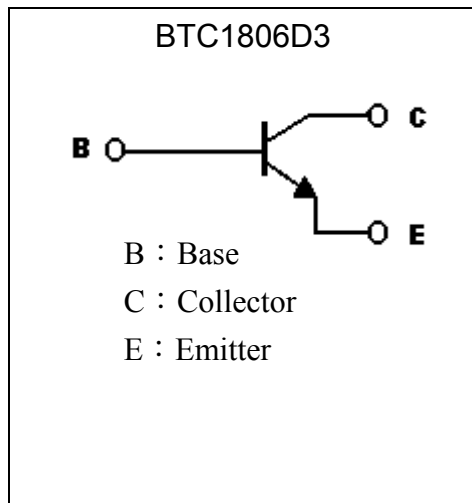
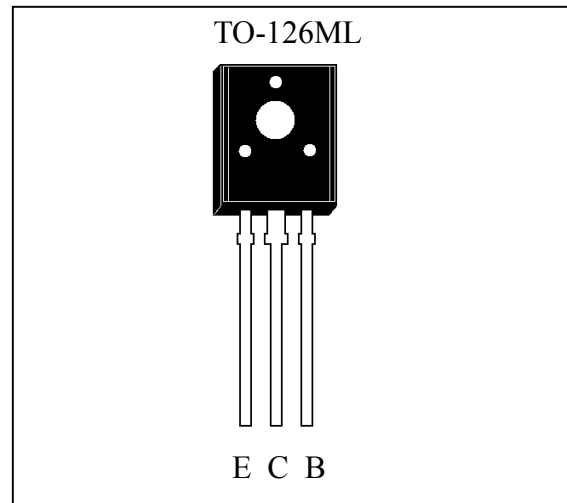


Silicon NPN Epitaxial Planar Transistor

BTC1806D3

Features

- Low saturation voltage, typically $V_{CE(sat)}=0.1V$ at $I_C/I_B=1A/25mA$
- Excellent DC current gain characteristics
- Pb-free lead plating and halogen-free package

Symbol

Outline

Absolute Maximum Ratings ($T_a=25^{\circ}C$)

| Parameter | Symbol | Limits | Unit |
|---------------------------|-----------|-------------------|-------------|
| Collector-Base Voltage | V_{CBO} | 100 | V |
| Collector-Emitter Voltage | V_{CEO} | 50 | V |
| Emitter-Base Voltage | V_{EBO} | 6 | V |
| Collector Current (DC) | I_C | 5 | A |
| Collector Current (Pulse) | I_{CP} | 9 | A |
| Power Dissipation | P_D | $T_A=25^{\circ}C$ | 1.5 |
| | | $T_C=25^{\circ}C$ | 15 |
| Junction Temperature | T_j | 150 | $^{\circ}C$ |
| Storage Temperature | T_{stg} | -55~+150 | $^{\circ}C$ |

**Thermal Characteristics**

| Parameter | Symbol | Value | Unit |
|---|-----------------|-------|----------------------|
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 83.3 | $^{\circ}\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 8.3 | $^{\circ}\text{C/W}$ |

Characteristics (Ta=25°C)

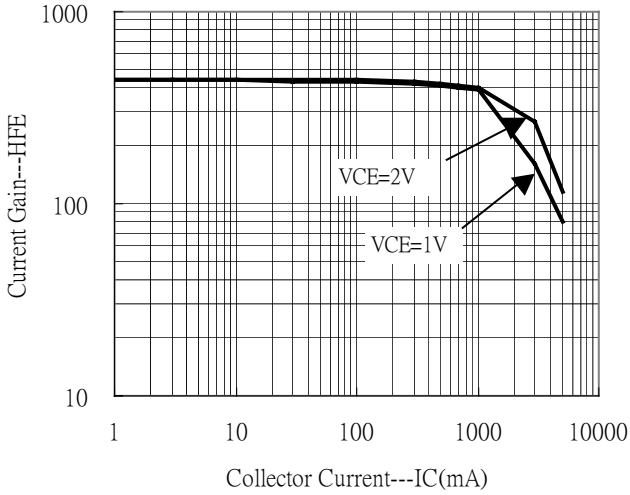
| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|-----------------|------|------|------|---------------|---|
| BV_{CBO} | 100 | - | - | V | $I_C=50\mu\text{A}, I_E=0$ |
| BV_{CEO} | 50 | - | - | V | $I_C=1\text{mA}, I_B=0$ |
| BV_{EBO} | 6 | - | - | V | $I_E=50\mu\text{A}, I_C=0$ |
| I_{CBO} | - | - | 0.1 | μA | $V_{CB}=80\text{V}, I_E=0$ |
| I_{EBO} | - | - | 0.1 | μA | $V_{EB}=5\text{V}, I_C=0$ |
| * $V_{CE(sat)}$ | - | 0.1 | 0.3 | V | $I_C=1\text{A}, I_B=25\text{mA}$ |
| * $V_{CE(sat)}$ | - | 0.23 | 0.4 | V | $I_C=2\text{A}, I_B=50\text{mA}$ |
| * $V_{BE(sat)}$ | 0.5 | - | 1.2 | V | $I_C=1\text{A}, I_B=100\text{mA}$ |
| h_{FE1} | 250 | - | 500 | - | $V_{CE}=2\text{V}, I_C=500\text{mA}$ |
| h_{FE2} | 80 | - | - | - | $V_{CE}=2\text{V}, I_C=3\text{A}$ |
| f_T | - | 210 | - | MHz | $V_{CE}=2\text{V}, I_C=500\text{mA}, f=100\text{MHz}$ |
| Cob | - | 25 | - | pF | $V_{CB}=10\text{V}, I_E=0, f=1\text{MHz}$ |

*Pulse Test: Pulse Width $\leq 380\mu\text{s}$, Duty Cycle $\leq 2\%$ **Ordering Information**

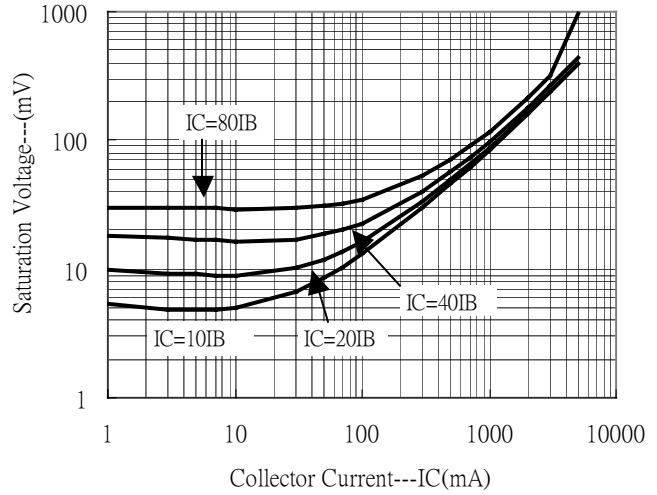
| Device | Package | Shipping |
|-----------|--|---|
| BTC1806D3 | TO-126 (Pb-free lead plating package) | 200 pcs / bag, 15 bags/box, 10 boxes/carton |

Typical Characteristics

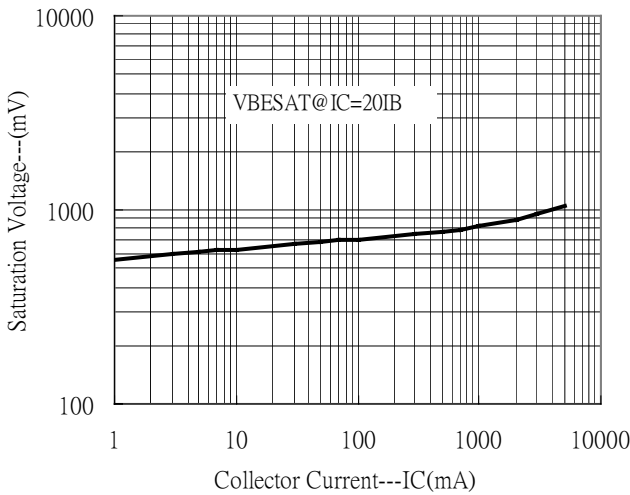
Current Gain vs Collector Current



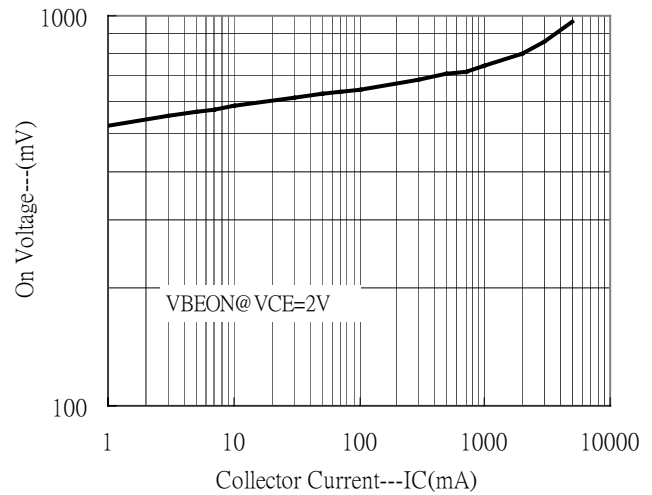
Saturation Voltage vs Collector Current



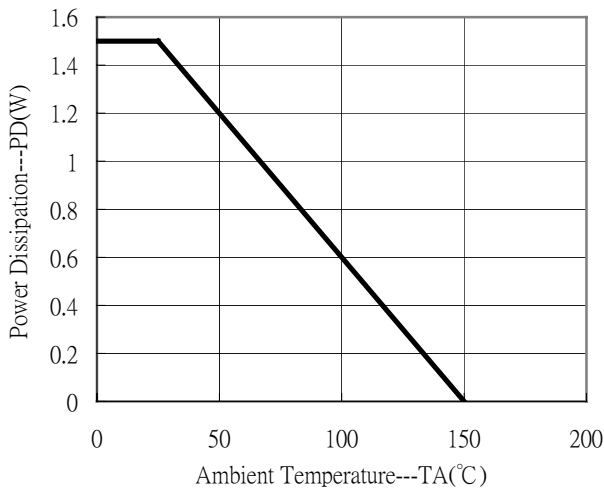
Saturation Voltage vs Collector Current



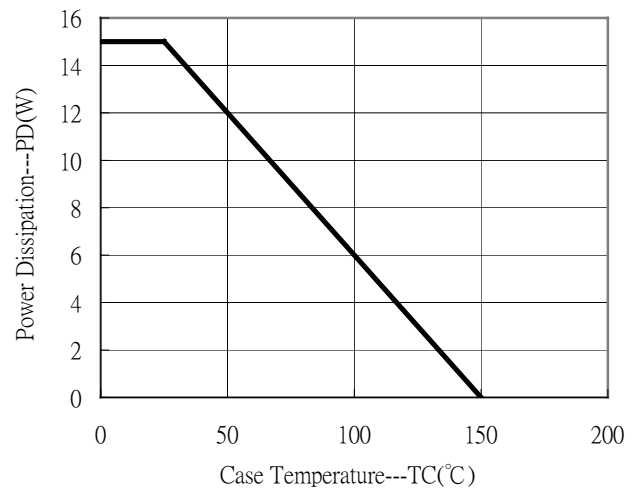
On Voltage vs Collector Current



Power Derating Curve

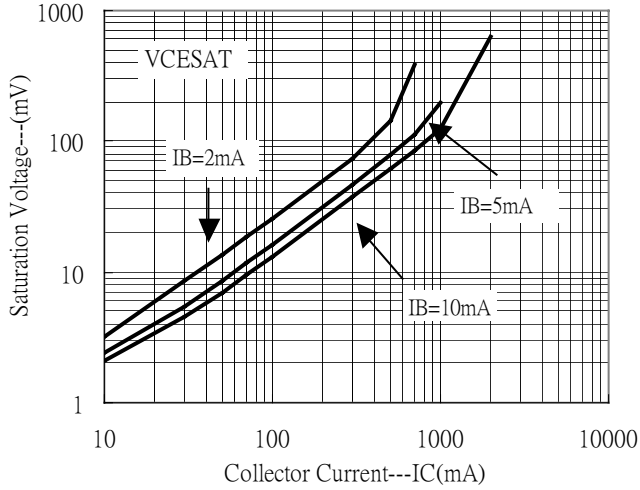


Power Derating Curve

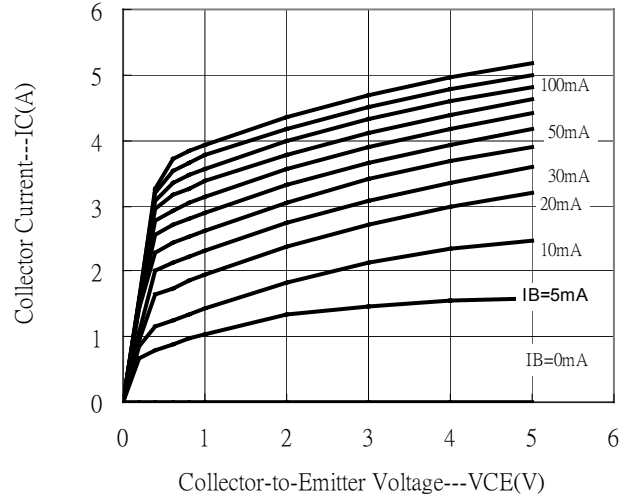


Typical Characteristics(Cont.)

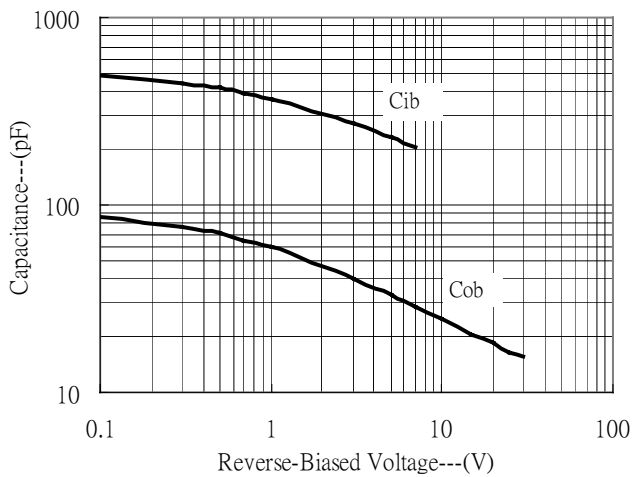
Saturation Voltage vs Collector Current



Output Characteristics



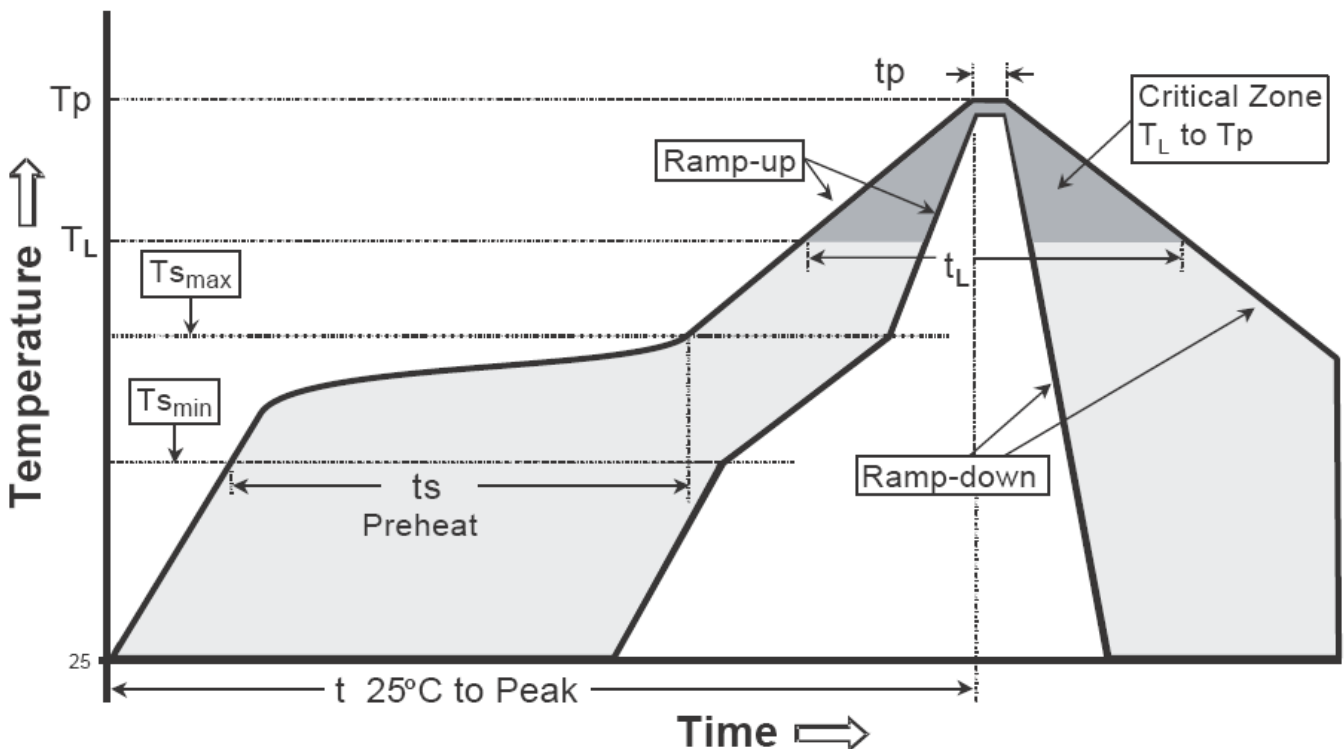
Capacitance vs Reverse-Biased Voltage



Recommended wave soldering condition

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

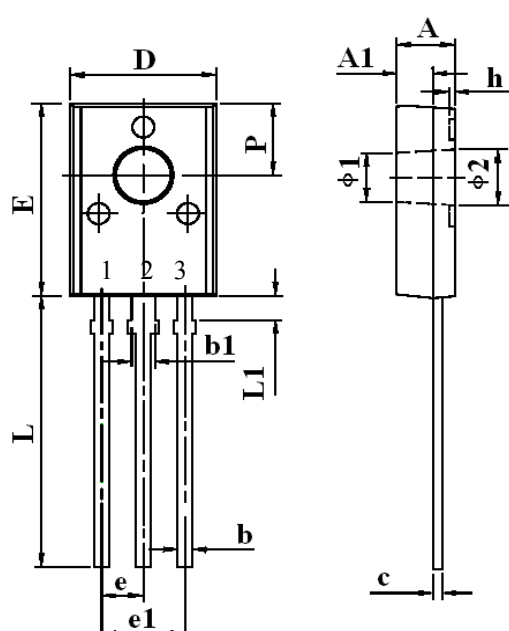
Recommended temperature profile for IR reflow



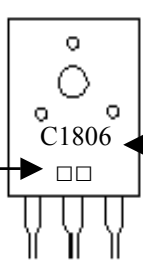
| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|--|-------------------------|------------------|
| Average ramp-up rate (Tsmax to Tp) | 3°C/second max. | 3°C/second max. |
| Preheat | | |
| -Temperature Min(Ts min) | 100°C | 150°C |
| -Temperature Max(Ts max) | 150°C | 200°C |
| -Time(ts min to ts max) | 60-120 seconds | 60-180 seconds |
| Time maintained above: | | |
| -Temperature (T _L) | 183°C | 217°C |
| - Time (t _L) | 60-150 seconds | 60-150 seconds |
| Peak Temperature(T _P) | 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-126ML Dimension



Marking:



Device Name

Date Code:
 Year+Month
 Year: 2005→5,2006
 →6, ..., etc
 Month: Jan→1, Feb
 →2, ..., Sep
 →9, Oct→A
 Nov→B,
 Dec→C

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

3-Lead TO-126ML Plastic Package
 CYStek Package Code: D3

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|-------|-------------|--------|----------------|--------|-------|-------------|--------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.118 | 0.134 | 3.000 | 3.400 | e | *0.090 | | *2.28 | |
| A1 | 0.071 | 0.087 | 1.800 | 2.200 | e1 | 0.176 | 0.183 | 4.460 | 4.660 |
| b | 0.026 | 0.034 | 0.660 | 0.860 | L | 0.594 | 0.610 | 15.100 | 15.500 |
| b1 | 0.046 | 0.054 | 1.170 | 1.370 | L1 | 0.051 | 0.059 | 1.300 | 1.500 |
| c | 0.018 | 0.024 | 0.450 | 0.600 | P | 0.159 | 0.167 | 4.040 | 4.240 |
| D | 0.307 | 0.323 | 7.800 | 8.200 | Φ ₁ | 0.118 | 0.126 | 3.000 | 3.200 |
| E | 0.425 | 0.441 | 10.800 | 11.200 | Φ ₂ | 0.122 | 0.130 | 3.100 | 3.300 |

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.

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