



PRODUCT NAME : 2N4400 NPN General Purpose Transistor (Pack of 5)

PRICE : Rs 20.00

SKU : RM2059



NOTE: THE PRODUCT MAY BE DIFFERENT FROM IMAGE SHOWN. Copyrights by Robomart.com

DESCRIPTION

Features

- Collector-Emitter Volt (V_{ce0}): 40V
- Collector-Base Volt (V_{cb0}): 60V
- Collector Current (I_c): 0.6A
- hfe: 50-150 @ 150mA
- Power Dissipation (P_{tot}): 625mW
- Current-Gain-Bandwidth (f_{total}): 200MHz
- Type: PNP

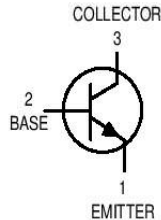
MOTOROLA
SEMICONDUCTOR TECHNICAL DATA

Order this document
 by 2N4400/D

General Purpose Transistors
NPN Silicon

2N4400
2N4401*

*Motorola Preferred Device



CASE 29-04, STYLE 1
 TO-92 (TO-226AA)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	40	Vdc
Collector–Base Voltage	V_{CBO}	60	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	Vdc
Collector Current — Continuous	I_C	600	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0	mW mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5 12	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 1.0$ mAdc, $I_B = 0$)	$V_{(BR)CEO}$	40	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 0.1$ mAdc, $I_E = 0$)	$V_{(BR)CBO}$	60	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 0.1$ mAdc, $I_C = 0$)	$V_{(BR)EBO}$	6.0	—	Vdc
Base Cutoff Current ($V_{CE} = 35$ Vdc, $V_{EB} = 0.4$ Vdc)	I_{BEV}	—	0.1	μAdc
Collector Cutoff Current ($V_{CE} = 35$ Vdc, $V_{EB} = 0.4$ Vdc)	I_{CEX}	—	0.1	μAdc

1. Pulse Test: Pulse Width ≤ 300 μs , Duty Cycle $\leq 2.0\%$.

Preferred devices are Motorola recommended choices for future use and best overall value.

REV 1

© Motorola, Inc. 1996



2N4400 2N4401

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS(1)				
DC Current Gain ($I_C = 0.1 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc}$)	2N4401	20	—	—
($I_C = 1.0 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc}$)	2N4400 2N4401	20 40	— —	—
($I_C = 10 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc}$)	2N4400 2N4401	40 80	— —	—
($I_C = 150 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc}$)	2N4400 2N4401	50 100	150 300	—
($I_C = 500 \text{ mAdc}, V_{CE} = 2.0 \text{ Vdc}$)	2N4400 2N4401	20 40	— —	—
Collector–Emitter Saturation Voltage ($I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$) ($I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$)	$V_{CE(sat)}$	— —	0.4 0.75	Vdc
Base–Emitter Saturation Voltage ($I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$) ($I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$)	$V_{BE(sat)}$	0.75 —	0.95 1.2	Vdc

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ($I_C = 20 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 100 \text{ MHz}$)	2N4400 2N4401	f_T	200 250	— —	MHz
Collector–Base Capacitance ($V_{CB} = 5.0 \text{ Vdc}, I_E = 0, f = 1.0 \text{ MHz}$)		C_{cb}	—	6.5	pF
Emitter–Base Capacitance ($V_{EB} = 0.5 \text{ Vdc}, I_C = 0, f = 1.0 \text{ MHz}$)		C_{eb}	—	30	pF
Input Impedance ($I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$)	2N4400 2N4401	h_{ie}	0.5 1.0	7.5 15	k ohms
Voltage Feedback Ratio ($I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$)		h_{re}	0.1	8.0	$\times 10^{-4}$
Small–Signal Current Gain ($I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$)	2N4400 2N4401	h_{fe}	20 40	250 500	—
Output Admittance ($I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$)		h_{oe}	1.0	30	μmhos

SWITCHING CHARACTERISTICS

Delay Time	$(V_{CC} = 30 \text{ Vdc}, V_{BE} = 2.0 \text{ Vdc}, I_C = 150 \text{ mAdc}, I_{B1} = 15 \text{ mAdc})$	t_d	—	15	ns
Rise Time		t_r	—	20	ns
Storage Time	$(V_{CC} = 30 \text{ Vdc}, I_C = 150 \text{ mAdc}, I_{B1} = I_{B2} = 15 \text{ mAdc})$	t_s	—	225	ns
Fall Time		t_f	—	30	ns

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

SWITCHING TIME EQUIVALENT TEST CIRCUITS

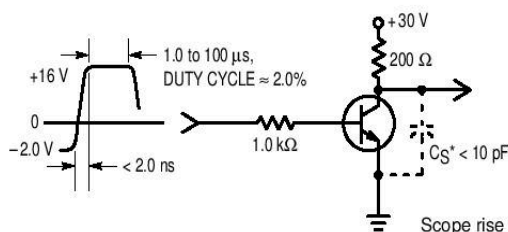


Figure 1. Turn–On Time

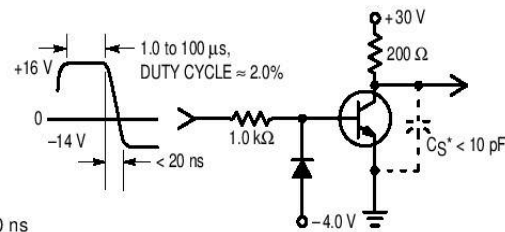


Figure 2. Turn–Off Time

