

# MAS1017

## AM Receiver IC

- Wide Supply Voltage Range
- Power Down and Power Up Control

### DESCRIPTION

The MAS1017 AM-Receiver chip is a highly sensitive, simple to use AM receiver specially intended to receive time signals in the frequency range from 40 kHz to 100 kHz. There are only a few external components needed. The circuit has a preamplifier,

wide range automatic gain control, demodulator and output comparator built in. The output signal can be processed directly with an additional digital circuitry to extract the data from the received signal.

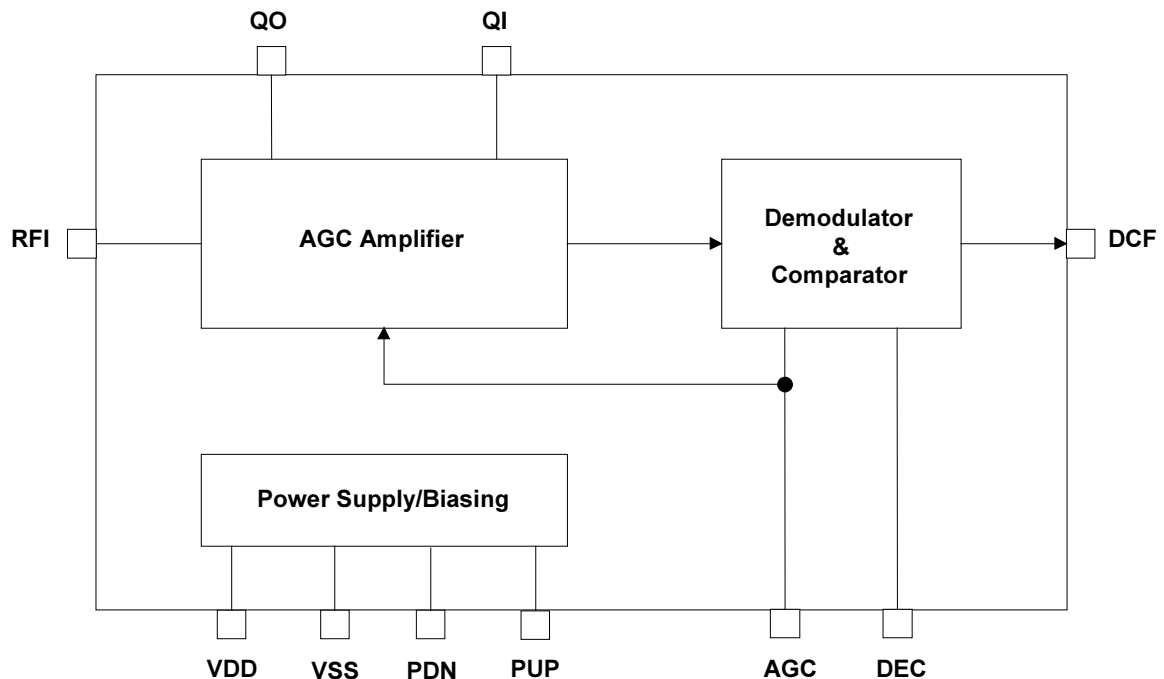
### FEATURES

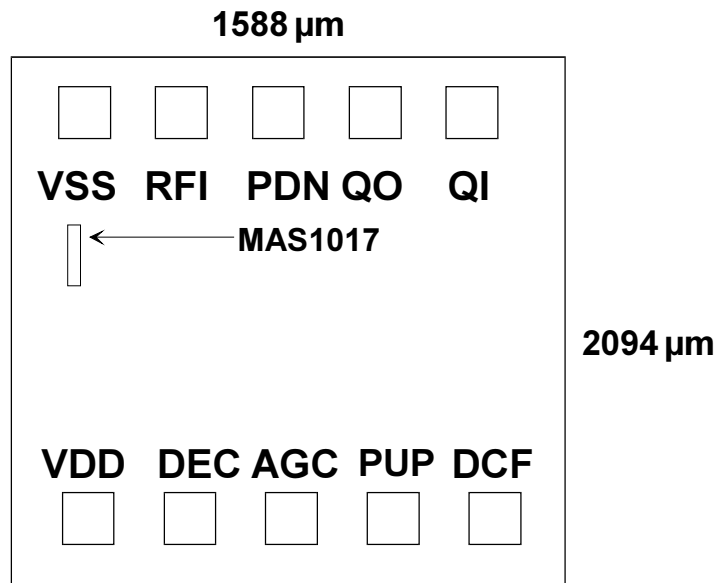
- Wide Supply Voltage Range
- Power Down and Power Up Control
- Only a Few External Components Needed
- Highly Sensitive AM Receiver

### APPLICATIONS

- Time Signal Receiver (designed for DCF77)

### BLOCK DIAGRAM



**PAD LAYOUT**


DIE size = 2.09 x 1.59 mm; PAD size = 100 x 100 μm  
 Substrate is connected to VDD. Please make sure that VDD is bonded first.  
 Note: Coordinates are calculated using VDD as a centre point.

Pad Identification	Name	X-coordinate	Y-coordinate	Note
Power Supply Voltage	VDD	0 μm	0 μm	
Demodulator Capacitor	DEC	244 μm	8 μm	
AGC Capacitor	AGC	520 μm	8 μm	
Power Up Input	PUP	759 μm	8 μm	2
DCF Signal Output	DCF	1075 μm	8 μm	3
Quarz Filter Input	QI	1038 μm	1625 μm	
Quarz Filter Output	QO	760 μm	1625 μm	
Power Down Input	PDN	483 μm	1625 μm	1
Receiver Input	RFI	243 μm	1625 μm	
Power Supply Ground	VSS	-15 μm	1605 μm	

**Notes:**

- 1) Level = VSS means receiver on; VDD = receiver off (PUP = VSS)  
Internal pull-up resistor > 1 MOhm to VDD
- 2) Level = VDD means receiver on; VSS = receiver off (PDN = VDD)  
Internal pull-down resistor > 1MOhm to VSS
- 3) 100% AM results in Level = VSS; 25% AM results in Level = VDD
  - the output is a current source/sink with  $|I_{OUT}| > 5 \mu A$
  - at power down the output is tri-state

## ABSOLUTE MAXIMUM RATINGS

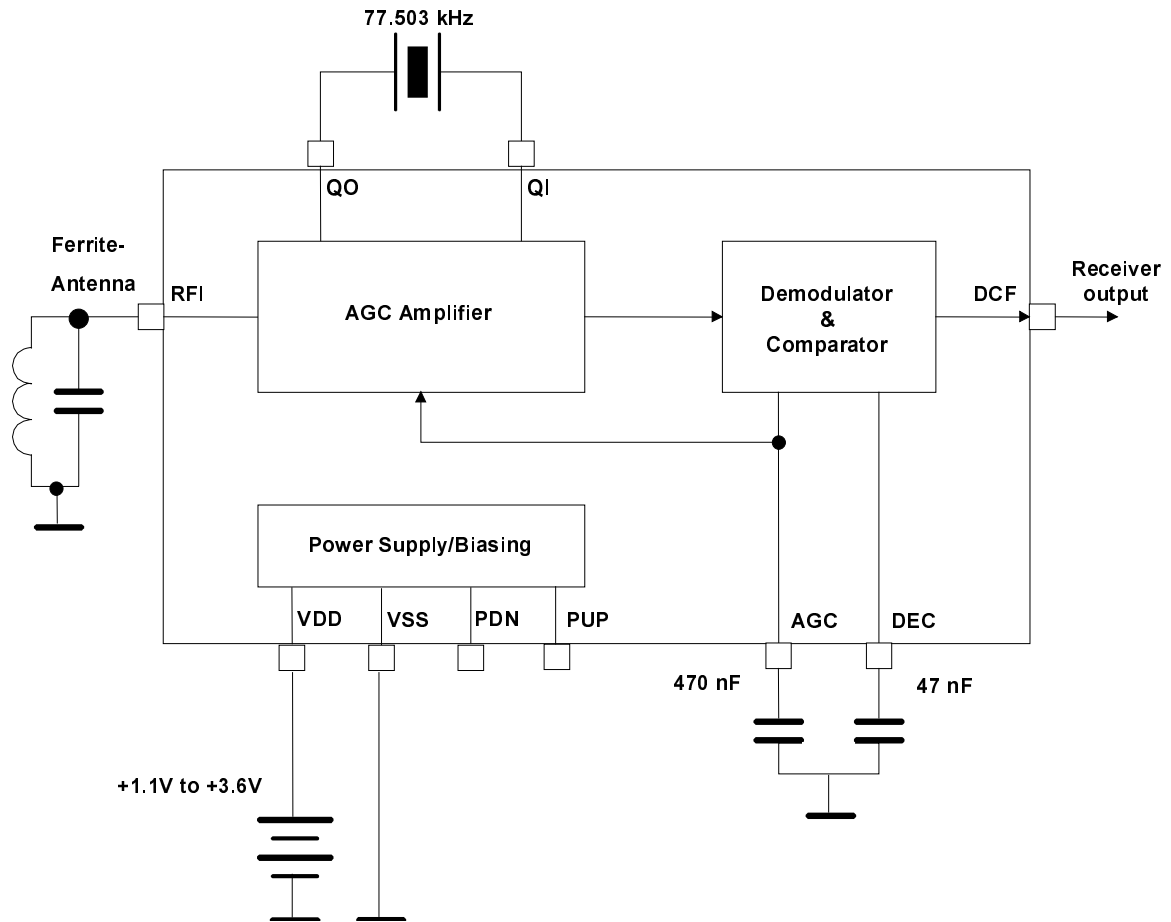
Parameter	Symbol	Conditions	Min	Max	Unit
Supply Voltage	$V_{DD}-V_{SS}$		-0.3	5.0	V
Input Voltage	$V_{IN}$		$V_{SS}-0.3$	$V_{DD}+0.3$	V
Power Dissipation	$P_{MAX}$			100	mW
Operating Temperature	$T_{OP}$		-20	70	°C
Storage Temperature	$T_{ST}$		-40	120	°C

## ELECTRICAL CHARACTERISTICS

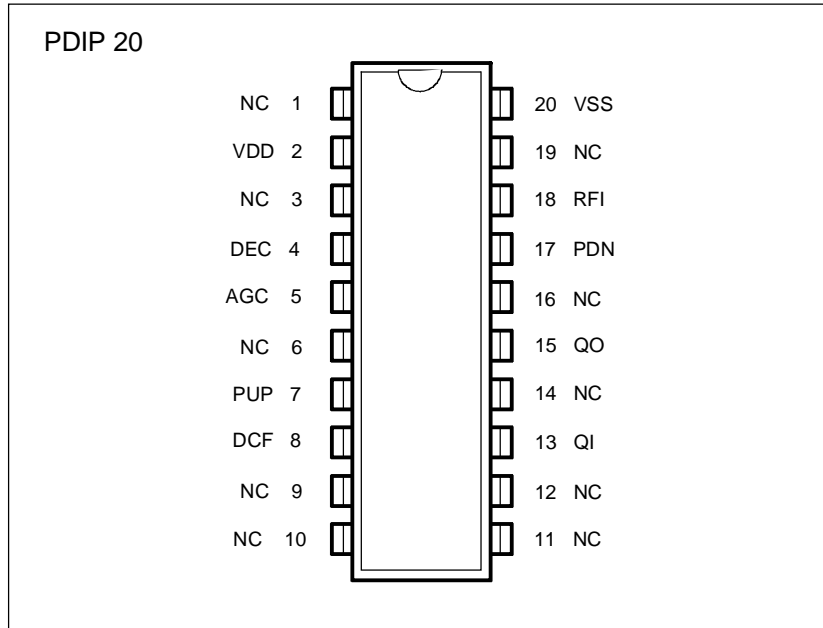
Operating Conditions:  $V_{DD} = 1.4V$ , Temperature = 25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating Voltage	$V_{DD}$		1.10		3.60	V
Current Consumption	$I_{DD}$			40	100	μA
Stand-By Current	$I_{DDoff}$				0.1	μA
Input Range	$f_{IN}$		40		100	kHz
Sensitivity	$V_{IN}$		0.001		20	mVrms
Input Levels $ I_{IN}  < 0.5 \mu A$	$V_{IL}$ $V_{IH}$		$V_{DD} - 0.3$		0.3	V
Output Current $V_{OL} < 0.2 V_{DD}; V_{OH} > 0.8 V_{DD}$	$ I_{OUT} $		5			μA
Output Pulse	$T_0$		30		125	ms
	$T_1$		130		220	ms
Startup Time	$T_{Start}$			8		s
Output Delay Time	$T_{Delay}$			50		ms

**TYPICAL APPLICATION**



**PACKAGE (an example, see ordering information)**



**PIN DESCRIPTION**

Pin Name	Pin	Type	Function	Note
NC	1			
VDD	2	P	Positive power supply	
NC	3			
DEC	4	AO	Demodulator capacitor	
AGC	5	AO	AGC capacitor	
NC	6			
PUP	7	AI	Power up input	2
DCF	8	DO	Demodulator output	3
NC	9			
NC	10			
NC	11			
NC	12			
QI	13	AI	Quartz filter input	
NC	14			
QO	15	AO	Quartz filter output	
NC	16			
PDN	17	AI	Power down input	1
RFI	18	AI	Receiver input	
NC	19			
VSS	20	G	Power supply ground	

Notes:

- 1) Level = VSS means receiver on; VDD = receiver off
- 2) Level = VDD means receiver on; VSS = receiver off (PDN = VDD)  
Internal pull-down resistor > 1M $\Omega$  to VSS
- 3) 100 % AM results in Level = VSS; 25 % AM results in Level = VDD  
- the output is a current source/sink with [Iout] > 5  $\mu$ A  
- at power down the output is tri-state

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**ORDERING INFORMATION**

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Product Code	Product	Package	Comments
MAS1017ATC1	AM-Receiver IC	Wafer, EWS-tested	wafer thickness 400 µm
MAS1017ATC1-1	AM-Receiver IC	Dice on sticky tape	wafer thickness 400 µm, sawn wafer, tape ring 6", non UV tape, tape not expanded

Please contact Micro Analog Systems Oy for other wafer thickness, sawn wafer delivery as well as SMD package options.

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**LOCAL DISTRIBUTOR**

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**MICRO ANALOG SYSTEMS OY CONTACTS**

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Micro Analog Systems Oy Kamreerintie 2, P.O. Box 51 FIN-02771 Espoo, FINLAND <a href="http://www.mas-oy.com">http://www.mas-oy.com</a>	Tel. (09) 80 521 Tel. Int. +358 9 80 521 Telefax +358 9 805 3213 E-mail: <a href="mailto:info@mas-oy.com">info@mas-oy.com</a>
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