TAA 861 · TAA 861 A
TAA 865 · TAA 865 A

Monolithisch Integrierte Schaltungen
Monolithic Integrated Circuits

Anwendungen: Operationsverstärker in Regelungstechnik, NF-Schaltungen, Analog-Rechnertechnik, Autoelektronik usw.

Applications: *Operational amplifiers in automatic control technique, audio circuits, analogue calculator and auto electronics etc.*

Besondere Merkmale:

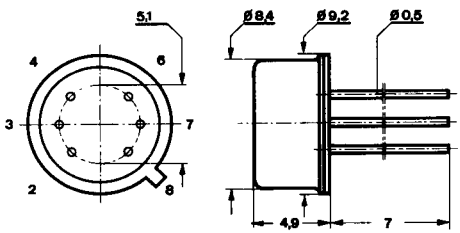
- Geringer Ruhestrom typ. 1,5 mA
- Großer Versorgungsspannungsbereich ±2...±10 V
- Ausgangsstrom bis 70 mA
- Hochohmiger Differenzeingang typ. 200 kΩ
- Hohe Leerlaufspannungsverstärkung typ. 90 dB
- Einfache Frequenzgangkompensation
- Hohe Gleichtaktunterdrückung typ. 86 dB

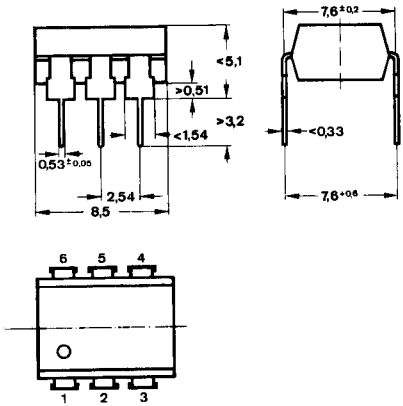
Features:

- *Low quiescent current typ. 1.5 mA*
- *Wide range of supply voltage ±2...±10 V*
- *Output current up to 70 mA*
- *High input differential impedance typ. 200 kΩ*
- *High open-loop voltage amplification typ. 90 dB*
- *Simple frequency compensation*
- *High common mode rejection ratio typ. 86 dB*

Vorläufige technische Daten · *Preliminary specifications*

Abmessungen in mm
Dimensions in mm

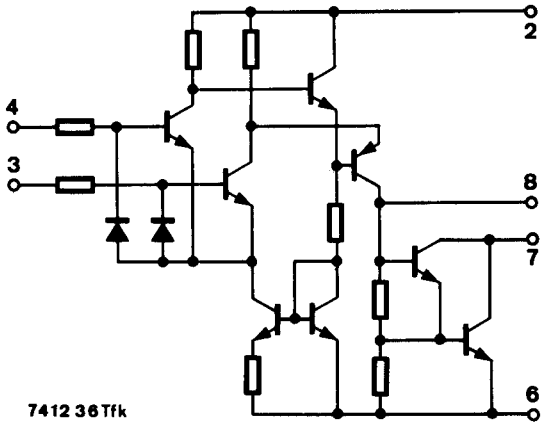




TAA 861 · TAA 865
Normgehäuse
Case
5 H 6 DIN 41873
≈ JEDEC MO 002 AE
Gewicht · *Weight*
max. 1 g

TAA 861 A · TAA 865 A
Kunststoffgehäuse
Plastic case
DIP 6-polig
Gewicht · *Weight*
max. 0,7 g

B 2/V.2.369/1174 A 2



	TAA 861 · TAA 861 A	TAA 865 · TAA 865 A
Invertierender Eingang *Inverting input*	4	3
Nicht invertierender Eingang *Non-inverting input*	3	2
Frequenzgangkompensation *Frequency compensation*	8	6
Ausgang *Output*	7	5
U_S	2	1
$-U_S$	6	4

Fig. 1 Schaltung und Anschlußbelegung
Diagram and pin connections

Bezugspunkt: Gemeinsamer Anschluß der Versorgungsspannungsquellen
Reference point: Common power supply

Anschlußbelegungen siehe: Fig. 1
Pin connections see:

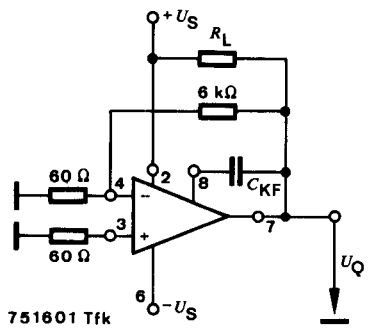
Nachfolgende Anschlußangaben nur für: **TAA 861, TAA 865**
Following terminal specification only for:

Absolute Grenzdaten
Absolute maximum ratings

Versorgungsspannungen *Supply voltages*	Pin 2	U_S	10	V
	Pin 6	$-U_S$	10	V
Funktionsbereich *Function range*	Pin 2, 6	$\pm U_S$	2...10	V
Ausgangsstrom *Output current*	Pin 7	I_Q	70	mA
Eingangsspannung *Input voltage*	Pin 3, 4	$\pm U_I$	$\pm U_S$	
Betriebsumgebungstemperaturbereich *Operating temperature range*				
TAA 861, TAA 861 A		t_{amb}	0...+70	°C
TAA 865, TAA 865 A		t_{amb}	−25...+85	°C
Sperrschichttemperatur *Junction temperature*		t_j	150	°C
Lagerungstemperaturbereich *Storage temperature range*		t_{stg}	−40...+125	°C

			Min.	Typ.	Max.	
Wärmewiderstände ***Thermal resistances***						
Sperrschicht-Umgebung *Junction ambient*	**TAA 861, TAA 865**	R_{thJA}			190	°C/W
	TAA 861 A, TAA 865 A	R_{thJA}			140	°C/W
Sperrschicht-Gehäuse *Junction case*	**TAA 861, TAA 865**	R_{thJC}			80	°C/W
Statische Kenngrößen ***Static characteristics***						
$\pm U_S$ = 10 V, t_{amb} = 25 °C						
Leistungsaufnahme *Total power* U_Q = 0 V, R_L = 2 kΩ		P_{tot}		70		mW
Leerlauf-Stromaufnahme *No load supply current*	Pin 2	I_S		1	1,5	mA
Eingangs-Fehlspannung *Input offset voltage* R_{KO} = 60 Ω, Fig. 2, 6	Pin 3	U_{IO}		2	10	mV
Eingangs-Fehlstrom, Fig. 8 *Input offset current*	Pin 3, 4	I_{IO}		50	300	nA
Eingangsstrom, Fig. 8 *Input current*	Pin 3, 4	I_I		0,3	1	µA
Dynamische Kenngrößen ***Dynamic characteristics***						
$\pm U_S$ = 10 V, t_{amb} = 25 °C						
Ausgangsspannung *Output voltage* R_L = 2 kΩ	Pin 7	$\pm U_Q$	9			V
R_L = 250 Ω	Pin 7	$\pm U_Q$	8			V
Eingangsimpedanz *Input impedance* f = 1 kHz		z_i		200		kΩ
Leerlauf-Spannungsverstärkung, Fig. 11 *Open circuit voltage amplification* f = 1 kHz, R_L = 2 kΩ	Pin 7	A_{uo}	75	84		dB
R_L = 10 kΩ	Pin 7	A_{uo}		90		dB
f = 1 MHz, R_L = 2 kΩ	Pin 7	A_{uo}		43		dB
Eingangs-Gleichtaktbereich *Input push pull range* R_L = 2 kΩ, Fig. 16	Pin 7	$\pm U_{IC}$		9		V
Gleichtaktunterdrückung *Push pull suppression* R_L = 2 kΩ	Pin 7	k_{cr}	75	86		dB

			Min.	Typ.	Max.	
Rauschspannung DIN 45405 *Noise voltage* R_{KF} = 2,5 kΩ		U_{ni}		3,1		µV
Temperaturkoeffizient der Eingangs-Fehlspannung *Temperature coefficient of input offset voltage* R_{KO} = 60Ω	Pin 3	a_{UIO}		6		µV/°C
Temperaturkoeffizient des Eingangs-Fehlstromes *Temperature coefficient of input offset current* R_{KO} = 60Ω	Pin 3, 4	a_{IIO}		0,3		nA/°C
Anstiegsgeschwindigkeit *Step response*						
nicht invertierender Betrieb, Fig. 4 *non-inverted operation*	Pin 3	S_{VOav}		3		V/µs
invertierender Betrieb, Fig. 5 *inverted operation*	Pin 4	S_{VOav}		12		V/µs

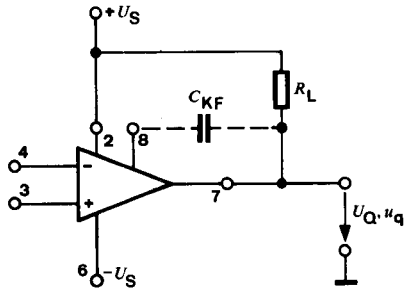


$$U_{IO} = \frac{U_{QO}}{A_U}$$

$$A_U = 100$$

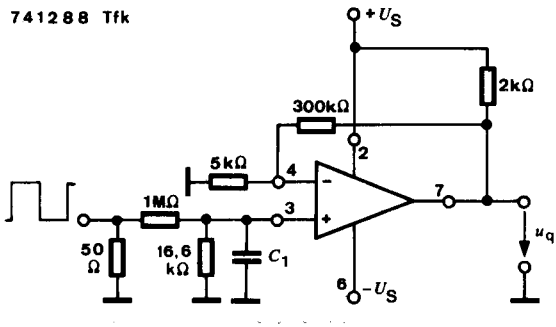
$$U_{IO} = \frac{U_{QO}}{100}$$

Fig. 2 Fehlspannungskompensation
Offset voltage compensation



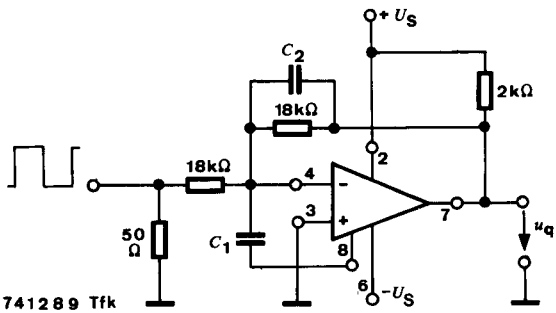
C_{KF} Frequenzgangkompensation
Frequency compensation

Fig. 3 Anschlußschema
Connection diagram



$C_1 \approx 22$ pF für minimales Überschwingen
for minimum overshoot

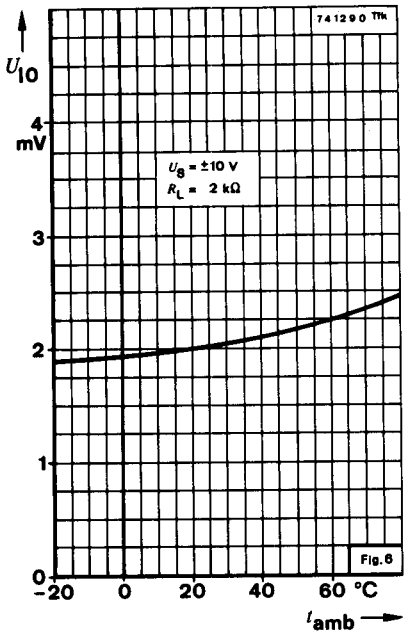
Fig. 4 Meßschaltung für nicht invertierenden Betrieb
Test circuit for non-inverted operation

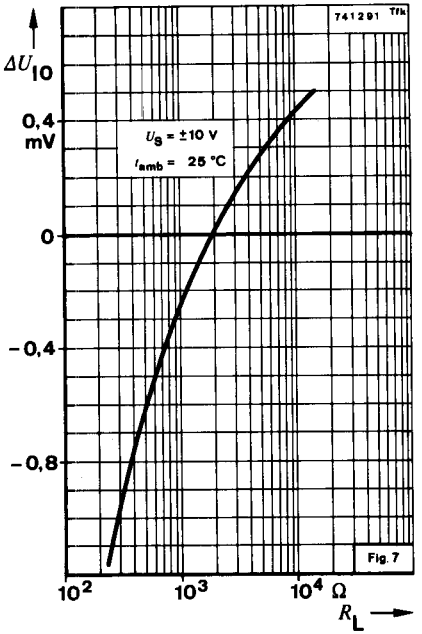


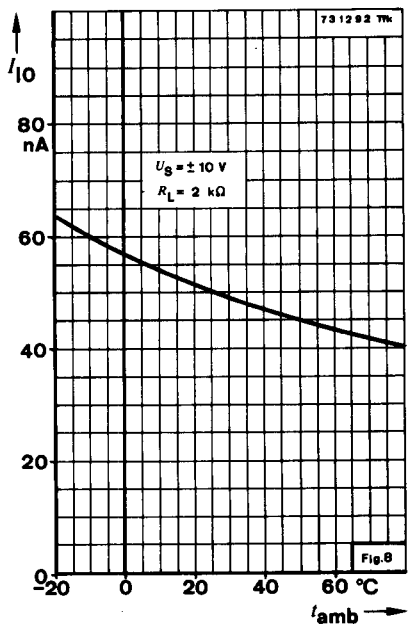
$C_1 \approx 3{,}9$ pF für minimales Überschwingen
for minimum overshoot

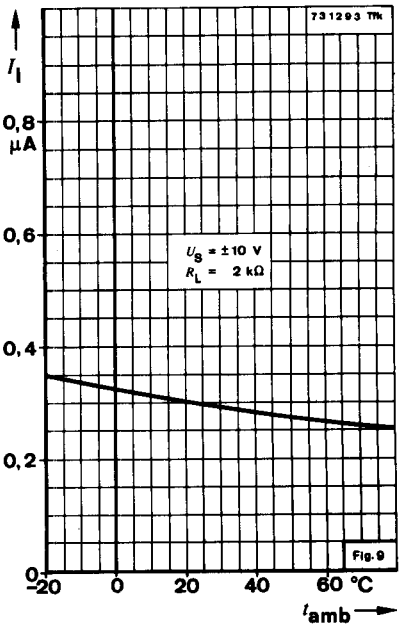
$C_2 \approx 390$ pF bewirkt frequenzabhängige Kompensation zur Verkleinerung der Anstiegszeiten
acts as a frequency dependent to decrease the rise time

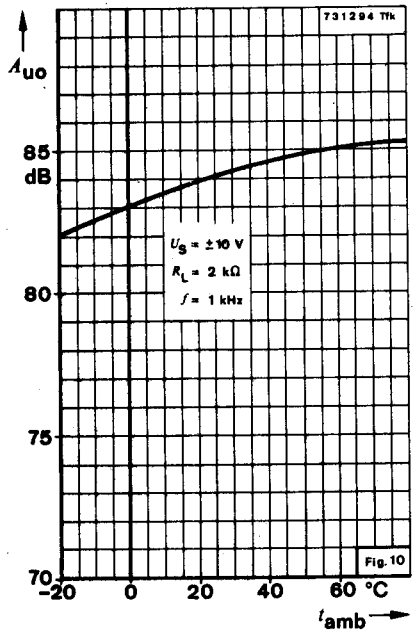
Fig. 5 Meßschaltung für invertierenden Betrieb
Test circuit for inverted operation

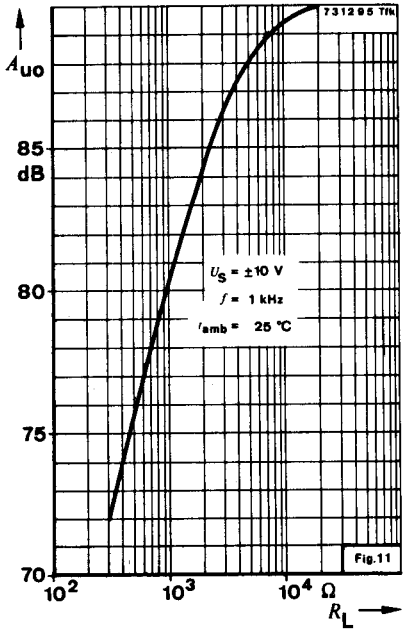

741290 Tfk
U_{IO}
4 mV
3
2
1
0
U_S = ±10 V
R_L = 2 kΩ
−20
0
20
40
60 °C
t_{amb}
Fig. 6

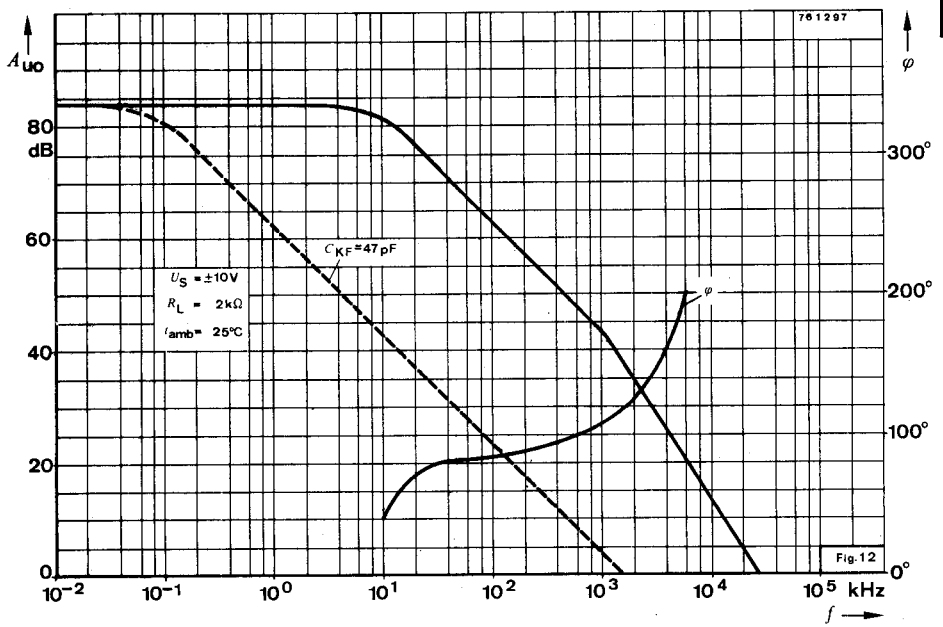

741291 Tfk
ΔU_{IO}
0,4 mV
0
−0,4
−0,8
U_S = ±10 V
t_{amb} = 25 °C
10^2
10^3
10^4 Ω
R_L
Fig. 7

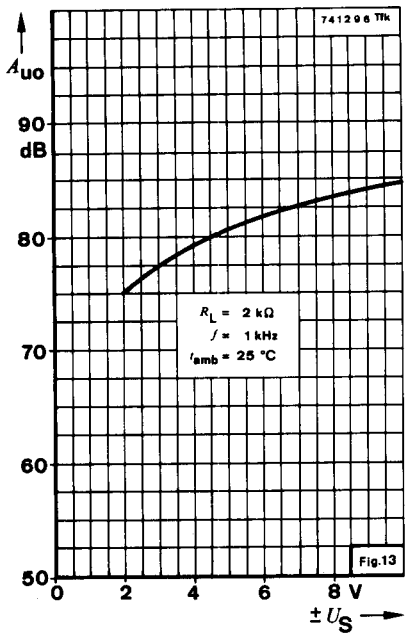

731292 Tfk
I_{IO}
80 nA
60
40
20
0
U_S = ± 10 V
R_L = 2 kΩ
−20
0
20
40
60 °C
t_{amb}
Fig. 8

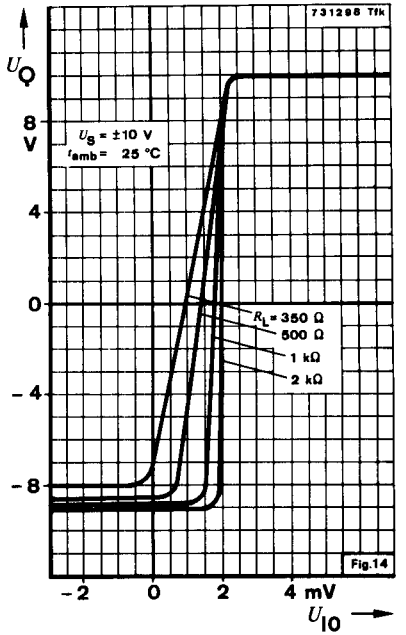

731293 Tfk
I_I
0,8 µA
0,6
0,4
0,2
0
U_S = ± 10 V
R_L = 2 kΩ
−20
0
20
40
60 °C
t_{amb}
Fig. 9

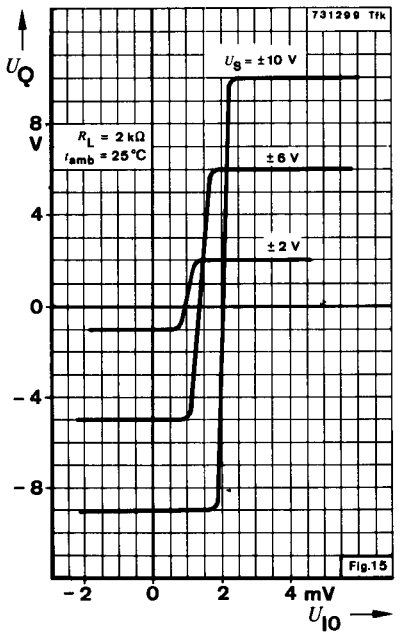

731294 TTk
A_{uo}
85 dB
80
75
70
U_S = ±10 V
R_L = 2 kΩ
f = 1 kHz
Fig. 10
-20
0
20
40
60 °C
t_{amb}

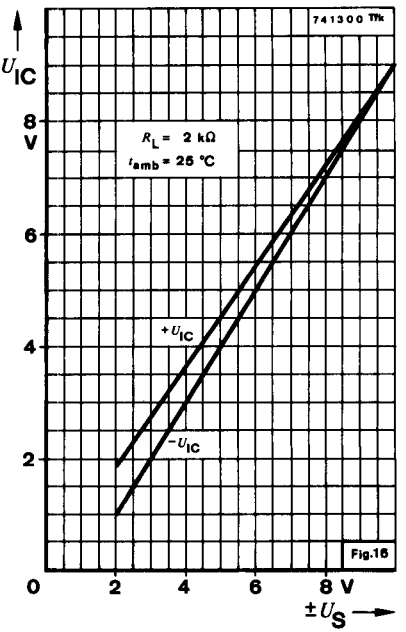

731295 TTk
A_{uo}
85 dB
80
75
70
U_S = ±10 V
f = 1 kHz
t_{amb} = 25 °C
Fig. 11
10^2
10^3
10^4 Ω
R_L


761297
A_{uo}
80 dB
60
40
20
0
φ
300°
200°
100°
0°
U_S = ±10V
R_L = 2kΩ
t_{amb} = 25°C
C_{KF} = 47pF
φ
Fig. 12
10^{-2}
10^{-1}
10^0
10^1
10^2
10^3
10^4
10^5 kHz
f


741296 Tfk
A_{uo}
90
dB
80
70
60
50
0
2
4
6
8 V
$\pm U_S$
R_L = 2 kΩ
f = 1 kHz
t_{amb} = 25 °C
Fig.13


731298 Tfk
U_Q
8
V
4
0
-4
-8
U_S = ±10 V
t_{amb} = 25 °C
R_L = 350 Ω
500 Ω
1 kΩ
2 kΩ
-2
0
2
4 mV
U_{IO}
Fig.14


731299 Tfk
U_Q
8
V
4
0
-4
-8
U_S = ±10 V
R_L = 2 kΩ
t_{amb} = 25 °C
±6 V
±2 V
-2
0
2
4 mV
U_{IO}
Fig.15


741300 Tfk
U_{IC}
8
V
6
4
2
0
R_L = 2 kΩ
t_{amb} = 25 °C
$+U_{IC}$
$-U_{IC}$
2
4
6
8 V
$\pm U_S$
Fig.16

Anwendungsbeispiele · ***Application notes***

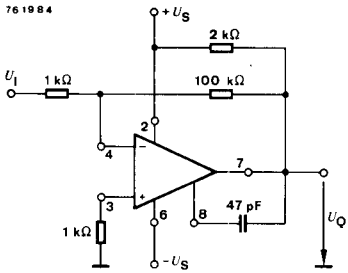


Fig. 17 Invertierender Verstärker
Inverting amplifier

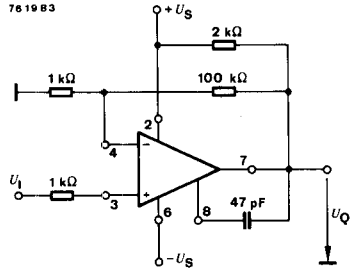


Fig. 18 Nicht invertierender Verstärker
Non inverting amplifier

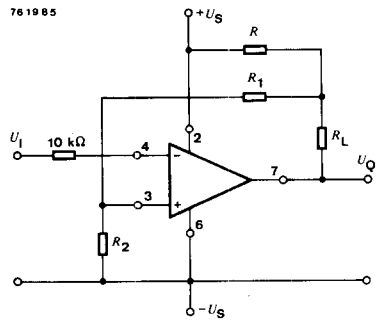


Fig. 19 Schmitt-Trigger
Schmitt Trigger

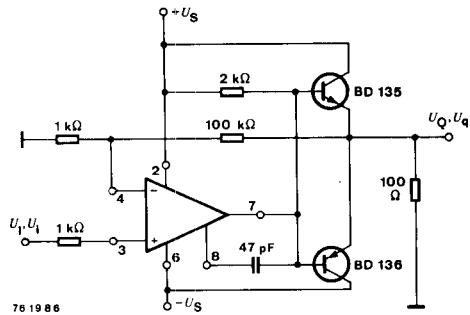


Fig. 20 Leistungsverstärker
Power amplifier

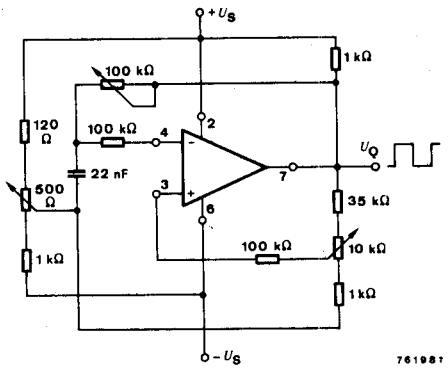
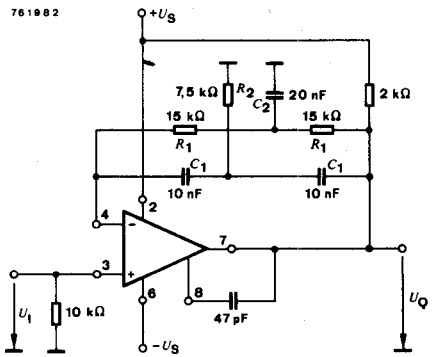


Fig. 21 Impulsgenerator
Pulse generator



$$f = \frac{1}{2\pi R_1 \cdot C_1}$$

$$R_1 = 2 \cdot R_2$$

$$C_2 = 2 \cdot C_1$$

Fig. 22 Selektiver Verstärker
Selective amplifier

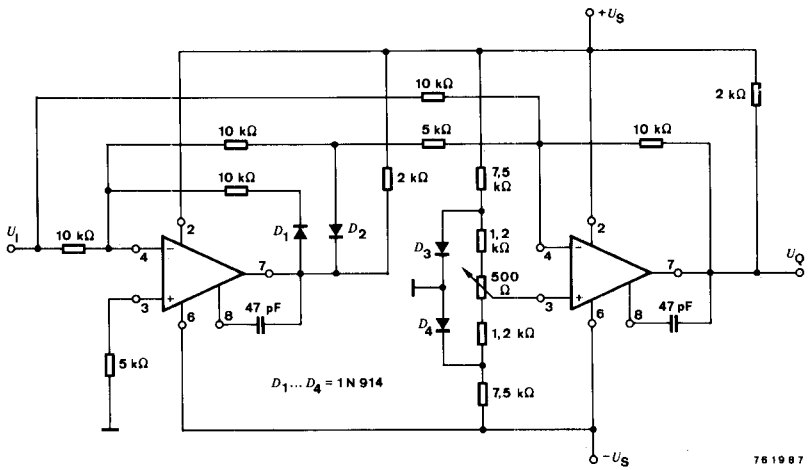


Fig. 23 AC-DC-Wandler
AC-DC-Converter