Rochester Electronics

Datasheet

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
    - Class Q Military
    - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)

    - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

HARRIS SEMICONDUCTOR

HI1178

Triple 8-Bit, 40 MSPS, RGB, 3-Channel D/A Converter

March 1998

Features

- Resolution . . . . . .Triple 8-Bit
- Maximum Conversion Speed 40MHz
- RGB 3-Channel Input/Output
- Differential Linearity Error . . . . . +0.3 LSB
- Low Power Consumption . . . . . .240mW (200Ω Load for $2V_{P-P}$ Output)
- Single Power Supply . . . . . .+5V
- Low Glitch Noise
- Direct Replacement for Sony CXD1178

Applications

- Digital TV
- Graphics Display
- High Resolution Color Graphics
- Video Reconstruction
- Instrumentation
- Image Processing
- I/Q Modulation

Description

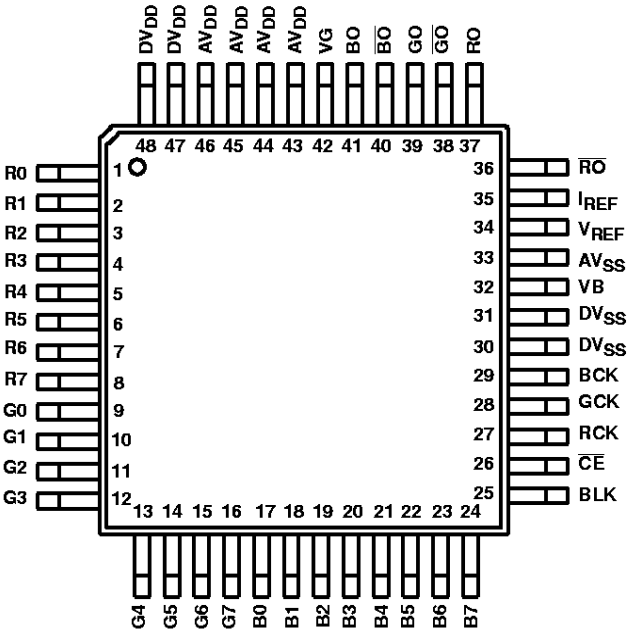
The HI1178 is a triple 8-bit, high-speed, CMOS D/A converter designed for video band use. It has three separate, 8-bit, pixel inputs, one each for red, green, and blue video data. A single 5.0V power supply and pixel clock input is all that is required to make the device operational. A bias voltage generator is internal. Each channel clock input can be controlled individually, or connected together as one. The HI1178 also has BLANK video control signal. Refer to the HI2304 for 3.3V operation.

Ordering Information

PART NUMBER	TEMP. RANGE (^oC)	PACKAGE	PKG. NO.
HI1178JCQ	-40 to 85	48 Ld MQFP	Q48.12x12-S

Pinout

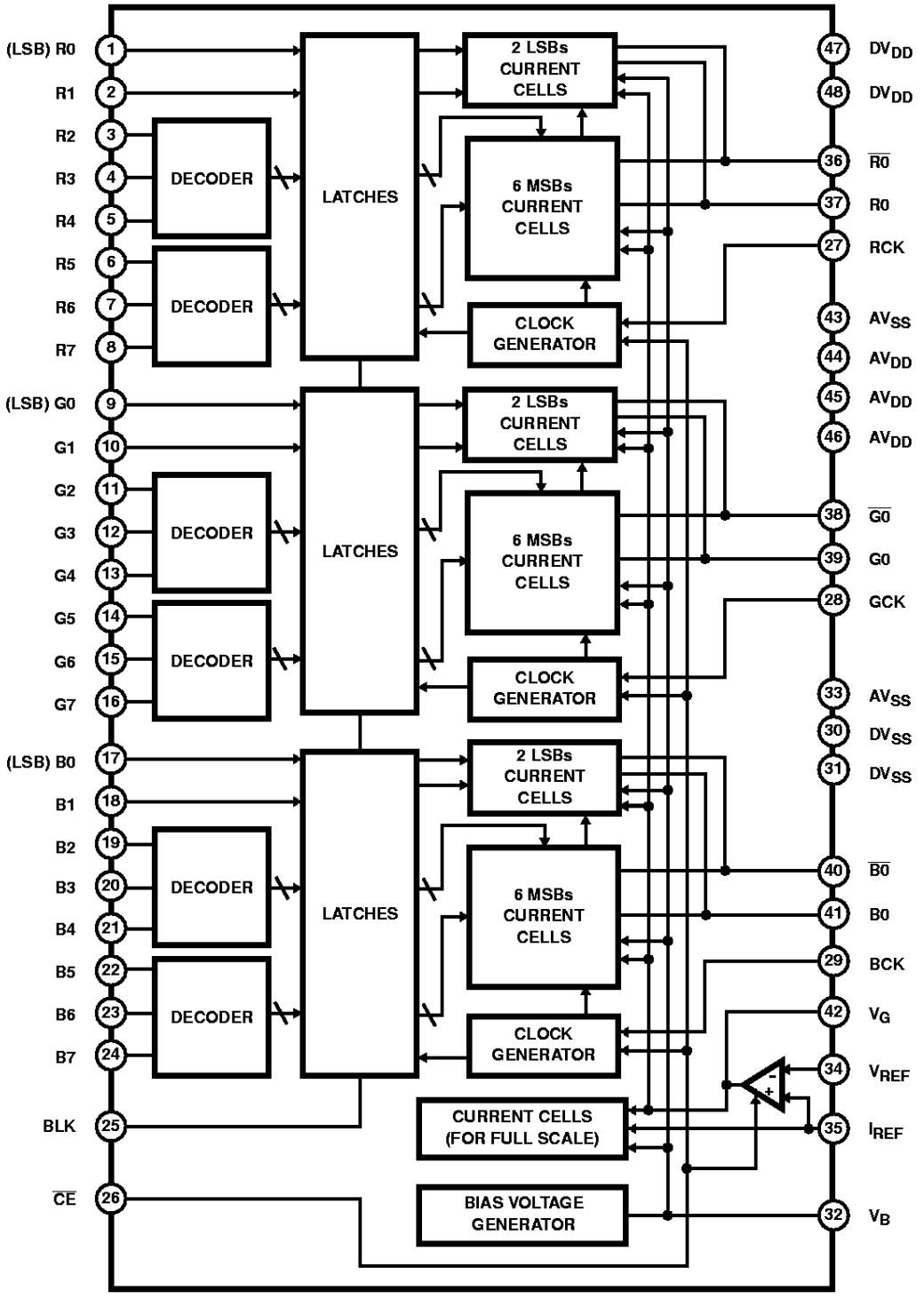
HI1178
(MQFP)
TOP VIEW



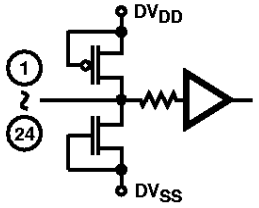
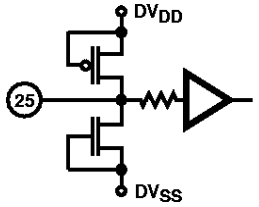
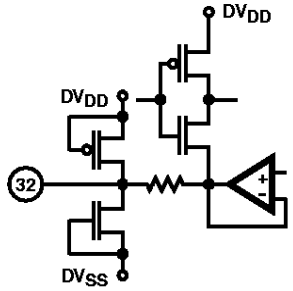
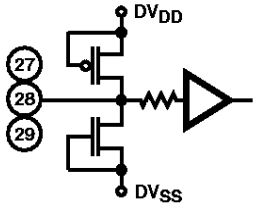
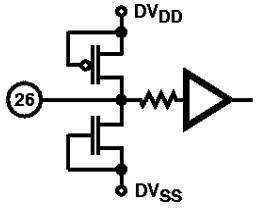
CAUTION: These devices are sensitive to electrostatic discharge. Users should follow proper IC Handling Procedures.

File Number **4115.2**

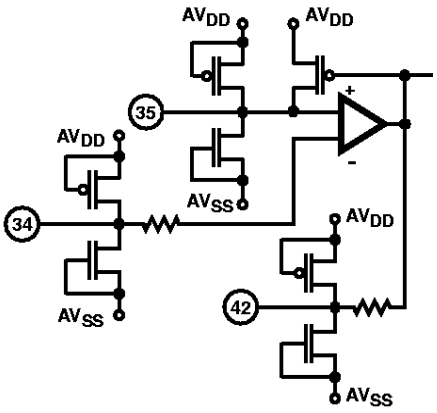
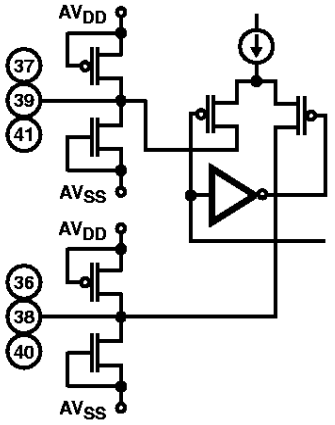
Functional Block Diagram



Pin Descriptions

PIN NO.	SYMBOL	EQUIVALENT CIRCUIT	DESCRIPTION
1 to 8	R0 to R7		Digital input.
9 to 16	G0 to G7		
17 to 24	B0 to B7		
25	BLK		Blanking pin. No signal at “H” (Output 0V). Output condition at “L”.
32	V_B		Connect a capacitor of about 0.1µF.
27	RCK		Clock pin. Moreover all input pins are TTL-CMOS compatible.
28	CLK		
29	BCK		
30, 31	DV_{SS}		Digital GND.
33	AV_{SS}		Analog GND.
26	$\overline{CE}$		Chip enable pin. No signal (Output 0V) at “H” and minimizes power consumption.

Pin Descriptions (Continued)

PIN NO.	SYMBOL	EQUIVALENT CIRCUIT	DESCRIPTION
35	I_{REF}		Connect a resistance 16 times "16R" that of output resistance value "R".
34	V_{REF}		Set full scale output value.
42	V_G		Connect a capacitor of about 0.1µF.
43 to 46	AV_{DD}		Analog V_{DD}.
37	RO		Current output pin. Voltage output can be obtained by connecting a resistance.
39	GO		
41	BO		
36	$\overline{RO}$		Inverted current output pin. Normally dropped to analog GND.
38	$\overline{GO}$		
40	$\overline{BO}$		
47, 48	DV_{DD}		Digital V_{DD}.

Absolute Maximum Ratings $T_A = 25^oC$

Supply Voltage (V_{DD}) 7V
Input Voltage (V_{IN}) . . . . . V_{DD} to V_{SS}
Output Current (I_{OUT}) . . . . . V_{DD} to V_{SS}
Digital Input Voltage (CLK) . . . . . 0mA to 15mA
(Every Each Channel)

Operating Conditions

Temperature Range (T_{OPR}) . . . . . -40^oC to 85^oC
Supply Voltage
AV_{DD}, AV_{SS} . . . . . 4.75V to 5.25V
DV_{DD}, DV_{SS} . . . . . 4.75V to 5.25V
Reference Input Voltage (V_{REF}) 2V
Clock Pulse Width
t_{PW1} . . . . . 12.5ns (Min)
t_{PW0} . . . . . 12.5ns (Min)

Thermal Information

Thermal Resistance (Typical, Note 1)	θ_{JA} ($^oC/W$)
MQFP Package	94

Maximum Junction Temperature (Plastic Package) . . . . . 150^oC
Maximum Storage Temperature Range (T_{STG}) . . . . -65^oC to 150^oC
Maximum Lead Temperature (Soldering 10s) . . . . . 300^oC
(Lead Tips Only)

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:
1. θ_{JA} is measured with the component mounted on an evaluation PC board in free air.

Electrical Specifications $f_{CLK} = 40MHz$, $V_{DD} = 5V$, $R_{OUT} = 200\Omega$, $V_{REF} = 2.0V$, $T_A = 25^oC$

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Resolution		n		-	8	-	bit
Maximum Conversion Speed		f_{MAX}		40	-	-	MSPS
Linearity Error		E_L		-2.5	-	2.5	LSB
Differential Linearity Error		E_D		-0.3	-	0.3	LSB
Full Scale Output Voltage		V_{FS}		1.8	2.0	2.2	V
Full Scale Output Ratio (Note 1)		F_{SR}		0	1.5	3	%
Full Scale Output Current		I_{FS}		-	10	15	mA
Offset Output Voltage		V_{OS}		-	-	1	mV
Power Supply Current		I_{DD}	14.3MHz, at Color Bar Data Input	-	-	48	mA
Digital Input Current	H Level	I_{IH}		-	-	5	µA
	L Level	I_{IL}		-5	-	-	µA
Set Up Time		t_S		5	-	-	ns
Hold Time		t_H		10	-	-	ns
Propagation Delay Time		t_{PD}		-	10	-	ns
Glitch Energy		GE	$R_{OUT} = 75\Omega$	-	30	-	pV/s
Crosstalk		CT	1MHz Sin Wave Output	-	57	-	dB

NOTE:
1. Full scale output ratio = $\left| \frac{\text{Full Scale Voltage of Channel}}{\text{Average of the Full Scale Voltage of the Channels}} - 1 \right| \times 100(\%)$

I/O Chart (When Full Scale Output Voltage at 2.00V)

INPUT CODE								OUTPUT CODE
MSB							LSB	
1	1	1	1	1	1	1	1	2.0V
				•				
				•				
				•				
1	0	0	0	0	0	0	0	1.0V
				•				
				•				
				•				
0	0	0	0	0	0	0	0	0V