Cogenda

cgd_t025_io

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2019-02-19

PB8 (tt_3p3v_25c/3.300000/25.0)

CMOS 3-state output pad with input.

Attributes

Attribute	Value
area	21369.024000000005 μm^2

OUTPUT FUNCTIONS

Output Pin	Function
C	PAD&IE
PAD	I

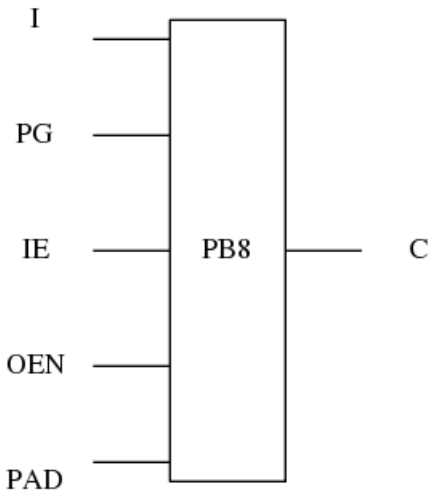
TRUTH TABLE FOR C

I	IE	OEN	PG	PAD	C
?	1	?	?	1	1
?	0	?	?	?	0
?	?	?	?	0	0

TRUTH TABLE FOR PAD

I	IE	OEN	PG	PAD
1	?	0	?	1
0	?	0	?	0
?	?	1	?	z

FUNCTIONAL SCHEMATIC



PIN CAPACITANCE (pf)

Pin	Type	Capacitance (pf)
I	input	0.0177
PG	input	0.0101
IE	input	0.0082
OEN	input	0.0146
PAD	inout	0.5861

DELAY AND OUTPUT TRANSITION TIME

Input Pin	Output	When Condition	Tin (ns)	Out Load (pf)	Delay (ns)	Tout (ns)
I(LH)	PAD(LH)	!IE&!OEN	0.4050	2.5873	1.1295	0.4938
I(LH)	PAD(LH)	IE&!OEN	0.4050	2.5873	1.1296	0.4940
I(HL)	C(HL)	IE&!OEN	0.4050	0.5050	2.4554	0.4339
I(HL)	PAD(HL)	!IE&!OEN	0.4050	4.5634	1.3310	0.4682
I(HL)	PAD(HL)	IE&!OEN	0.4050	4.5634	1.3314	0.4674
I(LH)	C(LH)	IE&!OEN	0.4050	0.5167	1.5744	0.4269
IE(LH)	C(LH)	I&!OEN	0.4050	0.5166	0.6187	0.4268
IE(LH)	C(LH)	!I&OEN&PAD	0.4050	0.5165	0.6186	0.4267
IE(LH)	C(LH)	I&OEN&PAD	0.4050	0.5165	0.6186	0.4267
IE(HL)	C(HL)	I&!OEN	0.4050	0.5043	1.3571	0.4338
IE(HL)	C(HL)	!I&OEN&PAD	0.4050	0.5043	1.3572	0.4341
IE(HL)	C(HL)	I&OEN&PAD	0.4050	0.5043	1.3572	0.4341
OEN(HL)	PAD(ZL)	!I&!IE	0.4050	4.5626	1.2962	0.4673
OEN(HL)	PAD(ZL)	!I&IE	0.4050	4.5636	1.2962	0.4670
OEN(HL)	PAD(ZH)	I&!IE	0.4050	2.5831	1.0874	0.4848

OEN(HL)	PAD(ZH)	I&IE	0.4050	2.5874	1.0877	0.4846
OEN(LH)	PAD(LZ)	!I&!IE	0.4050		0.9094	0.0000
OEN(LH)	PAD(LZ)	!I&IE	0.4050		0.9094	0.0000
OEN(LH)	PAD(HZ)	I&!IE	0.4050		0.9374	0.0000
OEN(LH)	PAD(HZ)	I&IE	0.4050		0.9374	0.0000
PAD(HL)	C(HL)	!I&IE&OEN	0.4050	0.5043	1.4739	0.4339
PAD(HL)	C(HL)	I&IE&OEN	0.4050	0.5045	1.4740	0.4341
PAD(LH)	C(LH)	!I&IE&OEN	0.4050	0.5168	0.6263	0.4269
PAD(LH)	C(LH)	I&IE&OEN	0.4050	0.5169	0.6264	0.4269

DYNAMIC ENERGY

Input Pin	When Condition	Tin (ns)	Output	Out Load (pf)	Energy (pJ)
I	!IE&!OEN	0.4050	PAD(LH)	2.5873	21.1432
I	IE&!OEN	0.4050	PAD(LH)	2.5873	8.6052
IE	I&!OEN	0.4050	C(LH)	0.5166	1.3748
IE	!I&OEN&PAD	0.4050	C(LH)	0.5165	1.3615
IE	I&OEN&PAD	0.4050	C(LH)	0.5165	1.3615
IE	I&!OEN	0.4050	C(HL)	0.5043	1.3263
IE	!I&OEN&PAD	0.4050	C(HL)	0.5043	1.3402
IE	I&OEN&PAD	0.4050	C(HL)	0.5043	1.3402
PAD	IE	0.4050	C(HL)	0.5043	3.6744
I	IE&!OEN	0.4050	C(HL)	0.5050	4.8864
I	!IE&!OEN	0.4050	PAD(HL)	4.5634	7.1461
I	IE&!OEN	0.4050	PAD(HL)	4.5634	3.6418
I	IE&!OEN	0.4050	C(LH)	0.5167	13.9533
PAD	IE	0.4050	C(LH)	0.5168	-0.8605
IE(HL)	!I&OEN&!PAD	0.4050	n/a	n/a	0.0468
IE(HL)	I&OEN&!PAD	0.4050	n/a	n/a	0.0468
IE(HL)	!I&!OEN	0.4050	n/a	n/a	0.0468
IE(LH)	!I&OEN&!PAD	0.4050	n/a	n/a	0.0035
IE(LH)	I&OEN&!PAD	0.4050	n/a	n/a	0.0035
IE(LH)	!I&!OEN	0.4050	n/a	n/a	0.0035
OEN	!I&!IE	0.4050	PAD(HL)	4.5626	5.1278
OEN	!I&IE	0.4050	PAD(HL)	4.5636	6.4960
OEN	I&!IE	0.4050	PAD(LH)	2.5831	8.2733

OEN	I&IE	0.4050	PAD(LH)	2.5874	10.0996
I(LH)	!IE&OEN&!PAD	0.4050	n/a	n/a	-0.1002
I(LH)	IE&OEN&!PAD	0.4050	n/a	n/a	-0.1002
I(LH)	!IE&OEN&PAD	0.4050	n/a	n/a	-0.1002
I(LH)	IE&OEN&PAD	0.4050	n/a	n/a	-0.1002
I(HL)	!IE&OEN&!PAD	0.4050	n/a	n/a	0.1015
I(HL)	IE&OEN&!PAD	0.4050	n/a	n/a	0.1015
I(HL)	!IE&OEN&PAD	0.4050	n/a	n/a	0.1015
I(HL)	IE&OEN&PAD	0.4050	n/a	n/a	0.1015
PAD(HL)	!I&!IE&OEN	0.4050	n/a	n/a	2.2839
PAD(HL)	I&!IE&OEN	0.4050	n/a	n/a	2.2839
PAD(LH)	!I&!IE&OEN	0.4050	n/a	n/a	-2.2861
PAD(LH)	I&!IE&OEN	0.4050	n/a	n/a	-2.2861

LEAKAGE POWER

When Condition	Power (nW)
!OEN	1.4954

SETUP AND CONDITIONS

PVT: tt_3p3v_25c
Voltage: 3.3000 volt
Temperature: 25.0 centigrade

PB8 (tt_5v_25c/5.0000/25.0)

CMOS 3-state output pad with input.

Attributes

Attribute	Value
area	21369.024000000005 μm^2

OUTPUT FUNCTIONS

Output Pin	Function
C	PAD&IE
PAD	I

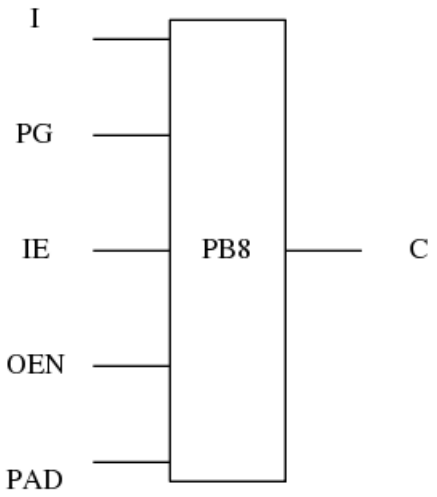
TRUTH TABLE FOR C

I	IE	OEN	PG	PAD	C
?	1	?	?	1	1
?	0	?	?	?	0
?	?	?	?	0	0

TRUTH TABLE FOR PAD

I	IE	OEN	PG	PAD
1	?	0	?	1
0	?	0	?	0
?	?	1	?	z

FUNCTIONAL SCHEMATIC



PIN CAPACITANCE (pf)

Pin	Type	Capacitance (pf)
I	input	0.0186
PG	input	0.0105
IE	input	0.0087
OEN	input	0.0152
PAD	inout	0.5526

DELAY AND OUTPUT TRANSITION TIME

Input Pin	Output	When Condition	Tin (ns)	Out Load (pf)	Delay (ns)	Tout (ns)
I(LH)	PAD(LH)	!IE&!OEN	0.4050	3.6415	0.8660	0.4674
I(LH)	PAD(LH)	IE&!OEN	0.4050	3.6415	0.8661	0.4680
I(HL)	C(HL)	IE&!OEN	0.4050	0.6216	1.7844	0.4248
I(HL)	PAD(HL)	!IE&!OEN	0.4050	5.6460	1.0023	0.4551
I(HL)	PAD(HL)	IE&!OEN	0.4050	5.6460	1.0023	0.4544
I(LH)	C(LH)	IE&!OEN	0.4050	0.7201	1.1754	0.4201
IE(LH)	C(LH)	I&!OEN	0.4050	0.7191	0.4889	0.4194
IE(LH)	C(LH)	!I&OEN&PAD	0.4050	0.7188	0.4888	0.4192
IE(LH)	C(LH)	I&OEN&PAD	0.4050	0.7188	0.4888	0.4192
IE(HL)	C(HL)	I&!OEN	0.4050	0.6219	1.0546	0.4250
IE(HL)	C(HL)	!I&OEN&PAD	0.4050	0.6225	1.0549	0.4247
IE(HL)	C(HL)	I&OEN&PAD	0.4050	0.6225	1.0549	0.4247
OEN(HL)	PAD(ZL)	!I&!IE	0.4050	5.6384	0.9902	0.4509
OEN(HL)	PAD(ZL)	!I&IE	0.4050	5.6451	0.9904	0.4508
OEN(HL)	PAD(ZH)	I&!IE	0.4050	3.6408	0.8544	0.4589

OEN(HL)	PAD(ZH)	I&IE	0.4050	3.6423	0.8544	0.4589
OEN(LH)	PAD(LZ)	!I&!IE	0.4050		0.6721	0.0000
OEN(LH)	PAD(LZ)	!I&IE	0.4050		0.6721	0.0000
OEN(LH)	PAD(HZ)	I&!IE	0.4050		0.7095	0.0000
OEN(LH)	PAD(HZ)	I&IE	0.4050		0.7095	0.0000
PAD(HL)	C(HL)	!I&IE&OEN	0.4050	0.6218	1.1325	0.4250
PAD(HL)	C(HL)	I&IE&OEN	0.4050	0.6218	1.1325	0.4250
PAD(LH)	C(LH)	!I&IE&OEN	0.4050	0.7202	0.4903	0.4207
PAD(LH)	C(LH)	I&IE&OEN	0.4050	0.7197	0.4902	0.4205

DYNAMIC ENERGY

Input Pin	When Condition	Tin (ns)	Output	Out Load (pf)	Energy (pJ)
I	!IE&!OEN	0.4050	PAD(LH)	3.6415	52.4175
I	IE&!OEN	0.4050	PAD(LH)	3.6415	19.7889
IE	I&!OEN	0.4050	C(LH)	0.7191	3.4042
IE	!I&OEN&PAD	0.4050	C(LH)	0.7188	3.3744
IE	I&OEN&PAD	0.4050	C(LH)	0.7188	3.3744
IE	I&!OEN	0.4050	C(HL)	0.6219	3.6196
IE	!I&OEN&PAD	0.4050	C(HL)	0.6225	3.6444
IE	I&OEN&PAD	0.4050	C(HL)	0.6225	3.6444
PAD	IE	0.4050	C(HL)	0.6218	8.6812
I	IE&!OEN	0.4050	C(HL)	0.6216	16.6046
I	!IE&!OEN	0.4050	PAD(HL)	5.6460	20.9263
I	IE&!OEN	0.4050	PAD(HL)	5.6460	8.0619
I	IE&!OEN	0.4050	C(LH)	0.7201	36.1972
PAD	IE	0.4050	C(LH)	0.7202	-1.4047
IE(HL)	!I&OEN&!PAD	0.4050	n/a	n/a	0.1107
IE(HL)	I&OEN&!PAD	0.4050	n/a	n/a	0.1107
IE(HL)	!I&!OEN	0.4050	n/a	n/a	0.1107
IE(LH)	!I&OEN&!PAD	0.4050	n/a	n/a	0.0098
IE(LH)	I&OEN&!PAD	0.4050	n/a	n/a	0.0098
IE(LH)	!I&!OEN	0.4050	n/a	n/a	0.0097
OEN	!I&!IE	0.4050	PAD(HL)	5.6384	12.0727
OEN	!I&IE	0.4050	PAD(HL)	5.6451	15.9624
OEN	I&!IE	0.4050	PAD(LH)	3.6408	19.1351

OEN	I&IE	0.4050	PAD(LH)	3.6423	23.7144
I(LH)	!IE&OEN&!PAD	0.4050	n/a	n/a	-0.2393
I(LH)	IE&OEN&!PAD	0.4050	n/a	n/a	-0.2393
I(LH)	!IE&OEN&PAD	0.4050	n/a	n/a	-0.2393
I(LH)	IE&OEN&PAD	0.4050	n/a	n/a	-0.2393
I(HL)	!IE&OEN&!PAD	0.4050	n/a	n/a	0.2415
I(HL)	IE&OEN&!PAD	0.4050	n/a	n/a	0.2415
I(HL)	!IE&OEN&PAD	0.4050	n/a	n/a	0.2415
I(HL)	IE&OEN&PAD	0.4050	n/a	n/a	0.2415
PAD(HL)	!I&!IE&OEN	0.4050	n/a	n/a	4.8972
PAD(HL)	I&!IE&OEN	0.4050	n/a	n/a	4.8972
PAD(LH)	!I&!IE&OEN	0.4050	n/a	n/a	-4.9046
PAD(LH)	I&!IE&OEN	0.4050	n/a	n/a	-4.9046

LEAKAGE POWER

When Condition	Power (nW)
!OEN	3.9864

SETUP AND CONDITIONS

PVT: tt_5v_25c
Voltage: 5.0000 volt
Temperature: 25.0 centigrade