

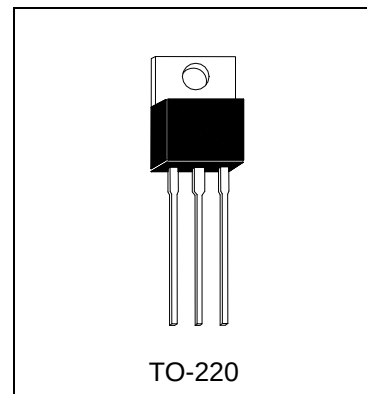


HMJE13003E

NPN Epitaxial Planar Transistor

Description

- High Voltage, High Speed Power Switch
- Switch Regulators
- PWM Inverters and Motor Controls
- Solenoid and Relay Drivers
- Deflection Circuits



Absolute Maximum Ratings ($T_A=25^\circ\text{C}$)

- Maximum Temperatures
Storage Temperature $-50 \sim +150^\circ\text{C}$
Junction Temperature 150°C Maximum
- Maximum Power Dissipation
Total Power Dissipation ($T_C=25^\circ\text{C}$) 35 W
- Maximum Voltages and Currents ($T_A=25^\circ\text{C}$)
 V_{CEX} 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 Continuous 1.5 A
 I_B Base Current Continuous 0.75 A

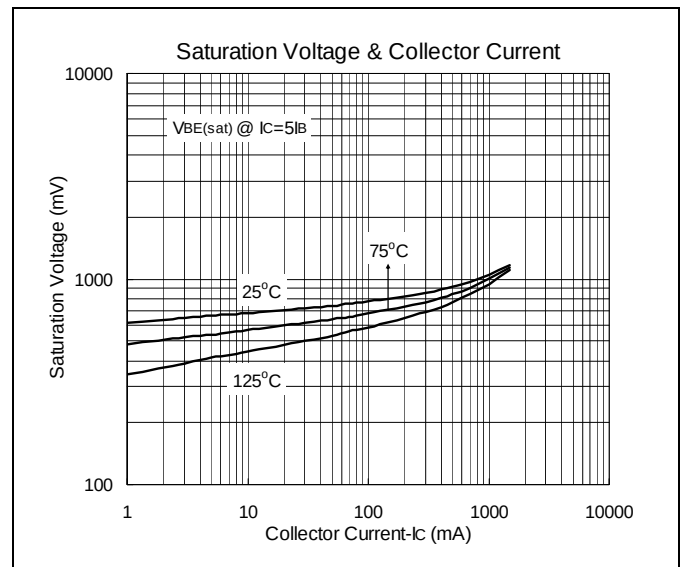
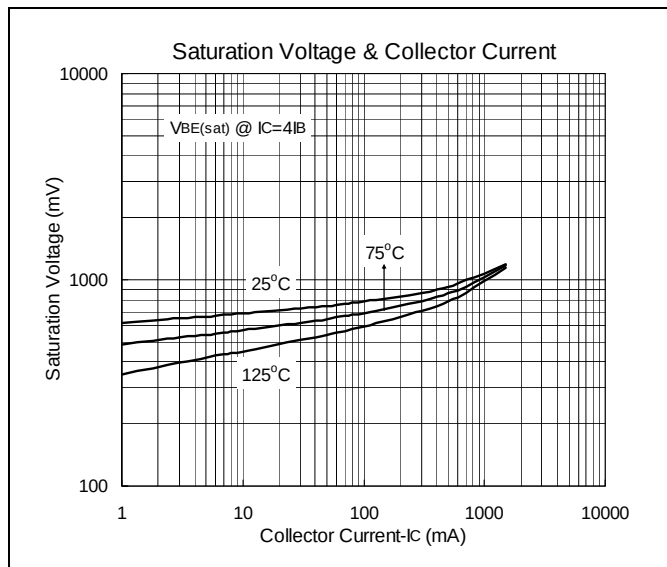
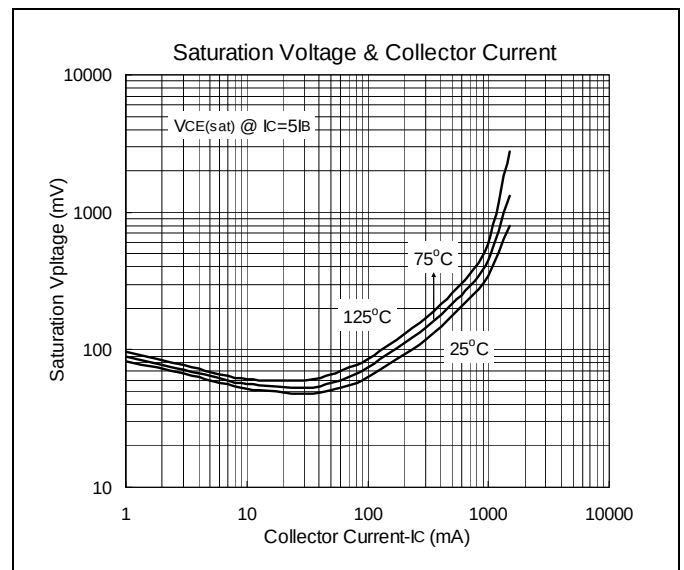
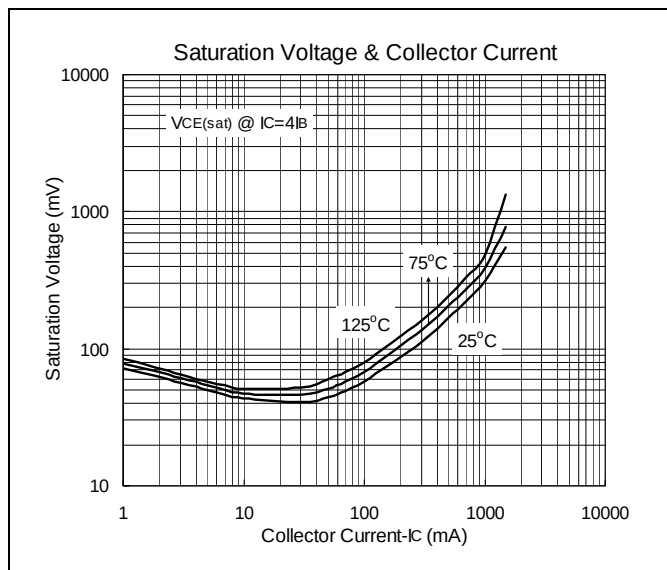
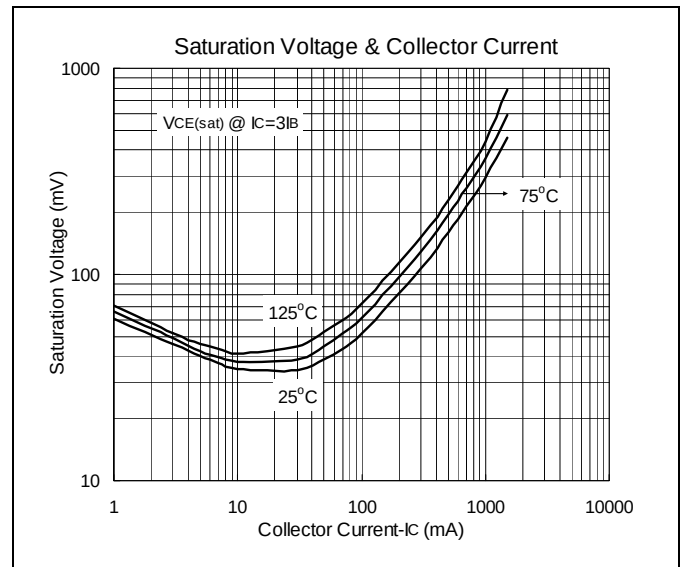
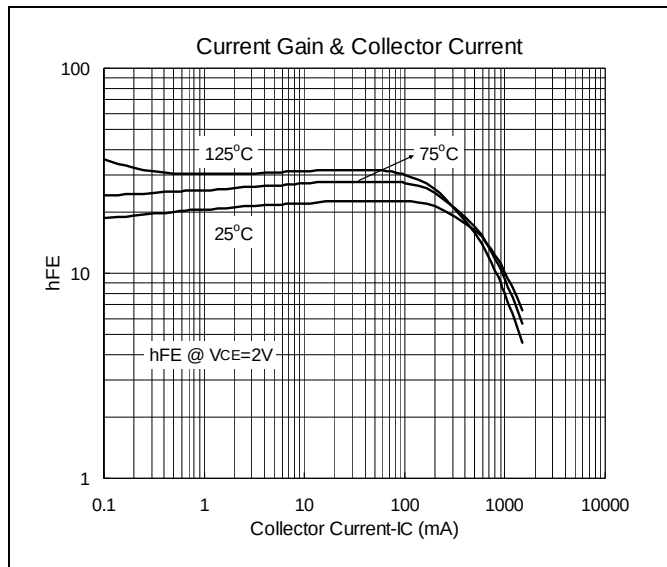
Electrical Characteristics ($T_A=25^\circ\text{C}$)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CEX}	700	-	-	V	$I_C=1\text{mA}$, $V_{BE(off)}=1.5\text{V}$
BV_{CEO}	400	-	-	V	$I_C=10\text{mA}$
I_{EBO}	-	-	1	mA	$V_{EB}=9\text{V}$
I_{CEX}	-	-	1	mA	$V_{CE}=700\text{V}$, $V_{BE(off)}=1.5\text{V}$
$*V_{CE(sat)1}$	-	-	500	mV	$I_C=0.5\text{A}$, $I_B=0.1\text{A}$
$*V_{CE(sat)2}$	-	-	1	V	$I_C=1\text{A}$, $I_B=0.25\text{A}$
$*V_{CE(sat)3}$	-	-	3	V	$I_C=1.5\text{A}$, $I_B=0.5\text{A}$
$*V_{BE(sat)}$	-	-	1	V	$I_C=0.5\text{A}$, $I_B=0.1\text{A}$
$*V_{BE(sat)}$	-	-	1.2	V	$I_C=1\text{A}$, $I_B=0.25\text{A}$
$*h_{FE1}$	8	-	40		$I_C=0.5\text{A}$, $V_{CE}=2\text{V}$
$*h_{FE2}$	5	-	25		$I_C=1\text{A}$, $V_{CE}=2\text{V}$

*Pulse Test: Pulse Width $\leq 380\mu\text{s}$, Duty Cycle $\leq 2\%$

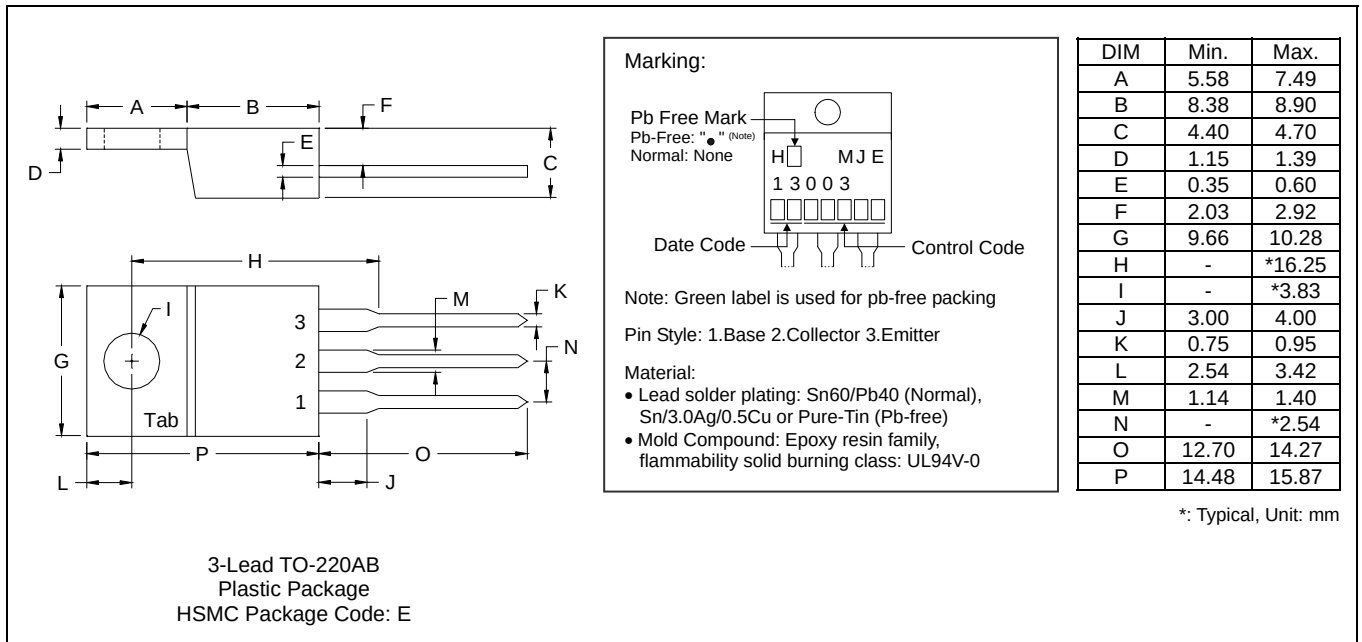


Characteristics Curve





TO-220AB Dimension



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Head Office

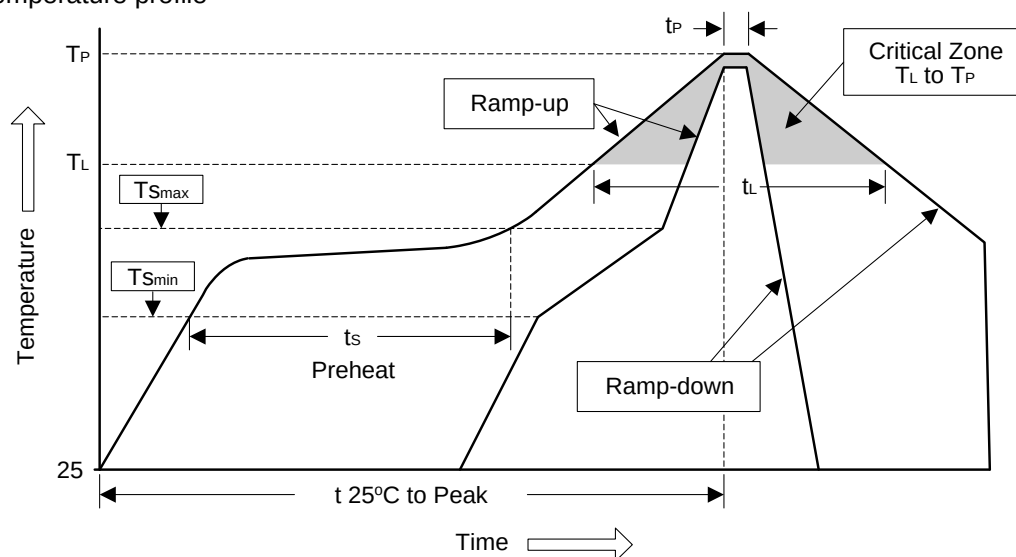
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Soldering Methods for HSMC's Products

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

Figure 1: Temperature profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	$<3^{\circ}\text{C}/\text{sec}$	$<3^{\circ}\text{C}/\text{sec}$
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	$<3^{\circ}\text{C}/\text{sec}$	$<3^{\circ}\text{C}/\text{sec}$
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	$<6^{\circ}\text{C}/\text{sec}$	$<6^{\circ}\text{C}/\text{sec}$
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