

FLAIRCOMM

FLC-BTMDC748 Specification

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Release History

Version	Release Note	Date	Author	Approved by
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CONTENT

Copyright	2
Notice	2
Specific trademark usage guidelines	2
1. Overview	6
1.1 Introduction	6
1.2 Device features	6
1.3 Application	7
2. Product Specification	7
2.1 Product information	7
2.2 Key Features	8
3. Block Diagram	8
4. Electrical Characteristic	9
4.1 Absolute Maximum rating	9
4.2 Recommend operation conditions	9
4.3 Radio characteristics	9
4.3.1 Transmitter	9
4.3.2 Receiver	10
5. Mechanical Dimensions	11
6. Pin Definition	12
7. Interface Characteristics	14
7.1 UART Interface	14
7.2 PCM CODEC Interface	15
7.3 Possible PCM settings	15
7.4 Serial Peripheral Interface (SPI)	16
7.5 AIO and PIO lines	16
8. Application Schematic	16
9. SMT Reflow Profile	17
9.1 Reliability solder temperature chart	17
9.2 Reflow temperature chart	17
Contact Information	18

Table List

Table 1 Product information.....	7
Table 2 Key Features.....	8
Table 3 Rating range.....	9
Table 4 Operation conditions.....	9
Table 5 Transmitter.....	9
Table 6 Receiver.....	10
Table 7 Pin definitions.....	12
Table 8 Interface.....	14
Table 9 Possible UART Settings.....	14
Table 10 Default Data Format.....	14
Table 11 Possible Data Format.....	15
Table 12 Default Data Format.....	15

Figure List

Figure 1 BTMDC748 appearance.....	6
Figure 2 Block Diagram.....	8
Figure 3 PCBA Dimension.....	11
Figure 4 Pad Dimension.....	11
Figure 5 Pin definition.....	12
Figure 6 Application Schematic.....	16

Chart List

Chart 1 Reliability solder temperature.....	17
Chart 2 Reflow temperature.....	17

1. Overview

1.1 Introduction

BTMDC748 is a next-generation, class I(100m),Bluetooth® 2.0+EDR (Enhanced Data Rates) module. BTMDC748 is a highly integrated and sophisticated Bluetooth® module, containing all the necessary elements from Bluetooth® radio to antenna and a fully implemented protocol stack. Therefore **BTMDC748** provides an ideal solution for developers who want to integrate Bluetooth® wireless technology into their design with limited knowledge of Bluetooth® and RF technologies.

By default **BTMDC748** module is equipped with powerful and easy-to-use iWRAP firmware. iWRAP enables users to access Bluetooth® functionality with simple ASCII commands delivered to the module over serial interface - it's just like a Bluetooth® modem.

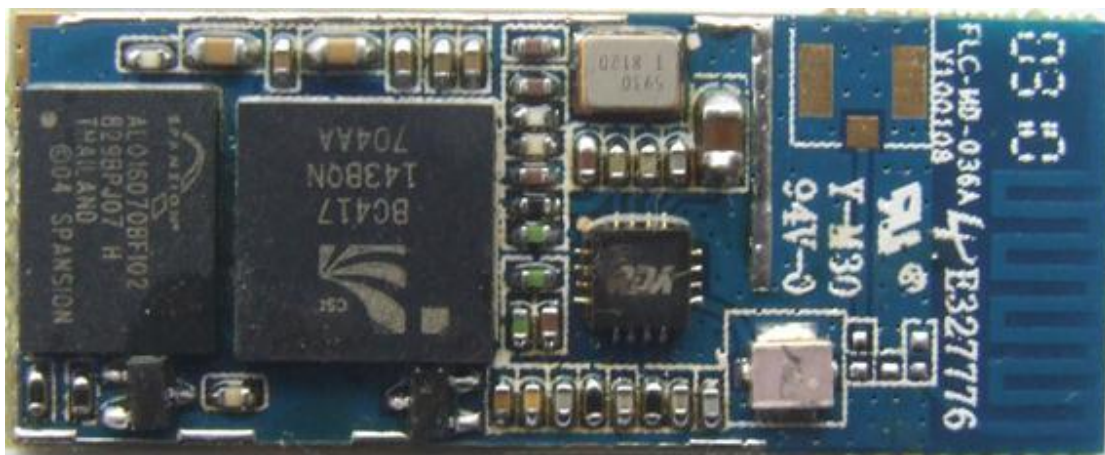


Figure 1 BTMDC748 appearance

1.2 Device features

- Fully Qualified Bluetooth system v2.0 +EDR, CE and FCC
- Class 1, range up to 100 meters
- Integrated chip antenna or UFL connector
- Industrial temperature range from -40oC to +85oC
- Enhanced Data Rate (EDR) compliant with v2.0.E.2 of specification for both 2Mbps and 3Mbps modulation modes

- RoHS Compliant
- Full Speed Bluetooth Operation
- USB interface (USB 2.0 compatible)
- UART with bypass mode
- Support for 802.11 Coexistence
- 8Mbits of Flash Memory

1.3 Application

- Hand held terminals
- Industrial devices
- Point-of-Sale systems
- PCs
- Personal Digital Assistants (PDAs)
- Computer Accessories
- Access Points
- Automotive Diagnostics Units

2. Product Specification

2.1 Product information

Table 1 Product information

Module Name	Supply Voltage
FLC-BTMDC748	3.3V DC

2.2 Key Features

Table 2 Key Features

Operating Frequency Band	2.402GHz -2.480GHz ISM band
Bluetooth Specification	V2.0+EDR
Theoretical range in open field	Bluetooth Class 1
Host Interface	UART/USB Interface
Antenna	Internal
Power Supply	3.3 Volt DC
Firmware version	HCI Build 19.2
Dimension	35.3mm (L) * 15mm (W)* 2.3mm(H)
Power	
Supply Voltage	3.3 V DC
Standby Current	2 mA

3. Block Diagram

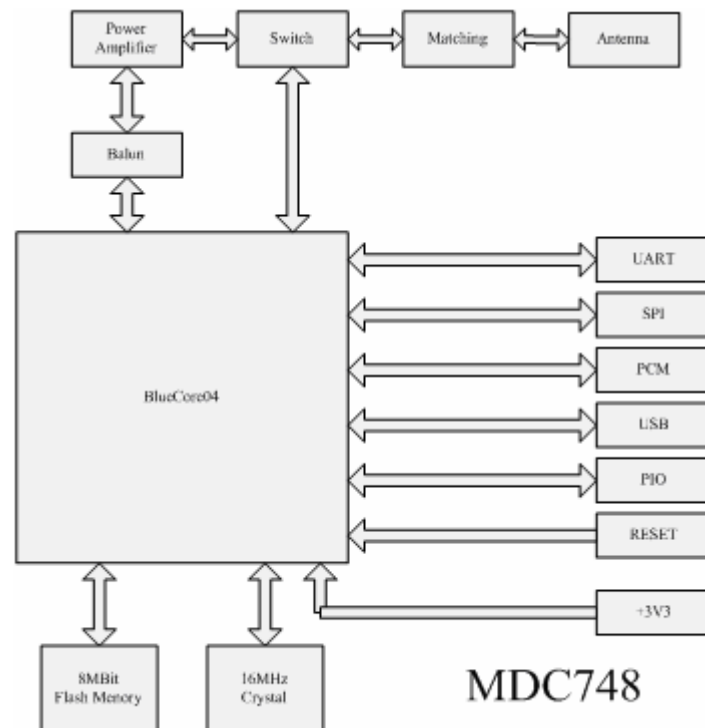


Figure 2 Block Diagram

4. Electrical Characteristic

4.1 Absolute Maximum rating

Table 3 Rating range

Rating	Minimum	Maximum
Storage temperature	-40°C	+120°C
Operation temperature	-40°C	+85°C
Supply voltage	-0.4 Volt	DC 3.6Volt
Terminal voltages	-0.4 Volt	VDD+0.4 Volt

4.2 Recommend operation conditions

Table 4 Operation conditions

Rating	Minimum	Type	Maximum
Store temperature	-40°C	+25°C	+85°C
Operation temperature	-20°C	+25°C	+70°C
Supply voltage	DC 3.1Volt	DC 3.3Volt	DC 3.6Volt
Terminal voltages	0	-	VDD

4.3 Radio characteristics

4.3.1 Transmitter

Table 5 Transmitter

Radio Characteristics VDD = 3.3V Temperature = +25°C					
	Min	Type	Max	Bluetooth Specification	Unit
Maximum RF transmit power	-	19.07	-	0 to +20	dBm
Variation in RF power over temperature range with compensation disabled (±)	-	2.0	-	-	dB
Variation in RF power over temperature range with compensation enabled (±)	-	1.0	-		dB
RF power control range	-	>20	-	≥16	dB

RF power range control resolution	-	0.5	-	-	dB
20dB bandwidth for modulated carrier	-	670	-	≤ 1000	kHz
Adjacent channel transmit power $F=F_0 \pm 2\text{MHz}$	-	-35	-	≤ -20	dBm
Adjacent channel transmit power $F=F_0 \pm 3\text{MHz}$	-	-40	-	≤ -40	dBm
Adjacent channel transmit power $F=F_0 > \pm 3\text{MHz}$	-	-47	-	≤ -40	dBm
$\Delta f_{1\text{avg}}$ Maximum Modulation	-	159	-	$140 < \Delta f_{1\text{avg}} < 175$	kHz
$\Delta f_{2\text{max}}$ Minimum Modulation	-	123	-	≥ 115	kHz
$\Delta f_{2\text{avg}} / \Delta f_{1\text{avg}}$	-	0.84	-	≥ 0.80	-
Initial carrier frequency tolerance	-	6.0	-	± 75	kHz
Drift Rate	-	8.0	-	≤ 20	kHz/50 μs
Drift Rate	-	9.0	-	≤ 25	kHz
Drift (five slot packet)	-	11.0	-	≤ 40	kHz
2nd Harmonic content	-	-43	-	≤ -30	dBm
3rd Harmonic content	-	-34	-	≤ -30	dBm

4.3.2 Receiver

Table 6 Receiver

Radio Characteristics VDD = 3.3V Temperature = +25°C						
	Frequency (GHz)	Min	Type	Max	Bluetooth Specification	Unit
Sensitivity at 0.1% BER for all packet types	2.402	-	-87	-	≤ -70	dBm
	2.441	-	-86.5	-		
	2.48	-	-87	-		
Maximum received signal at 0.1% BER		-	> -20	-	≥ -20	dBm

5. Mechanical Dimensions

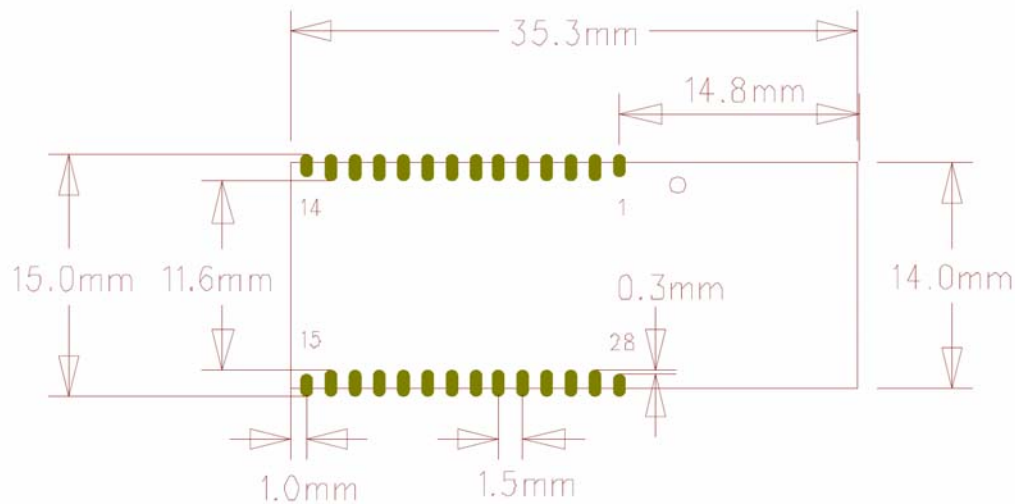


Figure 3 PCBA Dimension

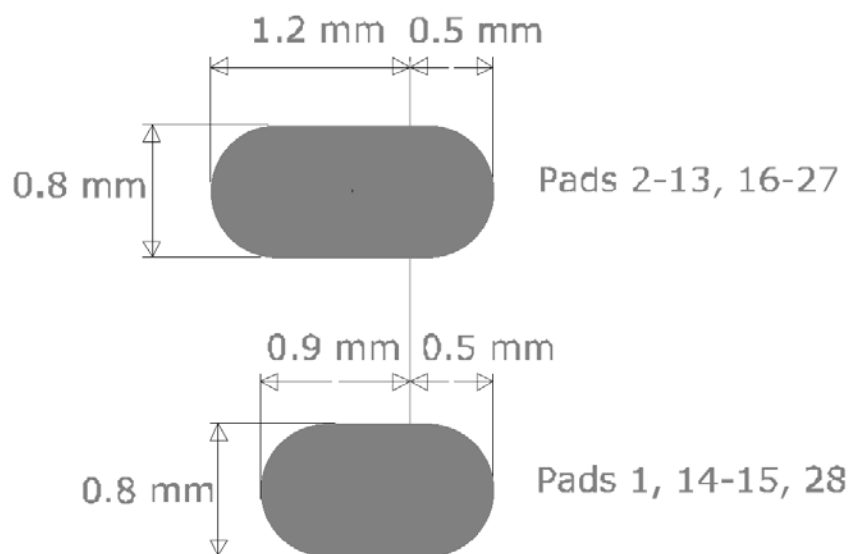


Figure 4 Pad Dimension

6. Pin Definition

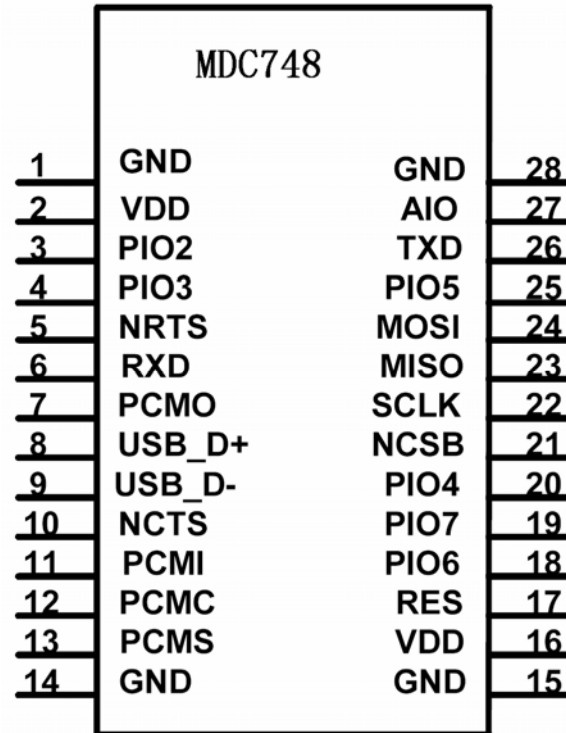


Figure 5 Pin definition

Table 7 Pin definitions

Pin NO.	Pin Name	Type	Pin Descriptions
1	GND	VSS	Power Ground
2	VDD	VDD	Power supply voltage 3.3V
3	PIO2	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
4	PIO3	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
5	NRTS	CMOS output, tri-state, with weak internal pull-up	UART request to send active low
6	RXD	CMOS input with weak internal pull-down	UART data input
7	PCMO	CMOS output, tri-state, with weak internal	Synchronous data output

		pull-down	
8	USB_D+	Bi-directional	USB data plus with selectable internal 1.5kΩ pull-up resistor
9	USB_D-	Bi-directional	USB data minus
10	NCTS	CMOS input with weak internal pull-down	UART clear to send active low
11	PCMI	CMOS input with weak internal pull-down	Synchronous data input
12	PCMC	CMOS input with weak internal pull-down	Synchronous data clock
13	PCMS	CMOS input with weak internal pull-down	Synchronous data sync
14	GND	VSS	Power Ground
15	GND	VSS	Power Ground
16	VDD	VDD	Power supply voltage 3.3V
17	RES	CMOS input with weak internal pull-down	Reset if high. Input debounced so must be low for >5ms to cause a reset.
18	PIO6	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
19	PIO7	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
20	PIO4	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
21	NCSB	CMOS input with weak internal pull-up	Chip select for synchronous serial interface. Active low.
22	SCLK	CMOS input with weak internal pull-down	Serial peripheral interface clock
23	MISO	CMOS output with weak internal pull-down	Serial peripheral interface data output
24	MOSI	CMOS input with weak internal pull-down	Serial peripheral interface data input
25	PIO5	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
26	TXD	CMOS output, tri-state, with weak internal pull-up	UART data output

27	AIO	Bi-directional	Programmable input/output line
28	GND	VSS	Power Ground

7. Interface Characteristics

7.1 UART Interface

Four signals are used to implement the UART function. When BTMDC748 is connected to another digital device, UART_RX and UART_TX transfer data between the two devices. The remaining two signals, UART_CTS and UART_RTS, can be used to implement RS232 hardware flow control where both are active low indicators.

The interface consists of four-line connection as described in below:

Table 8 Interface

Signal name	Driving source	Description
TXD	BTMDC748 module	Data from BTMDC748 module
RXD	Host	Data from Host
NRTS	BTMDC748 module	Request to send output of BTMDC748 module
NCTS	Host	Clear to send input of BTMDC748 module

Table 9 Possible UART Settings

Property	Possible Values
BCSP-Specific Hardware	Enable or Disable
Baudrate	
Flow Control	RTS/CTS or None
Data bit length	8bits
Parity	None, Odd or Even
Number of Stop Bits	1 or 2

Table 10 Default Data Format

Property	Possible Values
BCSP-Specific Hardware	Enable
Baudrate	115.2Kbps
Flow Control	None
Data bit length	8bit
Parity	Even
Number of Stop Bits	1

Note:

The DFU boot loader must be loaded into the Flash device before the UART or USB interfaces can be used. This initial flash programming can be done via the SPI.

7.2 PCM CODEC Interface

PCM_CLK, PCM_IN, PCM_OUT, and PCM_SYNC carry up to three bi-directional channels of voice data, each at 8k samples/s. The format of the PCM samples can be 13 or 16-bit linear, 8-bit u-law or A-law. The PCM_CLK and PCM_SYNC terminals can be configured as inputs or outputs, depending on whether FLC-BTMDC748 module is the Master or Slave of the PCM interface.

FLC-BTMDC748 interfaces directly to PCM audio devices including the following:

- Qualcomm MSM 3000 series and MSM 5000 series CDMA baseband devices
- OKI MSM7705 four channel A-law and μ -law CODEC
- Motorola MC145481 8-bit A-law and μ -law CODEC
- Motorola MC145483 13-bit linear CODEC
- STW 5093 and 5094 14-bit linear CODEC
- Also compatible with the Motorola SSI interface

7.3 Possible PCM settings

Bluetooth module can operate as the PCM interface master generating an output clock of 128, 256 or 512kHz. When configured as PCM interface slave, it can operate with an input clock up to 2048kHz. User can change data format the following selection using PSKEY.

Table 11 Possible Data Format

Property	Possible Values
Mode	Slave, Master
Clock rate	Master mode :128,256,512kHz Slave mode : up to 2048kHz
Clock formats	Long Frame Sync, Short Frame Sync and GCI timing environments
Sample formats	13 or 16-bit linear, 8-bit u-law or A-law

Table 12 Default Data Format

Property	Possible Values
Mode	Master
Clock rate	256kHz
Clock formats	Long Frame Sync
Sample formats	13-bit linear

The PCM configuration is set using two PS Keys, PSKEY_PCM_CONFIG32 and

PSKEY_PCM_LOW_JITTER_CONFIG. The default for PSKEY_PCM_CONFIG32 is 0x00800000, i.e., first slot following sync is active, 13-bit linear voice format, long frame sync and interface master generating 256kHz PCM_CLK from 4MHz internal clock with no tri-state of PCM_OUT.

7.4 Serial Peripheral Interface (SPI)

FLC-BTMDC748 module is a slave device that uses terminals SPI_MOSI, SPI_MISO, SPI_CLK and SPI_CSB. This interface is used for program emulation/debug and IC test. It is also the means by which the external Flash may be programmed 'in site' before any 'boot' program is loaded.

7.5 AIO and PIO lines

Six programmable bi-directional input/output (I/O) can be used.

One general purpose analogue interface pin can be used.

8. Application Schematic

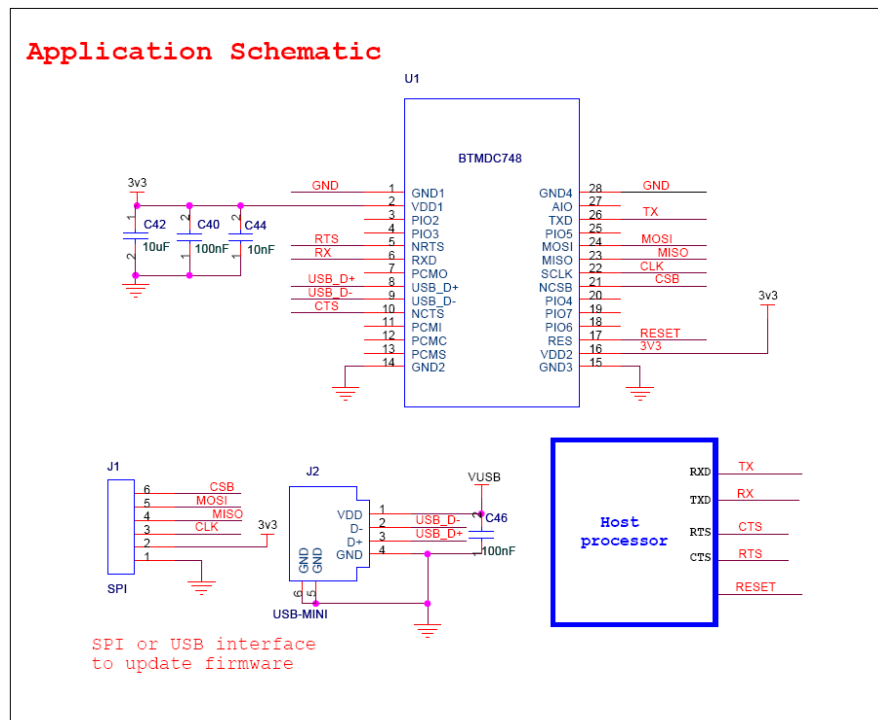
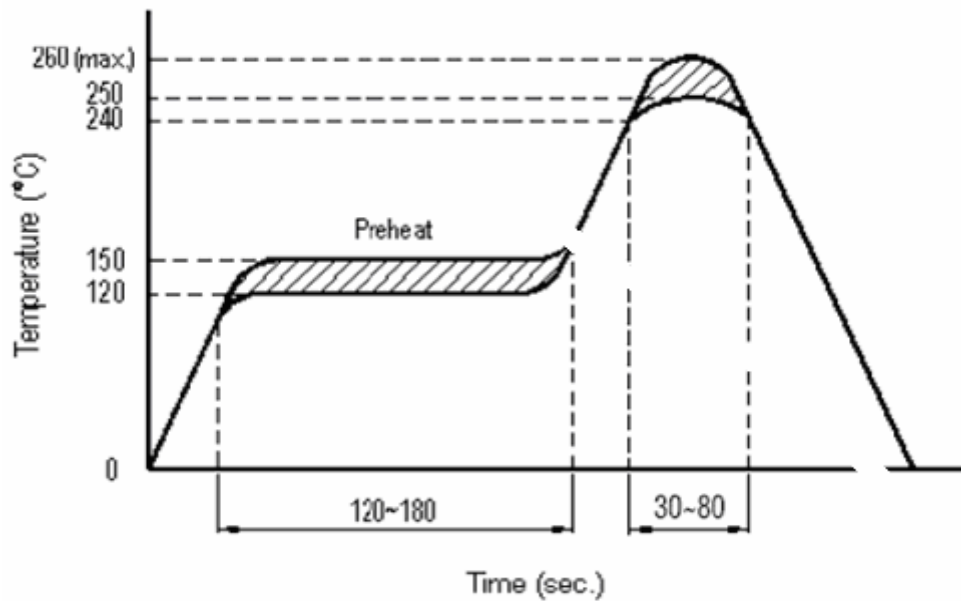


Figure 6 Application Schematic

9. SMT Reflow Profile

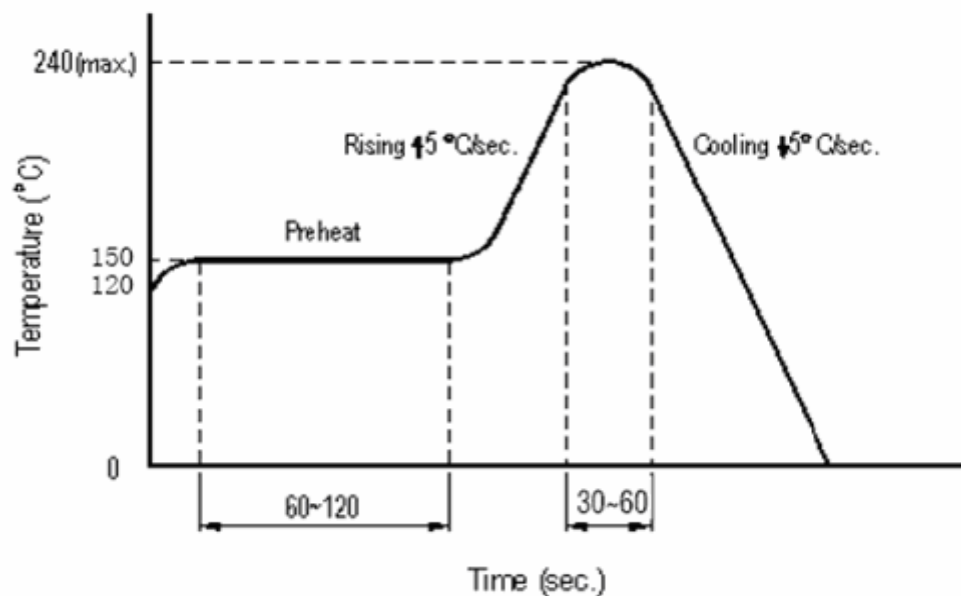
9.1 Reliability solder temperature chart

Chart 1 Reliability solder temperature



9.2 Reflow temperature chart

Chart 2 Reflow temperature



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