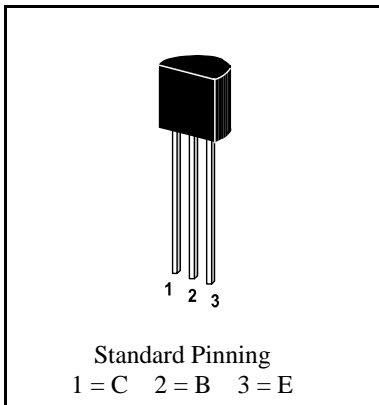


NPN

Si-Epitaxial Planar Transistors

NPN

Version 2004-01-20



Power dissipation – Verlustleistung 625 mW

Plastic case TO-92
Kunststoffgehäuse (10D3)

Weight approx. – Gewicht ca. 0.18 g

Plastic material has UL classification 94V-0
Gehäusematerial UL94V-0 klassifiziertStandard packaging taped in ammo pack
Standard Lieferform gegurtet in Ammo-Pack**Maximum ratings ($T_A = 25^\circ\text{C}$)****Grenzwerte ($T_A = 25^\circ\text{C}$)**

			2N4400, 2N4401
Collector-Emitter-voltage	B open	V_{CE0}	40 V
Collector-Base-voltage	E open	V_{CE0}	60 V
Emitter-Base-voltage	C open	V_{EB0}	6 V
Power dissipation – Verlustleistung		P_{tot}	625 mW ¹⁾
Collector current – Kollektorstrom (dc)		I_C	600 mA
Junction temp. – Sperrschichttemperatur		T_j	150°C
Storage temperature – Lagerungstemperatur		T_S	- 55...+ 150°C

Characteristics ($T_j = 25^\circ\text{C}$)**Kennwerte ($T_j = 25^\circ\text{C}$)**

		Min.	Typ.	Max.
Collector saturation volt. – Kollektor-Sättigungsspannung				
$I_C = 150\text{ mA}, I_B = 15\text{ mA}$	V_{CEsat}	–	–	400 mV
$I_C = 500\text{ mA}, I_B = 50\text{ mA}$	V_{CEsat}	–	–	750 mV
Base saturation voltage – Basis-Sättigungsspannung				
$I_C = 150\text{ mA}, I_B = 15\text{ mA}$	V_{BEsat}	750 mV	–	950 mV
$I_C = 500\text{ mA}, I_B = 50\text{ mA}$	V_{BEsat}	–	–	1.2 V
Collector cutoff current – Kollektorreststrom				
$V_{CE} = 35\text{ V}, V_{EB} = 0.4\text{ V}$	I_{CBV}	–	–	100 nA
Emitter cut-off current – Emitterreststrom				
$V_{CE} = 35\text{ V}, V_{EB} = 0.4\text{ V}$	I_{EBV}	–	–	100 nA

¹⁾ Valid, if leads are kept at ambient temperature at a distance of 2 mm from case

Gültig, wenn die Anschlußdrähte in 2 mm Abstand von Gehäuse auf Umgebungstemperatur gehalten werden

Characteristics ($T_j = 25^\circ\text{C}$)Kennwerte ($T_j = 25^\circ\text{C}$)

			Min.	Typ.	Max.
DC current gain – Kollektor-Basis-Stromverhältnis					
$V_{CE} = 1\text{ V}, I_C = 0.1\text{ mA}$	2N4401	h_{FE}	20	–	–
$V_{CE} = 1\text{ V}, I_C = 1\text{ mA}$	2N4400	h_{FE}	20	–	–
	2N4401	h_{FE}	40	–	–
$V_{CE} = 1\text{ V}, I_C = 10\text{ mA}$	2N4400	h_{FE}	40	–	–
	2N4401	h_{FE}	80	–	–
$V_{CE} = 1\text{ V}, I_C = 150\text{ mA}$	2N4400	h_{FE}	50	–	150
	2N4401	h_{FE}	100	–	300
$V_{CE} = 1\text{ V}, I_C = 500\text{ mA}$	2N4400	h_{FE}	20	–	–
	2N4401	h_{FE}	40	–	–
h-Parameters at $V_{CE} = 10\text{ V}, I_C = 1\text{ mA}, f = 1\text{ kHz}$					
Small signal current gain Kleinsignal-Stromverstärkung		h_{fe}	40	–	500
Input impedance – Eingangs-Impedanz		h_{ie}	1 k Ω	–	15 k Ω
Output admittance – Ausgangs-Leitwert		h_{oe}	1 μS	–	30 μS
Reverse voltage ratio – Spannungsrückwirkg.		h_{re}	$0.1 \cdot 10^{-4}$	–	$8 \cdot 10^{-4}$
Gain-Bandwidth Product – Transitfrequenz					
$V_{CE} = 10\text{ V}, I_C = 20\text{ mA},$ $f = 100\text{ MHz}$	2N4400	f_T	200 MHz	–	–
	2N4401	f_T	250 MHz	–	–
Collector-Base Capacitance – Kollektor-Basis-Kapazität					
$V_{CB} = 10\text{ V}, I_E = i_c = 0, f = 1\text{ MHz}$		C_{CB0}	–	–	6.5 pF
Emitter-Base Capacitance – Emitter-Basis-Kapazität					
$V_{EB} = 2\text{ V}, I_C = i_c = 0, f = 1\text{ MHz}$		C_{EB0}	–	–	30 pF
Switching times – Schaltzeiten					
turn-on time		t_{on}	–	–	35 ns
delay time		t_d	–	–	15 ns
rise time	$I_{Con} = 150\text{ mA}$	t_r	–	–	20 ns
turn-off time	$I_{Bon} = 15\text{ mA}$	t_{off}	–	–	255 ns
storage time	$-I_{Boff} = 15\text{ mA}$	t_s	–	–	225 ns
fall time		t_f	–	–	30 ns
Thermal resistance junction to ambient air Wärmewiderstand Sperrschicht – umgebende Luft			R_{thA}	200 K/W ¹⁾	
Recommended complementary PNP transistors Empfohlene komplementäre PNP-Transistoren				2N4402, 2N4403	

¹⁾ Valid, if leads are kept at ambient temperature at a distance of 2 mm from case

Gültig, wenn die Anschlußdrähte in 2 mm Abstand von Gehäuse auf Umgebungstemperatur gehalten werden