3.3 VOLT CMOS ASYNCHRONOUS FIFO
512 x 9, 1,024 x 9, 2,048 x 9, 4,096 x 9, 8,192 x 9, 16,384 x 9

IDT72V01, IDT72V02
IDT72V03, IDT72V04
IDT72V05, IDT72V06

FEATURES:

- **3.3V family uses less power than the 5 Volt 7201/7202/7203/7204/7205/7206 family**
- **512 x 9 organization (72V01)**
- **1,024 x 9 organization (72V02)**
- **2,048 x 9 organization (72V03)**
- **4,096 X 9 organization (72V04)**
- **8,192 x 9 organization (72V05)**
- **16,384 X 9 organization (72V06)**
- **Functionally compatible with 720x family**
- **Low-power consumption**
  - *— Active: 180 mW (max.)*
  - *— Power-down: 18 mW (max.)*
- **15 ns access time**
- **Asynchronous and simultaneous read and write**
- **Fully expandable by both word depth and/or bit width**
- **Status Flags: Empty, Half-Full, Full**
- **Auto-retransmit capability**
- **Available in 32-pin PLCC**
- **Industrial temperature range (–40°C to +85°C) is available**
- **Green parts available, see ordering information**

DESCRIPTION:

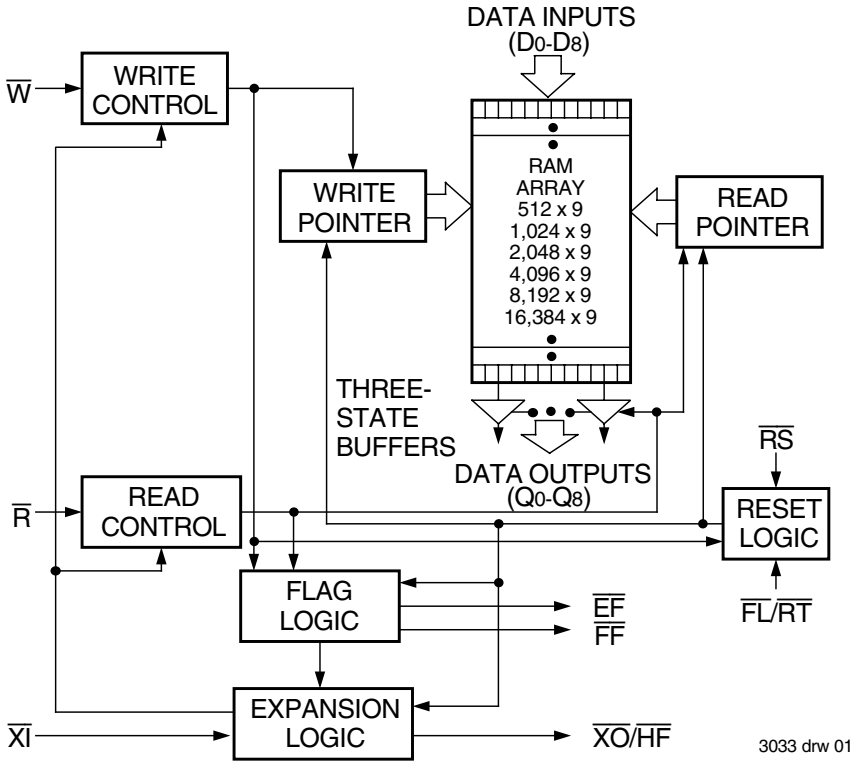
The IDT72V01/72V02/72V03/72V04/72V05/72V06 are dual-port FIFO memories that operate at a power supply voltage (Vcc) between 3.0V and 3.6V. Their architecture, functional operation and pin assignments are identical to those of the IDT7201/7202/7203/7204/7205/7206. These devices load and empty data on a first-in/first-out basis. They use Full and Empty flags to prevent data overflow and underflow and expansion logic to allow for unlimited expansion capability in both word size and depth.

The reads and writes are internally sequential through the use of ring pointers, with no address information required to load and unload data. Data is toggled in and out of the devices through the use of the Write ($\overline{W}$) and Read ($\overline{R}$) pins. The devices have a maximum data access time as fast as 25 ns.

The devices utilize a 9-bit wide data array to allow for control and parity bits at the user's option. This feature is especially useful in data communications applications where it is necessary to use a parity bit for transmission/reception error checking. They also feature a Retransmit ($\overline{RT}$) capability that allows for reset of the read pointer to its initial position when $\overline{RT}$ is pulsed LOW to allow for retransmission from the beginning of data. A Half-Full Flag is available in the single device mode and width expansion modes.

These FIFOs are fabricated using IDT's high-speed CMOS technology. It has been designed for those applications requiring asynchronous and simultaneous read/writes in multiprocessing and rate buffer applications.

FUNCTIONAL BLOCK DIAGRAM



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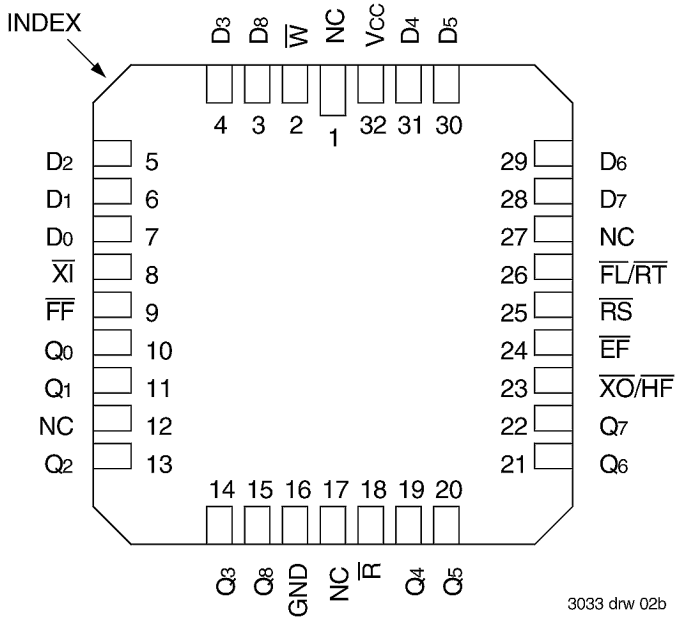
PIN CONFIGURATION



PLCC (J32-1, order code: J)
TOP VIEW

ABSOLUTE MAXIMUM RATINGS

Symbol	Rating	Com'l & Ind'l	Unit
V_{TERM}	Terminal Voltage with Respect to GND	–0.5 to +7.0	V
T_{STG}	Storage Temperature	–55 to +125	°C
I_{OUT}	DC Output Current	–50 to +50	mA

NOTE:
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.

RECOMMENDED DC OPERATING CONDITIONS

Symbol	Rating	Min.	Typ.	Max.	Unit
V_{CC}	Supply Voltage	3.0	3.3	3.6	V
GND	Supply Voltage	0	0	0	V
V_{IH}[1]	Input High Voltage	2.0	—	V_{CC}+0.5	V
V_{IL}[2]	Input Low Voltage	—	—	0.8	V
T_A	Operating Temperature Commercial	0	—	70	°C
T_A	Operating Temperature Industrial	–40	—	85	°C

NOTES:
1. For $\overline{RT}/\overline{RS}/\overline{XI}$ input, V_{IH} = 2.6V (commercial).
   For $\overline{RT}/\overline{RS}/\overline{XI}$ input, V_{IH} = 2.8V (military).
2. 1.5V undershoots are allowed for 10ns once per cycle.

DC ELECTRICAL CHARACTERISTICS

(Commercial: V_{CC} = 3.3V ± 0.3V, T_A = 0°C to +70°C; Industrial: V_{CC} = 3.3V ± 0.3V, T_A = –40°C to +85°C)

Symbol	Parameter	IDT72V01 IDT72V02 IDT72V03 IDT72V04 Commercial & Industrial[1] t_A = 15, 25, 35 ns		IDT72V05 IDT72V06 Commercial & Industrial[1] t_A = 15, 25, 35 ns		Unit
		Min.	Max.	Min.	Max.	
I_{LI}[2]	Input Leakage Current (Any Input)	–1	1	–1	1	µA
I_{LO}[3]	Output Leakage Current	–10	10	–10	10	µA
V_{OH}	Output Logic "1" Voltage I_{OH} = –2mA	2.4	—	2.4	—	V
V_{OL}	Output Logic "0" Voltage I_{OL} = 8mA	—	0.4	—	0.4	V
I_{CC1}[4,5]	Active Power Supply Current	—	60	—	75	mA
I_{CC2}[4,6]	Standby Current ($\overline{R}$=$\overline{W}$=$\overline{RS}$=$\overline{FL}/\overline{RT}$=$V_{IH}$)	—	5	—	5	mA

NOTES:
1. Industrial temperature range product for the 25ns speed grade is available as a standard device. All other speed grades are available by special order.
2. Measurements with 0.4 ≤ V_{IN} ≤ V_{CC}.
3. $\overline{R}$ ≥ V_{IH}, 0.4 ≤ V_{OUT} ≤ V_{CC}.
4. Tested with outputs open (I_{OUT} = 0).
5. Tested at f = 20 MHz.
6. All Inputs = V_{CC} - 0.2V or GND + 0.2V.

CAPACITANCE (T_A = +25°C, f = 1.0 MHz)

Symbol	Parameter[1]	Condition	Max.	Unit
C_{IN}	Input Capacitance	V_{IN} = 0V	8	pF
C_{OUT}	Output Capacitance	V_{OUT} = 0V	8	pF

NOTE:
1. Characterized values, not currently tested.

AC ELECTRICAL CHARACTERISTICS[1]

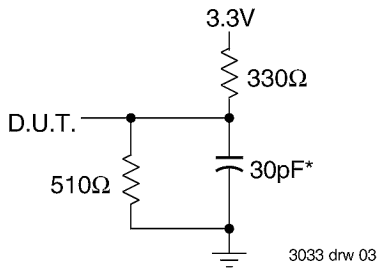
(Commercial: V_{CC} = 3.3V ± 0.3V, T_A = 0°C to +70°C; Industrial: V_{CC} = 3.3V ± 0.3V, T_A = –40°C to +85°C)

		Commercial		Com'l and Ind'l[2]		Commercial		
		IDT72V01L15 IDT72V02L15 IDT72V03L15 IDT72V04L15 IDT72V05L15 IDT72V06L15		IDT72V01L25 IDT72V02L25 IDT72V03L25 IDT72V04L25 IDT72V05L25 IDT72V06L25		IDT72V01L35 IDT72V02L35 IDT72V03L35 IDT72V04L35 IDT72V05L35 IDT72V06L35		
Symbol	Parameter	Min.	Max.	Min.	Max.	Min.	Max.	Unit
f_S	Shift Frequency	—	40	—	28.5	—	22.2	MHz
t_{RC}	Read Cycle Time	25	—	35	—	45	—	ns
t_A	Access Time	—	15	—	25	—	35	ns
t_{RR}	Read Recovery Time	10	—	10	—	10	—	ns
t_{RPW}	Read Pulse Width[3]	15	—	25	—	35	—	ns
t_{RLZ}	Read Pulse Low to Data Bus at Low Z[4]	3	—	3	—	3	—	ns
t_{WLZ}	Write Pulse High to Data Bus at Low Z[4,5]	5	—	5	—	5	—	ns
t_{DV}	Data Valid from Read Pulse High	5	—	5	—	5	—	ns
t_{RHZ}	Read Pulse High to Data Bus at High Z[4]	—	15	—	18	—	20	ns
t_{WC}	Write Cycle Time	25	—	35	—	45	—	ns
t_{WPW}	Write Pulse Width[3]	15	—	25	—	35	—	ns
t_{WR}	Write Recovery Time	10	—	10	—	10	—	ns
t_{DS}	Data Setup Time	11	—	15	—	18	—	ns
t_{DH}	Data Hold Time	0	—	0	—	0	—	ns
t_{RSC}	Reset Cycle Time	25	—	35	—	45	—	ns
t_{RS}	Reset Pulse Width[3]	15	—	25	—	35	—	ns
t_{RSS}	Reset Setup Time[4]	15	—	25	—	35	—	ns
t_{RSR}	Reset Recovery Time	10	—	10	—	10	—	ns
t_{RTC}	Retransmit Cycle Time	25	—	35	—	45	—	ns
t_{RT}	Retransmit Pulse Width[3]	15	—	25	—	35	—	ns
t_{RTS}	Retransmit Setup Time[4]	15	—	25	—	35	—	ns
t_{RTR}	Retransmit Recovery Time	10	—	10	—	10	—	ns
t_{EFL}	Reset to Empty Flag Low	—	25	—	35	—	45	ns
$t_{HFH,FFH}$	Reset to Half-Full and Full Flag High	—	25	—	35	—	45	ns
t_{RTF}	Retransmit Low to Flags Valid	—	25	—	35	—	45	ns
t_{REF}	Read Low to Empty Flag Low	—	15	—	25	—	30	ns
t_{RFF}	Read High to Full Flag High	—	15	—	25	—	30	ns
t_{RPE}	Read Pulse Width after $\overline{EF}$ High	15	—	25	—	35	—	ns
t_{WEF}	Write High to Empty Flag High	—	15	—	25	—	30	ns
t_{WFF}	Write Low to Full Flag Low	—	15	—	25	—	30	ns
t_{WHF}	Write Low to Half-Full Flag Low	—	25	—	35	—	45	ns
t_{RHF}	Read High to Half-Full Flag High	—	25	—	35	—	45	ns
t_{WPF}	Write Pulse Width after $\overline{FF}$ High	15	—	25	—	35	—	ns
t_{XOL}	Read/Write to $\overline{XO}$ Low	—	15	—	25	—	35	ns
t_{XOH}	Read/Write to $\overline{XO}$ High	—	15	—	25	—	35	ns
t_{XI}	$\overline{XI}$ Pulse Width[3]	15	—	25	—	35	—	ns
t_{XIR}	$\overline{XI}$ Recovery Time	10	—	10	—	10	—	ns
t_{XIS}	$\overline{XI}$ Setup Time	10	—	10	—	10	—	ns

NOTES:
1. Timings referenced as in AC Test Conditions.
2. Industrial temperature range product for the 25ns speed grade is available as a standard device. All other speed grades are available by special order.
3. Pulse widths less than minimum value are not allowed.
4. Values guaranteed by design, not currently tested.
5. Only applies to read data flow-through mode.

AC TEST CONDITIONS

Input Pulse Levels	GND to 3.0V
Input Rise/Fall Times	5ns
Input Timing Reference Levels	1.5V
Output Reference Levels	1.5V
Output Load	See Figure 1

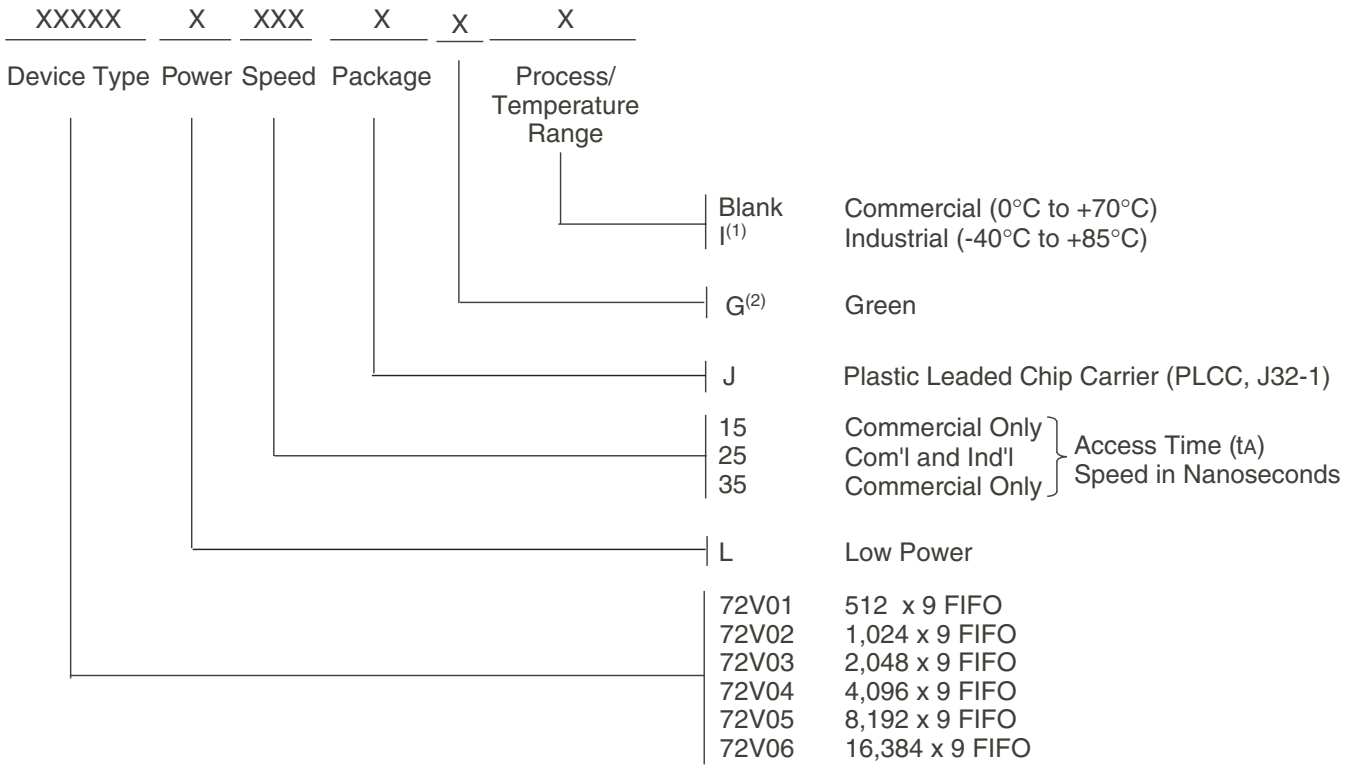


or equivalent circuit

Figure 1. Output Load

* Includes scope and jig capacitances.

ORDERING INFORMATION



3033 drw 21

NOTES:

1. Industrial temperature range product for the 25ns speed grade is available as a standard device. All other speed grades are available by special order.
2. Green parts are available. For specific speeds and packages contact your local sales office.