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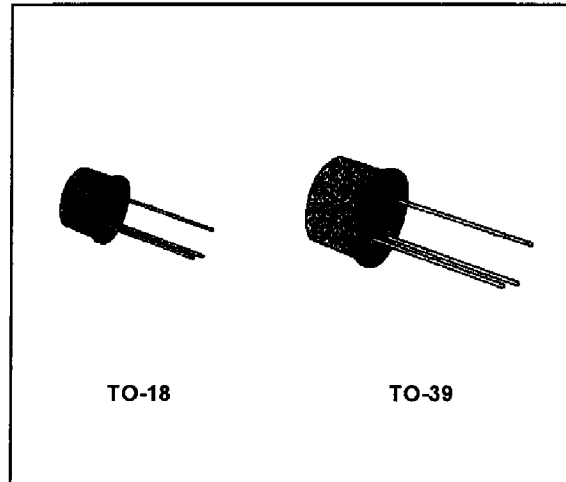
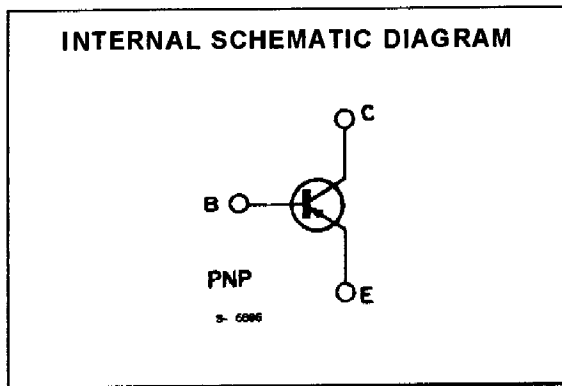
**2N2904/2N2905  
 2N2906/2N2907**

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**GENERAL PURPOSE AMPLIFIERS AND SWITCHES**

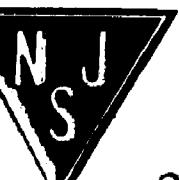
**DESCRIPTION**

The 2N2904, 2N2905, 2N2906 and 2N2907 are silicon planar epitaxial PNP transistors in Jedec TO-39 (for 2N2904, 2N2905) and in Jedec TO-18 (for 2N2906 and 2N2907) metal cases. They are designed for high-speed saturated switching and general purpose applications.



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )	- 60	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )	- 40	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )	- 5	V
$I_C$	Collector Current	- 600	mA
$P_{tot}$	Total Power Dissipation at $T_{amb} \leq 25^\circ C$		
	for 2N2904 and 2N2905	0.6	W
	for 2N2906 and 2N2907	0.4	W
	at $T_{case} \leq 25^\circ C$		
	for 2N2904 and 2N2905	3	W
	for 2N2906 and 2N2907	1.8	W
$T_{stg}, T_J$	Storage and Junction Temperature	- 65 to 200	$^\circ C$



NJ Semi-Conductors reserves the right to change test conditions, parameters limits and package dimensions without notice information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

## THERMAL DATA

			2N2904 2N2905	2N2906 2N2907
R <sub>th j-case</sub>	Thermal Resistance Junction-case	Max	58.3 °C/W	97.3 °C/W
R <sub>th j-amb</sub>	Thermal Resistance Junction-ambient	Max	292 °C/W	437.5 °C/W

## ELECTRICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CBO</sub>	Collector Cutoff Current (I <sub>E</sub> = 0)	V <sub>CB</sub> = - 50 V V <sub>CB</sub> = - 50 V T <sub>amb</sub> = 150 °C			- 20 - 20	nA μA
I <sub>CEX</sub>	Collector Cutoff Current (V <sub>BE</sub> = 0.5 V)	V <sub>CE</sub> = - 30 V			- 50	nA
I <sub>BEX</sub>	Base Cutoff Current (V <sub>BE</sub> = 0.5 V)	V <sub>CE</sub> = - 30 V			- 50	nA
V <sub>(BR) CBO</sub>	Collector-base Breakdown Voltage (I <sub>E</sub> = 0)	I <sub>C</sub> = - 10 μA	- 60			V
V <sub>(BR) CEO</sub> *	Collector-emitter Breakdown Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = - 10 mA	- 40			V
V <sub>(BR) EBO</sub>	Emitter-base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = - 10 μA	- 5			V
V <sub>CE (sat)</sub> *	Collector-emitter Saturation Voltage	I <sub>C</sub> = - 150 mA I <sub>B</sub> = - 15 mA I <sub>C</sub> = - 500 mA I <sub>B</sub> = - 50 mA			- 0.4 - 1.6	V V
V <sub>BE (sat)</sub> *	Base-emitter Saturation Voltage	I <sub>C</sub> = - 150 mA I <sub>B</sub> = - 16 mA I <sub>C</sub> = - 500 mA I <sub>B</sub> = - 50 mA			- 1.3 - 2.6	V V
h <sub>FE</sub> *	DC Current Gain	for 2N2904 and 2N2906 I <sub>C</sub> = - 0.1 mA V <sub>CE</sub> = - 10 V I <sub>C</sub> = - 1 mA V <sub>CE</sub> = - 10 V I <sub>C</sub> = - 10 mA V <sub>CE</sub> = - 10 V I <sub>C</sub> = - 150 mA V <sub>CE</sub> = - 10 V I <sub>C</sub> = - 500 mA V <sub>CE</sub> = - 10 V	20 25 35 40 20		120	
h <sub>FE</sub> *	DC Current Gain	for 2N2905 and 2N2907 I <sub>C</sub> = - 0.1 mA V <sub>CE</sub> = - 10 V I <sub>C</sub> = - 1 mA V <sub>CE</sub> = - 10 V I <sub>C</sub> = - 10 mA V <sub>CE</sub> = - 10 V I <sub>C</sub> = - 150 mA V <sub>CE</sub> = - 10 V I <sub>C</sub> = - 500 mA V <sub>CE</sub> = - 10 V	35 50 75 100 30		300	
f <sub>T</sub>	Transition Frequency	I <sub>C</sub> = - 50 mA V <sub>CE</sub> = - 20 V f = 100 MHz	200			MHz
C <sub>EBO</sub>	Emitter-base Capacitance	I <sub>C</sub> = 0 V <sub>EB</sub> = - 2 V f = 1 MHz			30	pF
C <sub>CBO</sub>	Collector-base Capacitance	I <sub>E</sub> = 0 V <sub>CB</sub> = - 10 V f = 1 MHz			8	pF
t <sub>d</sub>	Delay Time	I <sub>C</sub> = - 150 mA V <sub>CC</sub> = - 30 V I <sub>B1</sub> = - 15 mA			10	ns
t <sub>r</sub>	Rise Time	I <sub>C</sub> = - 150 mA V <sub>CC</sub> = - 30 V I <sub>B1</sub> = - 15 mA			40	ns
t <sub>s</sub>	Storage Time	I <sub>C</sub> = - 150 mA V <sub>CC</sub> = - 6 V I <sub>B1</sub> = - I <sub>B2</sub> = - 15 mA			80	ns
t <sub>f</sub>	Fall Time	I <sub>C</sub> = - 150 mA V <sub>CC</sub> = - 6 V I <sub>B1</sub> = - I <sub>B2</sub> = - 15 mA			30	ns

\* Pulsed : pulse duration = 300 μs, duty cycle = 1 %.

## TO-18 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		12.7			0.500	
B			0.49			0.019
D			5.3			0.208
E			4.9			0.193
F			5.8			0.228
G	2.54			0.100		
H			1.2			0.047
I			1.16			0.045
L	45°			45°		

