

## 74F543 Octal Registered Transceiver

### General Description

The 'F543 octal transceiver contains two sets of D-type latches for temporary storage of data flowing in either direction. Separate Latch Enable and Output Enable inputs are provided for each register to permit independent control of inputting and outputting in either direction of data flow. The A outputs are guaranteed to sink 24 mA (20 mA Mil) while the B outputs are rated for 64 mA (48 mA Mil).

### Features

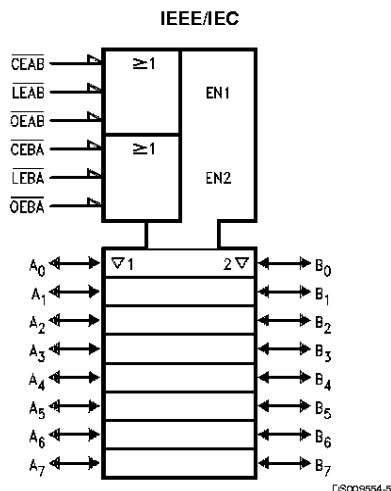
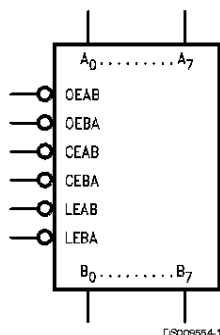
- 8-bit octal transceiver
- Back-to-back registers for storage
- Separate controls for data flow in each direction
- A outputs sink 24 mA (20 mA Mil)
- B outputs sink 64 mA (48 mA Mil)
- 300 mil slim package

### Ordering Code:

Commercial	Package Number	Package Description
74F543SPC	N24C	24-Lead (0.300" Wide) Molded Dual-In-Line
74F543SC (Note 1)	M24B	24-Lead (0.300" Wide) Molded Small Outline, JEDEC
74F543SJ (Note 1)	M24B	24-Lead (0.300" Wide) Molded Small Outline, EIAJ
74F543MSA (Note 1)	MSA24	24-Lead Molded Shrink Small Outline, EIAJ, Type II

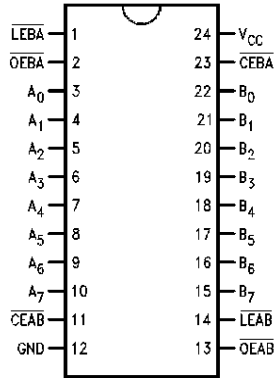
Note 1: Devices also available in 13" reel. Use suffix = SCX, SJX and MSAX

### Logic Symbols



## Connection Diagram

Pin Assignment for  
DIP and SOIC



DS00S54-2

## Unit Loading/Fan Out

Pin Names	Description	74F	
		U.L. HIGH/LOW	Input $I_{IH}/I_{IL}$ Output $I_{OH}/I_{OL}$
$\overline{OEAB}$	A-to-B Output Enable Input (Active LOW)	1.0/1.0	20 $\mu A$ /-0.6 mA
$\overline{OEBA}$	B-to-A Output Enable Input (Active LOW)	1.0/1.0	20 $\mu A$ /-0.6 mA
$\overline{CEAB}$	A-to-B Enable Input (Active LOW)	1.0/2.0	20 $\mu A$ /-1.2 mA
$\overline{CEBA}$	B-to-A Enable Input (Active LOW)	1.0/2.0	20 $\mu A$ /-1.2 mA
$\overline{LEAB}$	A-to-B Latch Enable Input (Active LOW)	1.0/1.0	20 $\mu A$ /-0.6 mA
$\overline{LEBA}$	B-to-A Latch Enable Input (Active LOW)	1.0/1.0	20 $\mu A$ /-0.6 mA
$A_0$ - $A_7$	A-to-B Data Inputs or B-to-A 3-STATE Outputs	3.5/1.083 150/40 (33.8)	70 $\mu A$ /-650 $\mu A$ -3 mA/24 mA (20 mA)
$B_0$ - $B_7$	B-to-A Data Inputs or A-to-B 3-STATE Outputs	3.5/1.083 600/106.6 (80)	70 $\mu A$ /-650 $\mu A$ -12 mA/64 mA (48 mA)

## Functional Description

The 'F543 contains two sets of eight D-type latches, with separate input and output controls for each set. For data flow from A to B, for example, the A-to-B Enable ( $\overline{CEAB}$ ) input must be LOW in order to enter data from  $A_0$ - $A_7$  or take data from  $B_0$ - $B_7$ , as indicated in the Data I/O Control Table. With  $\overline{CEAB}$  LOW, a LOW signal on the A-to-B Latch Enable ( $\overline{LEAB}$ ) input makes the A-to-B latches transparent; a subsequent LOW-to-HIGH transition of the  $\overline{LEAB}$  signal puts the A latches in the storage mode and their outputs no longer change with the A inputs. With  $\overline{CEAB}$  and  $\overline{OEAB}$  both LOW, the 3-STATE B output buffers are active and reflect the data present at the output of the A latches. Control of data flow from B to A is similar, but using the  $\overline{CEBA}$ ,  $\overline{LEBA}$  and  $\overline{OEBA}$  inputs.

## Data I/O Control Table

Inputs			Latch Status	Output Buffers
$\overline{CEAB}$	$\overline{LEAB}$	$\overline{OEAB}$		
H	X	X	Latched	High Z
X	H	X	Latched	—
L	L	X	Transparent	—
X	X	H	—	High Z
L	X	L	—	Driving

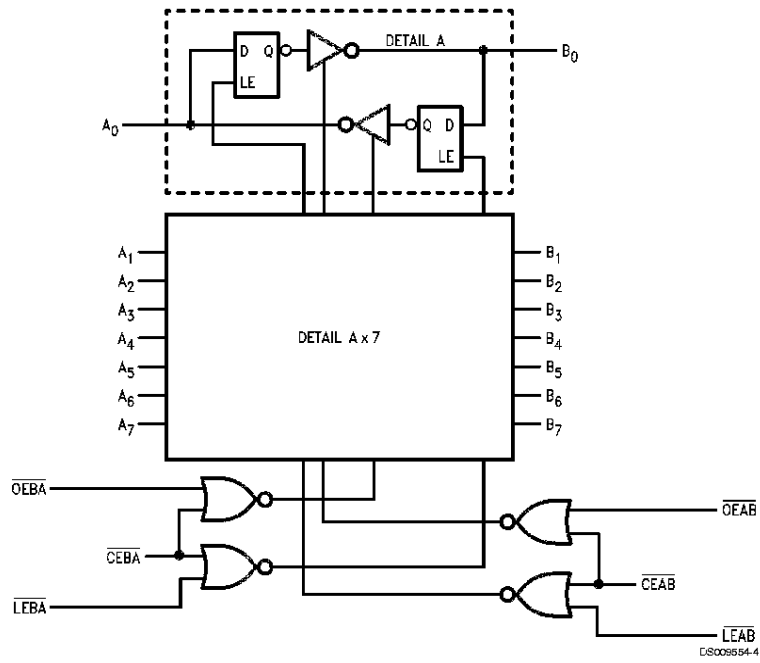
H = HIGH Voltage Level

L = LOW Voltage Level

X = Immaterial

A-to-B data flow shown. B-to-A flow control is the same, except using  $\overline{CEBA}$ ,  $\overline{LEBA}$  and  $\overline{OEBA}$ .

## Logic Diagram



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays

### Absolute Maximum Ratings (Note 2)

Storage Temperature	-65°C to +150°C
Ambient Temperature under Bias	-55°C to +125°C
Junction Temperature under Bias	-55°C to +175°C
Plastic	-55°C to +150°C
V <sub>CC</sub> Pin Potential to Ground Pin	-0.5V to +7.0V
Input Voltage (Note 3)	-0.5V to +7.0V
Input Current (Note 3)	-30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V <sub>CC</sub> = 0V)	
Standard Output	-0.5V to V <sub>CC</sub>
3-STATE Output	-0.5V to +5.5V

Current Applied to Output in LOW State (Max) twice the rated I<sub>OL</sub> (mA)

### Recommended Operating Conditions

Free Air Ambient Temperature	
Commercial	0°C to +70°C
Supply Voltage	
Commercial	+4.5V to +5.5V

**Note 2:** Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

**Note 3:** Either voltage limit or current limit is sufficient to protect inputs.

### DC Electrical Characteristics

Symbol	Parameter	74F			Units	V <sub>CC</sub>	Conditions
		Min	Typ	Max			
V <sub>IH</sub>	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V <sub>IL</sub>	Input LOW Voltage	0.8			V		Recognized as a LOW Signal
V <sub>CD</sub>	Input Clamp Diode Voltage	-1.2			V	Min	I <sub>IN</sub> = -18 mA
V <sub>OH</sub>	Output HIGH Voltage	74F 10% V <sub>CC</sub>	2.5		V	Min	I <sub>OH</sub> = -1 mA (A <sub>n</sub> )
		74F 10% V <sub>CC</sub>	2.4				I <sub>OH</sub> = -3 mA (A <sub>n</sub> , B <sub>n</sub> )
		74F 5% V <sub>CC</sub>	2.7				I <sub>OH</sub> = -1 mA (A <sub>n</sub> )
		74F 5% V <sub>CC</sub>	2.7				I <sub>OH</sub> = -3 mA (A <sub>n</sub> , B <sub>n</sub> )
		74F 10% V <sub>CC</sub>	2.0				I <sub>OH</sub> = -15 mA (B <sub>n</sub> )
V <sub>OL</sub>	Output LOW Voltage	74F 10% V <sub>CC</sub>	0.5		V	Min	I <sub>OL</sub> = 24 mA (A <sub>n</sub> )
		74F 10% V <sub>CC</sub>	0.55				I <sub>OL</sub> = 64 mA (B <sub>n</sub> )
I <sub>IH</sub>	Input HIGH Current	5.0			µA	Max	V <sub>IN</sub> = 2.7V
I <sub>BVI</sub>	Input HIGH Current Breakdown Test	74F	7.0		µA	Max	(OEAB, OEBA, LEAB, LEBÄ, CEAB, CEBA)
I <sub>BVIT</sub>	Input HIGH Current Breakdown (I/O)	74F	0.5		mA	Max	V <sub>IN</sub> = 5.5V (A <sub>n</sub> , B <sub>n</sub> )
I <sub>CEX</sub>	Output HIGH Leakage Current	74F	50		µA	Max	V <sub>OUT</sub> = V <sub>CC</sub>
V <sub>ID</sub>	Input Leakage Test	74F	4.75		V	0.0	I <sub>ID</sub> = 1.9 µA All Other Pins Grounded
I <sub>OD</sub>	Output Leakage Circuit Current	74F	3.75		µA	0.0	V <sub>IOD</sub> = 150 mV All Other Pins Grounded
I <sub>IL</sub>	Input LOW Current	-0.6			mA	Max	V <sub>IN</sub> = 0.5V (OEAB, OEBA)
		-1.2					V <sub>IN</sub> = 0.5V (CEAB, CEBA)
I <sub>IH</sub> + I <sub>OZH</sub>	Output Leakage Current	70			µA	Max	V <sub>OUT</sub> = 2.7V (A <sub>n</sub> , B <sub>n</sub> )
I <sub>IL</sub> + I <sub>OZL</sub>	Output Leakage Current	-650			µA	Max	V <sub>OUT</sub> = 0.5V (A <sub>n</sub> , B <sub>n</sub> )
I <sub>OS</sub>	Output Short-Circuit Current	-60		-150	mA	Max	V <sub>OUT</sub> = 0V (A <sub>n</sub> )
		-100		-225			V <sub>OUT</sub> = 0V (B <sub>n</sub> )
I <sub>ZZ</sub>	Bus Drainage Test	500			µA	0.0V	V <sub>OUT</sub> = 5.25V (A <sub>n</sub> , B <sub>n</sub> )
I <sub>CCH</sub>	Power Supply Current	67		100	mA	Max	V <sub>O</sub> = HIGH
I <sub>CCL</sub>	Power Supply Current	83		125	mA	Max	V <sub>O</sub> = LOW
I <sub>CCZ</sub>	Power Supply Current	83		125	mA	Max	V <sub>O</sub> = HIGH Z

## AC Electrical Characteristics

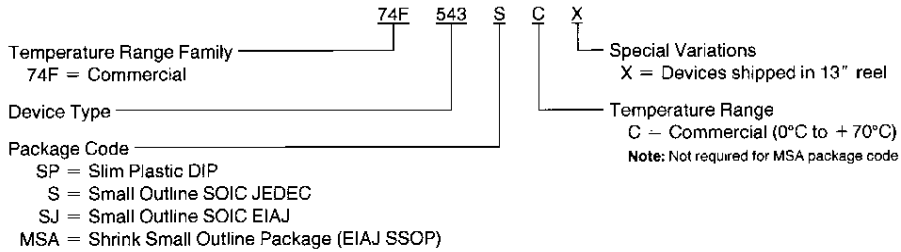
Symbol	Parameter	74F			74F		Units
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50 pF			T <sub>A</sub> , V <sub>CC</sub> = Com C <sub>L</sub> = 50 pF		
		Min	Typ	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Transparent Mode A <sub>n</sub> to B <sub>n</sub> or B <sub>n</sub> to A <sub>n</sub>	3.0	5.5	7.5	3.0	8.5	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay LEB $\bar{A}$ to A <sub>n</sub>	4.5	8.5	11.0	4.5	12.5	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay LEAB to B <sub>n</sub>	4.5	8.5	11.0	4.5	12.5	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable Time OEBA or OEAB to A <sub>n</sub> or B <sub>n</sub> CEBA or CEAB to A <sub>n</sub> or B <sub>n</sub>	3.0 4.0	7.0 7.5	9.0 10.5	3.0 4.0	10.0 12.0	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Output Disable Time OEBA or OEAB to A <sub>n</sub> or B <sub>n</sub> CEBA or CEAB to A <sub>n</sub> or B <sub>n</sub>	1.0 2.5	6.0 5.5	8.0 10.5	1.0 2.5	9.0 11.5	ns

## AC Operating Requirements

Symbol	Parameter	74F		74F		Units
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0V		T <sub>A</sub> , V <sub>CC</sub> = Com		
		Min	Max	Min	Max	
t <sub>s</sub> (H) t <sub>s</sub> (L)	Setup Time, HIGH or LOW A <sub>n</sub> or B <sub>n</sub> to LEBA or LEAB	3.0		3.5		ns
t <sub>h</sub> (H) t <sub>h</sub> (L)	Hold Time, HIGH or LOW A <sub>n</sub> or B <sub>n</sub> to LEBA or LEAB	3.0		3.5		
t <sub>w</sub> (L)	Latch Enable, B to A or B to A Pulse Width, LOW	8.0		9.0		ns

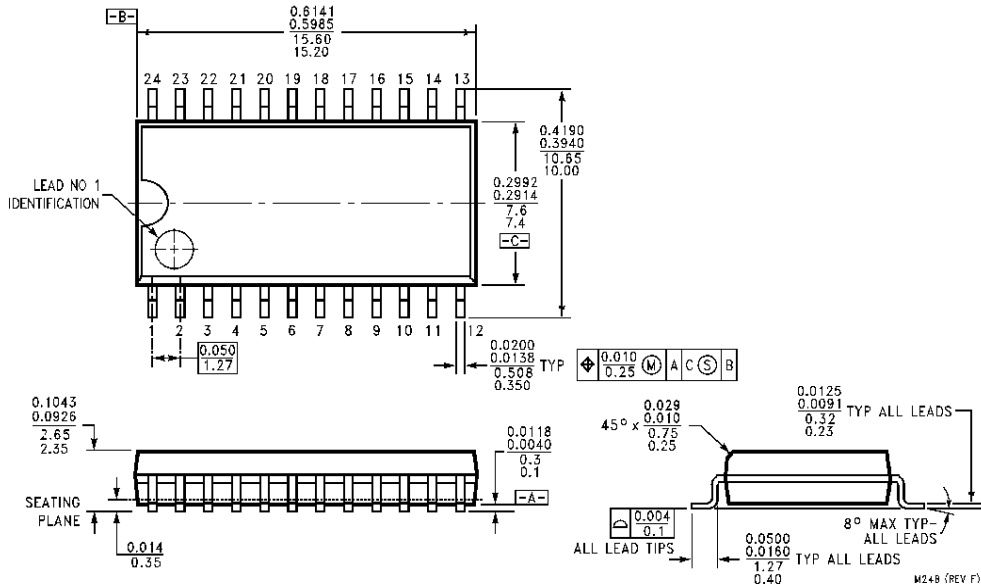
## Ordering Information

The device number is used to form part of a simplified purchasing code where the package type and temperature range are defined as follows:



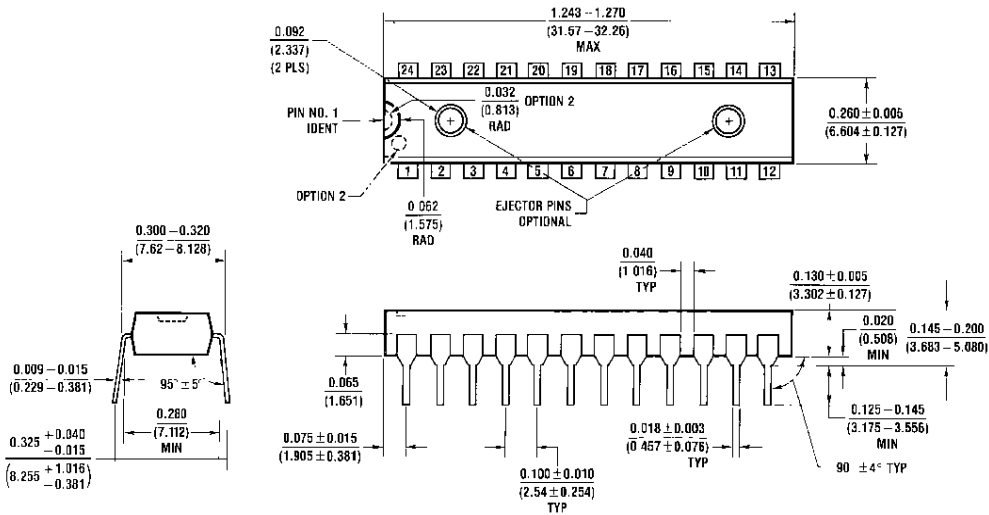
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## Physical Dimensions inches (millimeters) unless otherwise noted



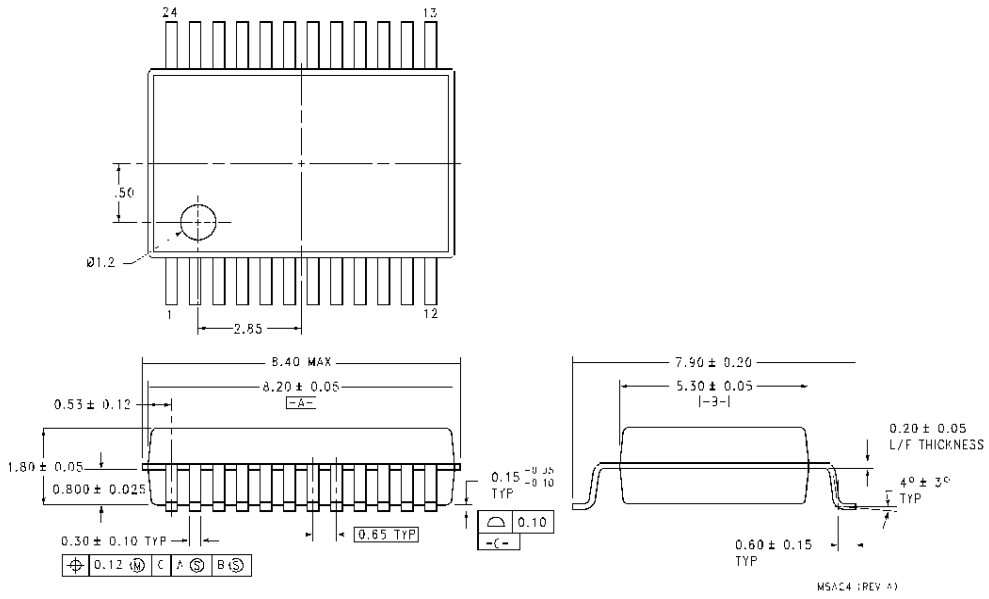
24-Lead (0.300" Wide) Molded Small Outline Package, JEDEC (S)  
 Package Number M24B

**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



MSA24 (REV 5)

Lit. # 114647



MSA24 (REV 5)

**24-Lead Molded Shrink Small Outline Package, EIAJ Type II (MSA)  
 Package Number MSA24**

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