## Low Vcesat NPN Epitaxial Planar Transistor

# BTD1816I3

| | |
|---|---|
| $BV_{CEO}$ | 100V |
| $I_C$ | 4A |
| $R_{CESAT}$ | 50mΩ |

## Features

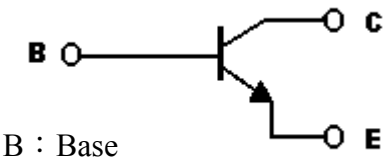
- Low collector-to-emitter saturation voltage
- High-speed switching
- Large current capability
- Good linearity of $h_{FE}$
- High $f_T$
- RoHS compliant package

## Applications

- Suitable for relay drivers, high speed inverters, converters, and other high current switching applications.

## Symbol

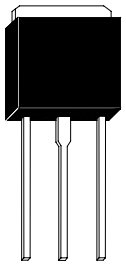
BTD1816I3




B：Base
C：Collector
E：Emitter

## Outline

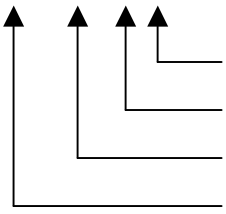
TO-251



B C E

## Ordering Information

| Device | Package | Shipping |
|---|---|---|
| BTD1816I3-0-UA-G | TO-251<br>(Pb-free lead plating and halogen-free package) | 80 pcs/tube, 50 tubes/box |



Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec,UA : 80 pcs / tube, 50 tubes/box

Product rank, zero for no rank products

Product name

## Absolute Maximum Ratings (Ta=25°C)

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 120 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 100 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 6 | V |
| Collector Current (DC) | $I_C$ | 4 | A |
| Collector Current (Pulse) | $I_{CP}$ | 8 (Note 1) | |
| Base Current | $I_B$ | 1.2 | A |
| Power Dissipation @ $T_A$=25°C | $P_D$ | 1 | W |
| Power Dissipation @ $T_C$=25°C | $P_D$ | 20 | |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 125 | °C/W |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 6.25 | °C/W |
| Junction Temperature | Tj | 150 | °C |
| Storage Temperature | Tstg | -55~+150 | °C |

Note : 1. Single Pulse , Pw≤380μs, Duty≤2%.

## Characteristics (Ta=25°C)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| $BV_{CBO}$ | 120 | - | - | V | $I_C$=10μA, $I_E$=0 |
| *$BV_{CEO}$ | 100 | - | - | V | $I_C$=1mA, $I_B$=0 |
| $BV_{EBO}$ | 6 | - | - | V | $I_C$=10μA, $I_C$=0 |
| $I_{CBO}$ | - | - | 1 | μA | $V_{CB}$=100V, $I_E$=0 |
| $I_{EBO}$ | - | - | 1 | μA | $V_{EB}$=4V, $I_C$=0 |
| *$V_{CE(sat)}$ 1 | - | 50 | 120 | mV | $I_C$=1A, $I_B$=50mA |
| *$V_{CE(sat)}$ 2 | - | 90 | 250 | mV | $I_C$=2A, $I_B$=200mA |
| *$V_{BE(sat)}$ | - | 0.9 | 1.2 | V | $I_C$=2A, $I_B$=200mA |
| *$h_{FE}$ 1 | 180 | - | 560 | - | $V_{CE}$=5V, $I_C$=500mA |
| *$h_{FE}$ 2 | 120 | - | - | - | $V_{CE}$=5V, $I_C$=3A |
| $f_T$ | - | 180 | - | MHz | $V_{CE}$=10V, $I_C$=500mA |
| Cob | - | 40 | - | pF | $V_{CB}$=10V, f=1MHz |
| $t_{on}$ | - | 100 | - | ns | $V_{CC}$=50V, $I_C$=10$I_B$1=-10$I_B$2=2A, $R_L$=25Ω |
| $t_{stg}$ | - | 900 | - | ns | |
| $t_f$ | - | 50 | - | ns | |

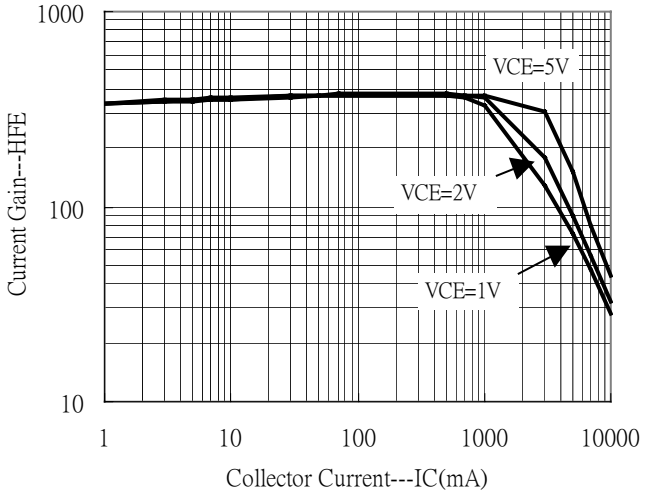
*Pulse Test : Pulse Width ≤380μs, Duty Cycle≤2%

## Classification of $h_{FE}$ 1

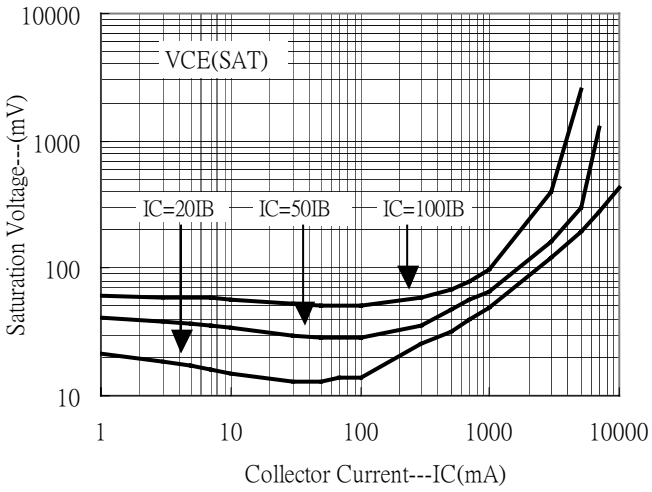
| Rank | R | S |
|---|---|---|
| Range | 180~390 | 270~560 |

## Characteristic Curves

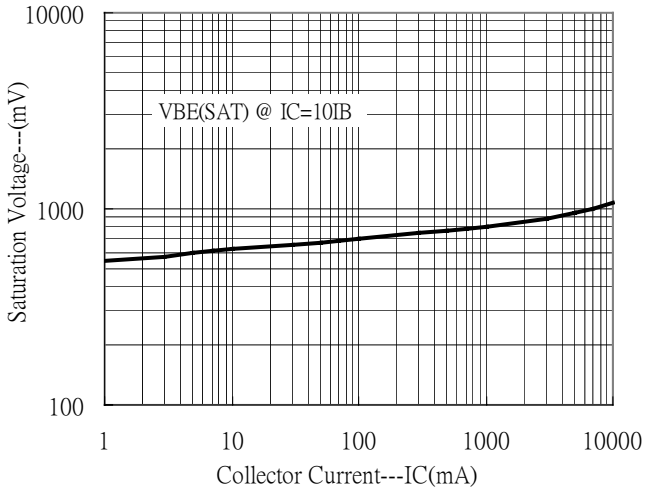
Current Gain vs Collector Current



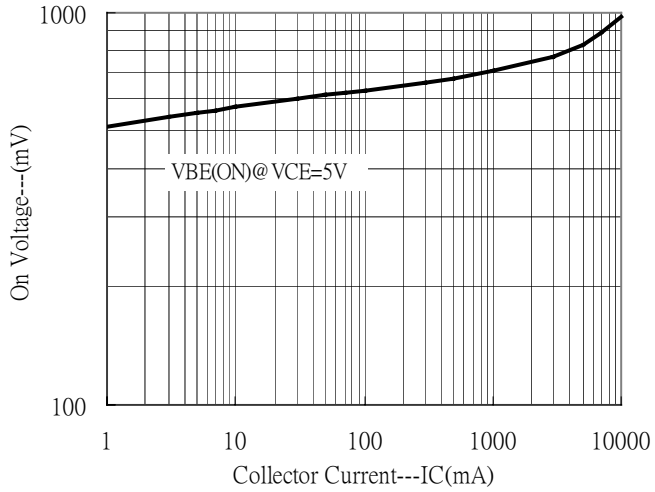

Saturation Voltage vs Collector Current



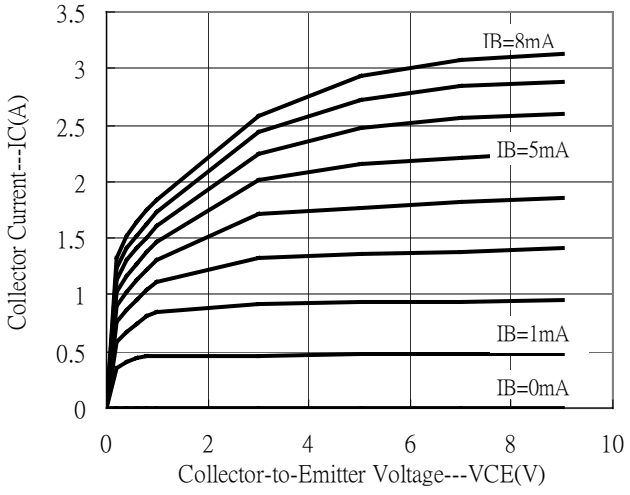

Saturation Voltage vs Collector Current



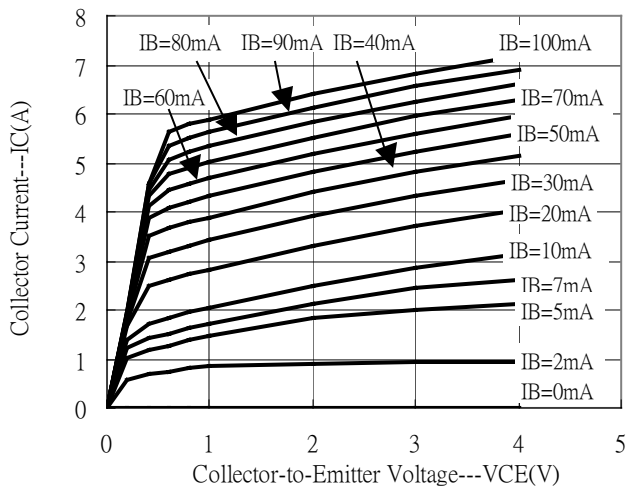

On Vottage vs Collector Current



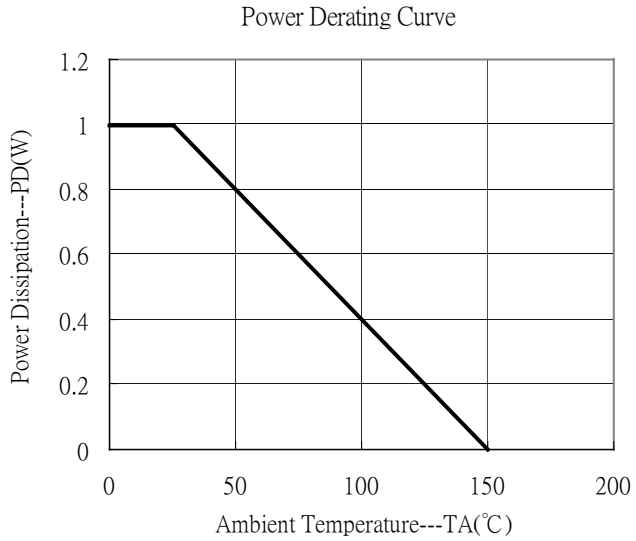

Grounded Emitter Output Characteristics

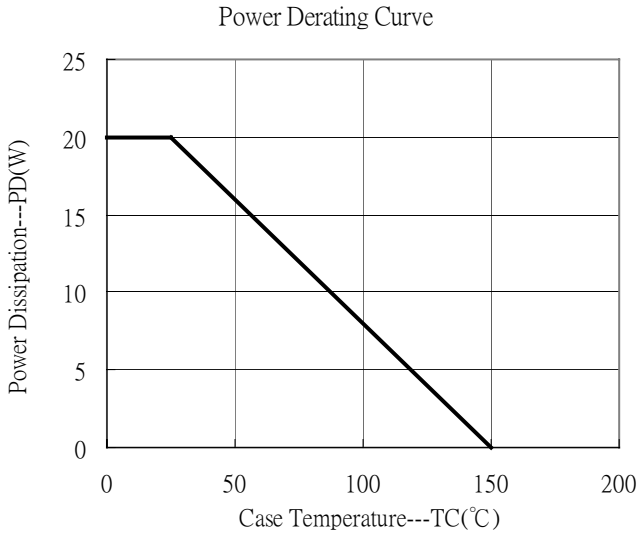



Grounded Emitter Output Characteristics



## Characteristic Curves(Cont.)

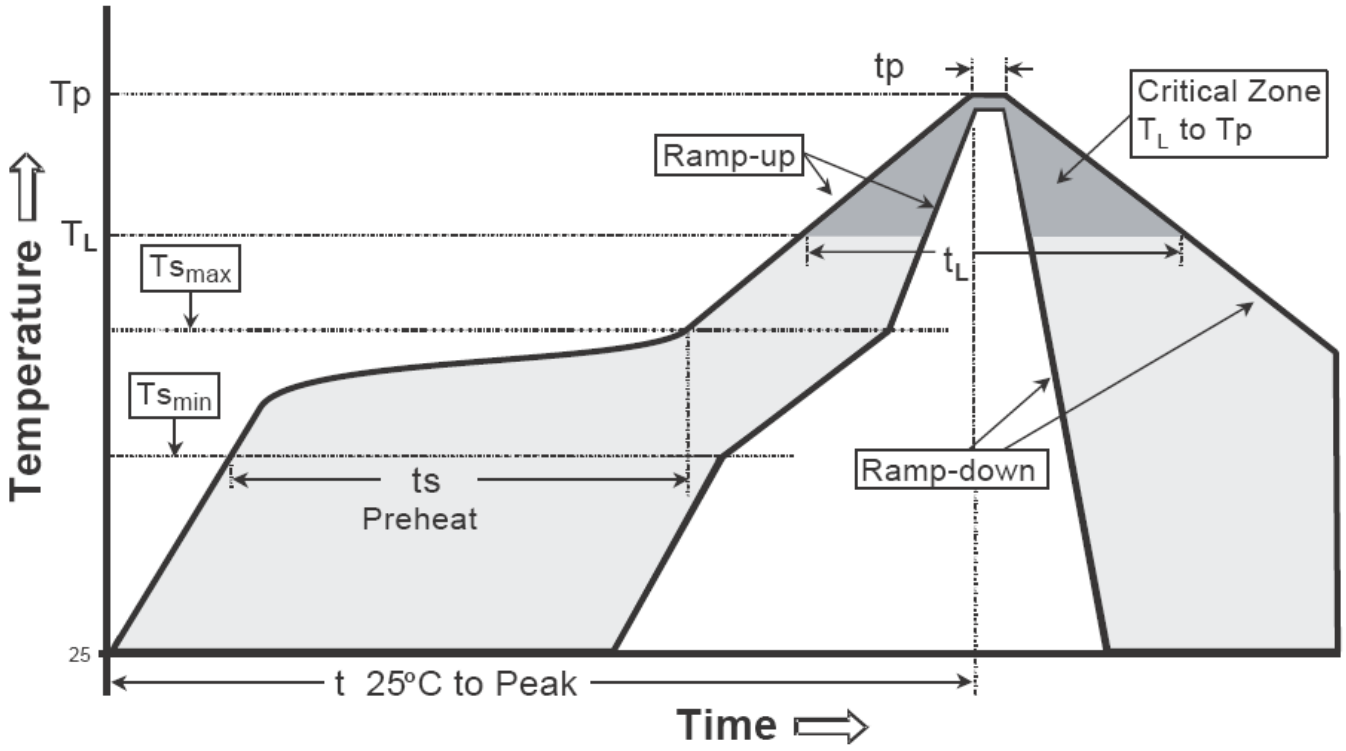


## Recommended wave soldering condition

| Product | Peak Temperature | Soldering Time |
|---|---|---|
| Pb-free devices | 260 +0/-5 °C | 5 +1/-1 seconds |

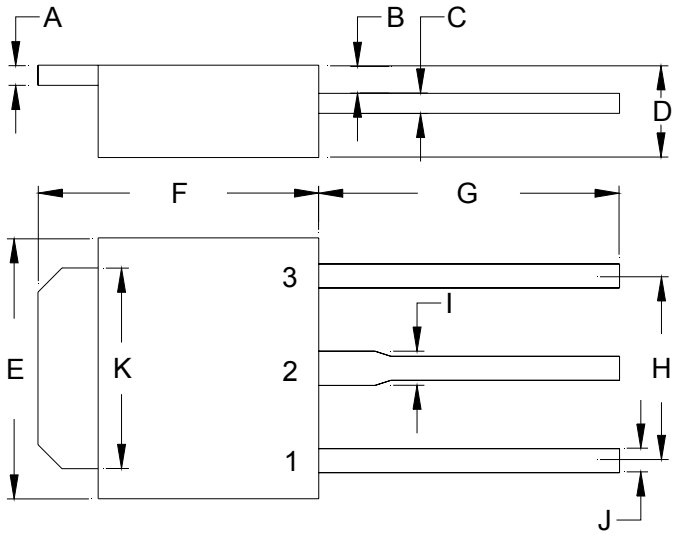
## Recommended temperature profile for IR reflow



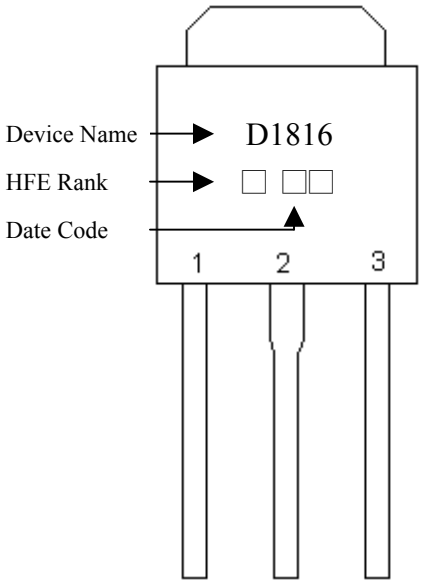

| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|---|---|---|
| Average ramp-up rate (Tsmax to Tp) | 3°C/second max. | 3°C/second max. |
| Preheat<br>−Temperature Min(Ts min)<br>−Temperature Max(Ts max)<br>−Time(ts min to ts max) | <br>100°C<br>150°C<br>60-120 seconds | <br>150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>−Temperature (TL)<br>− Time (tL) | <br>183°C<br>60-150 seconds | <br>217°C<br>60-150 seconds |
| Peak Temperature(TP) | 240 +0/-5 °C | 260 +0/-5 °C |
| Time within 5°C of actual peak temperature(tp) | 10-30 seconds | 20-40 seconds |
| Ramp down rate | 6°C/second max. | 6°C/second max. |
| Time 25 °C to peak temperature | 6 minutes max. | 8 minutes max. |

Note : All temperatures refer to topside of the package, measured on the package body surface.

## TO-251 Dimension




Marking:




Style: Pin 1.Base 2.Collector 3.Emitter

3-Lead TO-251 Plastic Package
CYStek Package Code: I3

*: Typical

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.0177 | 0.0217 | 0.45 | 0.55 | G | 0.2559 | - | 6.50 | - |
| B | 0.0354 | 0.0591 | 0.90 | 1.50 | H | - | *0.1811 | - | *4.60 |
| C | 0.0177 | 0.0236 | 0.45 | 0.60 | I | - | 0.0449 | - | 1.14 |
| D | 0.0866 | 0.0945 | 2.20 | 2.40 | J | - | 0.0346 | - | 0.88 |
| E | 0.2441 | 0.2677 | 6.20 | 6.80 | K | 0.2047 | 0.2165 | 5.20 | 5.50 |
| F | 0.2677 | 0.2835 | 6.80 | 7.20 | | | | | |

Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: Pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0