

Description

The Si4736/37 and Si4738/39 are the industry's first fully integrated, 100% CMOS AM/FM/WB and FM/WB radio receiver ICs. Offering unmatched integration and PCB space savings, the Si4736/37/38/39 requires only two external components and less than 15 mm² of board area, excluding the antenna inputs. The Si4736/37/38/39 AM/FM/WB radio provides the space savings and low power consumption necessary for portable devices while delivering the high performance and design simplicity desired for all AM/FM/WB solutions.

Leveraging Silicon Laboratories' proven and patented Si4700/01 FM tuner's digital low intermediate frequency (low-IF) receiver architecture, the Si4736/37/38/39 delivers superior RF performance and interference rejection in both AM and FM bands. The high integration and complete system production test simplifies design-in, increases system quality, and improves manufacturability.

The Si4736/37/38/39 is a feature-rich solution including 1050 Hz tone detection, advanced seek algorithms, soft mute, auto-calibrated digital tuning, and FM stereo processing. In addition, the Si4736/37/38/39 provides analog and digital audio outputs and a programmable reference clock. The device supports I²C-compatible, 2-wire control interface, SPI, and a Si4700/01 backwards-compatible, 3-wire control interface.

The Si4736/37/38/39 utilizes digital processing to achieve high fidelity, optimal performance, and design flexibility. The chip provides excellent pilot rejection, selectivity, and unmatched audio performance, and offers both the manufacturer and the end-user extensive programmability and flexibility in listening experience.

The Si4737/39 incorporates a digital processor for the European Radio Data System (RDS) and the North American Radio Broadcast Data System

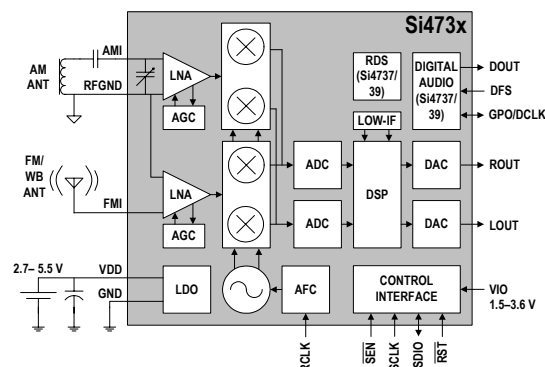
(RBDS), and includes all required symbol decoding, block synchronization, error detection, and error correction functions. Using this feature, the Si4737/39 enables broadcast data such as station identification and song name to be displayed to the user.

Features

- Weather band support (162.4–162.55 MHz)
- Worldwide FM band support (76–108 MHz)
- Worldwide AM band support (520–1710 kHz) (Si4736/7)
- 1050 Hz tone detection
- AM/FM/WB digital tuning
- No manual alignment necessary
- Excellent real-world performance
- Dynamic channel filters
- Advanced AM/FM seek tuning
- Digital volume control
- Adjustable soft mute control
- Frequency synthesizer with integrated VCO
- Automatic frequency control (AFC)
- Automatic gain control (AGC)
- Programmable de-emphasis
- Integrated LDO regulator
- Programmable reference clock
- FM RDS/RBDS processor (Si4736/7)
- 2-wire and 3-wire control interface
- 2.7 to 5.5 V supply voltage
- 3 x 3 x 0.55 mm 20-pin QFN package
 - Pb-free/RoHS compliant

Applications

- Emergency radios
- Table and portable radios
- Stereos
- Mini/micro systems
- Portable media players
- Handsets
- Boom boxes
- Clock radios



Selected FM Electrical Specifications

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Input Frequency	f_{RF}		76	—	108	MHz
Sensitivity headphone matching		(S+N)/N = 26 dB	—	2.2	—	μ V EMF
Sensitivity 50 Ω matching		(S+N)/N = 26 dB	—	1.1	—	μ V EMF
Input IP3		$ f_2 - f_1 > 1 \text{ MHz}; f_0 = 2 \times f_1 - f_2$	—	105	—	dB μ V EMF
Adjacent Channel Selectivity		$\pm 200 \text{ kHz}$	—	50	—	dB
Alternate Channel Selectivity		$\pm 400 \text{ kHz}$	—	70	—	dB
Audio Mono S/N			—	63	—	dB
Audio THD			—	0.1	—	%
Audio Output Voltage			72	80	90	mVrms
Supply Voltage*	V_D, V_A		2.7	—	5.5	V
Interface Supply Voltage*	V_{IO}		1.5	—	3.6	V
Powerdown Current*	I_{PD}		—	10	—	μ A

*Note: Applies to AM, FM, and WB modes.

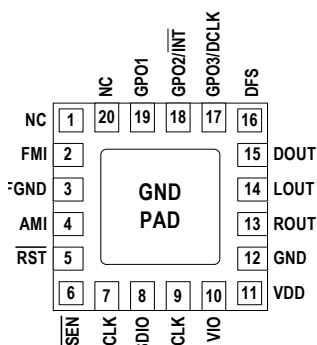
WB Receiver Characteristics

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Input Frequency	f_R		162.4	—	162.55	MHz
Sensitivity		SINAD = 12 dB	—	1.2	—	μ V EMF
Adjacent Channel Selectivity		+/-25 kHz	—	55	—	dB
Audio S/N		Mono	—	45	—	dB

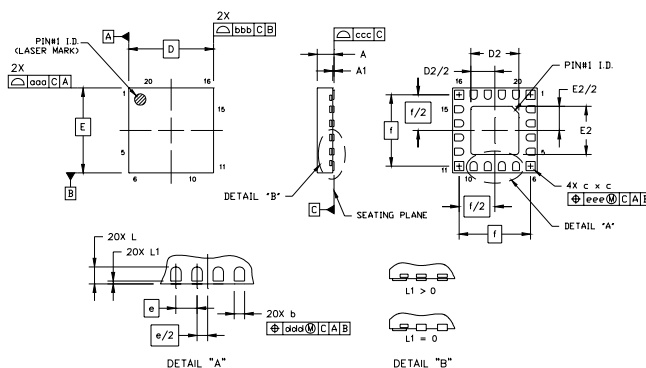
Selected AM Electrical Specifications

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Input Frequency	f_{RF}	Medium wave (AM)	520	—	1710	kHz
Sensitivity		(S+N)/N = 26 dB	—	25	—	μ V EMF
Audio S/N			—	56	—	dB
Audio THD			—	0.1	—	%
Audio Output Voltage			54	60	66	mVrms

Pin Assignments



3 x 3 x 0.55 mm, 20-pin QFN Package Information



Symbol	Millimeters		
	Min	Nom	Max
A	0.50	0.55	0.60
A1	0.00	0.02	0.05
b	0.18	0.25	0.30
c	0.27	0.32	0.37
D	3.00 BSC		
D2	1.60	1.70	1.80
e	0.50 BSC		
E	3.00 BSC		
E2	1.60	1.70	1.80
f	2.53 BSC		
L	0.35	0.40	0.45
L1	0.00	—	0.10
aaa	—	—	0.10
bbb	—	—	0.10
ccc	—	—	0.08
ddd	—	—	0.10
eee	—	—	0.10