



# HLB1211

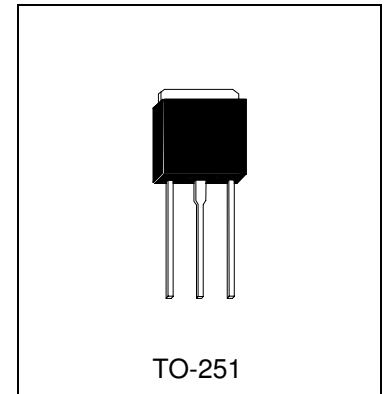
NPN Triple Diffused Planar Type High Voltage Transistor

## Description

The HLB1211 is a medium power transistor designed for use in switching applications.

## Features

- High breakdown voltage
- Low collector saturation voltage
- Fast switching speed



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

- Maximum Temperatures
  - Storage Temperature ..... -55 ~ +150 °C
  - Junction Temperature ..... +150 °C
- Maximum Power Dissipation
  - Total Power Dissipation (T<sub>C</sub>=25°C) ..... 10 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 ..... 6 V
  - I<sub>C</sub> Collector Current (DC) ..... 300 mA
  - I<sub>C</sub> Collector Current (Pulse) ..... 600 mA
  - I<sub>B</sub> Base Current (DC) ..... 40 mA
  - I<sub>B</sub> Base Current (Pulse) ..... 100 mA

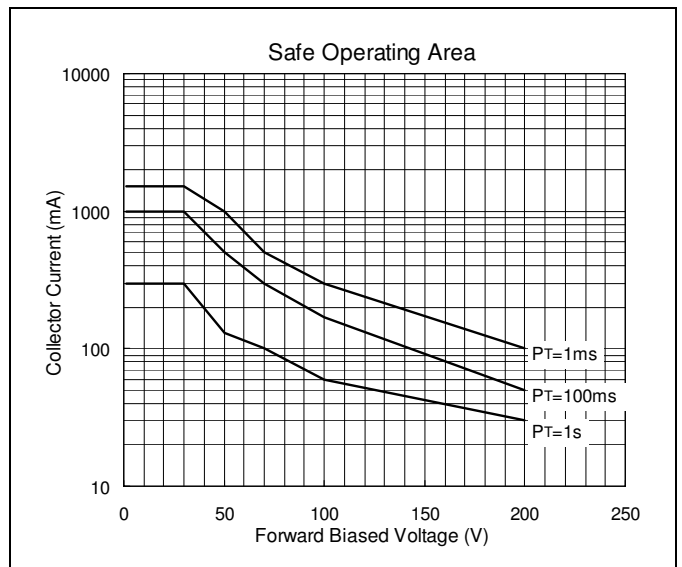
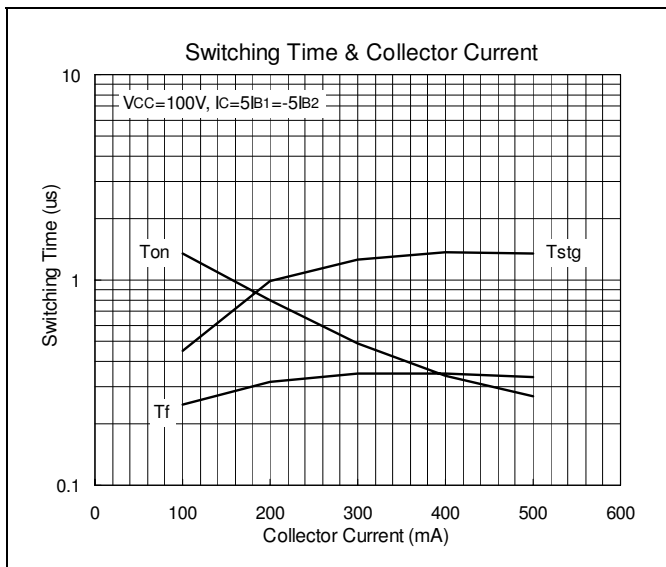
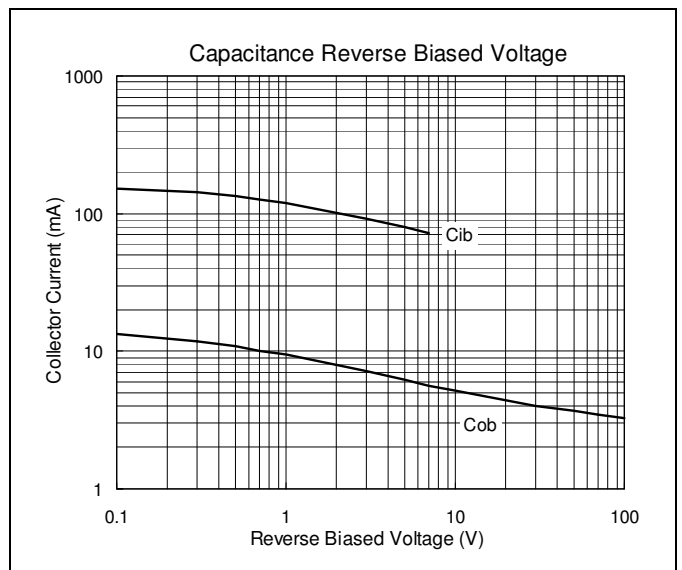
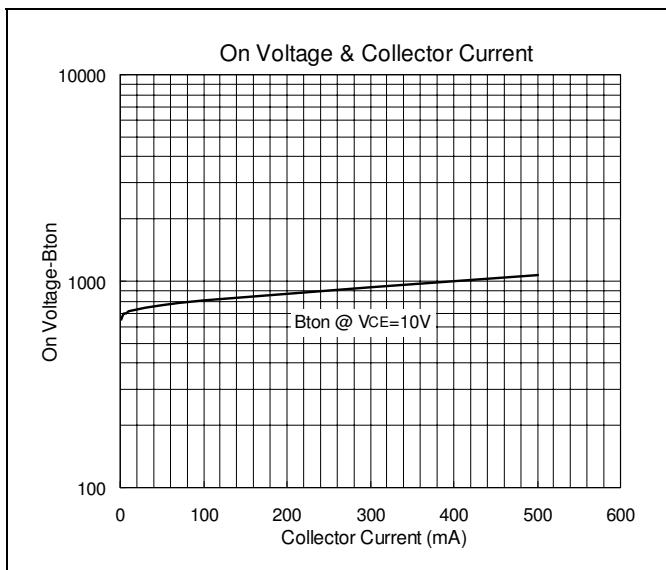
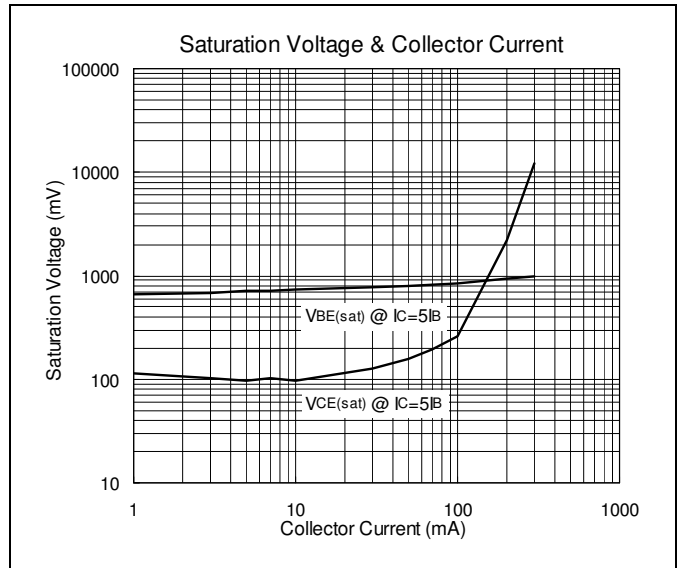
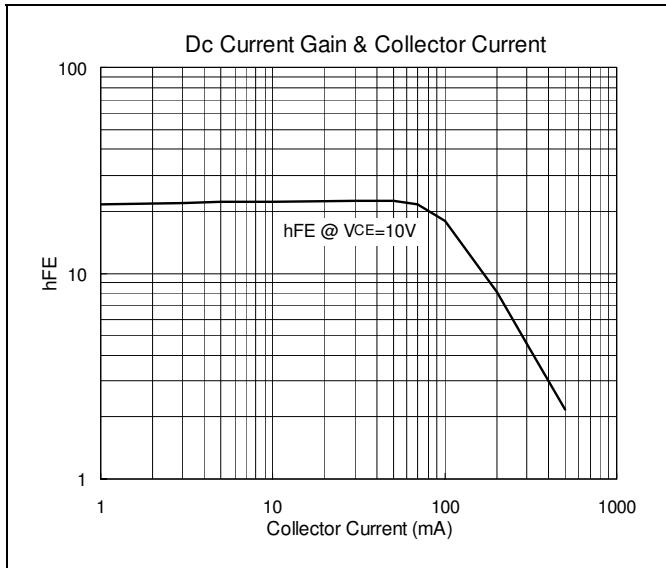
## Electrical Characteristics (T<sub>A</sub>=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>CBO</sub>	600	-	-	V	I <sub>C</sub> =100uA
BV <sub>CEO</sub>	400	-	-	V	I <sub>C</sub> =10mA
BV <sub>EBO</sub>	6	-	-	V	I <sub>E</sub> =10uA
I <sub>CBO</sub>	-	-	10	uA	V <sub>CB</sub> =550V
I <sub>CEO</sub>	-	-	10	uA	V <sub>CB</sub> =400V
I <sub>EBO</sub>	-	-	10	uA	V <sub>EB</sub> =6V
*V <sub>CE(sat)1</sub>	-	-	400	mV	I <sub>C</sub> =50mA, I <sub>B</sub> =10mA
*V <sub>CE(sat)2</sub>	-	-	750	mV	I <sub>C</sub> =100mA, I <sub>B</sub> =20mA
*V <sub>BE(sat)</sub>	-	-	1	V	I <sub>C</sub> =50mA, I <sub>B</sub> =10mA
*h <sub>FE1</sub>	8	-	-		V <sub>CE</sub> =10V, I <sub>C</sub> =10mA
*h <sub>FE2</sub>	10	-	36		V <sub>CE</sub> =10V, I <sub>C</sub> =50mA

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



### Characteristics Curve





### TO-251 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.Base 2/Tab.Collector 3.Emitter

**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

DIM	Min.	Max.
A	6.35	6.80
C	4.80	5.50
F	1.30	1.70
G	5.40	6.25
H1	6.75	8.00
K	0.50	0.90
K1	0.40	0.90
L	0.90	1.50
M	2.20	2.40
a1	0.40	0.65
a2	-	*2.30

\*: Typical, Unit: mm

3-Lead TO-251  
 Plastic Package  
 HSMC Package Code: I

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

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- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

DIM	Min.	Max.
A	6.40	6.80
B	-	6.00
C	5.04	5.64
D	-	*4.34
E	0.40	0.80
F	0.50	0.90
G	5.90	6.30
H	-	*1.80
H1	-	*9.30
I	-	*16.10
J	-	*0.80
K	-	0.96
K1	-	*0.76
M	2.20	2.40
a1	0.40	0.60
a2	2.10	2.50
y1	-	5°
y2	-	3°

\*: Typical, Unit: mm

3-Lead TO-251  
 Plastic Package  
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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