

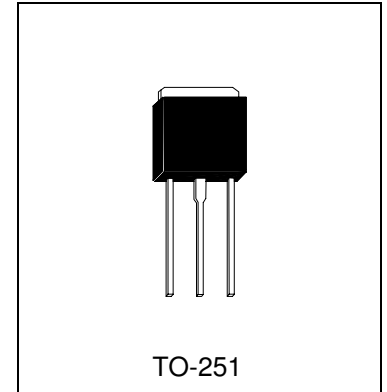


HI13003

NPN EPITAXIAL PLANAR TRANSISTOR

Description

These devices are designed for high-voltage, high-speed power switching inductive circuits where fall time is critical. They are particularly suited for 115 and 220V switchmode applications such as Switching Regulators, Inverters, Motor Controls, Solenoid/Relay drivers and Deflection circuits.



Absolute Maximum Ratings (T_A=25°C)

- Maximum Temperatures
 - Storage Temperature -55 ~ +150 °C
 - Junction Temperature 150 °C Maximum
- Maximum Power Dissipation
 - Total Power Dissipation (T_C=25°C) 40 W
 - Total Power Dissipation (T_A=25°C) 1.3 W
- Maximum Voltages and Currents (T_a=25°C)
 - BV_{CEV} Collector to Emitter Voltage 700 V
 - V_{CEO} Collector to Emitter Voltage 400 V
 - V_{EBO} Emitter to Base Voltage 9 V
 - I_C Collector Current 1.5 A

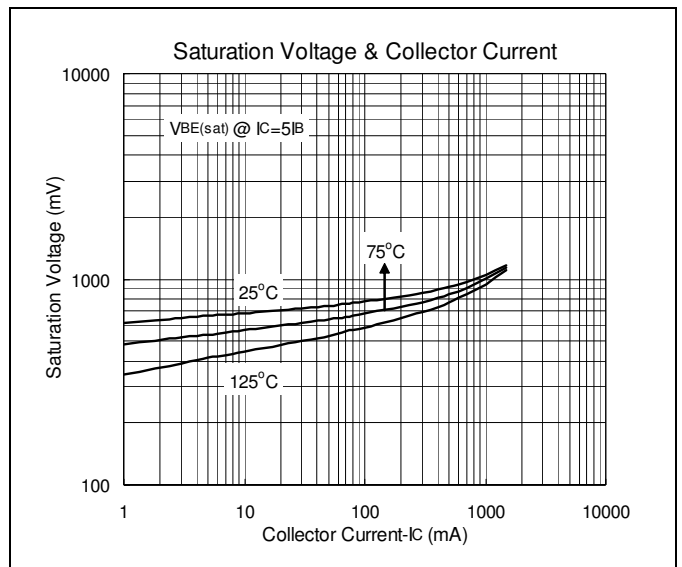
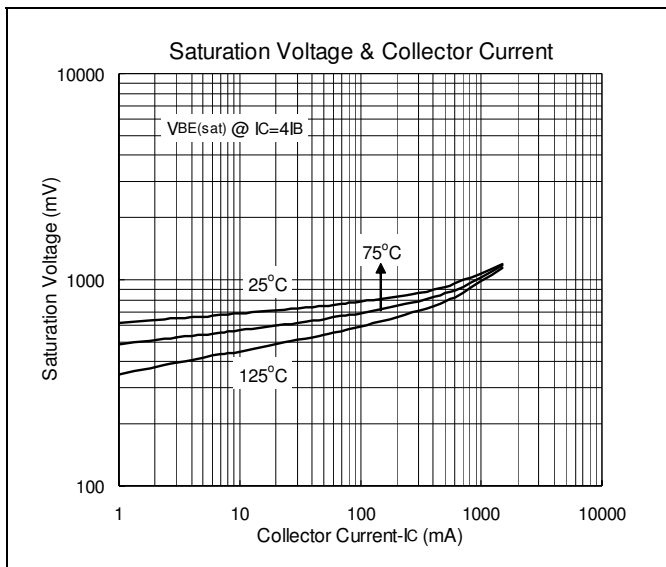
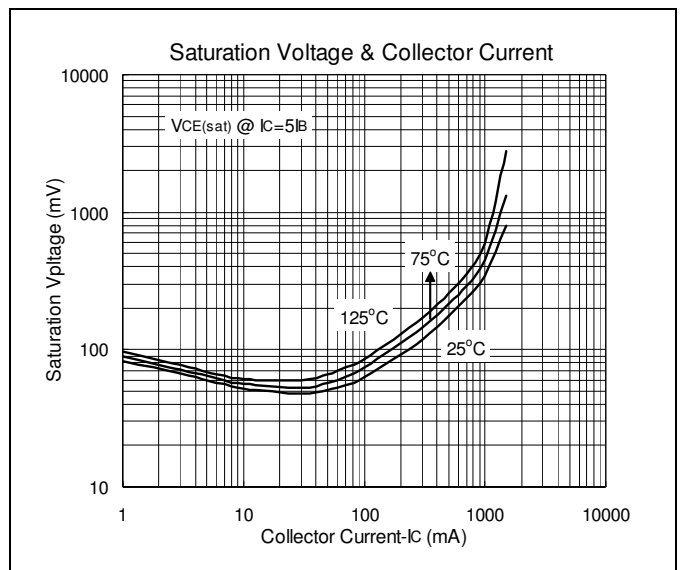
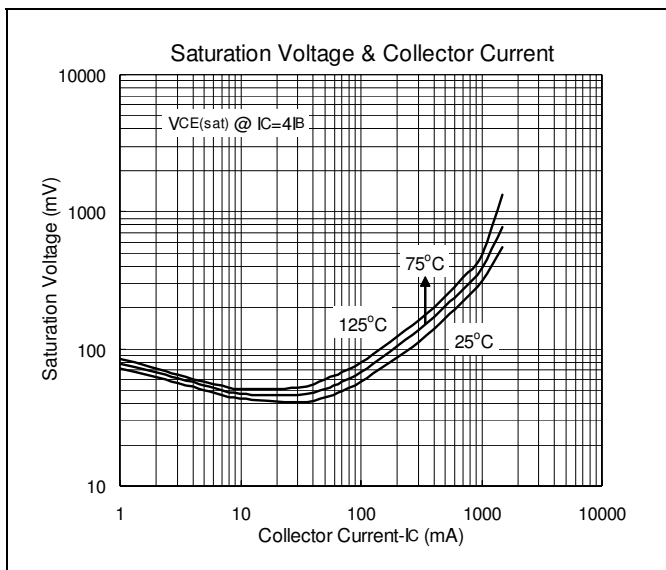
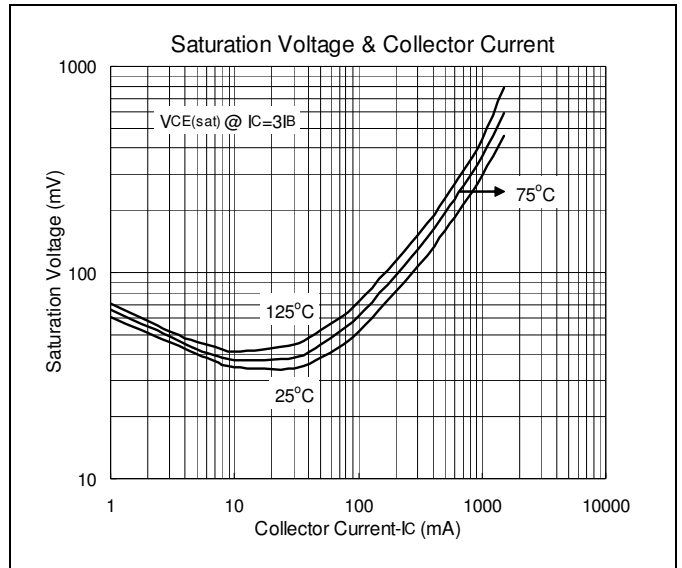
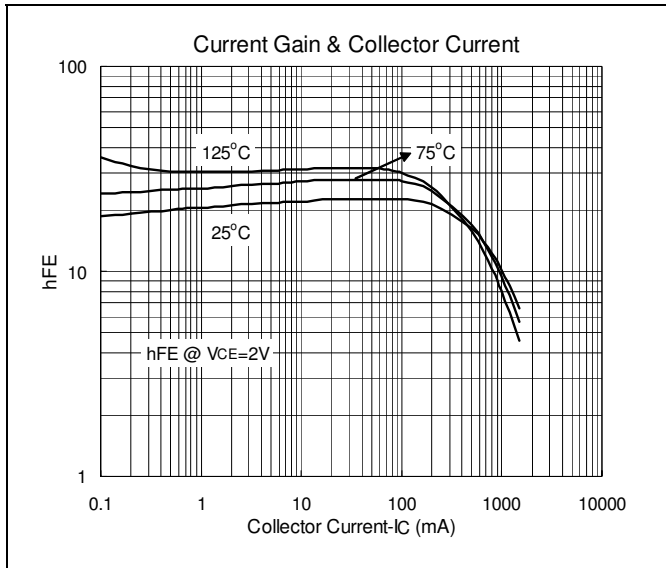
Electrical Characteristics (T_A=25°C)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|------------------------|------|------|------|------|---|
| BV _{CEO} | 400 | - | - | V | I _C =10mA |
| BV _{CEV} | 700 | - | - | V | I _C =1mA, V _{BE(OFF)} =1.5V |
| I _{EBO} | - | - | 1 | mA | V _{EB} =9V |
| I _{CEV} | - | - | 1 | mA | V _{CE} =700V, V _{BE(OFF)} =1.5V |
| *V _{CE(sat)1} | - | - | 0.5 | V | I _C =0.5A, I _B =0.1A |
| *V _{CE(sat)2} | - | - | 1 | V | I _C =1A, I _B =0.25A |
| *V _{CE(sat)3} | - | - | 3 | V | I _C =1.5A, I _B =0.5A |
| *V _{BE(sat)1} | - | - | 1 | V | I _C =0.5A, I _B =0.1A |
| *V _{BE(sat)2} | - | - | 1.2 | V | I _C =1A, I _B =0.25A |
| *h _{FE1} | 8 | - | 40 | | I _C =0.5A, V _{CE} =2V |
| *h _{FE2} | 5 | - | 25 | | V _{CE} =2V, I _C =1A |
| Cob | - | 21 | - | pF | V _{CB} =10V, I _E =0, f=1MHz |

*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

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.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 | 6.40 | 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
HSMC Package Code: I

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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) (ts) | 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 |