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TDA1083

One Chip AM/FM Radio with Audio Power Amplifier

Description

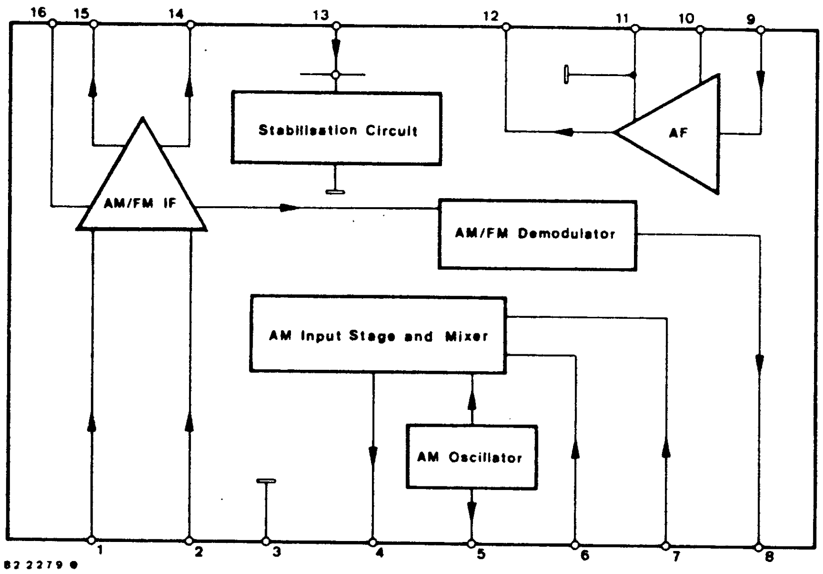
The integrated circuit TDA1083 includes, with exception of the FM front end, a complete AM-/FM-radio-circuit with audio power amplifier. An internal Z-diode stabilizes the supply voltage at $V_S \approx 13$ V, which allows with the aid of a resistor and a rectifier, the circuit to be driven by a higher external supply voltage.

Features

- Large supply voltage range $V_S = 3$ to 12 V
- High AM-Sensitivity
- Limiting threshold voltage $V_i = 50$ µV
- Audio output power $P_0 = 0.7$ W
- AFC-connection for VHF-tuner
- AM-FM switching without high frequency voltages

Applications

- AM-/FM- and audio-amplifier



1 IF-Decoupling
2 IF-Input
3 HF-Ground
4 AM-Mixer output
5 AM-Oscillator circuit
6 AM-Input
7 AM-Decoupling
8 Demodulator-Output
9 Audio-Input
10 Audio-Feedback
11 Audio-Ground
12 Audio-Output
13 + V_S
14 Demodulator circuit
15 Demodulator circuit
16 AGC/AFC-Voltage

Figure 1. Block diagram and pin connections

Absolute Maximum Ratings

Reference points Pin 3 and 11, unless otherwise specified

Parameters		Symbol	Value	Unit
Supply voltage range	Pin 13	V_s	3 to 12	V
Supply current when using the integrated stabilization circuit, $V_S = 12.5$ to 14.3 V	Pin 13	I_S	50	mA
Power dissipation	$T_{amb} = 65°C$	P_{tot}	600	mW
Junction temperature		T_j	125	°C
Storage temperature range		T_{stg}	–25 to +125	°C

Thermal Resistance

Parameters	Symbol	Maximum	Unit
Junction ambient	R_{thJA}	100	K/W

Electrical Characteristics

V_S = 9 V, reference points Pin 3 and 11, T_{amb} = 25°C, unless otherwise specified

Parameters	Test Conditions / Pin	Symbol	Min	Typ	Max	Unit
AF amplifier						
AF voltage amplification	f = 1 kHz	G_v		40		dB
Input impedance		R_i		150		kΩ
Output power	Figures 4 and 5 V_S = 5.5 V, R_L = 8 Ω, k = 10%	P_o	300			mW
AM-IF amplifier, f_i = 1 MHz, f_{IF} = 455 kHz, f_{mod} = 1 kHz, m = 0.3						
DC voltages at AM mode without signal	V_S = 3 V Pin 10	V_{10}		1.2		V
	Pin 12	V_{12}	1.0		1.4	V
	Pin 13	V_{13}	3.0	3.0	3.0	V
	Pin 16	V_{16}	1.25		2.0	V
	I_S = 42 mA Pin 10	V_{10}		1.2		V
	(V_S = 12.5 to14.3 V)				7.2	V
	Pin 12	V_{12}	5.9			
	Pin 13	V_{13}	12.5	13.3	14.3	V
	Pin 16	V_{16}	1.5		2.0	V
Regulation range	V_{oAF}/V_{oAF} = –10 dB Pin 6	ΔV_i		70		dB
AF voltage at demodulator output	Pin 8	V_{oAF}		100		mV
FM-IF amplifier, f_{IF} = 10.7 MHz, Δf = ± 22.5 kHz, f_{mod} = 1 kHz						
DC voltages at FM mode without signal	V_S = 3 V Pin 10	V_{10}		1.2		V
	Pin 12	V_{12}	1.0		1.4	V
	Pin 13	V_{13}	3.0	3.0	3.0	V
	Pin 16	V_{16}	1.8		2.8	V
	I_S = 42 mA Pin 10	V_{10}		1.2		V
	(V_S = 12.5 to 14.3 V)				7.2	V
	Pin 12	V_{12}	5.9			
	Pin 13	V_{13}	12.5	13.3	14.3	V
	Pin 16	V_{16}	2.0		3.1	V
Limiting threshold (–3 dB)	Pin 2	V_i		50		µV
AF voltage at demodulator output	Pin 8	V_{oAF}		100		mV

Different dc voltages are developed at Pin 16 due to gain spread of AM-IF-amplifier. To determine the value of parallel resistance R_8, at the output of the demodulator Pin 8 for V_S = 9 V, AM mode without signal, dc voltage should be selected at Pin 16.

Table 1. Available in following voltage groups:

V_{16}	1.4 to 1.7 V	1.7 to 1.9 V	1.9 to 2.1 V
R_8	∞	47 kΩ	33 kΩ
Group	1	2	3

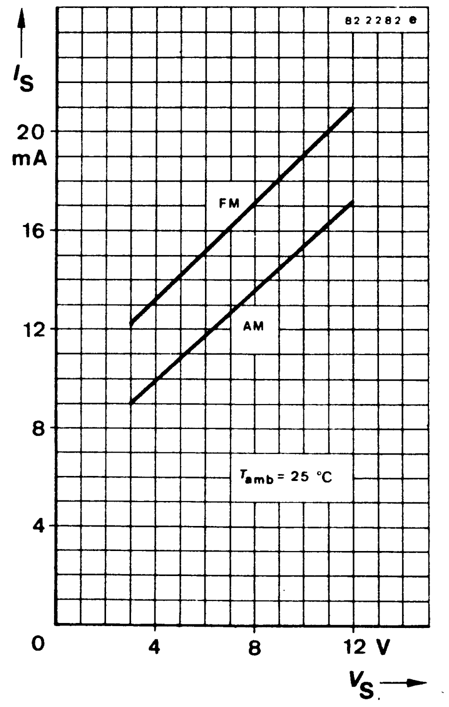


Figure 2.

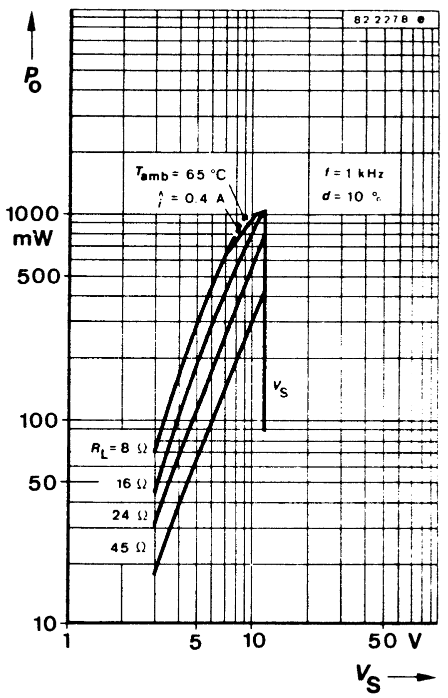


Figure 3.

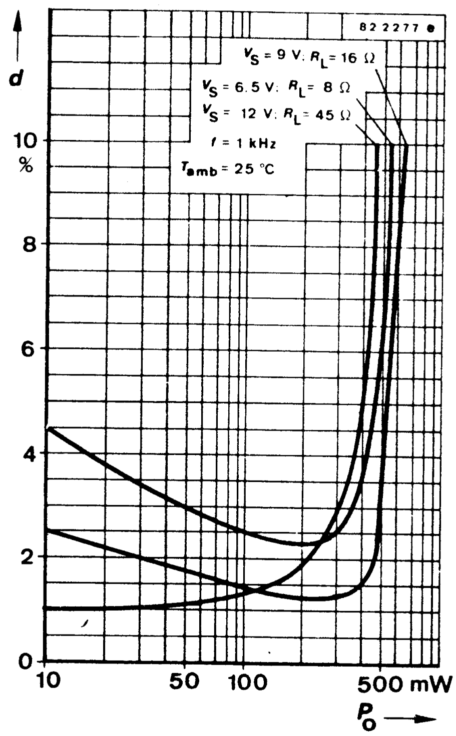


Figure 4.

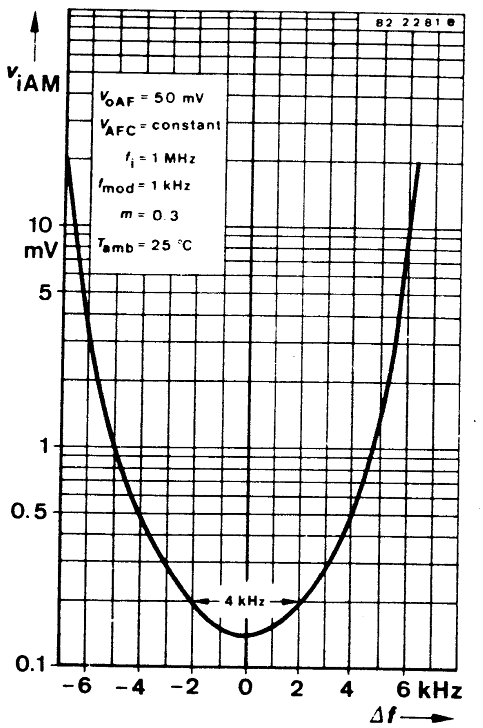


Figure 5.

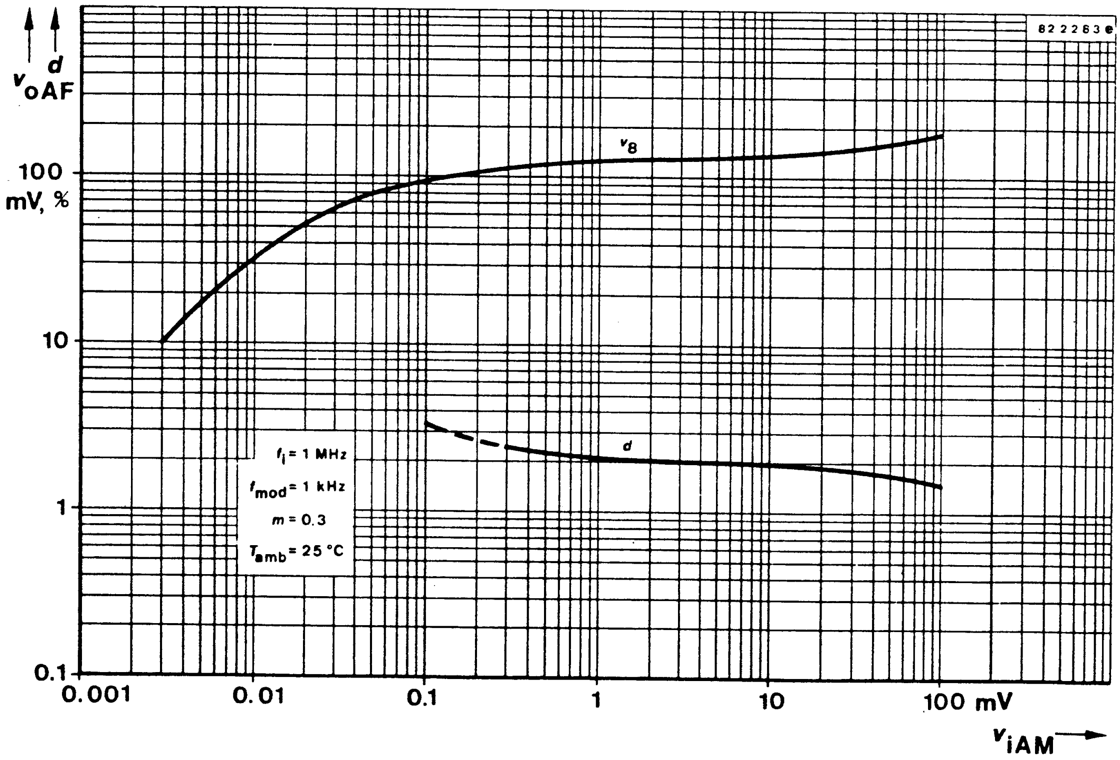


Figure 6.

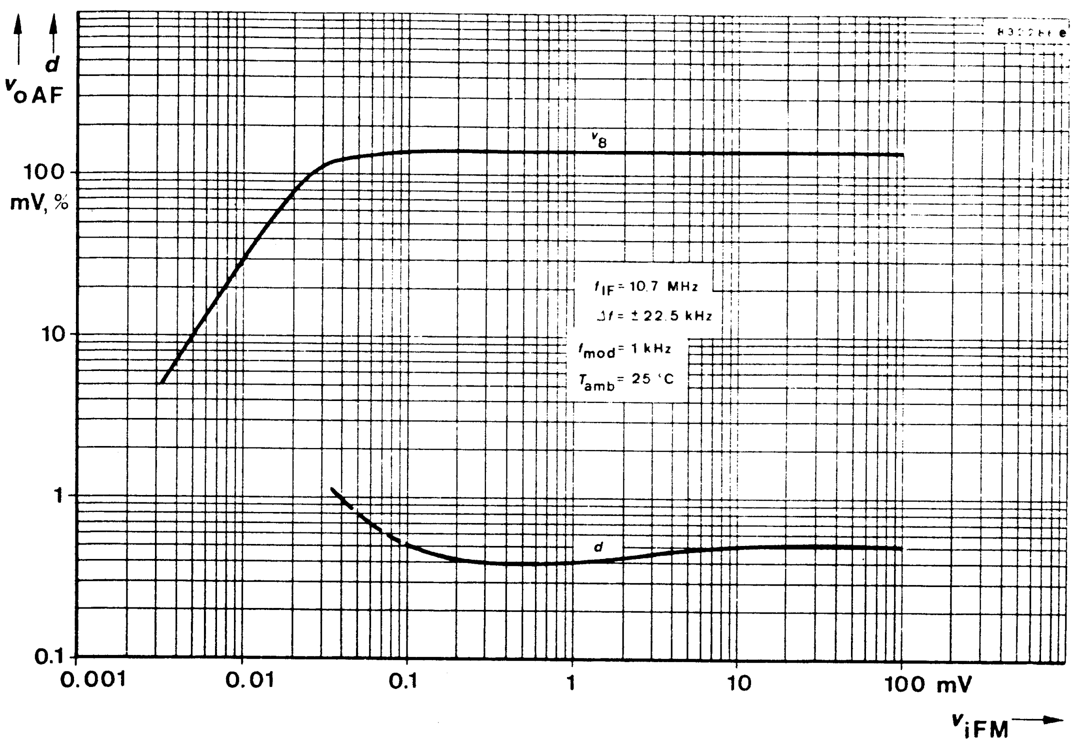


Figure 7.

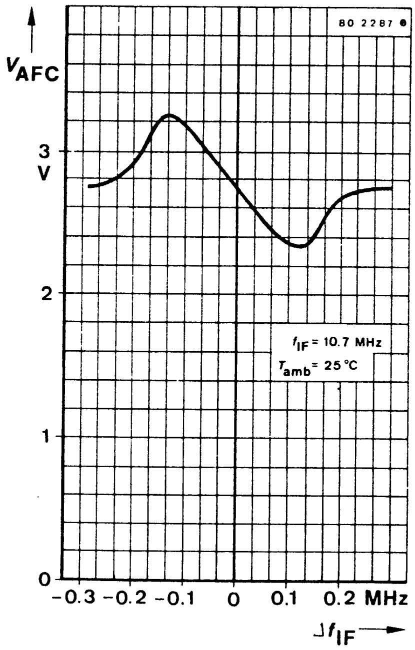


Figure 8.

Components in Figure 9

L_1	=	4	Wdg ∅ 0.45 CuL, threaded core 7.5x3 material: Fi 01 U8 (Vogt GmbH)
L_2	=	5	Wdg ∅ 0.45 CuL
L_3	=	5	Wdg ∅ 0.45 CuL, air core ∅ 3.5 mm
L_4	=	3+3	Wdg ∅ 0.45 CuL, air core ∅ 2.7 mm
L_5	=	12	Wdg ∅ 0.25 CuL, Pin 3–1, filter kit 154 AN(C) or 154ANS–7 A6363A0 (TOKO, Componex)
L_6	=	2	Wdg ∅ 0.25 CuL, Pin 4–6
L_7	=	7	Wdg ∅ 0.25 CuL, Pin 6–3, filter kit 154AN(C) or 154EES–7 A6392FA (TOKO, Componex)
L_8	=	7	Wdg ∅ 0.16 CuL, Pin 1–4, filter kit 154AN(C) or 154EES–7 A6391ABM (TOKO, Componex)
L_9	=	5	Wdg ∅ 0.16 CuL, Pin 2–6
L_{10}	=	96	Wdg ∅ 0.25 CuLs, ferrite aerial ∅ 8x130 mm, type 031039–2103–606, (Draloric)
L_{11}	=	6	Wdg ∅ 0.25 CuLs
L_{12}	=	78	Wdg ∅ 0.09 CuL, Pin 3–4, filter kit RBR or RWOS–6A7609AAU (TOKO, Componex)
L_{13}	=	7	Wdg ∅ 0.09 CuL, Pin 2–1
L_{14}	=	18	Wdg ∅ 0.09 CuL, Pin 3–4, filter kit RHN(C) or RHCS–1A7607AQH (TOKO, Componex)
L_{15}	=	46+100	Wdg ∅ 0.09 CuL, Pin 6–2–1
L_{16}	=	72+72	Wdg ∅ 0.09 Cul Pin 3–4/6–1, filter kit RHN(C) or RHNS–1A7608AZP (TOKO, Componex)
455 kHz	=	Ceramic filter LBF 6 (Componex) or CFU 445 H (Stettner)	
10.7 MHz	=	Ceramic filter 10.7 MF–18 (Componex) or SFE 10.7 MA (Stettner)	
D_{r1}, D_{r3}	=	Ferrit bead on the transistor terminal	
D_{r2}	=	16	Wdg ∅ 0.25 CuL, ∅ 2 air core
D_{r4}	=	6	Wdg ∅ 0.15 CuL, ∅ 2.1x3 mm ferrit bead
C_6=C_{14}	=	4.5 to 20 pF, variable capacitor type CY2–22124–RT02 (TOKO, Componex)	
C_{19}	=	5 to 80 pF	
C_{21}	=	5 to 140 pF	
R_8	=	According to gain groups ∞, 47 kΩ or 33 kΩ	

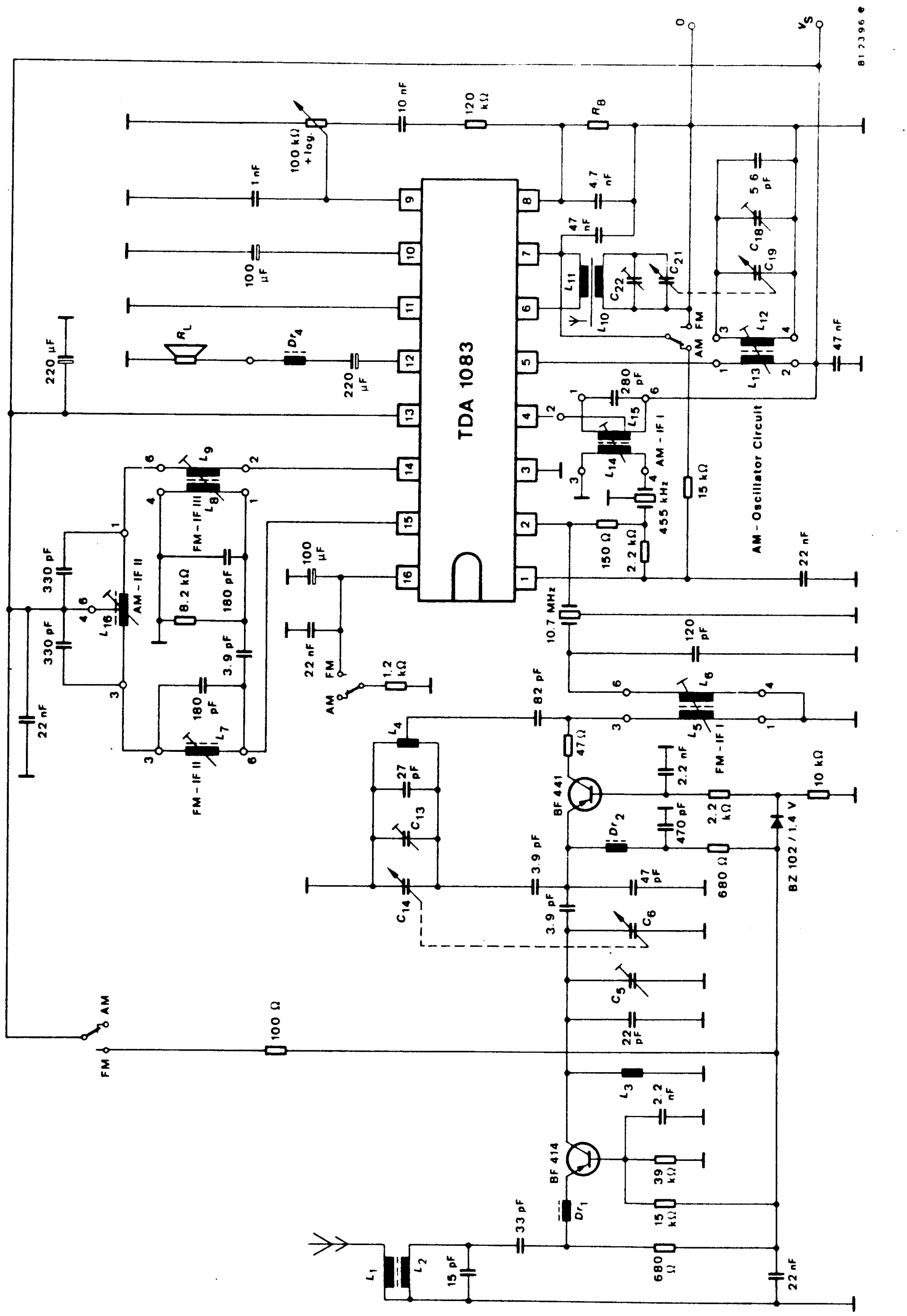


Figure 9. FM-/AM-receiver circuit

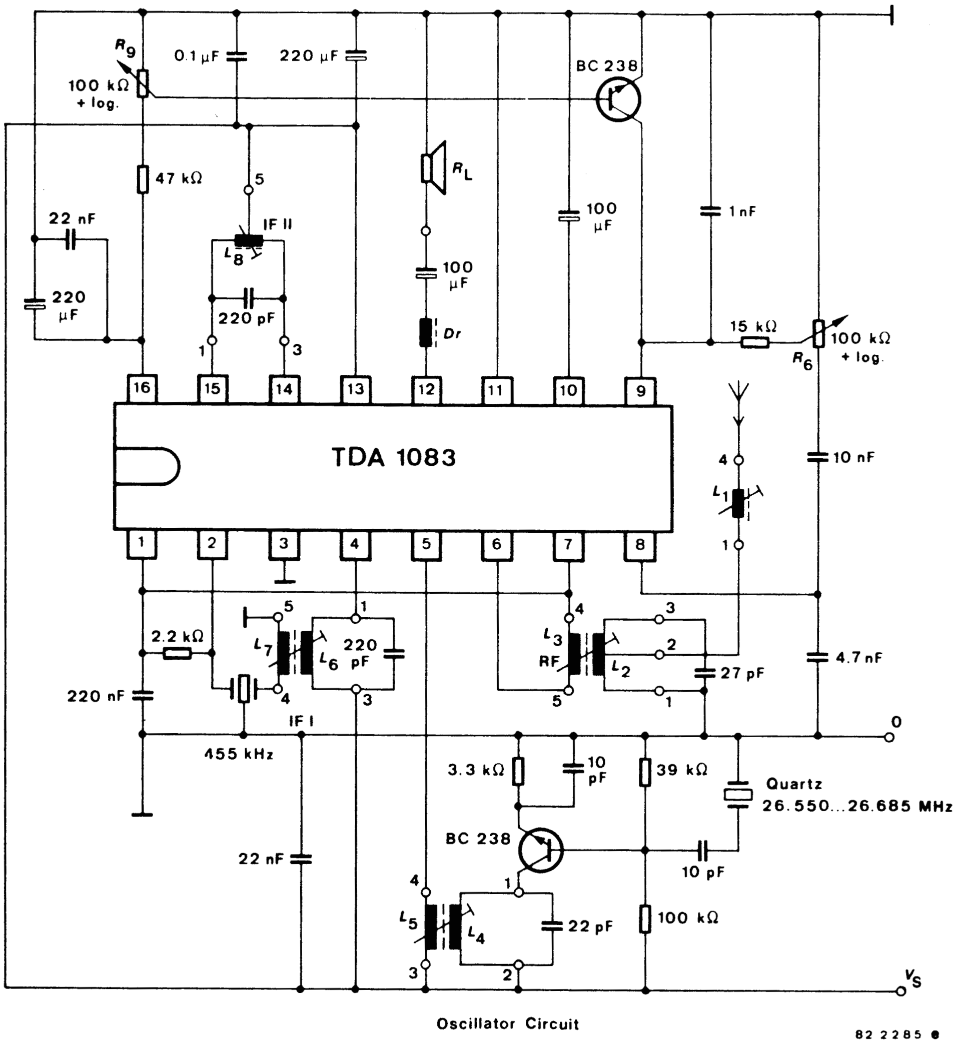
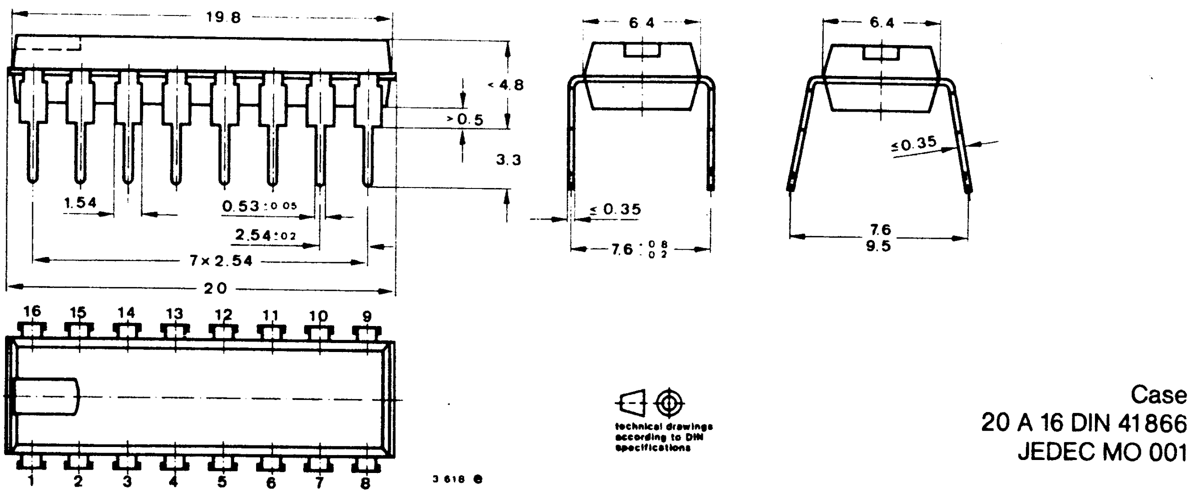


Figure 10.

Package Information



Ozone Depleting Substances Policy Statement

It is the policy of **Atmel Germany GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Atmel Germany GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Atmel Germany GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.
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Data sheets can also be retrieved from the Internet: http://www.atmel–wm.com

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