

VSC7157-03YS/XYS First Level Product Qualification Report

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Manufacturer: Vitesse
Device Type: VSC7157-03YS/XYS
Fab: TSMC Fab 6 **Process:** 0.13µm LV-OD
Assembler: ASAT, DG **Package Type:** TBGA
Test Location: Camarillo, CA

1.0 Package

1.1 Package Type	TBGA
1.2 Body Size	35x35x1.6 mm
1.3 Ball Pitch	1.00 mm
1.4 Pin/Ball Count	564
1.5 Cavity Up / Down	Down
1.6 Substrate P/N	DCDHCL35564-V003-100RA for XYS DCDHCL35564-10273-101RA for YS
1.7 Heat Spreader Description	10024001-1
1.8 Die Attach Epoxy	84-1 LMIS, Conductive
1.9 Bond Wire Material	Au
1.10 Bond Wire Diameter	1.0 mil
1.11 Dam Material	Hysol FP4451
1.12 Fill Material	Ciba R1001
1.13 Solder Ball Material	Sn3Ag0.5Cu for XYS, 62Sn/36Pb/2Ag for YS
1.14 Diameter	0.64 ±0.10 mm
1.15 Moisture Sensitivity Level	MSL4 for XYS and MSL3 for YS

2.0 Wafer/Die

2.1 Technology	0.13µm LV-OD CMOS
2.2 Die Dimensions	9619x8897 µm
2.3 Metallization Material	Cu
2.4 Metallization Layers	8+RDL
2.5 Dielectric Material	FSG
2.6 Passivation Material	Dual Passivation Si ₃ N ₄

3.0 Qualification Results

Table 1: Summary of Device Qualification Results

<u>Test</u>	<u>Conditions</u>	<u>Quantity</u>	<u>Results</u>	<u>Notes</u>
3.1 High Temperature Operating Life (HTOL)	MS883, Method 1005, T _j =140°C, 1008 hours, nominal supply voltages	48 + 48 +48	2 Fails	A, B
3.2 Temperature Humidity with Bias (THB)	JESD22-A101, 85°C/85%R.H., 1008 hours, with preconditioning per J-STD-020	22 +23	All Pass	C

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3.3 Temperature Cycle (TC)	JESD22-A104, Condition B (-55°C ~125 °C), 1000 cycles, with preconditioning per J-STD-020	45	All Pass	
3.4 High Temperature Storage Life (HTSL)	JESD22-A103, 1008 hours, 150°C	23 +55	1 Fail	D
3.5 ESD HBM	JESD22-A114, +/-1500V	3	All Pass	
3.6 ESD CDM	JESD22-C101, +/-200V	3	All Pass	
3.7 Latch Up	JESD78, Class II	6	All Pass	

Notes:

A: For the first group of 48 devices, there are two failures at 168 hrs. They are related to MEMBIST. The rest of devices passed 1008 hrs without failure. The 2nd group of 48 parts passed 168 hrs HTOL with no failure. The 3rd group of 48 parts also passed 168 hrs HTOL with no failure. The 3rd group was continued to 1008 hrs and all passed.

B: FA on this failure can't be performed. However, the two MEMBIST failures were identified at 168 hrs readpoint and the exact time to failure is unknown. They are likely to be random early failures. The failure can't be reproduced on 2nd and 3rd groups.

C: The first group of 22 parts passed 1008 hrs THB. The 2nd group of 23 parts also passed 1008 hrs THB test.

D: The first group of 23 parts passed 504 hrs HTSL. One failure was identified at 1008 hrs and it was due to PLL circuit. The 2nd group of 55 parts passed 1008 hrs HTSL with no failure. The first group of 23 parts including one failure device was stressed for additional 1008 hrs HTSL. Further degradation was observed for the failure device at 168 hrs, but no more degradation at 600 and 1008 hrs. No additional failure or degradation was observed for the rest of 22 parts. Maxim is conducting a detailed FA on the failure devices.

4.0 Reliability Data

The reliability results are documented in "*TSMC 0.13 μm LVOD PROCESS RELIABILITY REPORT*", report number: VQUR-00242