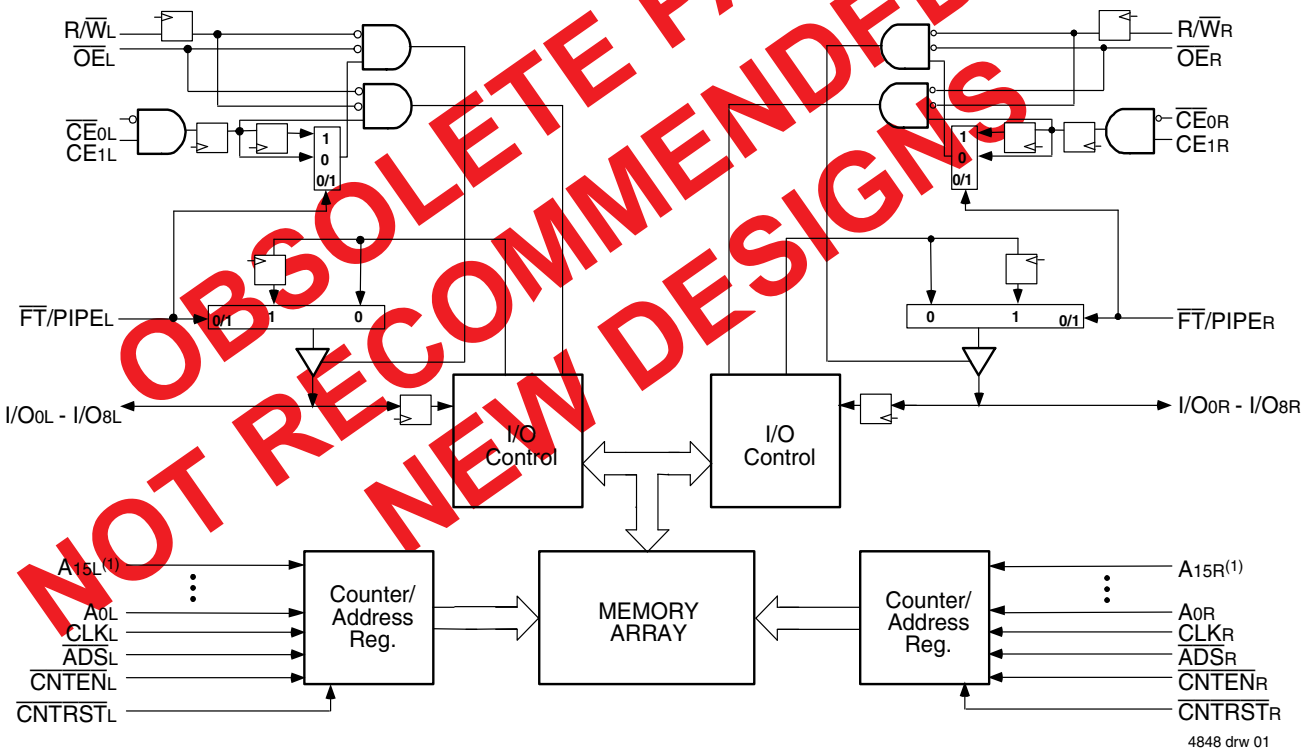
HIGH-SPEED 64/32K x 9 SYNCHRONOUS PIPELINED DUAL-PORT STATIC RAM

IDT709189/79L
OBSOLETE PARTS

Features

- True Dual-Ported memory cells which allow simultaneous access of the same memory location
- High-speed clock to data access
  - *Commercial: 6.5/7.5/9/12ns (max.)*
  - *Industrial: 9ns (max.)*
- Low-power operation
  - *IDT709189/79L*
    Active: 1.2W (typ.)
    Standby: 2.5mW (typ.)
- Flow-Through or Pipelined output mode on either Port via the $\overline{FT}$/PIPE pins
- Counter enable and reset features
- Dual chip enables allow for depth expansion without additional logic
- Full synchronous operation on both ports
  - *4ns setup to clock and 0ns hold on all control, data, and address inputs*
  - *Data input, address, and control registers*
  - *Fast 6.5ns clock to data out in the Pipelined output mode*
  - *Self-timed write allows fast cycle time*
  - *10ns cycle time, 100MHz operation in Pipelined output mode*
- TTL- compatible, single 5V (±10%) power supply
- Industrial temperature range (–40°C to +85°C) is available for selected speeds
- Available in a 100-pin Thin Quad Flatpack (TQFP) package

Functional Block Diagram



NOTE:
1. A_{15X} is a NC for IDT709179.

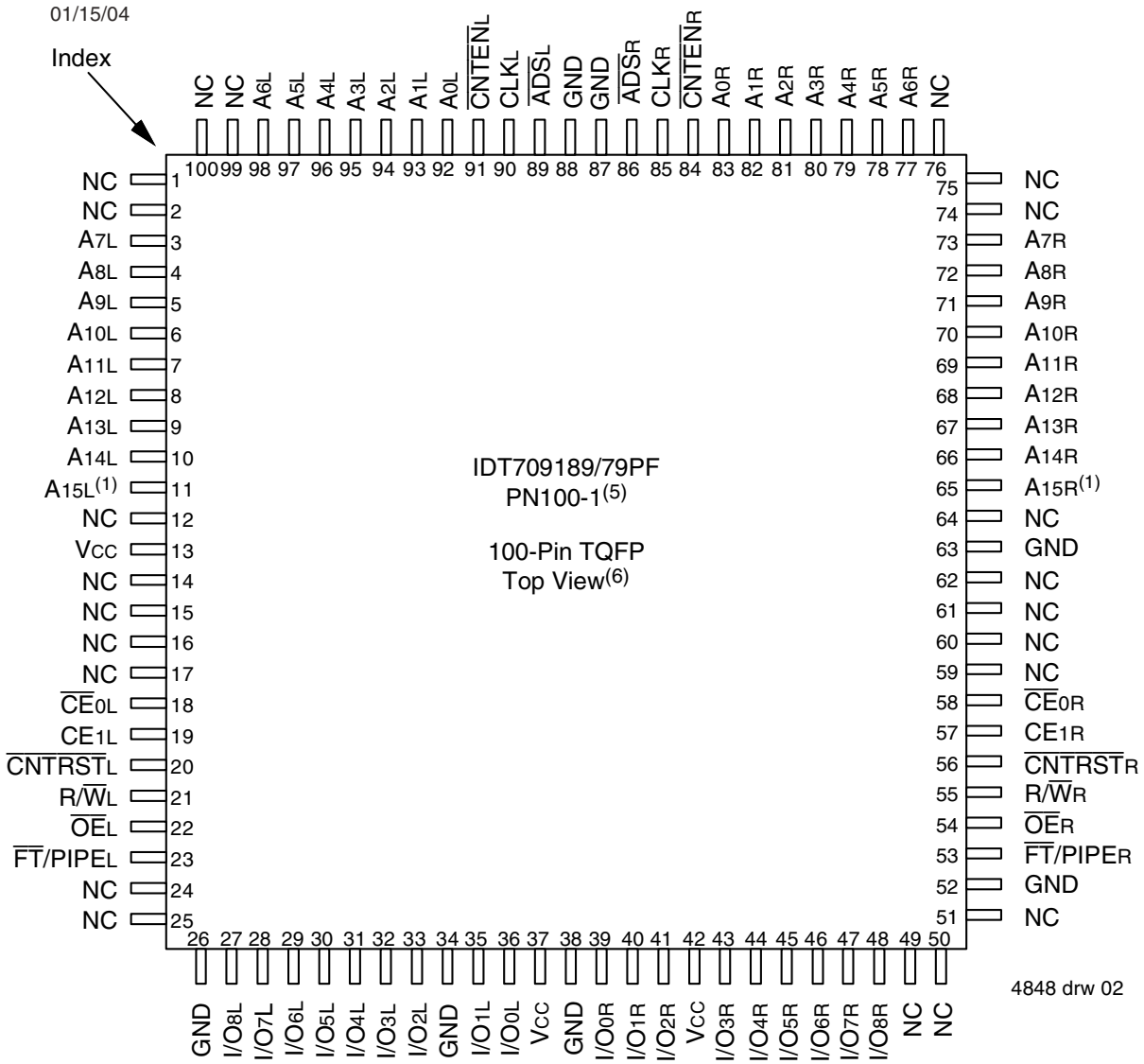
JANUARY 2009

Description

The IDT709189/79 is a high-speed 64/32K x 9 bit synchronous Dual-Port RAM. The memory array utilizes Dual-Port memory cells to allow simultaneous access of any address from both ports. Registers on control, data, and address inputs provide minimal setup and hold times. The timing latitude provided by this approach allows systems to be designed with very short cycle times.

With an input data register, the IDT709189/79 has been optimized for applications having unidirectional or bidirectional data flow in bursts. An automatic power down feature, controlled by $\overline{CE}_0$ and CE_1, permits the on-chip circuitry of each port to enter a very low standby power mode. Fabricated using IDT's CMOS high-performance technology, these devices typically operate on only 1.2W of power.

Pin Configurations[1,2,3]



NOTES:
1. A_{15X} is a NC for IDT709179.
2. All V_{CC} pins must be connected to power supply.
3. All GND pins must be connected to ground.
4. Package body is approximately 14mm x 14mm x 1.4mm
5. This package code is used to reference the package diagram.
6. This text does not indicate orientation of the actual part-marking.

Pin Names

Left Port	Right Port	Names
$\overline{CE}_{0L}$, CE_{1L}	$\overline{CE}_{0R}$, CE_{1R}	Chip Enables
R/$\overline{W}_L$	R/$\overline{W}_R$	Read/Write Enable
$\overline{OE}_L$	$\overline{OE}_R$	Output Enable
A_{0L} - A_{15L}(1)	A_{0R} - A_{15R}(1)	Address
I/O_{0L} - I/O_{8L}	I/O_{0R} - I/O_{8R}	Data Input/Output
CLK_L	CLK_R	Clock
$\overline{ADS}_L$	$\overline{ADS}_R$	Address Strobe
$\overline{CNTEN}_L$	$\overline{CNTEN}_R$	Counter Enable
$\overline{CNTRST}_L$	$\overline{CNTRST}_R$	Counter Reset
$\overline{FT}$/$PIPE_L$	$\overline{FT}$/$PIPE_R$	Flow-Through/Pipeline
V_{CC}		Power
GND		Ground

4848 tbl 01

NOTE:
1. A_{15X} is a NC for IDT709179.

Truth Table I—Read/Write and Enable Control(1,2,3)

$\overline{OE}$	CLK	$\overline{CE}_0$	CE_1	R/$\overline{W}$	I/O_{0-8}	Mode
X	↑	H	X	X	High-Z	Deselected—Power Down
X	↑	X	L	X	High-Z	Deselected—Power Down
X	↑	L	H	L	$DATA_{IN}$	Write
L	↑	L	H	H	$DATA_{OUT}$	Read
H	X	L	H	X	High-Z	Outputs Disabled

4848 tbl 02

NOTES:
1. "H" = V_{IH}, "L" = V_{IL}, "X" = Don't Care.
2. $\overline{ADS}$, $\overline{CNTEN}$, $\overline{CNTRST}$ = X.
3. $\overline{OE}$ is an asynchronous input signal.

Truth Table II—Address Counter Control(1,2,6)

External Address	Previous Internal Address	Internal Address Used	CLK	$\overline{ADS}$	$\overline{CNTEN}$	$\overline{CNTRST}$	I/O(3)	MODE
An	X	An	↑	L(4)	X	H	$D_{I/O}$ (n)	External Address Used
X	An	An + 1	↑	H	L(5)	H	$D_{I/O}$(n+1)	Counter Enabled—Internal Address generation
X	An + 1	An + 1	↑	H	H	H	$D_{I/O}$(n+1)	External Address Blocked—Counter disabled (An + 1 reused)
X	X	A_0	↑	X	X	L(4)	$D_{I/O}$(0)	Counter Reset to Address 0

4848 tbl 03

NOTES:
1. "H" = V_{IH}, "L" = V_{IL}, "X" = Don't Care.
2. $\overline{CE}_0$ and $\overline{OE}$ = V_{IL}; CE_1 and R/$\overline{W}$ = V_{IH}.
3. Outputs configured in Flow-Through Output mode: if outputs are in Pipelined mode the data out will be delayed by one cycle.
4. $\overline{ADS}$ is independent of all other signals including $\overline{CE}_0$ and CE_1.
5. The address counter advances if $\overline{CNTEN}$ = V_{IL} on the rising edge of CLK, regardless of all other signals including $\overline{CE}_0$ and CE_1.
6. While an external address is being loaded ($\overline{ADS}$ = V_{IL}), R/$\overline{W}$ = V_{IH} is recommended to ensure data is not written arbitrarily.

Recommended Operating Temperature and Supply Voltage

Grade	Ambient Temperature[2]	GND	Vcc
Commercial	0°C to +70°C	0V	5.0V ± 10%
Industrial	-40°C to +85°C	0V	5.0V ± 10%

4848 tbl 04

NOTES:
1. This is the parameter TA. This is the "instant on" case temperature.

Recommended DC Operating Conditions

Symbol	Parameter	Min.	Typ.	Max.	Unit
Vcc	Supply Voltage	4.5	5.0	5.5	V
GND	Ground	0	0	0	V
VIH	Input High Voltage	2.2	—	6.0[1]	V
VIL	Input Low Voltage	-0.5[2]	—	0.8	V

4848 tbl 05

NOTES:
1. VTERM must not exceed Vcc + 10%.
2. VIL ≥ -1.5V for pulse width less than 10ns.

Absolute Maximum Ratings[1]

Symbol	Rating	Commercial & Industrial	Unit
VTERM[2]	Terminal Voltage with Respect to GND	-0.5 to +7.0	V
TBIAS	TemperatureUnder Bias	-55 to +125	°C
TSTG	Storage Temperature	-65 to +150	°C
TJN	Junction Temperature	+150	°C
IOUT	DC Output Current	50	mA

4848 tbl 06

NOTES:
1. Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.
2. VTERM must not exceed Vcc + 10% for more than 25% of the cycle time or 10ns maximum, and is limited to ≤ 20mA for the period of VTERM ≥ Vcc + 10%.
3. Ambient Temperature Under Bias. No AC Conditions. Chip Deselected.

Capacitance[1]

(TA = +25°C, f = 1.0MHz)

Symbol	Parameter	Conditions[2]	Max.	Unit
CIN	Input Capacitance	VIN = 3dV	9	pF
COUT[3]	Output Capacitance	VOUT = 3dV	10	pF

4848 tbl 07

NOTES:
1. These parameters are determined by device characterization, but are not production tested.
2. 3dV references the interpolated capacitance when the input and output switch from 0V to 3V or from 3V to 0V.
3. COUT also references CI/O.

DC Electrical Characteristics Over the Operating Temperature Supply Voltage Range (Vcc = 5.0V ± 10%)

Symbol	Parameter	Test Conditions	709189/79L		Unit
			Min.	Max.	
|ILI|	Input Leakage Current[1]	Vcc = 5.5V, VIN = 0V to Vcc	—	5	µA
|ILO|	Output Leakage Current	$\overline{CE}_0$ = VIH or CE1 = VIL, VOUT = 0V to Vcc	—	5	µA
VOL	Output Low Voltage	IOL = +4mA	—	0.4	V
VOH	Output High Voltage	IOH = -4mA	2.4	—	V

4848 tbl 08

NOTE:
1. At VDD ≤ 2.0V input leakages are undefined.

DC Electrical Characteristics Over the Operating Temperature and Supply Voltage Range[3] (V_{CC} = 5V ± 10%)

Symbol	Parameter	Test Condition	Version		709189/79L6 Com'l Only		709189/79L7 Com'l Only		709189/79L9 Com'l & Ind		709189/79L12 Com'l Only		Unit
					Typ.[4]	Max.	Typ.[4]	Max.	Typ.[4]	Max.	Typ.[4]	Max.	
I_{CC}	Dynamic Operating Current (Both Ports Active)	$\overline{CE}_L$ and $\overline{CE}_R$= V_{IL} Outputs Disabled f = f_{MAX}[1]	COM'L	L	270	525	250	440	250	400	230	355	mA
			IND	L	—	—	—	—	300	430	—	—	
I_{SB1}	Standby Current (Both Ports - TTL Level Inputs)	$\overline{CE}_L$ = $\overline{CE}_R$ = V_{IH} f = f_{MAX}[1]	COM'L	L	80	175	65	145	80	135	70	110	mA
			IND	L	—	—	—	—	95	160	—	—	
I_{SB2}	Standby Current (One Port - TTL Level Inputs)	$\overline{CE}_{"A"}$ = V_{IL} and $\overline{CE}_{"B"}$ = V_{IH}[3] Active Port Outputs Disabled, f=f_{MAX}[1]	COM'L	L	180	360	160	295	175	275	150	240	mA
			IND	L	—	—	—	—	175	295	—	—	
I_{SB3}	Full Standby Current (Both Ports - CMOS Level Inputs)	Both Ports CE_R and $\overline{CE}_L \geq V_{CC}$ - 0.2V $V_{IN} \geq V_{CC}$ - 0.2V or $V_{IN} \leq$ 0.2V, f = 0[2]	COM'L	L	0.2	5	0.2	5.0	0.5	3.0	0.5	3.0	mA
			IND	L	—	—	—	—	0.5	6.0	—	—	
I_{SB4}	Full Standby Current (One Port - CMOS Level Inputs)	$\overline{CE}_{"A"} \leq$ 0.2V and $\overline{CE}_{"B"} \geq V_{CC}$ - 0.2V[5] $V_{IN} \geq V_{CC}$ - 0.2V or $V_{IN} \leq$ 0.2V, Active Port Outputs Disabled, f = f_{MAX}[1]	COM'L	L	170	340	150	290	170	270	140	225	mA
			IND	L	—	—	—	—	190	290	—	—	

4848 tbl 09

NOTES:

1. At f = f_{MAX}, address and control lines (except Output Enable) are cycling at the maximum frequency clock cycle of 1/t_{CYC}, using "AC TEST CONDITIONS" at input levels of GND to 3V.
2. f = 0 means no address, clock, or control lines change. Applies only to input at CMOS level standby.
3. Port "A" may be either left or right port. Port "B" is the opposite from port "A".
4. V_{CC} = 5V, TA = 25°C for Typ, and are not production tested. $I_{CC\,DC}$(f=0) = 150mA (Typ).
5. CE_X = V_{IL} means $\overline{CE}_{0X}$ = V_{IL} and CE_{1X} = V_{IH}
   CE_X = V_{IH} means $\overline{CE}_{0X}$ = V_{IH} or CE_{1X} = V_{IL}
   $CE_X \leq$ 0.2V means $\overline{CE}_{0X} \leq$ 0.2V and $CE_{1X} \geq V_{CC}$ - 0.2V
   $CE_X \geq V_{CC}$ - 0.2V means $\overline{CE}_{0X} \geq V_{CC}$ - 0.2V or $CE_{1X} \leq$ 0.2V
   "X" represents "L" for left port or "R" for right port.

AC Test Conditions

Input Pulse Levels	GND to 3.0V
Input Rise/Fall Times	3ns Max.
Input Timing Reference Levels	1.5V
Output Reference Levels	1.5V
Output Load	Figures 1,2 and 3

4848 tbl 10

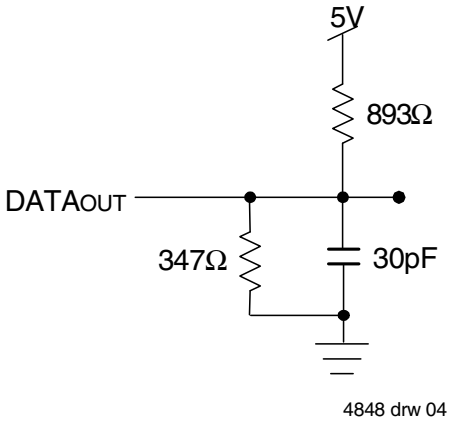


Figure 1. AC Output Test load.

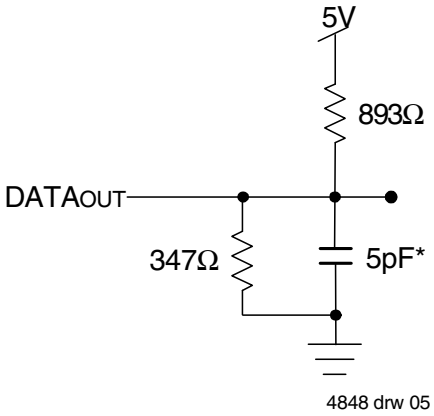


Figure 2. Output Test Load
(For t_{CKLZ}, t_{CKHZ}, t_{OLZ}, and t_{OHZ}).
*Including scope and jig.

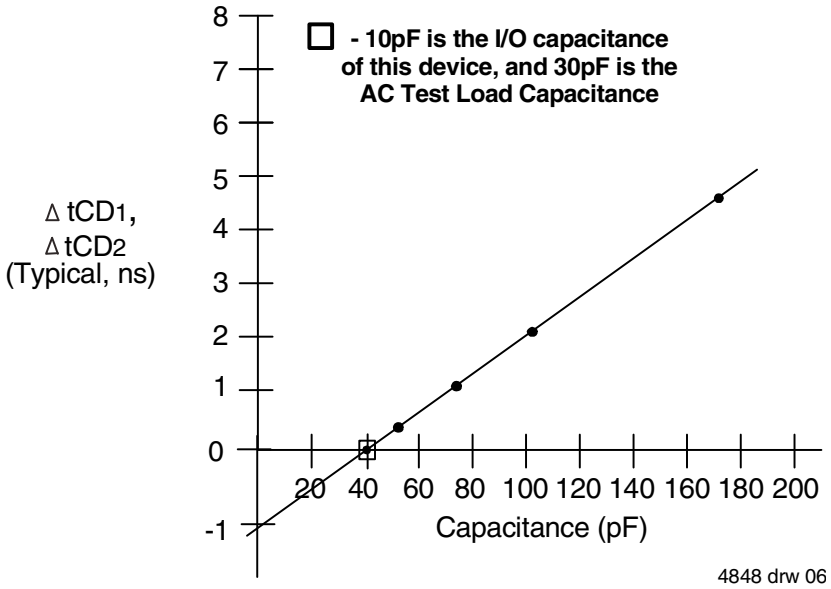


Figure 3. Typical Output Derating (Lumped Capacitive Load).

AC Electrical Characteristics Over the Operating Temperature Range (Read and Write Cycle Timing)[3] (V_{CC} = 5V ± 10%, T_A = 0°C to +70°C)

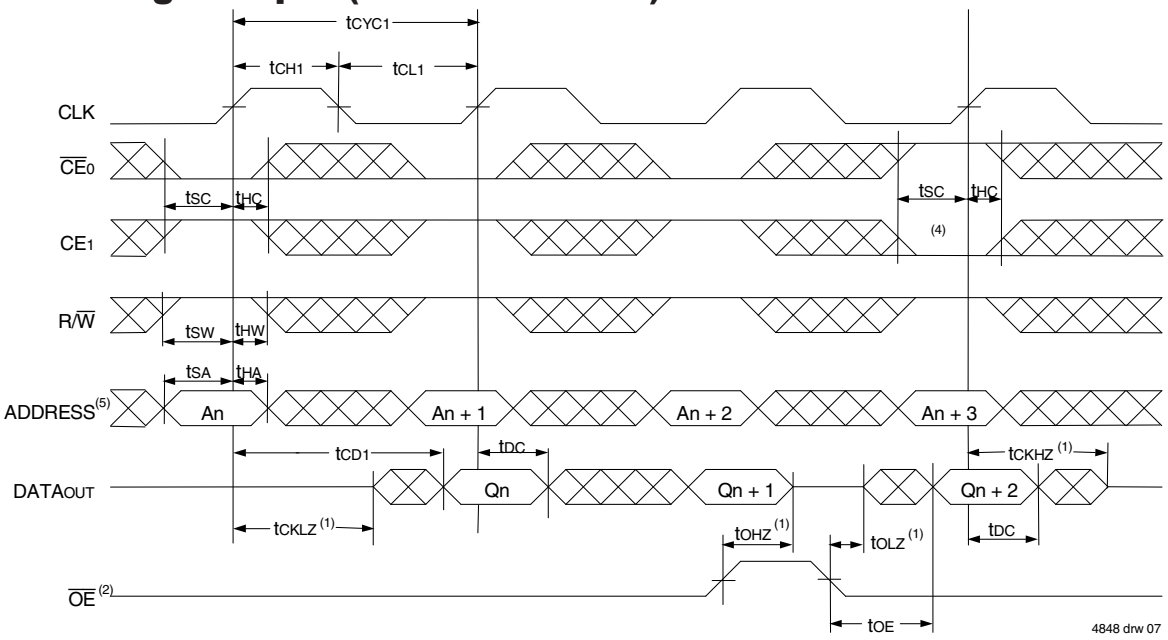
		709189/79L6 Com'l Only		709189/79L7 Com'l Only		709189/79L9 Com'l & Ind		709189/79L12 Com'l Only		
Symbol	Parameter	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Unit
t_{CYC1}	Clock Cycle Time (Flow-Through)[2]	19	—	22	—	25	—	30	—	ns
t_{CYC2}	Clock Cycle Time (Pipelined)[2]	10	—	12	—	15	—	20	—	ns
t_{CH1}	Clock High Time (Flow-Through)[2]	6.5	—	7.5	—	12	—	12	—	ns
t_{CL1}	Clock Low Time (Flow-Through)[2]	6.5	—	7.5	—	12	—	12	—	ns
t_{CH2}	Clock High Time (Pipelined)[2]	4	—	5	—	6	—	8	—	ns
t_{CL2}	Clock Low Time (Pipelined)[2]	4	—	5	—	6	—	8	—	ns
t_R	Clock Rise Time	—	3	—	3	—	3	—	3	ns
t_F	Clock Fall Time	—	3	—	3	—	3	—	3	ns
t_{SA}	Address Setup Time	3.5	—	4	—	4	—	4	—	ns
t_{HA}	Address Hold Time	0	—	0	—	1	—	1	—	ns
t_{SC}	Chip Enable Setup Time	3.5	—	4	—	4	—	4	—	ns
t_{HC}	Chip Enable Hold Time	0	—	0	—	1	—	1	—	ns
t_{SW}	R/$\overline{W}$ Setup Time	3.5	—	4	—	4	—	4	—	ns
t_{HW}	R/$\overline{W}$ Hold Time	0	—	0	—	1	—	1	—	ns
t_{SD}	Input Data Setup Time	3.5	—	4	—	4	—	4	—	ns
t_{HD}	Input Data Hold Time	0	—	0	—	1	—	1	—	ns
t_{SAD}	$\overline{ADS}$ Setup Time	3.5	—	4	—	4	—	4	—	ns
t_{HAD}	$\overline{ADS}$ Hold Time	0	—	0	—	1	—	1	—	ns
t_{SCN}	$\overline{CNTEN}$ Setup Time	3.5	—	4	—	4	—	4	—	ns
t_{HCN}	$\overline{CNTEN}$ Hold Time	0	—	0	—	1	—	1	—	ns
t_{SRST}	$\overline{CNTRST}$ Setup Time	3.5	—	4	—	4	—	4	—	ns
t_{HRST}	$\overline{CNTRST}$ Hold Time	0	—	0	—	1	—	1	—	ns
t_{OE}	Output Enable to Data Valid	—	6.5	—	7.5	—	9	—	12	ns
t_{OLZ}	Output Enable to Output Low-Z[1]	2	—	2	—	2	—	2	—	ns
t_{OHZ}	Output Enable to Output High-Z[1]	1	7	1	7	1	7	1	7	ns
t_{CD1}	Clock to Data Valid (Flow-Through)[2]	—	15	—	18	—	20	—	25	ns
t_{CD2}	Clock to Data Valid (Pipelined)[2]	—	6.5	—	7.5	—	9	—	12	ns
t_{DC}	Data Output Hold After Clock High	2	—	2	—	2	—	2	—	ns
t_{CKHZ}	Clock High to Output High-Z[1]	2	9	2	9	2	9	2	9	ns
t_{CKLZ}	Clock High to Output Low-Z[1]	2	—	2	—	2	—	2	—	ns
Port-to-Port Delay										
t_{CWDD}	Write Port Clock High to Read Data Delay	—	24	—	28	—	35	—	40	ns
t_{CCS}	Clock-to-Clock Setup Time	—	9	—	10	—	15	—	15	ns

4848 tbl 11

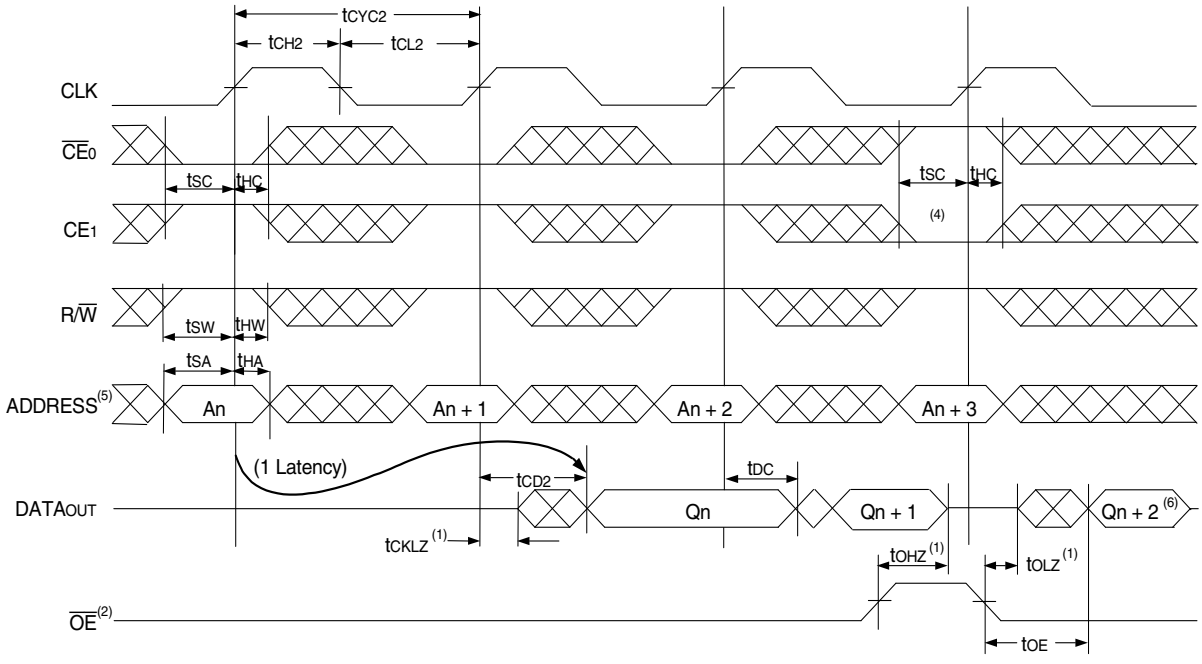
NOTES:

1. Transition is measured 0mV from Low or High-impedance voltage with the Output Test Load (Figure 2). This parameter is guaranteed by device characterization, but is not production tested.
2. The Pipelined output parameters (t_{CYC2}, t_{CD2}) to either the Left or Right ports when $\overline{FT}$/PIPE = V_{IH}. Flow-Through parameters (t_{CYC1}, t_{CD1}) apply when $\overline{FT}$/PIPE = V_{IL} for that port.
3. All input signals are synchronous with respect to the clock except for the asynchronous Output Enable ($\overline{OE}$), $\overline{FT}$/PIPE$_R$ and $\overline{FT}$/PIPE$_L$.

Timing Waveform of Read Cycle for Flow-Through Output ($\overline{FT}$/PIPE"X" = V_{IL})(3,6)



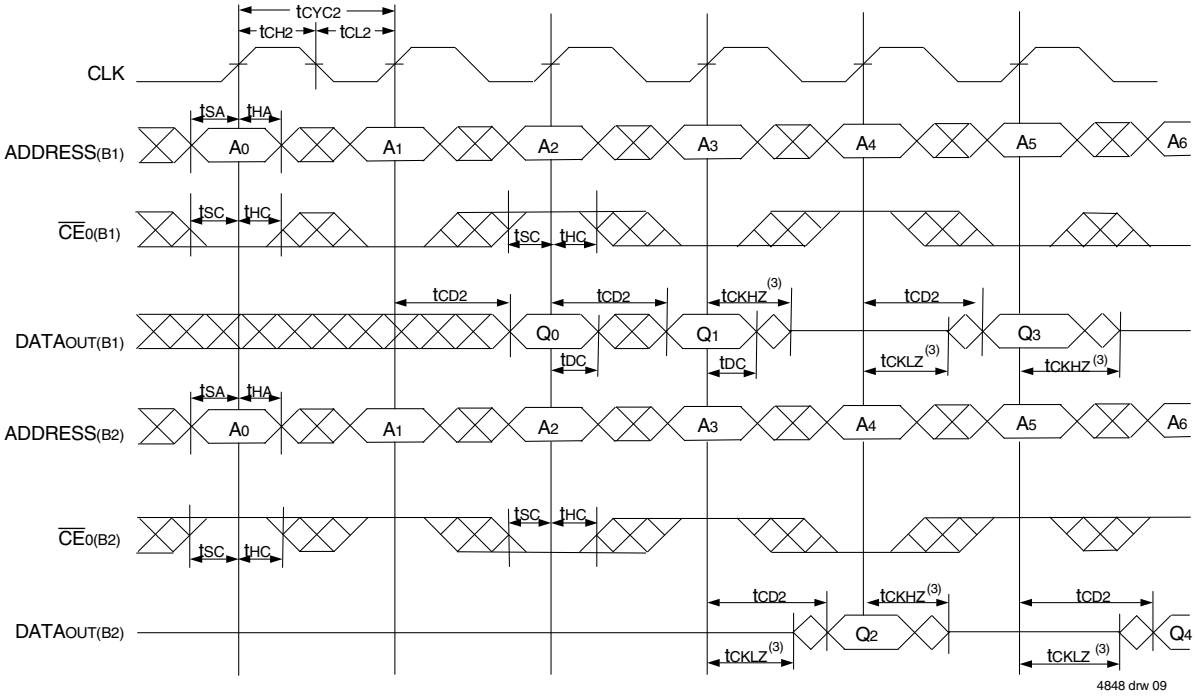
Timing Waveform of Read Cycle for Pipelined Operation ($\overline{FT}$/PIPE"X" = V_{IH})(3,6)



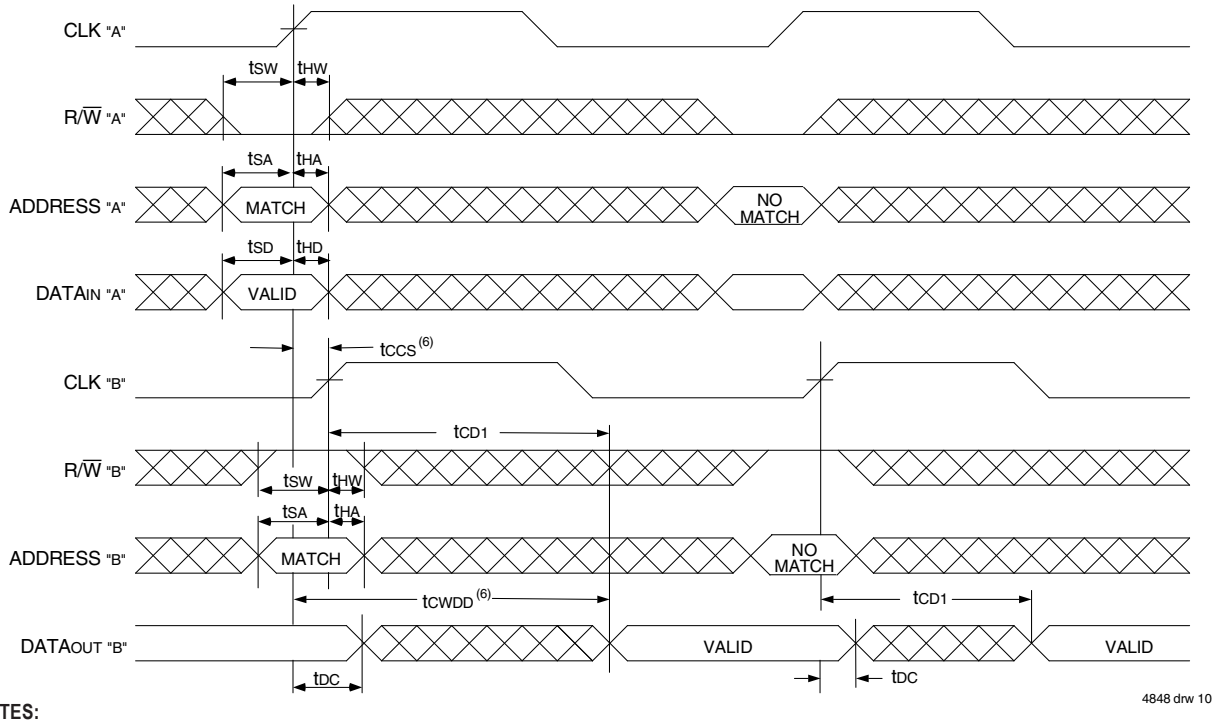
NOTES:

1. Transition is measured 0mV from Low or High-impedance voltage with the Output Test Load (Figure 2).
2. $\overline{OE}$ is asynchronously controlled; all other inputs are synchronous to the rising clock edge.
3. $\overline{ADS}$ = V_{IL}, $\overline{CNTEN}$ and $\overline{CNTRST}$ = V_{IH}.
4. The output is disabled (High-Impedance state) by $\overline{CE}_0$ = V_{IH} or CE_1 = V_{IL} following the next rising edge of the clock. Refer to Truth Table 1.
5. Addresses do not have to be accessed sequentially since $\overline{ADS}$ = V_{IL} constantly loads the address on the rising edge of the CLK; numbers are for reference use only.
6. "X" here denotes Left or Right port. The diagram is with respect to that port.

Timing Waveform of a Bank Select Pipelined Read(1,2)



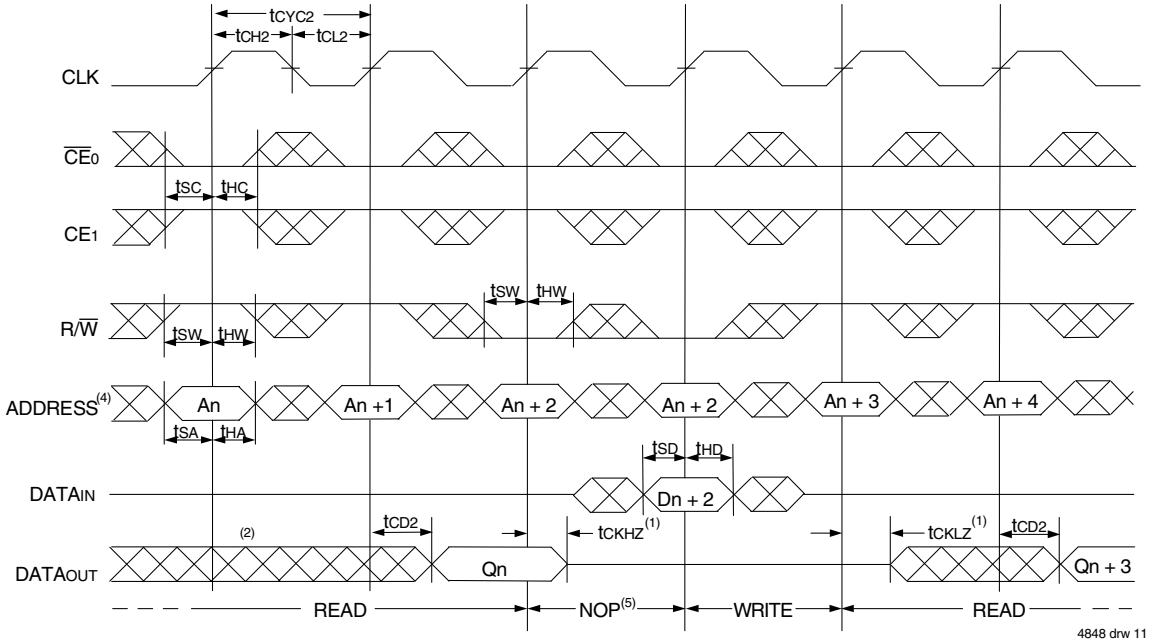
Timing Waveform of Write with Port-to-Port Flow-Through Read(4,5,7)



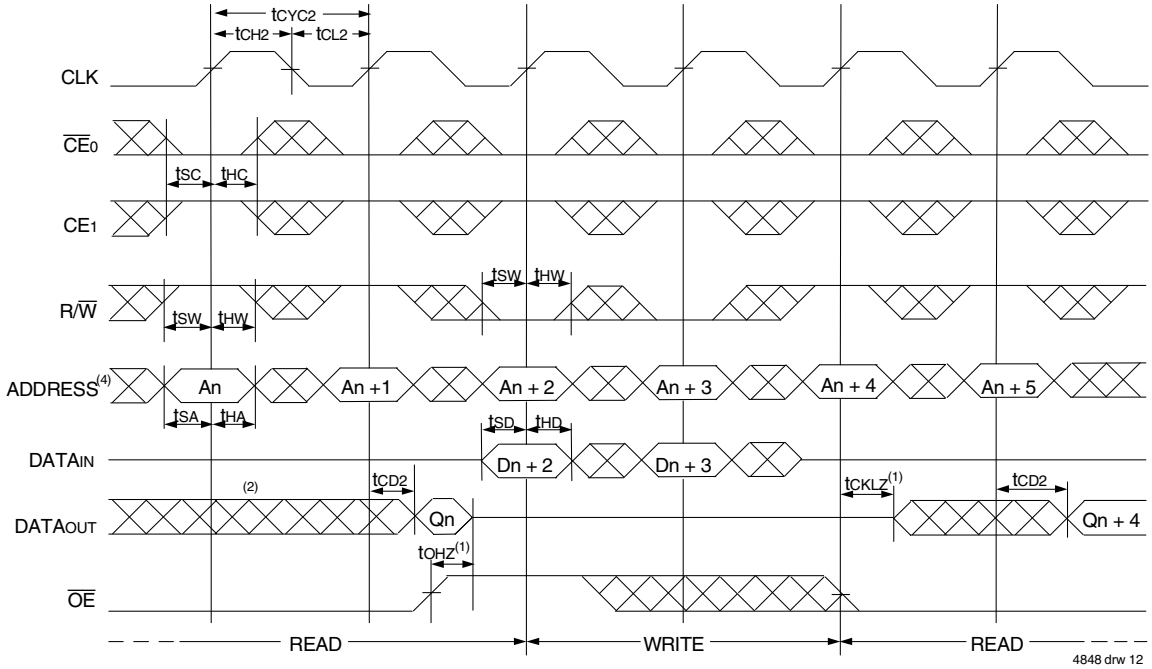
NOTES:

1. B1 Represents Bank #1; B2 Represents Bank #2. Each Bank consists of one IDT709189/79 for this waveform, and are setup for depth expansion in this example. ADDRESS(B1) = ADDRESS(B2) in this situation.
2. $\overline{OE}$ and $\overline{ADS}$ = V_{IL}; $CE_{1(B1)}$, $CE_{1(B2)}$, R/$\overline{W}$, $\overline{CNTEN}$, and $\overline{CNTRST}$ = V_{IH}.
3. Transition is measured 0mV from Low or High-impedance voltage with the Output Test Load (Figure 2).
4. $\overline{CE}_0$ and $\overline{ADS}$ = V_{IL}; CE_1, $\overline{CNTEN}$, and $\overline{CNTRST}$ = V_{IH}.
5. $\overline{OE}$ = V_{IL} for the Right Port, which is being read from. $\overline{OE}$ = V_{IH} for the Left Port, which is being written to.
6. If $t_{CCS} \leq$ maximum specified, then data from right port READ is not valid until the maximum specified for t_{CWDD}.
   If t_{CCS} > maximum specified, then data from right port READ is not valid until $t_{CCS} + t_{CD1}$. t_{CWDD} does not apply in this case.
7. All timing is the same for both Left and Right ports. Port "A" may be either Left or Right port. Port "B" is the opposite from Port "A".

Timing Waveform of Pipelined Read-to-Write-to-Read ($\overline{OE}$ = VIL)(3)



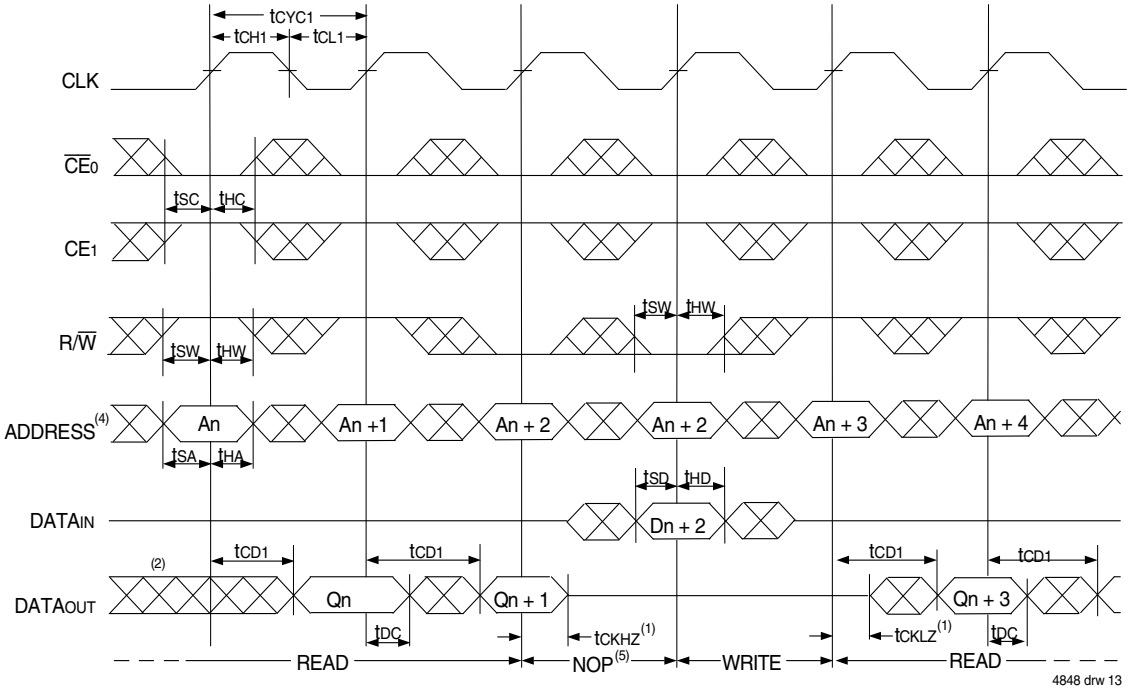
Timing Waveforn of Pipelined Read-to-Write-to-Read ($\overline{OE}$ Controlled)(3)



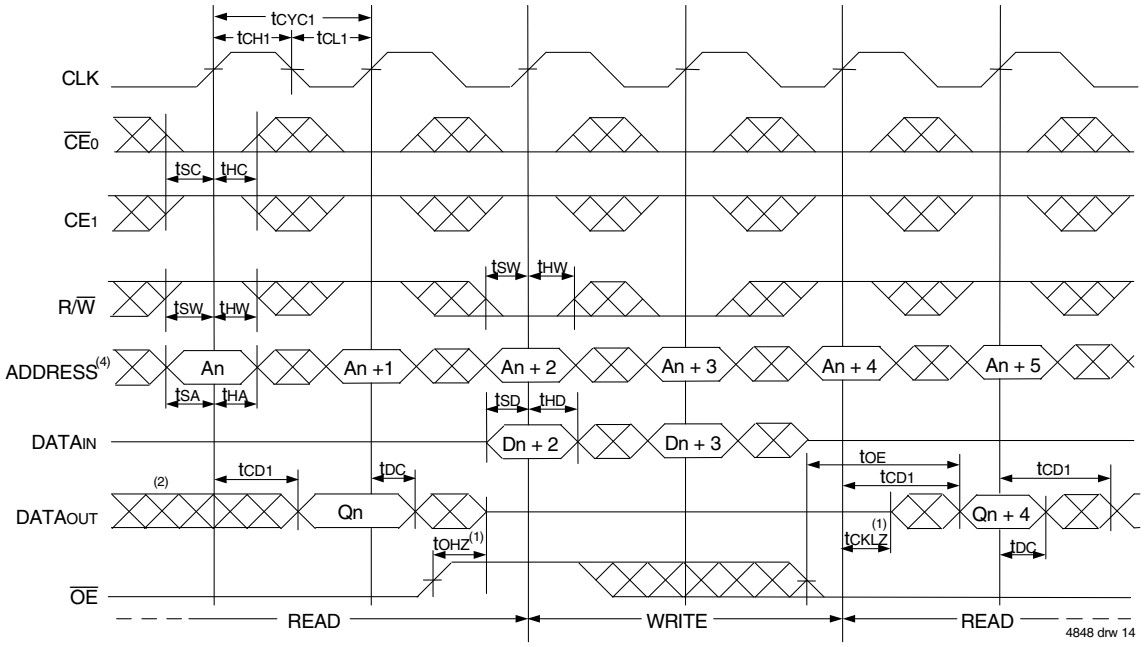
NOTES:

1. Transition is measured 0mV from Low or High-impedance voltage with the Output Test Load (Figure 2).
2. Output state (High, Low, or High-impedance) is determined by the previous cycle control signals.
3. $\overline{CE_0}$ and $\overline{ADS}$ = VIL; CE1, $\overline{CNTEN}$, and $\overline{CNTRST}$ = VIH. "NOP" is "No Operation".
4. Addresses do not have to be accessed sequentially since $\overline{ADS}$ = VIL constantly loads the address on the rising edge of the CLK; numbers are for reference use only.
5. "NOP" is "No Operation." Data in memory at the selected address may be corrupted and should be re-written to guarantee data integrity.

Timing Waveform of Flow-Through Read-to-Write-to-Read ($\overline{OE}$ = VIL)(3)



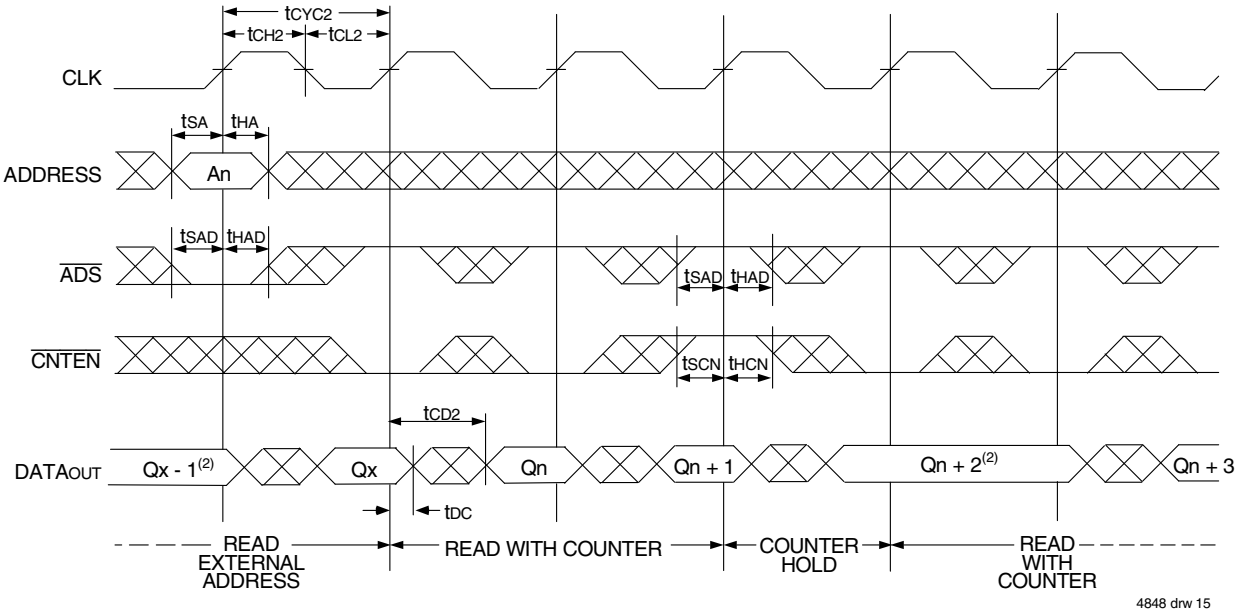
Timing Waveform of Flow-Through Read-to-Write-to-Read ($\overline{OE}$ Controlled)(3)



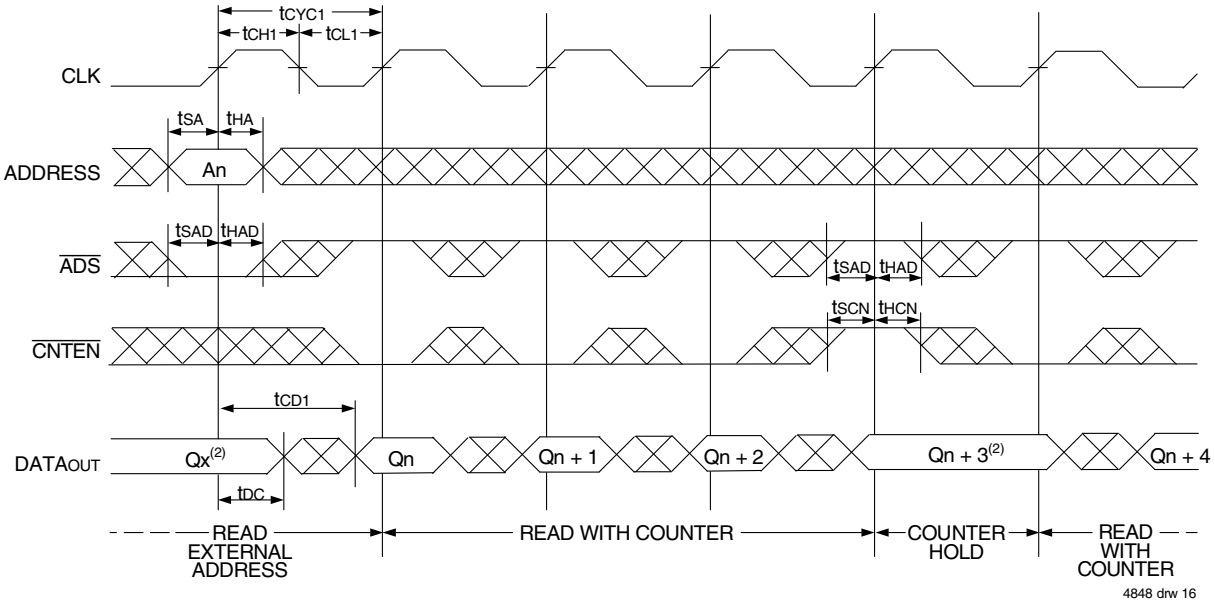
NOTES:

1. Transition is measured 0mV from Low or High-impedance voltage with the Output Test Load (Figure 2).
2. Output state (High, Low, or High-impedance is determined by the previous cycle control signals.
3. $\overline{CE_0}$ and $\overline{ADS}$ = VIL; CE1, $\overline{CNTEN}$, and $\overline{CNTRST}$ = VIH. "NOP" is "No Operation".
4. Addresses do not have to be accessed sequentially since $\overline{ADS}$ = VIL constantly loads the address on the rising edge of the CLK; numbers are for reference use only.
5. "NOP" is "No Operation." Data in memory at the selected address may be corrupted and should be re-written to guarantee data integrity.

Timing Waveform of Pipelined Read with Address Counter Advance(1)



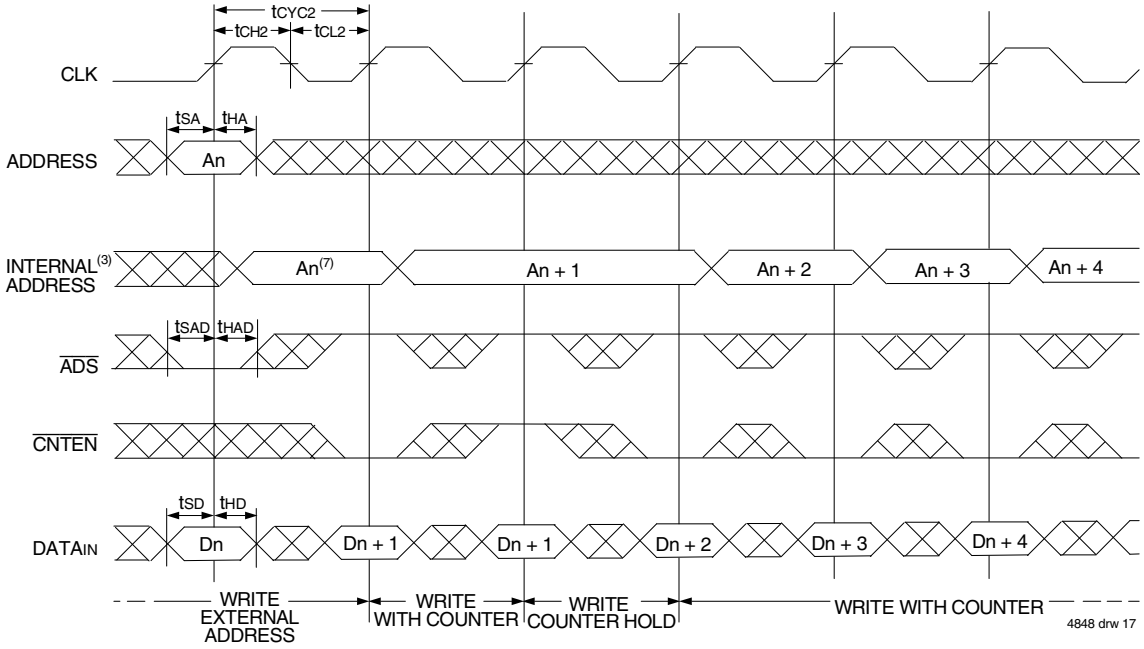
Timing Waveform of Flow-Through Read with Address Counter Advance(1)



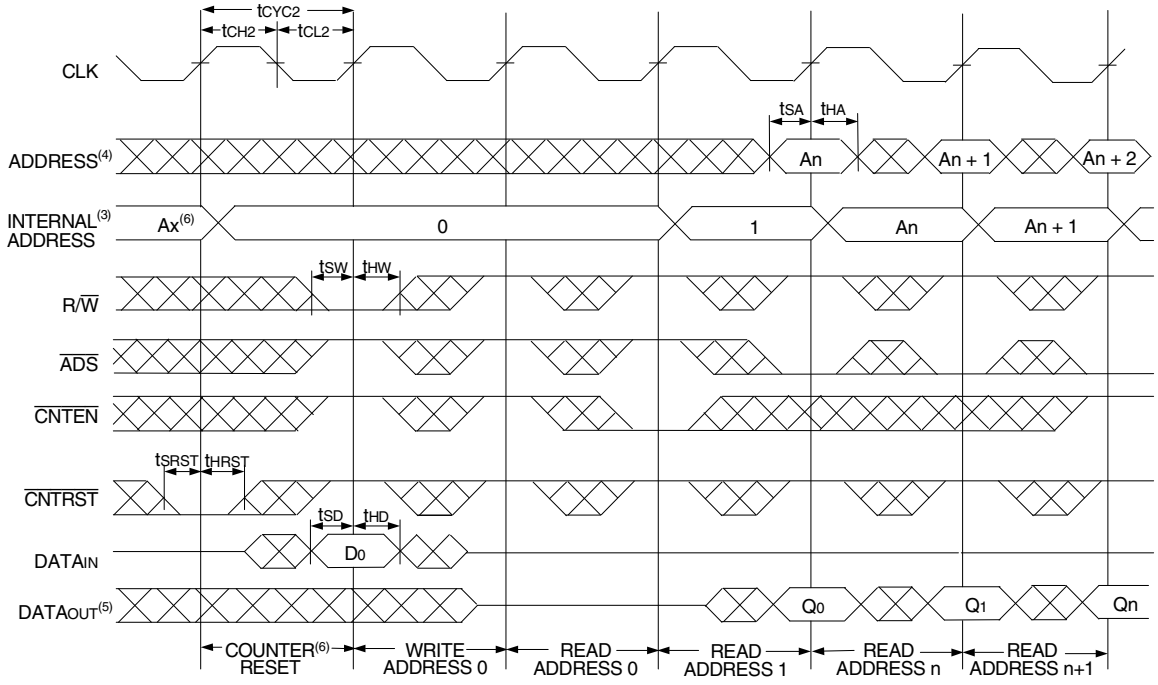
NOTES:

1. $\overline{CE_0}$ and $\overline{OE}$ = V_{IL}; CE_1, R/$\overline{W}$, and $\overline{CNTRST}$ = V_{IH}.
2. If there is no address change via $\overline{ADS}$ = V_{IL} (loading a new address) or $\overline{CNTEN}$ = V_{IL} (advancing the address), i.e. $\overline{ADS}$ = V_{IH} and $\overline{CNTEN}$ = V_{IH}, then the data output remains constant for subsequent clocks.

Timing Waveform of Write with Address Counter Advance (Flow-Through or Pipelined Outputs)(1)



Timing Waveform of Counter Reset (Pipelined Outputs)(2)



NOTES:

1. $\overline{CE_0}$ and R/$\overline{W}$ = V_{IL}; CE_1 and $\overline{CNTRST}$ = V_{IH}.
2. $\overline{CE_0}$ = V_{IL}; CE_1 = V_{IH}.
3. The "Internal Address" is equal to the "External Address" when $\overline{ADS}$ = V_{IL} and equals the counter output when $\overline{ADS}$ = V_{IH}.
4. Addresses do not have to be accessed sequentially since $\overline{ADS}$ = V_{IL} constantly loads the address on the rising edge of the CLK; numbers are for reference use only.
5. Output state (High, Low, or High-impedance) is determined by the previous cycle control signals.
6. No dead cycle exists during counter reset. A READ or WRITE cycle may be coincidental with the counter reset cycle.
7. $\overline{CNTEN}$ = V_{IL} advances Internal Address from 'An' to 'An +1'. The transition shown indicates the time required for the counter to advance. The 'An +1' Address is written to during this cycle.

A Functional Description

The IDT709189/79 provides a true synchronous Dual-Port Static RAM interface. Registered inputs provide minimal set-up and hold times on address, data, and all critical control inputs. All internal registers are clocked on the rising edge of the clock signal, however, the self-timed internal write pulse is independent of the LOW to HIGH transition of the clock signal.

An asynchronous output enable is provided to ease asynchronous bus interfacing. Counter enable inputs are also provided to stall the operation of the address counters for fast interleaved memory applications.

$\overline{CE}_0 = V_{IH}$ or $CE_1 = V_{IL}$ for one clock cycle will power down the internal circuitry to reduce static power consumption. Multiple chip enables allow easier banking of multiple IDT709189/79's for depth expansion configurations. When the Pipelined output mode is enabled, two cycles are required with $\overline{CE}_0 = V_{IL}$ and $CE_1 = V_{IH}$ to reactivate the outputs.

Depth and Width Expansion

The IDT709189/79 features dual chip enables (refer to Truth Table I) in order to facilitate rapid and simple depth expansion with no requirements for external logic. Figure 4 illustrates how to control the various chip enables in order to expand two devices in depth.

The IDT709189/79 can also be used in applications requiring expanded width, as indicated in Figure 4. Since the banks are allocated at the discretion of the user, the external controller can be set up to drive the input signals for the various devices as required to allow for 18-bit or wider applications.

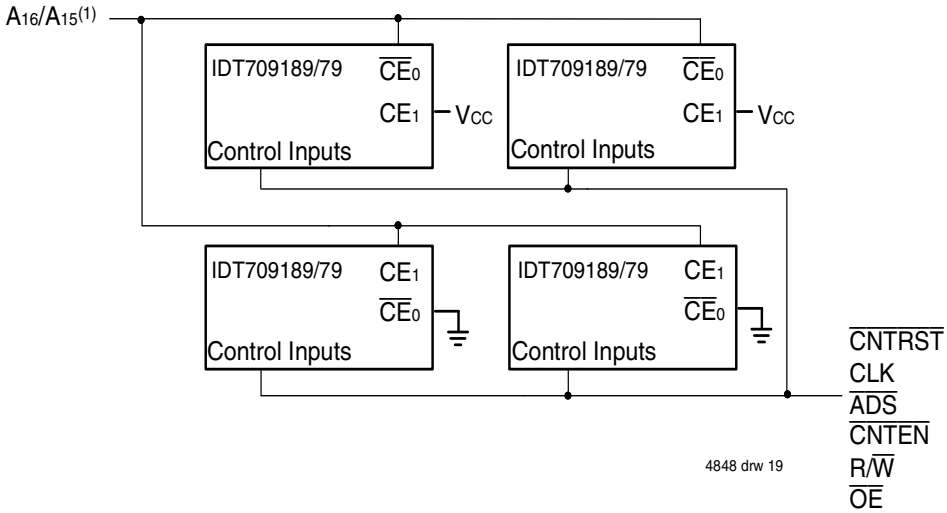
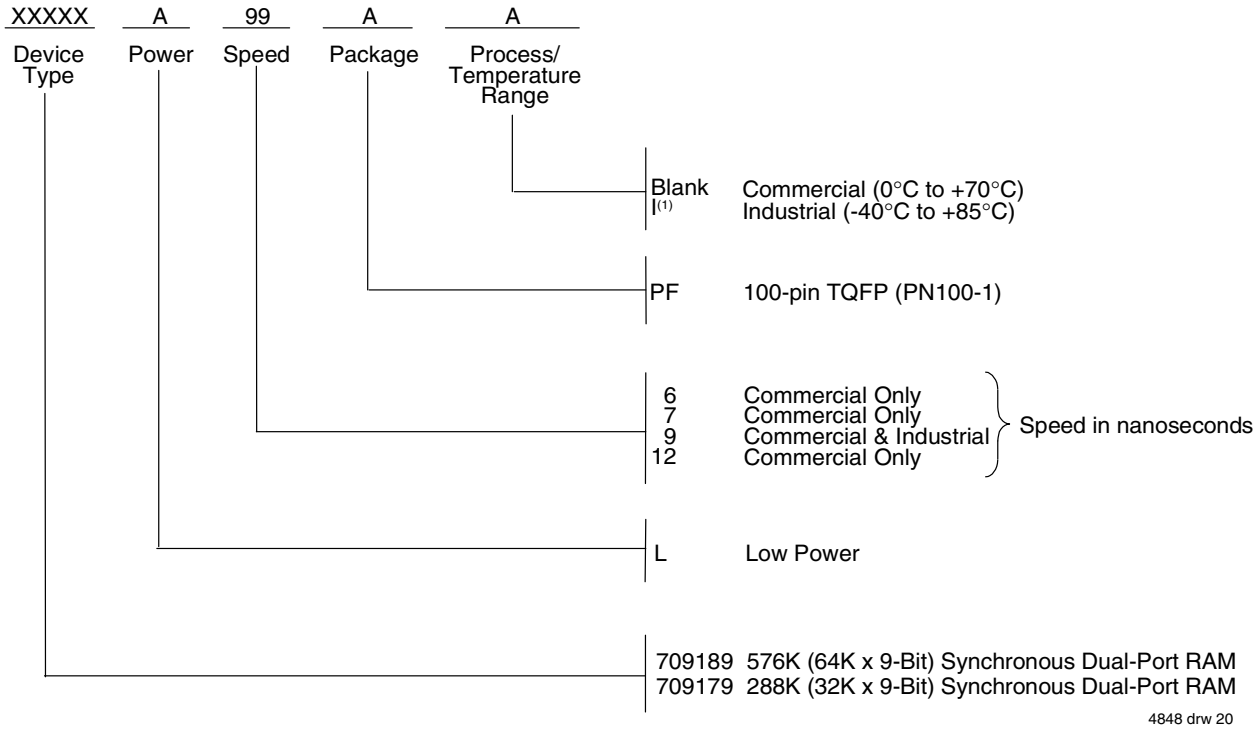


Figure 4. Depth and Width Expansion with IDT709189/79

NOTE:
1. A_{15} is for IDT709179.

Ordering Information



4848 drw 20

NOTE:
1. Industrial temperature range is available.
   For other speeds, packages and powers contact your sales office.

IDT Clock Solution for IDT709189/79 Dual-Port

IDT Dual-Port Part Number	Dual-Port I/O Specitications		Clock Specifications				IDT PLL Clock Device	IDT Non-PLL Clock Device
	Voltage	I/O	Input Capacitance	Input Duty Cycle Requirement	Maximum Frequency	Jitter Tolerance		
709189/79	5	TTL	9pF	40%	100	150ps	FCT88915TT	49FCT805T 49FCT806T 49FCT807T

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Datasheet Document History

9/30/99: Initial Public Release
11/10/99: Replaced IDT logo
12/22/99: Page 1 Added missing diamond
1/12/01: Page 3 Changed information in Truth Table II
Page 4 Increased storage temperature parameter
Clarified T_A parameter
Page 5 DC Electrical parameters–changed wording from "open" to "disabled"
Changed ±200mV to 0mV in notes
Removed Preliminary status
04/26/04: Consolidated multiple devices into one datasheet
Page 2 Added date revision to pin configuration
Page 4 Added Junction Temperature to Absolute Maximum Ratings Table
Added Ambient Temperature footnote
Page 4, 5 & 7 Removed Industrial temp footnote from all tables
Page 5 Added I-temp numbers for 9ns speed to the DC Electrical Characteristics Table
Added 6ns speed DC timing numbers to the DC Electrical Characteristics Table
Page 7 Added I-temp for 9ns speed to AC Electrical Characteristics Table
Added 6ns speed AC timing numbers to the AC Electrical Characteristics Table
Page 15 Added 6ns speed grade and 9ns I-temp to ordering information
Added IDT Clock Solution Table
Page 1 & 16 Replaced old TM logo with new TM logo
01/29/09: Page 15 Removed "IDT" from orderable part number
04/26/09: PDN-F-09-01 issued. See IDT.com for PDN specifics
02/06/14: Datasheet changed to Obsolete Status

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