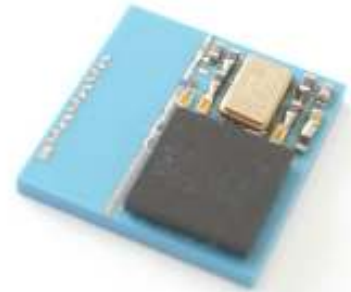


# Datasheet

## BTR110S

### Key Features

- A small and cost effective Bluetooth® System with integrated antenna
- Bluetooth® specification v1.1/v1.2 compliant
- Class 2, up to 10-meter range
- Complete 2.4GHz Bluetooth® System including:
  - Hardware: Antenna, Radio, Baseband, Crystal and Flash
  - Standard Firmware: HCI or RFCOMM stack
- Power management: low power 1.8V operation for Bluetooth® core
- Compact size: 12 mm x 12 mm x 2.41 mm
- 15-bit linear audio CODEC
- Support multiple connections
- Surface mount module for embedded applications
- Several firmware options
- Rewritable flash memory for easy upgrade route
- Custom firmware production available



### Description

The **Bluetron™ BTR110S module** from AvantWave is a complete Bluetooth® solution for fast implementation, cutting your time-to-market. It is a short-range, compact and cost effective radio/baseband module that can be implemented in any kind of electronic devices, such as cell phone, high-end headset and PDA, etc.

In standard configuration the module includes a baseband processor with on board 4Mbit Flash memory, a radio front-end, antenna, supporting circuitry, together with some higher-level software protocols and applications such as L2CAP, SDP, SPP, HSP and HFP are resided in the Flash.

The **Bluetron™ BTR110S module** is a power class 2 Bluetooth® devices, and is in compliance with version 1.1/1.2 of the Bluetooth® specification. It is supplied with Bluetooth® protocol stack firmware which runs on the internal microprocessor. **Bluetron™ BTR110S module** is built on CSR BC02 Flash core with a 4Mbit Flash memory for firmware and application software storage.

### Applications

- Cell phones
- High-end Bluetooth® headsets
- Digital cameras
- PDAs and other portable terminals
- Point-of-Sales (POS) systems
- Telemetry and machine-to-machine devices
- Fitness and sports telemetry devices



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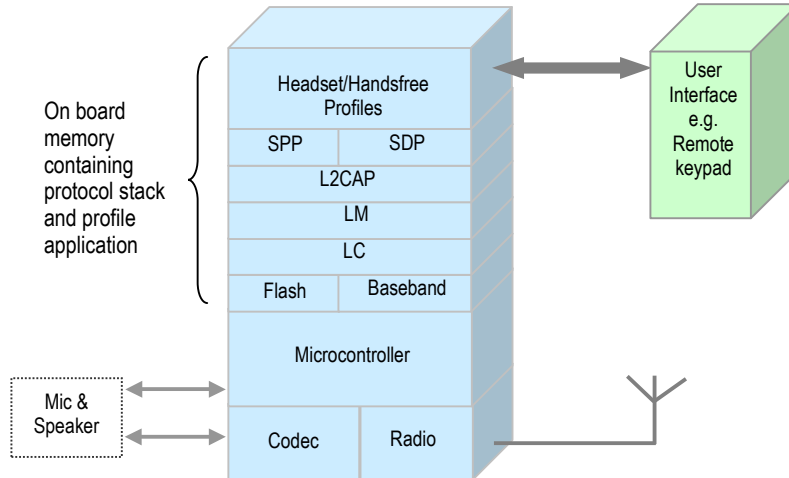
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# Software

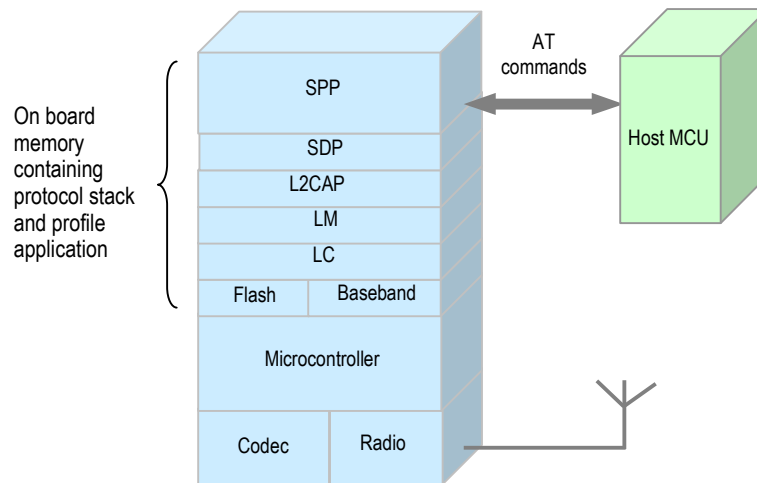
## 1) BTR110S-HSP/HFP

The BTR110S-HSP/HFP can execute custom Bluetooth headset/handsfree firmware, together with buttons, LED's, and battery management hardware; a cost effective headset/handsfree kit is formed.



## 2) BTR110S-SPP

For cable replacement type of application, the SPP firmware is designed and targeted to use in an embedded system with a host controller. SPP defines the requirements for Bluetooth devices necessary for setting up emulated serial cable connections using RFCOMM between two peer devices. Devices using Bluetooth for RS232 serial cable emulation can use it.



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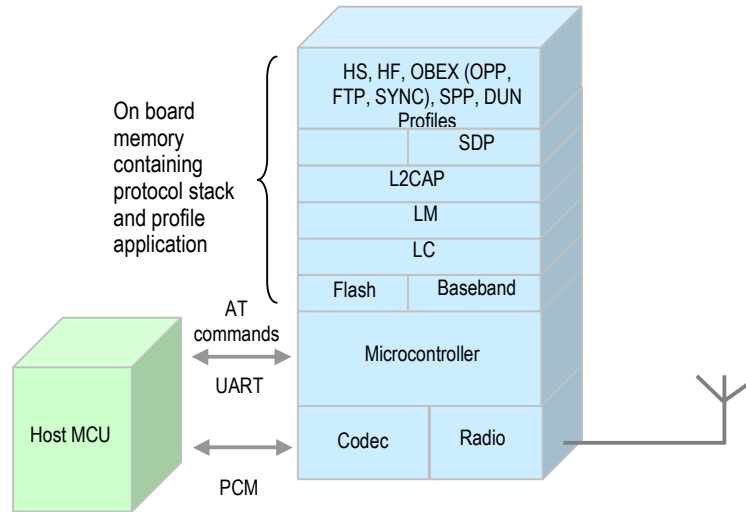
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### 3) BTR110S-BGW (Gateway)

BGW is a Bluetooth gateway solution for mobile phones or PDAs. The firmware is designed to interface directly with typical mobile phone architecture / embedded system digital connections and requires minimal interfacing to a Man-Machine Interface (MMI). The host processor communicates with our BTR110S-BGW via simple AT commands. Numerous application profiles such as HS, HF, OBEX (OPP, FTP, SYNC), SPP, and DUN are resided on internal Flash. It supports audio via on-chip analogue codec or digital PCM interface.



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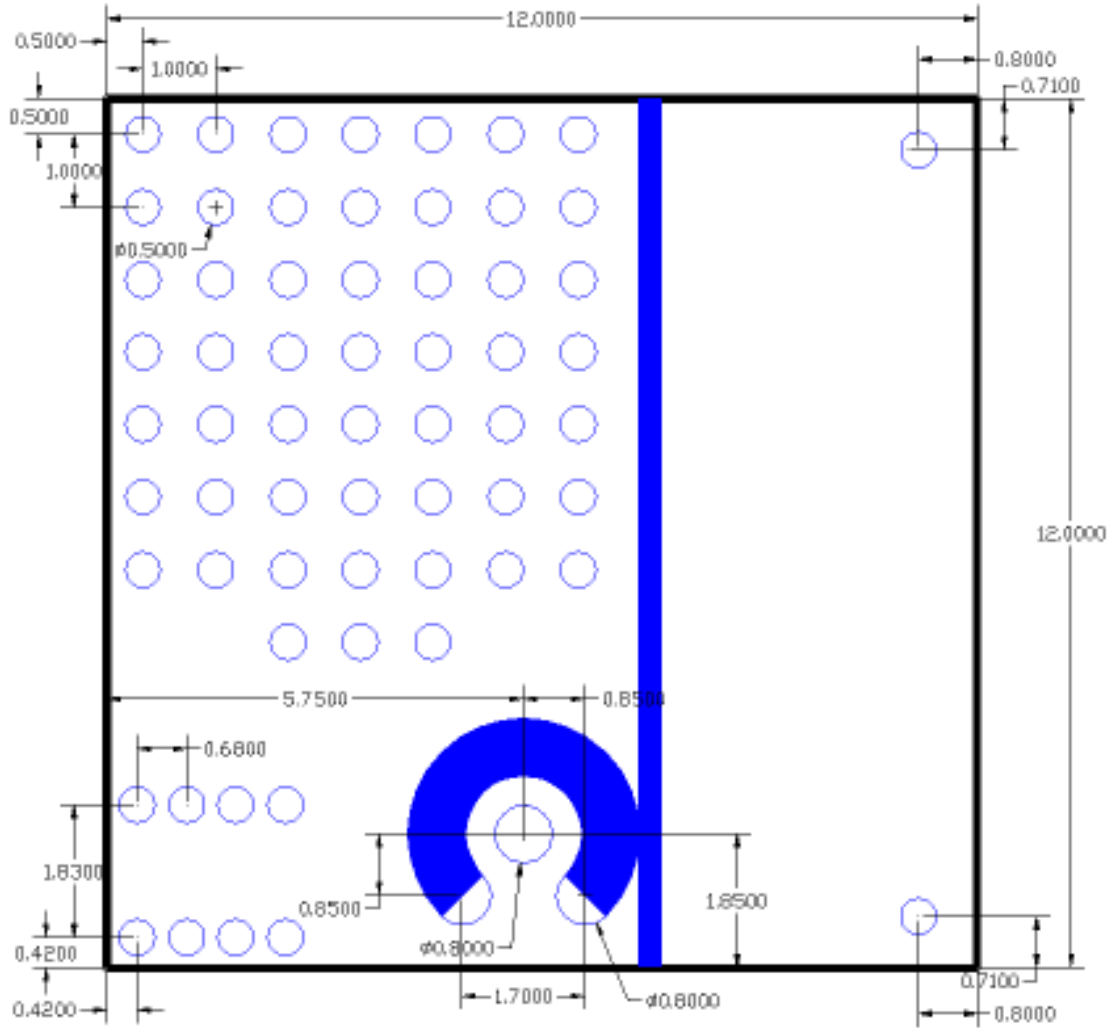
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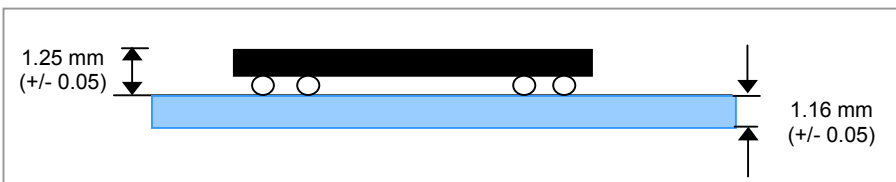
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# Mechanical Specification

Top view



Side view



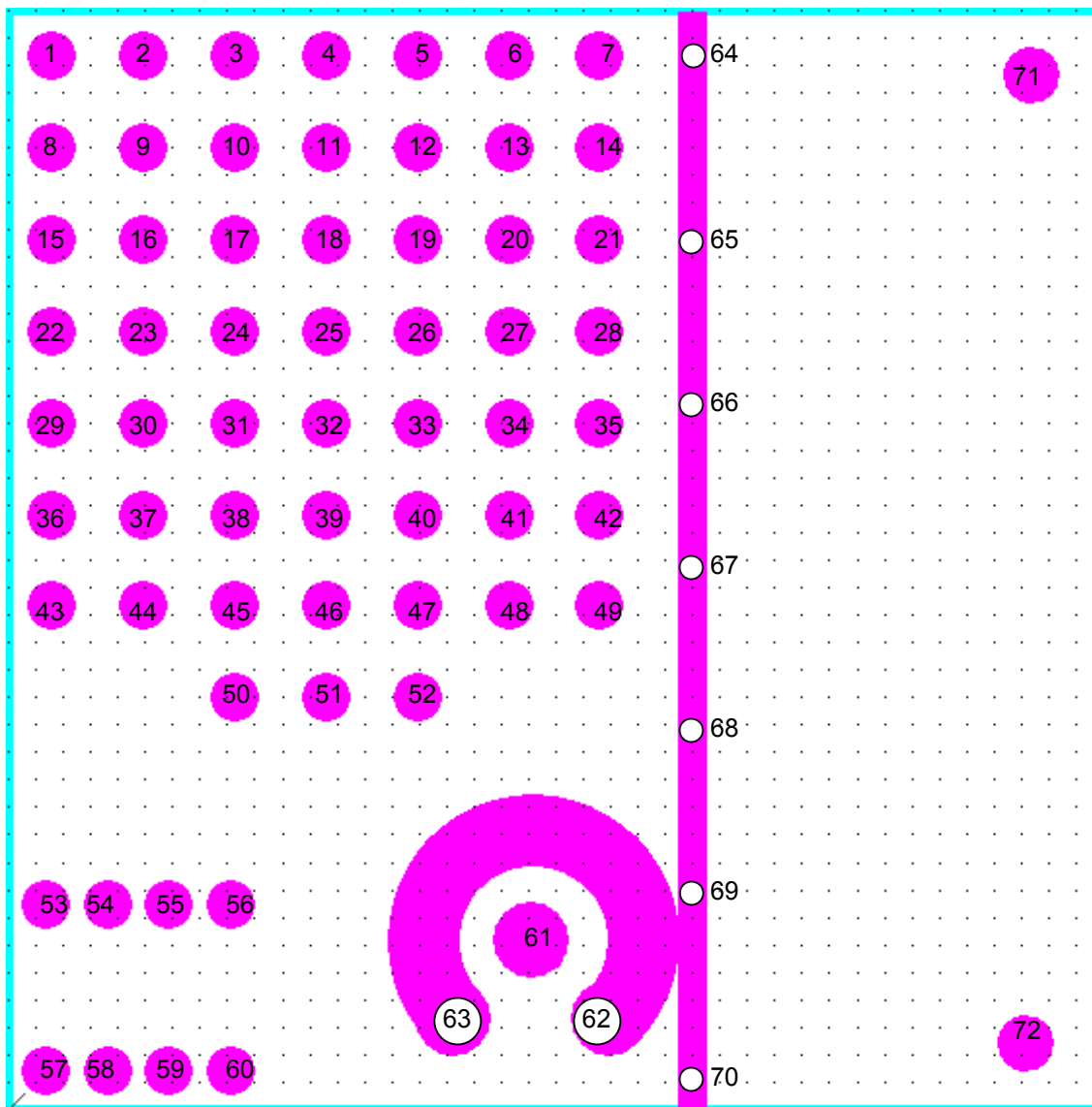
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# Pin Assignment

Top view



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## Pin Assignment

Terminal	Name	Description
1	SPI_CLK	Serial Peripheral Interface clock
2	PIO[6]	Programmable input/output line
3	PCM_SYNC	PCM Synchronous data sync
4	UART_RX	UART data input active high
5	PCM_CLK	PCM Synchronous data clock
6	UART_TX	UART data output active high
7	USB_D-	USB data minus
8	GND	System ground
9	SPI_MISO	Serial Peripheral Interface data output
10	SPI_CSB	Chip select for Serial Peripheral Interface, active low
11	PIO[7]	Programmable input/output line
12	PCM_IN	PCM Synchronous data input
13	USB_D+	USB data plus with selectable internal 1.5kΩ pull-up resistor
14	VCC	+3.3V voltage input
15	GND	System ground
16	RESET	Reset if high, input debounced so must be high for >5ms to cause a reset
17	GND	System ground
18	PCM_OUT	PCM Synchronous data output
19	UART_RTS	UART request to send active low
20	UART_CTS	UART clear to send active low
21	VREG_IN	Internal voltage regulator input (Please refer to Power Supply Diagram)
22	PIO[3]	Programmable input/output line
23	SPI_MOSI	Serial Peripheral Interface data input
24	PIO[8]	Programmable input/output line
25	GND	System ground
26	GND	System ground



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27	GND	System ground
28	AIO[0]	Programmable input/output line
29	PIO[2]	Programmable input/output line
30	PIO[9]	Programmable input/output line
31	PIO[10]	Programmable input/output line
32	GND	System ground
33	PIO[5]	Programmable input/output line
34	MIC_P	Microphone input positive
35	AIO[1]	Programmable input/output line
36	+1.8V	+1.8V voltage input (Please refer to Power Supply Diagram)
37	GND	System ground
38	PIO[1]	Programmable input/output line
39	PIO[4]	Programmable input/output line
40	GND	System ground
41	SPKR_P	Speaker output positive
42	AIO[2]	Programmable input/output line
43	PIO[0]	Programmable input/output line
44	GND	System ground
45	AUX_DAC	Voltage DAC output
46	PIO[11]	Programmable input/output line
47	MIC_N	Microphone input negative
48	N.C.	Not Connected
49	SPKR_N	Speaker output negative
50-60	GND	System ground
61	RF_TEST	RF test port
62-70	GND	System ground wall
71	ANT_DISABLE	Disable ANT for RF testing (For test purpose only)
72	N.C.	Not Connected



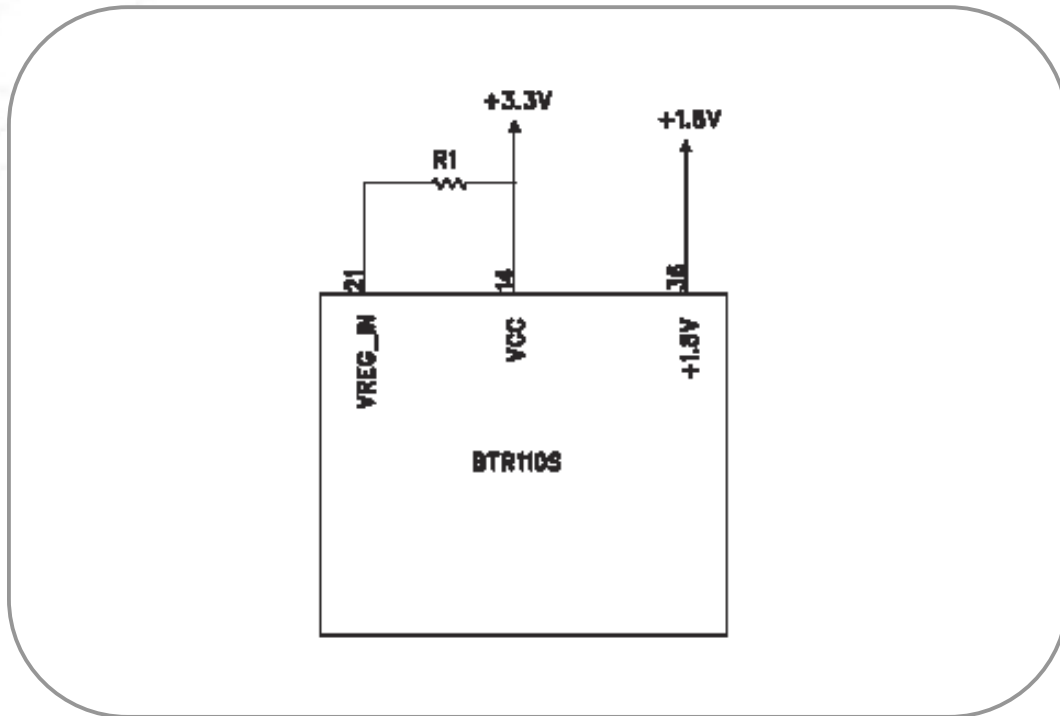
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# Power Supply Diagram



R1	Internal 1.8V linear voltage regulator	BTR110S power supply
0 ohm	Enabled	+3.3V
N.C.	Disabled	+3.3V and +1.8V



## General Specifications

	Minimum	Typical	Maximum
Supply Voltage (Vcc)	1.7V	3.3V	3.6V
Supply Voltage (VREG_IN)	2.2V	3.3V	4.2V
Supply Voltage (+1.8V)	1.75V	1.8V	1.85V
Operating Temperature range	-20°C	-	75°C
Storage Temperature range	-40°C	-	100°C
Frequency Range	2.4 GHz	-	2.4835 GHz

Remark: Logic levels for all PIOs depends the supply voltage Vcc.

## RF Specifications

Voltage Supplies = 3.3 V  
 Temperature = 25°C  
 Frequency = 2.441GHz

Receiver	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity (DH1/3/5) at 0.1% BER	-	-78	-	-70	dBm
Maximum received signal	-20	-	-	-20	dBm
C/I Co-channel		9	-	≤ 11	dB
C/I Adjacent channel (1MHz)	-	-5	-	≤ 0	dB
C/I Image rejection (carrier -3MHz)	-	-22	-	≤ -9	dB
Transmitter	Min	Typ	Max	Bluetooth Specification	Unit
Average Output Power	-4	0	2	+4 to -6	dBm
20dB bandwidth	-	885	-	≤ 1000	kHz
2 <sup>nd</sup> ACP (+/-2MHz)	-	-40	-	-20	dBc
3 <sup>rd</sup> ACP (+/-3MHz)	-	-60.5	-	-40	dBc

## Codec Characteristics

### 15-bit resolution

Microphone Amplifier	Minimum	Typical	Maximum	Unit
Input full scale at maximum gain	-	3	-	mV rms
Input full scale at minimum gain	-	350	-	mV rms
Gain Resolution <sup>(1)</sup>	-	3	-	dB
Distortion at 1KHz	-	-	-78	dB
Input referenced rms noise <sup>(2)</sup>	-	5	-	μV rms
Bandwidth	-	20	-	kHz
Mic mode input impedance	-	20	-	kΩ
Input mode input impedance	-	130	-	kΩ
Loudspeaker Driver				
Output voltage full scale swing (differential)	-	2.0	-	V Pk-Pk
Output current drive (at full scale swing) <sup>(3)</sup>	-	20	-	mA
Output full scale current (at reduced swing) <sup>(4)</sup>	-	75	-	mA
Output -3dB bandwidth	-	18.5	-	kHz
Distortion and noise (relative to full scale), 32 Ω load	-	-75	-	dB
Allowed load: resistive	-	-	O.C.	Ω
Allowed load: capacitive	-	-	500	pF

Notes:

- (1) 42 dB range of gain control (under software control)
- (2) Noise in bandwidth from 100Hz to 4kHz gain setting >17dB
- (3) Output for 0.1% THD, signal level of 2V Pk-Pk
- (4) Output for 1% THD, signal level of 1V Pk-Pk



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## Power Consumption

Voltage Supplies = 3.3 V  
 Temperature = 25°C  
 Frequency = 2.441GHz

Mode	Average	Peak	Unit
SCO connection HV3 (30ms interval sniff mode)(slave)	26	-	mA
SCO connection HV3 (30ms interval sniff mode)(Master)	26	-	mA
SCO connection HV1 (Slave)	43	-	mA
SCO connection HV1 (Master)	43	-	mA
ACL data transfer 115.2kbps UART (Master)	7	-	mA
ACL data transfer 720kbps USB (Slave)	50	-	mA
ACL data transfer 720kbps USB (Master)	50	-	mA
ACL connection, sniff mode 40ms interval, 38.4kbps UART	4	-	mA
ACL connection, sniff mode 1.28s interval, 38.4kbps UART	0.5	-	mA
Parked Slave, 1.28s beacon interval, 38.kpbs UART	0.6	-	mA
Standby Mode (Connected to host, no RF activity)	85	-	μ A
Transmit Mode (Payload is PRBS9 data, default DH1)	43	-	mA
Receive Mode	49	-	mA

## Solder Profiles

In order to setup your application, it is required to have the soldering profile which based on various parameters.

Zone	Sensor	Description
Preheat Zone	1-2	This zone raises the temperature at a controlled rate
Equilibrium Zone	3	This zone brings the board to a uniform temperature and also activates the flux. The duration in this zone will need to be adjusted to optimize the out gassing of the flux
Reflow Zone	4	The peak temperature should be high enough to achieve good wetting but not so high as to cause component discoloration or damage. Excessive soldering time can lead to intermetallic growth which can result in a brittle joint.
Cooling Zone	5-6	The cooling rate should be fast, to keep the solder grains small which will give longer lasting joint.

### Solder Re-Flow Profile for Devices with Lead-Free Solder Balls

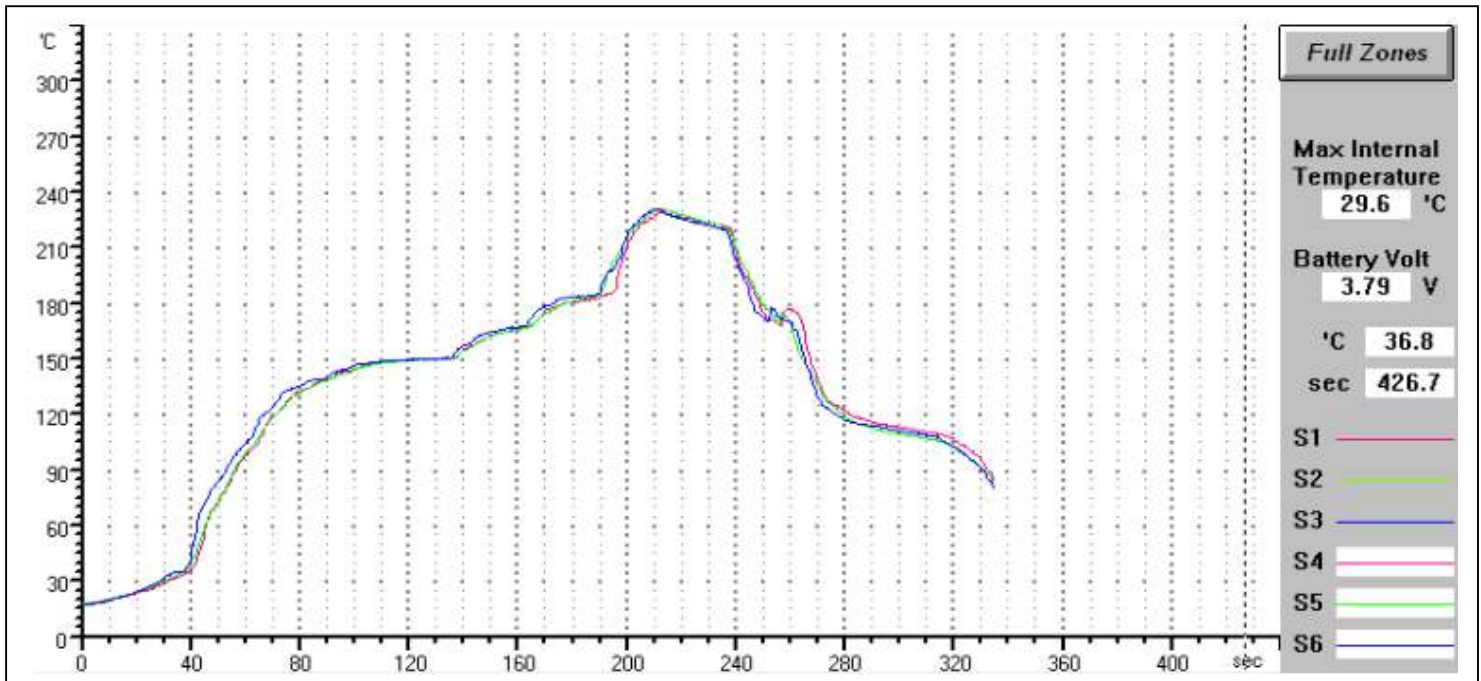


Figure 1.1: Typical Lead-Free Re-flow Solder Profile

#### Temperature Analysis at 200°C

Sensor	Max °C	Max at (s)	Over (s)
S4	229.5	212.5	44
S5	230.6	212.5	49
S6	231.1	211.5	45

**Remarks**

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