mikroelektronik

Information

RFT

B 611 D, B 615 D, B 621 D
B 625 D, B 631 D, B 635 D
B 761 D, B 765 D, B 861 D
B 865 D, B 2761 D, B 2765 D
B 4761 D, B 4765 D

International comparative types: **TCA 311 A, TCA 315 A, TCA 321 A, TCA 325 A, TCA 331 A, TCA 335 A, TAA 761 A, TAA 765 A, TAA 861 A, TAA 865 A, TAA 2761 A, TAA 2765 A, TAA 4761 A, TAA 4765 A**

Single, double or quadruple operational amplifier

Preliminary data

Application: Measuring, control and automatic control technique, automobile electronics, computer technology and consumer goods production

Special features: high amplification
- low offset voltage
- high input resistance
- wide operating voltage range
- wide range of modulation
- high output current
- open collector outputs
- TTL compatible outputs with B 611 D, B 615 D, B 621 D, B 625 D
- B 2761 D, B 2765 D, B 4761 D, B 4765 D are operational amplifiers with internal frequency compensation.

Casing: DIL plastic case

Design: 21.2.1.2.6 according to TGL 26 713 for single operational amplifiers
B 611 D, B 615 D, B 631 D, B 635 D, B 761 D,
B 861 D, B 865 D
21.1.1.2.8 according to TGL 26 713 for double operational amplifiers
B 2761 D, B 2765 D
21.2.1.2.14 according to TGL 26 713 for quadruple operational
amplifiers B 4761 D, B 4765 D

Weight: ≤ 1 ... 1.5 g

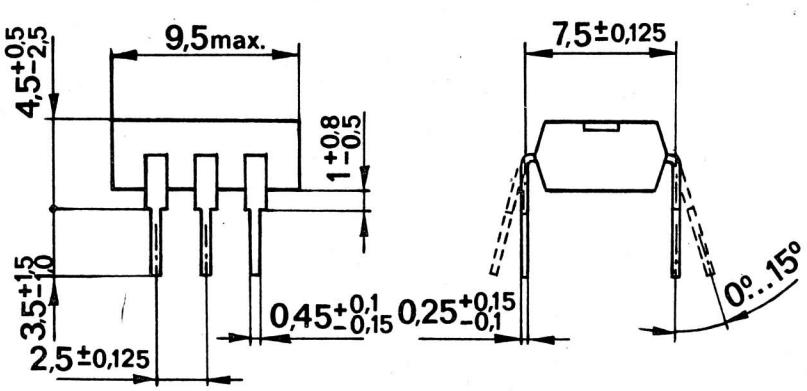
Type standard: TGL 38 925

Dimensions in mm and pin connections:

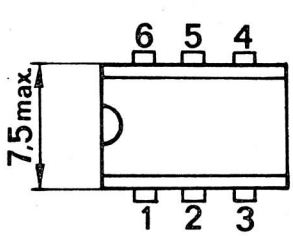
Single operational amplifiers

B 761 D, B 765 D, B 861 D, B 865 D, B 631 D, B 635 D, B 611 D, B 615 D,
B 621 D, B 625 D

1 – positive supply voltage
2 – non-inverting input
3 – inverting input
4 – negative supply voltage
5 – output
6 – frequency compensation or connection R for the integrated circuits
B 611 D, B 615 D, B 621 D, B 625 D

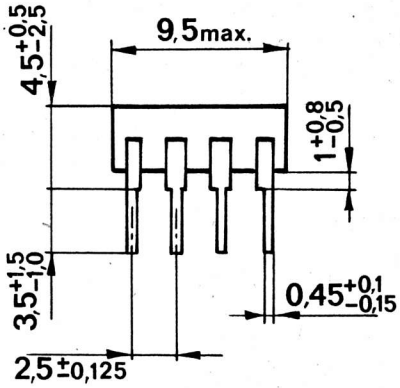


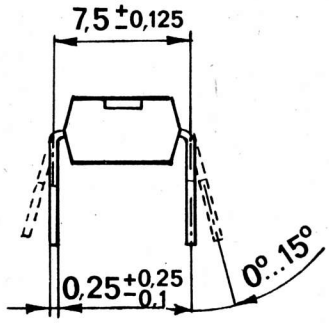
21.2.1. 2.6 TGL 26713



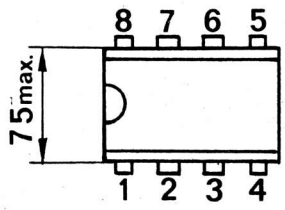
Double operational amplifier
B 2761 D, B 2765 D

1 – non-inverting input/system 1
2 – inverting input/system 1
3 – positive supply voltage
4 – inverting input/system 2
5 – non-inverting input/system 2
6 – output/system 2
7 – negative supply voltage
8 – output/system 1





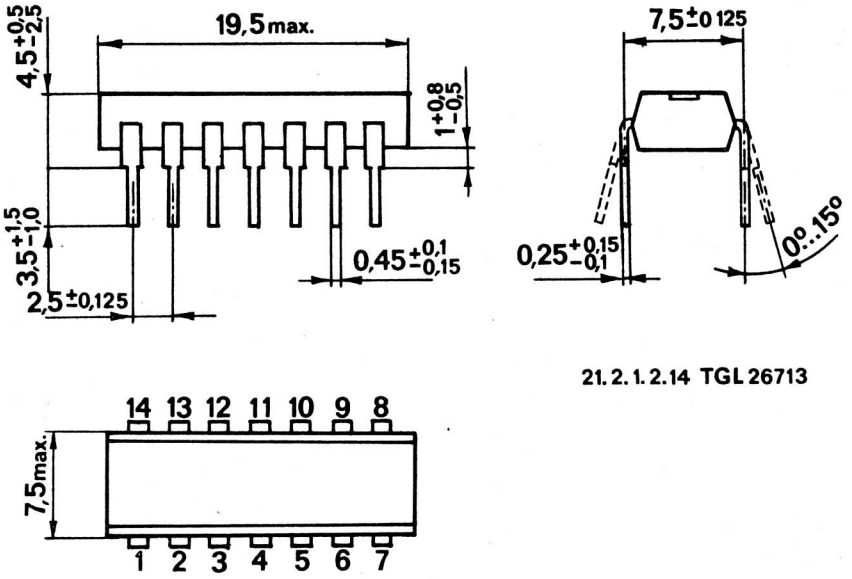
21.1.1.2.8 TGL 26713



Quadruple operational amplifiers

B 4761 D, B 4765 D

1 – negative supply voltage
2 – output/system 1
3 – input/system 1
4 – input/system 1
5 – input/system 2
6 – input/system 2
7 – output/system 2
8 – output/system 3
9 – input/system 3
10 – input/system 3
11 – positive supply voltage
12 – input/system 4
13 – input/system 4
14 – output/system 4



Maximum ratings, valid for operational temperature range

			min.	max.	
Supply voltage	$\pm U_S$	B 861 D, B 865 D	1.5[1])	10	V
		B 611 D, B 615 D, B 621 D, B 625 D, B 631 D, B 635 D, B 2761 D, B 2765 D B 4761 D, B 4765 D	2[2])	15	
		B 761 D, B 765 D	1.5[1])	18	V
Differential input voltage	U_{ID}	B 765 D, B 865 D, B 625 D, B 761 D, B 861 D, B 621 D, B 2761 D, B 2765 D, B 611 D, B 631 D, B 615 D, B 635 D, ($\pm U_S$ = 2 to 13 V)	$-U_S$	$+U_S$	V
		B 615 D, B 635 D, B 611 D, B 631 D, ($\pm U_S$ = 13 to 15 V) B 4761 D, B 4765 D	−13	+13	V
		$-(U_{S+} + \lvert U_S - \rvert)$			
		$(U_{S+} + \lvert U_S - \rvert)$			V
Common mode input voltage	U_I	B 765 D, B 2765 D, B 761 D, B 2761 D	12	+12	V
		B 861 D, B 865 D,	−8	+8	V
		B 611 D, B 615 D, B 621 D, B 631 D, B 625 D, B 635 D	−13	+13	V
		B 4761 D, B 4765 D	$-U_S$	$+U_S$	V
Output current	I_O	all types		70	mA
Junction temperature	ϑ_j	all types		150	°C

			min.	max.	
Total thermal resistance	R_{thja}	all types		140	k/W
		B 4761 D, B 4765 D		120	k/W
Operational temperature range	ϑ_a	B 761 D, B 861 D B 611 D, B 621 D, B 631 D, B 2761 D, B 4761 D	0	+70	°C
		B 765 D, B 865 D, B 615 D, B 625 D, B 635 D, B 2765 D, B 4765 D	−25	+85	°C

Note:
Voltages are related to earth (centre of the supply voltages $+U_S$ and $-U_S$). The differential voltage is the voltage of the non-inverting input related to the inverting input.

1) Operating values

Static data (ϑ_a = 25°C −5 K; ± U_S = 15 V, 10 V for B 861 D, B 865 D, R_L = 2 kΩ):

			min.	max.	
Input offset voltage R_S = 50 kΩ	U_{IO}	B 761 D, B 2761 D B 765 D, B 2765 D B 4761 D, B 4765 D	−6	6	mV
		B 621 D, B 625 D	−7.5	7.5	mV
		B 8611 D, B 865 D	−10	10	mV
		B 611 D, B 631 D B 615 D, B 635 D	−15	15	mV
Input offset current U_S = ± 5 V	I_{IO}	B 761 D, B 861 D, B 765 D, B 865 D, B 621 D, B 625 D, B 2761 D, B 2765 D B 4761 D, B 4765 D	−300	300	nA
		B 611 D, B 615 D B 631 D, B 635 D	−25	25	nA

			min.	max.	
Input bias current $U_S = \pm 5$ V	I_I	B 761 D, B 765 D, B 861 D, B 865 D, B 621 D, B 625 D, B 2761 D, B 2765 D B 4761 D, B 4765 D		1	µA
		B 611 D, B 615 D,		0.05	µA
Voltage gain with open output					
$U_S = \pm 5$ V	A_{Uoff}	B 861 D, B 865 D,	75[6])		dB
$U_O = \pm 2$ V	A_{Uoff}	B 761 D, B 765 D,	81.5[5])		dB
		B 2761 D, B 2765 D	80[5])		dB
		B 4761 D, B 4765 D			
		B 611 D, B 615 D, B 621 D, B 625 D, B 631 D, B 635 D	75[5])		dB
Range of modulation of the output voltage	U_O	B 761 D, B 765 D, B 631 D, B 635 D, B 2761 D, B 2765 D	14.9	−14	V
		B 611 D, B 615 D, B 621 D, B 625 D	14.9	−14.8	V
		B 861 D, B 865 D	9.8	−9	V
$R_L = 620\ \Omega$		B 761 D, B 765 D B 631 D, B 635 D, B 2761 D, B 2765 D	14.9	−12.5	V
		B 611 D, B 615 D, B 621 D, B 625 D	14.9	−14	V
		B 4761 D, B 4765 D	14	−11.5	V
$R_L = 400\ \Omega$		B 861 D, B 865 D	9.8	−8	V
Voltage gain with open output	A_{Uoff}	B 761 D, B 765 D, B 2761 D, B 2765 D, B 4761 D, B 4765 D B 861 D, B 865 D	70		dB
$U_O = \pm 2$ V, $\pm U_S = 5$ V		B 611 D, B 615 D, B 631 D, B 635 D, B 621 D, B 625 D	65		dB
Driving range of the output voltage $\pm U_S = 5$ V	U_O	B 761 D, B 765 D, B 2761 D, B 2765 D B 4761 D, B 4765 D	4.9	−4	V
		B 861 D, B 865 D	4.8	−4	V
Residual voltage $I_O = 10$ mA	U_{REST}	B 611 D, B 615 D		0.2	V
		B 621 D, B 625 D, B 2761 D, B 2765 D		1.0	V

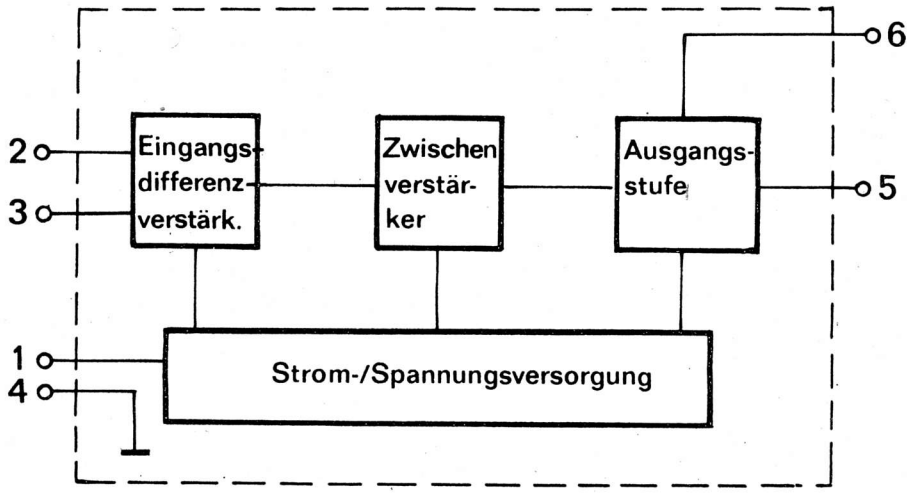
			min.	max.	
Common mode rejection	C_{MR}				
$U_I = \pm$ 7 V, $R_S = 50\ \Omega$	C_{MR}	B 861 D, B 865 D	60[4]		dB
$U_I = \pm$ 10 V, $R_S = 50\ \Omega$		B 761 D, B 765 D	65[3]		dB
$U_I = \pm$ 10 V, $R_S = 50\ \Omega$		B 4761 D, B 4765 D B 611 D, B 621 D B 631 D, B 615 D, B 625 D, B 635 D	60[2]		dB
Operating voltage rejection	SVR	B 2761 D, B 2765 D		100	µA/V
		B 4761 D, B 4765 D other types		200	µA/V
$\Delta U_S = 10$ V (7 V for B 861 D, B 865 D)					
Reserve output current	I_{OR}	B 861 D, B 865 D		100	µA
		other types		10	µA
Current input	I_S	B 861 D, B 865 D, B 611 D, B 615 D	1.5	mA	
$R_L \rightarrow \approx$ without signal		B 2761 D, B 2765 D			
		B 4761 D, B 4765 D		3	mA
		other types		2.5	mA

2) $U_I = \pm$ 13 V
3) $U_I = \pm$ 12 V
4) $U_I = \pm$ 8 V
5) $U_I = \pm$ 10 V
6) $U_I = \pm$ 5 V

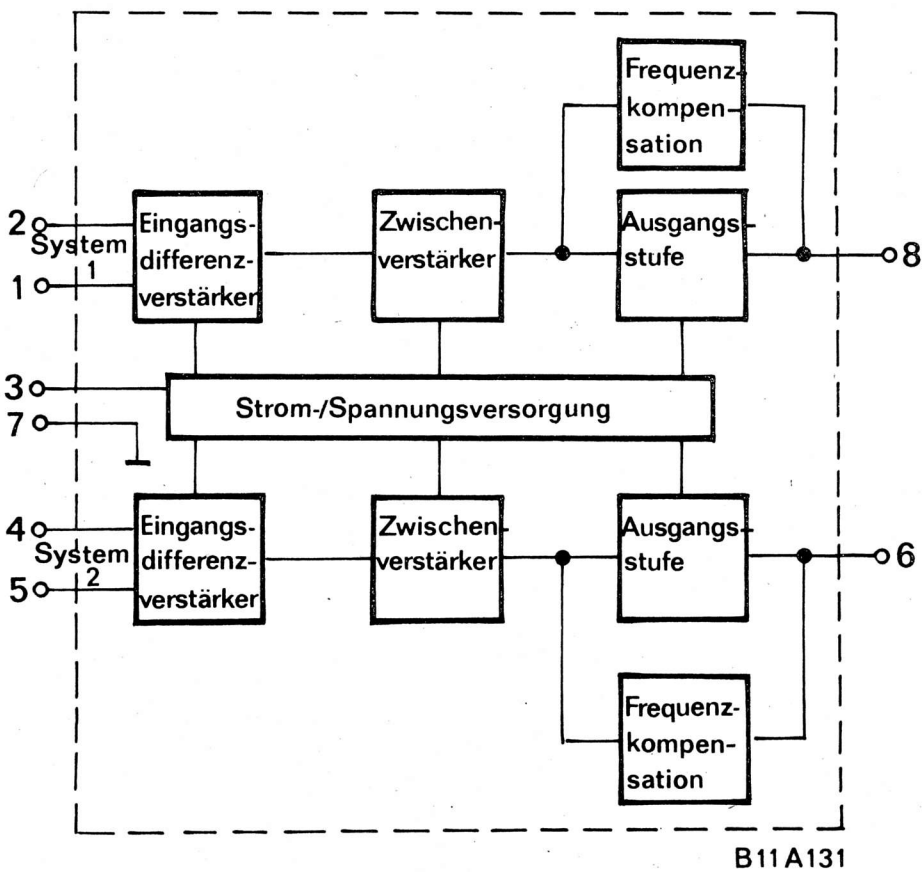
Order designation: Integrated circuit B 625 D according to TGL 38 925.

Block diagrams:

Single operational amplifier



Double operational amplifier

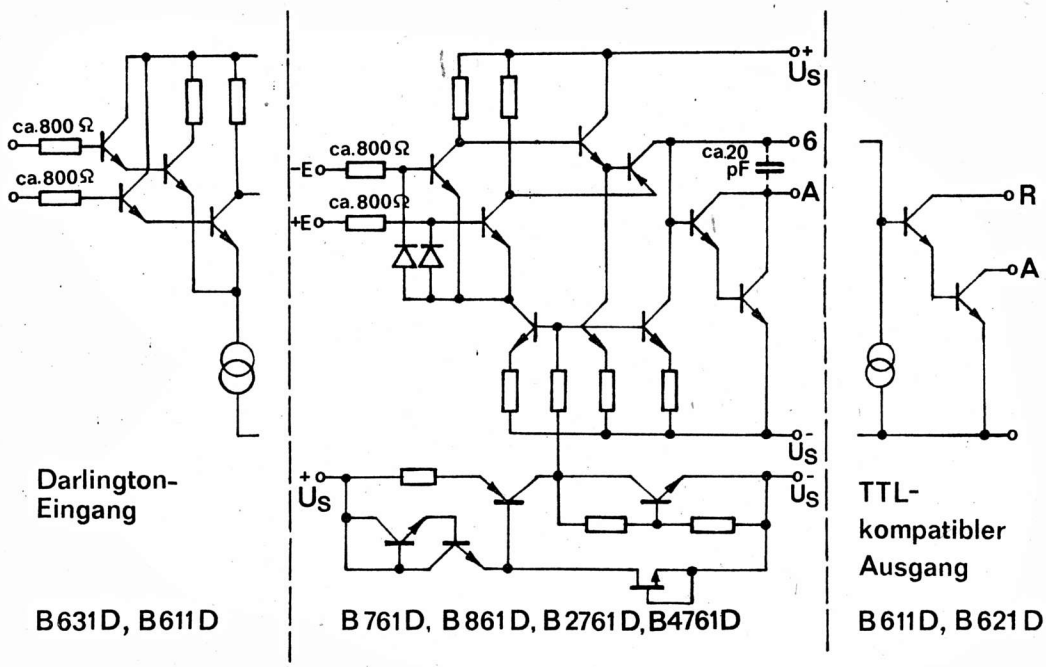


B11A131

Quadruple operational amplifier

Block diagram corresponds to 2-fold double operational amplifier

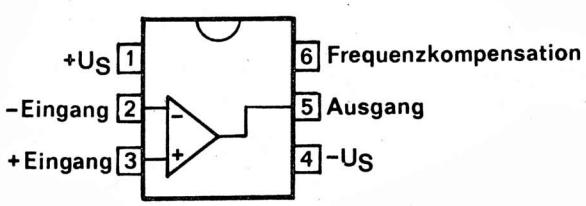
Internal circuits:



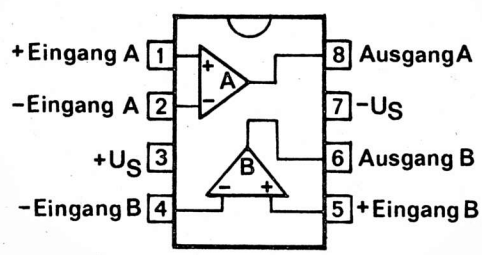
B11A3X1

Connection:

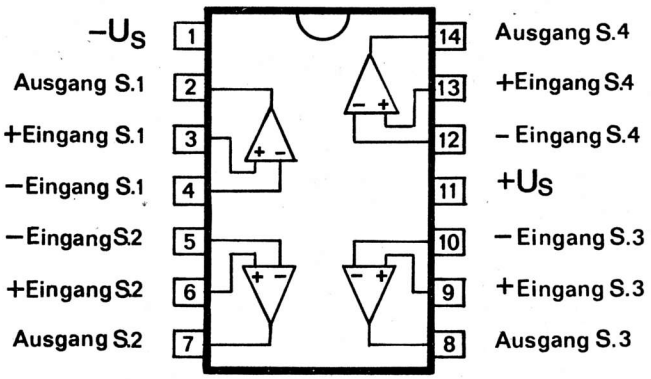
Single operational amplifier



Double operational amplifier



Quadruple operational amplifier



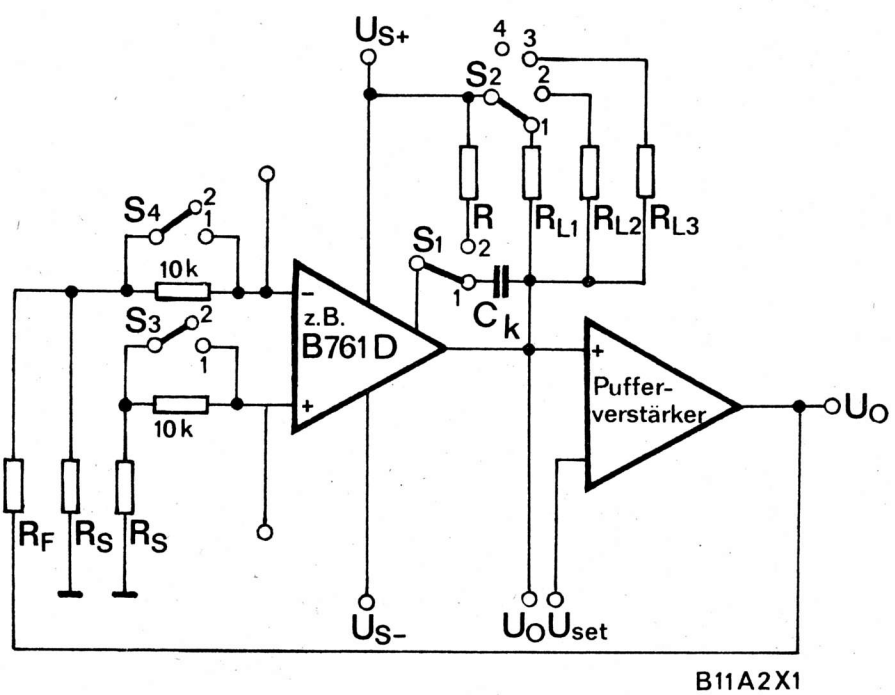
Measuring circuit:

S_1 tor 1 at B 761 D, B 765 D,
B 861 D, B 865 D,
B 631 D, B 635 D
S_1 to 2 at B 611 D, B 615 D,
B 625 D, B 621 D

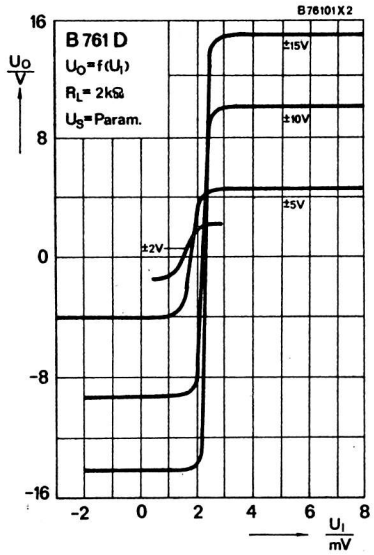
B 2761 D, B 2765 D do not have S_1, R, C_{K1}

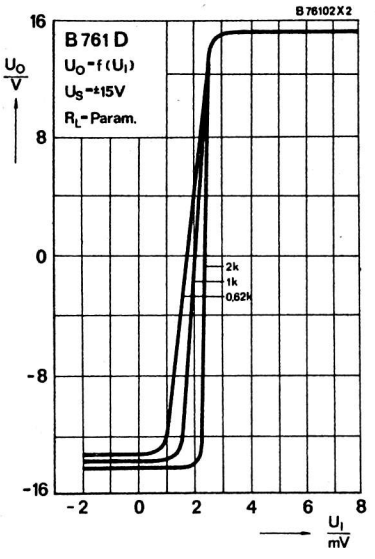
$R_S = 50\ \Omega$
$R_F = 24.95\ k\Omega$
$R1 = R2 = 10\ k\Omega$
$R = 6.8\ k\Omega$
$C_{K1} = 22\ pF$

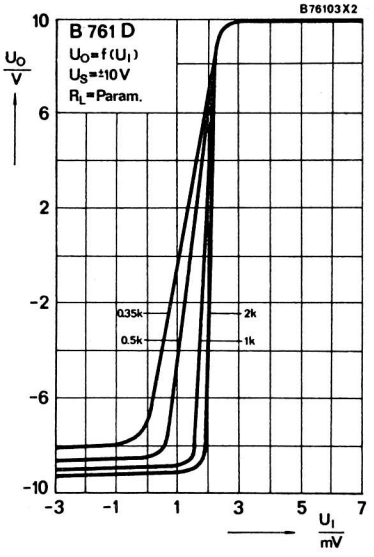
$R_L = 2\ k\Omega$ ou $620\ \Omega$ ou $400\ \Omega$

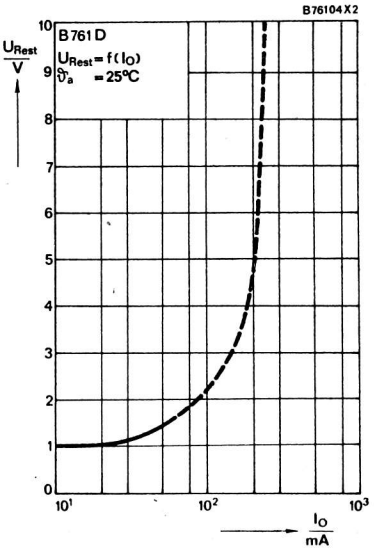


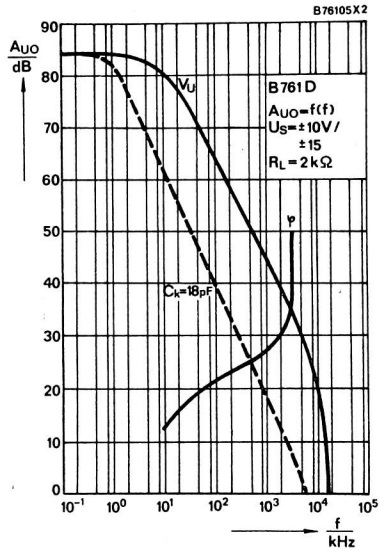
B11A2X1

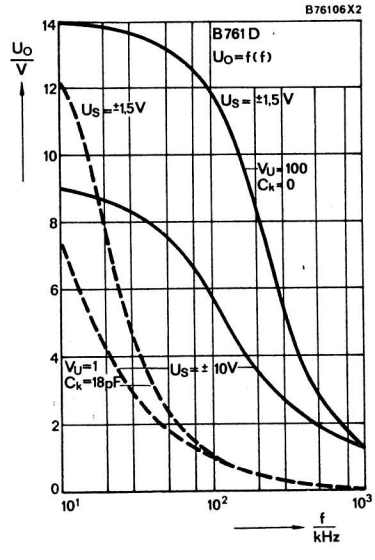

B76101X2
B 761 D
$U_O = f(U_I)$
R_L = 2kΩ
U_S = Param.
±15V
±10V
±5V
±2V
U_O / V
U_I / mV

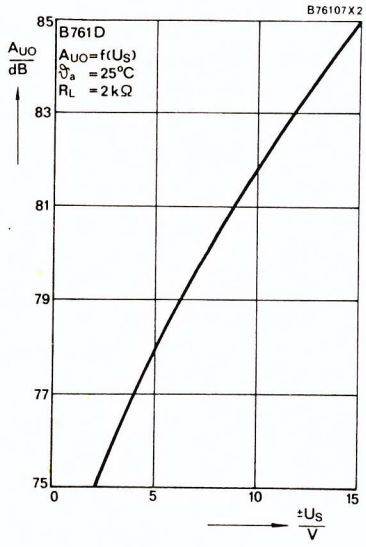

B76102X2
B 761 D
$U_O = f(U_I)$
U_S = ±15V
R_L = Param.
2k
1k
0,62k
U_O / V
U_I / mV

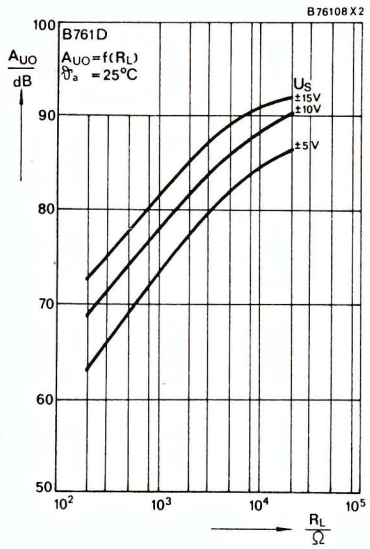

B76103X2
B 761 D
$U_O = f(U_I)$
U_S = ±10V
R_L = Param.
0,35k
0,5k
2k
1k
U_O / V
U_I / mV

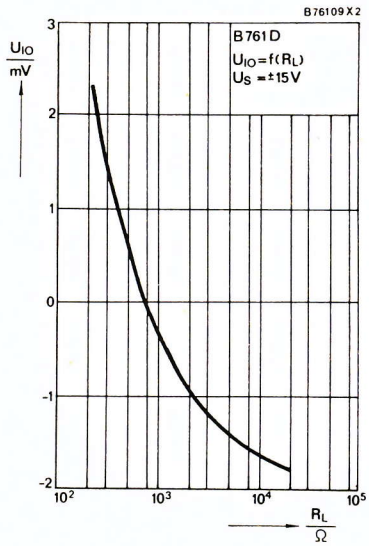

B76104X2
B 761 D
$U_{Rest} = f(I_O)$
ϑ_a = 25°C
U_{Rest} / V
I_O / mA

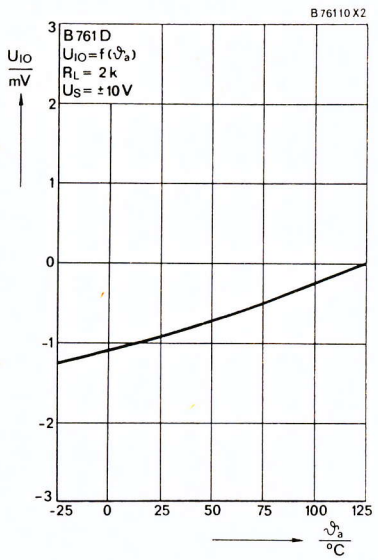

B76105X2
B 761 D
$A_{UO} = f(f)$
U_S = ±10V / ±15
R_L = 2kΩ
V_U
φ
C_k=18pF
A_{UO} / dB
f / kHz


B76106X2
B761D
$U_O = f(f)$
U_S = ±1,5V
U_S = ±1,5 V
V_U = 100
C_k = 0
V_U = 1
C_k = 18pF
U_S = ± 10V
U_O / V
f / kHz









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RFT

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