



### Pin Definition:

1. Base
2. Collector
3. Emitter

### PRODUCT SUMMARY

|               |                                    |
|---------------|------------------------------------|
| $BV_{CBO}$    | -40V                               |
| $BV_{CEO}$    | -30V                               |
| $I_C$         | -5A                                |
| $V_{CE(SAT)}$ | -0.5V @ $I_C / I_B = -4A / -100mA$ |

### Features

- Low  $V_{CE(SAT)}$  -0.36 @  $I_C / I_B = -4A / -100mA$  (Typ.)
- Complementary part with TSD2118

### Structure

- Epitaxial Planar Type
- PNP Silicon Transistor

### Ordering Information

| Part No.      | Package | Packing            |
|---------------|---------|--------------------|
| TSB1412CP RO  | TO-252  | 2.5Kpcs / 13" Reel |
| TSB1412CP ROG | TO-252  | 2.5Kpcs / 13" Reel |

**Note:** "G" is denote Halogen Free Product.

### Absolute Maximum Rating ( $T_A=25^{\circ}C$ unless otherwise noted)

| Parameter                                        | Symbol            | Limit        | Unit        |
|--------------------------------------------------|-------------------|--------------|-------------|
| Collector-Base Voltage                           | $V_{CBO}$         | -40          | V           |
| Collector-Emitter Voltage                        | $V_{CEO}$         | -30          | V           |
| Emitter-Base Voltage                             | $V_{EBO}$         | -6           | V           |
| Collector Current                                | DC                | -5           | A           |
|                                                  | Pulse             | -10 (note)   |             |
| Collector Power Dissipation                      | $T_A=25^{\circ}C$ | 1            | W           |
|                                                  | $T_C=25^{\circ}C$ | 10           |             |
| Operating Junction Temperature                   | $T_J$             | +150         | $^{\circ}C$ |
| Operating Junction and Storage Temperature Range | $T_{STG}$         | - 55 to +150 | $^{\circ}C$ |

**Note:** Single pulse,  $P_w=10ms$

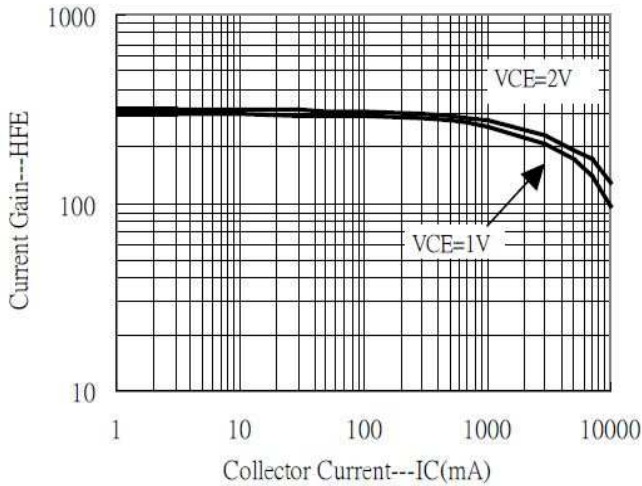
### Electrical Specifications ( $T_A=25^{\circ}C$ unless otherwise noted)

| Parameter                            | Conditions                           | Symbol         | Min | Typ   | Max  | Unit    |
|--------------------------------------|--------------------------------------|----------------|-----|-------|------|---------|
| Collector-Base Breakdown Voltage     | $I_C = -50\mu A, I_E = 0$            | $BV_{CBO}$     | -40 | --    | --   | V       |
| Collector-Emitter Breakdown Voltage  | $I_C = -1mA, I_B = 0$                | $BV_{CEO}$     | -30 | --    | --   | V       |
| Emitter-Base Breakdown Voltage       | $I_E = -50\mu A, I_C = 0$            | $BV_{EBO}$     | -6  | --    | --   | V       |
| Collector Cutoff Current             | $V_{CB} = -25V, I_E = 0$             | $I_{CBO}$      | --  | --    | -0.5 | $\mu A$ |
| Emitter Cutoff Current               | $V_{EB} = -5V, I_C = 0$              | $I_{EBO}$      | --  | --    | -0.5 | $\mu A$ |
| Collector-Emitter Saturation Voltage | $I_C / I_B = -4A / -100mA$           | $*V_{CE(SAT)}$ | --  | -0.36 | -0.5 | V       |
| DC Current Transfer Ratio            | $V_{CE} = -2V, I_C = -500mA$         | $*h_{FE}$      | 180 | --    | 390  |         |
| Transition Frequency                 | $V_{CE} = -6V, I_C = -50mA, f=30MHz$ | $f_T$          | --  | 120   | --   | MHz     |
| Output Capacitance                   | $V_{CB} = -20V, f=1MHz$              | $C_{ob}$       | --  | 60    | --   | pF      |

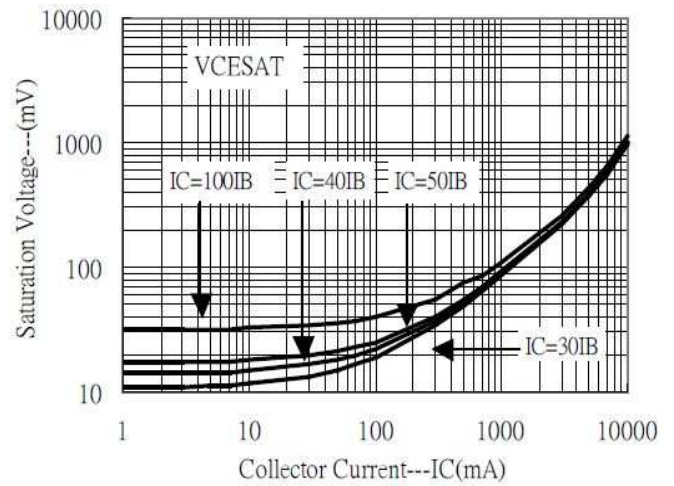
**\* Pulse Test:** Pulse Width  $\leq 380\mu S$ , Duty Cycle  $\leq 2\%$

**Electrical Characteristics Curve** ( $T_A=25^\circ\text{C}$ , unless otherwise noted)

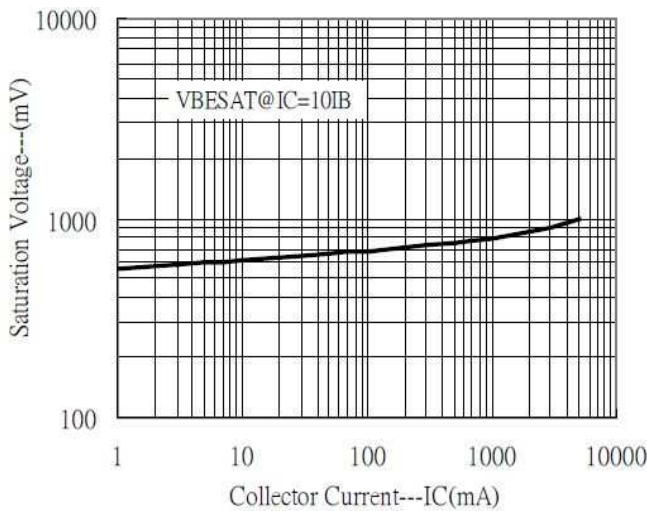
**Figure 1. DC Current Gain**



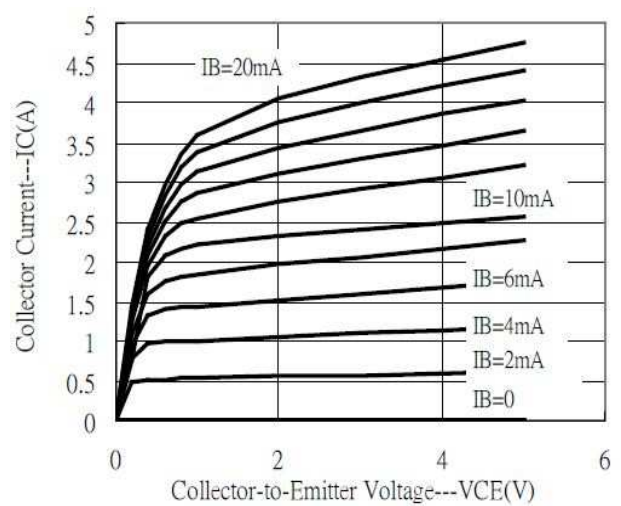
**Figure 2.  $V_{CE(SAT)}$  v.s.  $I_C$**



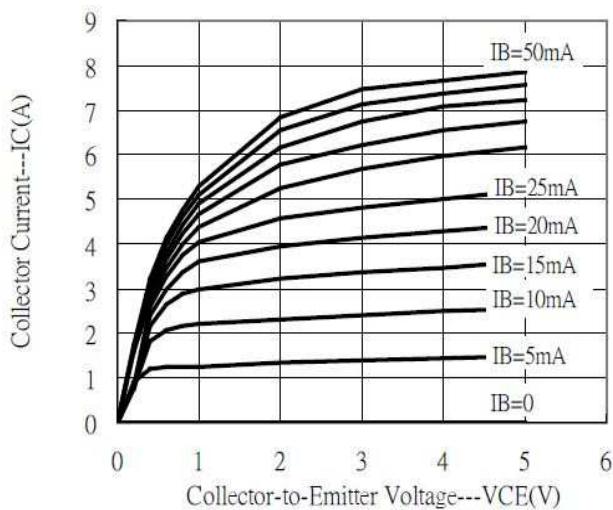
**Figure 3.  $V_{BE(SAT)}$  v.s.  $I_C$**



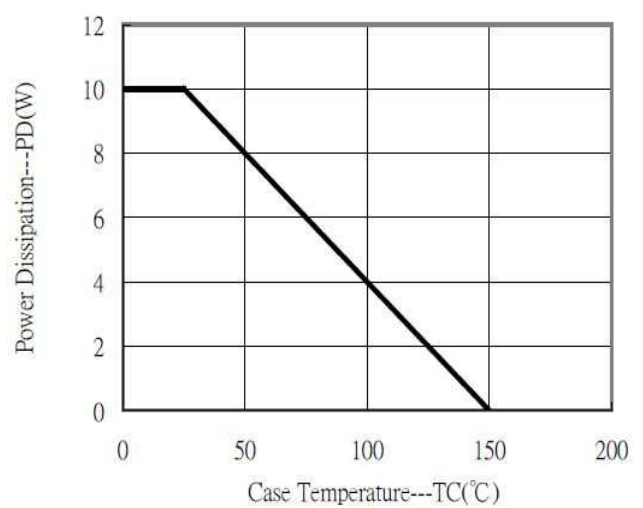
**Figure 4. Output Characteristics**



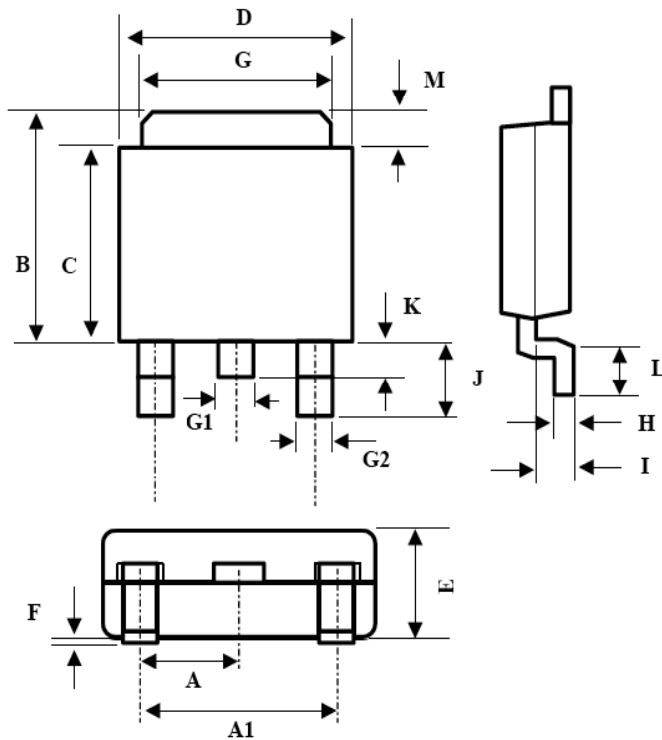
**Figure 5. Output Characteristics**



**Figure 6. Power Derating Curve**



## TO-252 Mechanical Drawing



| TO-252 DIMENSION |             |       |           |       |
|------------------|-------------|-------|-----------|-------|
| DIM              | MILLIMETERS |       | INCHES    |       |
|                  | MIN         | MAX   | MIN       | MAX   |
| A                | 2.290 BSC   |       | 0.090 BSC |       |
| A1               | 4.600 BSC   |       | 0.180 BSC |       |
| B                | 7.000       | 7.200 | 0.275     | 0.283 |
| C                | 6.000       | 6.200 | 0.236     | 0.244 |
| D                | 6.400       | 6.604 | 0.252     | 0.260 |
| E                | 2.210       | 2.387 | 0.087     | 0.094 |
| F                | 0.010       | 0.127 | 0.000     | 0.005 |
| G                | 5.232       | 5.436 | 0.206     | 0.214 |
| G1               | 0.666       | 0.889 | 0.026     | 0.035 |
| G2               | 0.633       | 0.889 | 0.025     | 0.035 |
| H                | 0.508 REF   |       | 0.020 REF |       |
| I                | 0.900       | 1.500 | 0.035     | 0.059 |
| J                | 2.743 REF   |       | 0.108 REF |       |
| K                | 0.660       | 0.940 | 0.026     | 0.037 |
| L                | 1.397       | 1.651 | 0.055     | 0.065 |
| M                | 1.100 REF   |       | 0.043 REF |       |

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