FOXY

LOW COST LOW POWER DEDICATED TRANSCEIVER
FOR SIGFOX WORLDWIDE NETWORK

➕ WHAT IS FOXY?

Foxy is a single-chip Sub-GHz transceiver that connects Things to the Sigfox network, anywhere in the world, enabling:

Event-based IoT applications thanks to its:
- Marginal cost, miniature solution
- MPU-free autonomous mode
- Embedded Sigfox-compliant frame encoder
- 5 to 10 years foreseen lifetime on a coin battery

Complex IoT use cases thanks to its:
- SPI interface
- Datarates from 0.1 to 20 kbps DBPSK/GFSK
- Bidirectional modulator
- 1-Hz resolution frequency synthesis

➕ APPLICATIONS

Specifically designed for the Internet of Things, Foxy enables both marginal cost, event-based, massive IoT applications and complex IoT scenarios which require aggressive node lifetimes.

Foxy can build tomorrow's millions-of-Things applications including predictive maintenance and asset management.

➕ WHAT'S NEW?

Ultra-narrow-band (UNB) is an enabling technology for the Internet-of-Things. UNB simultaneously optimizes network capacity while maximizing the communication link budget of Low-Power Wide-Area (LPWA) networks.

Foxy is the first wireless transceiver dedicated to UNB. Foxy is a low power, low cost 65nm CMOS transceiver that allows GFSK and DBPSK modulations as well as data rates from 100bps to 20kbps. Foxy covers the complete Sigfox specifications including ETSI, FCC, ARIB and AUS/NZ bands and its TCXO-less protocol.

Going beyond Sigfox specifications, Foxy can push the UNB paradigm to its limits. Indeed, at ultimate narrow bandwidths, this technology is historically limited by Carrier Frequency Offsets (CFO) and drift, classically mitigated using a precise but costly TCXO.

Thanks to Foxy's unique capabilities, **unprecedented bandwidths of 100 Hz** can be achieved even in the downlink, without a TCXO.
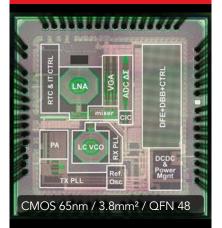
➕ KEY FIGURES

Receiver:

RX Current consumption @ 3.3 V	4.4mA
Typical sensivity (PER=10%)	
• DBPSK 100bps, no CFO	-136 dBm
• GFSK 600 bps	-125.5dBm
S11 868-930 MHz	<-11dB
IIP3 (two-tone, in-band)	-48dBm
CFO/drift for 1dB Sens. loss	+/- 75Hz;35Hz/s
Blocking, 3dB sens. loss	90dB@10MHz

Transmitter:

Current consumption @ 3.3 V	
• TX Ready	2.62mA
• TX DBPSK 100bps, 10dBm	24mA
• TX GFSK 600bps, 10dBm	20mA
EVM DBPSK 100bps, 10dBm	<5%
Maximum CW output power	14.7dBm
Wake-up IT enabled	140nA
32kHz RTC & all IT enabled	450nA
Embedded framer & AES encrypt.	yes

UNIQUE:

- TCXO-less 100bps DBPSK/GFSK downlink
- Low power RX consumption: 15mW
- Autonomous mode without MPU: 5 to 10 years lifetime on coin battery

CMOS 65nm / 3.8mm² / QFN 48

KEY FACTS:

- Presented at ISSCC 2017
- Patented solution

OPEN TO PARTNERSHIP FOR INDUSTRIAL TRANSFER

Contact:
Michel Durr
michel.durr@cea.fr
+33 787 005 645

INSTITUT CARNOT Leti