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

PRICE : Rs 20.00
SKU : RM2059

DESCRIPTION

Features

- Collector-Emitter Volt (Vceo): 40V
- Collector-Base Volt (Vcbo): 60V
- Collector Current (Ic): 0.6A
- hfe: 50-150 @ 150mA
- Power Dissipation (Ptot): 625mW
- Current-Gain-Bandwidth (ftotal): 200MHz
- Type: PNP

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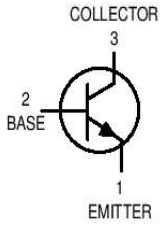
SEMICONDUCTOR TECHNICAL DATA

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°C Derate above 25°C	P_D	625 5.0	mW mW/°C
Total Device Dissipation @ T_C = 25°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°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 ≤ 2.0%.

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

REV 1

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Max	Unit
ON CHARACTERISTICS(1)					
DC Current Gain		h_{FE}			—
(I_C = 0.1 mAdc, V_{CE} = 1.0 Vdc)	2N4401		20	—	
(I_C = 1.0 mAdc, V_{CE} = 1.0 Vdc)	2N4400		20	—	
	2N4401		40	—	
(I_C = 10 mAdc, V_{CE} = 1.0 Vdc)	2N4400		40	—	
	2N4401		80	—	
(I_C = 150 mAdc, V_{CE} = 1.0 Vdc)	2N4400		50	150	
	2N4401		100	300	
(I_C = 500 mAdc, V_{CE} = 2.0 Vdc)	2N4400		20	—	
	2N4401		40	—	
Collector–Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 mAdc)		$V_{CE(sat)}$	—	0.4	Vdc
(I_C = 500 mAdc, I_B = 50 mAdc)			—	0.75	
Base–Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 mAdc)		$V_{BE(sat)}$	0.75	0.95	Vdc
(I_C = 500 mAdc, I_B = 50 mAdc)			—	1.2	
SMALL–SIGNAL CHARACTERISTICS					
Current–Gain — Bandwidth Product		f_T			MHz
(I_C = 20 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	2N4400		200	—	
	2N4401		250	—	
Collector–Base Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 1.0 MHz)		C_{cb}	—	6.5	pF
Emitter–Base Capacitance (V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)		C_{eb}	—	30	pF
Input Impedance		h_{ie}			k ohms
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N4400		0.5	7.5	
	2N4401		1.0	15	
Voltage Feedback Ratio (I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)		h_{re}	0.1	8.0	X 10^{-4}
Small–Signal Current Gain		h_{fe}			—
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N4400		20	250	
	2N4401		40	500	
Output Admittance (I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)		h_{oe}	1.0	30	μmhos
SWITCHING CHARACTERISTICS					
Delay Time	(V_{CC} = 30 Vdc, V_{BE} = 2.0 Vdc,	t_d	—	15	ns
Rise Time	I_C = 150 mAdc, I_{B1} = 15 mAdc)	t_r	—	20	ns
Storage Time	(V_{CC} = 30 Vdc, I_C = 150 mAdc,	t_s	—	225	ns
Fall Time	I_{B1} = I_{B2} = 15 mAdc)	t_f	—	30	ns

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

SWITCHING TIME EQUIVALENT TEST CIRCUITS

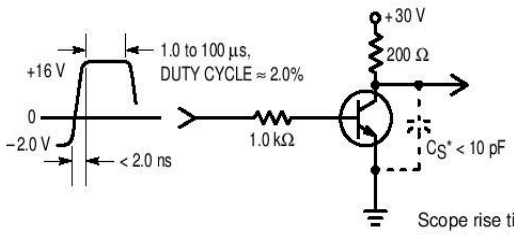

Figure 1. Turn–On Time

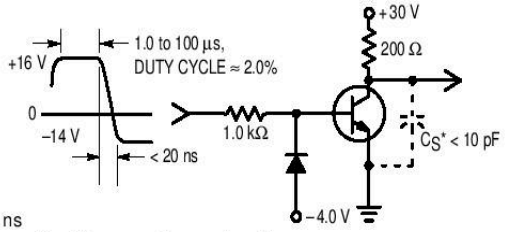

Figure 2. Turn–Off Time

Scope rise time < 4.0 ns
*Total shunt capacitance of test jig connectors, and oscilloscope