

Absolute Maximum Ratings:

2N3905 & 2N3906 **Silicon PNP Transistor General Purpose TO92 Type Package**

60

15

30

Collector-Base Voltage, V_{CBO} Emitter-Base Voltage, V_{EBO} Continuous Collector Current, I_{C} Total Device Dissipation (T_{A} = +2 Derate Above 25°C Total Device Dissipation (T_{C} = +6 Total Device Dissipation (T_{C} = +2	5°C), P _D 0°C), P _D 5°C), P _D Range, T Case, R _{tr} Ambient,	JJC R _{thJA}		5	5.0 5.0 12 55° to 83	40V 5V 200mA 625mW 0mW/°C 250mW 1.5W 2mW/°C +150°C +150°C
Parameter	Symbol	Test Conditions	Min	Тур	Max	Unit
OFF Characteristics			<u>I</u>	<u> </u>	<u> </u>	
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	I _C = 1mA, I _B = 0, Note 1	40	_	_	V
Collector-Base Breakdown Voltage	V _{(BR)CBO}	I _C = 10° A, I _E = 0	40	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10^{\circ} A, I_C = 0$	5	_	_	V
	V _{(BR)EBO}	$I_E = 10^{\circ} A, I_C = 0$ $V_{CE} = 30V, V_{EB} = 3V$	5 -	-	- 50	V nA
Emitter-Base Breakdown Voltage						
Emitter-Base Breakdown Voltage Collector Cutoff Current	I _{CEX}	V _{CE} = 30V, V _{EB} = 3V	-	_	50	nA
Emitter-Base Breakdown Voltage Collector Cutoff Current Base Cutoff Current	I _{CEX}	V _{CE} = 30V, V _{EB} = 3V	-	_	50	nA
Emitter-Base Breakdown Voltage Collector Cutoff Current Base Cutoff Current ON Characteristics (Note 1) DC Current Gain	I _{CEX}	V _{CE} = 30V, V _{EB} = 3V V _{CE} = 30V, V _{EB} = 3V	-	-	50	nA
Emitter-Base Breakdown Voltage Collector Cutoff Current Base Cutoff Current ON Characteristics (Note 1) DC Current Gain 2N3905	I _{CEX}	V _{CE} = 30V, V _{EB} = 3V V _{CE} = 30V, V _{EB} = 3V	30	-	50 50 -	nA
Emitter-Base Breakdown Voltage Collector Cutoff Current Base Cutoff Current ON Characteristics (Note 1) DC Current Gain 2N3905 2N3906	I _{CEX}	$V_{CE} = 30V, V_{EB} = 3V$ $V_{CE} = 30V, V_{EB} = 3V$ $V_{CE} = 1V, I_{C} = 0.1 \text{mA}$	30	_ 	50 50 -	nA
Emitter-Base Breakdown Voltage Collector Cutoff Current Base Cutoff Current ON Characteristics (Note 1) DC Current Gain 2N3905 2N3906 2N3905	I _{CEX}	$V_{CE} = 30V, V_{EB} = 3V$ $V_{CE} = 30V, V_{EB} = 3V$ $V_{CE} = 1V, I_{C} = 0.1 \text{mA}$	30 60 40	- - -	50 50 - - -	nA
Emitter-Base Breakdown Voltage Collector Cutoff Current Base Cutoff Current ON Characteristics (Note 1) DC Current Gain 2N3905 2N3906 2N3906 2N3906	I _{CEX}	$V_{CE} = 30V, V_{EB} = 3V$ $V_{CE} = 30V, V_{EB} = 3V$ $V_{CE} = 1V, I_{C} = 0.1 \text{mA}$ $V_{CE} = 1V, I_{C} = 1 \text{mA}$	30 60 40 80	- - - -	50 50 - - -	nA

 $V_{CE} = 1V, I_{C} = 100mA$

Note 1. Pulse Test: Pulse Width ≤ 300° s, Duty Cycle ≤ 2%.

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<u>Electrical Characteristics (Cont'd)</u>: $(T_A = +25^{\circ}C \text{ unless otherwise specified})$

Parameter	Symbol	Test Conditions	Min	Тур	Max	Unit
ON Characteristics (Cont'd) (Note	1)					
Collector-Emitter Saturation Voltage	V _{CE(sat)}	I _C = 10mA, I _B = 1mA	_	_	0.25	V
		I _C = 50mA, I _B = 5mA	_	_	0.4	V
Base-Emitter Saturation Voltage	V _{BE(sat)}	I _C = 10mA, I _B = 1mA	0.65	-	0.85	V
		I _C = 50mA, I _B = 5mA	-	-	0.95	V
Small-Signal Characteristics	•					
Current Gain-Bandwidth Product 2N3905	f _T	I _C = 10mA, V _{CE} = 20V, f = 100MHz	200	_	_	MHz
2N3906			250	_	_	MHz
Output Capacitance	C _{obo}	V _{CB} = 5V, I _E = 0, f = 1MHz	_	_	4.5	pF
Input Capacitance	C _{ibo}	V _{CB} = 0.5V, I _C = 0, f = 100kHz	-	-	10.0	pF
Input Impedance 2N3905	h _{ie}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	0.5	_	8.0	k≤
2N3906			2.0	_	12	k≤
Voltage Feedback Ratio 2N3905	h _{re}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	0.1	_	5.0	x 10 ⁻⁴
2N3906			0.1	_	10	x 10 ⁻⁴
Small-Signal Current Gain 2N3905	h _{fe}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	50	_	200	
2N3906			100	_	400	
Output Admittance 2N3905	h _{oe}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	1.0	-	40	°mhos
2N3906			3.0	_	60	°mhos
Noise Figure 2N3905	NF	$I_C = 100^{\circ} \text{ A}, V_{CE} = 5\text{V}, R_S = 1\text{k} \le$, f = 10Hz to 15.7kHz	-	_	5.0	db
2N3906			_	_	4.0	db
Switching Characteristics	I.					
Delay Time	t _d	$V_{CC} = 3V$, $V_{EB} = 0.5V$, $I_{C} = 10mA$, $I_{B1} = 1mA$	_	_	35	ns
Rise Time	t _r		_	_	35	ns
Storage Time 2N3905	ts	$V_{CC} = 3V, I_{C} = 10mA,$ $I_{B1} = I_{B2} = 1mA$	_	-	200	ns
2N3906	1		_	_	225	ns
Fall Time 2N3905	t _f		_	-	60	ns
2N3906	1		_	_	75	ns

Note 1. Pulse Test: Pulse Width $\leq 300^{\circ}$ s, Duty Cycle $\leq 2\%$.

