Supertex inc.

HV25
HV26

Preliminary

High Voltage, Fault-protected Analog Multiplexer

Ordering Information

Device Configuration		Order Number / Package		
	16-pin Plastic Dip	16-pin Side-brazed Dip	Plastic SOW-16	Die
Single 8-Channel	HV2516P	HV2516C	HV2516WG	HV2516X
Dual 4-Channel	HV2616P	HV2616C	HV2616WG	HV2616X

Features

- ☐ HVCMOS ® technology
- ☐ Fault input voltage ±75V with power supplies off
- ☐ Fault input voltage ±60V with ±15V power supplies
- ☐ 300Ω switch resistance
- ☐ All switches off with power supplies off
- ☐ Digital inputs are TTL and CMOS compatible
- ☐ Low power monolithic CMOS design

General Description

The Supertex HV25 and HV26 are 300Ω high voltage fault protected analog multiplexers. The HV25 is an 8-channel 1 of 8 multiplexer and the HV26 is a dual 4-channel 2 of 8 multiplexer. These devices can withstand a continuous voltage of ±75V on their inputs with their power supplies inadvertently turned off. When properly powered up with ±15V, their inputs can protect against a continuous voltage of ±60V.

The fault protection feature on the HV25 and HV26 will not only protect itself from high voltages but also the sensors, signal generators, or instrumentation amplifiers connected to the output.

Applications

- ☐ Data acquisition systems
- ☐ Industrial and process control systems
- ☐ Avionics test equipment
- ☐ Signal routing between systems

Absolute Maximum Ratings

V_{PP} - V_{NN}	+44V
V_{PP} Positive Supply Voltage	+22V
V_{NN} Negative Supply Voltage	-22V
V_{IN} with Power Off	±80V
V_{IN} with Power On	±65V
Peak Analog Signal Current	40mA
Storage Temperature	-65 C to +150 C
Power Dissipation	Plastic Package 0.8W Ceramic Package 1.5W

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Electrical Characteristics

(V_{PP} = +15V, V_{NN} = -15V, V_{IH} = +2.4V, V_{IL} = +0.8V, T_A = 25 °C, unless otherwise noted.)

DC Characteristics

Characteristics	Sym	Min	Typ	Max	Unit	Conditions
Switch Resistance	R_{ON}		260	300	ohms	V_{OUT} = ±2.0V, I_{IN} = 100µA
			600	800	ohms	V_{OUT} = ±10V, I_{IN} = 100µA
Switch Off Input Leakage Current	$I_{IN(OFF)}$	-3.0	1.5	3.0	nA	V_{OUT} = ±10V, V_{IN} = ∓10V
Switch Off Output Leakage Current	$I_{O(OFF)}$	-15.0	8.0	15.0	nA	V_{OUT} = ±10V, V_{IN} = ∓10V
Switch On Output Leakage Current	$I_{O(ON)}$	-15.0	8.0	15.0	nA	V_{IN} = V_{OUT} = ±10V
Diff. Off Output Leakage Current	I_{DIFF}	-50		50	nA	For HV2616 only
V_{PP} Quiescent Current	I_{PPQ}		1.0	100	µA	
V_{NN} Quiescent Current	I_{NNQ}		1.0	100	µA	
Logic Input Current	I	-1.0		1.0	µA	V_{IH} = 5V, V_{IL} = 0V
Fault-Protection						
Switch Off Output Leakage Current (overvoltage)	$I_{O(OFF)}$			100	µA	V_{OUT} = 0V, V_{IN} = ±60V
Switch Off Input Leakage Current (overvoltage)	$I_{IN(OFF)}$			200	µA	V_{OUT} = ±10V, V_{IN} = ±60V,
Switch Off Input Leakage Current	$I_{IN(OFF)}$		360	800	µA	V_{EN} = V_{OUT} = 0V, V_{IN} = ±75V V_{PP} & V_{NN} supplies off
Overvoltage Protection	V_{IN}	-60		60	V	V_{PP} & V_{NN} supplies off
Overvoltage Fault-Protection	V_{IN}	-75		75	V	V_{PP} & V_{NN} supplies off

AC Characteristics

Characteristics	Sym	Min	Typ	Max	Unit	Conditions
Access Time	t_A		1.2	2.4	µs	See Figure 1
Break-Before-Make Delay	t_D	25	220		ns	See Figure 2
Enable ON Time	$t_{ON(EN)}$		550	1000	ns	See Figure 3
Enable OFF Time	$t_{OFF(EN)}$		650	1100	ns	See Figure 3
Settling 0.1% Time 0.01%	t_{SETT}		1.2 3.5		µs	
Off Isolation	KO	-50	-68		dB	f = 100Khz 1k //15pF load
Switch Off Input Capacitance	$C_{IN(OFF)}$		7.0		pF	
Switch Off Output Capacitance	$C_{O(OFF)}$		50		pF	HV2516
			25		pF	HV2616
Logic Input Capacitance	C		18.0		pF	
Switch Off Input to Output Capacitance	$C_{I/O}$		6.6		pF	

Operating Conditions

Symbol	Parameter	Value
V_{PP}	Positive Voltage Supply	10.0V to 15.5V
V_{NN}	Negative Voltage Supply	-10.0V to -15.5V
V_{IH}	Input Logic High Voltage	2.4V to V_{PP}
V_{IL}	Input Logic Low Voltage	V_{NN} to 0.8V
V_{IN}	Analog Input Signal Voltage	V_{NN}+3V to V_{PP}-1.5V

Test Circuits

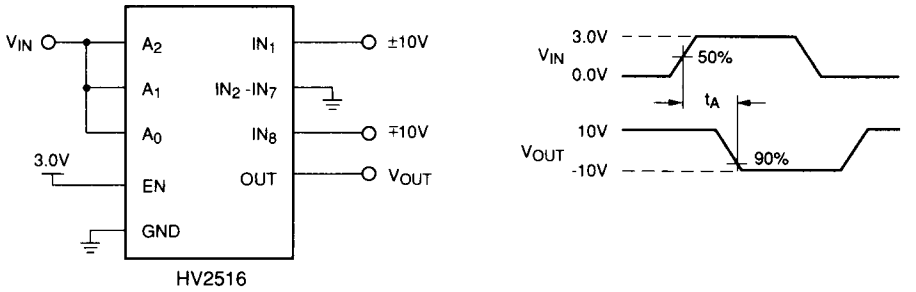


Figure 1. Access Time

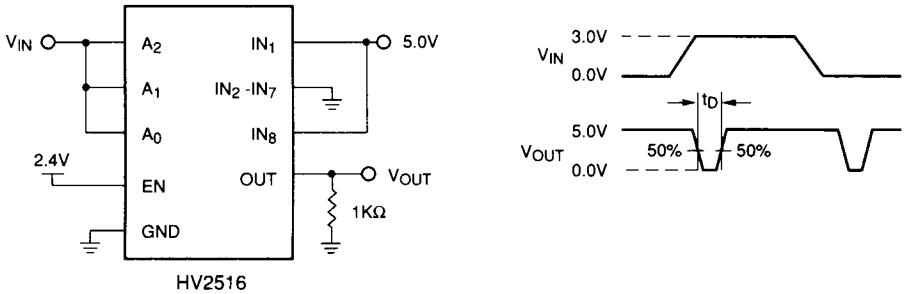


Figure 2. Break-Before-Make Delay

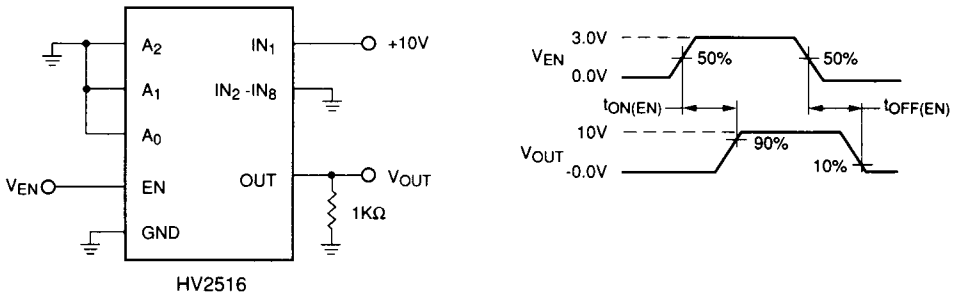
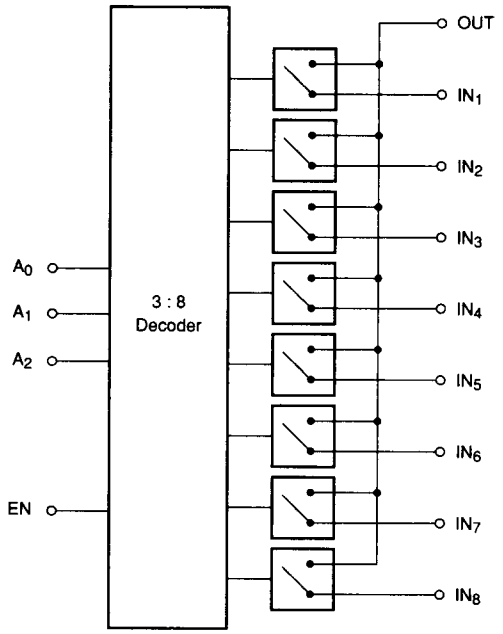
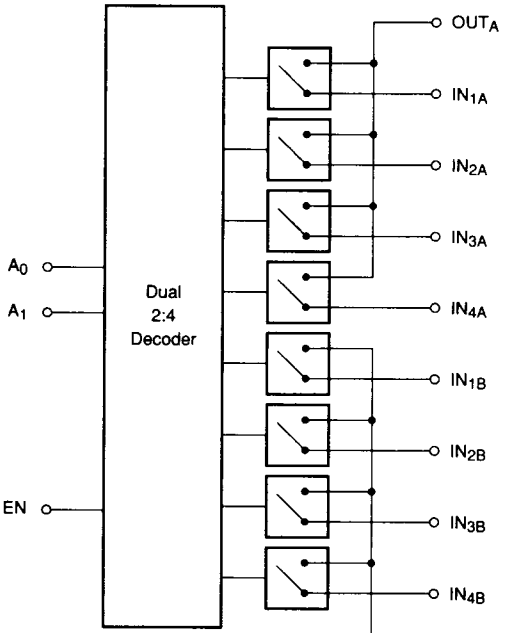


Figure 3. Enable On/Off Time

Block Diagram



HV2516



HV2616

Truth Table

HV2516

A_2	A_1	A_0	EN	Switch On
L	L	L	H	IN_1
L	L	H	H	IN_2
L	H	L	H	IN_3
L	H	H	H	IN_4
H	L	L	H	IN_5
H	L	H	H	IN_6
H	H	L	H	IN_7
H	H	H	H	IN_8
X	X	X	L	None

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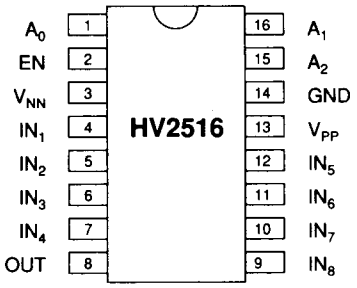
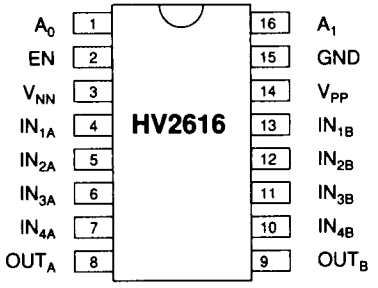
A_1	A_0	EN	Switch On
L	L	H	IN_{1A}, IN_{1B}
L	H	H	IN_{2A}, IN_{2B}
H	L	H	IN_{3A}, IN_{3B}
H	H	H	IN_{4A}, IN_{4B}
X	X	L	None

Package Outlines

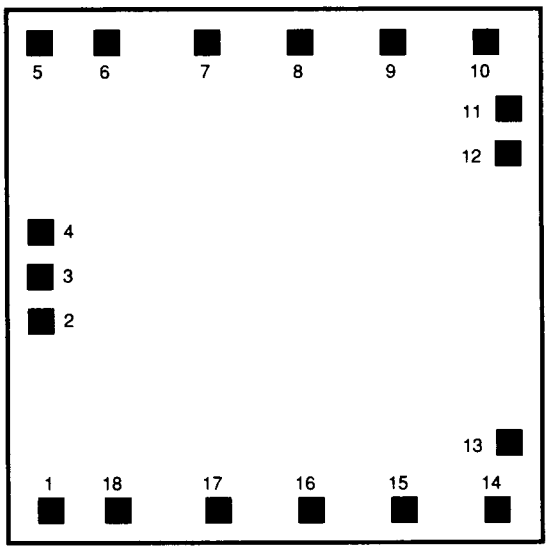


top view



top view

Die Specifications



Pad Coordinates in Microns

1	0; 0	10	3220.5; 3298.5
2	47.5; 1450.5	11	3432.5; 3012.5
3	47.5; 1667.5	12	3482.5; 2612.5
4	35.5; 1883.5	13	3482.5; 355
5	35.5; 3339	14	3220.5; 38
6	3725; 3339	15	2482.5; 38
7	1006.5; 3298.5	16	1744.5; 38
8	1744.5; 3298.5	17	1006.5; 38
9	2482.5; 3298.5	18	362; -1.5

	mils	mm	
Die Size:	154 x 148	3.912 x 3.759	Back Side Metal: None
Die Thickness:	20 ± 1	0.05 ± 0.02	Die Attach Material: Epoxy Ablestick 84-1 LMIS
Bond Pad Size:	4.5 x 4.5	0.11 x 0.11	Bond Pad Metal: Al/Si
Bond Wire Size	1.3	0.03	

HV25		**HV26**	
Pin	Function	Pin	Function
1	EN	1	EN
2	A_0	2	A_0
3	A_1	3	A_1
4	A_2	4	NC
5	GND	5	GND
6	V_{PP}	6	V_{PP}
7	IN_5	7	IN_{1B}
8	IN_6	8	IN_{2B}
9	NC	9	NC
10	IN_7	10	IN_{3B}
11	IN_8	11	IN_{4B}
12	NC	12	OUT_B
13	OUT	13	OUT_A
14	IN_4	14	IN_{4A}
15	IN_3	15	IN_{3A}
16	IN_2	16	IN_{2A}
17	IN_1	17	IN_{1A}
18	V_{NN}	18	V_{NN}