μA4558

DUAL OPERATIONAL AMPLIFIER

FAIRCHILD LINEAR INTEGRATED CIRCUITS

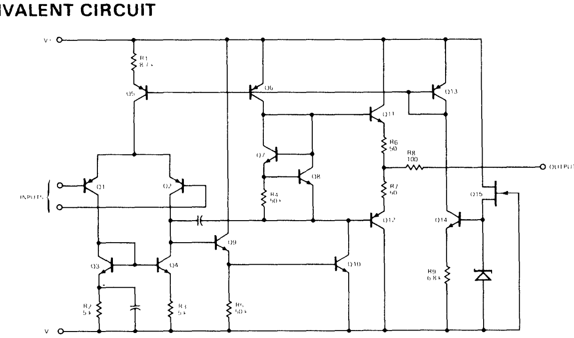
GENERAL DESCRIPTION – The μA4558 Monolithic Dual Operational Amplifiers consist of two independent high gain, internally frequency compensated operational amplifiers. The specially designed low noise input transistors allow the μA4558 to be used in low noise signal processing applications such as audio preamplifiers and signal conditioners. They are constructed using the Fairchild Planar* Epitaxial process. The simplified output stage completely eliminates crossover distortion under any load conditions, has large source and sink capacity, and is short-circuit protected. A novel current source stabilizes output parameters over a wide power supply voltage range.

- **UNITY GAIN BANDWIDTH 3 MHz**
- **CONTINUOUS SHORT CIRCUIT PROTECTION**
- **NO FREQUENCY COMPENSATION REQUIRED**
- **NO LATCH-UP**
- **LARGE COMMON MODE AND DIFFERENTIAL VOLTAGE RANGES**
- **PARAMETER TRACKING OVER TEMPERATURE RANGE**
- **GAIN AND PHASE MATCH BETWEEN AMPLIFIERS**

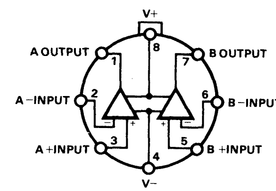
ABSOLUTE MAXIMUM RATINGS

Supply Voltage	
μA4558C	±18 V
μA4558	±22 V
Differential Input Voltage (Note 1)	±30 V
Input Voltage (Note 1)	±15 V
Internal Power Dissipation (Note 2)	670 mW
Metal Can	500 mW
Mini DIP	310 mW
Output Short Circuit Duration (Note 3)	Indefinite
Operating Temperature Range	
μA4558	−55°C to +125°C
μA4558C	0°C to +70°C
Storage Temperature Range	
Molded Package	−55°C to +125°C
Hermetic Package	−65°C to +150°C
Pin Temperature	
Molded Package (Soldering, 10 s)	260°C
Hermetic Package (Soldering, 60 s)	300°C

1/2 OF EQUIVALENT CIRCUIT



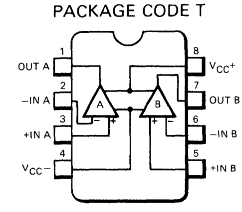
CONNECTION DIAGRAM
8-PIN METAL CAN
(TOP VIEW)
PACKAGE OUTLINE 5S
PACKAGE CODE H



ORDER INFORMATION

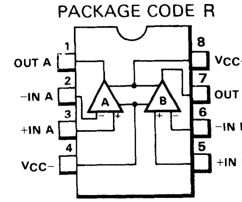
TYPE	PART NO.
μA4558C	μA4558HC
μA4558	μA4558HM

8-PIN MINI DIP
(TOP VIEW)
PACKAGE OUTLINE 9T
PACKAGE CODE T



TYPE	PART NO.
μA4558C	μA4558TC

8-PIN MINI CER DIP
(TOP VIEW)
PACKAGE OUTLINE 6T
PACKAGE CODE R



TYPE	PART NO.
μA4558C	μA4558RC
μA4558	μA4558RM

*Planar is a patented Fairchild process.

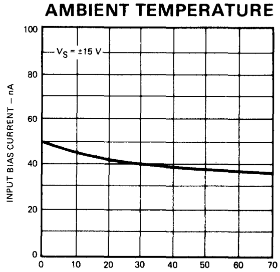
ELECTRICAL CHARACTERISTICS: $T_A = 25°C$, $V_S = ±15$ V unless otherwise specified

CHARACTERISTICS	CONDITIONS	μA4558 MIN	μA4558 TYP	μA4558 MAX	μA4558C MIN	μA4558C TYP	μA4558C MAX	UNITS
Input Offset Voltage	$R_S \leqslant 10$ kΩ		1.0	5.0		2.0	6.0	mV
Input Offset Current			30	200		30	200	nA
Input Bias Current			200	500		200	500	nA
Input Resistance		0.3	1.0		0.3	1.0		MΩ
Large Signal Voltage Gain	$R_L \geqslant 2$ kΩ, $V_{OUT} = ±10$ V	50,000	200,000		20,000	100,000		
Output Voltage Swing	$R_L \geqslant 10$ kΩ	±12	±14		±12	±14		V
	$R_L \geqslant 2$ kΩ	±10	±13		±10	±13		V
Input Voltage Range		±12	±13		±12	±13		V
Common Mode Rejection Ratio	$R_S \leqslant 10$ kΩ	70	90		70	90		dB
Supply Voltage Rejection Ratio	$R_S \leqslant 10$ kΩ		30	150		30	150	μV/V
Power Consumption			100	170		100	170	mW
Transient Response (unity Gain) Risetime	$V_{IN} = 20$ mV, $R_L = 2$ kΩ, $C_L \leqslant 100$ pF		0.13			0.13		μs
Transient Response (Unity Gain) Overshoot	$V_{IN} = 20$ mV, $R_L = 2$ kΩ, $C_L \leqslant 100$ pF		5.0			5.0		%
Unity Gain Bandwidth			3.0			3.0		MHz
Slew Rate (Unity Gain)	$R_L \geqslant 2$ kΩ		1.5			1.0		V/μs
Channel Separation (Open Loop)	f = 10 kHz, $R_S = 1$ kΩ		105			105		dB
	f = 10 kHz, $R_S = 1$ kΩ		105			105		dB
The following specifications apply for $-55°C \leqslant T_A \leqslant +125°C$ for μA4558; $0°C \leqslant T_A \leqslant +70°C$ for μA4558C.								
Input Offset Voltage	$R_S \leqslant 10$ kΩ			6.0			7.5	mV
Input Offset Current				500			300	nA
Input Bias Current				1500			800	nA
Large Signal Voltage Gain	$R_L \geqslant 2$ kΩ, $V_{OUT} = ±10$ V	25,000			15,000			
Output Voltage Swing	$R_L \geqslant 2$ kΩ, $V_S = ±15$ V	±12			±10			V
Power Consumption	T_A = High		90	150		90	150	mW
	T_A = Low		120	200		120	200	

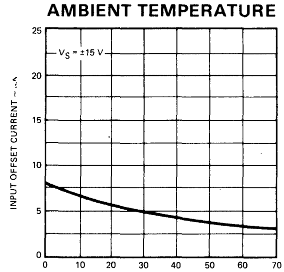
NOTES:
1. For supply voltage less than ±15 V, the absolute maximum input voltage is equal to the supply voltage.
2. Rating applies to ambient temperature up to 70°C. Above $T_A = 70°C$, derate linearly at 6.3°C/W for the hermetic package (5S) and 5.6°C/W for the molded package (9T).
3. Short circuit may be to ground, one amplifier only. $I_{SC} = 45$ mA (Typical).

TYPICAL PERFORMANCE CURVES

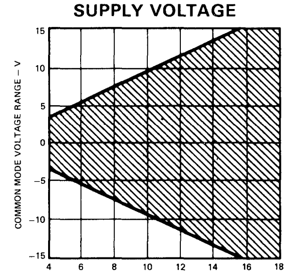
INPUT BIAS CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



INPUT OFFSET CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE

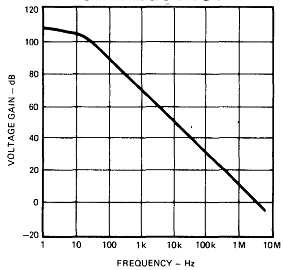


COMMON MODE RANGE AS A FUNCTION OF SUPPLY VOLTAGE

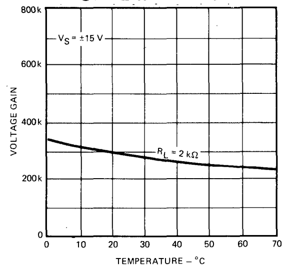


TYPICAL PERFORMANCE CURVES (Cont'd)

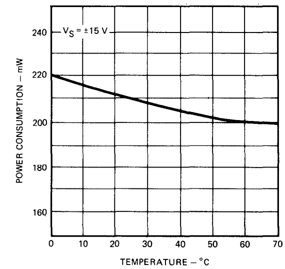
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF FREQUENCY



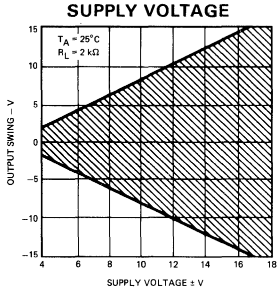
OPEN LOOP GAIN AS A FUNCTION OF TEMPERATURE



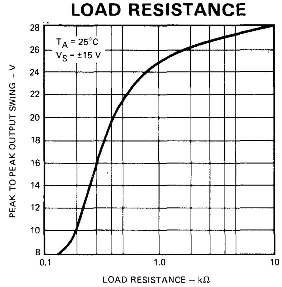
POWER CONSUMPTION AS A FUNCTION OF AMBIENT TEMPERATURE



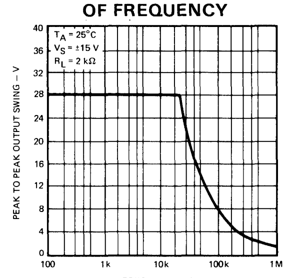
TYPICAL OUTPUT VOLTAGE AS A FUNCTION OF SUPPLY VOLTAGE



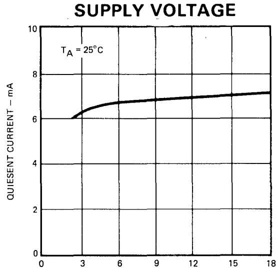
OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE



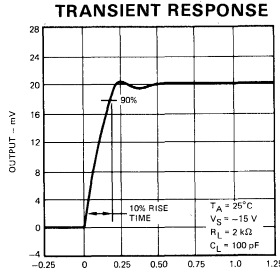
OUTPUT VOLTAGE SWING AS A FUNCTION OF FREQUENCY



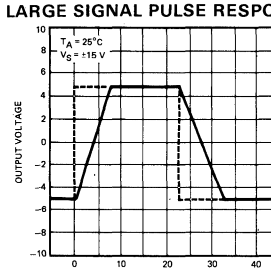
QUIESENT CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



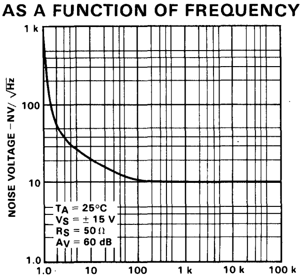
TRANSIENT RESPONSE



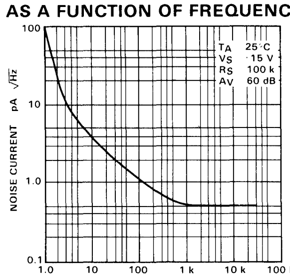
VOLTAGE FOLLOWER LARGE SIGNAL PULSE RESPONSE



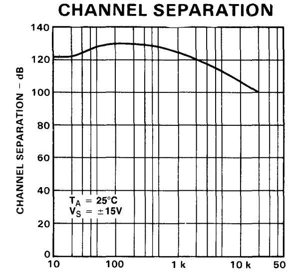
INPUT NOISE VOLTAGE AS A FUNCTION OF FREQUENCY



INPUT NOISE CURRENT AS A FUNCTION OF FREQUENCY

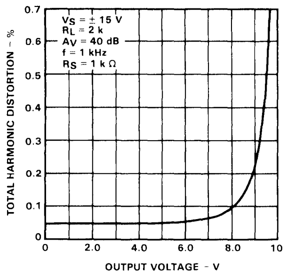


CHANNEL SEPARATION

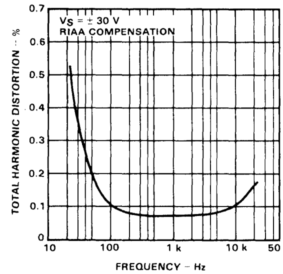


TYPICAL PERFORMANCE CURVES (Cont'd)

TOTAL HARMONIC DISTORTION AS A FUNCTION OF OUTPUT VOLTAGE f = 1 kHz



DISTORTION AS A FUNCTION OF FREQUENCY V_{OUT} = 1 Vrms



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