

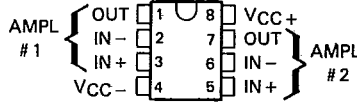
RM4558, RV4558, RC4558
DUAL HIGH-PERFORMANCE OPERATIONAL AMPLIFIERS

T-79-05-20

D2141, MARCH 1976—REVISED DECEMBER 1988

- Continuous-Short-Circuit Protection
- Wide Common-Mode and Differential Voltage Ranges
- No Frequency Compensation Required
- Low Power Consumption
- No Latch-up
- Unity Gain Bandwidth 3 MHz Typical
- Gain and Phase Match Between Amplifiers
- Low Noise . . . 8 nV/√Hz Typ at 1 kHz
- Designed to be Interchangeable with Raytheon RM4558, RV4558, and RC4558

D, JG, OR P PACKAGE
 (TOP VIEW)



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Operational Amplifiers

description

The RM4558, RV4558, and RC4558 are dual general-purpose operational amplifiers with each half electrically similar to uA741 except that offset null capability is not provided.

The high common-mode input voltage range and the absence of latch-up make these amplifiers ideal for voltage-follower applications. The devices are short-circuit protected and the internal frequency compensation ensures stability without external components.

The RM4558 is characterized for operation over the full military temperature range of -55°C to 125°C, the RV4558 is characterized for operation from -40°C to 85°C, and the RC4558 is characterized for operation from 0°C to 70°C.

AVAILABLE OPTIONS

TA	V _{IO} MAX at 25°C	PACKAGES		
		SMALL OUTLINE (D)	CERAMIC DIP (JG)	PLASTIC DIP (P)
0°C to 70°C	6 mV	RC4558D	RC4558JG	RC4558P
-40°C to 85°C	6 mV	RV4558D	RV4558JG	RV4558P
-55°C to 125°C	5 mV	—	RM4558JG	—

The D packages are available taped and reeled. Add the suffix "R" to the device type (e.g., RC4558DR).

PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



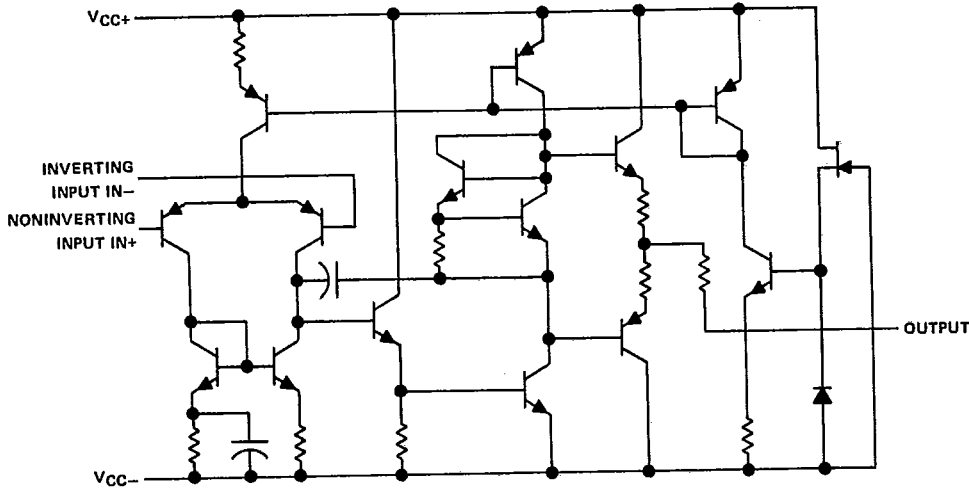
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**RM4558, RV4558, RC4558
DUAL HIGH-PERFORMANCE OPERATIONAL AMPLIFIERS**

T-79-05-20

schematic (each amplifier)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

	RM4558	RV4558	RC4558	UNIT
Supply voltage V_{CC+} (see Note 1)	22	18	18	V
Supply voltage V_{CC-} (see Note 1)	-22	-18	-18	V
Differential input voltage (see Note 2)	± 30	± 30	± 30	V
Input voltage (any input, see Notes 1 and 3)	± 15	± 15	± 15	V
Duration of output short-circuit to ground, one amplifier at a time (see Note 4)	unlimited	unlimited	unlimited	
Continuous total dissipation	See Dissipation Rating Table			
Operating free-air temperature range	-55 to 125	-40 to 85	0 to 70	$^{\circ}\text{C}$
Storage temperature range	-65 to 150	-65 to 150	-65 to 150	$^{\circ}\text{C}$
Lead temperature 1,8 mm (1/16 inch) from case for 60 seconds: JG package	300	300	300	$^{\circ}\text{C}$
Lead temperature 1,8 mm (1/16 inch) from case for 10 seconds: D or P package		260	260	$^{\circ}\text{C}$

- NOTES: 1. All voltage values, unless otherwise noted, are with respect to the midpoint between V_{CC+} and V_{CC-} .
 2. Differential voltages are at the noninverting input terminal with respect to the inverting input terminal.
 3. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 volts, whichever is less.
 4. Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25^{\circ}\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^{\circ}\text{C}$	DERATE ABOVE T_A	$T_A = 70^{\circ}\text{C}$ POWER RATING	$T_A = 85^{\circ}\text{C}$ POWER RATING	$T_A = 85^{\circ}\text{C}$ POWER RATING
D	680 mW	5.8 mW/ $^{\circ}\text{C}$	33 $^{\circ}\text{C}$	464 mW	377 mW	N/A
JG (RM4558)	680 mW	8.4 mW/ $^{\circ}\text{C}$	69 $^{\circ}\text{C}$	672 mW	546 mW	210 mW
JG (RV4558)	680 mW	6.6 mW/ $^{\circ}\text{C}$	47 $^{\circ}\text{C}$	528 mW	429 mW	N/A
(RC4558)	680 mW	8.0 mW/ $^{\circ}\text{C}$	65 $^{\circ}\text{C}$	640 mW	520 mW	N/A
P	680 mW	8.0 mW/ $^{\circ}\text{C}$	65 $^{\circ}\text{C}$	640 mW	520 mW	N/A

2 Operational Amplifiers

RM4558, RV4558, RC4558
DUAL HIGH-PERFORMANCE OPERATIONAL AMPLIFIERS

T-79-05-20

electrical characteristics at specified free-air temperature, $V_{CC+} = 15\text{ V}$, $V_{CC-} = -15\text{ V}$

PARAMETER	TEST CONDITIONS†	RM4558			RV4558			RC4558			UNIT	
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
V_{IO} Input offset voltage	$V_O = 0$	25°C	0.5	5	0.5	6	0.5	6			mV	
		Full range	6			7.5			7.5			
I_{IO} Input offset current	$V_O = 0$	25°C	5	200	5	200	5	200			nA	
		Full range	600			500			300			
I_{IB} Input bias current	$V_O = 0$	25°C	140	500	140	500	150	500			nA	
		Full range	1600			1600			800			
V_{ICR} Common-mode input voltage range		25°C	±12	±14	±12	±14	±12	±14			V	
V_{OM} Maximum output voltage swing	$R_L = 10\text{ k}\Omega$	25°C	±12	±14	±12	±14	±12	±14			V	
	$R_L = 2\text{ k}\Omega$	25°C	±10	±13	±10	±13	±10	±13				
	$R_L \geq 2\text{ k}\Omega$	Full range	±10			±10			±10			
A_{VD} Large-signal differential voltage amplification	$R_L \geq 2\text{ k}\Omega$, $V_O = \pm 10\text{ V}$	25°C	50	350	20	300	20	300			V/mV	
		Full range	25			15			15			
B_1 Unity-gain bandwidth		25°C	2	3.5	3		3				MHz	
r_i Input resistance		25°C	0.3	5	0.3	5	0.3	5			MΩ	
CMRR Common-mode rejection ratio		25°C	70	90	70	90	70	90			dB	
k_{SVS} Supply voltage sensitivity ($\Delta V_{IO}/\Delta V_{CC}$)	$V_{CC} = \pm 15\text{ V}$ to $\pm 9\text{ V}$	25°C	30	150	30	150	30	150			$\mu\text{V/V}$	
V_n Equivalent input noise voltage (closed-loop)	$A_{VD} = 100$, $R_S = 100\ \Omega$, $f = 1\text{ kHz}$, $BW = 1\text{ Hz}$	25°C	8			8			8			nV/ $\sqrt{\text{Hz}}$
I_{CC} Supply current (Both amplifiers)	No load, $V_O = 0$	25°C	2.5	5.6	2.5	5.6	2.5	5.6			mA	
		MIN T_A	3	6.6	3	6.6	3	6.6				
		MAX T_A	2	5	2.3	5	2.3	5				
P_D Total power dissipation (Both amplifiers)	No load, $V_O = 0$	25°C	75	170	75	170	75	170			mW	
		MIN T_A	90	200	90	200	90	200				
		MAX T_A	60	160	70	150	70	160				
V_{O1}/V_{O2} Crosstalk attenuation	Open loop $A_{VD} = 100$	25°C	85			85			85			dB
		25°C	105			105			105			

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Operational Amplifiers

† All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified. Full range is -55°C to 125°C for RM4558, -40°C to 85°C for RV4558, and 0°C to 70°C for RC4558.

operating characteristics, $V_{CC+} = 15\text{ V}$, $V_{CC-} = -15\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	RM4558			RV4558			RC4558			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
t_r Rise time	$V_I = 20\text{ mV}$, $R_L = 2\text{ k}\Omega$	0.13			0.13			0.13			ns
Overshoot	$C_L = 100\text{ pF}$	5%			5%			5%			
SR Slew rate at unity gain	$V_I = 10\text{ V}$, $R_L = 2\text{ k}\Omega$, $C_L = 100\text{ pF}$	1.1	1.7		1.1	1.7		1.1	1.7		V/ μs

