Operational Amplifiers

TAA 861; A; W
TAA 862
TAA 865; A; W

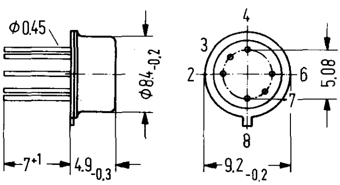
Especially economical and universal operational amplifiers which by their excellent performance qualities are well suited for a wide range of applications, such as automatic controls, automobile electronics, AF-circuits, analog computers etc.
In addition to a high gain, high input resistance, low offset voltage, low temperature- and supply voltage-dependence, the amplifiers feature

- Wide common-mode range,
- Large supply voltage range,
- Large control range,
- High output current,
- Simple frequency compensation,
- Wide temperature range (TAA 862)

Type	Ordering codes	Type	Ordering codes
TAA 861	Q67000-A89	TAA 865	Q67000-A109
TAA 861 A	Q67000-A278	TAA 865 A	Q67000-A279
TAA 861 W	Q67000-A89-S3	TAA 865 W	Q67000-A109-S3
TAA 862	Q67000-A236		

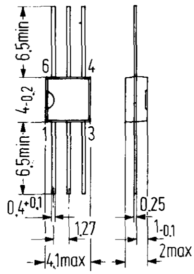
Package outlines

TAA 861, TAA 862, TAA 865



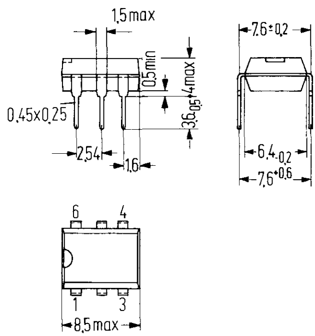
Package 5 H 6 DIN 41873
(similar TO-78)
Weight approx. 1 g

TAA 861 W, TAA 865 W



Miniature plastic
package
6 pins
Weight approx. .1 g
Colour code
TAA 861 W green/green
TAA 865 W blue/blue

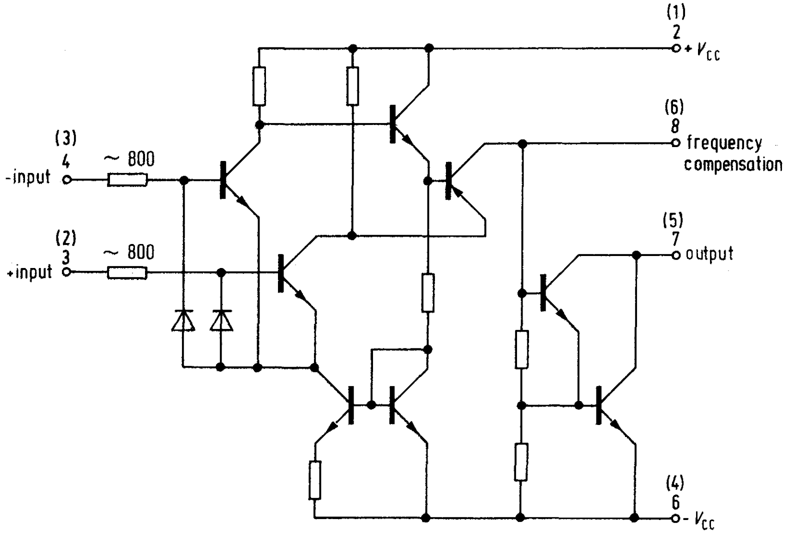
TAA 861 A, TAA 865 A



Plastic plug-in package
6 pins
20 A 6 Din 41866
Weight approx. .7 g

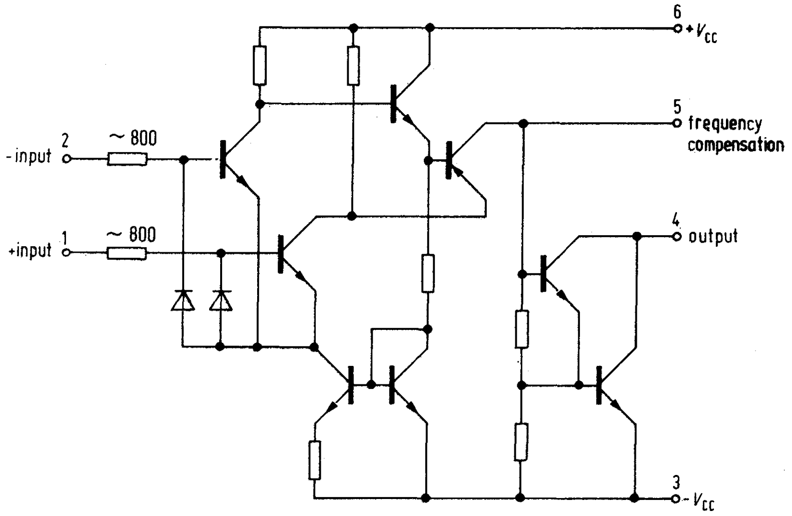
Dimensions in mm

Circuit for TAA 861, TAA 865, TAA 862 and TAA 861 A, TAA 865 A



Numbers in brackets refer to TAA 861A and TAA 865A

Circuit for TAA 861 W, TAA 865 W



Maximum ratings

		TAA 861/TAA 865 TAA 861 A/TAA 865 A TAA 861 W/TAA 865 W TAA 862	
Supply voltage	V_{CC}	±10	V
Output current	I_q	70	mA
Differential input voltage	V_{iD}	$\pm V_{CC}$	
Junction temperature	T_j	150	°C
Storage temperature	T_S	−55 to +125	°C
Thermal resistance:			
System-case (TAA 861, TAA 862, TAA 865)	$R_{thScase}$	80	K/W
System-ambient air (TAA 861/862/865)	R_{thSamb}	190	K/W
System-ambient air (TAA 861 A, TAA 865 A)	R_{thSamb}	140	K/W
System-ambient air (TAA 861 W, TAA 865 W)	R_{thSamb}	200	K/W

Range of operation

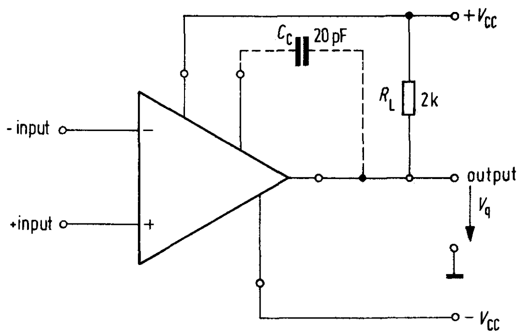
Supply voltage	V_{CC}	±1.5 to ±10	V
Ambient temperature in operation			
TAA 861/A/W	T_{amb}	0 to +70	°C
TAA 865/A/W	T_{amb}	−25 to +85	°C
TAA 862	T_{amb}	−55 to +125	°C

Operating characteristics $V_{CC} = \pm 10$ V		TAA 861/A/W TAA 865/A/W $T_{amb} = 25$ °C			TAA 862 $T_{amb} = 25$ °C			TAA 862 $T_{amb} = -55$ to $+125$ °C		
		min	typ	max	min	typ	max	min	max	
Supply current	I_{CC}		1.0	1.5		1.0	1.5			mA
Input offset voltage ($R_G = 50\ \Omega$)	V_{io}	−10		10	−4		4	−6	6	mV
Input offset current	I_{io}	−300	±80	300	−100	±50	100	−300	300	nA
Input current	I_i		.5	1.0		.3	.7		1.0	μA
Output voltage										
($R_L = 2$ kΩ)	V_{qpp}	9.8		−9	9.9		−9	9.8	−9	V
($R_L = 400\ \Omega$)	V_{qpp}	9.8		−8	9.8		−8	9.8	−7.5	V
($R_L = 2$ kΩ, $f = 100$ kHz)	V_{qpp}		±7			±7				V
Input impedance ($f = 1$ kHz)	Z_i		200			200				kΩ
Output impedance ($f = 1$ kHz)	Z_q		800							Ω
Open-loop voltage gain										
($R_L = 2$ kΩ, $f = 1$ kHz)	G_V	75	80		85	87		80		dB
($R_L = 10$ kΩ, $f = 1$ kHz)	G_V		90			90				dB
($R_L = 2$ kΩ, $f = 1$ MHz)	G_V		43			43				dB
Input common-mode range ($R_L = 2$ kΩ)	V_{icM}	8	±9	−8	8	±9	−8			V
Common mode rejection ratio ($R_L = 2$ kΩ)	$CMRR$	60	74		70	81				dB
Sensitivity to supply voltage variations ($G_V = 100$)	$\frac{\Delta V_{io}}{\Delta V_{CC}}$	25	200		25	200				μV/V
Temperature-coeffizient of V_{io} ($R_G = 50\ \Omega$, $T_{amb} = 0$ to 70 °C)	α_{Vio}		6			6	25			μV/K
Temperature-coefficient of I_{io} ($R_G = 50\ \Omega$, $T_{amb} = 0$ to 70 °C)	$\alpha_{I\ io}$		.3			.3	1.5			nA/K
Rise time of V_q for non-inverting operation (test circuit 1, TAA 861)	$\frac{dV_q}{d_{tr}}$		9			9				V/μs
Rise time of V_q for inverting operation (test circuit 2, TAA 861)	$\frac{dV_q}{d_{tr}}$		18			18				V/μs

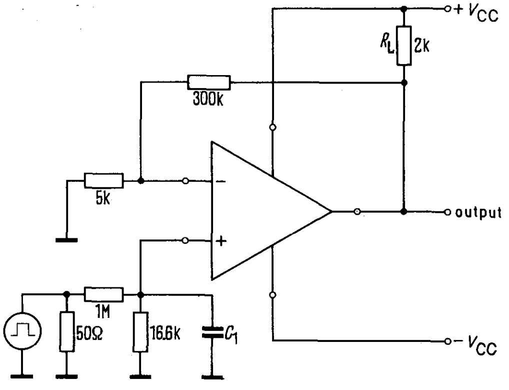
Operating characteristics		**TAA 861/A/W TAA 865/A/W** T_{amb} = 25 °C			**TAA 862** T_{amb} = 25 °C			
V_{CC} = ±10 V		min	typ	max	min	typ	max	
Output leakage current	I_{qlk}		10	100		1	10	µA
Noise voltage (to spec. DIN 45405 measured at input R_S = 2.5 kΩ)	V_N		3			3		µV
V_{CC} = ±5 V								
Supply current	I_{CC}		.7			.7		mA
Input offset voltage	V_{io}	−10		10	−4		4	mV
Input offset current	I_{io}	−300		300	−70		70	nA
Input current	I_i			1.0			.6	µA
Output voltage (R_L = 2 kΩ)	V_{qpp}	4.8		−4	4.9		−4	V
(T_{amb} = −55 to +125 °C)	V_{qpp}				4.8		−4	V
Open-loop voltage gain (R_L = 2 kΩ, f = 1 kHz)	G_V	70			70			dB

Connection diagram

C_C = output frequency compensation; R_L = load resistor

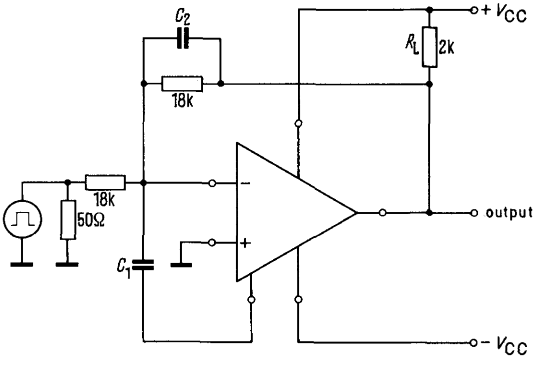


1. Test circuit for rise time of V_q (non-inverting operation)



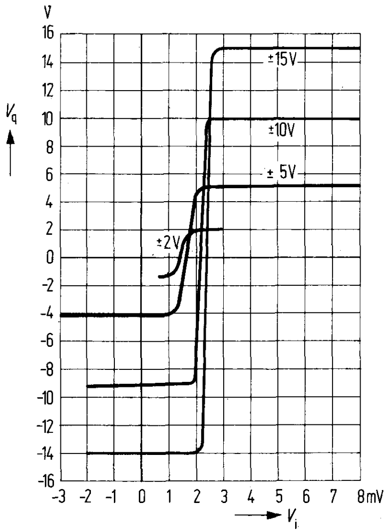
$C_1 \approx$ 22 pF for min overshoot

2. Test circuit for rise time of V_q (inverting operation)

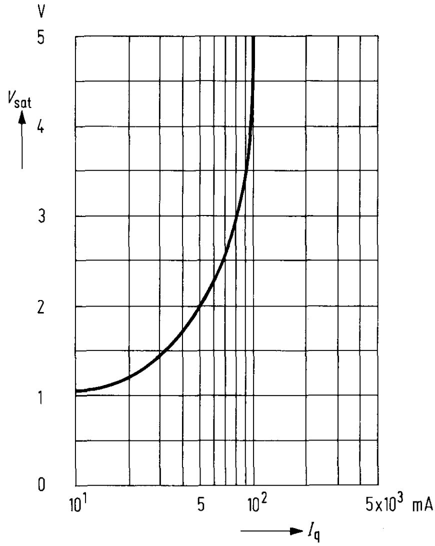


C_2 is for a frequency dependent compensation of the reduction of rise times
C_1 3.9 pF for min overshoot

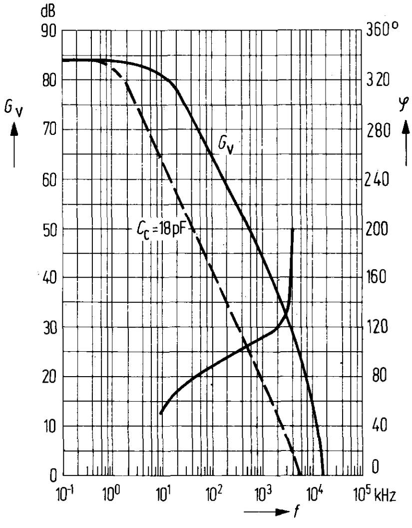
Transfer characteristic $V_q = f(V_i)$
V_{CC} = parameter, R_L = 2 kΩ



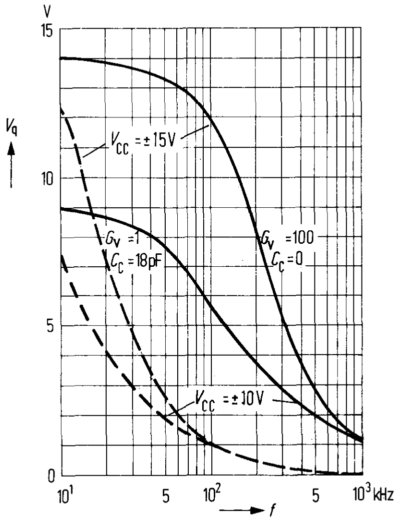
Saturation voltage $V_R = f(I_q)$
T_{amb} = 25 °C



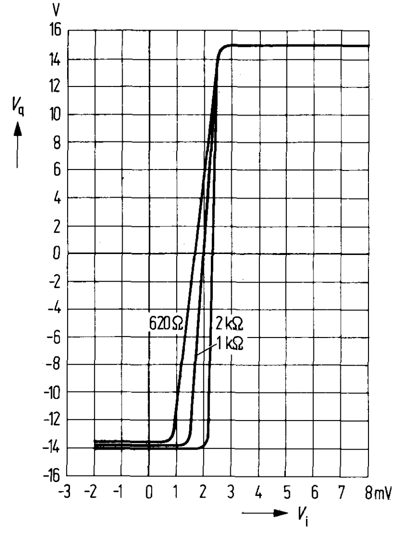
Open-loop voltage gain and phase
$G_V = f(f)$; $\varphi = f(f)$; $V_{CC} = \pm 10$ V/± 15 V



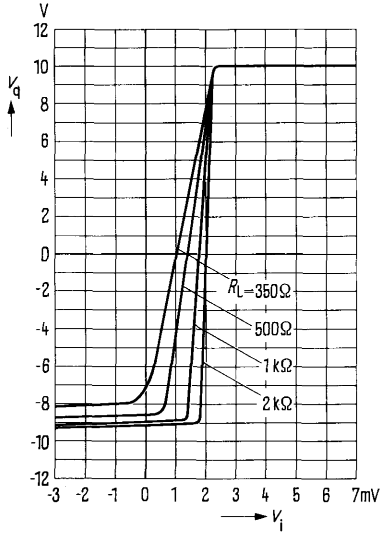
Frequency dependance of large signal modulation $V_q = f(f)$



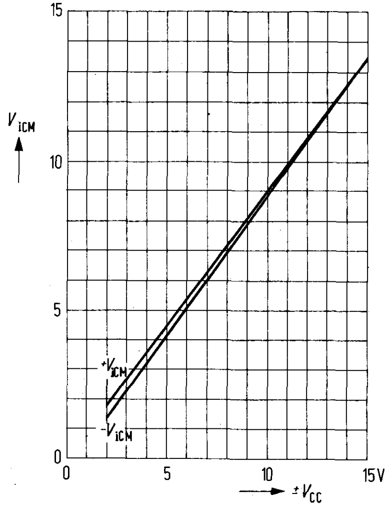
Transfer characteristic $V_q = (V_i)$
$V_{RR} = \pm 15$ V, R_c = parameter



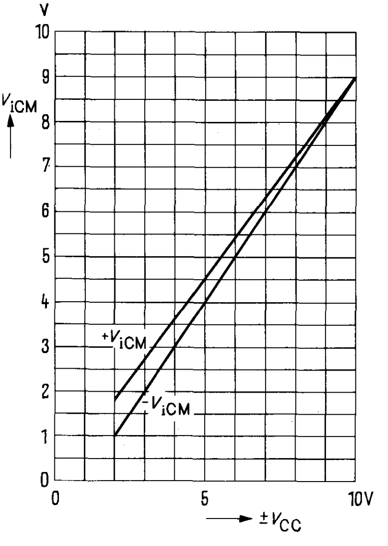
Transfer characteristic $V_q = f(V_i)$
$V_{CC} = \pm 15$ V, R_c = parameter



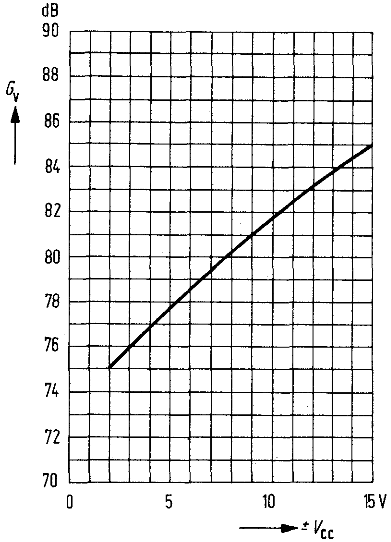
Common mode range $V_{iCM} = f(V_{CC})$



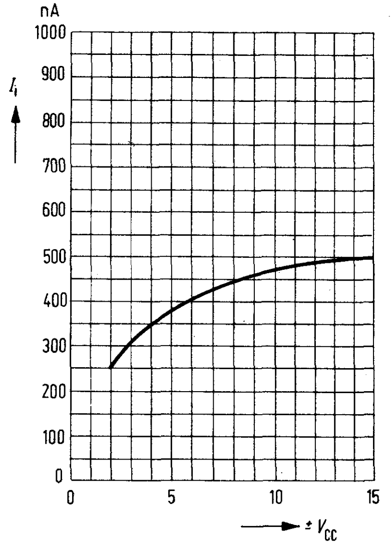
Common mode range $V_{iCM} = f(V_{CC})$



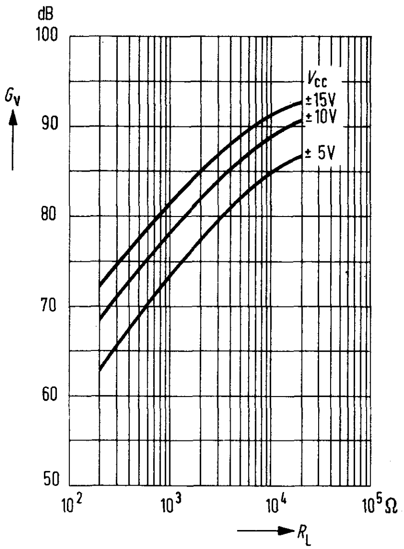
Open-loop voltage gain
$G_V = f(V_{CC})$; $T_{amb} = 25\ °C$
$R_L = 2\ k\Omega$



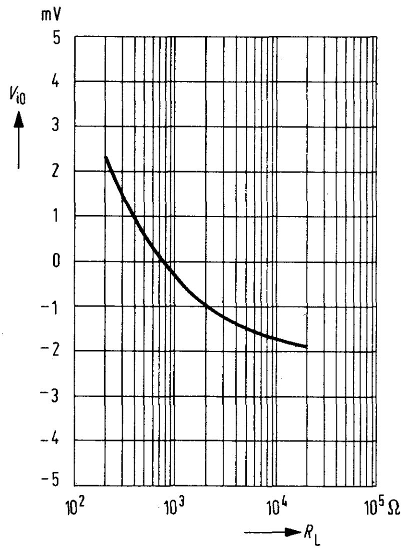
Input current
$I_I = f(V_{CC})$



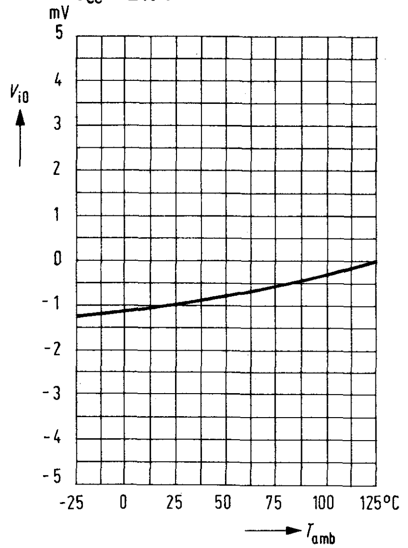
Open-loop voltage gain
$G_V = f(R_L)$; $T_{amb} = 25\ °C$



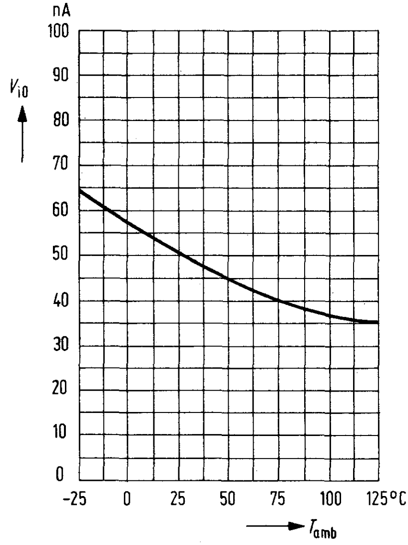
Input offset voltage
$V_{IO} = f(R_L)$; $V_{CC} = \pm 15\ V$



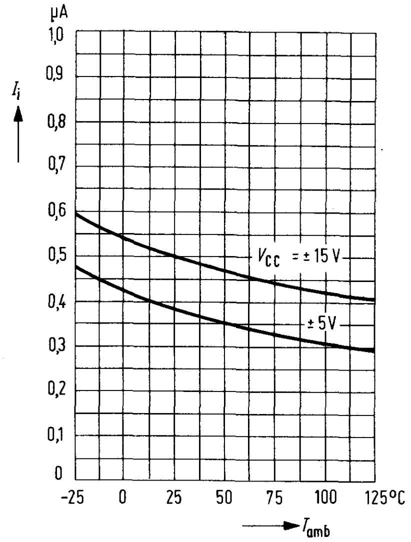
Input offset voltage
$V_{io} = f(T_{amb})$; $R_L = 2\ k\Omega$
$V_{CC} = \pm 10\ V$



Input offset current
$V_{IO} = f(T_{amb})$; $R_L = 2\ k\Omega$
$V_{CC} = \pm 10\ V$



Input current
$I_i = f(T_{amb})$; $R_L = 2\ k\Omega$



Open-loop voltage gain
$G_V = f(T_{amb})$; $R_L = 2\ k\Omega$; $f = 1\ kHz$