Low Vcesat NPN Epitaxial Planar Transistor

BTD1805AT3

Description

The device is manufactured in NPN planar technology by using a “Base Island” layout. The resulting transistor shows exceptional high gain performance coupled with very low saturation voltage.

Features

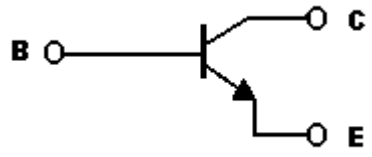
- Very low collector-to-emitter saturation voltage
- Fast switching speed
- High current gain characteristic
- Large current capability
- Pb-free lead plating package

Applications

- CCFL drivers
- Voltage regulators
- Relay drivers
- High efficiency low voltage switching applications

Symbol

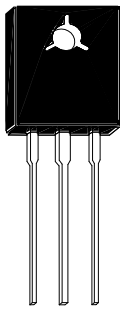
BTD1805AT3



B：Base
C：Collector
E：Emitter

Outline

TO-126



E C B

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage (I_E=0)	V_{CBO}	120	V
Collector-Emitter Voltage (I_B=0)	V_{CEO}	60	V
Emitter-Base Voltage (I_C=0)	V_{EBO}	8	V
Collector Current (DC)	I_C	5	A
Collector Current (Pulse)	I_{CP}	10 (Note 1)	
Base Current	I_B	2	A
Power Dissipation @ T_A=25℃	P_D	1.5	W
Power Dissipation @ T_C=25℃	P_D	20	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	83.3	°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%.

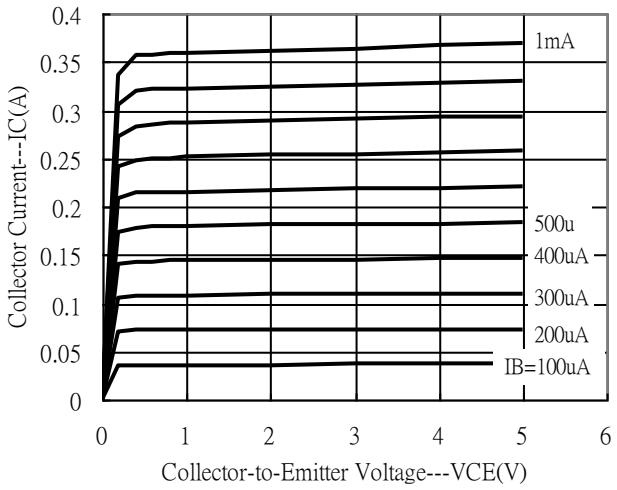
Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	120	-	-	V	I_C=100μA, I_E=0
*BV_{CEO}	60	-	-	V	I_C=1mA, I_B=0
BV_{EBO}	8	-	-	V	I_C=100μA, I_C=0
I_{CBO}	-	-	0.1	μA	V_{CB}=120V, I_E=0
I_{EBO}	-	-	0.1	μA	V_{EB}=8V, I_C=0
*$V_{CE(sat)}$ 1	-	-	50	mV	I_C=100mA, I_B=5mA
*$V_{CE(sat)}$ 2	-	190	250	mV	I_C=2A, I_B=50mA
*$V_{CE(sat)}$ 3	-	230	300	mV	I_C=3A, I_B=150mA
*$V_{CE(sat)}$ 4	-	-	400	mV	I_C=5A, I_B=200mA
*$V_{CE(sat)}$ 5	-	-	300	mV	I_C=2A, I_B=20mA
*$V_{CE(sat)}$ 6	-	-	500	mV	I_C=2A, I_B=10mA
*$V_{BE(sat)}$	-	0.9	1	V	I_C=2A, I_B=100mA
*h_{FE} 1	200	-	450	-	V_{CE}=2V, I_C=100mA
*h_{FE} 2	120	-	-	-	V_{CE}=2V, I_C=5A
*h_{FE} 3	40	-	-	-	V_{CE}=2V, I_C=10A
f_T	-	150	-	MHz	V_{CE}=10V, I_C=50mA
Cob	-	50	-	pF	V_{CB}=10V, f=1MHz
t_{on}	-	50	-	ns	V_{CC}=30V, I_C=10I_{B1}=-10I_{B2}=1A, R_L=30Ω
t_{stg}	-	1.35	2.5	μs	
t_f	-	120	1000	ns	

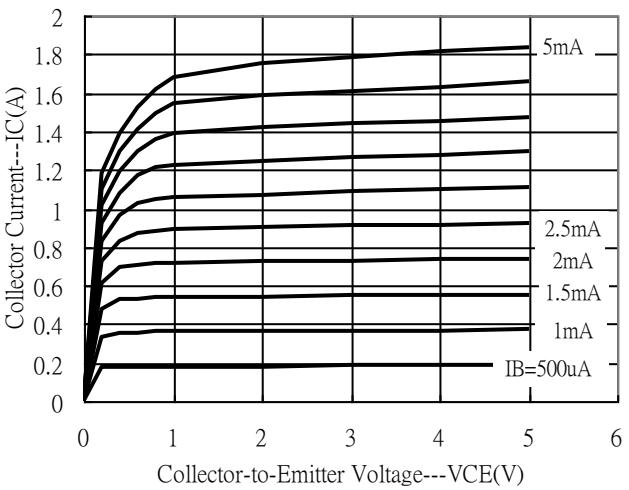
*Pulse Test : Pulse Width ≤380μs, Duty Cycle≤2%

Typical Characteristics

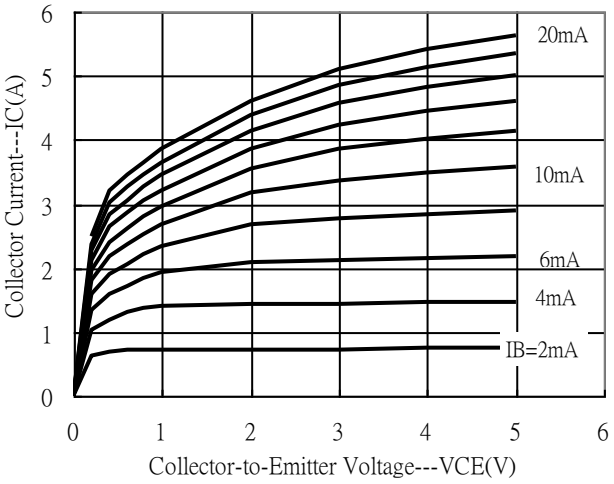
Emitter Grounded Output Characteristics



Emitter Grounded Output Characteristics



Emitter Grounded Output Characteristics



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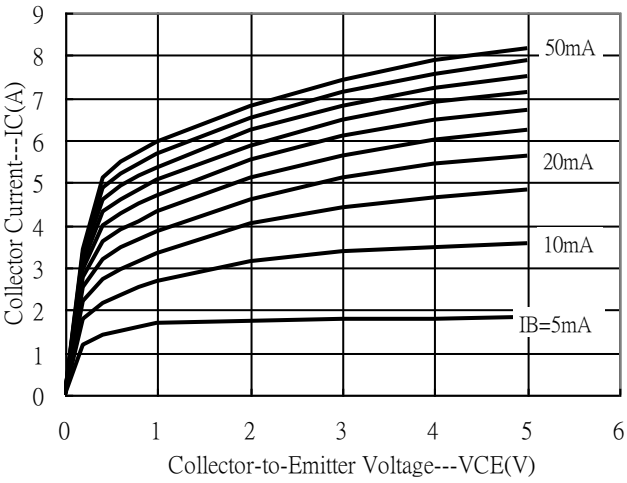
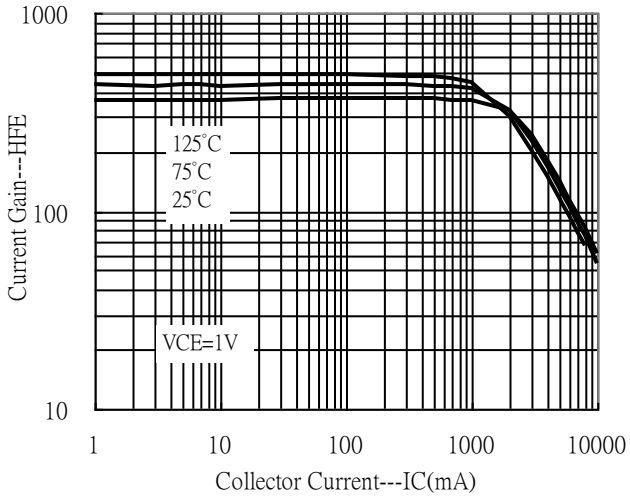
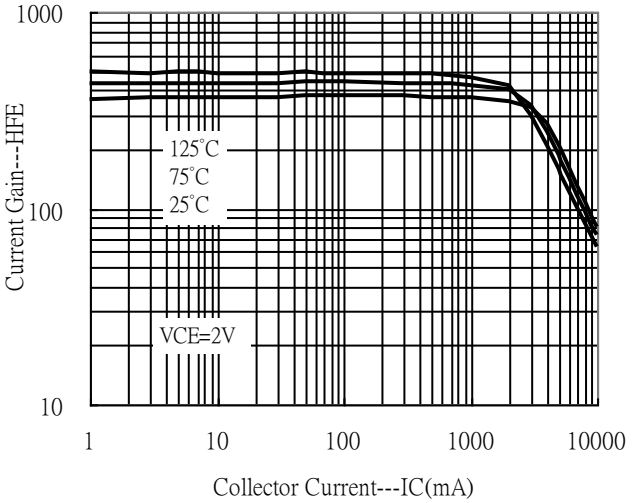


Current Gain vs Collector Current

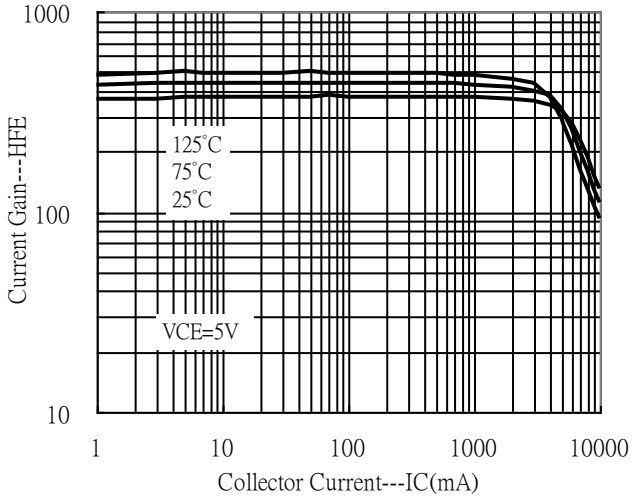


Current Gain vs Collector Current

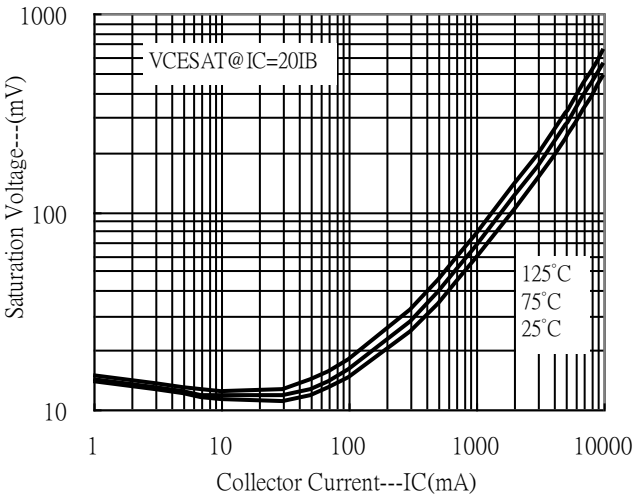


Typical Characteristics(Cont.)

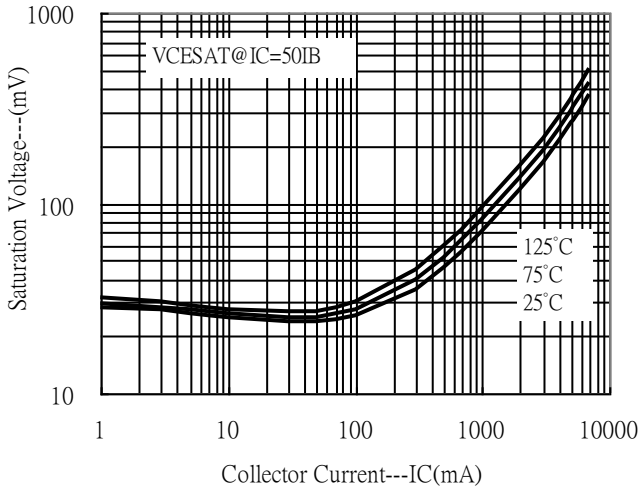
Current Gain vs Collector Current



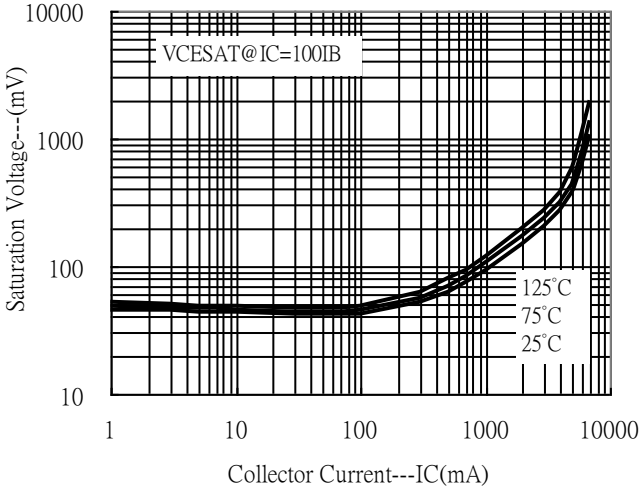
Saturation Voltage vs Collector Current



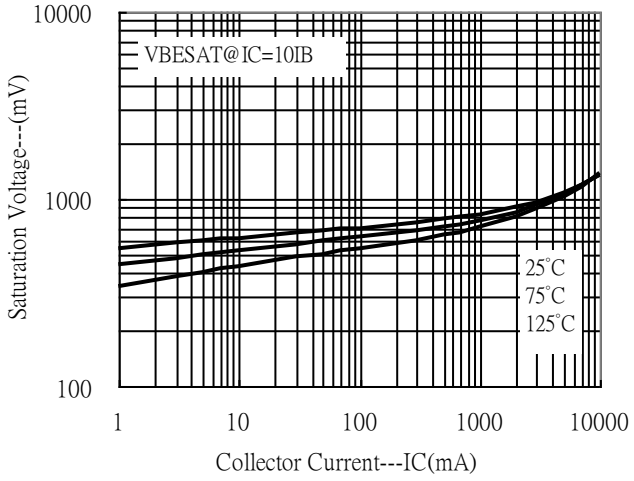
Saturation Voltage vs Collector Current



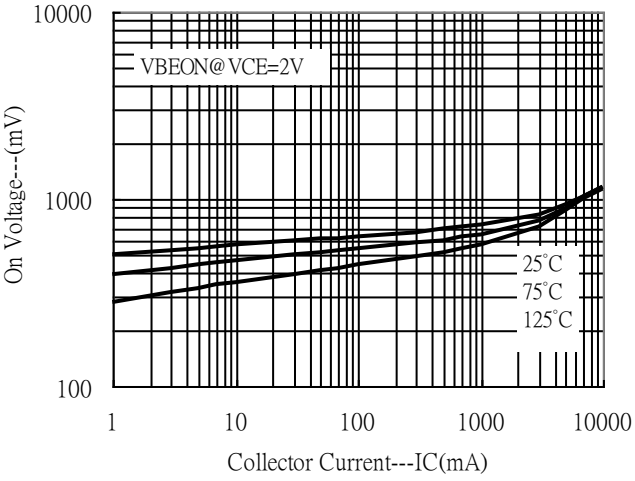
Saturation Voltage vs Collector Current



Saturation Voltage vs Collector Current

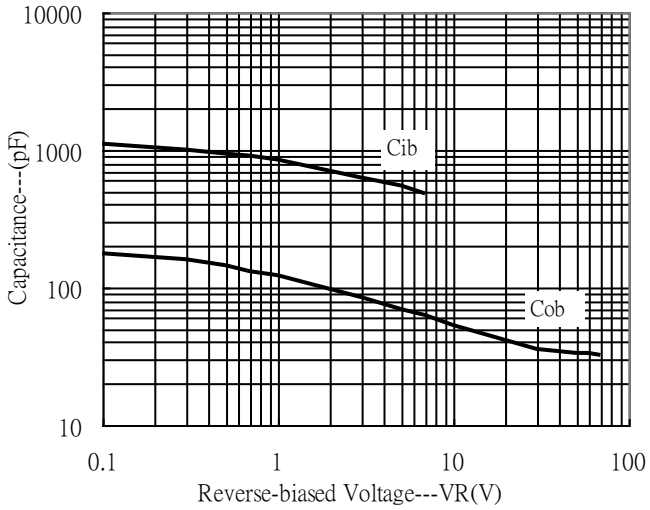


On Voltage vs Collector Current

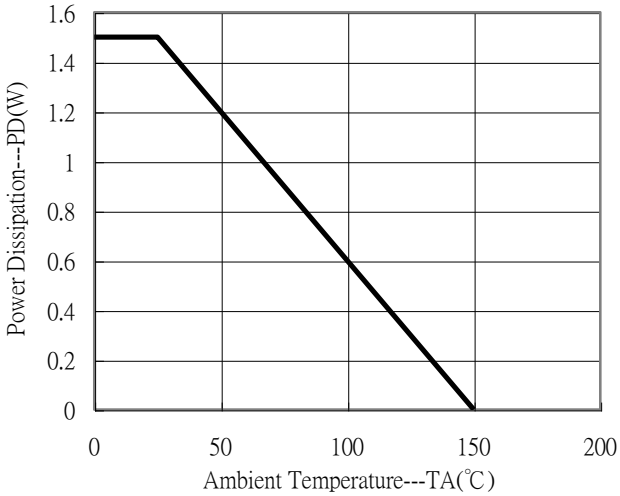


Typical Characteristics(Cont.)

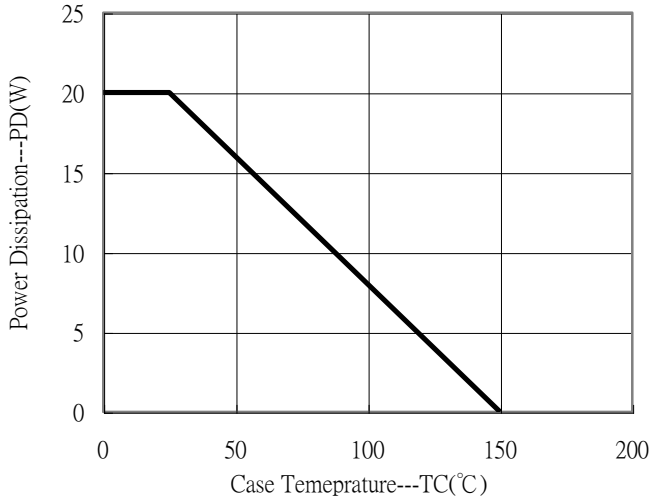
Capacitance vs Reverse-biased Voltage



Power Derating Curve

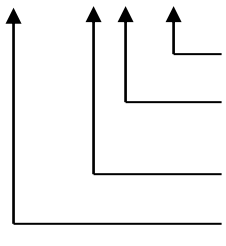


Power Derating Curve



Ordering Information

Device	Package	Shipping
BTD1805AT3-0-BL-X	TO-126 (Pb-free lead plating and halogen-free package)	200 pcs / bag, 3,000 pcs/box 30,000 pcs/carton
BTD1805AT3-0-UH-X		60 pcs/ tube, 40 tubes/box



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

Packing spec, BL: bulk, 200 pcs/bag, 15 bags/box, 10 boxes/carton ; UH : tube, 60 pcs/tube, 40 tubes/box

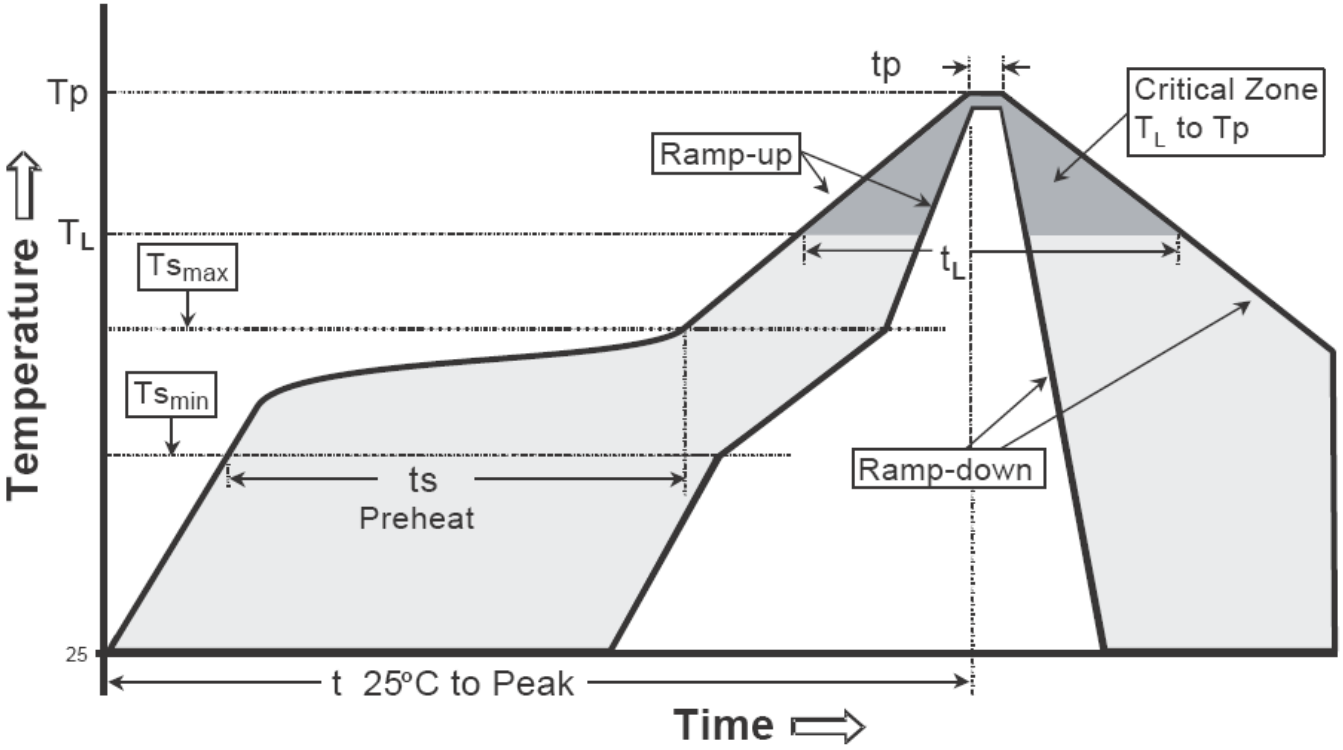
Product rank, zero for no rank products

Product name

Recommended wave soldering condition

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

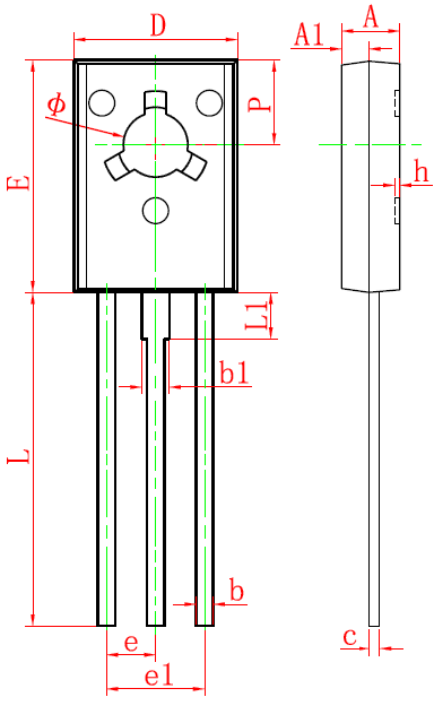
Recommended temperature profile for IR reflow



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) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	 183°C 60-150 seconds	 217°C 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.

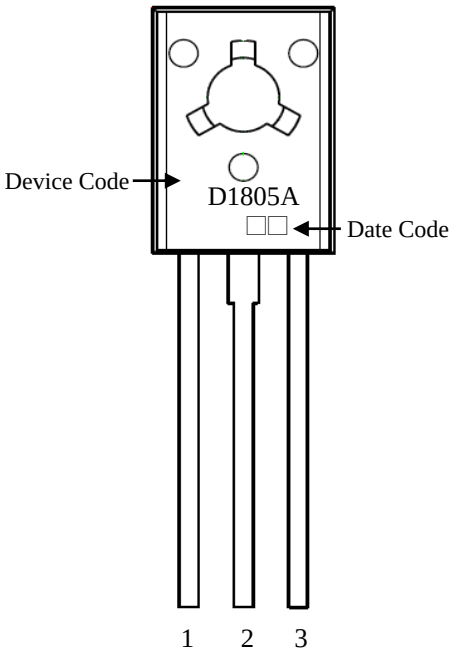
TO-126 Dimension



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

3-Lead TO-126 Plastic Package
CYStek Package Code: T3

Marking:



Date Code : Year Code + Month Code
Year Code : 2011→1, 2012→2,…, 2020→0,
2021→1, 2022→2, …, etc
Month Code : Jan →1, Feb → 2,…, Sep→9,
Oct→A, Nov→B, Dec→C

*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	2.500	2.900	0.098	0.114	e	*2.290		*0.090	
A1	1.100	1.500	0.043	0.059	e1	4.480	4.680	0.176	0.184
b	0.660	0.860	0.026	0.034	h	0.000	0.300	0.000	0.012
b1	1.170	1.370	0.046	0.054	L	15.300	15.700	0.602	0.618
c	0.450	0.600	0.018	0.024	L1	2.100	2.300	0.083	0.091
D	7.400	7.800	0.291	0.307	P	3.900	4.100	0.154	0.161
E	10.600	11.000	0.417	0.433	Φ	3.000	3.200	0.118	0.126

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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