signetics

OPERATIONAL AMPLIFIER 5556

LINEAR INTEGRATED CIRCUITS

DESCRIPTION

The 5556 is an internally compensated precision monolithic operational amplifier featuring extremely low offset and bias currents and offset null capability. The 5556 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.

The 5556 features industry standard pinout and is a direct pin-for-pin replacement for the MC15556G and MC1456G.

ABSOLUTE MAXIMUM RATINGS

Power Supply Voltage

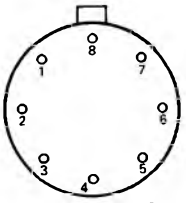
S5556	±22V
N5556	±18V
Differential Input Voltage	± V^+
Common Mode Input Voltage	± V^+
Load Current	20mA
Output Short Circuit Duration	Indefinite
Power Dissipation	680mW
Derate Above T_A = 25°C	4.6mW/°C
Operating Temperature Range	
S5556	−55°C to +125°C
N5556	0°C to +70°C
Storage Temperature Range	−65°C to +150°C

FEATURES

- LOW INPUT BIAS CURRENT - 15nA maximum
- LOW INPUT OFFSET CURRENT - 2.0nA maximum
- LOW INPUT OFFSET VOLTAGE - 4.0mV maximum
- HIGH SLEW RATE - 2.5 V/μs typical
- LARGE POWER BANDWIDTH - 40kHz typical
- LOW POWER CONSUMPTION - 45mW maximum
- OFFSET VOLTAGE NULL CAPABILITY

PIN CONFIGURATIONS (Top View)

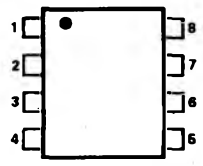
T PACKAGE



1. Offset Null
2. Inverting Input
3. Non-inverting Input
4. V^-
5. Offset Null
6. V_{OUT}
7. V^+
8. NC

Order Part Nos. S5556T/N5556T

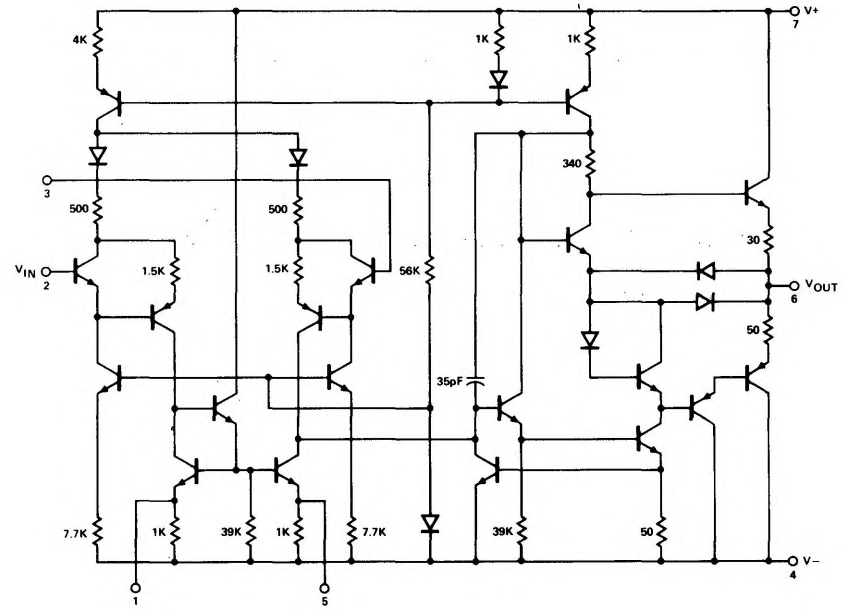
V PACKAGE



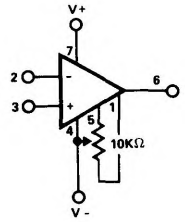
1. Offset Null
2. Inverting Input
3. Non-inverting Input
4. V^-
5. Offset Null
6. V_{OUT}
7. V^+
8. NC

Order Part Nos. S5556V/N5556V

EQUIVALENT CIRCUIT



OFFSET ADJUST CIRCUIT



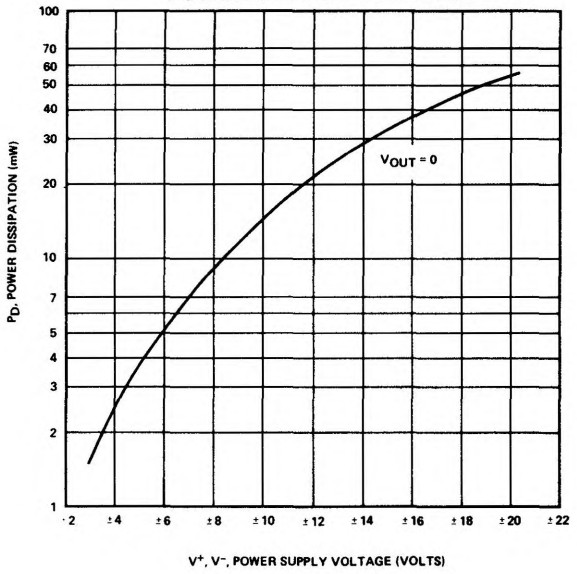
ELECTRICAL CHARACTERISTICS ($V^+ = +15V$, $V^- = -15V$, $T_A = +25°C$ Unless Otherwise Noted)

PARAMETER	SYMBOL	MIN		TYP		MAX		UNITS
		S5556	N5556	S5556	N5556	S5556	N5556	
Input Bias Current	I_B							
$T_A = 25°C$				8	15	15	30	nA
$T_A = T_{LOW}$ to T_{HIGH} (Note 1)						30	40	nA
Input Offset Current	I_{io}							
$T_A = 25°$				1.0	5.0	2.0	10	nA
$T_A = 25°C$ to T_{High}						3.0	14	nA
$T_A = T_{LOW}$ to $25°C$						5.0	14	nA
Input Offset Voltage	V_{io}							
$T_A = 25°C$				2.0	5.0	4.0	10	mV
$T_A = T_{LOW}$ to T_{HIGH}						6.0	14	mV
Differential Input Impedance (Open Loop–f = 20Hz)								
Parallel Input Resistance	R_p			5.0	3.0			M
Parallel Input Capacitance	C_p			6.0	6.0			pF
Common Mode Input Impedance (f = 20Hz)	Z_{IN}			250	250			M
Common Mode Input Voltage Swing	CMV_{IN}	±12	±11	±13	±12			V
Equivalent Input Noise Voltage (Av = 100, Rs = 10KΩ, F = 1.0KHz, BW = 1.0Hz)	E_{IN}			45	45			$nV/\sqrt{Hz}$
Common Mode Rejection Ratio (f = 100Hz)	CMRR	80	70	110	110			dB
Open Loop Voltage Gain ($V_{Out} = ±10V$, $R_L = 2K\Omega$)	AVO							
$T_A = 25°C$		100K	70K	200K	100K			V/V
$T_A = T_{LOW}$ to T_{HIGH}		40K	40K					V/V
Power Bandwidth Av = 1, $R_L = 2K\Omega$, THD ≤ 5%, $V_{OUT} = ±10V$)	P_{BW}			40	40			KHz
Unity Gain Crossover Frequency (open-loop)				1.0	1.0			MHz
Phase Margin (open-loop, unity gain)				70	70			Degrees
Gain Margin				18	18			dB
Slew Rate (unity gain)	dV_{OUT}/dt			2.5	2.5			V/μsec
Output Impedance (f = 20Hz)	Z_{OUT}			1.0	1.0	2.0	2.5	KΩ
Output Voltage Swing ($R_L = 2K\Omega$)	V_{OUT}	±12	±11	±13	±12			V
Power Supply Sensitivity								
$V^- =$ Constant, RS ≤ 10K	S^+			50	75	100	200	MV/V
$V^+ =$ Constant, RS ≤ 10K	S^-			50	75	100	200	MV/V
Power Supply Current	I_{D+}			1.0	1.3	1.5	3.0	mA
	I_{D-}			1.0	1.3	1.5	3.0	mA
DC Quiescent Power Dissipation ($V_{OUT} = 0$)	P_D			30	40	45	90	mW

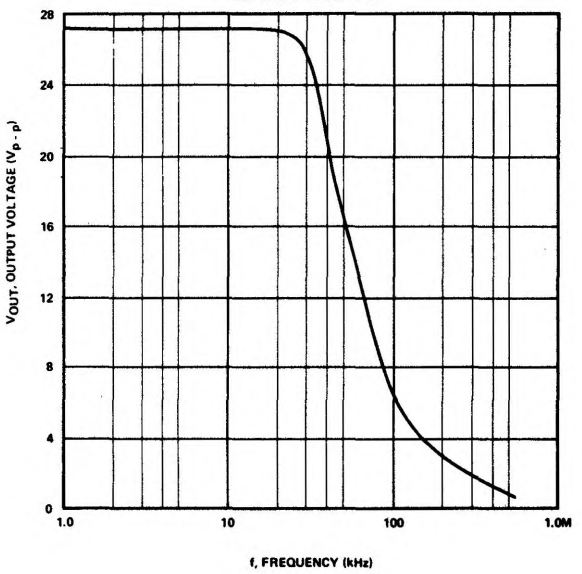
NOTE:
1. $T_{LOW} = 0°C$ for N5556, $-55°C$ for S5556; $T_{HIGH} = 70°C$ for N5556, $125°C$ for S5556

TYPICAL PERFORMANCE CHARACTERISTICS

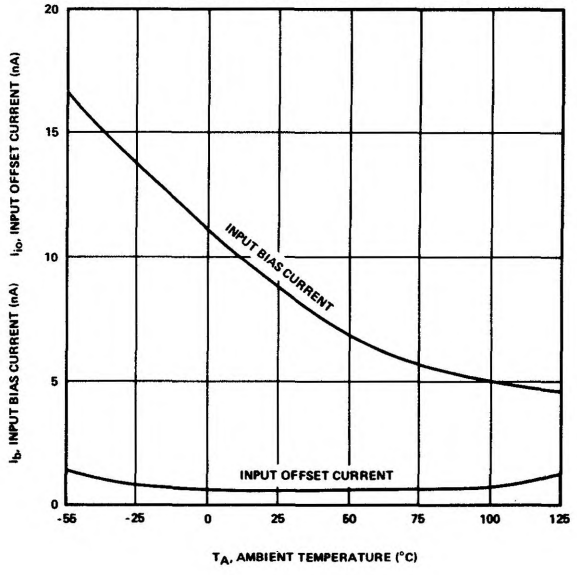
POWER DISSIPATION VERSUS POWER SUPPLY VOLTAGE



POWER BANDWIDTH



TYPICAL INPUT BIAS CURRENT AND INPUT OFFSET CURRENT VERSUS TEMPERATURE FOR S5556



VOLTAGE-FOLLOWER PULSE RESPONSE