

# High-current Gain Medium Power Transistor (20V, 0.5A)

## 2SD2114K / 2SD2144S

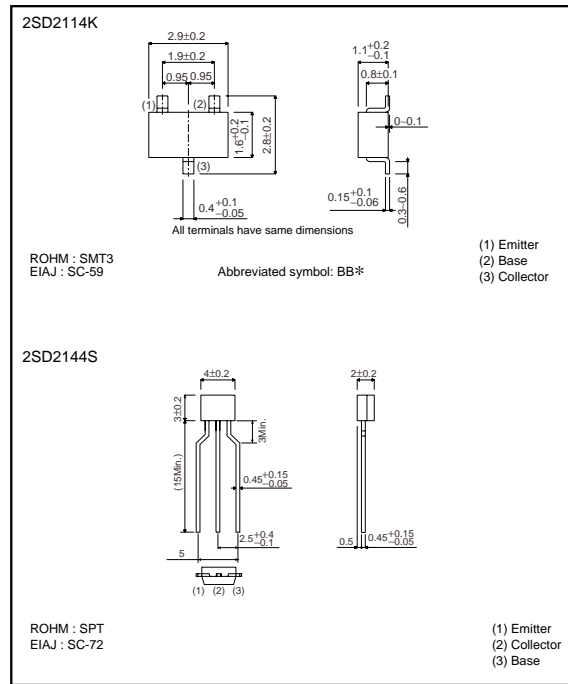
● **Features**

- 1) High DC current gain.  
 $h_{FE} = 1200$  (Typ.)
- 2) High emitter-base voltage.  
 $V_{EBO} = 12V$  (Min.)
- 3) Low  $V_{CE(sat)}$ .  
 $V_{CE(sat)} = 0.18V$  (Typ.)  
 $(I_c / I_B = 500mA / 20mA)$

● **Structure**

Epitaxial planar type  
 NPN silicon transistor

● **External dimensions (Units : mm)**



● **Absolute maximum ratings (Ta=25°C)**

| Parameter                   | Symbol    | Limits   | Unit       |
|-----------------------------|-----------|----------|------------|
| Collector-base voltage      | $V_{CBO}$ | 25       | V          |
| Collector-emitter voltage   | $V_{CEO}$ | 20       | V          |
| Emitter-base voltage        | $V_{EBO}$ | 12       | V          |
| Collector current           | $I_c$     | 0.5      | A(DC)      |
|                             |           | 1        | A(Pulse) * |
| Collector power dissipation | $P_c$     | 0.2      | W          |
|                             |           | 0.3      |            |
| Junction temperature        | $T_j$     | 150      | °C         |
| Storage temperature         | $T_{stg}$ | -55~+150 | °C         |

\* Single pulse Pw=100ms

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●Electrical characteristics (Ta=25°C)

| Parameter                            | Symbol               | Min.            | Typ. | Max. | Unit | Conditions  |   |
|--------------------------------------|----------------------|-----------------|------|------|------|---|---|
| Collector-base breakdown voltage     | BV <sub>CB0</sub>    | 25              | –    | –    | V    | I <sub>C</sub> =10μA                                    |   |
| Collector-emitter breakdown voltage  | BV <sub>CEO</sub>    | 20              | –    | –    | V    | I <sub>C</sub> =1mA                                     |   |
| Emitter-base breakdown voltage       | BV <sub>EBO</sub>    | 12              | –    | –    | V    | I <sub>E</sub> =10μA                                    |   |
| Collector cutoff current             | I <sub>CBO</sub>     | –               | –    | 0.5  | μA   | V <sub>CB</sub> =20V                                    |   |
| Emitter cutoff current               | I <sub>EBO</sub>     | –               | –    | 0.5  | μA   | V <sub>EB</sub> =10V                                    |   |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | –               | 0.18 | 0.4  | V    | I <sub>C</sub> /I <sub>B</sub> =500mA/20mA              |   |
| DC current transfer ratio            | 2SD2114K             | h <sub>FE</sub> | 820  | –    | 2700 | –   | V <sub>CE</sub> =3V, I <sub>C</sub> =10mA |
|                                      | 2SD2144S             | h <sub>FE</sub> | 560  | –    | 2700 | –   |   |
| Transition frequency                 | f <sub>T</sub> *     | –               | 350  | –    | MHz  | V <sub>CE</sub> =10V, I <sub>E</sub> =–50mA, f=100MHz   |   |
| Output capacitance                   | C <sub>ob</sub>      | –               | 8.0  | –    | pF   | V <sub>CB</sub> =10V, I <sub>E</sub> =0A, f=1MHz        |   |
| Output On-resistance                 | R <sub>on</sub>      | –               | 0.8  | –    | pF   | I <sub>B</sub> =1mA, V <sub>I</sub> =100mV(rms), f=1kHz |   |

\* Measured using pulse current

●Packaging specifications and h<sub>FE</sub>

| Type     | h <sub>FE</sub> | Package                      | Taping |      |
|----------|-----------------|------------------------------|--------|------|
|          |                 | Code                         | T146   | TP   |
|          |                 | Basic ordering unit (pieces) | 3000   | 5000 |
| 2SD2114K | VW              | ○                            | –      | –    |
| 2SD2144S | UVW             | –                            | –      | ○    |

h<sub>FE</sub> values are classified as follows :

| Item            | U        | V        | W         |
|-----------------|----------|----------|-----------|
| h <sub>FE</sub> | 560~1200 | 820~1800 | 1200~2700 |

●Electrical characteristic curves

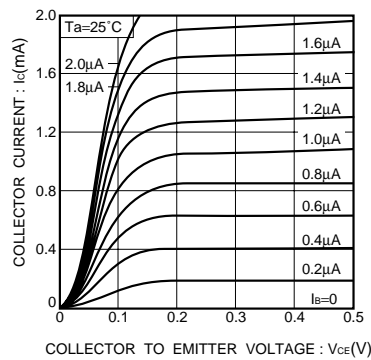


Fig.1 Grounded emitter output characteristics(I)

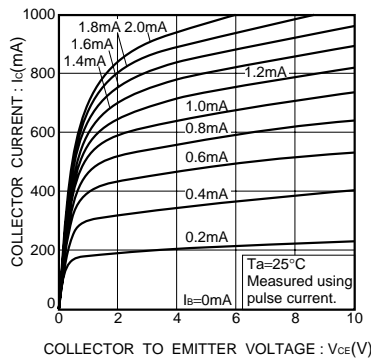


Fig.2 Grounded emitter output characteristics(II)

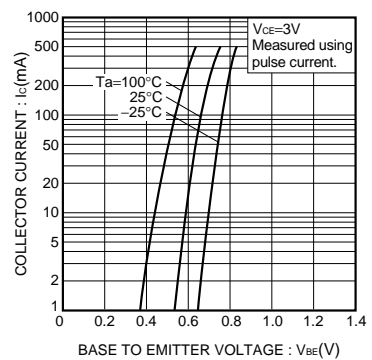


Fig.3 Grounded emitter propagation characteristics

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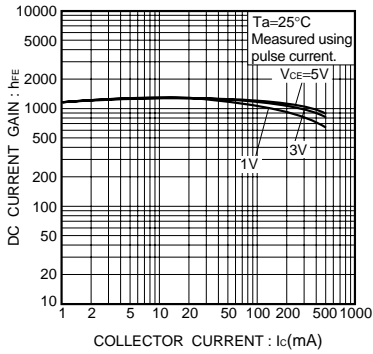


Fig.4 DC current gain vs. collector current(I)

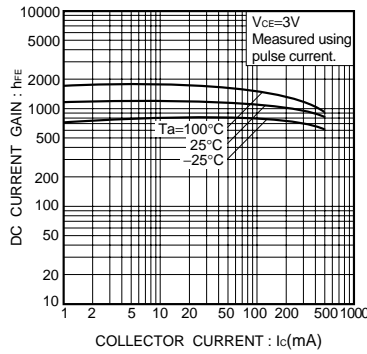


Fig.5 DC current gain vs. collector current(II)

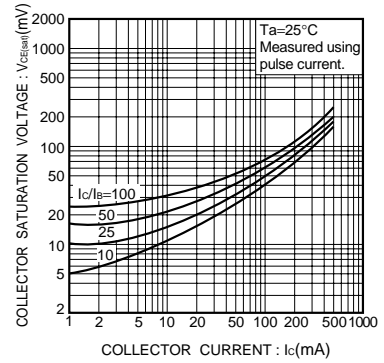


Fig.6 Collector-emitter saturation voltage vs. collector current(I)

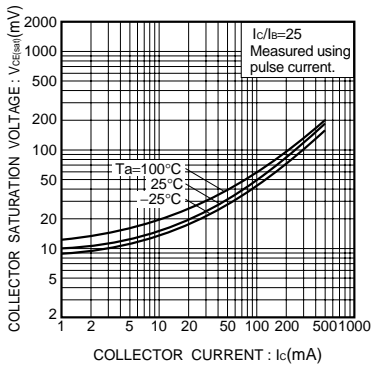


Fig.7 Collector-emitter saturation voltage vs. collector current(II)

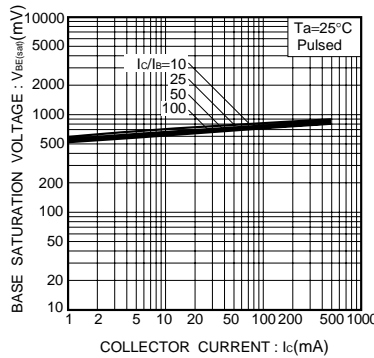


Fig.8 Base-emitter saturation voltage vs. collector current(I)

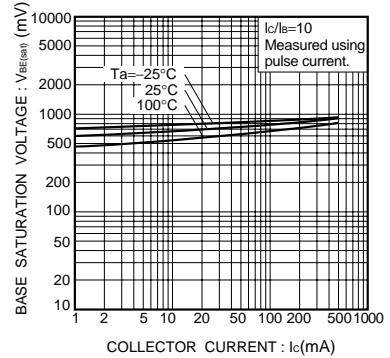


Fig.9 Base-emitter saturation voltage vs. collector current(II)

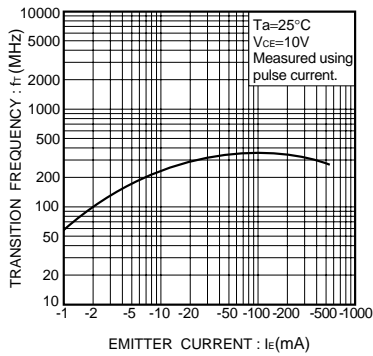


Fig.10 Gain bandwidth product vs. emitter current

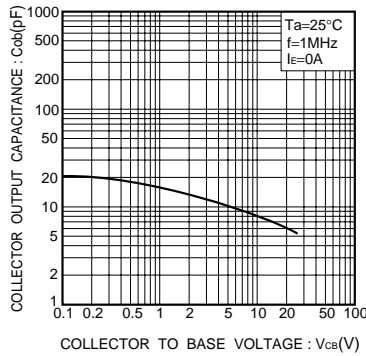


Fig.11 Collector output capacitance vs. collector-base voltage

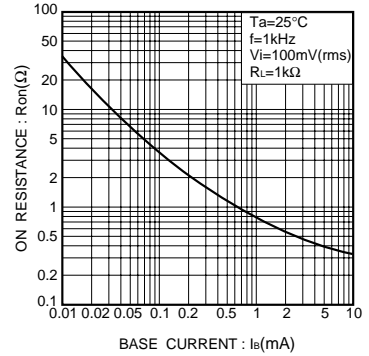
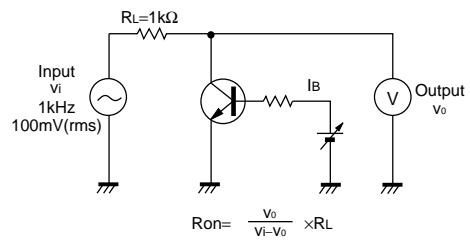


Fig.12 Output-on resistance vs. base current

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### ● Ron measurement circuit



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