Embedded and Wire bondable SiCap EMSC 1208 1µF BV11



Rev. 3.00

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.

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:
 - o 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, automotive 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):

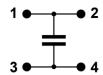


Figure 1 – 1µF EMS capacitor block diagram

Electrical performances

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
С	Capacitance value	@+25°C	-	1	J -	μF
ΔC _P	Capacitance tolerance (1)	@+25°C	-15	- 7	+15	%
Тор	Operating temperature		-55	20	+150	°C
T _{STG}	Storage temperature (2)		-70	-	+165	°C
ΔСт	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	-	рН
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'.



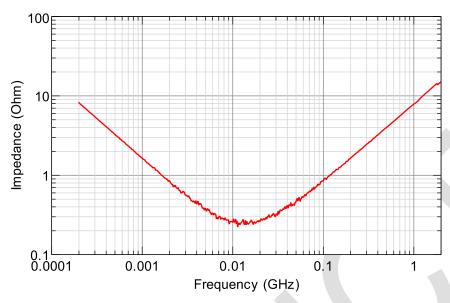


Figure 2 - Decoupling (shunt mode) impedance

Pinning definition

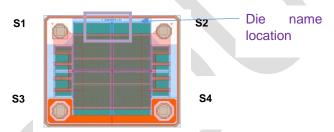


Figure 3- Pin configuration

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 avoid to connect the backside to electrical signal. If backside is connected to electrical signal, this signal will absolutely be the same as pads 3-4.

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Ordering Information for product EMSC 1208 1µF BV11

Murata Integrated Passive Devices delivers products with AQL level II (0.65). Tighter quality levels are available upon request.

Type number	Package					
rype number	Packaging	Finishing	Description			
935123424710-T3A	7" T&R ⁽⁴⁾	Alu ⁽²⁾	EMSC/1208/1μF ⁽³⁾ /100μm thick/T&R1000/3μm AI / BV11			
935123424710-F1A	6" FFC	Alu ⁽²⁾	EMSC/1208/1μF ⁽³⁾ /100μm thick/FF070/3μm AI / BV11			
935123424710-E1A	6" GR	Alu ⁽²⁾	EMSC/1208/1μF ⁽³⁾ /100μm thick/GRP-2620-6/3μm AI / BV11			
935123424710-F2A	8" FFC	Alu ⁽²⁾	EMSC/1208/1µF ⁽³⁾ /100µm thick/FF108/3µm AI / 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		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 (3μ m 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

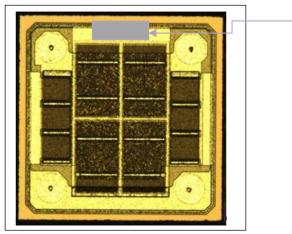
This product is RoHS compliant at the time of publication. For further information about regulation compliancy, please ask your sales representative.





Package outline

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



Die name:

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

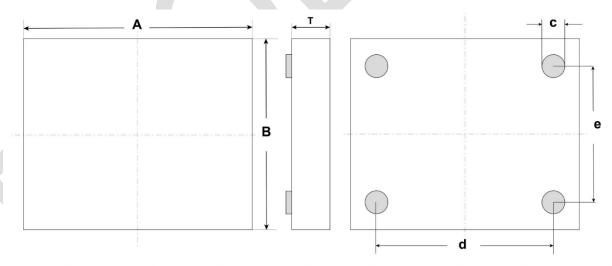


Figure 5 - Package outline drawing



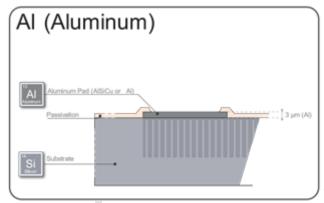


Figure 6 – Cross section on top finishing

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.

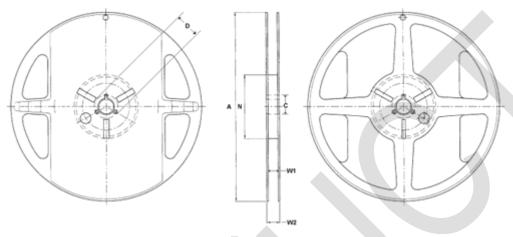


Figure 8 - Reel drawing

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

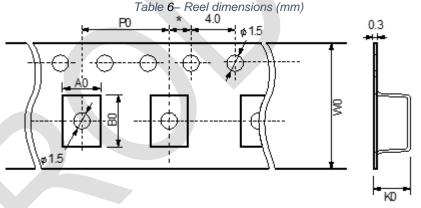


Figure 9 - Tape drawing

Cavity dimensions			Carrier tape	Carrier tape	Quantity		
	Ao	Во	Ко	width W0	pitch P0	per reel	
F	2.3	3.37	0.51	12	4	1000	

Table **7**- Tape dimensions (mm)

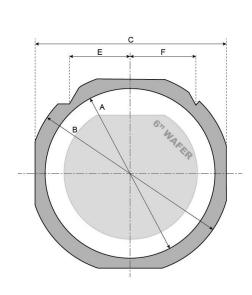




Film frame carrier:

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.



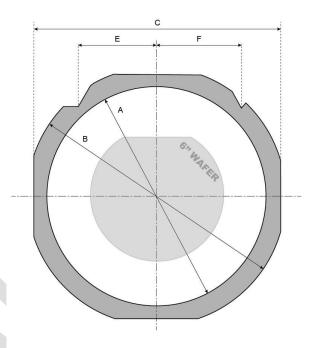


Figure 2 FF070 Frame with a 6" wafer

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.

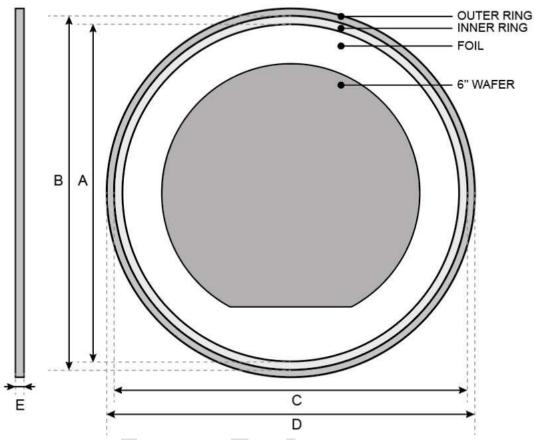


Figure 12 - Grip Ring drawing

Grip Ring Style	Α	В	С	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



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Definitions Rev. 3.00

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 8 ^h	Objective specification	OGA
Release 1.1	2010 February 26 rd	Preliminary specification	OGA
Release 1.3	2010 May 18 th	Product specification	OGA
Release 1.4	2011 November 17 th	Product specification	LLE
Release 1.5	2014 december 02 nd	Product specification	LLE
Release 1.6	2017 december 07 th	PN change according to PCN	LLE
Release 3.00	2024 february 09	General update	OGA -CGU

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