

Low $V_{CE(sat)}$ NPN Epitaxial Planar Transistor

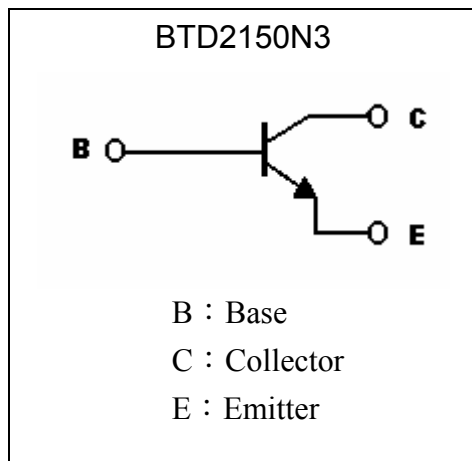
BTD2150N3

| | |
|--------------------|--------------|
| BV_{CEO} | 50V |
| I_C | 4A |
| $R_{CE(SAT)}$ typ. | 90m Ω |

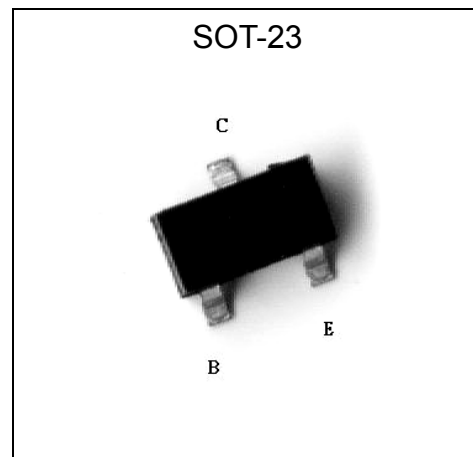
Features

- Low $V_{CE(sat)}$, typically 0.18V at $I_C / I_B = 2A / 0.1A$
- Excellent current gain characteristics
- Complementary to BTB1424N3
- Pb-free lead plating and halogen-free package

Symbol



Outline



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

| Parameter | Symbol | Limit | Unit |
|--|-----------------|------------|--------------------|
| Collector-Base Voltage | V_{CBO} | 80 | V |
| Collector-Emitter Voltage | V_{CEO} | 50 | V |
| Emitter-Base Voltage | V_{EBO} | 6 | V |
| Collector Current (DC) | I_C | 4 | A |
| Collector Current (Pulse) | I_{CP} | 7 (Note 1) | A |
| Power Dissipation | P_D | 225 | mW |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 556 | $^\circ\text{C/W}$ |
| Operating Junction and Storage Temperature Range | $T_j ; T_{stg}$ | -55~+150 | $^\circ\text{C}$ |

Note : 1. Single Pulse $P_w \leq 350\mu\text{s}$, Duty $\leq 2\%$.



Characteristics (Ta=25°C)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|-----------------------|------|------|------|------|---|
| BV _{CB0} | 80 | - | - | V | I _C =100μA, I _E =0 |
| BV _{CE0} | 50 | - | - | V | I _C =1mA, I _B =0 |
| BV _{EB0} | 6 | - | - | V | I _E =50μA, I _C =0 |
| I _{CB0} | - | - | 100 | nA | V _{CB} =80V, I _E =0 |
| I _{EB0} | - | - | 100 | nA | V _{EB} =6V, I _C =0 |
| *V _{CE(sat)} | - | 40 | 100 | mV | I _C =400mA, I _B =20mA |
| *V _{CE(sat)} | - | 160 | 220 | mV | I _C =1A, I _B =10mA |
| *V _{CE(sat)} | - | 180 | 320 | mV | I _C =2A, I _B =100mA |
| *R _{CE(sat)} | - | 90 | 160 | mΩ | I _C =2A, I _B =100mA |
| *V _{BE(sat)} | - | 0.94 | 1.3 | V | I _C =2A, I _B =200mA |
| *h _{FE1} | 200 | - | - | - | V _{CE} =2V, I _C =100mA |
| *h _{FE2} | 270 | - | 820 | - | V _{CE} =2V, I _C =500mA |
| *h _{FE3} | 100 | - | - | - | V _{CE} =2V, I _C =1A |
| f _T | - | 175 | - | MHz | V _{CE} =1V, I _C =0.1A, f=100MHz |
| Cob | - | 14 | - | pF | V _{CB} =10V, f=1MHz |

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

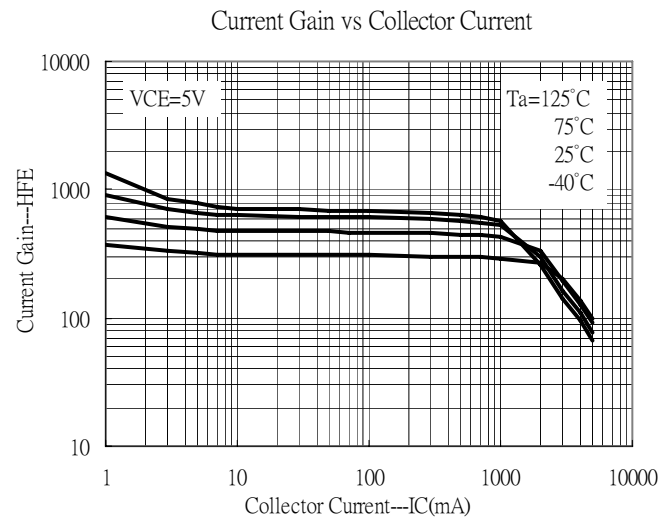
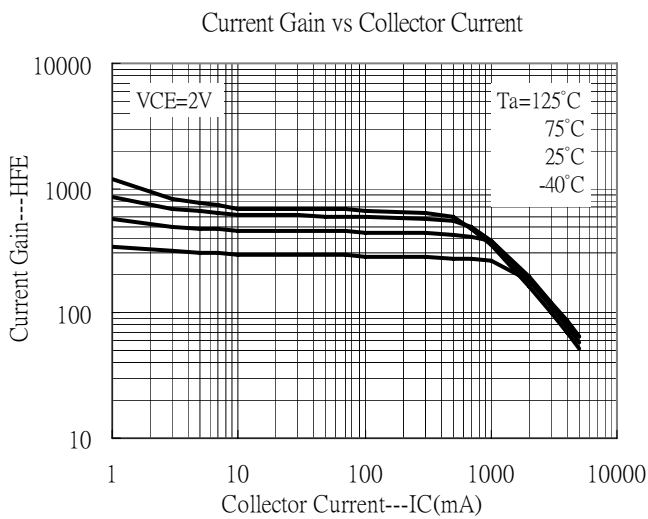
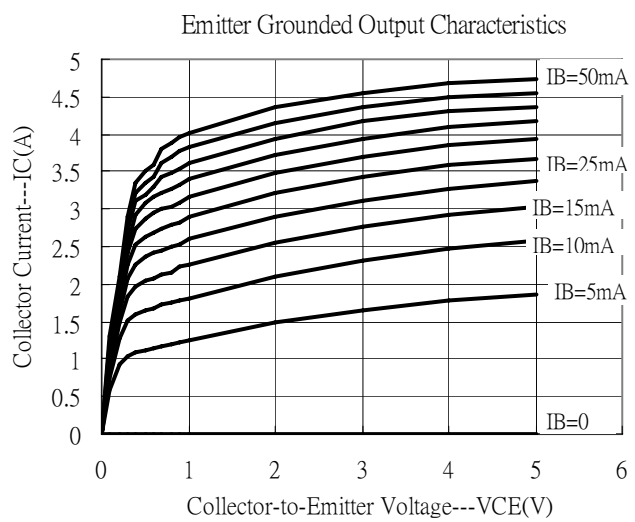
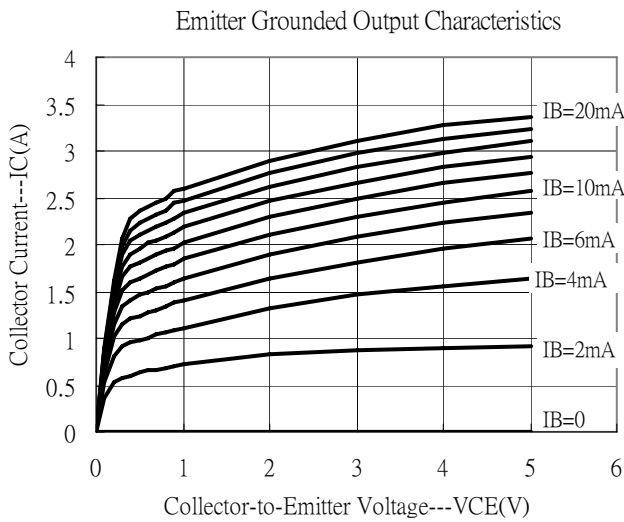
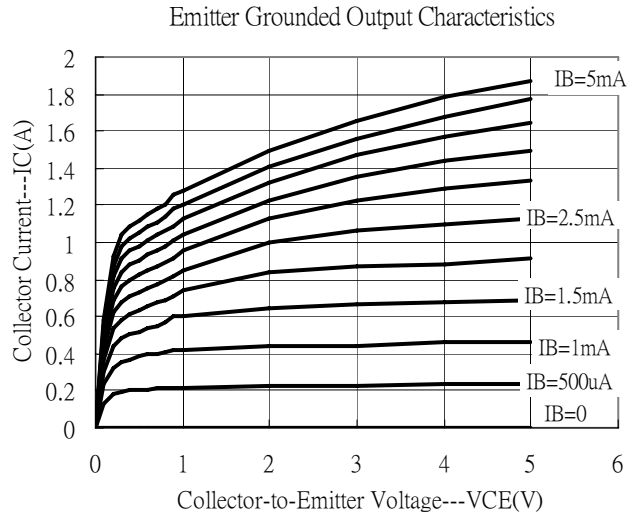
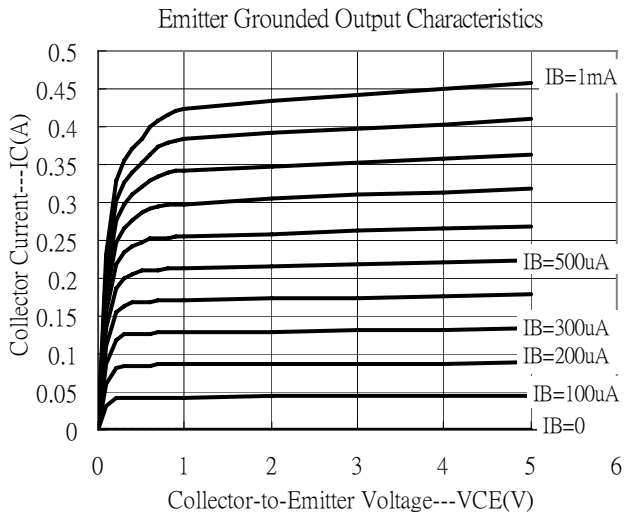
Classification Of hFE 2

| Rank | S | T |
|-------|---------|---------|
| Range | 270~560 | 390~820 |

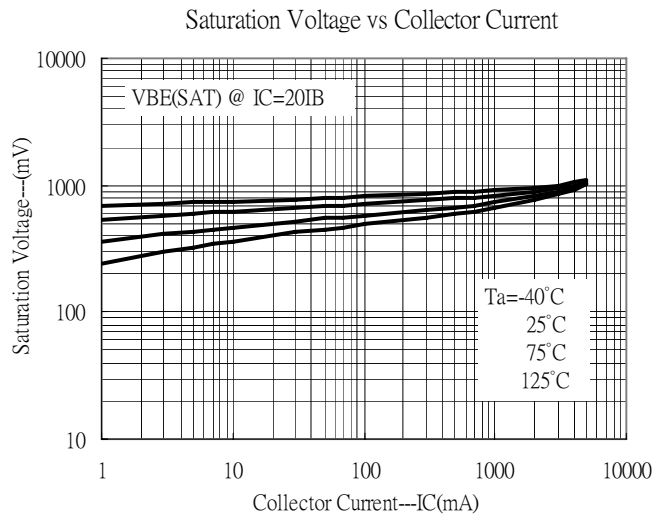
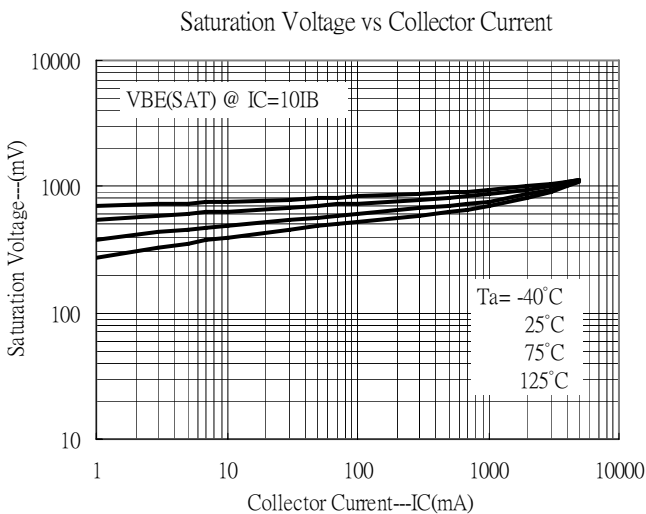
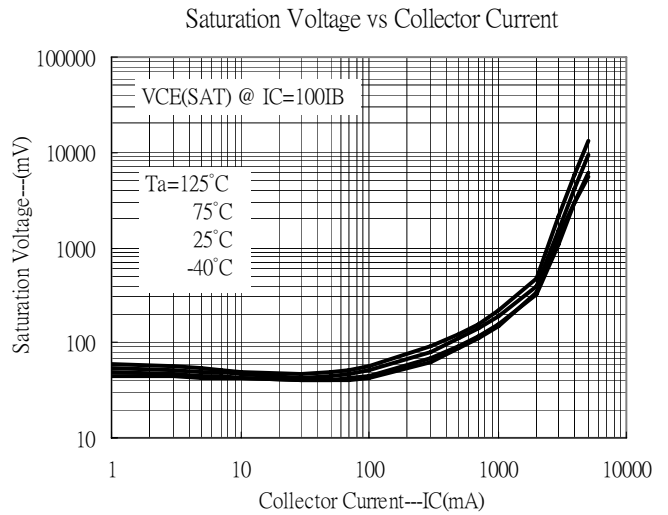
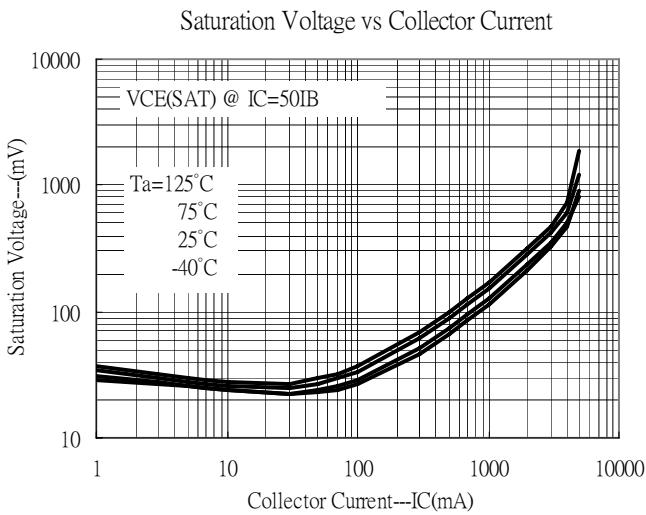
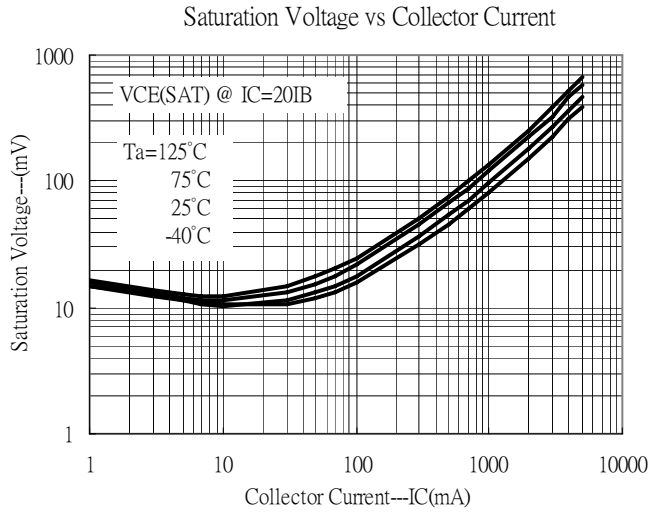
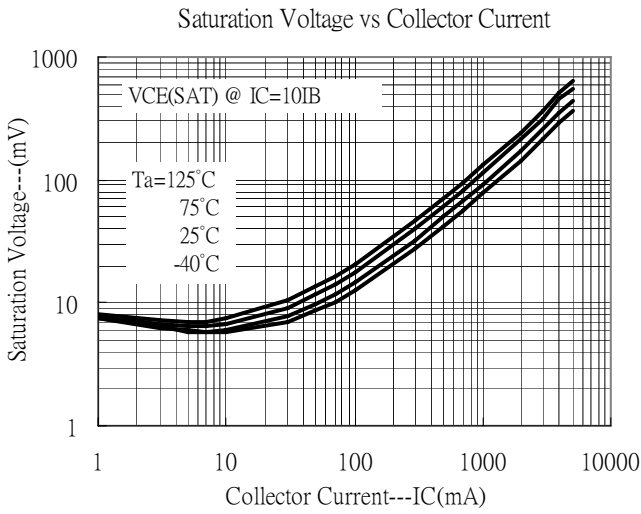
Ordering Information

| Device | HFE Rank | Package | Shipping |
|------------------|----------|--|------------------------|
| BTD2150N3-S-T1-G | S | SOT-23 (Pb-free lead plating and halogen-free package) | 3000 pcs / Tape & Reel |
| BTD2150N3-T-T1-G | T | SOT-23 (Pb-free lead plating and halogen-free package) | 3000 pcs / Tape & Reel |

Typical Characteristics

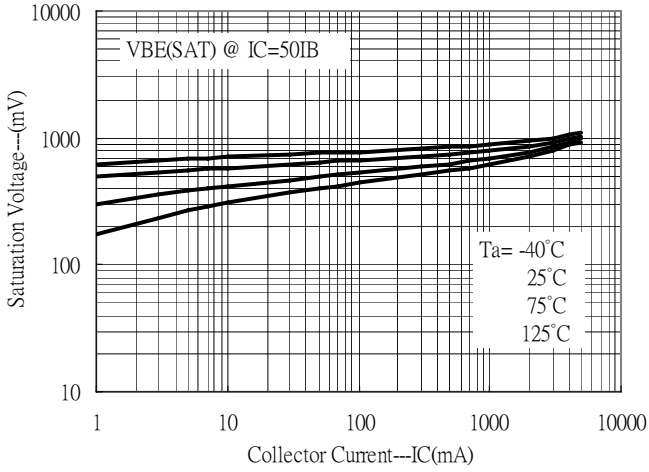


Typical Characteristics(Cont.)

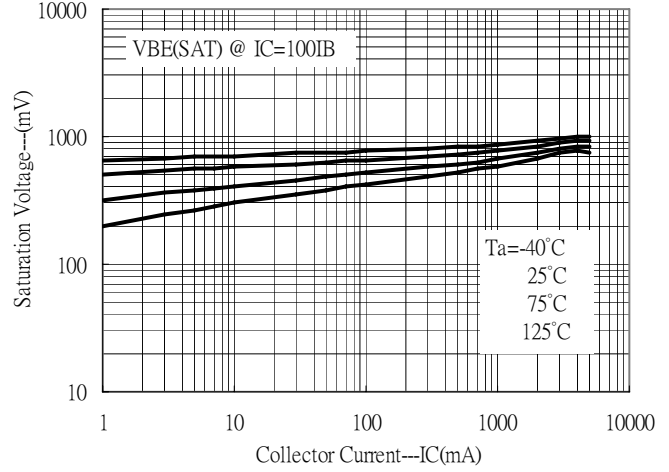


Typical Characteristics(Cont.)

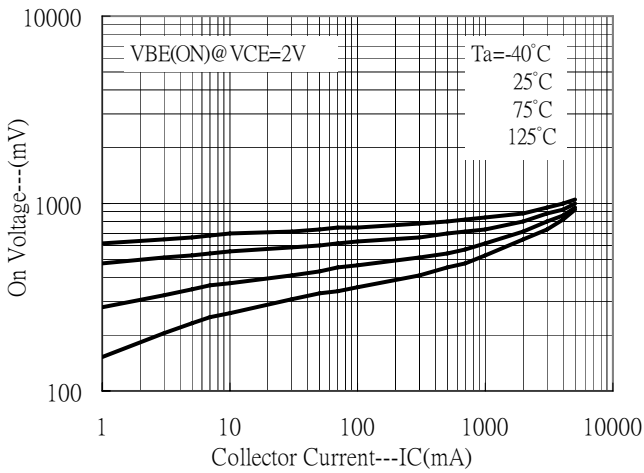
Saturation Voltage vs Collector Current



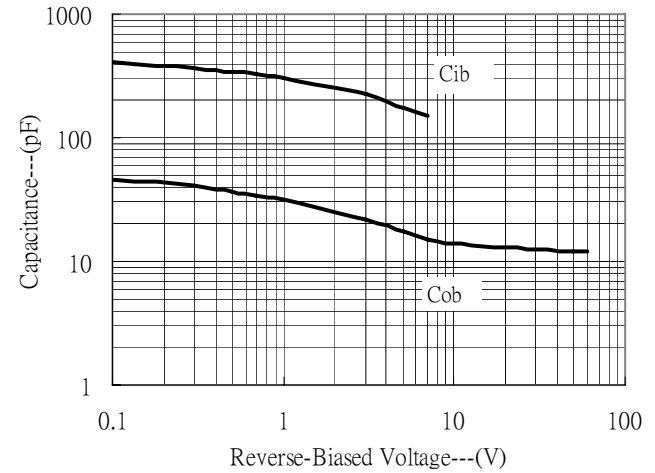
Saturation Voltage vs Collector Current



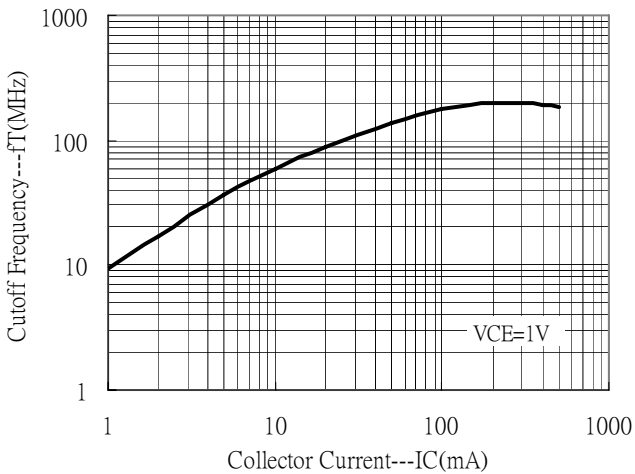
On Voltage vs Collector Current



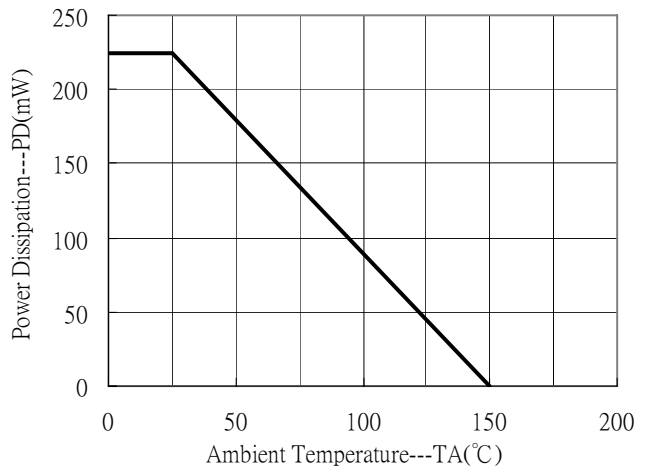
Capacitance vs Reverse-Biased Voltage



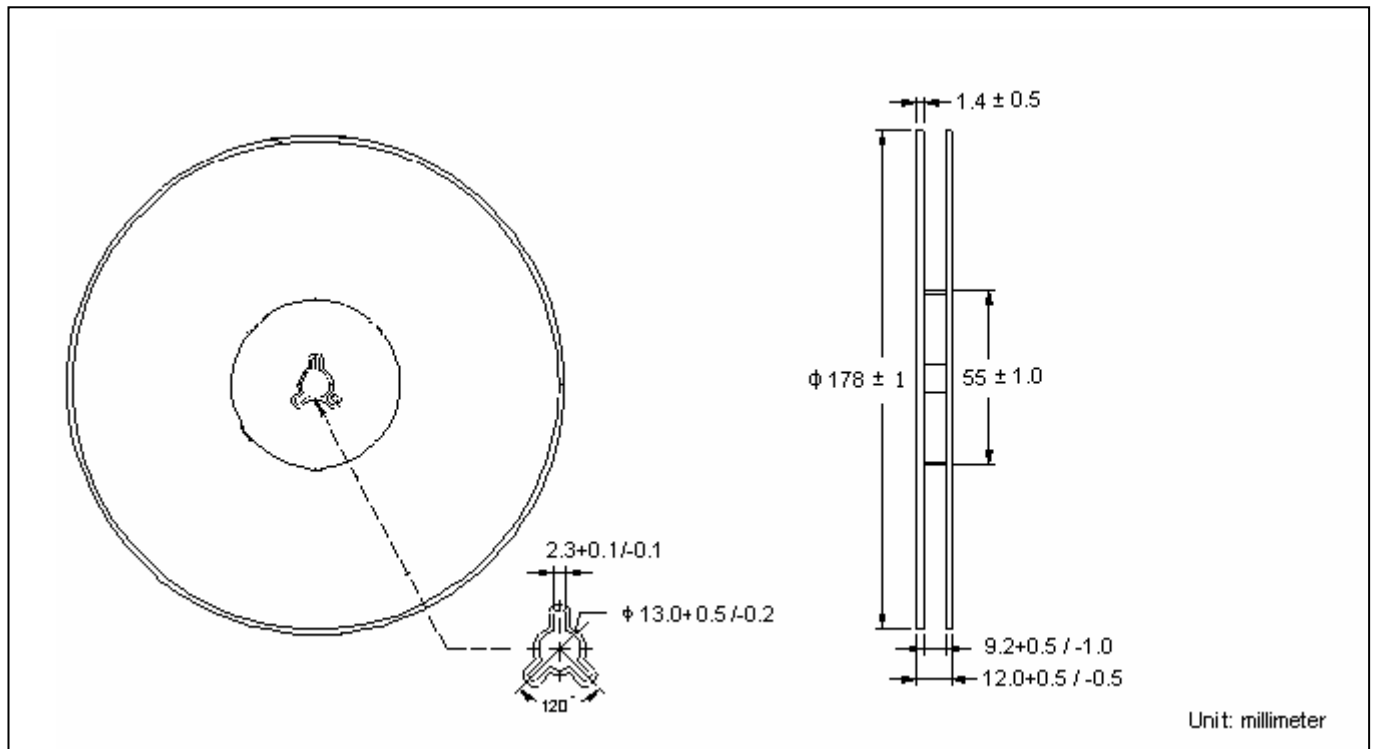
Cutoff frequency vs Collector Current



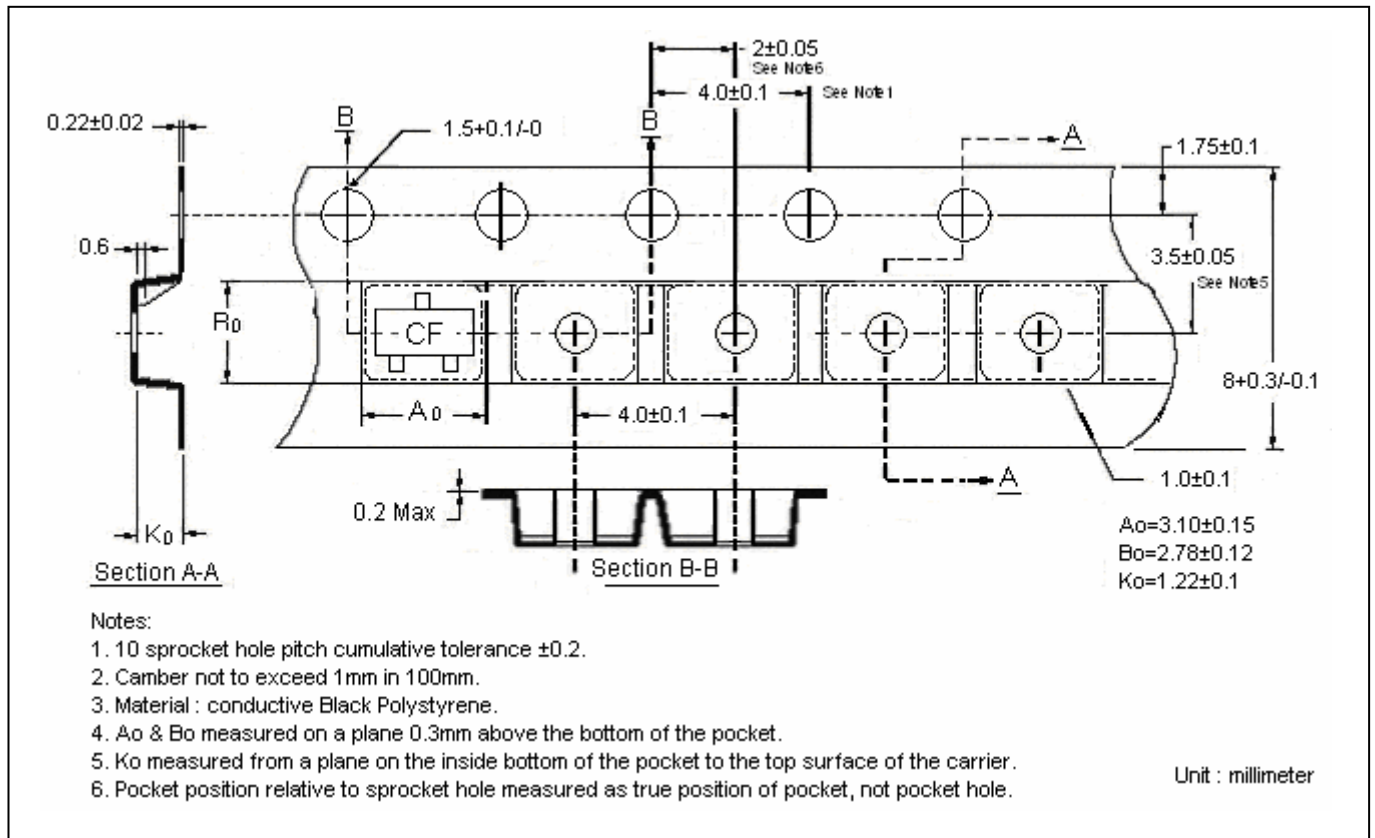
Power Derating Curve



Reel Dimension



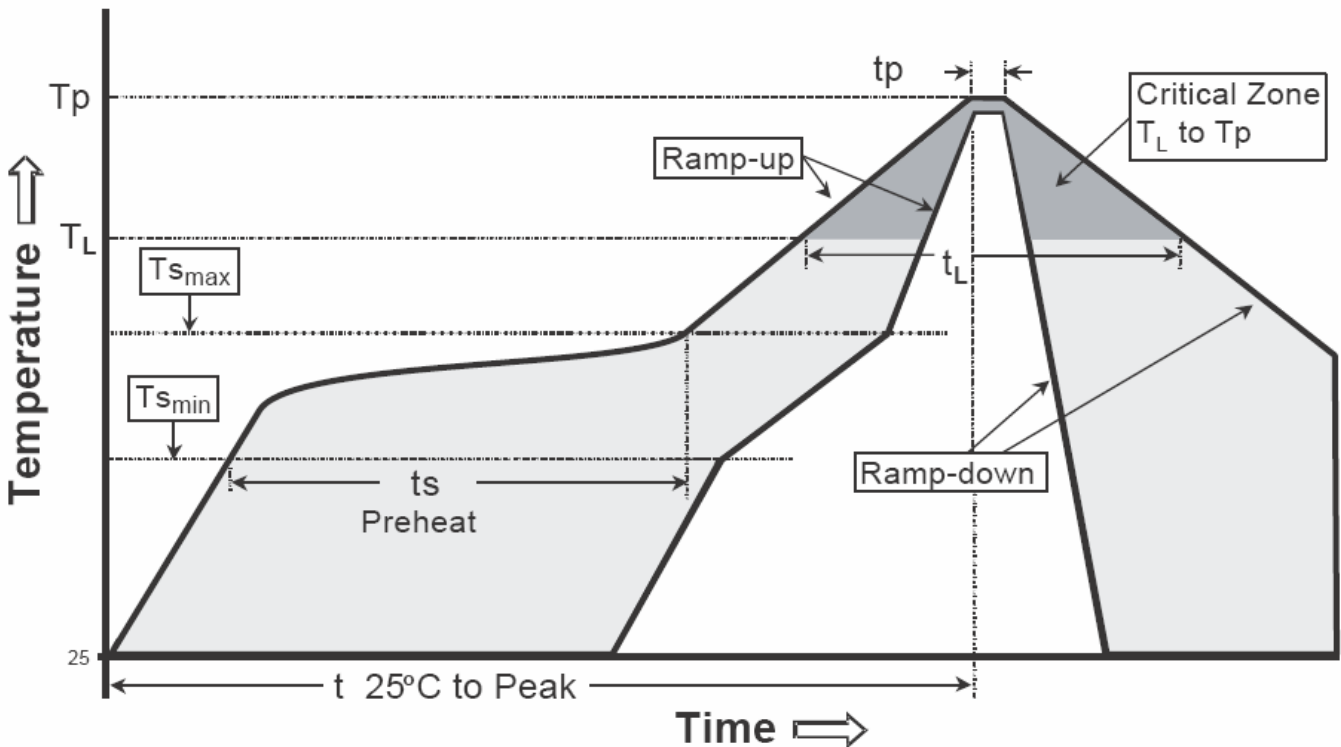
Carrier Tape Dimension



Recommended wave soldering condition

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

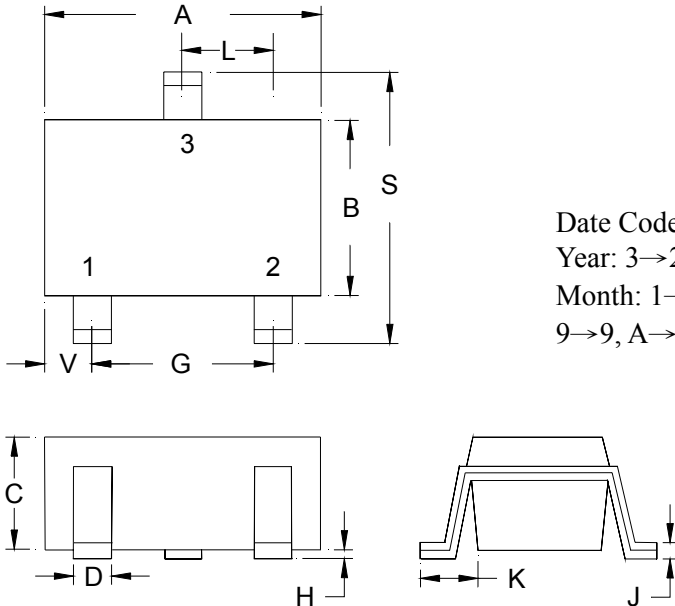
Recommended temperature profile for IR reflow



| 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. |

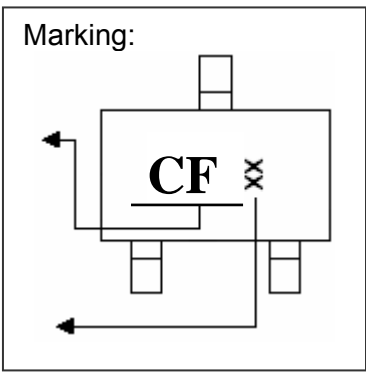
Note : All temperatures refer to topside of the package, measured on the package body surface.

SOT-23 Dimension



The diagram shows three views of the SOT-23 package: a top view with dimensions A, L, B, S, 1, 2, 3, V, and G; a side view with dimensions C, D, and H; and a perspective view with dimensions K and J. The top view labels 1, 2, and 3 correspond to the base, emitter, and collector pins respectively.

Marking:



The marking diagram shows a top-down view of the package with the letters 'CF' and a double cross symbol (⊗) on the top surface. Arrows point to the locations of the three pins.

Product Code

Date Code: Year+Month
 Year: 3→2003, 4→2004
 Month: 1→1, 2→2, . . .
 9→9, A→10, B→11, C→12

3-Lead SOT-23 Plastic Surface Mounted Package
 CYStek Package Code: N3

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

*: Typical

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|--------|-------------|------|-----|--------|--------|-------------|-------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.1102 | 0.1204 | 2.80 | 3.04 | J | 0.0034 | 0.0070 | 0.085 | 0.177 |
| B | 0.0472 | 0.0630 | 1.20 | 1.60 | K | 0.0128 | 0.0266 | 0.32 | 0.67 |
| C | 0.0335 | 0.0512 | 0.89 | 1.30 | L | 0.0335 | 0.0453 | 0.85 | 1.15 |
| D | 0.0118 | 0.0197 | 0.30 | 0.50 | S | 0.0830 | 0.1161 | 2.10 | 2.95 |
| G | 0.0669 | 0.0910 | 1.70 | 2.30 | V | 0.0098 | 0.0256 | 0.25 | 0.65 |
| H | 0.0005 | 0.0040 | 0.013 | 0.10 | | | | | |

- 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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