SN54LS183, SN74LS183
DUAL CARRY-SAVE FULL ADDERS

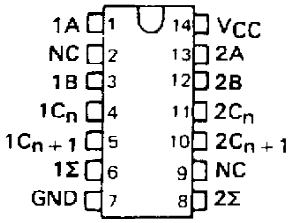
SDLS137

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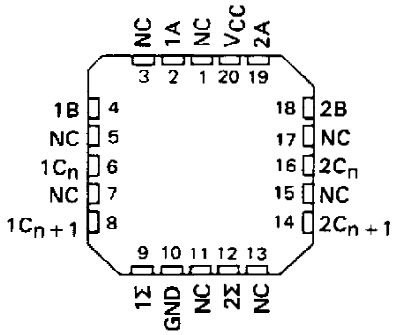
- For Use in High-Speed Wallace-Tree Summing Networks
- High-Speed, High-Fan-Out Darlington Outputs
- Input Clamping Diodes Simplify System Design

TYPES	TYPICAL AVERAGE PROPAGATION DELAY TIME	TYPICAL POWER DISSIPATION
'LS183	15 ns	23 mW per bit

SN54LS183 . . . J OR W PACKAGE
SN74LS183 . . . D OR N PACKAGE
(TOP VIEW)



SN54LS183 . . . FK PACKAGE
(TOP VIEW)

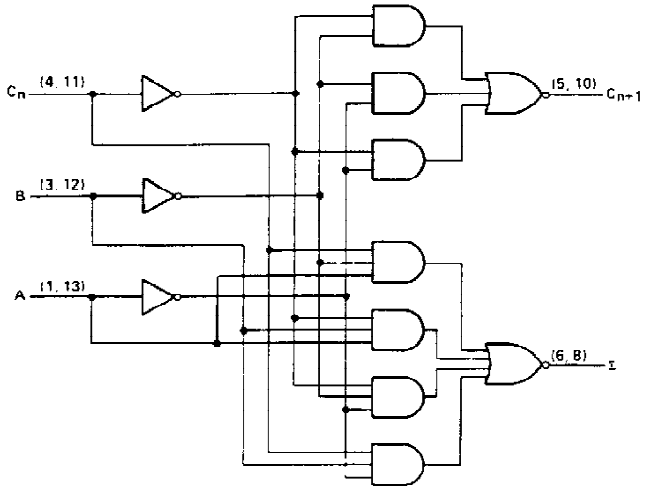


NC – No internal connection

description

These dual full adders feature an individual carry output from each bit for use in multiple-input, carry-save techniques to produce the true sum and true carry outputs with no more than two gate delays. The circuits utilize high-speed, high-fan-out, transistor-transistor logic (TTL), but are compatible with both DTL and TTL families. SN54LS183 is characterized for operation over the full military temperature range of −55°C to 125°C; SN74LS183 is characterized for operation from 0°C to 70°C.

logic diagram (each adder)



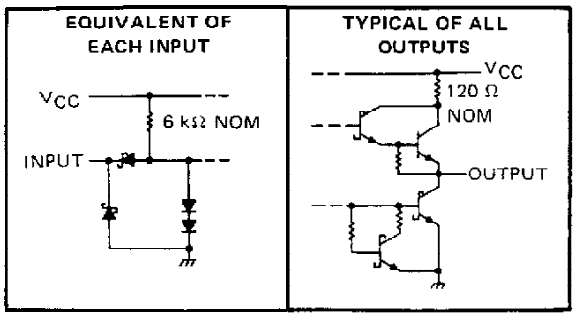
Pin numbers shown are for D, J, N, and W packages.

FUNCTION TABLE
(EACH ADDER)

INPUTS			OUTPUTS	
C_n	B	A	Σ	C_{n+1}
L	L	L	L	L
L	L	H	H	L
L	H	L	H	L
L	H	H	L	H
H	L	L	H	L
H	L	H	L	H
H	H	L	L	H
H	H	H	H	H

H = high level, L = low level

schematics of inputs and outputs



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absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage V_{CC} (see Note 1) . . . . . 7 V
Input voltage . . . . . 7 V
Operating free-air temperature range: SN54LS183 Circuits . . . . . −55°C to 125°C
SN74LS183 Circuits . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

NOTE 1: Voltage values, except interemitter voltage, are with respect to network ground terminal.

recommended operating conditions

	SN54LS183			SN74LS183			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			−400			−400	μA
Low-level output current, I_{OL}			4			8	mA
Operating free-air temperature, T_A	−55		125	0		70	°C

electrical characteristics over recommended operation free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS†		MIN	TYP‡	MAX	MIN	TYP‡	MAX	UNIT
V_{IH}	High-level input voltage			2			2			V
V_{IL}	Low-level input voltage					0.7			0.8	V
V_{IK}	Input clamp voltage	V_{CC} = MIN,	I_I = −18 mA			−1.5			−1.5	V
V_{OH}	High-level output voltage	V_{CC} = MIN, V_{IL} = V_{IL}max,	V_{IH} = 2 V, I_{OH} = −400 μA	2.5	3.4		2.7	3.4		V
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = V_{IL}max,	I_{OL} = 4 mA		0.25	0.4		0.25	0.4	V
			I_{OL} = 8 mA					0.35	0.5	
I_I	Input current at maximum input voltage	V_{CC} = MAX,	V_I = 7 V			0.3			0.3	mA
I_{IH}	High-level input current	V_{CC} = MAX,	V_I = 2.7 V			60			60	μA
I_{IL}	Low-level input current	V_{CC} = MAX,	V_I = 0.4 V			−1.2			−1.2	mA
I_{OS}	Short-circuit output current§	V_{CC} = MAX		−20		−100	−20		−100	mA
I_{CCL}	Supply current, all outputs low	V_{CC} = MAX,	See Note 3		10	17		10	17	mA
I_{CCH}	Supply current, all outputs high	V_{CC} = MAX,	See Note 4		8	14		8	14	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.
§ Not more than one output should be shorted at a time, and duration of the short circuit should not exceed one second.
NOTES: 3. I_{CCL} is measured with all outputs open and all inputs grounded.
4. I_{CCH} is measured with all outputs open and all inputs at 4.5 V.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L = 15 pF, R_L = 2 kΩ, See Note 5		9	15	ns
t_{PHL}	Propagation delay time, high-to-low-level output			20	33	ns

NOTE 5: Load circuits and voltage waveforms are shown in Section 1.

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