

JEDEC STANDARD

2.5 V \pm 0.2 V (Normal Range) and 1.8 V – 2.7 V (Wide Range) Power Supply Voltage and Interface Standard for Nonterminated Digital Integrated Circuits

JESD8-5A.01

(Minor Revision of JESD8-5A, June 2006)

SEPTEMBER 2007

JEDEC SOLID STATE TECHNOLOGY ASSOCIATION



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2.5 V \pm 0.2 V (NORMAL RANGE), AND 1.8 V TO 2.7 V (WIDE RANGE)
POWER SUPPLY VOLTAGE AND INTERFACE STANDARD FOR
NONTERMINATED DIGITAL INTEGRATED CIRCUIT

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2.5 V \pm 0.2 V (NORMAL RANGE) AND 1.8 V – 2.7 V (WIDE RANGE) POWER SUPPLY VOLTAGE AND INTERFACE STANDARD FOR NONTERMINATED DIGITAL INTEGRATED CIRCUITS

(From JEDEC Board Ballots JCB-94-59 and JCB-05-77, formulated under the cognizance of the JC-16 Committee on Interface Technology.)

1 Scope

This standard defines power supply voltages, dc interface parameters for a high speed, low voltage family of non-terminated digital circuits driving/driven by parts of the same family. The specifications in this standard represent a minimum set or “base line” set of interface specifications for CMOS compatible circuits.

The purpose is to provide a standard of specification for uniformity, multiplicity of sources, elimination of confusion, and ease of device specification and design by users. Paragraph 2.3 describes normal DC electrical characteristics and paragraph 2.4 (added into revision A) describes the optional characteristics for Schmitt trigger operation.

2 Standard specifications

2.1 Absolute maximum continuous ratings (Note 1)

Supply Voltage, V_{DD}	-0.5 V to 3.6 V
dc Input Voltage, V_{IN} (except I/O pins)	-0.5 V to 3.6 V
dc Output Voltage, V_{OUT} (including I/O pins)(note 2)	-0.5 V to $V_{DD}+0.5$ V
dc Input Diode Current, I_{IK} ($V_I < 0$ or $V_I > V_{DD}$)	+/- 20 mA
dc Output Diode Current, I_{OK} ($V_O < 0$ or $V_O > V_{DD}$)	+/- 20 mA
Storage Temperature Range	-65 °C to 150 °C

NOTE 1 Absolute maximum continuous ratings are those values beyond which damage to the device may occur. Exposure to these conditions or conditions beyond those indicated may adversely affect device reliability. Functional operation under absolute maximum conditions is not implied.

NOTE 2 Not to exceed 3.6 V.

2.2 Recommended operating conditions

2.2.1 Normal range

Symbol	Parameter	Operating Range
V_{DD}	Power Supply Voltage	2.3 V to 2.7 V
T_A	Operating Temperature	Note 1

NOTE 1 Specified by manufacture to be commercial, industrial, and/or military grade

2.2.2 Wide range

Symbol	Parameter	Operating Range
V_{DD}	Power Supply Voltage	1.8 V to 2.7 V
T_A	Operating Temperature	Note 1

NOTE 1 Specified by manufacture to be commercial, industrial, and/or military grade

2.3 DC specifications

2.3.1 Normal range

Symbol	Parameter	Test Condition	MIN	MAX	Unit
V_{DD}	Supply Voltage		2.3	2.7	V
V_{IH}	Input High Voltage	$V_{OUT} \geq V_{OH(min)}$	1.7	$V_{DD}+0.3$	V
V_{IL}	Input Low Voltage	$V_{OUT} \leq V_{OL(max)}$	-0.3	0.7	V
V_{OH}	Output High Voltage	$V_{DD} = \text{Min},$ $V_I = V_{IH} \text{ or } V_{IL}$ $I_{OH} = -100 \text{ uA}$ $I_{OH} = -1 \text{ mA}$ $I_{OH} = -2 \text{ mA}$	2.1 2.0 1.7		V
V_{OL}	Output Low Voltage	$V_{DD} = \text{Min},$ $V_I = V_{IH} \text{ or } V_{IL}$ $I_{OL} = 100 \text{ uA}$ $I_{OL} = 1 \text{ mA}$ $I_{OL} = 2 \text{ mA}$		0.2 0.4 0.7	V
I_I	Input Current	$V_{DD} = \text{Max},$ $V_I = V_{DD} \text{ or } \text{GND}$ Except I/O pins I/O pins		± 5 ± 15	μA

2.3 DC specifications (cont'd)

2.3.2 Wide range

Symbol	Parameter	Test Condition	MIN	MAX	Unit
V_{DD}	Supply Voltage		1.8	2.7	V
V_{IH}	Input High Voltage	$V_{OUT} \geq V_{OH(min)}$	$0.7 V_{DD}$	$V_{DD}+0.3$	V
V_{IL}	Input Low Voltage	$V_{OUT} \leq V_{OL(max)}$	-0.3	$0.2 V_{DD}$	V
V_{OH}	Output High Voltage	$V_{DD} = \text{Min}, V_I = V_{IH} \text{ or } V_{IL}, I_{OH} = -100 \mu\text{A}$	$V_{DD} - 0.2$		V
V_{OL}	Output Low Voltage	$V_{DD} = \text{Min}, V_I = V_{IH} \text{ or } V_{IL}, I_{OL} = 100 \mu\text{A}$		0.2	V

2.4 Optional DC electrical characteristics for Schmitt trigger operation

2.4.1 Optional Schmitt trigger operation - Normal range

Symbol	Parameter	Test Condition	MIN	MAX	Unit
V_{DD}	Supply Voltage	---	2.3	2.7	V
$V_{t+} (V_p)$	Positive Going Threshold Voltage	$V_{OUT} \geq V_{OH(min)}$	0.9	1.7	V
$V_{t-} (V_n)$	Negative Going Threshold Voltage	$V_{OUT} \leq V_{OL(max)}$	0.7	1.5	V
$V_h (\Delta V_t)$	Hysteresis Voltage	$V_{t+} - V_{t-}$	0.2	1.0	V
V_{OH}	Output High Voltage	$I_{OH} = -2 \text{ mA}$	$V_{DD}-0.45$		V
V_{OL}	Output Low Voltage	$I_{OL} = 2 \text{ mA}$		0.45	V

2.4.2 Optional Schmitt trigger operation - Wide range

Symbol	Parameter	Test Condition	MIN	MAX	Unit
V_{DD}	Supply Voltage	---	1.8	2.7	V
$V_{t+} (V_p)$	Positive Going Threshold Voltage	$V_{OUT} \geq V_{OH(min)}$	$0.25 V_{DD}$	$0.75 V_{DD}$	V
$V_{t-} (V_n)$	Negative Going Threshold Voltage	$V_{OUT} \leq V_{OL(max)}$	$0.15 V_{DD}$	$0.65 V_{DD}$	V
$V_h (\Delta V_t)$	Hysteresis Voltage	$V_{t+} - V_{t-}$	$0.1 V_{DD}$	$0.6 V_{DD}$	V
V_{OH}	Output High Voltage	$I_{OH} = -100 \mu\text{A}$	$V_{DD}-0.2$		V
V_{OL}	Output Low Voltage	$I_{OL} = 100 \mu\text{A}$		0.2	V

3 Test conditions for optional Schmitt trigger operation

3.1 Positive Going Threshold Voltage: V_{t+} (V_p)

As the input signal is raised from a ground level in the measurement circuit shown in Figure 1, the input voltage value at which the output logic changed is determined as V_{t+} (V_p).

3.2 Negative Going Threshold Voltage: V_{t-} (V_n)

As the input signal is dropped from a power supply voltage level in the measurement circuit shown in Figure 1, the input voltage value at which the output logic changed is determined as V_{t-} (V_n).

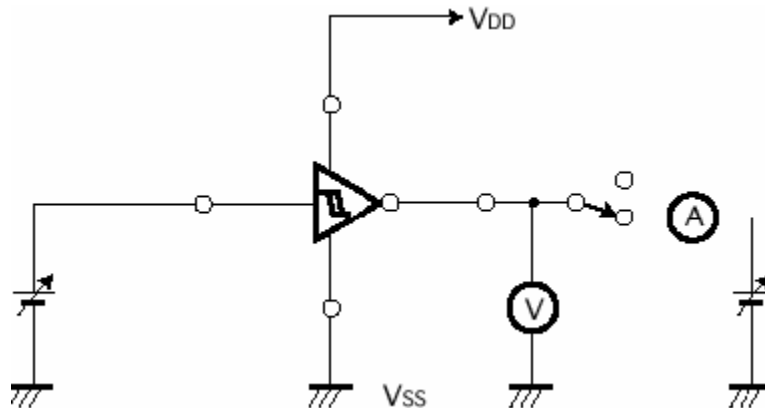


Figure 1 — DC characteristic measurement circuit of Schmitt trigger input.

Annex A Differences between JESD8-5A.01 and JESD8-5A

This table briefly describes changes that appear in this standard, JESD8-5A.01, compared to its predecessor, JESD8-5A (June 2006). These changes were approved at the March, 2007 meeting of the JC-16 committee.

Page	Description of change
2	The table in Section 2.3.1 was updated to properly reflect that the V_{IL} Test Condition should be $V_{OUT} \leq V_{OL(max)}$.

Annex A.1 Differences between JESD8-5A and JESD8-5

This table briefly describes most of the changes made to entries that appear in this standard, JESD8-5A, compared to its predecessor, JESD8-5 (October 1995). If the change to a concept involves any words added or deleted (excluding deletion of accidentally repeated words), it is included. Some punctuation changes are not included.

Page	Description of change
All	Document renumbered to be consistent with the JEDEC Style Manual, JM7
2	In 2.3.1, for consistency with other JESD8-series documents, the following were renamed: "High-level Input Voltage" to "Input High Voltage", and "Low-level Input Voltage" to "Input Low Voltage".
3	Added Section 2.4 to describe the DC electrical characteristics for optional Schmitt trigger operation.
4	Added Section 3 to provide the test conditions for optional Schmitt trigger operation



Standard Improvement Form**JEDEC JESD8-5A.01**

The purpose of this form is to provide the Technical Committees of JEDEC with input from the industry regarding usage of the subject standard. Individuals or companies are invited to submit comments to JEDEC. All comments will be collected and dispersed to the appropriate committee(s).

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1. I recommend changes to the following:

☐ Requirement, clause number _____

☐ Test method number _____ Clause number _____

The referenced clause number has proven to be:

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