Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

## Contact us

FAST CMOS 8-BIT IDENTITY COMPARATOR

IDT74FCT521AT/CT

FEATURES:

- A and C grades
- Low input and output leakage ≤1µA (max.)
- CMOS power levels
- True TTL input and output compatibility:
  - V_{OH} = 3.3V (typ.)
  - V_{OL} = 0.3V (typ.)
- **High Drive outputs (-15mA I_{OH}, 48mA I_{OL})**
- **Meets or exceeds JEDEC standard 18 specifications**
- **Power off disable outputs permit "live insertion"**
- **Available in SOIC and QSOP packages**

DESCRIPTION:

The IDT74FCT521T is an 8-bit identity comparator built using an advanced dual metal CMOS technology. These devices compare two words of up to eight bits each and provide a low output when the two words match bit for bit. The expansion input $\bar{I}_{A=B}$ also serves as an active low enable input.
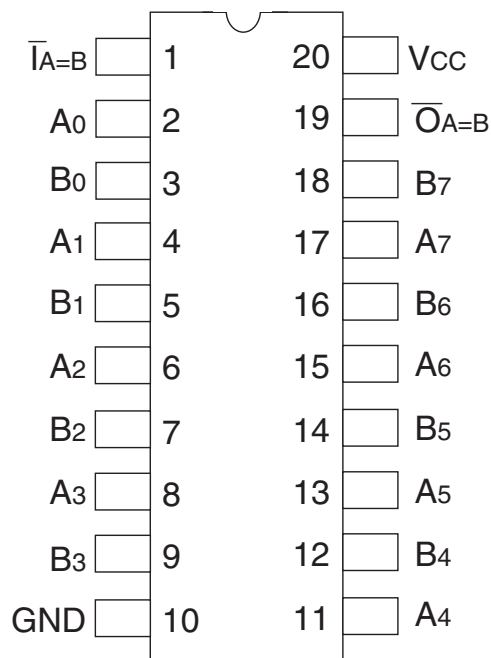
FUNCTIONAL BLOCK DIAGRAM
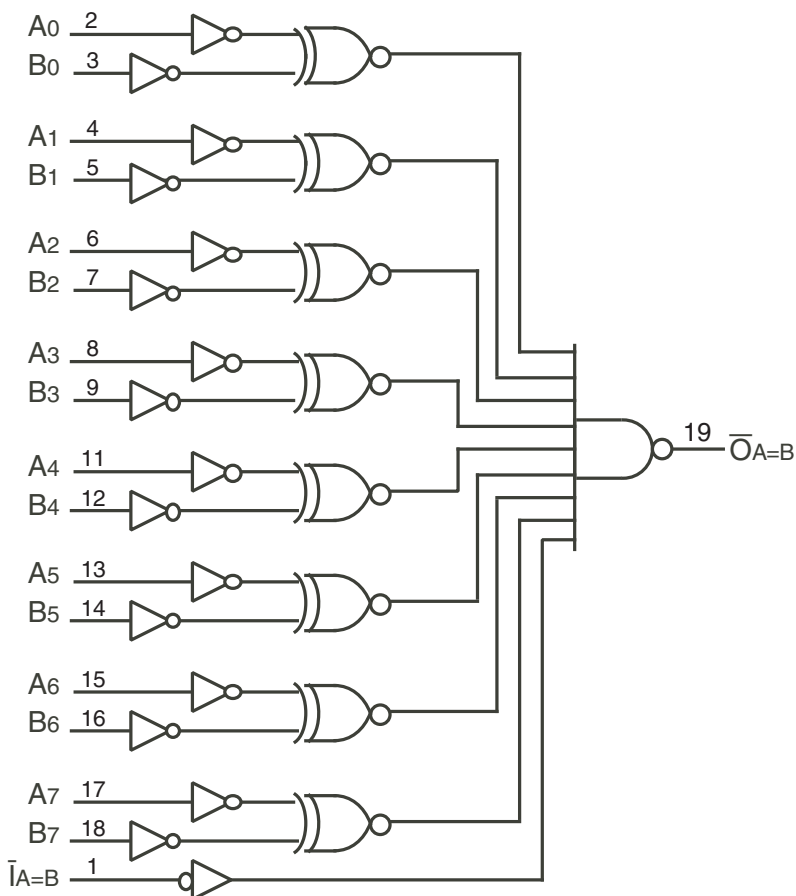
INDUSTRIAL TEMPERATURE RANGE

NOVEMBER 2016

DSC-2572/14

PIN CONFIGURATION

```
                       ┌───────∪───────┐
            IA=B ──┤ 1          20 ├── VCC
             A0 ──┤ 2          19 ├── OA=B
             B0 ──┤ 3          18 ├── B7
             A1 ──┤ 4          17 ├── A7
             B1 ──┤ 5          16 ├── B6
             A2 ──┤ 6          15 ├── A6
             B2 ──┤ 7          14 ├── B5
             A3 ──┤ 8          13 ├── A5
             B3 ──┤ 9          12 ├── B4
            GND ──┤ 10         11 ├── A4
                       └───────────────┘
```

TOP VIEW

Package Type	Package Code	Order Code
QSOP	PCG20	QG
SOIC	PSG20	SOG

ABSOLUTE MAXIMUM RATINGS[1]

Symbol	Description	Max	Unit
V_{TERM}[2]	Terminal Voltage with Respect to GND	−0.5 to +7	V
V_{TERM}[3]	Terminal Voltage with Respect to GND	−0.5 to V_{CC}+0.5	V
T_{STG}	Storage Temperature	−65 to +150	°C
I_{OUT}	DC Output Current	−60 to +120	mA

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. No terminal voltage may exceed Vcc by +0.5V unless otherwise noted.
2. Inputs and Vcc terminals only.
3. Output and I/O terminals only.

CAPACITANCE (T_A = +25°C, F = 1.0MHz)

Symbol	Parameter[1]	Conditions	Typ.	Max.	Unit
C_{IN}	Input Capacitance	V_{IN} = 0V	6	10	pF
C_{OUT}	Output Capacitance	V_{OUT} = 0V	8	12	pF

NOTE:
1. This parameter is measured at characterization but not tested.

PIN DESCRIPTION

Pin Names	Description
A_0 - A_7	Word A Inputs
B_0 - B_7	Word B Inputs
$\overline{I}_{A=B}$	Expansion or Enable Input (Active LOW)
$\overline{O}_{A=B}$	Identity Output (Active LOW)

FUNCTION TABLE[1]

Inputs		Output
$\overline{I}_{A=B}$	A, B	$\overline{O}_{A=B}$
L	A = B*	L
L	A ≠ B	H
H	A = B*	H
H	A ≠ B	H

NOTE:
1. H = HIGH Voltage Level
   L = LOW Voltage Level
   *A_0 = B_0, A_1 = B_1, A_2 = B_2, etc.

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:
Industrial: T_A = –40°C to +85°C, V_{CC} = 5.0V ±5%

Symbol	Parameter	Test Conditions[1]		Min.	Typ.[2]	Max.	Unit
V_{IH}	Input HIGH Level	Guaranteed Logic HIGH Level		2	—	—	V
V_{IL}	Input LOW Level	Guaranteed Logic LOW Level		—	—	0.8	V
I_{IH}	Input HIGH Current[4]	V_{CC} = Max.	V_I = 2.7V	—	—	±1	µA
I_{IL}	Input LOW Current[4]	V_{CC} = Max.	V_I = 0.5V	—	—	±1	
I_I	Input HIGH Current[4]	V_{CC} = Max., V_I = V_{CC} (Max.)		—	—	±1	µA
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA		—	–0.7	–1.2	V
I_{OS}	Short Circuit Current	V_{CC} = Max., V_O = GND[3]		–60	–120	–225	mA
V_{OH}	Output HIGH Voltage	V_{CC} = Min	I_{OH} = –8mA	2.4	3.3	—	V
		V_{IN} = V_{IH} or V_{IL}	I_{OH} = –15mA	2	3	—	
V_{OL}	Output LOW Voltage	V_{CC} = Min	I_{OL} = 48mA	—	0.3	0.5	V
		V_{IN} = V_{IH} or V_{IL}					
V_H	Input Hysteresis	—		—	200	—	mV
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max. V_{IN} = GND or V_{CC}		—	0.01	1	mA

NOTES:
1. For conditions shown as Min. or Max., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{CC} = 5.0V, +25°C ambient.
3. Not more than one output should be tested at one time. Duration of the test should not exceed one second.
4. The test limit for this parameter is ±5µA at T_A = –55°C.

POWER SUPPLY CHARACTERISTICS

Symbol	Parameter	Test Conditions[1]		Min.	Typ.[2]	Max.	Unit
ΔI_{CC}	Quiescent Power Supply Current TTL Inputs HIGH	V_{CC} = Max. V_{IN} = 3.4V[3]		—	0.5	2	mA
I_{CCD}	Dynamic Power Supply Current[4]	V_{CC} = Max. Outputs Open One Input Toggling 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND	—	0.15	0.25	mA/ MHz
I_C	Total Power Supply Current[6]	V_{CC} = Max. Outputs Open	V_{IN} = V_{CC} V_{IN} = GND	—	1.5	3.5	mA
		f_i = 10MHz One Bit Toggling 50% Duty Cycle	V_{IN} = 3.4V V_{IN} = GND	—	1.8	4.5	

NOTES:
1. For conditions shown as Min. or Max., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{CC} = 5.0V, +25°C ambient.
3. Per TTL driven input; (V_{IN} = 3.4V). All other inputs at V_{CC} or GND.
4. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
5. Values for these conditions are examples of ΔI_{CC} formula. These limits are guaranteed but not tested.
6. I_C = $I_{QUIESCENT}$ + I_{INPUTS} + $I_{DYNAMIC}$
   I_C = I_{CC} + ΔI_{CC} $D_H N_T$ + I_{CCD} (f_{CP}/2+ $f_i N_i$)
   I_{CC} = Quiescent Current
   ΔI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = 3.4V)
   D_H = Duty Cycle for TTL Inputs High
   N_T = Number of TTL Inputs at D_H
   I_{CCD} = Dynamic Current caused by an Input Transition Pair (HLH or LHL)
   f_{CP} = Clock Frequency for Register Devices (Zero for Non-Register Devices)
   f_i = Output Frequency
   N_i = Number of Outputs at f_i
All currents are in milliamps and all frequencies are in megahertz.

SWITCHING CHARACTERISTICS OVER OPERATING RANGE

Symbol	Parameter	Condition[1]	74FCT521AT		74FCT521CT		Unit
			Min.[2]	Max.	Min.[2]	Max.	
t_{PLH} t_{PHL}	Propagation Delay Ax or Bx to $\overline{O}_{A=B}$	C_L = 50pF R_L = 500Ω	1.5	7.2	1.5	4.5	ns
t_{PLH} t_{PHL}	Propagation Delay $\overline{I}_{A=B}$ to $\overline{O}_{A=B}$		1.5	6	1.5	4.1	ns

NOTES:
1. See test circuit and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
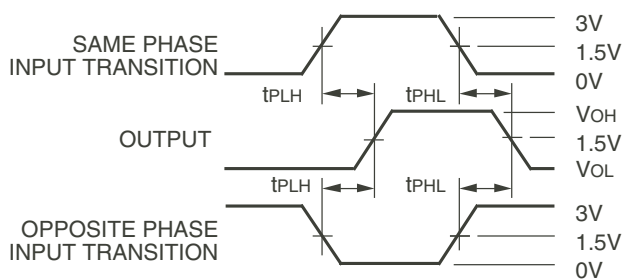
TEST CIRCUITS AND WAVEFORMS

VCC
7.0V
500W
Pulse Generator
V_{IN}
D.U.T.
V_{OUT}
50pF
500W
R_T
C_L
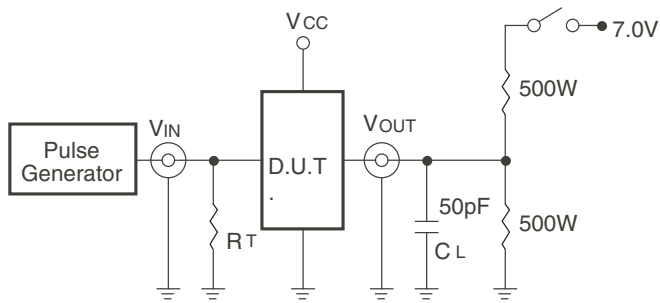
Octal Link

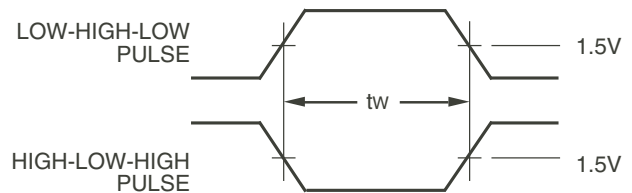*Test Circuits for All Outputs*

SWITCH POSITION

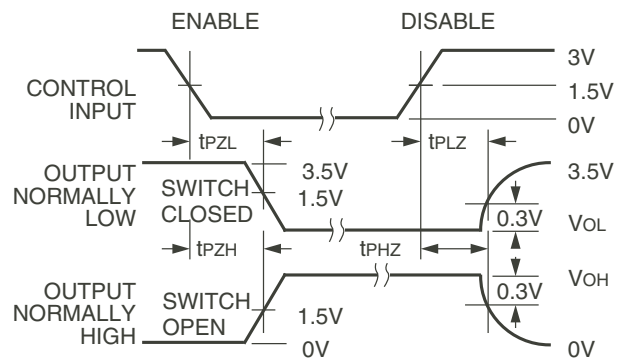| Test	Switch
Open Drain Disable Low Enable Low	Closed
All Other Tests	Open

DEFINITIONS:

C_L = Load capacitance: includes jig and probe capacitance.
R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.

DATA INPUT — 3V 1.5V 0V
t_{SU} t_H
TIMING INPUT — 3V 1.5V 0V
ASYNCHRONOUS CONTROL PRESET CLEAR ETC. — 3V 1.5V 0V
t_{REM}
SYNCHRONOUS CONTROL PRESET CLEAR CLOCK ENABLE ETC. — 3V 1.5V 0V
t_{SU} t_H

Octal Link

Set-Up, Hold, and Release Times

LOW-HIGH-LOW PULSE — 1.5V
t_w
HIGH-LOW-HIGH PULSE — 1.5V

Octal Link

Pulse Width

SAME PHASE INPUT TRANSITION — 3V 1.5V 0V
t_{PLH} t_{PHL}
OUTPUT — VOH 1.5V VOL
t_{PLH} t_{PHL}
OPPOSITE PHASE INPUT TRANSITION — 3V 1.5V 0V

Octal Link

Propagation Delay

ENABLE   DISABLE
CONTROL INPUT — 3V 1.5V 0V
t_{PZL} t_{PLZ}
OUTPUT NORMALLY LOW SWITCH CLOSED — 3.5V 1.5V VOL 0.3V
t_{PZH} t_{PHZ}
OUTPUT NORMALLY HIGH SWITCH OPEN — 1.5V 0V 3.5V 0.3V VOH 0V
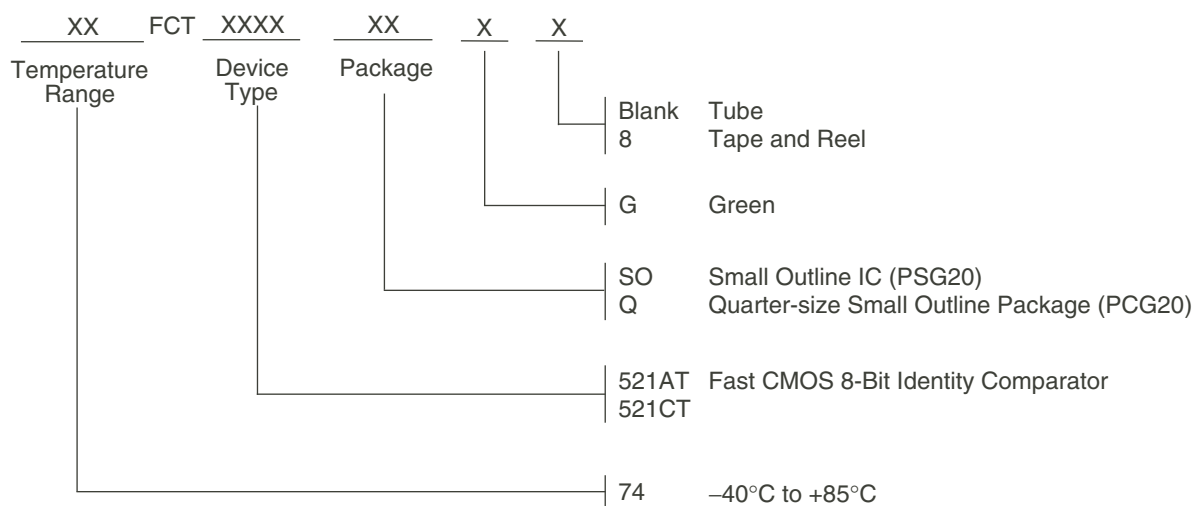
Octal Link

Enable and Disable Times

NOTES:
1. Diagram shown for input Control Enable-LOW and input Control Disable-HIGH.
2. Pulse Generator for All Pulses: Rate ≤ 1.0MHz; t_F ≤ 2.5ns; t_R ≤ 2.5ns.

ORDERING INFORMATION

```
XX    FCT    XXXX      XX       X      X
```
Temperature   Device   Package
Range   Type

Blank	Tube
8	Tape and Reel

G	Green

SO	Small Outline IC (PSG20)
Q	Quarter-size Small Outline Package (PCG20)

521AT	Fast CMOS 8-Bit Identity Comparator
521CT	

74	−40°C to +85°C

Orderable Part Information

Speed Grade	Orderable Part ID	Pkg. Code	Pkg. Type	Temp. Grade
A	74FCT521ATQG	PCG20	QSOP	I
	74FCT521ATQG8	PCG20	QSOP	I
	74FCT521ATSOG	PSG20	SOIC	I
	74FCT521ATSOG8	PSG20	SOIC	I
C	74FCT521CTQG	PCG20	QSOP	I
	74FCT521CTQG8	PCG20	QSOP	I
	74FCT521CTSOG	PSG20	SOIC	I
	74FCT521CTSOG8	PSG20	SOIC	I

Datasheet Document History

10/03/2009	Pg. 6	Updated the ordering information by removing the "IDT" notation and non RoHS part.
11/16/2016	Pg. 2, 6	Added table under pin configuration diagram with detailed package information. Updated the ordering information diagram by deleting PYG package and adding Tube, Tape and Reel. Added new table of orderable part information.