

**NPN Epitaxial Planar Transistor**

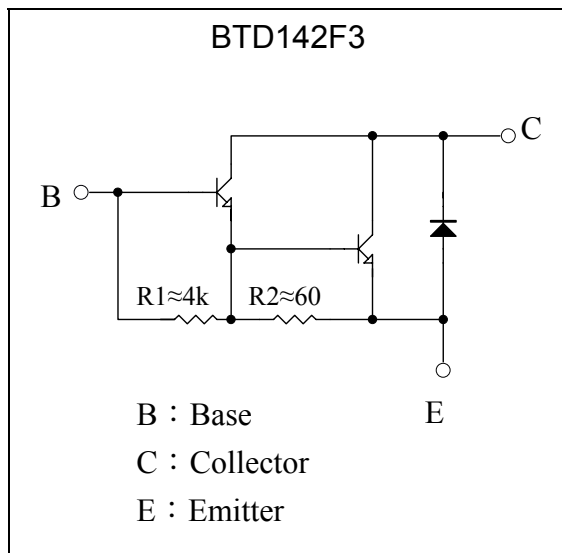
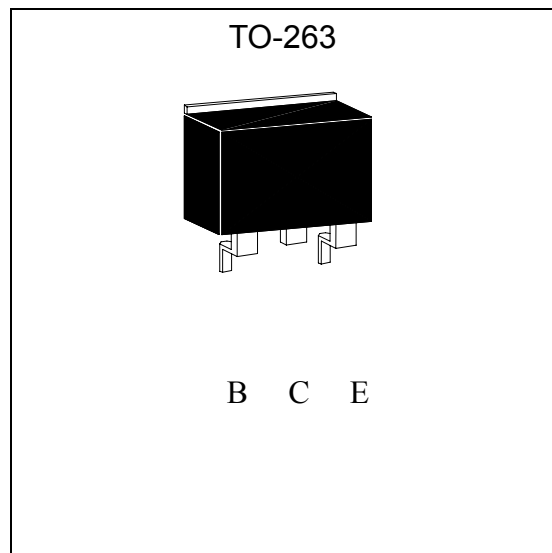
# BTD142F3

**Description**

The BTD142F3 is a NPN Darlington transistor, designed for general purpose amplifier and low speed switching application.

**Features:**

- High  $BV_{CEO}$
- Low  $V_{CE(SAT)}$
- High current gain
- Monolithic construction with built-in base-emitter shunt resistors
- Pb-free lead plating package

**Equivalent Circuit****Outline**



**Absolute Maximum Ratings** (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V <sub>CBO</sub>	250	V
Collector-Emitter Voltage	V <sub>CEO</sub>	250	V
Emitter-Base Voltage	V <sub>EBO</sub>	10	V
Collector Current(DC)	I <sub>C</sub>	10	A
Collector Current(Pulse)	I <sub>CM</sub>	15 (Note 1)	
Power Dissipation	Pd(T <sub>A</sub> =25°C)	2	W
	Pd(T <sub>C</sub> =25°C)	60	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	62.5	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	2.08	°C/W
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55~+150	°C

Note : \*1. Single Pulse Pw=300μs

**Characteristics** (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>CBO</sub>	250	-	-	V	I <sub>C</sub> =100μA, I <sub>E</sub> =0
BV <sub>CEO</sub>	250	-	-	V	I <sub>C</sub> =1mA, I <sub>B</sub> =0
I <sub>CEO</sub>	-	-	100	μA	V <sub>CE</sub> =250V, I <sub>E</sub> =0
I <sub>CBO</sub>	-	-	100	μA	V <sub>CB</sub> =250V, I <sub>E</sub> =0
I <sub>EBO</sub>	-	-	2	mA	V <sub>EB</sub> =5V, I <sub>C</sub> =0
*V <sub>CE(sat)</sub> 1	-	-	1.4	V	I <sub>C</sub> =10A, I <sub>B</sub> =250mA
*V <sub>CE(sat)</sub> 2	-	-	1.3	V	I <sub>C</sub> =7A, I <sub>B</sub> =50mA
*V <sub>CE(sat)</sub> 3	-	-	1.0	V	I <sub>C</sub> =4A, I <sub>B</sub> =5mA
*V <sub>CE(sat)</sub> 4	-	-	1.2	V	I <sub>C</sub> =6A, I <sub>B</sub> =5mA
*V <sub>BE(sat)</sub>	-	-	2.0	V	I <sub>C</sub> =8A, I <sub>B</sub> =15mA
*V <sub>BE(on)</sub>	-	-	1.8	V	V <sub>CE</sub> =4V, I <sub>C</sub> =8A
*h <sub>FE</sub>	3000	-	-	-	V <sub>CE</sub> =4V, I <sub>C</sub> =5A

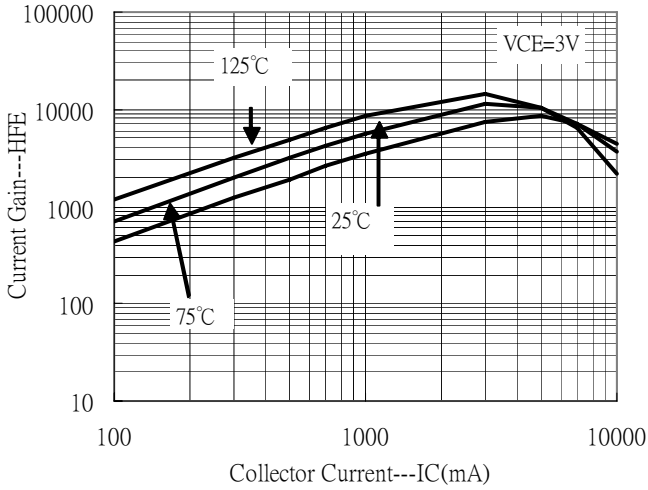
\*Pulse Test : Pulse Width ≤380μs, Duty Cycle ≤2%

**Ordering Information**

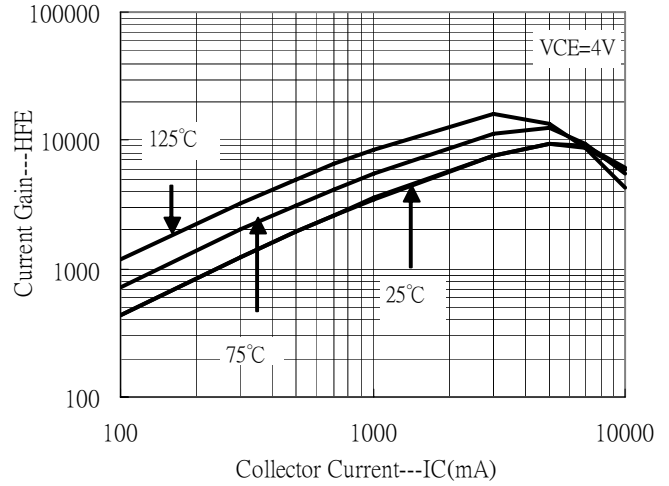
Device	Package	Shipping	Marking
BTD142F3	TO-263 (Pb-free lead plating package)	800 pcs / Tape & Reel	D142

**Typical Characteristics**

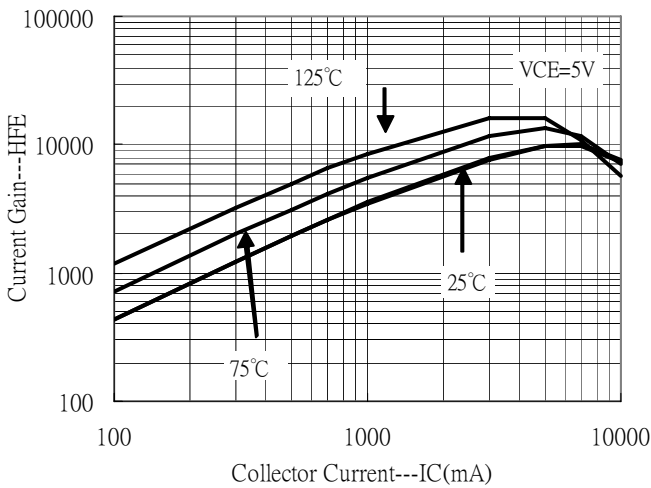
Current Gain vs Collector Current



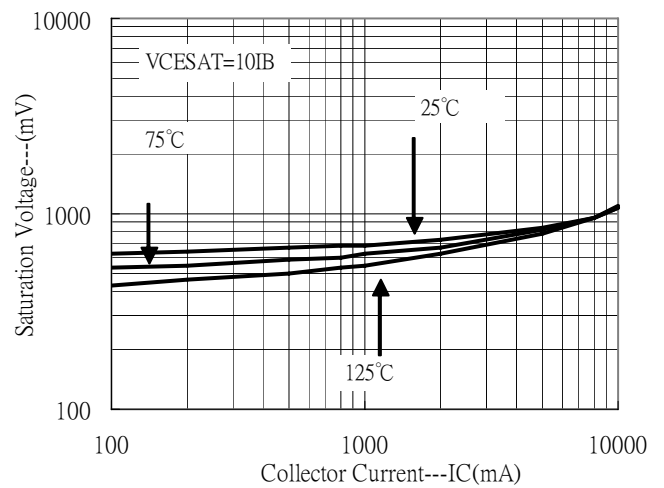
Current Gain vs Collector Current



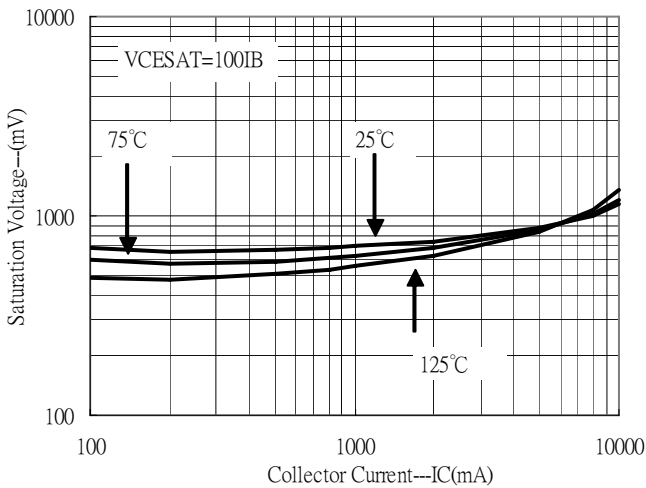
Current Gain vs Collector Current



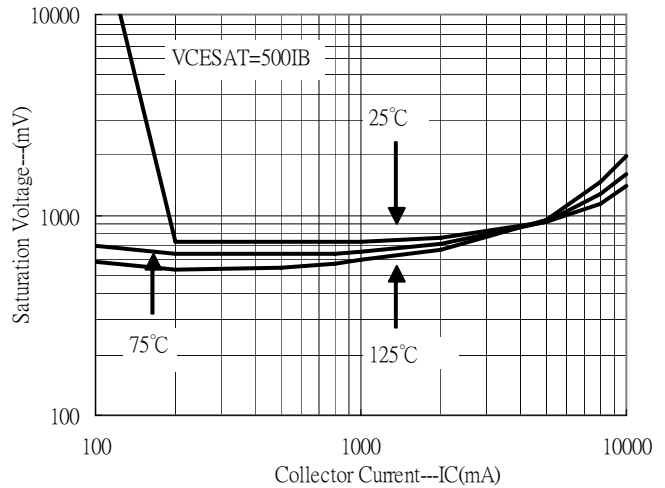
Saturation Voltage vs Collector Current



Saturation Voltage vs Collector Current

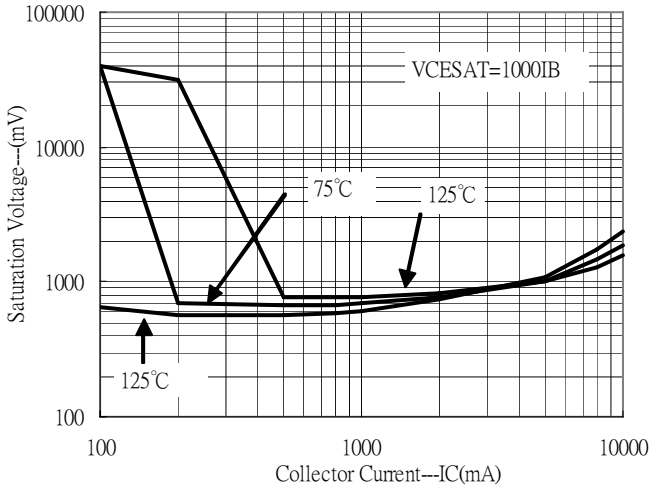


Saturation Voltage vs Collector Current

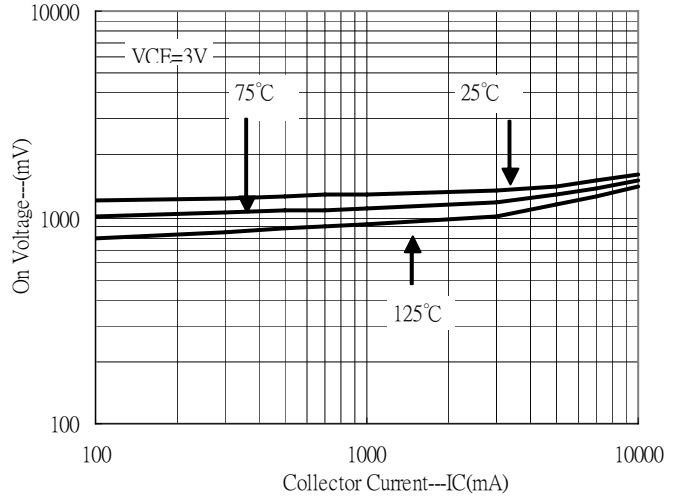


**Typical Characteristics(Cont.)**

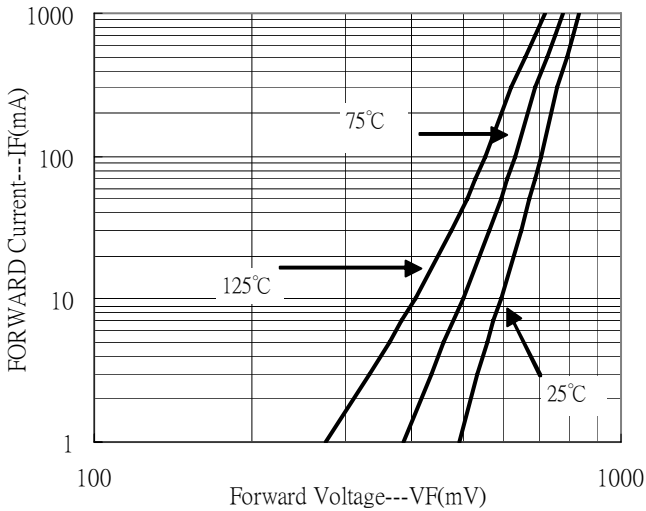
Saturation Voltage vs Collector Current



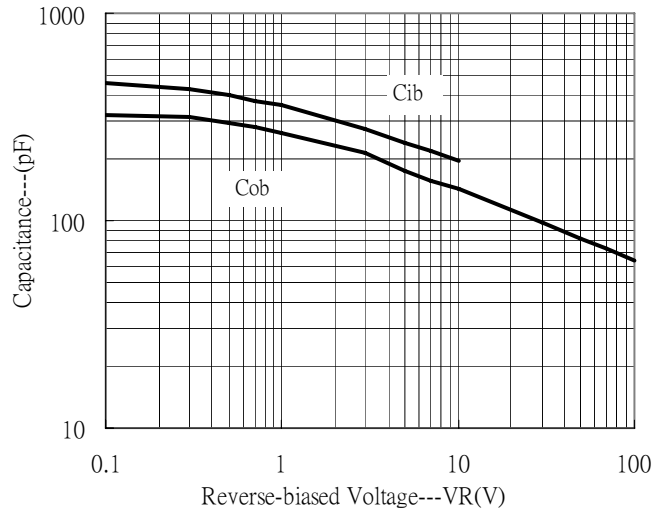
On Voltage vs Collector Current



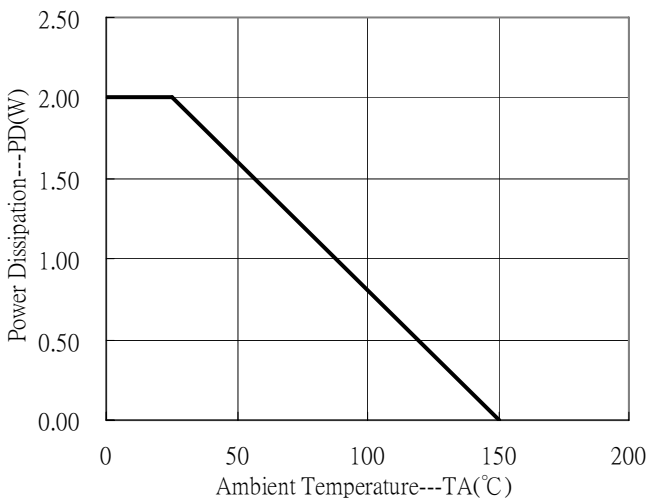
Built-in Diode Characteristics



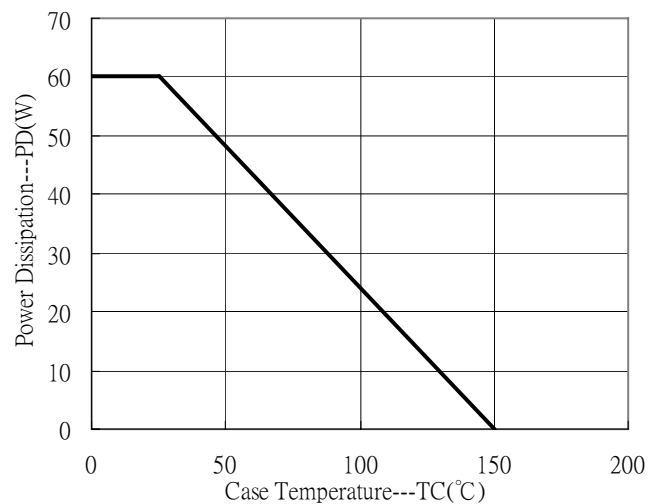
Capacitance vs Reverse-biased Voltage



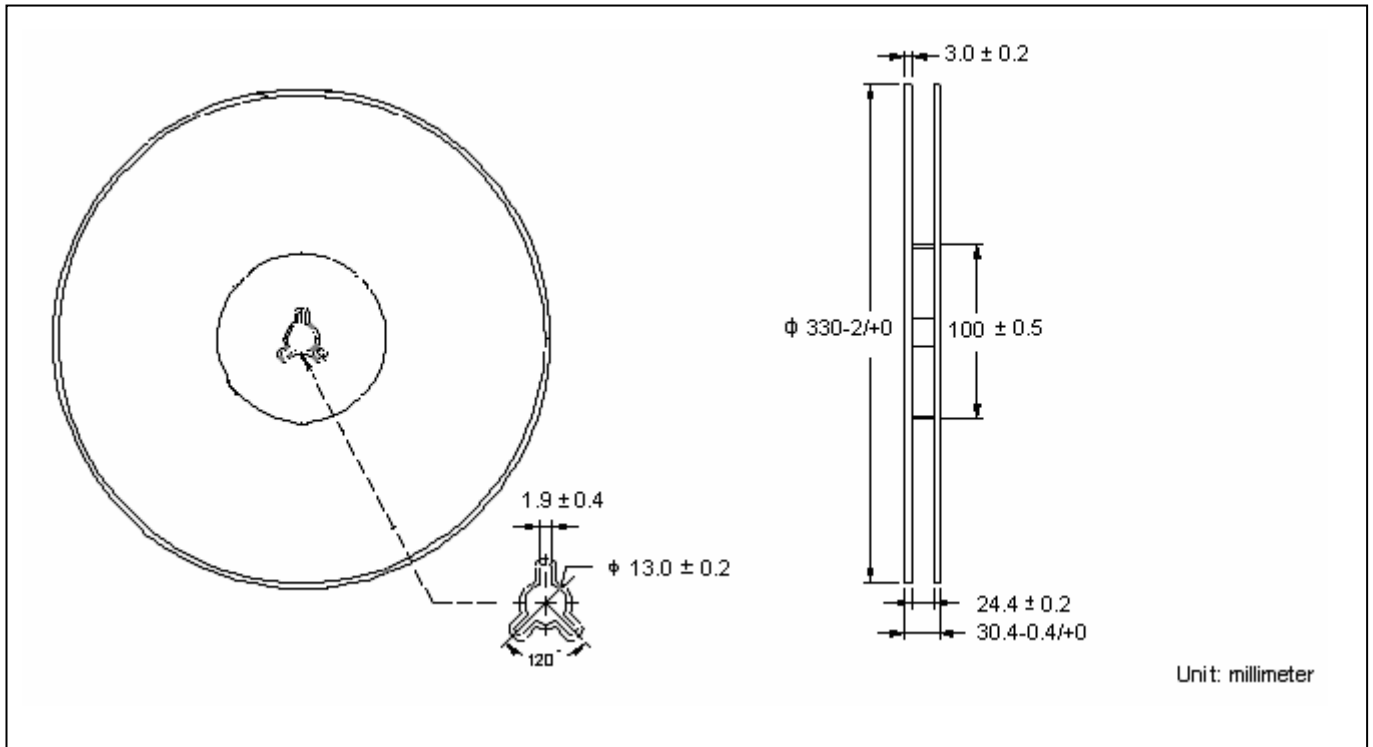
Power Derating Curve



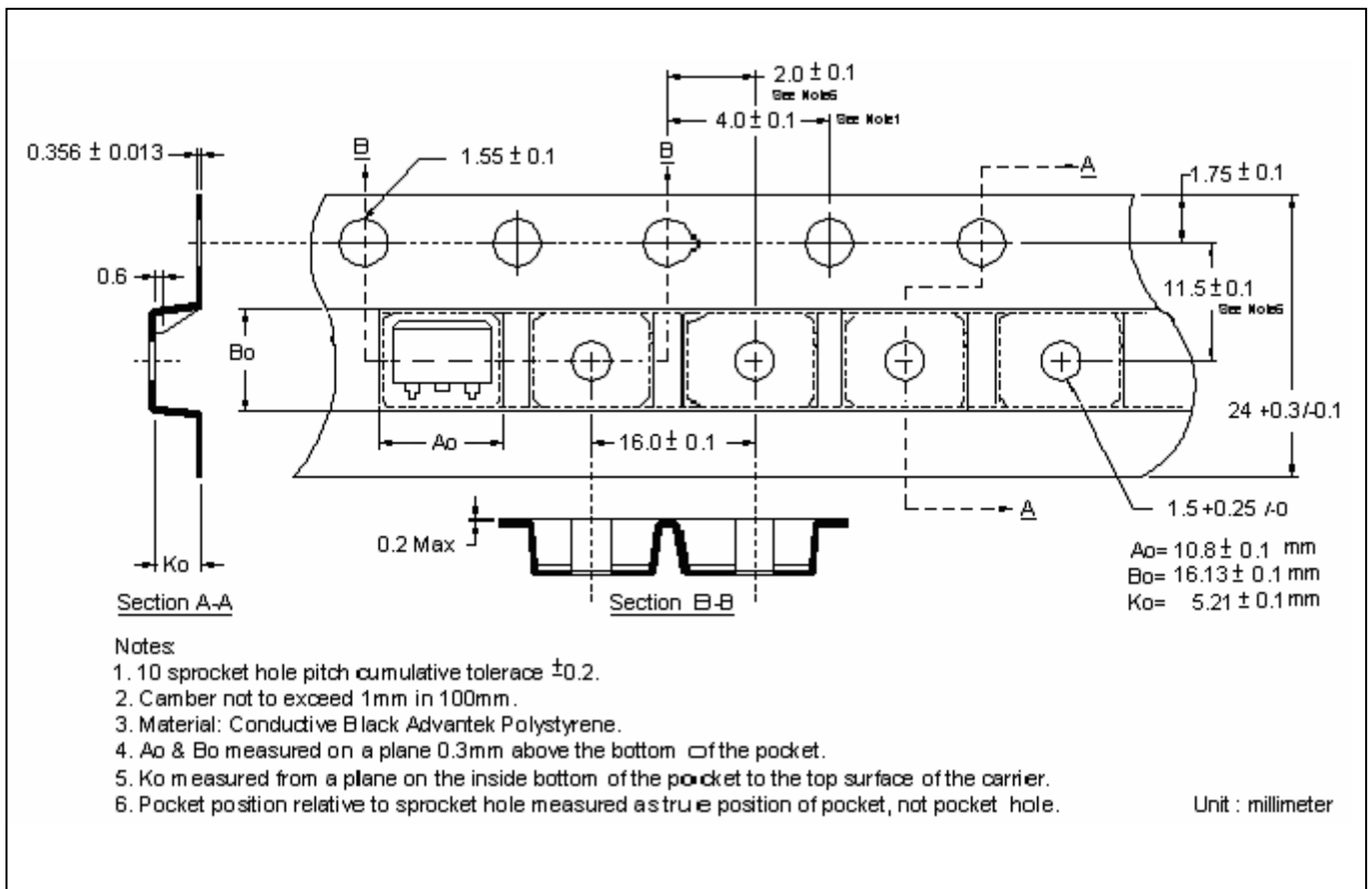
Power Derating Curve



**Reel Dimension**

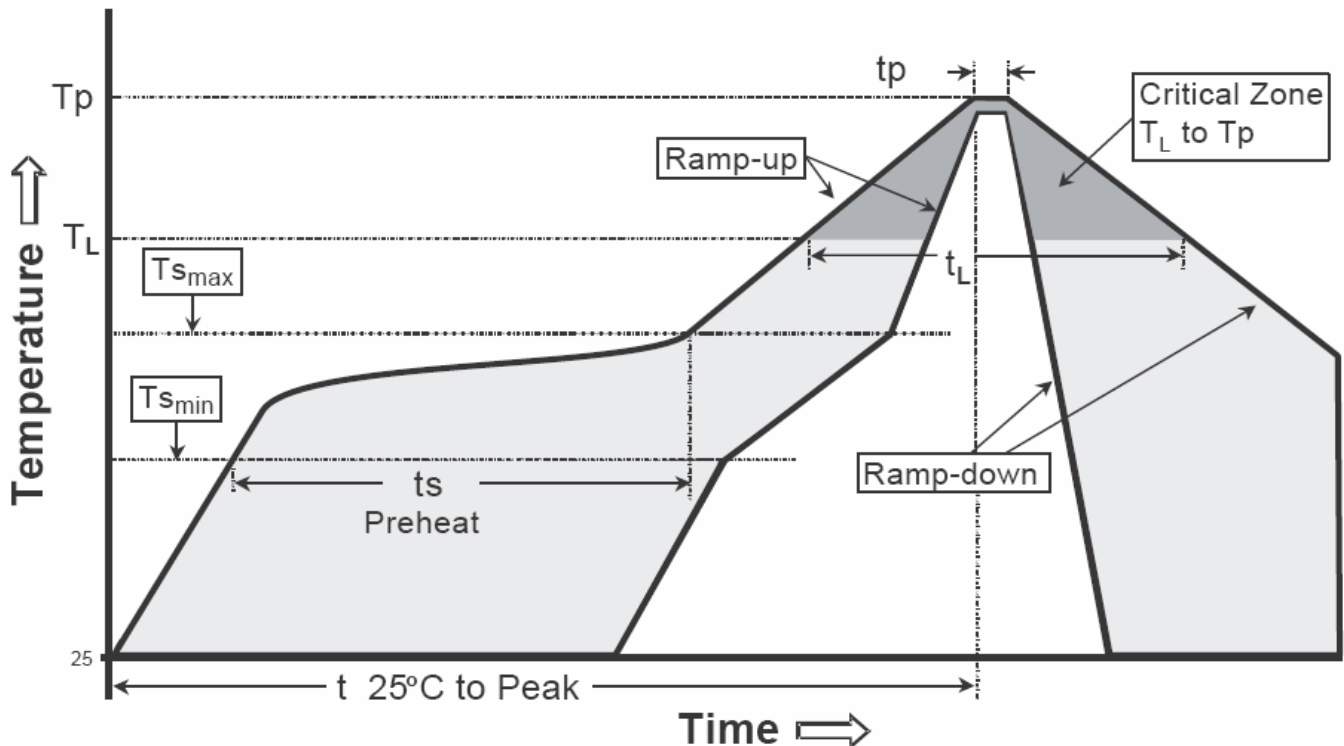


**Carrier Tape Dimension**



**Recommended wave soldering condition**

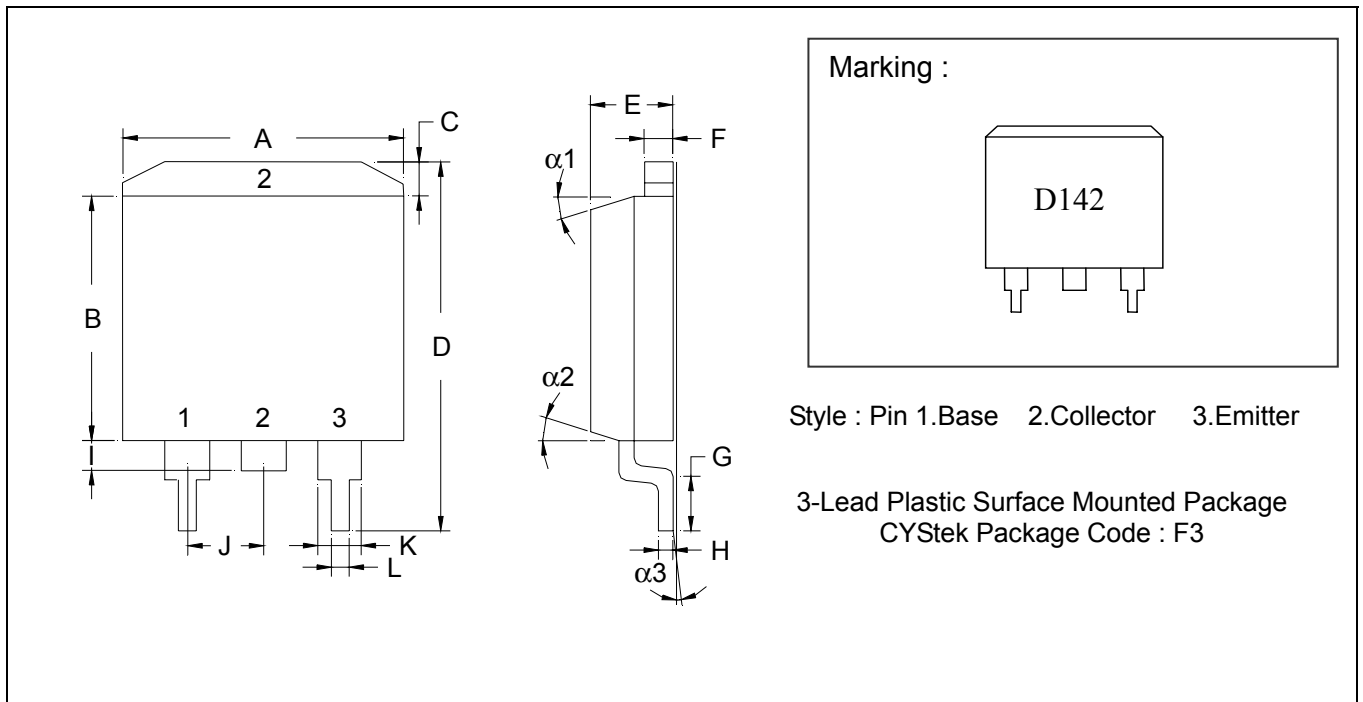
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

**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)	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-263 Dimension**



\*:Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.3800	0.4050	9.65	10.29	I	0.0500	0.0700	1.27	1.78
B	0.3300	0.3700	8.38	9.40	J	-	*0.1000	-	*2.54
C	-	0.0550	-	1.40	K	0.0450	0.0550	1.14	1.40
D	0.5750	0.6250	14.61	15.88	L	0.0200	0.0390	0.51	0.99
E	0.1600	0.1900	4.06	4.83	$\alpha 1$	-	-	6°	8°
F	0.0450	0.0550	1.14	1.40	$\alpha 2$	-	-	6°	8°
G	0.0900	0.1100	2.29	2.79	$\alpha 3$	-	-	0°	5°
H	0.0180	0.0290	0.46	0.74					

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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