



DC COMPONENTS CO., LTD.

DISCRETE SEMICONDUCTORS

2N3904

TECHNICAL SPECIFICATIONS OF NPN EPITAXIAL PLANAR TRANSISTOR

Description

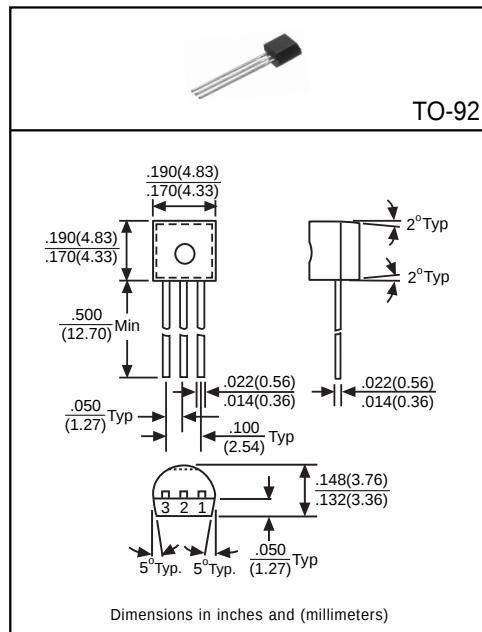
Designed for general purpose switching and amplifier applications.

Pinning

- 1 = Emitter
- 2 = Base
- 3 = Collector

Absolute Maximum Ratings($T_A=25^{\circ}\text{C}$)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CB0}	60	V
Collector-Emitter Voltage	V_{CE0}	40	V
Emitter-Base Voltage	V_{EB0}	6	V
Collector Current	I_C	200	mA
Total Power Dissipation	P_D	625	mW
Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}\text{C}$



Electrical Characteristics

(Ratings at 25°C ambient temperature unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	V_{CB0}	60	-	-	V	$I_C=10\mu\text{A}$, $I_E=0$
Collector-Emitter Breakdown Voltage	V_{CE0}	40	-	-	V	$I_C=1\text{mA}$, $I_B=0$
Emitter-Base Breakdown Voltage	V_{EB0}	6	-	-	V	$I_E=10\mu\text{A}$, $I_C=0$
Collector Cutoff Current	I_{CEX}	-	-	50	nA	$V_{CE}=30\text{V}$, $V_{BE}=3\text{V}$
Collector-Emitter Saturation Voltage ⁽¹⁾	$V_{CE(sat)1}$	-	-	0.2	V	$I_C=10\text{mA}$, $I_B=1\text{mA}$
	$V_{CE(sat)2}$	-	-	0.3	V	$I_C=50\text{mA}$, $I_B=5\text{mA}$
Base-Emitter Saturation Voltage ⁽¹⁾	$V_{BE(sat)1}$	0.65	-	0.85	V	$I_C=10\text{mA}$, $I_B=1\text{mA}$
	$V_{BE(sat)2}$	-	-	0.95	V	$I_C=50\text{mA}$, $I_B=5\text{mA}$
DC Current Gain ⁽¹⁾	h_{FE1}	40	-	-	-	$I_C=0.1\text{mA}$, $V_{CE}=1\text{V}$
	h_{FE2}	70	-	-	-	$I_C=1\text{mA}$, $V_{CE}=1\text{V}$
	h_{FE3}	100	-	300	-	$I_C=10\text{mA}$, $V_{CE}=1\text{V}$
	h_{FE4}	60	-	-	-	$I_C=50\text{mA}$, $V_{CE}=1\text{V}$
	h_{FE5}	30	-	-	-	$I_C=100\text{mA}$, $V_{CE}=1\text{V}$
Transition Frequency	f_T	300	-	-	MHz	$I_C=10\text{mA}$, $V_{CE}=20\text{V}$, $f=100\text{MHz}$
Output Capacitance	C_{ob}	-	-	4	pF	$V_{CB}=5\text{V}$, $f=1\text{MHz}$, $I_E=0$

(1) Pulse Test: Pulse Width $\leq 380\mu\text{s}$, Duty Cycle $\leq 2\%$

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