

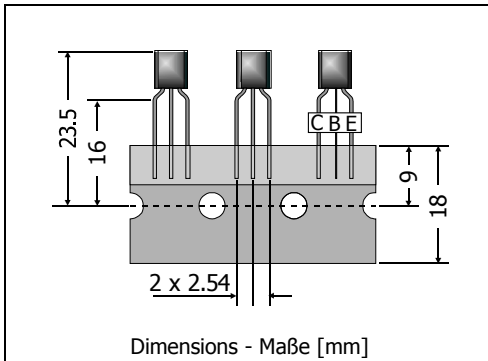
PN2222 / PN2222A

NPN

Si-Epi-Planar Switching Transistors
Si-Epi-Planar Schalttransistoren

NPN

Version 2006-09-12

Power dissipation
Verlustleistung

625 mW

Plastic case
KunststoffgehäuseTO-92
(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-PackMaximum ratings ($T_A = 25^\circ\text{C}$)Grenzwerte ($T_A = 25^\circ\text{C}$)

			PN2222 (2N2222)	PN2222A (2N2222A)
Collector-Emitter-volt. – Kollektor-Emitter-Spannung	B open	V_{CEO}	30 V	40 V
Collector-Base-voltage – Kollektor-Basis-Spannung	E open	V_{CBO}	60 V	75 V
Emitter-Base-voltage – Emitter-Basis-Spannung	C open	V_{EBO}	5 V	6 V
Power dissipation – Verlustleistung		P_{tot}	625 mW ¹⁾	
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 ²⁾					
$I_C = 0.1 \text{ mA}$, $V_{CE} = 10 \text{ V}$		h_{FE}	35	–	–
$I_C = 1 \text{ mA}$, $V_{CE} = 10 \text{ V}$		h_{FE}	50	–	–
$I_C = 10 \text{ mA}$, $V_{CE} = 10 \text{ V}$		h_{FE}	75	–	–
$I_C = 150 \text{ mA}$, $V_{CE} = 10 \text{ V}$		h_{FE}	100	–	300
$I_C = 500 \text{ mA}$, $V_{CE} = 10 \text{ V}$	PN2222	h_{FE}	30	–	–
	PN2222A	h_{FE}	40	–	–
h-Parameters at/bei $V_{CE} = 10 \text{ V}$, $f = 1 \text{ kHz}$, $I_C = 1 \text{ mA} / 10 \text{ mA}$					
Small signal current gain Kleinsignal-Stromverstärkung	PN2222A	h_{fe}	50	–	300
	PN2222A	h_{fe}	75	–	375
Input impedance – Eingangs-Impedanz	PN2222A	h_{ie}	2 k Ω	–	8 k Ω
	PN2222A	h_{ie}	0.25 k Ω	–	1.25 k Ω
Output admittance – Ausgangs-Leitwert	PN2222A	h_{oe}	5 μS	–	35 μS
	PN2222A	h_{oe}	25 μS	–	200 μS

1 Mounted on P.C. board with 3 mm² copper pad at each terminal
Montage auf Leiterplatte mit 3 mm² Kupferbelag (Löt-pad) 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°C)**Kennwerte (T_j = 25°C)**

			Min.	Typ.	Max.
Collector-Emitter saturation voltage – Kollektor-Sättigungsspannung ²⁾					
I _C = 150 mA, I _B = 15 mA	PN2222	V _{CEsat}	–	–	0.4 V
	PN2222A	V _{CEsat}	–	–	0.3 V
I _C = 500 mA, I _B = 50 mA	PN2222	V _{CEsat}	–	–	1.6 V
	PN2222A	V _{CEsat}	–	–	1.0 V
Base-Emitter saturation voltage – Basis-Sättigungsspannung ²⁾					
I _C = 150 mA, I _B = 15 mA	PN2222	V _{BEsat}	–	–	1.3 V
	PN2222A	V _{BEsat}	0.65 V	–	1.2 V
I _C = 500 mA, I _B = 50 mA	PN2222	V _{BEsat}	–	–	2.6 V
	PN2222A	V _{BEsat}	–	–	2.0 V
Collector-Base cutoff current – Kollektor-Basis-Reststrom					
V _{CB} = 50 V, (E open)	PN2222	I _{CBO}	–	–	10 nA
	PN2222A	I _{CBO}	–	–	10 nA
V _{CB} = 60 V, (E open)	PN2222	I _{CBO}	–	–	10 μA
	PN2222A	I _{CBO}	–	–	10 μA
Emitter-Base cutoff current – Emitter-Basis-Reststrom					
V _{EB} = 3 V, (C open)	PN2222A	I _{EB0}	–	–	100 nA
Gain-Bandwidth Product – Transitfrequenz					
V _{CE} = 20 V, I _C = 20 mA, f = 100 MHz		f _T	250 MHz	–	–
Collector-Base Capacitance – Kollektor-Basis-Kapazität					
V _{CB} = 10 V, I _E = i _e = 0, f = 1 MHz		C _{CBO}	–	–	8 pF
Emitter-Base Capacitance – Emitter-Basis-Kapazität					
V _{EB} = 0.5 V, I _C = i _c = 0, f = 1 MHz		C _{EBO}	–	–	30 pF
Noise figure – Rauschzahl					
V _{CE} = 10 V, I _C = 100 μA, R _G = 1 kΩ, f = 1 kHz	PN2222A	F	–	–	4 dB
Switching times – Schaltzeiten (between 10% and 90% levels)					
delay time	V _{CC} = 3 V, V _{BE} = 0.5 V I _C = 150 mA, I _{B1} = 15 mA	t _d	–	–	10 ns
rise time		t _r	–	–	25 ns
storage time	V _{CC} = 3 V, I _C = 150 mA, I _{B1} = I _{B2} = 15 mA	t _s	–	–	225 ns
fall time		t _f	–	–	60 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			PN2709 / PN2709A		

²⁾ Tested with pulses t_p = 300 μs, duty cycle ≤ 2% – Gemessen mit Impulsen t_p = 300 μs, Schaltverhältnis ≤ 2%

¹⁾ Mounted on P.C. board with 3 mm² copper pad at each terminal
Montage auf Leiterplatte mit 3 mm² Kupferbelag (Lötpad) an jedem Anschluss