

PNP General Purpose Silicon Transistor Amplifier Die

Rev. V1

Features

- JEDEC Registered 2N3906
- Designed For Low Noise Amplifier Applications
- High Gain, Low Saturation Voltage



Electrical Characteristics ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Off Characteristics					
Collector - Emitter Breakdown Voltage	$I_C = 1.0 \text{ mA dc}, I_B = 0$	$V_{(BR)CEO}$	V dc	40	—
Collector - Base Breakdown Voltage	$I_C = 10 \mu\text{A dc}, I_E = 0$	$V_{(BR)CBO}$	V dc	40	—
Emitter - Base Breakdown Voltage	$I_E = 10 \mu\text{A dc}, I_C = 0$	$V_{(BR)EBO}$	V dc	5.0	—
Base Cutoff Current	$V_{CE} = 30 \text{ V dc}, V_{EB} = 3.0 \text{ V dc}$	I_{BL}	nA dc	—	50
Collector Cutoff Current	$V_{CE} = 30 \text{ V dc}, V_{EB} = 3.0 \text{ V dc}$	I_{CEX}	nA dc	—	50
On Characteristics					
Forward Current Transfer Ratio	$V_{CE} = 1.0 \text{ V dc}, I_C = 0.1 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}, I_C = 1.0 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}, I_C = 10 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}, I_C = 50 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}, I_C = 100 \text{ mA dc}$	h_{FE}	-	60 80 100 60 30	300
Collector - Emitter Saturation Voltage	$I_C = 10 \text{ mA dc}, I_B = 1.0 \text{ mA dc}$ $I_C = 50 \text{ mA dc}, I_B = 5.0 \text{ mA dc}$	$V_{CE(sat)}$	V dc	—	0.25 0.40
Base - Emitter Saturation Voltage	$I_C = 10 \text{ mA dc}, I_B = 1.0 \text{ mA dc}$ $I_C = 50 \text{ mA dc}, I_B = 5.0 \text{ mA dc}$	$V_{BE(sat)}$	Vdc	0.65	0.85 0.95
Small Signal Characteristics					
Current Gain - Bandwidth Product	$V_{CE} = 20 \text{ V dc}, I_C = 10 \text{ mA dc}$ $f = 100 \text{ MHz}$	f_T	MHz	250	
Output Capacitance	$V_{CB} = 5.0 \text{ V dc}, I_E = 0, f = 1.0 \text{ MHz}$	C_{obo}	pF		4.5
Input Capacitance	$V_{EB} = 0.5 \text{ V dc}, I_C = 0, f = 1.0 \text{ MHz}$	C_{ibo}	pF		10
Noise Figure	$V_{CE} = 5.0 \text{ V dc}, I_C = 100 \mu\text{A}, R_S = 1.0 \text{ k}\Omega,$ $f = 1.0 \text{ kHz}$	NF	dB		4.0

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Small Signal Characteristics					
Input Impedance	$V_{CE} = 10 \text{ V dc}, I_C = 1.0 \text{ mA dc}, f = 1.0 \text{ kHz}$	h_{ie}	k Ω	2.0	12
Voltage Feedback Ratio	$V_{CE} = 10 \text{ V dc}, I_C = 1.0 \text{ mA dc}, f = 1.0 \text{ kHz}$	h_{re}	$\times 10^{-4}$	0.1	10
Small-Signal Current Gain	$V_{CE} = 10 \text{ V dc}, I_C = 1.0 \text{ mA dc}, f = 1.0 \text{ kHz}$	h_{fe}	-	100	400
Output Admittance	$V_{CE} = 10 \text{ V dc}, I_C = 1.0 \text{ mA dc}, f = 1.0 \text{ kHz}$	h_{oe}	μmhos	3.0	60

Switching Characteristics					
Parameter	Test Conditions	Symbol	Units	Min.	Max.
Delay Time	$V_{CC} = 3.0 \text{ V dc}, V_{BE} = 0.5 \text{ V dc}, I_C = 10 \text{ mA dc}, I_{B1} = 1.0 \text{ mA}$	t_d	ns	—	35
Rise Time	$V_{CC} = 3.0 \text{ V dc}, V_{BE} = 0.5 \text{ V dc}, I_C = 10 \text{ mA dc}, I_{B1} = 1.0 \text{ mA}$	t_r	ns	—	35
Storage Time	$V_{CC} = 3.0 \text{ V dc}, I_C = 10 \text{ mA dc}, I_{B1} = I_{B2} = 1.0 \text{ mA dc}$	t_s	ns		225
Fall Time	$V_{CC} = 3.0 \text{ V dc}, I_C = 10 \text{ mA dc}, I_{B1} = I_{B2} = 1.0 \text{ mA dc}$	t_f	ns	—	75

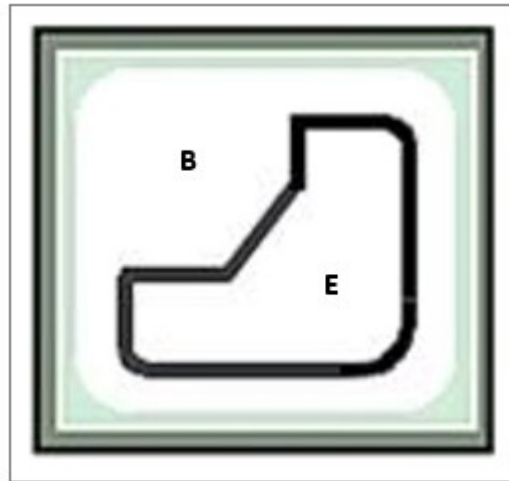
Absolute Maximum Ratings ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Ratings	Symbol	Value
Collector - Emitter Voltage	V_{CEO}	40 V dc
Collector - Base Voltage	V_{CBO}	40 V dc
Emitter - Base Voltage	V_{EBO}	5.0 V dc
Collector Current	I_C	200 mA dc
Operating & Storage Temperature Range	T_J, T_{STG}	-55°C to $+150^\circ\text{C}$

Notes:

- Exceeding maximum ratings may damage the device.
- These are steady-state limits. VPT Components should be consulted on applications involving pulsed or low-duty cycle

Outline Drawing (Chip)



Length	Width	Bond Pads	Thickness
0.010	0.010	0.003 x 0.003 (+0.0005)	0.007

Notes:

1. All dimensions are in inches.
2. All tolerances are ± 0.002 inches unless otherwise noted.
3. Top Side Metallization: Aluminum (20kÅ)
4. Back Side Metallization: Gold (8kÅ)
5. **B** = Base, **E** = Emitter, **C** = Collector (Backside of the die).

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