

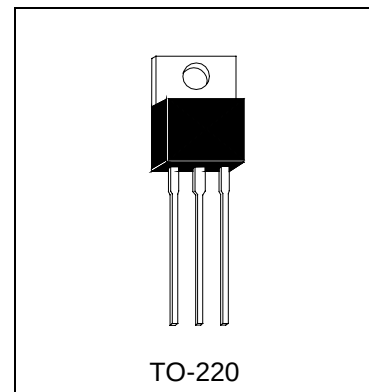


HSD313

NPN EPITAXIAL PLANAR TRANSISTOR

Description

The HSD313 is designed for use in general purpose amplifier and switching applications.



TO-220

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

- Maximum Temperatures
Storage Temperature $-50 \sim +150^{\circ}\text{C}$
Junction Temperature $+150^{\circ}\text{C}$ Maximum
- Maximum Power Dissipation
Total Power Dissipation ($T_A=25^{\circ}\text{C}$) 2 W
Total Power Dissipation ($T_C=25^{\circ}\text{C}$) 30 W
- Maximum Voltages and Currents
 BV_{CBO} Collector to Base Voltage 60 V
 BV_{CEO} Collector to Emitter Voltage 60 V
 BV_{EBO} Emitter to Base Voltage 5 V
 I_C Collector Current 3 A

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	60	-	-	V	$I_C=1\text{mA}$, $I_E=0$
BV_{CEO}	60	-	-	V	$I_C=10\text{mA}$, $I_B=0$
BV_{EBO}	5	-	-	V	$I_E=100\mu\text{A}$, $I_C=0$
I_{CBO}	-	-	0.1	mA	$V_{CB}=20\text{V}$, $I_E=0$
I_{CEO}	-	-	5	mA	$V_{CE}=60\text{V}$, $I_B=0$
I_{EBO}	-	-	1	mA	$V_{EB}=4\text{V}$, $I_C=0$
$*V_{CE(sat)}$	-	-	1	V	$I_C=2\text{A}$, $I_B=0.2\text{A}$
$*V_{BE(on)}$	-	-	1.5	V	$I_C=1\text{A}$, $V_{CE}=2\text{V}$
$*h_{FE1}$	40	-	320		$I_C=1\text{A}$, $V_{CE}=2\text{V}$
$*h_{FE2}$	40	-	-		$I_C=0.1\text{A}$, $V_{CE}=2\text{V}$
f_T	-	8	-	MHz	$V_{CE}=5\text{V}$, $I_C=0.5\text{A}$

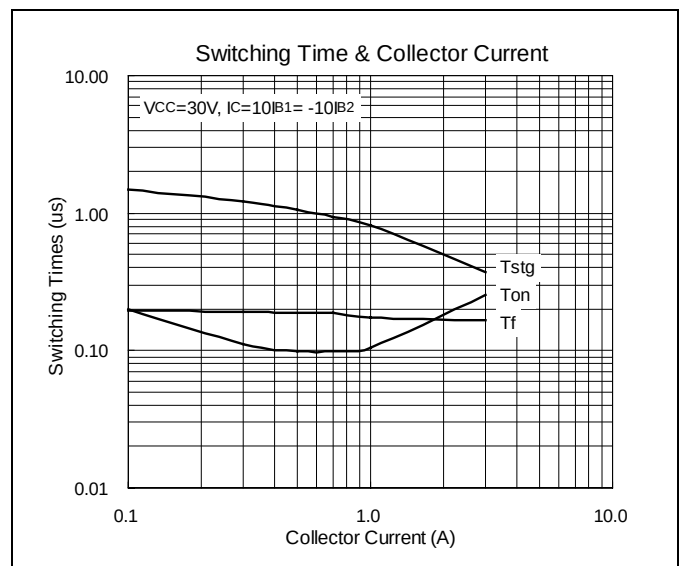
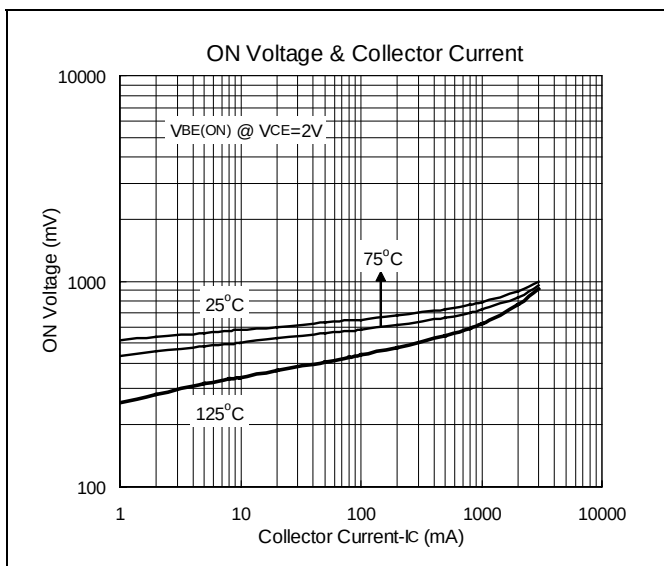
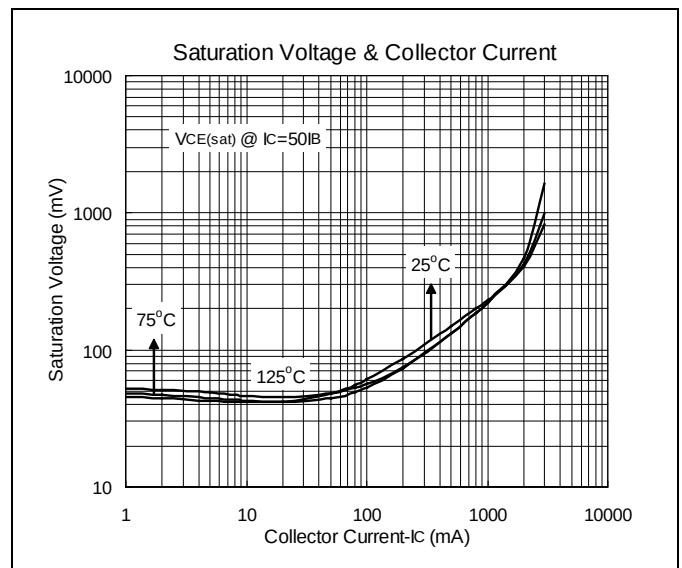
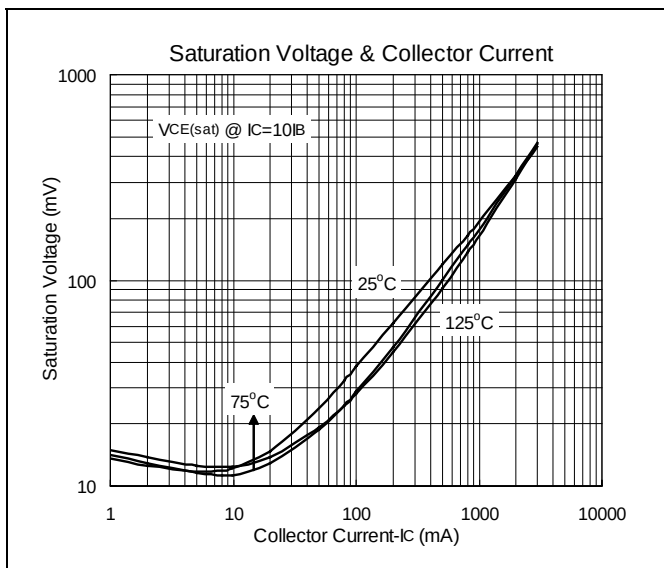
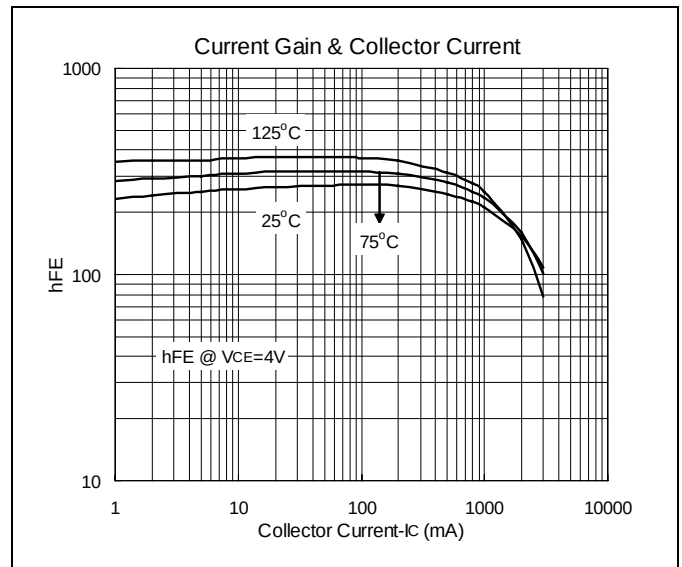
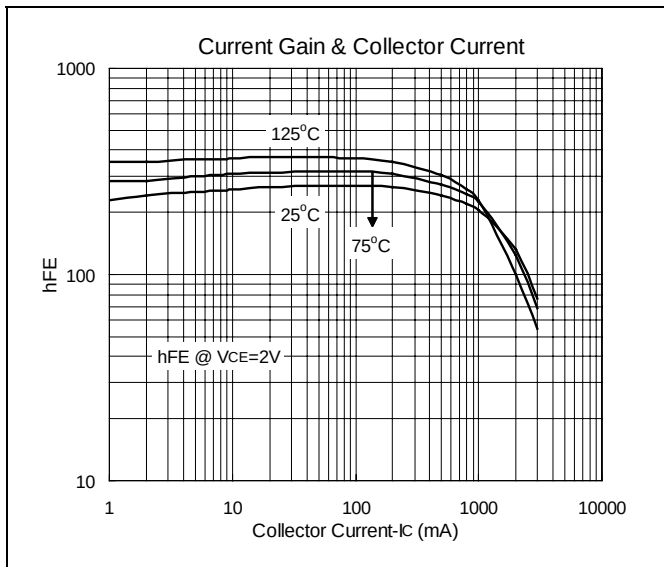
*Pulse Test: Pulse Width $\leq 380\mu\text{s}$, Duty Cycle $\leq 2\%$

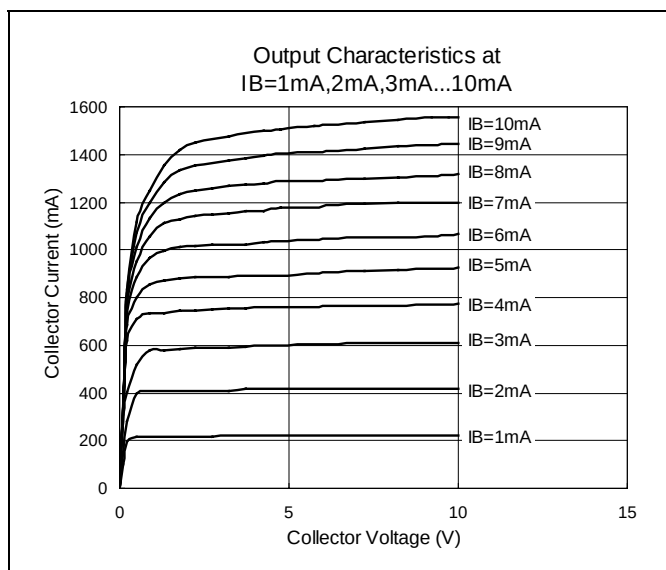
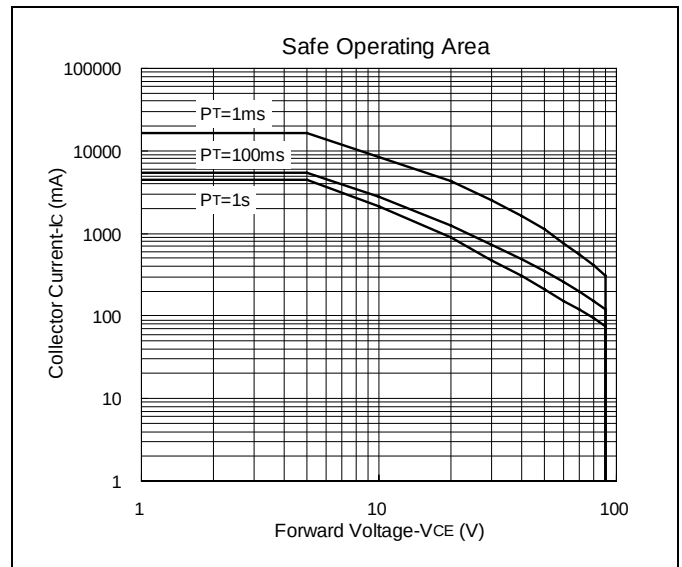
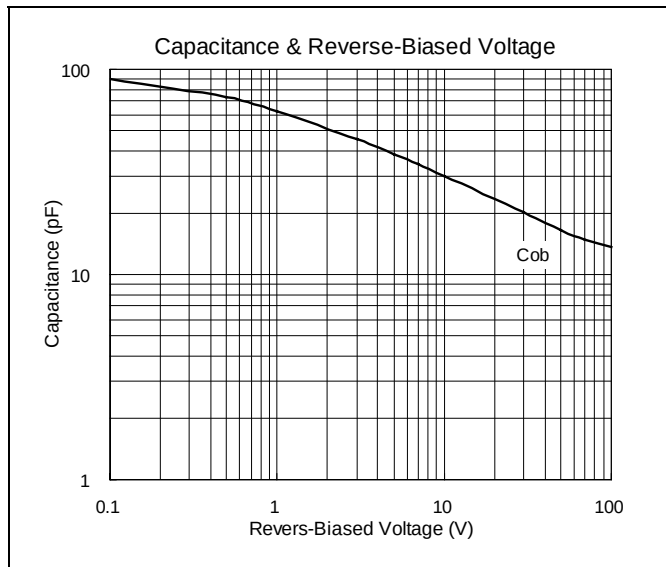
Classification Of h_{FE1}

Rank	C	D	E	F
h_{FE}	40-80	60-120	100-200	160-320



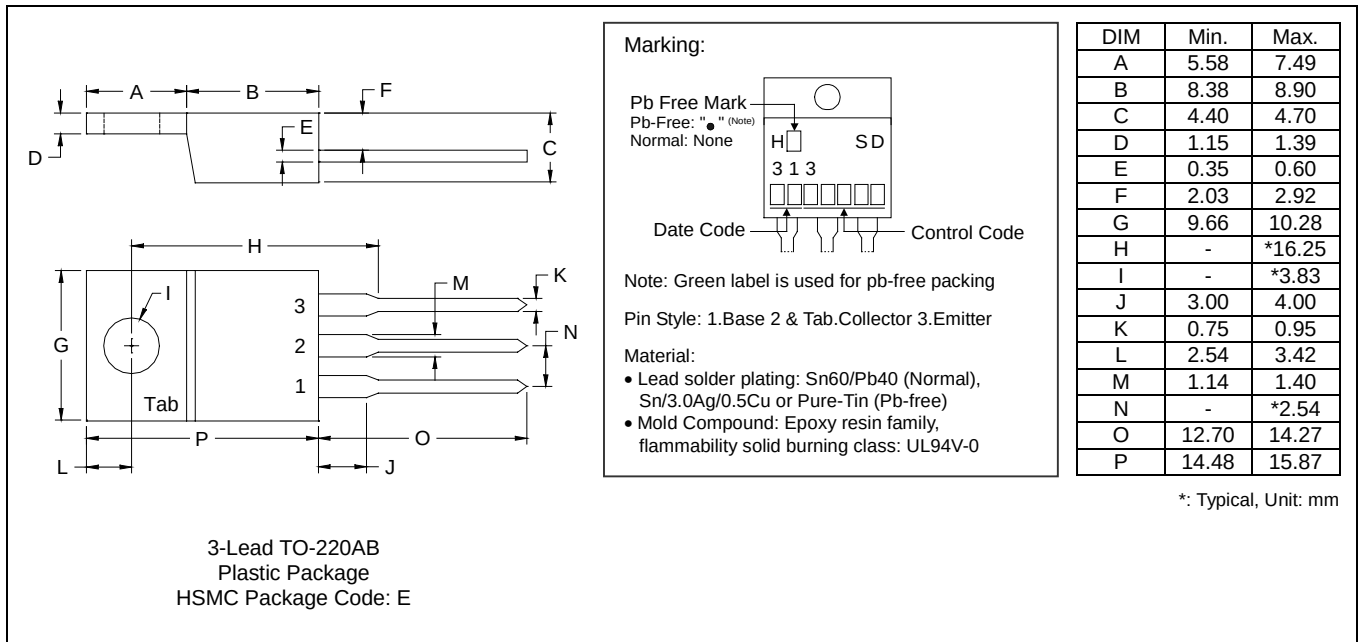
Characteristics Curve







TO-220AB Dimension



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Head Office And Factory:

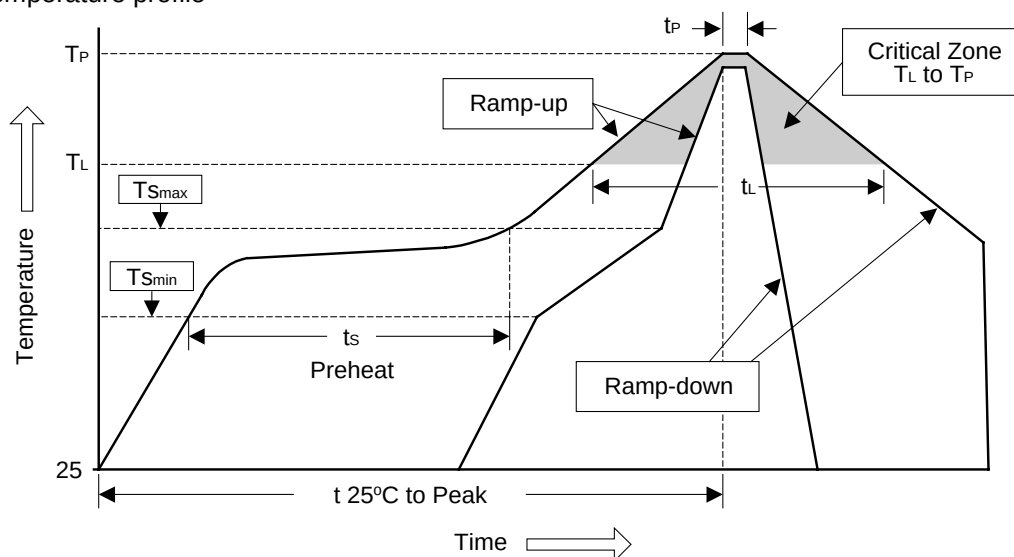
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Soldering Methods for HSMC's Products

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°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