

HI-8195, HI-8196, HI-8197

28Ω QUAD SPST ANALOG SWITCH

Open Circuit when Power Off

GENERAL DESCRIPTION

The HI-8195 is a quad analog CMOS switch fabricated with Silicon-on-Insulator (SOI) technology for latch-up free operation and maximum switch isolation. These switches are ideally suited for applications demanding low switch leakage when the power pins are 0V.

The logic supply (VLOGIC) can be independently set from 2.5V to 5V without changing the switch resistance (RON). With V+/V- set at +/-15V and a signal range from +5V to -5V, the RON maximum is 28Ω at 25°C and the maximum deviation from flat is typically less than 10%.

These switches conduct equally well in either direction. Power down and Off state leakages are less than 10nA maximum. Charge injection is less than 10pC. Switching times with a 3.3V VLOGIC supply are typically 55ns to the On state and 35ns to the Off state.

The HI-8195 provides four each normally open switches when the switch control inputs are low. The HI-8196 provides four each normally closed switches when the switch control inputs are low. The HI-8197 provides a combination of two normally closed and two normally open switches.

Industry-standard plastic package options include 16-pin SOIC, DIP and QFN. Ceramic packaging is available on request. All three products are offered in both industrial (-40°C to +85°C) and extended (-55°C to +125°C) temperature range options.

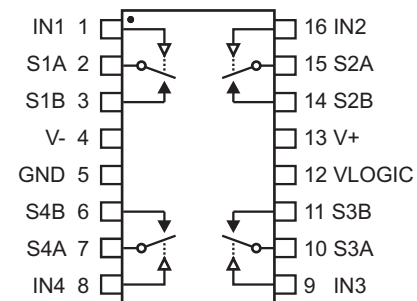
APPLICATIONS

- Avionics
- Data bus isolation
- Sample-and-Hold circuits
- Test Equipment
- Communications Systems

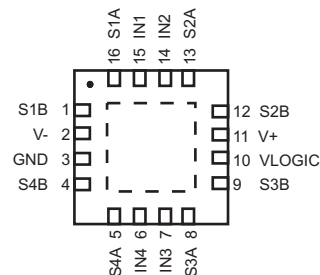
FEATURES

- CMOS analog switches with up to +/-10V Common Mode Range
- 28 Ω max at 25°C with Common Mode < +/-5V
- Robust CMOS Silicon-on-Insulator (SOI) technology
- Switch nodes are open-circuit when chip is powered down
- SOI switch isolation with 1nA typical Off leakage
- Superior ESD protection > 4KV HBM
- Fast switching time with break-before-make
- Low power
- Extended Temperature Range (-55°C to +125°C)

PIN CONFIGURATIONS (Top Views)



HI-8195PSx, HI-8195PDx
16-Pin SO or DIP package

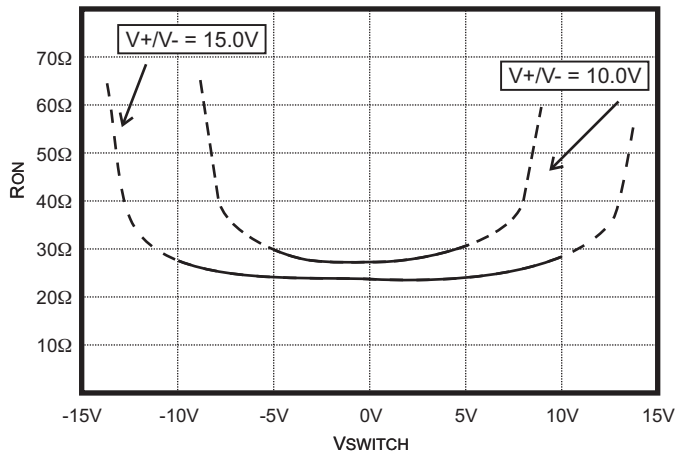


HI-8195PCx
16-pin 5mm x 5mm Chip-scale package

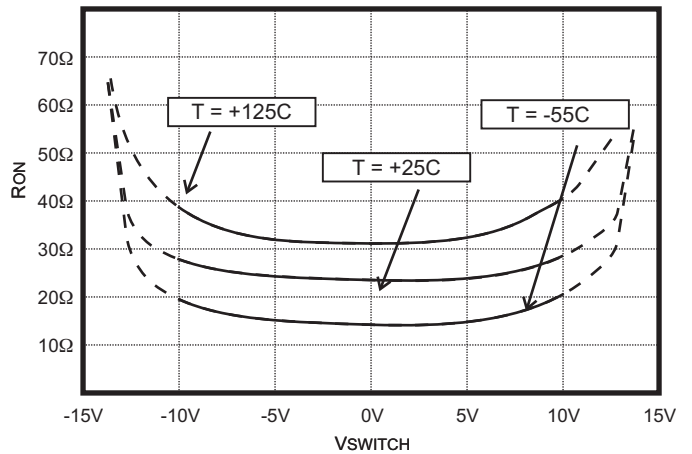
PRODUCT OPTIONS								
PART TYPE	IN1	Switch 1	IN2	Switch 2	IN3	Switch 3	IN4	Switch 4
HI-8195	0	Open	0	Open	0	Open	0	Open
	1	Closed	1	Closed	1	Closed	1	Closed
HI-8196	0	Closed	0	Closed	0	Closed	0	Closed
	1	Open	1	Open	1	Open	1	Open
HI-8197	0	Open	0	Closed	0	Closed	0	Open
	1	Closed	1	Open	1	Open	1	Closed

PIN DESCRIPTIONS

SIGNAL	FUNCTION	DESCRIPTION
IN1	Logic Input	HI-8195 and HI-8197 are normally Open when input Low
S1A	Switch Node	Switch 1 Node
S1B	Switch Node	Switch 1 Node
V-	Supply	Negative supply
GND	Supply	Reference Ground
S4B	Switch Node	Switch 4 Node
S4A	Switch Node	Switch 4 Node
IN4	Logic Input	HI-8195 and HI-8197 are normally Open when input Low
IN3	Logic Input	HI-8196 and HI-8197 are normally Closed when input Low
S3A	Switch Node	Switch 3 Node
S3B	Switch Node	Switch 3 Node
VLOGIC	Supply	3.3V or 5.0V Logic supply
V+	Supply	Positive supply
S2B	Switch Node	Switch 2 Node
S1B	Switch Node	Switch 2 Node
IN2	Logic input	HI-8196 and HI-8197 are normally Closed when input Low



Typical RON as a function of VSUPPLY and VSWITCH (10mA switch current, 25°C)



Typical RON as a function of VSWITCH and Temperature (10mA switch current, VSUPPLY = +/-15V)

ABSOLUTE MAXIMUM RATINGS

(Voltages referenced to GND = 0V)

Supply Voltage, V+ :	16.5V	Continuous Power Dissipation (TA=70°C): SO Package (derate 6.7mW/°C above 70°C).....696mW Plastic DIP (derate 10.53 mW/°C above 70°C)842mW Thin QFN (derate 21.3mW/°C above 70°C)1702mW	
Supply Voltage, V-:.....	-16.5V		
Supply Voltage, V _{LOGIC}	5.5V		
Switch Current (either direction, DC):	20mA		
Peak Switch Current (1 ms pulse, 10% duty cycle max.).....	100mA		
Digital Input Voltage (IN1-4):.....	-0.3V to V _{LOGIC} + 0.3V	Storage Temperature Range:	-65°C to +150°C
Operating Temperature Range: (Industrial).....	-40°C to +85°C	Soldering Temperature: (Ceramic).....60 sec. at +300°C (Plastic - leads).....10 sec. at +280°C (Plastic - body)+260°C Max.	
(Hi-Temp).....	-55°C to +125°C		
Maximum Junction Temperature	175°C		

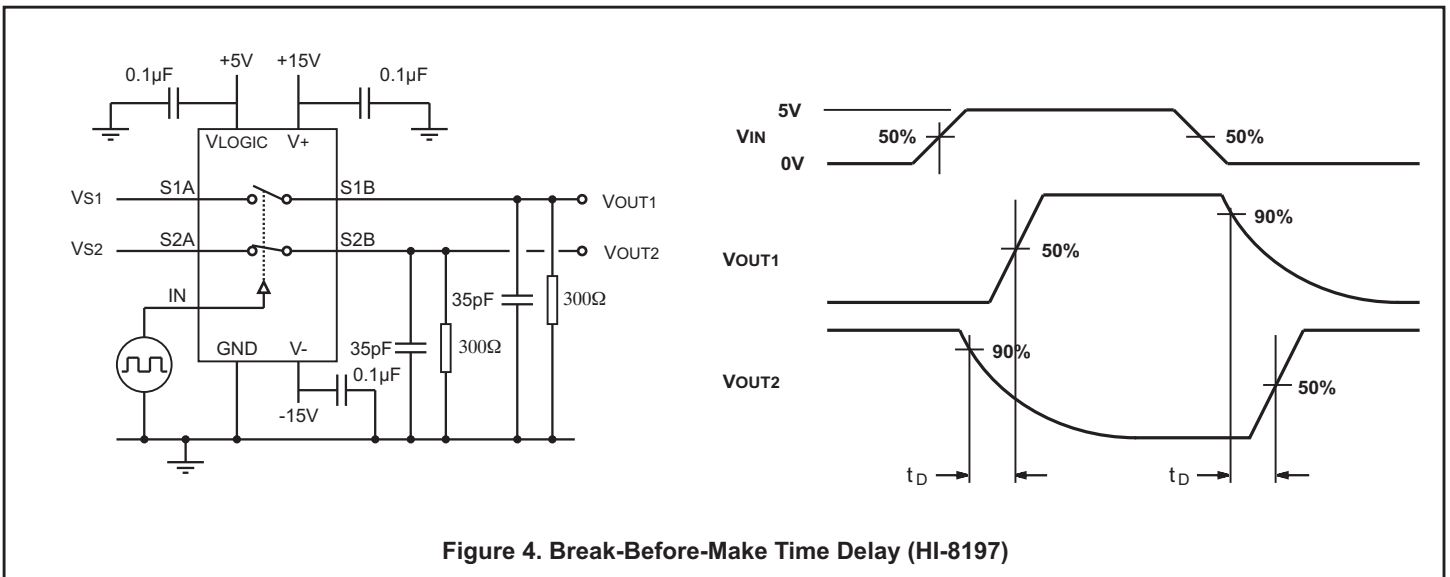
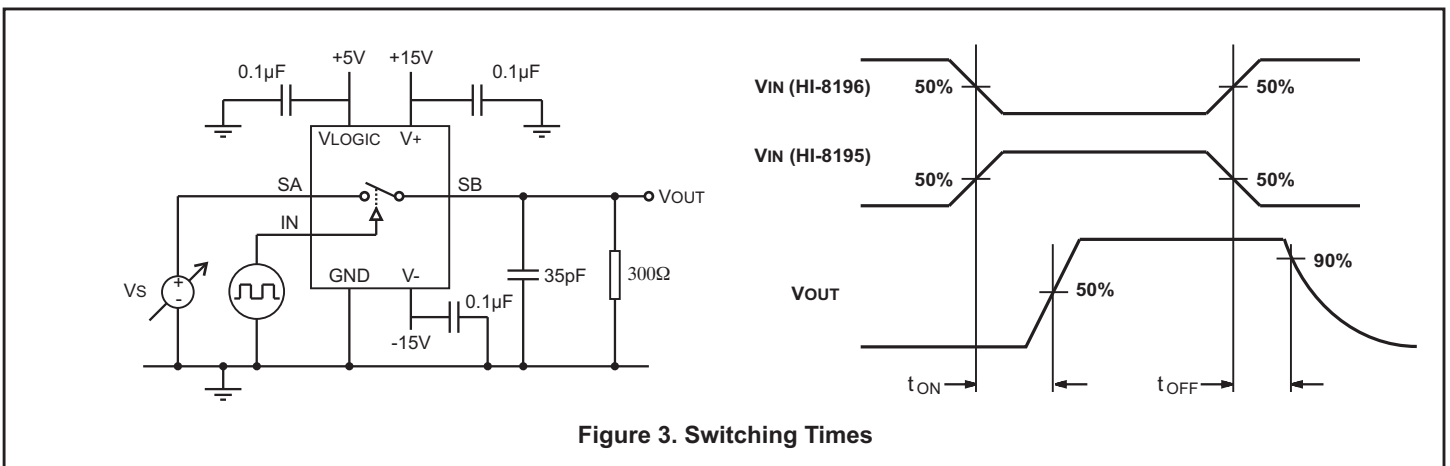
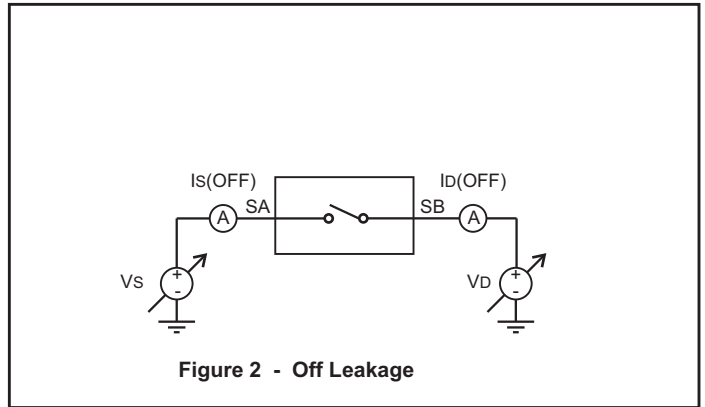
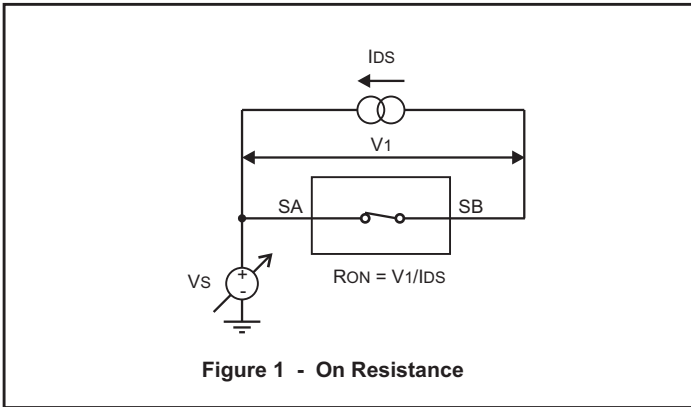
NOTE: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

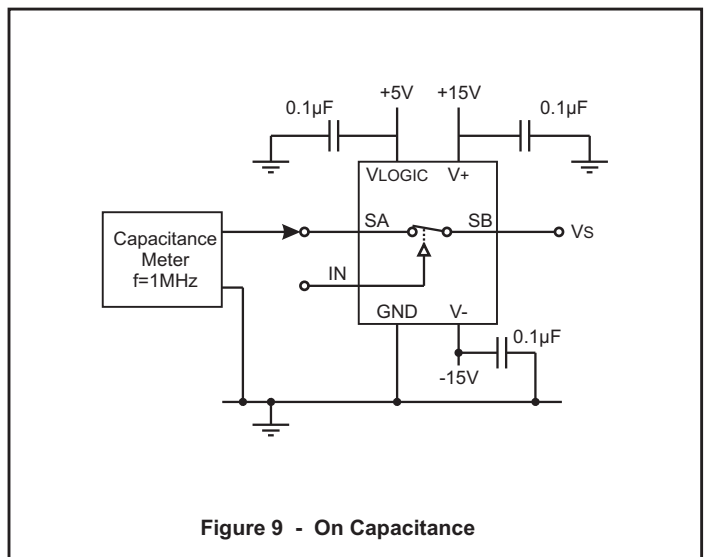
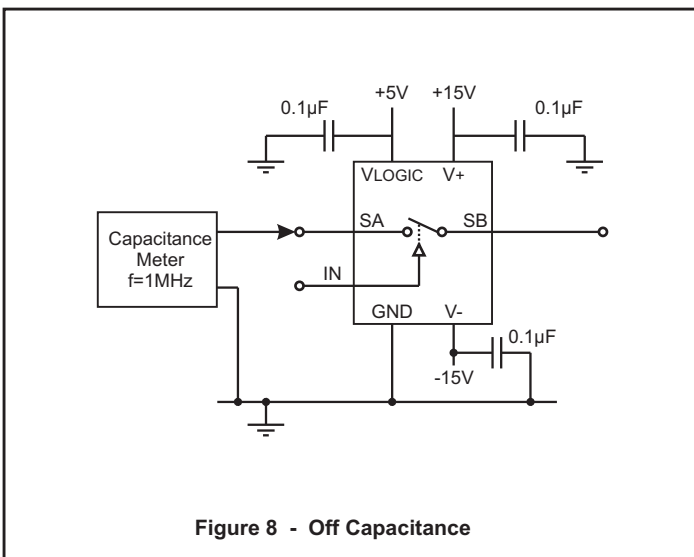
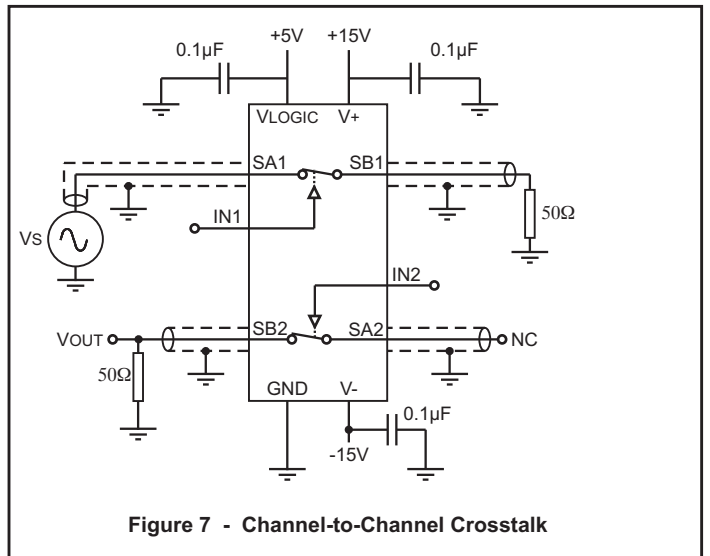
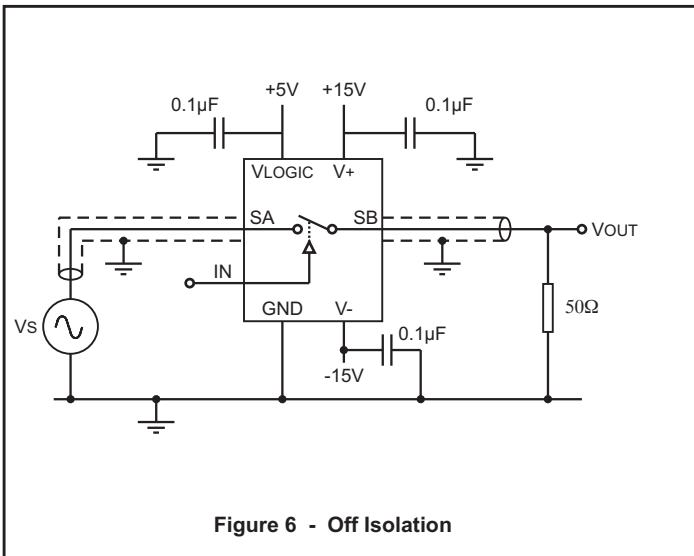
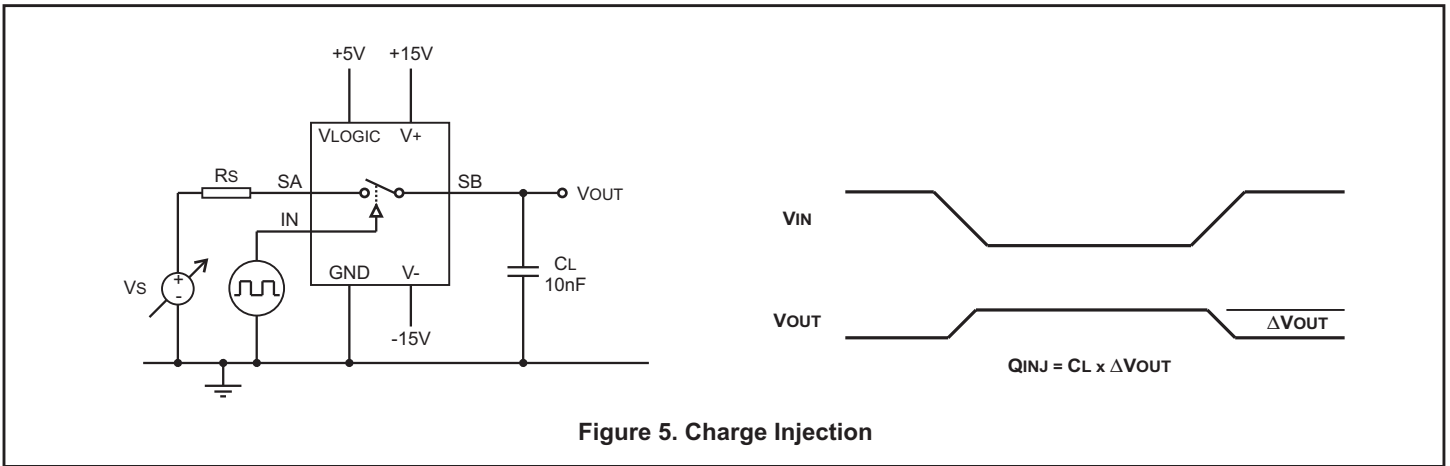
ELECTRICAL CHARACTERISTICS

V+ = 15V, V- = -15V, GND = 0V. Operating temperature range (unless otherwise noted).

PARAMETER	SYMBOL	CONDITIONS	FIGURE	V _{LOGIC} = 3.3V			V _{LOGIC} = 5.0V			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
SWITCH PARAMETERS										
Switch Resistance 25°C, 10mA	R _{ON}	V+/V- = +/-15V, V _s = +/-5V	1	18	24	28	18	24	28	Ω
		V+/V- = +/-15V, V _s = +/-10V	1	18	27	31	18	27	31	Ω
		V+/V- = +/-10V, V _s = +/-5V	1	20	28	32	20	28	32	Ω
Leakage (open circuit and power down)	I _{SWLEAK}	Switch voltage ± 10V, 25°C	2			5			5	nA
		Switch voltage ± 10V, 125°	2			20			20	nA
		Switch voltage ± 10V, -55°C	2			150			150	nA
LOGIC INPUTS										
Input High Voltage	V _{IH}			70			70			%V _{LOGIC}
Input Low Voltage	V _{IL}					30			30	%V _{LOGIC}
Input Current	I _{IN}	V _{IN} = 0V or V _{IN} = V _{LOGIC}		-0.5		0.5	-0.5		0.5	μA
SUPPLY										
V _{LOGIC} Current	I _{DD1}	Any state				0.5			0.5	μA
V+ Current	I _{DD2}	Any state				0.5			0.5	μA
V- Current	I _{EE}	Any state		-0.5			-0.5			μA
DYNAMIC PARAMETERS										
Turn On Time	T _{ON}	V+/V- = ±10V, 25°C V _s = ±10V, -55°C to +125°C	3		55	75		35	55	ns
			3							ns
Turn Off time	T _{OFF}	V+/V- = ±10V, 25°C V _s = ±10V, -55°C to +125°C	3		35	40		20	25	ns
			3							ns
Break-Before-Make Time	T _D	10V signal, 25°C 10V signal, -55°C to +125°C	4		8			8		ns
			4	4			4			ns
Charge Injection	Q	V _s = 0V, R _s = 0Ω, 25°C	5		-10			-10		pC
Off Isolation	R _R	f = 1 MHz, 25°C	6		65			65		dB
Crosstalk	C _R	f = 1 MHz, 25°C	7		90			90		dB
Capacitance	C _{OFF} C _{ON}	Switch Off, 25°C Switch On, 25°C	8		12			12		pF
			9		46			46		pF

TEST CIRCUITS





FREQUENCY RESPONSE

Figure 10 shows a typical frequency response.

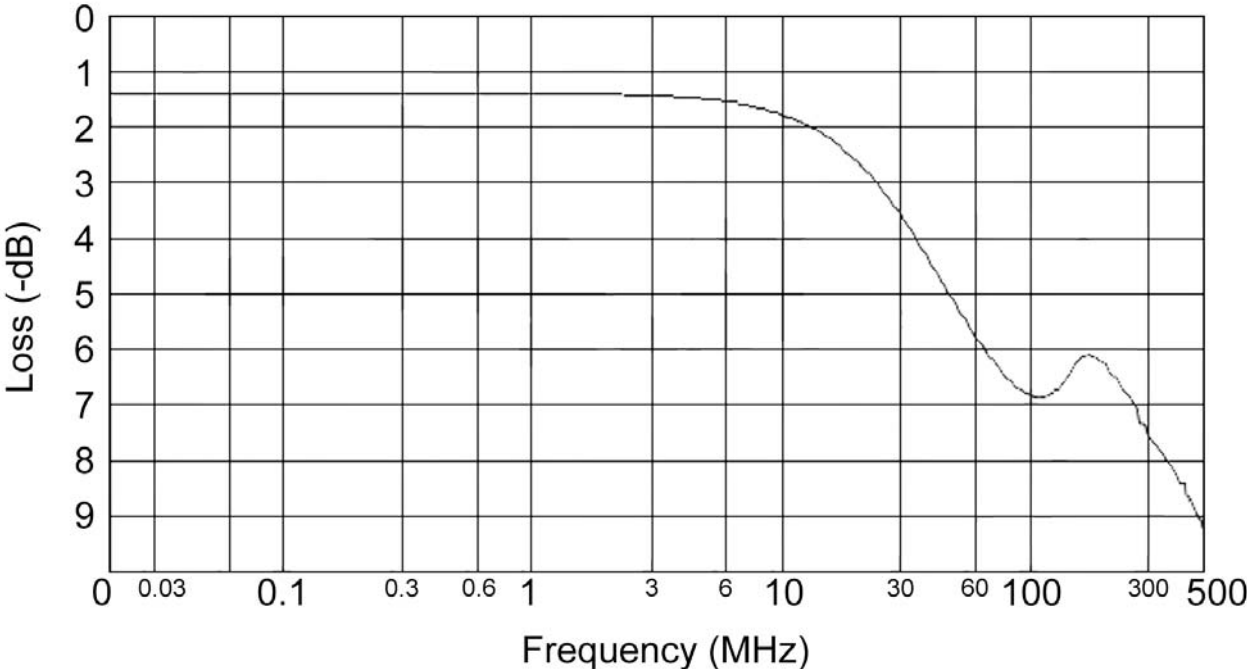


Figure 10. Frequency Response.

ORDERING INFORMATION

HI - 819x xx x x

PART NUMBER	LEAD FINISH
Blank	Tin / Lead (Sn / Pb) Solder
F	Pb-free, RoHS compliant

PART NUMBER	TEMPERATURE RANGE	FLOW	BURN IN
I	-40°C TO +85°C	I	NO
T	-55°C TO +125°C	T	NO
M	-55°C TO +125°C	M	YES

PART NUMBER	PACKAGE DESCRIPTION
PC	16 PIN PLASTIC 5 x 5 mm CHIP SCALE (16PCS1) (No M-flow, Pb-free only)
PS	16 PIN PLASTIC NARROW BODY SOIC (16HN)
PD	16 PIN PLASTIC DIP (16P)

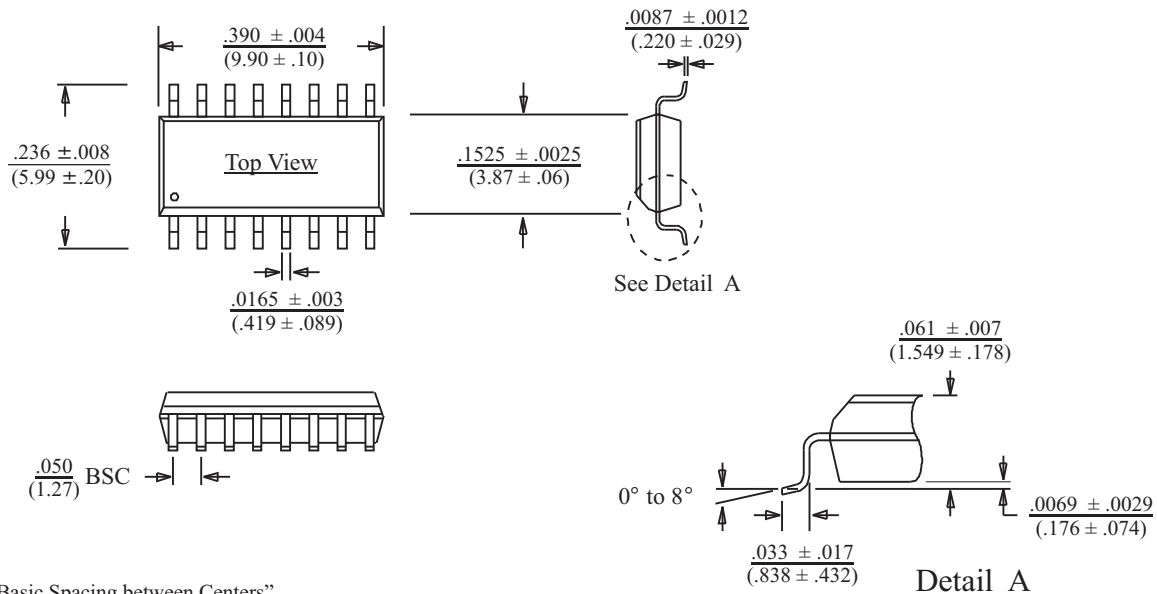
PART NUMBER	FUNCTION
8195	QUAD SWITCH, NORMALLY OPEN
8196	QUAD SWITCH, NORMALLY CLOSED
8197	QUAD SWITCH, TWO NORMALLY OPEN, TWO NORMALLY CLOSED

REVISION HISTORY

P/N	Rev	Date	Description of Change
DS8195	New	12/08/11	Initial Release
	A	11/08/17	Add frequency response curve.

16-PIN PLASTIC SMALL OUTLINE (SOIC) - NB
(Narrow Body)

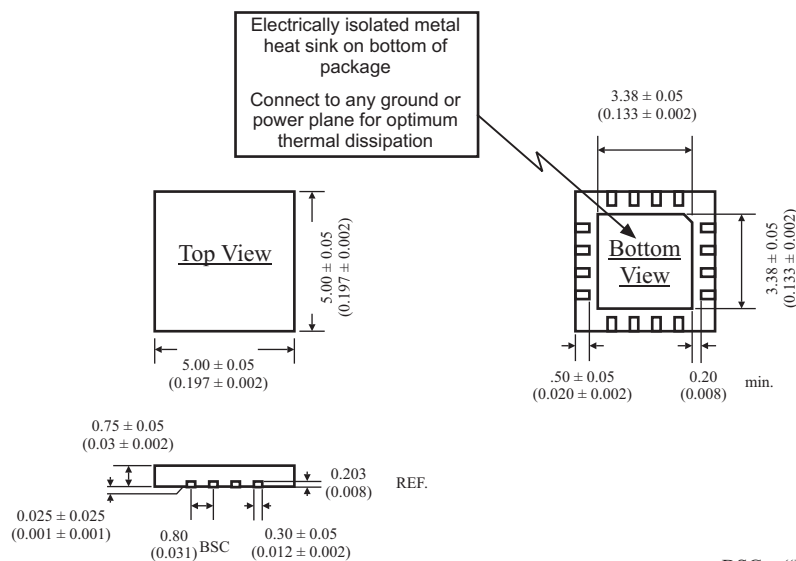
inches (millimeters)
Package Type: 16HN



BSC = "Basic Spacing between Centers" is theoretical true position dimension and has no tolerance. (JEDEC Standard 95)

16-PIN PLASTIC CHIP-SCALE PACKAGE

millimeters
Package Type: 16PCS1

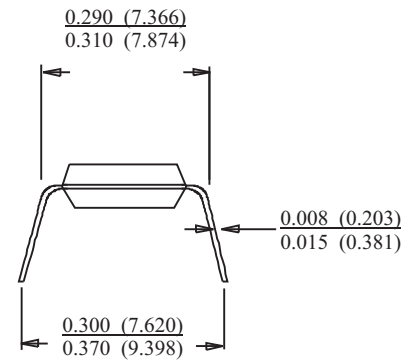
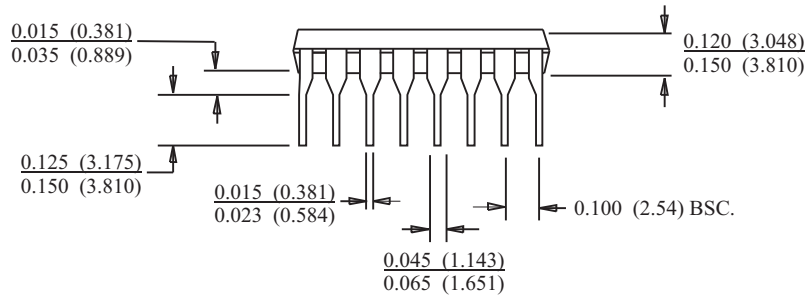
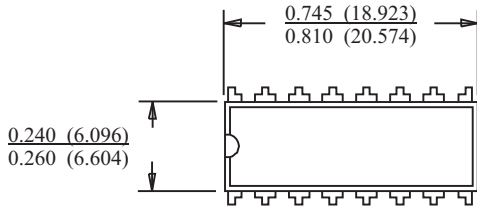


Electrically isolated metal heat sink on bottom of package
Connect to any ground or power plane for optimum thermal dissipation

BSC = "Basic Spacing between Centers" is theoretical true position dimension and has no tolerance. (JEDEC Standard 95)

16-PIN PLASTIC DIP

Package Type: 16P



inches (millimeters)