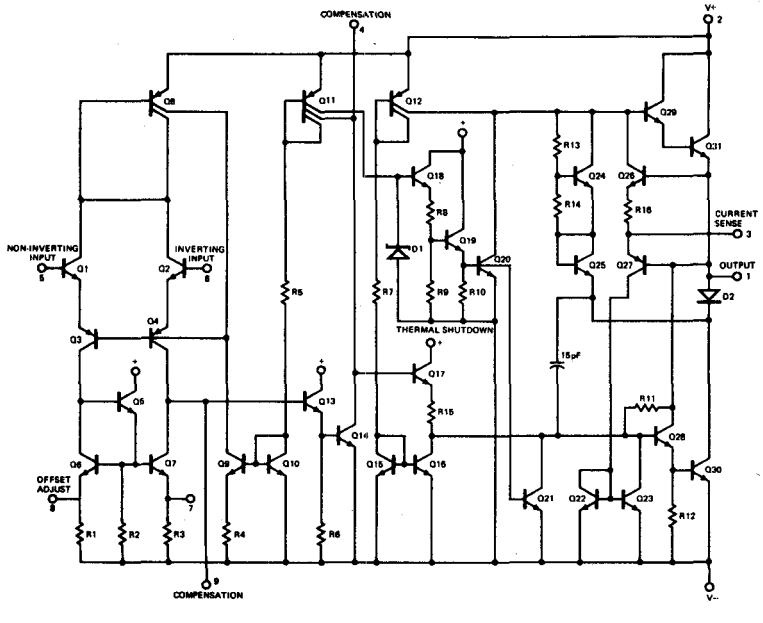
μA791
POWER OPERATIONAL AMPLIFIER
FAIRCHILD LINEAR INTEGRATED CIRCUIT

GENERAL DESCRIPTION – The μA791 is a high performance monolithic Operational Amplifier constructed using the Fairchild Planar* Epitaxial process with input characteristics similar to the μA741 operational amplifier and 1A available output current. It is intended for use in a wide variety of applications including audio amplifiers, servo amplifiers, and power supplies. The high gain and high output power capability provide superior performance wherever an operational amplifier/power booster combination is required. The μA791 is thermal overload and short circuit protected.

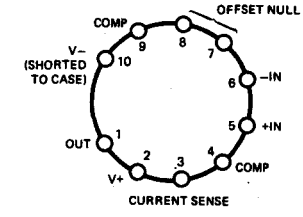
- **CURRENT OUTPUT TO 1 A**
- **SHORT CIRCUIT PROTECTION**
- **OFFSET VOLTAGE NULL CAPABILITY**
- **NO LATCH UP**
- **LARGE COMMON MODE AND DIFFERENTIAL MODE RANGES**
- **THERMAL OVERLOAD PROTECTION**

EQUIVALENT CIRCUIT



NOTE: Lead connections shown are for metal can

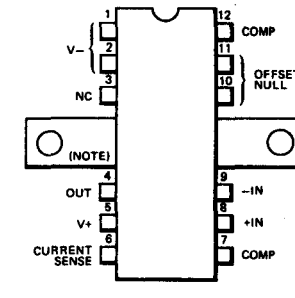
CONNECTION DIAGRAMS
10-LEAD METAL CAN
(TOP VIEW)
PACKAGE OUTLINE 5H
PACKAGE CODE K



ORDER INFORMATION

TYPE	PART NO.
μA791C	μA791KC
μA791	μA791KM

12-LEAD DIP
(TOP VIEW)
PACKAGE OUTLINE 9W
PACKAGE CODE P5



ORDER INFORMATION

TYPE	PART NO.
μA791C	μA791P5

NOTES:
The heat sink wings on the P-package are internally connected to V–.
Both pin 1 and pin 2 must be connected externally to V–.

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ABSOLUTE MAXIMUM RATINGS

Supply Voltage	
Military (μA791)	±22 V
Commercial (μA791C)	±18 V
Peak Output Current	1.25 A
Continuous Internal Power Dissipation (Total Package) (Note 1)	Internally Limited
Peak Internal Power Dissipation (Per Output Transistor for t ≤ 5 s, Note 2)	15 W
Differential Input Voltage	±30 V
Input Voltage (Note 3)	±15 V
Voltages between offset Null and V−	±0.5 V
Operating Junction Temperature	
Military (μA791)	−55°C to +150°C
Commercial (μA791C)	0°C to +125°C
Storage Temperature Range	
Metal Can	-65°C to +150°C
Molded Power DIP	-55°C to +125°C
Lead Temperatures	
Metal Can (Soldering, 60 s max.)	280°C
Molded Power DIP (Soldering, 10 s max.)	260°C

NOTES:

1. Thermal resistance of the packages (without a heat sink)

Package	Junction to Case		Junction to Ambient		Unit
	Typ	Max	Typ	Max	
TO-3 Type (5H)	4	6	35	40	°C/W
Dual In-Line Power (9W)	8	12	50	55	

2. Under short circuit conditions, the safe operating area and dc power dissipation limitations must be observed.
3. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

μA791C

ELECTRICAL CHARACTERISTICS (V_S = ±15 V, T_J = 25°C unless otherwise specified)

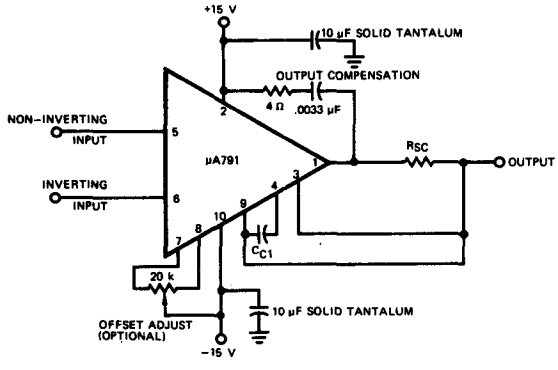
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input Offset Voltage	$R_S \leq 10\ k\Omega$		2.0	6.0	mV
Input Offset Current			20	200	nA
Input Bias Current			80	500	nA
Input Resistance		0.3	1.0		MΩ
Offset Voltage Adjustment Range			±15		mV
Input Voltage Range		±12	±13		V
Common Mode Rejection Ratio		70			dB
Power Supply Rejection Ratio				150	μV/V
Large Signal Voltage Gain	R_L = 1 kΩ, V_{OUT} = ±10 V	20k			V/V
	R_L = 10 Ω V_{OUT} = ±10 V	20k			V/V
Output Voltage Swing	R_{SC} = 0, R_L = 1kΩ	±11.5	±14		V
	R_{SC} = 0, R_L = 10 Ω	±10	±12.2		V
Output Short Circuit Current	R_{SC} = 0.7Ω		1000		mA
	R_{SC} = 1.5Ω		500		mA
Supply Current (Zero Signal)				30	mA
The following specifications apply for 0°C ≤ T_J ≤ 125°C					
Input Offset Voltage	$R_S \leq 10\ k\Omega$			7.5	mV
Input Offset Current				300	nA
Input Bias Current				800	nA
Common Mode Rejection Ratio		70			dB
Power Supply Rejection Ratio				150	μV/V
Large Signal Voltage Gain	R_L = 1 kΩ, V_{OUT} = ±10 V	15k			V/V
	R_L = 10 Ω, V_{OUT} = ±10 V	15k			V/V
Output Voltage Swing	R_{SC} = 0, R_L = 1 kΩ	±10			V
	R_{SC} = 0, R_L = 10 Ω	±10			V
Supply Current (Zero signal)				30	mA

μA791

ELECTRICAL CHARACTERISTICS (V_S = ±15 V, T_J = 25°C unless otherwise specified)

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Offset Voltage	$R_S \leq 10\ k\Omega$		1.0	5.0	mV
Input Offset Current			20	200	nA
Input Bias Current			80	500	nA
Input Resistance		0.3	2.0		MΩ
Offset Voltage Adjustment Range			±15		mV
Input Voltage Range		±12	±13		V
Common Mode Rejection Ratio		70			dB
Power Supply Rejection Ratio				150	μV/V
Large Signal Voltage Gain	R_L = 1 kΩ	50,000			V/V
	R_L = 10 Ω	50,000			V/V
Output Voltage Swing	R_{SC} = 0, R_L = 1 kΩ	±12	±14		V
	R_{SC} = 0, R_L = 10 Ω	±10	±12.2		V
Output Short Circuit Current	R_{SC} = 0.7Ω		1000		mA
	R_{SC} = 1.5Ω		500		mA
Supply Current (Zero Signal)				25	mA
The following specifications apply for $-55°C \leq T_J \leq 150°C$					
Input Offset Voltage	$R_S \leq 10\ k\Omega$			6	mV
Input Offset Current				500	nA
Input Bias Current				1.5	μA
Common Mode Rejection Ratio		70			dB
Power Supply Rejection Ratio				150	μV/V
Large Signal Voltage Gain	R_L = 1 kΩ	25,000			V/V
	R_L = 10 Ω	25,000			V/V
Output Voltage Swing	R_{SC} = 0, R_L = 1 kΩ	±10			V
	R_{SC} = 0, R_L = 10 Ω	±10			V
Supply Current (Zero Signal)				30	mA

FREQUENCY COMPENSATION



GAIN	C_{C1}
1	100 pF
10	10 pF
100	2 pF

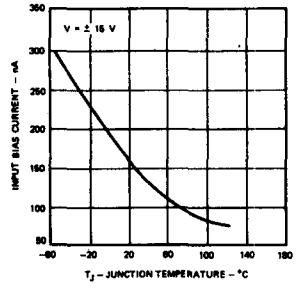
R_{SC}	I_{SC}
0.6Ω	1.0 A
1.5Ω	500 mA
3.0Ω	250 mA

NOTES

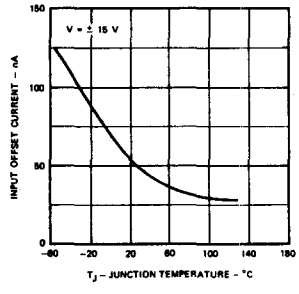
1. Power supply decoupling capacitors and compensation networks must have short leads and must be located at the amplifier pins.
2. When short circuit limiting is not required, short terminals one and three together.
3. Lead connections shown are for Metal Can only.

TYPICAL PERFORMANCE CURVES FOR μA791 AND μA791C

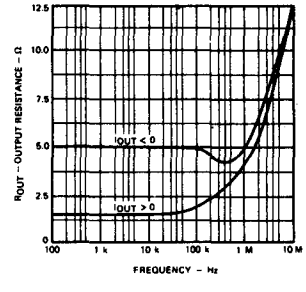
INPUT BIAS CURRENT AS A FUNCTION OF JUNCTION TEMPERATURE



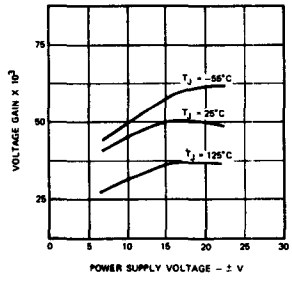
INPUT OFFSET CURRENT AS A FUNCTION OF JUNCTION TEMPERATURE



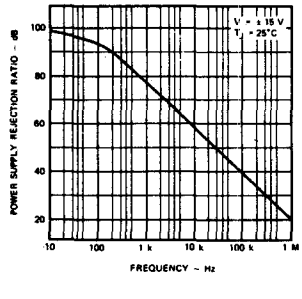
OUTPUT RESISTANCE AS A FUNCTION OF FREQUENCY (OPEN LOOP)



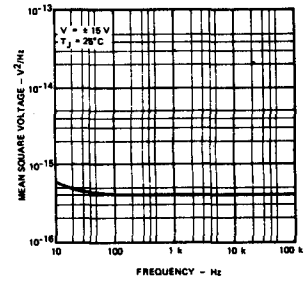
VOLTAGE GAIN AS A FUNCTION OF *POWER SUPPLY VOLTAGE*



POWER SUPPLY REJECTION RATIO AS A FUNCTION OF *FREQUENCY*

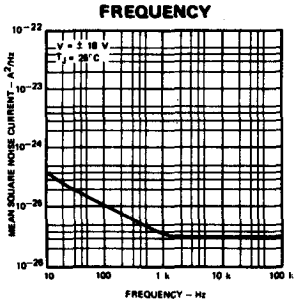


INPUT NOISE VOLTAGE AS A FUNCTION OF *FREQUENCY*

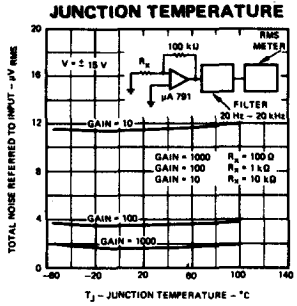


TYPICAL PERFORMANCE CURVES FOR μA791 and μA791C (Cont'd)

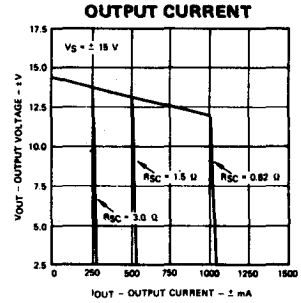
INPUT NOISE CURRENT AS A FUNCTION OF FREQUENCY



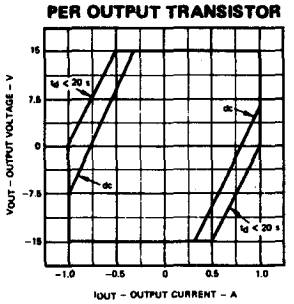
TOTAL NOISE (20 Hz-20 kHz) AS A FUNCTION OF JUNCTION TEMPERATURE



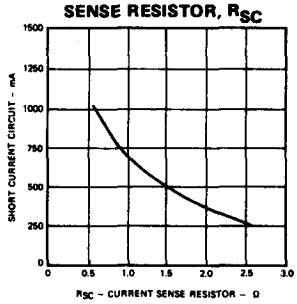
OUTPUT VOLTAGE SWING AS A FUNCTION OF OUTPUT CURRENT



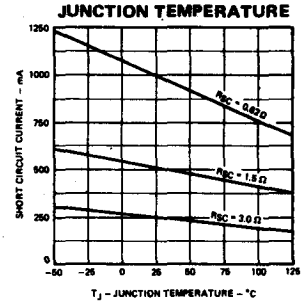
OUTPUT SAFE OPERATING AREA PER OUTPUT TRANSISTOR



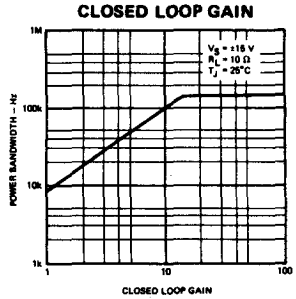
SHORT CIRCUIT CURRENT AS A FUNCTION OF CURRENT SENSE RESISTOR, R_{SC}



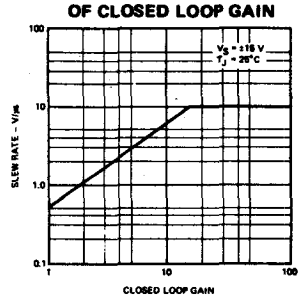
SHORT CIRCUIT CURRENT AS A FUNCTION OF JUNCTION TEMPERATURE



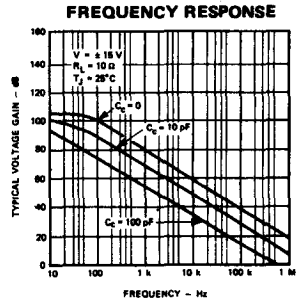
POWER BANDWIDTH AS A FUNCTION OF CLOSED LOOP GAIN



SLEW RATE AS A FUNCTION OF CLOSED LOOP GAIN



OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF FREQUENCY RESPONSE



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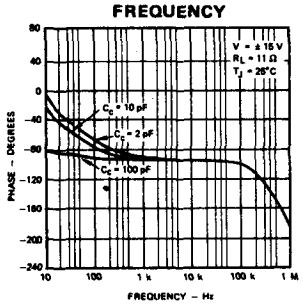
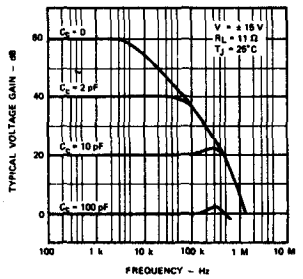
TYPICAL PERFORMANCE CURVES FOR μA791 and μA791C (Cont'd)

OPEN LOOP PHASE RESPONSE AS A FUNCTION OF FREQUENCY

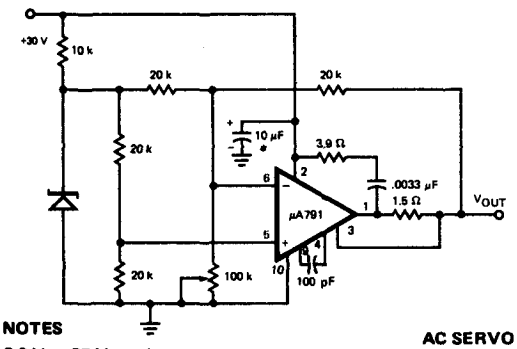


CLOSED LOOP VOLTAGE GAIN AS A FUNCTION OF FREQUENCY



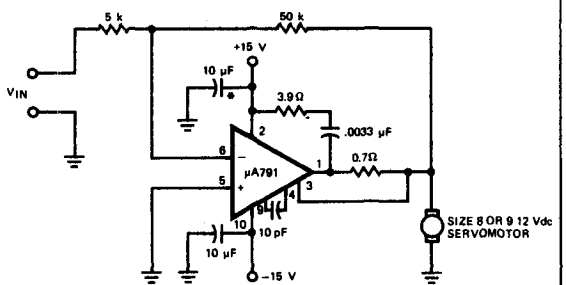
TYPICAL APPLICATIONS

POSITIVE VOLTAGE REGULATOR

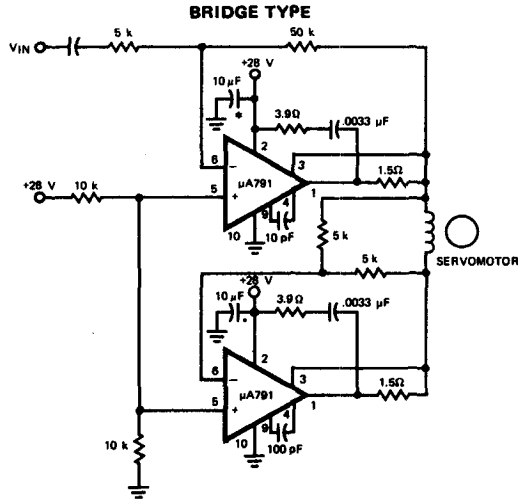


NOTES
3.0 V to 27 V regulator
500 mA output current

DC SERVO AMPLIFIER



AC SERVO AMPLIFIER BRIDGE TYPE



*Solid tantalum recommended.