

Type	Ordering code	Package
TDA 1047	Q67000-A1091	DIP 18

FM IF amplifier for radio sets with 8-stage amplifier and symmetrical coincidence demodulator. The TDA 1047 additionally offers provisions for feeding an amplitude indicator and either positive or negative mono-stereo voltage as well as an AFT output (push-pull current output) with automatic switch-off. The included squelch can be adjusted within an input signal range of more than 40 dB and depends on detuning.

Features

- Excellent limiting qualities
- Excellent frequency stability of demodulator characteristic
- Large range of operating voltage between 4 and 18 V
- Low current consumption
- Externally adjustable squelch
- Few external components

Maximum ratings

Supply voltage	V_S	18	V
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-40 to 125	°C
Thermal resistance (system-air)	R_{thSA}	90	K/W

Operating range

Supply voltage	V_S	4 to 18	V
Frequency	f	0 to 15	MHz
Ambient temperature	T_A	-25 to 85	°C

Characteristics

$V_S = 12\text{ V}$; $T_A = 25^\circ\text{C}$; $f_i = 10.7\text{ MHz}$; $f_{\text{mod}} = 1\text{ kHz}$; $\Delta f = \pm 75\text{ kHz}$; Q_B approx. 20
see test circuit

	min	typ	max		
Current consumption ($I_{14} = 0$)					
Voltage for field strength indicator	I_{12}	9	12	15	mA
$R_{14} = 3.3\text{ k}\Omega$					
$V_{\text{irms}} = 160\text{ mV}$	V_{14}	1.6	2		V
$V_{\text{irms}} = 16\text{ }\mu\text{V}$	V_{14}		10	20	mV
Current	I_{14}			3.6	mA
Voltage for squelch adjustment (approx. log.)					
$V_{\text{irms}} = 8\text{ mV}$	V_{15}		0		V
$V_{\text{irms}} = 16\text{ }\mu\text{V}$	V_{15}	2.2	2.5		V
Current	I_{15}			3.6	mA
AF output DC voltage	V_7		2.1		V
AF output voltage	$V_{7\text{rms}}$	270	300		mV
$V_i = 10\text{ mV}$; $THD = 0.4\%$					
Internal DC voltage of output emitter follower	I_7	180	200		μA
Total harmonic distortion ($V_i = 10\text{ mV}$) ¹⁾	THD		0.4	0.8	%
Input voltage for limiting ²⁾	V_i		30	50	μV
Input resistance	R_{i18}	10			k Ω
AF output resistance ³⁾ (emitter follower output)	R_{q7}		0.3	1	k Ω
Threshold of detuning-depending squelch referred to $f = 10.7\text{ MHz}$	Δf		± 100	± 150	kHz
Switching threshold for AFT OFF	V_2			20	mV
Input resistance	R_{i2}	40	100		k Ω
Voltage for AFT OFF	V_3	0.8			V
Current deviation of the AFT output	ΔI_5		± 150		A
IF output voltage for limiting	$V_{8-11\text{pp}}$		500		mV
Input resistance for demodulator circuit	R_{9-10}		5.4		k Ω
Recommended voltage for demodulator circuit ⁴⁾	$V_{9-10\text{pp}}$		500		mV
Threshold for AF OFF	V_{13}		0.85	0.95	V
AF ON	V_{13}	0.5	0.6		V
Hysteresis for switching threshold	ΔV_{13}		120	200	mV
Internal resistance for AF switch-off time constant	R_{q6}		500		Ω
AM suppression ($V_i = 10\text{ mV}$; $m = 30\%$)	a_{AM}	60			dB
Signal-to-noise-ratio ($V_i = 10\text{ mV}$)	$a_{\text{S/N}}$	70			dB
AF suppression at muting circuit	a_{AF}		60		dB
$V_i = 10\text{ mV}$					

For footnotes refer to page 391.

Notes

- 1) In the case of using a band filter: $THD_{max} = 0.3\%$
- 2) Limiting application for $V_{AF} = -3$ dB
- 3) The output resistance R_{Q7} can be reduced by connecting a resistor of at least 2.7 k Ω between pin 7 and ground.
- 4) The recommended voltage at the demodulator circuit V_{9-10} can be adjusted by the capacitors C_{8-9} and C_{10-11} , which are also influencing the voltage V_{14} and V_{15} .

If the slider of potentiometer P is grounded, the field-strength-dependent squelch is switched off.

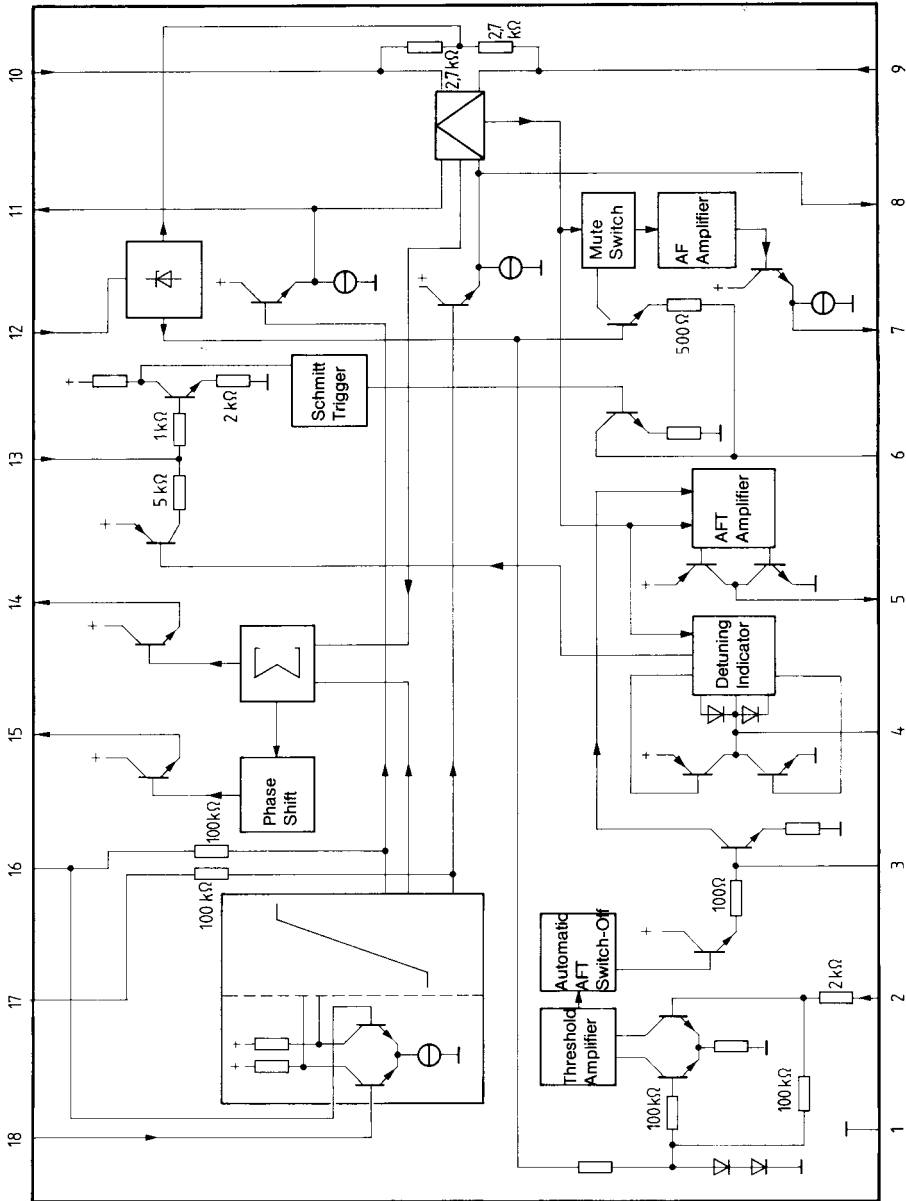
If pin 13 is grounded, both the field-strength- and the detuning-dependent squelch are switched off.

The noise level between the transmitters becomes more or less audible, when pin 6 is loaded with a resistance to $+12$ V in case of "squelch on". Noise attenuation increases with the size of the resistance ($R \geq 10$ k Ω).

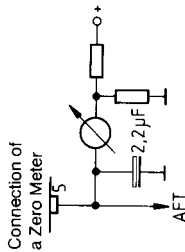
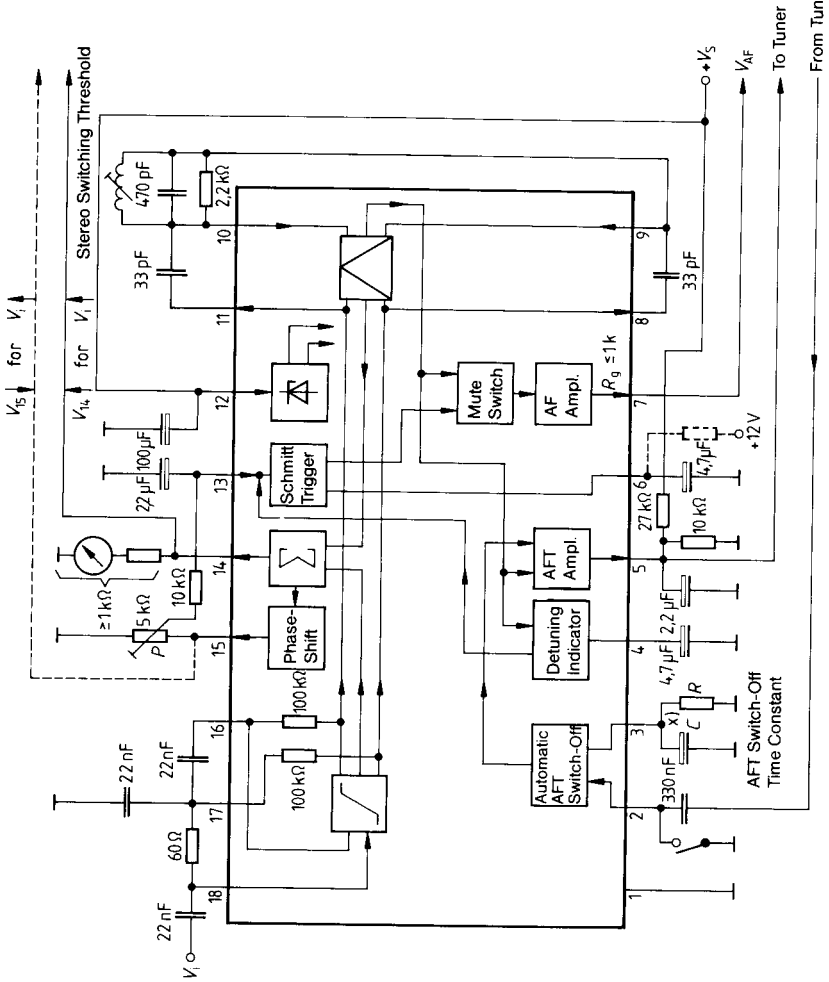
Pin description

Pin	Function
1	GND
2	Sensor input for AFT switch off
3	AFT switch-off time constant
4	Low-pass capacitor for detuning-dependent AF switch off
5	AFT output (push-pull output)
6	Low-pass capacitor for suppression of switch off clicks in case of detuning and insufficient field strength
7	AF output (emitter follower with constant-current source)
8	Output of limiter amplifier
9 } 10 }	Phase shifting circuit
11	Output of limiter amplifier
12	Positive operating voltage
13	Input for amplitude-dependent switch off
14	Instrument connection and stereo switching voltage (positive going)
15	Squelch and stereo switching voltage (negative going)
16 } 17 }	Feedbacks for IF amplifier
18	IF input

Block diagram



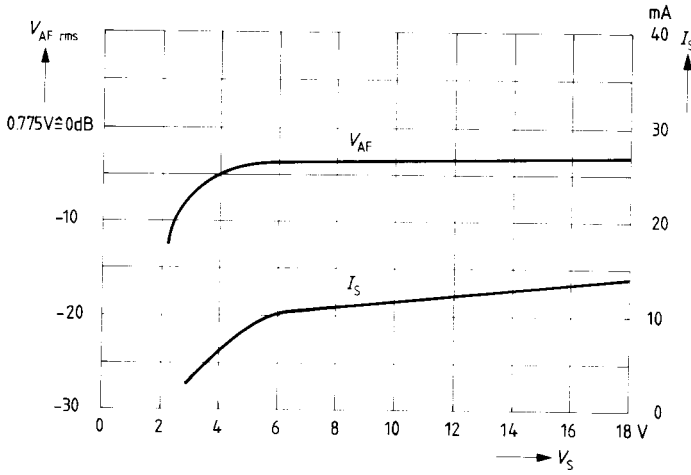
Measurement and application circuit



x) e.g. $R = 100\text{ k}\Omega$
 $C = 10\text{ }\mu\text{F}$ } 1s

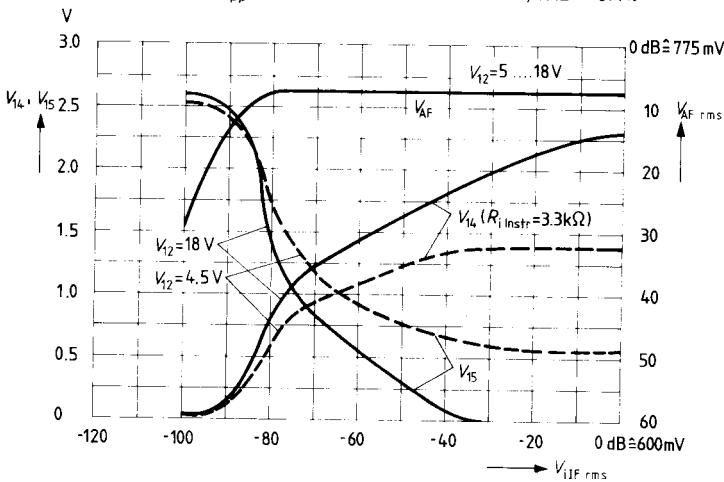
AF output voltage, total current consumption versus supply voltage

$V_{iIF} = 60 \text{ mV}_{\text{rms}}$ wideband, pin 13 to ground, $V_{9-10} = 500 \text{ mV}_{\text{pp}}$



AF output voltage, indicator voltage, squelch voltage versus input voltage

$V_{i2} = 15 \text{ V}$; $f = 10.7 \text{ MHz}$, $\Delta f = \pm 75 \text{ kHz}$, $f_{\text{mod}} = 1 \text{ kHz}$
 $V_{9-10} = 500 \text{ mV}_{\text{pp}}$, wideband-measured at 100 nF , $\text{THD} = 0.4\%$



AF output voltage, noise voltage versus input voltage
 $f = 10.7 \text{ MHz}, \Delta f = \pm 75 \text{ kHz}, V_{12} = 15 \text{ V}$

