Embedded and Wire bondable SiCap EMSC 1208 1µF BV11

Rev. 3.01

General description

The EMS Capacitor targets power supplies decoupling and filtering of active devices. This version is a single 1µF capacitor in 1208 package size.
1µF EMSC Capacitor targets filtering and decoupling in high reliability applications with space constraint.
1µF EMSC Capacitor is using our PICS3 process which allows it to operate under 3.8V at 100°C (10 years)
EMSC Capacitor is based on Silicon Integrated Passive technology could operate up to 250°C on request.

Assembly: This Capacitor is designed to support wire bond on lead frame applications, as well for embedding inside PCB.
Pads finishing: Aluminum. Copper pads for embedding version and Gold pads for wire bonding version, as an optional finishing.

Other capacitance values and other package size are available as a single die or capacitor array, please feel free to contact us

Key features

- High operating temperature (up to 150 °C)
- Ultra-high stability of capacitance value:
  - Temperature 70ppm/K (-55 °C to +150 °C)
  - Voltage <0.1%/Volt
  - Negligible capacitance loss through ageing
- Low profile: 100 µm
- Size size 3.07 x 2.07 mm (1208)
- Break down voltage: 11V
- Low leakage current < 100pA
- High reliability
- ESD compatibility
- Load Dump
- Compatible with high temperature cycling during manufacturing operations (exceeding 300 °C)
- Applicable for almost embedded and wire bonding application

Key applications

- Any demanding applications, such as medical, aerospace, industrial…
- Supply decoupling / filtering of active device
- High reliability applications
- High volumetric efficiency *(i.e. capacitance per unit volume)*
- Devices with battery operations
- High temperature applications

Functional diagram

The next figure provides implementation set-up of the capacitor (4 connections):

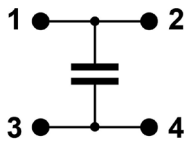

Figure 1 – 1µF EMS capacitor block diagram

Electrical performances

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
C	Capacitance value	@+25°C	-	1	-	µF
ΔC_P	Capacitance tolerance (1)	@+25°C	-15	-	+15	%
T_{OP}	Operating temperature		-55	20	+150	°C
T_{STG}	Storage temperature (2)		-70	-	+165	°C
ΔC_T	Capacitance temperature variation	-55°C to +150°C	-	70	-	ppm/K
RV_{DC}	Rated voltage (3)		-	-	3.8(4) 3.4(5)	V_{DC}
BV	Breakdown voltage	@+25°C	11	-	-	V_{DC}
ΔC_{RVDC}	Capacitance voltage variation	From 0V to RV_{DC}	-	-	0.1	%/V_{DC}
IR	Insulation resistance	@ 3V, +25°C, 120s	50	-	-	GΩ
ESR	Equivalent Series Resistance	@+25°C, shunt mode	-	100	-	mΩ
ESL	Equivalent Series Inductance	@+25°C, SRF shunt mode	-	100	-	pH
ESD	HBM stress (6)	(100pF/1.5kOhms) max +/-8kV Level H3B	8	-	-	kV
ESD	HMM stress (6)	ANSI/ESD SP5.6-2009 (150pF/330Ohms) max +/-8kV Setup A Level 5	8	-	-	kV

Table 1 – 1µF EMS capacitor performances

(1): other tolerance available upon request
(2): without packaging
(3): Lifetime is voltage and temperature dependent, please refer to application note 'Lifetime of 3D capacitors'
(4): 10 years of intrinsic life time prediction at 100°C continuous operation
(5): 10 years of intrinsic life time prediction at 150°C continuous operation.
(6): please refer to application note 'ESD Challenge in 3D Murata Integrated Passive technology'.

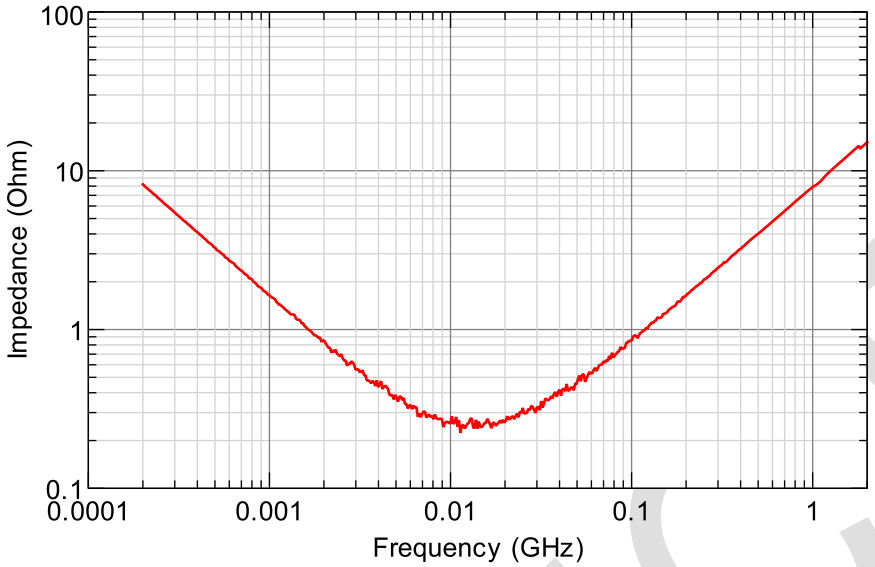

Figure 2 - Decoupling (shunt mode) impedance

Pinning definition

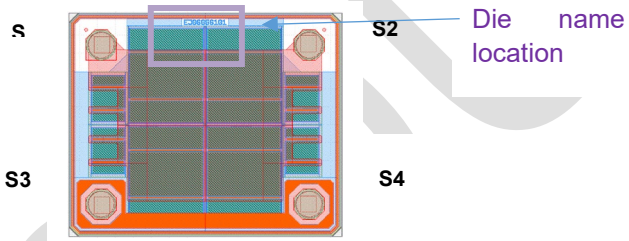

Figure 3- Pin configuration

pin #	Symbol	Coordinates X / Y (mm)
1	Signal 1	-1.22 / 0.72
2	Signal 1	1.22 / 0.72
3	Signal 2	-1.22 / -0.72
4	Signal 2	1.22 / -0.72

Table 2 - Pining description. Reference (0,0) located at the centre of the die.

Parts should be glued with non-conductive paste.If conductive glue is used on the backside of the silicon cap, it's strongly recommended to avoidto connect the backside to electrical signal.If backside is connected to electrical signal, this signal will absolutely be the same as pads 3-4.

Ordering Information for product EMSC 1208 1µF BV11

Type number	Package		
	Packaging	Finishing	Description
935123424710–T3A	7'' T&R (4)	Alu(2)	EMSC/1208/1µF(3) /100µm thick/T&R1000/3µm Al / BV11
935123424710–F1A	6'' FFC	Alu(2)	EMSC/1208/1µF(3) /100µm thick/FF070/3µm Al / BV11
935123424710–E1A	6'' GR	Alu(2)	EMSC/1208/1µF(3) /100µm thick/GRP-2620-6/3µm Al / BV11
935123424710–F2A	8'' FFC	Alu(2)	EMSC/1208/1µF(3) /100µm thick/FF108/3µm Al / BV11

Table 3 - Packaging and ordering information

(1) Other film frame carrier are possible on request
(2) Aluminium 3µm
(3) Refer to Figure 7
(4) Missing capacitors can reach 0.5%

Product Name	Die Name	Description
935123424710	E1208710	Embedding Low Profile Silicon Capacitor 1µF, -55/+150°C, 1208, 3.07 x 2.07mm,Thickness: 100µm, BV: 11V

Table 4 - Die information

Pad Metallization

Pad finishing in Aluminum (3µm thickness +/- 10%), other finishing available on request such as copper, nickel or gold. Silicon dies are not sensitive to humidity, please refer to applications notes 'Assembly Notes' section 'Handling precautions and storage'.

Material regulation

This product is RoHS compliant at the time of publication. For further information about regulation compliancy, please ask your sales representative.

Package outline

The product is delivered as a bare silicon die, with passivation opening for contacts.

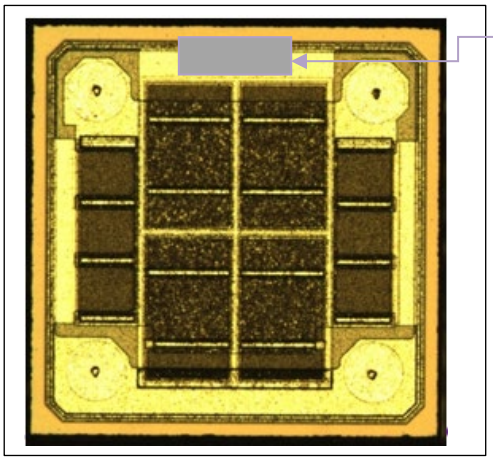

Figure 4 – Die Micro photography

A (mm)	B (mm)	T (mm)	c (mm)	d (mm)	e (mm)
3.07 ±0.02	2.07	0.1 ±0.02	0.15	2.44	1.44

Table 5 - Dimensions and tolerances

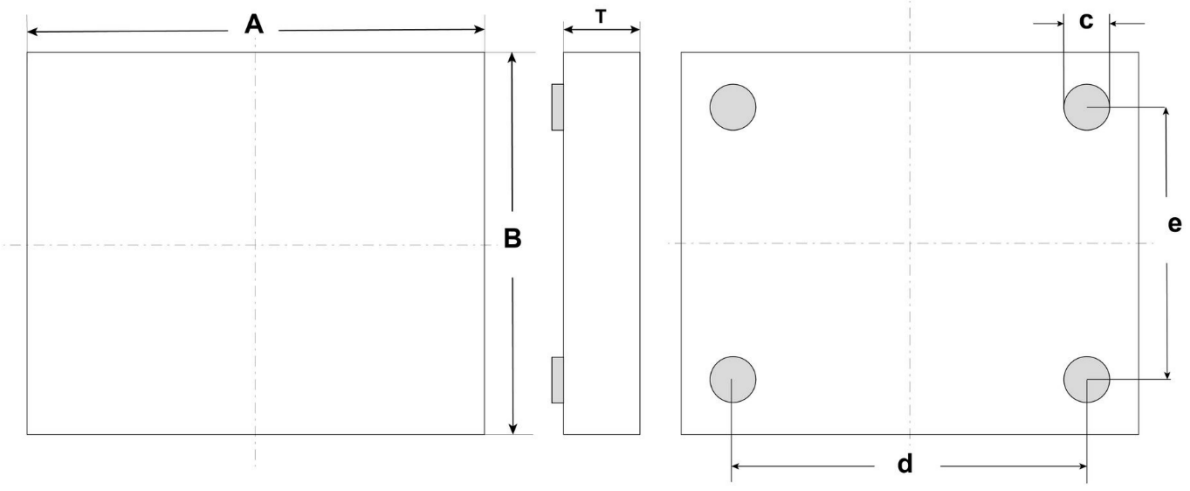

Figure 5 - Package outline drawing

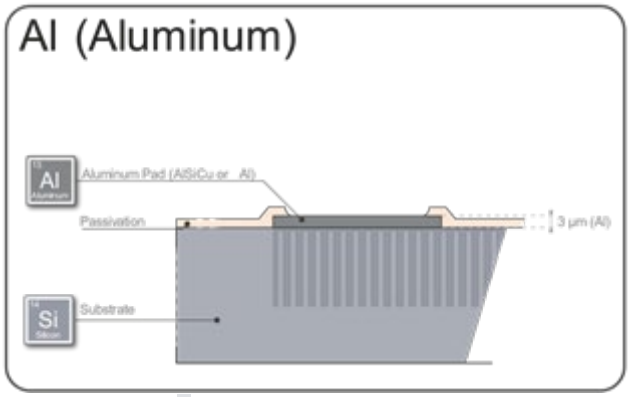

Figure 6 – Cross section on top finishing

Assembly

EMSC series is compatible with standard wire bonding and embedding technology.
For further information, please see our mounting application note

The attachment techniques recommended by Murata on the customer's substrates are fully detailed in specific documents available on our website. To assure the correct use and proper functioning of Murata capacitors **please download the assembly instructions on https://www.murata.com/en-us/products/capacitor/siliconcapacitors and read them carefully.**

Figure 7 Scan this QR Code to access the Murata Silicon Capacitor web page

Packaging format

Please refer to application note ‘Products Storage Conditions and Shelf Life’.

Tape and Reel:

Dies are not flipped in the tape cavity (wire bond pad up) with die ID located near the driving holes of the tape.

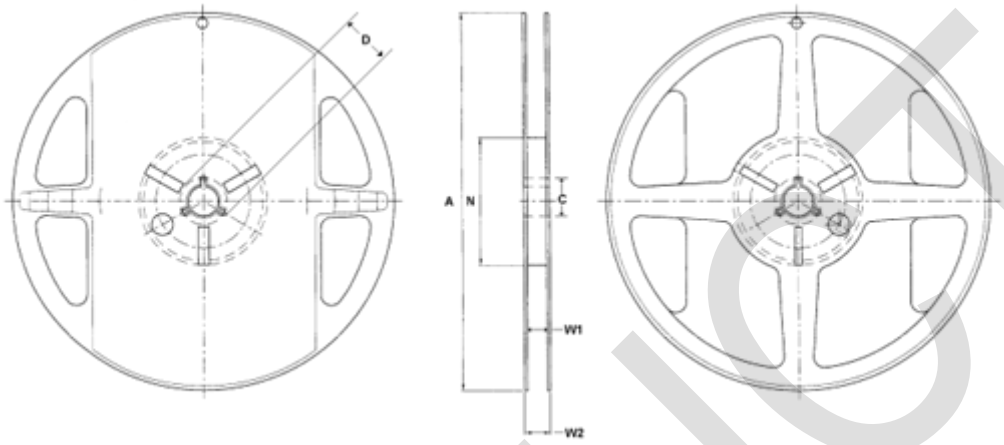

Figure 8 - Reel drawing

Tape Width	Diameter A	C	D	Hub N	W1	W2
8	178 (7 inches)	13.5	20.2	60	9	11.5

Table 6– Reel dimensions (mm)

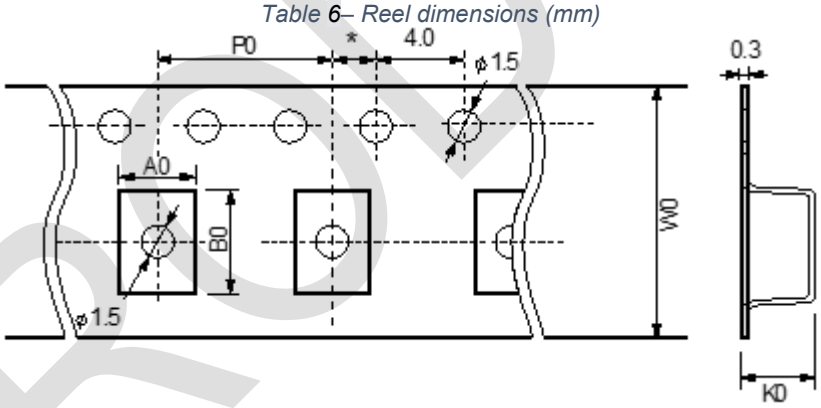

Figure 9 - Tape drawing

Cavity dimensions			Carrier tape width W0	Carrier tape pitch P0	Quantity per reel
Ao	Bo	Ko			
2.3	3.37	0.51	12	4	1000

Table 7- Tape dimensions (mm)

Film frame carrier:

With UV curable dicing tape (UV performed)

Good dies are identified using the SINF electronic mapping format. No ink is added on wafer to label other dies.

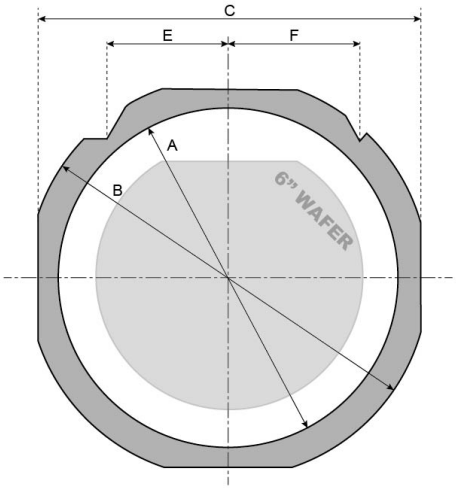

Figure 2 FF070 Frame with a 6" wafer

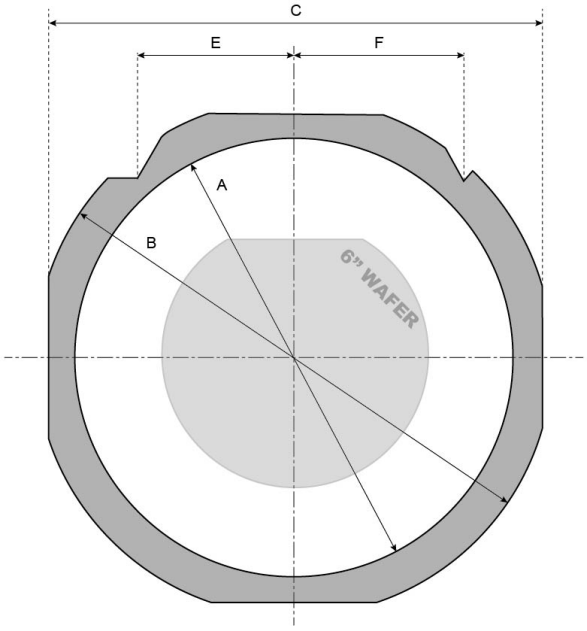

Figure 3 FF108 Frame with a 6" wafer

Frame Reference	Frame Style	Inside diameter A	Outside diameter B	Width C	Thickness	Pin location E	Pin location F
FF070 (1)	DTF-2-6-1	7.638”	8.976”	8.346”	0.048’’	2.370”	2.5’’
FF108 (1)	DTF-2-8-1	9.842”	11.653”	10.866”	0.048”	2.381”	2.5’’

Table 5 - Frame dimensions (inches)

(1) or equivalent

Expander grip ring 6” diameter:

With UV curable dicing tape (UV performed)

Good dies are identified using the SINF electronic mapping format. No ink is added on wafer to label other dies.

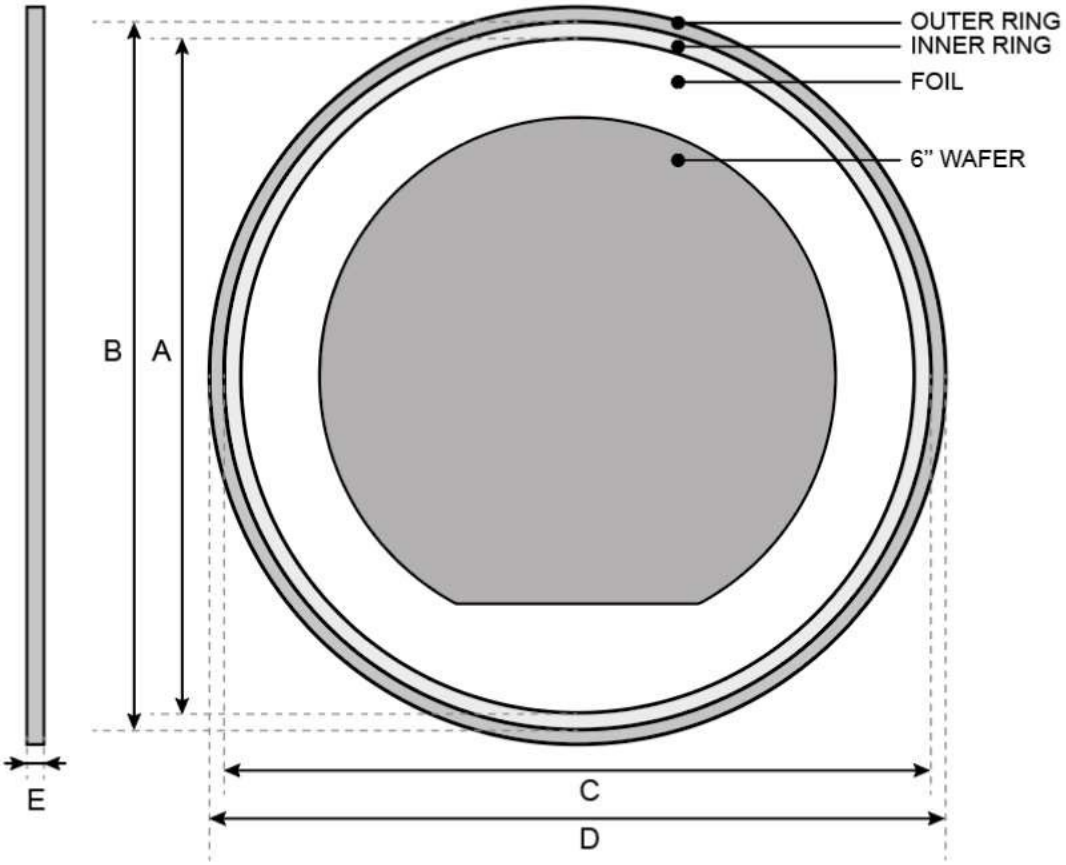

Figure 12 – Grip Ring drawing

Grip Ring Style	A	B	C	D	E	Locator Notch
GRP-2620-6 (1)	7.670”	7.973”	7.975”	8.280”	0.236”	None

Table 9 - Frame dimensions (inches)

(1) or equivalent

Definitions

Data sheet status

Objective specification: This data sheet contains target or goal specifications for product development.

Preliminary specification: This data sheet contains preliminary data; supplementary data may be published later.

Product specification: This data sheet contains final product specifications.

Limiting values

Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those given in the Electrical performances sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information

Where application information is given, it is advisory and does not form part of the specification.

Revision history

Revision	Date	Description	Author.
Release 1.0	**2010 February 8h**	**Objective specification**	**OGA**
Release 1.1	**2010 February 26rd**	**Preliminary specification**	**OGA**
Release 1.3	**2010 May 18th**	**Product specification**	**OGA**
Release 1.4	**2011 November 17 th**	**Product specification**	LLE
Release 1.5	**2014 december 02nd**	**Product specification**	LLE
Release 1.6	**2017 december 07th**	**PN change according to PCN**	LLE
Release 3.00	**2024 february 09**	**General update**	OGA -CGU
Release 3.01	**2025 October 20th**	**Key applications have been updated according to the latest market requirement / Ordering information has been updated according to the latest product lineup and specification.**	CGU- HFU

Disclaimer / Life support applications

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Murata customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Murata for any damages resulting from such improper use or sale.

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