Electronics For Extreme Environments - Deliverable No. 1

Report on low temperature and low voltage characterization of a radiation hardened RS422 receiver, Intersil HS26C32RH.

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Acknowledgement

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Projects: NEPP, TI, X2000

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Manufacturers: Intersil Corporation
Melbourne, Florida

Background

JPL Office 514, electronic parts engineering, has several device testers in-house which are used to support JPL projects for parts evaluation, testing and failure analyses, etc. Whenever there is a need to test at temperature, a portable thermo stream is used. Typically, the testing is done over the military temperature range of -55C to +125C. Although the capability of the thermo stream can be pushed somewhat (may be down to -65C or -70C), it doesn't come close to meeting the cold temp requirements for the MARS missions (-150C acceptable, -170C desirable). In order to take advantage of a rather extensive library of the in-house device test programs, it was decided to build dedicated low temperature test fixtures to provide support to the MARS project. This effort was supported by the TI and the NEPP accounts. The test vehicle used, a rad hard RS422 device, was developed by Intersil Corporation for the X2000 project.

Test set up and Discussion

The 514 cold test fixture development team now has a set up for the Advantest VLSI tester that would bring the part under test down to -125C. To demonstrate this capability, Intersil space level HS26C32 was tested over the temperature range -125C to room temperture.

The test samples were tested at -125C, -100C and 25C. The test program used measured all basic parameters, including the quiescent and dynamic power supply currents, input currents, output voltages and currents, propagation delays and the output transition times. The data was taken over a wide power supply voltage range, 2.8V to 5.5V. Typical plots for one test samples are shown on the following sheets.

Summary

As the results show, the RS422 part works well down to -125C.

Work In Progress

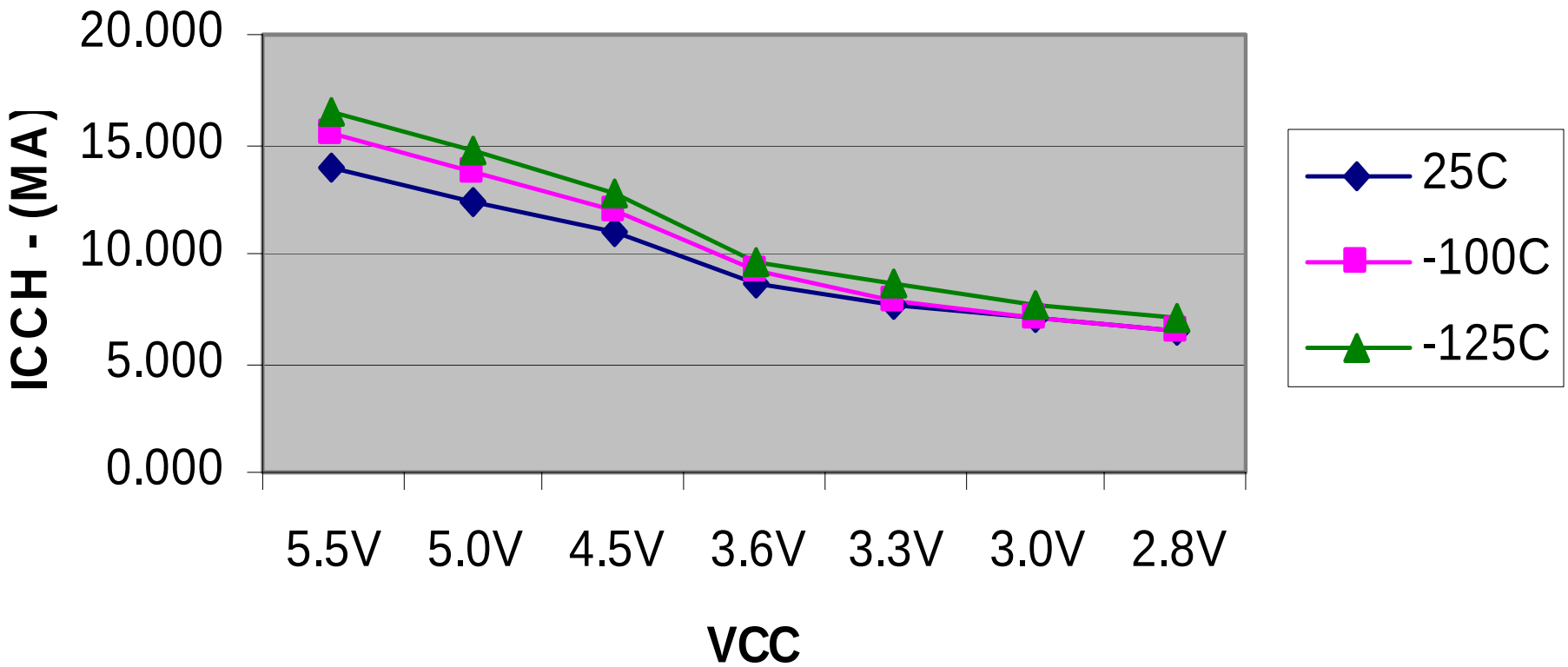
Since the temperature of -125C comes short as far as satisfying the MARS needs, the 514 cold test team has just finished making further improvements in the set up. The results will be published after the data has been taken and analyzed.

Device Description

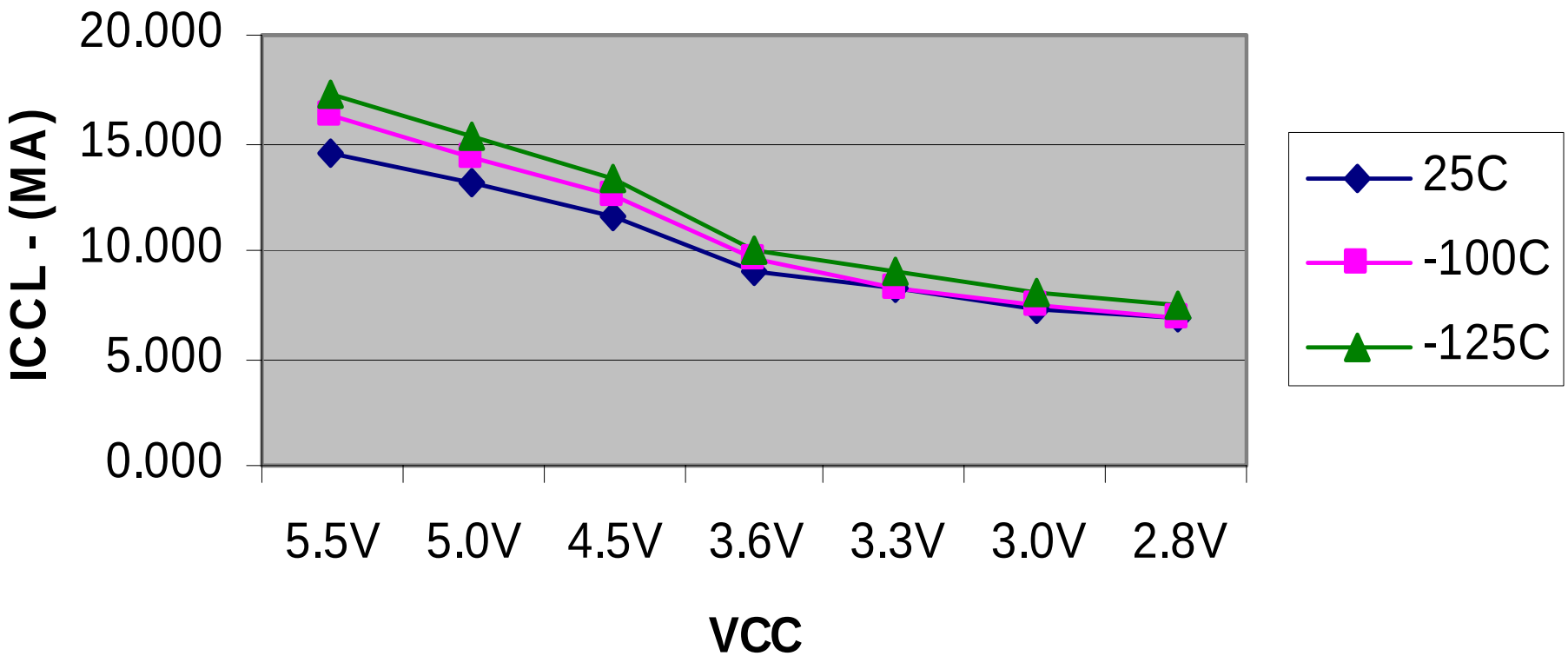
The HS-26CLV32RH made by Intersil Corporation is a differential quad line receiver designed for digital data transmission over balanced lines and meets the requirements of EIA standard RS422. Radiation hardened CMOS processing assures low power consumption, high speed, and reliable operation in the most severe radiation environments.

Its features include input fail fsafe circuitry, high impedance inputs when disabled or powered down and single power supply. This 3.3V version was developed by Intersil for the X2000 project. It is now available as a standard space level SMD product.

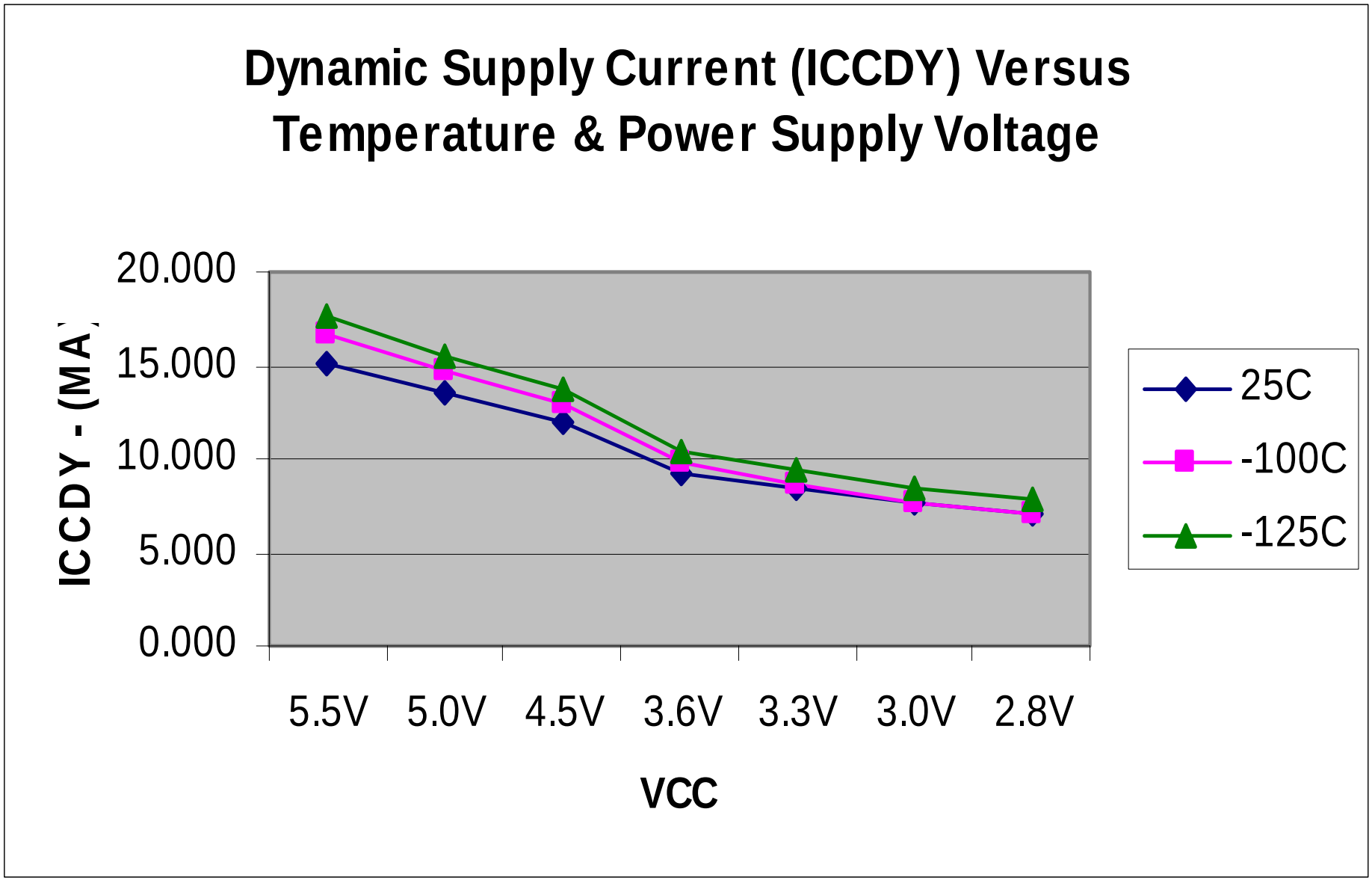
Intersil 26C32 RS 422 Receiver Performance



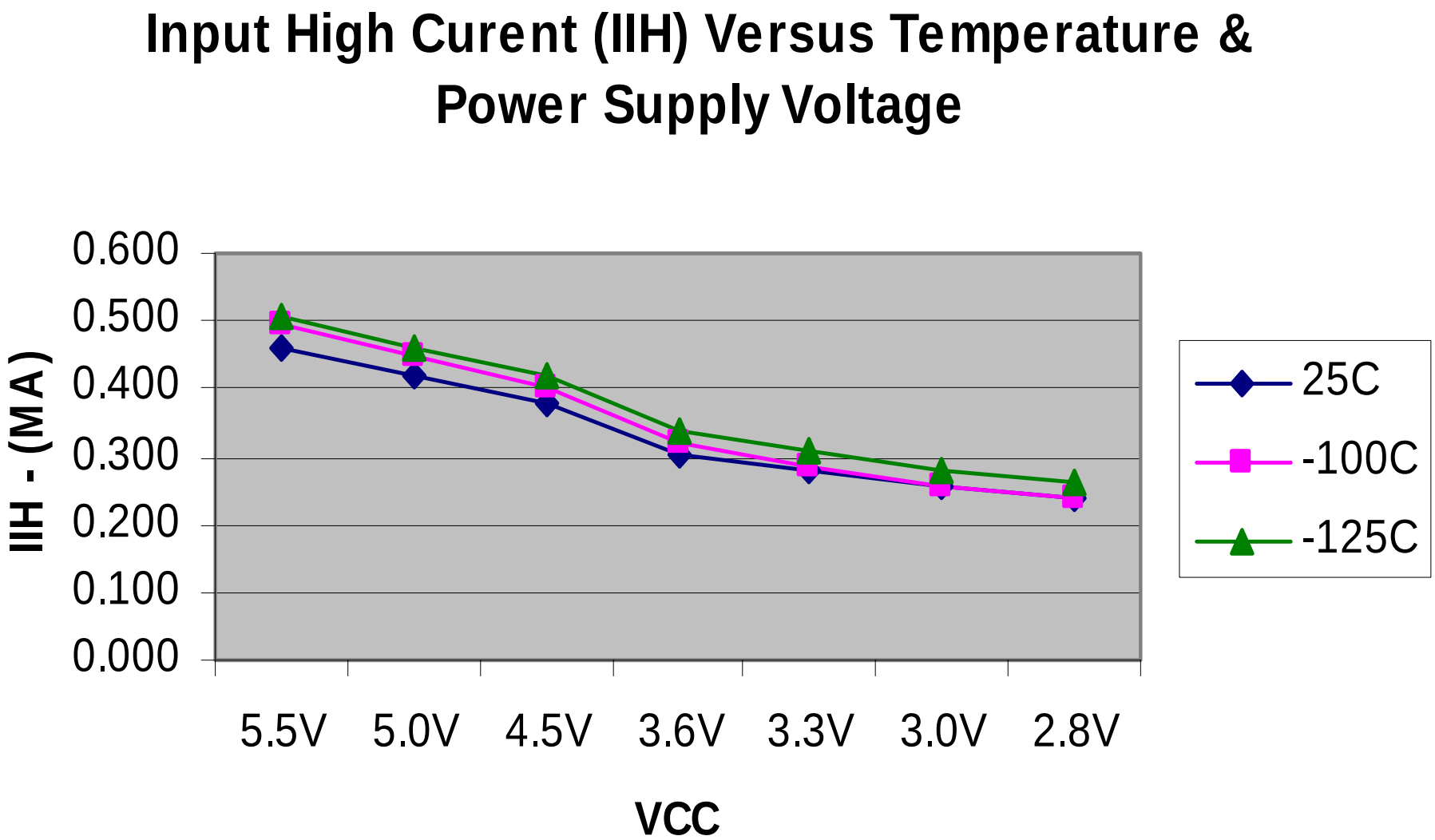
Intersil 26C32 RS 422 Receiver Performance



Intersil 26C32 RS 422 Receiver Performance



Intersil 26C32 RS 422 Receiver Performance



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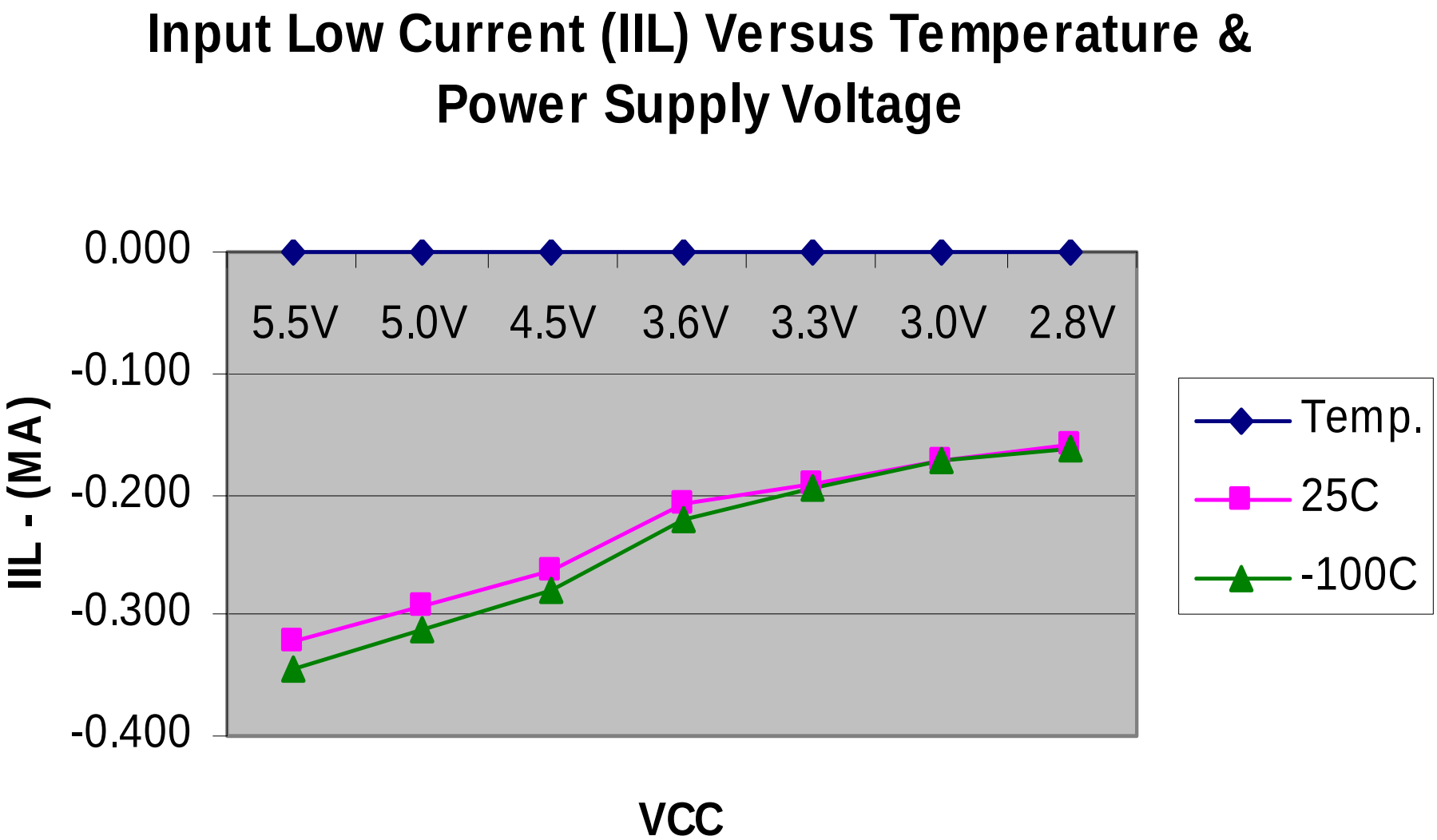

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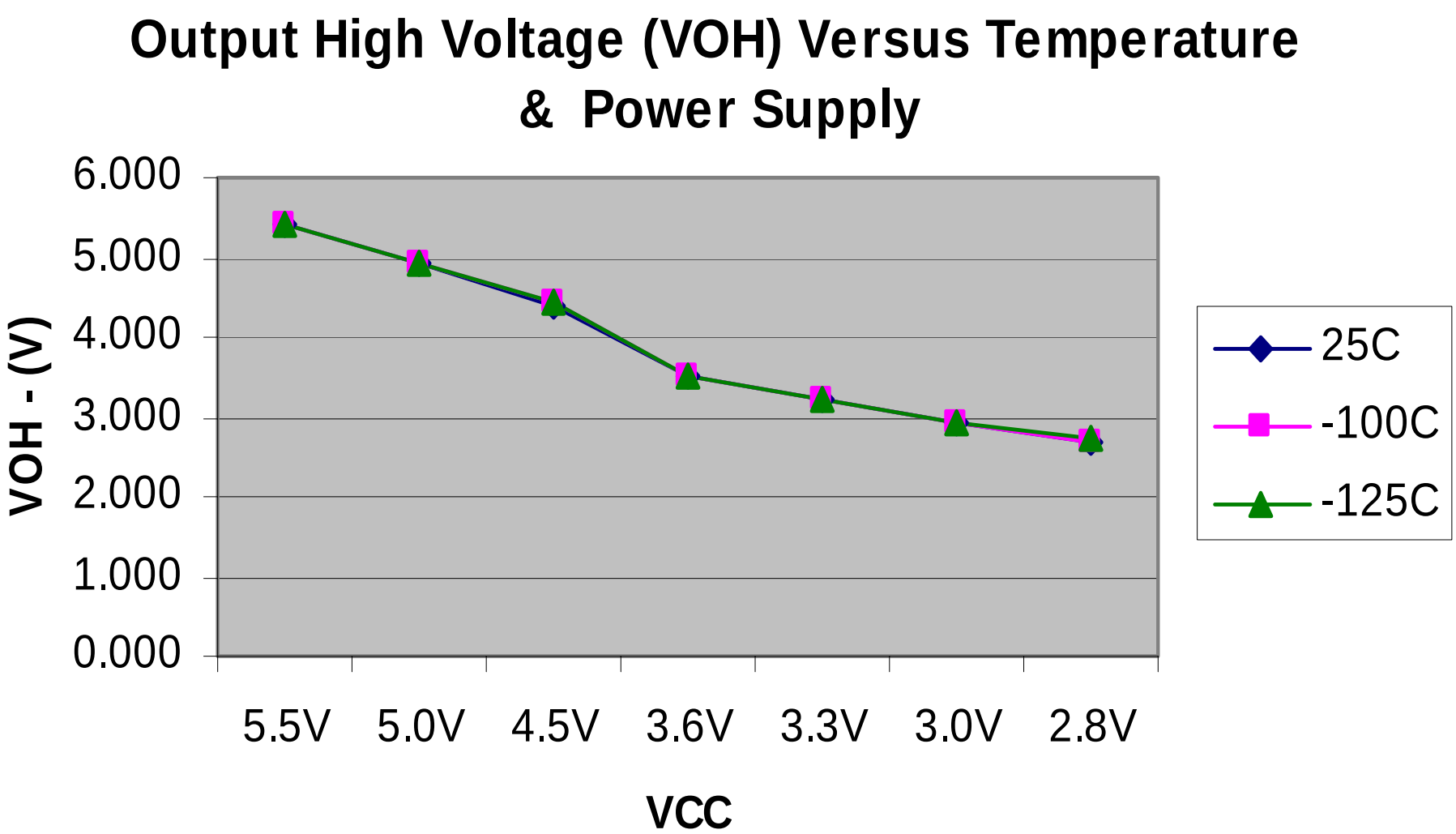

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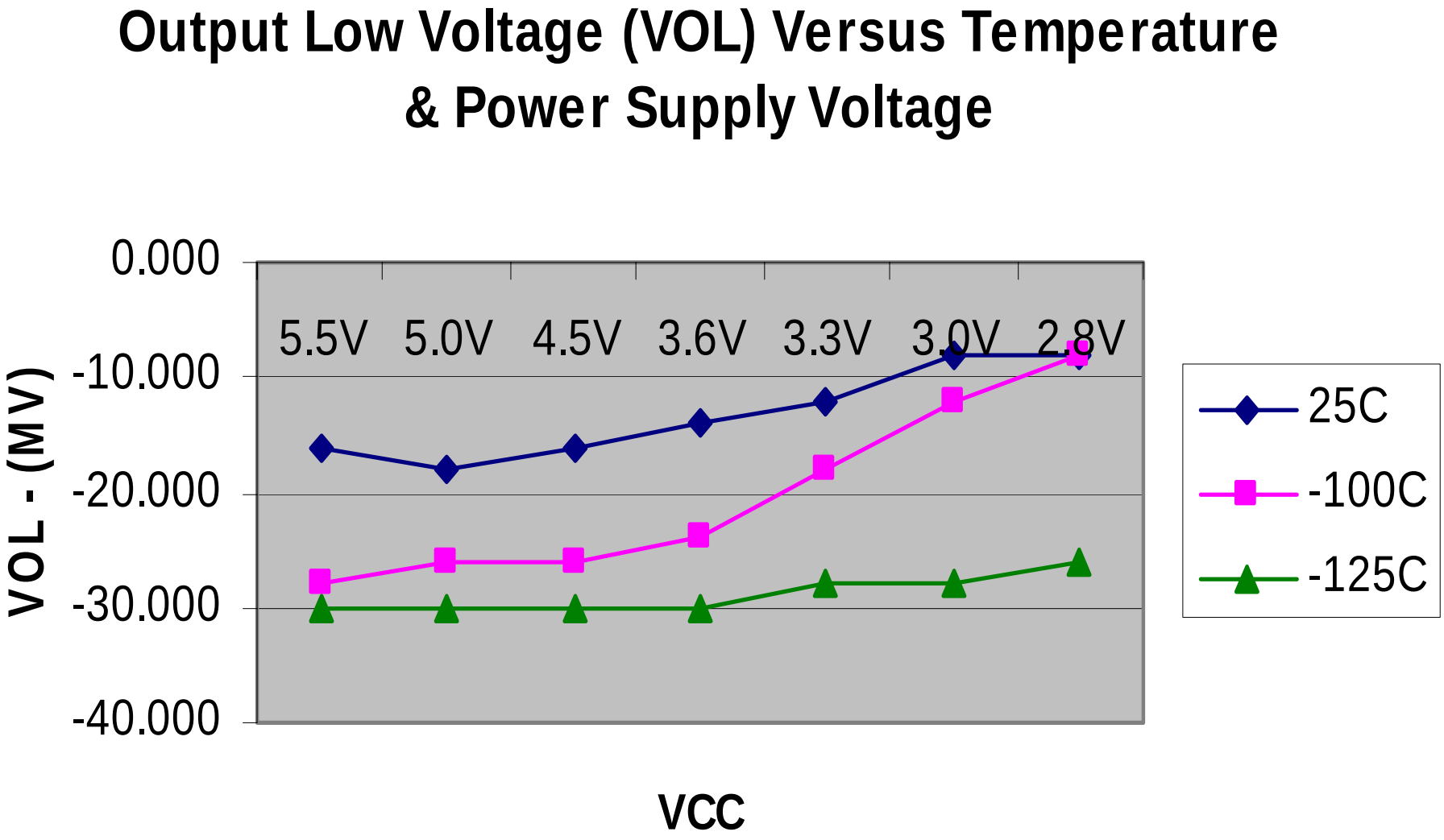

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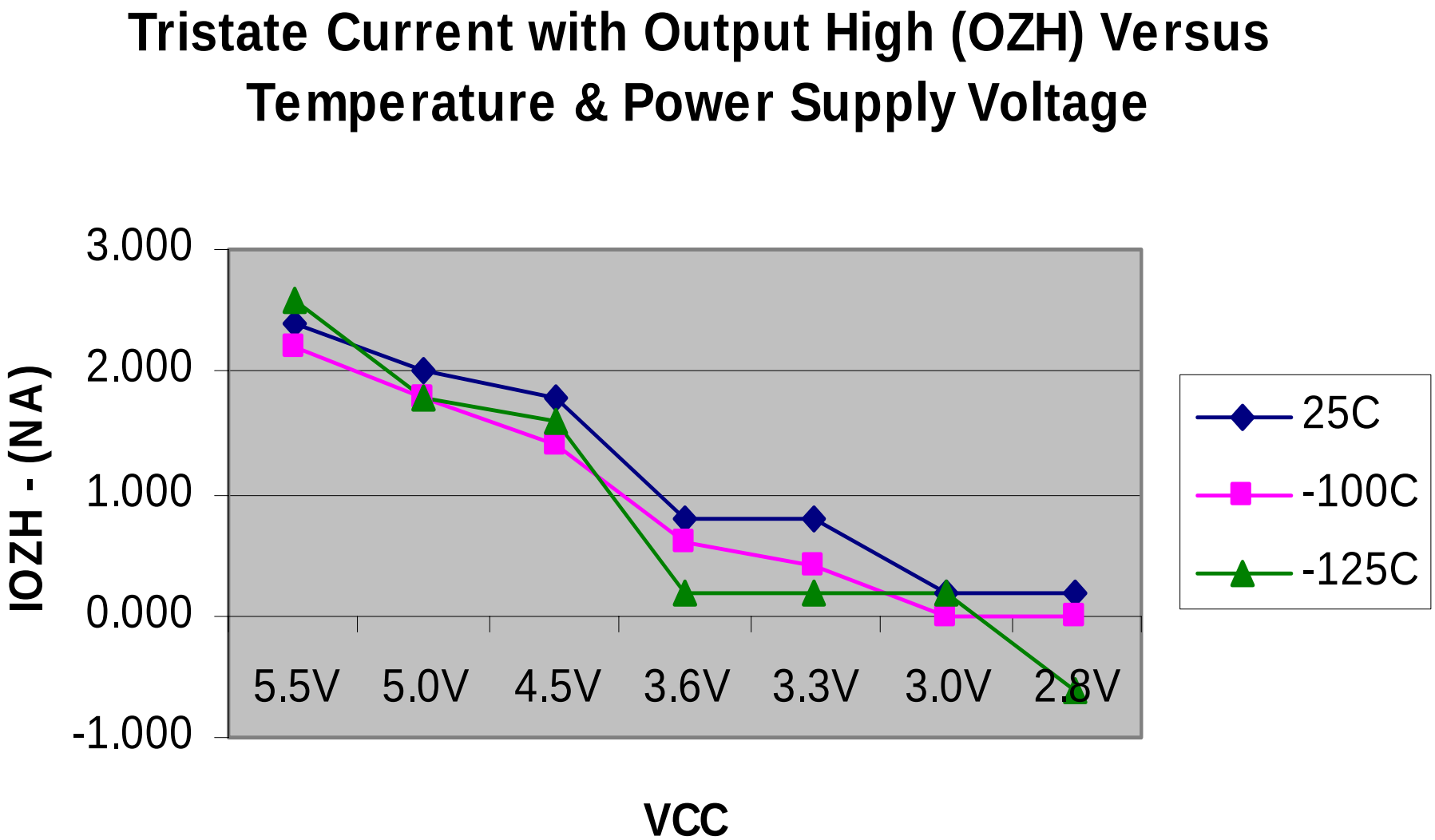

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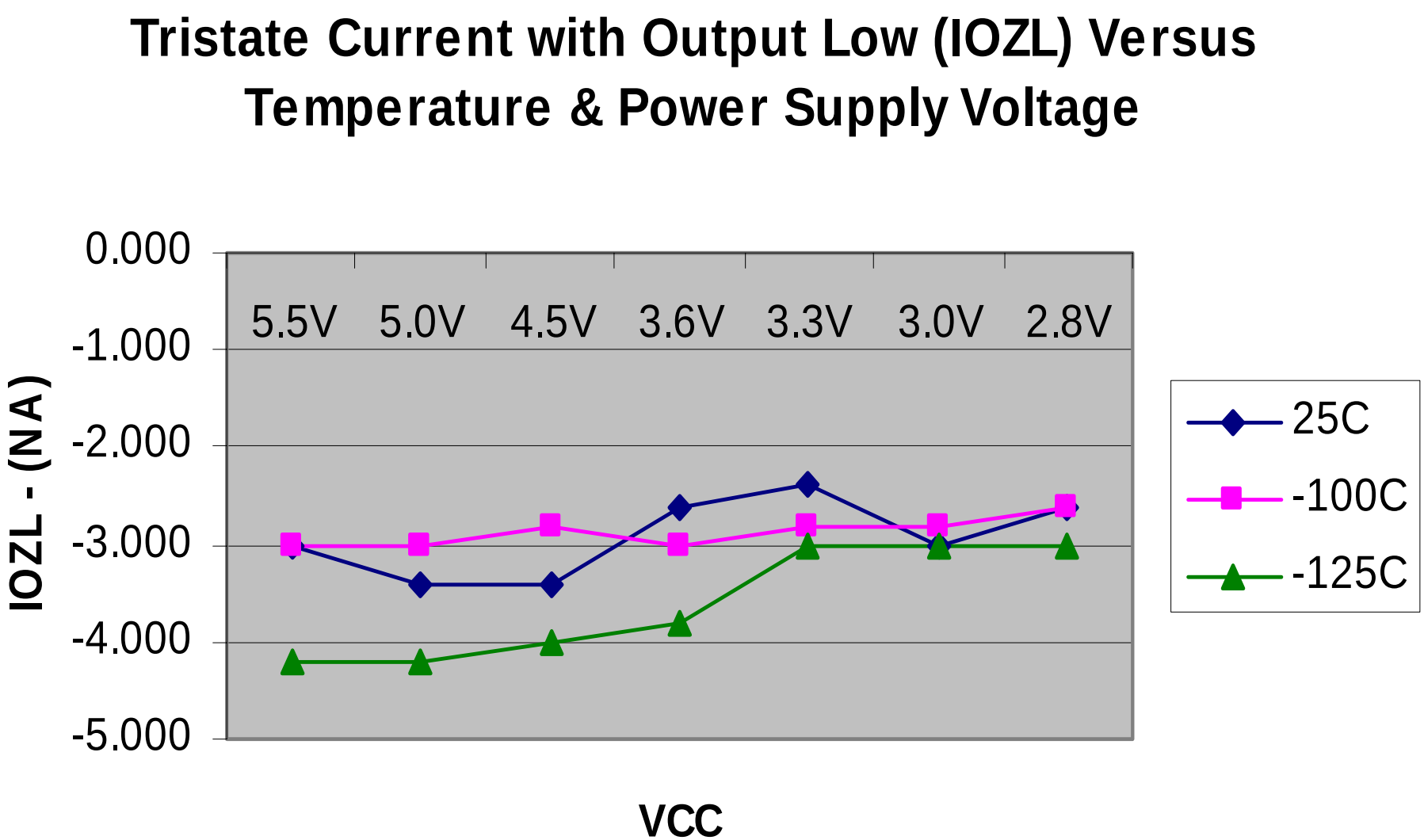

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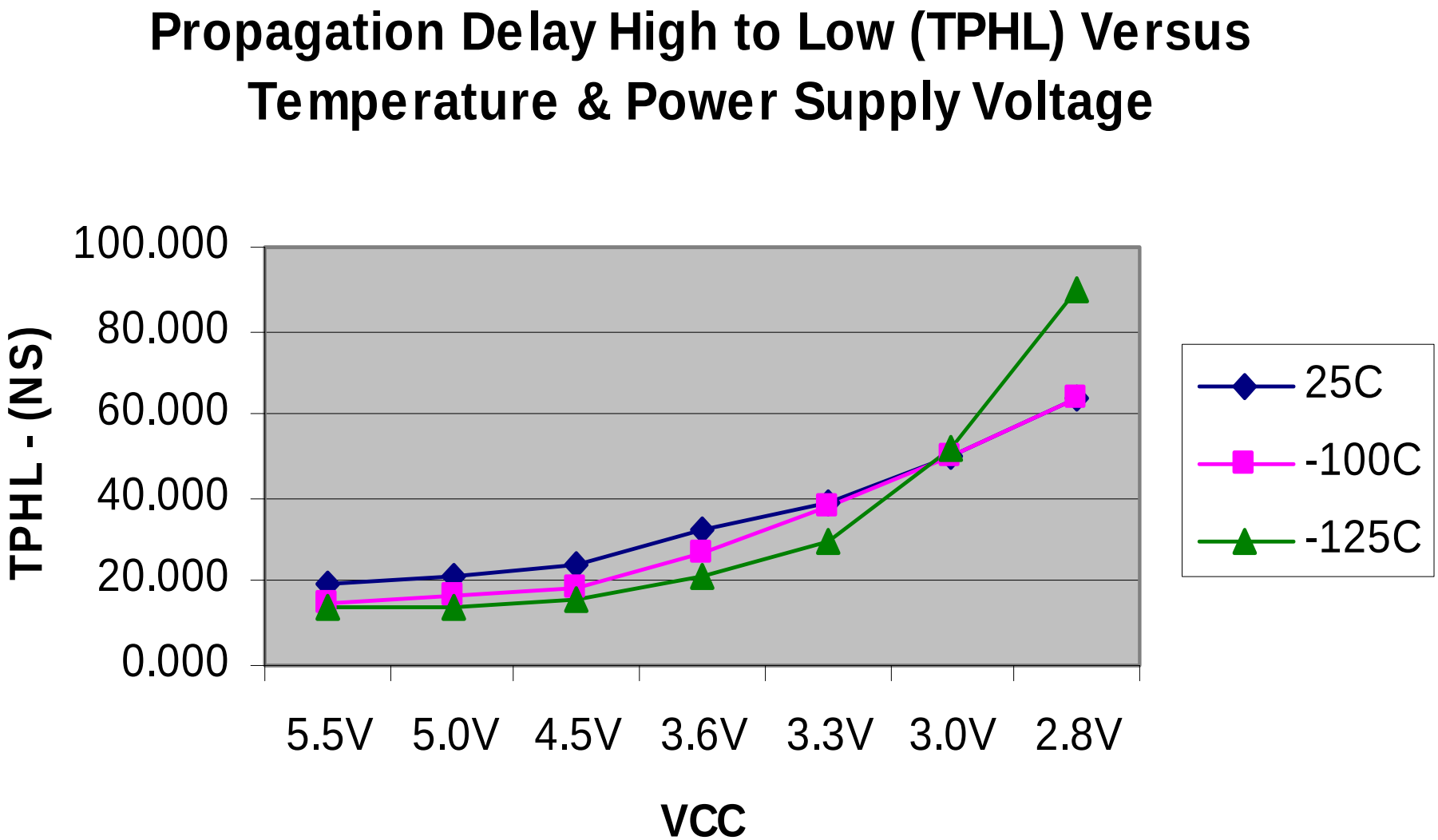

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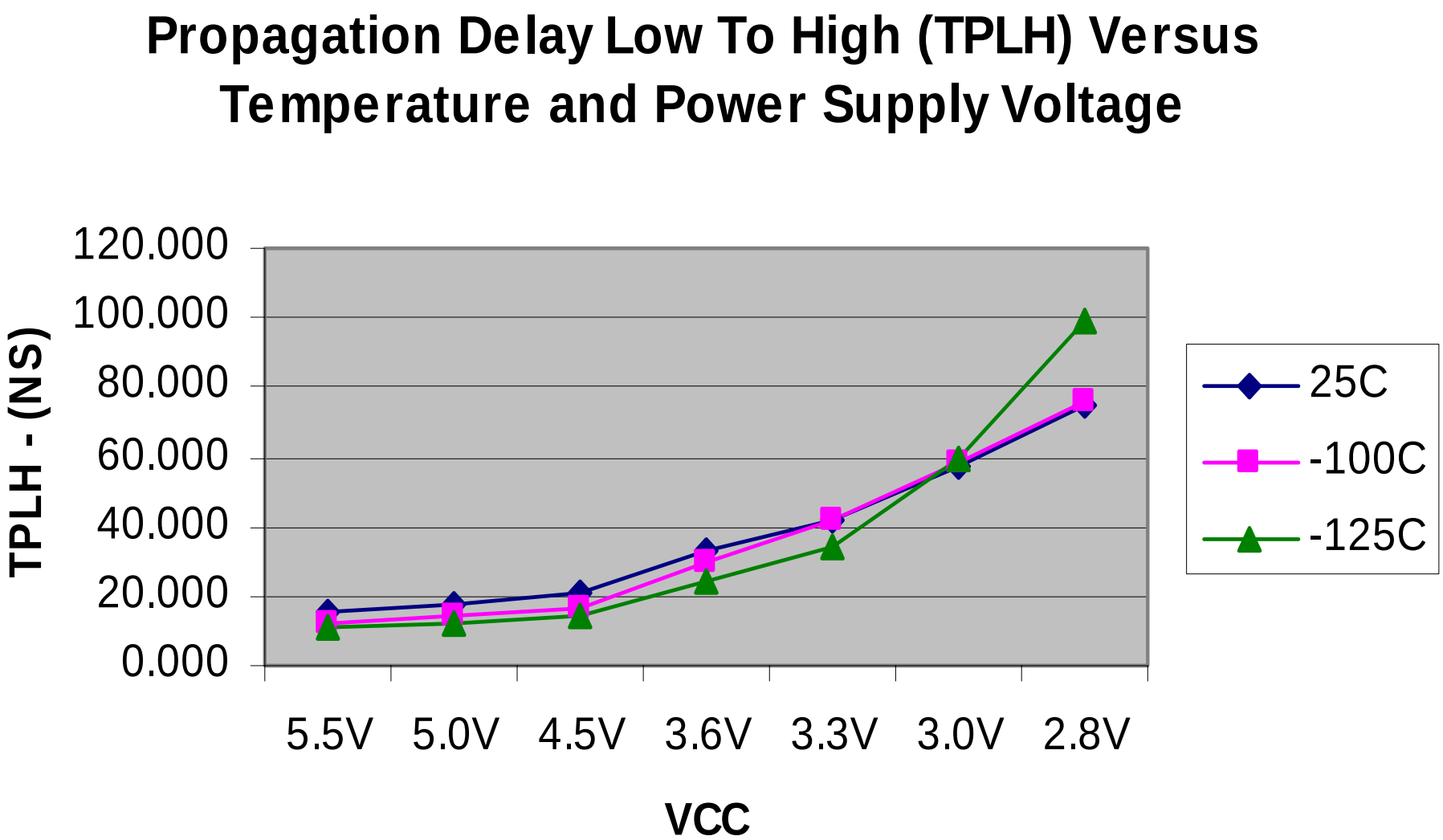

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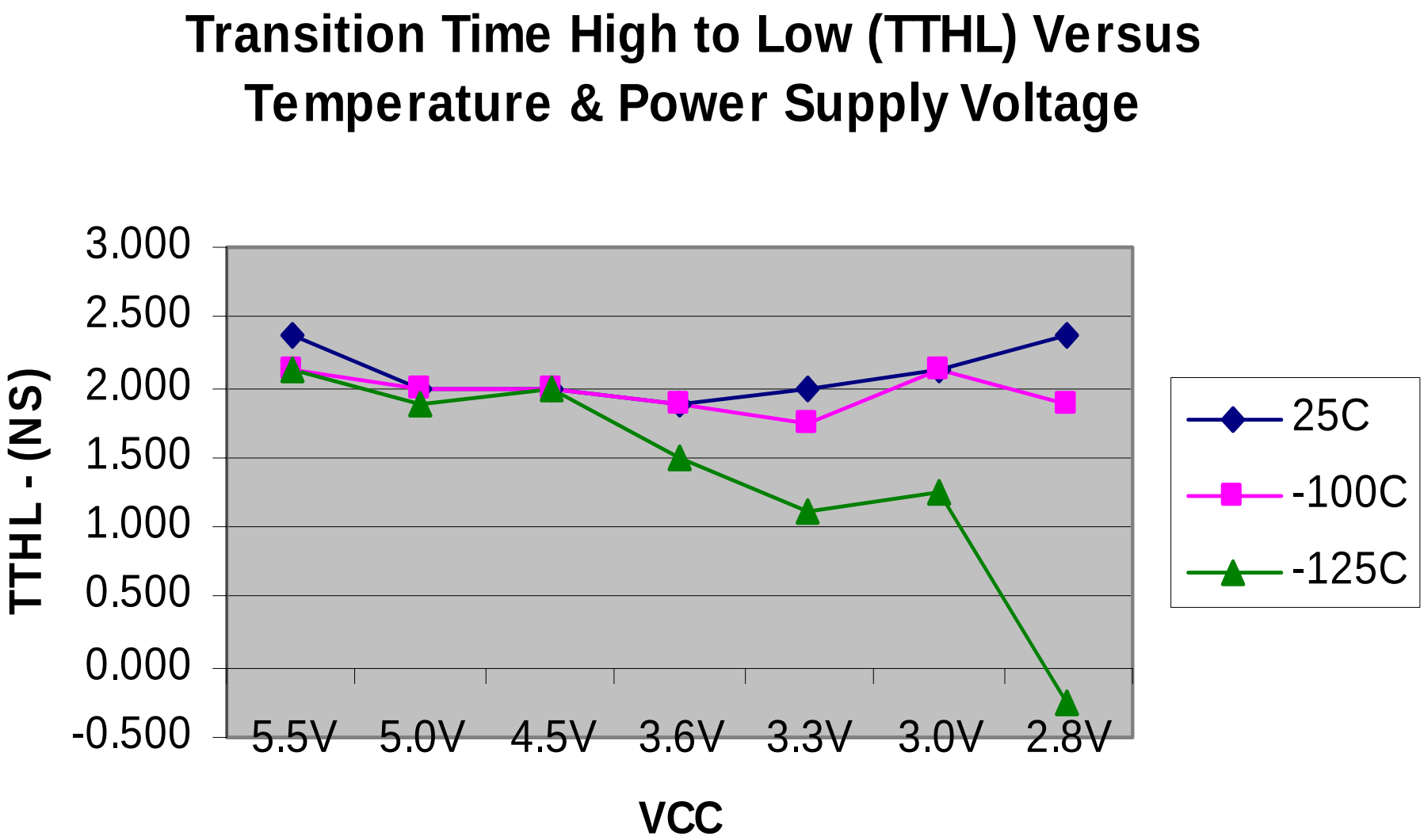

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