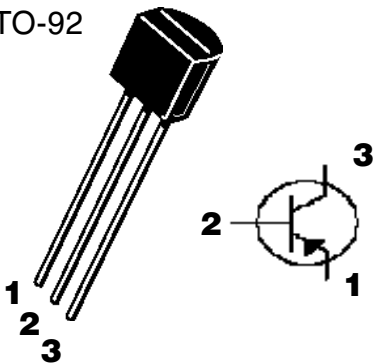




2N3905, 2N3906

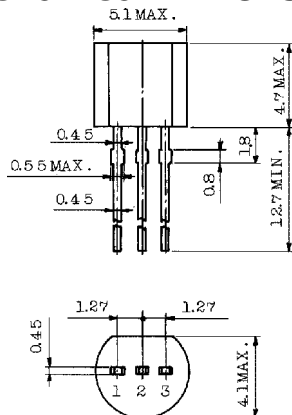
Description

TO-92



PNP General Purpose Transistors

Mechanical Dimensions



Maximum Ratings

Ratings	Symbol	Value	Units
Collector - Emitter Voltage	V_{CEO}	40	Vdc
Collector - Base Voltage	V_{CBO}	40	Vdc
Emitter - Base Voltage	V_{EBO}	5.0	Vdc
Collector Current (Continuous)	I_C	200	mAdc

Thermal Characteristics

Characteristic	Symbol	Max	Units
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_A = 60^\circ\text{C}$	P_D	250	mW
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5 12	Watts mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\theta JA}$	83.3	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Electrical Characteristics @ 25°C

Off Characteristic	Symbol	Min	Max	Unit
Collector - Emitter Breakdown Voltage (Note 1) ($I_C = 1.0\text{mAdc}, I_B = 0$)	$V_{BR(CEO)}$	40	---	Vdc
Collector - Base Breakdown Voltage ($I_C = -10\mu\text{Adc}, I_E = 0$)	$V_{BR(CBO)}$	40	---	Vdc
Emitter - Base Breakdown Voltage ($I_E = -10\mu\text{Adc}, I_C = 0$)	$V_{BR(EBO)}$	5.0	---	Vdc
Base Cutoff Current ($V_{CE} = 30\text{Vdc}, V_{EB} = 3.0\text{Vdc}$)	I_{BL}	---	50	nAdc
Collector Cutoff Current ($V_{CE} = 30\text{Vdc}, V_{EB} = 3.0\text{Vdc}$)	I_{CEX}	---	50	nAdc

Notes:

(1) Pulse test: Pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2.0\%$.

2N3905, 2N3906 PNP General Purpose Transistors

Electrical Characteristics @ 25°C

On Characteristic	Symbol	Min	Max	Unit
DC Current Gain ($I_C = 0.1$ mAdc, $V_{CE} = 1.0$ Vdc)	H_{FE}	30	---	---
		60	---	
($I_C = 1.0$ mAdc, $V_{CE} = 1.0$ Vdc)		40	---	
		80	---	
($I_C = 10$ mAdc, $V_{CE} = 1.0$ Vdc)		50	150	
		100	300	
($I_C = 50$ mAdc, $V_{CE} = 1.0$ Vdc)		30	---	
		60	---	
($I_C = 100$ mAdc, $V_{CE} = 1.0$ Vdc)		15	---	
		30	---	
Collector - Emitter Saturation Voltage (Note 1)	$V_{CE(sat)}$			Vdc
($I_C = 10$ mAdc, $I_B = 1.0$ mAdc)		---	0.25	
($I_C = 50$ mAdc, $I_B = 5.0$ mAdc)		---	0.4	
Base - Emitter Saturation Voltage (Note 1)	$V_{BE(sat)}$			Vdc
($I_C = 10$ mAdc, $I_B = 1.0$ mAdc)		0.65	0.85	
($I_C = 50$ mAdc, $I_B = 5.0$ mAdc)		---	0.95	
Small-Signal Characteristic				
Current - Gain - Bandwidth Product ($I_C = -10$ mAdc, $V_{CE} = -20$ Vdc, $f = 100$ MHz)	f_T	200	---	MHz
		250	---	
Output Capacitance ($V_{CB} = -5.0$ Vdc, $I_E = 0$, $f = 1.0$ MHz)	C_{obo}	---	4.5	pF
Input Capacitance ($V_{EB} = -0.5$ Vdc, $I_C = 0$, $f = 1.0$ MHz)	C_{ibo}	---	10	pF
Input Impedance ($V_{CE} = -10$ Vdc, $I_C = -1.0$ mAdc, $f = 1.0$ kHz)	h_{ie}	0.5	8.0	k Ω
		2.0	12	
Voltage Feedback Ratio ($V_{CE} = -10$ Vdc, $I_C = -1.0$ mAdc, $f = 1.0$ kHz)	h_{re}	0.1	5.0	$\times 10^{-4}$
		0.1	10	
Small - Signal Current Gain ($V_{CE} = -10$ Vdc, $I_C = -1.0$ mAdc, $f = 1.0$ kHz)	h_{fe}	50	200	---
		100	400	
Output Admittance ($V_{CE} = -10$ Vdc, $I_C = -1.0$ mAdc, $f = 1.0$ kHz)	h_{oe}	1.0	40	μ mhos
		3.0	60	
Noise Figure ($V_{CE} = -5.0$ Vdc, $I_C = -100$ μ Adc, $R_S = 1.0$ k Ω , $f = 1.0$ kHz)	NF	---	5.0	dB
		---	4.0	
Switching Characteristic				
Delay Time ($V_{CC} = -3.0$ Vdc, $V_{BE} = 0.5$ Vdc, Rise Time $I_C = -10$ mAdc, $I_{B1} = -1.0$ mAdc)	t_d	---	35	ns
	t_r	---	35	
Storage Time	t_s	---	200	ns
		---	225	
Fall Time ($V_{CC} = -3.0$ Vdc, $I_C = -10$ mAdc, $I_{B1} = I_{B2} = -1.0$ mAdc)	t_f	---	60	ns
		---	75	