

NPN Epitaxial Planar Transistor

BTD2510F3

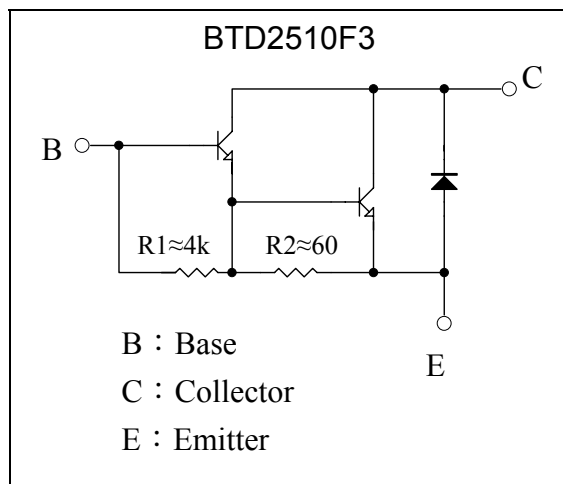
Description

The BTD2510F3 is a NPN Darlington transistor, designed for general purpose amplifier and low speed switching application.

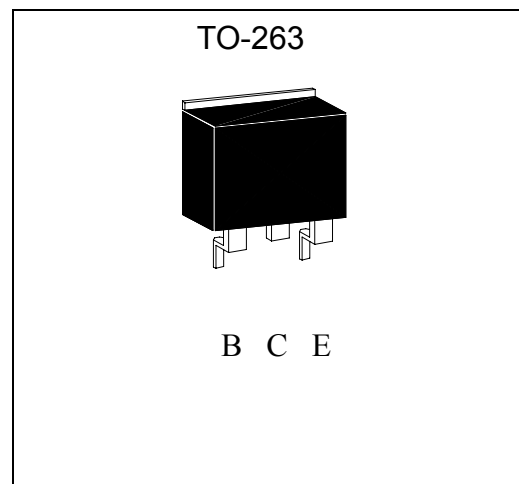
Features:

- 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 ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	250	V
Collector-Emitter Voltage	V_{CEO}	250	V
Emitter-Base Voltage	V_{EBO}	10	V
Collector Current	$I_C(DC)$	10	A
	$I_C(Pulse)$	15 *1	
Power Dissipation	$P_d(T_A=25^\circ\text{C})$	2	W
	$P_d(T_C=25^\circ\text{C})$	100	
Operating Junction Temperature Range	T_j	$-55\sim+150$	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55\sim+150$	$^\circ\text{C}$

Note : *1. Single Pulse $P_w=300\mu\text{s}$

**Thermal Data**

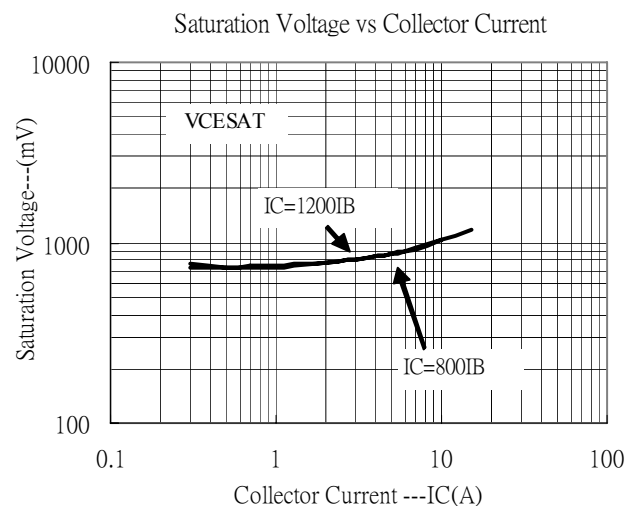
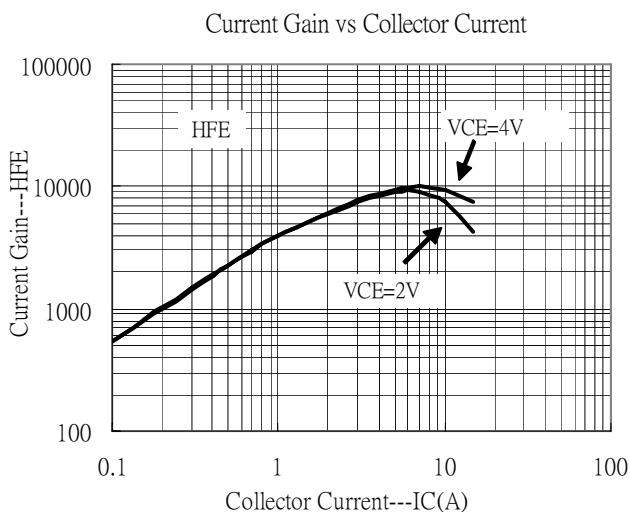
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	1.25	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62.5	$^{\circ}\text{C/W}$

Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	250	-	-	V	$I_C=100\mu\text{A}$, $I_E=0$
BV_{CEO}	250	-	-	V	$I_C=1\text{mA}$, $I_B=0$
I_{CEO}	-	-	100	μA	$V_{CE}=250\text{V}$, $I_E=0$
I_{CBO}	-	-	100	μA	$V_{CB}=250\text{V}$, $I_E=0$
I_{EBO}	-	-	2	mA	$V_{EB}=5\text{V}$, $I_C=0$
* $V_{CE(sat)1}$	-	-	1	V	$I_C=4\text{A}$, $I_B=5\text{mA}$
* $V_{CE(sat)2}$	-	-	1.2	V	$I_C=6\text{A}$, $I_B=5\text{mA}$
* $V_{CE(sat)3}$	-	-	1.4	V	$I_C=10\text{A}$, $I_B=250\text{mA}$
* $V_{BE(sat)}$	-	-	2	V	$I_C=5\text{A}$, $I_B=15\text{mA}$
* $V_{BE(on)}$	-	-	1.8	V	$V_{CE}=4\text{V}$, $I_C=8\text{A}$
* h_{FE1}	1500	-	-	-	$V_{CE}=2\text{V}$, $I_C=2\text{A}$
* h_{FE2}	2000	-	-	-	$V_{CE}=4\text{V}$, $I_C=5\text{A}$
* h_{FE3}	1500	-	-	-	$V_{CE}=5\text{V}$, $I_C=10\text{A}$

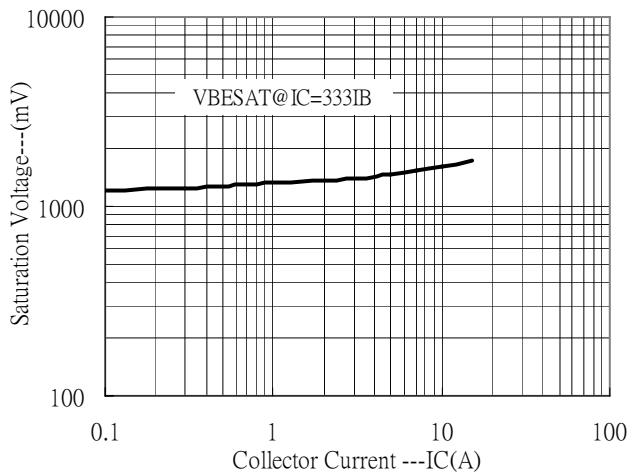
*Pulse Test : Pulse Width $\leq 380\mu\text{s}$, Duty Cycle $\leq 2\%$ **Ordering Information**

Device	Package	Shipping
BTD2510F3	TO-263 (Pb-free lead plating)	800 pcs / Tape & Reel

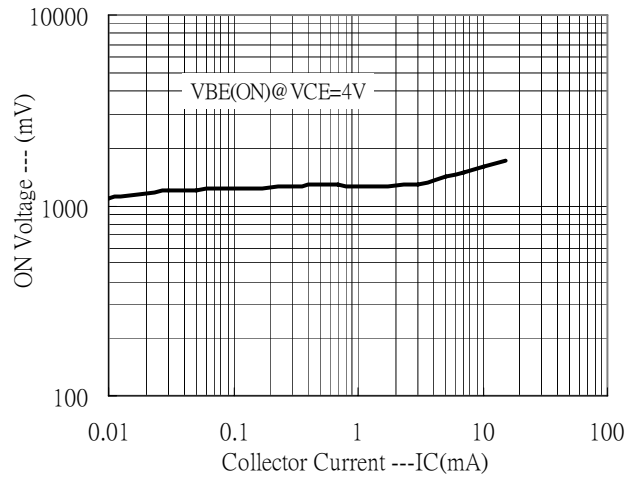
Typical Characteristics

Typical Characteristics(Cont.)

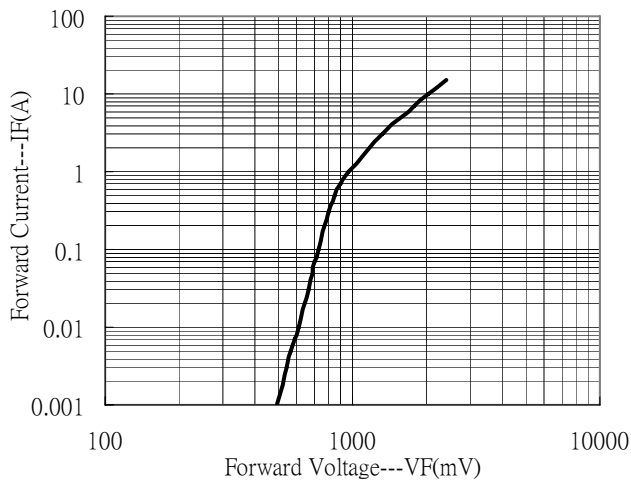
Saturation Voltage vs Collector Current



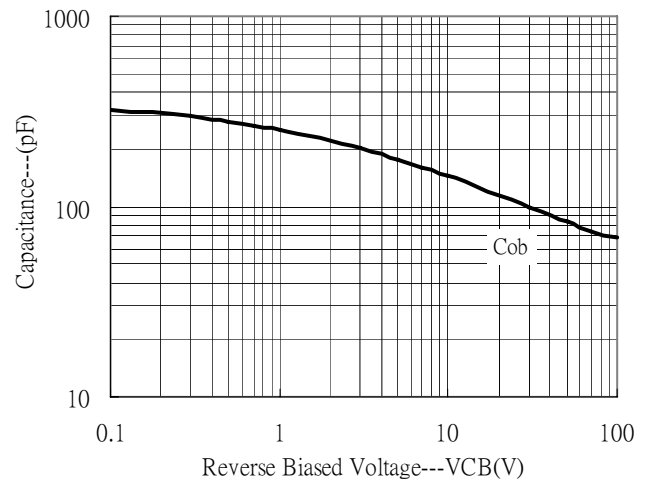
ON Voltage vs Collector Current



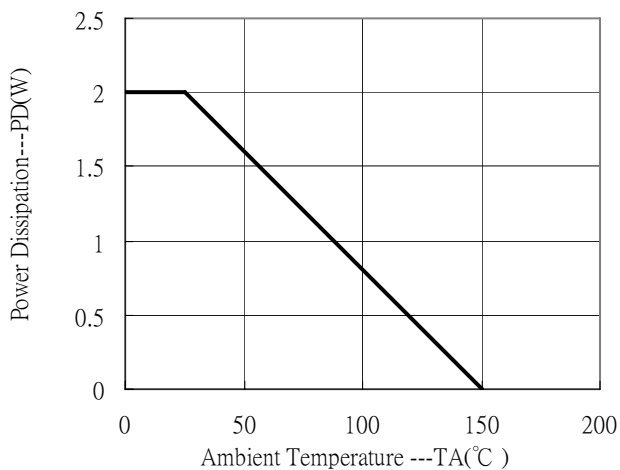
Typical Built-in Diode Characteristics



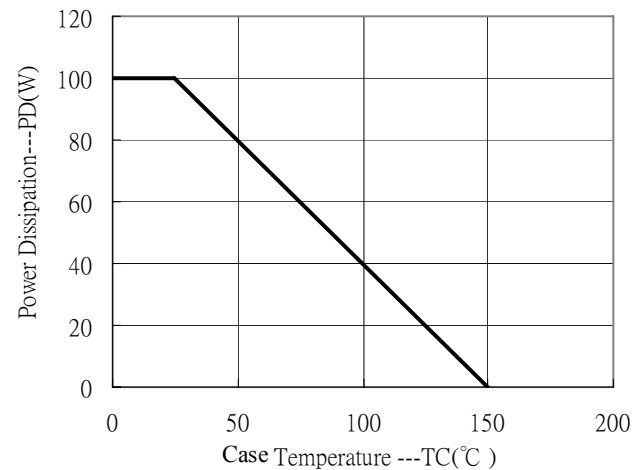
Output Capacitance vs Reverse Biased Voltage



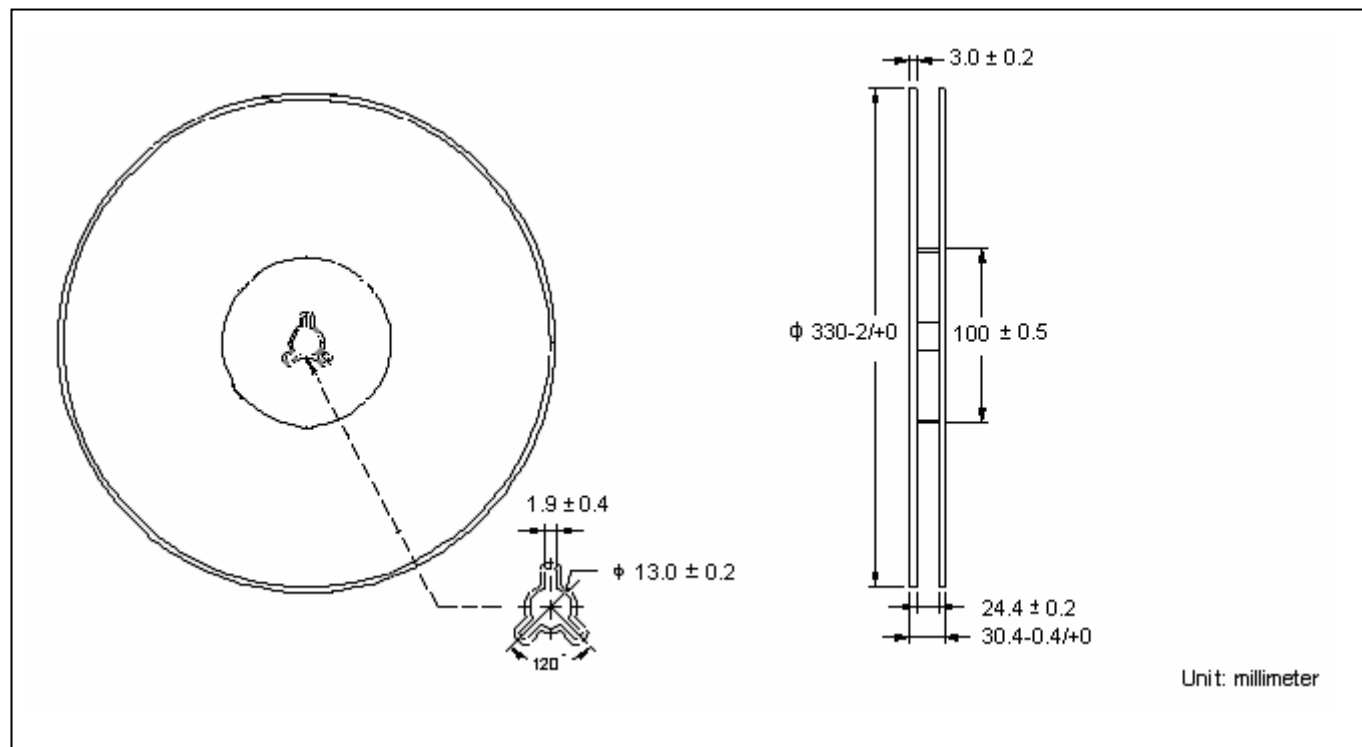
Power Derating Curve



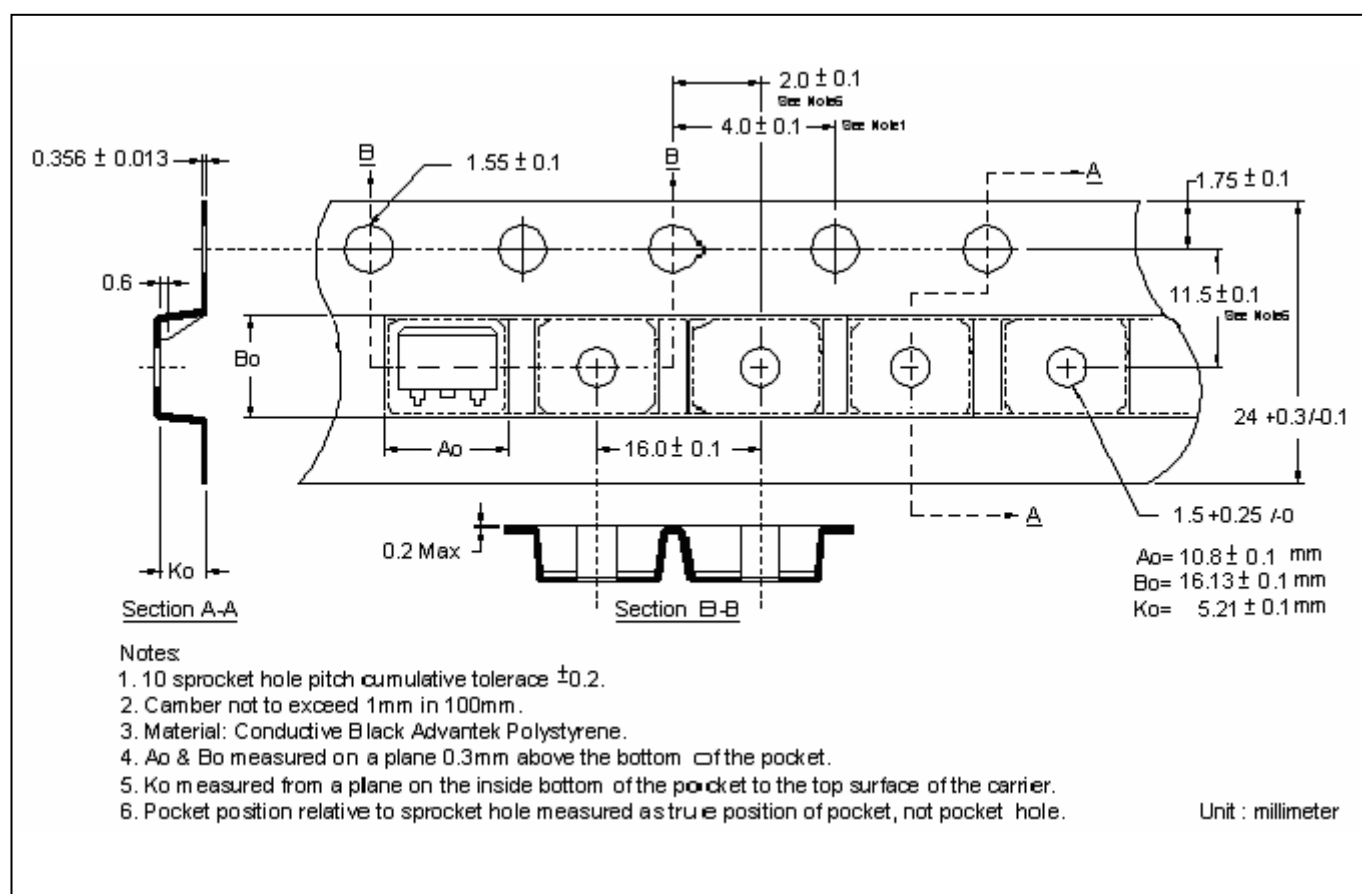
Power Derating Curve



Reel Dimension



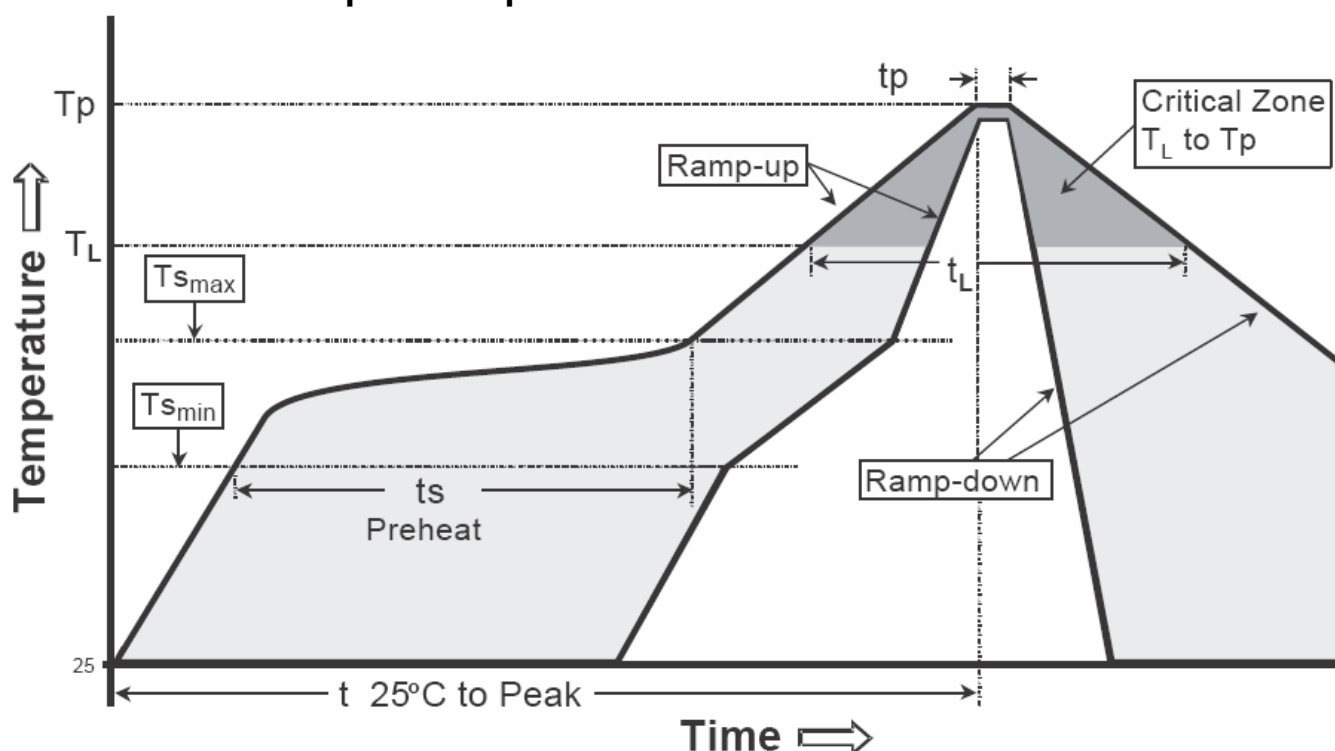
Carrier Tape Dimension



Recommended wave soldering condition

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

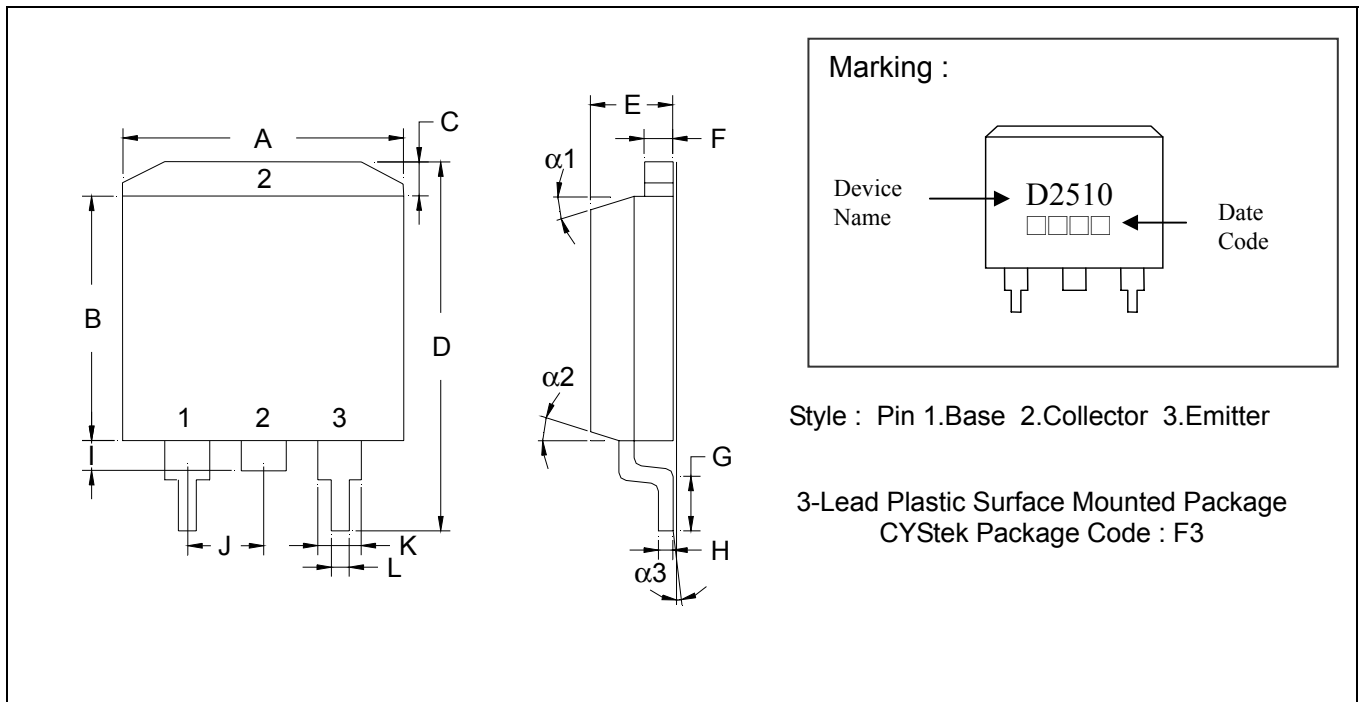
Recommended temperature profile for IR reflow



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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