

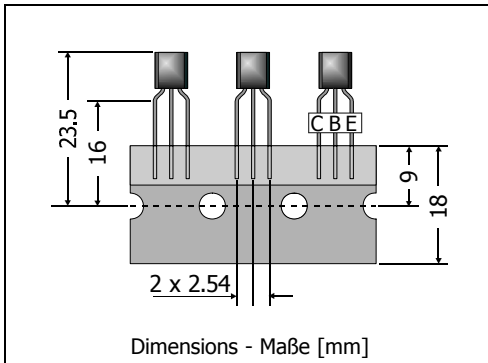
## 2N4401

NPN

General Purpose Si-Epitaxial Planar Transistors  
Si-Epitaxial Planar-Transistoren für universellen Einsatz

NPN

Version 2006-09-12



Power dissipation  
Verlustleistung

625 mW

Plastic case  
Kunststoffgehäuse

TO-92  
(10D3)

Weight approx. – Gewicht ca.

0.18 g

Plastic material has UL classification 94V-0  
Gehäusematerial UL94V-0 klassifiziert

Standard packaging taped in ammo pack  
Standard Lieferform getupet in Ammo-Pack

Maximum ratings ( $T_A = 25^\circ\text{C}$ )Grenzwerte ( $T_A = 25^\circ\text{C}$ )

			2N4401
Collector-Emitter-volt. – Kollektor-Emitter-Spannung	B open	$V_{CEO}$	40 V
Collector-Base-voltage – Kollektor-Basis-Spannung	E open	$V_{CBO}$	60 V
Emitter-Base-voltage – Emitter-Basis-Spannung	C open	$V_{EBO}$	6 V
Power dissipation – Verlustleistung		$P_{tot}$	250 mW <sup>1)</sup>
Collector current – Kollektorstrom (dc)		$I_C$	600 mA
Junction temperature – Sperrschichttemperatur		$T_j$	-55...+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.
DC current gain – Kollektor-Basis-Stromverhältnis <sup>2)</sup>				
$I_C = 0.1 \text{ mA}$ , $V_{CE} = 1 \text{ V}$	$h_{FE}$	20	–	–
$I_C = 1 \text{ mA}$ , $V_{CE} = 1 \text{ V}$	$h_{FE}$	40	–	–
$I_C = 10 \text{ mA}$ , $V_{CE} = 1 \text{ V}$	$h_{FE}$	80	–	–
$I_C = 150 \text{ mA}$ , $V_{CE} = 1 \text{ V}$	$h_{FE}$	100	–	300
$I_C = 500 \text{ mA}$ , $V_{CE} = 2 \text{ V}$	$h_{FE}$	40	–	–
Collector-Emitter saturation voltage – Kollektor-Emitter-Sättigungsspg. <sup>2)</sup>				
$I_C = 150 \text{ mA}$ , $I_B = 15 \text{ mA}$	$V_{CEsat}$	–	–	0.40 V
$I_C = 500 \text{ mA}$ , $I_B = 50 \text{ mA}$	$V_{CEsat}$	–	–	0.75 V
Base-Emitter saturation voltage – Basis-Emitter-Sättigungsspannung <sup>2)</sup>				
$I_C = 150 \text{ mA}$ , $I_B = 15 \text{ mA}$	$V_{BEsat}$	0.75 V	–	0.95 V
$I_C = 500 \text{ mA}$ , $I_B = 50 \text{ mA}$	$V_{BEsat}$	–	–	1.2 V

1 Mounted on P.C. board with 3 mm<sup>2</sup> copper pad at each terminal  
Montage auf Leiterplatte mit 3 mm<sup>2</sup> Kupferbelag (Lötpad) an jedem Anschluss

2 Tested with pulses  $t_p = 300 \mu\text{s}$ , duty cycle  $\leq 2\%$  – Gemessen mit Impulsen  $t_p = 300 \mu\text{s}$ , Schaltverhältnis  $\leq 2\%$

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

		Min.	Typ.	Max.	
Collector-Base cutoff current – Kollektor-Basis-Reststrom $V_{CE} = 35\text{ V}, V_{EB} = 0,4\text{ V}$					
	$I_{CBV}$	–	–	100 nA	
Emitter-Base cutoff current – Emitter-Basis-Reststrom $V_{CE} = 35\text{ V}, V_{EB} = 0,4\text{ V}$					
	$I_{EBV}$	–	–	100 nA	
Gain-Bandwidth Product – Transitfrequenz $I_C = 20\text{ mA}, V_{CE} = 10\text{ V}, f = 100\text{ MHz}$					
	$f_T$	250 MHz	–	–	
Collector-Base Capacitance – Kollektor-Basis-Kapazität $V_{CB} = 5\text{ V}, I_E = i_e = 0, f = 1\text{ MHz}$					
	$C_{CBO}$	–	–	6.5 pF	
Emitter-Base Capacitance – Emitter-Basis-Kapazität $V_{EB} = 0.5\text{ V}, I_C = i_c = 0, f = 1\text{ MHz}$					
	$C_{EBO}$	–	–	30 pf	
Switching times – Schaltzeiten (between 10% and 90% levels)					
delay time	$V_{CC} = 30\text{ V}, V_{EB} = 2\text{ V}$ $I_C = 150\text{ mA}, I_{B1} = 15\text{ mA}$	$t_d$	–	–	15 ns
rise time		$t_r$	–	–	20 ns
storage time	$V_{CC} = 30\text{ V}, I_C = 150\text{ mA},$ $I_{B1} = I_{B2} = 15\text{ mA}$	$t_s$	–	–	225 ns
fall time		$t_f$	–	–	30 ns
Thermal resistance junction to ambient air Wärmewiderstand Sperrschicht – umgebende Luft		$R_{thA}$	< 200 K/W <sup>1)</sup>		
Recommended complementary PNP transistors Empfohlene komplementäre PNP-Transistoren		2N4403			

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Montage auf Leiterplatte mit 3 mm<sup>2</sup> Kupferbelag (Löt-pad) an jedem Anschluss