

PRODUCT SUMMARY

SKY68018-11: LTE Multi-Band Front-End Module for NB-IoT

Applications

- Cellular IoT modem devices targeting low-power wide area network (LPWAN):
 - 4G LTE technology capability
 - Dedicated LTE half-duplex operation (HD-FDD) for NB-IoT
 - Designed to meet 3GPP Rel-13 specifications (with compatible cellular transceiver)
- LTE universal modem products (low-band and mid-band):
 - Low-band B5/B8/B12/B13/B17/B18/B19/B20/B26/B28
 - Mid-band B1/B2/B3/B4/B25/B39/B66
- PAE optimized for both Class 4 LTE output power (+20 dBm) and Class 3 LTE output power (+23 dBm)

Features

- Cost-optimized front end for NB-IoT low-data-rate applications
- Low-loss post-PA transmit front end for enhanced transmitter efficiency (compared to LTE-FDD radio front ends)
- Broadband PA supporting APT mode of operation or Vcc fixed supply
- Integrated low-pass filters for harmonic rejection to comply with spurious emission requirements
- Integrated SP6T antenna Tx/Rx switch
- Optimized to support NB-IoT with POUT = +23.5 dBm @1SC and +21.5 dBm @12SC/1RB
- MIPI® RFFE control interface, 2.0 compliant
- Four additional TRX ports offer greater flexibility for more bands on the Tx or Rx path
- Adaptive biasing scheme for maximum PA efficiencies
- Small, low-profile package (4 mm x 5 mm x 0.85 mm [nominal]) (MSL3 @ 260 °C per JEDEC J-STD-020)
- Lead (Pb)-free and RoHS-compliant



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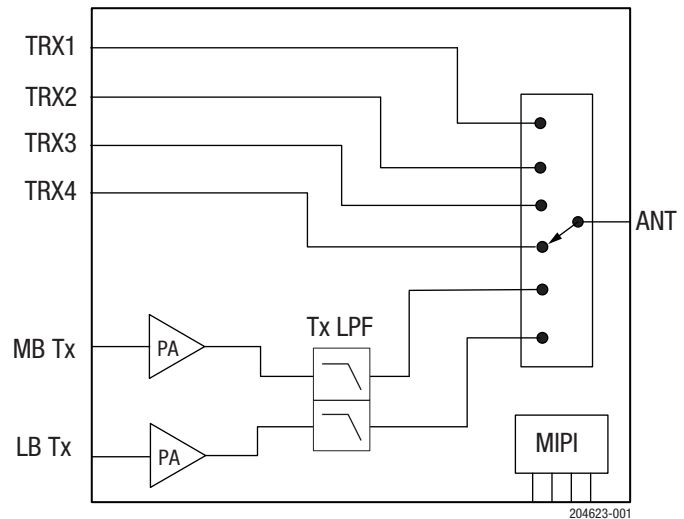


Figure 1. SKY68018-11 Functional Block Diagram

Description

The SKY68018-11 is a hybrid, multi-band multi-chip RF front-end (RFFE) module supporting cellular NB-IoT (half-duplex system) transceiver platforms. The module integrates the entire RF front end necessary for an LTE multi-band radio operating in low-band B5/B8/B12/B13/B17/B18/B19/B20/B26/B28 and mid-band B1/B2/B3/B4/B25/B39/B66 frequencies, including broadband PA with bias controller, Tx low-pass harmonic filter, antenna switch, and MIPI RFFE controller.

Tx Section

The PA load-line is optimized for high efficiency while simultaneously meeting 3GPP ACLR and emissions mask specifications for NB-IoT. An integrated LPF is implemented to reject the PA and transceiver harmonics while at the same time minimizing any post PA loss for an optimized transmit current consumption. Out-of-band emissions performance is emphasized by the design to be 3GPP-compliant for low-band B5/B8/B12/B13/B17/B18/B19/B20/B26/B28 and mid-band B1/B2/B3/B4/B25/B39/B66.

TRX Path

The four TRX ports are additional broadband ports that can be used symmetrically for either the Tx or Rx operation. The AUX ports can support conventional GSM power levels.

Smart Biasing

For most IoT applications, the DC-DC converter might not be available to control the VCC supply of the PA. With a fixed DC supply, Smart Biasing allows for easy power control through the MIPI interface by programming reduced bias current for lower gain states. Based on the application, a set of 4 to 6 different bias conditions with specific fixed-gain steps are predefined. For each of the steps, the transceiver output power can be adjusted to meet the desired total output power.

The key advantages of the smart biasing scheme are:

- Saving current consumption during lower output power operation
- Easy programming of fixed-gain steps through the MIPI interface
- Reducing the required output dynamic range of the transceiver

MIPI RFFE Controller Interface

The SKY68018-11 functional operation is fully controllable by a single MIPI interface that is used to drive the PA in various optimized bias modes as well as providing band selection and controlling the antenna switch Tx, Rx, and band selection.

Figure 1 shows the block diagram for the SKY68018-11.

Ordering Information

Part Number	Product Description	Evaluation Board Part Number
SKY68018-11	LTE Multi-Band Front-End Module for NB-IOT	SKY68018-11EK1

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