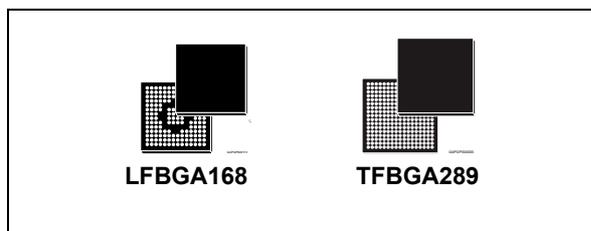


Automotive HD Radio™ baseband receiver - MRC enabled

Data brief



Features



- AEC-Q100 qualified
- IBOC (in-band on-channel) digital audio broadcast signal decoding for AM/FM hybrid and all-digital modes
- Dual-channel HD 1.5 for background scanning and data services or FM Maximum Ratio Combining (MRC) Diversity algorithm
- HD codec (HDC) audio decompression
- Metadata support for HD Radio reception
- MPS (main program service), SPS (supplemental program service) and PAD (program associated data) data decoding
- Advanced HD Radio feature support:
 - Apple ID3 tag
 - Multicasting
 - Electronic program guide (EPG)
 - Real-time traffic
- Automatic Audio Alignment (AAA) algorithm support
- Variable input base-band data-rate I2S-like interface supporting 650, 675, 744.1875, 912 kS/s data rates
- Secondary RF base-band interface for dual tuner applications
- Glueless interface to Synchronous SDRAM addressing up to 512 Mbit of SDRAM in x16 configuration
- Optional Serial Flash® memory SPI interface for application code storage

- IIS serial audio interface with programmable sample rate converter
- Primary and secondary serial interfaces for host micro communication based on industry standard IIC and SPI
- Several General purpose IOs
- One Internal clock oscillator and two internal PLLs
- External clock input
- 1.2 V core supply; 3.3 V I/O supply

Description

The STA680M is an HD-radio base-band processor for car-radio applications. The STA680M functionality includes audio decompression and data processing, while multiple interfaces ensure flexible integration into the system.

The STA680M takes full advantage of HD 1.5 Radio benefits including CD-like audio quality from HD Radio FM broadcasts and FM-like audio quality using HD Radio AM, while program associated data or traffic information is received from the second channel or, alternatively, it features FM Maximum Ratio Combining Diversity for superior reception performance.

STA680M supports FM/AM analog/digital AAA algorithm by mean of specific FW.

Table 1. Device summary

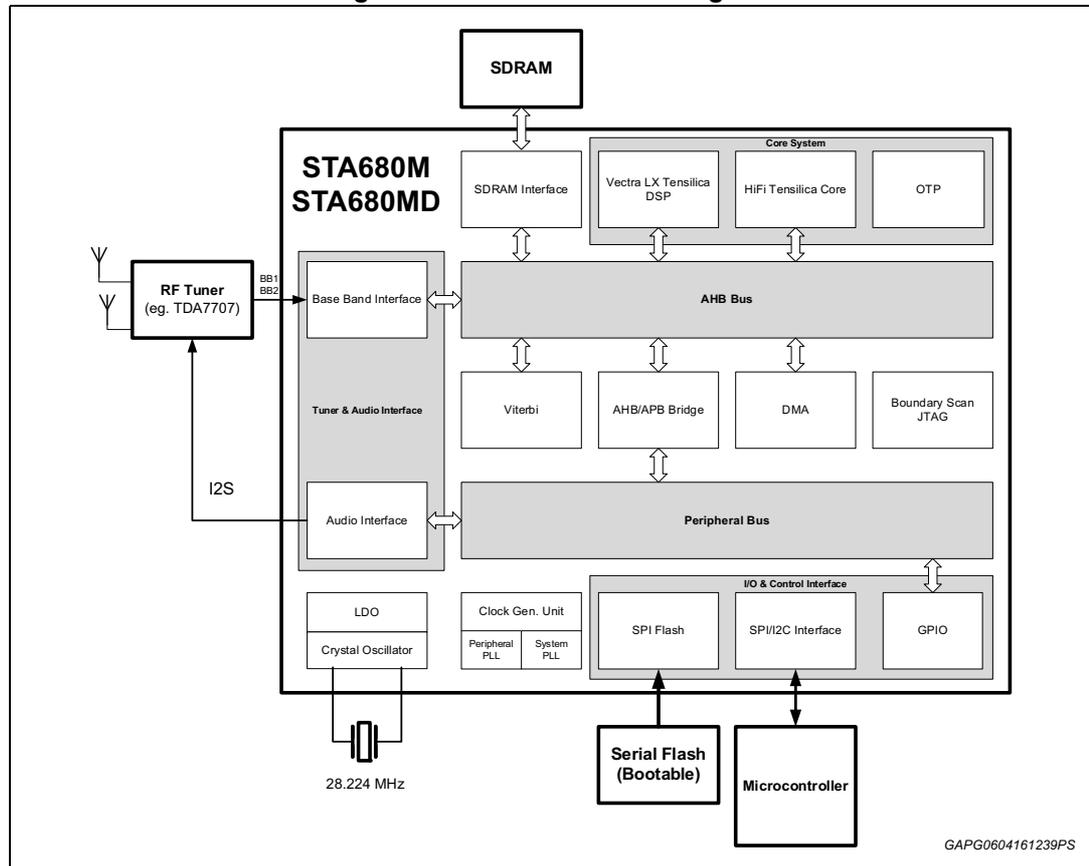
Order code	Package ⁽¹⁾	Packing
STA680M	LFBGA 168 balls (12x12x1.4 mm)	Tray
STA680MTR		Tape & Reel
STA680MD	TFBGA 289 balls (15x15x1.2 mm)	Tray
STA680MDTR		Tape & Reel

1. ECOPACK® compliant.

1 Block diagram and pin description

1.1 Block diagram

Figure 1. Functional block diagram



1.2 Ball-out description

The STA680M is available in two different packages. It comes in a 12x12 mm LFBGA with 168 balls with 0.8 mm pitch and in 15x15 mm TFBGA with 289 balls with 0.8 mm pitch. TFBGA289 package option offers ball-to-ball compatibility with STA660 DAB/DRM digital decoder.

2 Electrical specifications

2.1 Absolute maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Test condition	Min	Typ	Max	Units
VDD	Core supply voltage	-	-	1.47	-	V
VDD_GEN_IO	Generic IO supply voltage	-	-	3.6	-	V
VDD_FSH_IO	Flash IO supply voltage	-	-	3.6	-	V
VDD_RAM_IO	SDRAM IO supply voltage	-	-	3.6	-	V
VDD_OSC	Osc 1V8 supply voltage	-	-	1.95	-	V
VDD_PLL_ANA	PLL analog supply voltage	-	-	2.75	-	V
VDD_PLL_DIG	PLL digital supply voltage	-	-	1.47	-	V
VDD_SAF	SAF core supply voltage	-	-	1.47	-	V
V _i	Voltage on input pin	-	-0.5	-	VDDIO+0.5	V
V _o	Voltage on output pin	-	-0.5	-	VDDIO+0.5	V
V _{ESD}	ESD absolute minimum withstand voltage	R = 1.5 kΩ; C = 1.5 pF Human Body Model, LFBGA package	> ±1000			V
		Charged device mode, LFBGA package	> ±500			

2.2 Thermal data

Table 3. Thermal data

Symbol	Parameter	Test condition	Value	Unit
R _{th j-amb}	Thermal resistance junction-to-ambient	BGA package, JEDEC 2s2p PCB, free air	44	°C/W
T _{stg}	Storage temperature	-	-55 to 150	°C
T _{amb}	Operating ambient temperature	-	-40 to 85	°C
T _{j, max}	Maximum junction temperature	-	125	°C

3 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK[®] specifications, grade definitions and product status are available at: www.st.com.

ECOPACK[®] is an ST trademark.

3.1 LFBGA168 (12x12x1.4 mm) package information

Figure 2. LFBGA168 (12x12x1.4 mm) package outline

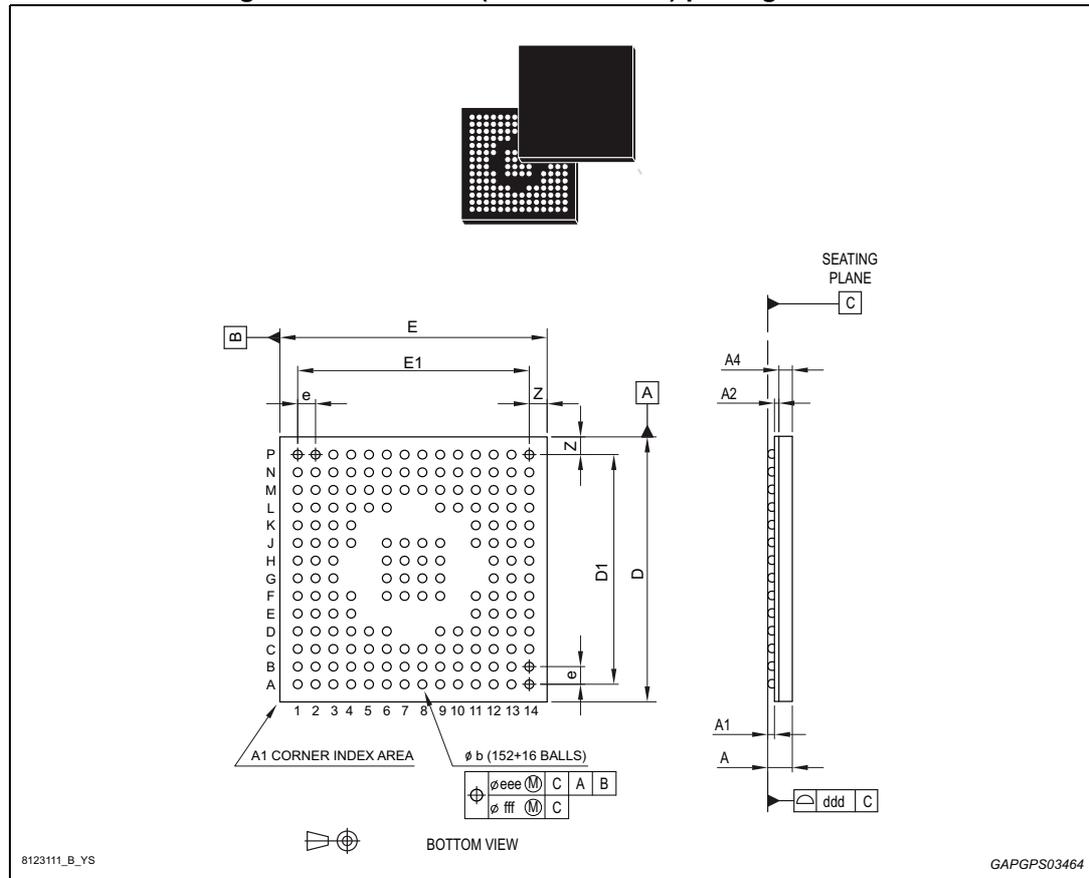


Table 4. LFBGA168 (12x12x1.4 mm) package mechanical data

Ref	Dimensions					
	Millimeters			Inches ⁽¹⁾		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	-	1.400	-	-	0.0551
A1	0.210	-	-	0.0083	-	-
A2	-	0.200	-	-	0.0078	-
A4	-	-	0.800	-	-	0.0315
b	0.350	0.400	0.450	0.0138	0.0157	0.0177
D	11.850	12.000	12.150	0.4665	0.4724	0.4783
D1	-	10.400	-	-	0.4094	-
E	11.850	12.000	12.150	0.4665	0.4724	0.4783
E1	-	10.400	-	-	0.4094	-
e	-	0.800	-	-	0.0315	-
Z	-	0.800	-	-	0.0315	-
ddd	-	-	0.100	-	-	0.0039
eee	-	-	0.150	-	-	0.0059
fff	-	-	0.080	-	-	0.0031

1. Values in inches are converted from mm and rounded to 4 decimal digits.

3.2 TFBGA289 (15x15x1.2 mm) package information

Figure 3. TFBGA289 (15x15x1.2 mm) package outline

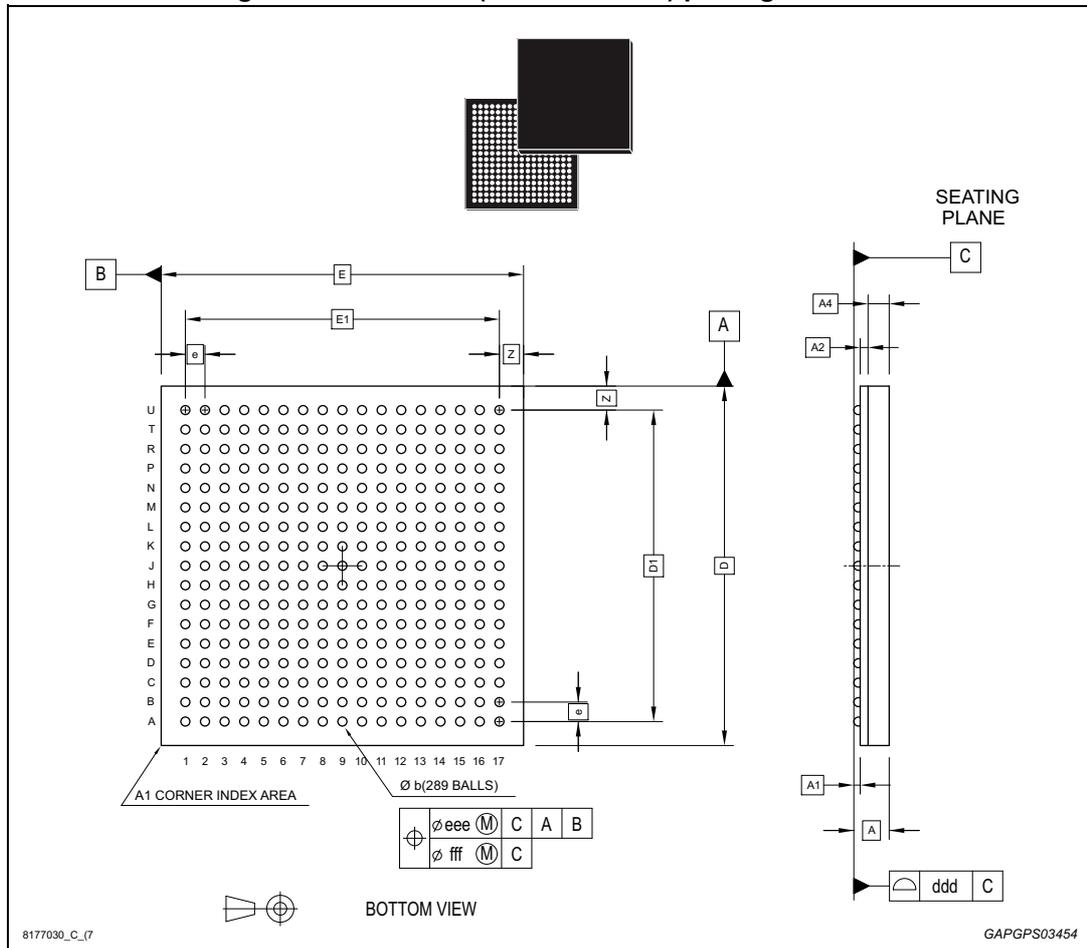


Table 5. TFBGA289 (15x15x1.2 mm) package mechanical data

Ref	Dimensions					
	Millimeters			Inches ⁽¹⁾		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	-	1.200	-	-	0.0472
A1	0.210	-	-	0.0083	-	-
A2	-	0.200	-	-	0.0079	-
A4	-	-	0.620	-	-	0.0244
b	0.350	0.400	0.480	0.0138	0.0157	0.0189
D	14.850	15.000	15.150	0.5846	0.5906	0.5965
D1	-	12.800	-	-	0.5039	-
E	14.850	15.000	15.150	0.5846	0.5906	0.5965
E1	-	12.800	-	-	0.5039	-
e	-	0.800	-	-	0.0315	-
Z	-	1.100	-	-	0.0433	-
ddd	-	-	0.100	-	-	0.0039
eee	-	-	0.150	-	-	0.0059
fff	-	-	0.080	-	-	0.0031

1. Values in inches are converted from mm and rounded to 4 decimal digits.

4 Revision history

Table 6. Document revision history

Date	Revision	Changes
22-Feb-2019	1	Initial release.
25-Feb-2019	2	Removed conditional text "Restricted".

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