EM Microelectronic

A COMPANY OF THE SWATCH GROUP

EM4200

Product Presentation

Backward compatibility with EM410x read only chips
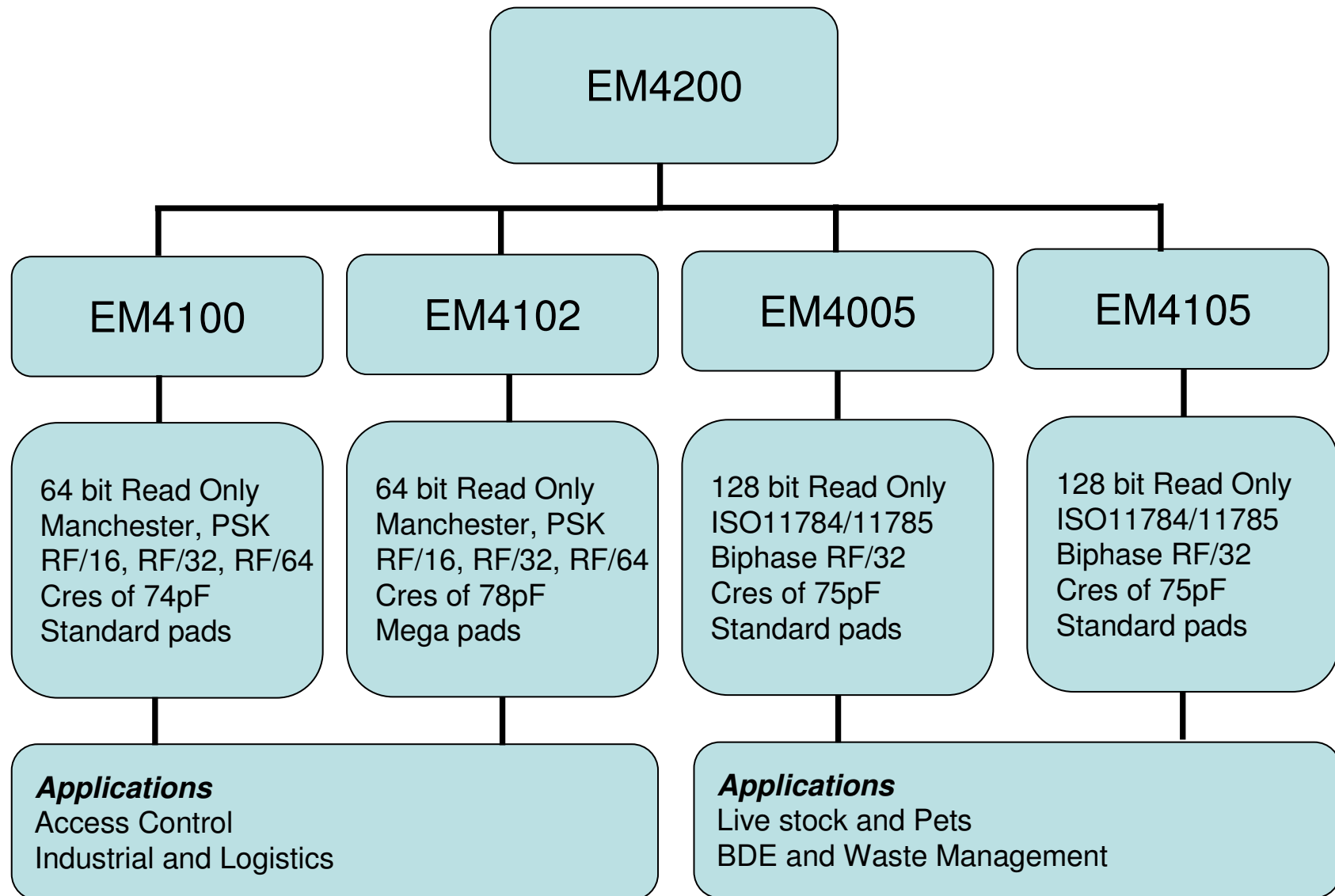
EM4200 – Main Features

❖ Latest generation of low frequency read only chip

- ➢ Direct successor of existing EM4100, EM4102, EM4005 and EM4105 ICs
- ➢ Improved reading range performances, robust solution
- ➢ Backward compliant with existing installed bases (all communication protocols supported)

❖ 128 bit ROM factory programmed, 2 * 64 bit or 1 * 128 bit serial number format

❖ Advanced serial number data base management to ensure uniqueness over EM4x0x chip generations

EM4200 – Main Features

❖ Mega bumps version available for flip chip process assembly

❖ Several options for the resonant capacitor

➢ 75pF, 210pF and 250pF

➢ Compatibility with other EM Marin LF chips (EM4205 and EM4305)

EM4200 – One single chip replacing 4 existing ones

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                        ┌─────────────┐
                        │   EM4200    │
                        └──────┬──────┘
        ┌──────────────┬───────┴───────┬──────────────┐
  ┌──────────┐   ┌──────────┐   ┌──────────┐   ┌──────────┐
  │ EM4100   │   │ EM4102   │   │ EM4005   │   │ EM4105   │
  └────┬─────┘   └────┬─────┘   └────┬─────┘   └────┬─────┘
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EM4100	EM4102	EM4005	EM4105
64 bit Read Only Manchester, PSK RF/16, RF/32, RF/64 Cres of 74pF Standard pads	64 bit Read Only Manchester, PSK RF/16, RF/32, RF/64 Cres of 78pF Mega pads	128 bit Read Only ISO11784/11785 Biphase RF/32 Cres of 75pF Standard pads	128 bit Read Only ISO11784/11785 Biphase RF/32 Cres of 75pF Standard pads

Applications
Access Control
Industrial and Logistics

Applications
Live stock and Pets
BDE and Waste Management

EM4200 - Compatibility

❖ *Data Structure*

➢ 2 * 64 bits EM4100/EM4102 data telegram composed by:

❖ 9 bits header – Start bit "0"

❖ 8 bit customer code

❖ 32 bit data field

❖ Column and Row Parity bit

➢ 1 * 128 bit of EM4005/EM4105

❖ ISO11784/11785

❖ BDE telegram structure

❖ *Data encodings*: Manchester, Biphase, PSK

❖ *Data Rates*: RF/16, RF/32, RF/64

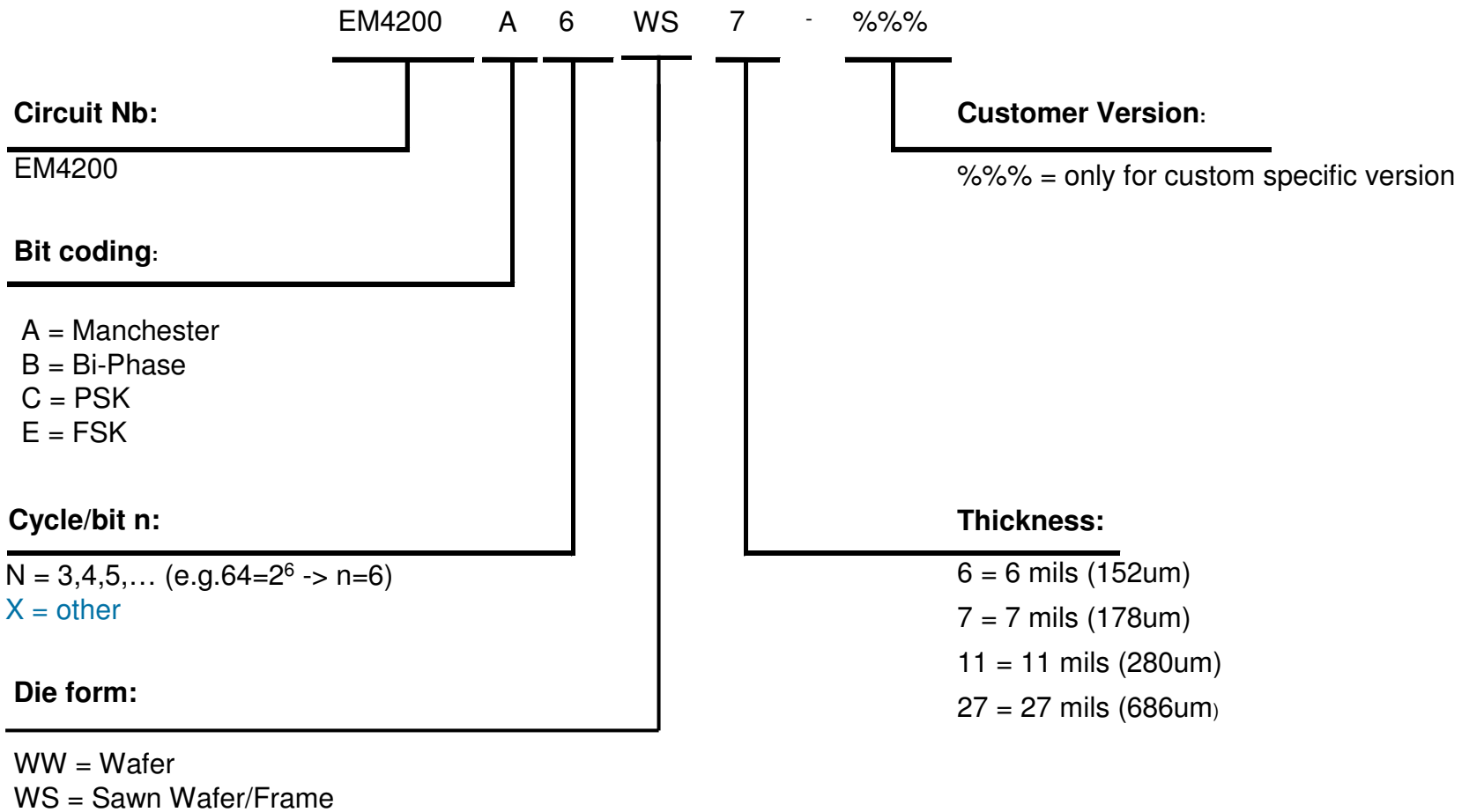❖ *Resonant Capacitor*: 75pF

EM4200 – Added Key features

❖ Higher resonant capacitor versions (210pF and 250pF) for tag miniaturization and process optimization

❖ Improved reading range on sensitive readers (~10% more). Transparent behavior on other readers and installed bases

❖ FSK2 data encoding supported

❖ Small die size, around 70k parts per 8 inch wafer

❖ Minimum ordering quantity of 2 wafers (~140k parts)

❖ New thin plastic package designed for manual or thermo compression soldering processes: EMDFN02

EM4200 – Electrical Parameters Comparison

Parameters	Symbol	EM4200	EM4100	EM4102	EM4005	EM4105
Input current on COIL1/COIL2	I_{COIL}	-30 to +30mA	-30 to +30mA	-30 to +30mA	-30 to +30mA	-30 to +30mA
Operating temperature range	T_{OP}	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C
Storage temperature range	T_{STORE}	-55 to +200°C	-55 to +200°C	-55 to +200°C	-55 to +200°C	-55 to +200°C
Electrostatic discharge to MIL-STD-883 method 3015 Between Coil1 and Coil2	V_{ESD}	2000V	1000V	2000V	1000V	1000V
Maximum coil current	I_{COIL1}	+/- 10mA	+/- 10mA	+/- 10mA	+/- 10mA	+/- 10mA
Frequency on coil pads	F_{COIL1}	100kHz – 150kHz	100kHz – 150kHz	100kHz – 150kHz	100kHz – 150kHz	100kHz – 150kHz
Limiter Voltage	V_{LIM}	8.2V Typ	7V Typ	7V Typ	7V Typ	7V Typ
Resonant Capacitors	C_R	75pF +/-10%	74pF +/-15%	78pF +/-15%	75pF +/-15%	75pF +/-15%
Modulation index range in ASK mode	Mr	41 - 73%	40 - 64%	35 - 62%	36 - 56%	36 - 56%

EM4200 – Wafer form versions

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EM4200   A   6   WS   7   -   %%%

Circuit Nb:

EM4200

Customer Version:

%%% = only for custom specific version

Bit coding:

A = Manchester
B = Bi-Phase
C = PSK
E = FSK

Cycle/bit n:

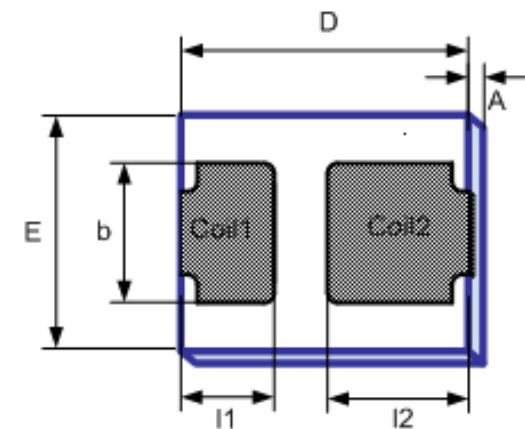N = 3,4,5,… (e.g.64=2^6 -> n=6)
X = other

Thickness:

6 = 6 mils (152um)

7 = 7 mils (178um)

11 = 11 mils (280um)

27 = 27 mils (686um)

Die form:

WW = Wafer
WS = Sawn Wafer/Frame

EM4200 – Package versions

EM4200 A 6 DF2 C - %%%

Circuit Nb:

EM4200

Bit coding:

A = Manchester
B = Bi-Phase
C = PSK
E = FSK

Customer Version:

Cycle/bit n:

N = 3,4,5,… (e.g.64 = 2^6 -> n = 6)
X = other

Delivery form:

C=Bulk (vrac)
H=Wafer frame

Package:

DF2 = EMDFN02

Package mechanical dimensions:

	A	D	E	B	I1	I2
Size	0.76	2.20	1.78	1.07	0.71	1.08
Tolerance	0.10	0. 15	0.15	0.05	0.05	0.05
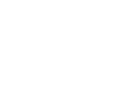
Thank you for your confidence