Quad Operational Amplifier with Darlington Input

TBB 4331 A
TBE 4335 A

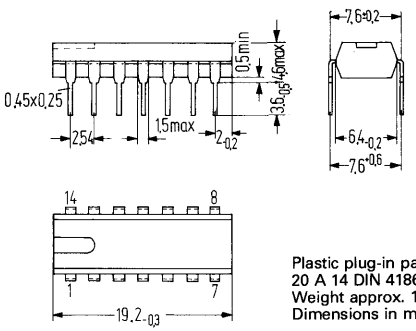
An economical and universal operational amplifier which by its excellent performance qualities is well suited for a wide range of applications such as measurement- and servo-systems, automobile electronics, AF-circuits, analog computers etc. The low input current of this amplifier is particulary advantageous in measurement- and servo system applications. In addition to a high gain, low offset voltage, small temperature- and supply voltage-dependence, the amplifier features

- High input resistance
- Wide common-mode range
- Large supply voltage range
- Large control range
- High output current

Type	Ordering codes
TBB 4331 A	Q67000-A1166
TBE 4335 A	Q67000-A1167

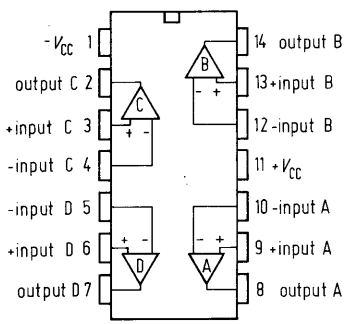
For single amplifier performance, see TCA 311 data sheet.

Package outlines

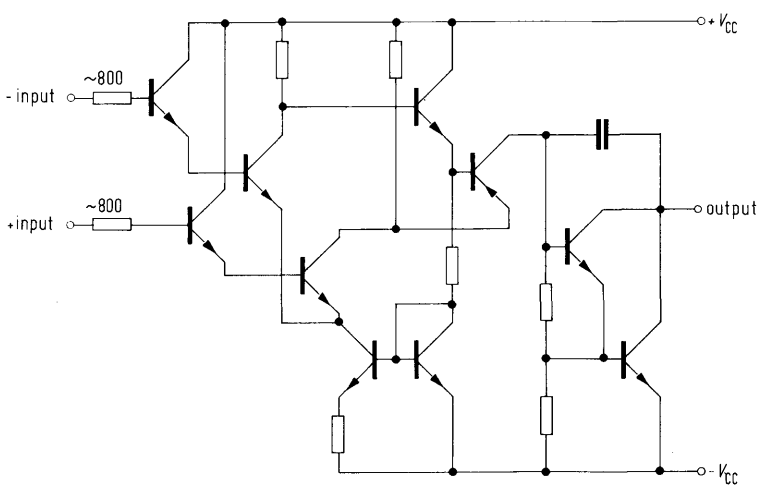


Plastic plug-in package, 14 pins
20 A 14 DIN 41866 (TO-116)
Weight approx. 1.1 g
Dimensions in mm

Pin connection



Equivalent circuit



Maximum ratings

		TBB 4331 A TBE 4335 A	
Supply voltage	V_{CC}	±15	V
Output current	I_q	70	mA
Differential input voltage V_{CC} = ±13 to ±15 V	V_{iD}	±13	V
Differential input voltage V_{CC} = ±2 to ±13 V	V_{iD}	$\pm V_{CC}$	
Junction temperature	T_j	150	°C
Storage temperature	T_S	−55 to +125	°C
Thermal resistance:			
System-ambient air	R_{thSamb}	140	k/W

Range of operation

Supply voltage	V_{CC}	±2 to ±15	V
Ambient temperature in operation			
TBB 4331 A	T_{amb}	0 to +70	°C
TBE 4335 A	T_{amb}	−25 to +85	°C

Operating characteristics
(V_{CC} = ±15 V, T_{amb} = 25°C)

		TBB 4331 A TBE 4335 A			
		min	typ	max	
Supply current	I_{CC}		1	3	mA
Input offset voltage (R_G = 50 Ω)	V_{io}	−15		15	mV
Input offset current	I_{io}	−25		25	nA
Input current	I_i		30	50	nA
Output voltage					
(R_L = 2 kΩ)	V_{qpp}	14.9		−14	V
(R_L = 620 Ω)	V_{qpp}	14.9		−12.5	V
Input impedance (f = 1 kHz)	Z_i		3		MΩ
Open-loop voltage gain					
(R_L = 2 kΩ, f = 100 Hz)	G_V	75	80		dB
(R_L = 10 kΩ, f = 100 Hz)	G_V		85		dB
Output saturation voltage (I_q = 10 mA)	V_{qsat}			1	V
Output leakage current	I_{qlk}		1	10	µA
Input common-mode range (R_L = 2 kΩ)	V_{iCM}	12	±13.5	−12	V
Common-mode rejection ration (R_L = 2 kΩ)	$CMRR$	65	79		dB
Sensitivity to supply voltage variation (G_V = 100)	$\frac{\Delta V_{io}}{\Delta V_{CC}}$		25	100	µV/V
Temp.-coefficient of V_{io} (R_G = 50 Ω)	α_{Vio}		12		µV/K
Temp.-coefficient of I_{io} (R_G = 50 Ω)	α_{Iio}		50		pA/K
V_{CC} = ±5 V					
Supply current	I_{CC}		1		mA
Input offset voltage	V_{io}	−15		15	mV
Input offset current	I_{io}	−25	±10	25	nA
Input current	I_i		30	50	nA
Open-loop voltage gain (R_L = 2 kΩ, f = 1 kHz)	G_V	70			dB
Output voltage (R_L = 2 kΩ)	V_{qpp}	4.9		−4	V