

**2N3903**

**NPN EPITAXIAL SILICON TRANSISTOR**

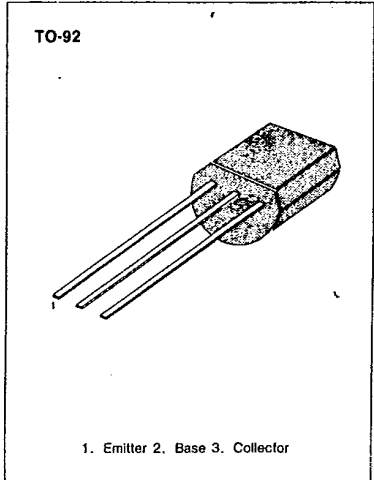
**GENERAL PURPOSE TRANSISTOR**

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

**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
Current Gain Bandwidth Product	$f_T$	$I_c=10mA, V_{CE}=20V$ $f=100MHz$	250			MHz
Turn On Time	$t_{on}$	$V_{CC}=3V, V_{BE}=0.5V$			70	ns
Turn Off Time	$t_{off}$	$I_c=10mA, I_{B1}=1mA$ $V_{CC}=3V, I_c=1mA$ $I_B=I_{B2}=1mA$			225	ns

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