

Low Vcesat NPN Epitaxial Planar Transistor

BTD1816I3

BV_{CEO}	100V
I_C	4A

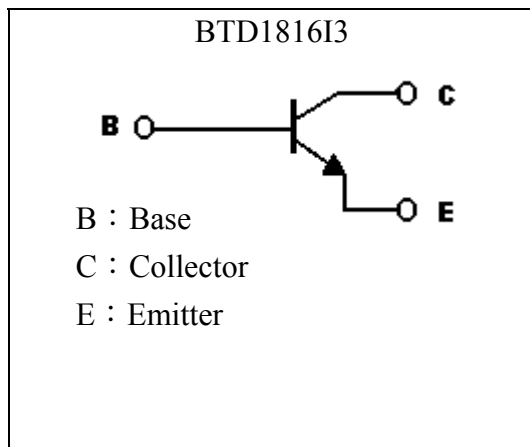
Features

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

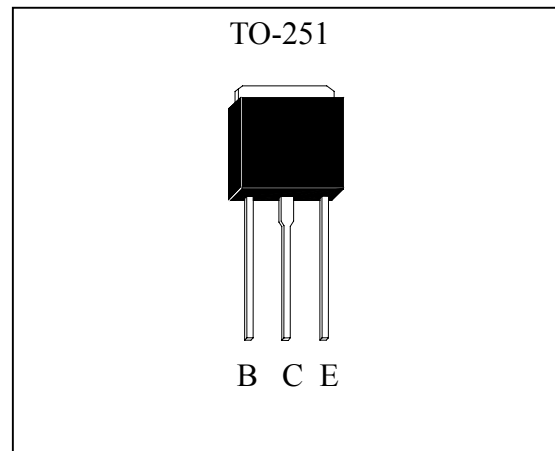
Applications

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

Symbol

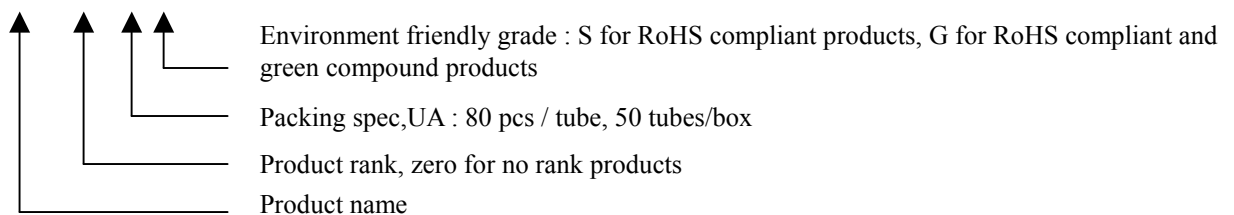


Outline



Ordering Information

Device	Package	Shipping
BTD1816I3-0-UA-G	TO-251 (Pb-free lead plating and halogen-free package)	80 pcs/tube, 50 tubes/box





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 _{θJA}	125	°C/W
Thermal Resistance, Junction to Case	R _{θJC}	6.25	°C/W
Junction Temperature	T _j	150	°C
Storage Temperature	T _{stg}	-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	-	50	120	mV	I _C =1A, I _B =50mA
*V _{CE(sat)} 2	-	90	250	mV	I _C =2A, I _B =200mA
*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
C _{ob}	-	40	-	pF	V _{CB} =10V, f=1MHz
t _{on}	-	100	-	ns	V _{CC} =50V, I _C =10I _B 1=-10I _B 2=2A, R _L =25Ω
t _{stg}	-	900	-	ns	
t _f	-	50	-	ns	

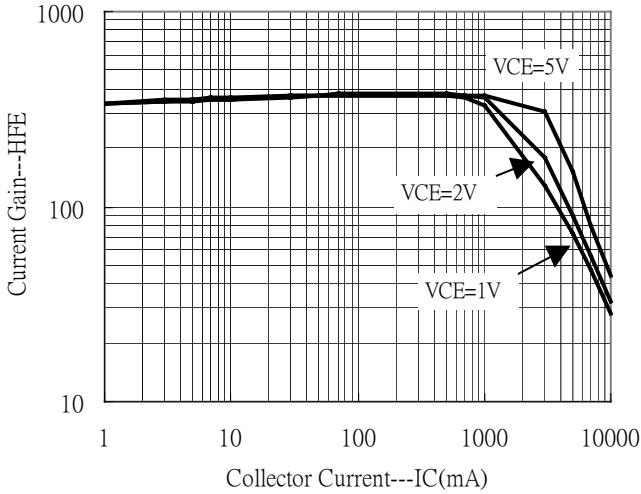
*Pulse Test : Pulse Width ≤380μs, Duty Cycle≤2%

Classification of hFE 1

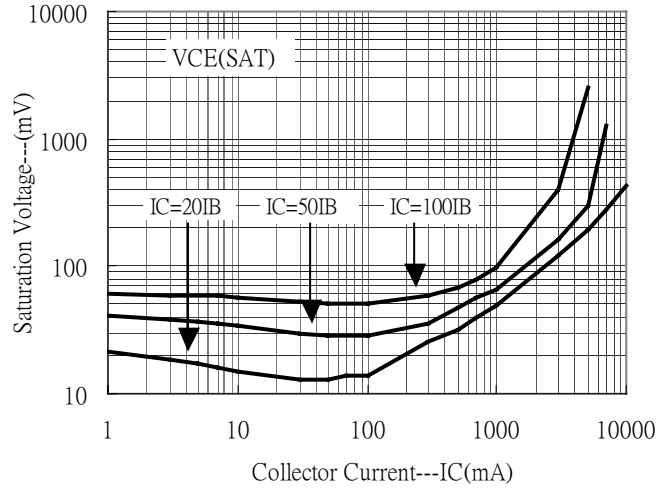
Rank	R	S
Range	180~390	270~560

Typical Characteristics

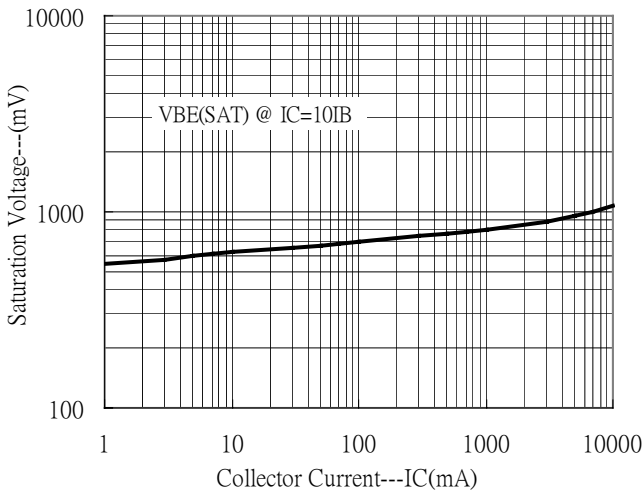
Current Gain vs Collector Current



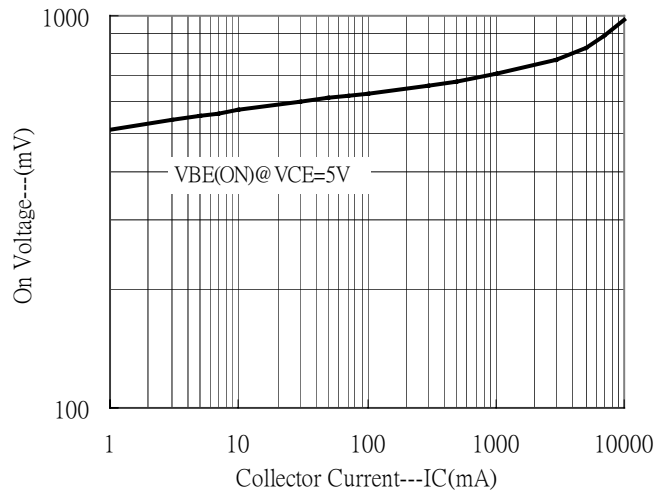
Saturation Voltage vs Collector Current



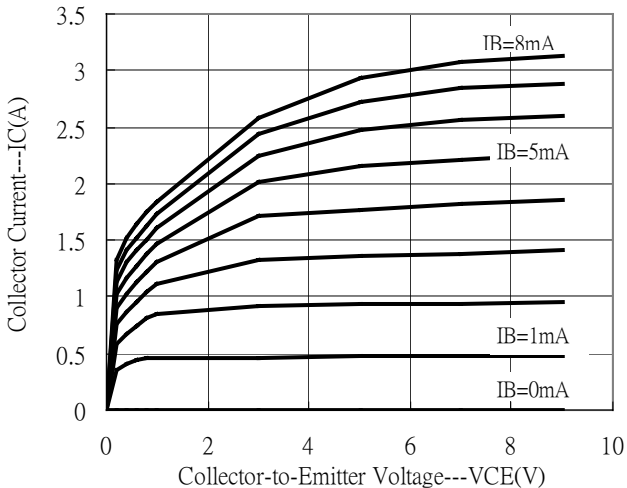
Saturation Voltage vs Collector Current



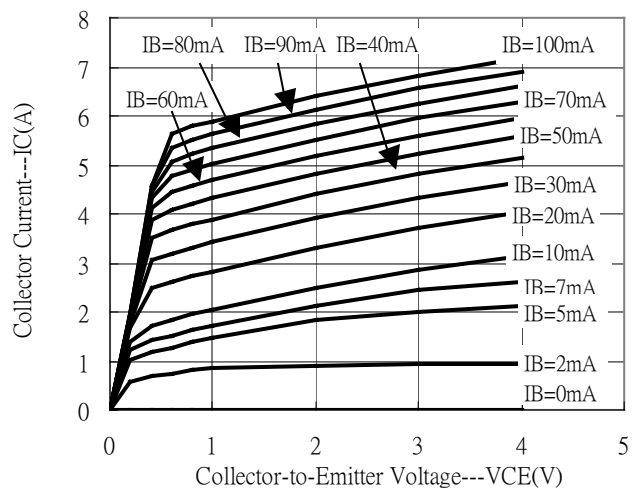
On Voltage vs Collector Current



Grounded Emitter Output Characteristics

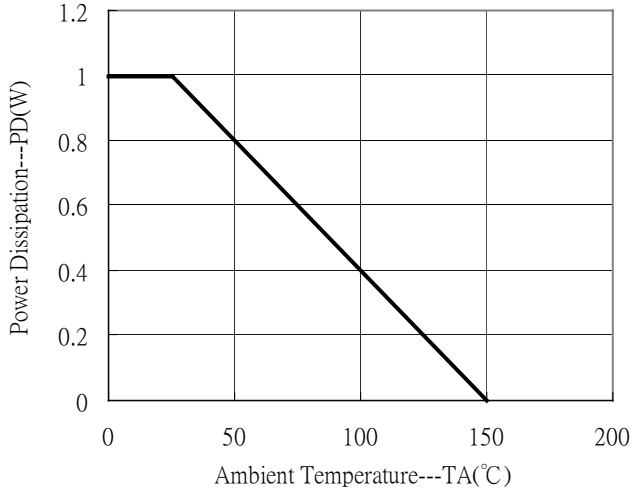


Grounded Emitter Output Characteristics

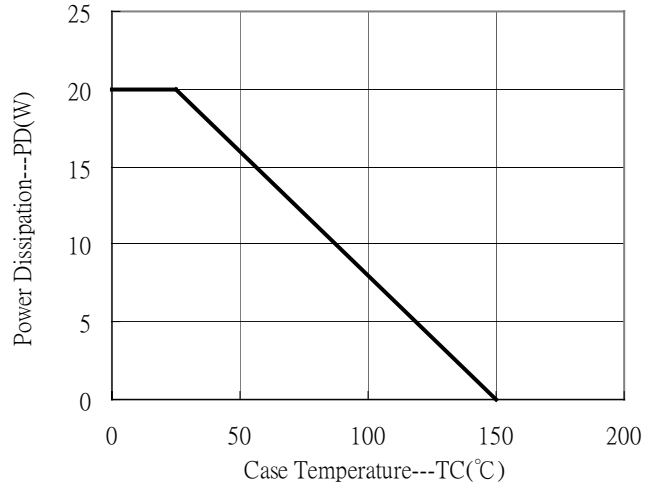


Typical Characteristics(Cont.)

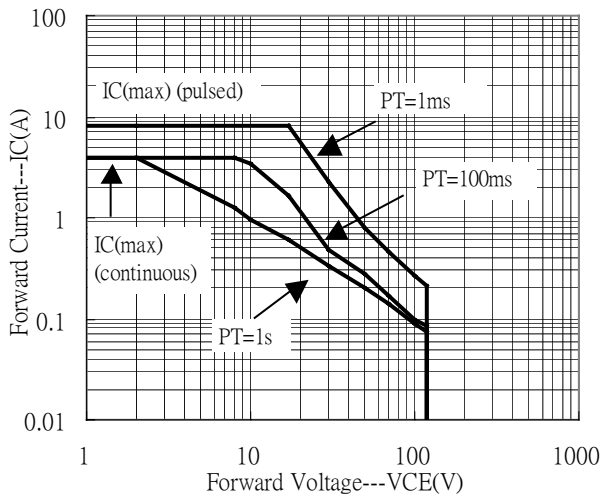
Power Derating Curve



Power Derating Curve



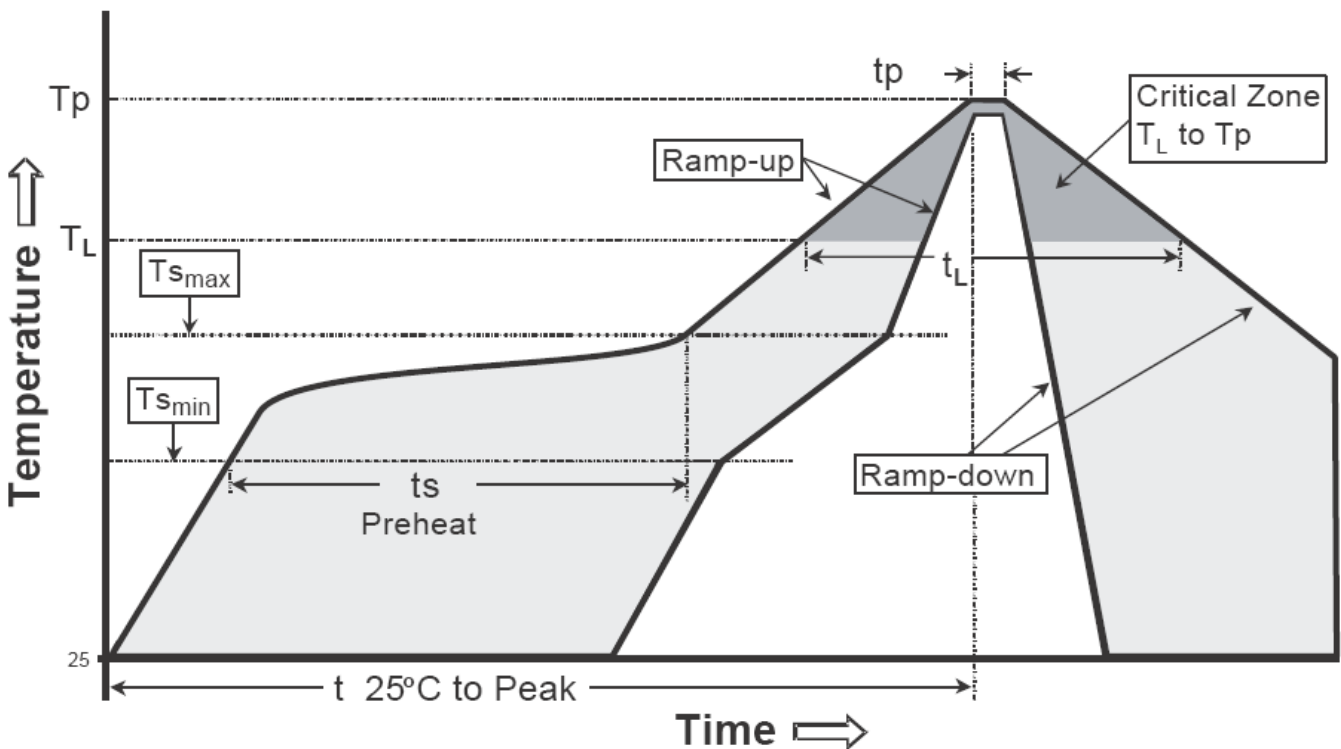
Safe Operating Area



Recommended wave soldering condition

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

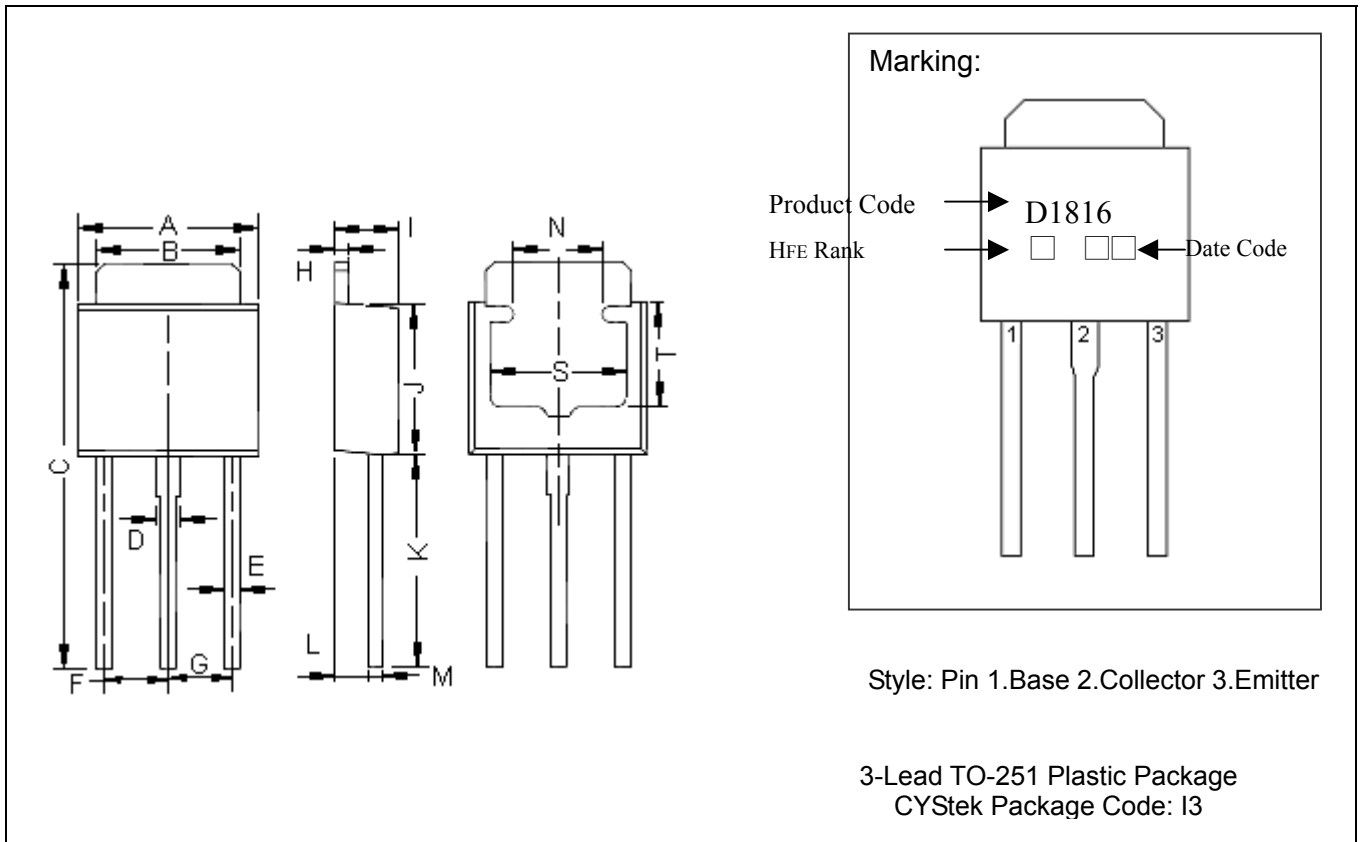
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmmax 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 (Tl)	183°C	217°C
- Time (tl)	60-150 seconds	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-251 Dimension



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.

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