ONFI Technical Errata

Errata ID	**009**
Affected Spec Ver.	**ONFI 1.0, 2.0, 2.1, 2.2, 2.3, 3.0, 3.1**
Corrected Spec Ver.	

Submission info

Name	Company	Date
Terry Grunzke	Micron	3/21/2013

This erratum fixes inconsistency in Table 5 “Absolute maximum DC ratings” with Table 11 “DC and Operating Conditions for VccQ of 1.8V (NV-DDR2), measured on VccQ rail” For 1.8V, the absolute maximum value range (-0.20 to 2.4V) was less than the DC operating conditions (VssQ – 0.3V to VccQ + 0.3V). This erratum changes Absolute Maximum range for 1.8V to -0.45V to 2.4V.

The erratum also reduces the input slew rate combinations supported for DQS (DQS_t/DQS_c) and the DQs in Tables 45 and 46. In NAND systems it is expected that there will be similar loading and hence similar input slew rates for DQS and DQs. This removes the requirement for the NAND device to support large differences in input slew rate between DQS and the DQs.

Description of the specification changes

In the ONFI 3.1 specification, Section 2.8, Table 5:

Parameter	Symbol	Rating	Units
Vcc = 3.3V and VccQ = 3.3V nominal			
Vcc Supply Voltage	V_{CC}	-0.6 to +4.6	V
Voltage Input	V_{IN}	-0.6 to +4.6	
VccQ Supply Voltage	V_{CCQ}	-0.6 to +4.6	
Vcc = 3.3V and VccQ = 1.8V nominal			
Vcc Supply Voltage	V_{CC}	-0.6 to +4.6	V
Voltage Input	V_{IN}	~~-0.2~~ -0.45 to +2.4	
VccQ Supply Voltage	V_{CCQ}	~~-0.2~~ -0.45 to +2.4	
Vcc = 1.8V and VccQ = 1.8V nominal			
Vcc Supply Voltage	V_{CC}	~~-0.2~~ -0.45 to +2.4	V
Voltage Input	V_{IN}	~~-0.2~~ -0.45 to +2.4	
VccQ Supply Voltage	V_{CCQ}	~~-0.2~~ -0.45 to +2.4	

Table 1 Absolute maximum DC ratings

In the ONFI 3.1 specification, Section 4.11.2, Table 45:

Was:

DQ V/ns	DQS_t/DQS_c Slew Rate Derating VIH/L(AC) = 250 mV, VIH/L(DC) = 125 mV																									
	12		6		5		4		3		2		1.8		1.6		1.4		1.2		1		0.8		0.6	
	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld
6	-26	-26	-21	-21	-19	-19	-16	-16	-10	-10	0	0	7	7	16	16	27	27	42	42	63	63	93	93	144	144
5	-26	-26	-21	-21	-19	-19	-16	-16	-10	-10	0	0	7	7	16	16	27	27	42	42	63	63	93	93	144	144
4	-26	-26	-21	-21	-19	-19	-16	-16	-10	-10	0	0	7	7	16	16	27	27	42	42	63	63	93	93	144	144
3	-26	-26	-21	-21	-19	-19	-16	-16	-10	-10	0	0	7	7	16	16	27	27	42	42	63	63	93	93	144	144
2	-26	-26	-21	-21	-19	-19	-16	-16	-10	-10	0	0	7	7	16	16	27	27	42	42	63	63	93	93	144	144
1.5	-26	-26	-21	-21	-19	-19	-16	-16	-10	-10	0	0	7	7	16	16	27	27	42	42	63	63	93	93	144	144
1	-26	-26	-21	-21	-19	-19	-16	-16	-10	-10	0	0	7	7	16	16	27	27	42	42	63	63	93	93	144	144
0.9	-12	-12	-7	-7	-5	-5	-2	-2	3	3	14	14	21	21	30	30	41	41	56	56	76	76	106	106	157	157
0.8	5	5	10	10	13	13	16	16	21	21	31	31	38	38	47	47	58	58	73	73	94	94	124	124	175	175
0.7	28	28	33	33	35	35	38	38	43	43	54	54	61	61	69	69	80	80	95	95	116	116	146	146	197	197
0.6	57	57	63	63	65	65	68	68	73	73	83	83	90	90	99	99	110	110	125	125	146	146	176	176	227	227
0.5	99	99	104	104	106	106	109	109	115	115	125	125	132	132	141	141	152	152	167	167	188	188	218	218	269	269
0.4	161	161	167	167	169	169	172	172	177	177	188	188	194	194	203	203	214	214	229	229	250	250	282	282	333	333
0.3	266	266	271	271	273	273	276	276	281	281	292	292	299	299	308	308	319	319	334	334	355	355	385	385	436	436

Table 2 Input Slew Rate Derating Values for DQ and differential DQS

Is:

Shaded areas indicate input slew rate combinations not supported.

DQ V/ns	DQS_t/DQS_c Slew Rate Derating VIH/L(AC) = 250 mV, VIH/L(DC) = 125 mV																							
	12		6		4		3		2		1.8		1.6		1.4		1.2		1		0.8		0.6	
	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld
6	-26	-26	-21	-21	-16	-16																		
3	-26	-26	-21	-21	-16	-16	-10	-10																
2			-21	-21	-16	-16	-10	-10	0	0														
1.5					-16	-16	-10	-10	0	0	7	7												
1					-16	-16	-10	-10	0	0	7	7	16	16										
0.9							3	3	14	14	21	21	30	30	41	41								
0.8									31	31	38	38	47	47	58	58	73	73						
0.7											61	61	69	69	80	80	95	95	116	116				
0.6													99	99	110	110	125	125	146	146	176	176		
0.5															152	152	167	167	188	188	218	218	269	269
0.4																	229	229	250	250	282	282	333	333
0.3																			355	355	385	385	436	436

Table 3 Input Slew Rate Derating Values for DQ and differential DQS

In the ONFI 3.1 specification, Section 4.11.2, Tables 46:

Was:

DQ V/ns	DQS Slew Rate Derating VIH/L(AC) = 250 mV, VIH/L(DC) = 125 mV																									
	6		5		3		2		1.5		1		0.9		0.8		0.7		0.6		0.5		0.4		0.3	
	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld
6	0	0	0	0	0	0	0	0	0	0	0	0	14	14	31	31	54	54	83	83	125	125	188	188	292	292
5	0	0	0	0	0	0	0	0	0	0	0	0	14	14	31	31	54	54	83	83	125	125	188	188	292	292
4	0	0	0	0	0	0	0	0	0	0	0	0	14	14	31	31	54	54	83	83	125	125	188	188	292	292
3	0	0	0	0	0	0	0	0	0	0	0	0	14	14	31	31	54	54	83	83	125	125	188	188	292	292
2	0	0	0	0	0	0	0	0	0	0	0	0	14	14	31	31	54	54	83	83	125	125	188	188	292	292
1.5	0	0	0	0	0	0	0	0	0	0	0	0	14	14	31	31	54	54	83	83	125	125	188	188	292	292
1	0	0	0	0	0	0	0	0	0	0	0	0	14	14	31	31	54	54	83	83	125	125	188	188	292	292
0.9	14	14	14	14	14	14	14	14	14	14	14	14	28	28	45	45	67	67	97	97	139	139	201	201	306	306
0.8	31	31	31	31	31	31	31	31	31	31	31	31	45	45	63	63	85	85	115	115	156	156	219	219	324	324
0.7	54	54	54	54	54	54	54	54	54	54	54	54	67	67	85	85	107	107	137	137	179	179	241	241	346	346
0.6	83	83	83	83	83	83	83	83	83	83	83	83	97	97	115	115	137	137	167	167	208	208	271	271	376	376
0.5	125	125	125	125	125	125	125	125	125	125	125	125	139	139	156	156	179	179	208	208	250	250	313	313	418	418
0.4	188	188	188	188	188	188	188	188	188	188	188	188	201	201	219	219	241	241	271	271	313	313	375	375	480	480
0.3	292	292	292	292	292	292	292	292	292	292	292	292	306	306	324	324	346	346	376	376	418	418	480	480	594	594

Table 4 Input Slew Rate Derating Values for DQ and single-ended DQS

Is:

Shaded areas indicate input slew rate combinations not supported.

DQ V/ns	DQS Slew Rate Derating VIH/L(AC) = 250 mV, VIH/L(DC) = 125 mV																									
	6		5		3		2		1.5		1		0.9		0.8		0.7		0.6		0.5		0.4		0.3	
	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld	Δ set	Δ hld
6	0	0	0	0																						
5	0	0	0	0	0	0																				
4			0	0	0	0	0	0																		
3			0	0	0	0	0	0	0	0																
2					0	0	0	0	0	0	0	0														
1.5					0	0	0	0	0	0	0	0	14	14												
1							0	0	0	0	0	0	14	14	31	31										
0.9									14	14	14	14	28	28	45	45	67	67								
0.8											31	31	45	45	63	63	85	85	115	115						
0.7													67	67	85	85	107	107	137	137	179	179				
0.6															115	115	137	137	167	167	208	208	271	271		
0.5																	179	179	208	208	250	250	313	313	418	418
0.4																			271	271	313	313	375	375	480	480
0.3																					418	418	480	480	594	594

Table 5 Input Slew Rate Derating Values for DQ and single-ended DQS

Disposition log

3/21/2013	Erratum captured.

Technical input submitted to the ONFI Workgroup is subject to the terms of the ONFI contributor's agreement.