MaxWave Microelectronics Ltd

MW8112 DATASHEET

Version 1.4

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1. General Description

MW8112 is MaxWave's UHF passive tag product with proprietary intellectual property. It's compatible with EPC GS1 GEN2V2 and ISO 18000-6C standards. Good performance and group consistency make MW8112 well suitable for inventory management applications such as asserts inventory, logistics management.

MW8112 supports all mandatory commands include full-function lock, kill and access commands. The product provides convenient configuration for EPC and User memory size, pre-locked TID with even parity check protection.

2. Key Features

- EPC Gen2V2 and ISO/IEC 18000-6C compliant
- Supports all mandatory commands; including
  - ✧ Full function Lock command
  - ✧ Kill command
  - ✧ Access command
- Frequency Range: 840MHz-960MHz
- Read sensitivity: -20dBm
- Write sensitivity: -16dBm
- Memory
  - ✧ Maximum 128-bit EPC
  - ✧ 96-bit TID factory locked, with even parity protection
  - ✧ Shared 32-bit Kill Password and Access Password
  - ✧ Maximum 32-bit User Memory
  - ✧ Possible mapping modes of EPC and User Memory: 96+32, 112+16, 128+0
- Writing result auto-confirmation
- Easily configuration for EPC and User memory size
- No less than 10-year data retention in 85℃ environment
- Minimum 10K write cycle endurance

3. Block Diagram

The MW8112 consists of three major blocks: Analog part, Digital part and NVM.

Analog part senses the RF wave through off-chip antenna and extracts power for whole tag, also the demodulator circuit extracts baseband signal and passes down to Digital part, the modulator transmits data back to the Reader, the OSC generates system clock and the POR provides power-on-reset signal for digital part.

The digital section includes the state machines (FSM), Decoder, Encoder and NVM interface controller. FSM guides all digital blocks processing sequence, Decoder and Encoder process UHF RFID baseband protocol and handle communication with the NVM through NVM interface.

The NVM contains the EPC and user data, provides reading, writing function and retains data when power off.

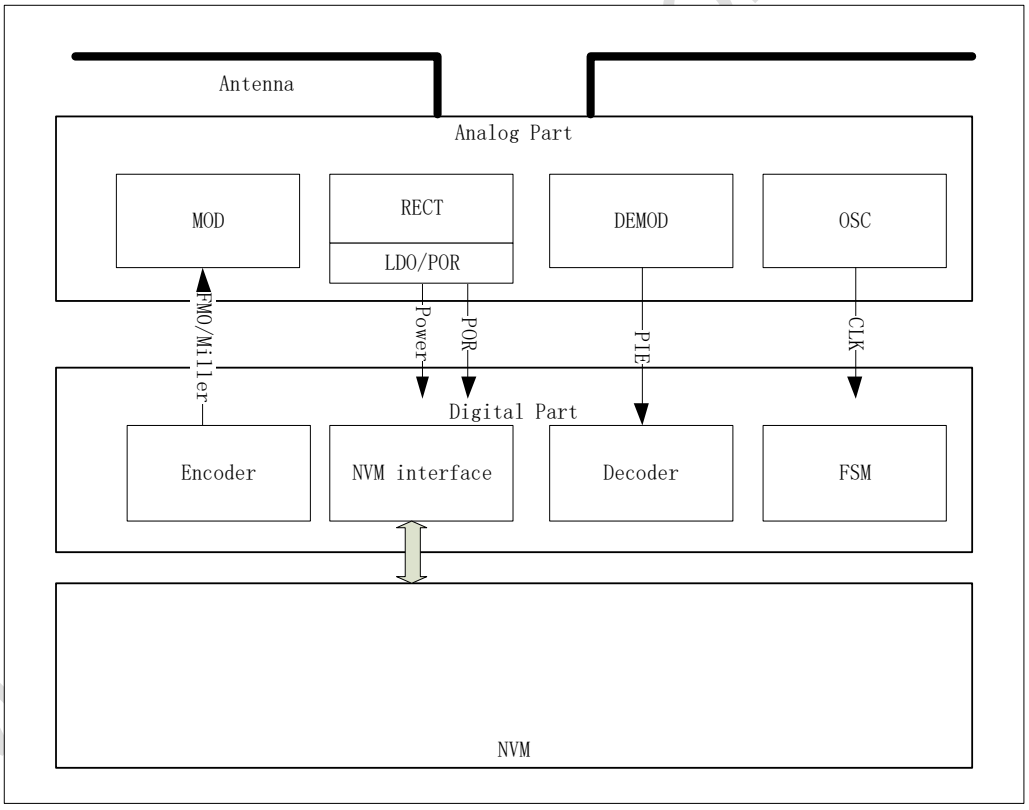

Figure 1:MW8112 Block diagram

4. Block Diagram

Bank	Address	Type	Content	Initial Value	Status
EPC (01)	00-0Fh	RAM	CRC-16		Read only
	10-14h	NVM	EPC length	00000b	R/W
	15h	ROM	UMI	1b	Read only
	16-1Fh	ROM		all 0	locked
	20-7Fh	NVM	EPC	TID_SN	R/W
	80-9Fh	NVM	EPC Option	All 0	R/W
TID (10)	00-07h	ROM	Class identifier	11100010b	RO
	08-13h	ROM	Mask designer identifier	100000111110b	RO
	14-1Fh	ROM	Tag version	000011010011b	RO
	20-2Fh	ROM	XTID header	2000h	RO
	30-5Fh	NVM	Serial Number	TID_SN	RO
Reserved (00)	00-1Fh	NVM	Shared Kill password	All 0	R/W
	20-3Fh	NVM	Shared Access password	All 0	R/W
	40-7Fh	NVM	Trimming control		
	Note: Kill and Access password shares same physical memory, should be same value				
User (11)	00-1Fh	NVM	User	All 0	R/W

Table 1:MW8112 Memory map

Product	FACTORY DEFAULT PC WORD(HEX)	EPC VALUE PRE-PROGRAMMED AT THE FACTORY(HEX)
MW8112	**0x4000**	**E283_E0E0_2000_xxxx_xxxx_xxxx_xxxx_xxxx**

Table 2:MW8112 Initial EPC at Factory-Program

5. Pin Information

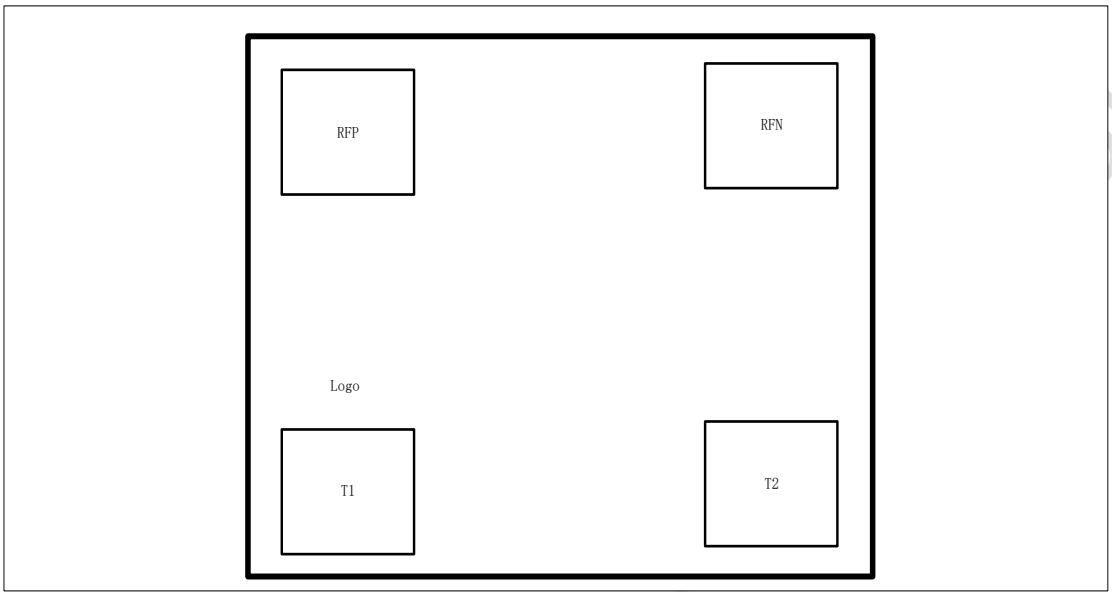

Figure 2:MW8112 Pin Information

Pin name	Description
RFP	Antenna connector 1
RFN	Antenna connector 2
T1	Test pad1, electrically isolated with tag
T2	Test pad2, electrically isolated with tag

Table 3:MW8112 Pin Information

6. Wafer Information

a) Wafer Specification

Item	Specification	Error
Wafer Diameter	8” 200mm	N/A
Wafer Thickness	120um	±10%
Backside Material	Si	N/A
Backside Treatment	Ground and stress release	N/A
Scribe Line Width	25um	N/A
PAD Size	50 um X 50 um	N/A
Passivation Material	SiOx + SiNx	N/A
Passivation Thickness	1.75um	N/A
Al Pad Material	Al-99.5% Cu-0.5%	N/A

Table 4:wafer specification

b) Bump Specification

Item	Specification	Error
Bump Material	>99.9 pure Au	N/A
PI Spacer	5um	±1um
Bump Height	18um	±3um
Bump Size	56um*56um	±3um
Bump Variation	<5um	N/A

Table 5 :bump specification

7. RF Interface Characteristics and Limited Values

Parameter	Conditions	Min	Typ	Max	Unit
Input Frequency		840		960	MHz
Read sensitivity			-20		dBm
Write sensitivity			-16		dBm
Chip impedance Z	915MHz		18-j253[1]		Ω
Input Capacitance Cp			0.684[1]		pF
RF PAD Assembled Capacitance			0.15		pF
Write time/word			6		ms

[1] additional parasitic cap=100fF

Table 6: RF interface characteristics

Parameter	Condition	Min	Typ	Max	Unit
Ambient Temperature		-40		85	℃
Storage Temperature		-50		150	℃
Input Power				100	mW
ESD	HBM		2000		V

Table 7:limited values

8. Version History

Version	Release Date	Description
1.0	2021/3/19	Preliminary
1.1	2021/6/15	Preliminary with Updated impedance
1.2	2021/7/19	Update parasitic cap Update bump size
1.3	2022/4/22	Update table: MW8112 Initial EPC at Factory-Program
1.4	2022/8/9	Modify MW8112 Initial EPC Setting

Table 8: Version History