Qualification report for transfer of Final Test from site ATBK, Bangkok, to site ASEN, Suzhou, for product TJA1049 TJA1042 and TJA1051 of Product Line In-Vehicle Networking (PL IVN)

Enovia document #: DOC-267907

Revision	Date	Author	Changes
1.0	November 20th 2020	Rungsan Pisavongvilai	Initial document

#

1. Introduction

This report describes the qualification of the transfer of Final Test (FT) from site ATBK, Bangkok, to site ASEN, Suzhou, for product TJA1049 TJA1042 TJA1051 of Product Line In-Vehicle Networking (PL IVN). This FT transfer is part of the introduction of a Quad Source strategy, combining Dual Source Front-End wafer fab diffusion with Dual Source Back-End assembly, final test and packing/shipping/labeling. In Figure 1 the material flow for the ASEN FT qualification is shown. Up to and including ATBK FT this is the previously qualified production flow. The same devices undergo ASEN FT afterwards, to enable its release.

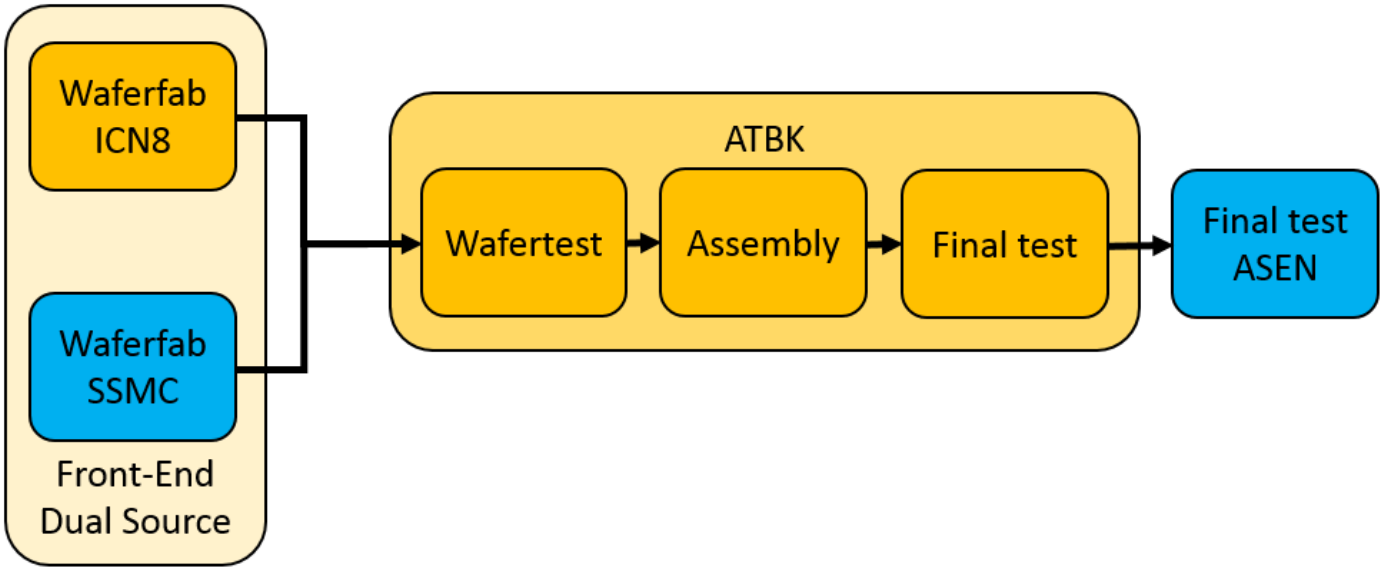


Figure 1: Material flow for the ASEN FT qualification

Note that the ASEN FT qualification is completely decoupled from the ASEN assembly qualification, only material from the previously qualified ATBK assembly is used. By performing FT on the same devices in both ATBK and ASEN, the ASEN FT can be qualified.

This FT transfer applies to all HVSO8-package versions of product TJA1049 TJA1042 TJA1051:

- TJA1049TK/3
- TJA1049TK
- TJA1042TK/3
- TJA1051TK/3

Here /3 indicates the microcontroller 3V interface product version. TJA1049TK/3 devices containing both ICN8 and SSMC silicon dies have been chosen as lead vehicle for the FT transfer.

The TJA1049TK/3 FT transfer consist of the following items:

- Test hardware comparison
- Test program transfer
- Continuity test
- Measurement System Capability (MSC)
- Delta-Sigma Analysis (DSA)
- Bin flip analysis
- Release other TJA1049TK TJA1042TK/3 TJA1051TK/3 product variant

2. Test hardware comparison

ASEN and ATBK use the same test platform with the same software version. Associated hardware is either the same or equivalent. A load board qualified for production in the already-released site ATBK has been transferred to ASEN for this FT transfer. The load board is redesigned to fit with new handler and socket interface in ASEN.

3. Test program transfer

The test programs of all versions of product TJA1049 released for production in ATBK, have been transferred to ASEN.

4. Continuity test

A single ATBK-tested pass device was tested in a continuous loop in ASEN for 200 cycles, to monitor degradation. No degradation has been observed, the ASEN test setup doesn't damage devices (e.g. through voltage spikes).

5. Measurement System Capability (MSC)

A standard Measurement System Capability (MSC) study was performed on 45 numbered devices, to check the Repeatability and Reproducibility (R&R) between 2 testers (ATBK and ASEN) and between 2 loadboards in ASEN(LB#1 and LB#2). The pass criteria are:

- Reproducibility (Rpr) ≤7%
- Repeatability (Rep) ≤7%
- R&R ≤10%

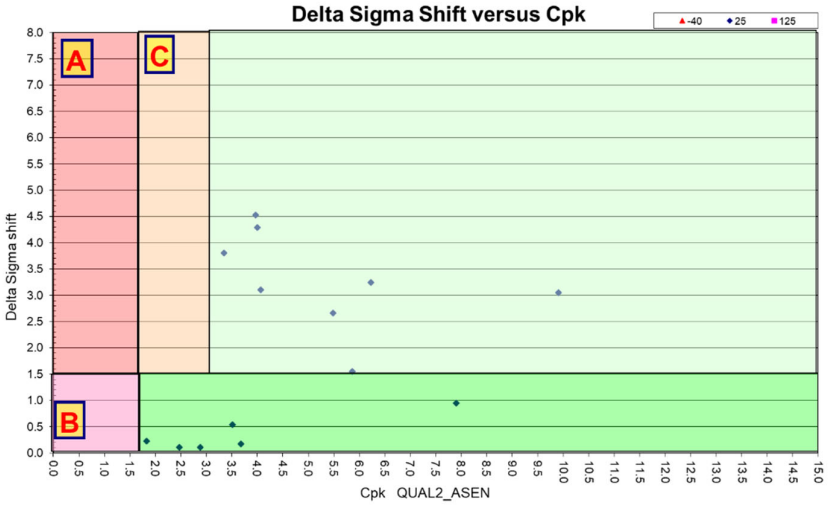
All tests meet this criterium.

6. Delta-Sigma Analysis (DSA)

A pilot run of product TJA1049TK/3 8000 devices were tested in both ATBK and ASEN, to check Process capability index (Cpk) and Delta-Sigma shift analysis between ATBK and ASEN where is different handler. There are 3 criteria that need to be explained if a test is in the area. The criteria are:

- Area A: Cpk <1.67 and Delta-Sigma shift >1.5
- Area B: Cpk <1.67 and Delta-Sigma shift <1.5
- Area C: Cpk >1.67 and Delta-Sigma shift >1.5

All tests meet this criterium without a test in the criteria area.



7. Bin flip analysis

Of product TJA1049TK 1000 devices were tested in both ATBK and ASEN, and a bin comparison was made. The results are:

- pass-to-pass ➔ 100%
- pas-to-fail ➔ 0% (none)
- fail-to-pass ➔ 0% (none)
- fail-to-fail ➔ 0% (none)

8. Release other product variants

For the TJA1049TK TJA1042TK/3 TJA1051TK/3 product variants, a tube of ATBK-tested bin 1 pass devices (95pcs) was re-tested at room temperature in ASEN, showing all pass results.Based on this data ASEN FT for product TJA1049TK TJA1042TK/3 TJA1051TK/3 can be released for production.

9. Conclusion

Based on all above data, ASEN FT for product TJA1049TK/3 TJA1049TK TJA1042TK/3 and TJA1051TK/3 can be released for production.