

M33G

GSM / GPRS Wireless Module

Datasheet

Rev. 1.0.2

2009/04/14

Document ID: M7-13-0006-102

Copyright © 2008, 2009 Qisda Corporation. All rights reserved.

This document contains proprietary technical information which is the property of Qisda Corporation and is issued in strict confidential and shall not be disclosed to others parties in whole or in parts without written permission of Qisda Corporation.

The documents contain information on a product, which is under development and is issued for customer evaluation purposes only.

Qisda may make changes to product specifications at any time, without notice.

Module Business Division

Mobile Communications BU

Qisda Corporation

18 Jihu Road, Nei-Hu, Taipei 114, Taiwan

Tel: +886-2-2799-8800

Fax: +886-2-2799-8332

<http://Qisda.com>

Date	Originator	Reviewer
12-SEP-2008	C.K. Wang	

History

Version	Date	Notes
VER: 1.0.0	12-SEP-2008	First Release
VER: 1.0.1	13-FEB-2009	Added Vbackup pin Removed keypad interrupt
VER: 1.0.2	14-APR-2009	Modified PCB layout recommendation Removed Vbackup

1. INTRODUCTION.....	4
1.1. DESCRIPTION	4
1.2. APPLICATION DEVICE	4
2. FEATURES.....	5
2.1. GENERAL CHARACTERISTICS	5
2.2. VOICE/DATA SERVICE.....	7
2.3. SUPPLEMENTARY SERVICE.....	8
2.4. RF FUNCTIONALITIES.....	9
3. HARDWARE DESCRIPTION	10
3.1. INTERFACE	10
3.2. FUNCTIONAL DIAGRAM.....	11
3.3. PIN DESCRIPTION	11
3.4. M33 TERMINAL DEFINITION.....	15
3.5. ENVIRONMENTAL	20
3.6. PHYSICAL PACKAGE	21

1. INTRODUCTION

1.1. DESCRIPTION

Overview

The document describes all the functions, features, and interfaces of the GSM/GPRS Dual band Module M33 from Qisda. The M33 GSM/GPRS module can provide wireless communication solution for any product that has requirement of voice communication and data transmission through state of the art cellular technology.

With the QISDA M33 GSM/GPRS module, devices are enhanced in both functionality and usability based on state of the art wireless technology.

1.2. APPLICATION DEVICE

This module is designed to satisfy manufacturers, which also have a physical dimension concern of embedded GSM/GPRS features built into their products. Some main application devices of this module are:

- Telematics
- Wireless Terminal
- Alarm/Securities System
- Automatic Meter Reading
- Remote control
- Mobile Trunk
- Wireless PSTN

2. Features

2.1. General Characteristics

- BAND: EGSM 900/DCS 1800

	TX	RX
EGSM	880~915 MHz	925~960MHz
DCS	1710~1785MHz	1805~1880MHz

- GSM/GPRS: Phase 2+ Compliance
 - GPRS Class 10: Max 4 downlink, 2 uplink, max 5 slot
 - GPRS Class B:
 - Simultaneous
 - attach
 - activation
 - monitor
 - No simultaneous traffic.
 - Coding Scheme:
 - CS1 - 9.05 kbps
 - CS2 - 13.4 kbps
 - CS3 - 15.6 kbps
 - CS4 - 21.4 kbps
- Support SIM Interface: 3V
- Form factor
 - Dimension: 55.5 x 40 x 5.5 mm
 - Weight: 13 g
- Power

Operation Voltage: 3.3V – 4.2V
- Power Consumption:

Speech Mode: 230 mA (min), 280 mA (max)

Standby Mode: < 6 mA (paging rate 2), < 3 mA (paging rate 9) at GSM 900MHz

GPRS : TBD
- Hardware Output:

44 Pins female connector interface.

 - **UART/RS232** **RS232 Transmit Interface**
 - **USB** **Software Debug**
 - **RESET** **Hardware Reset**
 - **GPIO** **General Purpose I/O**

- | | |
|--------------|------------------------|
| — Power On | Power On Pin |
| — LED Driver | LED Driver, Paging |
| — SIM | SIM Function |
| — VBAT | Battery Voltage Input |
| — Audio | Earphone/MIC/Hand free |
| — BGND | GND |
| — ANT | Antenna Pad |

- Software Interface:

GSM Rec. 27.07

- General
- Call Control
- Network Service
- ME Control and Status
- ME Errors
- TIA IS-101

GSM Rec. 27.05

- SMS related services
- General Configuration
- Message Configuration
- Message Receiving and Reading
- Message Sending and Writing

ITU-T Rec. V25ter

- General TA Control
- Call Control and Command Response
- Data Compression

ITU-T Rec. T.32

- Action Command
- DCE Response
- Service Command

Note: For software AT commands, please refer to the M33 AT Command List.

2.2. Voice/Data Service

Tele Service

- Speech Service With EFR (Enhance Full Rate)/FR (Full Rate)/HR (Half Rate)/AMR (Adaptive Multi-rate) Codec.
- Emergency Call
- DTMF Tone Generation

Short Message Service

- SMS with MT (Mobile Terminate)/PP, MO (Mobile Originated)/PP
- Delivery Report
- Cell Broadcast

FAX Service

- Direction: MOC (Mobile originated call) & MTC (Mobile terminated call)
- Fax GSM TS 3.45 fax transparent mode
- TS 61, 62
- TIA/EIA 578, Fax class 1, Interface to PC for GSM & PSTN
- TIA/EIA 592, Fax class 2, Interface to PC for PSTN
- ITU-T V.17 (14400 bps), V.29 (9600bps), V.27ter (2400/4800 bps)
- Transmission speed rate: 2400, 4800, 7200, 9600bps

Circuit Switch

- Data GSM TS 4.21 transparent mode
- Data GSM TS4.22 transparent mode
- Data transmission mode: asynchronous (normal)
- Radio channel: full rate
- Transmission speed rate: 2400, 4800, 9600 bps with data compression max 14400bps

Packet Switch

- GPRS Class B device
- Multi-Slot Transmission up to Class 10, 2 uplink slot, 4 downlink slot
- Coding Scheme CS1 – CS4 Supported

TCP/IP (M2M)

- TCP/IP client to a specific TCP/UDP server
- Machine-to-machine connection over GPRS

STK Parsing

- Parse STK raw data to specific data fields

2.3. Supplementary Service

Number identification

- Calling line identification presentation (CLIP)
- Calling line identification restriction (CLIR)
- Connected line identification presentation (CoLP)
- Connected line identification restriction (CoLR)

Call Offering

- Call forwarding unconditional (CFU)
- Call forwarding on mobile subscriber busy (CFB)
- Call forwarding on no reply (CFNRy)
- Call forwarding on mobile subscriber not reachable (CFNRC)

Call Completion

- Call waiting (CW)
- Call hold (HOLD)

Multi-Party

- MPTY Supported

Call-barring

- Barring of all outgoing calls (BAOC)
- Barring of outgoing international calls (BOIC)
- Barring of outgoing international calls (BOIC- xHC)
- Barring of all incoming calls (BAIC)
- Barring of incoming calls when roaming (BIC-Roam)

2.4. RF Functionalities

Maximum TX Power

The performance of the transmitter meets test requirement GSM 11.10 Chapter 13.

Band	Max	Min
EGSM	33 dBm $\pm$ 2dBm	5 dBm $\pm$ 5dBm
DCS	30 dBm $\pm$ 2dBm	0 dBm $\pm$ 5dBm

Parametric Performance

Tests carried out at -20°C, 25°C and 60°C for each voltage 3.6V, 3.8V and 4.0V. The Measure Peak Phase, RMS Phase, frequency error, power level, and static sensitivity meets GSM 11.10 specifications

Band	Peak Phase Error	RMS Phase Error
EGSM	<20°	<5°
DCS	<20°	<5°

Sensitivity

The performance of the receiver meets test requirement GSM 11.10 Chapter 14.

Band	Typical	Min
EGSM	-110 dBm	-107 dBm
DCS	-110 dBm	-108 dBm

Radio Frequency

Radio Frequency (900 MHz EGSM)	
Frequency Range	TX 880-915 MHz; RX 925-960 MHz
Channel Spacing	200 KHz
Number of Channels	124 Carriers x 8 (TDMA)
Modulation	GMSK
Duplex Spacing	45 MHz
Frequency Stability	+/- 0.1 ppm (Uplink TX)
Power Output	33 dBm Class 8 (2 W peak) – 5 dBm
Output Impedance	50 Ohm
Spurious Emission	-36 dBm up to 1 GHz (< -30 dBm > 1 GHz)
Radio Frequency (1800 MHz)	
Frequency Range	TX 1710-1785 MHz; RX 1805-1880 MHz
Channel Spacing	200 KHz
Number of Channels	374 Carriers x 8 (TDMA)
Modulation	GMSK
Duplex Spacing	95 MHz
Frequency Stability	+/- 0.1 ppm (Uplink TX)
Power Output	30 dBm – 0 dBm
Output Impedance	50 Ohm
Spurious Emission	-36 dBm up to 1 GHz (< -30 dBm > 1 GHz) Compatible with phase 2 feature

3. Hardware Description

3.1. INTERFACE

The function description of the M33 module is illustrated as the following table. The pins of the M33 module support functions like UART, GPIO, AUDIO, SIM ... etc. These features can meet customer design requirement for Car Phone.

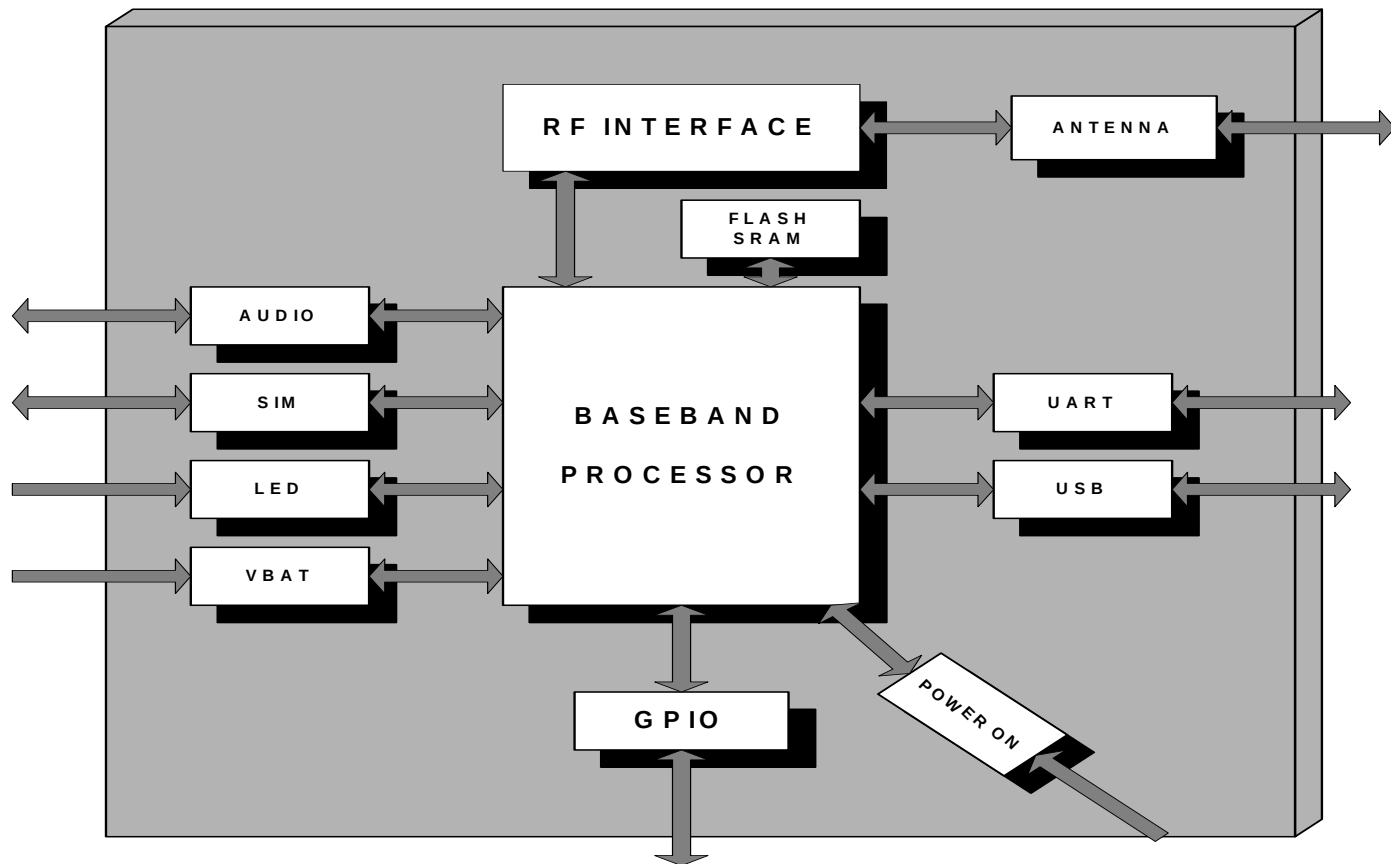
44 Pins female connector interface

Group	Pin no.	Description
UART/RS232	6	RS232 transmit Interface
USB	3	Software Debug
RESET	1	Hardware Reset
GPIO	6	General Purpose I/O
Power On	1	Power On Pin
LED Driver	1	LED Driver, Paging
SIM	4	SIM Function
VBATRF	3	Power input for RF
VBATBB	1	Power input for BB
Audio	7	Earphone/MIC/Hand Free
NC	1	No connection pin
BGND	10	GND

Antenna interface (MMCX connector)

Group	Pin no.	Description
ANT	1	Antenna interface

3.2. Functional Diagram



3.3. Pin Description

Description Table

Pin	Description	I/O	PU	Reset	Config
BGND	Ground				
IO 10	M33 wake up External device	O		Input	Output / 0
ON_nOFF	Hardware Reset	I	PU	Input	Input
PWON	Power On	I	PU	Input	Input
USD_DP	USB Data				
USD_DM	USB Data				
VBUS	USB VBUS	O		0	0
IO 12 / DCD	GPIO 12	O		Input	Output / 0
VBATRF	RF PA Power Voltage Input	power			min Typ max V
					3.3 3.8 4.2 V
TXD	UART1-Transmit Data	O		Output / 1	1
RXD	UART1-Receive Data	I	PU	Input	Input
RTS	UART1-Request To Send	O		Output / 1	1
CTS	UART1-Clear To Send	I	PD	Input	Input
DSR	UART1-Data Set Ready	I	PU	Input	Input
IO8/DTR	GPIO 8/ Data Terminal Ready	O		1	Output / 0
TDI	JTAG-Data Input	I	LPU	Input	Input
IO 13	GPIO 13	I		Output / 1	Input
IO1 / RI	GPIO 1	O		Input	Output / 0
IO 6	Re-download Data path and audio path switch	O		Input	Output / 1
IO 11	Power off mode switch control signal to open or link the connection between system (Host) and module (client). <i>Low :; Connect</i> <i>High: Disconnect</i> <i>Default = Connect (Low)</i>	O		Input	Output / 0
HSMIC	Headset Microphone input	I			Input
MICIN	Microphone amplifier negative input(-)	I			Input
MICIP	Microphone amplifier positive input(+)	I			Input
MICBIAS	Microphone bias supply	power			Output(2v/2.5v)
EARP	Earphone amplifier positive output(+)	O			Output
EARN	Earphone amplifier negative output(-)	O			Output
HSOL	Headset amplifier	O			Output
SIM_RST	SIM Reset	O		0	Output
SIM_IO	SIM Input / Output	I/O		0	Input / Output
SIM_CLK	SIM Clock	O		0	Output
VRSIM	Regulator SIM Output	O			Output
LEDA	LED Driver, Paging Indicator	I			Input
VBATBB	System Power Voltage Input	power			min Typ max V
					3.3 3.8 4.2 V

UART/RS232

The UART includes the following additional features

- Hardware flow control (DSR, RTS/CTS)
- Auto-baud rate with the possibility of baud-rates ranging from 1200 to 115.2K bits.

Pin Name	Pin Out	Pull	Reset	Config	Description
TXD	34		1	Output/1	Transmit Data
RXD	33	PU	Input	Input	Receive Data
RTS	32		Output / 1	Output/1	Request to Send
CTS	31	PD	Input	Input	Clear to Send
DSR	30	PU	Input	Input	Data Set Ready
IO 8/DTR	29		1	Output/1	Data Terminal Ready

USB

Used for software debug and download.

Pin Name	Pin Out	Pull	Reset	Config	Description
USB_DP	8			Input/Output	USB data bus (positive terminal)
USB_DM	37			Input/Output	USB data bus (negative terminal)
VBUS	36			Power supply	Power Supply VBUS line

GPIO

The module provides 6 GPIO pins configurable in read or write mode.

Pin Name	Pin Out	Pull	Reset	Config	Description
IO 15	39		Input	Input	General Purpose I/O
IO 1	28		1	Input	General Purpose I/O
IO 7	25		Input	Input	General Purpose I/O
IO 2	27		Input	Input	General Purpose I/O
IO 0 / DCD	9		Input	Input	GPIO12/Data Carrier Detect
IO 37/ RI	24		Input	Input	GPIO1/Ring Indicator

LED Driver

LEDA is dedicated for paging identification.

The initial status is listed as follows:

- i. In the initial mode (no voltage input), this pin will be in HIGH status.
- ii. In standby mode it will be pulled low for **500 ms** and then pulled high for **500 ms**, alternately.
- iii. In active mode (Incoming call) it will be pulled low **125 ms** and pull high **125 ms**.

Pin Name	Pin Out	Pull	Reset	Config	Description
LEDA	6			Input	LED DRIVER, paging Indicator

Note: 1) The maximum current is 10 mA.

2) The LEDA voltage range is 0.4 V ~ VBATBB

SIM Function

The SIM Card digital interface in ABB insures the translation of logic levels between DBB and SIM Card for the transmission of 3 different signals: a clock signal, derived from a clock elaborated in DBB, to SIM Card (SIM_CLK); a reset signal, from DBB to the SIM Card (SIM_RST); and serial data from DBB to SIM Card (SIM_IO) and vice-versa.

Pin Name	Pin Out	Pull	Reset	Config	Description
SIM_CLK	11		0	Output	SIM Clock
SIM_RST	13		0	Output	SIM Reset
SIM_IO	12		0	Input / Output	SIM Input / Output
VRSIM (3V)	23			Output	Regulator SIM Output

VBAT

The maximum and minimum voltage will be defined in the [Electrical Characteristics Table](#).

Pin Name	Pin Out	Pull	Reset	Config	Description
VBATRF	41			Input	RF PA Power Voltage input
VBATRF	42			Input	RF PA Power Voltage input
VBATRF	43			Input	RF PA Power Voltage input
VBATBB	1			Input	System Power Voltage input

Audio Function

There is a choice of differential EAR Phone output and differential Microphone input depending on customers' use. In addition, auxiliary pins can be used for hands-free.

Pin Name	Pin Out	Pull	Reset	Config	Description
EARP	20			Output	Earphone amplifier positive output(+)
EARN	21			Output	Earphone amplifier negative output(-)
MICP	16			Input	Microphone amplifier positive input(+)
MICN	17			Input	Microphone amplifier negative input(-)
HSOL	22			Output	Headset amplifier
HSMIC	18			Input	Headset Microphone input
MICBIAS	15			Output	Microphone bias supply

BGND

Pin Name	Pin Out	Pull	Reset	Config	Description
BGND	2				GND
BGND	3				GND
BGND	4				GND
BGND	5				GND
BGND	10				GND
BGND	19				GND
BGND	26				GND
BGND	35				GND
BGND	40				GND
BGND	44				GND

Power ON

The Power On Pin needs to be pulled low for at least **120ms** to operate

Pin Name	Pin Out	Pull	Reset	Config	Description
PWON	38	PU		Input	Power On

Antenna

Pin Name	Pin Out	Pull	Reset	Config	Description
Ant	Antenna Pad				Antenna pad for RF cable soldering

3.4. M33 Terminal Definition

VBATBB	1	44	GND
GND	2	43	VBATRF
GND	3	42	VBATRF
GND	4	41	VBATRF
GND	5	40	GND
LEDA	6	39	IO15
ON_nOFF	7	38	PWON
USB_DP	8	37	USB_DM
IO12 / DCD	9	36	VBUS
GND	10	35	GND
SIM_CLK	11	34	TXD
SIM_IO	12	33	RXD
SIM_RST	13	32	RTS
NC	14	31	CTS
MICBIAS	15	30	DSR
MICIP	16	29	IO8
MICIN	17	28	IO1
HSMIC	18	27	IO2
GND	19	26	GND
EARP	20	25	IO7
EARN	21	24	IO1 / RI
HSOL	22	23	VRSIM

Terminal Signal Table

Signal	Pin Number		Signal
VBATTBB	1	44	GND
GND	2	43	VBATTRF
GND	3	42	VBATTRF
GND	4	41	VBATTRF
GND	5	40	GND
LEDA	6	39	GPIO15(LS)
OnnOFF	7	38	PWON
USB_DP	8	37	USB_DM
GPIO0_DCD(LS)	9	36	VBUS
GND	10	35	GND
SIM_CLK	11	34	TXD(LS)
SIM_IO	12	33	RXD(LS)
SIM_RST	13	32	RTS(LS)
NC	14	31	CTS(LS)
MICBIAS	15	30	DSR(LS)
MICIP	16	29	DTR(LS)
MICIIN	17	28	GPIO1(LS)
HSMIC	18	27	GPIO2(LS)
GND	19	26	GND
EARP	20	25	GPIO7(LS)
EARN	21	24	RI(LS)
HSOL	22	23	VRSIM

Signal Pins Comparison Table between M23 and M33

M33	M23				M33
		Pin Number			
VBATTBB	VBATTBB	1	44	GND	GND
GND	GND	2	43	VBATTRF	VBATTRF
GND	GND	3	42	VBATTRF	VBATTRF
GND	GND	4	41	VBATTRF	VBATTRF
GND	GND	5	40	GND	GND
LEDA	LEDA	6	39	IO10	GPIO15(LS)
OnnOFF	ROW4	7	38	PWON	PWON
USB_DP	TXD2	8	37	RXD2	USB_DM
GPIO0_DCD(LS)	DCD	9	36	BUZZ	VBUS
GND	GND	10	35	GND	GND
SIM_CLK	SIM_CLK	11	34	TXD	TXD(LS)
SIM_IO	SIM_IO	12	33	RXD	RXD(LS)
SIM_RST	SIM_RST	13	32	RTS	RTS(LS)
NC	NC	14	31	CTS	CTS(LS)
MICBIAS	MICBIAS	15	30	DSR	DSR(LS)
MICIP	MICIP	16	29	DTR	DTR(LS)
MICIIN	MICIIN	17	28	IO13	GPIO1(LS)
HSMIC	AUXI	18	27	IO11	GPIO2(LS)
GND	GND	19	26	GND	GND
EARP	EARP	20	25	IO6	GPIO7(LS)
EARN	EARN	21	24	RI	RI(LS)
HSOL	AUXOP	22	23	VRSIM	VRSIM

Electrical Characteristics

Pin	Function /Name	Description	PARAMETER		Min	Typ	Max	Unit
2	GND	Ground						
1	VBATBB	System power input			3.3	3.8	4.2	V
6	LEDA	LED driver, paging	DIGOUT	Current			10	mA
				Supply voltage			VBATBB	V
23	VRSIM	Regulator SIM output		Active mode			10	mA
				Sleep mode			1	mA
				SIMSEL='0'	1.65	1.8	1.95	V
				SIMSEL='1' (Default)	2.7	2.85	3	V
11	SIM_CLK	SIM_clock	CLKOUT		1MHz@3V		5MHz@3V	
				(Voh)	0.7*VRSIM			V
				(Vol)			0.2*VRSIM	V
				Rated Current		2		mA
13	SIM_RST	SIM_reset	DIGOUT	(Voh)	0.7*VRSIM			V
				(Vol)			0.2*VRSIM	V
				Rated Current		2		mA
				(Vol)			0.4	V
				Rated Current		2		mA
10	GND	Ground						
22	HSOL	Headset amplifier		Min. output resistive load		32		ohms
				Max. output capacitive load			100	pF
19	GND	Ground						
21	EARN	Earphone amplifier output(-)	1.5 Vpp/Output swing 3.9 Vpp		33/120			ohms
20	EARP	Earphone amplifier output(+)	1.5 Vpp/Output swing 3.9 Vpp		33/120			ohms
15	MICBIAS	Microphone bias supply	DC-Power	MICBIAS=0	2			V
				MICBIAS=1	2.5			V
16	MICIP	Microphone amplifier input(+)			32.5			mVrms
17	MICIN	Microphone amplifier input(-)	Nominal Ref. Level (MICIP-MICIN)		-10			dBm0
			Differential input resistance (MICIP-MICIN)		100			dBm0
18	HSMIC	Headset Microphone input				78		mVrms
3	GND	Ground						
27	IO2	GPIO: Input/Output	DIGOUT	(Voh)	2.24			V
				(Vol)			0.616	V
				Rated current		2		mA
25	IO7	GPIO: Input/Output	DIGOUT	(Voh)	2.24			V
				(Vol)			0.616	V
				Rated current		2		mA
24	IO37/RI	GPIO: Input/Output	DIGOUT	(Voh)	2.24			V
				(Vol)			0.616	V
				Rated current		2mA		mA

Pin	Function /Name	Description	PARAMETER		Min	Typ	Max	Unit
26	GND	Ground						
4	GND	Ground						
28	IO1	GPIO:Input/Output	DIGIN/OUT	(Vih)	1.96		3.3	V
				(Vil)	-0.5		0.84	
29	DTR	Data Terminal Ready	DIGOUT	(Voh)	2.24			V
				(Vol)			0.616	V
				Rated current		2		mA
30	DSR	RS232: Data set ready	DIGIN	(Vih)	1.96		3.3	V
				(Vil)	-0.5		0.84	
31	CTS	RS232: Clear to send	DIGIN	(Vih)	1.96		3.3	V
				(Vil)	-0.5		0.84	
32	RTS	RS232: request to send	DIGOUT	(Voh)	2.24			V
				(Vol)			0.616	
				Rated current		4		mA
33	RXD	RS232: receive data	DIGIN	(Vih)	1.96		3.3	V
				(Vil)	-0.5		0.84	
				Rated current		1		mA
34	TXD	RS232: transmit data	DIGOUT	(Voh)	2.24			V
				(Vol)			0.616	
				Rated current		4		mA
35	GND	Ground						
41	VBATRF	Battery voltage input			3.3	3.8	4.2	V
42	VBATRF	Battery voltage input			3.3	3.8	4.2	
43	VBATRF	Battery voltage input			3.3	3.8	4.2	
40	GND	Ground						
44	GND	Ground						
9	IO 0 / DCD	GPIO:Input/Output	DIGOUT	(Voh)	2.24			V
				(Vol)			0.616	
				Rated current		2		mA
36	VBUS	USB VBUS power supply		Supply voltage	2.7	5.0	5.25	V
				Current	8		60	mA
37	USB_DM	USB data bus (positive terminal)	DIGI/O	Termination Voltage For Upstream Facing Port Pull-Up	3.0	3.3	3.6	V
				Transceiver Leakage Current	-2		2	μA
8	USB_DP	USB data bus (negative terminal)	DIGI/O	Termination Voltage For Upstream Facing Port Pull-Up	3.0	3.3	3.6	V
				Transceiver Leakage Current	-2		2	μA
38	PWON	POWER ON pin	Power On input	(Vih)	0.7*VBATBB			
				(Vil)			0.3*VBATBB	
7	ONnOFF	Hardware Reset	Interrupt (Input)	Low level input voltage VIL	0		0.35	V
				High level input voltage VIH	1.2		3.00	
39	IO15	GPIO :Input/Output	DIGI/O	(Voh)	2.24			V
				(Vol)			0.616	
				Rated current		2		mA
5	GND	Ground						

Operating Voltage/Current Characteristics

Parameter	Description	Min	Typ	Max	Unit
Supply Voltage range VBATRF		3.3	3.8	4.2	V
Peak VBATRF Current			TBD		A
Average VBATRF Current		TBD		TBD	mA
Average Standby mode VBATRF current	Paging Rate 9		TBD		mA
Vih	High-level input voltage	1.96		3.3	V
Vil	Low-level input voltage	-0.5		0.84	V
Voh	High-level output voltage	2.24			V
Vol	Low-level output voltage			0.616	V
SIM_CLK	Output frequency	1.625		3.25	MHz
VRSIM	SIMSEL=1	2.7	2.85	3.0	V

Audio Uplink Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Maximum Input Range (MICIP-MICIN)	Inputs 3 dBm0 (Maximum digital sample amplitude with PGA gain set to 0 dB)		32.5		mVrms
Nominal Ref. Level (MICIP-MICIN)			-10		dBm0
Differential Input Resistance			36		KΩ
Micro amplifier gain (MIC)			25.6		dB
DC Level at MICBIAS	MICBIAS=0		2.0		Volt
Current Capability at MICBIAS		0		2	mA

Audio Downlink Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Differential Minimum Resistive load at EARP-EARN	Output swing 3.9 Vpp		120		Ω
	Output swing 1.5 Vpp		33		Ω
Differential Maximum Resistive load at EARP-EARN				100	pF
Common Mode Minimum Resistive load at EARP-EARN			200		KΩ
Common Mode Maximum Resistive load at EARP-EARN				50	pF

Global Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Maximum Output Swing	5% distortion and 120Ω	3.1	3.92		Vpp
EARP – EARN	5% distortion and 33Ω	1.2	1.5		Vpp
Earphone amplifier gain			1		dB
Earphone amplifier state in power down			Hi-Z		
Power Supply Rejection			40		dB

3.5. Environmental

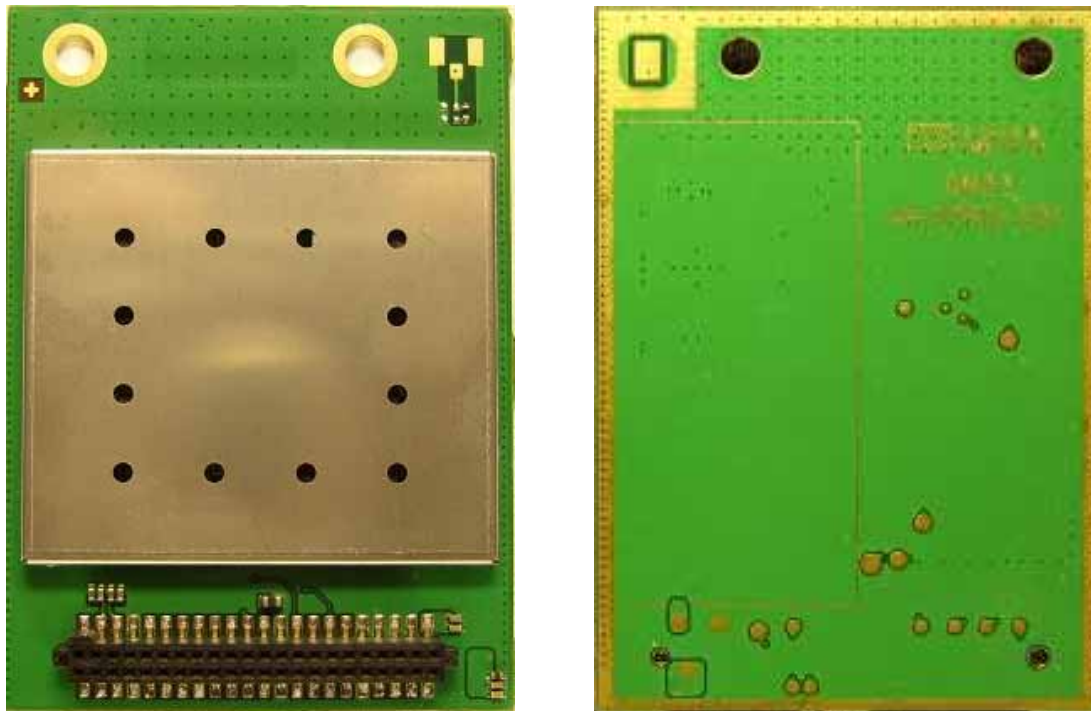
Operational temperature : -20 ~ +60

Functional temperature : -20 ~ +70

Storage temperature : -40 ~ +85

3.6. Physical Package

M33 Top View & Bottom View



Physical Dimension

