

**2N3903**

**NPN EPITAXIAL SILICON TRANSISTOR**

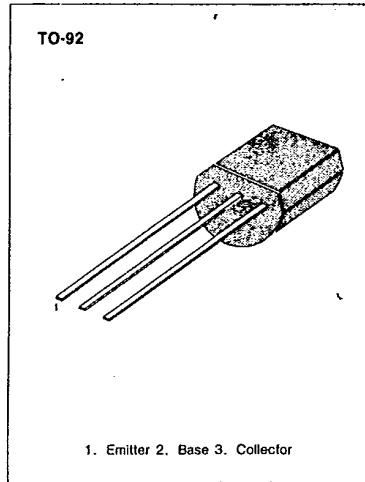
**GENERAL PURPOSE TRANSISTOR**

- Collector-Emitter Voltage:  $V_{CE0} = 40V$
- Collector Dissipation:  $P_c (max) = 625mW$

**ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ C$ )**

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	60	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	200	mA
Collector Dissipation	$P_C$	625	mW
Junction Temperature	$T_J$	150	$^\circ C$
Storage Temperature	$T_{stg}$	-55 - 150	$^\circ C$

\* Refer to 2N3904 for graphs



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**ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ C$ )**

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	$BV_{CBO}$	$I_C = 10\mu A, I_E = 0$	60			V
*Collector-Emitter Breakdown Voltage	$BV_{CEO}$	$I_C = 1mA, I_B = 0$	40			V
Emitter-Base Breakdown Voltage	$BV_{EBO}$	$I_E = 10\mu A, I_C = 0$	6			V
Collector Cut-off Current	$I_{CEX}$	$V_{CE} = 30V, V_{EB} = 3V$			50	nA
Base Cut-off Current	$I_{BL}$	$V_{CE} = 30V, V_{EB} = 3V$			50	nA
*DC Current Gain	$h_{FE}$	$I_C = 0.1mA, V_{CE} = 1V$	20			
		$I_C = 1mA, V_{CE} = 1V$	35			
		$I_C = 10mA, V_{CE} = 1V$	50		150	
		$I_C = 50mA, V_{CE} = 1V$	30			
		$I_C = 100mA, V_{CE} = 1V$	15			
*Collector-Emitter Saturation Voltage	$V_{CE (sat)}$	$I_C = 10mA, I_B = 1mA$			0.2	V
		$I_C = 50mA, I_B = 5mA$			0.3	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
Output Capacitance	$C_{ob}$	$V_{CB} = 5V, I_E = 0$			4	pF
		$f = 1MHz$				
Current Gain Bandwidth Product	$f_T$	$I_C = 10mA, V_{CE} = 20V$	250			MHz
		$f = 100MHz$				
Turn On Time	$t_{on}$	$V_{CC} = 3V, V_{BE} = 0.5V$			70	ns
		$I_C = 10mA, I_{B1} = 1mA$				
Turn Off Time	$t_{off}$	$V_{CC} = 3V, I_C = 1mA$			225	ns
		$I_B = I_{B2} = 1mA$				

\* Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$