

MC1530 MC1531

OPERATIONAL AMPLIFIERS

... designed for use as a summing amplifier, integrator, or amplifier with operating characteristics as a function of the external feedback components.

Lead 4 connected to case



G SUFFIX
METAL PACKAGE
CASE 602B



F SUFFIX
CERAMIC PACKAGE
CASE 606
TO-91

Typical Amplifier Features:

- Excellent Open Loop Gain Characteristics
 $A_{VOL} = 74$ dB typical
 A_{VOL} stability = ± 1.5 dB from -55°C to $+125^{\circ}\text{C}$
- Low Temperature Drift — $\pm 3.0 \mu\text{V}/^{\circ}\text{C}$
- Large Output Voltage Swing —
Typically ± 5.0 V @ ± 6.0 V Supply
- Low Output Impedance —
 $Z_{out} = 25$ ohms typical
- High Slew Rate — typically $4.5 \text{ V}/\mu\text{s}$
@ $A_V = 10$

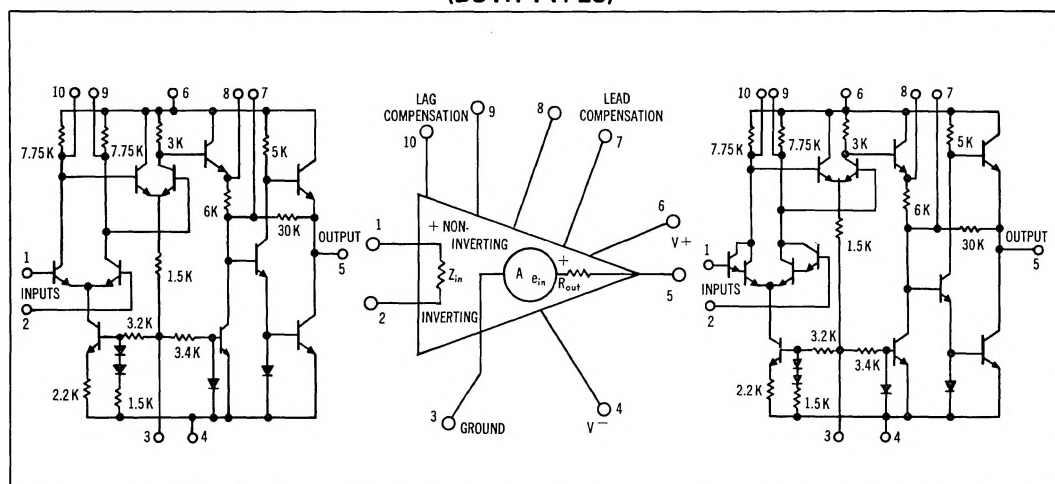
MAXIMUM RATINGS ($T_A = 25^{\circ}\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Power Supply Voltage	V_+	+9.0	Vdc
Power Supply Voltage	V_-	-9.0	Vdc
Differential Input Signal	V_{in}	± 5.0	Vdc
Load Current	I_L	10	mA
Power Dissipation (Package Limitation)	P_D		
Metal Can Derate above 25°C		680 4.6	mW $\text{mW}/^{\circ}\text{C}$
Flat Package Derate above 25°C		500 3.3	mW $\text{mW}/^{\circ}\text{C}$
Operating Temperature Range	T_A	-55 to $+125$	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-65 to $+175$	$^{\circ}\text{C}$

MC1530 (STANDARD INPUT)

EQUIVALENT CIRCUIT (BOTH TYPES)

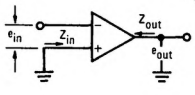
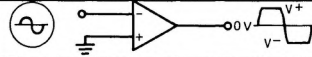
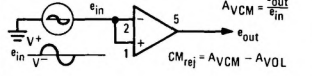
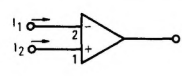
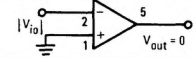
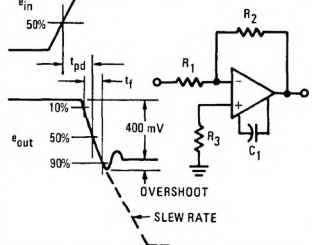
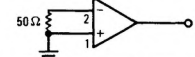
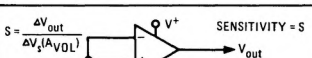
MC1531 (DARLINGTON INPUT)



See Packaging Information Section for outline dimensions.

MC1530, MC1531 (continued)

ELECTRICAL CHARACTERISTICS (V⁺ = +6.0Vdc, V⁻ = -6.0Vdc, T_A = 25°C unless otherwise noted)

Characteristic Definitions (linear operation)	Characteristic	Symbol	Min	Typ	Max	Unit
 $A_{VOL} = \frac{e_{out}}{e_{in}}$	Open Loop Voltage Gain (T _A = -55 to +125°C) MC1530 MC1531	A _{VOL}	4500 2500	5000 3500	12500 7000	V/V dB
	Output Impedance (f = 20 Hz)	Z _{out}	-	25	50	ohms
	Input Impedance (f = 20 Hz)	Z _{in}	10k 1.0M	20k 2.0M	- -	ohms
	Output Voltage Swing (R _L = 1.0 k ohm)	V _{out}	±4.5	±5.2	-	V _{peak}
 $CMV = \frac{e_{out}}{e_{in}}$	Input Common Mode Voltage Swing MC1530 MC1531	CMV _{in}	±2.0 ±2.0	±2.7 ±2.4	- -	V _{peak}
	Common Mode Rejection Ratio MC1530 MC1531	CM _{rej}	70 65	75 65	- -	dB
 $I_b = \frac{I_1 + I_2}{2}$	Input Bias Current (I _b = (I ₁ + I ₂) / 2) MC1530 MC1531	I _b	- -	3.0 0.025	10 0.150	μA
	Input Offset Current I _{io} = I ₁ - I ₂ MC1530 MC1531	I _{io}	- -	0.200 0.003	2.0 0.025	μA
	Input Offset Voltage MC1530 MC1531	V _{io}	- -	1.0 3.0	5.0 10	mV
	Step Response Gain = 100, 0% overshoot R ₁ = 1.0 k ohm R ₂ = 100 k ohm R ₃ = 1.0 k ohm C ₁ = 1800 pF Gain = 10, 10% overshoot R ₁ = 10 k ohm R ₂ = 100 k ohm R ₃ = 10 k ohm C ₁ = 6800 pF Gain = 1.0, 5.0% overshoot R ₁ = 10 k ohm R ₂ = 10 k ohm R ₃ = 5.0 k ohm C ₁ = 33,000 pF	t _f t _{pd} dV _{out} /dt ①	- - -	0.60 0.30 17	- - -	μs μs V/μs
	Input Noise Voltage (Open Loop, 50 ohm source, BW _{OL} = 5.0 MHz) MC1530 MC1531	V _{n(in)}	- -	10 20	- -	μV _{rms}
	Average Temperature Coefficient of Input Offset Voltage 25°C to +125°C -55°C to +25°C 25°C to +125°C -55°C to +25°C MC1530 MC1531	TC _{Vio}	- - - -	3.8 8.0 11 20	- - - -	μV/°C
	D. C. Power Dissipation (Power Supply = ±6.0 V, V _{out} = 0)	P _D	-	110	150	mW
	Positive Supply Sensitivity (V ₋ constant)	S ⁺	-	100	-	μV/V
	Negative Supply Sensitivity (V ₊ constant)	S ⁻	-	100	-	μV/V

① dV_{out}/dt = Slew Rate

MC1530, MC1531 (continued)

TYPICAL OUTPUT CHARACTERISTICS

$V^+ = +6.0\text{ Vdc}$, $V^- = -6.0\text{ Vdc}$, $T_A = 25^\circ\text{C}$

FIGURE 1 – TEST CIRCUIT

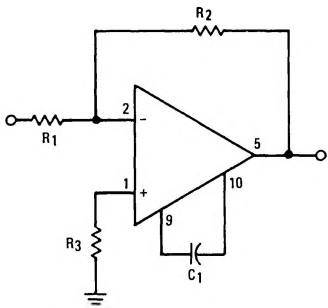


FIG. NO.	CURVE NO.	VOLTAGE GAIN	DEVICE	TEST CONDITIONS				OUTPUT NOISE (mV rms)
				$R_1 (\Omega)$	$R_2 (\Omega)$	$R_3 (\Omega)$	$C_1 (\text{pF})$	
2	1	100	MC1530	1.0 k	100 k	1.0 k	1800	3.5
		100	MC1531	1.0 k	100 k	1.0 k	1800	3.4
	2	10	MC1530	10 k	100 k	10 k	6800	4.8
		10	MC1531	10 k	100 k	10 k	6800	4.8
	3	1.0	MC1530	10 k	10 k	5.0 k	33000	3.4
		1.0	MC1531	10 k	10 k	5.0 k	33000	7.0
3	1	100	MC1530	1.0 k	100 k	1.0 k	1800	3.5
		100	MC1531	1.0 k	100 k	1.0 k	1800	3.4
	2	10	MC1530	10 k	100 k	10 k	6800	4.8
		10	MC1531	10 k	100 k	10 k	6800	4.8
	3	1.0	MC1530	10 k	10 k	5.0 k	33000	3.4
		1.0	MC1531	10 k	10 k	5.0 k	33000	7.0
4	1	AVOL	MC1530	0	∞	0	1800	7.6
		AVOL	MC1531	0	∞	0	1800	19.0
	2	AVOL	MC1530	0	∞	0	6800	5.5
		AVOL	MC1531	0	∞	0	6800	15.0
	3	AVOL	MC1530	0	∞	0	33000	5.0
		AVOL	MC1531	0	∞	0	33000	11.0

FIGURE 2 – LARGE SIGNAL SWING versus FREQUENCY

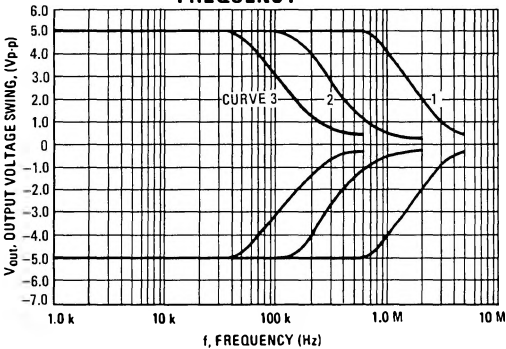


FIGURE 3 – VOLTAGE GAIN versus FREQUENCY

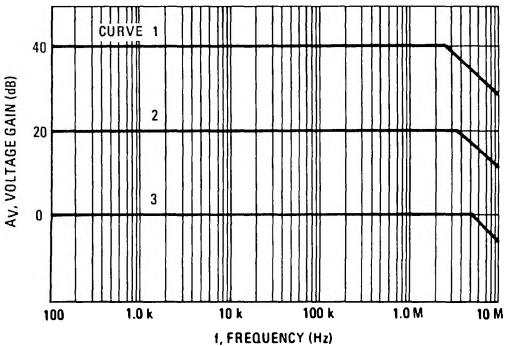


FIGURE 4 – OPEN LOOP VOLTAGE GAIN versus FREQUENCY

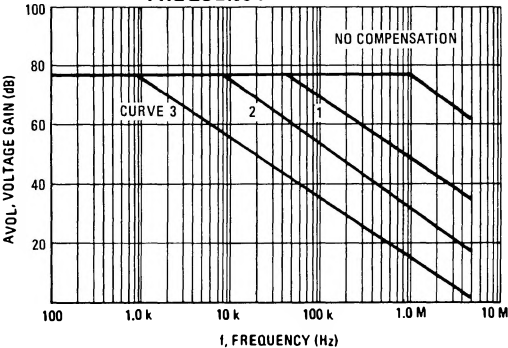
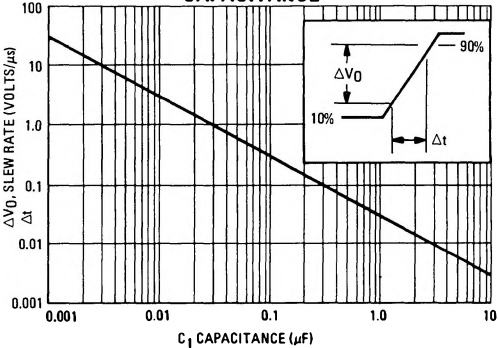


FIGURE 5 – SLEW RATE versus ROLLOFF CAPACITANCE



MC1530, MC1531 (continued)

FIGURE 6 – VOLTAGE GAIN versus POWER SUPPLY VOLTAGE

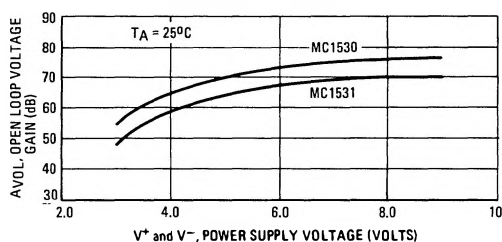


FIGURE 7 – COMMON MODE SWING versus POWER SUPPLY VOLTAGE

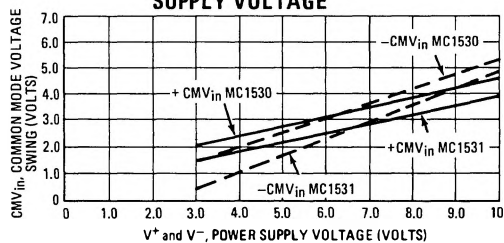


FIGURE 8 – POWER DISSIPATION versus POWER SUPPLY VOLTAGE

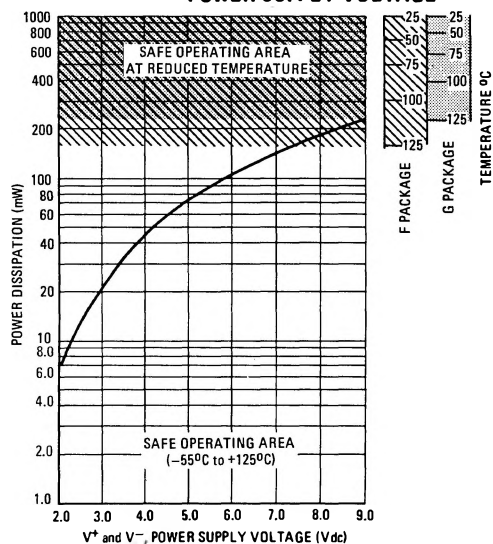


FIGURE 9 – OUTPUT NOISE VOLTAGE versus SOURCE RESISTANCE

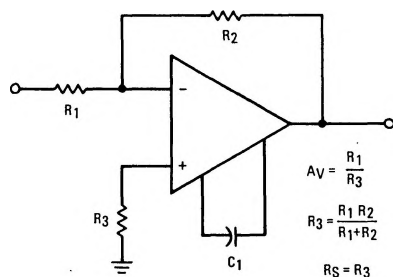
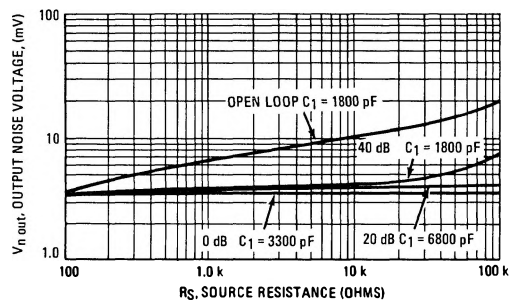


FIGURE 10 – OUTPUT VOLTAGE SWING versus LOAD RESISTANCE

