UNIVERSAL SEMICONDUCTOR, INC.

USC1843
TRIPLE 4-BIT VIDEO DAC

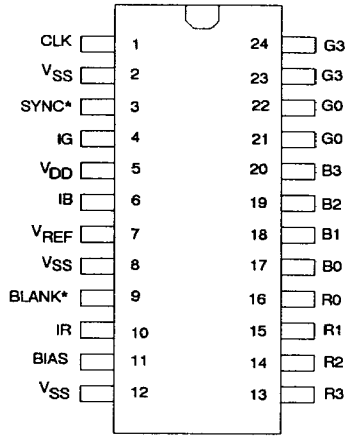
FEATURES

- RGB color output
- Low power CMOS
- Single 5V supply
- Direct monitor drive
- Low glitch energy
- 4 bit resolution
- TTL / CMOS compatible
- High speed operation
- 37.5 / 75 ohm drive
- Built-in reference
- 4 ns settling time (typical)
- 7 ns delay time (typical)
- Composite sync (green channel)
- Composite blanking

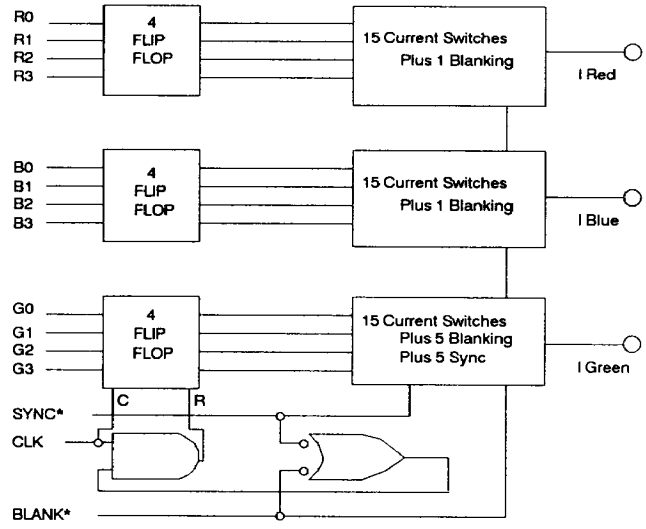
DESCRIPTION

The USC1843 is a monolithic high speed silicon gate CMOS D/A converter containing three video DACs. Each DAC will convert 4 bit digital information into the drive for the respective RGB color. Current sources are switched to set the output levels into the monitor load. Either 75 or 37.5 ohm loads may be driven. The device contains current sources for blanking on each output and sync source on the green output channel.

PIN CONFIGURATION



BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNITS
Supply Voltage (V_{DD})	6	V
Supply Current (I_{DD})	100	mA
Full Scale Output Current (I_O)/DAC	33	mA
Drive Current into any pin	+/–10	mA
Output Voltage Range V_O	+2.5 to –10	V
Logic Input Voltage	-0.3 to Vdd +0.3	V

Absolute Maximum Ratings are those beyond which damage to the device may occur. All voltages are referenced to ground.

DC ELECTRICAL CHARACTERISTICS

V_{DD} = 5V +/–5% ; I_{DD} = 28mA @ 75 ohm loads ; T_A = 0°C to 70°C

PARAMETER	MIN	MAX	UNITS
Output Current (@ 1.2V)*		33	mA
Output Voltage		1.5	V
Resolution		6	Bits
Linearity Error		1	Count
Diff. Linearity Error		1	Count
Voltage Reference	1.13	1.33	V
Offset Current		1	uA
Logic Low Input Voltage V_{IL}		0.8	V
Logic High Input Voltage V_{IH}	2.0		V
Compatibility			TTL / CMOS
Input Code			Binary
Sync (green only)		40.5	IRE units
Blanking		7.5	IRE units
Video		92	IRE units

* Green ; Red or Blue = 25mA

AC OPERATING CONDITIONS

PARAMETER		UNITS
Conversion Rate (min)	85	MSPS
Settling Time (max to 1%)	4	ns
Output Glitch Energy (typical)	48	PV–sec
Output Glitch Energy Amplitude	14	mV
Delay Time (max)	7	ns

DEVICE OPERATION

Each output of the USC1843 Video DAC is a current source whose full scale values are set by an external resistor. This resistor is connected to the internal 1.23V reference. The current through the resistor (I_P) equals 1.5 LSB of output current. Either a pot or a fixed resistor with the full scale current set in the monitor may be used. All current sources are ratioed to I_P.

The video control pins operate as follows:

SYNC: A logic 0 shuts off this current and clears all three DACs.

BLANK: A logic 0 shuts off these current sources and clears the DACs.

CLOCK: Loads data from the 18 inputs while high and data is transferred to the DACs on the falling edge.

R0 – 5: RED DAC control bits.

G0 – 5: GREEN DAC control bits.

B0 – 5: BLUE DAC control bits.

(0 is LSB ; 5 is MSB)

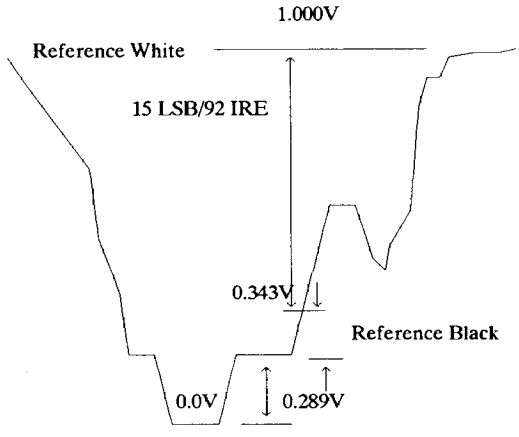
V_{REF}: Nominal 1.23V internal reference. I_P resistor to ground sets full scale current.

V_{DD}: +5V power pin.

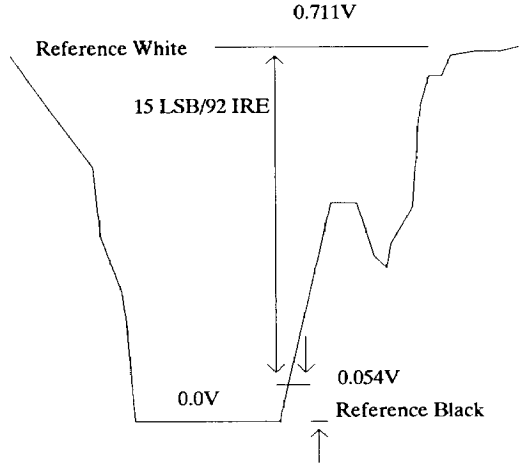
V_{SS}: Ground pin.

BIAS: Bias amplifier output. Bypass to ground with 0.01 uf capacitor.

IR, IG, IB: Current sources to drive color monitor.

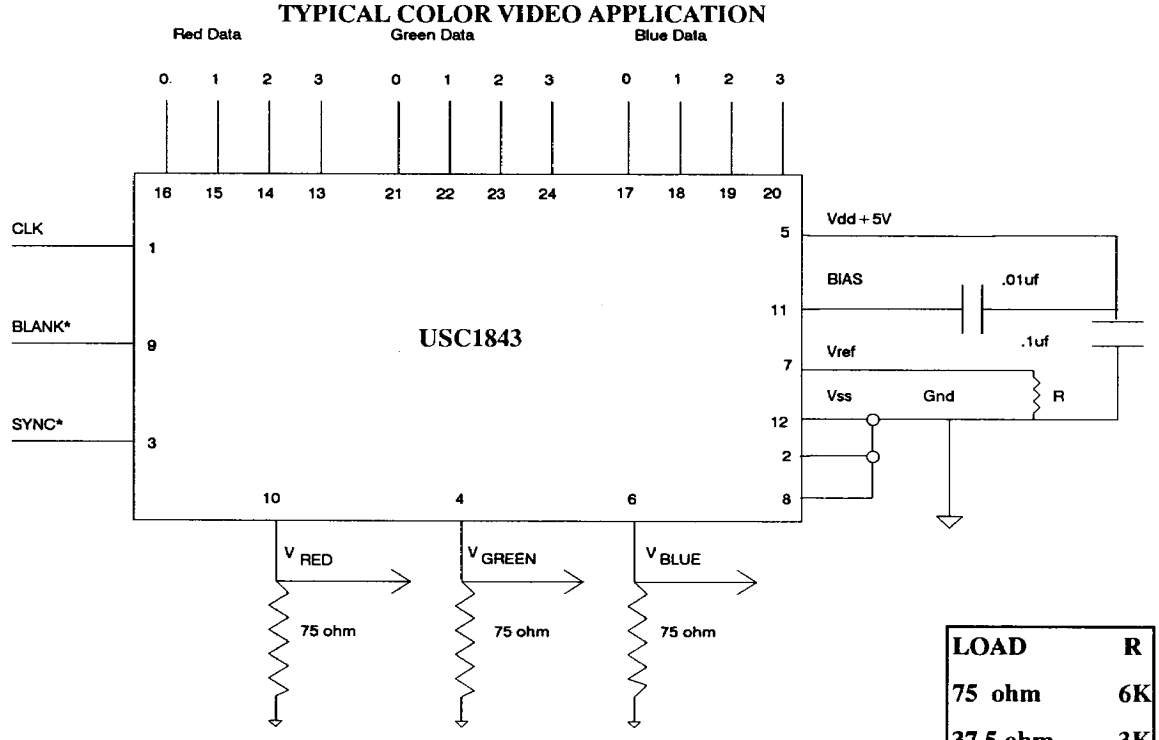


VIDEO OUT GREEN CHANNEL



VIDEO OUT RED/BLUE

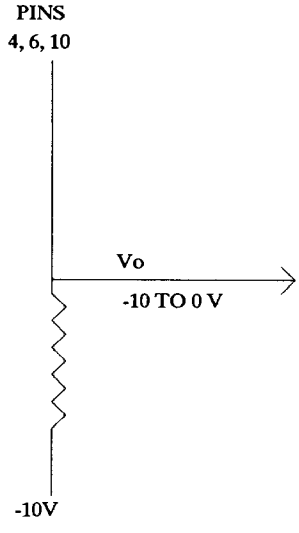
TYPICAL COLOR VIDEO APPLICATION



LOAD	R
75 ohm	6K
37.5 ohm	3K

TYPICAL NON-VIDEO APPLICATION

10V DAC



ORDERING INFORMATION:

USC1843-BI-P24