

# MICRO ELECTRONICS

2N4400  
2N4401

THE 2N4400, 2N4401 ARE NPN SILICON PLANAR EPITAXIAL TRANSISTORS FOR GENERAL PURPOSE AMPLIFIERS AND MEDIUM SPEED SWITCHING APPLICATIONS. THEY ARE COMPLEMENTARY TO THE PNP TYPE 2N4402 AND 2N4403 RESPECTIVELY.

CASE TO-92A



EBC

ABSOLUTE MAXIMUM RATINGS

Collector-Base Voltage	V <sub>CBO</sub>	60V
Collector-Emitter Voltage	V <sub>CEO</sub>	40V
Emitter-Base Voltage	V <sub>EBO</sub>	6V
Collector Current	I <sub>C</sub>	0.6A
Total Power Dissipation (T <sub>A</sub> ≤ 25°C)	P <sub>tot</sub>	500mW **
Operating Junction & Storage Temperature	T <sub>j</sub> , T <sub>stg</sub>	-55 to 150°C

\*\* 310mW in JEDEC registration.

ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise noted)

PARAMETER	SYMBOL	2N4400		2N4401		UNIT	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
Collector-Base Breakdown Voltage	V <sub>CBO</sub>	60		60		V	I <sub>C</sub> =0.1mA I <sub>E</sub> =0
Collector-Emitter Breakdown Voltage	V <sub>CEO</sub> *	40		40		V	I <sub>C</sub> =1mA I <sub>B</sub> =0
Emitter-Base Breakdown Voltage	V <sub>EBO</sub>	6		6		V	I <sub>E</sub> =0.1mA I <sub>C</sub> =0
Collector Cutoff Current	I <sub>CEV</sub>		0.1		0.1	μA	V <sub>CE</sub> =35V V <sub>EB</sub> =0.4V
Base Cutoff Current	I <sub>BL</sub>		0.1		0.1	μA	V <sub>CE</sub> =35V V <sub>EB</sub> =0.4V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub> *		0.4		0.4	V	I <sub>C</sub> =150mA I <sub>B</sub> =15mA
			0.75		0.75	V	I <sub>C</sub> =500mA I <sub>B</sub> =50mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub> *	0.75	0.95	0.75	0.95	V	I <sub>C</sub> =150mA I <sub>B</sub> =15mA
			1.2		1.2	V	I <sub>C</sub> =500mA I <sub>B</sub> =50mA
D.C. Current Gain	H <sub>FE</sub> *				20		I <sub>C</sub> =0.1mA V <sub>CE</sub> =1V
					40		I <sub>C</sub> =1mA V <sub>CE</sub> =1V
					80		I <sub>C</sub> =10mA V <sub>CE</sub> =1V
			150	100	300		I <sub>C</sub> =150mA V <sub>CE</sub> =1V
							I <sub>C</sub> =500mA V <sub>CE</sub> =2V
Current Gain-Bandwidth Product	f <sub>T</sub>	200		250		MHz	I <sub>C</sub> =20mA V <sub>CE</sub> =10V

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PARAMETER	SYMBOL	2N4400		2N4401		UNIT	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
Collector-Base Capacitance	Cob		6.5		6.5	pF	V <sub>CB</sub> =5V I <sub>E</sub> =0 f=140kHz
Emitter-Base Capacitance	Cib		30		30	pF	V <sub>EB</sub> =0.5V I <sub>C</sub> =0 f=140kHz
Input Impedance	h <sub>ie</sub>	0.5	7.5	1.0	15	KΩ	I <sub>C</sub> =1mA V <sub>CE</sub> =10V f=1kHz
Voltage Feedback Ratio	h <sub>re</sub>	0.1	8.0	0.1	8.0	x10 <sup>-4</sup>	I <sub>C</sub> =1mA V <sub>CE</sub> =10V f=1kHz
Small Signal Current Gain	h <sub>fe</sub>	20	250	40	500		I <sub>C</sub> =1mA V <sub>CE</sub> =10V f=1kHz
Output Admittance	h <sub>oe</sub>	1	30	1	30	μS	I <sub>C</sub> =1mA V <sub>CE</sub> =10V f=1kHz
Delay Time	t <sub>d</sub>		15		15	nS	I <sub>C</sub> =150mA I <sub>B1</sub> =15mA V <sub>CC</sub> =30V
Rise Time	t <sub>r</sub>		20		20	nS	I <sub>C</sub> =150mA I <sub>B1</sub> =15mA V <sub>CC</sub> =30V
Storage Time	t <sub>s</sub>		225		225	nS	I <sub>C</sub> =150mA I <sub>B1</sub> =-I <sub>B2</sub> =15mA V <sub>CC</sub> =30V
Fall Time	t <sub>f</sub>		30		30	nS	I <sub>C</sub> =150mA I <sub>B1</sub> =-I <sub>B2</sub> =15mA V <sub>CC</sub> =30V

\* Pulse Test : Pulse Width=0.3mS, Duty Cycle=1%

