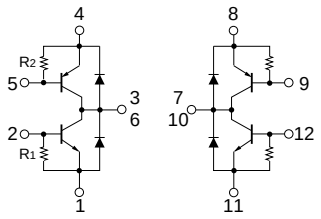
## Absolute maximum ratings

(Ta=25°C)

| Symbol | Ratings | | Unit |
|---|---|---|---|
| | NPN | PNP | |
| $V_{CBO}$ | 60 | –60 | V |
| $V_{CEO}$ | 60 | –60 | V |
| $V_{EBO}$ | 6 | –6 | V |
| $I_C$ | 12 | –12 | A |
| $I_B$ | 3 | –3 | A |
| $P_T$ | 5 (Ta=25°C) | | W |
| | 40 (Tc=25°C) | | |
| $V_{ISO}$ | 1000 (Between fin and lead pin, AC) | | $V_{rms}$ |
| $T_j$ | 150 | | °C |
| $T_{stg}$ | –40 to +150 | | °C |
| $\theta_{j-c}$ | 3.12 | | °C/W |

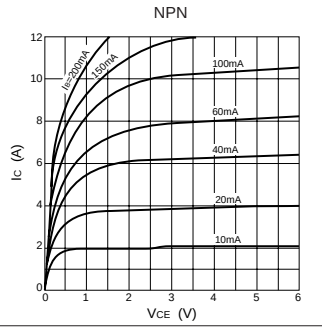
## ■Equivalent circuit diagram

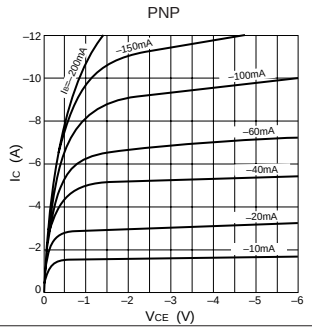



R1: 500kΩ typ R2: 350Ω typ

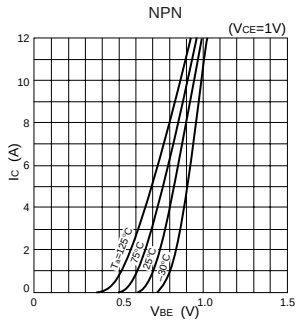
## Characteristic curves

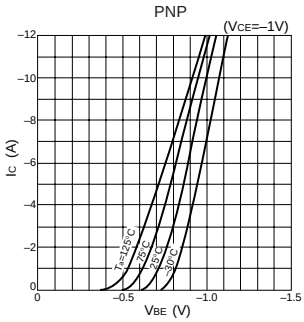
**IC-VCE Characteristics (Typical)**



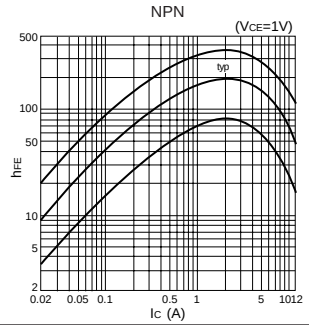



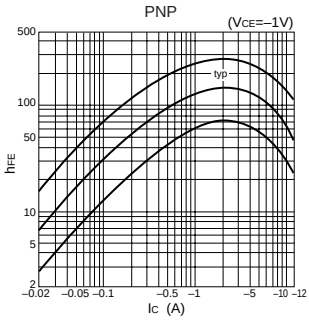

**IC-VBE Temperature Characteristics (Typical)**



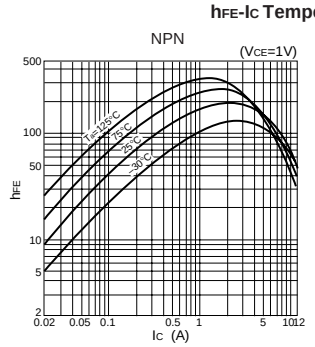



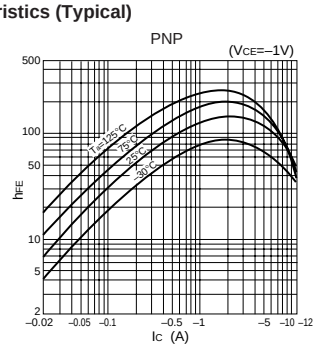

**hFE-IC Characteristics (Typical)**




**hFE-IC Temperature Characteristics (Typical)**



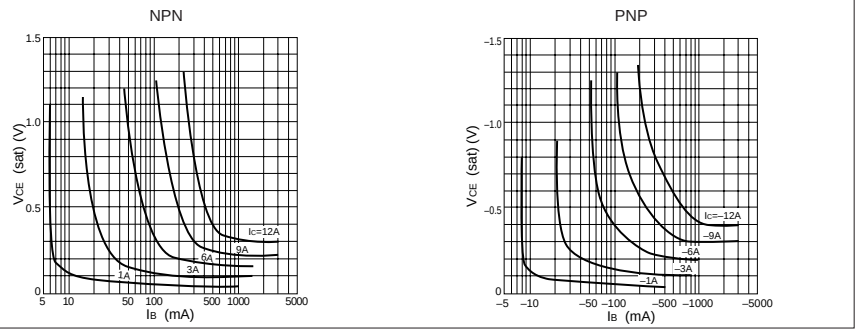
## Electrical characteristics

($T_a$=25°C)

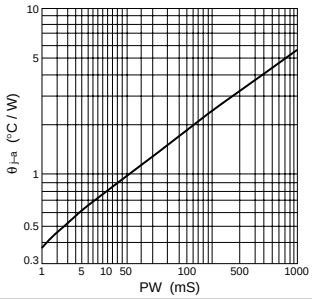
| Symbol | NPN | | | | | PNP | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Specification | | | Unit | Conditions | Specification | | | Unit | Conditions |
| | min | typ | max | | | min | typ | max | | |
| $I_{CBO}$ | | | 100 | μA | $V_{CB}$=60V | | | –100 | μA | $V_{CB}$=–60V |
| $I_{EBO}$ | | | 60 | mA | $V_{EB}$=6V | | | –60 | mA | $V_{EB}$=–6V |
| $V_{CEO}$ | 60 | | | V | $I_C$=25mA | –60 | | | V | $I_C$=–25mA |
| $h_{FE}$ | 50 | | | | $V_{CE}$=1V, $I_C$=6A | 50 | | | | $V_{CE}$=–1V, $I_C$=–6A |
| $V_{CE}$(sat) | | | 0.35 | V | $I_C$=6A, $I_B$=0.3A | | | –0.35 | V | $I_C$=–6A, $I_B$=–0.3A |
| $V_{FEC}$ | | | 2.5 | V | $I_{FEC}$=10A | | | 2.5 | V | $I_{FEC}$=10A |

## Characteristic curves

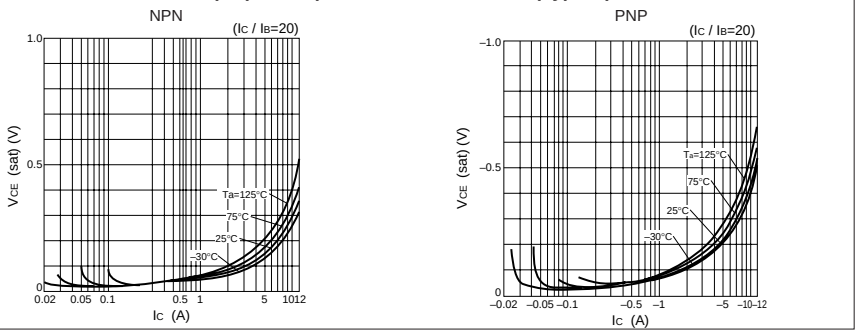
**$V_{CE}$(sat)-$I_B$ Characteristics (Typical)**



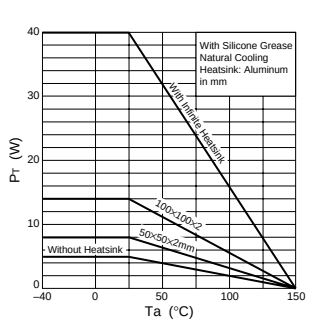

**$\theta_{j\text{-}a}$-PW Characteristics**




**$V_{CE}$(sat)-$I_C$ Temperature Characteristics (Typical)**




**$P_T$-$T_a$ Characteristics**




**Safe Operating Area (SOA)**