MANUFACTURER	PART NUMBER	HARRIS EQUIVALENT	NOTES
Motorola (continued)	MC1545/1445	HA-2400/2405	C3
	MC1554/1454	HA-2630/2635	C3
	MC1556/1456	HA-2600/2605	B2
	MC1558/1458	HA-2650/2655	A2
	MC1582L	HD-245	C2
	MC1583L	HD-246	C2
	MC1584L	HD-249	C2
	MC1488L	HD-1488	A1
	MC1489L	HD-1489	A1
	MC1489AL	HD-1489A	A1
National Semiconductor	LH0001	HA-2700	C2
	LH0002	HA-2630	C2
	LH0003	HA-2520	C2
	LH0004	HA-2640	C2
	LH0005	HA-2620	C2
	LH0022/42/52	HA-2060/2065	B2
	LH0023/43	HA-2420/2425	C2
	LH0024	HA-2530/2535	B2
	LH0032	HA-2050/2055	C3
	LH0033/63	HA-2630/2635	C3
	LH0062	HA-2050/2055	B2
	LM101/301/107/307	HA-909/911, 2600/2605, 2700/2705	B2
	LM102/302	HA-2600/2605	B2
	LM108/208/308	HA-2700/2704/2705	B3
	LM110/310	HA-2500/2505	B2
	LM111/211/311	HA-2111/2211/2311	A1
	LM112/212/312	HA-2700/2704/2705	B3
	LM216/316	HA-2060/2065	B3
	LM118/318	HA-2510/2515	B2
	LM143/343	HA-2640/2645	A2
	LM163/363	HD-248/548	C3
	LM1488	HD-1488	A1
	LM1489/A	HD-1489/A	A1
Precision Monolithics	OP-01	HA-2600/2605/2500/2505	B2
	OP-05/07	HA-2900/2905	B2
	CMP-01/02	HA-2111/2311	B3
	SSS1558/1458	HA-2650/2655	A2
	DAC-02/04/100	HI-1080/1085	C3
RCA	111/211/311	HA-2111/2211/2311	A1
	CA3020	HA-2630/2635	C2
	CA3078	HA-2720/2730	B2
	CA3100	HA-2520/2525	B2
	CA3130	HA-2060/2065	B2
	CA3558/3458	HA-2650/2655	A2
	CA6078	HA-2720/2730	B2
	CD4016	HI-201	C2
	CD4046	HA-2820/2825	C2

NOTES:
A. Pin-for-pin replacement
B. Minor pin-out difference (offset adj., compensation, etc.)
C. Not pin compatible — consult data sheets.

1. Identical electrical specifications
2. Harris part superior in most parameters
3. Parameter tradeoffs — consult data sheets

HARRIS SEMICONDUCTOR
A DIVISION OF HARRIS CORPORATION

HD-245/545 *Triple Line Transmitter*
HD-246/546/249/549 *Triple Line Receivers*
HD-248/548 *Triple Party Line Receiver*

FEATURES:

- CURRENT MODE OPERATION
- HIGH SPEED: 15MHz WITH 50FT. CABLE; 2MHz WITH 1,000FT. CABLE
- HIGH NOISE IMMUNITY
- LOW EMI GENERATION
- LOW POWER DISSIPATION
- HIGH COMMON MODE REJECTION
- TRANSMITTER AND RECEIVER PARTY LINE CAPABILITY
- TOLERATES -2.0V TO +20.0V GROUND DIFFERENTIAL (Transmitter with respect to receiver)
- TRANSMITTER INPUT/RECEIVER OUTPUT TTL/DTL COMPATIBLE

GENERAL DESCRIPTION

Each transmitter-receiver combination provides a digital interface between systems linked by 100Ω twisted pair, shielded cable. Each device contains three circuits fabricated within a single monolithic chip. Data rates greater than 15MHz are possible depending on transmission line loss characteristics and length.

The transmitter employs constant current switching which provides high noise immunity along with high speeds, low power dissipation, low EMI generation and the ability to drive high capacitance loads. In addition, the transmitters can be turned "off", allowing several transmitters to time-share a single line.

Receiver input/output differences are shown in the following table:

	INPUT	OUTPUT
HD-246 / 546	100 Ω	OPEN COLLECTOR
HD-248 / 548	HI-Z	6K PULL-UP RES.
HD-249 / 549	100 Ω	6K PULL-UP RES.

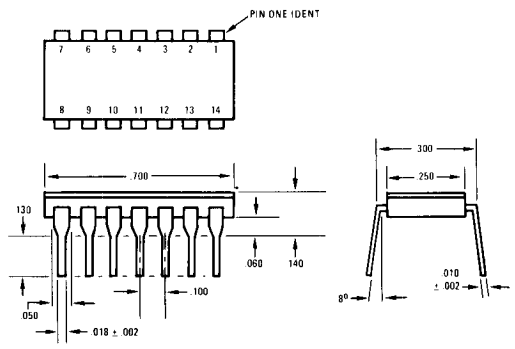
The internal 100 Ω cable termination consists of 50 Ω from each input to ground.

HD-248/548 "party line" receivers have a high-Z input such that as many as ten of these receivers can be used on a single transmission line.

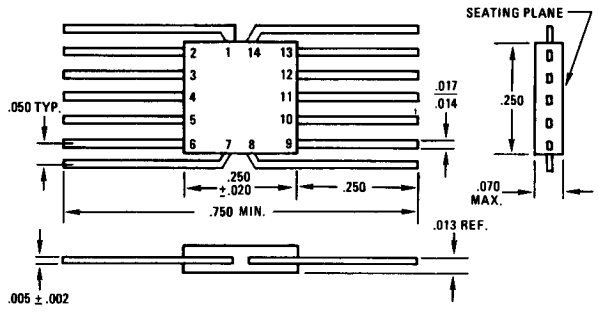
Each transmitter input and receiver output can be connected to TTL and DTL systems. When used with shielded transmission line, the transmitter-receiver system has very high immunity to capacitive and magnetic noise coupling from adjacent conductors. The system can tolerate ground differentials of -2.0 V to +20.0V (transmitter with respect to receiver).

PACKAGES

CODE 1S 14 LEAD BRAZED C.I.P.



CODE 9V TO-86 (METAL BOTTOM)



ALL DIMENSIONS ARE IN INCHES.
ALL DIMENSIONS ± .010 UNLESS OTHERWISE SHOWN.

LINEAR

SPECIFICATIONS HD-245/545 TRANSMITTERS

ABSOLUTE MAXIMUM RATINGS

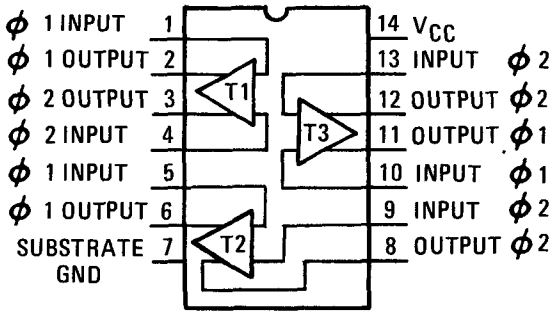
Input Voltage Range: -0.5V to +10V
Output Voltage Range: -30V to +0.5V with respect to V_{CC}
V_{CC} Range: -0.5V to +10V
Storage Temperature Range: -65°C to +150°C

ELECTRICAL CHARACTERISTICS

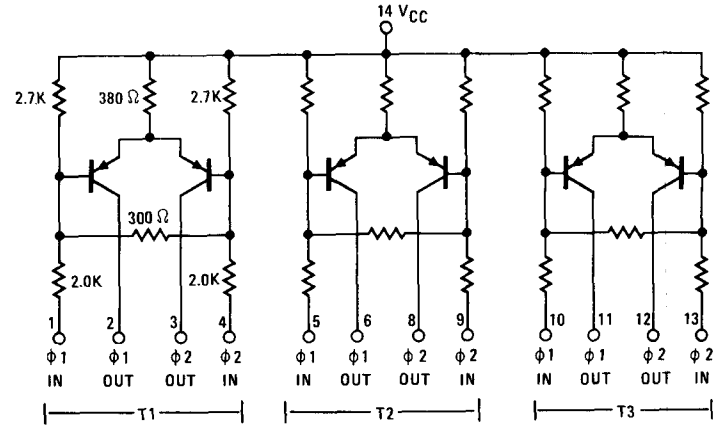
	PARAMETER	SYMBOL	TEMP.	HD-245 -55°C to +125°C MIN.	HD-245 TYP.	HD-245 MAX.	HD-545 0°C to +75°C MIN.	HD-545 TYP.	HD-545 MAX.	UNITS	TEST CONDITION V_{CC}	TEST CONDITION NOTES
DC	INPUT LOW CURRENT	I_{IL}	25°C Full		-1.5	-2.2 -2.5		-1.5	-2.3 -2.4	mA	5.5	1
DC	"ON" OUTPUT CURRENT	I_{OUT} "ON"	25°C Full Full	-2.3 -2.0 -1.6			-1.9 -1.8 -1.5			mA mA mA	4.5 4.5 4.5	1 1 2
			25°C Full		-4.1	-5.4 -5.6		-4.1	-6.3 -6.7	mA	5.5	1
DC	"ON" OUTPUT CURRENT UNBALANCE	ΔI_{OUT}	25°C Full		0.1	0.25 0.3		0.1	0.25 0.3	mA	5.5	3
DC	"OFF" OUTPUT CURRENT	I_{OUT} "OFF"	25°C Full		-30	-100 -100		-30	-100 -100	μA	4.5	1
DC	OUTPUT BREAKDOWN	BV_{CER}	25°C	-30	-50		-30	-50		V	GND	4
DC	POWER SUPPLY CURRENT-TOTAL		25°C 25°C		15	18.6 0.6		15	24 0.6	mA	5.0	5 6
AC	PROPAGATION DELAY	t_{PLH}	25°C Full		3	10 14		3	10 14	ns	5.0	
AC	TEST CIRCUIT 1, PAGE 4	t_{PHL}	25°C Full		3.2	10 14		3.2	10 14	ns	5.0	

NOTES:
1. One input at Gnd. one input open, each output at Gnd.
2. One input at 0.45V, one input open, each output at Gnd.
3. Difference between $\phi 1$ and $\phi 2$ "ON" output data current.
4. Each input at Gnd., one output at Gnd., $I_{Limit} \geq 100\,\mu A$ on output tested with -30V applied.
5. One input of each transmitter at Gnd and the other input open. All six output lines at Gnd.
6. All six input lines open, all six output lines at Gnd.

BLOCK DIAGRAM



SCHEMATIC



SPECIFICATIONS HD-246/546; HD-248/548; HD-249/549 RECEIVERS

ABSOLUTE MAXIMUM RATINGS

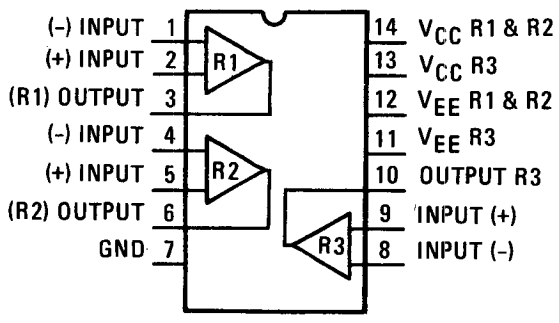
Input Voltage Range	-1.0V to +1.0V	Input Current	±25mA
Output Voltage Range	-0.5V to +6.0V	Output Current	+50mA
V_{CC} Range	-0.5V to +8.0V	Storage Temperature	-65°C to +150°C
V_{EE} Range	-8.0V to +0.5V		

ELECTRICAL CHARACTERISTICS

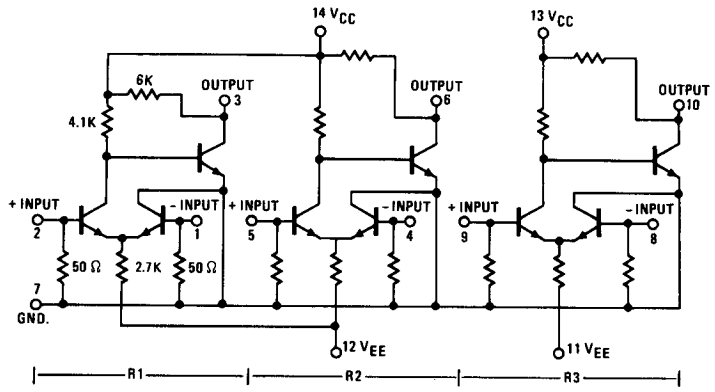
	PARAMETER	SYM.	TEMP.	HD-246 / 248 / 249 -55°C to +125°C MIN.	TYP.	MAX	HD-546 / 548 / 549 0°C to +75°C MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS V_{EE} = -5V V_{CC}	NOTES
DC	INPUT RESISTANCE (HD-246/546 & HD-249/549	R_{IN}	+25°C Full	40 39	47	61 68	35 33	47	65 70	Ohms		
	PULL-UP RESISTOR (HD-248/548 & HD-249/549)		+25°C Full	4.2 4.1	6	7.8 8.6	4.0 3.9	6	8.1 8.6	K Ohms		
	OUTPUT VOLTAGE (HIGH)	V_{OH}	+25°C Full	2.6 2.5			2.6 2.5			V	4.5	Note 1 I_{OH}=-120μA Ext. 6K Res. For HD-246/546
	OUTPUT VOLTAGE (LOW)	V_{OL}	+25°C Full			0.45 0.45			0.45 0.45	V	4.5	Note 2 I_{OL}=9.6mA 10mA For HD-246/546
	OUTPUT VOLTAGE (LOW) (INPUT SHORT CIRCUIT)	V_{OLSC}	+25°C		0.4			0.4		V	5.0	Note 3 I_{OL} = 3.2mA
	POWER SUPPLY CURRENT (TOTAL) HD-246 / 546	I_{CC} I_{EE}	+25°C		3.3 5.1	4.8 6.0		3.3 5.1	5.7 6.3	mA	5.0	Note 4
		I_{CC} I_{EE}	+25°C		3.9 5.1	6.6 6.0		3.9 5.1	7.5 6.3	mA	5.0	Note 5
	HD-248 / 548 & HD-249 / 549	I_{CC} I_{EE}	+25°C		6.3 5.1	7.8 6.0		6.3 5.1	8.7 6.3	mA	5.0	Note 4
		I_{CC} I_{EE}	+25°C		3.9 5.1	6.6 6.0		3.9 5.1	7.5 6.3	mA	5.0	Note 5
AC	PROPAGATION DELAY TEST CIRCUIT 2 PAGE 4	t_{PLH}	+25°C Full		18	30 30		18	30 30	ns	5.0	
		t_{PHL}	+25°C Full		25	30 30		25	30 30	ns	5.0	

NOTES:
1. (+) I_{IN} = 1.5mA; (–) Input = open (For HD-248/548; Ext. 50Ω Res. or 75mV).
2. (+) Input = open; (–) I_{IN} = 1.5mA. (For HD-248/548; Ext. 50Ω Res. or 75mV)
3. Both inputs shorted to Gnd; or both inputs open such that 50Ω termination resistors are in the circuit.
4. (+) Input = open; (–) I_{IN} = 3mA.
5. (+) I_{IN} = 3mA; (–) Input = open.

BLOCK DIAGRAM



SCHEMATIC

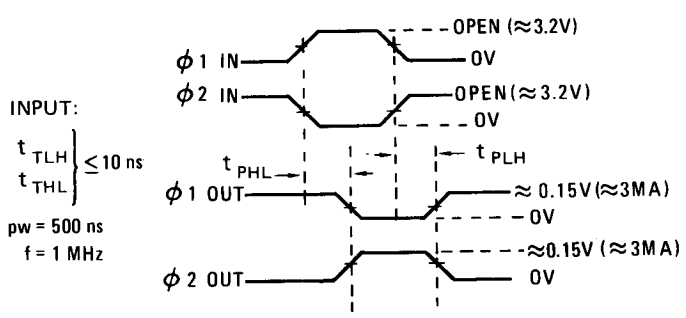


NOTES:
1. HD- 249/549 is as shown
2. HD- 246/546 does not have 6K output pull- up resistors.
3. HD- 248/548 does not have 50 Ω input termination resistors.
4. Resistor values are nominal

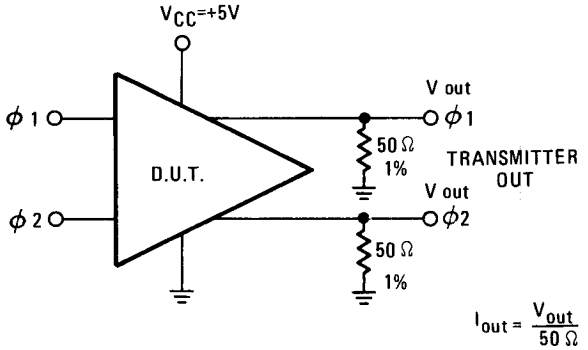
LINEAR

TEST CIRCUITS

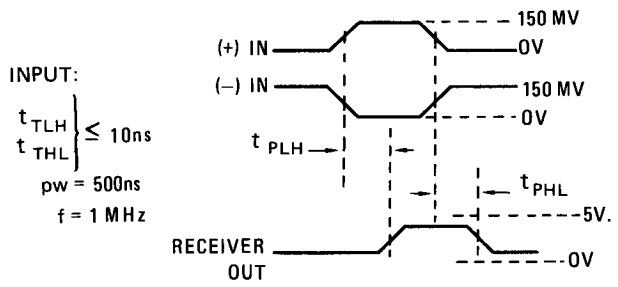
TEST CIRCUIT 1 - TRANSMITTER PROPAGATION DELAY



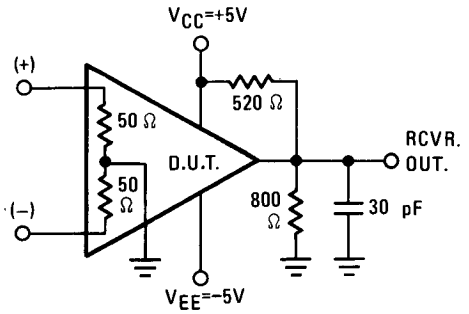
All measurements referenced to 50 % V points



TEST CIRCUIT 2 - RECEIVER PROPAGATION DELAY



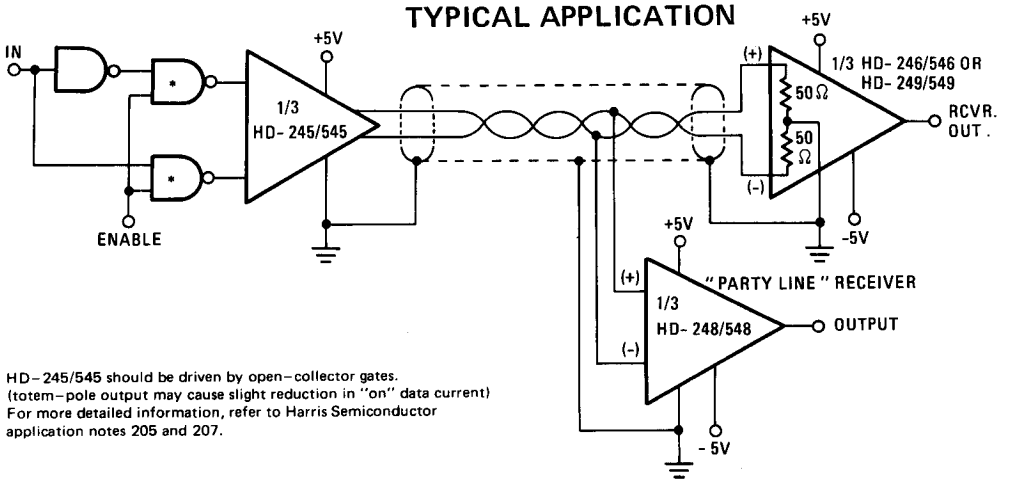
All measurements referenced to 50%V points.



NOTE: External 50Ω resistors needed for HD–248/548.

APPLICATIONS

TYPICAL APPLICATION



* HD–245/545 should be driven by open–collector gates. (totem–pole output may cause slight reduction in "on" data current) For more detailed information, refer to Harris Semiconductor application notes 205 and 207.