ANALOG DEVICES

Ultra High Speed ECL Hybrid D/A Converter

HDS-0810E - HDS-1015E

FEATURES
Settling Times to 10ns
Low Glitch Energy — 200pV-sec.
100MHz Update Rates
8- & 10-Bit Versions Available
Low Power < 1 Watt

APPLICATIONS
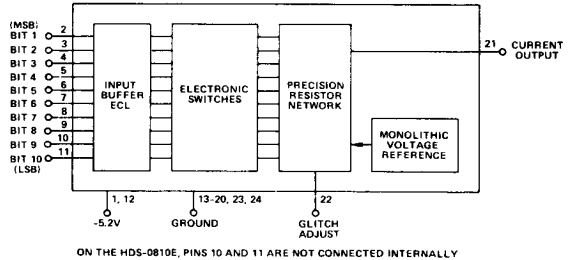Raster Scan & Vector Graphic Displays
TV Video Reconstruction
Digital VCO's
High-Frequency Waveform Generators
Analytical & Medical Instrumentation

HDS-0810E, HDS-1015E FUNCTIONAL BLOCK DIAGRAM

ON THE HDS-0810E, PINS 10 AND 11 ARE NOT CONNECTED INTERNALLY

PRODUCT DESCRIPTION
The HDS-0810E and HDS-1015E represent the state-of-the-art in ultra-high-speed hybrid D/A converters. They are designed to be input compatible with standard ECL logic families, and feature internal high-precision monolithic voltage reference, active laser-trimmed resistor network, and 75Ω output impedance — allowing them to be used to drive 75Ω cable directly without external driver amplifiers. This feature assures that a full 1 volt is available at the load, since the D/A output is a full 27mA. In addition, these D/A's are monotonic over the full operating temperature range and require only one power supply (–5.2V) for operation.

Packaged in an industry standard size 24-pin double width dual in-line case, the HDS-E Series D/A's are available in either ceramic cases (commercial) or hermetically sealed metal cases (extended).
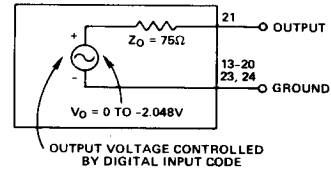
The HDS-E D/A's are ideally suited for use in a wide variety of applications, including graphic CRT displays, since they feature very low glitch energy and extremely fast settling time.
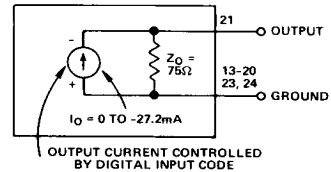
Current Equivalent Circuit

Voltage Equivalent Circuit

SPECIFICATIONS (typical @25°C with nominal power supplies and with 75Ω output load unless otherwise noted)

MODEL	UNITS	HDS-0810E	HDS-1015E
RESOLUTION FS = Full Scale	Bits	8	10
LSB WEIGHT (Current)	μA	106	27
LSB WEIGHT (Voltage)	mV	4	1
ACCURACY[1]	±% FS	0.1	0.05
Linearity	±μA	26.5	13
Monotonicity		Guaranteed	*
Zero Offset (Initial)	μA	5	*
TEMPERATURE COEFFICIENTS			
Linearity	ppm/°C	5	*
Zero Offset	ppm/°C	1	*
Gain	ppm/°C	80	*
DATA INPUTS			
Logic Compatibility		ECL	*
Logic Voltage Levels "1" =	V	-0.9	*
(Positive Logic) "0" =	V	-1.7	*
Logic Loading "1" =	mA	+13.6	*
(Each Bit) "0" =	μA	-50	*
Coding (See Coding Table)		BIN	*
OUTPUT			
Current Range (Unipolar) FS	mA	0 to -27.2	0 to -27.3
Voltage with 75Ω Ext. Load	V (±1%)	0 to -1.020	0 to -1.023
Compliance	V	-1.1 to +1.1	*
Impedance, Internal	Ω (±5%)	75	*
SPEED PERFORMANCE			
Settling Time (Voltage)[2]	ns (to % FS)	10 (0.2)	15 (0.1)
Slew Rate	V/μs	200	*
Update Rate[3]	MHz	100	67
Rise Time	ns	4	4
Glitch Energy[4]	pV-sec	200	*
POWER REQUIREMENTS			
-5.2V ±0.25V	mA	155	180
Power Supply Rejection			
Ratio	%/%	0.04	*
Reference		Monolithic, Internal	*
TEMPERATURE RANGE			
Operating; Glass Case	°C	0 to +70	*
Operating; "M" Metal Case	°C	-55 to +125	*
Storage	°C	-55 to +125	*
PACKAGE OPTIONS[5]		HY24E	HY24G

NOTES
[1] Relative to FS, including linearity.
[2] Worst case settling time. Includes FS and MSB transitions.
[3] Limited only by D/A settling time.
[4] Reducible to less than 100pV-sec with appropriate deskewing of digital inputs.
[5] See Section 19 for package outline information.
*Specifications same as HDS-0810E.

Specifications subject to change without notice.

PIN DESIGNATIONS

PIN	FUNCTION
1, 12	-5.2V
2	BIT 1 (MSB)
3	BIT 2
4	BIT 3
5	BIT 4
6	BIT 5
7	BIT 6
8	BIT 7
9	BIT 8
10	BIT 9
11	BIT 10 (LSB)
13-20	GROUND
21	OUTPUT
22	GLITCH ADJUST
23, 24	GROUND

ON THE HDS-0810E, PINS 10 AND 11 ARE NOT CONNECTED INTERNALLY, AND PIN 9 IS THE LSB. ALL GROUND PINS ARE CONNECTED TOGETHER INTERNALLY.