

TABLE OF CONTENTS

1.0 PURPOSE	1
2.0 SCOPE	1
3.0 INTRODUCTION	1
4.0 KEY PARAMETERS	3
5.0 SCENARIOS	4
5.1 IP TYPE I: GENERAL PURPOSE I/O LIBRARY	4
5.2 IP TYPE II: IP INCLUDING FIXED I/O PADS AND ESD NETWORK IP.....	6
5.3 IP TYPE III: IP INCLUDING I/O PADS; ALLOWS VARIOUS ESD NETWORK IMPLEMENTATIONS	7
5.4 IP TYPE IV: IP DOES NOT INCLUDE I/O PADS.....	8
5.5 IP TYPE V: IP WITH NO EXTERNAL CONNECTIONS OR ONLY SEPARATED SUPPLY.....	9
5.6 SOFT IP (SYNTHESIZED LOGIC USING STANDARD-CELLS).....	10
6.0 ESD DESIGN RULES TYPICALLY RELEVANT FOR IP BLOCK INTEGRATION	10
7.0 EXAMPLES OF DELIVERABLES	12
8.0 FULL EDA CHECK ENVIRONMENT	13
9.0 NEED AND VALUE OF ESD ELEMENT RELATED CHARACTERIZATION DATA	14
10.0 CONCLUSIONS	14
11.0 BIBLIOGRAPHY	14

FIGURES

Figure 1: Involved Partners (Foundry/IP/EDA Vendor/Integrated Circuit (IC) Design) for ESD Robust IC Design and the Typical Activities and Interactions Required for ESD Robust IC Design Between the Various Stakeholders (Foundry/IP/EDA Vendor/IC Design)	1
Figure 2: Floor Plan View of a Perimeter General Purpose I/O Cell Embedded in a SoC Floor Plan	5
Figure 3: Floor Plan View of the Arrangement of Area I/O Cells (GPIO) in a SoC Floor Plan	6
Figure 4: Floor Plan View of Type II IP Containing a Fixed Set of I/O and Supply Cells Embedded in a SoC Floor Plan.....	7
Figure 5: Floor Plan View of Type III IP Containing a Defined Set of I/O and Supply Cells but Variable Placement Embedded in a SoC Floor Plan	8
Figure 6: Floor Plan View of Type IV IP with Customer Defined I/O and Supply Cells Embedded in a SoC Floor Plan.....	9
Figure 7: Floor Plan View of Type V IP Without I/O and Supply Cells Connected via SoC Supply Net or Directly Routed to Supply Cells Embedded in a SoC Floor Plan.....	10
Figure 8: Cross Domain Configuration with Critical Gate Stress at the Receiver [2]	12

TABLES

Table 1: Documentation and Data Exchange Needed to Safely Integrate IP Blocks	2
Table 2: Overview of Typical Integration Rules to be Provided Depending on the IP Type.....	12