Low Vcesat NPN Epitaxial Planar Transistor

BTD1805I3

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

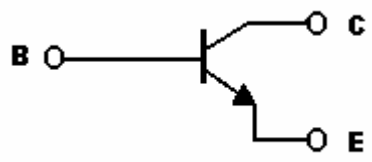
- Very low collector-to-emitter saturation voltage
- Fast switching speed
- High current gain characteristic
- Large current capability
- RoHS compliant package

Applications

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

Symbol

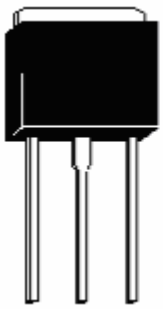
BTD1805I3



B：Base
C：Collector
E：Emitter

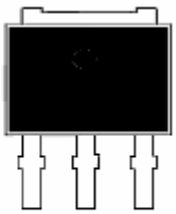
Outline

TO-251AB



B C E

TO-251S



B C E

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	
Emitter-Base Voltage (I_C=0)	V_{EBO}	7	
Collector Current (DC)	I_C	5	A
Collector Current (Pulse)	I_{CP}	10 (Note 1)	
Base Current	I_B	2	
Power Dissipation @ T_A=25℃	P_D	1	W
Power Dissipation @ T_C=25℃	P_D	15	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	8.33	
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~+150	

Note : 1. Single Pulse , Pw ≤300μs,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}	7	-	-	V	I_C=100μA, I_C=0
I_{CBO}	-	-	0.1	μA	V_{CB}=100V, I_E=0
I_{EBO}	-	-	0.1	μA	V_{EB}=7V, I_C=0
*$V_{CE(sat)}$ 1	-	14	50	mV	I_C=100mA, I_B=5mA
*$V_{CE(sat)}$ 2	-	130	300	mV	I_C=2A, I_B=50mA
*$V_{CE(sat)}$ 3	-	160	300	mV	I_C=3A, I_B=150mA
*$V_{CE(sat)}$ 4	-	300	600	mV	I_C=5A, I_B=200mA
*$V_{BE(sat)}$	-	0.9	1.2	V	I_C=2A, I_B=100mA
*h_{FE} 1	200	-	400	-	V_{CE}=2V, I_C=100mA
*h_{FE} 2	85	-	-	-	V_{CE}=2V, I_C=5A
*h_{FE} 3	20	-	-	-	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	-	μs	
t_f	-	120	-	ns	

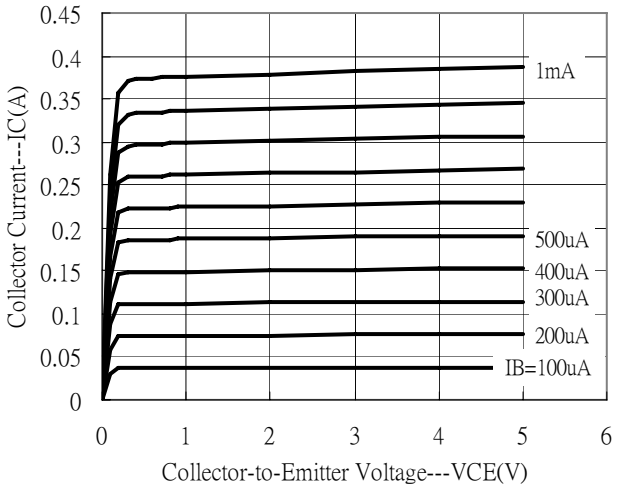
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Ordering Information

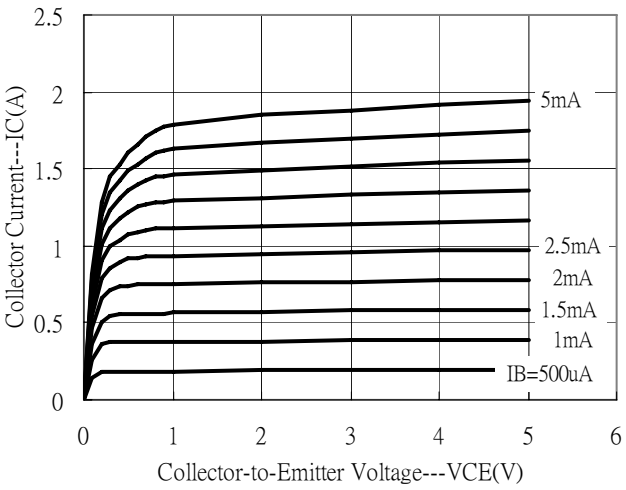
Device	Package	Shipping
BTD1805I3-0-UB-G	TO-251 (RoHS compliant and halogen-free package)	80 pcs / tube, 50 tubes / box

Typical Characteristics

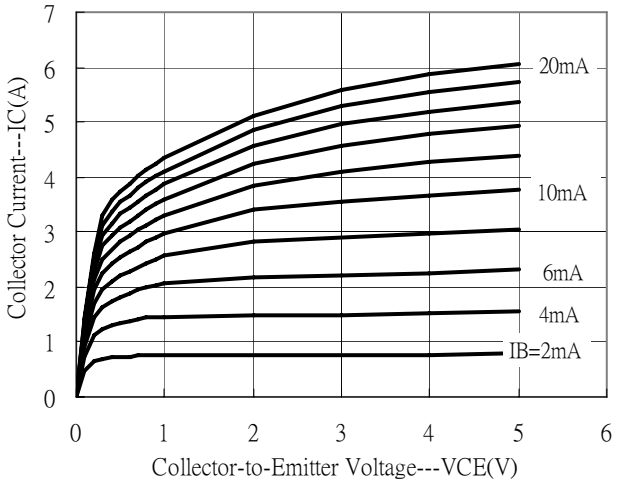
Emitter Grounded Output Characteristics



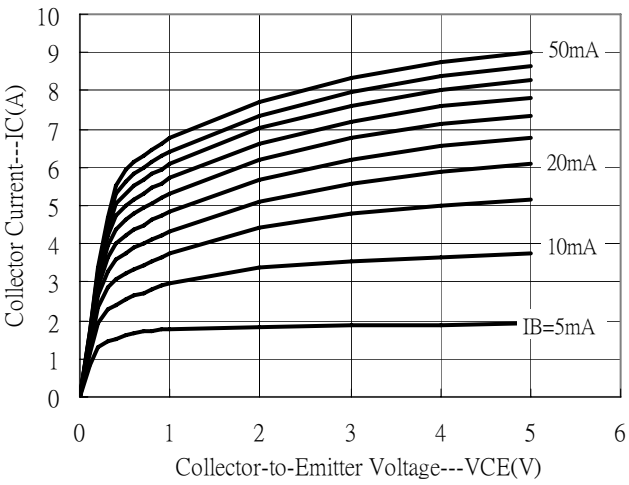
Emitter Grounded Output Characteristics



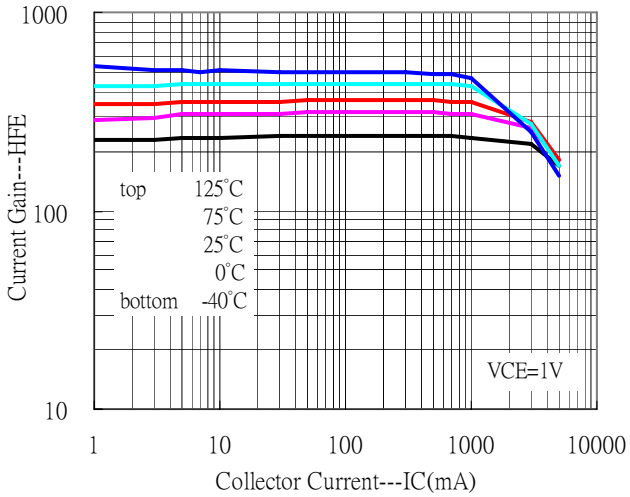
Emitter Grounded Output Characteristics



Emitter Grounded Output Characteristics



Current Gain vs Collector Current



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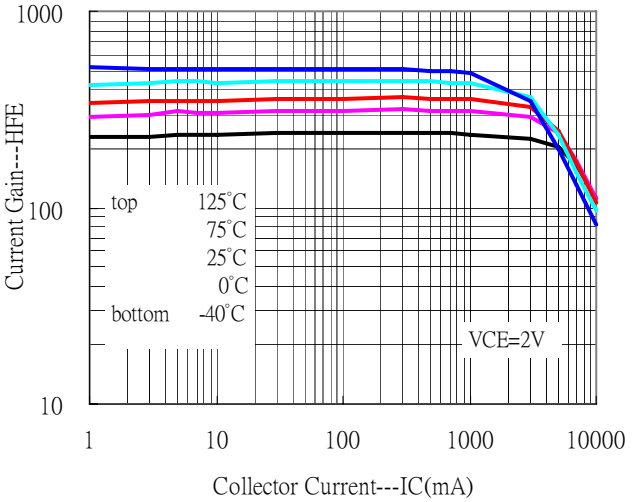
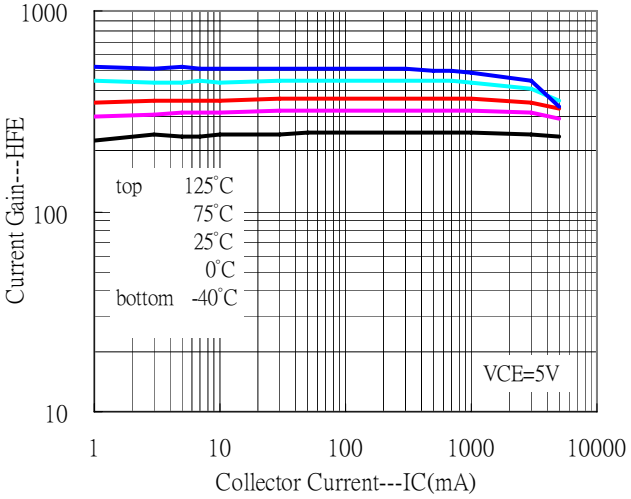
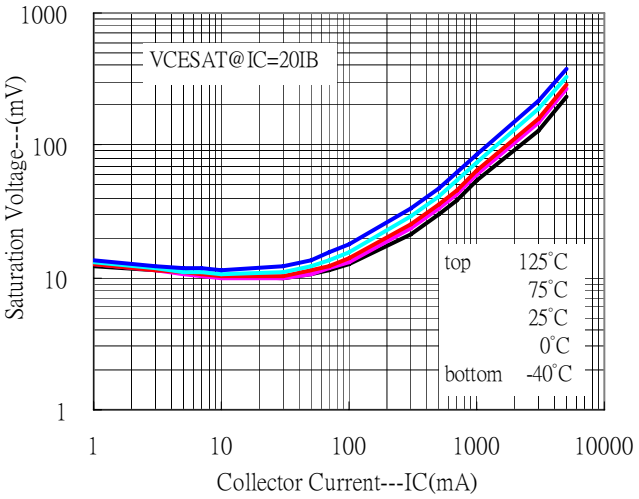


Typical Characteristics(Cont.)

Current Gain vs Collector Current



Saturation Voltage vs Collector Current



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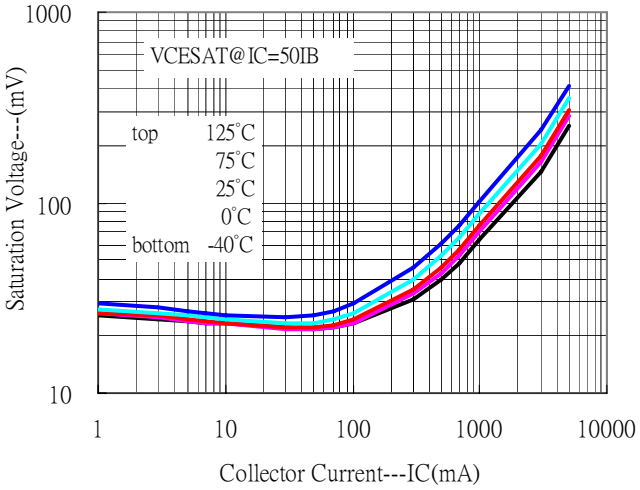

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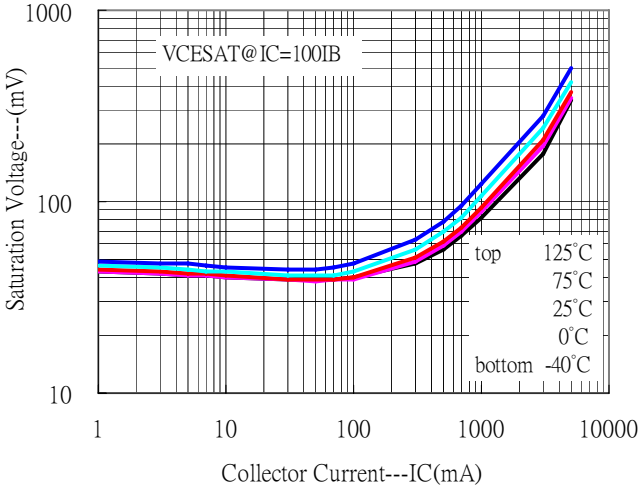

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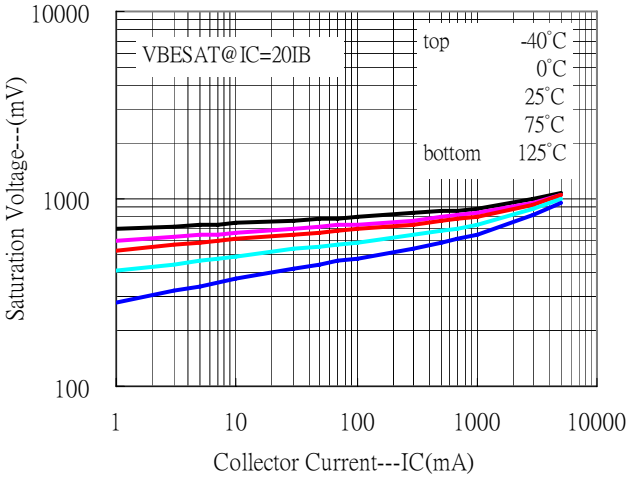
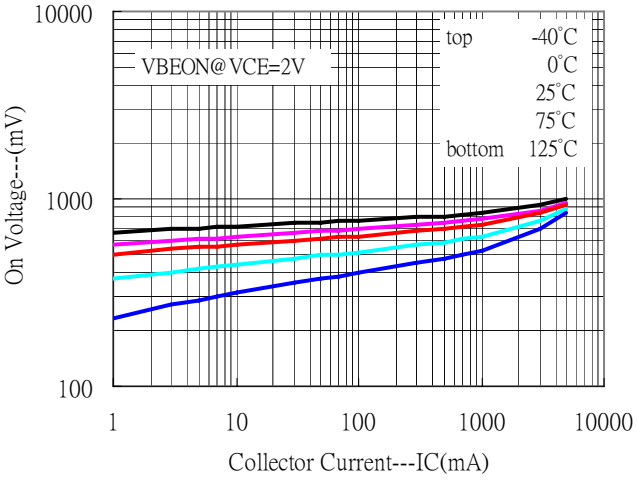
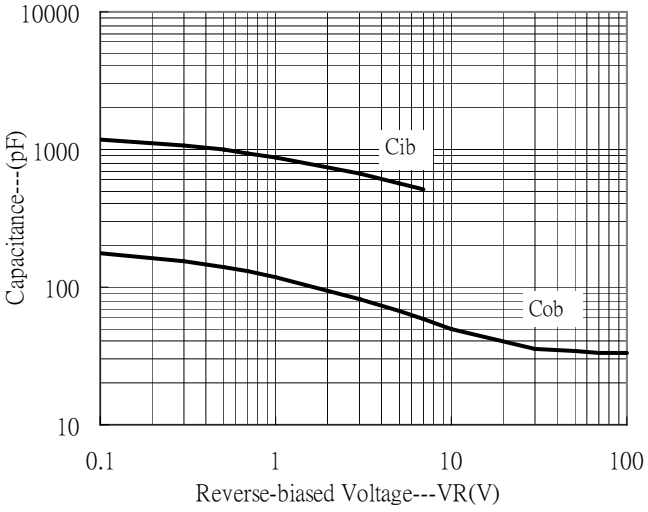


On Voltage vs Collector Current

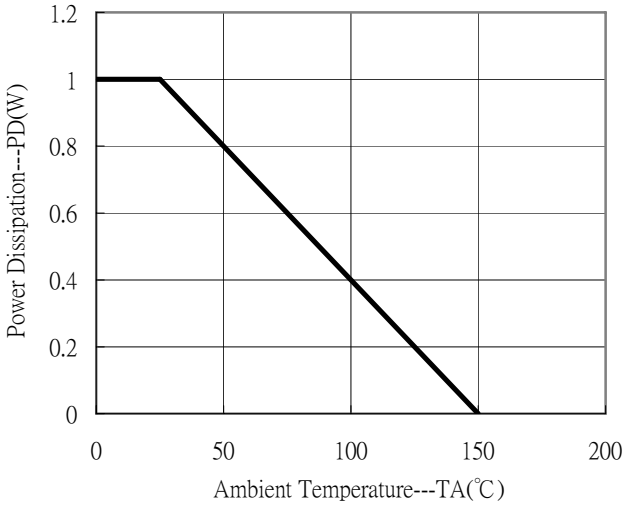


Typical Characteristics(Cont.)

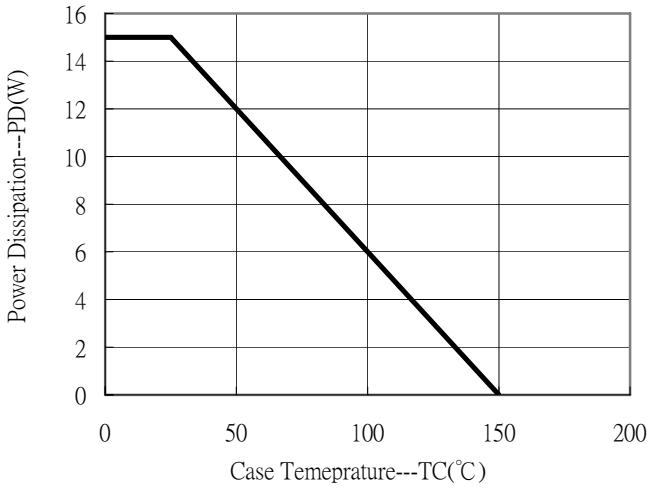
Capacitance vs Reverse-biased Voltage



Power Derating Curve



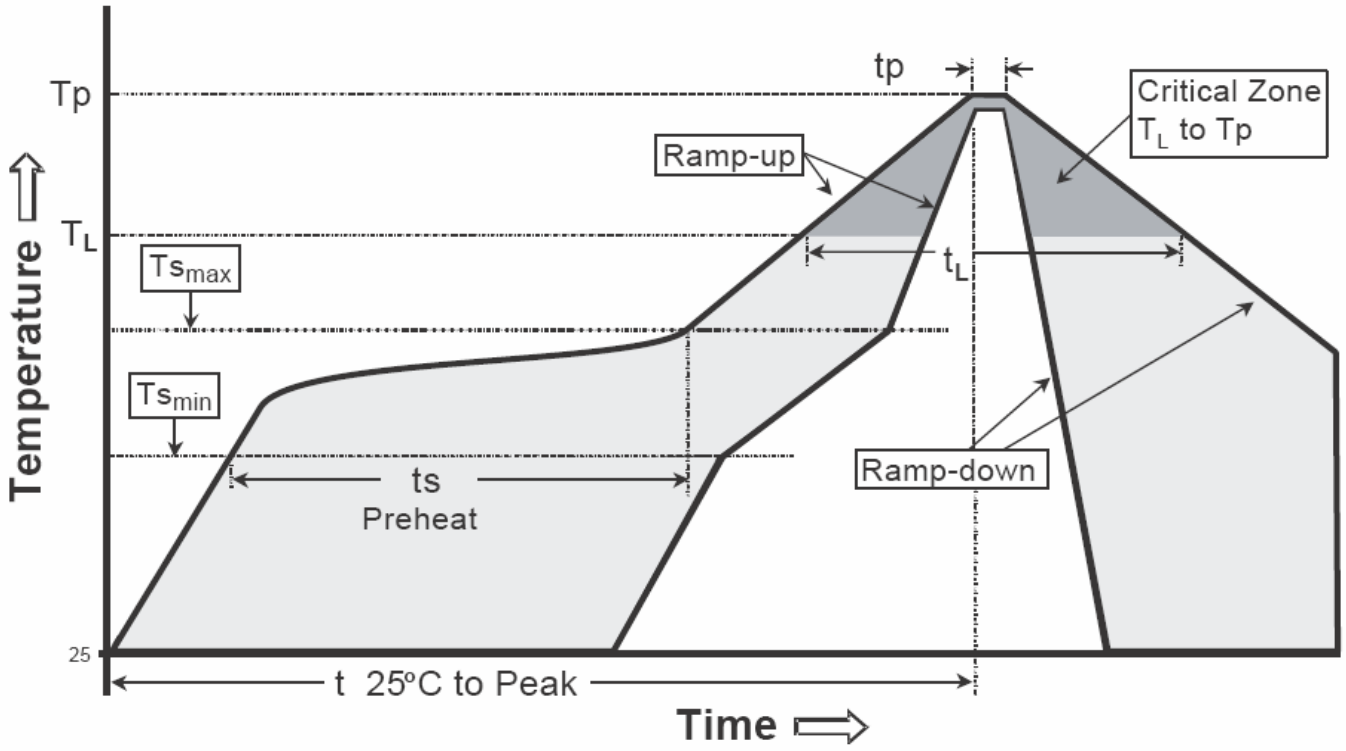
Power Derating Curve



Recommended wave soldering condition

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

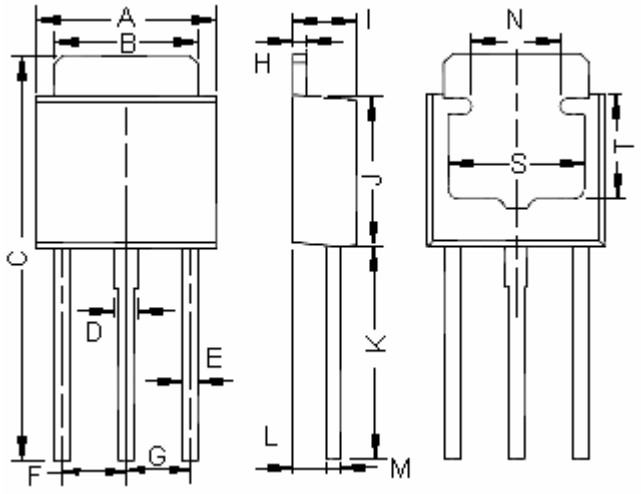
Recommended temperature profile for IR reflow

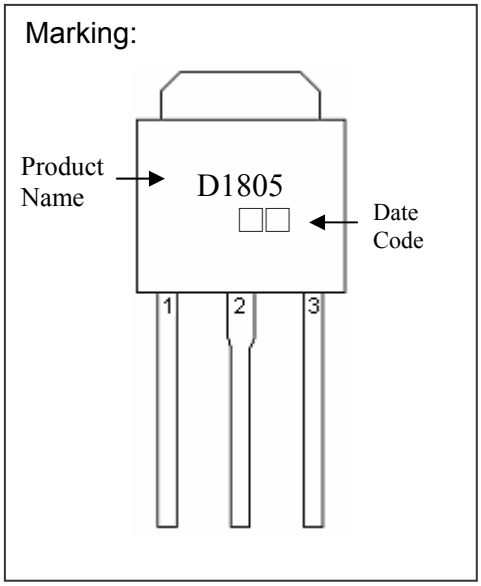


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	 183°C 60-150 seconds	 217°C 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





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

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

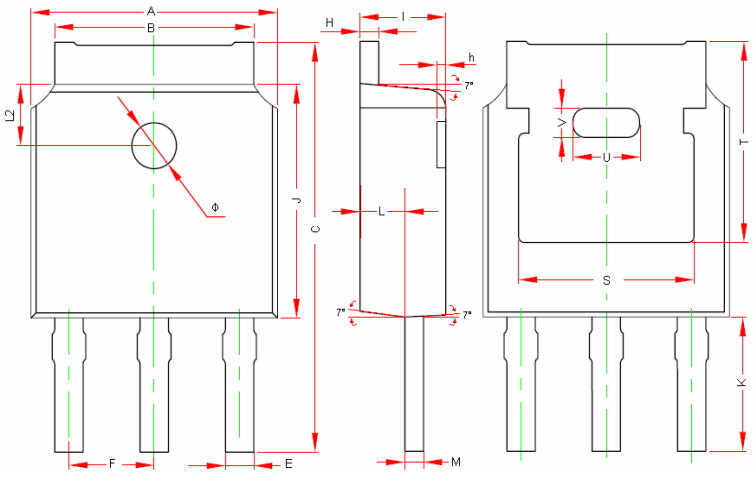
DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.250	0.262	6.350	6.650	I	0.087	0.094	2.200	2.400
B	0.205	0.213	5.200	5.400	J	0.213	0.224	5.400	5.700
C	0.571	0.587	14.500	14.900	K	0.295	0.311	7.500	7.900
D	0.028	0.035	0.700	0.900	L	0.042	0.054	1.050	1.350
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	

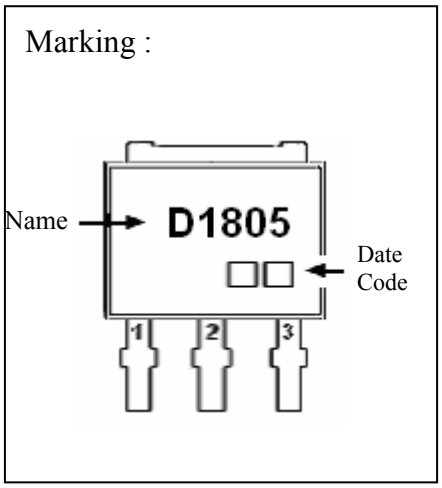
Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

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

TO-251S Dimension





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

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

*: 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.