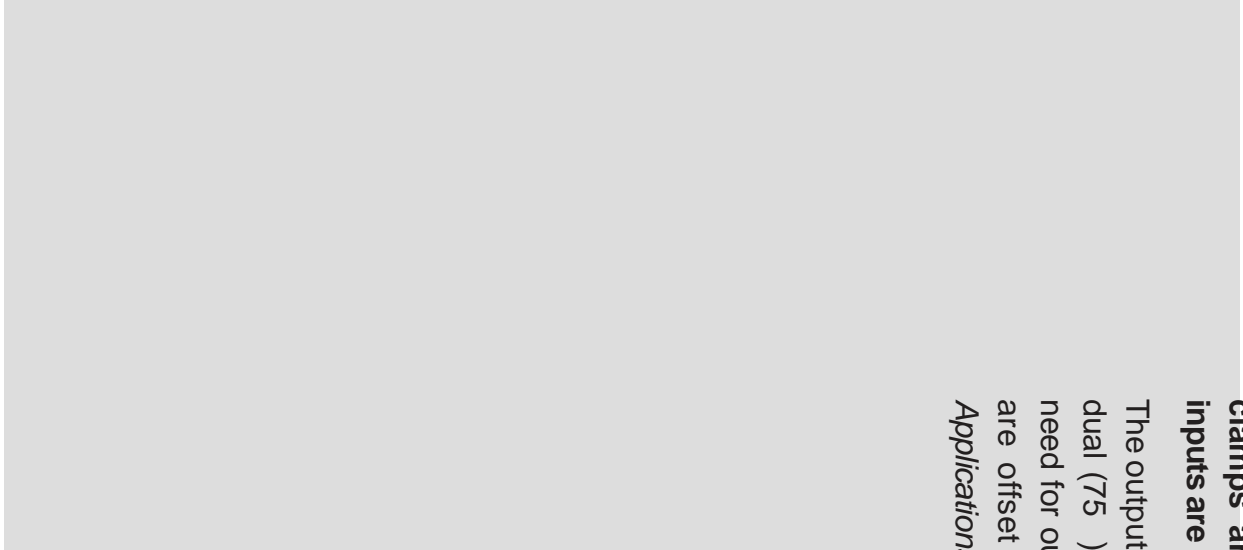
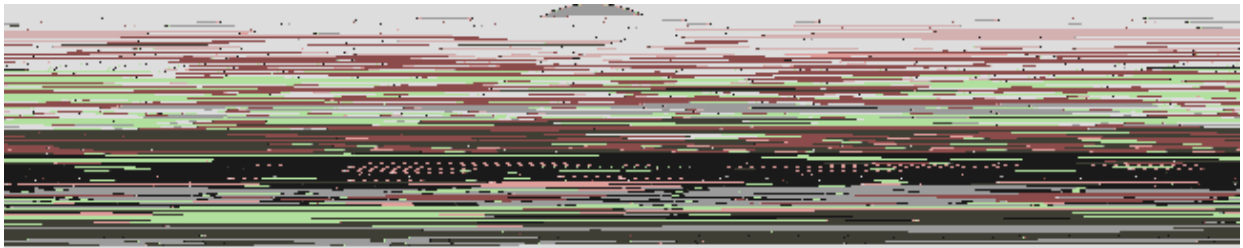
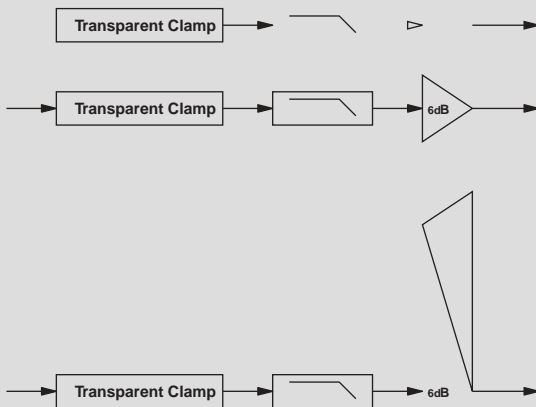


---



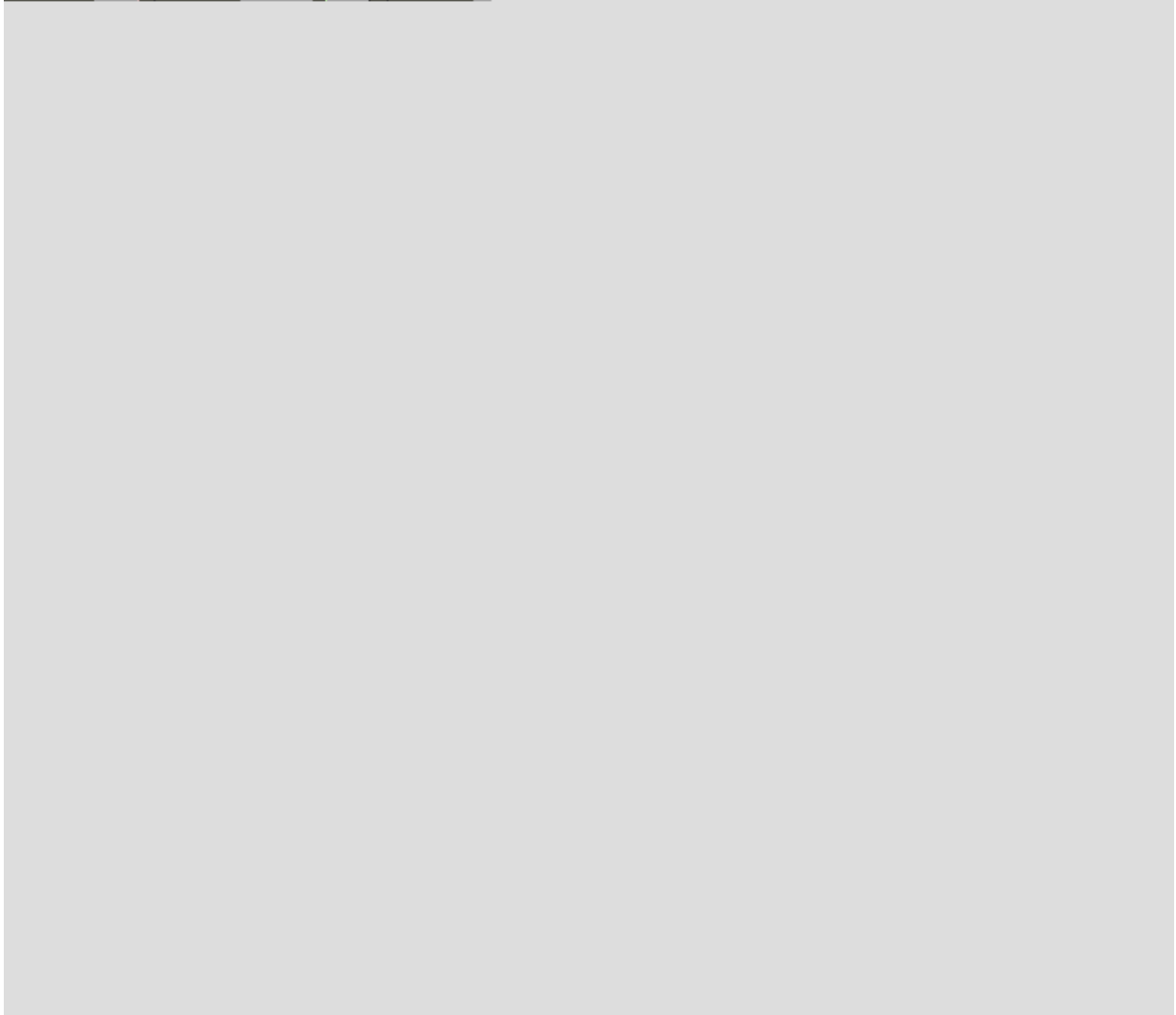
DAC output or an AC-coupled signal. Internal diode clamps and bias circuitry may be used if AC-coupled inputs are required (see Applications section for details). The outputs can drive AC- or DC-coupled single (150 dual (75 ) loads. DC coupling the outputs removes need for output coupling capacitors. The input DC level are offset approximately +280mV at the output (see Applications section for details).



### Ordering Information

Part Number	Operating			





### DC Electrical Characteristics

$T_A = 25^\circ\text{C}$ ,  $V_{CC} = 5\text{V}$ ,  $R_{SOURCE} = 37.5 \ \Omega$ ; all inputs are AC-coupled with  $0.1\ \mu\text{F}$ ; all outputs are AC coupled with  $220\ \mu\text{F}$  into  $150 \ \Omega$  loads; unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$I_{CC}$	Supply Current <sup>(1)</sup>	FMS6145 (No Load)		30	46	mA
$V_{IN}$	Video Input Voltage Range	Referenced to GND if DC-coupled		1.4		$V_{pp}$
PSRR	Power Supply Rejection	DC (All Channels)		-50		dB

<sup>(1)</sup> 100% tested at  $25^\circ\text{C}$ .

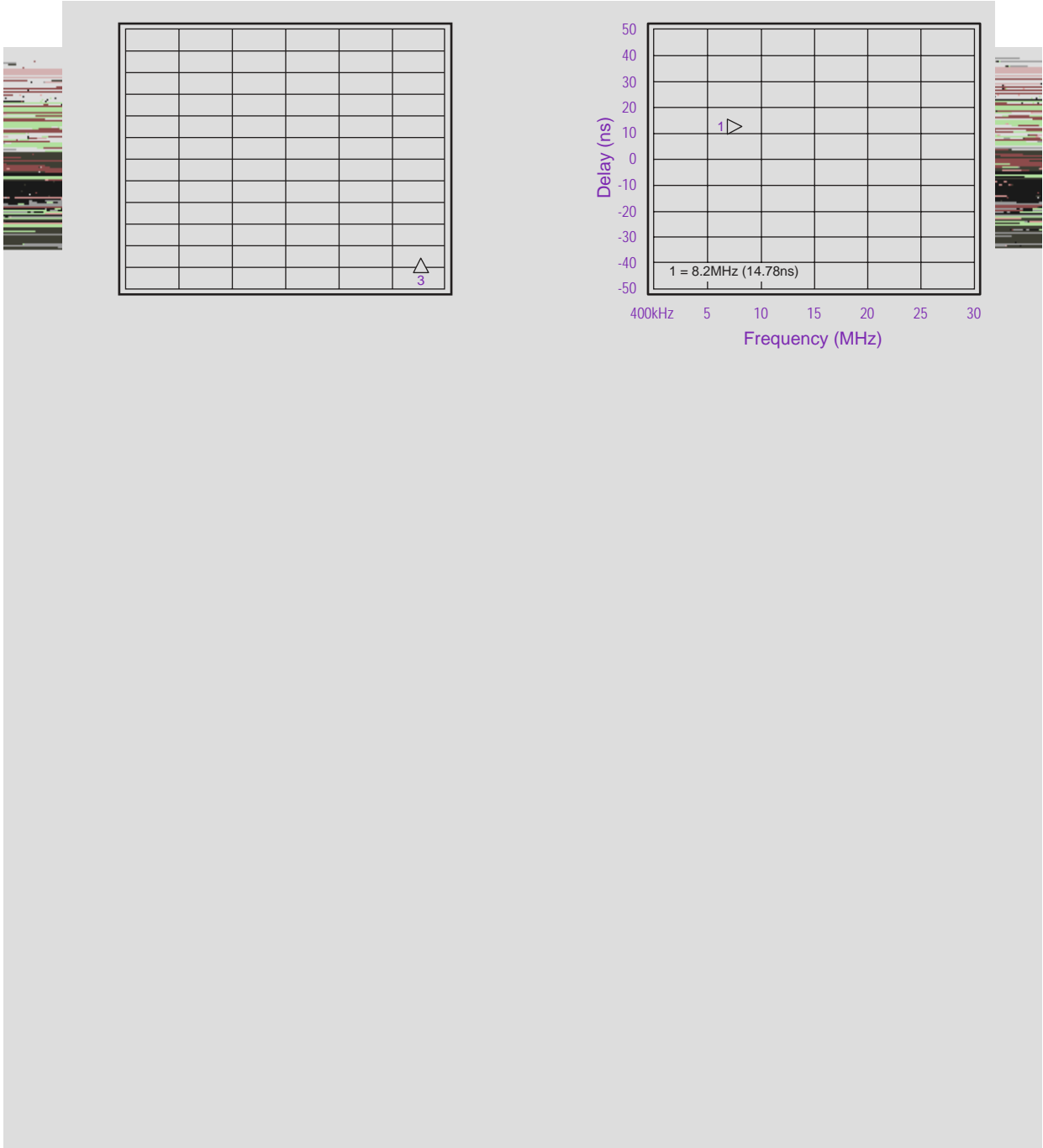
### AC Electrical Characteristics

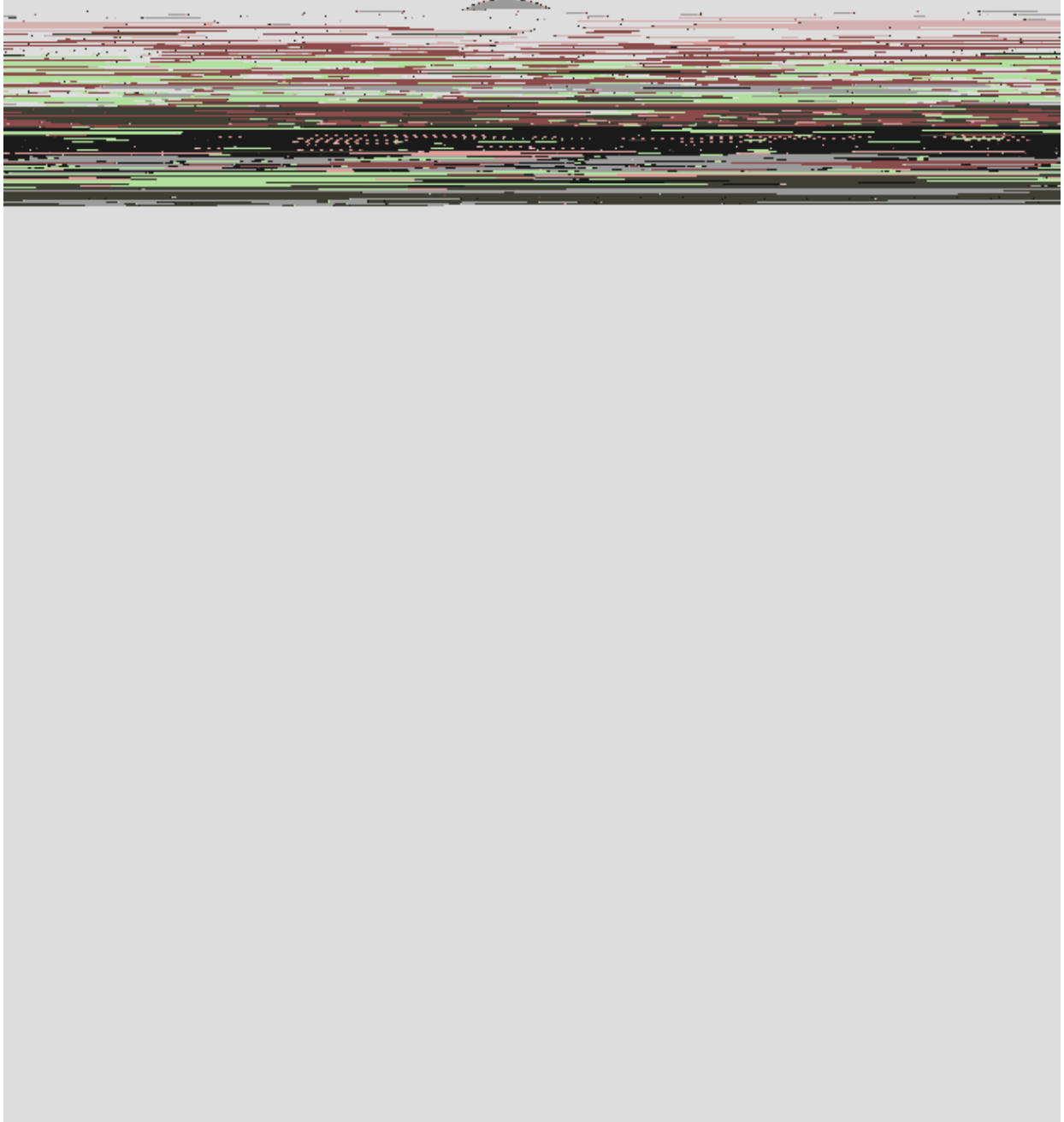
$T_A = 25^\circ\text{C}$ ,  $V_{IN} = 1V_{pp}$ ,  $V_{CC} = 5\text{V}$ ,  $R_{SOURCE} = 37.5 \ \Omega$ ; all inputs are AC coupled with  $0.1\ \mu\text{F}$ ; all outputs are AC-coupled with  $220\ \mu\text{F}$  into  $150 \ \Omega$  loads; unless otherwise noted.



### Typical Performance Characteristics

$T_A = 25^\circ\text{C}$ ,  $V_{CC} = 5\text{V}$ ,  $R_{SOURCE} = 37.5 \Omega$ ; all inputs AC coupled with  $0.1\mu\text{F}$ ; all outputs are AC coupled with  $220\mu\text{F}$  into  $150 \Omega$  loads; unless otherwise noted.

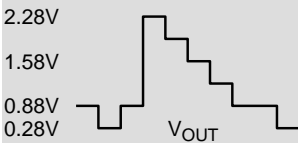
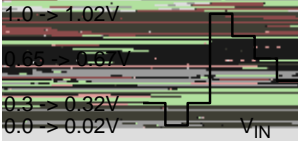




## Application Information

### Application Circuits

The FMS6145 Low Cost Video Filter (LCVF) provides 6dB gain from input to output. In addition, the input is slightly offset to optimize the output driver performance. The offset is held to the minimum required value to decrease the standing DC-current into the load. Typical voltage levels are shown in the diagram below:



Driven by:  
DC-Coupled DAC Outputs  
AC-Coupled and Clamped  
Y, CV, R, G, B

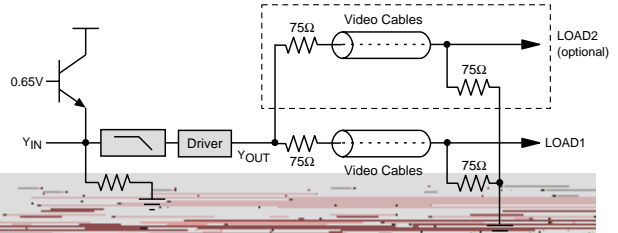
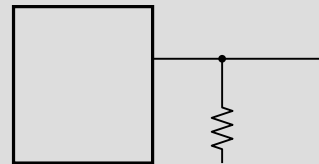


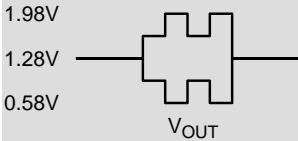
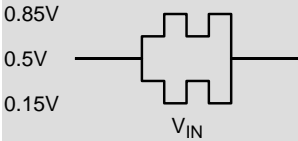
Figure 8. Input Clamp Circuit

### I/O Configurations

For a DC-coupled DAC drive with DC-coupled outputs, use the configuration in Figure 9.



There is a 280mV offset from the DC input level to the DC output level.  $V_{OUT} = 2 * V_{IN} + 280mV$ .



Driven by:  
AC-Coupled and Biased  
U, V, Pb, Pr, C

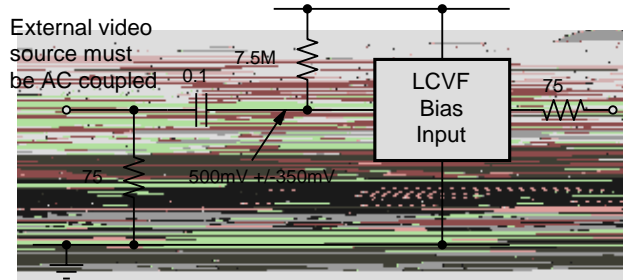
Figure 7. Typical Voltage Levels

The FMS6145 provides an internal diode clamp to support AC-coupled input signals. If the input signal does not go below ground, the input clamp does not operate. This allows DAC outputs to directly drive the FMS6145 without an AC coupling capacitor. When the input is AC coupled, the diode clamp sets the sync tip (or lowest voltage) just below ground. The worst-case sync tip compression due to the clamp cannot exceed 7mV. The input level set by the clamp, combined with the internal DC offset, keeps the output within its acceptable range.

For symmetric signals like Chroma, U, V, Pb, and Pr, the average DC bias is fairly constant and the inputs can be AC coupled with the addition of a pull-up resistor to set the DC input voltage. DAC outputs can also drive these same signals without the AC coupling capacitor. A conceptual illustration of the input clamp circuit is shown in Figure 8.

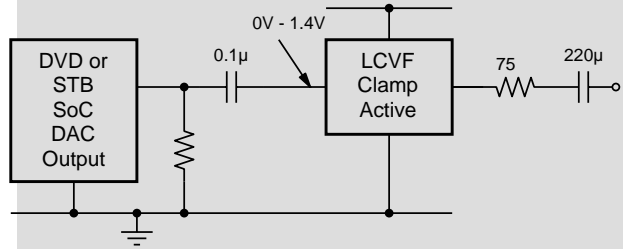


The same method can be used for biased signals, with the addition of a pull-up resistor to make sure the clamp never operates. The internal pull-down resistance is  $800k \pm 20\%$ , so the external resistance should be  $7.5M$  to set the DC level to  $500mV$ ; as shown in Figure 12.

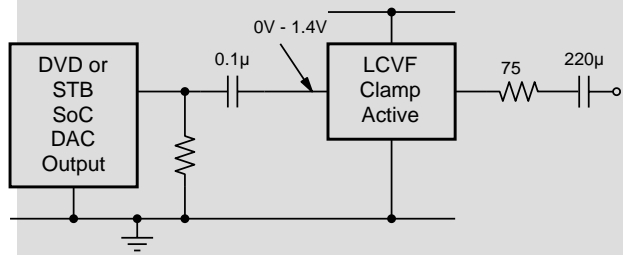


**Figure 12. Biased SCART with DC-Coupled Outputs**

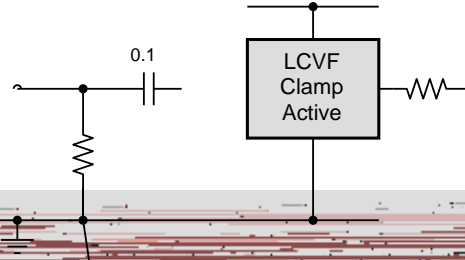
The same circuits can be used with AC-coupled outputs if desired.



**Figure 13. DC-Coupled Inputs, AC-Coupled Outputs**



**Figure 14. AC-Coupled Inputs and Outputs**



**Figure 15. Biased SCART with AC-Coupled Outputs**

by the AC-coupling capacitor. The value may need to be increased beyond  $20\mu F$  to obtain satisfactory operation in some applications.

**Power Dissipation**

The FMS6145 output drive configuration must be considered when calculating overall power dissipation. Care must be taken not to exceed the maximum die junction temperature. The following example can be used to calculate the FMS6146's power dissipation and internal temperature rise.

$$T_j = T_A + P_d \cdot \theta_{JA} \tag{EQ. 1}$$

$$\text{where: } P_d = P_{CH1} + P_{CH2} + P_{CH3} \text{ and} \tag{EQ. 2}$$

$$P_{CHx} = V_{CC} \cdot I_{CH} - (V_O^2/R_L) \tag{EQ. 3}$$

$$\text{where: } V_O = 2V_{IN} + 0.280V \tag{EQ. 4}$$

$$I_{CH} = (I_{CC}/3) + (V_O/R_L) \tag{EQ. 5}$$

$V_{IN}$  = RMS value of input signal

$I_{CC} = 30mA$

$V_{CC} = 5V$

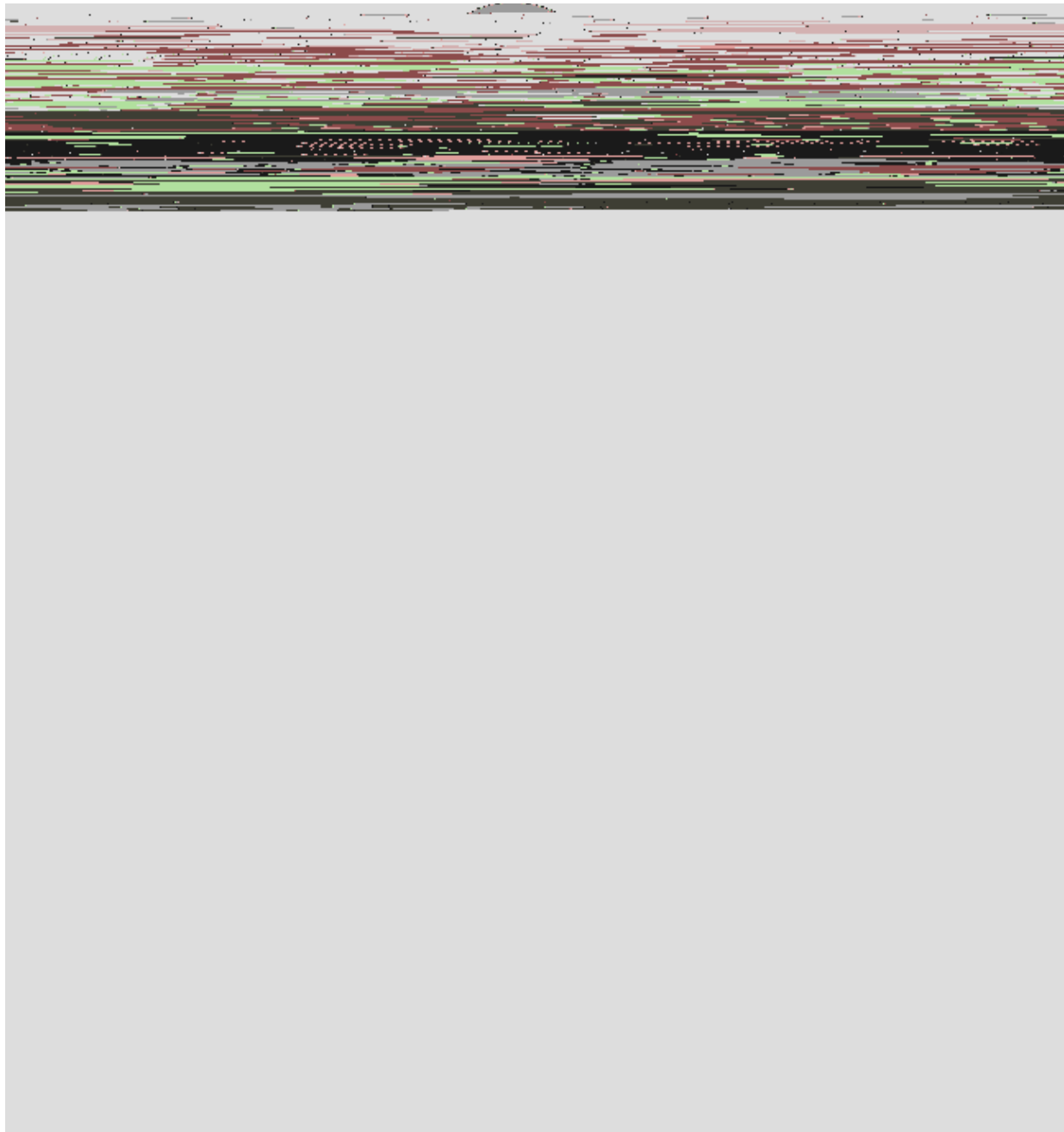
$R_L$  = channel load resistance

Board layout can also affect thermal characteristics. Refer to the *Layout Considerations* section for details.

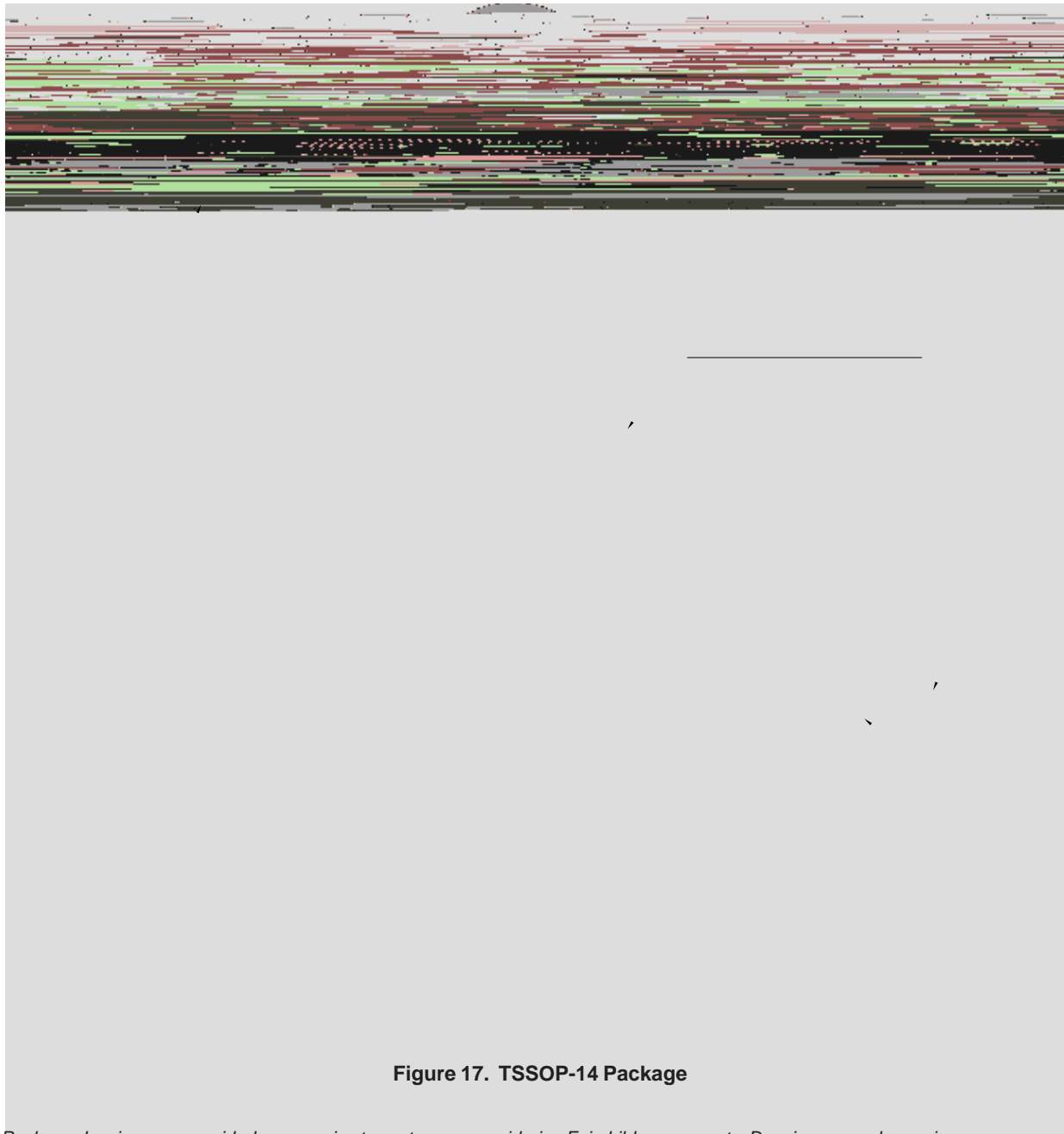
The FMS6145 is specified to operate with output currents typically less than 50mA, more than sufficient for a dual (75  $\Omega$ ) video load. Internal amplifiers are current limited to a maximum of 100mA and should withstand brief-duration short-circuit conditions; this capability is not guaranteed.

## Layout Considerations

General layout and supply bypassing play major roles in



## Physical Dimensions



**Figure 17. TSSOP-14 Package**

*Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.*

*Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:*

*<http://www.fairchildsemi.com/packaging/>.*



