DATE: Feb. 2016	**QUALIFICATION REPORT** *This document specifies that referenced product(s) is(are) compliant to* **PGQ 15: GENERAL PRINCIPLES OF QUALIFICATION**	PAGE: 1 / 3

PRODUCT DESCRIPTION	E2V PART-NUMBER	PACKAGE	Temp. range	Screening level
12-bit 3Gsps MuxDAC	EV12DS130BMLG9NB1	CLGA 255	-55°C < Tc Tj < 125°C	ESCC 9000
	EV12DS130BMGS9NB1	CI-CGA 255		
	EV12DS130BMGC9NB1	CCGA 255		

QUALIFICATION STATUS ☑ ACCEPTED ☐ PENDING ☐ REJECTED

Products listed above have met all requirements of PGQ15

DICE INFORMATION	Wafer fab	INFINEON - Regensburg (Germany)
	Process	B7HF200
	Technology	200Ghz SiGe Bipolar
	Mask	VN54B
	Die size	5.04 mm x 4.67 mm (23.54 mm²)
	Die thickness	300 µm
	Passivation	SiO2 (0.3 µm) & SiN (0.55 µm)
	Last metallization layer	Au (500nm) / Pt (60nm) / Ti (60nm)
PACKAGE INFORMATION	Outline	21 x 21 mm
	Pitch	1.27 mm
	Die attach material	JM7000
	Wire	Au 23 µm
	Lid	COMBO HIREL OD .645SQ
	Marking ink	Markem 4489 black
	LG	CLGA 255 - Au pad termination
	GS	CI-CGA 255 - Solder column interposer Pb 90 / Sn 10
	GC	CCGA 255 - Cu spiral column Pb 80 / Sn 20
ASSEMBLY LOCATION	e2v semiconductors - St Egrève - France	
TEST LOCATION		

Authorized Signature	Validation Date *(Last update)*
Christian CARMONA *Semiconductors Quality Officer* *& DLA point of contact*	**February 19th 2016**

DATE: Feb. 2016	**QUALIFICATION REPORT** *This document specifies that referenced product(s) is(are) compliant to* **PGQ 15: GENERAL PRINCIPLES OF QUALIFICATION**	PAGE: 2 / 3

QUALIFICATION BATCH INFORMATION

Mask	Diffusion lot	Assy lot ID / WO	Date Code
VN54B	**RU349519**	**990000041 / 990000833**	**1433**

TEST	METHODE	COND	DESCRIPTION	Qualif. sample	Σ (1)
Construction analysis	**MIL-STD-883 TM2018 ESA/SCC N°21400**		**8 dice from RU349519 diff lot**	Pass	All diffusion lot
ESD HBM	**JESD22-A114E**	**>1000V**	**Class 1C**	5(0)	-
LATCH UP	**JEDEC 78B**		**Class I** **Class II**	6(0) 6(0)	- -
HTOL Test	**MIL-STD-883 TM1005**		**4000Hrs / Tj 156°C**	22(0)	-
Reflow simulation	**J-STD-020D**	**3x**	**SnPb profil peak >220°C**	0	12(0)
Seal (fine & gross leaks)	**MIL-STD-883 TM1014**	**A. & C.**			
Interm. electrical	**Device specification**				
Reflow simulation	**J-STD-020D**	**2x**	**SnPb profil peak >220°C**		
Seal (fine & gross leaks)	**MIL-STD-883 TM1014**	**A. & C.**			
Interm. & End-point elect.	**Device specification**				
Temperature cycling	**MIL STD 883 TM1010**	**C.**	**100cy**	0	12(0)
Thermal shock	**MIL STD 883 TM1011**	**C. 100cy**	**-65°C/2min then +150°C/2min**		
Seal (fine & gross leaks)	**MIL-STD-883 TM1014**	**A. & C.**			
Temp. cycling	**MIL STD 883 TM1010**	**C.**	**400cy**		
Seal (fine & gross leaks)	**MIL-STD-883 TM1014**	**A. & C.**			
External visual inspection	**ESCC 20500**				
End-point elect.	**Device specification**				
DPA	**Internal inspection**		**wire loops & pad intermetallic**		
Mechanical Shock	**MIL STD 883 TM 2002**	**B. 5x**	**5x6 axis: duration of pulse 0.5ms/1500g**	0	12(0)
Vibration	**MIL STD 883 TM 2007**	**A. 12x**	**3 axis: 20-2000 Htz/20G/4min**		
Seal (fine & gross leaks)	**MIL-STD-883 TM1014**	**A. & C.**			
External visual inspection	**ESCC 20500**				
Intermediate-point elect.	**Device specification**				
Mechanical Shock	**MIL STD 883 TM 2002**	**B. 45x**	**5x6 axis: duration of pulse 0.5ms/1500g**		
Vibration	**MIL STD 883 TM 2007**	**A. 108x**	**3 axis: 20-2000 Htz/20G/4min**		
Seal (fine & gross leaks)	**MIL-STD-883 TM1014**	**A. & C.**			
External visual inspection	**ESCC 20500**				
End-point elect.	**Device specification**				

(1) Σ corresponds to cumulative tests done on same package family

Reliability information:

Note: This mask set does not have yet enough cumulated component hours to calculate a reliable MTTF.
However, cumulative LFR data of the product family allow for a more significant MTTF.

RELIABILITY REPORT *Cumulative EFR & LFR*	Equivalent Tj **Tj 125°C**	Nb components hours **2970579**	Nb failure **0**	Activation Energy **0.7 eV**
e2v Calculation	*For* **Tj 125°C**	*Confidence level:* **60 %**	**LFR = 309 FIT**	**MTTF = 3 241 221 Hrs (370 Years)**
Extrapolation with ARRHENIUS law	*For* **Tj 110°C**	*Confidence level:* **60 %**	**LFR = 139 FIT**	**MTTF = 7 200 299 Hrs (822 Years)**
	For **Tj 90°C**	*Confidence level:* **60 %**	**LFR = 43 FIT**	**MTTF =23 126 148 Hrs (2640 Years)**

DATE: Feb. 2016	**QUALIFICATION REPORT** *This document specifies that referenced product(s) is(are) compliant to* **PGQ 15: GENERAL PRINCIPLES OF QUALIFICATION**	PAGE: 3 / 3

PRODUCT FAMILY INFORMATION ***(for cumulative calculation)***

Mask	Product	Description	Package
VN15A	EV10DS130A	10bit 3Gsps MuxDAC	CLGA255 / CI-CGA255 / CCGA255
VN15A	EV12DS130A	12bit 3Gsps MuxDAC	CLGA255 / CI-CGA255 / CCGA255
VN54B	EV12DS130B	12bit 3Gsps MuxDAC	CLGA255 / CI-CGA255 / CCGA255
VN41A	EV10AS180A	10bit 1.5Gsps ADC	CLGA255 / CI-CGA255 / CCGA255

LAT Sub.	TEST	METHODE	COND	DESCRIPTION	LAT-QCI sample (1)	Σ (2)
LAT3 B1	Resistance to solvents	MIL-STD-883 TM2015			0	9(0)
	Permanence of marking	ESCC 24800			0	20(0)
LAT3 B2	Internal visual inspection	MIL-STD-883 TM2010			0	19(0)
	Bond strength	MIL-STD-883 TM2011		22 bonds x 4 devices	0	360(0)
	Bond shear	ASTM-F1269-06		10 bonds x 4 devices	0	360(0)
	Substrate attach strength	MIL-STD-883 TM2027			0	18(0)
LAT3 B3	Solderability	MIL-STD-883 TM2003			0	7(0)
		JESD22-B102E			0	9(0)
LAT3 B4	Solder column pull test	MIL-STD-883 TM2038		45 columns from 2 parts	0	144(0
LAT2 C	HTOL Test	MIL-STD-883 TM1005		4000Hrs / Tj 156°C	22(0)	37(0)
				2000Hrs / 156°C	22(0)	217(0)
				500Hrs / Tj 156°C	22(0)	67(0)
	Seal (fine & gross leaks)	MIL-STD-883 TM1014	A. & C.		100%(0)	100%(0)
	External visual inspection	MIL-STD-883 TM2009				
	Interm. & End-point elect.	Device specification				
D1	Physical dimensions	MIL-STD-883 TM2016		Included in screening	100%(0)	100%(0)
LAT1 D3	Thermal shock	MIL-STD-883 TM1011	C. 15cy		0	128(0)
	Temperature cycling	MIL-STD-883 TM1010	C. 100cy			
	Moisture resistance	MIL-STD-883 TM1004				
	Seal (fine & gross leaks)	MIL-STD-883 TM1014	A. & C.			
	External visual inspection	MIL-STD-883 TM2009				
	End-point electrical	Device specification				
LAT1 D4	Mechanical shock	MIL-STD-883 TM2002	B.		0	128(0)
	Vibration	MIL-STD-883 TM2007	A.			
	Constant acceleration	MIL-STD-883 TM2001	D. Y1			
	Seal (fine & gross leaks)	MIL-STD-883 TM1014	A. & C.			
	External visual inspection	MIL-STD-883 TM2009				
	End-point electrical	Device specification				
D5	Salt atmosphere	MIL-STD-883 TM1009	A.		0	15(0)
	External visual inspection	MIL-STD-883 TM2009				
	Seal (fine & gross leaks)	MIL-STD-883 TM1014	A. & C.			
D6	Internal water vapor test	MIL-STD-883 TM1018		Monitoring	0	-
D9	Soldering heat	MIL-STD-883 TM2036			0	3(0)
	Seal (fine & gross leaks)	MIL-STD-883 TM1014	A. & C.			
	External visual inspection	MIL-STD-883 TM2009				
	End-point electrical	Device specification				

(1) LAT & QCI tests done on EV12DS130B devices

(2) cumulative LAT & QCI tests done on same product family