

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

## 2SD2114K

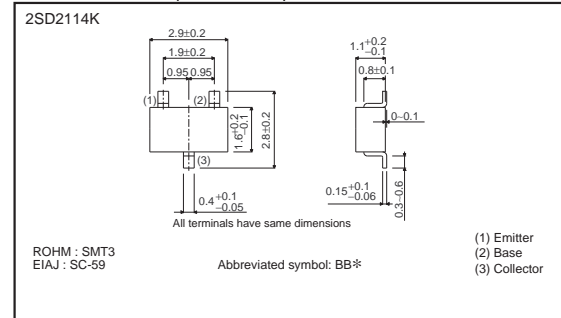
### ●Features

- 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

### ●Dimensions (Unit : 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          |
| Junction temperature        | $T_j$     | 150         | °C         |
| Storage temperature         | $T_{stg}$ | -55 to +150 | °C         |

\* Single pulse  $P_w=100ms$

### ●Electrical characteristics (Ta=25°C)

| Parameter                            | Symbol        | Min. | Typ. | Max. | Unit     | Conditions                        |
|--------------------------------------|---------------|------|------|------|----------|-----------------------------------|
| Collector-base breakdown voltage     | $BV_{CBO}$    | 25   | -    | -    | V        | $I_C=10\mu A$                     |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | 20   | -    | -    | V        | $I_C=1mA$                         |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | 12   | -    | -    | V        | $I_E=10\mu A$                     |
| Collector cutoff current             | $I_{CBO}$     | -    | -    | 0.5  | $\mu A$  | $V_{CB}=20V$                      |
| Emitter cutoff current               | $I_{EBO}$     | -    | -    | 0.5  | $\mu A$  | $V_{EB}=10V$                      |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | -    | 0.18 | 0.4  | V        | $I_C/I_B=500mA/20mA$              |
| DC current transfer ratio            | $h_{FE}$      | 820  | -    | 2700 | -        | $V_{CE}=3V, I_C=10mA$             |
| Transition frequency                 | $f_T^*$       | -    | 350  | -    | MHz      | $V_{CE}=10V, I_E=-50mA, f=100MHz$ |
| Output capacitance                   | $C_{ob}$      | -    | 8.0  | -    | pF       | $V_{CB}=10V, I_E=0A, f=1MHz$      |
| Output On-resistance                 | $R_{on}$      | -    | 0.8  | -    | $\Omega$ | $I_B=1mA, V_i=100mV(rms), f=1kHz$ |

\* Measured using pulse current

●Packaging specifications and hFE

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

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

| Item            | V           | W            |
|-----------------|-------------|--------------|
| h <sub>FE</sub> | 820 to 1800 | 1200 to 2700 |

●Electrical characteristic curves

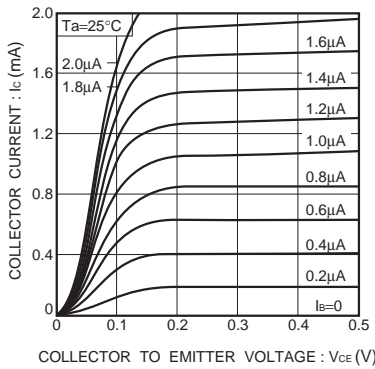


Fig.1 Grounded emitter output characteristics ( I )

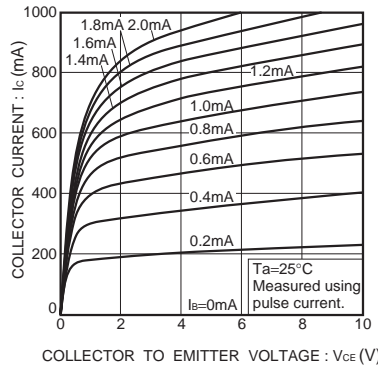


Fig.2 Grounded emitter output characteristics ( II )

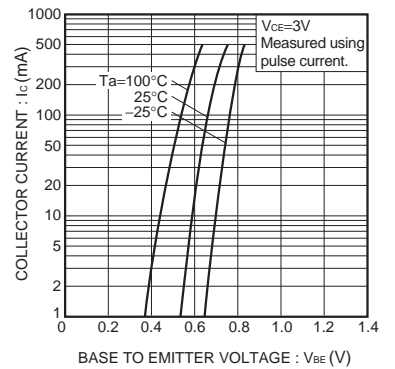


Fig.3 Grounded emitter propagation characteristics

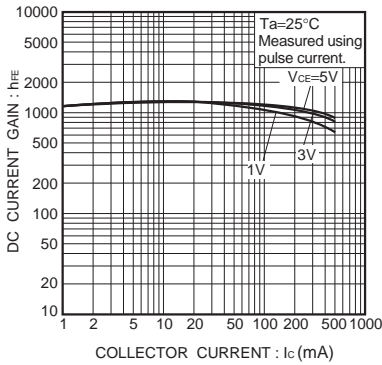


Fig.4 DC current gain vs. collector current ( I )

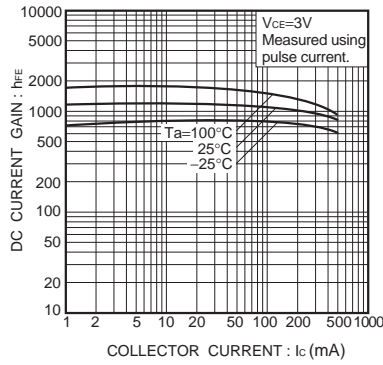


Fig.5 DC current gain vs. collector current ( II )

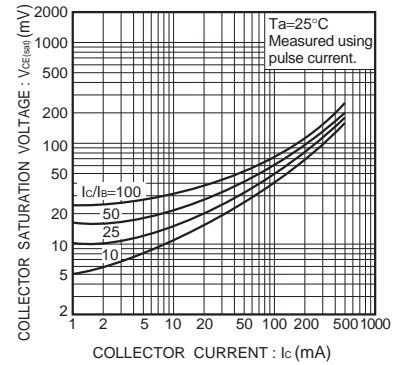


Fig.6 Collector-emitter saturation voltage vs. collector current ( I )

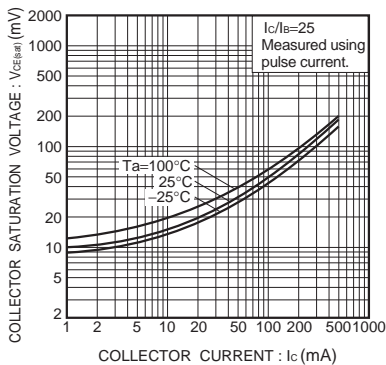


Fig.7 Collector-emitter saturation voltage vs. collector current ( II )

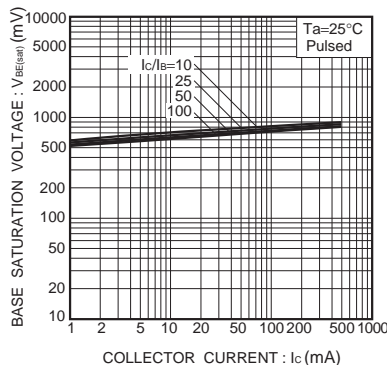


Fig.8 Base-emitter saturation voltage vs. collector current ( I )

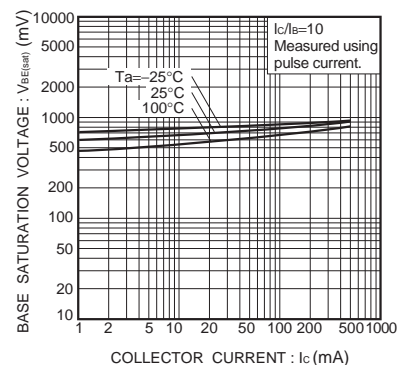


Fig.9 Base-emitter saturation voltage vs. collector current ( II )

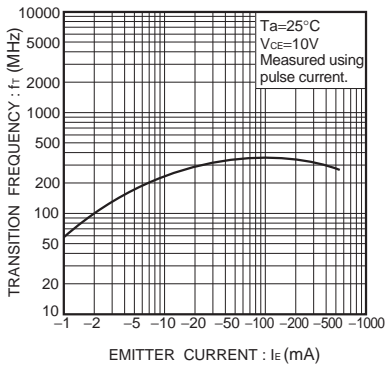


Fig.10 Gain bandwidth product vs. emitter current

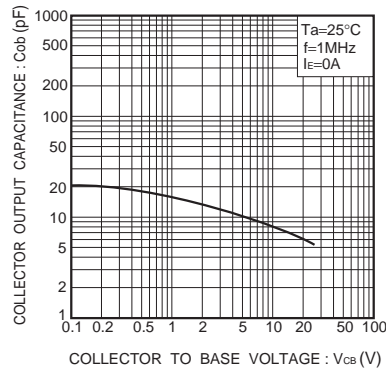


Fig.11 Collector output capacitance vs. collector-base voltage

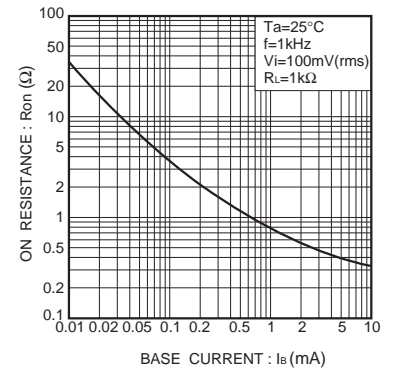
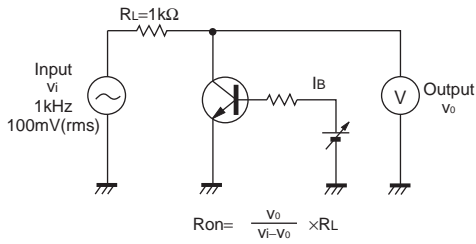


Fig.12 Output-on resistance vs. base current

● Ron measurement circuit



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