

130 nm status for CALOROC-EICROC fabrication

Summary of July monthly report

July 2026

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- ❑ Early 2026: stop of TSMC 130 nm MPW (OMEGA is using Engineering runs)

- ❑ March 20th: CERN/IMEC Microelectronics User Group
 - ❑ Situation confirmed for MPW (CERN proposal for Eng. Runs as MPW)
 - ❑ Classical node phase-out over several years (NTO, RTO, Eng. runs and production not affected)

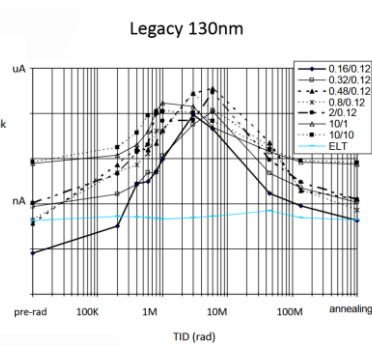
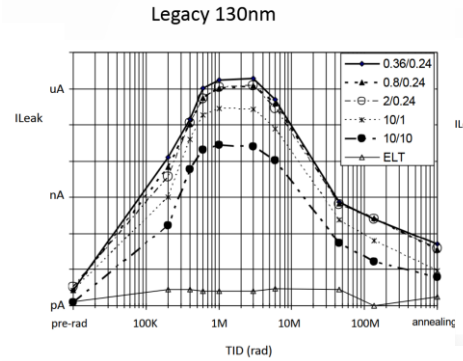
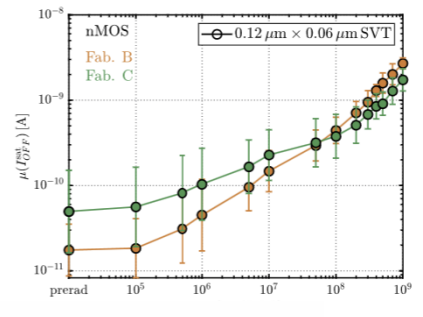
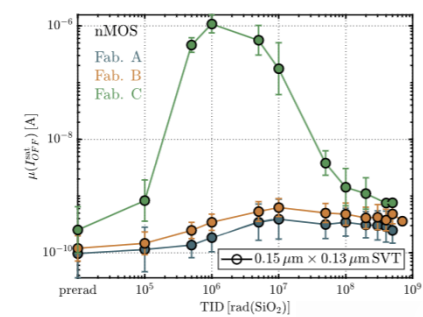
- ❑ Early June: IMEC announced following TSMC decision
 - ❑ 1. All N90 and 0.13 flavours are impacted
 - ❑ 2. Tape-out (both new and mask revision) remain possible in FAB14 (not FAB12) until the last day of September 2026
 - ❑ 3. Tape-out (both new and mask revision) is NOT possible anymore in any fab starting 1st October 2026
 - ❑ 4. Production of existing products continues.
- ❑ Situation confirmed for MPW, NTO, RTO and Eng. runs (production “almost” not affected)

TSMC decision to only keep 1 fab for production in 130 nm
(excluding MPW, RTO, NTO)

IMEC is in Taiwan (now) to directly discuss with TSMC

Radhard fabs through CERN or IMEC

- ❑ > 100 Mrad full-characterized node:
 - ❑ ~~130 nm Fab12 only (else 100-200 krad) – C4~~
 - ❑ 65 nm (right plot) or 28 nm all fabs – C4
- ❑ ~100 krad:
 - ❑ ~~130 nm Fab14 (only available for production)~~
 - ❑ IBM 130 nm (Now GF) – **no C4**
 - ❑ Abandoned in 2014, now back in CERN portfolio
 - ❑ UMC 110 (already used in EIC)
 - ❑ XFAB 130 nm



TSMC130	TSMC65	UMC110	XFAB130	VIS130
5M 1T 1U RDL C4	5M 2T 1U RDL C4	5M 1T 1U no C4?		As TSMC130
Radhard 200 Mrad	Radhard 200 Mrad	Bump @ 5 Mrad	N/A	Which fab
ER : 300 k\$	ER : 750 k\$	ER : 300 k\$?		
EIC	EIC, LHCb	EIC, LHCb, ALICE		
AGH, Lisbon, SLAC	FNAL, BNL, CERN	Torino		
Discontinued	Perennity ?	Low volume	6-9 months fab	Available when ?

- ☐ CNRS funding vs tech. choice
 - ☐ Funding for R&D was based on 130nm prices (caloroc and eicroc)
 - ☐ EIC recognition as French priority project (IR*) may ease access to lower node (selection ~ end 2026)

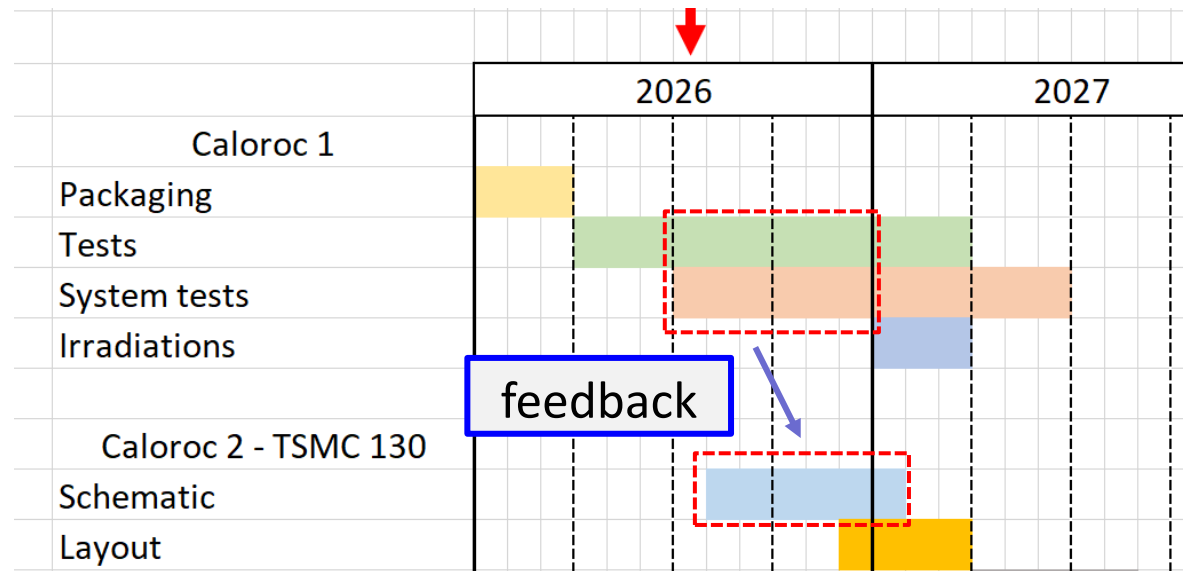
- ☐ To keep synergies between ROCs, a common tech. node is preferable
 - ☐ So driven by EICROC (due to its x8 size compared to CALOROC)

- ☐ Schedule if TSMC 65 chosen:
 - ☐ More IP available (ADC, PLL, IO PADS, Bandgap etc)
 - ☐ C4 by TSMC / OSAT + through CERN (payment)
 - ☐ ~12 months delay

- ☐ Schedule if UMC 110 chosen:
 - ☐ Few IP available (ADC, PLL, IO PADS, Bandgap etc)
 - ☐ C4 outsourced + through IMEC (payment)
 - ☐ Better perennity ?
 - ☐ ~18 months delay

Next steps and summary

- ❑ An ASIC schematic is largely technology-agnostic
 - ❑ Need to have it “clean” before moving to a new tech (~ October 26)
- ❑ Feedback from users is extremely important (Caloroc A or B selection)
- ❑ All possible technologies are available at OMEGA (NDA signed + access granted)
- ❑ Active discussion with IMEC... Today: possible access to **TSMC130 – Fab6** (confirmation soon)



Initial schedule for TSMC 130nm

Important milestones on the technology strategy:

- ❑ June 30th: first meeting with CNRS scientific and technical directors
- ❑ **Sept. 3rd: 2nd CNRS dedicated meeting (then as many as needed)**
- ❑ Oct: schematic of CALOROC2 ready (with feedbacks)
- ❑ End 26: IR* selection results

- ❑ Early 2026: stop of TSMC 130 nm MPW (OMEGA is using Engineering runs)

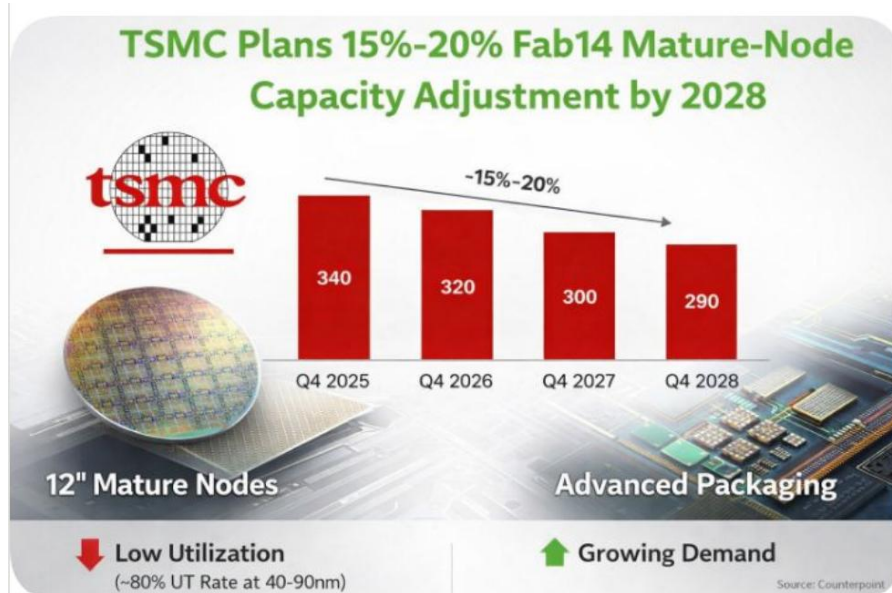
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- ❑ June 26th: CERN communication
 - ❑ TSMC strategy is being implemented primarily through two measures:
 - (a) the consolidation of mature and legacy technology production into a single fabrication facility
 - (b) a gradual reduction and eventual limitation of new design introductions that would have required an increase in production capacity
 - ❑ Despite CERN’s ongoing efforts to engage in discussions, we must, for the time being, proceed under the assumption of a **worst-case scenario in which the final window for New Tape-Outs closes in September 2026.**

TSMC has confirmed a planned adjustment to 12-inch mature-node capacity at Fab14, with a cumulative reduction of approximately 15–20% by 2028. This reflects a shift in demand mix rather than short-term cyclical weakness.

From a supply-side perspective, utilization at 40–90nm nodes has remained around 80% with limited visibility for recovery. Selected Fab14 capacity is being released to support higher-value process technologies and advanced packaging-related expansion. Cleanroom space, equipment, and capital are being reallocated toward segments with stronger long-term returns.



In parallel, TSMC affiliate VIS is playing an increasingly important role in absorbing mature-node capacity. VIS has announced plans to acquire 12" tools from TSMC to support its expansion into 130nm~40nm processes at its Singapore manufacturing base, VSMC. This arrangement reinforces a clearer division of labor within the group – TSMC focuses on advanced logic and advanced packaging, while VIS addresses stable, long-cycle mature-node demand with greater capital efficiency.

Fabs converted for “advanced packaging”

40-90 nm seems also to have the same (rentability) issue

VSMC line transfer in Singapore (no schedule)

TSMC130	TSMC65	UMC110	XFAB130	VIS130
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❑ Multi-criteria selection:

- ❑ Radiation hardness vs EIC needs (TID < ~100-200 krad everywhere ?)
- ❑ Cost - Perennity
- ❑ Schedule

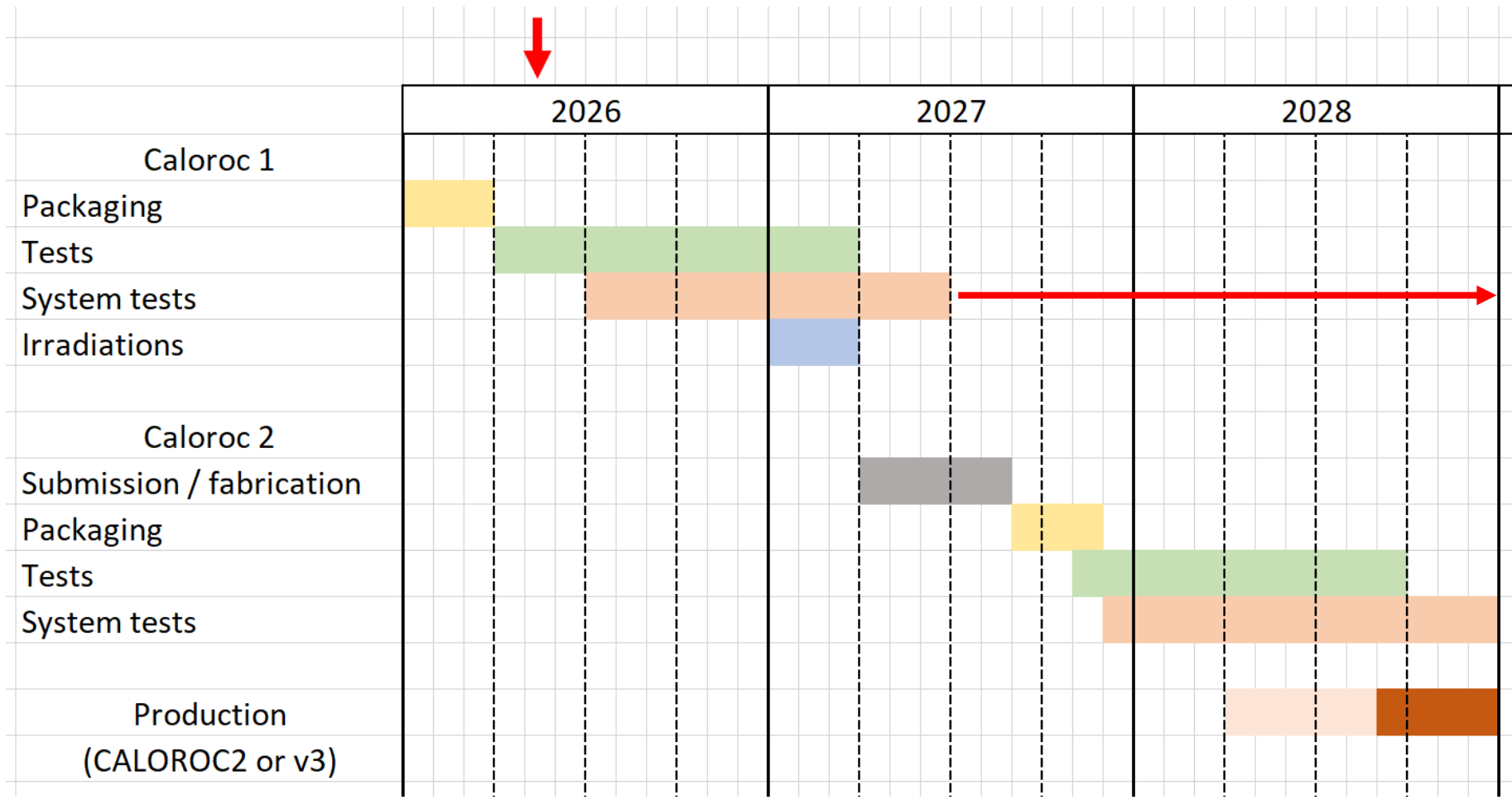
- ☐ Prepare CALOROC2 in TSMC 130nm (just in case)
 - ☐ Discussion today between IMEC / TSMC
 - ☐ Minor modifications
 - ☐ Pedro position extended by 5 months

- ☐ VIS/VSMC 130 is possible if the 130 nm line is transferred from TSMC:
 - ☐ High risk in terms of availability and schedule
 - ☐ Early discussions with IMEC

- ☐ Preferred solutions are UMC 110 (NDA signed this week) and TSMC65 (PDK available):
 - ☐ TID levels should be checked (for UMC vs detector)

Timeline / System tests

- ❑ CALOROC timeline – 2026 to 2028
 - ❑ First fabrication completed in Dec 2025 (Eng. Run)
 - ❑ Only 28 ASICs per variant of CALOROC1
 - ❑ Second fabrication foreseen in March 2027



CALOROCs provided (May 26):

- 12 ASICs for LLR FEB (A+B)
- 2 ASICs for ORNL (A)
- 3 for testboards (B)