



# HLB123D

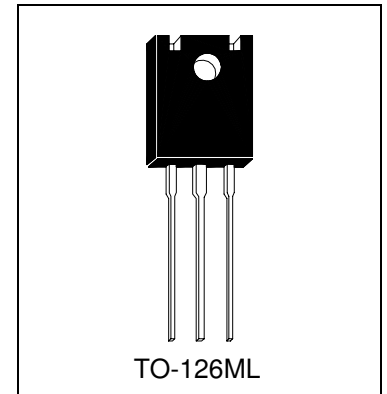
NPN EPITAXIAL PLANAR TRANSISTOR

## Description

The HLB123D is designed for high voltage. High speed switching inductive circuits and amplifier applications.

## Features

- High Speed Switching
- Low Saturation Voltage
- High Reliability



## Absolute Maximum Ratings (T<sub>A</sub>=25°C)

- Maximum Temperatures
  - Storage Temperature ..... -50 ~ +150 °C
  - Junction Temperature ..... +150 °C Maximum
- Maximum Power Dissipation
  - Total Power Dissipation (T<sub>C</sub>=25°C) ..... 30 W
- Maximum Voltages and Currents
  - BV<sub>CBO</sub> Collector to Base Voltage ..... 600 V
  - BV<sub>CEO</sub> Collector to Emitter Voltage ..... 400 V
  - BV<sub>EBO</sub> Emitter to Base Voltage ..... 8 V
  - I<sub>C</sub> Collector Current (DC) ..... 1 A
  - I<sub>C</sub> Collector Current (Pulse) ..... 2 A

## Electrical Characteristics (T<sub>A</sub>=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>CBO</sub>	600	-	-	V	I <sub>C</sub> =1mA, I <sub>E</sub> =0
BV <sub>CEO</sub>	400	-	-	V	I <sub>C</sub> =10mA, I <sub>B</sub> =0
BV <sub>EBO</sub>	8	-	-	V	I <sub>E</sub> =1mA, I <sub>C</sub> =0
I <sub>CBO</sub>	-	-	10	uA	V <sub>CB</sub> =600V, I <sub>E</sub> =0
I <sub>EBO</sub>	-	-	10	uA	V <sub>BE</sub> =9V, I <sub>C</sub> =0
*V <sub>CE(sat)1</sub>	-	-	0.8	V	I <sub>C</sub> =0.1A, I <sub>B</sub> =10mA
*V <sub>CE(sat)2</sub>	-	-	0.9	V	I <sub>C</sub> =0.3A, I <sub>B</sub> =30mA
*V <sub>BE(sat)1</sub>	-	-	1.2	V	I <sub>C</sub> =0.1A, I <sub>B</sub> =10mA
*V <sub>BE(sat)2</sub>	-	-	1.8	V	I <sub>C</sub> =0.3A, I <sub>B</sub> =30Ma
*h <sub>FE1</sub>	10	-	50		I <sub>C</sub> =0.3A, V <sub>CE</sub> =5V
*h <sub>FE2</sub>	10	-	-		I <sub>C</sub> =0.5A, V <sub>CE</sub> =5V
*h <sub>FE3</sub>	6	-	-		I <sub>C</sub> =1A, V <sub>CE</sub> =5V
T <sub>on</sub>	-	0.4	1.1	uS	V <sub>CC</sub> =100V, I <sub>C</sub> =1A, I <sub>B1</sub> =I <sub>B2</sub> =0.2A
T <sub>stg</sub>	-	2.4	4	uS	V <sub>CC</sub> =100V, I <sub>C</sub> =1A, I <sub>B1</sub> =I <sub>B2</sub> =0.2A
T <sub>off</sub>	-	0.3	0.7	uS	V <sub>CC</sub> =100V, I <sub>C</sub> =1A, I <sub>B1</sub> =I <sub>B2</sub> =0.2A

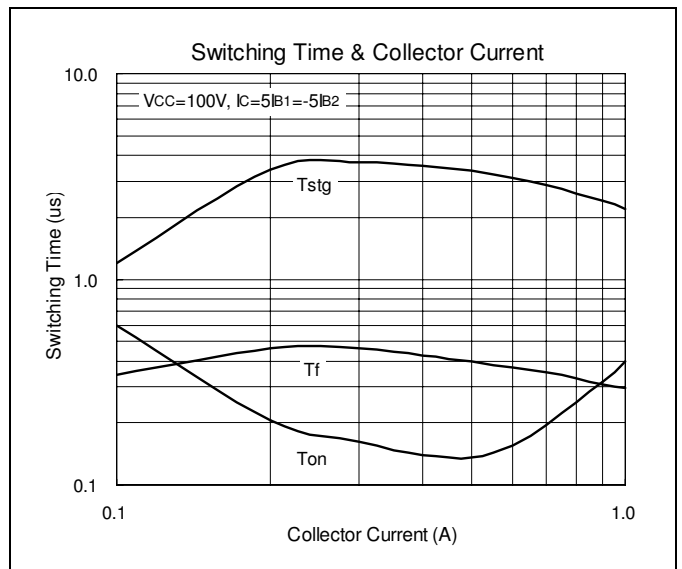
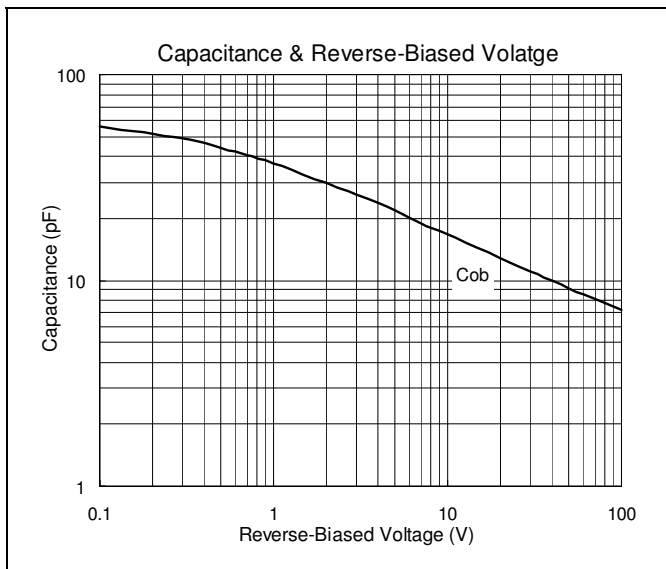
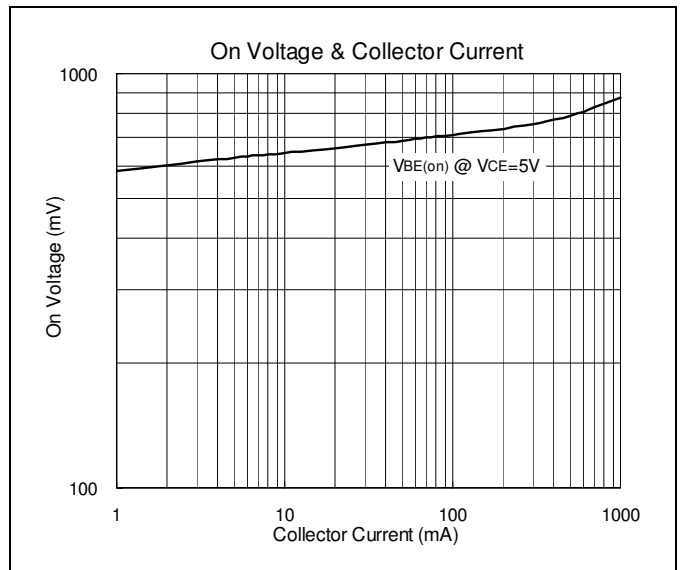
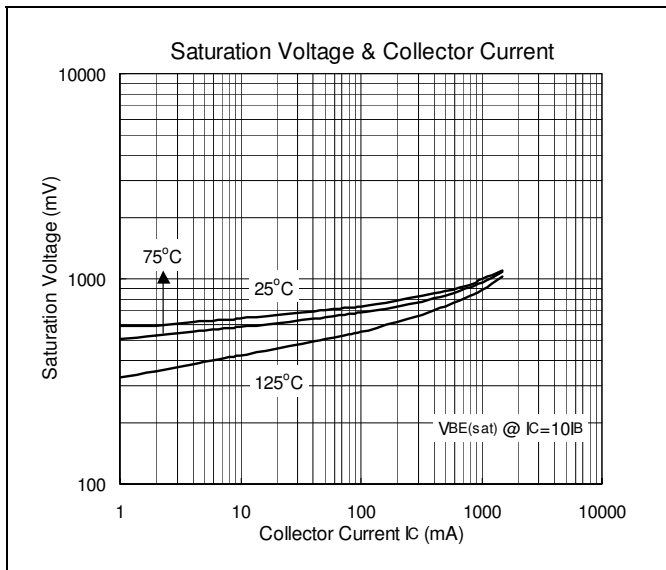
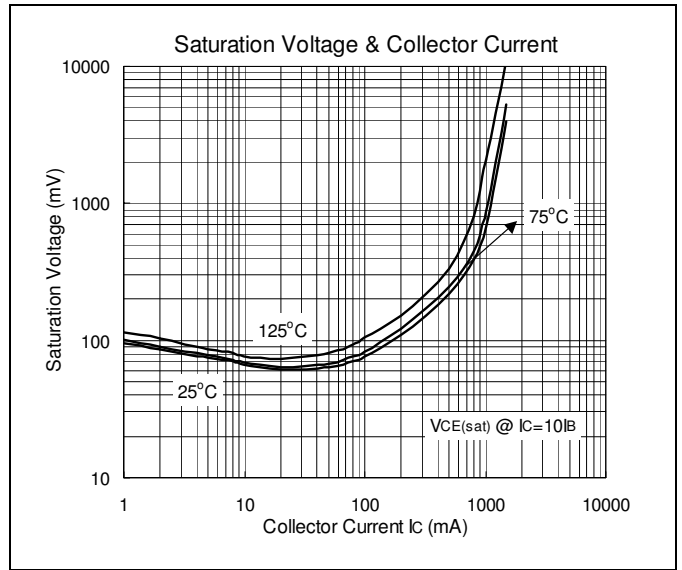
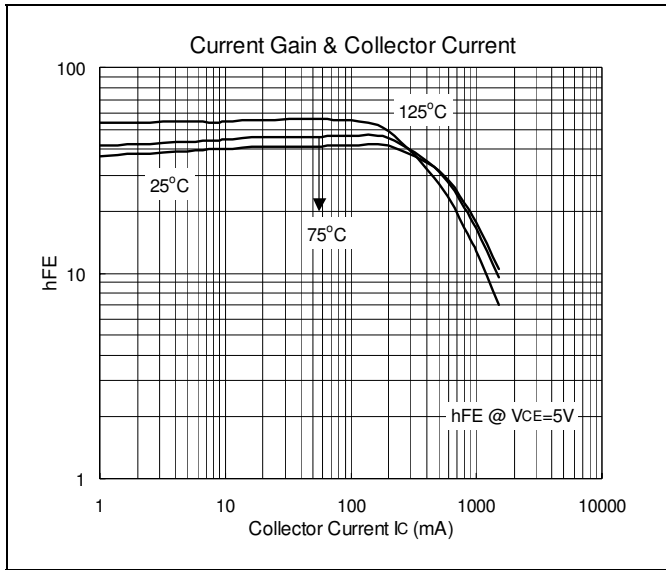
\*Pulse Test: Pulse Width ≤380us, Duty Cycle≤2%

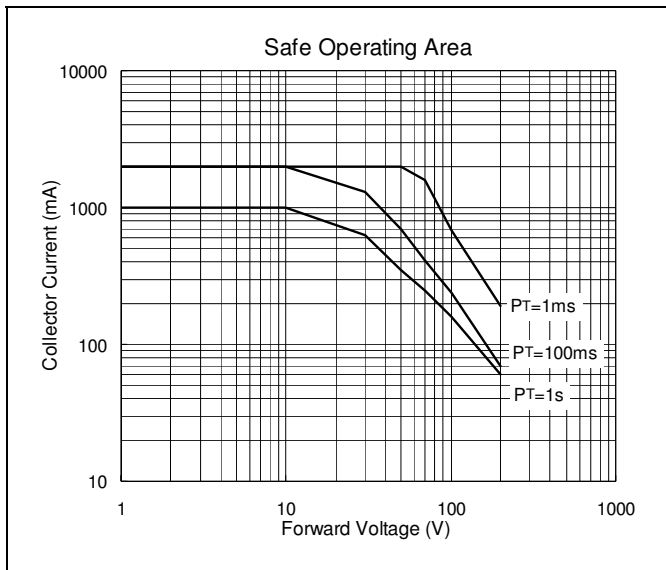
## Classification Of hFE1

Rank	B1	B2	B3	B4	B5	B6	B7	B8
Range	10-17	13-22	18-27	23-32	28-37	33-42	38-47	43-50



### Characteristics Curve







### TO-126ML Dimension

Marking:

Pb Free Mark  
 Pb-Free: "●" (Note)  
 Normal: None

Date Code      Control Code

Note: Green label is used for pb-free packing  
 Pin Style: 1.Emitter 2.Collector 3.Base

Material:  
 • Lead solder plating: Sn60/Pb40 (Normal), Sn/3.0Ag/0.5Cu or Pure-Tin (Pb-free)  
 • Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

3-Lead TO-126ML  
 Plastic Package  
 HSMC Package Code: D

DIM	Min.	Max.
A	7.74	8.24
B	10.87	11.37
C	0.88	1.12
D	1.28	1.52
E	3.50	3.75
F	2.61	3.37
G	13	-
H	1.18	1.42
I	2.88	3.12
J	0.68	0.84
K	-	2.30
L	3.44	3.70
M	1.88	2.14
N	0.50	0.51

\*: Typical, Unit: mm

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### Soldering Methods for HSMC's Products

1. Storage environment: Temperature=10°C~35°C Humidity=65%±15%
2. Reflow soldering of surface-mount devices



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min ( $T_{smin}$ )	100°C	150°C
- Temperature Max ( $T_{smax}$ )	150°C	200°C
- Time (min to max) ( $t_s$ )	60~120 sec	60~180 sec
$T_{smax}$ to $T_L$		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature ( $T_L$ )	183°C	217°C
- Time ( $t_L$ )	60~150 sec	60~150 sec
Peak Temperature ( $T_P$ )	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature ( $t_p$ )	10~30 sec	20~40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

### 3. Flow (wave) soldering (solder dipping)

Products	Peak temperature	Dipping time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec