



Module Dimensions	33 mm x 25 mm
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The BK2xx series of modules offers a wide choice of frequency band selection:

169 MHz , 315 or 434 MHz , 868 or 915 MHz .

The modules are NBFM (Narrow Band Frequency Modulation) 12.5 or 25 kHz channel separation programmable and are based on the Analog Devices AD7021N high performance Narrow-Band Transceiver IC . The BK2xx complies with the most important Narrow-Band Standards: ETSI EN300 220 (v2.3.1), FCC Part 15 – Part 95, ARIB STD-T67 .

A narrow channel separation together with a high receiver selectivity allows to obtain an exceptional RF link budget figure of more then 130 dB for a stable and long range communication.

A wideband, high efficiency UHF power transistor is employed to increase the TX output power to over 200mW (on the Frequency Bands were it is allowed) together with a low loss low pass filter and antenna T/R Switch.

A TCXO with 2,5 ppm stability over the entire temperature range assures long term reliability to the wireless radio link.

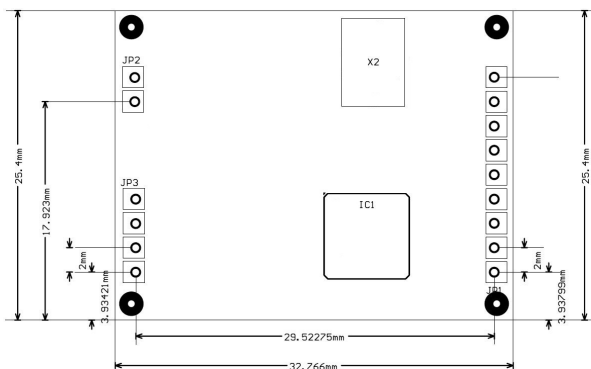
Applications:

- Automatic Meter Reading on 169MHz - 200mW
- Tracing & Asset Tracking
- Social Alarms
- Remote Control

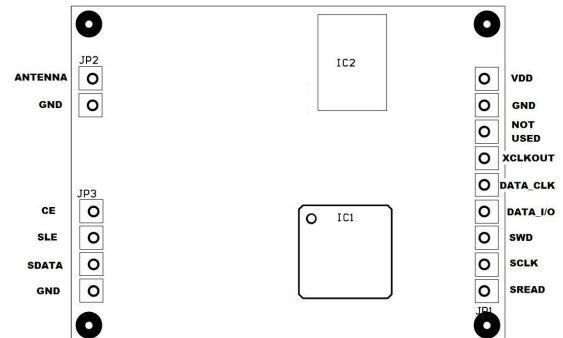
TABLE 1 PERFORMANCE DATA BK2x – RECEIVER SECTION	
Frequency	80 to 650 MHz / 842 to 916 MHz ¹
Modulation	2FSK ÷ GFSK ÷ RCFSK ÷ 3FSK ÷ 4FSK
Receiver sensitivity	-122 dBm 1 KBPS with 2FSK Modulation
Channel Selectivity	9 KHz
	13,5 KHz
	18,5 KHz
Data rate	Default 1 kbps
	Max 18 kbps
Supply current	Average : 20 mA
	Power Down : 100 nA
Supply Voltage	3.3 VDC ± 5%
Operating temperature range	-40°C ÷ 85°C
Storage temperature range	+65°C ÷ 125°C

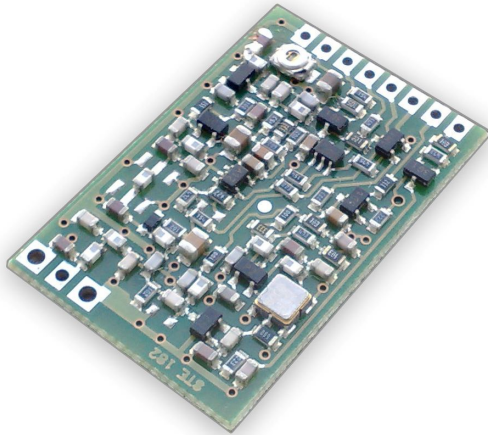
TABLE 1 PERFORMANCE DATA BK2x – TRANSMITTER SECTION		
Frequency	80 to 650 MHz / 842 to 916 MHz ¹	
Modulation	2FSK ÷ GFSK ÷ RCFSK ÷ 3FSK ÷ 4FSK	
Output RF power Programmable from +10dBm to +23 dBm	Typical	+10 dBm
	Max	+23 dBm
Data rate	Default	1 kbps
	Max	18 kbps
Supply current	Active : 25 mA (200mA)	
	Power Down : 100 nA	
Supply Voltage	3 ÷ 3.6 VDC ± 5%	
Operating temperature range	-40°C ÷ 85°C	
Storage temperature range	+65°C ÷ 125°C	

BK2 Layout



Pin Out



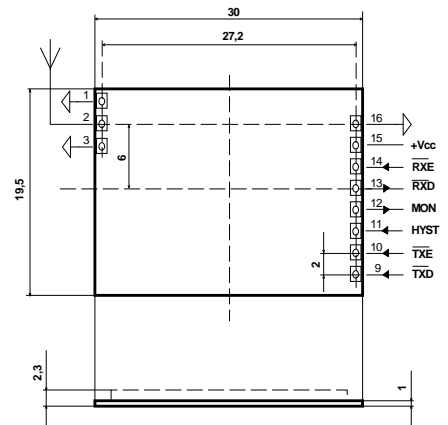
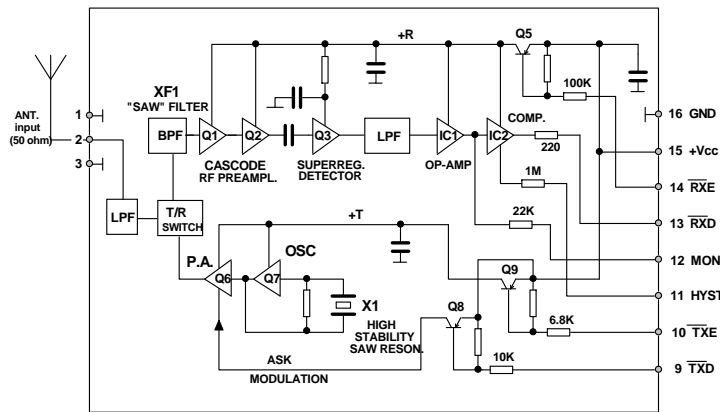


BK47L3-G4 (433.175 MHz)	
Receiver sensitivity	-96 dBm
Transmitter power	20mW
Data rate	9.6 Kb
Supply voltage	2.6 – 5.5 Vdc
Rx current	400 μ A

TABLE 1 PERFORMANCE DATA		
Modulation	GASK	
Output RF power	@5V	+13 dBm (40mW)
	@3.3V	+10 dBm(20mW)
Receiver sensitivity	(note 1)	-96 dBm
Data rate	Rx	9.6 kB
	Tx	64 kB
Receiver start-up time	Default	80 ms
T-R switching time	25 ms	
Supply current	Rx @5V	550 μ A
	Rx @3V	400 μ A
	Tx	20-35 mA
Operating temperature range	-20 + 60 $^{\circ}$ C	
Dimensions	19.5 x 30 x 2.5 mm	

A new concept of design high speed "SAW" Tx with a very low current consumption superregenerative Rx

BK47 SCHEMATIC

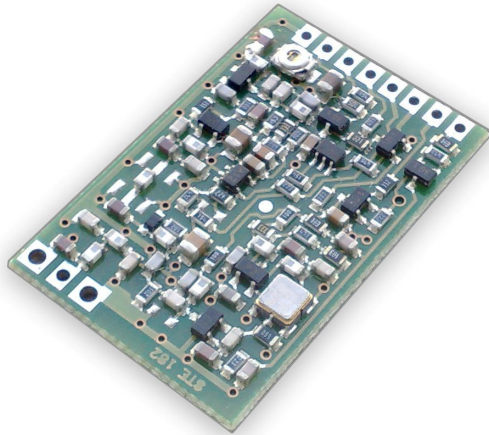


Circuit notes

- Receiver hysteresis n.11 PIN can be ground connected to block „RXD“ random output pulses in absence of received RF signal (at the expense of reduced sensitivity and data speed).

Table 2 – BK4x Versions

model	frequency
BK47xx	433-435 MHz
BK48xx	868-870 MHz

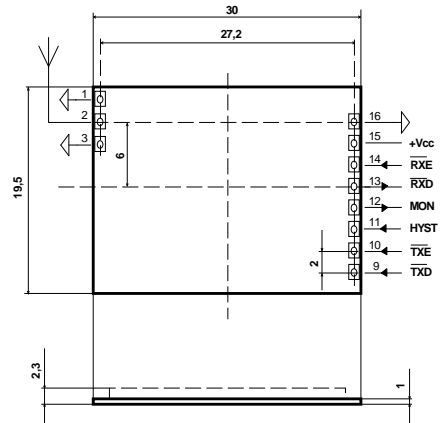
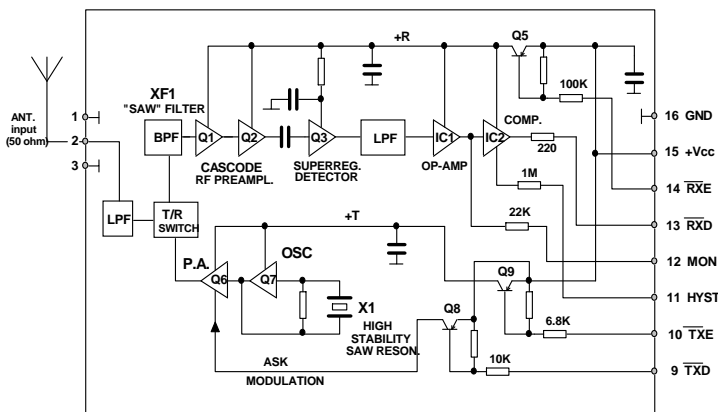


BK48L3-M2 (868.350 MHz)	
Receiver sensitivity	-96 dBm
Transmitter power	25mW
Data rate	9.6 Kb
Supply voltage	2.4 – 5.5 Vdc
Rx current	400 μ A

A new concept of design high speed "SAW" Tx with a very low current consumption superregenerative Rx

TABLE 1 PERFORMANCE DATA		
Modulation	GASK	
Output RF power	@5V	+14 dBm (25 mW)
	@3.3V	+12 dBm(15 mW)
Receiver sensitivity	(note 1)	-96 dBm
Data rate	Rx	9.6 kB
	Tx	38.4 kB
Receiver start-up time	Default	80ms
T-R switching time	25 ms	
Supply current	Rx @5V	550 μ A
	Rx @3V	400 μ A
	Tx	20-40 mA
Operating temperature range	-20 + 60 $^{\circ}$ C	
Dimensions	19.5 x 30 x 2.5 mm	

BK47 SCHEMATIC



Circuit notes

- Receiver hysteresis n.11 PIN can be ground connected to block „RXD” random output pulses in absence of received RF signal (at the expense of reduced sensitivity and data speed).

Table 2 – BK4x Versions

model	frequency
BK47xx	433-435 MHz
BK48xx	868-870 MHz

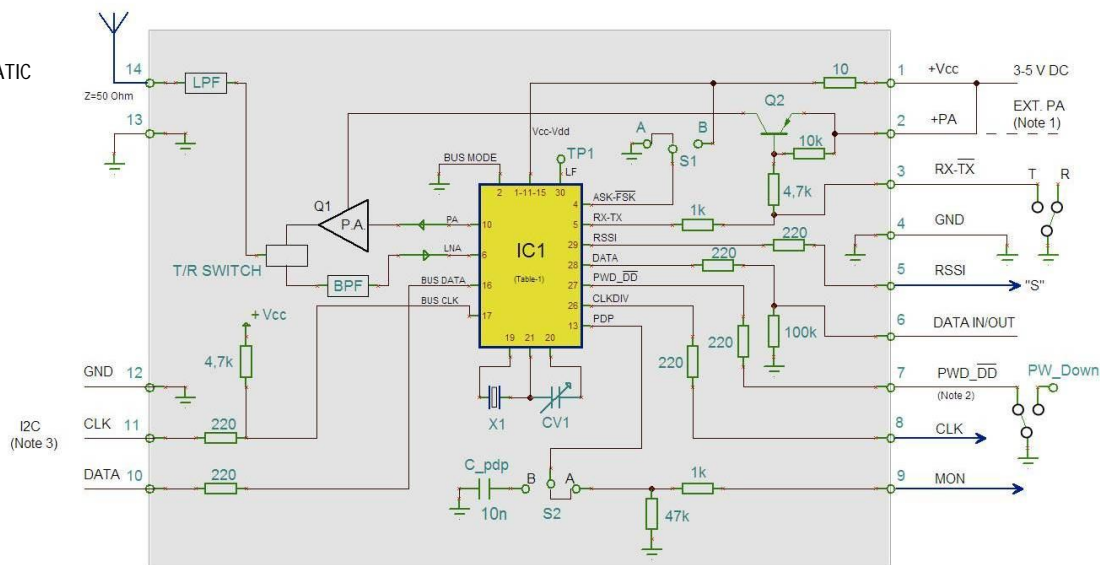


BK57F3xx 434MHz SRD Band	
Receiver sensitivity	-106 dBm
Transmitter power	40mW
Data rate	64kB
Supply voltage	2.6 – 5.5 Vdc

Low cost, high performances data transceiver based on TDA5255 by Infineon (www.infineon.com)
 The good performances of the IC are further enhanced by a power amplifier to increase RF output.
 Refer to TDA5255 Data Sheet par. 3.11 for the "Default" setup and performances.
 Through the I2C port it is possible to read IC1 internal registers and/or program different operating modes.
 For applications in battery operated systems a reduced current consumption "Self Polling" mode can be activated with "Receive Data Valid" detection circuit using RSSI level and datarate detection as decision criteria.

TABLE 1 PERFORMANCE DATA – Mod. BK57F3-G5	
Frequency	434.175 MHz
Modulation	FSK
Output RF power	@5V +16dBm (40mW) @3.3V +13dBm(20mW)
Receiver sensitivity	FSK – 9.6 KB -106 dBm
Data rate	Default 9.6 kB Max 64 kB
System setup time	8ms
T-R switching time	2.6 ms
R-T switching time	1.1 ms
Supply current	Rx 9mA Tx 20-35mA
Operating temperature range	-20 + 60 °C
Dimensions	20.5 x 32 x 2.5 mm

BK57 SCHEMATIC



Circuit notes
1) n°7 Terminal (PWD-DD) must be ground connected for normal operation. IC1 n° 27 pin is internally pulled high via a 30 KΩ resistor.
2) IC1 n°2 Pin (BUSMODE) is ground connected to support the I2C 2 wires protocol.

Table 2 – BK5x Versions / IC1 Type		
<i>model</i>	<i>frequency</i>	<i>IC1 Type</i>
BK57xx	433-435 MHz	TDA 5255
BK58xx	868-870 MHz	TDA 5250
BK59xx	910-920 MHz	TDA 5252
BK55xx	312-325 MHz	TDA 5251

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BK58F3xx 868MHz SRD Band	
Receiver sensitivity	-106 dBm
Transmitter power	60mW
Data rate	64kB
Supply voltage	2.6 – 5.5 Vdc

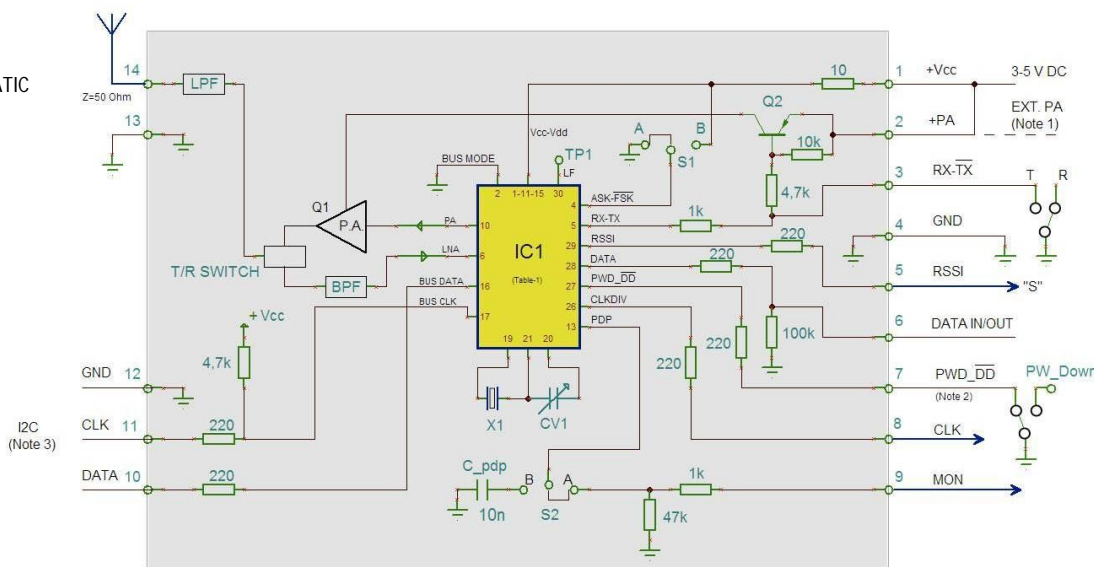
Low cost, high performances data transceiver based on TDA5250 by Infineon (www.infineon.com)

The good performances of the IC are further enhanced by a power amplifier to increase RF output. Refer to TDA5250 Data Sheet par. 3.11 for the "Default" setup and performances.

Through the I2C port it is possible to read IC1 internal registers and/or program different operating modes. For applications in battery operated systems a reduced current consumption "Self Polling" mode can be activated with "Receive Data Valid" detection circuit using RSSI level and datarate detection as decision criteria.

TABLE 1 PERFORMANCE DATA – Mod. BK58F3-M2	
Frequency	868,350 MHz
Modulation	FSK
Output RF power	@5V +17.5dBm (60mW) @3.3V +14dBm(25mW)
Receiver sensitivity	FSK – 9.6 KB -106 dBm
Data rate	Default 9.6 kB Max 64 kB
System setup time	8ms
T-R switching time	2.6 ms
R-T switching time	1.1 ms
Supply current	Rx 9mA Tx 20-40mA
Operating temperature range	-20 + 60 °C
Dimensions	20.5 x 32 x 2.5 mm

BK58 SCHEMATIC



Circuit notes

- 1) n°7 Terminal (PWD-DD) must be ground connected for normal operation. IC1 n° 27 pin is internally pulled high via a 30 KΩ resistor.
- 2) IC1 n°2 Pin (BUSMODE) is ground connected to support the I2C 2 wires protocol.
- 3) n°2 Terminal (+PA) can be supplied with 8VDC to obtain 100mW RF output power (only mod. BK58F8-M8 , 869.550 MHz, REC 70-03 Annex 1 Band g3).

Table 2 – BK5x Versions / IC1 Type

model	frequency	IC1 Type
BK57xx	433-435 MHz	TDA 5255
BK58xx	868-870 MHz	TDA 5250
BK59xx	910-920 MHz	TDA 5252
BK55xx	312-325 MHz	TDA 5251

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TABLE 1 – BK67 VERSIONS			
BK67F5 (1)	433.050 – 434.790 MHz	20 mW	5Vdc
BK67F3 (1)	433.050 – 434.790 MHz	15 mW	3Vdc
Note (1) STANDARD VERSIONS WITH EX STOCK AVAILABILITY. PLEASE CONTACT THE FACTORY FOR SAMPLES AND AVAILABILITY OF NON STANDARD VERSIONS.			

- PLL Synthesized
- Data rate to 64 KB
- -106dbm Rx Sensitivity

General Description

The BK67F5 is a synthesized UHF transceiver for use in wireless data transmission applications. The transceiver operates on the 433.05 – 434.79 MHz ISM band and it is designed to comply to the European Standards EN 300-220-3 and EN 301-489-3, in accordance with the CEPT-ERC-REC 70-03 recommendation (Annex 1 – Non Specific Short Range Devices). Together with a precision and low phase-noise crystal controlled PLL architecture, the transceiver has high reception sensitivity (-105 dBm) and high RF output power (20 mW). High RF output power allows to employ poor efficiency antennas (helical, patch, loop or a trace on a PCB) to remain under legal 10 mW ERP (Effective Radiated Power) limit. The BK67F5 is designed to be directly interfaced to a microcontroller (MCU) to control and to monitor the receive and transmit mode and to program (through a 3 wires serial interface) the appropriate Rx and Tx frequencies. In a typical application the MCU manages also the communication protocol i.e. the switching between transmit and receive mode, the preamble, the start byte, the bit encoding and decoding and other important operations

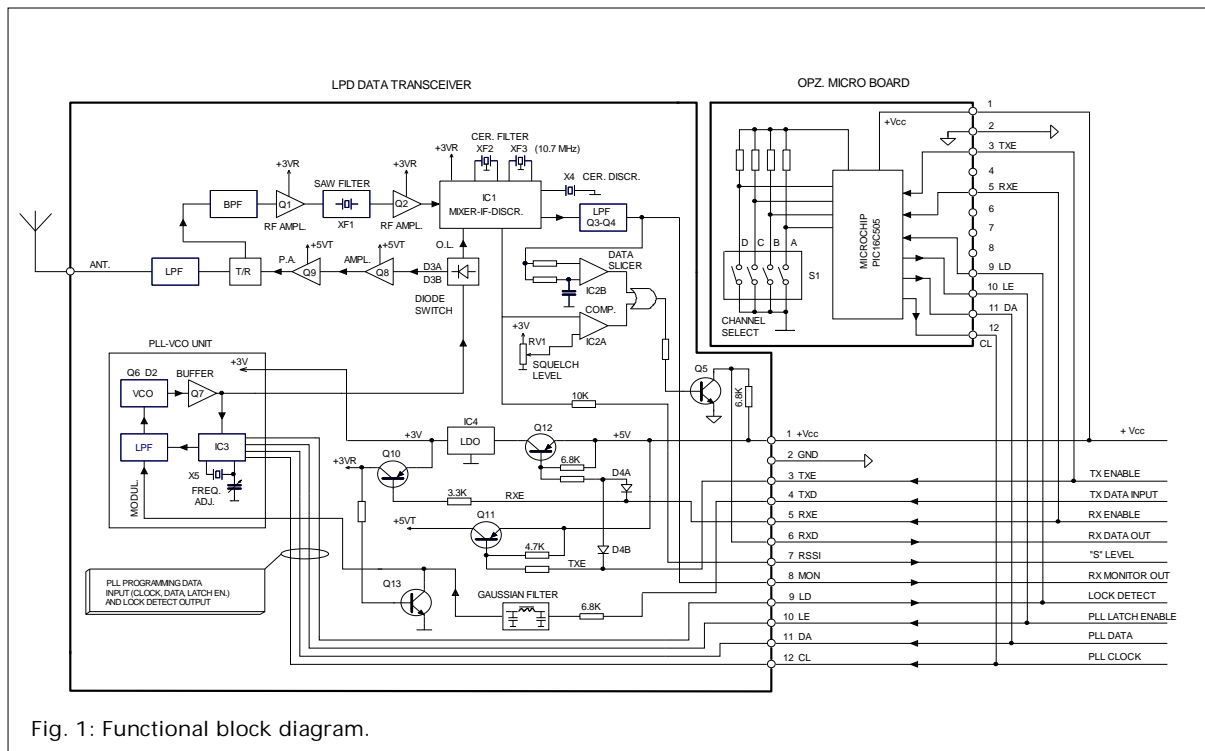
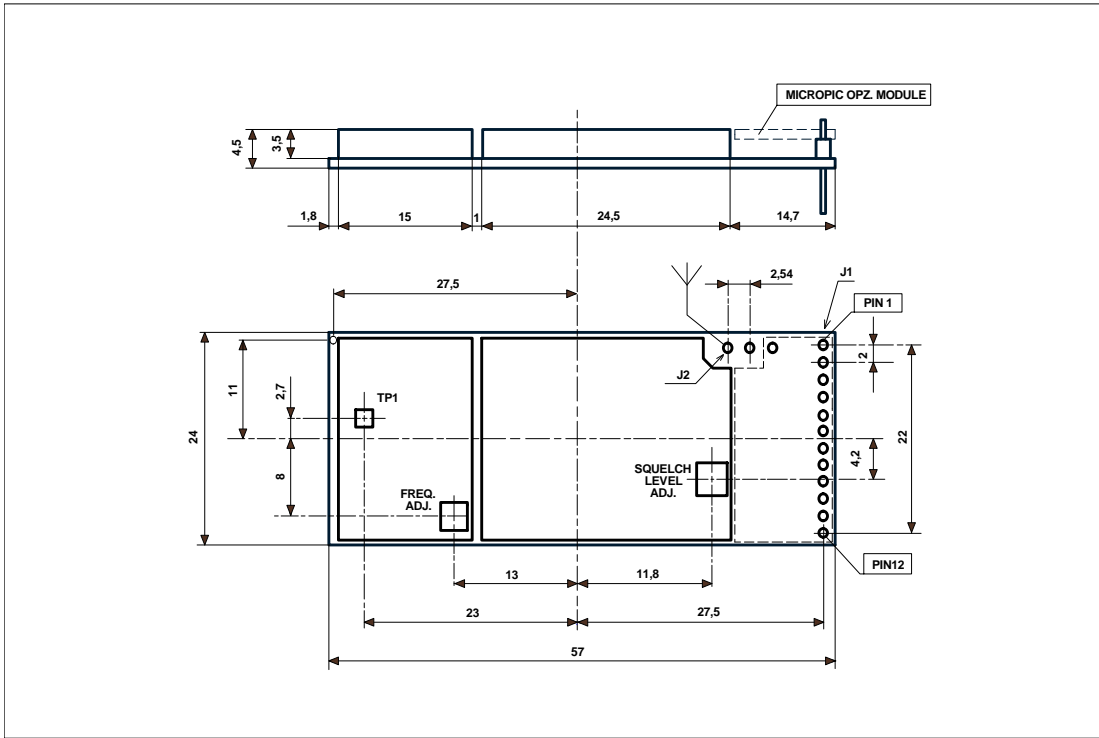


Fig. 1: Functional block diagram.



Optional microboard.

An optional small μ C board (Micropic Module – part.n° 015917) can be directly mounted on the transceiver J1 connector. The Micropic Module eliminates the necessity of an external programming of Tx and Rx frequencies. Up to 16 factory pre-programmed RF channels can be easily selected by means of a four positions dip-switch.

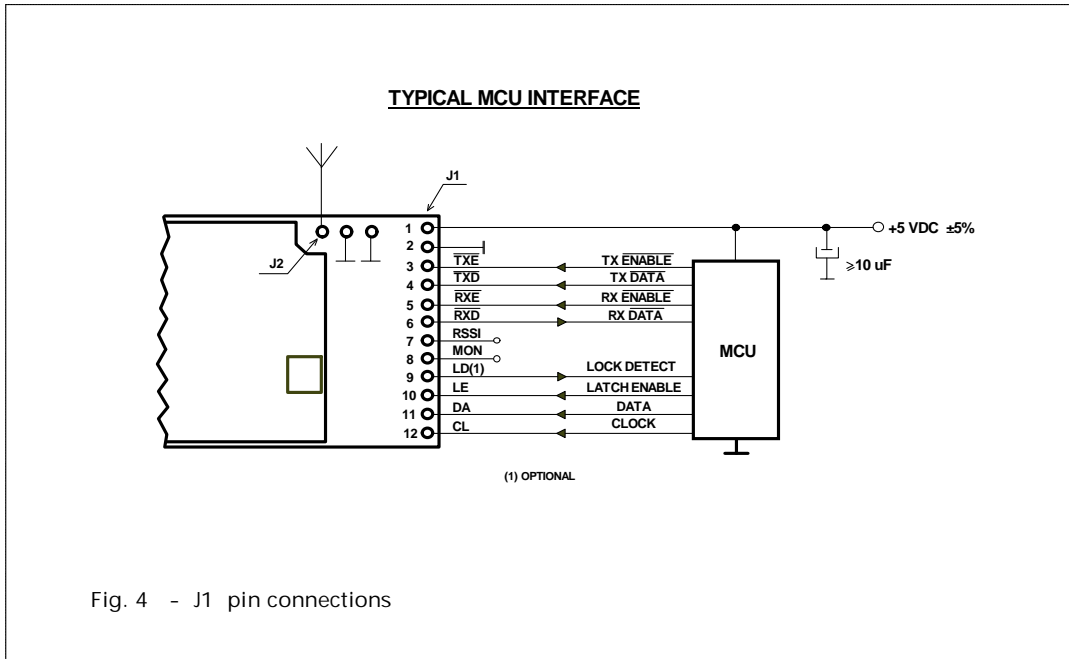


Fig. 4 - J1 pin connections

BK67F5 Specifications

	Min	Typ	Max	Units	Notes
GENERAL					
FREQUENCY RANGE	432.000		436.000	MHz	(1)
CHANNEL SPACING	150	200		KHz	
FREQUENCY PROGR. STEP	25	50	100	KHz	
FREQUENCY STABILITY		±4	±7	KHz	(2)
DATA RATE	7.2		64	Kbaud	
ANTENNA IMPEDANCE		50		Ω	
SUPPLY VOLTAGE	4.75	5	5.25	V	
SUPPLY CURRENT - SLEEP		1	10	μA	
SUPPLY CURRENT - Rx MODE		21	24	mA	
SUPPLY CURRENT - Tx MODE		30	35	mA	
OPERATING TEMPERATURE	- 20		+ 60	°C	
TRANSMITTER					
RF OUTPUT POWER	15		20	mW	(3)
SPURIOUS EMISSION			- 50	dBc	
MODULATION FREQUENCY	3.5		32	KHz	(4)
FM DEVIATION		30		KHz	(4)
R/T SWITCHING TIME		2		ms	(5)
CHANNEL SWITCHING TIME		1		ms	(5)
RECEIVER					
SENSITIVITY	- 102	- 106		dBm	
SELECTIVITY		40	30	dB	(6)
IMAGE REJECTION		50		dB	
DYNAMIC RANGE		100		dB	
SQUELCH LEVEL ADJ. RANGE	- 115	- 110	- 70	dBm	
T/R SWITCHING TIME		1.5		ms	(5)
CHANNEL SWITCHING TIME		500		μs	(5)
DIMENSIONS	57 x 24 x 4.5 mm				
WEIGHT	10 g				
<p>NOTE :</p> <p>(1) CEPT SRD BAND LIMITS = 433.05 – 434.79 MHz</p> <p>(2) OVER OPERATING TEMPERATURE RANGE</p> <p>(3) POWER ON 50 Ω . CEPT MAX ERP = 10 mW</p> <p>(4) SQUARE WAVE 0-5 Vdc LEVEL</p> <p>(5) PLL LOCK-UP TIME</p> <p>(6) AT Fo ± 200 KHz</p>					



TABLE 1 – BK68 VERSIONS

Model	Frequency Range	Power	Voltage
BK68F5 (1)	868 - 870 MHz	35 mW	5Vdc
BK68F3 (1)	868 - 870 MHz	25 mW	3Vdc

Note (1) STANDARD VERSIONS WITH EX STOCK AVAILABILITY.
 PLEASE CONTACT THE FACTORY FOR SAMPLES AND AVAILABILITY OF NON STANDARD VERSIONS.

- PLL Synthesized
- Data rate to 64 KB
- -106dbm Rx Sensitivity

General Description

The BK68F5 is a synthesized UHF transceiver for use in wireless data transmission applications. The transceiver operates on the 868 – 870 MHz ISM band and it is designed to comply to the European Standards EN 300-220-3 and EN 301-489-3, in accordance with the CEPT-ERC-REC 70-03 recommendation (Annex 1 – Non Specific Short Range Devices). Together with a precision and low phase-noise crystal controlled PLL architecture, the transceiver has high reception sensitivity (-105 dBm) and high RF output power (40 mW). High RF output power allows to employ poor efficiency antennas (helical, patch, loop or a trace on a PCB) to remain under legal 25 mW ERP (Effective Radiated Power) limit. The BK68F5 is designed to be directly interfaced to a microcontroller (MCU) to control and to monitor the receive and transmit mode and to program (through a 3 wires serial interface) the appropriate Rx and Tx frequencies. In a typical application the MCU manages also the communication protocol i.e. the switching between transmit and receive mode, the preamble, the start byte, the bit encoding and decoding and other important operations

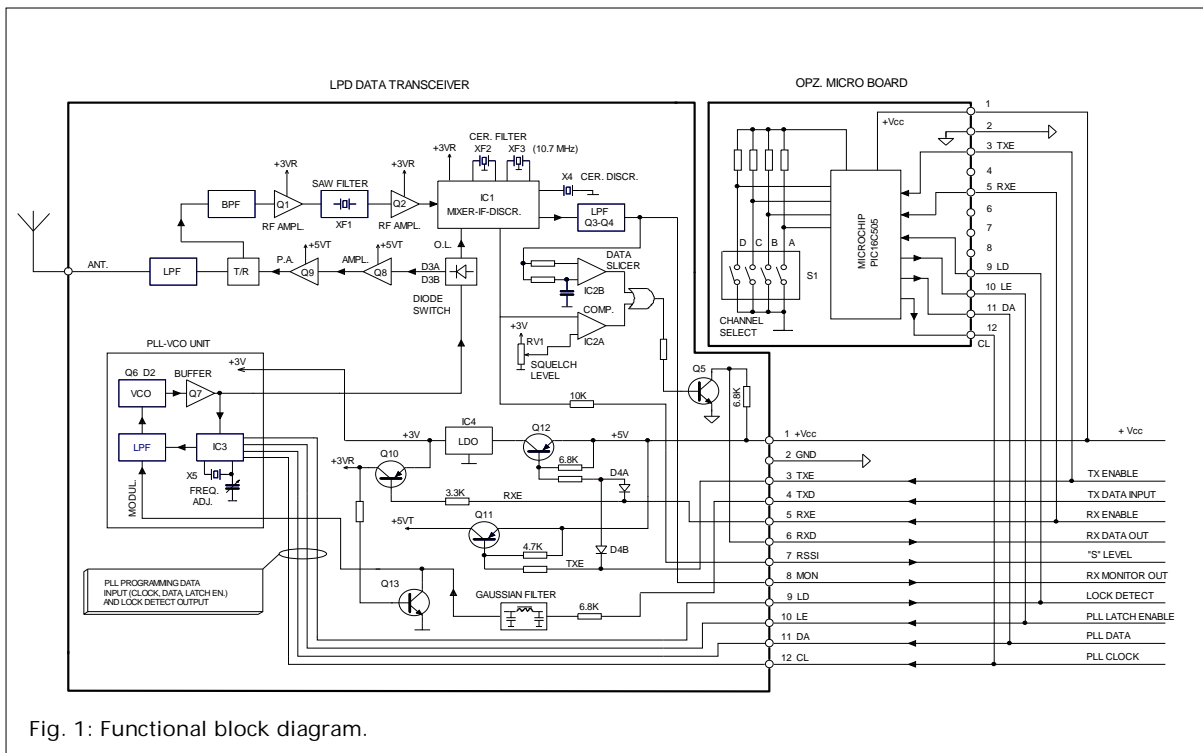
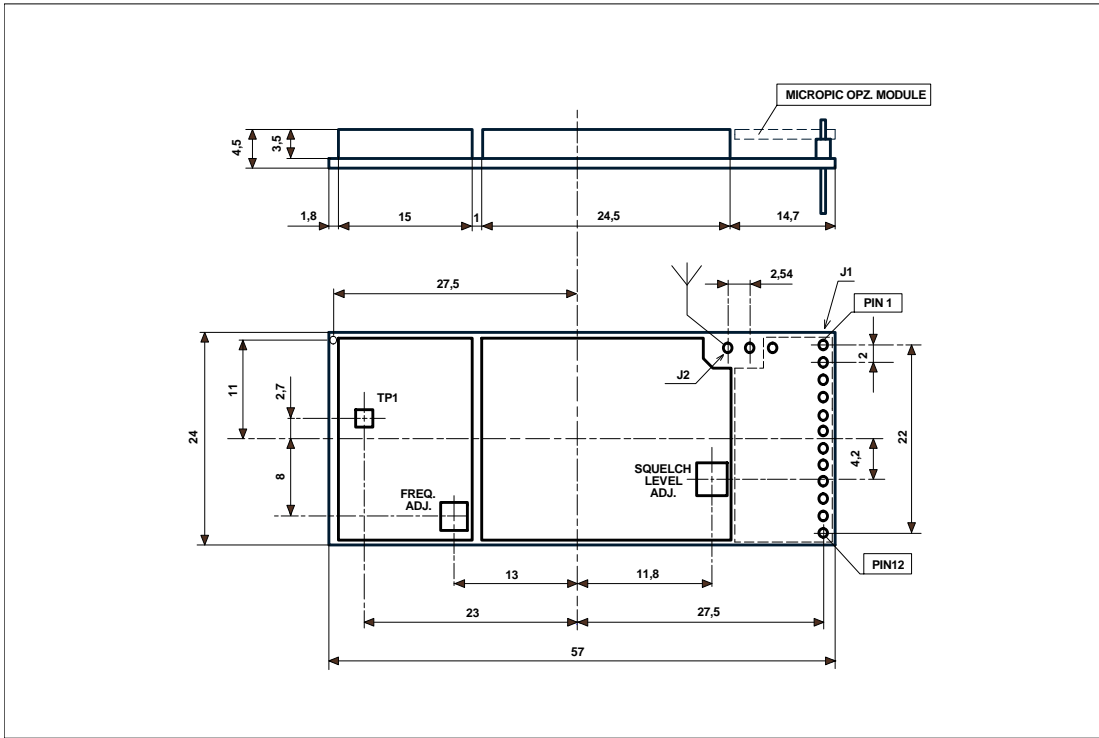


Fig. 1: Functional block diagram.



Optional microboard.

An optional small μ C board (Micropic Module – part.n° 015917) can be directly mounted on the transceiver J1 connector. The Micropic Module eliminates the necessity of an external programming of Tx and Rx frequencies. Up to 16 factory pre-programmed RF channels can be easily selected by means of a four positions dip-switch.

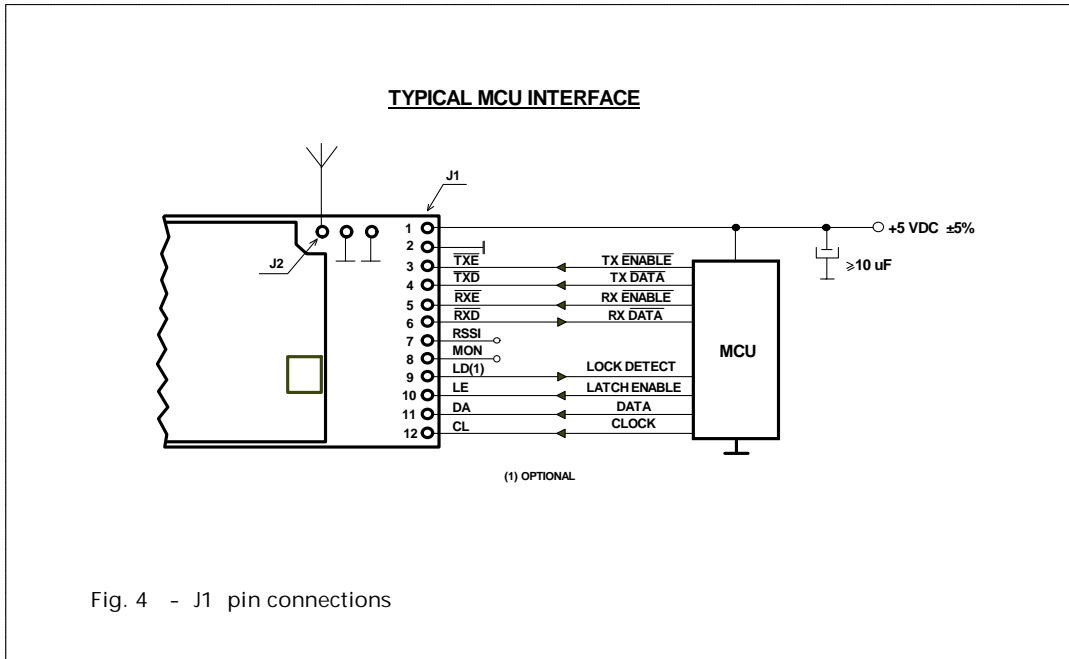


Fig. 4 - J1 pin connections

BK68F5 Specifications					
	Min	Typ	Max	Units	Notes
GENERAL					
FREQUENCY RANGE	867.000		871.000	MHz	(1)
CHANNEL SPACING	150	200		KHz	
FREQUENCY PROGR. STEP	25	50	100	KHz	
FREQUENCY STABILITY		±6	±15	KHz	(2)
DATA RATE	7.2		64	Kbaud	
ANTENNA IMPEDANCE		50		Ω	
SUPPLY VOLTAGE	4.75	5	5.25	V	
SUPPLY CURRENT - SLEEP		1	10	μA	
SUPPLY CURRENT - Rx MODE		21	24	mA	
SUPPLY CURRENT - Tx MODE		40	48	mA	
OPERATING TEMPERATURE	- 20		+ 60	°C	
TRANSMITTER					
RF OUTPUT POWER	30		40	mW	(3)
SPURIOUS EMISSION			- 50	dBc	
MODULATION FREQUENCY	3.5		32	KHz	(4)
FM DEVIATION		30		KHz	(4)
R/T SWITCHING TIME		2		ms	(5)
CHANNEL SWITCHING TIME		1		ms	(5)
RECEIVER					
SENSITIVITY	- 102	- 106		dBm	
SELECTIVITY		40	30	dB	(6)
IMAGE REJECTION		50		dB	
DYNAMIC RANGE		100		dB	
SQUELCH LEVEL ADJ. RANGE	- 115	- 110	- 70	dBm	
T/R SWITCHING TIME		1.5		ms	(5)
CHANNEL SWITCHING TIME		500		μs	(5)
DIMENSIONS	57 x 24 x 4.5 mm				
WEIGHT	10 g				
NOTE :					
(1) CEPT SRD BAND LIMITS = 868 - 870 MHz					
(2) OVER OPERATING TEMPERATURE RANGE					
(3) POWER ON 50 Ω . CEPT MAX ERP SUB BAND F (868 – 868,6 MHz) = 25 mW					
POWER ON 50 Ω . CEPT MAX ERP SUB BAND G (868,7 – 869,2 MHz) = 25 mW					
POWER ON 50 Ω . CEPT MAX ERP SUB BAND I (869,4 – 869,65 MHz) = 500 mW					
POWER ON 50 Ω . CEPT MAX ERP SUB BAND K (869,7 – 870 MHz) = 5 mW					
(4) SQUARE WAVE 0-5 Vdc LEVEL					
(5) PLL LOCK-UP TIME					
(6) AT Fo ± 200 KHz					



General Description

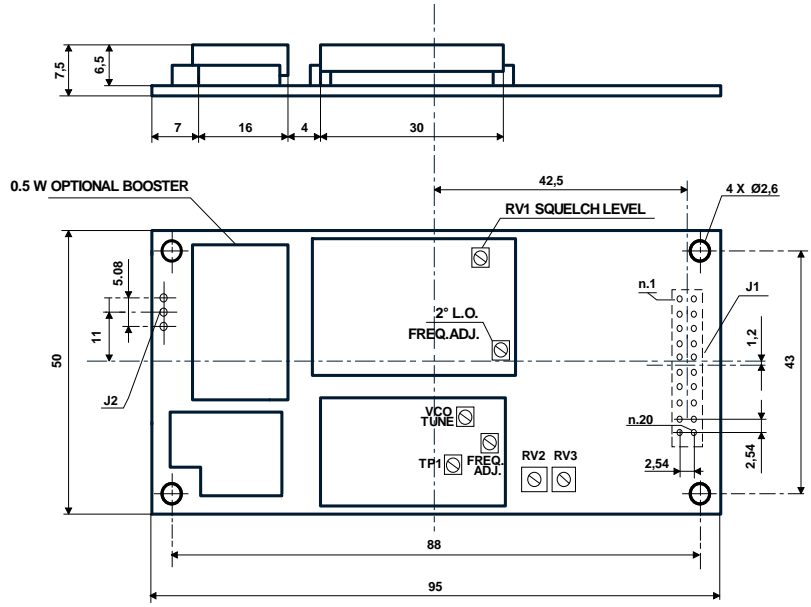
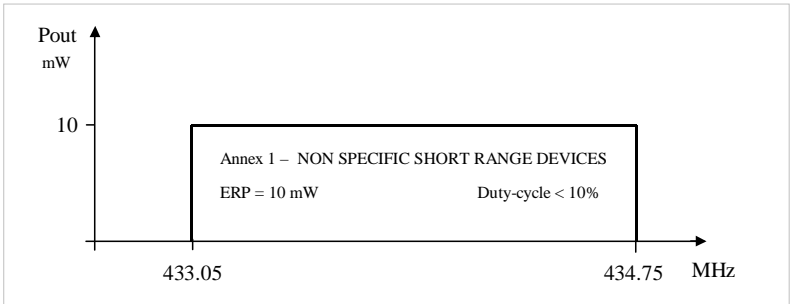
The BK77A5 and the BK77B5 are "PLL" synthesized UHF transceivers for use in Wireless "Voice" (Analogue Signal) or Data transmission applications. The transceivers operate on the 433.05-434.79 MHz ISM Band and are designed to comply to the European Standards EN 300-220-3 (class I) and EN 301-489-3.
 The transceivers employ NBFM (Narrow Band Frequency Modulation) with a 25 KHz channel separation.

A) BK77A5

The BK77A5 is designed in accordance with CEPT-ERC/REC 70-03 recommendation (Annex 1 – Non specific short range devices) for applications employing a 10 mW max radiated power (ERP).

B) BK77B5

The BK77B5 has 500 mW output RF power (100mW in " Low Power") and it is programmable from 432 MHz to 436.1 MHz (to cover also the Italian 436.000-436.100 MHz telemetry and Data transmission band).





General Description:

The BK78A5 and the BK78B5 are "PLL" synthesized UHF transceivers for use in Wireless "Voice" (Analogue Signal) or Data transmission applications. The transceivers operate on the 868-870 MHz ISM Band and are designed to comply to the European Standards EN 300-220-3 (class 1) and EN 301-489-3. The transceivers employ NBFM (Narrow Band Frequency Modulation) with a 25 KHz channel separation.

A) BK78A5

The BK78A5 is designed in accordance with CEPT-ERC/REC 70-03 recommendation (Annex 1 – Non specific short range devices) for applications employing a 10 mW or 25 mW max radiated power (ERP).

B) BK78B5

The BK78B5 has 500 mW output RF power (100mW in " Low Power") and it is programmable from 868 MHz to 870 MHz .

