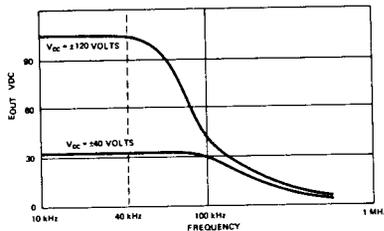
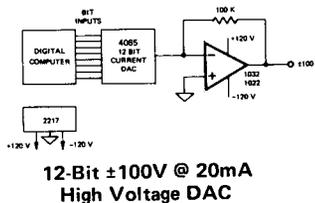


High Voltage FET Input Operational Amplifiers

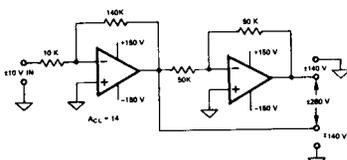
The 1022 and 1032 are general purpose FET operational amplifiers designed for applications requiring output voltage swings from $\pm 8V$ to $\pm 140V$. While operating from power supplies in the range of $\pm 18V$ to $\pm 150V$, these op amps can withstand common mode voltages to within 10 volts of the supplies. The 1022 operates from $\pm 40V$ to $\pm 150V$ supplies with output swings from $\pm 30V$ to $\pm 140V$. Output current is a minimum of $\pm 20mA$, and output slew rate is $30V/\mu sec$. The 1032 operates from $\pm 18V$ to $\pm 125V$ supplies with output swings from $\pm 8V$ to $\pm 115V$. Its output current is a minimum of $\pm 10mA$, and it slews at $10V/\mu sec$. Applications for these amplifiers include high impedance high voltage buffers, high voltage digital to analog converters, high compliance-voltage current sources, analog computing amplifiers, linear servomotor drivers, klystron modulators, optical modulators for lasers, and CRT deflection amplifiers. As indicated below, the 1022 can conservatively drive a $100V$ peak-to-peak signal into $5k\Omega$ from dc to $30kHz$. These devices are epoxy encapsulated. Two threaded inserts allow mechanical mounting to chassis, PC board, or the model 6043 heat-sink socket. Input circuitry is fully protected up to the supply voltage, while output circuitry is protected against shorts to ground, $+V_{CC}$, and $-V_{CC}$.



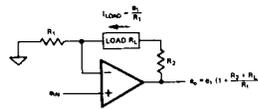
Model 1022 Output Voltage vs. Frequency



12-Bit $\pm 100V$ @ 20mA
High Voltage DAC

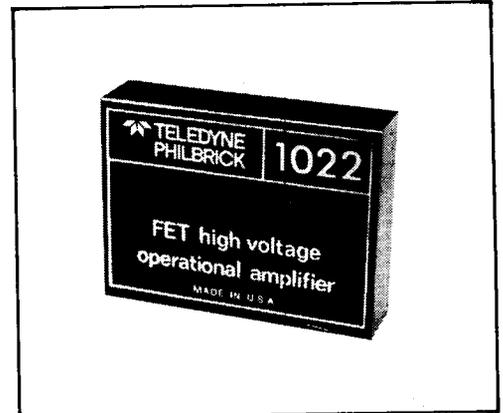


1022 CRT Deflection Amp $E_{out} = \pm 280V$



1022 and 1032 as Current Pump
With Floating Load

1022 1032



FEATURES

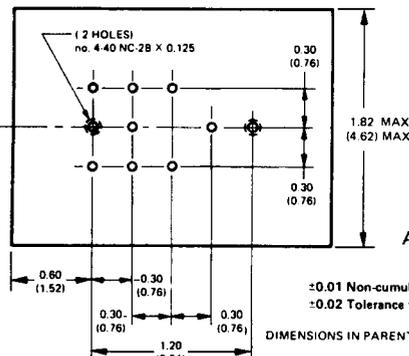
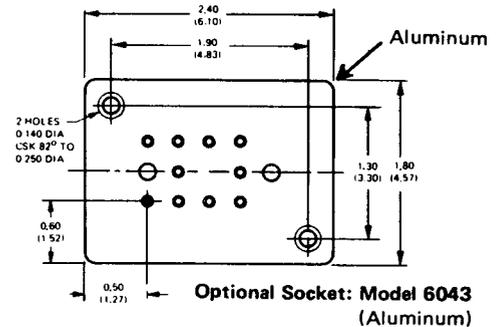
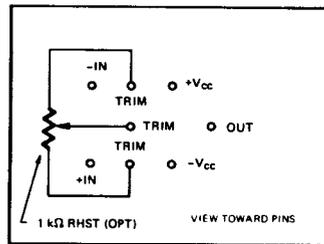
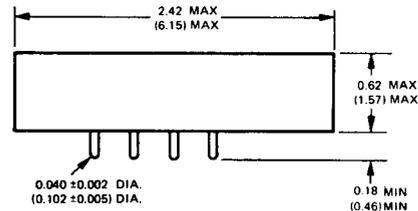
- Output Voltage $\pm 140V$
- Output Current $\pm 25mA$
- Slew Rate $30V/\mu sec$
- Common Mode Voltage $\pm 140V$
- Open Loop Gain 130dB
- CMRR 110dB
- Offset Voltage $\pm 1mV$

APPLICATIONS

- High Voltage DAC's
- High Voltage Audio Amplifiers
- High CMV Isolation
- Constant Current Generation
- Servo Motor Drives

	1022		1032	
OUTPUT RANGE	Typical	Guaranteed	Typical	Guaranteed
Voltage (Peak)	± V _{CC} -8 V	± V _{CC} -10 V	± V _{CC} -8 V	± V _{CC} -10 V
Current	±25 mA	±20 mA	±12.5 mA	±10 mA
VOLTAGE GAIN (dc, Open Loop)				
Rated Load	130 dB	120 dB	110 dB	100 dB
FREQUENCY-TIME-RESPONSE (Inverting)				
Small Signal (Unity Gain, Open Loop)	1.2 MHz	1 MHz	1.2 MHz	1.0 MHz
Max Sine Power Out (3% to 5% distortion)	30 kHz	---	10 kHz	---
Max Peak to Peak Out (Triangle Wave) e _o = ±100 V	---	40 kHz	13 kHz	10 kHz
Slew Rate (e _o = ±100 V)	30 V/μsec	20 V/μsec	10 V/μsec	6 V/μsec
Settling Time (100 V Step Input)				
to +0.1%	12 μsec	---	17 μsec	25 μsec
to +0.01%	15 μsec (C _f = 5 pF)	---	20 μsec	---
Max Capacitive Load without Instability	0.5 pF	---	0.001 μF	---
INPUT VOLTAGE RANGE				
Common Mode (dc Linear Operation)	± V _{CC} -10 V	± V _{CC} -15 V	± V _{CC} -10 V	± V _{CC} -15 V
Common Mode Fault, Abs. Max.	---	± V _{CC}	---	±V _{CC}
Differential (between inputs) Abs. Max.	---	+V _{CC} -(-V _{CC})	---	+V _{CC} -(-V _{CC})
Common Mode Rejection Ratio	110 dB	94 dB	110 dB	94 dB
INPUT OFFSET VOLTAGE				
Initial (without external trim) @ 25°C	±1 mV	±2 mV	±1.5 mV	±5 mV
Zero Adjustment (optional)	1 kΩ pot	---	1 kΩ pot	---
Vs. Temperature (avg. -25°C to +85°C)	±25 μV/°C	±50 μV/°C	±20 μV/°C	±50 μV/°C
Vs. Time (per 24 hours)	±100 μV	---	±100 μV	---
Vs. Power Supply	±10 μV/V	---	±15 μV/V	---
INPUT BIAS CURRENT				
Initial @ 25°C	-10 pA	-30 pA	-1 pA	-10 pA
Vs. Temperature (avg. -25 to +85°C)	+3 pA/°C ⊖	doubles every +10°C	+3 pA/°C	doubles every +10°C
Vs. Time (per 24 hours)	±2 pA	---	±1 pA	---
Vs. Power Supply	±0.5 pA/V	---	±0.02 pA/V	---
Difference (tracking)	±10 pA	---	±0.5 pA	---
INPUT IMPEDANCE @ DC				
Differential	10 ¹² Ω 10 pF	---	10 ¹² Ω 5 pF	---
Common Mode (either Input to Common)	10 ¹² Ω 10 pF	---	10 ¹² Ω 6 pF	---
NOISE (Referred to Input)				
Flicker (0.016 to 1.6 Hz)				
Voltage (Peak to Peak)	25 μV	---	4 μV	---
Current (Peak to Peak)	0.5 pA	---	0.5 pA	---
Midband (1.6 to 160 Hz)				
Voltage (rms)	8 μV	---	2 μV	---
Broadband (160 Hz to 16 kHz)				
Voltage (rms)	5 μV	---	3 μV	---
Current (rms)	1 pA	---	---	---
Wideband (5 Hz to 50 kHz) Voltage (rms).	---	---	5 μV	---
POWER REQUIREMENTS				
Voltage Range	±40 to ±150 V	---	±18 to ±125 V	---
Current: Quiescent	±8 mA	±10 mA	±8 mA	±10 mA
TEMPERATURE RANGES				
Operating: Rated	---	-25 to +85°C	---	-25 to +85°C
Derated	---	---	---	-40 to +85°C
Storage	---	-55 to +125°C	---	-55 to +125°C

⊖ Slope at +25°C. I_{bias} = 1.5 nA max. @ +85°C



Aluminum Base

Teledyne Philbrick makes no representation that use of its modules in the circuits described herein, or use of other technical information contained herein will not infringe on existing or future patent rights nor do the descriptions contained herein imply the granting of licenses to make, use, or sell equipment constructed in accordance therewith.

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