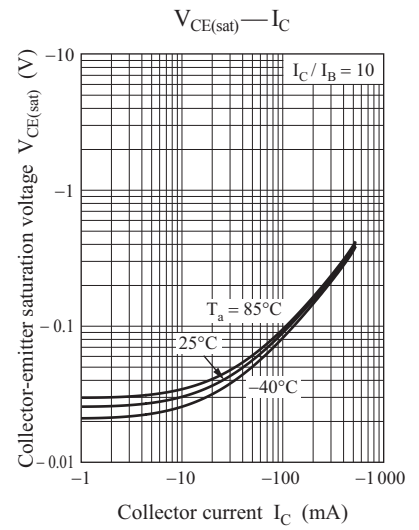
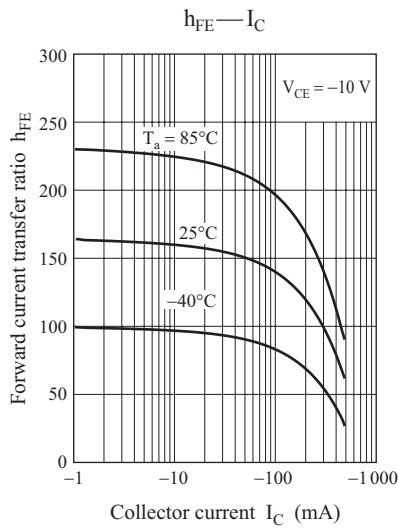
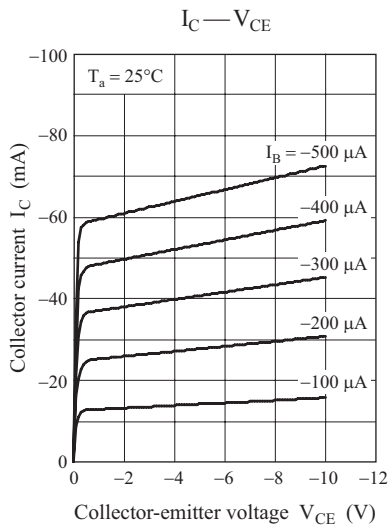
Common characteristics chart



Characteristics charts of Tr1

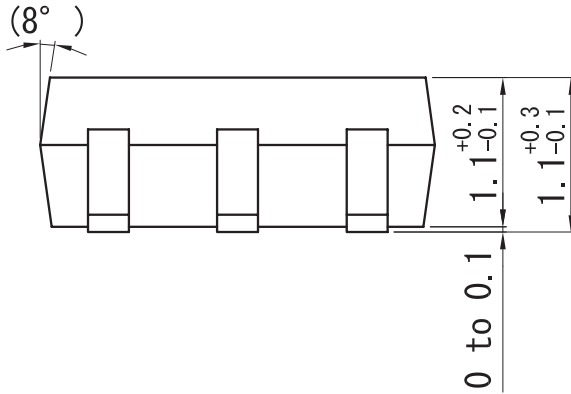
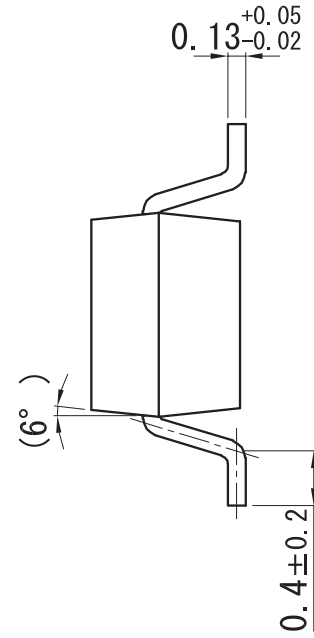
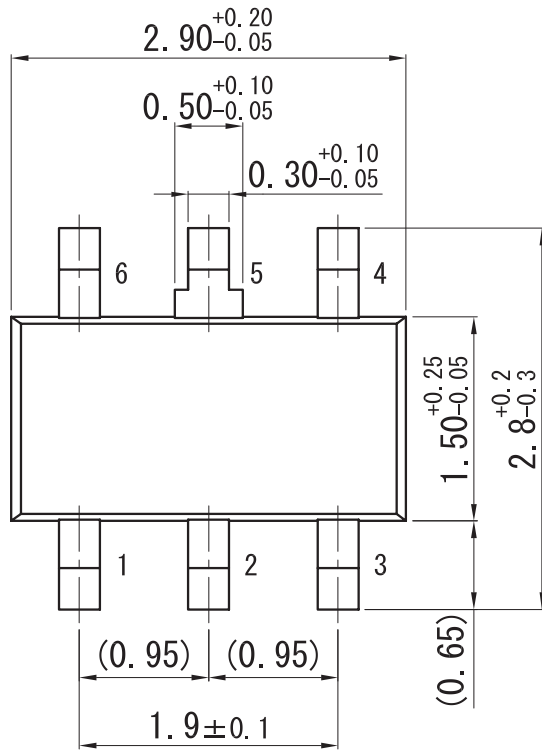


Characteristics charts of Tr2

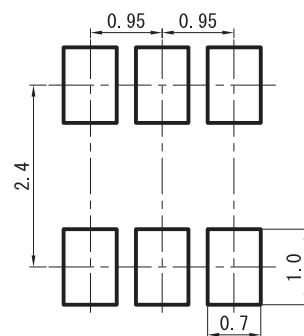


Mini6-G4-B

Unit: mm



■ Land Pattern (Reference) (Unit: mm)



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