LM2480 80V Triple Bias Clamp

Check for Samples: LM2480

FEATURES

- **Wide Range Integrated Triple Bias Clamp**
- **High Input Impedance**
- **Single Supply Operation**
- **Matched to the LM126X Family of Preamplifiers**

RECOMMENDED APPLICATIONS

- **CRT Monitors Requiring DC Restoration at the Cathodes**

DESCRIPTION

The LM2480 driver is an Integrated 80V triple bias clamp circuit for DC recovery of each of the AC coupled outputs of a CRT driver. It is well matched with the DAC outputs of the LM126X family of pre-amplifiers. Each amplifier has its gain internally set to -18. The IC is packaged in an industry standard 8 lead molded PDIP package.

Block Diagrams

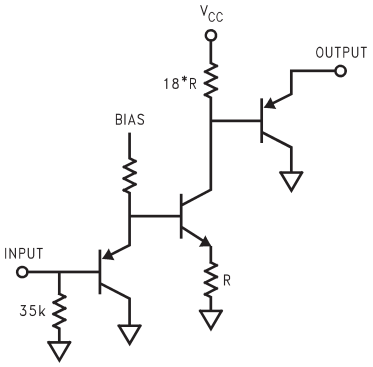

Figure 1. Simplified Schematic (One Channel)

Package Pinout

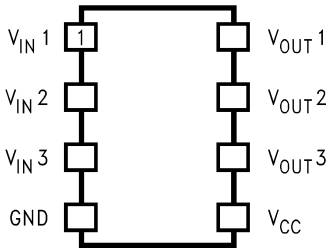

Figure 2. LM2480 Package Pinout - PDIP
See Package Number P

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

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ABSOLUTE MAXIMUM RATINGS(1)(2)(3)

Supply Voltage, V_{CC}		+90V
Input Voltage, V_{IN}		0V to 5V
Storage Temperature Range, T_{STG}		-65°C to +150°C
Lead Temperature (Soldering, <10sec.)		300°C
ESD Tolerance	Machine Model	200V
	Human Body Model	2KV

(1) Linearity Error is the variation in DC gain from V_{IN} = 1.0V to V_{IN} = 4.0V.
(2) If Military/Aerospace specified devices are required, please contact the Texas Instruments Sales Office/Distributors for availability and specifications.
(3) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur.

LIMITS OF OPERATING RANGES(1)

V_{CC}	70V to 85V
V_{OUT}	10V to V_{CC}
Ambient Temperature Range, T_A	0 to 70°C

(1) Operating Ratings indicate conditions for which the device is functional, but do not ensure specific performance limits. For ensured specifications and the test conditions, see the Electrical Characteristics. The ensured specifications apply only for the test conditions listed. Some performance characteristics may change when the device is not operated under the listed test conditions.

DC CLAMP ELECTRICAL CHARACTERISTICS TARGETS AND LIMIT(1)

Unless otherwise noted: V_{CC} = +80V, V_{IN} = 2.25V_{DC}, T_A = 25°C.

Symbol	Spec Parameter	Conditions	Min	Typ	Max	Units
I_{CC}	Supply Current	All channels		2.1	3.5	mA
V_{OUT}	DC Output Voltage		42	46	50	V_{DC}
$V_{OUT-Range}$	Output Voltage Range	V_{IN} Range = 1.0V - 4.0V		53		V
V_{OUTSAT}	Max Saturation Limit	V_{IN} = 4.0V		16		V_{DC}
A_V	DC Voltage Gain		-16	-18	-20	
LE	Linearity Error	See Note (2)		5		%
R_{IN}	Input Resistance			34K		Ω

(1) All voltages are measured with respect to GND, unless otherwise specified.
(2) Linearity Error is the variation in DC gain from V_{IN} = 1.0V to V_{IN} = 4.0V.

TEST CIRCUIT

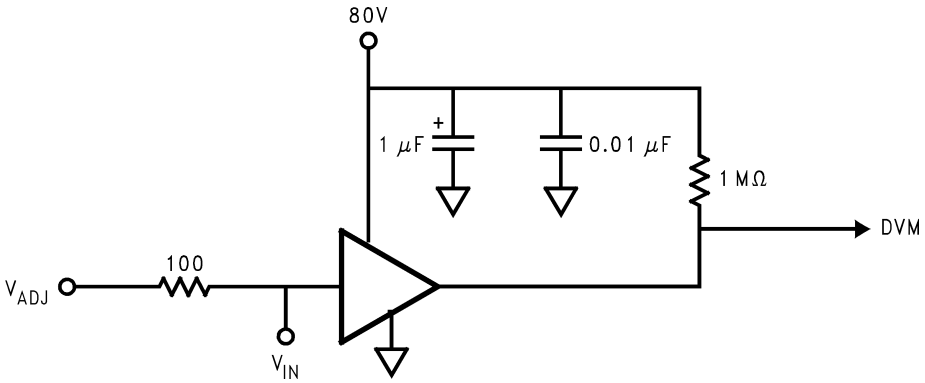

Figure 3. Test Circuit (One Channel)

Figure 3 shows the test circuit for evaluation of the LM2480 Clamp Amplifier. A high impedance VM (>100MΩ) is used for DC measurements at the output.

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TYPICAL PERFORMANCE CHARACTERISTICS

(V_{CC} = +80V), Test Circuit - Figure 3 unless otherwise specified.

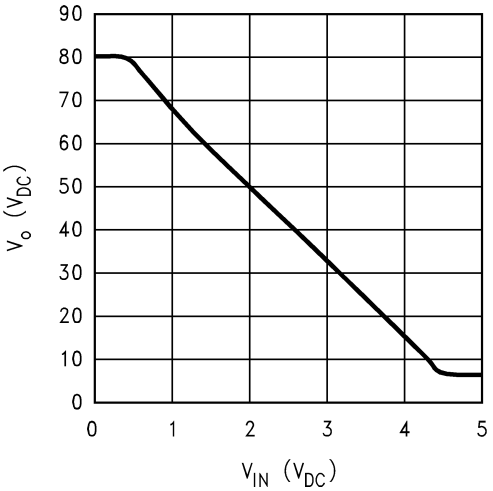

Figure 4. V_{out} vs V_{in}

THEORY OF OPERATION

The circuit diagram of the LM2480 is shown in Figure 1. The DC clamp circuit amplifies the input signal by -18 and the gain is set by the resistor ratio of 18R and R. The output requires pull-up resistor to 80V. Figure 3 shows the test circuit used for evaluation of the LM2480 Clamp Amplifier. A high impedance voltmeter (>100MΩ) is used for DC measurements at the output. The DC transfer function is shown in Figure 4.

APPLICATION HINTS

POWER SUPPLY BYPASS

The LM2480 should have proper power supply bypassing for optimum performance. A 0.1µF capacitor should be connected from the supply pin, V_{CC}, to ground, as close to the supply and ground pins as is practical. Additionally, a 1.0µF electrolytic capacitor should be connected from the supply pin to ground. The electrolytic capacitor should also be placed reasonably close to the LM2480's supply and ground pins.

APPLICATION CIRCUIT

The application circuit shown in Figure 5 is designed to help clamp the voltage at the output of the driver to the desired level. Capacitor C_4 stabilizes the entire node at the anode of the clamp diode, D_3, by creating a low impedance at high frequencies. Figure 5 also shows the standard application circuit topology when used with an LM246X CRT driver. It shows all the components necessary to optimize performance as well as to protect against damage from a CRT arc event. No additional components are required to protect the LM2480 from arc damage.

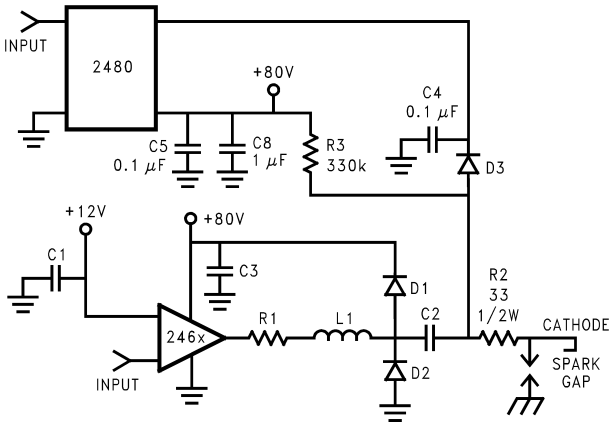

Figure 5. One Channel of the LM2480 and LM246X Application Circuit

DEMONSTRATION HARDWARE

Texas Instruments has designed a demonstration neckboard for the LM126X, LM246X, and the LM2480 chipset. To obtain demonstration boards contact the Texas Instruments Sales Office in your region.

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REVISION HISTORY

Changes from Revision C (April 2013) to Revision D	Page
• Changed layout of National Data Sheet to TI format	4

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