Freescale Semiconductor
Application Note

IBIS Model File for Dual 24 V High Side Switch Family

1 Introduction

This application note describes the Input/Output Buffer Information Specification (IBIS) model of the MC06XS4200, MC10XS4200, and MC20XS4200 devices. These intelligent high side switches are designed to be used in 24 V systems such as trucks and busses. They can be used in some industrial and 12 V applications as well. The low $R_{DS(ON)}$ channels can control incandescent lamps, LEDs, solenoids, or DC motors. Control, device configuration, and diagnostics are performed through a 16-bit SPI interface, allowing easy integration into existing applications. For a complete feature description, please refer to the individual data sheets.

Contents

2   Model Description

IBIS file contain the basic signal models for each type of signal of device:

- For input buffers: Input's capacitance and static pull-up/down currents
- For output buffers: Output's capacitance, static/dynamic pull-up/down currents, propagation delay

For Dual 24 V High Side Switch, the IBIS model contains descriptions of

- 4 input buffers: CLOCK, SCLK, CSB, RSTB, SI, IN[0:1], CONF[0:1] pins
- 4 output buffers: FSB, SO, FSB, SYNC pins
- Package parasitic elements

This model can be used to characterize I/V output curves, rise/fall transition waveforms, and device package parasitic information. They cannot be used as a delay model for detailed timing analysis.
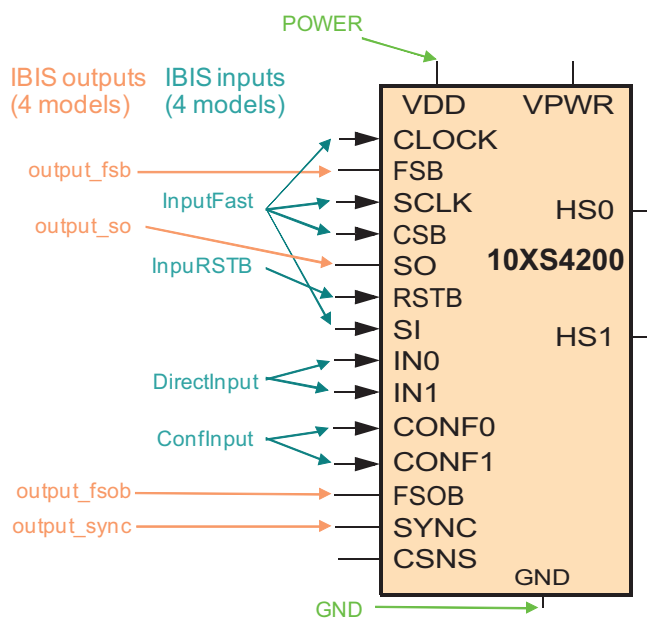

Figure 1. IBIS I/O Description

3   Model Validation

The input/output buffers are verified using the setup described in the IBIS MODELING COOKBOOK version 4.0. The Figure 2 and Figure 3 present best, typical, and worst cases of I/O transient responses.

BCS Reference
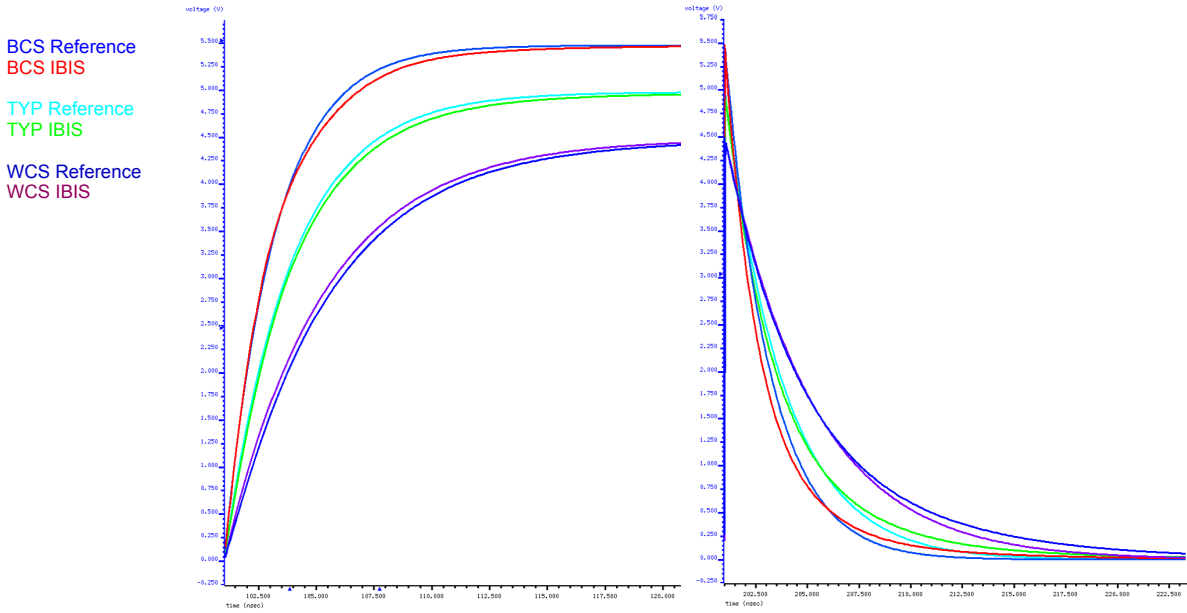BCS IBIS

TYP Reference
TYP IBIS

WCS Reference
WCS IBIS

Figure 2. SI Transient Waveforms - Low to High and High to Low

BCS Reference
BCS IBIS

TYP Reference
TYP IBIS

WCS Reference
WCS IBIS
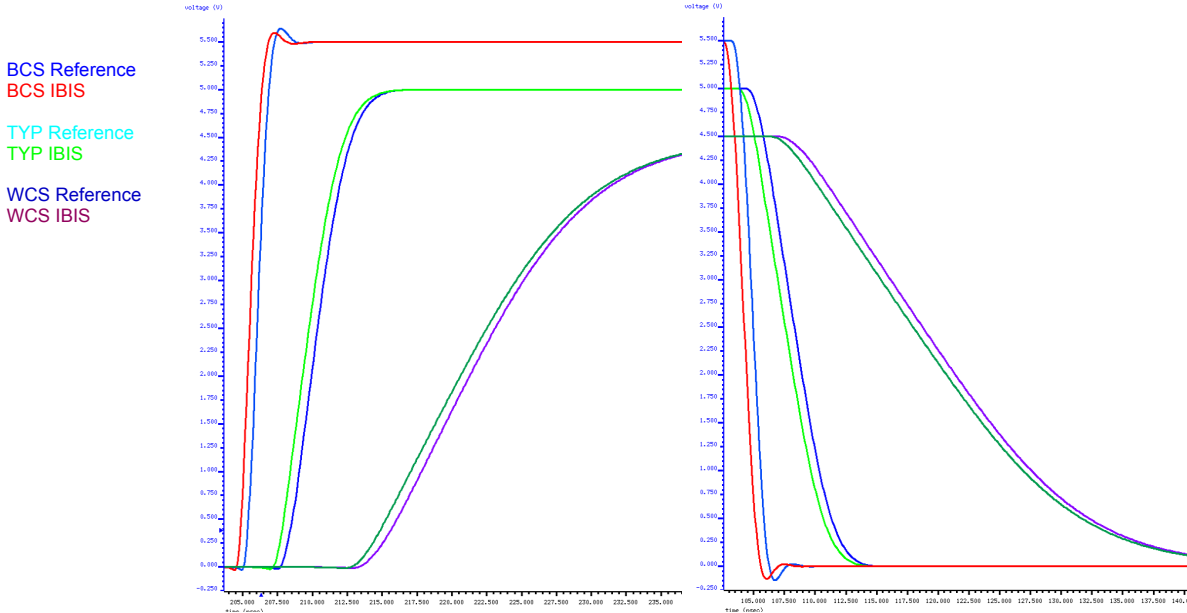
Figure 3. SO Transient Waveforms - Low to High and High to Low

IBIS Model File for Dual 24 V High Side Switch Family, Rev. 1.0

4 References

The following documents provide key reference material related to this Application Note:

DOCUMENT NUMBER	DOCUMENT TYPE	DESCRIPTION / URL
MC06XS4200	Datasheet	• Dual 24 V High Side Switch (6.0 mΩ)
MC10XS4200	Datasheet	• Dual 24 V High Side Switch (10 mΩ)
MC20XS4200	Datasheet	• Dual 24 V High Side Switch (20 mΩ)
KT06XS4200UG	Evaluation Board User Guide	• Dual 24 V High Side Switch (6.0 mΩ)
KT10XS4200UG	Evaluation Board User Guide	• Dual 24 V High Side Switch (10 mΩ)
KT20XS4200UG	Evaluation Board User Guide	• Dual 24 V High Side Switch (20 mΩ)
	White Paper	• IBIS Modeling Cookbook version 4.0, September 2005

5   Revision History

REVISION	DATE	DESCRIPTION OF CHANGES
1.0	11/2012	• Initial release

Document Number: AN4516
Rev. 1.0
11/2012