# THE DATASHEET OF

# 2SD2114KT146V

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

## 2SD2114K / 2SD2144S

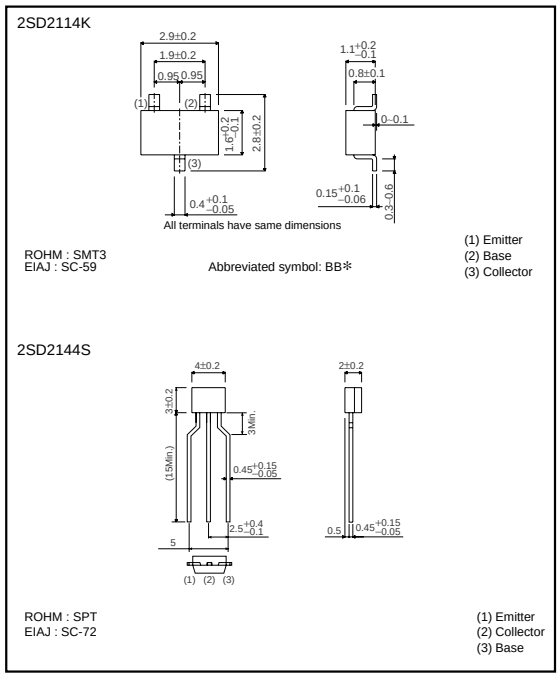
### ●Features

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 (Unit : mm)




* Denotes $h_{FE}$

### ●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 | 2SD2114K | $P_C$ | 0.2 | W |
| | 2SD2144S | | 0.3 | |
| Junction temperature | | Tj | 150 | °C |
| Storage temperature | | Tstg | −55 to +150 | °C |

* Single pulse Pw=100ms

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Collector-base breakdown voltage | $BV_{CBO}$ | 25 | – | – | V | $I_C$=10μA |
| Collector-emitter breakdown voltage | $BV_{CEO}$ | 20 | – | – | V | $I_C$=1mA |
| Emitter-base breakdown voltage | $BV_{EBO}$ | 12 | – | – | V | $I_E$=10μA |
| Collector cutoff current | $I_{CBO}$ | – | – | 0.5 | μA | $V_{CB}$=20V |
| Emitter cutoff current | $I_{EBO}$ | – | – | 0.5 | μA | $V_{EB}$=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 | Cob | – | 8.0 | – | pF | $V_{CB}$=10V, $I_E$=0A, f=1MHz |
| Output On-resistance | Ron | – | 0.8 | – | Ω | $I_B$=1mA, Vi=100mV(rms), f=1kHz |

* Measured using pulse current

●**Packaging specifications and $h_{FE}$**

| Type | $h_{FE}$ | Package | Taping | |
|---|---|---|---|---|
| | | Code | T146 | TP |
| | | Basic ordering unit (pieces) | 3000 | 5000 |
| 2SD2114K | VW | | ○ | – |
| 2SD2144S | VW | | – | ○ |

$h_{FE}$ values are classified as follows :

| Item | V | W |
|---|---|---|
| $h_{FE}$ | 820 to 1800 | 1200 to 2700 |

●**Electrical characteristic curves**

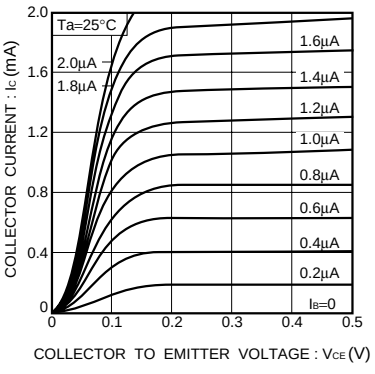



Fig.1 Grounded emitter output characteristics ( I )

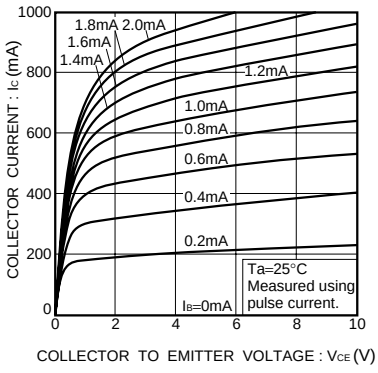



Fig.2 Grounded emitter output characteristics ( II )

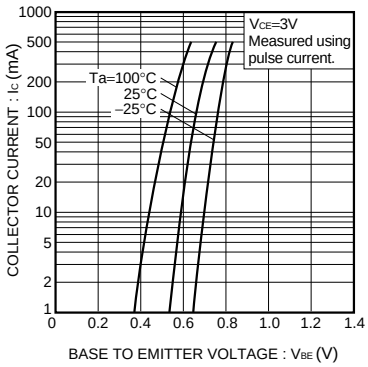



Fig.3 Grounded emitter propagation characteristics

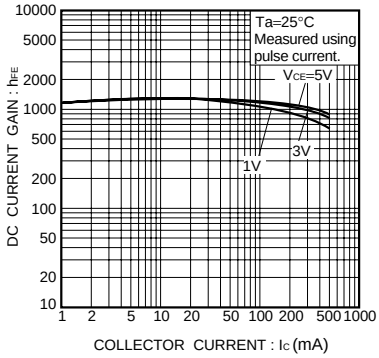



Fig.4 DC current gain vs. collector current ( I )

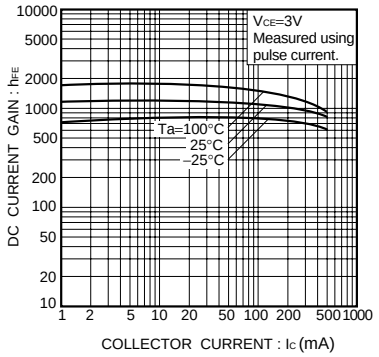



Fig.5 DC current gain vs. collector current ( II )

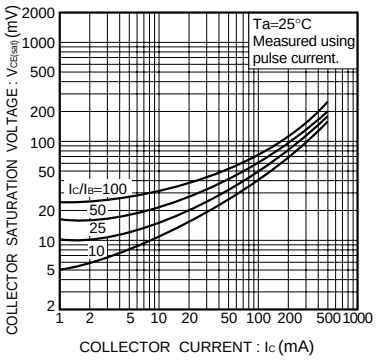



Fig.6 Collector-emitter saturation voltage vs. collector current ( I )

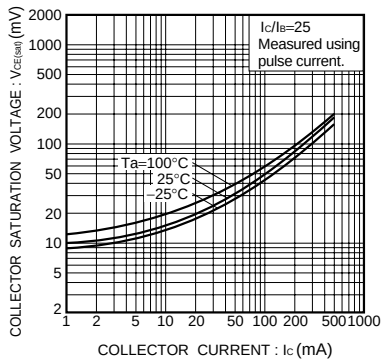



Fig.7 Collector-emitter saturation voltage vs. collector current ( II )

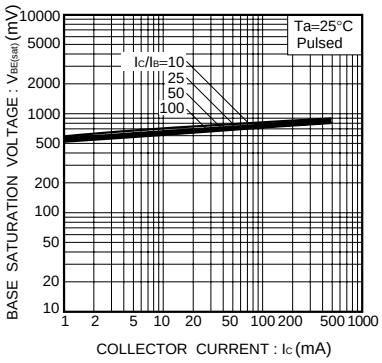



Fig.8 Base-emitter saturation voltage vs. collector current ( I )

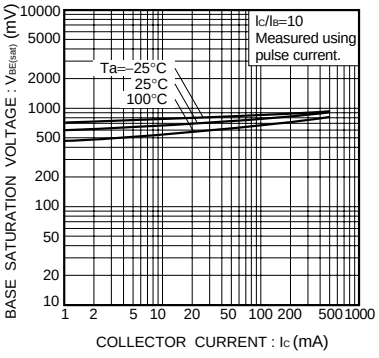



Fig.9 Base-emitter saturation voltage vs. collector current ( II )

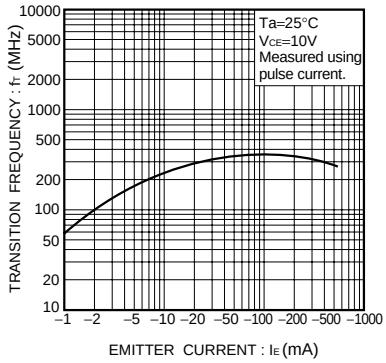



Fig.10 Gain bandwidth product vs. emitter current

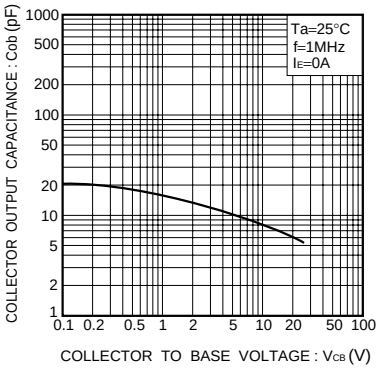



Fig.11 Collector output capacitance vs. collector-base voltage

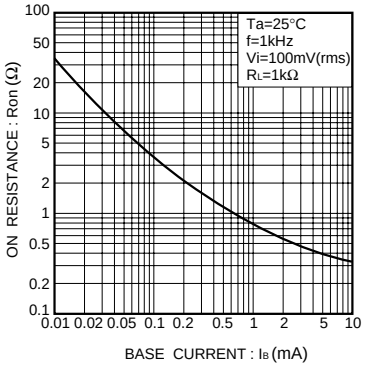
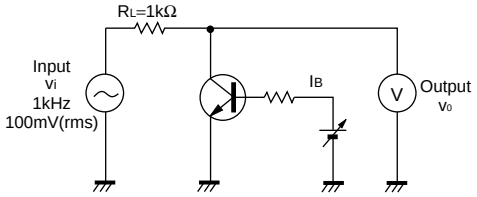



Fig.12 Output-on resistance vs. base current

●**Ron measurement circuit**




$$Ron = \frac{V_O}{V_i - V_O} \times R_L$$

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