

## Remote Control and Security Systems Hybrids – ver.11

Web Site : <http://www.telecontrolli.com>

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### HEAD OFFICE AND PLANT

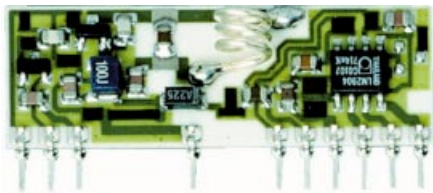
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## RR1-XXX

### Fixed Frequency Super Regenerative Radio Receiver



#### General description

The RR1-XXX is a super regenerative data receiver. Sensitivity typically exceeds  $-100\text{dBm}$  ( $2.2\mu\text{Vrms}$ ) when matched to  $50\ \Omega$ .

The tuning frequency can be custom-specified in the range 200 to 450 MHz.

It shows stable electrical characteristics thanks to "Thick film hybrid" technology.

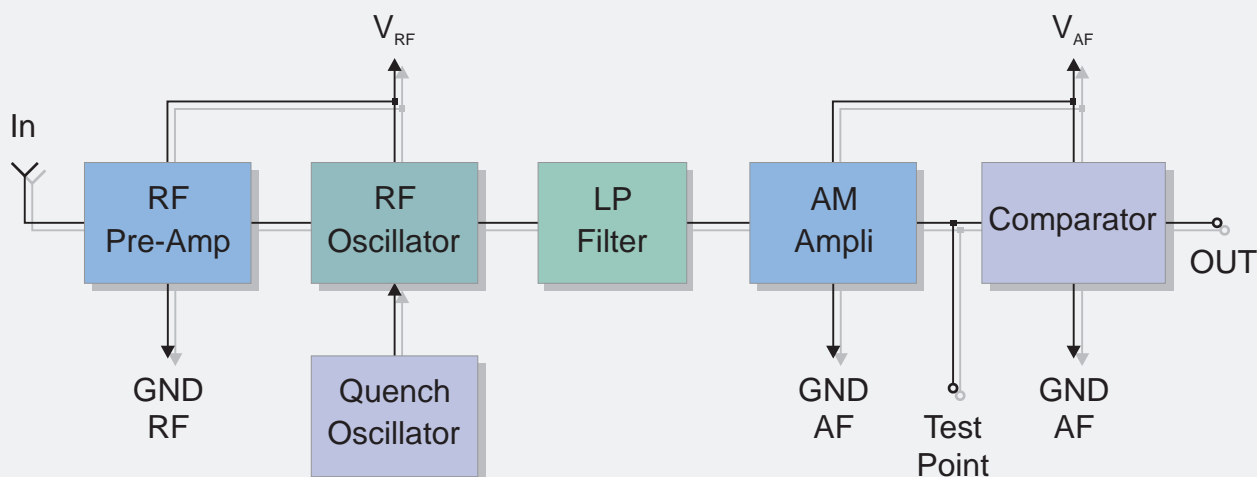
**XXX:** custom-specified working frequency  
(200 ÷ 450 MHz)

Standard European and U.S. frequencies (315MHz, 418MHz, 433.92MHz) are readily available from stock.

#### Applications

- Home security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

#### BLOCK DIAGRAM



## Electrical Characteristics

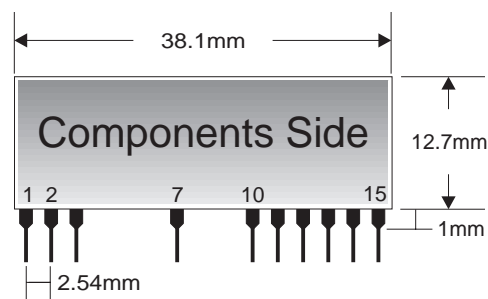
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>RF</sub>	RF Supply Voltage	4.5	5	5.5	VDC
V <sub>AF</sub>	AF Supply Voltage	4.5	5	5.5	VDC
I <sub>S</sub>	Supply Current		2.5	3.5	mA
F <sub>W</sub>	Working Frequency	200		450	MHz
	Tuning Tolerance		±0.5		MHz
B <sub>W</sub>	-3dB Bandwidth		±2	±3	MHz
	Max Data Rate			2	KHz
	RF Sensitivity (100% AM)	-100	-105		dBm
	Level of Emitted Spectrum		-65	-60	dBm
V <sub>ol</sub>	Low-Level Output Voltage			0.6	V
V <sub>oh</sub>	High-Level Output Voltage	3.6			V
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

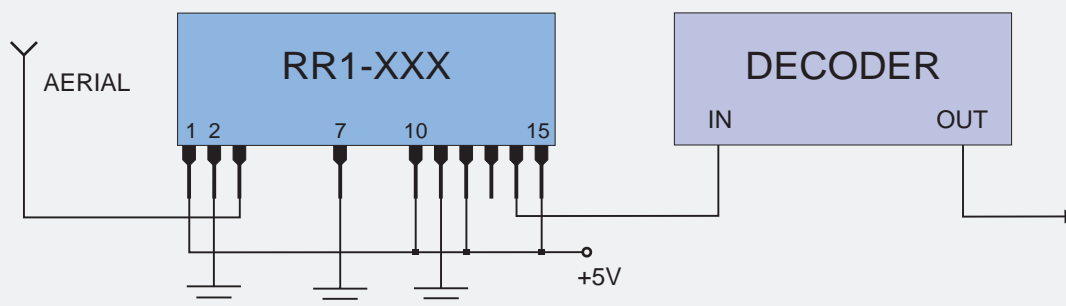
## Pin Description

1	RF +V <sub>CC</sub>	9	NC
2	RF GND	10	AF +V <sub>CC</sub>
3	IN	11	AF GND
4	NC	12	AF +V <sub>CC</sub>
5	NC	13	Test Point
6	NC	14	OUT
7	RF GND	15	AF +V <sub>CC</sub>
8	NC		

## Mechanical Dimensions



## TYPICAL APPLICATION



## RR3-XXX

### Super Regenerative Radio Receiver With Laser Trimmed Inductor



#### General description

The RR3-XXX is a super regenerative data receiver. Sensitivity typically exceeds  $-100\text{dBm}$  ( $2.2\mu\text{Vrms}$ ) when matched to  $50\ \Omega$ .

It shows high frequency stability also in presence of mechanical vibrations, manual handling and in a wide range of temperature.

The frequency accuracy is very high thanks to laser trimming process. PATENTED.

**I-ETS 300-220 Compliance (RR3-418, RR3-433.92)**  
**FCC 15/C Compliance (RR3-315)**

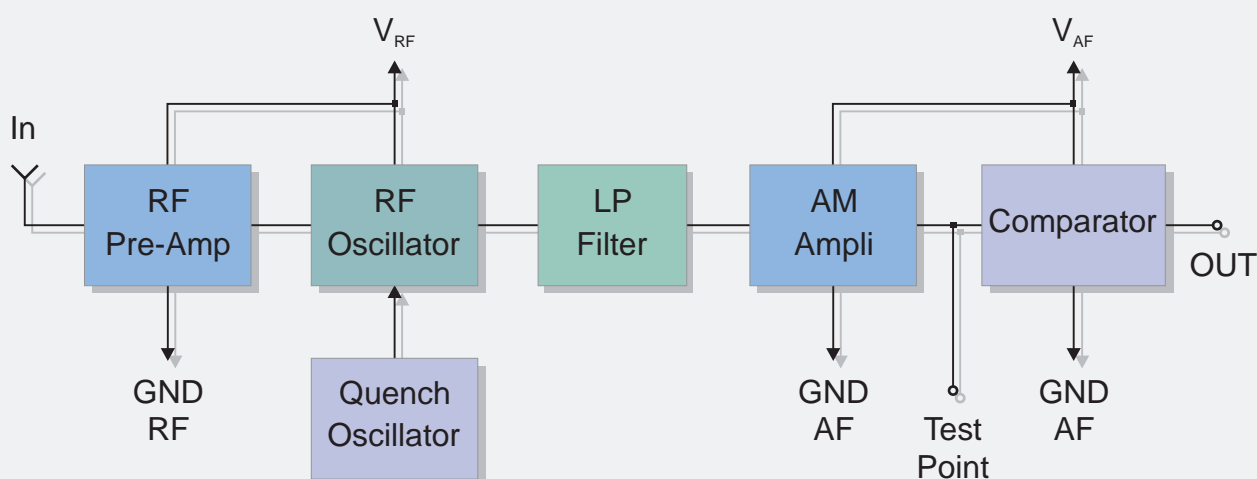
**XXX:** custom-specified working frequency  
 ( $200 \div 450\ \text{MHz}$ )

Standard European and U.S. frequencies ( $315\text{MHz}$ ,  $418\text{MHz}$ ,  $433.92\text{MHz}$ ) are readily available from stock.

#### Applications

- Home security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

#### BLOCK DIAGRAM



## Electrical Characteristics

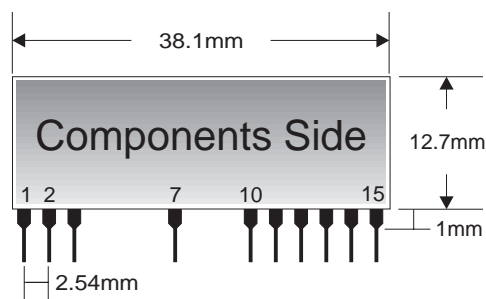
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>RF</sub>	RF Supply Voltage	4.5	5	5.5	VDC
V <sub>AF</sub>	AF Supply Voltage	4.5	5	5.5	VDC
I <sub>S</sub>	Supply Current		2.5	3	mA
F <sub>W</sub>	Working Frequency	200		450	MHz
	Tuning Tolerance		±0.2	±0.5	MHz
B <sub>W</sub>	-3dB Bandwidth		±2	±3	MHz
	Max Data Rate			2	KHz
	RF Sensitivity (100% AM)	-100	-105		dBm
	Level of Emitted Spectrum		-65	-60	dBm
V <sub>ol</sub>	Low-Level Output Voltage			0.6	V
V <sub>oh</sub>	High-Level Output Voltage	3.6			V
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

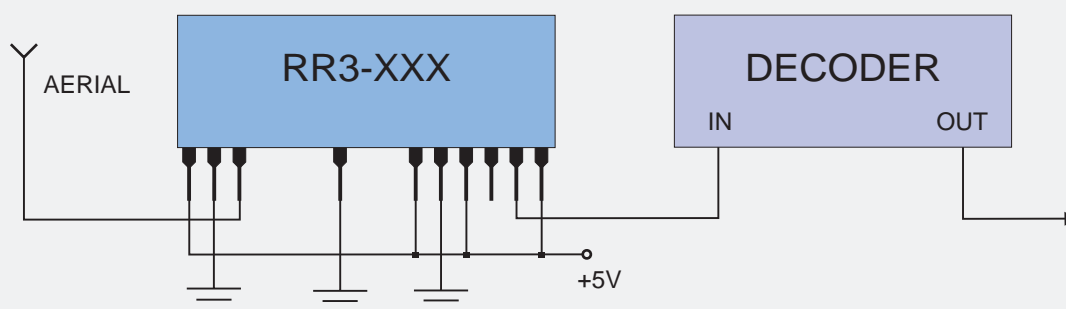
## Pin Description

1	RF +V <sub>CC</sub>	9	NC
2	RF GND	10	AF +V <sub>CC</sub>
3	IN	11	AF GND
4	NC	12	AF +V <sub>CC</sub>
5	NC	13	Test Point
6	NC	14	OUT
7	RF GND	15	AF +V <sub>CC</sub>
8	NC		

## Mechanical Dimensions



## TYPICAL APPLICATION



## RR4-XXX

### Super Regenerative Radio Receiver With Laser Trimmed Inductor and Cascode Input Stage



#### General description

The RR4-XXX is a super regenerative data receiver. Sensitivity typically exceeds  $-100\text{dBm}$  ( $2.2\mu\text{Vrms}$ ) when matched to  $50\ \Omega$ .

Emission level:  $-70\ \text{dBm}$  typ (Cascode Input)

$-3\text{dB}$  Bandwidth:  $\pm 1.5\ \text{MHz}$  typ

It shows high frequency stability also in presence of mechanical vibrations, manual handling and in a wide range of temperature.

The frequency accuracy is very high thanks to laser trimming process. PATENTED.

#### I-ETS 300 220 Compliance (RR4-433.92)

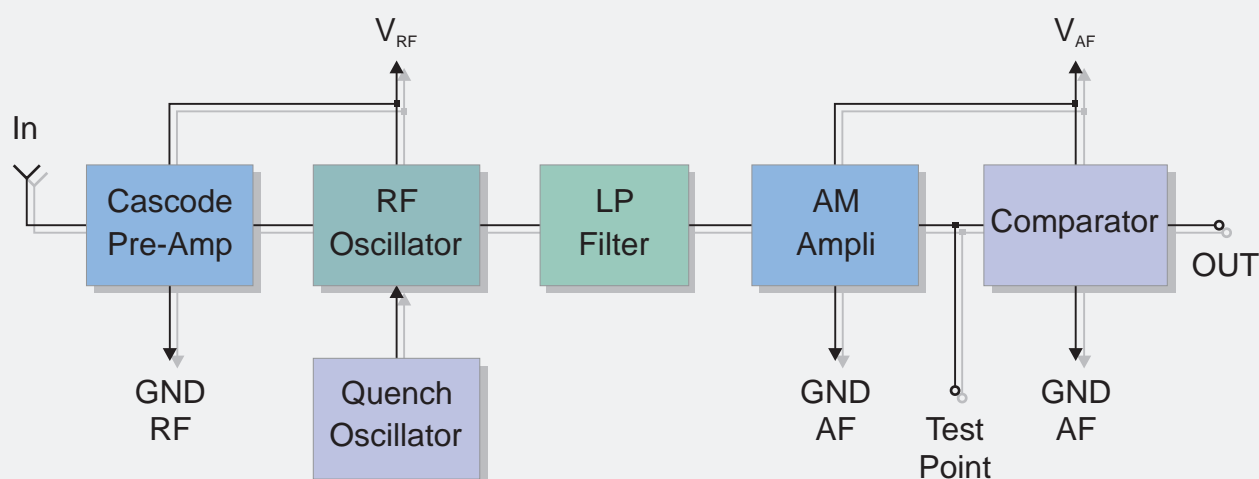
**XXX:** custom-specified working frequency  
( $200 \div 450\ \text{MHz}$ )

Standard European and U.S. frequencies ( $315\text{MHz}$ ,  $418\text{MHz}$ ,  $433.92\text{MHz}$ ) are readily available from stock.

#### Applications

- Home security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

#### BLOCK DIAGRAM



## Electrical Characteristics

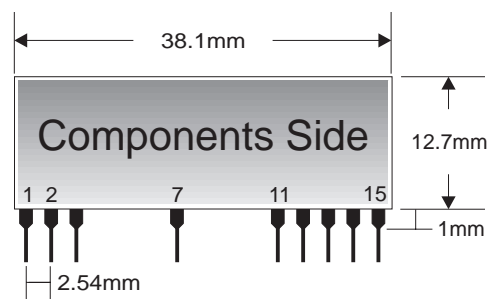
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>RF</sub>	RF Supply Voltage	4.5	5	5.5	VDC
V <sub>AF</sub>	AF Supply Voltage	4.5	5	5.5	VDC
I <sub>S</sub>	Supply Current		2.5	3	mA
F <sub>W</sub>	Working Frequency	200		450	MHz
	Tuning Tolerance		±0.2	±0.5	MHz
B <sub>W</sub>	-3dB Bandwidth		±1.5	±2	MHz
	Max Data Rate			2	KHz
	RF Sensitivity (100% AM)	-100	-105		dBm
	Level of Emitted Spectrum		-70	-65	dBm
V <sub>ol</sub>	Low-Level Output Voltage			0.6	V
V <sub>oh</sub>	High-Level Output Voltage	3.6			V
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

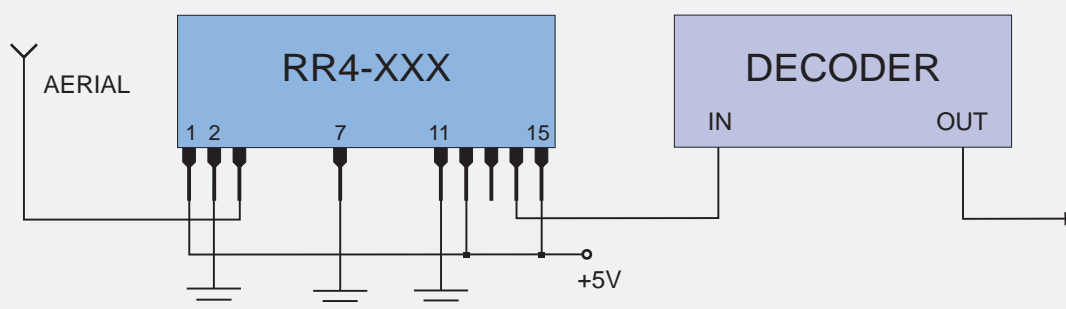
## Pin Description

1	RF +V <sub>CC</sub>	9	NC
2	RF GND	10	NC
3	IN	11	AF GND
4	NC	12	AF +V <sub>CC</sub>
5	NC	13	Test Point
6	NC	14	OUT
7	RF GND	15	AF +V <sub>CC</sub>
8	NC		

## Mechanical Dimensions

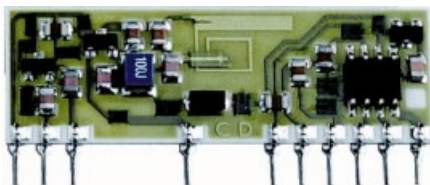


## TYPICAL APPLICATION



## RR6-XXX

Very Low Consumption Super Regenerative  
Radio Receiver - Fast Turn-On Time



### General description

The RR6-XXX is a super regenerative data receiver. Sensitivity typically exceeds  $-95\text{dBm}$  when matched to  $50\ \Omega$ .

Typical current consumption is  $0.5\ \text{mA}$ .

Low Turn-on Time ( $150\ \text{msec}$ ).

It shows high frequency stability also in presence of mechanical vibrations, manual handling and in a wide range of temperature.

The frequency accuracy is very high thanks to laser trimming process. **PATENTED.**

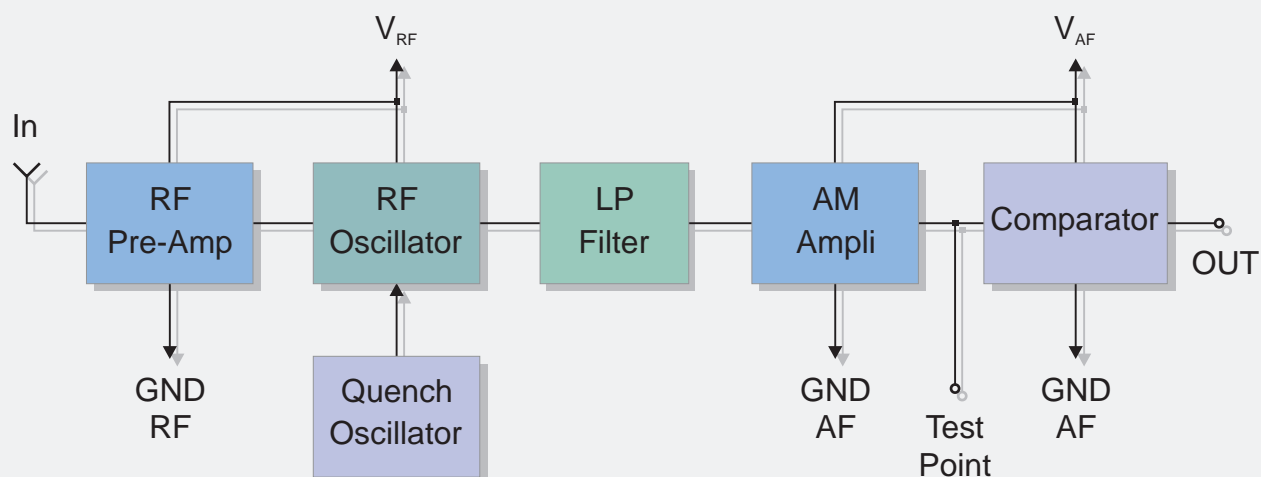
**XXX:** custom-specified working frequency  
( $200 \div 450\ \text{MHz}$ )

Standard European and U.S. frequencies ( $315\text{MHz}$ ,  $418\text{MHz}$ ,  $433.92\text{MHz}$ ) are readily available from stock.

### Applications

- Home security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

### BLOCK DIAGRAM



## Electrical Characteristics

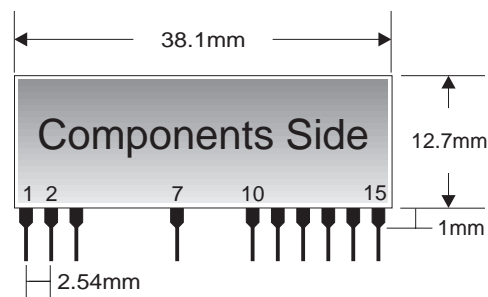
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>RF</sub> , V <sub>AF</sub>	Supply Voltage	4.5	5	5.5	VDC
I <sub>S</sub>	Supply Current		0.5		mA
F <sub>W</sub>	Working Frequency	280		450	MHz
	Tuning Tolerance		±0.2	±0.5	MHz
B <sub>W</sub>	-3dB Bandwidth		±2	±3	MHz
	Max Data Rate			2	KHz
	RF Sensitivity (100% AM)		-95		dBm
	Level of Emitted Spectrum		-65	-60	dBm
T <sub>ON</sub>	Turn-on Time		100	150	msec
V <sub>ol</sub>	Low-Level Output Voltage			0.6	V
V <sub>oh</sub>	High-Level Output Voltage	3.6			V
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

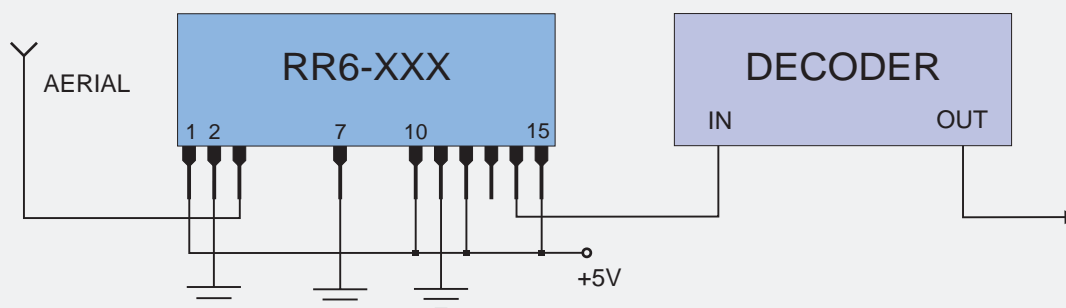
## Pin Description

1	RF +V <sub>CC</sub>	9	NC
2	RF GND	10	AF +V <sub>CC</sub>
3	IN	11	AF GND
4	NC	12	AF +V <sub>CC</sub>
5	NC	13	Test Point
6	NC	14	OUT
7	RF GND	15	AF +V <sub>CC</sub>
8	NC		

## Mechanical Dimensions

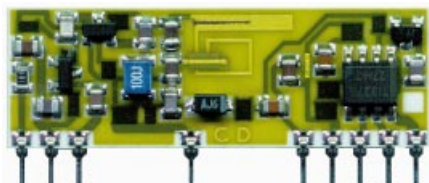


## TYPICAL APPLICATION



## RR8-XXX

3V Supply Voltage - Very Low Consumption  
Super Regenerative Radio Receiver



### General description

The RR8-XXX is a super regenerative data receiver.

Sensitivity typically exceeds  $-90\text{dBm}$  when matched to  $50\ \Omega$ .

Typical current consumption is  $0.5\ \text{mA}$ .

Low Turn-on Time ( $150\ \text{msec}$ ).

It shows high frequency stability also in presence of mechanical vibrations, manual handling and in a wide range of temperature.

The frequency accuracy is very high thanks to laser trimming process. **PATENTED.**

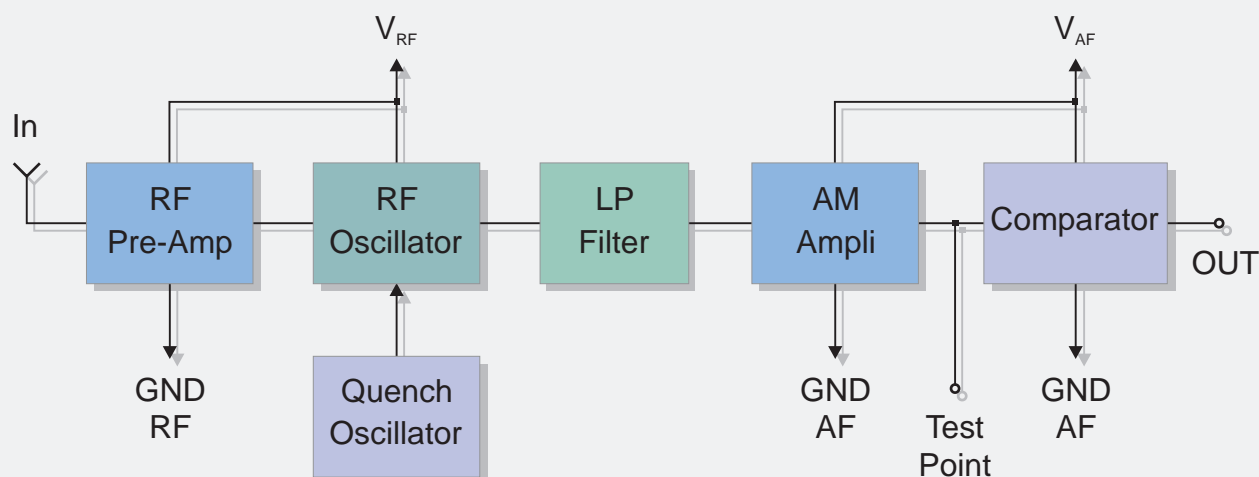
**XXX:** custom-specified working frequency  
( $200 \div 450\ \text{MHz}$ )

Standard European and U.S. frequencies ( $315\text{MHz}$ ,  $418\text{MHz}$ ,  $433.92\text{MHz}$ ) are readily available from stock.

### Applications

- Battery powered portable devices
- Home security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

### BLOCK DIAGRAM



## Electrical Characteristics

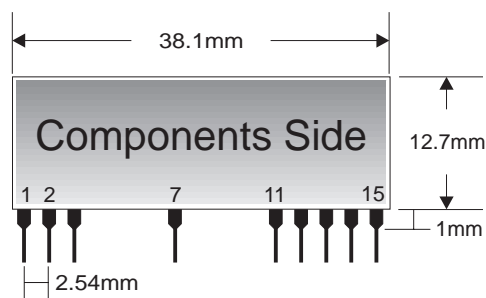
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>RF</sub> , V <sub>AF</sub>	Supply Voltage	2.7	3	3.3	VDC
I <sub>S</sub>	Supply Current		0.5		mA
F <sub>W</sub>	Working Frequency	280		450	MHz
	Tuning Tolerance		±0.2	±0.5	MHz
B <sub>W</sub>	-3dB Bandwidth		±2	±3	MHz
	Max Data Rate			2	KHz
	RF Sensitivity (100% AM)		-90		dBm
	Level of Emitted Spectrum		-65	-60	dBm
T <sub>ON</sub>	Turn-on Time		150		msec
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

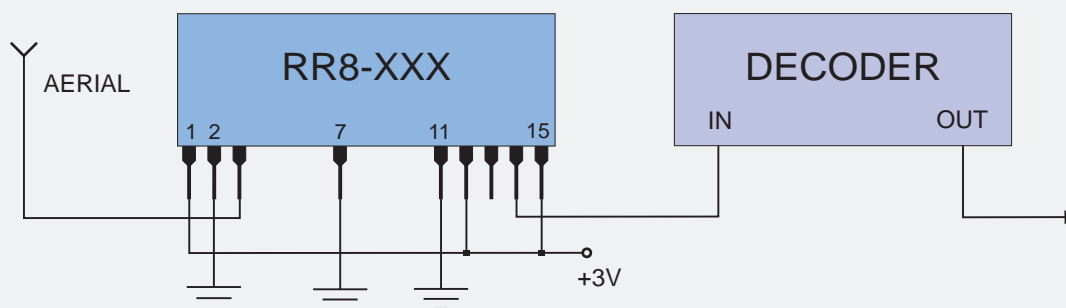
## Pin Description

1	RF +V <sub>CC</sub>	9	NC
2	RF GND	10	NC
3	IN	11	AF GND
4	NC	12	AF +V <sub>CC</sub>
5	NC	13	Test Point
6	NC	14	OUT
7	RF GND	15	AF +V <sub>CC</sub>
8	NC		

## Mechanical Dimensions

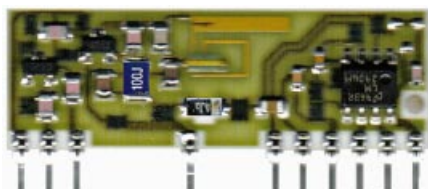


## TYPICAL APPLICATION



## RR10-XXX

Narrow Bandwidth Super Regenerative Radio Receiver - Laser Trimmed Inductor



### General description

The RR10-XXX is a super regenerative data receiver. Sensitivity typically exceeds  $-100\text{dBm}$  ( $2.2\mu\text{Vrms}$ ) when matched to  $50\ \Omega$ .

Narrow Bandwidth:

-3dB	+/- 1.5MHz
-30dB	+/- 5MHz
-50dB	+/- 7MHz

The frequency accuracy is very high thanks to laser trimming process. PATENTED.

### I-ETS 300-220 Compliance

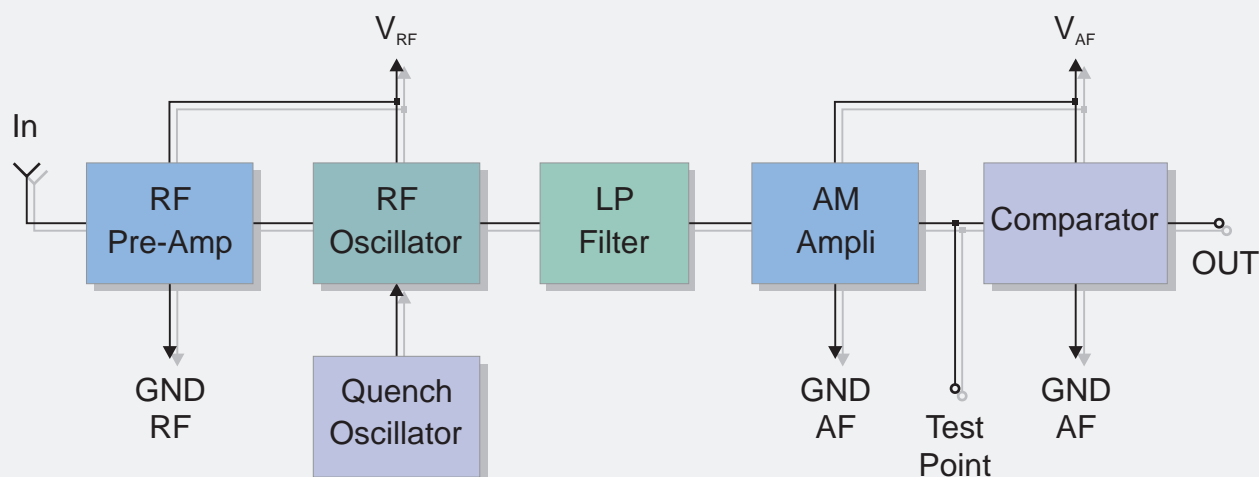
**XXX:** custom-specified working frequency  
( $200 \div 450\ \text{MHz}$ )

Standard European and U.S. frequencies ( $315\text{MHz}$ ,  $418\text{MHz}$ ,  $433.92\text{MHz}$ ) are readily available from stock.

### Applications

- Home security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

### BLOCK DIAGRAM



## Electrical Characteristics

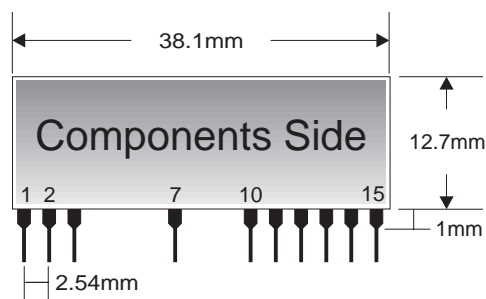
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>RF</sub>	RF Supply Voltage	4.5	5	5.5	VDC
V <sub>AF</sub>	AF Supply Voltage	4.5	5	5.5	VDC
I <sub>S</sub>	Supply Current		1.2	1.5	mA
F <sub>W</sub>	Working Frequency	200		450	MHz
	Tuning Tolerance		+/-0.2	+/-0.5	MHz
B <sub>W</sub>	-3dB Bandwidth		+/-1.5	+/-2	MHz
	Max Data Rate			2	KHz
	RF Sensitivity (100% AM)	-100	-102		dBm
	Level of Emitted Spectrum		-65	-60	dBm
V <sub>ol</sub>	Low-Level Output Voltage			0.6	V
V <sub>oh</sub>	High-Level Output Voltage	3.6			V
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

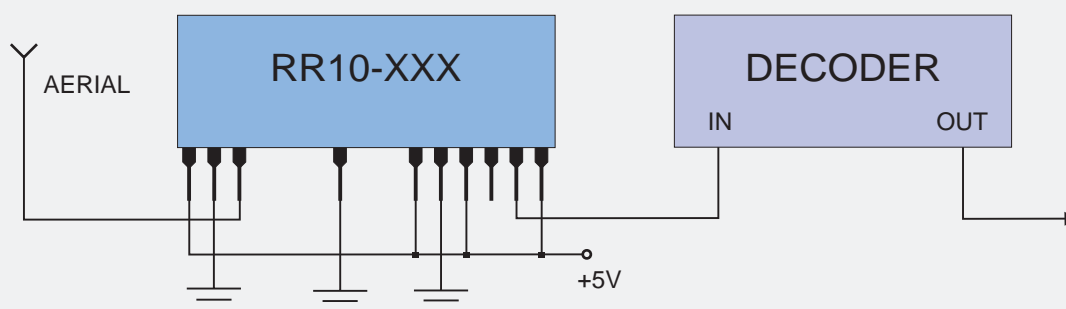
## Pin Description

1	RF +V <sub>CC</sub>	9	NC
2	RF GND	10	AF +V <sub>CC</sub>
3	IN	11	AF GND
4	NC	12	AF +V <sub>CC</sub>
5	NC	13	Test Point
6	NC	14	OUT
7	RF GND	15	AF +V <sub>CC</sub>
8	NC		

## Mechanical Dimensions

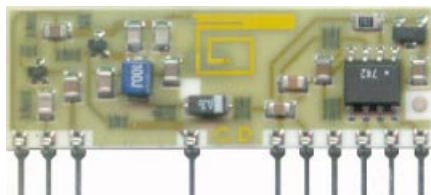


## TYPICAL APPLICATION



## RR11-XXX

Very Low Consumption Super Regenerative  
Radio Receiver - Fast Turn-On Time



### General description

The RR11-XXX is a super regenerative data receiver. Sensitivity typically exceeds  $-95\text{dBm}$  when matched to  $50\ \Omega$ .

Typical current consumption is  $300\ \mu\text{A}$ .

Low Turn-on Time ( $150\ \text{msec}$ ).

It shows high frequency stability also in presence of mechanical vibrations, manual handling and in a wide range of temperature.

The frequency accuracy is very high thanks to laser trimming process. **PATENTED.**

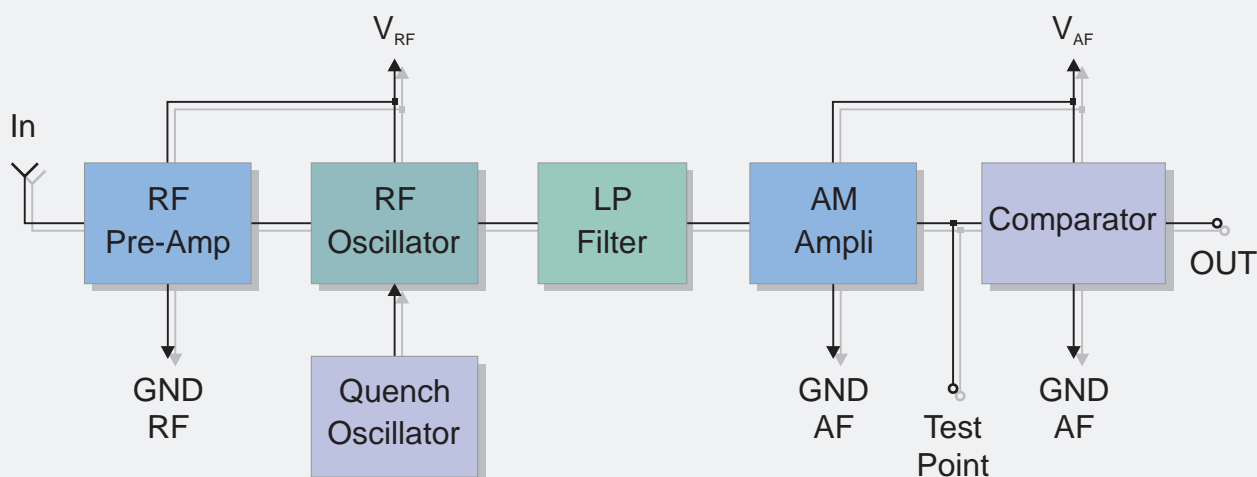
**XXX:** custom-specified working frequency  
( $200 \div 450\ \text{MHz}$ )

Standard European and U.S. frequencies ( $315\text{MHz}$ ,  $418\text{MHz}$ ,  $433.92\text{MHz}$ ) are readily available from stock.

### Applications

- Home security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

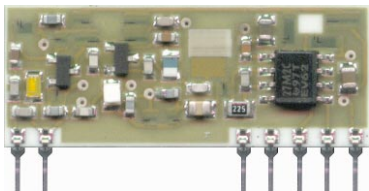
### BLOCK DIAGRAM





## RR13-868.35

### 868.350 MHz Super Regenerative Radio Receiver With Laser Trimmed Capacitor



#### General description

The RR13 is a super regenerative UHF radio receiver with minimum power consumption and good sensitivity.

The RR13 is ideally designed to a variety of remote alarm, control or monitoring battery operated applications.

The frequency accuracy is very high thanks to laser trimming process.

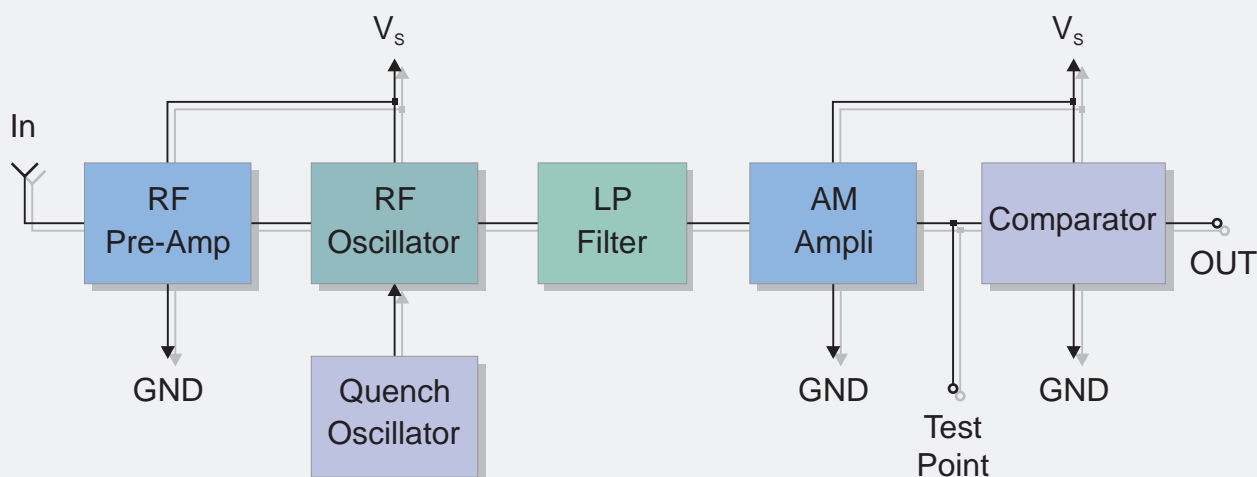
Typical Sensitivity: -90dBm

Current consumption: 500uA

#### Applications

- Home security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

#### BLOCK DIAGRAM



## Electrical Characteristics

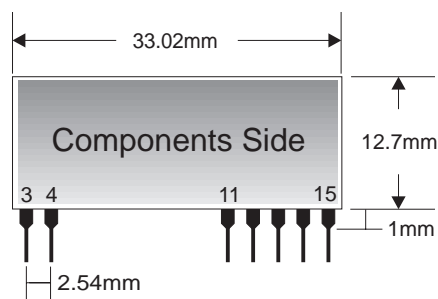
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>s</sub>	Supply Voltage	4.5	5	5.5	VDC
I <sub>s</sub>	Supply Current		500		uA
F <sub>w</sub>	Receiver Frequency		868.350		MHz
	Tuning Tolerance		±0.2	±0.5	MHz
B <sub>w</sub>	-3dB Bandwidth		±2		MHz
	Data Rate	50		4800	bit/sec
	RF Sensitivity (100% AM)		-90		dBm
	Start-Up Time		100		msec
	Conducted Spurious Emissions			-60	dBm
V <sub>ol</sub>	Low-Level Output Voltage			0.25	V
V <sub>oh</sub>	High-Level Output Voltage	3.5			V
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

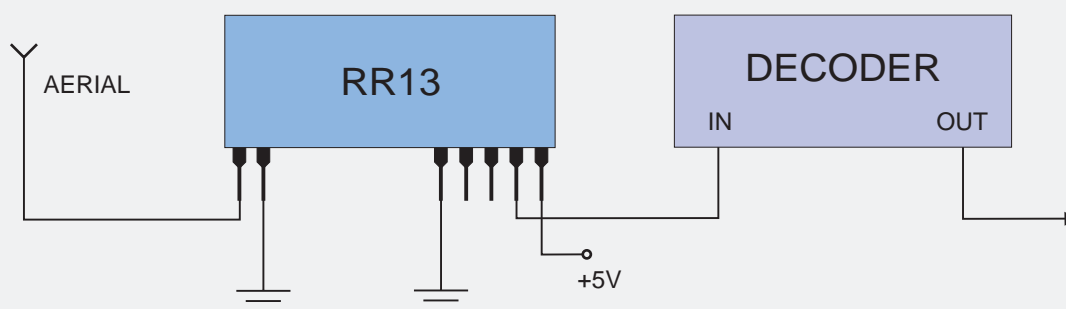
## Pin Description

3	IN
4	GND
11	GND
12	NC
13	Test Point
14	Output
15	+V <sub>CC</sub>

## Mechanical Dimensions

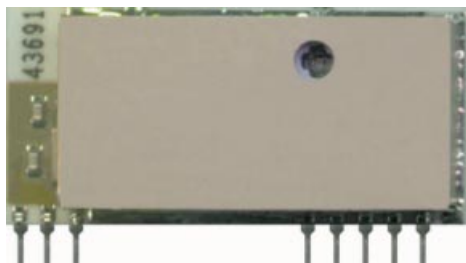


## TYPICAL APPLICATION



## RR15-XXX

### Super Regenerative Radio Receiver with Front End SAW Filter - Shielded



#### General description

The RR15-XXX is a super regenerative data receiver with a front end SAW filter to reduce RF Bandwidth.

EMI immunity improved by a metal shield.

Sensitivity typically exceeds  $-100\text{dBm}$  ( $2.2\mu\text{Vrms}$ ) when matched to  $50\ \Omega$ .

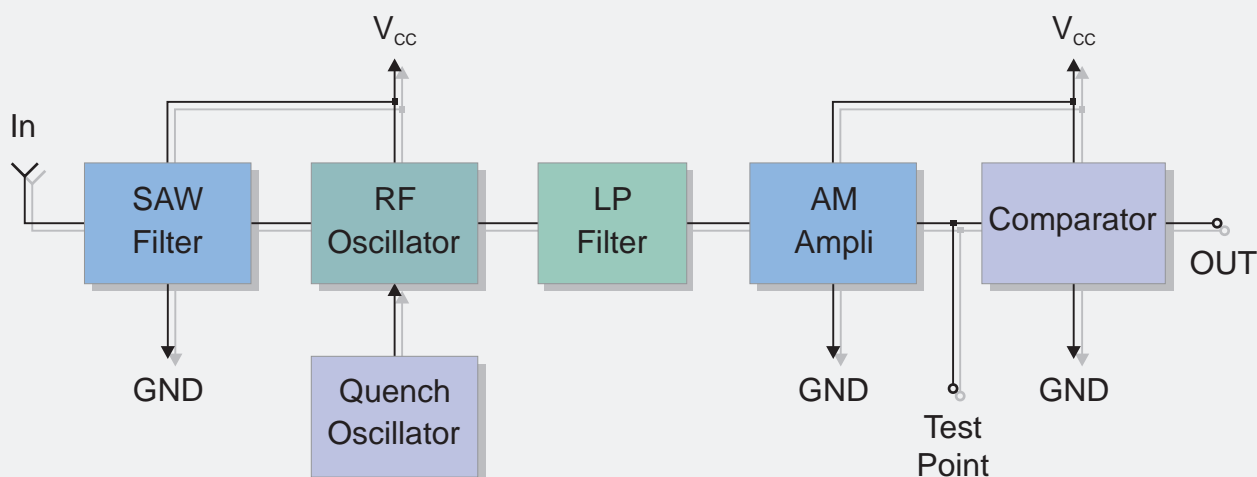
Narrow Bandwidth:  $\pm 250\ \text{KHz}$

**XXX:** custom-specified working frequency

#### Applications

- Home security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

#### BLOCK DIAGRAM



## Electrical Characteristics

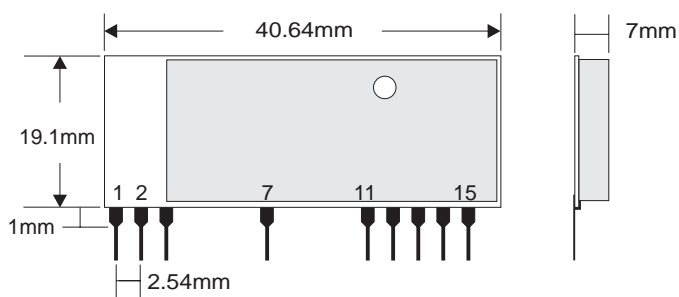
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	4.5	5	5.5	VDC
I <sub>S</sub>	Supply Current		4.0		mA
F <sub>W</sub>	Working Frequency		433.9		MHz
	Tuning Tolerance			+/-75	KHz
B <sub>W</sub>	-3dB Bandwidth		+/-250	+/-300	KHz
	Data Rate		4.8	9.6	Kbit/s
	RF Sensitivity (100% AM)	-98	-102		dBm
	Level of Emitted Spectrum		-75	-70	dBm
V <sub>ol</sub>	Low-Level Output Voltage			0.6	V
V <sub>oh</sub>	High-Level Output Voltage	3.6			V
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

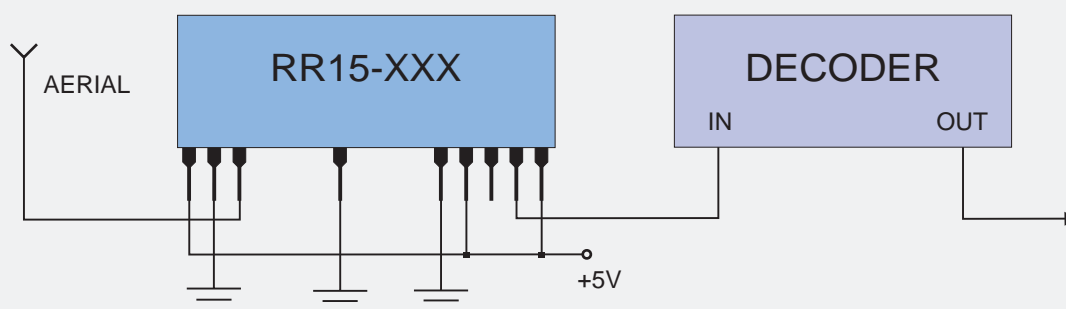
## Pin Description

1	NC	12	+V <sub>CC</sub>
2	GND	13	Test Point
3	IN	14	OUT
7	GND	15	+V <sub>CC</sub>
11	GND		

## Mechanical Dimensions



## TYPICAL APPLICATION



# RT1-XXX

## Radio Transmitter Module (Integrated Antenna)



### General description

The RT1-XXX is an hybrid circuit that allows to realize a complete radio transmitter adding a coding circuit.

The Frequency accuracy is very high thanks to laser trimming process. **PATENTED**

It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

XXX : working frequency (418, 433.92 MHz)

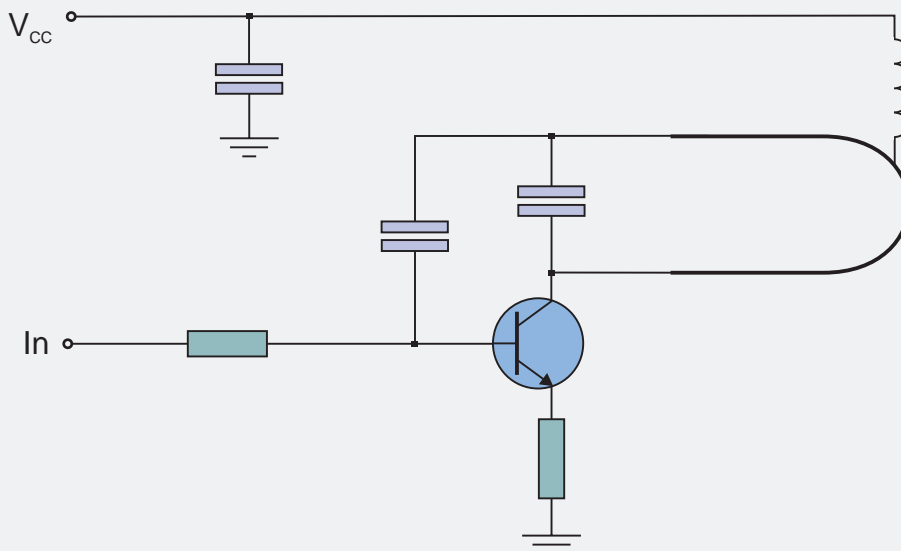
### Features

- Integrated Antenna
- High Reliability
- Laser Trimming Process

### Applications

- Wireless security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

### CIRCUIT SCHEMATIC



## Electrical Characteristics

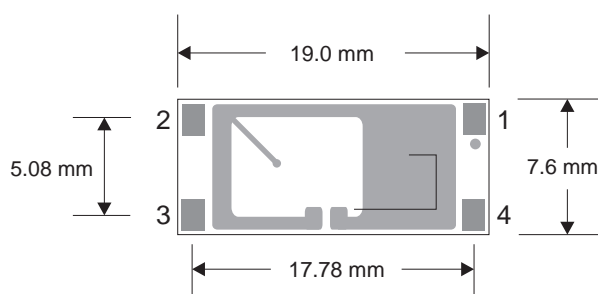
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	9		14	VDC
I <sub>S</sub>	Supply Current		3		mA
F <sub>W</sub>	Working Frequency		418/433.92		MHz
	Tuning Tolerance		±0.2	±0.5	MHz
	Max Data Rate			4	KHz
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

## Pin Description

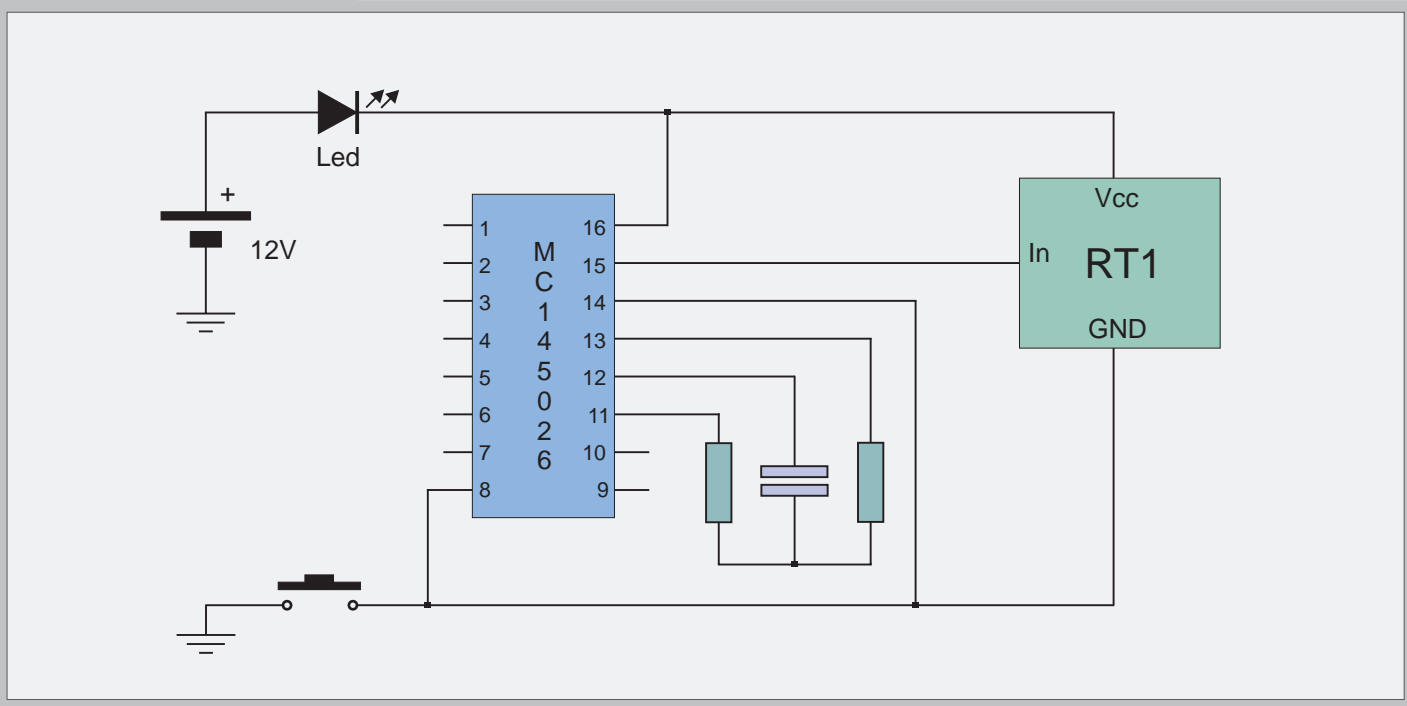
1	GND	Ground
2	IN	Modulation Input
3	NC	Not Connected
4	V <sub>CC</sub>	Supply Voltage

## Mechanical Dimensions



TOP VIEW

## TYPICAL APPLICATION



## RT2-XXX

### Radio Transmitter Module with SAW Resonator (Integrated Antenna)



#### General description

The RT2-XXX is an hybrid circuit that allows to realize a complete radio transmitter adding a coding circuit.

It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

XXX : working frequency (418, 433.92 MHz)

#### I-ETS 300-220 Compliance

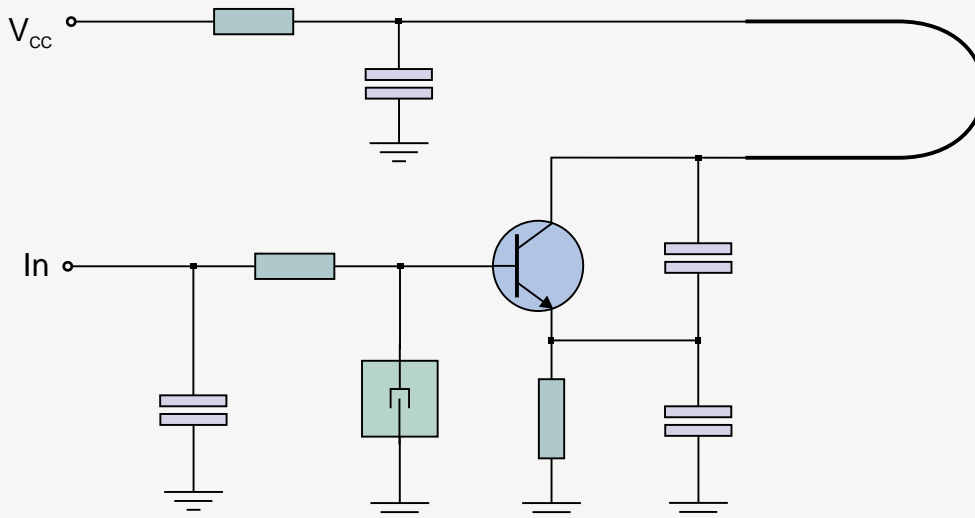
#### Features

- Integrated Antenna
- High Reliability
- DIL Package

#### Applications

- Wireless security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

#### CIRCUIT SCHEMATIC



## Electrical Characteristics

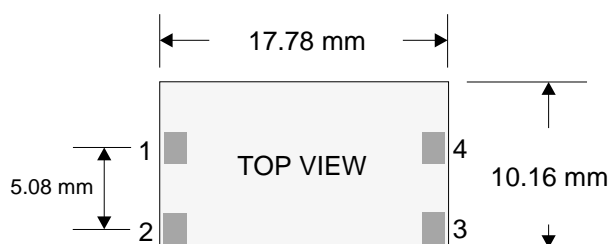
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	3		14	VDC
I <sub>S</sub>	Supply Current		3		mA
F <sub>W</sub>	Working Frequency		418/433.92		MHz
	Max Data Rate			4	KHz
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

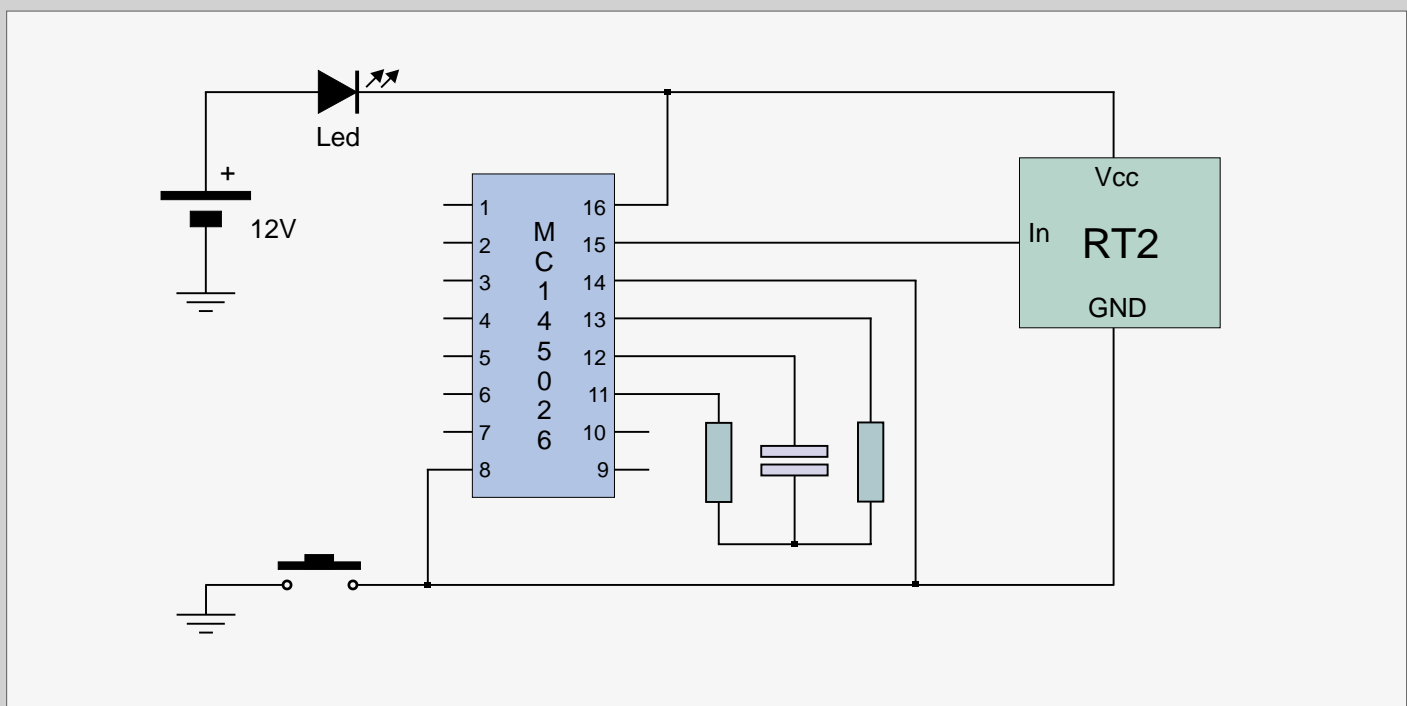
## Pin Description

1	V <sub>CC</sub>	Supply Voltage
2	GND	Ground
3	IN	Modulation Input
4	NC	Not Connected

## Mechanical Dimensions



## TYPICAL APPLICATION



## RT4-XXX

### Radio Transmitter Module with SAW Resonator and External Antenna



#### General description

The RT4-XXX is an hybrid circuit that allows to realize a complete radio transmitter adding a coding circuit.

It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

XXX : working frequency (315, 418, 433.92 MHz)

#### I-ETS 300 220 Compliance (RT4-433.92-IETS)

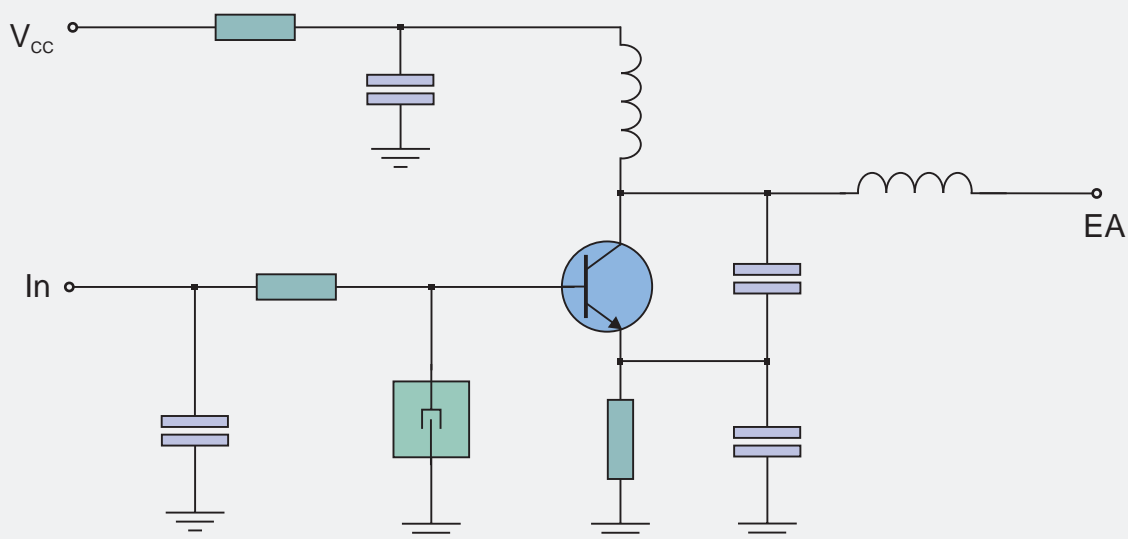
#### Features

- High Reliability
- DIL Package

#### Applications

- Wireless security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

#### CIRCUIT SCHEMATIC



## Electrical Characteristics

Ta = 25°C unless otherwise specified

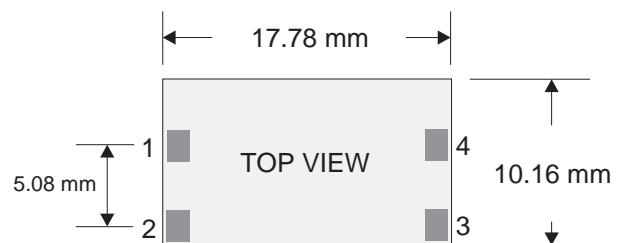
CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	2		14	VDC
I <sub>S</sub>	Supply Current (V <sub>CC</sub> =5V IN=1KHz Square Wawe)		4		mA
F <sub>W</sub>	Working Frequency	303.8		433.92	MHz
P <sub>O</sub>	RF Output Power into 50Ω (Vi=5V, Vcc=12V)		7	10	dBm
	Harmonic Spurious Emission		-30		dBc
V <sub>IH</sub>	Input High Voltage	2		V <sub>CC</sub>	V
	Max Data Rate			4	KHz
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

Typically, equipment utilizing this device requires emissions testing and government approval, wich is the responsibility of the equipment manufacturer .

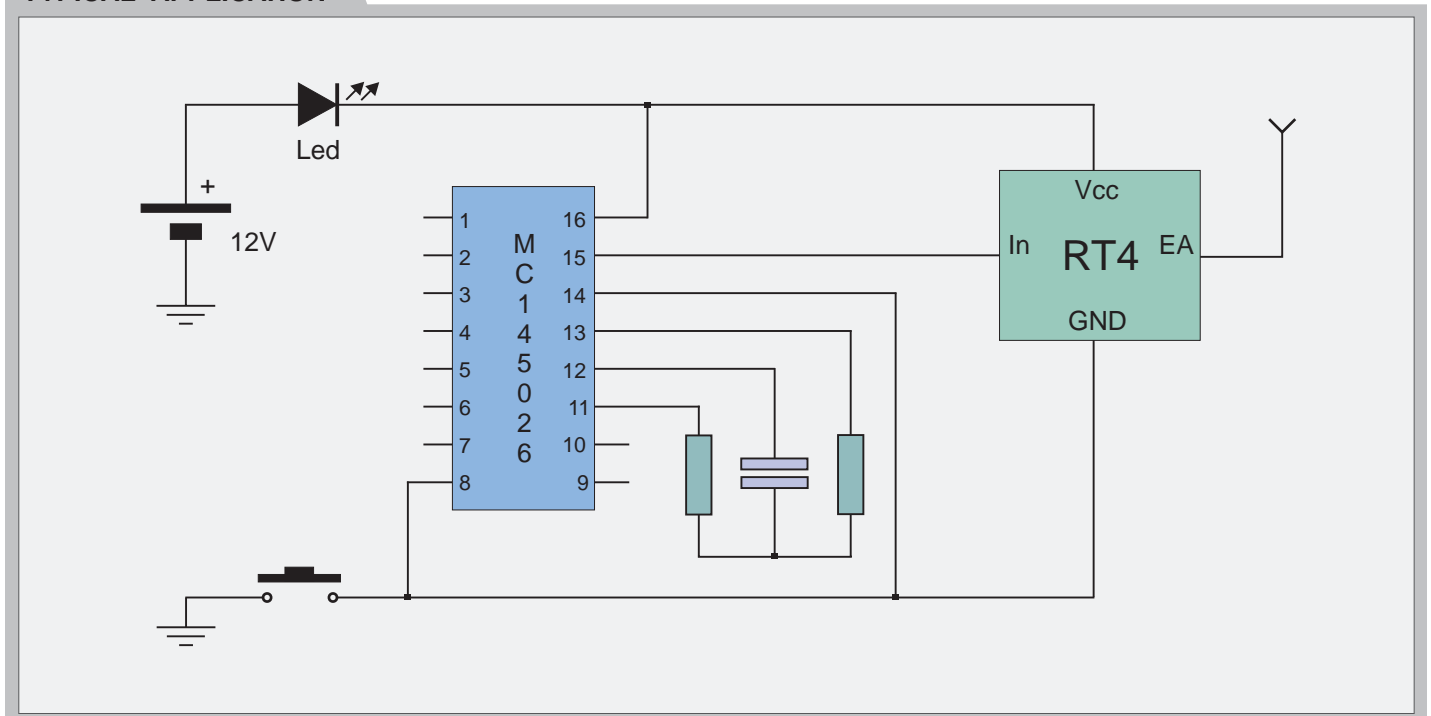
## Pin Description

1	V <sub>CC</sub>	Supply Voltage
2	GND	Ground
3	IN	Modulation Input
4	EA	External Antenna

## Mechanical Dimensions



## TYPICAL APPLICATION



## RT5-XXX

Radio Transmitter Module with SAW Resonator and External Antenna



### General description

The RT5-XXX is a hybrid circuit that allows to realize a complete radio transmitter adding a coding circuit.

It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

XXX : working frequency (315, 418, 433.92 MHz)

**I-ETS 300 220 Compliance (RT4-433.92-IETS)**

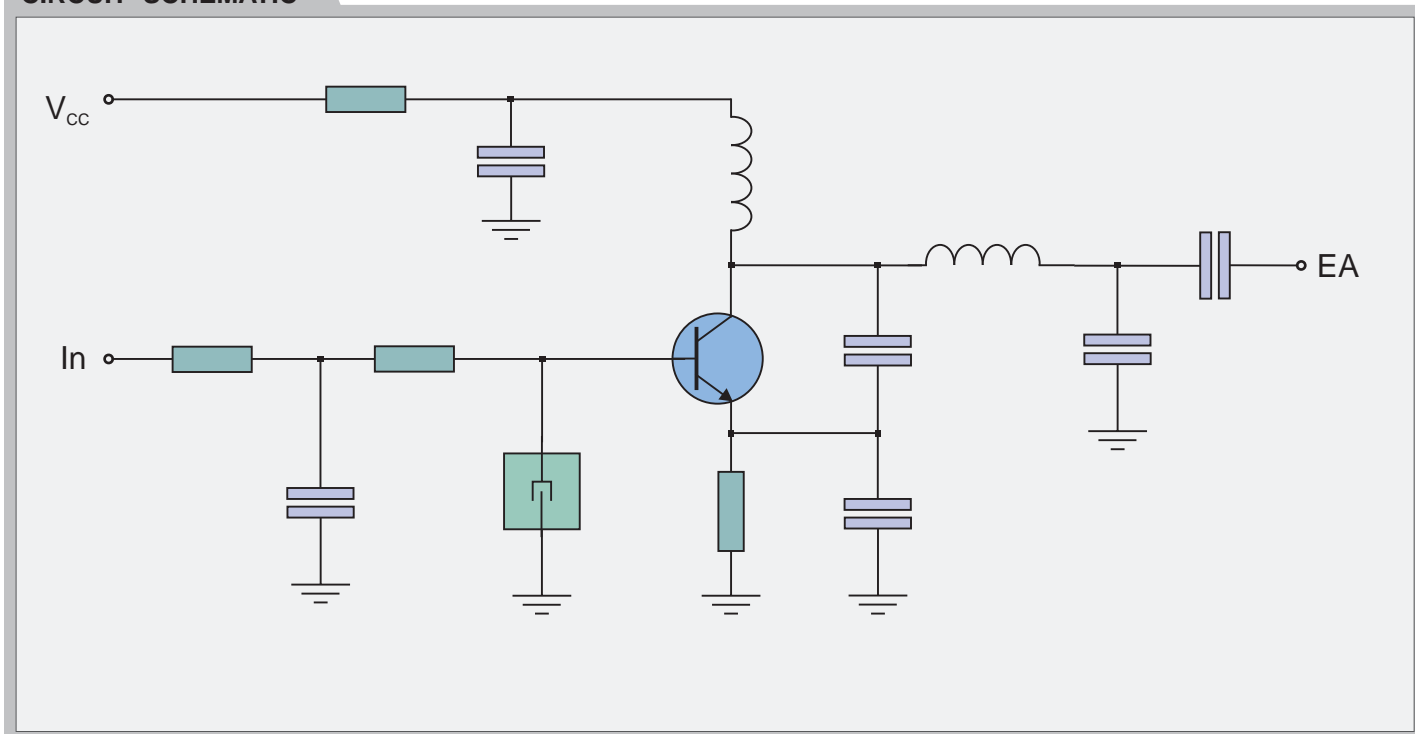
### Features

- High Reliability
- SIL Package

### Applications

- Wireless security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

### CIRCUIT SCHEMATIC



## Electrical Characteristics

Ta = 25°C unless otherwise specified

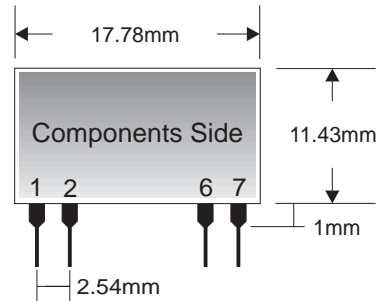
CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	2		14	VDC
I <sub>S</sub>	Supply Current (V <sub>CC</sub> =5V IN=1KHz Square Wave)		3		mA
F <sub>W</sub>	Working Frequency	303.8		433.92	MHz
P <sub>O</sub>	RF Output Power into 50Ω (Vi=5V, Vcc=12V)		7	10	dBm
	Harmonic Spurious Emission		-35		dBc
V <sub>IH</sub>	Input High Voltage	2		V <sub>CC</sub>	V
	Max Data Rate			4	KHz
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

Typically, equipment utilizing this device requires emissions testing and government approval, which is the responsibility of the equipment manufacturer.

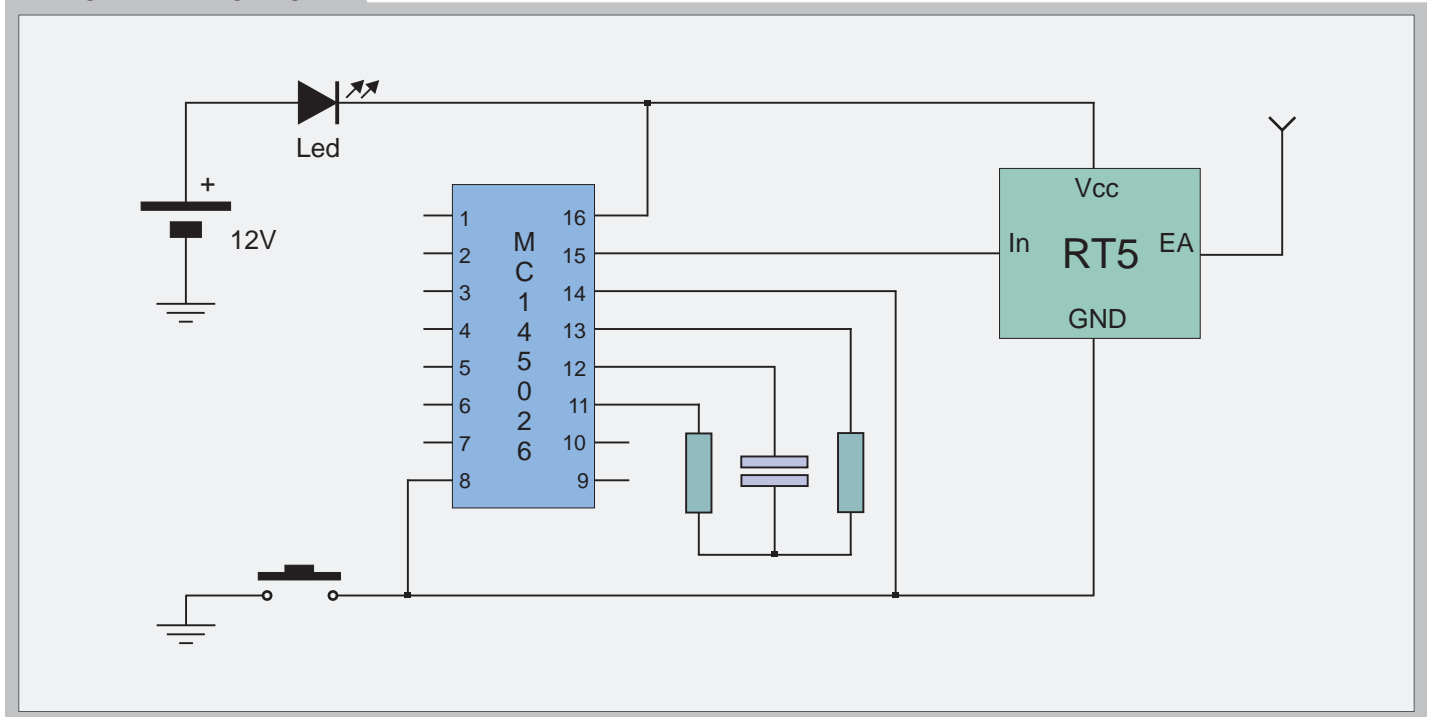
## Pin Description

1	EA	External Antenna
2	IN	Modulation Input
6	GND	Ground
7	VCC	Supply Voltage

## Mechanical Dimensions

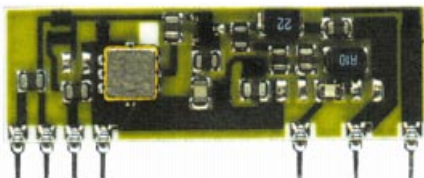


## TYPICAL APPLICATION



## RT6-XXX

Radio Transmitter Module with SAW Resonator and External Antenna



### General description

The RT6-XXX is a hybrid circuit that allows to realize a complete radio transmitter adding a coding circuit.

It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

XXX : working frequency (315, 418, 433.92 MHz)

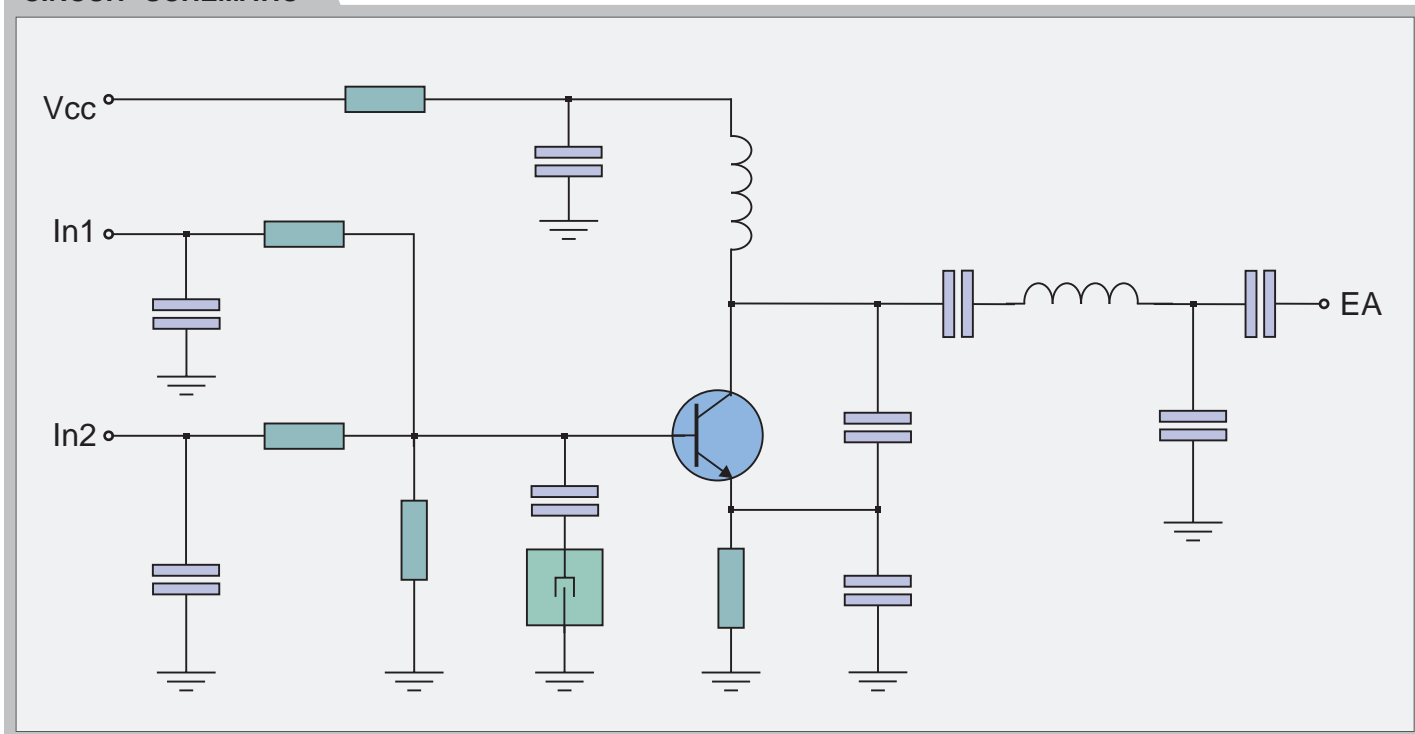
### Features

- High Reliability
- SIL Package

### Applications

- Wireless security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

### CIRCUIT SCHEMATIC



## Electrical Characteristics

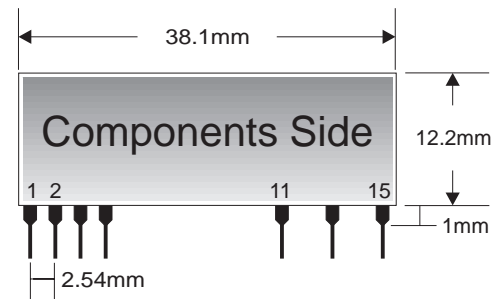
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	2.7		14	VDC
I <sub>S</sub>	Supply Current (IN=1KHz Square Wawe)		See Table		mA
F <sub>W</sub>	Working Frequency	303.8		433.92	MHz
P <sub>O</sub>	RF Output Power into 50Ω		See Table		dBm
	Harmonic Spurious Emission		-50		dBc
V <sub>IH</sub>	Input High Voltage	2.5		V <sub>CC</sub>	V
	Max Data Rate			4	KHz
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

## RF Output Power

V <sub>CC</sub> (V)	IN1	IN2	P <sub>O</sub> (dBm)	I <sub>S</sub> (mA)
3 ÷ 5	0 ÷ V <sub>CC</sub>	NC	3 ÷ 8	3 ÷ 7
5 ÷ 8	NC	0 ÷ 5	7 ÷ 10	3 ÷ 4
8 ÷ 12	0 ÷ 5	NC	12 ÷ 15	7 ÷ 9

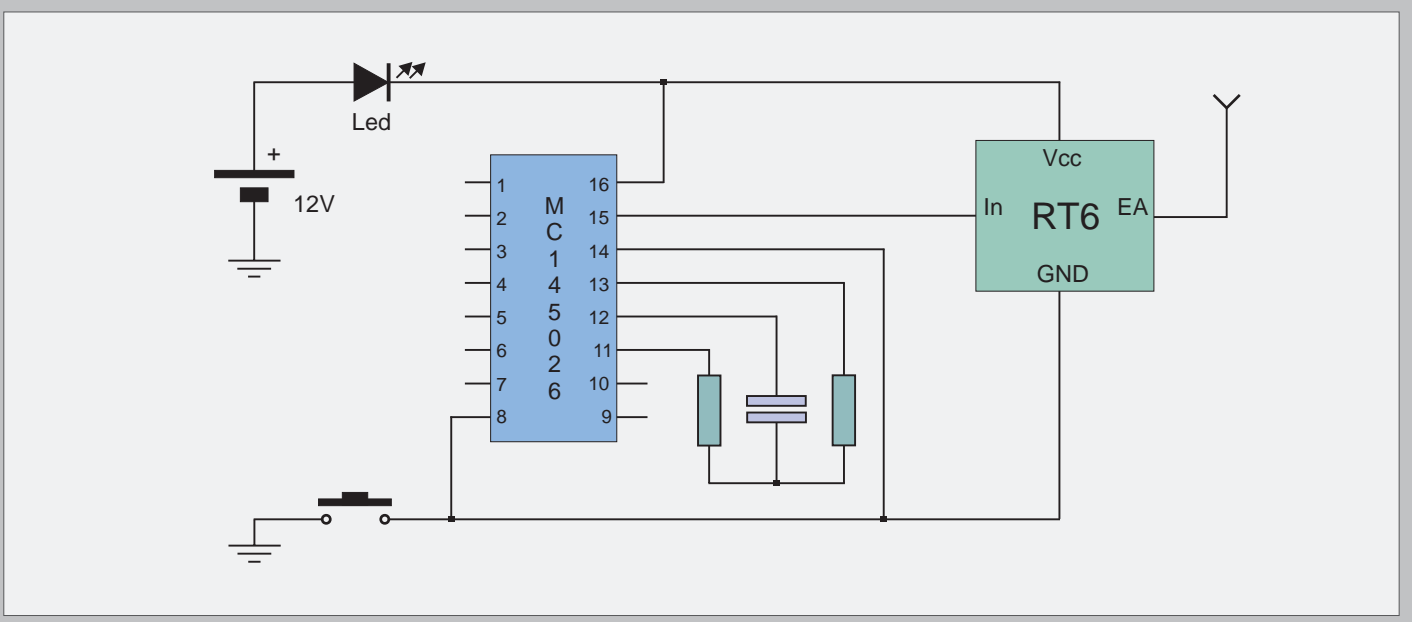
## Mechanical Dimensions



## Pin description

1 GND	4 GND	15 Vcc
2 IN1	11 EA	
3 IN2	13 GND	

## TYPICAL APPLICATION



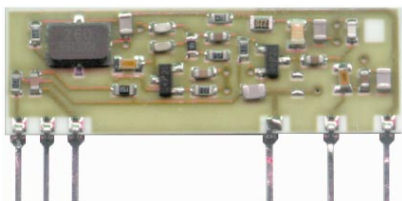
## RT8-868.35

868.350 MHz Radio Transmitter Module with SAW Resonator and External Antenna

### General description

The RT8 is a SAW stabilized ASK (OOK) transmitter. For a better stability and modulation it employs a two transistor design: an oscillator and a separate power amplifier.

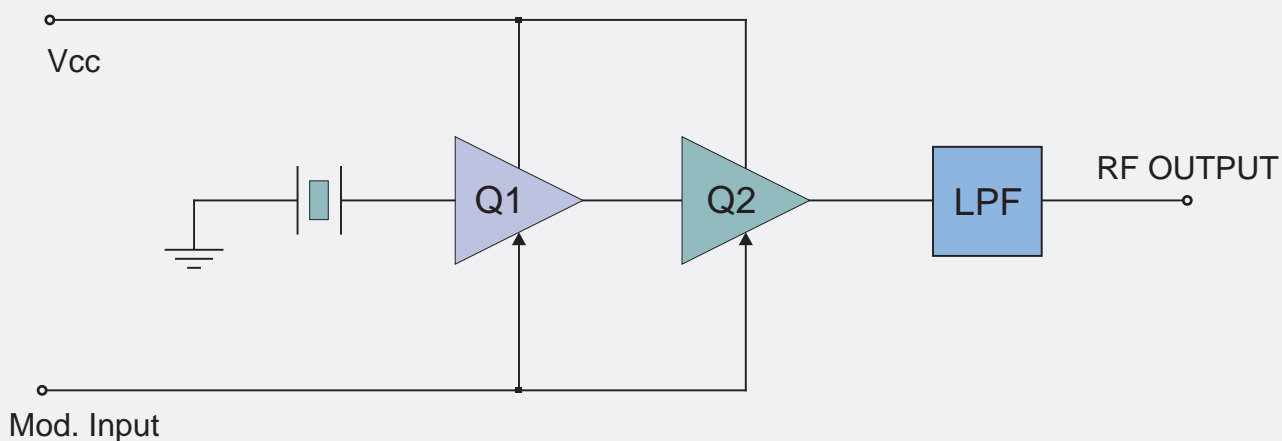
The RT8 is provided by a low-pass filter to attenuate the harmonic emissions.



### Applications

- Wireless security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

### CIRCUIT SCHEMATIC



## Electrical Characteristics

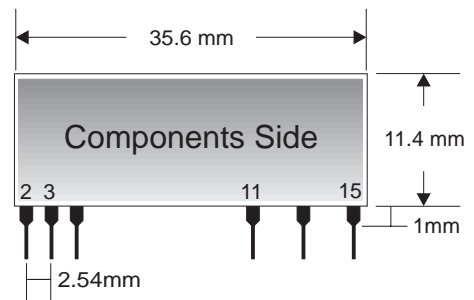
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	4.0		13	VDC
I <sub>CC</sub>	Supply Current (V <sub>CC</sub> =5V IN=1KHz Square Wave)		12		mA
F <sub>W</sub>	Working Frequency		868.350		MHz
	Overall Frequency Accuracy	868.200		868.500	MHz
P <sub>O</sub>	RF Output Power into 50Ω (V <sub>CC</sub> =5V)		7	10	dBm
	Harmonic Spurious Emission		-35		dBc
	Max Data Rate			9.6	Kbps
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

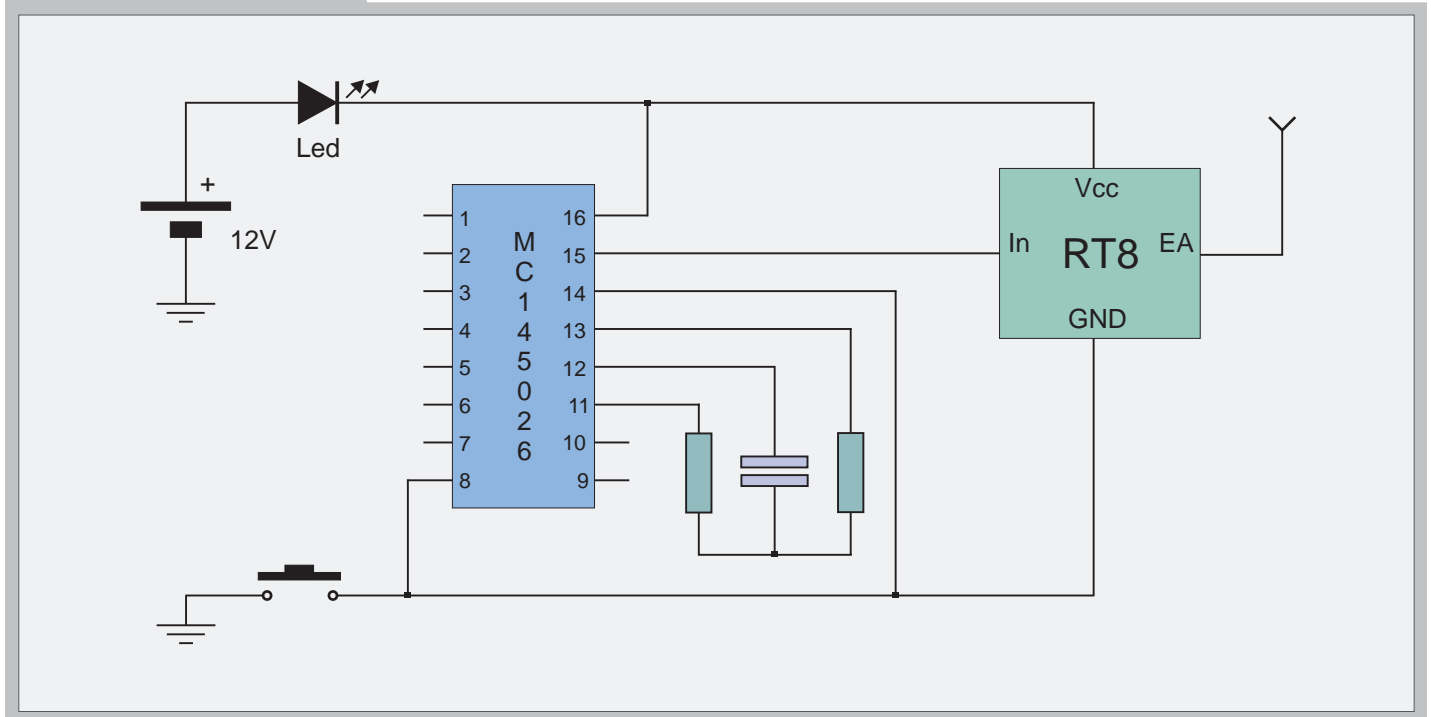
## Pin description

2	Mod. Input	11	GND
3	NC	13	RF Output
4	GND	15	V <sub>CC</sub>

## Mechanical Dimensions

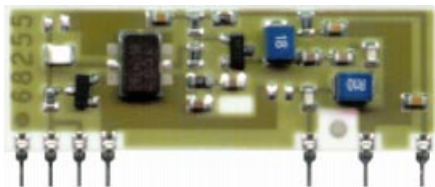


## TYPICAL APPLICATION



## RTF2-XXX

FSK Radio Transmitter Module with SAW Resonator and External Antenna



### General description

The RTF2-XXX is a hybrid circuit that allows to realize a complete FSK radio transmitter adding a coding circuit.

It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

Up to 250 meters range with RRF1-XXX receiver.

XXX: custom-specified working frequency (315, 418, 433.92 MHz)

### Features

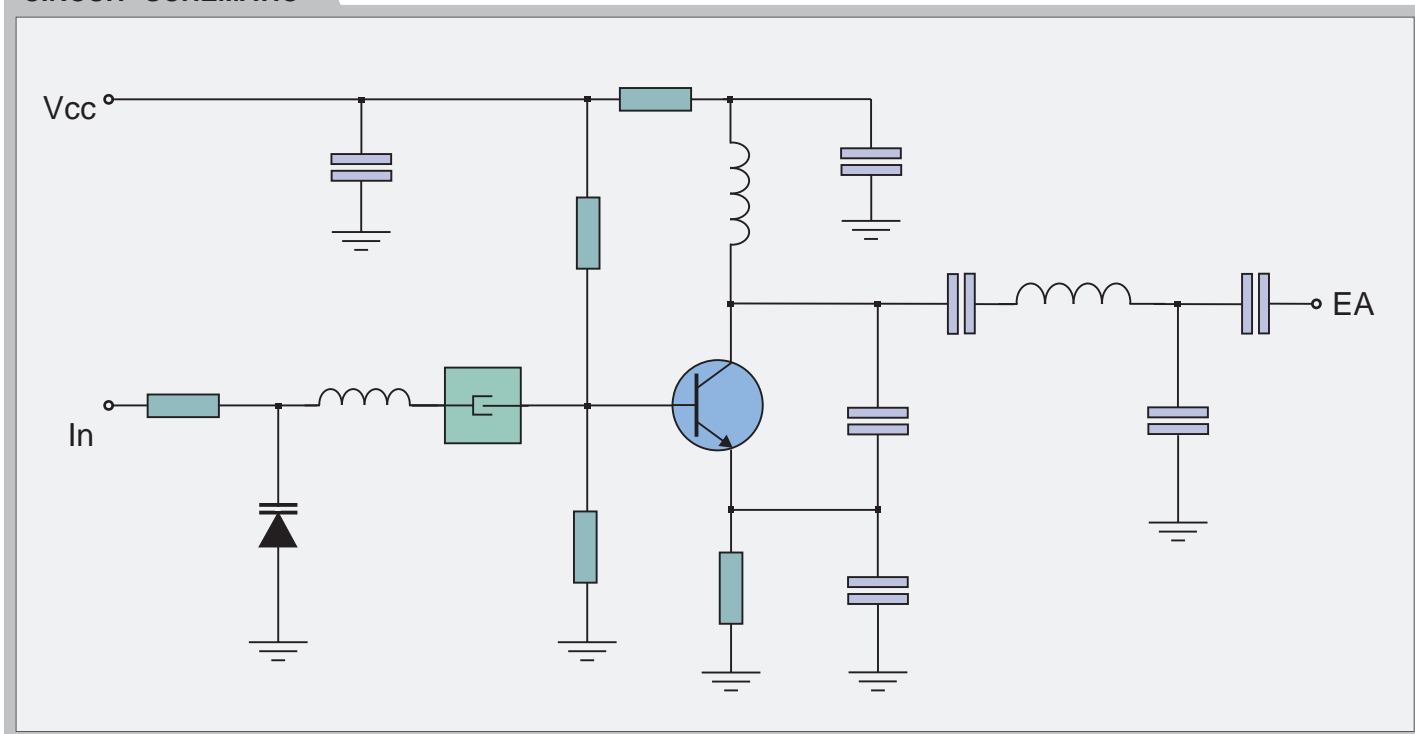
- High Reliability
- SIL Package

### I-ETS 300-220 Compliance

### Applications

- Wireless security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

### CIRCUIT SCHEMATIC



## Electrical Characteristics

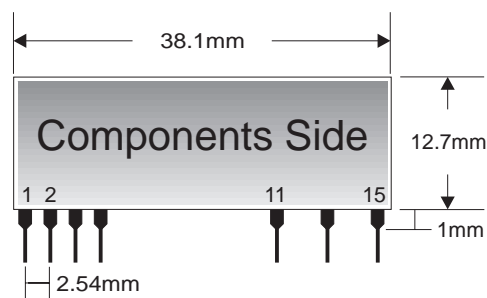
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	2.7		14	VDC
I <sub>S</sub>	Supply Current		15		mA
ΔF	Frequency Deviation		50		KHz
P <sub>O</sub>	RF Output Power into 50Ω		+7		dBm
	Harmonic Spurious Emission		-50		dBc
V <sub>IH</sub>	Input High Voltage	2.5		V <sub>CC</sub>	V
	Max Data Rate			9.6	Kbps
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

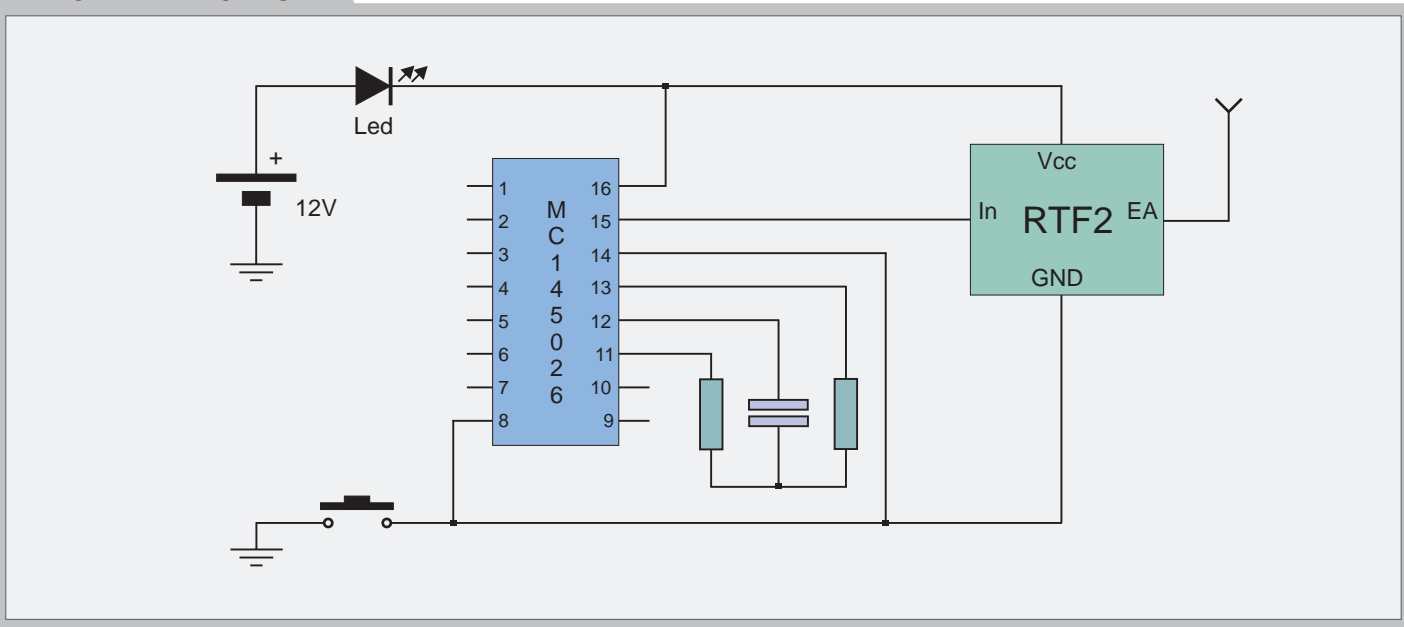
## Pin description

- 1 GND
- 2 IN
- 3 IN
- 4 GND
- 11 EA
- 13 GND
- 15 Vcc

## Mechanical Dimensions

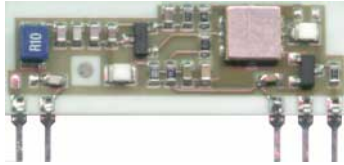


## TYPICAL APPLICATION



## RTF6-XXX

### FSK Radio Transmitter Module with SAW Resonator and External Antenna



#### General description

The RTF6-XXX is a hybrid circuit that allows to realize a complete FSK radio transmitter adding a coding circuit.

It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

Up to 250 meters range with RRF1-XXX receiver.

XXX: custom-specified working frequency  
(315, 418, 433.92 MHz)

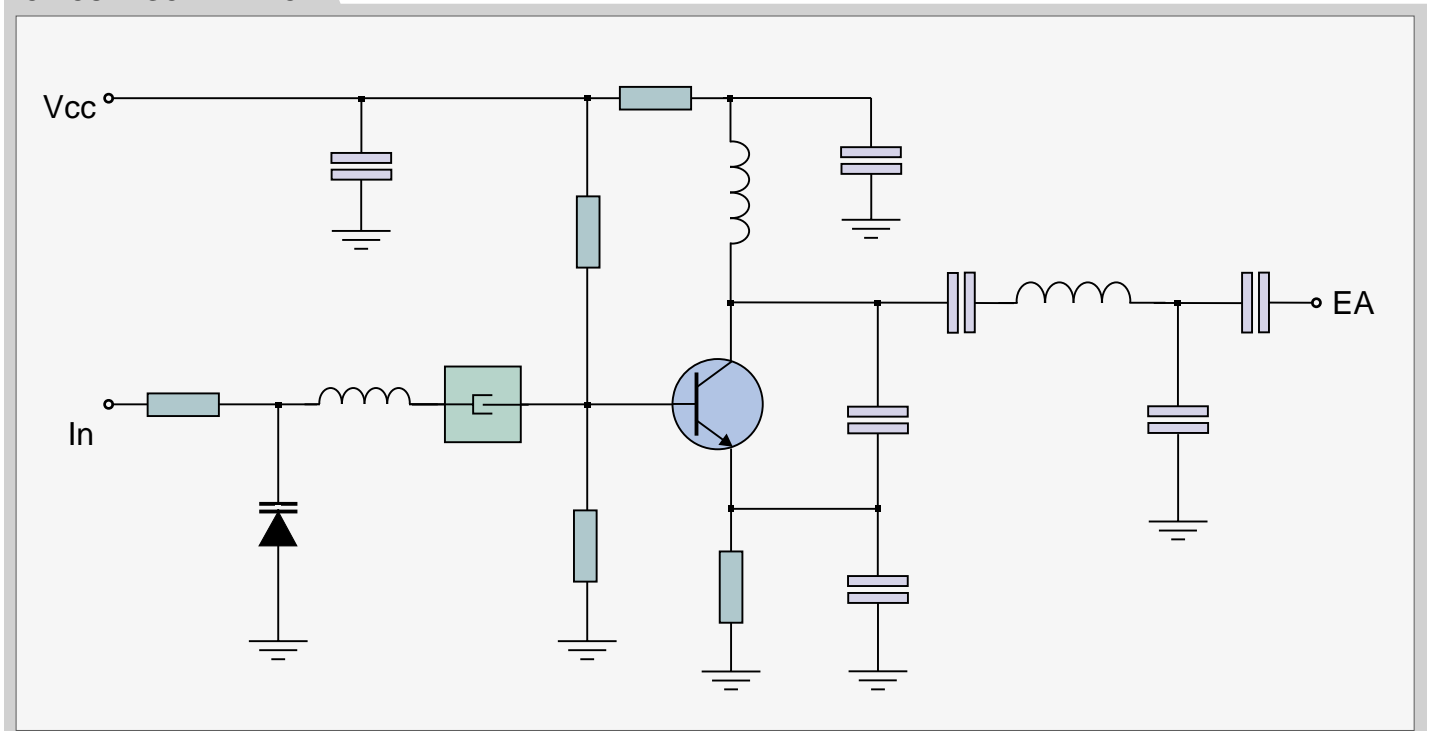
#### Features

- High Reliability
- SIL Package

#### Applications

- Wireless security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

#### CIRCUIT SCHEMATIC



## Electrical Characteristics

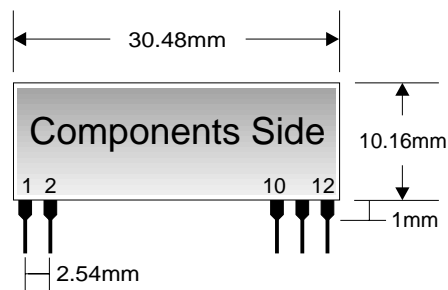
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	2.7		14	VDC
I <sub>S</sub>	Supply Current		15		mA
ΔF	Frequency Deviation		50		KHz
P <sub>O</sub>	RF Output Power into 50Ω		+7		dBm
	Harmonic Spurious Emission		-50		dBc
V <sub>IH</sub>	Input High Voltage	2.5		V <sub>CC</sub>	V
	Max Data Rate			9.6	Kbps
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

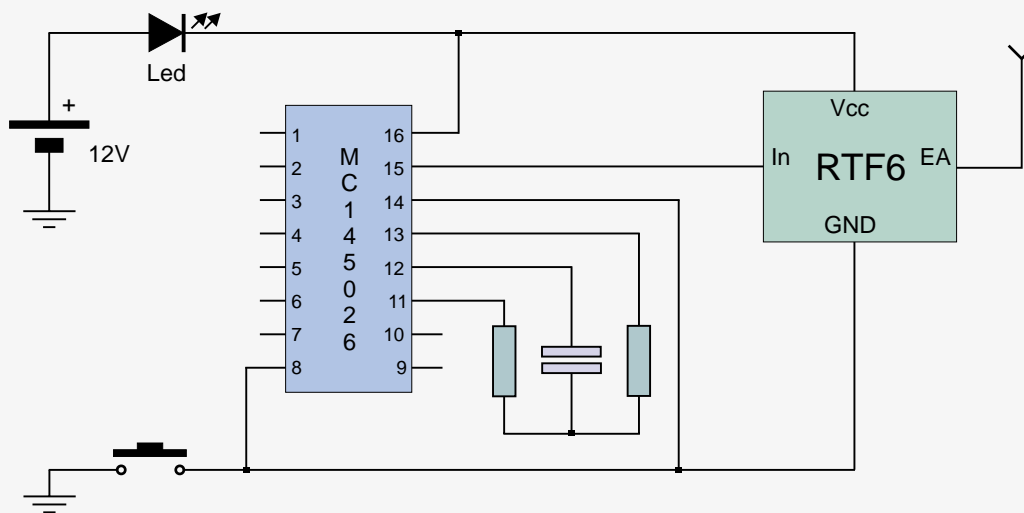
## Pin description

1	GND	Ground
2	EA	External Antenna
10	V <sub>CC</sub>	Supply Voltage
11	GND	Ground
12	IN	Modulation Input

## Mechanical Dimensions

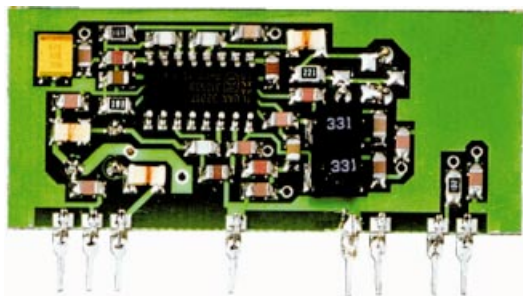


## TYPICAL APPLICATION



## RRS1-XXX

### AM Superhet Receiver With SAW Front End Filter



#### General description

The RRS1-XXX is an AM superhet data receiver with SAW front end filter.

IF Frequency: 500KHz

Typical sensitivity: -100dBm (2.2uVrms)

Supply current: 3.7 mA (typ)

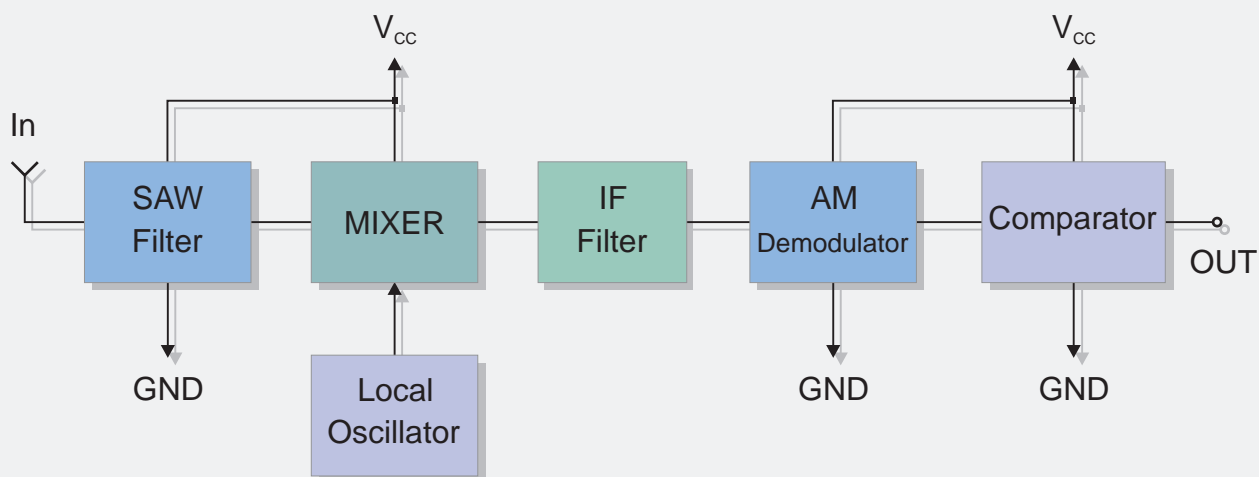
#### I-ETS 300 220 Compliance

**XXX:** custom-specified working frequency  
(315, 418, 433.92 MHz)

#### Applications

- Wireless security systems
- Car Alarm systems
- Remote gate controls
- Sensor reporting

#### BLOCK DIAGRAM



## Electrical Characteristics

Ta = 25°C unless otherwise specified

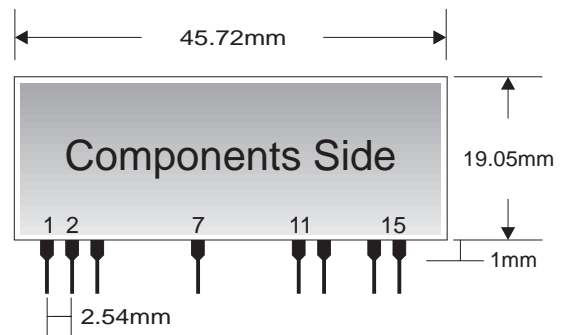
CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	4.5	5	5.5	VDC
I <sub>S</sub>	Supply Current		3.7	5	mA
F <sub>R</sub>	Receiver Frequency		315/418/433.92		MHz
F <sub>IF</sub>	IF Frequency		500		KHz
	Max Data Rate			3	KHz
	RF Sensitivity (100% AM)*		-100		dBm
	Level of Emitted Spectrum		-65	-60	dBm
V <sub>ol</sub>	Low-Level Output Voltage (I=-200uA)			0.6	V
V <sub>oh</sub>	High-Level Output Voltage (I=10uA)	V <sub>CC</sub> - 0.5			V
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

\* Best Performances are obtained utilizing a transmitted coding with a DC average value independent of the data content (BiPhase Manchester coding)

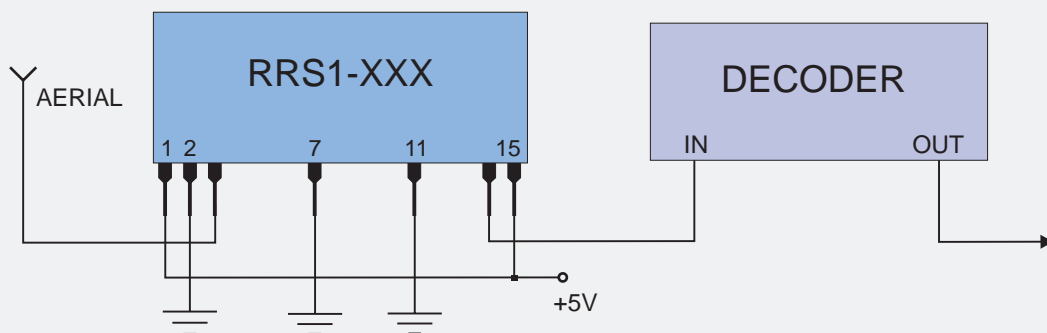
## Pin Description

1	V <sub>CC</sub>	9	NC
2	GND	10	NC
3	IN	11	GND
4	NC	12	V <sub>CC</sub>
5	NC	13	NC
6	NC	14	OUT
7	GND	15	V <sub>CC</sub>
8	NC		

## Mechanical Dimensions



## TYPICAL APPLICATION



## Electrical Characteristics

Ta = 25°C unless otherwise specified

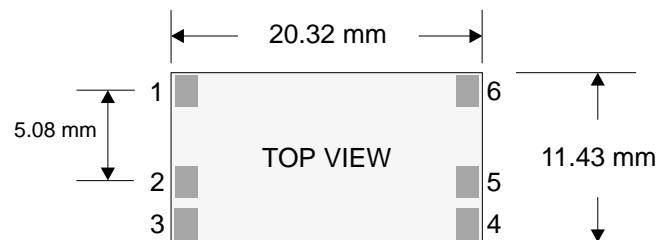
CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	2.2	3.3	4	VDC
I <sub>S</sub>	Operating Supply Current		7	8	mA
I <sub>STANDBY</sub>	Standby Supply Current (IN = EN = Low)			100	nA
F <sub>W</sub>	Working Frequency		315/433.9/868.35		MHz
P <sub>O</sub>	RF Output Power into 50Ω (V <sub>CC</sub> = 3.3V)		+5 / +5 / +1		dBm
	Initial Frequency Accuracy	-35	0	+35	KHz
	FM Deviation (+/-)	25	30	35	KHz
	Harmonic Spurious Emission		-40		dBc
V <sub>IH</sub>	Input High Voltage	1.5		V <sub>CC</sub>	V
	Max Data Rate			9.6	Kbps
	Power-Up Time (EN → full RF)			1	msec
T <sub>OP</sub>	Operating Temperature Range	-25		+80	°C

EN	IN	STATE
L	L	Power Down Mode
H	H / L	Transmit Mode

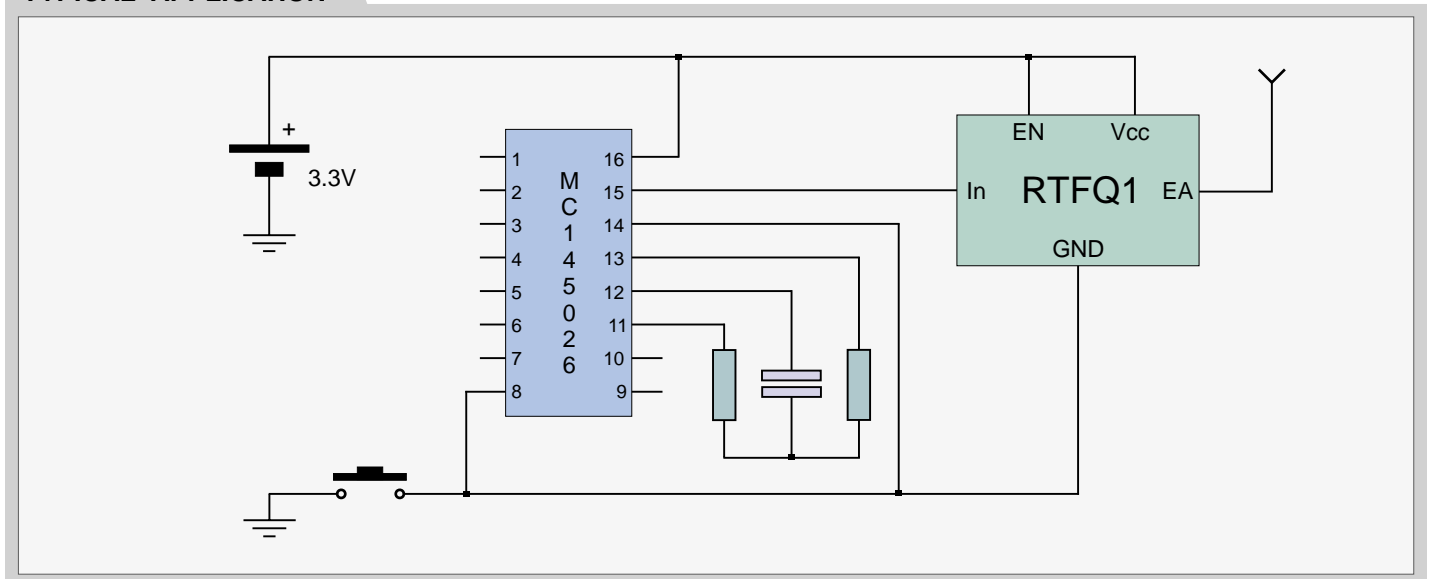
## Pin Description

1	EN	Enable	4	V <sub>CC</sub>	Supply Voltage
2	IN	Data In	5	GND	Ground
3	GND	Ground	6	EA	External Antenna

## Mechanical Dimensions

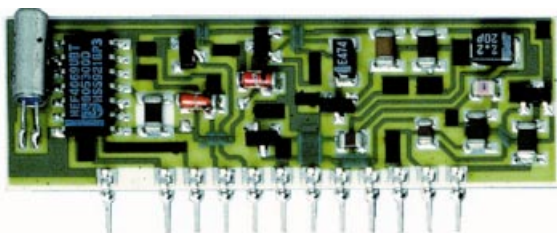


## TYPICAL APPLICATION



# UTR1

## Ultrasonic Transmitter / Receiver



### General description

The UTR1 is an hybrid circuit that allows to realize an ultrasonic detector adding few external components.

Detection is based on amplitude variation of received ultrasonic signal (40KHz) due to the movement of an object.

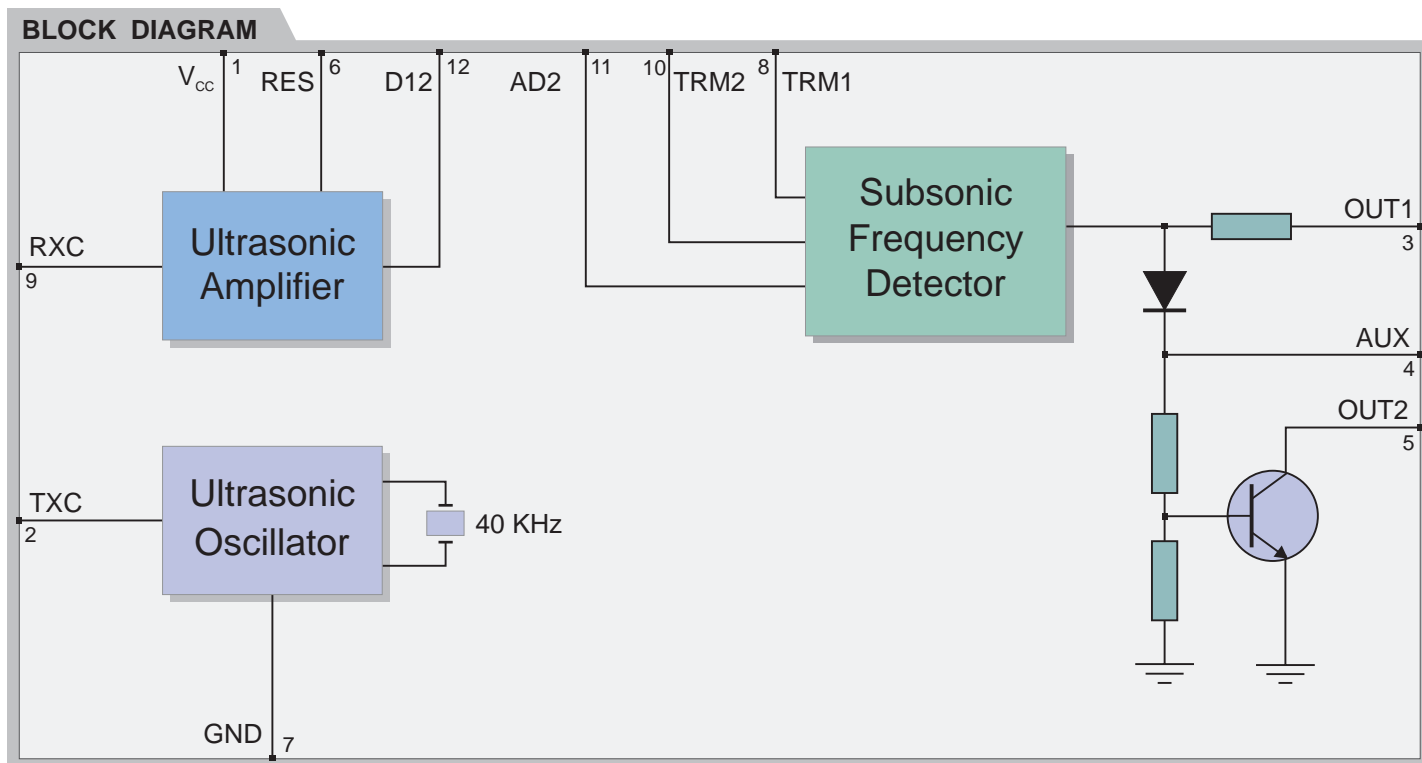
It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

### Features

- High RFI Immunity
- SIL Package

### Applications

- Car Alarm systems
- Residential and commercial security systems
- Automatic doors opening systems



## Electrical Characteristics

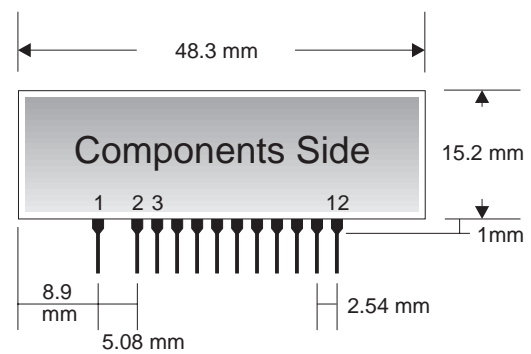
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	9	12	16	VDC
I <sub>S</sub>	Supply Current		9		mA
G	Ultrasonic Amplifier Gain		50		dB
F <sub>U</sub>	Ultrasonic Frequency	38	40	42	KHz
I <sub>o</sub>	Out2 Sink Current			100	mA
T <sub>OP</sub>	Operating Temperature Range	-20		+80	°C

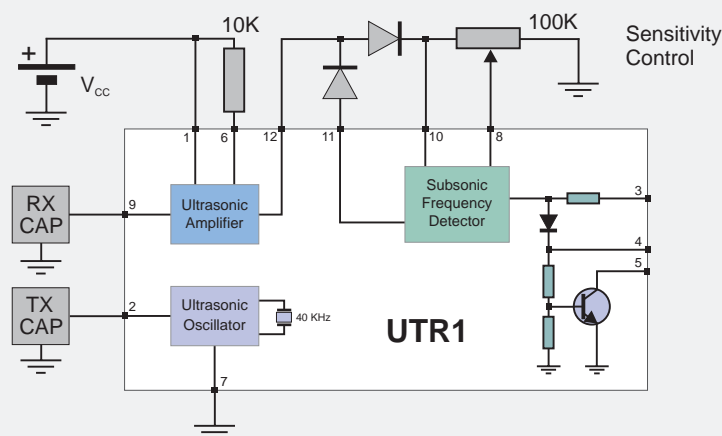
## Pin Description

1	V <sub>CC</sub>	Supply Voltage
2	TXC	Ultrasonic Piezoceramic Transmitter Output (TXCAP)
3	OUT1	Output Signal (OUT = "HIGH" if objet is moving)
4	AUX	Auxiliary Output Signal
5	OUT2	Open Collector Output
6	RES	Pull-up Resistor Input
7	GND	Ground
8	TRM1	External Trimmer
9	RXC	Ultrasonic Piezoceramic Receiver input (RXCAP)
10	TRM2	External Trimmer
11	AD2	External Diode Anode
12	D12	External Diodes Common Point

## Mechanical Dimensions



## TYPICAL APPLICATION



TX CAP : MA40S3S Murata

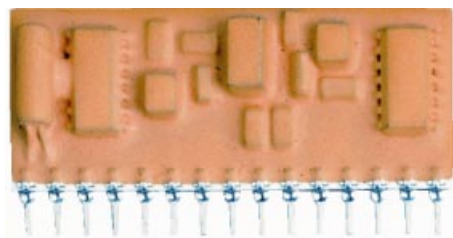
RX CAP : MA40S3R Murata

D1 -D2 : Germanium Diode

Component typical values

# UTR2

## Ultrasonic Transmitter / Receiver



### General description

The UTR2 is a hybrid circuit that allows to realize an ultrasonic detector adding few external components.

Detection is based on amplitude variation of received ultrasonic signal (40KHz) due to the movement of an object.

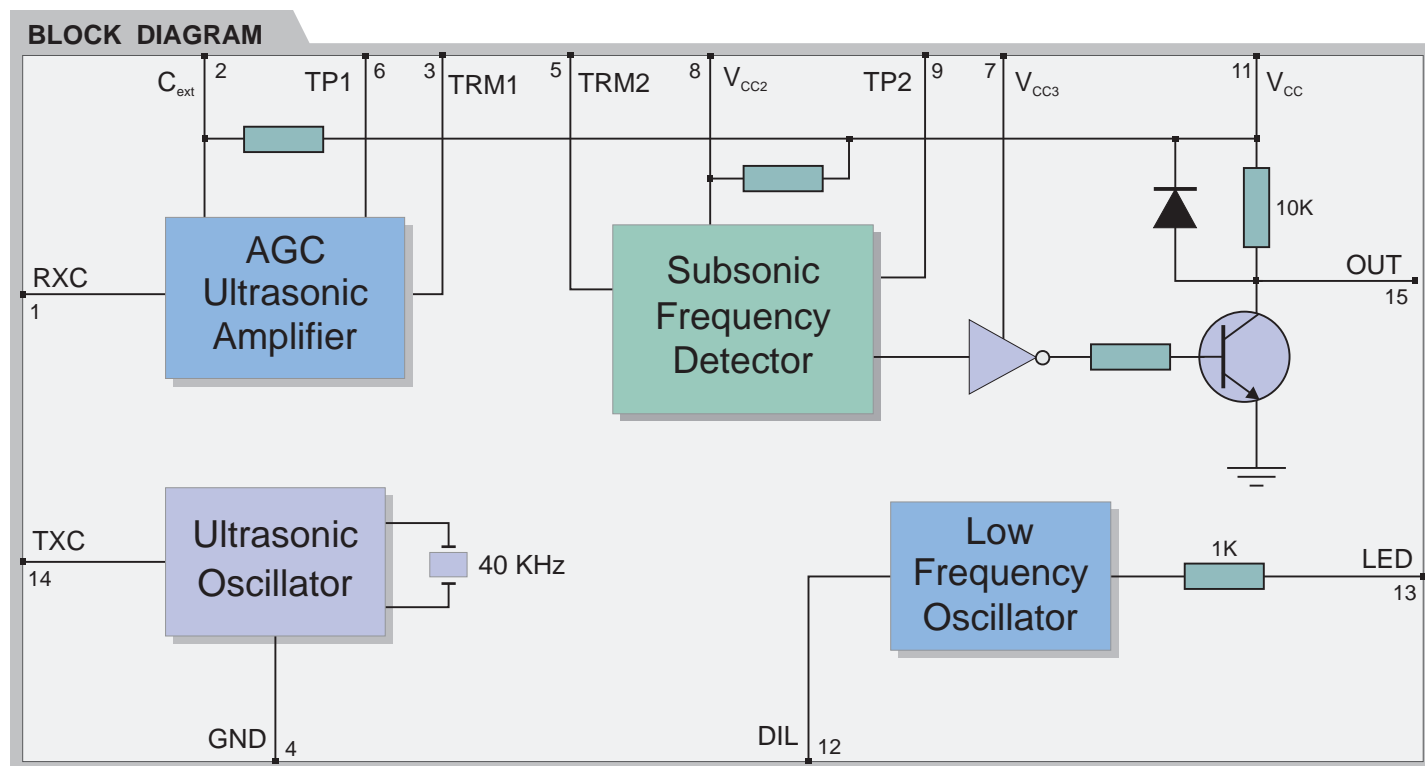
It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

### Features

- AC Input Amplifier with Automatic Gain Control
- Output Relay Driving with Ricirculation Diode

### Applications

- Car Alarm systems
- Residential and commercial security systems
- Automatic doors opening systems



## Electrical Characteristics

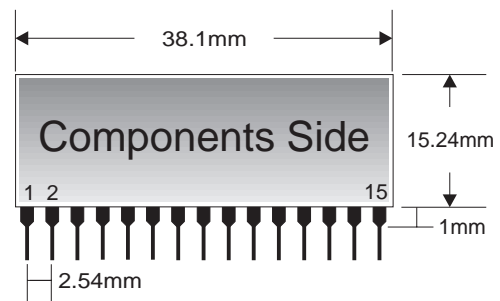
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	9	12	16	VDC
I <sub>S</sub>	Supply Current		15		mA
G	Ultrasonic Amplifier Gain		50		dB
F <sub>U</sub>	Ultrasonic Frequency	38	40	42	KHz
I <sub>o</sub>	Out2 Sink Current			20	mA
T <sub>OP</sub>	Operating Temperature Range	-20		+80	°C

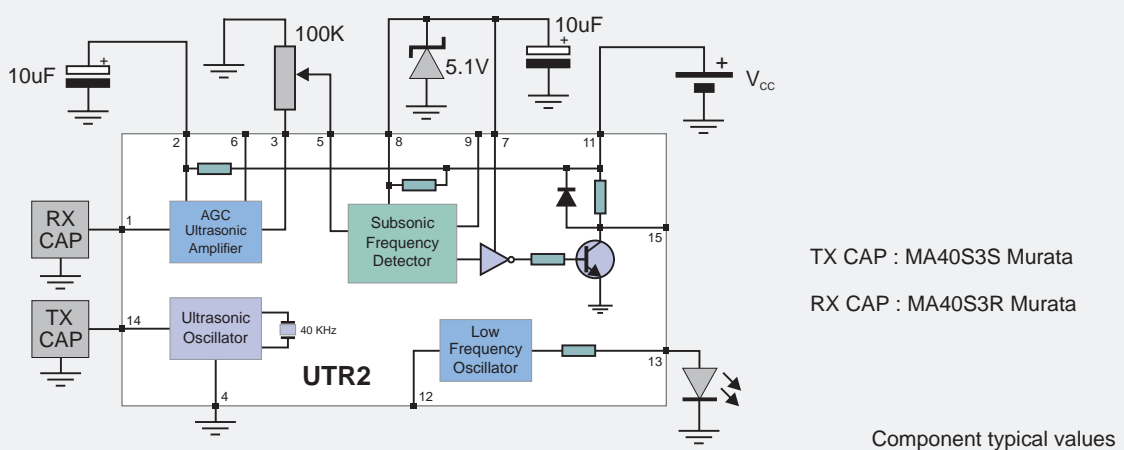
## Pin Description

1	RXC	Ultrasonic Piezoceramic Receiver Input (RXCAP)
2	Cext	Supply Voltage External Capacitor
3	TRM1	External Trimmer
4	GND	Ground
5	TRM2	External Trimmer
6	TP1	Test Point
7	VCC3	Supply Voltage of output stage
8	VCC2	Supply Voltage of internal stage
9	TP2	Test Point
10	INS	Internal signal: not to be connect
11	VCC	External Supply Voltage
12	DIL	Disable signal LED control: active Low
13	LED	LED control signal
14	TXC	Ultrasonic Piezoceramic Transmitter Output (TXCAP)
15	OUT	OUT="LOW" if Objet is moving

## Mechanical Dimensions

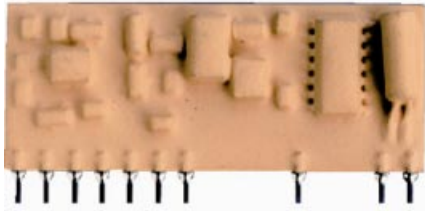


## TYPICAL APPLICATION



# UTR3

## Ultrasonic Transmitter / Receiver



### General description

The UTR3 is an hybrid circuit that allows to realize an ultrasonic detector adding few external components.

Detection is based on amplitude variation of received ultrasonic signal (40KHz) due to the movement of an object.

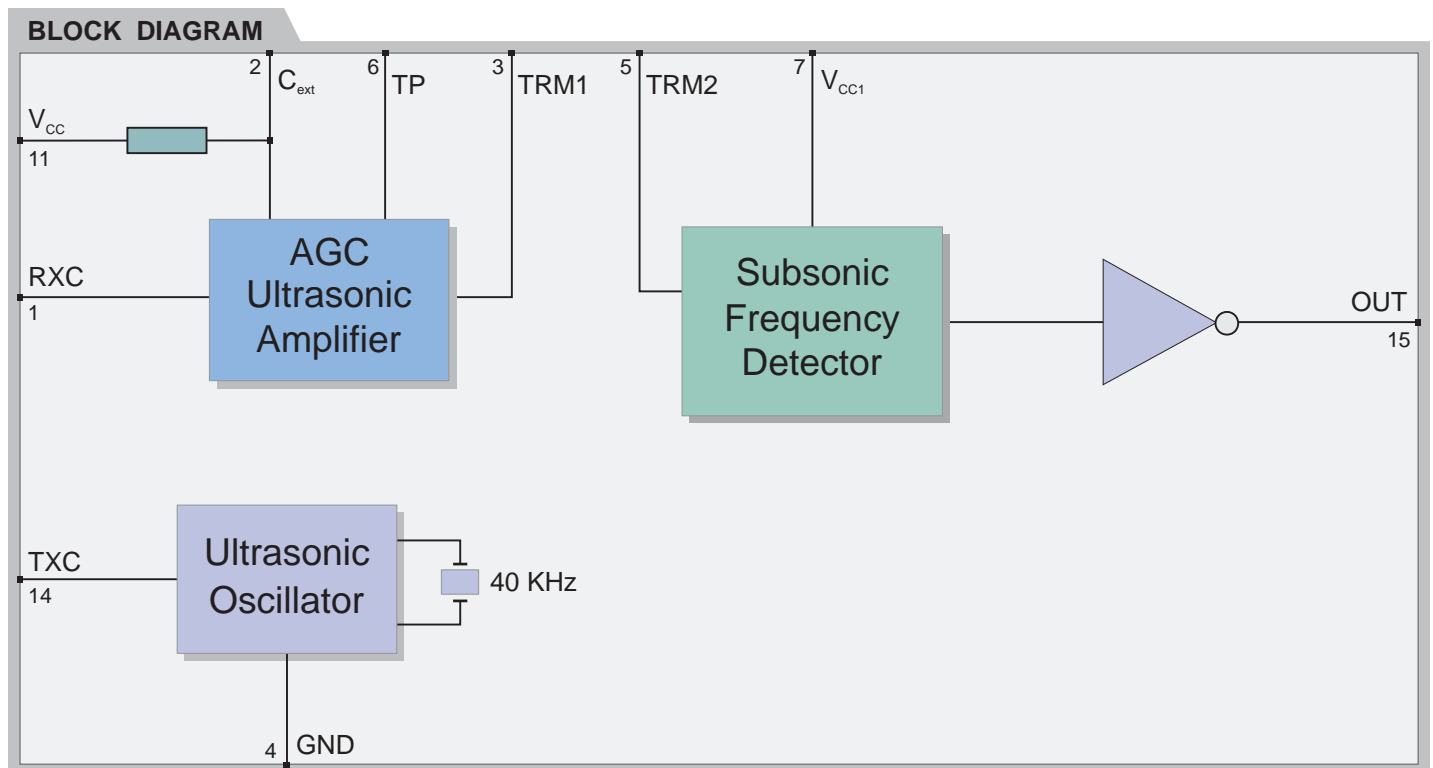
It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

### Features

- AC Input Amplifier with Automatic Gain Control

### Applications

- Car Alarm systems
- Residential and commercial security systems
- Automatic doors opening systems



## Electrical Characteristics

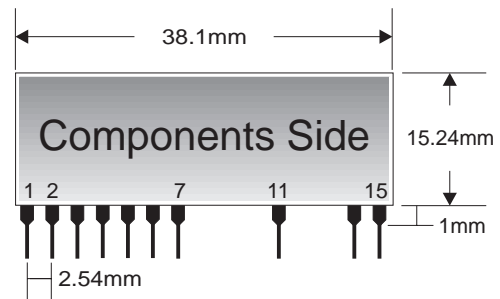
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	9	12	16	VDC
V <sub>CC1</sub>	Supply Voltage	4.5	5	5.5	VDC
I <sub>S</sub>	Supply Current		10		mA
G	Ultrasonic Amplifier Gain		50		dB
F <sub>U</sub>	Ultrasonic Frequency	38	40	42	KHz
I <sub>OL</sub>	Out Sink Current (Vo = 0.4V)	0.5	1		mA
I <sub>OH</sub>	Out Source Current (Vo = 4.6V)	0.5	1		mA
T <sub>OP</sub>	Operating Temperature Range	-20		+80	°C

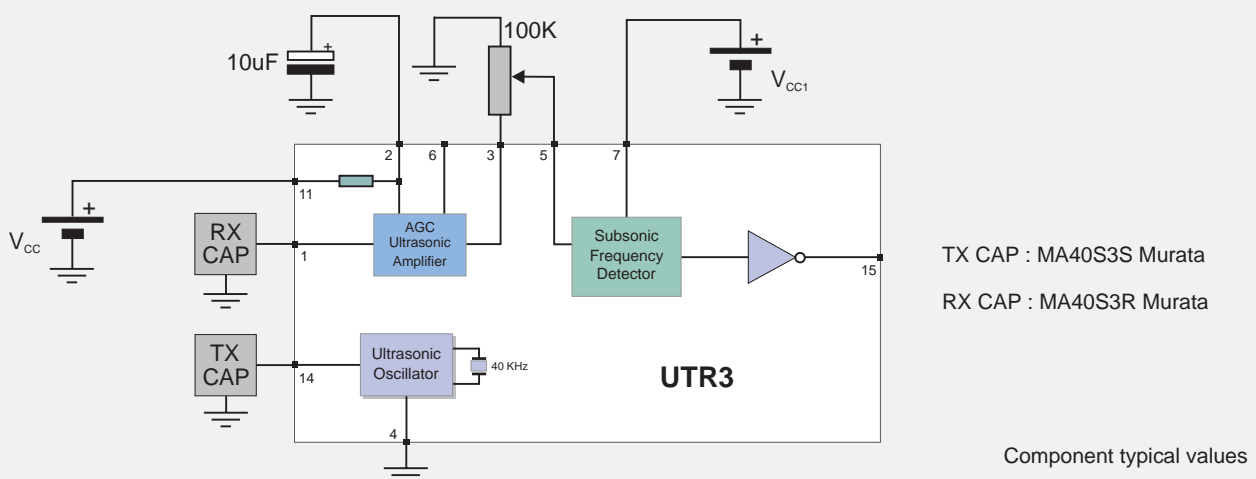
## Pin Description

1	RXC	Ultrasonic Piezoceramic Receiver Input (RXCAP)
2	Cext	Supply Voltage External Capacitor
3	TRM1	External Trimmer
4	GND	Ground
5	TRM2	External Trimmer
6	TP	Test Point
7	VCC1	+5V Supply Voltage
11	VCC	+12V Supply Voltage
14	TXC	Ultrasonic Piezoceramic Transmitter Output (TXCAP)
15	OUT	OUT="LOW" if Objet is moving

## Mechanical Dimensions

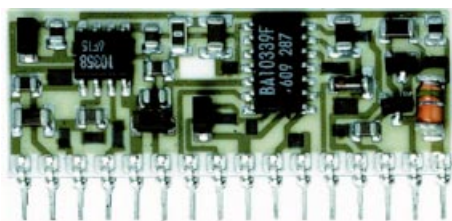


## TYPICAL APPLICATION



# PID1

## Passive Infrared Detector



### General description

The PID1 is an hybrid circuit that allows to realize a passive infrared detector adding few external components.

Detection is based on infrared radiations emitted by human body.

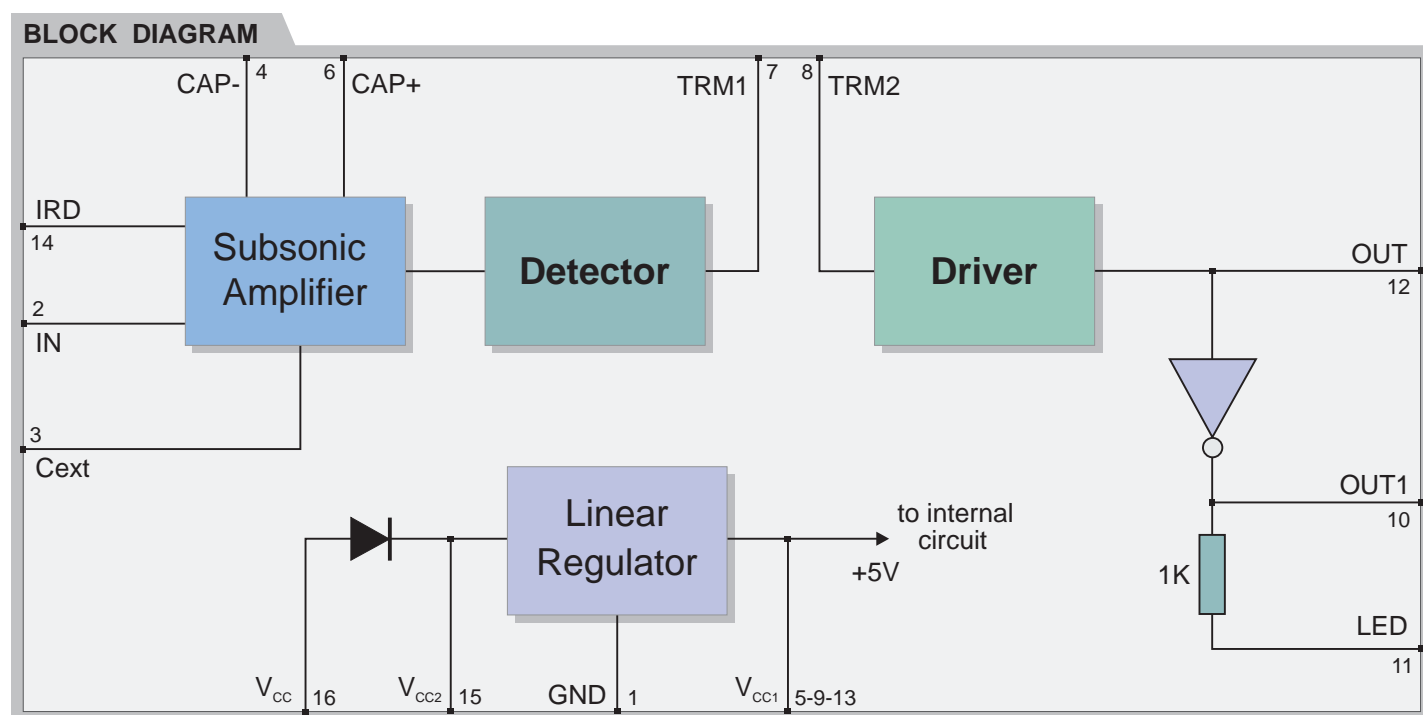
It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

### Features

- High RFI Immunity
- SIL Package

### Applications

- Residential and commercial security systems
- Automatic doors opening systems



## Electrical Characteristics

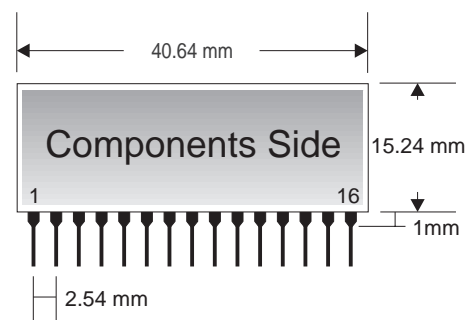
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	9	12	16	VDC
I <sub>S</sub>	Supply Current		5		mA
G	Amplifier Gain		70		dB
B <sub>W</sub>	Amplifier Bandwidth	1		10	KHz
I <sub>o</sub>	Out2 Sink Current			20	mA
T <sub>OP</sub>	Operating Temperature Range	-10		+70	°C

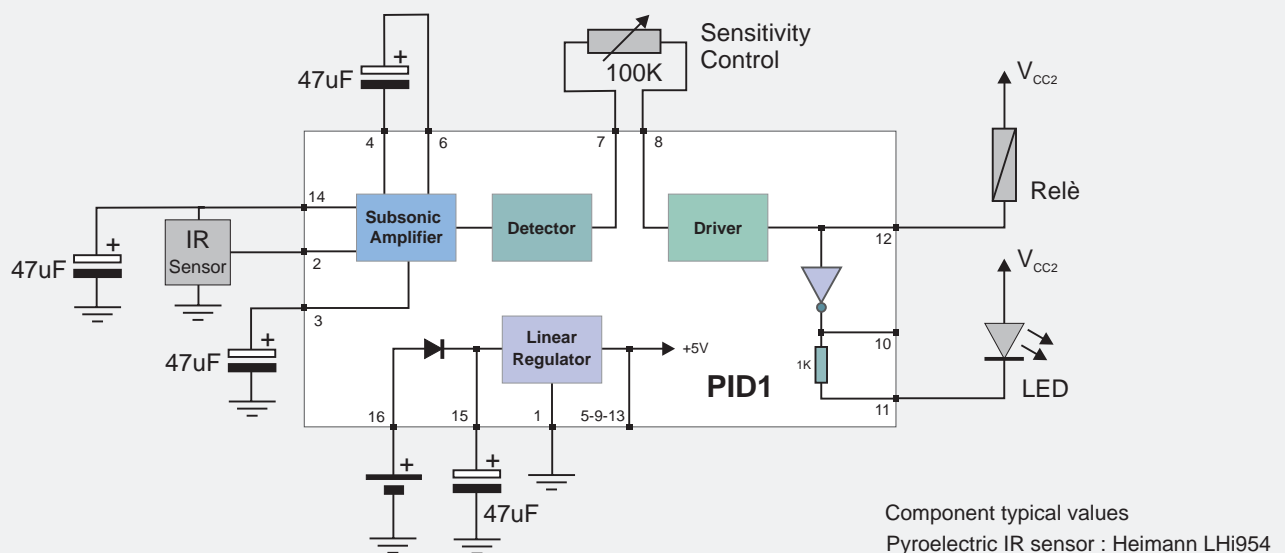
## Pin Description

1	GND	Ground
2	IN	Infrared Sensor Input
3	Cext	External Capacitor
4	CAP-	External Capacitor (-)
5-9-13	Vcc1	Supply Voltage of Internal Stage
6	CAP+	External Capacitor (+)
7	TRM1	External Trimmer
8	TRM2	External Trimmer
10	Out1	Output Signal (active low)
11	LED	Led Control Signal
12	Out	Output Signal (active high)
14	IRD	Infrared Sensor Drain
15	Vcc2	+12V Output Voltage
16	Vcc	Input Supply Voltage

## Mechanical Dimensions



## TYPICAL APPLICATION



# IRT1

## Infrared Pulse Transmitter



### General description

The IRT1 is an hybrid circuit that allows to realize an infrared barrier when utilized with an infrared pulse detector (IRD1).

It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

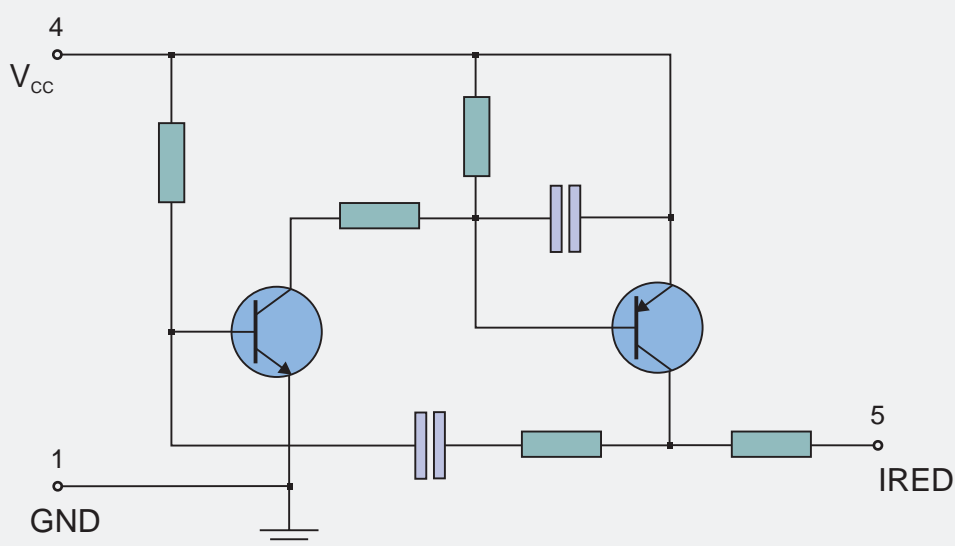
### Features

- High RFI Immunity
- SIL Package

### Applications

- Residential and commercial security systems
- Automatic doors opening systems

### BLOCK DIAGRAM



## Electrical Characteristics

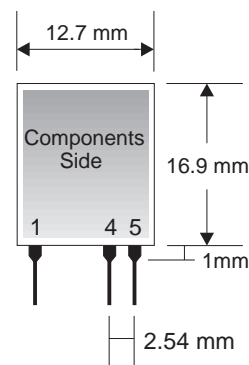
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC</sub>	Supply Voltage	8	9	10	VDC
I <sub>S</sub>	Supply Current		35		mA
F <sub>IR</sub>	Infrared Pulse Frequency	300	400		Hz
T <sub>p</sub>	Pulse Width		40		µsec
T <sub>OP</sub>	Operating Temperature Range	-20		+80	°C

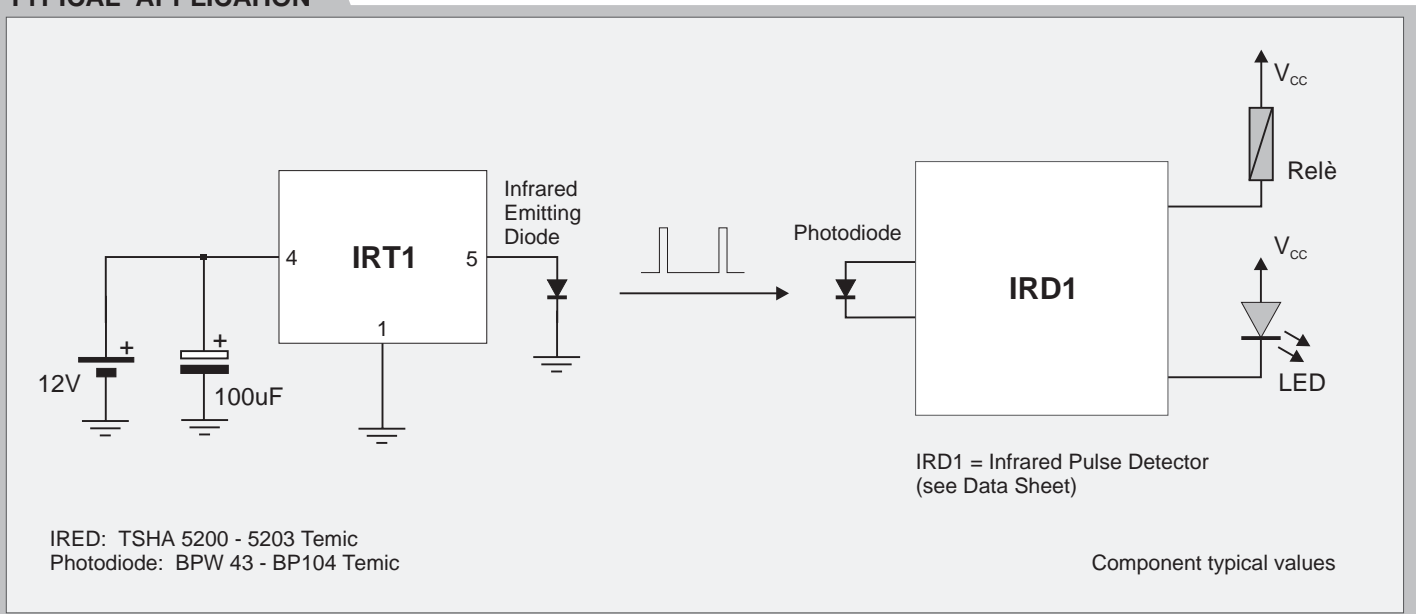
## Pin Description

1	GND	Ground
4	Vcc	Supply Voltage
5	IRED	Infrared Emitting Diode

## Mechanical Dimensions

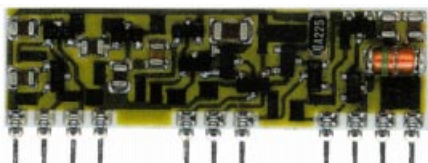


## TYPICAL APPLICATION



# IRD1

## Infrared Pulse Detector



### General description

The IRD1 is an hybrid circuit that allows to realize an infrared barrier when utilized with an infrared pulse transmitter (IRT1).

IRD1 detect IR pulses and activate the output signal when the barrier is interrupted by an object.

It shows stable electric characteristics thanks to the "Thick film hybrid" technology.

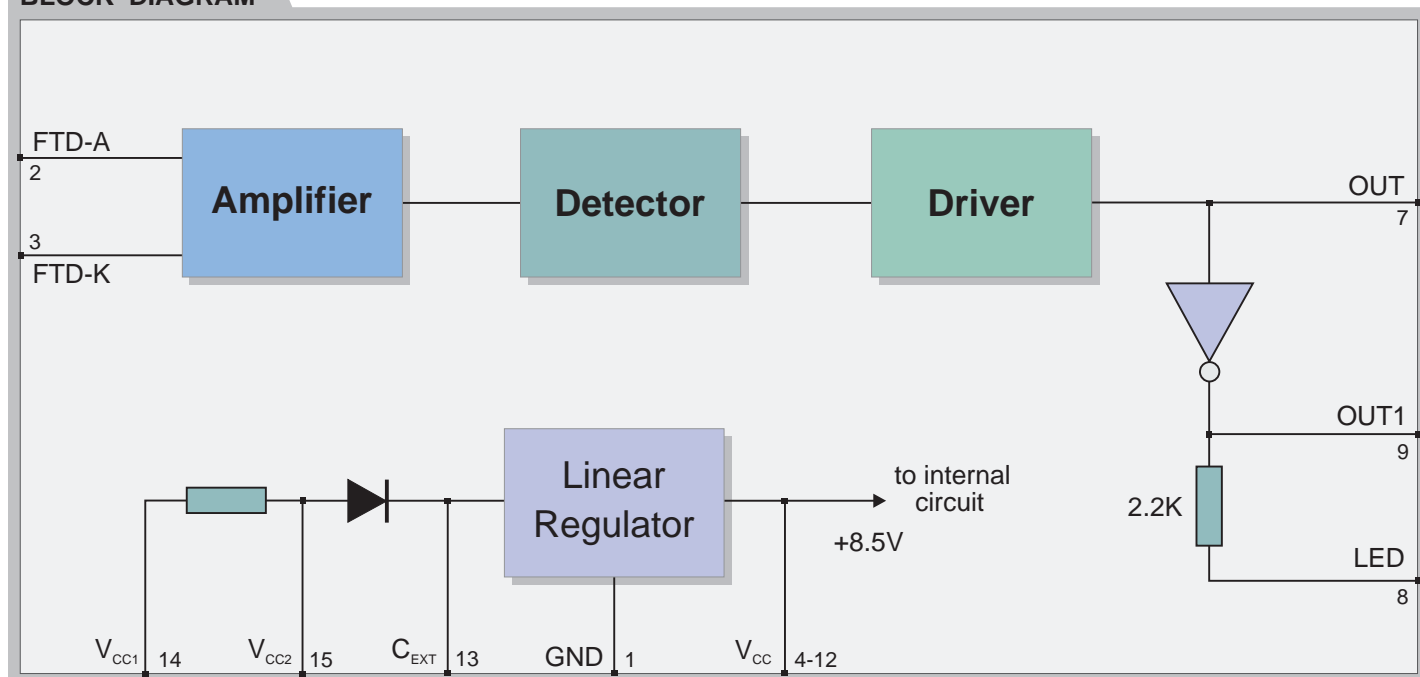
### Features

- High RFI Immunity
- SIL Package

### Applications

- Residential and commercial security systems
- Automatic doors opening systems

### BLOCK DIAGRAM



## Electrical Characteristics

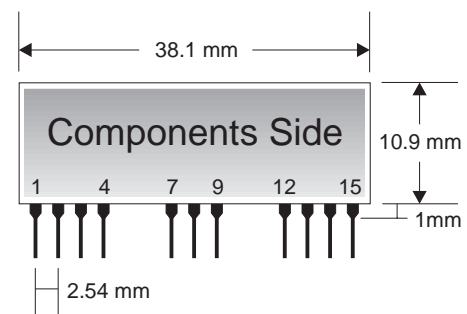
Ta = 25°C unless otherwise specified

CHARACTERISTICS		MIN	TYP	MAX	UNIT
V <sub>CC1</sub>	Supply Voltage	18	24	32	VDC/VAC
V <sub>CC2</sub>	Supply Voltage	9	12	18	VDC/VAC
I <sub>S</sub>	Supply Current		3		mA
F <sub>IR</sub>	Infrared Pulse Frequency	300	400		Hz
I <sub>O</sub>	Out Sink Current			20	mA
T <sub>OP</sub>	Operating Temperature Range	-20		+80	°C

## Pin Description

1	GND	Ground
2	FTD-A	Photodiode Anode
3	FTD-K	Photodiode Katode
4-12	V <sub>CC</sub>	Supply Voltage of Internal Stage
7	Out	Output Signal (Low if impulse received)
8	LED	Led Control Signal
9	Out1	Output Signal (High if impulse received)
13	C <sub>EXT</sub>	External Filter Capacitor
14	V <sub>CC1</sub> *	24V DC/AC Supply Voltage
15	V <sub>CC2</sub> *	12V DC/AC Supply Voltage

## Mechanical Dimensions



\* Only one power supply voltage is necessary (12 or 24 V)

## TYPICAL APPLICATION

