Low Vcesat NPN Epitaxial Planar Transistor

BTD4512F3

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.

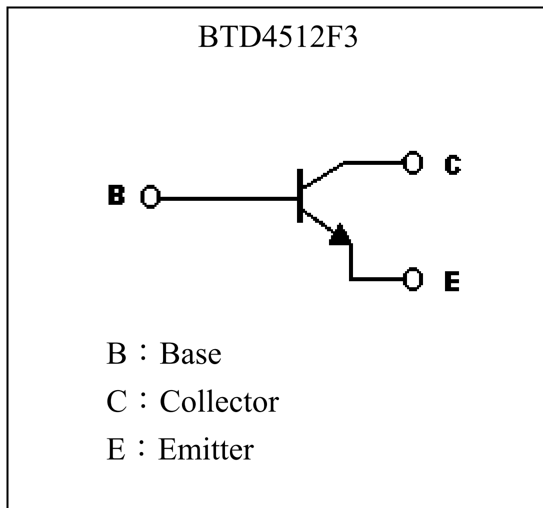
Features

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

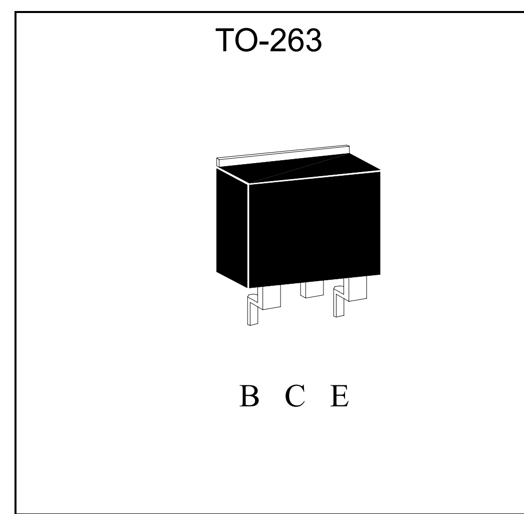
Applications

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

Symbol



Outline



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage (I_E=0)	V_{CBO}	150	V
Collector-Emitter Voltage (I_B=0)	V_{CEO}	60	V
Emitter-Base Voltage (I_C=0)	V_{EBO}	7	V
Collector Current (DC)	I_C	7	A
Collector Current (Pulse)	I_{CP}	12 (Note 1)	
Base Current	I_B	2	A
Power Dissipation @ T_A=25℃	P_D	1.65	W
Power Dissipation @ T_C=25℃	P_D	40	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	75.8	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	3.125	°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}	150	-	-	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}	-	-	100	nA	V_{CB}=150V, I_E=0
I_{EBO}	-	-	100	nA	V_{EB}=7V, I_C=0
*$V_{CE(sat)}$ 1	-	14	25	mV	I_C=100mA, I_B=5mA
*$V_{CE(sat)}$ 2	-	58	70	mV	I_C=1A, I_B=50mA
*$V_{CE(sat)}$ 3	-	94	120	mV	I_C=1A, I_B=10mA
*$V_{CE(sat)}$ 4	-	118	180	mV	I_C=2A, I_B=40mA
*$V_{CE(sat)}$ 5	-	185	260	mV	I_C=4A, I_B=400mA
*$V_{CE(sat)}$ 6	-	215	300	mV	I_C=4A, I_B=80mA
*$V_{CE(sat)}$ 7	-	260	400	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	-	-	-	V_{CE}=2V, I_C=10mA
*h_{FE} 2	200	-	500	-	V_{CE}=2V, I_C=500mA
*h_{FE} 3	200	-	-	-	V_{CE}=2V, I_C=1A
*h_{FE} 4	40	-	-	-	V_{CE}=2V, I_C=10A
f_T	-	150	-	MHz	V_{CE}=10V, I_C=50mA
Cob	-	54	-	pF	V_{CB}=10V, f=1MHz
t_{on}	-	45	-	ns	V_{CC}=10V, I_C=10I_B1=-10I_B2=1A, R_L=10Ω
t_{off}	-	630	-	ns	

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

Typical Characteristics

Emitter Grounded Output Characteristics

1mA
500u
400uA
300uA
200uA
IB=100uA
Collector Current---IC(A)
Collector-to-Emitter Voltage---VCE(V)

Emitter Grounded Output Characteristics

5mA
2.5mA
2mA
1.5mA
1mA
IB=500uA
Collector Current---IC(A)
Collector-to-Emitter Voltage---VCE(V)

Emitter Grounded Output Characteristics

20mA
10mA
6mA
4mA
IB=2mA
Collector Current---IC(A)
Collector-to-Emitter Voltage---VCE(V)

Emitter Grounded Output Characteristics

50mA
20mA
10mA
IB=5mA
Collector Current---IC(A)
Collector-to-Emitter Voltage---VCE(V)

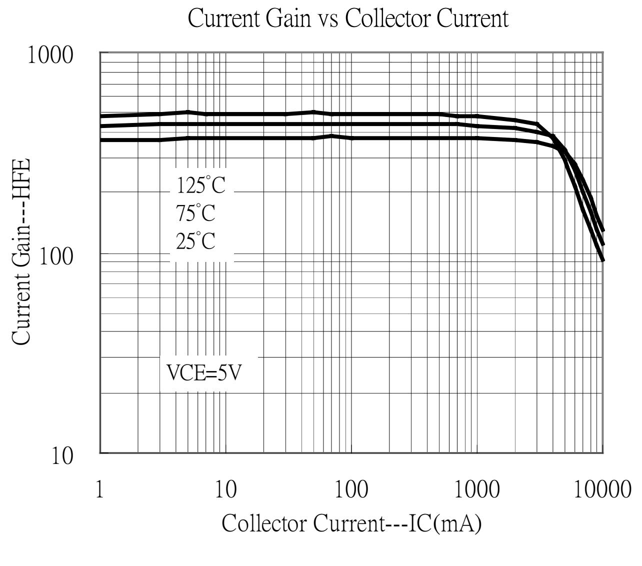
Current Gain vs Collector Current

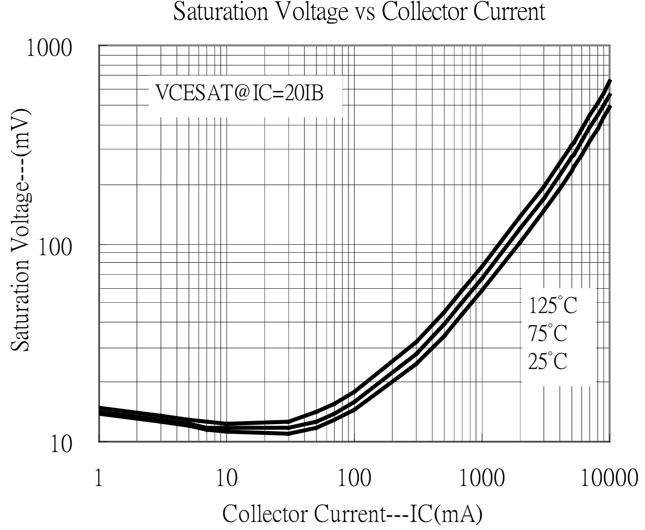
125°C
75°C
25°C
VCE=1V
Current Gain---HFE
Collector Current---IC(mA)

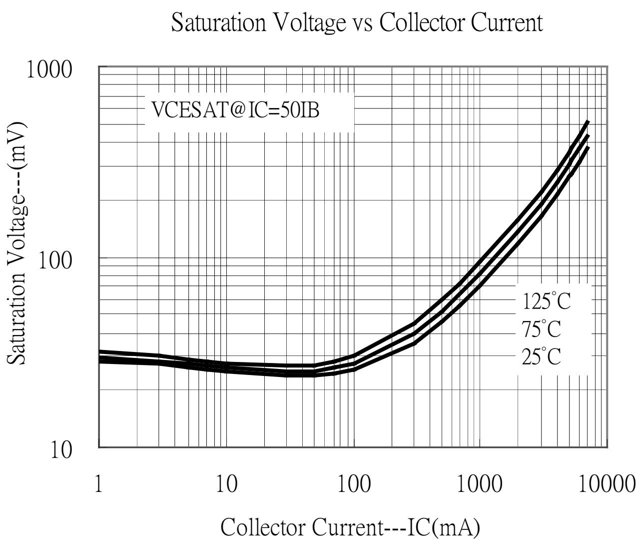
Current Gain vs Collector Current

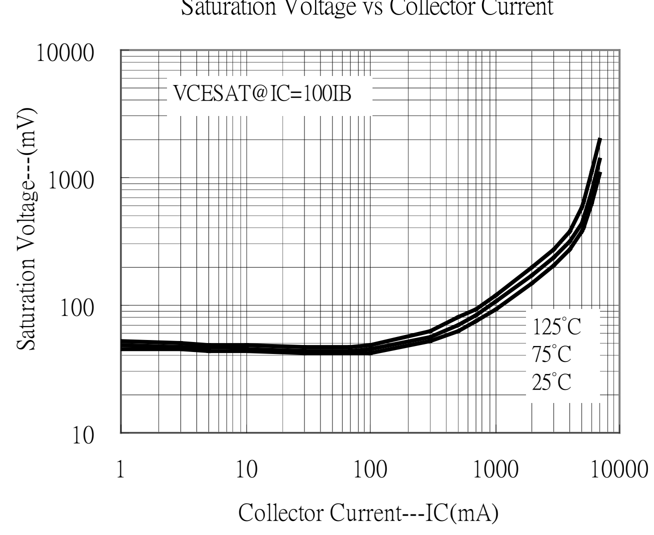
125°C
75°C
25°C
VCE=2V
Current Gain---HFE
Collector Current---IC(mA)

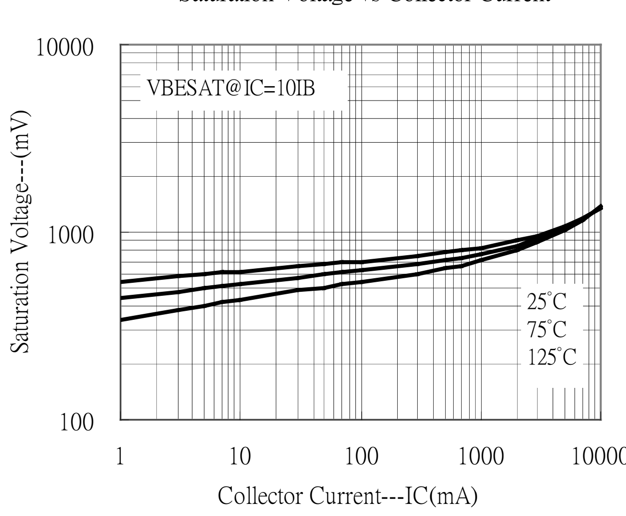
Typical Characteristics(Cont.)

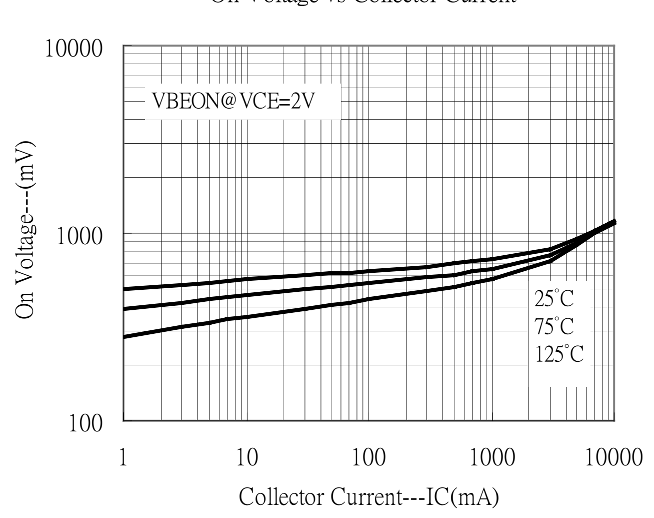




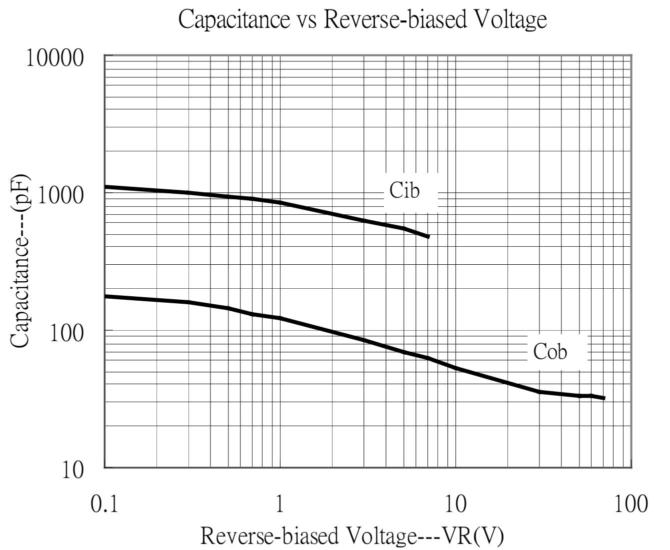


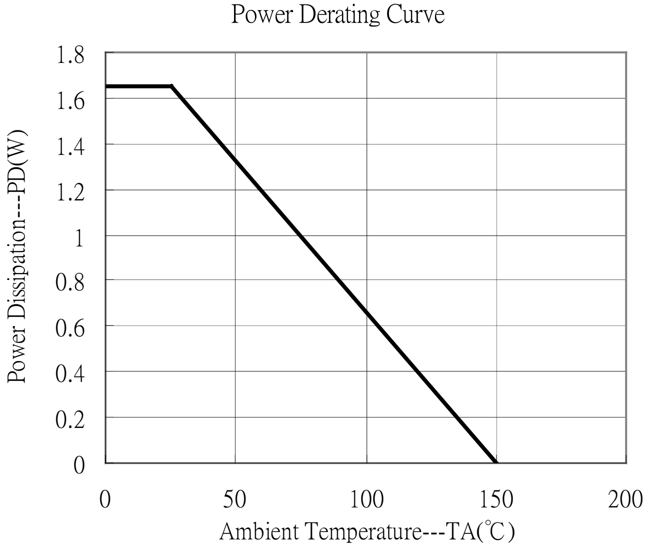


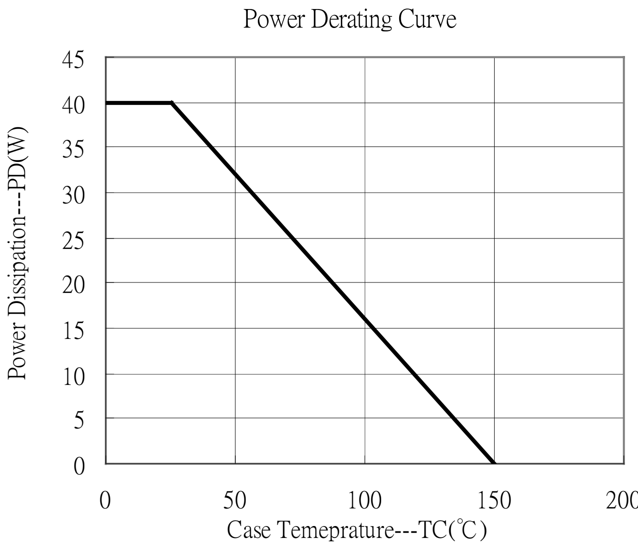




Typical Characteristics(Cont.)



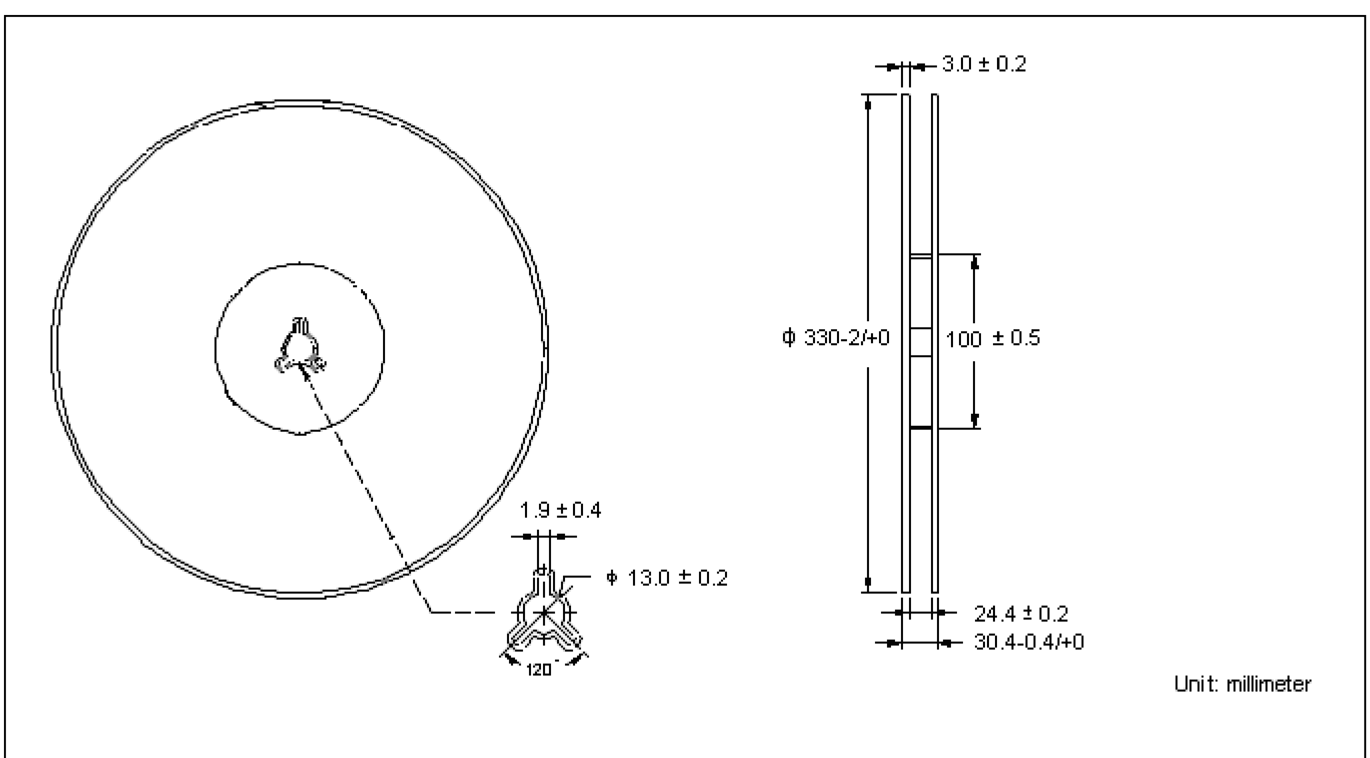




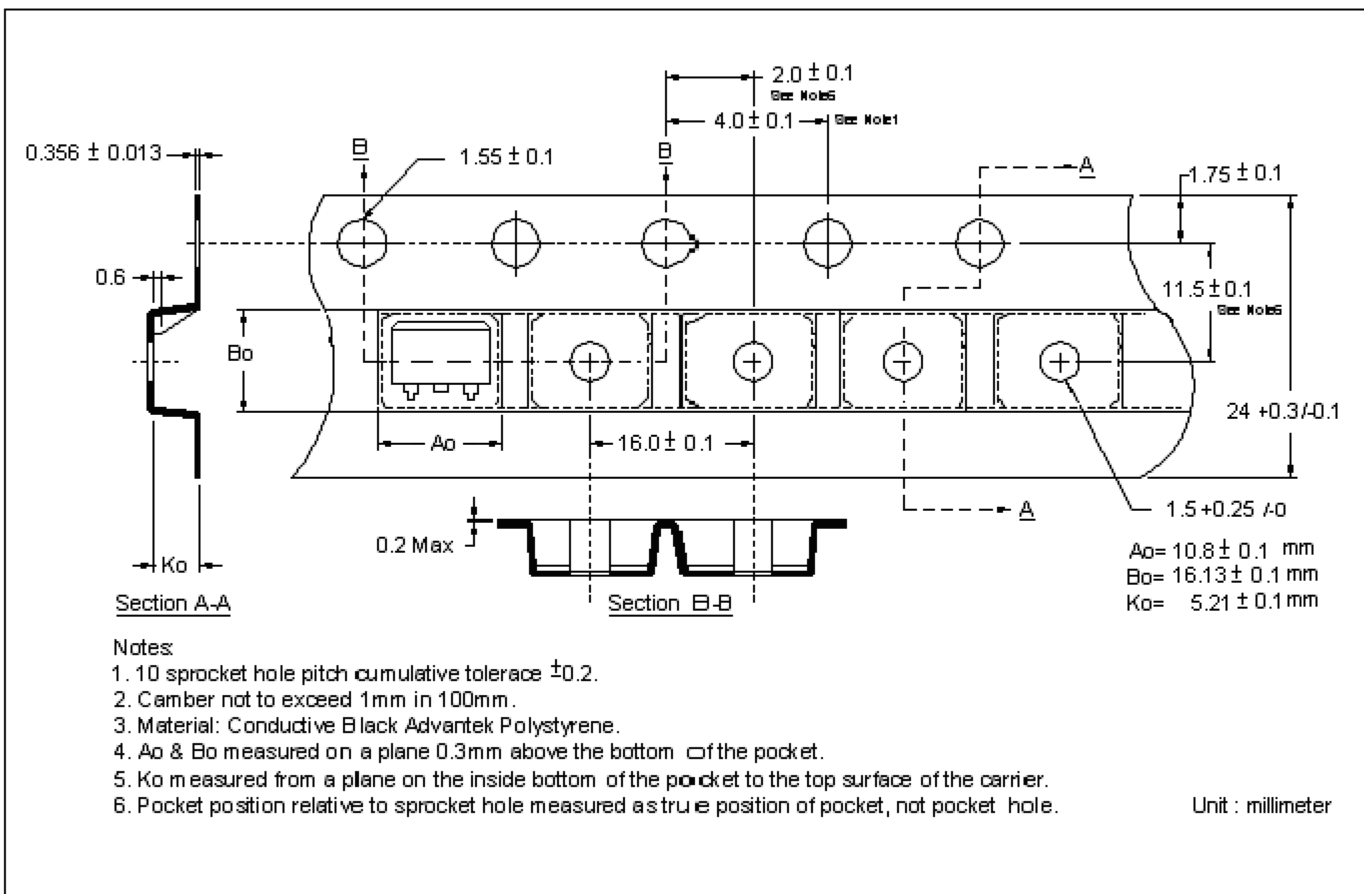
Ordering Information

Device	Package	Shipping
BTD4512F3	TO-263 (Pb-free lead plating)	800pcs / tape & reel

Reel Dimension



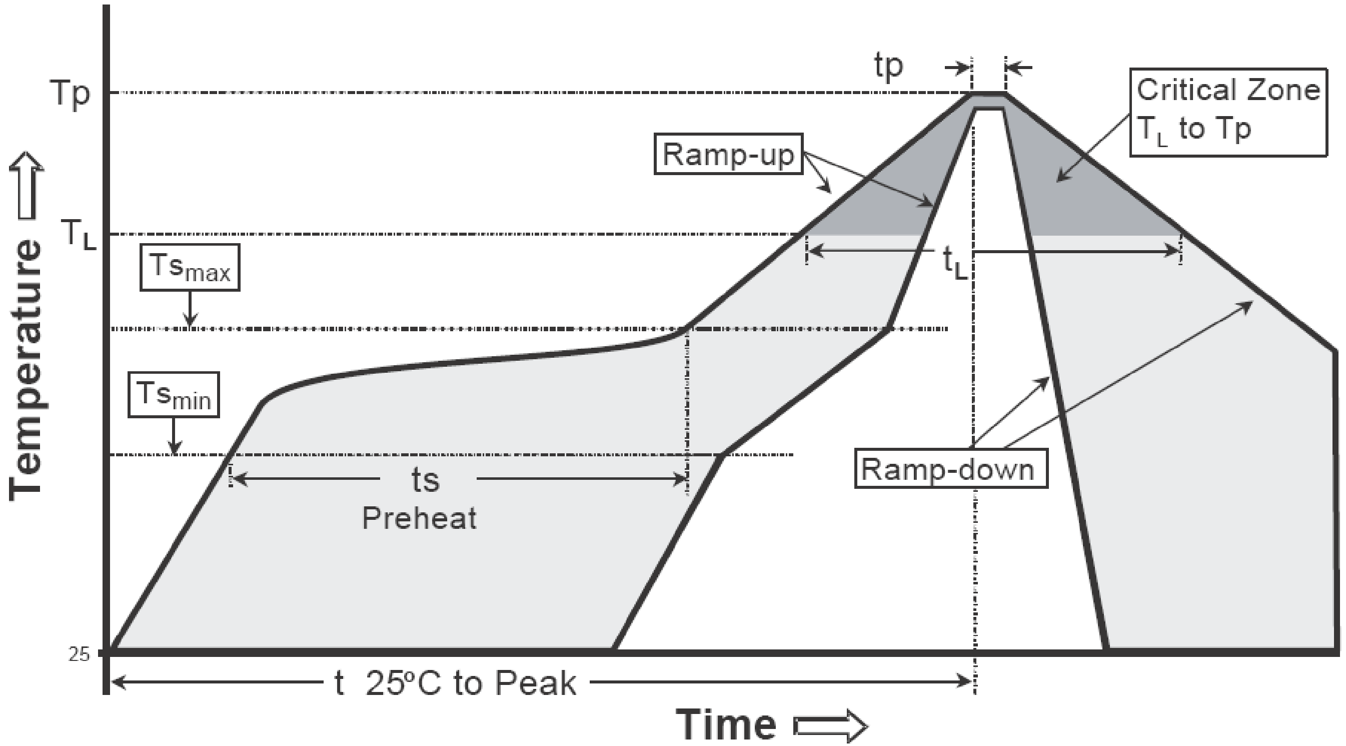
Carrier Tape Dimension



Recommended wave soldering condition

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

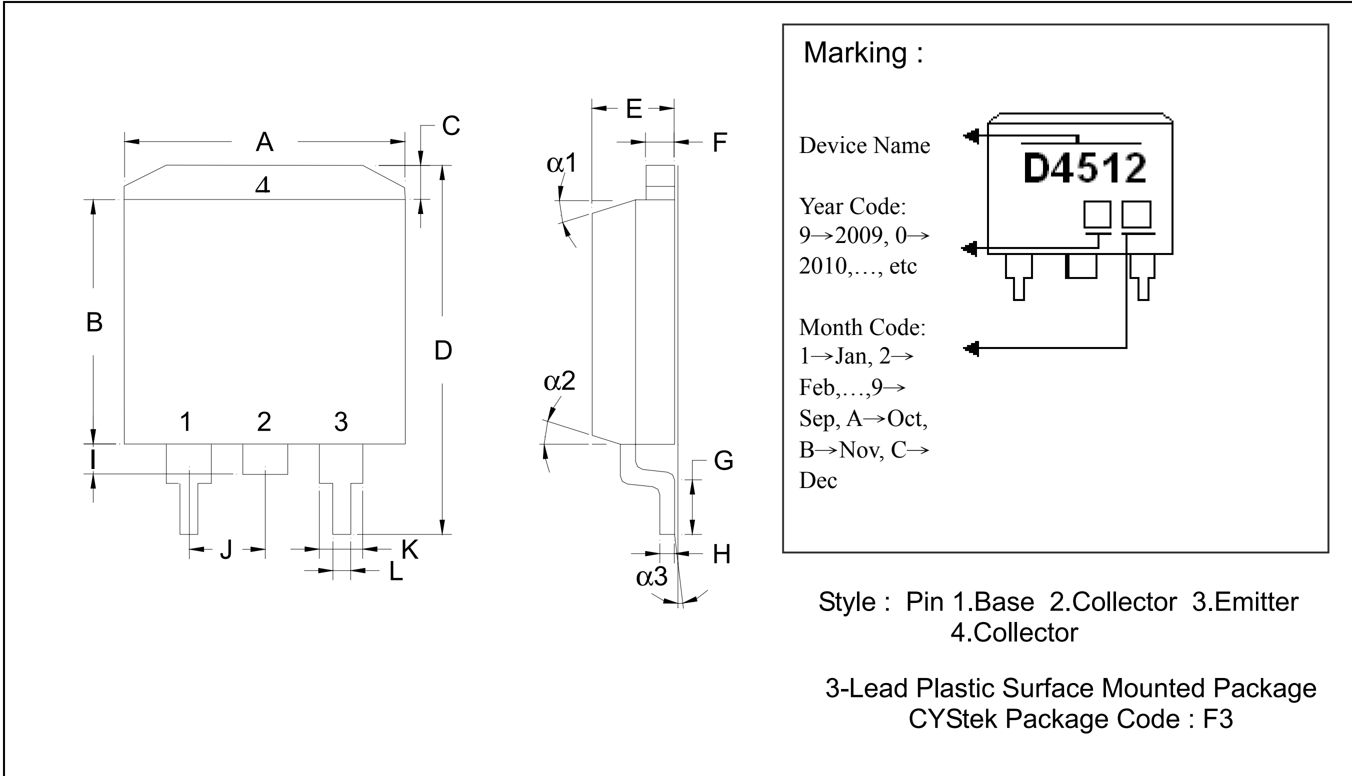
Recommended temperature profile for IR reflow



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(T_S min) −Temperature Max(T_S max) −Time(ts min to ts 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-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	α1	-	-	6°	8°
F	0.0450	0.0550	1.14	1.40	α2	-	-	6°	8°
G	0.0900	0.1100	2.29	2.79	α3	-	-	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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