



## TO-92 Plastic-Encapsulate Transistors

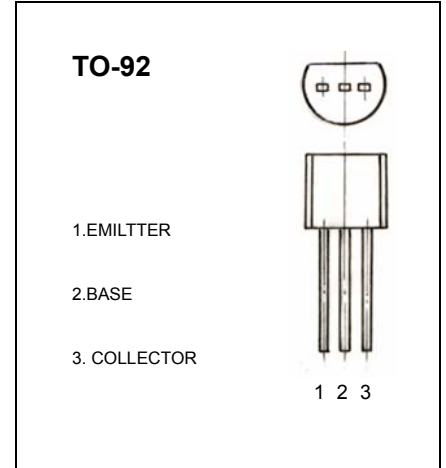
### 2N4401 TRANSISTOR (NPN)

#### FEATURES

Power dissipation

#### MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Units
$V_{CBO}$	Collector-Base Voltage	60	V
$V_{CEO}$	Collector-Emitter Voltage	40	V
$V_{EBO}$	Emitter-Base Voltage	6	V
$I_C$	Collector Current -Continuous	600	mA
$P_C$	Collector Power dissipation	0.625	W
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{stg}$	Storage Temperature	-55to +150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, junction to Ambient	357	$^\circ\text{C}/\text{mW}$



#### ELECTRICAL CHARACTERISTICS ( $T_{amb}=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=100\mu\text{A}$ , $I_E=0$	60		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}$ , $I_B=0$	40		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=100\mu\text{A}$ , $I_C=0$	6		V
Collector cut-off current	$I_{CBO}$	$V_{CB}=35\text{V}$ , $I_E=0$		0.1	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB}=5\text{V}$ , $I_C=0$		0.1	$\mu\text{A}$
DC current gain	$h_{FE(1)}$	$V_{CE}=1\text{V}$ , $I_C=0.1\text{mA}$	20		
	$h_{FE(2)}$	$V_{CE}=1\text{V}$ , $I_C=1\text{mA}$	40		
	$h_{FE(3)}$	$V_{CE}=1\text{V}$ , $I_C=10\text{mA}$	80		
	$h_{FE(4)}$	$V_{CE}=1\text{V}$ , $I_C=150\text{mA}$	100	300	
	$h_{FE(5)}$	$V_{CE}=2\text{V}$ , $I_C=500\text{mA}$	40		
Collector-emitter saturation voltage	$V_{CE(sat)1}$	$I_C=150\text{mA}$ , $I_B=15\text{mA}$		0.4	V
	$V_{CE(sat)2}$	$I_C=500\text{mA}$ , $I_B=50\text{mA}$		0.75	V
Base-emitter saturation voltage	$V_{BE(sat)1}$	$I_C=150\text{mA}$ , $I_B=15\text{mA}$		0.95	V
	$V_{BE(sat)2}$	$I_C=500\text{mA}$ , $I_B=50\text{mA}$		1.2	V
Transition frequency	$f_T$	$V_{CE}=10\text{V}$ , $I_C=20\text{mA}$ , $f=100\text{MHz}$	250		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}$ , $I_E=0$ , $f=100\text{KHz}$		6.5	pF
Delay time	$t_d$	$V_{CC}=30\text{V}$ , $V_{BE(OFF)}=2\text{V}$ $I_C=150\text{mA}$ , $I_{B1}=15\text{mA}$		15	nS
Rise time	$t_r$			20	nS
Storage time	$t_s$	$V_{CC}=30\text{V}$ , $I_C=150\text{mA}$ $I_{B1}=-I_{B2}=15\text{mA}$		225	nS
Fall time	$t_f$			30	nS

# Typical Characteristics

# 2N4401

