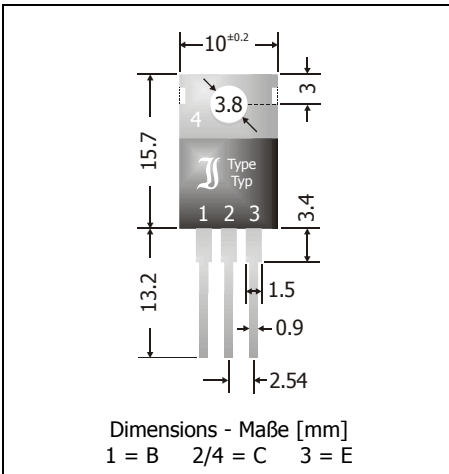


**TIP31 ... TIP31C**  
**General Purpose Silicon Power Transistors**  
**Silizium Leistungs-Transistoren für universellen Einsatz**

**NPN**

**NPN**

Version 2006-07-12



Max. power dissipation with cooling  
 Max. Verlustleistung mit Kühlung 40 W

Collector current  
 Kollektorstrom 3 A

Plastic case  
 Kunststoffgehäuse TO-220AB

Weight approx.  
 Gewicht ca. 2.2 g

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

Standard packaging in tubes  
 Standard Lieferform in Stangen



**Maximum ratings (T<sub>A</sub> = 25°C)**

**Grenzwerte (T<sub>A</sub> = 25°C)**

			TIP31	TIP31A	TIP31B	TIP31C
Collector-Emitter-voltage	B open	V <sub>CEO</sub>	40 V	60 V	80 V	100 V
Collector-Emitter-voltage	E open	V <sub>CES</sub>	40 V	60 V	80 V	100 V
Emitter-Base-voltage	C open	V <sub>EBO</sub>	5 V			
Power dissipation – Verlustleistung						
without cooling – ohne Kühlung	T <sub>A</sub> = 25°C	P <sub>tot</sub>	2 W <sup>1)</sup>			
with cooling – mit Kühlung	T <sub>C</sub> = 25°C	P <sub>tot</sub>	40 W			
Collector current – Kollektorstrom (dc)			I <sub>C</sub>			
			3 A			
Peak Collector current – Kollektor-Spitzenstrom			I <sub>CM</sub>			
			5 A			
Base current – Basisstrom (dc)			I <sub>B</sub>			
			1 A			
Junction temperature – Sperrschichttemperatur			T <sub>j</sub>			
Storage temperature – Lagerungstemperatur			T <sub>s</sub>			
			-55...+150°C			

**Characteristics (T<sub>j</sub> = 25°C)**

**Kennwerte (T<sub>j</sub> = 25°C)**

		Min.	Typ.	Max.
DC current gain – Kollektor-Basis-Stromverhältnis <sup>2)</sup>				
V <sub>CE</sub> = 4 V, I <sub>C</sub> = 1 A	h <sub>FE</sub>	25	–	–
V <sub>CE</sub> = 4 V, I <sub>C</sub> = 3 A	h <sub>FE</sub>	10	–	50
Collector-Emitter saturation volt. – Kollektor-Emitter-Sättigungsspg. <sup>2)</sup>				
I <sub>C</sub> = 3 A, I <sub>B</sub> = 375 mA	V <sub>CEsat</sub>	–	–	1.2 V
Base-Emitter voltage – Basis-Emitter-Spannung <sup>2)</sup>				
V <sub>CE</sub> = 4 V, I <sub>C</sub> = 3 A	V <sub>BE</sub>	–	–	1.8 V

1 Valid, if leads are kept at ambient temperature at a distance of 5 mm from case  
 Gültig wenn die Anschlussdrähte in 5 mm Abstand vom Gehäuse auf Umgebungstemperatur gehalten werden

2 Tested with pulses t<sub>p</sub> = 300 µs, duty cycle ≤ 2% – Gemessen mit Impulsen t<sub>p</sub> = 300 µs, Schaltverhältnis ≤ 2%

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

			Min.	Typ.	Max.
Collector-Emitter cutoff current – Kollektor-Emitter-Reststrom					
$V_{CE} = 30\text{ V}$ (B open)	TIP31	$I_{CE0}$	–	–	300 nA
	TIP31A	$I_{CE0}$	–	–	300 nA
$V_{CE} = 60\text{ V}$ (B open)	TIP31B	$I_{CE0}$	–	–	300 nA
	TIP31C	$I_{CE0}$	–	–	300 nA
$V_{CE} = 40\text{ V}$ (B-E short)	TIP31	$I_{CES}$	–	–	200 nA
$V_{CE} = 60\text{ V}$ (B-E short)	TIP31A	$I_{CES}$	–	–	200 nA
$V_{CE} = 80\text{ V}$ (B-E short)	TIP31B	$I_{CES}$	–	–	200 nA
$V_{CE} = 100\text{ V}$ (B-E short)	TIP31C	$I_{CES}$	–	–	200 nA
Emitter-Base cutoff current					
$V_{EB} = 5\text{ V}$ , (C open)		$I_{EB0}$	–	–	1 mA
Gain-Bandwidth Product – Transitfrequenz					
$V_{CE} = 10\text{ V}$ , $I_C = 0.5\text{ A}$ , $f = 1\text{ MHz}$		$f_T$	3 MHz	–	–
Small signal current gain – Kleinsignal-Stromverstärkung					
$V_{CE} = 10\text{ V}$ , $I_C = 0.5\text{ A}$ , $f = 1\text{ kHz}$		$h_{fe}$	20	–	–
$V_{CE} = 10\text{ V}$ , $I_C = 0.5\text{ A}$ , $f = 1\text{ MHz}$		$h_{fe}$	3	–	–
Switching times – Schaltzeiten (between 10% and 90% levels)					
turn-on time	$I_{Con} = 1\text{ A}$	$t_{on}$	–	300 ns	–
turn-off time	$I_{Bon} = -I_{Boff} = 100\text{ mA}$	$t_{off}$	–	1 $\mu\text{s}$	–
Thermal resistance junction to ambient air Wärmewiderstand Sperrschicht – umgebende Luft		$R_{thA}$	< 63 K/W <sup>1)</sup>		
Thermal resistance junction to case Wärmewiderstand Sperrschicht – Gehäuse		$R_{thC}$	< 3 K/W		
Admissible torque for mounting Zulässiges Anzugsdrehmoment		M4	9 $\pm$ 10% lb.in. 1 $\pm$ 10% Nm		
Recommended complementary PNP transistors Empfohlene komplementäre PNP-Transistoren			TIP32 ... TIP32C		

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Gültig wenn die Anschlussdrähte in 5 mm Abstand vom Gehäuse auf Umgebungstemperatur gehalten werden