

# 3V DUAL MODE TRANSCEIVER 434 MHz BAND

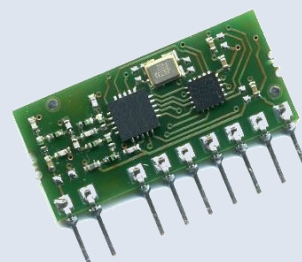
**Code: 32001269**


## QUICK DESCRIPTION:

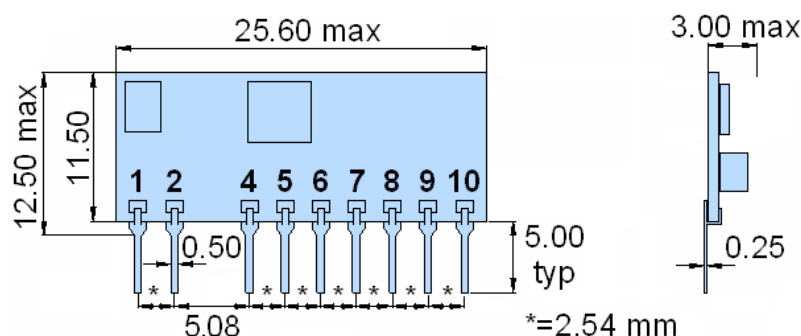
Dual-mode transceiver operating in the 434 MHz ISM band with extremely compact dimensions. The module operates as an independent device that can be controlled through external control lines.

Two different operating modes are possible:

- **Normal mode (default):** The TRX module operates as a dual channel (433.42- 434.42 MHz) transceiver in OOK. Through the external pins, the user can control the operation mode (Tx, Rx, stand-by) and the channel frequency. Supports data rates up to 4800 baud.
- **Extended Mode (User-programmable):** through a predefined sequence of serial commands sent on input pins, the user can enter configuration mode and then customize the module. It is possible to set the output power, the frequency of the channel (selectable for each channel between 433.42, 433.92 and 434.42 MHz), the modulation (ASK, FSK), the baud rate up to **38400 baud**, etc.



## MECHANICAL CHARACTERISTICS



## PIN DESCRIPTION

Pin	Name	Description
1	RF I/O	Tx: RF Output Rx: RF Input
2	GND	Ground (0 V)
4	Data Out	Data Output in reception mode
5	EN	0 = Power down 1 = Active; ready to TX or RX
6	Tx/Rx	0 = Reception 1 = Transmission
7	GND	Ground (0 V)
8	CH_SEL / Serial input	<b>Normal Mode:</b> 0 = 433.42 MHz " " : 1 = 434.42 MHz <b>Extended Mode:</b> Sequence of commands
9	Data In	Data Input in transmission mode
10	Vcc	Voltage Supply (3 V range)

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RF  
WIRELESS**ABSOLUTE MAXIMUM RATINGS:**

Supply voltage + Vcc (pin 15)	-0.3V ÷ + 4V
Max voltage on pins 4, 5, 6, 8, 9	-0.3V ÷ Vcc + 0.3V
Storage temperature:	- 40 ÷ + 100° C
Operating Temperature:	- 20 ÷ + 70° C
Radio Frequency Input, pin 2:	+10 dBm

**ELECTRICAL CHARACTERISTICS AT +25°C TEMPERATURE**

Parameter	Min.	Typ.	Max.	Unit	Notes
Voltage (Vcc)	2.1	3.0	3.6	Volt	
Current consumption	Tx Mode	-	18	mA	Note 1
	Rx Mode	-	14	mA	
	Power Down	-	0.5	µA	
Vlow on I/O pins	0	-	0.2*Vcc	V	
Vhigh I/O pins	0.8*Vcc	-	+Vcc	V	
Output load on pin 4	2k	-	-	Ohm	

**RECEIVER CHARACTERISTICS AT + 25 °C TEMPERATURE**

Sensitivity in ASK	-	-112	-	dBm	Note 2
Sensitivity in FSK (extended mode only)	-	-107	-	dBm	
Operating Frequency Ch.1	-	433.42	-	MHz	
Operating Frequency Ch.2	-	434.42	-	MHz	
-3dB Bandwidth	-	100	-	kHz	
Δf FSK deviation (extended mode only)	-	±25	-	kHz	
Baud-Rate RF	1200	-	4800	Baud	

**TRANSMITTER CHARACTERISTICS AT + 25 °C TEMPERATURE**

Output power (50 Ohm load)	-	+10.0	-	dBm	Note 3
Operating frequency Ch.1	-	433.42	-	MHz	
Operating frequency Ch.2	-	434.42	-	MHz	
FSK Δf deviation (extended mode only)	-	±25	-	kHz	
Frequency accuracy	-	±10	-	kHz	
Baud-Rate RF	1200	-	4800	Baud	

**TIMINGS**

Time between turning on the module (+ Vcc) and valid data reception (+ Vcc) in OOK	-	40	-	ms	
Time between turning on the module (+ Vcc) and valid data reception (+ Vcc) in FSK	-	40	-	ms	
Time between turning on the module (+ Vcc) and valid data transmission (+ Vcc) in OOK	-	40	-	ms	
Time between turning on the module (+ Vcc) and valid data transmission (+ Vcc) in FSK	-	40	-	ms	
Time by Powerdown to RX in OOK	-	1.5	-	ms	
Time by Powerdown to RX in FSK	-	1	-	ms	
Time by Powerdown to TX in OOK	-	1	-	ms	
Time by Powerdown to TX in FSK	-	1	-	ms	
Time by TX to RX in OOK	-	400	-	µs	
Time by TX to RX in FSK	-	400	-	µs	
Time by RX to TX in OOK	-	400	-	µs	
Time by RX to TX in FSK	-	400	-	µs	
Time by Ch1 to Ch2 in RX in OOK	-	1	-	ms	
Time by Ch1 to Ch2 in RX in FSK	-	700	-	µs	
Time by Ch2 to Ch1 in RX in OOK	-	700	-	µs	
Time by Ch2 to Ch1 in RX in FSK	-	600	-	µs	
Time by Ch1 to Ch2 in TX in OOK	-	500	-	µs	
Time by Ch1 to Ch2 in TX in FSK	-	600	-	µs	

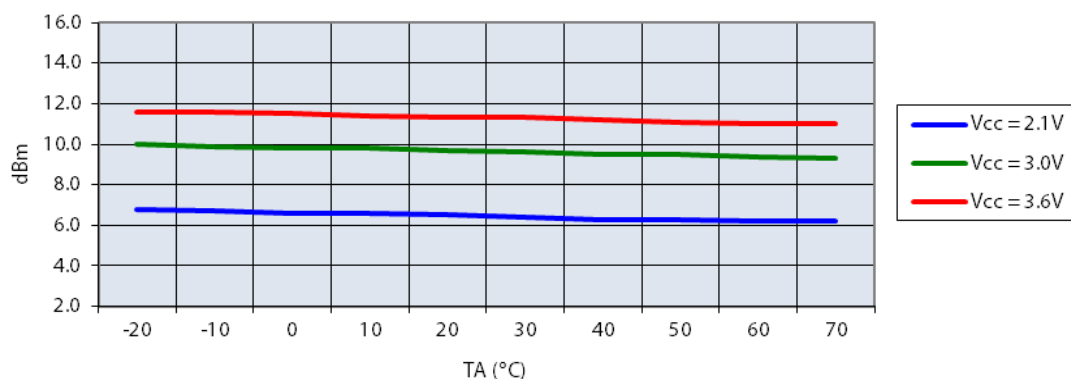
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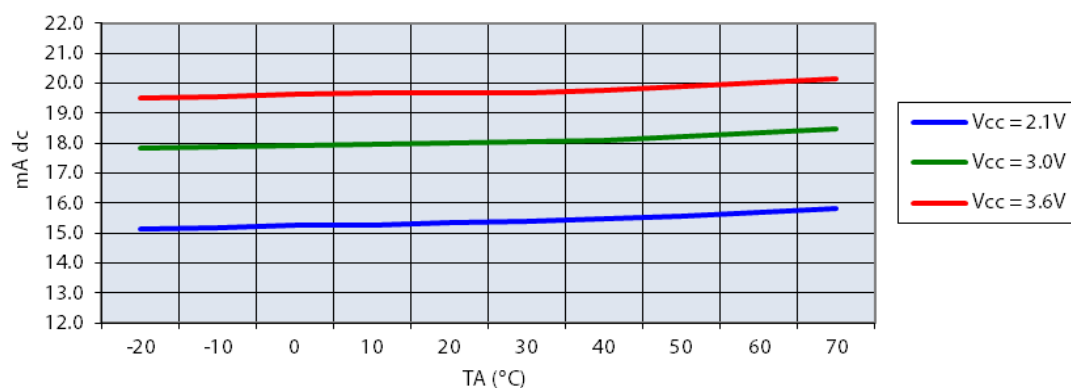
Time by Ch2 to Ch1 in TX in OOK	-	500	-	$\mu$ s
Time by Ch2 to Ch1 in TX in FSK	-	500	-	$\mu$ s
Time by no RF ay input port to valid data reception (settling) in OOK	-	150		$\mu$ s
Time by no RF ay input port to valid data reception (settling) in FSK	-	150		$\mu$ s

## TYPICAL CHARACTERISTICS (\*)

Output power (Load 50ohm) vs. temperature

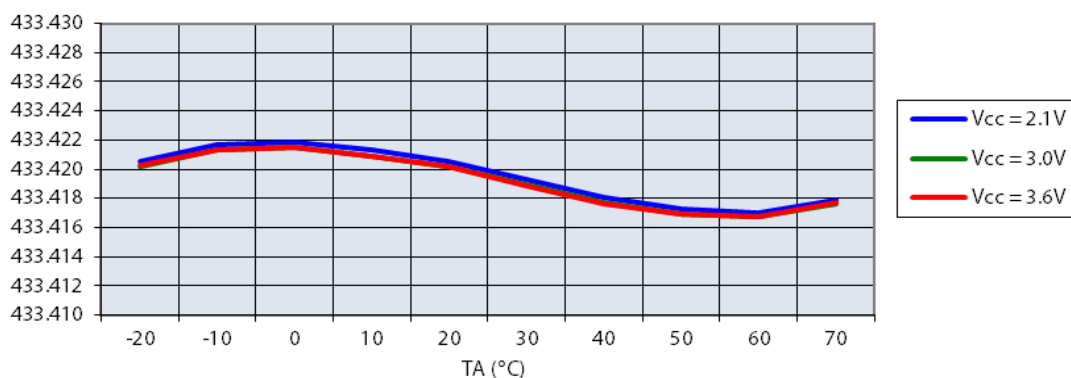


Current consumption in TX vs. temperature (CWmode)



MHz

Transmit Frequency vs. temperature (CWmode)



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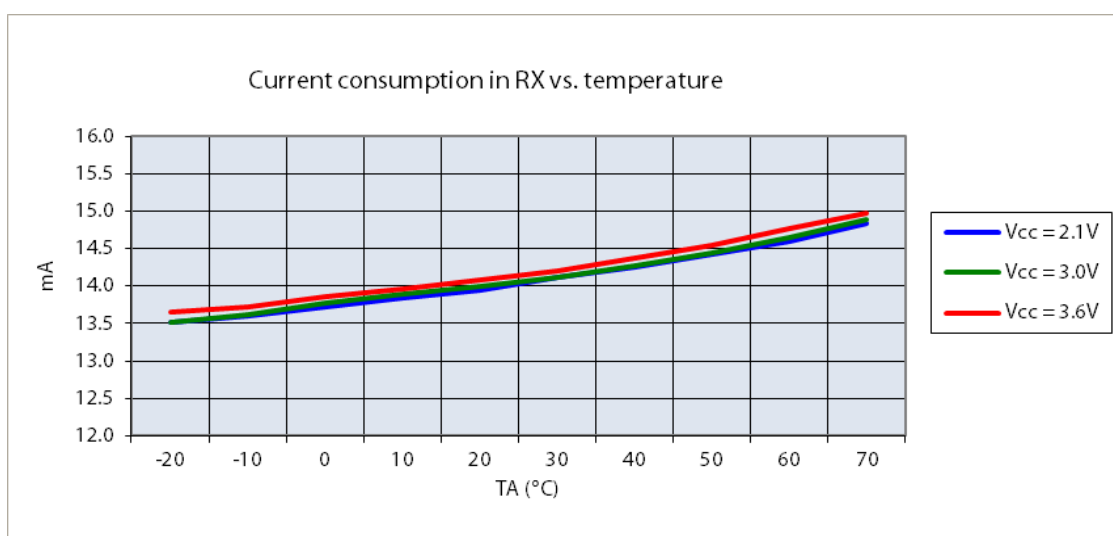
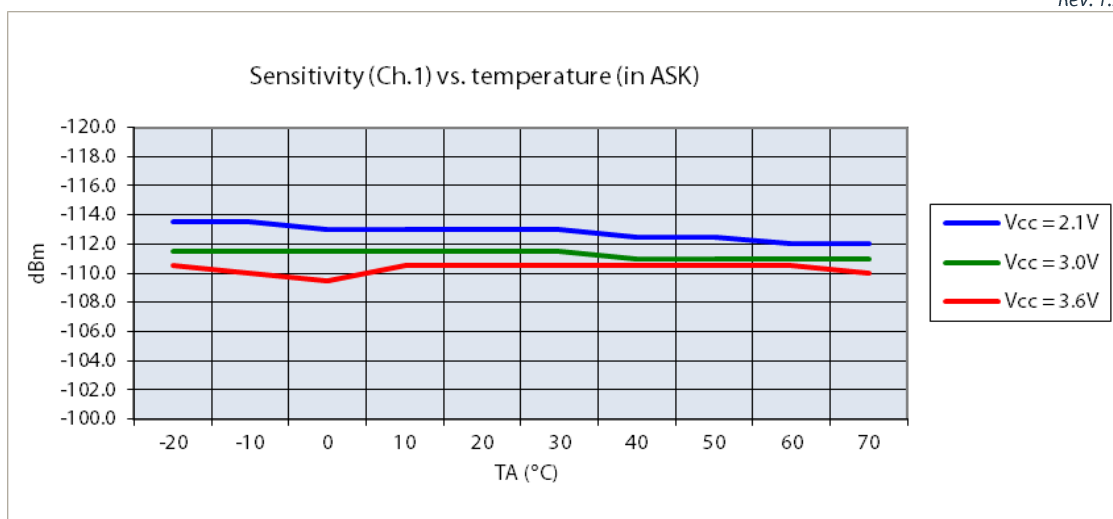
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(\*): All graphs must be considered as indicative typical results in accordance with temperature variation.

**Note 1:** Current consumption measured at power supply level of +3V. Current consumption in TX measured in CW.

**Note 2:** Sensitivity measured with OOK modulated signal, PRBS code, 4800 baud, result at BER equal or less than  $10^{-2}$ .

**Note 3:** transmitter is compliant with ETSI 300 220 V. 2.4.1.

**Note 4:** All RF parameters measured with Input/output (pin 1) connected to 50 Ohm impedance signal source or load.

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## APPLICATION NOTES

- **STATE OF INPUT / OUTPUT PINS:**
- **Data Out (pin 4):**
  - Normal operation: ACTIVE (High or Low)
  - Power Down: ACTIVE LOW – MUST NOT be driven externally
- **EN (pin 5):**
  - Normal Operation: HIGH IMPEDANCE – MUST be driven externally (High or Low)
  - Power Down: HIGH IMPEDANCE – MUST be driven externally (High or Low)
- **Tx/Rx (pin 6):**
  - Normal Operation: HIGH IMPEDANCE – MUST be driven externally (High or Low)
  - Power Down: HIGH IMPEDANCE – MUST be driven externally (High or Low)
- **CH\_SEL/Serial input (pin 8):**
  - Normal Operation: HIGH IMPEDANCE – MUST be driven externally (High or Low)
  - Power Down: HIGH IMPEDANCE – MUST be driven externally (High or Low)
- **Data In (pin 9):**
  - Normal Operation: HIGH IMPEDANCE – MUST be driven externally (High or Low)
  - Power Down: HIGH IMPEDANCE – MUST be driven externally (High or Low)
- **USE IN NORMAL MODE:**

It is the standard use, the module behaves as a transparent device with respect to the data stream, and can be controlled via external control lines.

The data flow is carried out along the following lines:

- **Data out (pin 4):** data output in reception mode
- **Data in (pin 9):** data input in transmission mode.

The maximum data rate is 4800 baud/s.

Command lines are:

- **EN (pin 5):** enable pin. Allows to activate or set in stand-by the module, according to the following logic:  
     **0: powerdown** (module in stand-by)  
     **1: enable** (module on)
- **TX/RX (pin 6):** operating mode selection pin  
     **0: module in reception**  
     **1: module in trasmission**
- **CH\_SEL (pin 8):** channel selection pin  
     **0: module operating on channel 1** (433.42 MHz)  
     **1: module operating on channel 2** (434.42 MHz)

**Important:** These three command pins are in high impedance, therefore must NOT be left floating (ie: if the "powerdown" function is not used, connect the EN pin to Vcc +, if only channel 1 is used, connect CH\_SEL to GND, etc.).

- **USE IN EXTENDED MODE** (user programmable): see Application Note [AN003](#)
- **OPERATION BELOW MINIMUM OPERATING VOLTAGE:** in order to ensure compliance

with the EMC and radio spectrum regulations, it is necessary to provide externally the putting into power-down of them module before its voltage falls below the minimum operating voltage (2.1 volts) .

- FRAME STRUCTURE FOR RADIO SYSTEMS: see Application Note [AN001](#)
- PCB LAYOUT GUIDELINES: see Application Note [AN002](#)



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