Monolithisch Integrierte Schaltung
Monolithic Integrated Circuit

Anwendung: NF-Leistungsverstärker
Application: *Audio power amplifier*

Besondere Merkmale:

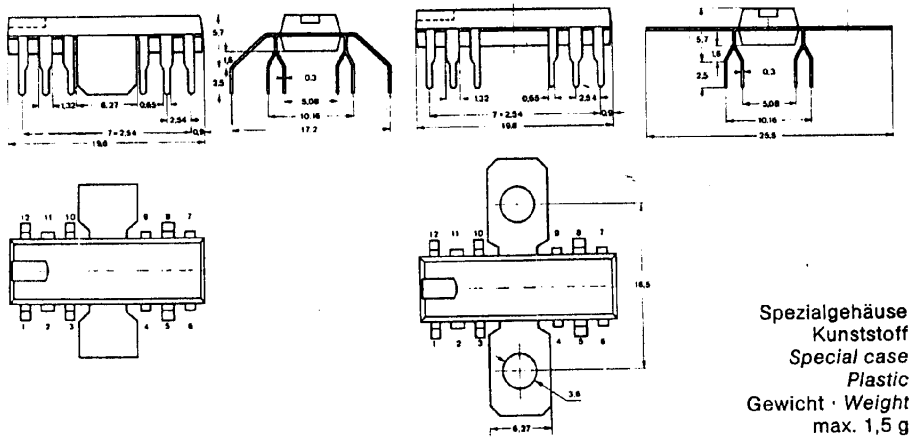
- Thermische Abschaltung
- Hoher Ausgangsstrom bis 2,5 A
- Großer Versorgungsspannungsbereich, 4 bis 20 V
- Hohe Ausgangsleistung, 7 W
- Kleine Übernahmeverzerrungen
- Kleiner Klirrfaktor
- Sehr guter Wirkungsgrad, 70%

Features:

- *Thermal shut-down*
- *High output current, up to 2.5 A*
- *Wide range of supply voltage, 4 to 20 V*
- *High output power 7 W*
- *Low harmonic distortion*
- *Low cross overdistortion*
- *Very high efficiency 70%*

Vorläufige technische Daten · *Preliminary specifications*

Abmessungen in mm
Dimensions in mm



TBA 810 S

TBA 810 AS

Spezialgehäuse
Kunststoff
Special case
Plastic
Gewicht · *Weight*
max. 1,5 g

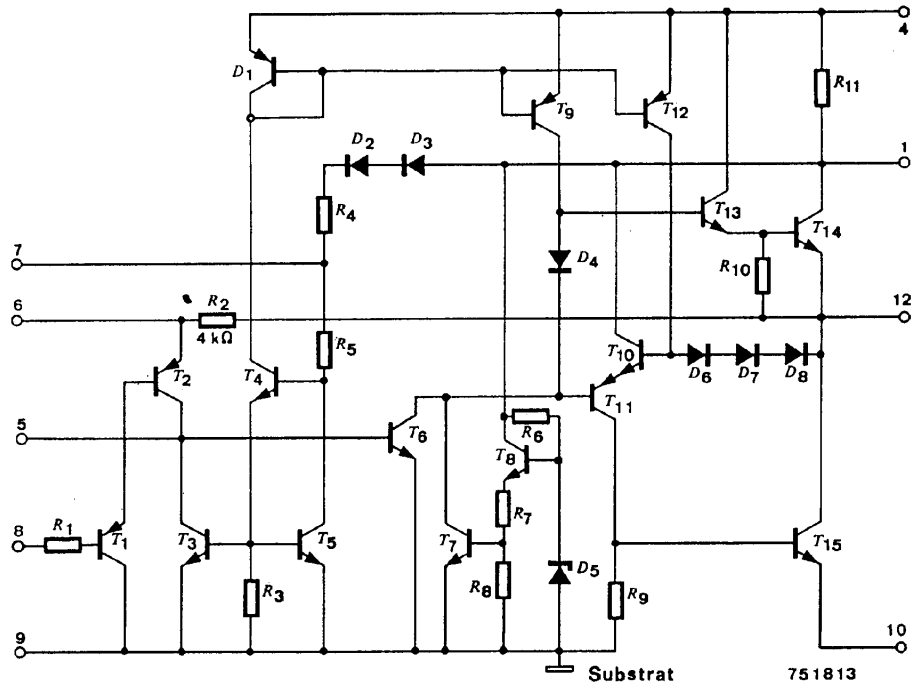
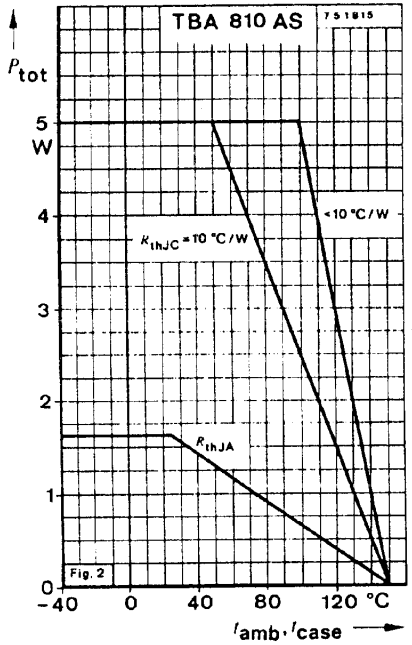


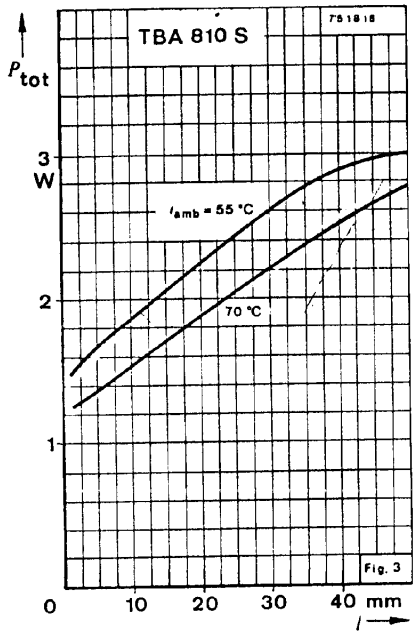
Fig. 1 Schaltung und Anschlußbelegung
Diagram and pin connections

Absolute Grenzdaten
Absolute maximum ratings

Bezugspunkt Pin 9, Pin 10
Reference point

Versorgungsspannung *Supply voltage*	Pin 1	U_S	20	V
Ausgangsstoßstrom *Surge output current*	Pin 12	I_{QS}	3,5	A
Ausgangsspitzenstrom *Peak output current (repetitive)*	Pin 12	I_{QM}	2,5	A
Verlustleistung *Power dissipation*	Fig. 2, 3, 4, 5, 6			
t_{amb} = 80 °C	**TBA 810 S**	P_{tot}	1	W
t_{case} = 100 °C	**TBA 810 AS**	P_{tot}	5	W
Sperrschichttemperatur *Junction temperature*		t_j	+150	°C
Lagerungstemperaturbereich *Storage temperature range*		t_{stg}	−40 ... +150	°C





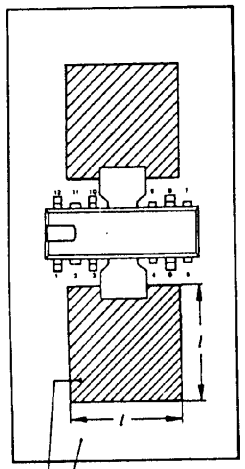


Fig. 4

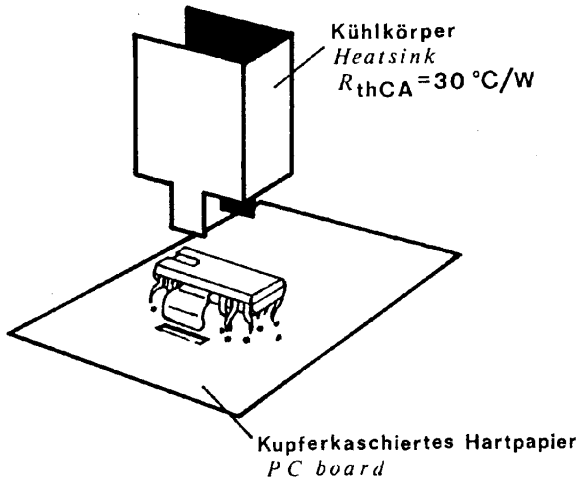


Fig. 5

				Min.	Typ.	Max.	
Wärmewiderstände *Thermal resistances*							
Sperrschicht-Umgebung *Junction ambient*		**TBA 810 S**	R_{thJA}			70	°C/W
		TBA 810 AS	R_{thJA}			80	°C/W
Sperrschicht-Gehäuse *Junction case*	Fig. 3, 4, 5 Fig. 2	**TBA 810 S**	R_{thJC} [1])			12	°C/W
		TBA 810 AS	R_{thJC} [1])			10	°C/W

Elektrische Kenngrößen *Electrical characteristics*

t_{amb} = 25 °C, R_f = 56 Ω, Bezugspunkt: *Reference point:* Pin 9, Pin 10 falls nicht anders angegeben *unless otherwise specified*

				Min.	Typ.	Max.	
Versorgungsspannung *Supply voltage*		Pin 1	U_S	4		20	V
Mittenspannung *Quiescent output voltage* U_S = 14,4 V	Fig. 13	Pin 12	U_{QB}	6,4	7,2	8	V
Ruhestrom der Gesamtschaltung *Quiescent drain current* U_S = 14,4 V	Fig. 12	Pin 1	I_{SB}		12	20	mA
Gesamtstromaufnahme *Total supply current* P_q = 6 W, U_S = 14,4 V, R_L = 4 Ω		Pin 1	$I_{S\,tot}$		600		mA
Thermische Abschalttemperatur *Thermal shut-down temperature* P_{tot} = 2,8 W	Fig. 11		t_{case}		120		°C
Brummunterdrückung *Supply voltage rejection ratio* U_S = 14,4 V, R_L = 4 Ω, f_{Br} = 100 Hz	Fig. 14, 15		k_{SVR}		48		dB
Eingangsstrom *Input current* U_S = 14,4 V		Pin 8	I_{IB}		0,4	4	µA
Ausgangsleistung *Output power*	Fig. 6, 8, 9, 10, 11						
R_L = 4 Ω, f = 1 kHz, k = 10%			U_S = 16,0 V P_q		7		W
			U_S = 14,4 V P_q	4,6	6		W
			U_S = 9,0 V P_q		2,5		W
			U_S = 6,0 V P_q		1		W
Eingangsspannung *Input voltage*		Pin 8	U_i			220	mV
Eingangsspannung *Input voltage* U_S = 14,4 V, P_q = 6 W, f = 1 kHz, R_L = 4 Ω,	Fig. 18	Pin 8	R_f = 56 Ω U_i		80		mV
			R_f = 22 Ω U_i		35		mV

[1]) mit Kühlfläche R_{thCA} = 10 °C/W *with cooling plate*

			Min.	Typ.	Max.	
Eingangswiderstand *Input resistance*	Pin 8	R_i		5		MΩ
Bandbreite (−3 dB) Fig. 16 *Band width* U_S = 14,4 V, R_L = 4 Ω, C_3 = 820 pF		B		40 ... 20000		Hz
C_3 = 1500 pF		B		40 ... 10000		Hz
Klirrfaktor Fig. 6, 19, 20 *Distortion* U_S = 14,4 V, R_L = 4 Ω, f = 1 kHz, P_q = 50 mW bis/*to* 3 W		k		0,3		%
Spannungsverstärkungen *Voltage amplifications* U_S = 14,4 V, R_L = 4 Ω, f = 1 kHz						
Leerlauf *Open loop*		A_{ug}		80		dB
mit Gegenkopplung Fig. 17 *closed loop*		A_{uf}	34	37	40	dB
Eingangsrauschspannung *Input noise voltage* U_S = 14,4 V, B = 20 ... 20000 Hz	Pin 8	U_{ni}		2		μV
Eingangsrauschstrom *Input noise current* U_S = 14,4 V, B = 20 ... 20000 Hz	Pin 8	I_{ni}		0,1		nA
Wirkungsgrad Fig. 6, 9 *Efficiency* P_q = 5 W, U_S = 14,4 V, R_L = 4 Ω, f = 1 kHz		η		70		%

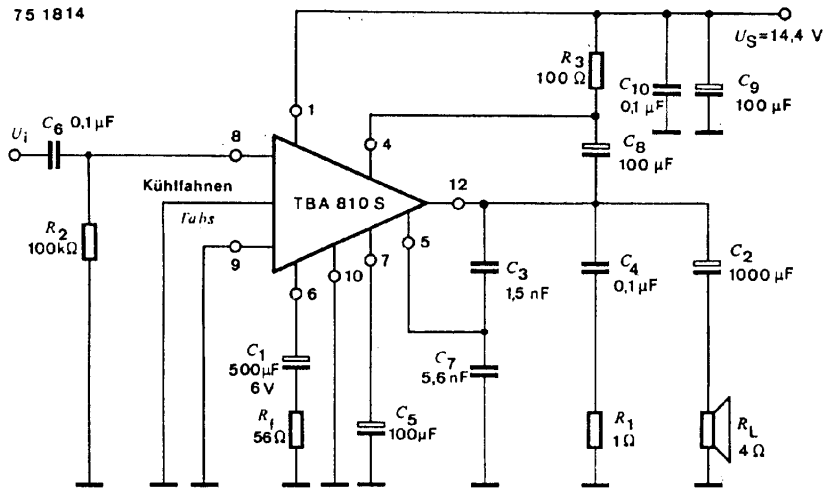
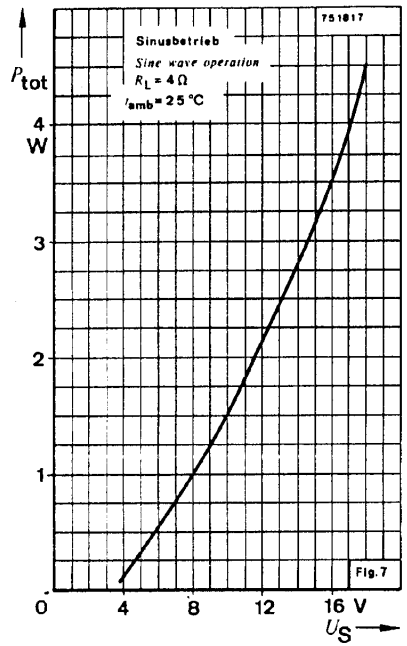
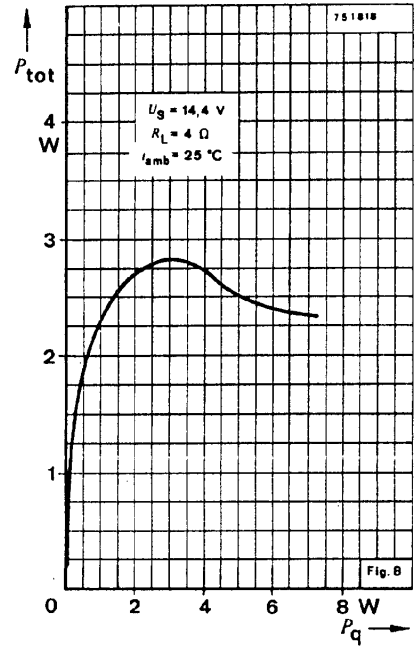
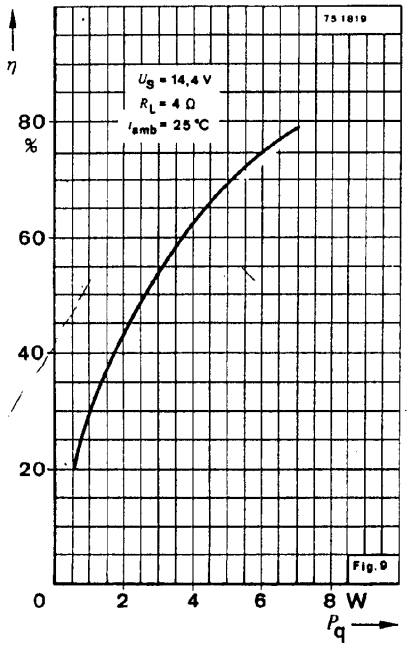
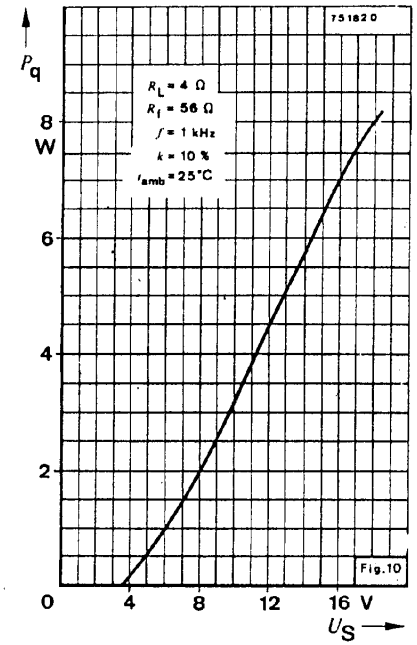


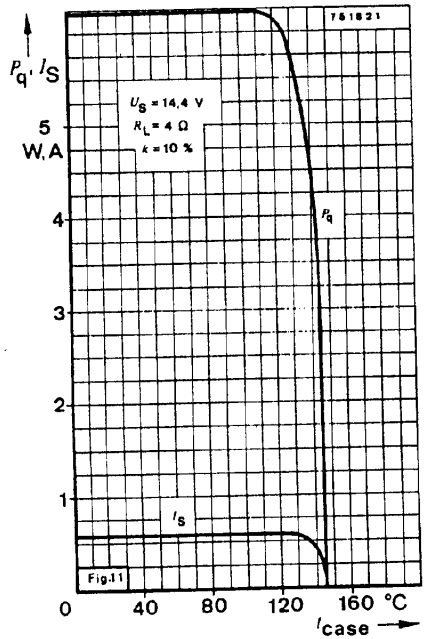
Fig. 6 Meßschaltung für: P_q, P_{tot}, k, η und Anwendungsbeispiel
Test circuit for: *and application note*

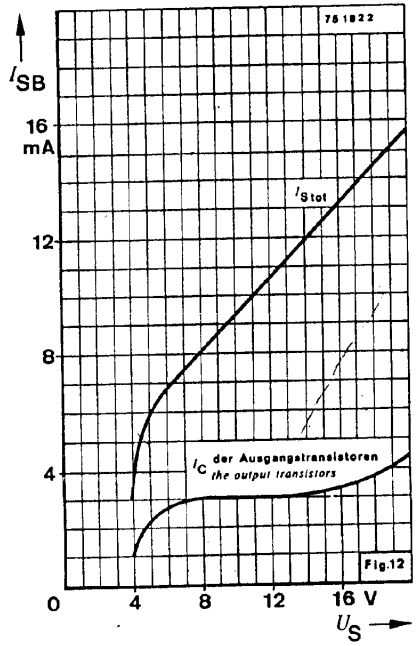












Thermisches Abschalten:

Die eingebaute thermische Begrenzerschaltung ergibt folgende Vorteile:

1. Eine dauernde Überlastung des Ausganges oder eine Erhöhung der zulässigen oberen Umgebungstemperatur kann einfach verhindert werden.

2. Die Kühlung kann gegenüber konventionellen Schaltungen mit einem kleineren Sicherheitsfaktor ausgelegt werden. Bei einer thermischen Überlastung wird der Schaltkreis nicht infolge einer zu hohen Sperrschichttemperatur zerstört, denn es wird ausschließlich P_Q (und somit P_{tot}) und I_S reduziert (siehe Fig. 11).

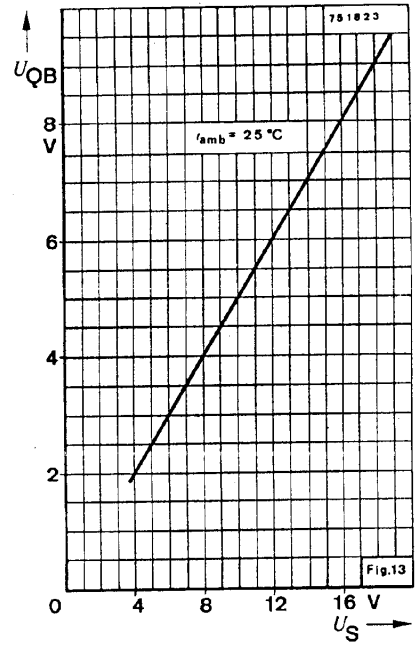
Thermal shut-down

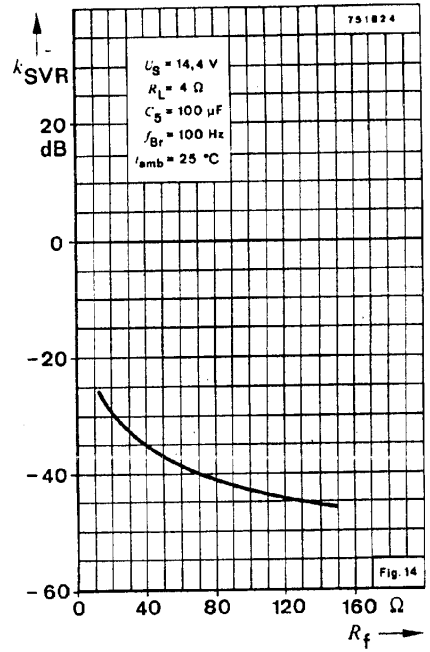
The presence of a thermal limiting circuit offers the following advantages:

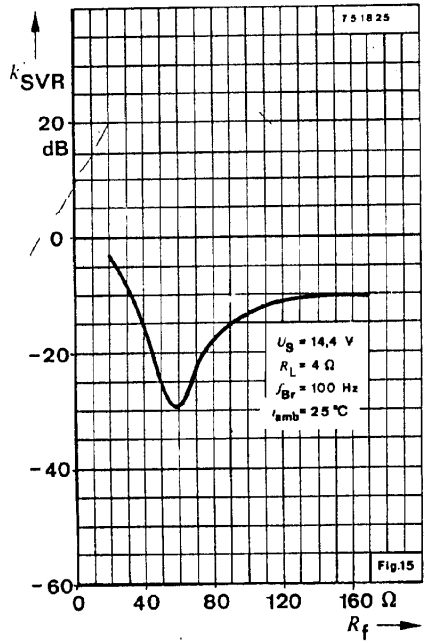
1. *An overload on the output (even if it is permanent), or an above-limit ambient temperature can be easily supported.*

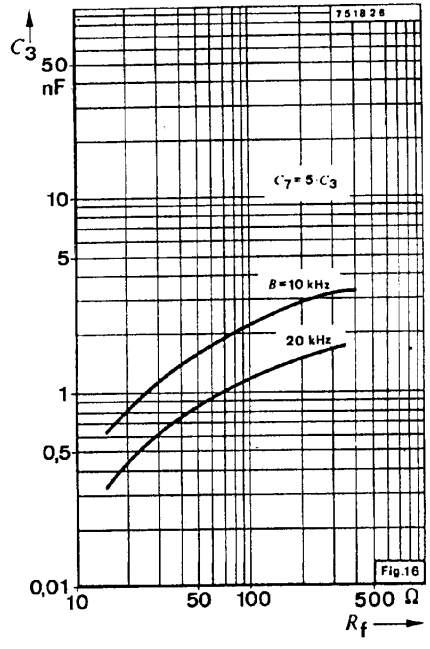
2. *The heat sink can have a smaller factor of safety compared with that of a conventional circuit. There is no device damage in the case of too high a junction temperature: all that happens is that P_Q (and therefor P_{tot}) and I_S are reduced (fig. 11).*

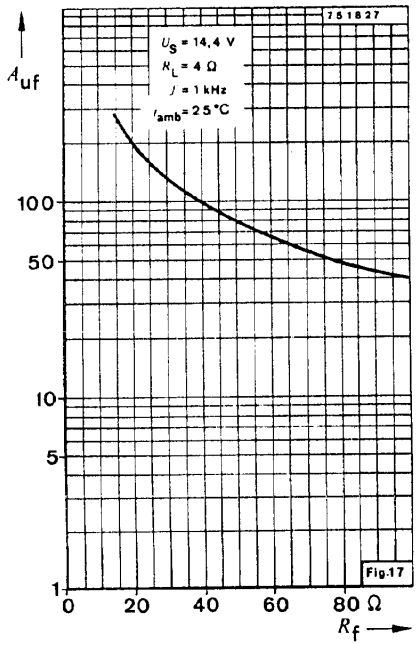
TBA 810 S · TBA 810 AS

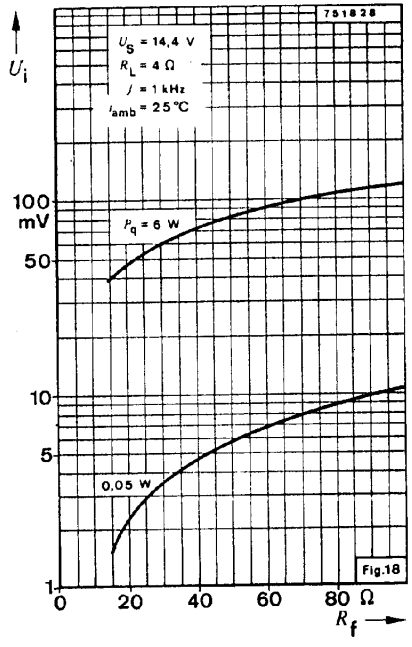


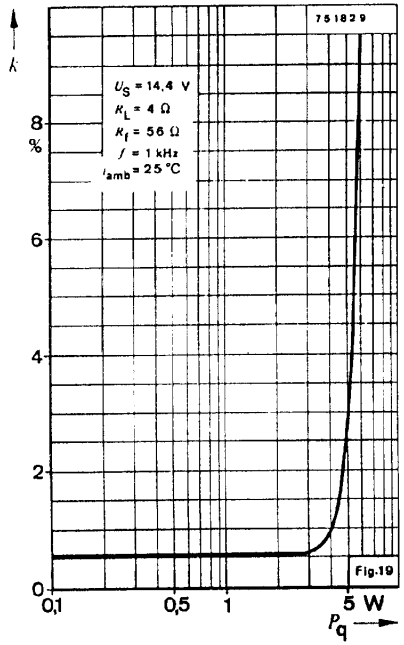


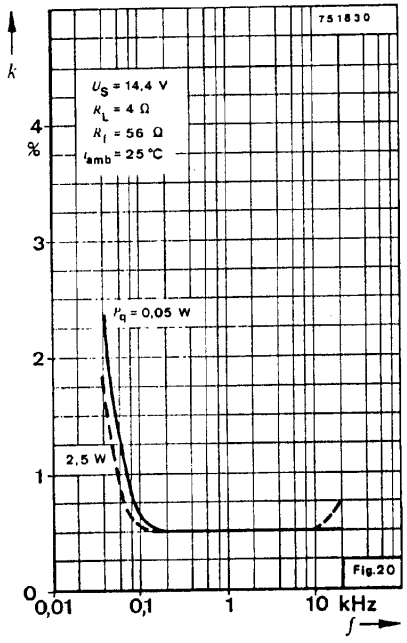












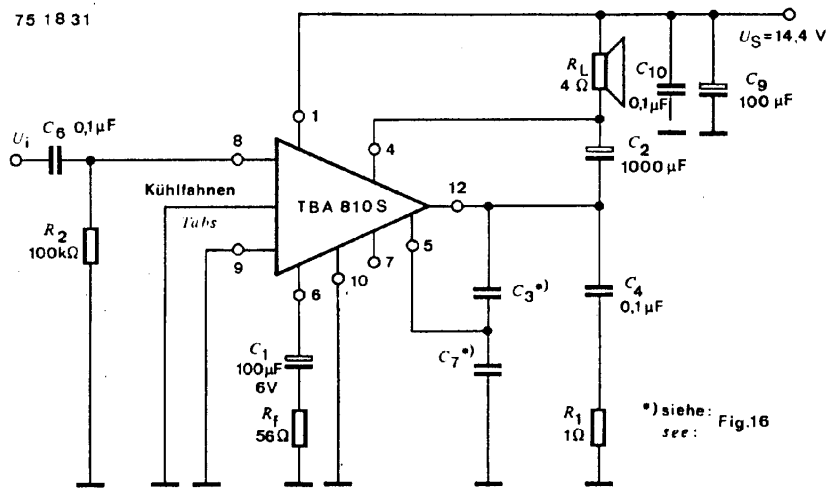


Fig. 21 Schaltungsbeispiel mit hochliegendem R_L
Circuit example with load connected to supply voltage