



ELECTRONICS, INC.
 44 FARRAND STREET
 BLOOMFIELD, NJ 07003
 (973) 748-5089
<http://www.nteinc.com>

2N5400 & 2N5401 Silicon NPN Transistor General Purpose Amplifier TO92 Type Package

Absolute Maximum Ratings:

Collector–Emitter Voltage, V_{CEO}		
2N5400	120V	
2N5401	150V	
Collector–Base Voltage, V_{CBO}		
2N5400	130V	
2N5401	160V	
Emitter–Base Voltage, V_{EBO}	5V	
Continuous Collector Current, I_C	600mA	
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_D	625mW	
Derate Above 25°C	5.0mW/ $^\circ\text{C}$	
Total Device Dissipation ($T_C = +25^\circ\text{C}$), P_D	1.5W	
Derate Above 25°C	12.0mW/ $^\circ\text{C}$	
Operating Junction Temperature Range, T_J	-55° to $+150^\circ\text{C}$	
Storage Temperature Range, T_{stg}	-55° to $+150^\circ\text{C}$	
Thermal Resistance, Junction to Case, R_{thJC}	83.3 $^\circ\text{C/W}$	
Thermal Resistance, Junction to Ambient, R_{thJA}	200 $^\circ\text{C/W}$	

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector–Emitter Breakdown Voltage 2N5400	$V_{(BR)CEO}$	$I_C = 1\text{mA}, I_B = 0$, Note 1	120	–	–	V
2N5401			150	–	–	V
Collector–Base Breakdown Voltage 2N5400	$V_{(BR)CBO}$	$I_C = 100^\circ\text{A}, I_E = 0$	130	–	–	V
2N5401			160	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10^\circ\text{A}, I_C = 0$	5	–	–	V
Collector Cutoff Current 2N5400	I_{CBO}	$V_{CB} = 100\text{V}, I_E = 0$	–	–	100	nA
2N5401			–	–	50	nA
2N5400		$V_{CB} = 100\text{V}, I_E = 0, T_A = +100^\circ\text{C}$	–	–	100	nA
2N5401			–	–	50	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 3\text{V}, I_C = 0$	–	–	50	nA

Note 1. Pulse Test: Pulse Width = 300 $^\circ\text{s}$, Duty Cycle = 2%.

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics (Note 1)						
DC Current Gain 2N5400	h_{FE}	$V_{CE} = 5V, I_C = 1mA$	30	-	-	
2N5401			50	-	-	
2N5400		$V_{CE} = 5V, I_C = 10mA$	40	-	180	
2N5401			60	-	240	
2N5400		$V_{CE} = 5V, I_C = 50mA$	40	-	-	
2N5401			50	-	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10mA, I_B = 1mA$	-	-	0.2	V
		$I_C = 50mA, I_B = 5mA$	-	-	0.5	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10mA, I_B = 1mA$	-	-	1.0	V
		$I_C = 50mA, I_B = 5mA$	-	-	1.0	V
Small-Signal Characteristics						
Current Gain-Bandwidth Product 2N5400	f_T	$I_C = 10mA, V_{CE} = 10V, f = 100MHz$	100	-	400	MHz
2N5401			100	-	300	MHz
Output Capacitance	C_{obo}	$V_{CB} = 10V, I_E = 0, f = 1MHz$	-	-	6.0	pF
Small-Signal Current Gain 2N5400	h_{fe}	$I_C = 1mA, V_{CE} = 10V, f = 1kHz$	30	-	200	
2N5401			40	-	200	
Noise Figure	NF	$I_C = 250^\circ A, V_{CE} = 5V, R_S = 1k\Omega, f = 10Hz \text{ to } 15.7kHz$	-	-	8.0	db

Note 1. Pulse Test: Pulse Width $\leq 300^\circ s$, Duty Cycle $\leq 2\%$.

