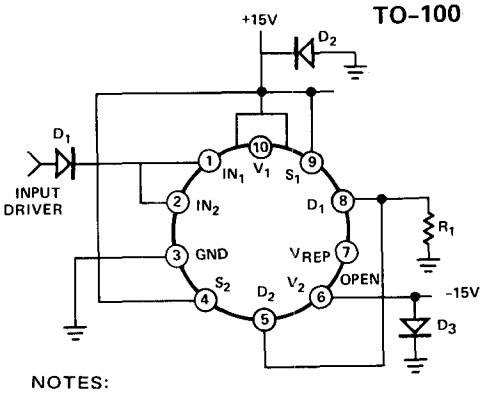
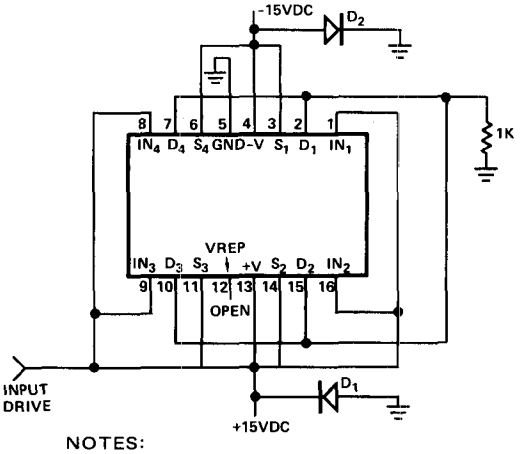
19 HI-200

TO-100



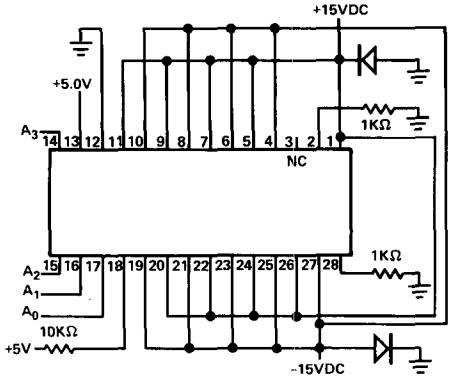
NOTES:
T_A = +125°C
R_1 = 10KΩ
$D_1D_2D_3$ = IN4002
Freq: = 100KHz

20 HI-201



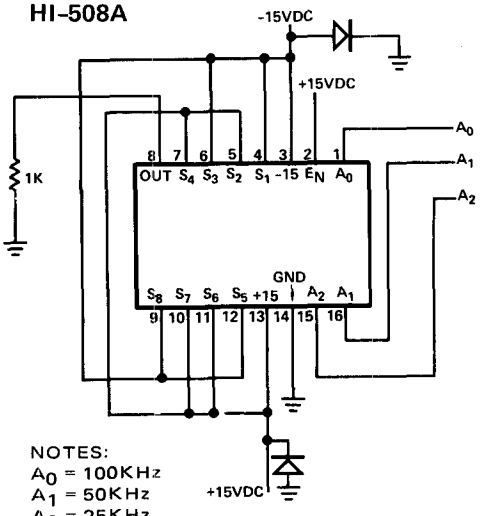
NOTES:
T_A = +125°C
D_1D_2 = IN4002
Freq: = 100KHz

21 HI-506/507/506A/507A



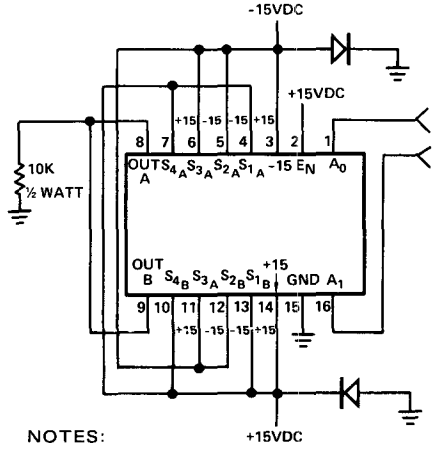
NOTES:
A_0 = 100KHz
A_1 = 50KHz
A_2 = 25KHz
A_3 = 12.5KHz

22 HI-508A



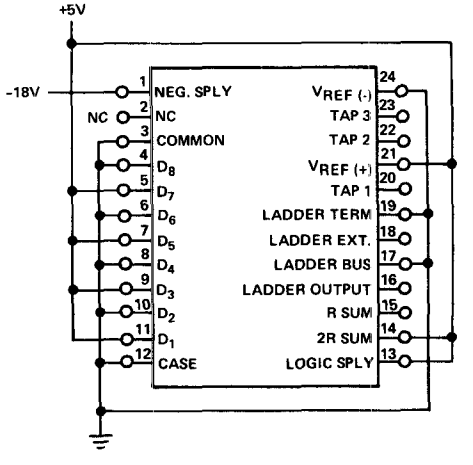
NOTES:
A_0 = 100KHz
A_1 = 50KHz
A_2 = 25KHz
TEMP: +125°C
PACKAGE: 16 PIN DIP

23 HI-509A



NOTES:
A_0 = 100KHz
A_1 = 50KHz
TEMP: +125°C
PACKAGE: 16 PIN DIP

24 HI-1080



NOTE:
T_A = +125°C

DASH 8

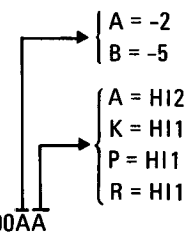
CROSS-REFERENCE
Linear and Interface Devices

MANUFACTURER	PART NUMBER	HARRIS EQUIVALENT	NOTES
Advanced Micro Devices	AM111/211/311	HA-2111/2211/2311	A1
	AM118/318	HA-2510/2515	B2
	AM715	HA-2520/2525	B2
	AM1660	HA-2500/2505	B2
		HA-2600/2605	B2
		HA-2700/2705	B2
	AM1488	HD-1488	A1
	AM1489	HD-1489	A1
	AM1489A	HD-1489A	A1
	AM9616	HD-1488	C2
	AM9617	HD-1489A	C2
Analog Devices	AD505	HA-2530/2535	C2
	AD507J*	HA-2625	A1
	AD507S	HA-2620	A1
	AD509J*	HA-2525	A1
	AD509S	HA-2520	A1
	AD518	HA-2510/2515	B2
	AD7501	HI-1818A	B2
	AD7502	HI-1828A	B2
	AD7503	HI-1818A	B2
	AD7506	HI-506	A1
	AD7507	HI-507	A1
	AD7510	HI-201	C2
	AD7511	HI-201	C2
	AD7512	HI-5043	C2
	AD7513	HI-200	A1
Burr Brown	3500A	HA-2605	B2
	3500R	HA-2600	B2
	3505J	HA-2505	A1
	3506J	HA-2605	A1
	3507J	HA-2525	A1
	3508J	HA-2625	A1
	3550J	HA-2055	B2
	3550K	HA-2050	B2
	3550S	HA-2055	B2
	MPCBD	HI1-507A-5	A1
	MPC16S	HI1-506A-5	A1
Datel	AM-405-2	HA2-2055-5	A1
	AM-406-2	HA2-2065-5	A1
	AM-452-2	HA2-2525-5	A1
	AM-462-1	HA1-2625-5	A1
	AM-462-2	HA2-2625-5	A1
	SHM-1C-1	HA-2425	A1
Exar	XR215	HA-2820/2825	C3
	XR1488	HD-1488	A1
	XR1489A	HD-1489A	A1

* "K" equivalent is either military device or selected commerical device

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

MANUFACTURER	PART NUMBER	HARRIS EQUIVALENT	NOTES
Raytheon	RM/RC1556A	HA-2600/2605	B2
	RM/RC4131	HA-2600/2605	B2
	RM/RC4132	HA-2700/2705	B2
	RM/RC4531	HA-2500/2505	B2
	RM/RC4558	HA-2650/2655	A2
	111/211/311	HA-2111/2211/2311	A1
	1488	HD-1488	A1
	1489/1489A	HA-1489/1489A	A1
Signetics	531	HA-2510/2515	B2
	536	HA-2060/2065	B2
	560	HA-2820/2825	C2
	561	HA-2820/2825	C2
	562	HA-2820/2825	C2
	565	HA-2820/2825	C2
	5556	HA-2600/2605	B2
	5558	HA-2650/2655	A2
Silicon General	SG741S	HA-2500	B2
	SG741SG	HA-2505	B2
Siliconix	DG181*	HI-5048	C2
	DG184	HI-5049	A2
	DG185	HI-5045	A2
	DG187	HI-5050	C2
	DG188	HI-5042	C2
	DG190	HI-5051	A2
	DG191	HI-5043	A2
	DG200	HI-200	A2
	DG201	HI-201	A2
	DG506	HI-506	A1
	DG507	HI-507	A1
	DG508	HI-508A	A3
	DG509	HI-509A	A3
	L120	HA-2060/2065	B2
	L140	HA-2720/2725	B2
			
	* Part Numbers: Siliconix	DG200AA	
	Harris	HI2-200-2	

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

HI-200

Dual SPST CMOS Analog Switch

FEATURES

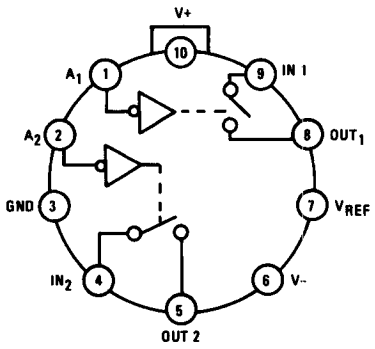
- ANALOG SIGNAL RANGE ±15V
- TURN-ON TIME (TYP) 240ns
- R_{ON} <60Ω (TYP) AT +25°C
- SWITCH CURRENT AT +25°C 80mA
- LOW POWER DISSIPATION 15mW
- DTL/TTL AND CMOS COMPATIBLE
- NO LATCH-UP

DESCRIPTION

The HI-200 is a monolithic device consisting of two independently selectable SPST switches. High switching speeds at low power levels are simultaneously achieved using the Harris Dielectric Isolation, Complementary MOS process. Latch-up or SCR phenomenon is inherently non-existent with this process. The device is packaged in a 10 pin TO-100 hermetic can and is available in both military and commercial temperature ranges.

PIN OUT

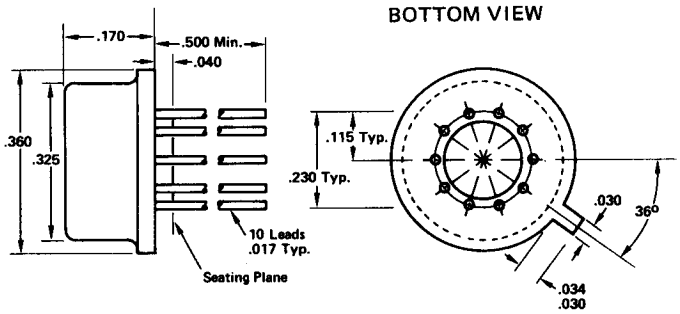
TOP VIEW



PACKAGE

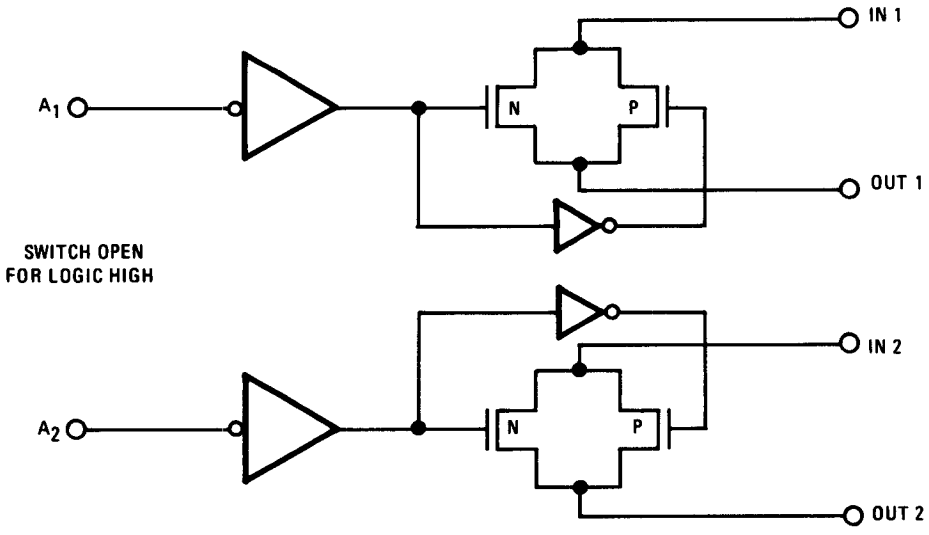
CODE 2G TO-100

BOTTOM VIEW



OTHER PACKAGES AVAILABLE:
TO-116: 14 LEAD D.I.P. (CODE 1A)
TO-86: 14 LEAD FLAT PACK (CODE 9V)

FUNCTIONAL DIAGRAM



SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS

Supply Voltage Between Pins 6 and 10 — 40V

V_{REF} to Ground — +20V, -5V

Digital Input Voltage: $+V_{Supply}$ +4V; $-V_{Supply}$ -4V

Analog Input Voltage (One Switch) $+V_{Supply}$ +2.0V; $-V_{Supply}$ -2.0V

Total Power Dissipation* — 450mW

Operating Temperature

HI-200-2 — -55°C to +125°C

HI-200-5 — 0°C to +75°C

Storage Temperature — -65°C to +150°C

*Derate 6 mW/°C above T_A = 75°C

ELECTRICAL CHARACTERISTICS

Unless Otherwise Specified

Supplies = +15V, -15V; V_{REF} (Pin 7) = Open; V_{AH} (Logic Level High) = 3.0V V_{AL} (Logic Level Low) = +0.8V

For Test Conditions, consult Performance Characteristics

PARAMETER	TEMP.	-55°C to +125°C MIN.	-55°C to +125°C TYP.	-55°C to +125°C MAX.	0°C to +75°C MIN.	0°C to +75°C TYP.	0°C to +75°C MAX.	UNITS
ANALOG SWITCH CHARACTERISTICS								
*V_S, Analog Signal Range	Full	-15		+15	-15		+15	V
*R_{ON}, On Resistance (Note 1)	+25°C		55	70		55	80	Ω
	Full		80	100		72	100	Ω
*$I_{S(OFF)}$, Off Input Leakage Current	+25°C		1			1		nA
	Full		100	500		10	500	nA
*$I_{D(OFF)}$, Off Output Leakage Current	+25°C		1			1		nA
	Full		100	500		10	500	nA
*$I_{D(ON)}$, On Leakage Current	+25°C		.02			.02		nA
	Full		6	500		6	500	nA
DIGITAL INPUT CHARACTERISTICS								
V_{AL}, Input Low Threshold	Full			0.8			0.8	V
V_{AH}, Input High Threshold	Full	3.0			3.0			V
*I_A, Input Leakage Current (High or Low) (Note 2)	Full			1.0			1.0	μA
SWITCHING CHARACTERISTICS								
t_{OPEN}, Break - Before Make Delay (Note 3)	+25°C		60			60		ns
t_{on}, Switch on Time	+25°C		240	500		240		ns
t_{off}, Switch off Time	+25°C		330	500		500		ns
"Off Isolation" (Note 4)	+25°C		70			70		dB
$C_{S(OFF)}$, Input Switch Capacitance	+25°C		5.5			5.5		pF
$C_{D(OFF)}$, Output Switch Capacitance	+25°C		5.5			5.5		pF
$C_{D(ON)}$, Output Switch Capacitance	+25°C		11			11		pF
C_A, Digital Input Capacitance	+25°C		5			5		pF
$C_{DS(OFF)}$, Drain-To-Source Capacitance	+25°C		0.5			0.5		pF
POWER REQUIREMENTS (Note 5)	+25°C		15			15		mW
P_D, Power Dissipation	Full			60			60	mW
* I^+, Current (Pin 10)	+25°C		0.5			0.5		mA
	Full			2.0			2.0	mA
* I^-, Current (Pin 6)	+25°C		0.5			0.5		mA
	Full			2.0			2.0	mA

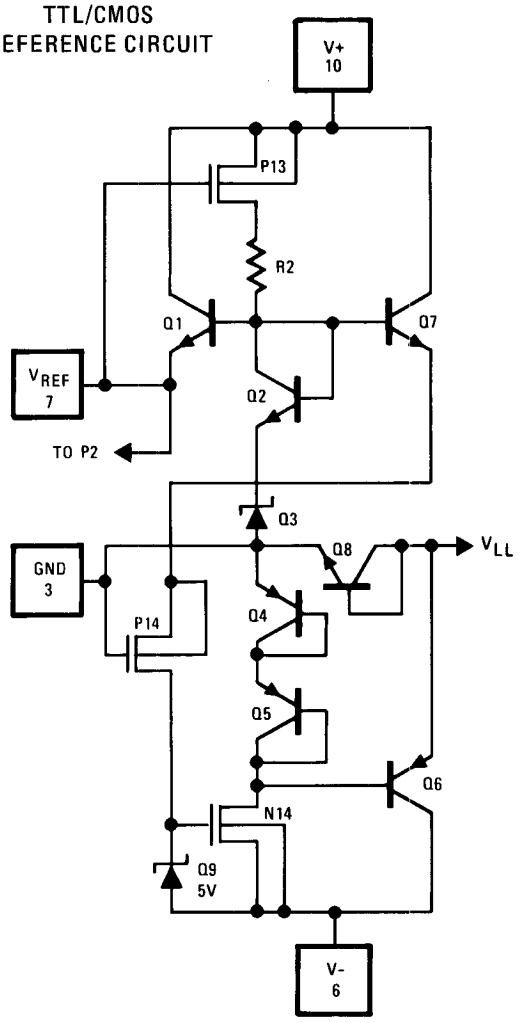
NOTES:
1. V_{OUT} = +10V I_{OUT} = 1mA
2. Digital Inputs Are MOS Gates Typical Leakage is Less Than 1nA
3. V_{AH} 4.0V
4. V_A = +3V, R_L = 1KΩ, C_L = 10pF, V_S = 3VRMS, f, 100 kHz
5. V_A = +3V or V_A = 0V For Both Switches

*100% Tested For DASH 8

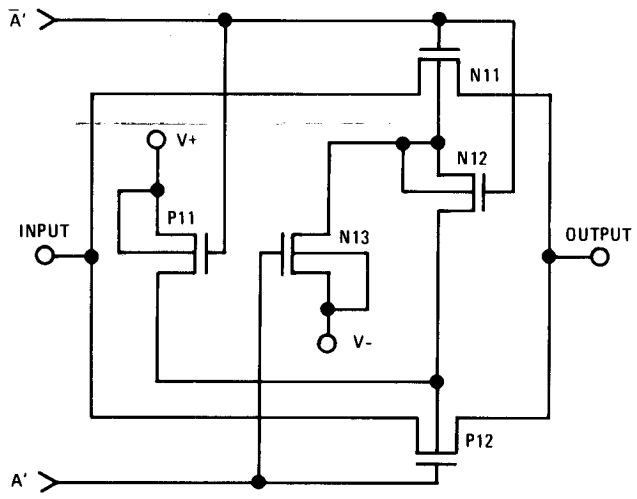
LINEAR

SCHEMATIC DIAGRAMS

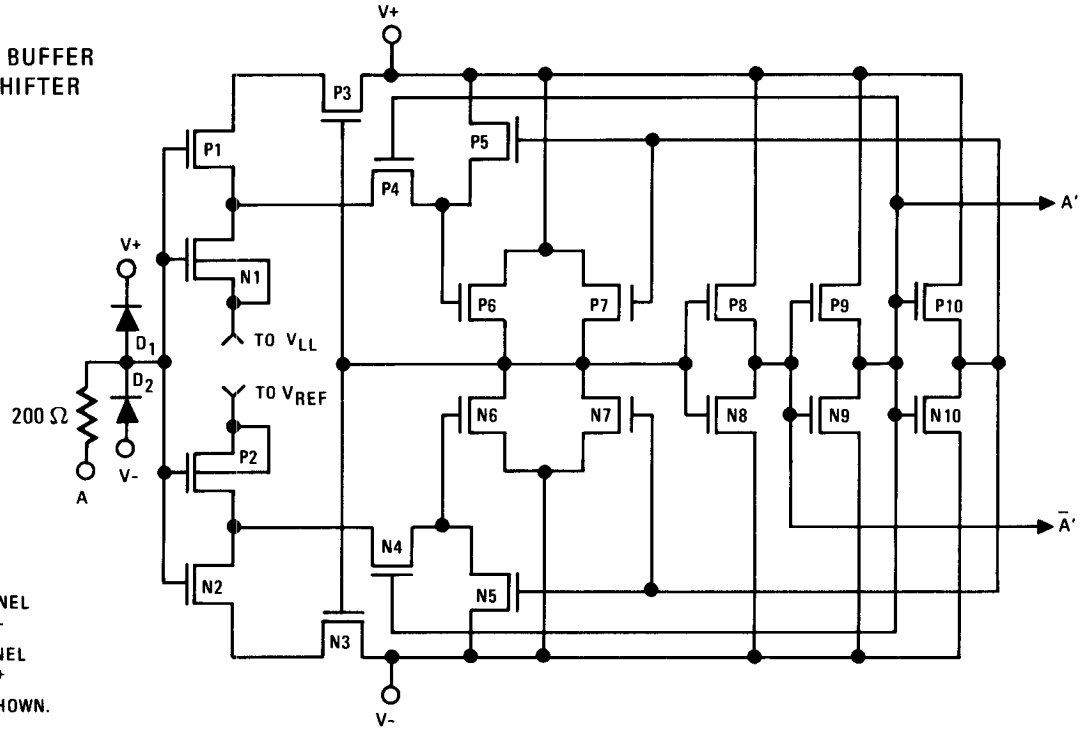
TTL/CMOS
REFERENCE CIRCUIT



SWITCH CELL



DIGITAL INPUT BUFFER
AND LEVEL SHIFTER



ALL N-CHANNEL
BODIES TO V-

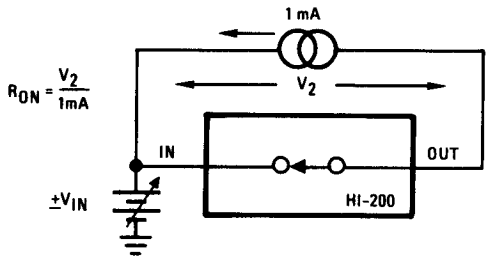
ALL P-CHANNEL
BODIES TO V+

EXCEPT AS SHOWN.

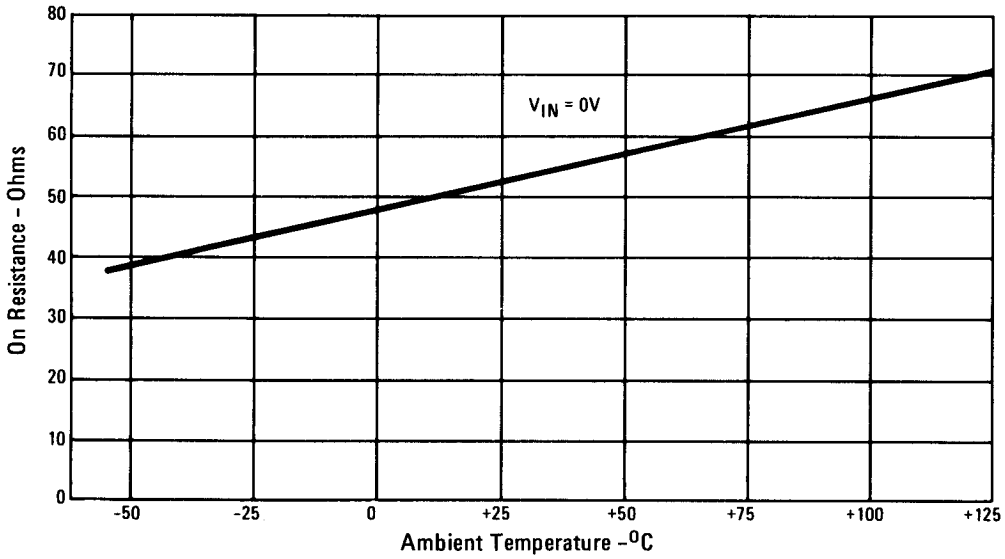
LINEAR

(UNLESS OTHERWISE SPECIFIED $T_A = 25^oC$, $V_{SUPPLY} = \pm 15V$, $V_{AH} = 3.0V$ $V_{AL} = 0.8V$ AND V_{REF} = OPEN).

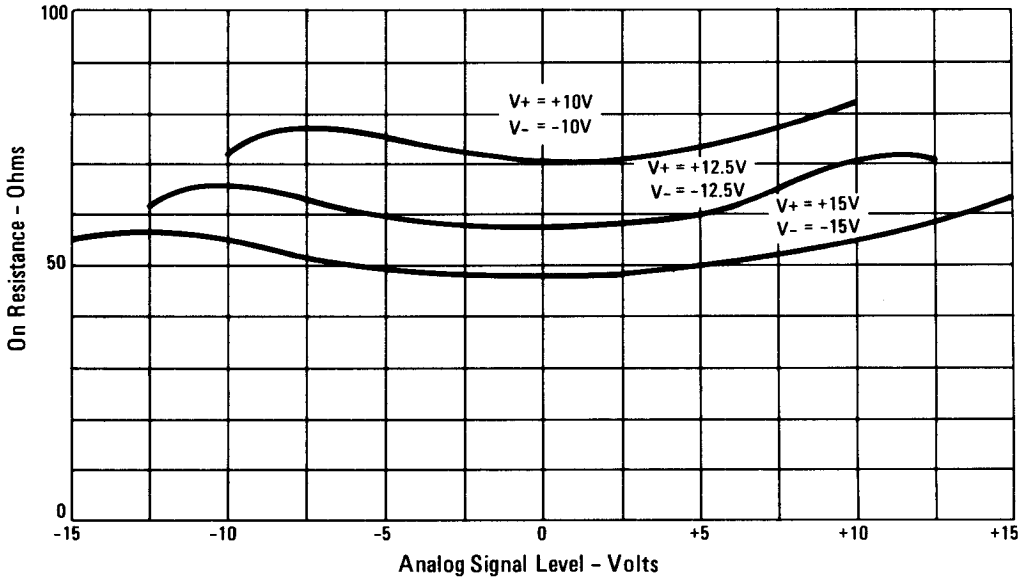
ON RESISTANCE vs. ANALOG SIGNAL LEVEL,
SUPPLY VOLTAGE AND TEMPERATURE



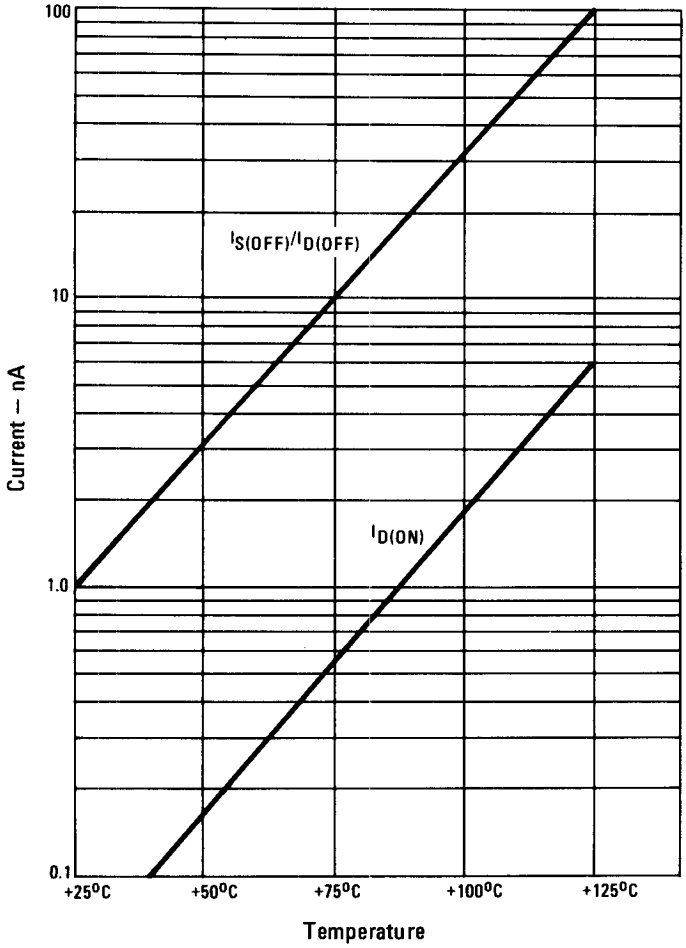
ON RESISTANCE vs. TEMPERATURE



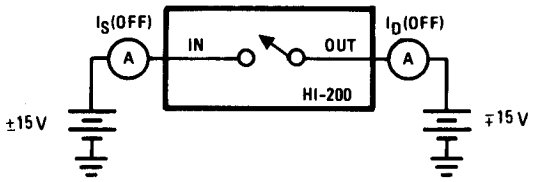
(HI-200)
ON RESISTANCE vs. ANALOG SIGNAL LEVEL
AND POWER SUPPLY VOLTAGE



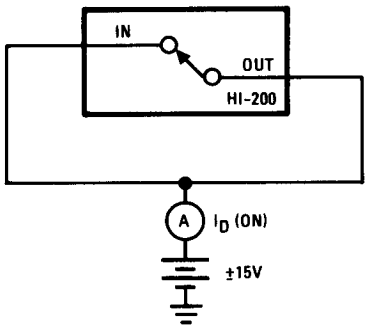
SWITCH LEAKAGE CURRENT vs. TEMPERATURE (HI-200)



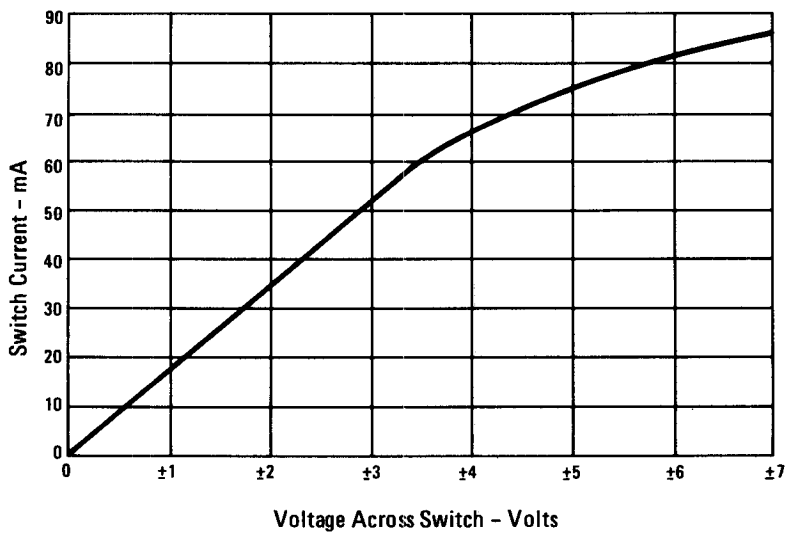
OFF LEAKAGE CURRENT vs. TEMPERATURE



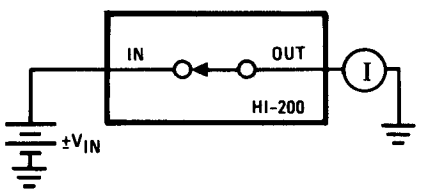
ON LEAKAGE CURRENT vs. TEMPERATURE



SWITCH CURRENT vs. VOLTAGE

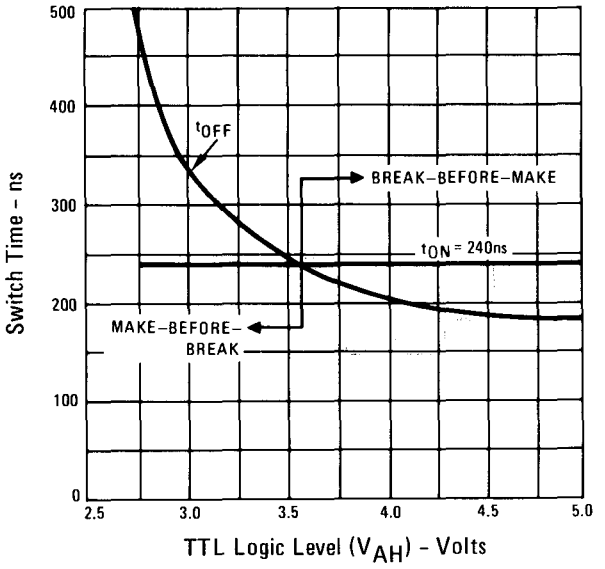


SWITCH CURRENT vs. VOLTAGE

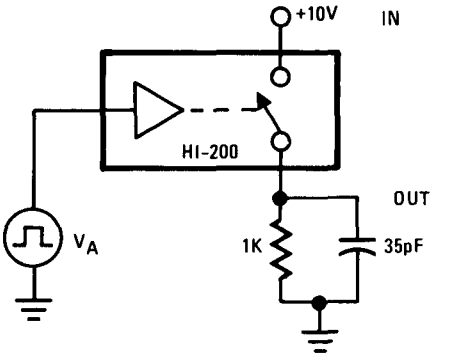


PERFORMANCE CHARACTERISTICS AND TEST CIRCUITS (continued)

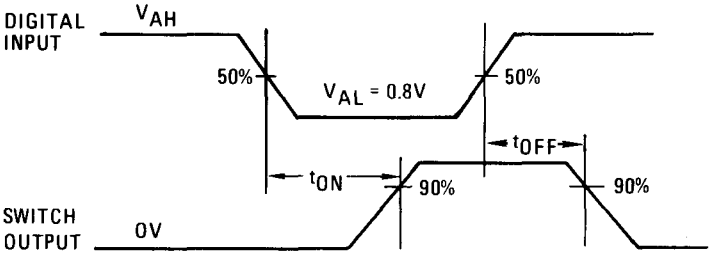
(HI-200)
SWITCH TIME vs. TTL LOGIC LEVEL



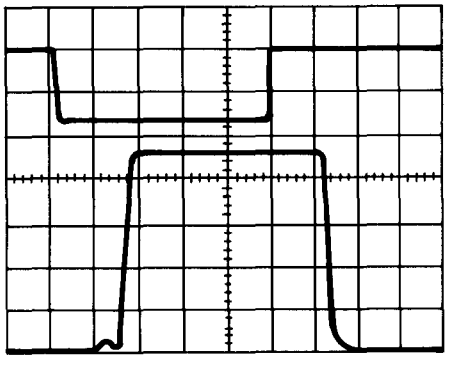
ON/OFF SWITCH TIME vs.
LOGIC LEVEL



SWITCHING WAVEFORMS

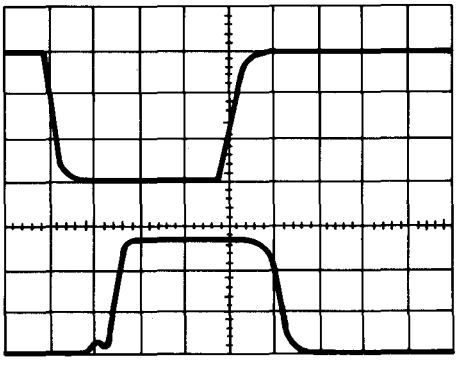


t_{ON}, t_{OFF} (TTL INPUT)
V_{AH} = +4.0V



Top: TTL Input
Bottom: Output
Vertical: 2V/Div.
Horizontal: 200ns/Div.

t_{ON}, t_{OFF} (CMOS INPUT)
V_{REF} = OPEN, V_{AH} = +15V



Top: CMOS Input
Bottom: Output
Vertical: 5V/Div.
Horizontal: 200ns/Div.