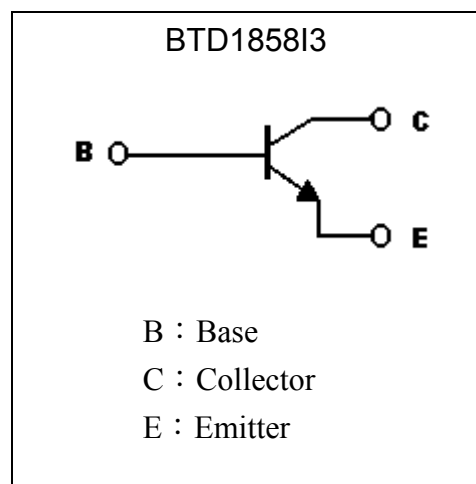
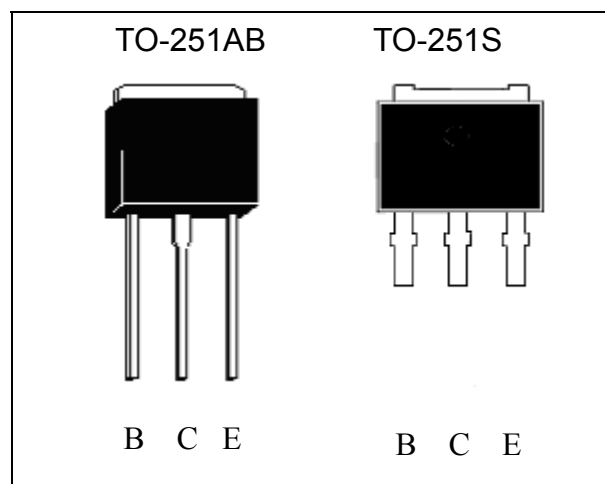


Silicon NPN Epitaxial Planar Transistor

BTD1858I3

Description

- High BV_{CEO}
- High current capability
- Pb-free lead plating package

Symbol

Outline

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

| Parameter | Symbol | Limits | Unit |
|--|-----------------|----------|-----------------------------|
| Collector-Base Voltage | V_{CB0} | 180 | V |
| Collector-Emitter Voltage | V_{CEO} | 160 | V |
| Emitter-Base Voltage | V_{EB0} | 5 | V |
| Collector Current (DC) | I_C | 1.5 | A |
| Collector Current (Pulse) | I_{CP} | 3 (Note) | A |
| Power Dissipation @ $T_A=25^{\circ}\text{C}$ | P_D | 1 | W |
| Power Dissipation @ $T_C=25^{\circ}\text{C}$ | P_D | 15 | W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 125 | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 8.33 | $^{\circ}\text{C}/\text{W}$ |
| Junction Temperature | T_j | 150 | $^{\circ}\text{C}$ |
| Storage Temperature | T_{stg} | -55~+150 | $^{\circ}\text{C}$ |

 Note : Single Pulse , $P_w \leq 380\mu\text{s}$, $Duty \leq 2\%$.



Characteristics (Ta=25°C)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|-----------------------|------|------|------|------|---|
| BV _{CB0} | 180 | - | - | V | I _C =50μA, I _E =0 |
| BV _{CE0} | 160 | - | - | V | I _C =1mA, I _B =0 |
| BV _{EBO} | 5 | - | - | V | I _E =50μA, I _C =0 |
| I _{CB0} | - | - | 1 | μA | V _{CB} =160V, I _E =0 |
| I _{EBO} | - | - | 1 | μA | V _{EB} =4V, I _C =0 |
| *V _{CE(sat)} | - | 0.15 | 0.3 | V | I _C =1A, I _B =100mA |
| *V _{CE(sat)} | - | - | 0.4 | V | I _C =1A, I _B =50mA |
| *V _{BE(on)} | - | - | 0.8 | V | V _{CE} =5V, I _C =5mA |
| h _{FE1} | 180 | - | 560 | - | V _{CE} =5V, I _C =200mA |
| h _{FE2} | 30 | - | - | - | V _{CE} =5V, I _C =500mA |
| f _T | - | 140 | - | MHz | V _{CE} =5V, I _C =150mA |
| Cob | - | 27 | - | pF | V _{CB} =10V, I _E =0, f=1MHz |

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

Classification of hFE 1

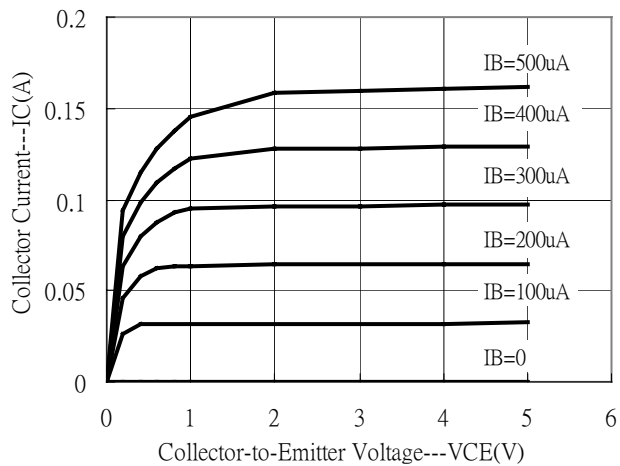
| Rank | Q | R |
|-------|---------|---------|
| Range | 180~390 | 270~560 |

Ordering Information

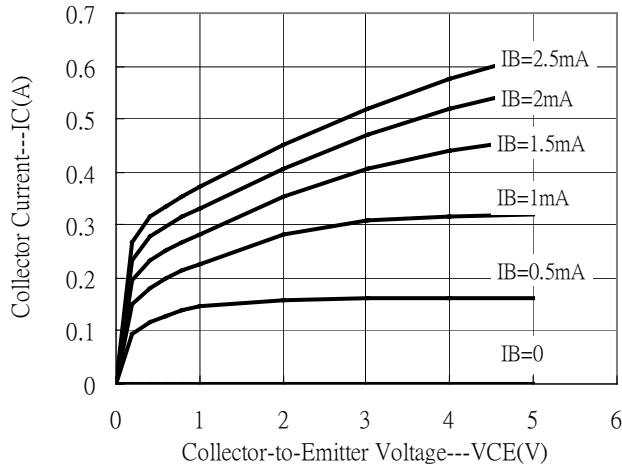
| Device | HFE rank | Package | Shipping |
|-------------------|----------|---|-------------------------------|
| BTD1858I3-Q-UA-S | Q | TO-251AB (Pb-free lead plating) | 80 pcs / tube, 50 tubes / box |
| BTD1858I3-R-UA-S | R | TO-251AB (Pb-free lead plating) | 80 pcs / tube, 50 tubes / box |
| BTD1858I3S-Q-UA-S | Q | TO-251S (Pb-free lead plating) | 80 pcs / tube, 50 tubes / box |
| BTD1858I3S-R-UA-S | R | TO-251S (Pb-free lead plating) | 80 pcs / tube, 50 tubes / box |
| BTD1858I3-Q-UA-G | Q | TO-251AB (Pb-free lead plating and halogen-free package) | 80 pcs / tube, 50 tubes / box |
| BTD1858I3-R-UA-G | R | TO-251AB (Pb-free lead plating and halogen-free package) | 80 pcs / tube, 50 tubes / box |
| BTD1858I3S-Q-UA-G | Q | TO-251S (Pb-free lead plating and halogen-free package) | 80 pcs / tube, 50 tubes / box |
| BTD1858I3S-R-UA-G | R | TO-251S (Pb-free lead plating and halogen-free package) | 80 pcs / tube, 50 tubes / box |

Typical Characteristics

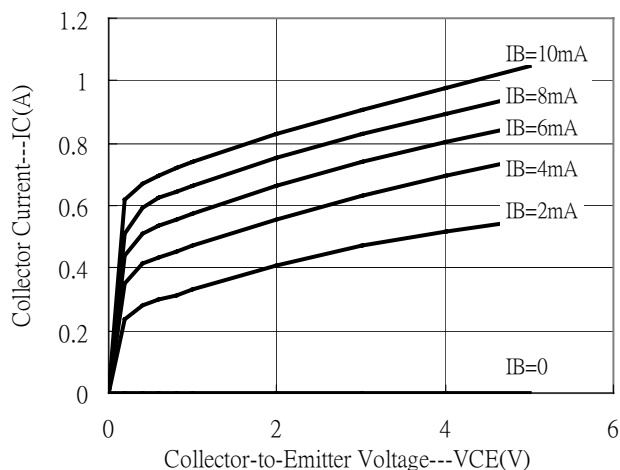
Output Characteristics



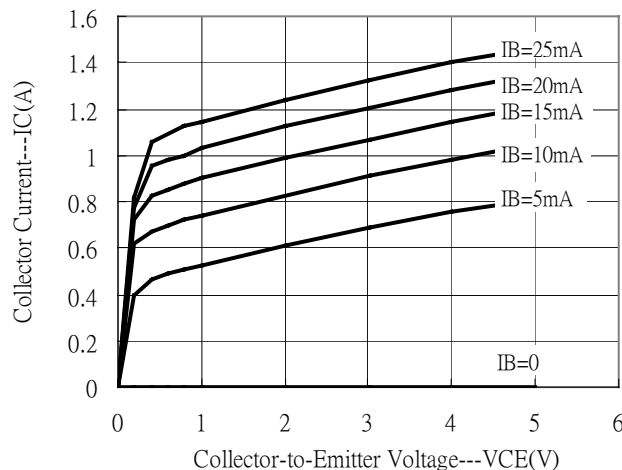
Output Characteristics



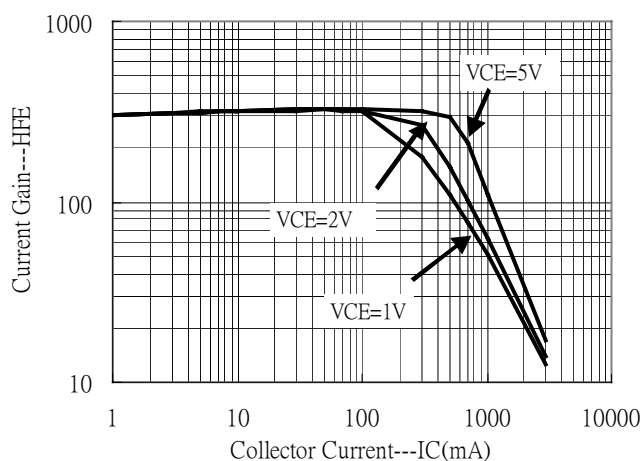
Output Characteristics



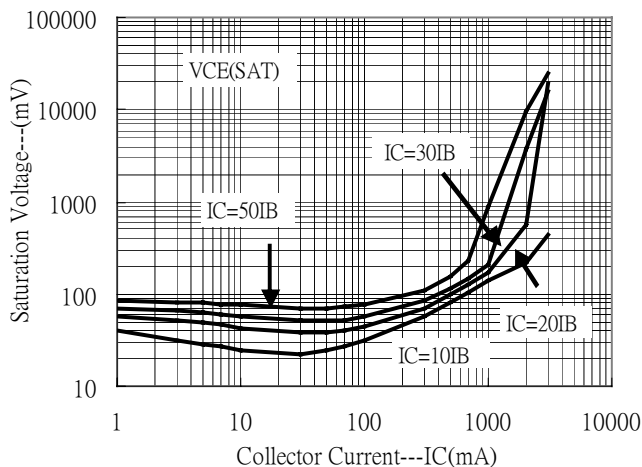
Output Characteristics



Current Gain vs Collector Current



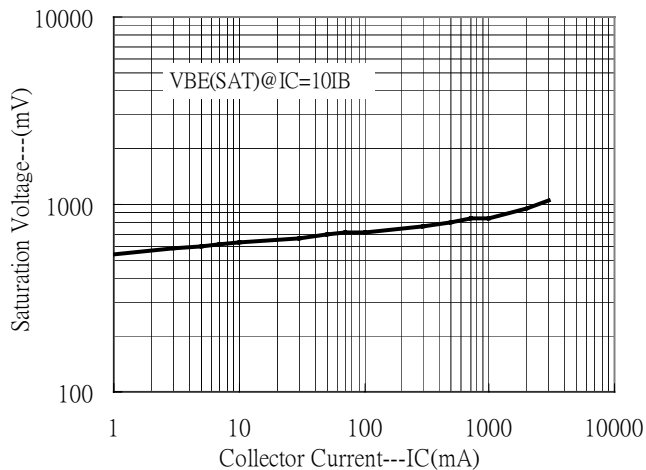
Saturation Voltage vs Collector Current



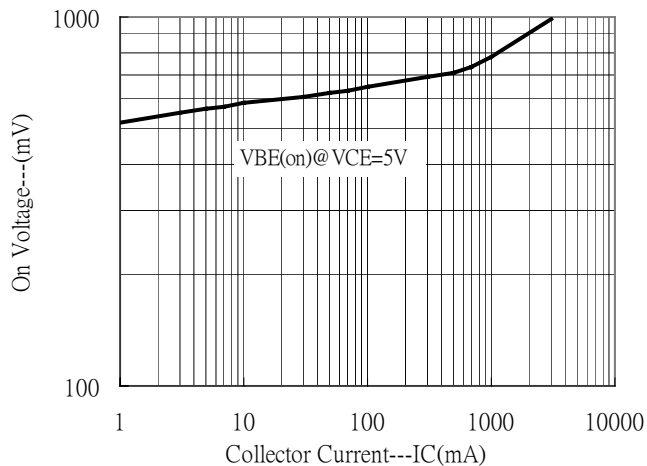


Typical Characteristics(Cont.)

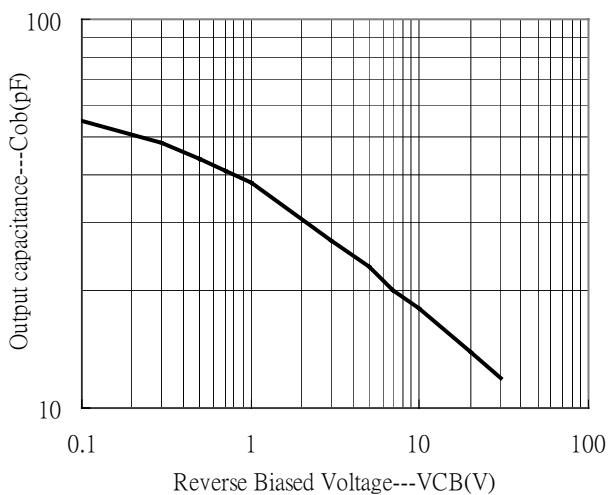
Saturation Voltage vs Collector Current



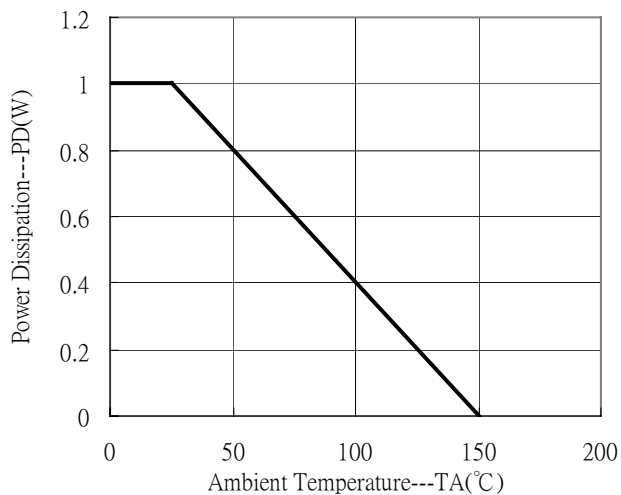
On Voltage vs Collector Current



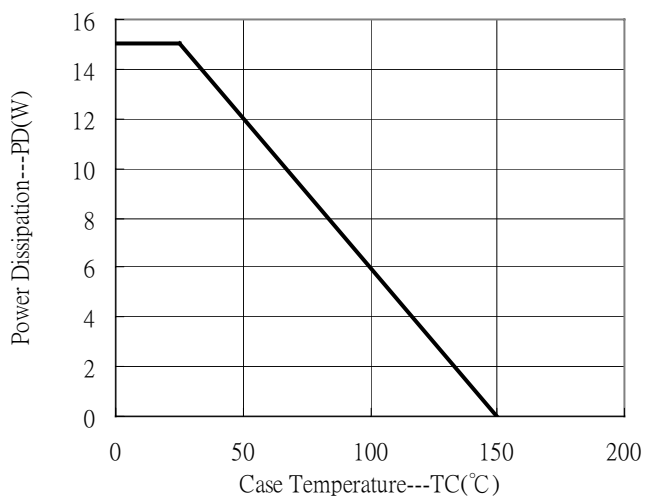
Output Capacitance vs Reverse Biased Voltage



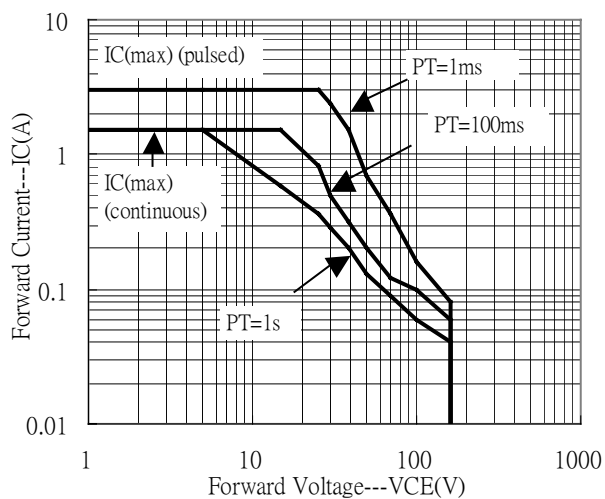
Power Derating Curve



Power Derating Curve



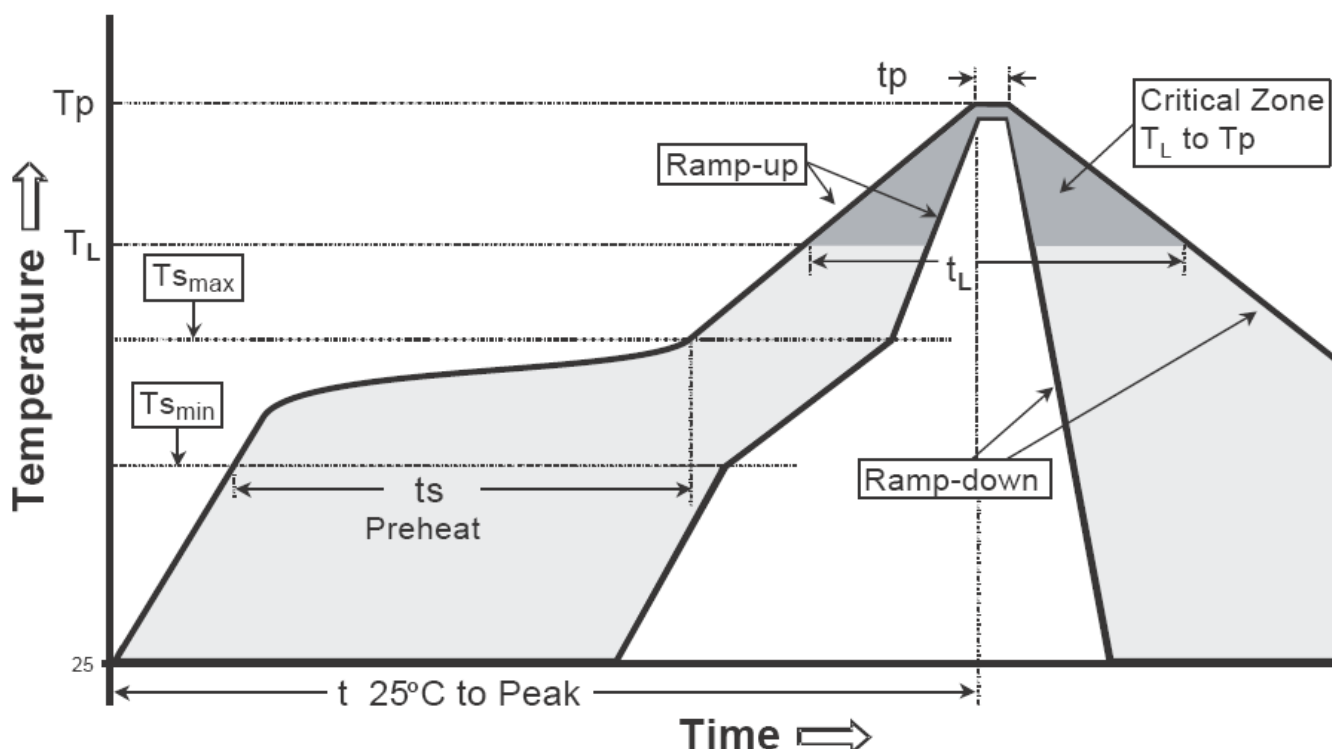
Safe Operating Area



Recommended wave soldering condition

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

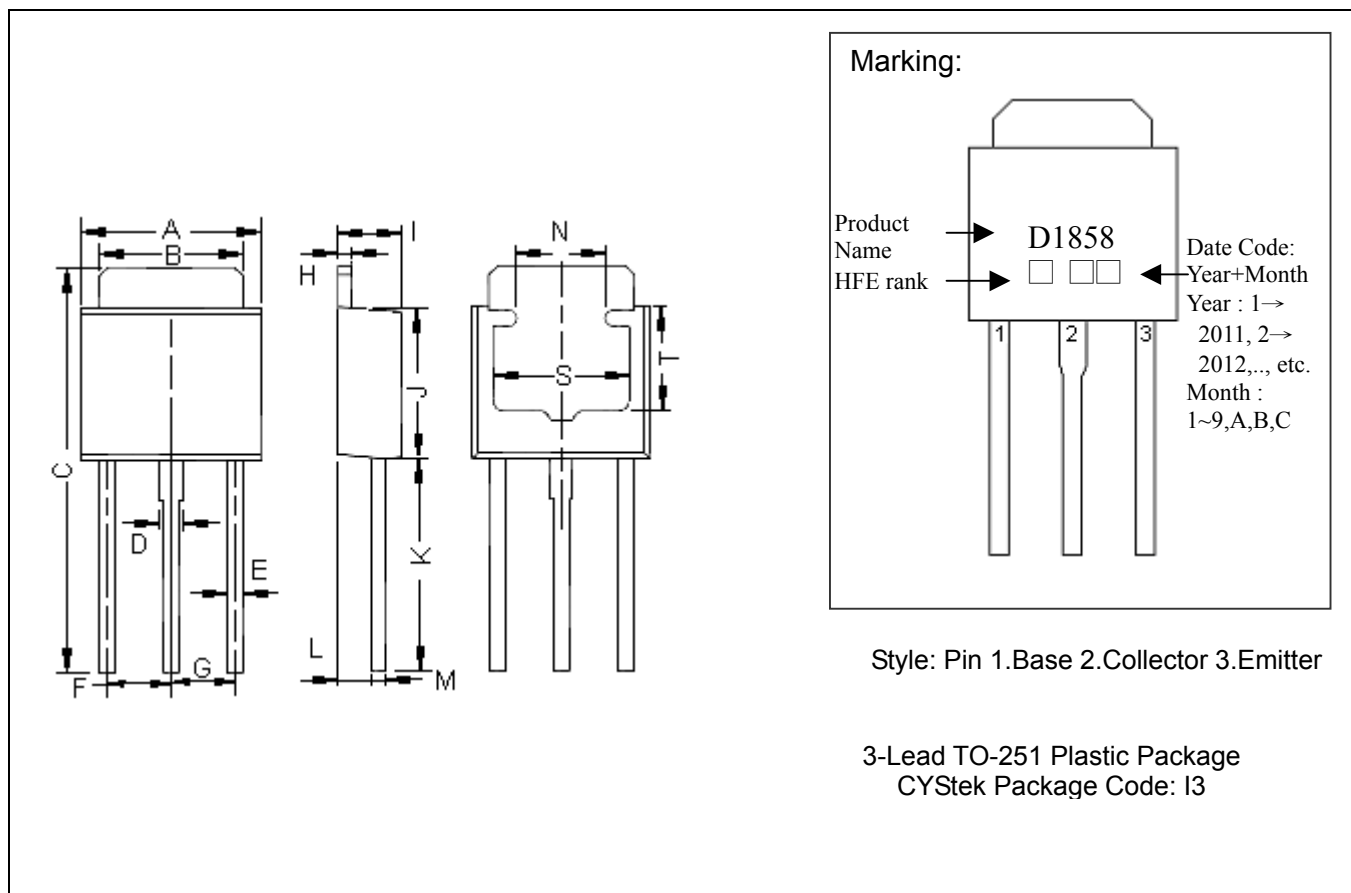
Recommended temperature profile for IR reflow



| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|--|-------------------------|------------------|
| Average ramp-up rate (T _s max to T _p) | 3°C/second max. | 3°C/second max. |
| Preheat | | |
| -Temperature Min(T _s min) | 100°C | 150°C |
| -Temperature Max(T _s max) | 150°C | 200°C |
| -Time(t _s min to t _s 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-251AB Dimension



Marking:

Product Name: D1858
 HFE rank: □ □ □
 Date Code: Year+Month
 Year : 1→ 2011, 2→ 2012,..., etc.
 Month : 1~9,A,B,C

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

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

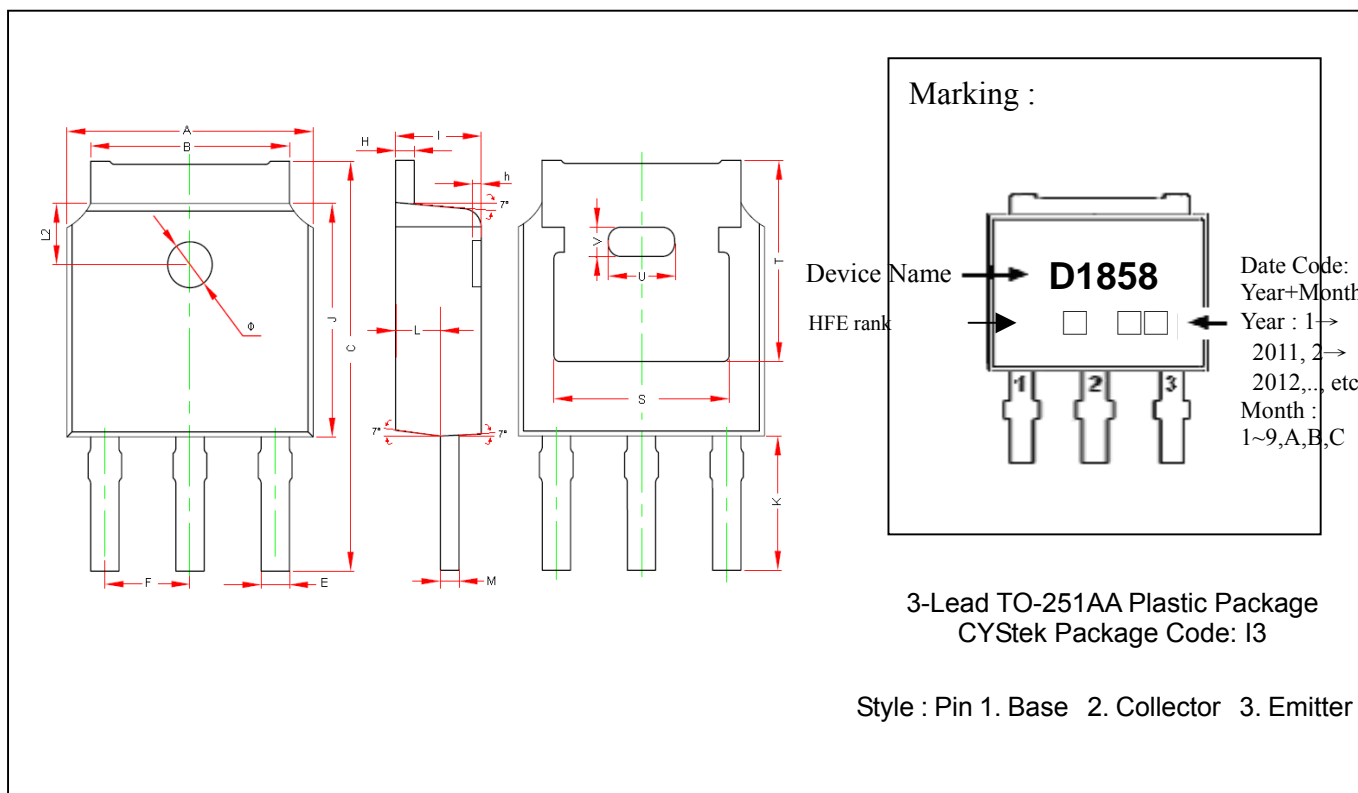
| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|-----------|-------|-------------|--------|-----|-----------|-------|-------------|-------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.250 | 0.262 | 6.350 | 6.650 | I | 0.087 | 0.094 | 2.200 | 2.400 |
| B | 0.205 | 0.213 | 5.200 | 5.400 | J | 0.213 | 0.224 | 5.400 | 5.700 |
| C | 0.571 | 0.587 | 14.500 | 14.900 | K | 0.295 | 0.311 | 7.500 | 7.900 |
| D | 0.028 | 0.035 | 0.700 | 0.900 | L | 0.042 | 0.054 | 1.050 | 1.350 |
| E | 0.020 | 0.028 | 0.500 | 0.700 | M | 0.017 | 0.023 | 0.430 | 0.580 |
| F | 0.091 TYP | | 2.300 TYP | | N | 0.118 REF | | 3.000 REF | |
| G | 0.091 TYP | | 2.300 TYP | | S | 0.197 REF | | 5.000 REF | |
| H | 0.017 | 0.023 | 0.430 | 0.580 | T | 0.150 REF | | 3.800 REF | |

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.

TO-251S Dimension



*: Typical

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|-------|-------------|--------|-----|--------|-------|-------------|-------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.256 | 0.264 | 6.500 | 6.700 | K | 0.138 | REF | 3.500 | REF |
| B | 0.201 | 0.215 | 5.100 | 5.460 | L | 0.036 | 0.046 | 0.910 | 1.110 |
| C | 0.409 | 0.433 | 10.400 | 11.000 | L2 | 0.063 | REF | 1.600 | REF |
| E | 0.026 | 0.034 | 0.660 | 0.860 | M | 0.018 | 0.023 | 0.460 | 0.580 |
| F | 0.086 | 0.094 | 2.186 | 2.386 | S | 0.190 | REF | 4.830 | REF |
| H | 0.018 | 0.023 | 0.460 | 0.580 | T | 0.211 | REF | 5.350 | REF |
| h | 0.000 | 0.012 | 0.000 | 0.300 | U | 0.070 | REF | 1.780 | REF |
| I | 0.087 | 0.094 | 2.200 | 2.400 | V | 0.030 | REF | 0.760 | REF |
| J | 0.236 | 0.244 | 6.000 | 6.200 | Φ | 0.043 | 0.051 | 1.100 | 1.300 |

Notes: 1. Controlling dimension: inch.
 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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