DATA ITEM DESCRIPTION

Title: Integrated Circuit Design Analysis Report

Number: DI-SESS-81733
AMSC Number: 7688
DTIC Applicable: No
Office of Primary Responsibility: NS/I1S4
Applicable Forms: N/A

Approval Date: 20 DEC 2006
Limitation: N/A
GIDEP Applicable: No

Use/Relationship:

1. The Integrated Circuit Design Analysis Report documents the electrical analysis performed and rationale for the analysis performed to insure that the Integrated Circuit has been created with the adequate design margins to meet the requirements of the intended end use and specifications.

2. This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by the specific and discrete task requirements as delineated by the contract.

3. This DID is used in conjunction with DI-EDRS-81339A, Integrated Circuit Cell/Functional Sub-Block Data Notebook.

Requirements:

1. Reference Documents. The applicable issue of the document cited herein, including their approval dates and dates of any applicable amendments, notices, and revision, shall be as stated herein.

2. Format. The document shall be prepared on 8” x 10 ½” or 8 ½” x 11” paper (use of larger sheets for circuit drawings and computer listings where required is acceptable) use nonfading ink suitable for reproduction. This document shall be bound together to avoid separation of the pages.

3. Content. Report shall include the following data to document the electrical analysis performed and the rationale for the analysis to insure the integrated circuit being designed has adequate design margins to meet the requirements of the circuits intended end use and specifications.

   3.1 This document shall include but not be limited to the following sections as described below:
   a. Title Page.
   b. Index.

c. Design Requirements.
d. Design Analysis Approach.
e. Design Analysis Assumptions.
f. Design Analysis.
g. Design Analysis Results.
h. Description of Circuit models and Equations and Parameter Values used in the Design Analysis.

3.2 Title Page – The title page shall contain the following information:
a. Contract Number.
b. Contract Short Title (if applicable).
c. Contractor Name and Address.
d. Part Number and Name of Circuit.
e. Date Prepared.

3.3 Index – The index shall contain a listing referenced by page number to facilitate location of sections of the report.

3.4 Design Requirements – This section shall describe or reference electrical specification drawings, which describe the electrical requirements and temperature range over which the integrated circuit being designed is required to operate. Parameters such as voltage supply limits, acceptable input and output levels, source or sink currents for outputs, output loads, clock and input signal wave forms and voltage levels, etc… shall be described to define the limits over which the integrated circuit being designed must perform. The required timing relationships between internal and external signals shall be described. Use of waveform pictorials or sketches shall be used to accurately define all timing relationships and reference points at which voltage levels are determined. These requirements are expected to be those which will appear in the device's specifications and test requirements, and approved by the Contracting Officer's Representative (COR).

3.5 Design Analysis Approach – This section shall describe the approach to be taken to insure the circuit will meet the requirements described in the previous section. One approach could detail the use of the performance curves of a standard cell family. It shall be required under this approach that data described in Data Item Description DI-EDRS-81339A; if also called out under the contract, would be the source of expected performance data to be used in the analysis. If the performance data were not applicable or the design involves custom cells/functional sub-blocks the modeling (see 3.9 below) or other approaches to be used shall be detailed.

3.6 Design Analysis Assumptions – Assumptions made during the design analysis shall be detailed in this section. These assumptions shall include the definition of worst-case parameter values selected for voltages, signals, as well as the semiconductor process electrical parameters required for models used. The choice of input stimuli and loading assumptions shall be detailed. The selection of critical timing paths for analysis and the rationale for elimination of other timing paths within the integrated circuit being designed shall be described. Any assumptions made because of lack of detailed information about interface requirements, semiconductor process specifications, and circuit performance requirements shall be specifically noted.

3.7 Design Analysis – This section shall describe and detail the analysis that was actually performed. Circuit schematics, logic diagrams or other sketches or drawings used in the analysis shall be presented in this section. There shall be a means of cross-referencing these diagrams of a one for one basis to computer modeling input data and results presented in the next section. Information which will aid in the interpretation of the results shall also be contained in this section.

3.8 Design Analysis Results – The results of the design analysis performed shall be documented in this section. Where the volume of computational or computer modeling results prohibits inclusion of results within the covers of this report summary data or separate submission or both shall be determined by the Contracting Officer's Representative.
Narrative shall be included detailing how the results obtained demonstrate that adequate margin has been designed into the integrated circuit to meet the circuit's electrical performance requirements.

3.9 Description of Circuit Models and Equations and Parameter Values Used in the Design Analysis – Where circuit models and equations are used in the design analysis for various elements of the integrated circuit they shall be described in this section. Parameter values and their definitions shall be clearly noted. User manuals for computer modeling programs along with the program listings shall be supplied to facilitate interpretation of results and input data. Data supporting the validation of models used in the analysis shall be presented in this section.

3.9 General Comments – It is intended that the sections outlined represent the engineering approach and information required to be known during a typical integrated circuit design analysis. Where significant deviation in the above is expected a suitable alternate format shall be determined with the COR.

4. END OF DI-SESS-81733