Low Vcesat NPN Epitaxial Planar Transistor

BTD1816J3

BV_{CEO}	100V
I_C	4A
R_{CESAT}	57mΩ(typ)

Features

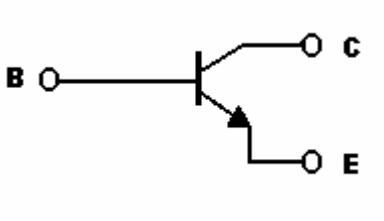
- Low collector-to-emitter saturation voltage
- High-speed switching
- Large current capability
- Good linearity of h_{FE}
- High f_T
- RoHS compliant package

Applications

- Suitable for relay drivers, high speed inverters, converters, and other high current switching applications.

Symbol

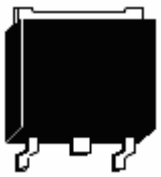
BTD1816J3



B：Base
C：Collector
E：Emitter

Outline

TO-252(DPAK)



B C E

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	120	V
Collector-Emitter Voltage	V_{CEO}	100	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current (DC)	I_C	4	A
Collector Current (Pulse)	I_{CP}	8 (Note 1)	
Base Current	I_B	1.2	A
Power Dissipation @ T_A=25°C	P_D	1	W
Power Dissipation @ T_C=25°C	P_D	20	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125	°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=10μA, I_E=0
*BV_{CEO}	100	-	-	V	I_C=1mA, I_B=0
BV_{EBO}	6	-	-	V	I_C=10μA, I_C=0
I_{CBO}	-	-	1	μA	V_{CB}=100V, I_E=0
I_{EBO}	-	-	1	μA	V_{EB}=4V, I_C=0
*$V_{CE(sat)}$ 1	-	57	100	mV	I_C=1A, I_B=50mA
*$V_{CE(sat)}$ 2	-	86	150	mV	I_C=2A, I_B=200mA
*$R_{CE(sat)}$	-	57	100	mΩ	I_C=1A, I_B=50mA
*$V_{BE(sat)}$	-	0.9	1.2	V	I_C=2A, I_B=200mA
*h_{FE} 1	180	-	560	-	V_{CE}=5V, I_C=500mA
*h_{FE} 2	120	-	-	-	V_{CE}=5V, I_C=3A
f_T	-	180	-	MHz	V_{CE}=10V, I_C=500mA
Cob	-	40	-	pF	V_{CB}=10V, f=1MHz
t_{on}	-	100	-	ns	V_{CC}=50V, I_C=10I_{B1}=-10I_{B2}=2A, R_L=25Ω
t_{stg}	-	900	-	ns	
t_f	-	50	-	ns	

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

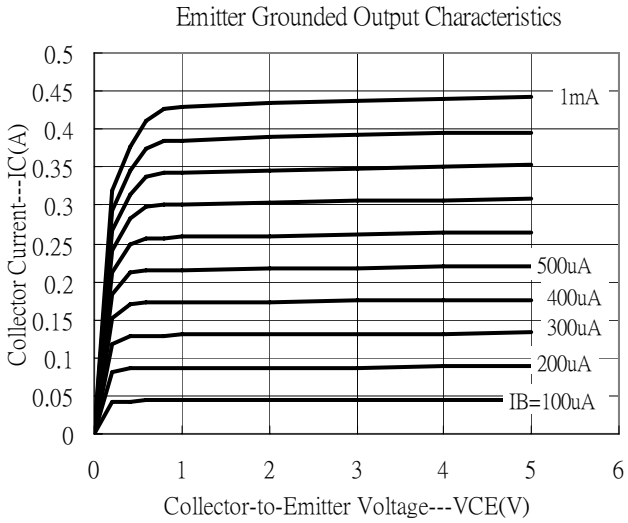
Classification of h_{FE} 1

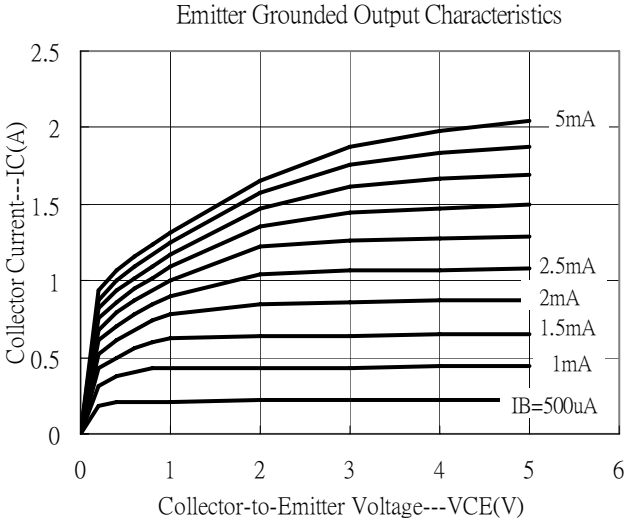
Rank	R	S
Range	180~390	270~560

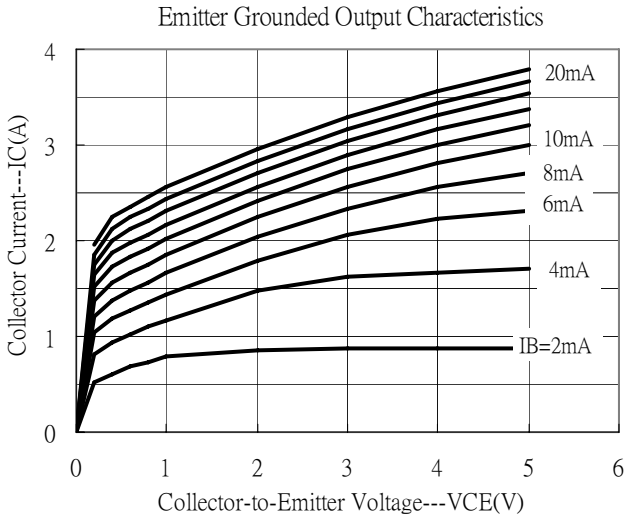
Ordering Information

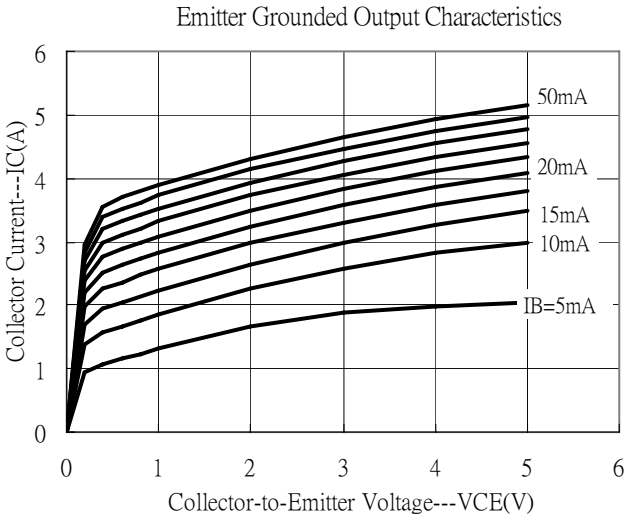
Device	HFE Rank	Package	Shipping
BTD1816J3-R-T3-G	R	TO-252 (Pb-free lead plating and halogen-free package)	2500 pcs / Tape & Reel
BTD1816J3-S-T3-G	S	TO-252 (Pb-free lead plating and halogen-free package)	2500 pcs / Tape & Reel

Typical Characteristics



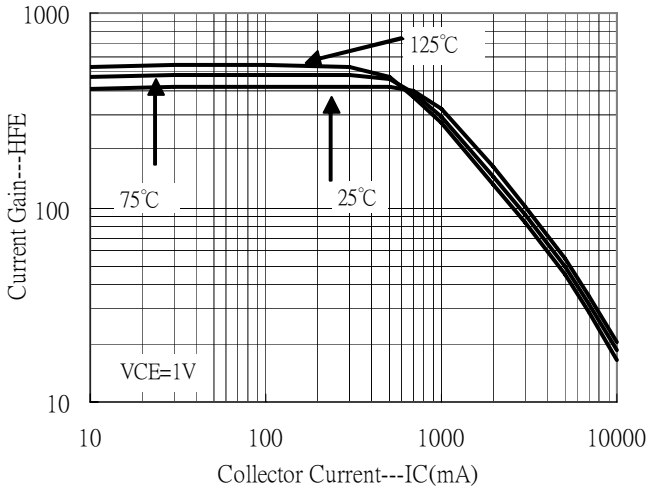




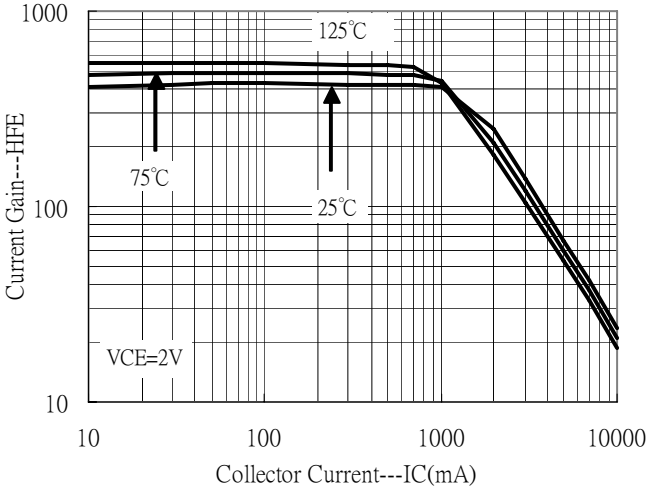


Typical Characteristics(Cont.)

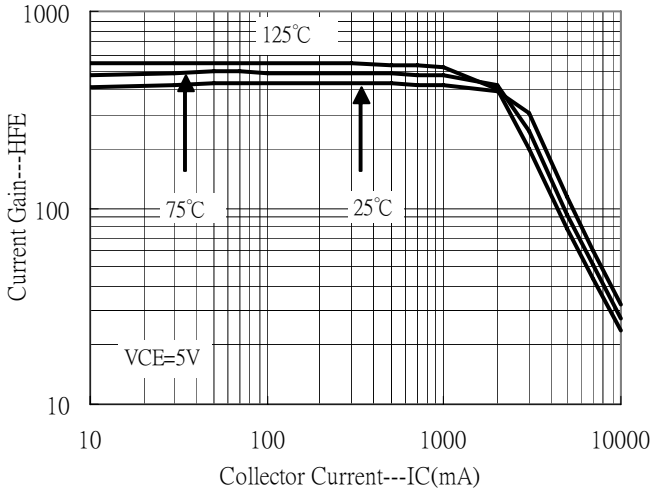
Current Gain vs Collector Current



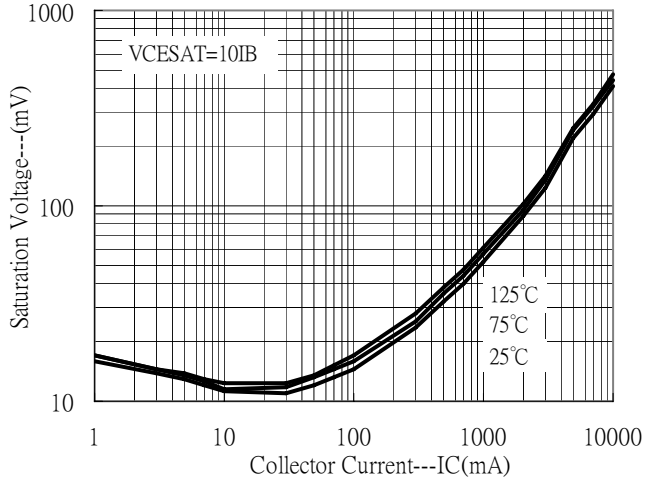
Current Gain vs Collector Current



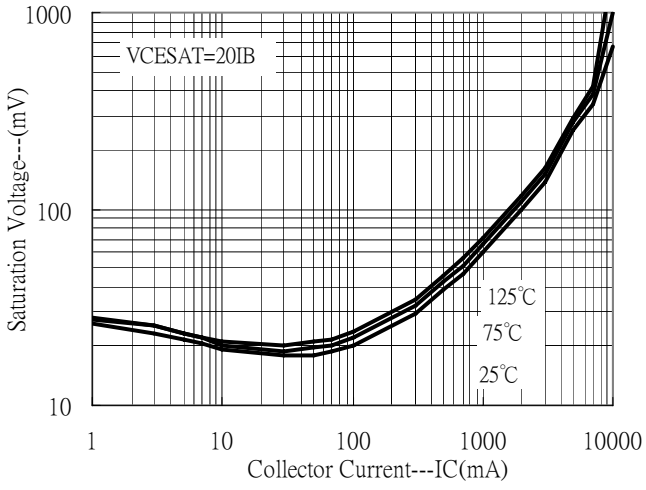
Current Gain vs Collector Current



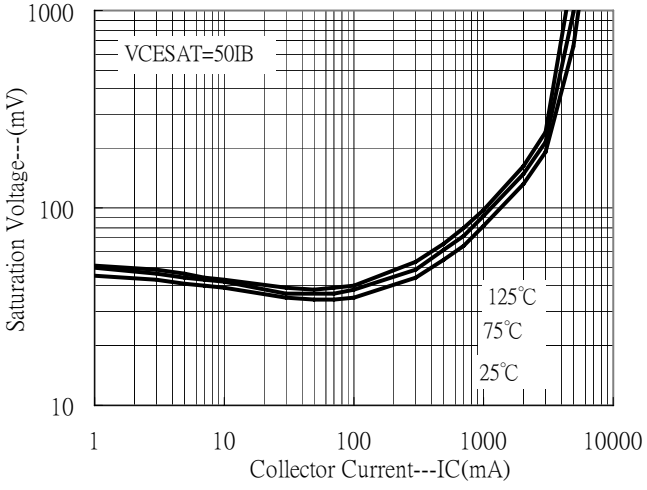
Saturation Voltage vs Collector Current



Saturation Voltage vs Collector Current

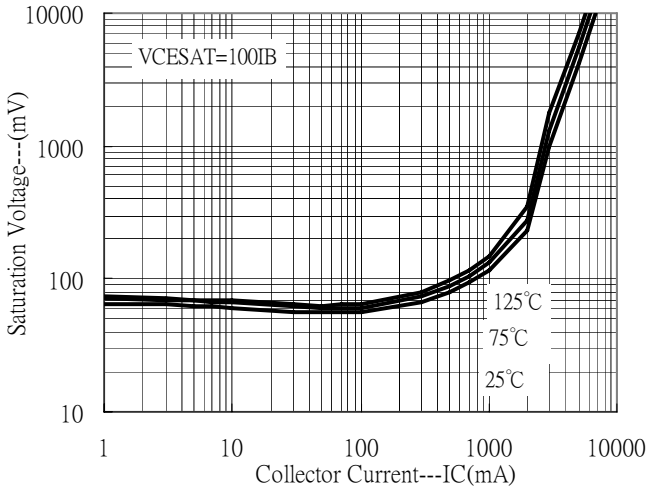


Saturation Voltage vs Collector Current

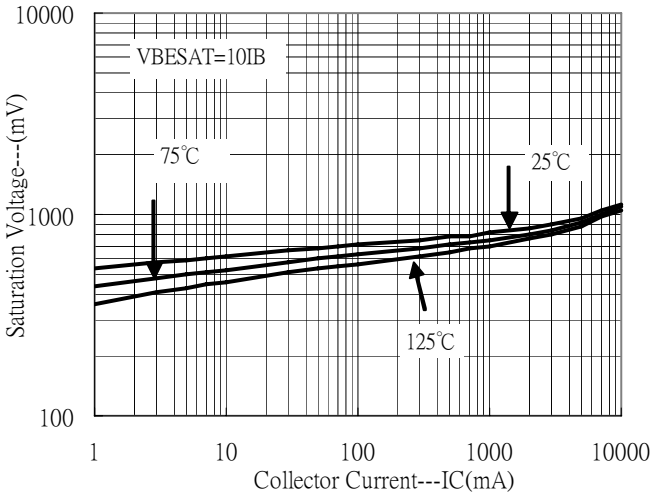


Typical Characteristics(Cont.)

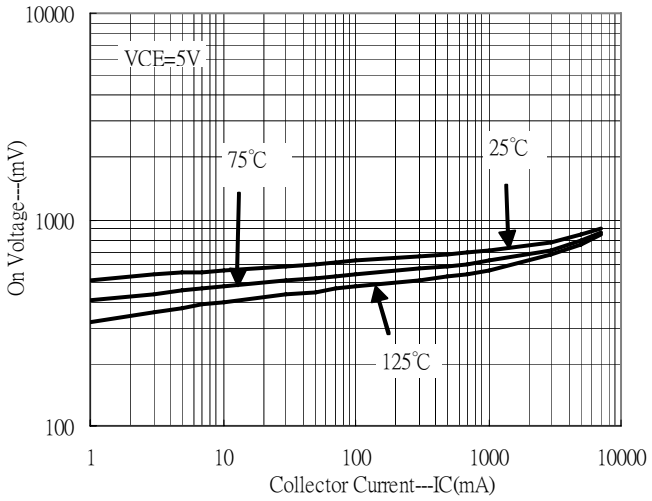
Saturation Voltage vs Collector Current



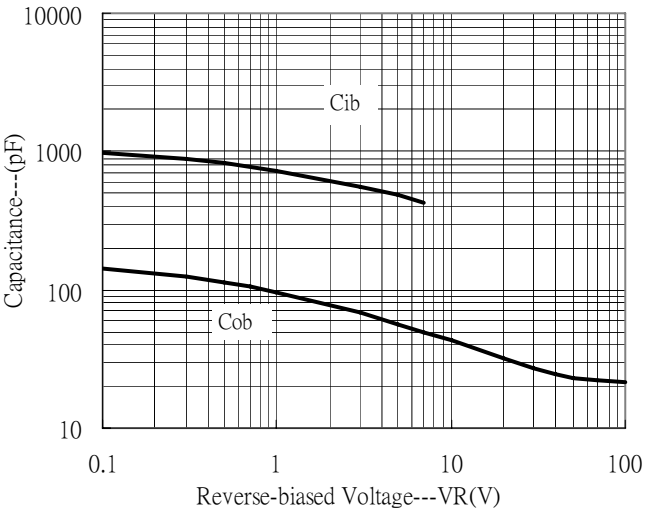
Saturation Voltage vs Collector Current



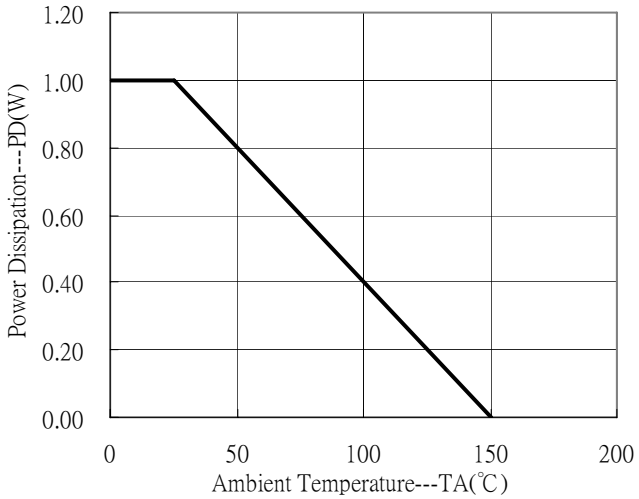
On Voltage vs Collector Current



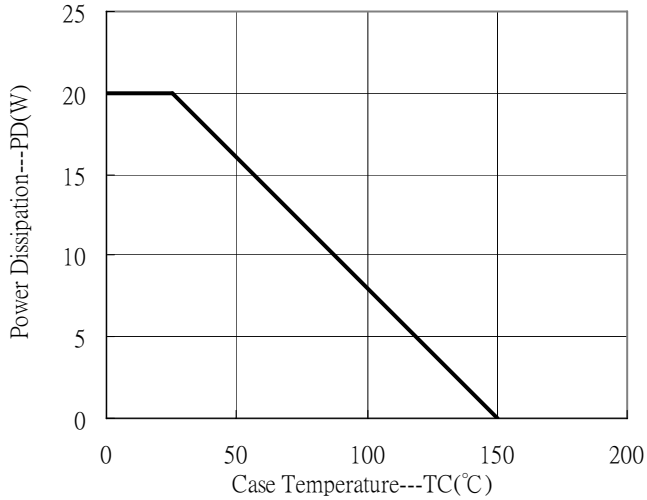
Capacitance vs Reverse-biased Voltage



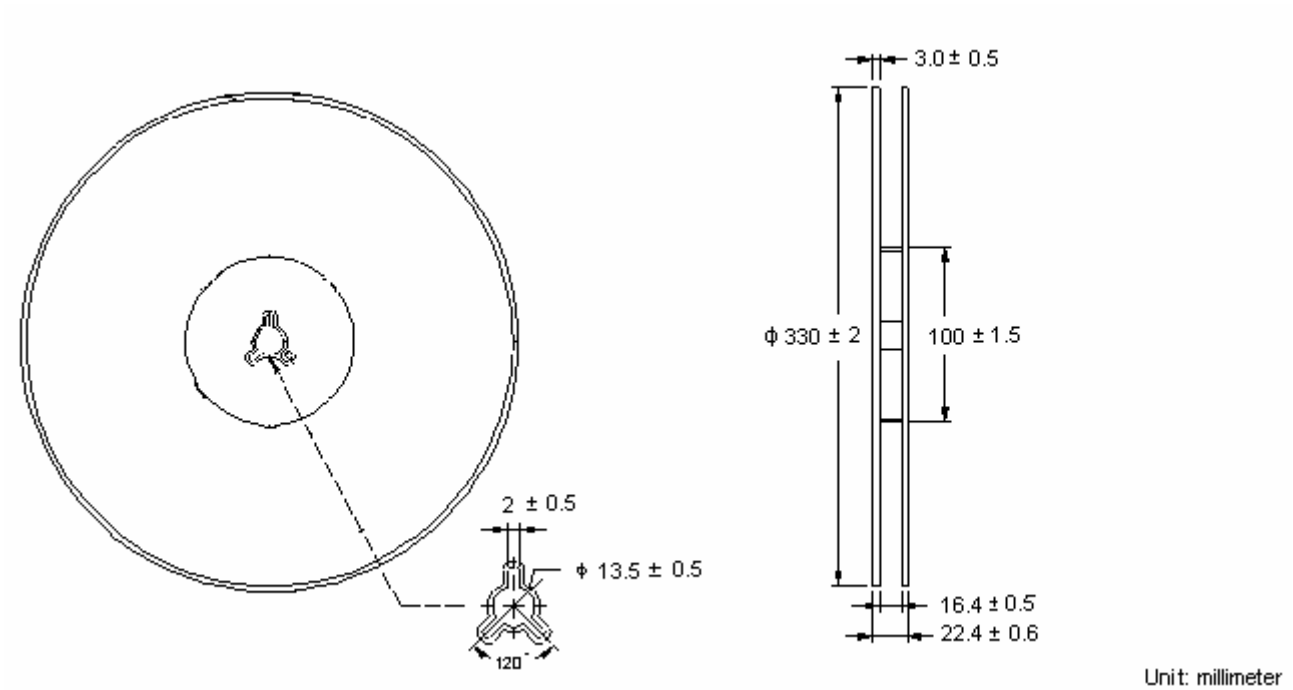
Power Derating Curve



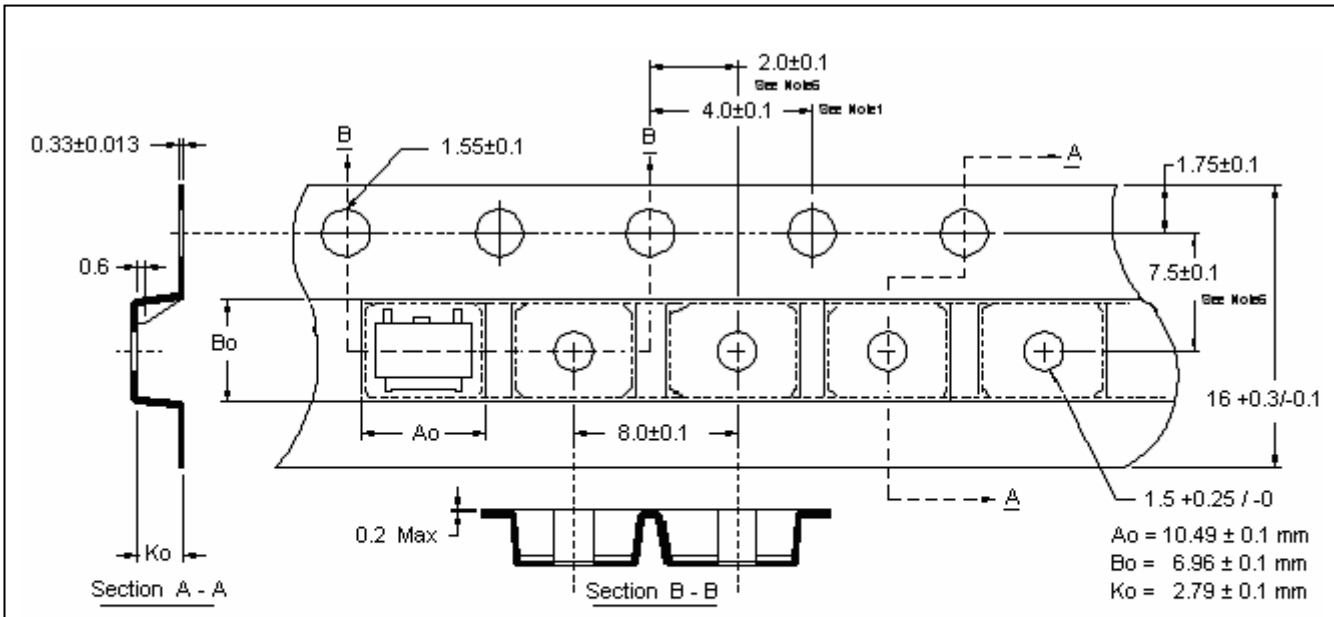
Power Derating Curve



Reel Dimension



Carrier Tape Dimension



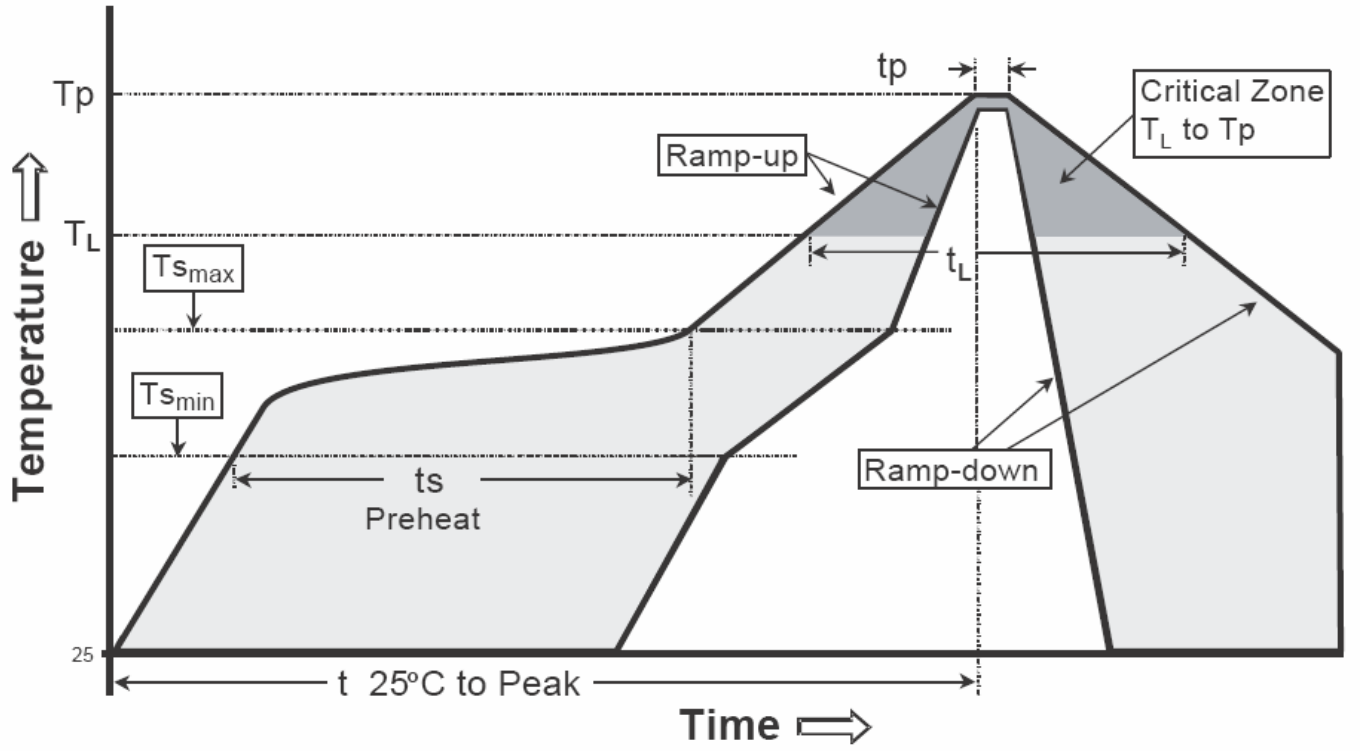
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive black polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

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

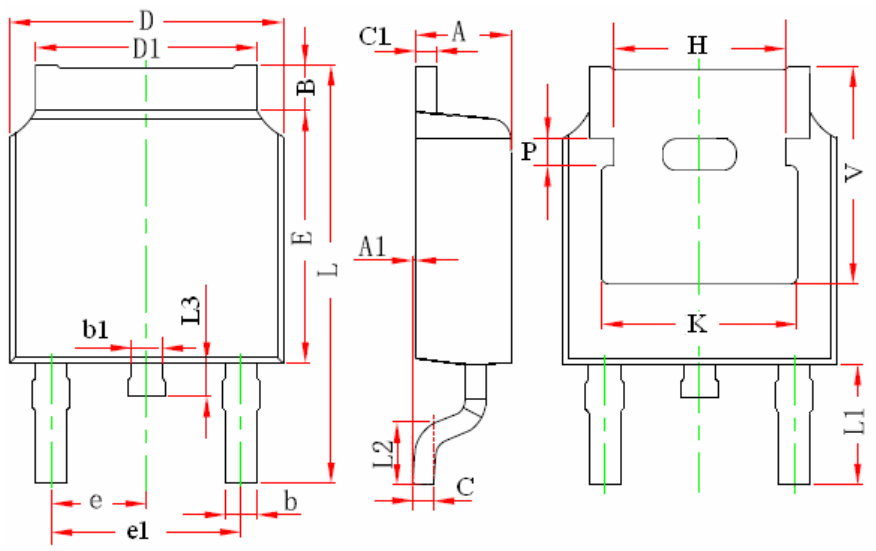
Recommended temperature profile for IR reflow

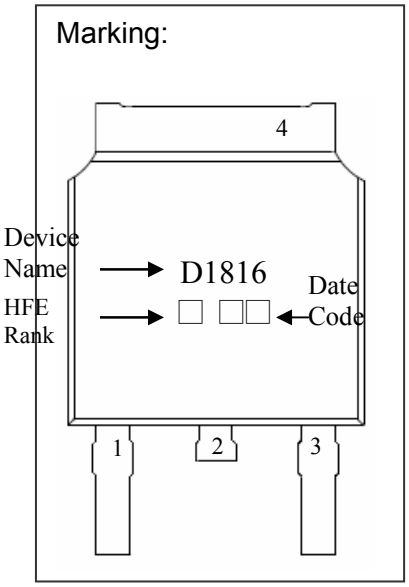


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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-252 Dimension





3-Lead TO-252 Plastic Surface Mount Package
CYStek Package Code: J3

Style: Pin 1.Base 2.Collector 3.Emitter 4.Collector

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.087	0.094	2.200	2.400	e	0.086	0.094	2.186	2.386
A1	0.000	0.005	0.000	0.127	e1	0.172	0.188	4.372	4.772
B	0.039	0.048	0.990	1.210	H	0.163	REF	4.140	REF
b	0.026	0.034	0.660	0.860	K	0.190	REF	4.830	REF
b1	0.026	0.034	0.660	0.860	L	0.386	0.409	9.800	10.400
C	0.018	0.023	0.460	0.580	L1	0.114	REF	2.900	REF
C1	0.018	0.023	0.460	0.580	L2	0.055	0.067	1.400	1.700
D	0.256	0.264	6.500	6.700	L3	0.024	0.039	0.600	1.000
D1	0.201	0.215	5.100	5.460	P	0.026	REF	0.650	REF
E	0.236	0.244	6.000	6.200	V	0.211	REF	5.350	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.