

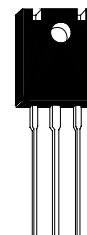


HSD669A

NPN Epitaxial Planar Transistor

Description

Low frequency power amplifier complementary pair with HSB649A



TO-126ML

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

- Maximum Temperatures
 - Storage Temperature -55 ~ +150 °C
 - Junction Temperature +150 °C Maximum
- Maximum Power Dissipation
 - Total Power Dissipation ($T_A=25^{\circ}\text{C}$) 1 W
 - Total Power Dissipation ($T_C=25^{\circ}\text{C}$) 20 W
- Maximum Voltages and Currents
 - BV_{CBO} Collector to Base Voltage 180 V
 - BV_{CEO} Collector to Emitter Voltage 160 V
 - BV_{EBO} Emitter to Base Voltage 5 V
 - I_C Collector Current (DC) 1.5 A
 - I_C Collector Current (Pulse) 3 A

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	180	-	-	V	$I_C=1\text{mA}$, $I_E=0$
BV_{CEO}	160	-	-	V	$I_C=10\text{mA}$, $I_B=0$
BV_{EBO}	5	-	-	V	$I_E=1\text{mA}$, $I_C=0$
I_{CBO}	-	-	10	μA	$V_{CB}=160\text{V}$, $I_E=0$
$*V_{CE(sat)}$	-	-	1	V	$I_C=500\text{mA}$, $I_B=50\text{mA}$
$V_{BE(on)}$	-	-	1.5	V	$I_C=150\text{mA}$, $V_{CE}=5\text{V}$
$*h_{FE1}$	100	-	200		$I_C=150\text{mA}$, $V_{CE}=5\text{V}$
$*h_{FE2}$	30	-	-		$I_C=500\text{mA}$, $V_{CE}=5\text{V}$
f_T	-	140	-	MHz	$I_C=150\text{mA}$, $V_{CE}=5\text{V}$
Cob	-	14	-	pF	$V_{CB}=10\text{V}$, $f=1\text{MHz}$, $I_E=0$

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

Thermal Characteristics

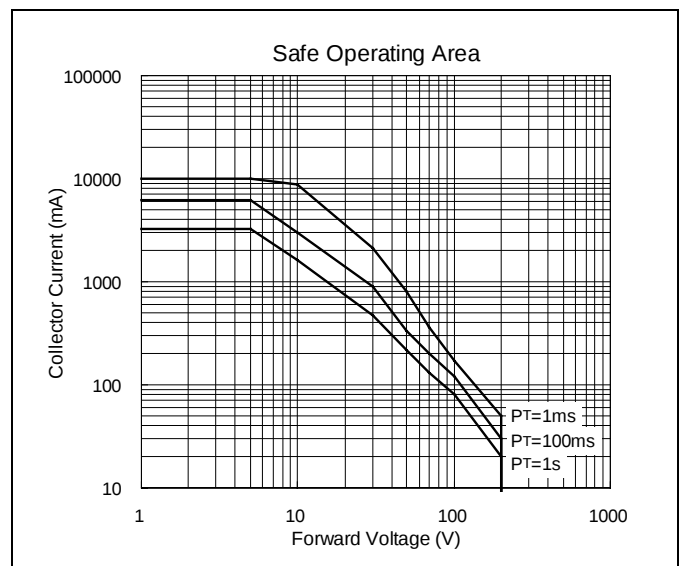
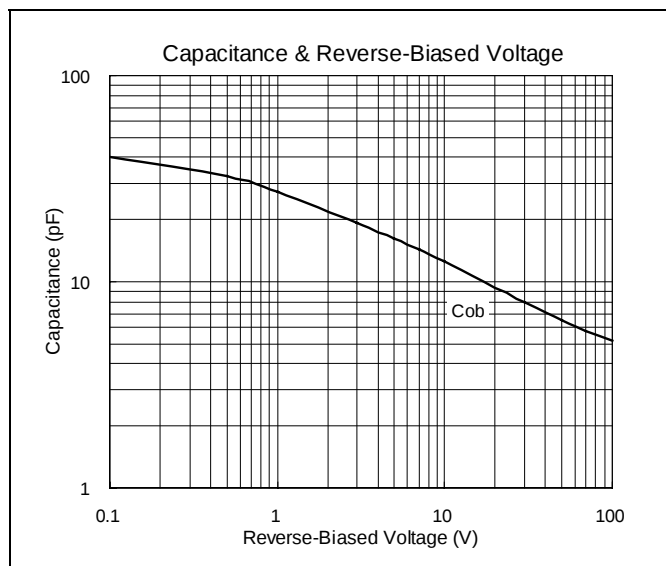
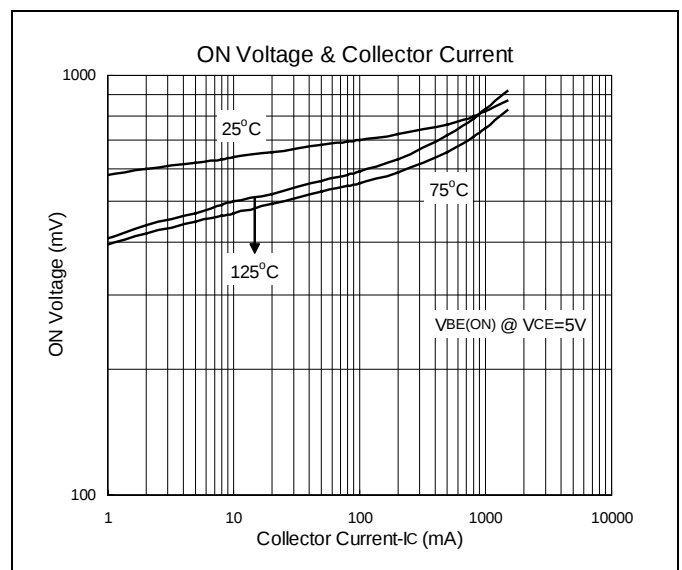
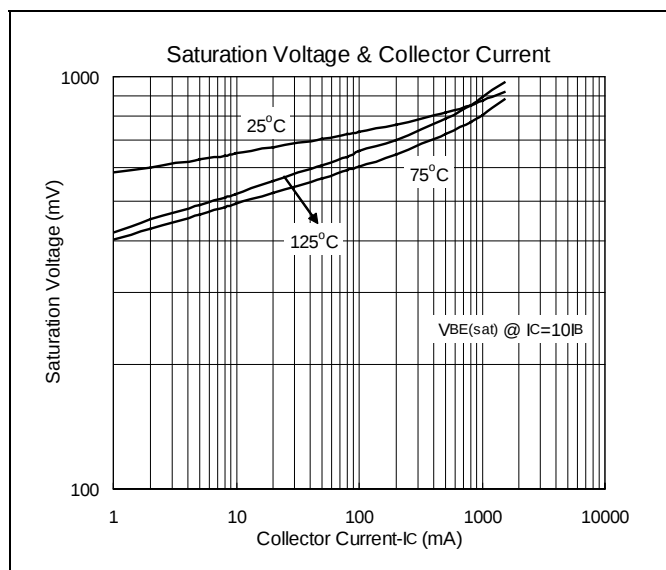
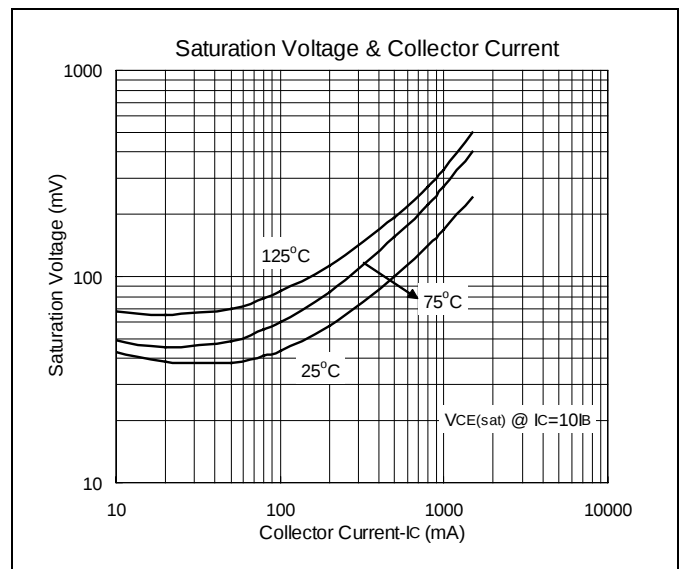
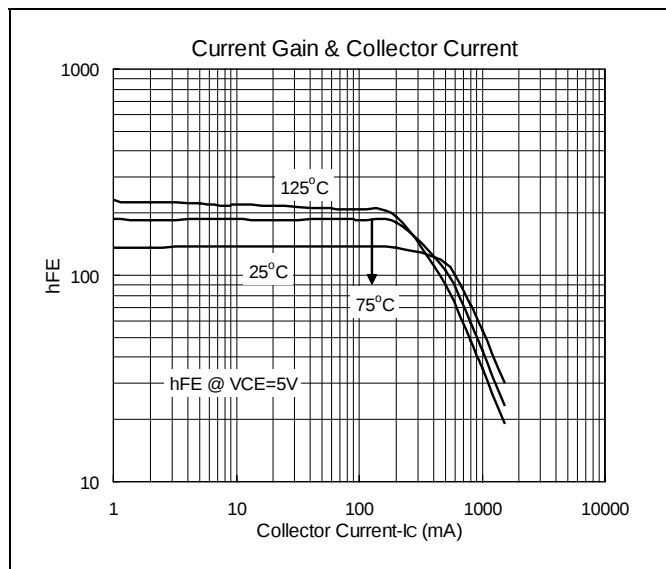
Symbol	Parameter	Value	Unit
R_{th-ja}	Thermal resistance from junction to ambient	125	$^{\circ}\text{C/W}$
R_{th-jc}	Thermal resistance from junction to case	6.25	$^{\circ}\text{C/W}$

Classification Of h_{FE1}

Rank	C
Range	100-200

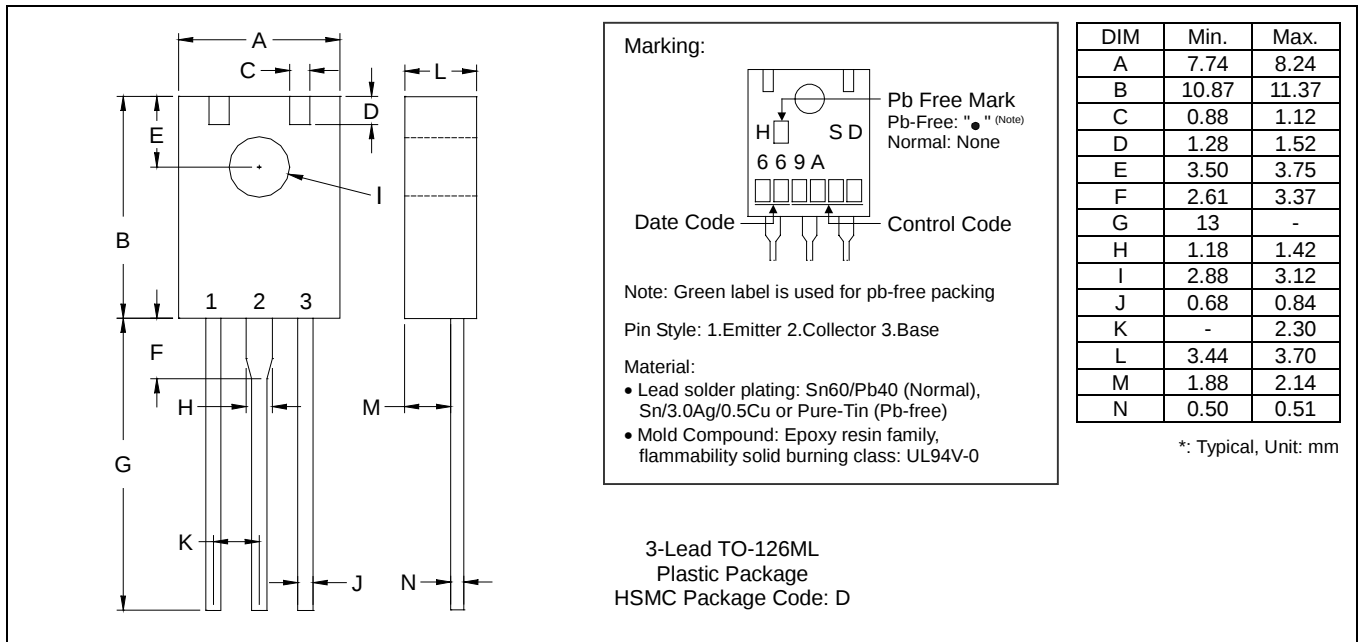


Characteristics Curve





TO-126ML Dimension



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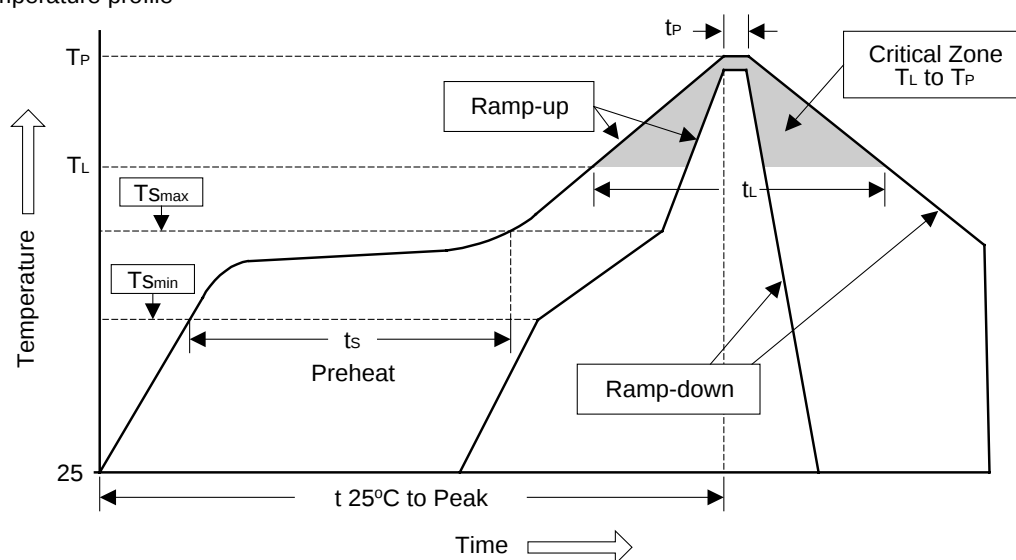
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Soldering Methods for HSMC's Products

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	10sec ±1sec
Pb-Free devices.	260°C ±5°C	10sec ±1sec