General Purpose NPN Epitaxial Planar Transistor

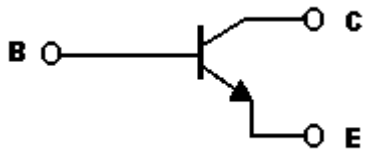
MJE13003D3

Features

- High breakdown voltage, V_{CEO}=400V (min.)
- High collector current, $I_{C(max)}$=1.5A (DC)
- Pb-free package

Symbol

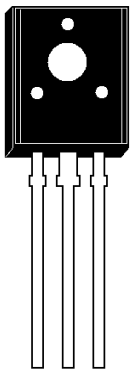
MJE13003D3



B：Base
C：Collector
E：Emitter

Outline

TO-126ML



B C E

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	700	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	9	V
Collector Current(DC)	I_C	1.5	A
Collector Current(Pulsed)	I_{CP}	3 (Note)	A
Base Current	I_B	0.2	A
Power Dissipation(T_A=25℃)	Pd	1.5	W
Power Dissipation(T_C=25℃)		20	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~+150	°C

Note : Single pulse, Pw≤300μs, Duty Cycle≤2%.

Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	700	-	-	V	I_C=100μA
BV_{CEO}	400	-	-	V	I_C=10mA
BV_{EBO}	9	-	-	V	I_E=2mA
I_{CBO}	-	-	10	μA	V_{CB}=700V, I_E=0
I_{CEO}	-	-	500	μA	V_{CE}=400V, I_E=0
I_{EBO}	-	-	10	μA	V_{EB}=9V, I_C=0
*$V_{CE(SAT)}$	-	-	300	mV	I_C=500mA, I_B=100mA
*$V_{CE(SAT)}$	-	-	600	mV	I_C=1A, I_B=250mA
*$V_{BE(SAT)}$	-	-	1.2	V	I_C=1A, I_B=250mA
*h_{FE} 1	10	-	30	-	V_{CE}=5V, I_C=500mA
*h_{FE} 2	5	-	-	-	V_{CE}=5V, I_C=1.5A
f_T	5	-	-	MHz	V_{CE}=10V, I_C=100mA, f=100MHz
t_{stg}	-	-	0.5	μs	V_{CC}=100V, I_C=1A, I_{B1}=-I_{B2}=0.2A, I_C=0.25A
t_f	1.8	-	6.6		

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

Classification Of h_{FE}

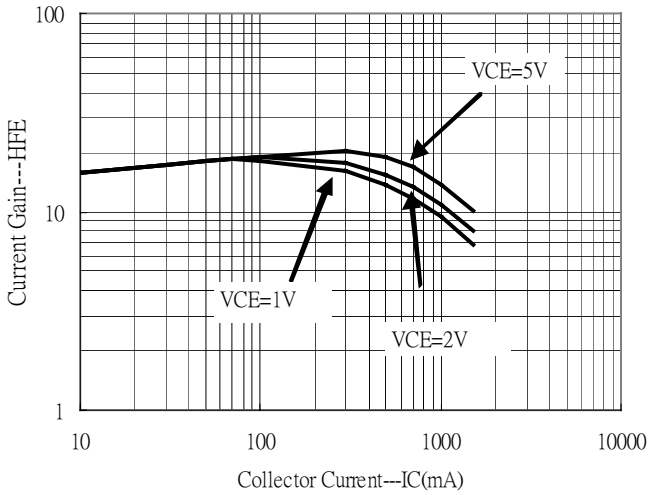
Rank	A	B	C	D
Range	10~15	15~20	20~25	25~30

Ordering Information

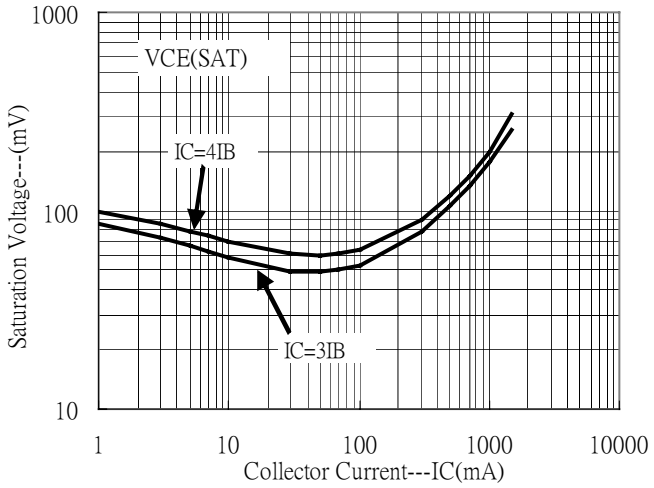
Device	Package	Shipping	Marking
MJE13003D3	TO-126ML (Pb-free)	200 pcs / Bag, 15 Bags/Box, 10 Boxes/Carton	13003

Characteristic Curves

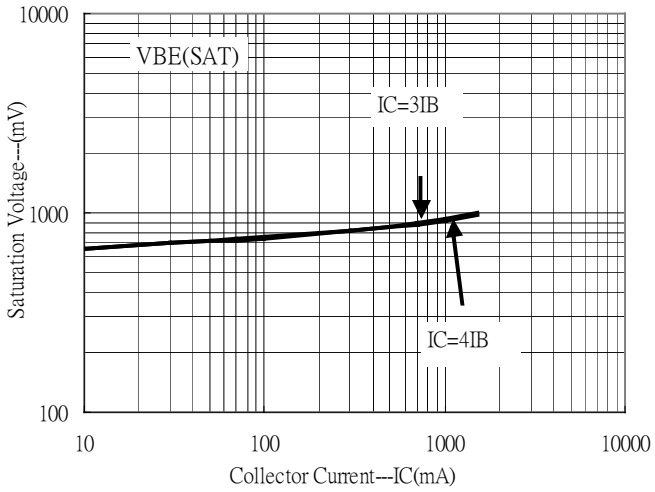
Current Gain vs Collector Current



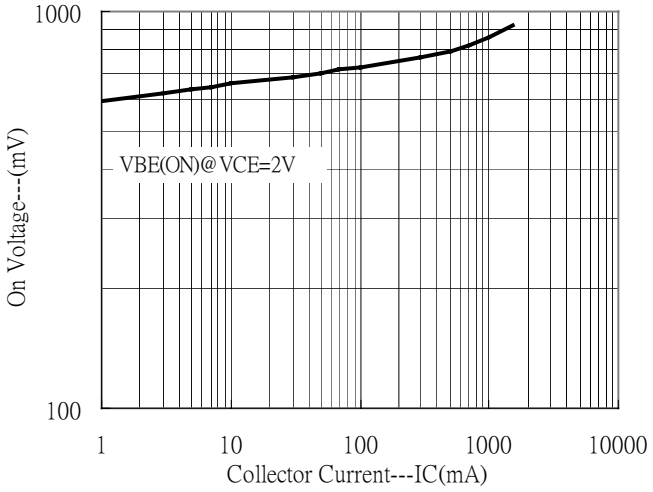
Saturation Voltage vs Collector Current



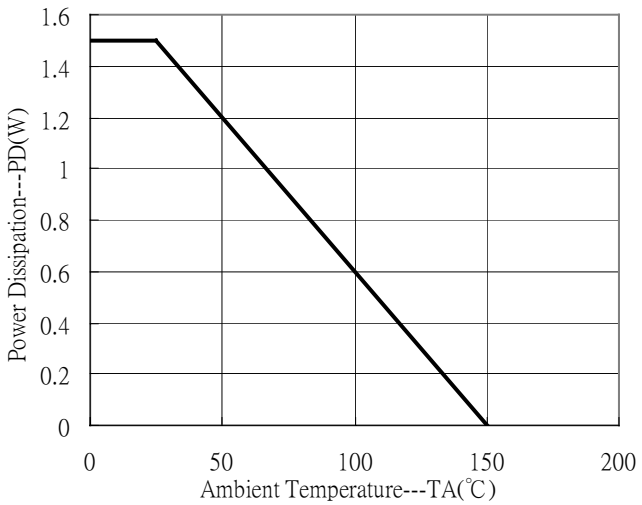
Saturation Voltage vs Collector Current



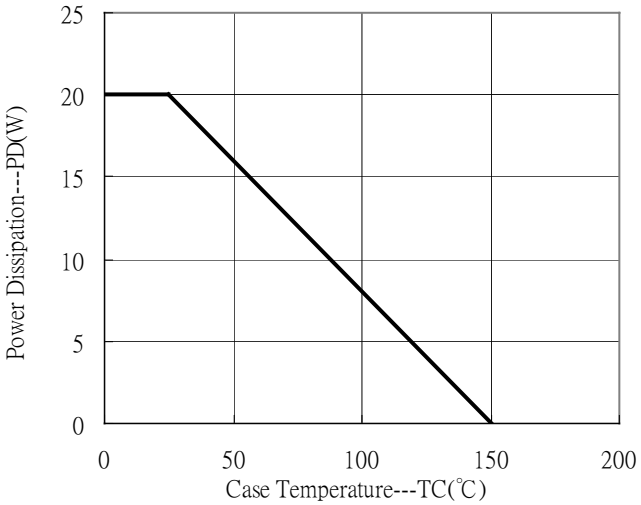
On Vottage vs Collector Current



Power Derating Curve



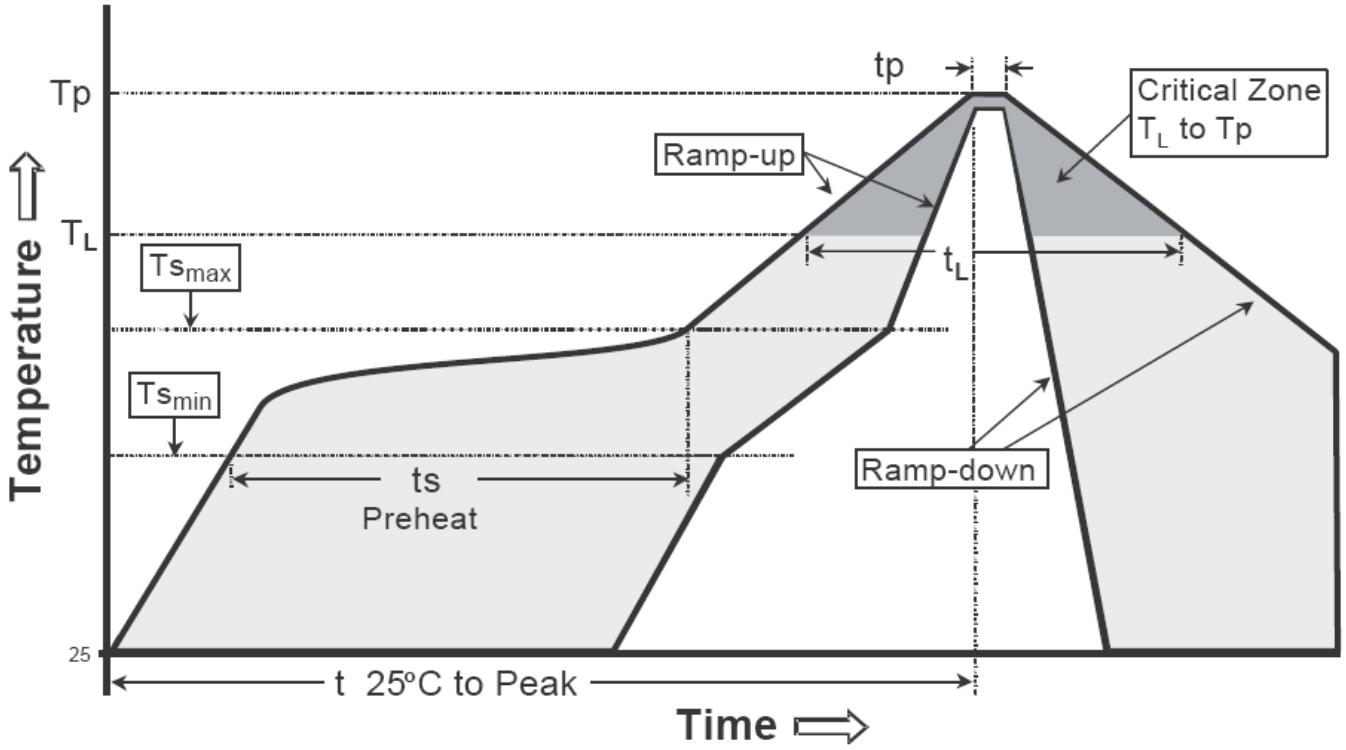
Power Derating Curve



Recommended wave soldering condition

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

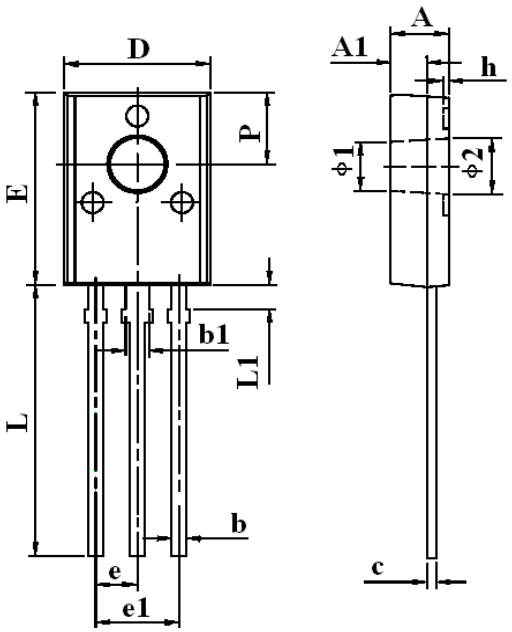
Recommended temperature profile for IR reflow



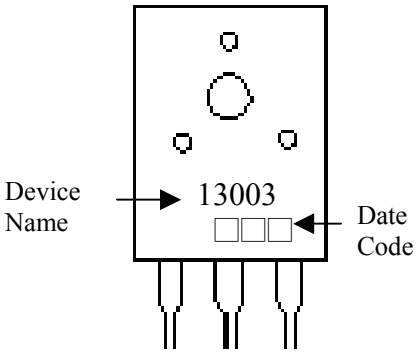
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	 183°C 60-150 seconds	 217°C 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-126ML Dimension



Marking:



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

3-Lead TO-126ML Plastic Package
CYStek Package Code: D3

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.118	0.134	3.000	3.400	e	*0.090		*2.28	
A1	0.071	0.087	1.800	2.200	e1	0.176	0.183	4.460	4.660
b	0.026	0.034	0.660	0.860	L	0.594	0.610	15.100	15.500
b1	0.046	0.054	1.170	1.370	L1	0.051	0.059	1.300	1.500
c	0.018	0.024	0.450	0.600	P	0.159	0.167	4.040	4.240
D	0.307	0.323	7.800	8.200	Φ_1	0.118	0.126	3.000	3.200
E	0.425	0.441	10.800	11.200	Φ_2	0.122	0.130	3.100	3.300

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: KFC ; solder plating
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0