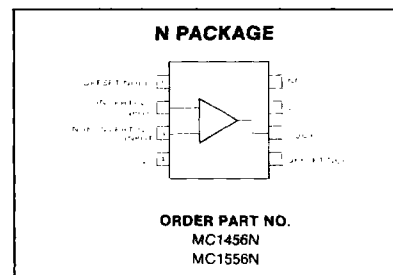
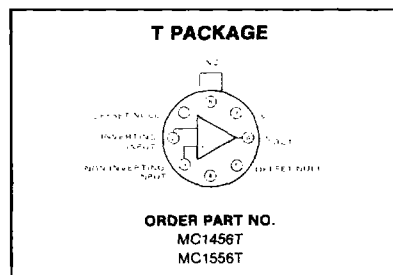


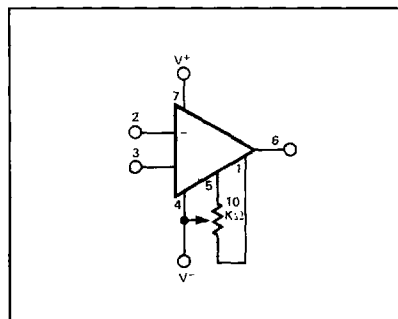
DESCRIPTION

The MC1456/1556 is an internally compensated precision monolithic operational amplifier featuring extremely low offset and bias currents and offset null capability. The MC1456/1556 is short circuit protected and its high common mode and differential input voltage range provides exceptional performance when used as an integrator, summing amplifier, and voltage follower.

PIN CONFIGURATIONS

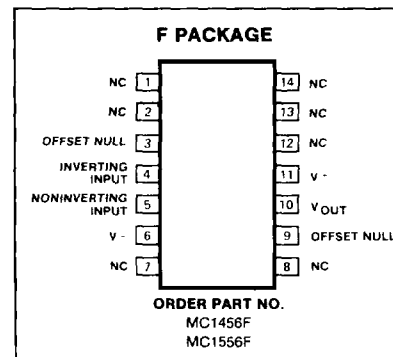


OFFSET ADJUST CIRCUIT

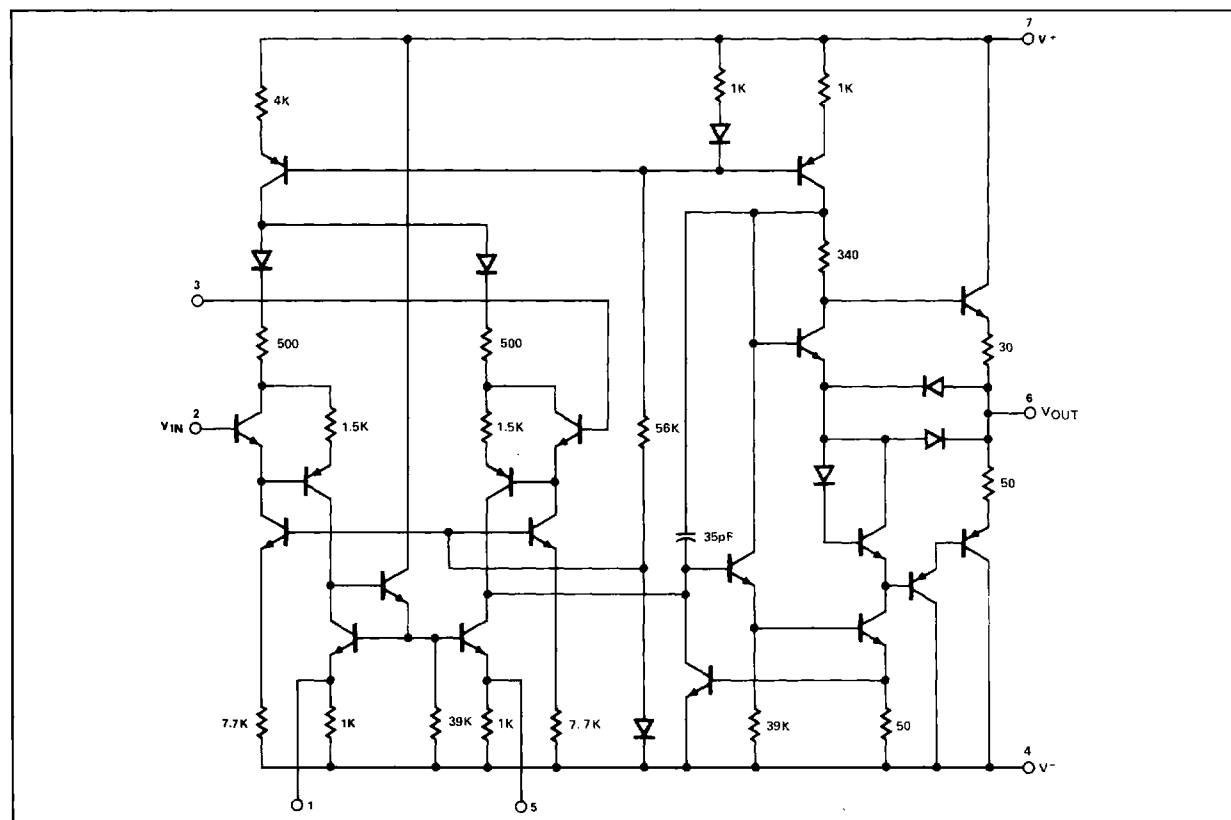


FEATURES

- Low input bias current—15nA maximum
- Low input offset current—2.0nA maximum
- Low input offset voltage—4.0mV maximum
- High slew rate—2.5V/ μ s typical
- Large power bandwidth—40kHz typical
- Low power consumption—45mW maximum
- Offset voltage null capability
- Output short circuit protection
- Input over-voltage protection
- Mil std 883A,B,C, available



EQUIVALENT SCHEMATIC



ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Power supply voltage MC1556	± 22	V
MC1456	± 18	V
Differential input voltage	$\pm V_{CC}$	V
Common mode input voltage	$\pm V_{CC}$	V
Load current	20	mA
Output short circuit duration	Continuous	
Power dissipation	680	mW
Derate above $T_A = 25^\circ\text{C}$	4.6	mW/ $^\circ\text{C}$
Operating temperature range		
MC1556	-55 to +125	$^\circ\text{C}$
MC1456	0 to +70	$^\circ\text{C}$
Storage temperature range	-65 to +150	$^\circ\text{C}$

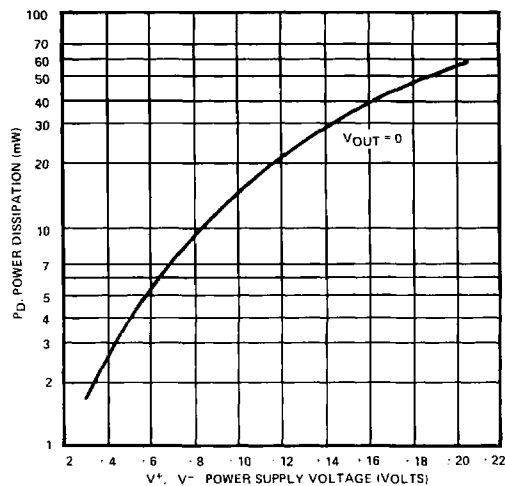
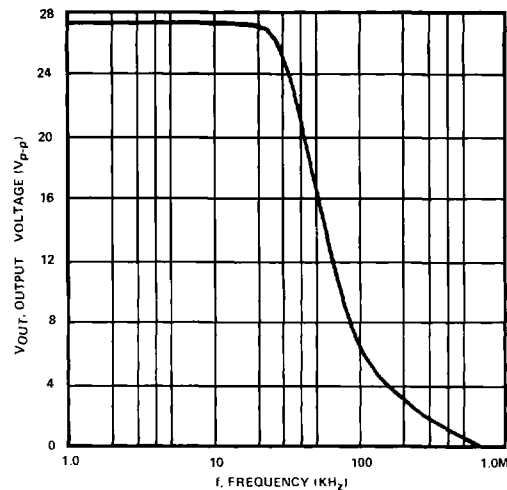
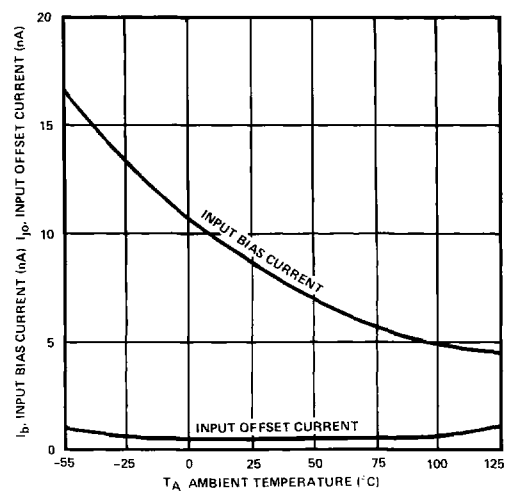
DC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{V}$ unless otherwise specified

PARAMETER	TEST CONDITIONS	MC1556			MC1456			UNIT
		Min	Typ	Max	Min	Typ	Max	
V_{OS} Offset voltage	Over temperature		2.0	4.0 6.0		5.0	10.0 14.0	mVdc mVdc
I_{OS} Offset current	$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ $25^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ $-55^\circ\text{C} \leq T_A \leq 25^\circ\text{C}$		1.0	2.0 3.0 5.0		5.0	10.0 14	nA nA nA
I_{BIAS} Input current	Over temperature		8.0	15 30		15.0	30.0 40	nA nA
V_{CM} Common mode voltage range	$R_S \leq 10\text{k}\Omega$, $T_A = 25^\circ\text{C}$, $f = 100\text{Hz}$ $f = 20\text{Hz}$	± 12	± 13		± 11	± 12		V
CMRR Common mode rejection ratio		80	110		70	110		dB
Z_{IN} Common mode input impedance			250			250		M Ω
V_{OUT} Output voltage swing	$R_L = 2\text{k}\Omega$	± 12	± 13		± 11	± 12		V
I_{CC} Supply current			1.0	1.5		1.3	3.0	mA
P_D DC quiescent power dissipation ($V_O = 0$)			30	45		40	90	mW
$PSRR$ Supply voltage rejection ratio	$R_S \leq 10\text{k}\Omega$		50	100		75	200	$\mu\text{V/V}$
Large signal voltage gain	$R_L \leq 2\text{k}\Omega$, $V_{OUT} = \pm 10\text{V}$, $T_A = 25^\circ\text{C}$ Over temperature	100 40	200		70 40	100		V/mV V/mV

AC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{V}$ unless otherwise specified.

PARAMETER	TEST CONDITIONS	MC1556			MC1456			UNIT
		Min	Typ	Max	Min	Typ	Max	
C_p Differential input impedance	Open loop $f = 20\text{Hz}$ $A_v = 100$, $R_S = 10\text{k}\Omega$, $f = 1.0\text{kHz}$, $BW \approx 1.0\text{Hz}$		6.0			6.0		pF
r_p Parallel input capacitance			5			3		M Ω
e_n Parallel input resistance			45			45		nV/ $\sqrt{\text{Hz}}$
BW_p Power bandwidth	$A_v = 1$, $R_L = 2\text{k}\Omega$, $\text{THD} \leq 5\%$ $V_{OUT} = \pm 10\text{V}$		40			40		kHz
Phase margin (open loop, unity gain)			70			70		degrees
Gain margin			18			18		dB
S_R Slew rate (unity gain)			2.5			2.5		V/ μsec
Z_{OUT} Output impedance	$f = 20\text{Hz}$		1.0	2.0		1.0	2.5	k Ω
BW Unity gain crossover frequency (open loop)			1.0			1.0		MHz

TYPICAL PERFORMANCE CHARACTERISTICS

POWER DISSIPATION vs
POWER SUPPLY VOLTAGEPOWER
BANDWIDTHTYPICAL INPUT BIAS CURRENT AND
INPUT OFFSET CURRENT vs
TEMPERATURE FOR MC1556VOLTAGE FOLLOWER
PULSE RESPONSE