

Description

The Si2115/13/11 digital TV receiver integrates a complete digital TV tuner and a DVB-T and/or DVB-C digital demodulator into a single, monolithic, CMOS mixed-signal IC.

Leveraging Silicon Labs' proven 3rd-generation digital low-IF tuner architecture, the Si2115/13/11 delivers a higher number of received channels in real-world crowded spectrum conditions without the need for external LNAs, tracking filters, or SAW filters.

An enhanced version of the proven DVB-T/C demodulator technology from Silicon Labs' Si2165 has been incorporated into the Si2115/13/11 to deliver superior performance under a wide variety of field conditions. The digital demodulator uses sophisticated on-chip algorithms to ensure optimal reception even under difficult transmission conditions. In addition, the Si2115/13/11 offers on-chip Blindscan and Blindlock scanning algorithms for DVB-C as well as DSP-assisted DVB-T fast channel scanning.

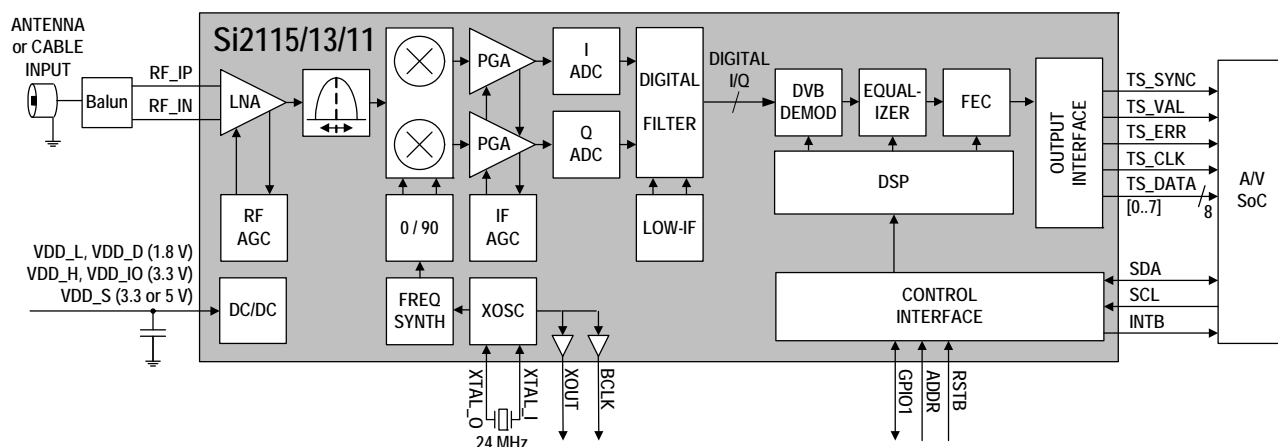
By combining digital tuner and demodulator functions in a single device, the Si2115/13/11 enables a full TV receiver solution in a very small PCB footprint and with minimal external components. The Si2115/13/11 contains an on-chip crystal oscillator and only requires the connection of a standard 24 MHz crystal or a reference clock. For dual-receiver applications, the primary Si2115/13/11 can provide a reference clock on its XOUT pin directly to the XTAL_I pin of the secondary Si2115/13/11, thus saving the cost of one crystal. The Si2115/13/11 programmable Transport Stream interface provides both serial and parallel modes, and is fully compatible with all MPEG decoders and conditional access modules (CI/CI+) to support any customer application.

Features

- Digital TV tuner
 - 42–870 MHz frequency range
 - No alignment, tuning or calibration
- Digital TV (DTV) demodulator and FEC decoder
 - DVB-T (ETSI EN 300 744)(Si2115 and Si2111 only)
 - DVB-C (ETSI EN 300 429)(Si2115 and Si2113 only)
 - ITU J.83 Annex A/C (Si2115 and Si2113 only)
- Supports all DVB-T modes
- Supports DVB-C symbol rates from 1 to 7.2 MBaud
 - Advanced echo equalizer
- Best-in-class real-world reception
- Compliance with NorDig 2.1, D-Book, and C-Book specifications
- Highly integrated, lowest BOM
 - No SAW filters required
 - Integrated LNAs and complete tracking filters
- Customizable channel select filters
- Flexible output interface to AV processor
 - Serial or parallel TS output
 - Low IF output to optional external demodulator
- Single die in standard CMOS process
- 3.3 and 1.8 V power supplies
- 7x7 mm, 48-pin QFN package, RoHS compliant

Applications

- Digital terrestrial or cable STB
- Digital PVR and DVD recorder
- Digital TV
- Digital PC TV card and USB dongle
- Digital full-NIM tuner module



Selected Electrical Specifications

($V_{DD_H} = 3.3\text{ V}$, $V_{DD_L} = 1.8\text{ V}$, $V_{DD_D} = 1.8\text{ V}$, $T_A = 25\text{ }^{\circ}\text{C}$)

Parameter	Test Condition	Typ	Unit
Supply Voltage		1.8 and 3.3	V
Total Power Consumption	DVB-T mode	1.1	W
RF Input Frequency Range		42 to 870	MHz
Noise Figure ¹	Max gain	4.0	dB
Wideband IIP3 ¹	$N \pm 18, \pm 36$; max RF gain	+18	dBm
Inband IIP3 ¹	$N \pm 1, \pm 2$; max RF gain	-5	dBm
LO Phase Noise at 860 MHz	125 Hz 250 Hz 1 kHz 10 kHz 100 kHz	-83 -91 -96 -95 -104	dBc/Hz
	Integrated DSB: 125 Hz to 4 MHz	0.4 (-43)	°rms (dBc)
Adjacent Channel Attenuation	$N \pm 1$; RF input ¹ to DLIF output	80	dB
DVB-T Sensitivity ²	8K, 64-QAM, 2/3CR, Gaussian Channel	-84	dBm
DVB-T Carrier to Noise Ratio ²	8K, 64-QAM, 2/3CR, Gaussian Channel	17	dB

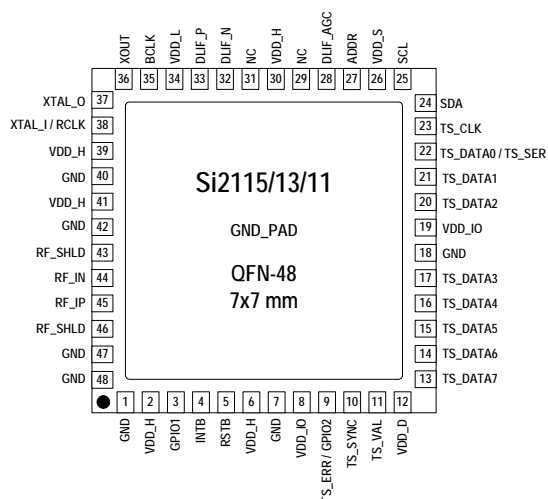
Notes:

1. Measured at the F-connector input of the Si2115/13/11 reference design and includes all front-end circuit losses.
2. Measured at Quasi Error Free conditions ($\text{BER} = 2 \times 10^{-4}$).

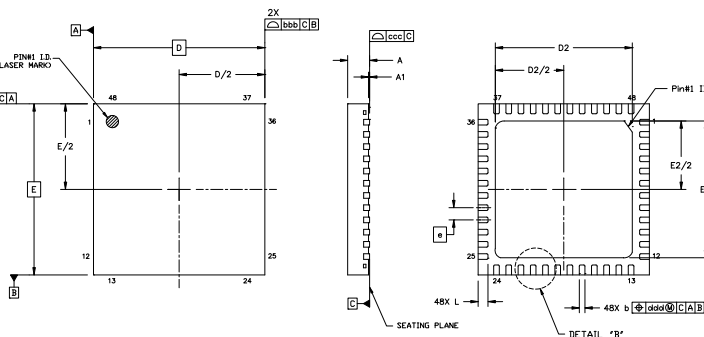
Selection Guide

Part #	Description
Si2115	Digital TV receiver for DVB-T/C
Si2113	Digital TV Receiver for DVB-C
Si2111	Digital TV Receiver for DVB-T

Pin Assignments



7x7 mm QFN-48 Package Information



Symbol	Min	Nom	Max	Unit
A	0.80	0.85	0.90	mm
D, E	7.00 BSC			mm
e	0.50 BSC			mm