

This document is e2v property. Any copy and/or disclosure thereof are subject to e2v Grenoble's prior written consent

<b>DATE:</b> <i>September</i> <i>2018</i>	<b>QUALIFICATION REPORT</b>	<b>PAGE:</b> <i>1/4</i>
	In accordance with PGQ 15: <b>GENERAL PRINCIPLES OF QUALIFICATION</b>	

<i>Product:</i>	<b>EV12AD550BMGC</b>
-----------------	----------------------

<i>Qualification status:</i>	<input checked="" type="checkbox"/> <b>Accepted</b>	<input type="checkbox"/> <b>Pending</b>	<input type="checkbox"/> <b>Rejected</b>
<b><i>This product has met all Teledyne - e2v Grenoble qualification requirements.</i></b>			

<i>Qualified products</i>	<i>Package</i>	<i>Temperature range</i>	<i>Screening level</i>
<b>EV12AD550BMGC</b>	<b>CCGA 323</b>	<b>M grade : -55°C &lt; Tc ; Tj &lt; 125°C</b>	<b>Standard</b>
<b>EV12AD550BMGCD/T</b>	<b>CCGA323</b>	<b>M grade: -55°C &lt; Tc ; Tj &lt; 125°C</b>	<b>D/T (Std + burn-in)</b>
<b>EV12AD550BMGC-V</b>	<b>CCGA 323</b>	<b>Space: -55°C &lt; Tc ; Tj &lt; 125°C</b>	<b>MIL-PRF-38535</b>

<i>Die information:</i>			
<b>Die size:</b> <b>6.1 mm x 7.1 mm</b>	<b>Mask:</b> <b>VO02A</b>	<b>Wafer fab:</b> <b>ST microelectronics (France)</b>	<b>Process / technology:</b> <b>BiCMOS9 / 0.13µm CMOS; High speed SiGe:C bipolar</b>
<b>Bumping plant:</b> <b>ASE (Taiwan)</b>	<b>Bump composition:</b> <b>Sn63Pb37</b>	<b>Bump pitch:</b> <b>250 µm</b>	<b>UBM composition:</b> <b>Ti / NiV / Cu</b>

<i>Package information:</i>			
<b>Outline / Number of pin:</b> <b>21 x 21 mm / 323</b>	<b>Package material:</b> <b>AlN</b>	<b>Lid material / finish:</b> <b>Kovar / Ni finish</b>	<b>Type of marking:</b> <b>laser</b>
<b>Assy plant:</b> <b>Teledyne e2v (Grenoble)</b>	<b>Column attach plant:</b> <b>Six sigma (USA)</b>	<b>Column pitch:</b> <b>1 mm</b>	<b>Solder column composition:</b> <b>embedded copper ribbon / Pb85Sn15 core material / Sn63Pb37 finishing</b>

<i>Qualification batch information :</i>			
<b>Mask :</b> <b>VO02A</b>	<b>Diffusion lot :</b> <b>J703EVW</b>	<b>Assy lot PO :</b> <b>660265921 / 660265921S</b>	<b>Date Code :</b> <b>17A1741 / 17A1749</b>

This document is e2v property. Any copy and/or disclosure thereof are subject to e2v Grenoble's prior written consent

<b>DATE:</b> <i>August 2018</i>	<b>QUALIFICATION REPORT</b>	<b>PAGE:</b> <b>2/4</b>
	In accordance with PGQ 15: <b>GENERAL PRINCIPLES OF QUALIFICATION</b>	

TEST <i>Acceptable criteria</i>	METHOD <i>Condition</i>	Sample	Fail	Status
<b>Die Construction analysis</b> <i>ST Bicmos9 specifications</i>	<b>According to MIL-STD-883 TM2018 ESA/SCC Basic Specification N° 21400</b>	4 dice	0	<i>Pass</i>
<b>ESD HBM</b> <i>ATE program</i>	<b>JS-001-2014 / MIL-STD-883 TM 3015</b> <i>3 positive and 3 negative pulses</i>	3	0	<i>Pass 500V (Class 1B)</i>
<b>LATCH UP</b> <i>ATE program</i>	<b>JESD78</b> <i>T<sub>j</sub> = 125 °C I test @ + / - 100 mA Over voltage test @ 1.5 x VDD</i>	5	0	<i>Pass (Class II)</i>
<b>Life Test</b> <b>Steady state Life Test</b> <i>ATE program (3 temperatures)</i>	<b>MIL-STD-883 TM1005</b> <i>2000 Hrs / Vsupply max / Tj 145 °C<sup>(1)</sup></i>	22	0	<i>Pass</i>
<b>Temperature cycling test</b> <b>Column attach simulation</b> <b>Temperature cycling</b>  <i>Fines &amp; grosses leaks</i> <i>C-SAM inspection</i> <i>External Visual Inspection</i> <i>Electrical test</i>	<b>3 reflows</b> (according to J-STD-020; SnPb eutectic process cond.; 220 °C peak reflow) <b>MIL-STD-883 TM 1010 cond C</b> <i>1500 cycles -55 °C/+125 °C</i>  MIL-STD-883 TM1014 cond A & C According to MIL-STD-883 TM2030 MIL-STD-883 TM2009 / ESA SCC 20500 ATE program (3 temperatures)	15	0	<i>Pass</i>
<b>Environmental tests</b> <b>Column attach simulation</b> <b>Thermal shock</b> <b>Temperature cycling</b> <b>Moisture resistance test</b>  <i>Fines &amp; grosses leaks</i> <i>C-SAM inspection</i> <i>External Visual Inspection</i> <i>Electrical test</i>	<b>3 reflows according to J-STD-020</b> (SnPb eutectic process cond.; 220 °C peak reflow) <b>MIL-STD-883 TM 1011 cond C</b> <i>15 cycles -65 °C/+150 °C</i>  <b>MIL-STD-883 TM 1010 cond C</b> <i>100 cycles -65 °C/+150 °C</i>  <b>MIL-STD-883 TM 1004</b> <i>10 cycles, w/o bias</i>  MIL-STD-883 TM1014 cond A & C According to MIL-STD-883 TM2030 MIL-STD-883 TM2009 / ESA SCC 20500 ATE program (3 temperatures)	15	0	<i>Pass</i>

This document is e2v property. Any copy and/or disclosure thereof are subject to e2v Grenoble's prior written consent

<b>DATE:</b> <i>August 2018</i>	<b>QUALIFICATION REPORT</b>	<b>PAGE:</b> <b>3/4</b>
	In accordance with PGQ 15: <b>GENERAL PRINCIPLES OF QUALIFICATION</b>	

TEST <i>Acceptable criteria</i>	METHOD <i>Condition</i>	Sample	Fail	Status
<b><u>Mechanical tests</u></b>				
<b>Column attach simulation</b>	<b>3 reflows according to J-STD-020</b> (SnPb eutectic process cond.; 220 °C peak reflow)			
<b>Mechanical shock</b>	<b>MIL-STD-883 TM 2002 cond B</b> <i>(50 pulses duration 0.5 ms / 1500 g) x 6 axis</i>			
<b>Vibration</b>	<b>MIL-STD-883 TM 2007 cond A</b> <i>(120 sweeps: 20 to 2000 Hz / 20 G / 4 min min.) x 3 axis</i>	5 <sup>(2)</sup>	0	<b>Pass</b>
Fines & grosses leaks	MIL-STD-883 TM1014 cond A & C			
C-SAM inspection	According to MIL-STD-883 TM2030			
External Visual Inspection	MIL-STD-883 TM2009 / ESA SCC 20500			
Electrical test	ATE program (3 temperatures)			
<b><u>Mechanical tests</u></b>				
<b>Column attach simulation</b>	<b>3 reflows according to J-STD-020</b> (SnPb eutectic process cond.; 220 °C peak reflow)			
<b>Mechanical shock</b>	<b>MIL-STD-883 TM 2002 cond B</b> <i>(5 pulses duration 0.5 ms / 1500 g) x 6 axis</i>			
<b>Vibration</b>	<b>MIL-STD-883 TM 2007 cond A</b> <i>(12 sweeps: 20 to 2000 Hz / 20 G / 4 min min.) x 3 axis</i>	15 <sup>(2)</sup>	0	<b>Pass</b>
<b>Constant acceleration</b>	<b>MIL-STD-883 TM 2001 cond D</b> <i>20000G, 1 min., Y1 only</i>			
Fines & grosses leaks	MIL-STD-883 TM1014 cond A & C			
C-SAM inspection	According to MIL-STD-883 TM2030			
External Visual Inspection	MIL-STD-883 TM2009 / ESA SCC 20500			
Electrical test	ATE program (3 temperatures)			
<b><u>Thermal vacuum test</u></b>				
<b>Column attach simulation</b>	<b>3 reflows according to J-STD-020</b> (SnPb eutectic process cond.; 220 °C peak reflow)			
<b>Thermal vacuum</b>	<b>20 cycles -30 °C to +70 °C, slope 2 °C/min., dwell time 2 hours; pressure : 10<sup>-5</sup> Pa</b>	5 <sup>(2)</sup>	0	<b>Pass</b>
Fines & grosses leaks	MIL-STD-883 TM1014 cond A & C			
C-SAM inspection	According to MIL-STD-883 TM2030			
External Visual Inspection	MIL-STD-883 TM2009 / ESA SCC 20500			
Electrical test	ATE program (3 temperatures)			

This document is e2v property. Any copy and/or disclosure thereof are subject to e2v Grenoble's prior written consent

<b>DATE:</b> <i>August 2018</i>	<b>QUALIFICATION REPORT</b>	<b>PAGE:</b> 4/4
	In accordance with PGQ 15: <b>GENERAL PRINCIPLES OF QUALIFICATION</b>	

TEST <i>Acceptable criteria</i>	METHOD <i>Condition</i>	Sample	Fail	Status
<b><u>Soldering heat</u></b>  Reflow simulation  Fines & grosses leaks C-SAM inspection External Visual Inspection Electrical test	<b>20 reflows (according to J-STD-020; SnPb eutectic process cond.; 220 °C peak reflow)</b>  MIL-STD-883 TM1014 cond A & C According to MIL-STD-883 TM2030 MIL-STD-883 TM2009 / ESA SCC 20500 ATE program (3 temperatures)	5	0	<i>Pass</i>
<b><u>Internal water vapor test</u></b>  <i>Humidity &lt; 5000ppm</i>	MIL-STD-883 TM 1018  <i>Prebake 16-24 hrs @ 100 °C</i>	3	0	<i>Pass</i>
<b><u>Column pull test</u></b>  <i>Lead pull strength &gt; 370 gf</i>	MIL-STD-883 TM 2038	2 <sup>(*)</sup> <sup>(2)</sup>	0	<i>Pass</i>
<b><u>Solderability</u></b>	MIL-STD-883 TM 2003  <i>4 hrs steam aging</i>	3 <sup>(**)</sup> <sup>(2)</sup>	0	<i>Pass</i>
<b><u>Salt atmosphere</u></b>  Salt atmosphere  Visual examination Fines & grosses leaks	<b>MIL-STD-883 TM 1009 cond A</b>  In accordance with visual criteria of TM 1009 MIL-STD-883 TM1014 cond A & C	15 <sup>(2)</sup>	0	<i>Pass</i>

(\*) 45 columns from 2 devices

(\*\*) 22 leads from 3 devices

<sup>(1)</sup> 4000 hrs Life Test done on EV12AD550AMGC product (same BiCMOS9 die process)

<sup>(2)</sup> Done on EV12AD550AMGC product: by similarity for EV12AD550BMGC product

----- END OF DOCUMENT -----