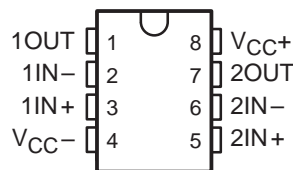


# RC4558, RM4558 DUAL GENERAL-PURPOSE OPERATIONAL AMPLIFIERS

SLOS073A – MARCH 1976 – REVISED JUNE 1999

- **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 Typ**
- **Gain and Phase Match Between Amplifiers**
- **Low Noise . . . 8 nV $\sqrt{\text{Hz}}$  Typ at 1 kHz**
- **Designed To Be Interchangeable With Raytheon RC4558 and RM4558 Devices**

**D, JG, P, OR PS PACKAGE  
(TOP VIEW)**



## description

The RC4558 and RM4558 devices are dual general-purpose operational amplifiers with each half electrically similar to the  $\mu\text{A}741$  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 RC4558 is characterized for operation from 0°C to 70°C, and the RM4558 is characterized for operation over the full military temperature range of –55°C to 125°C.

### AVAILABLE OPTIONS

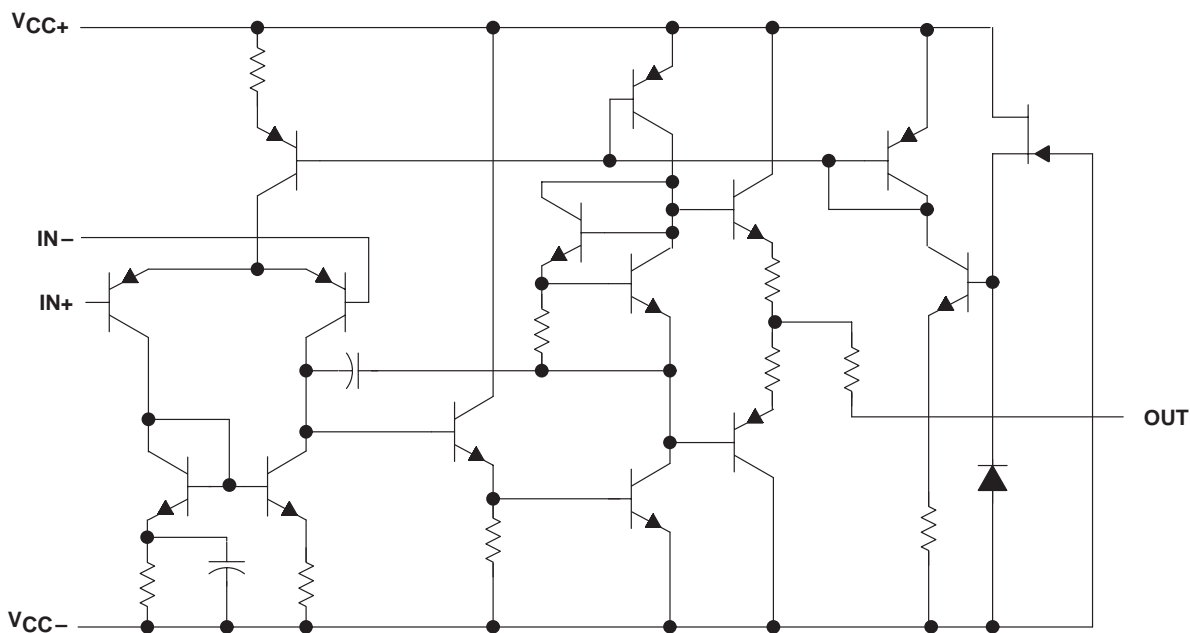
T <sub>A</sub>	V <sub>IO</sub> MAX AT 25°C	PACKAGED DEVICES				
		SMALL OUTLINE (D)	SSOP (DBR)	CERAMIC DIP (JG)	PLASTIC DIP (P)	SOP (PSR)
0°C to 70°C	6 mV	RC4558D	RC4558DBR	—	RC4558P	RC4558PSR
–55°C to 125°C	6 mV	—	—	RM4558JG	—	—

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

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## schematic (each amplifier)



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

		RC4558	RM4558	UNIT
Supply voltage (see Note 1)	V <sub>CC+</sub>	18	22	V
	V <sub>CC-</sub>	-18	-22	
Differential input voltage (see Note 2)		±30	±30	V
Input voltage (any input, see Notes 1 and 3)		±15	±15	V
Duration of output short circuit to ground, one amplifier at a time (see Note 4)		unlimited	unlimited	
Package thermal impedance, $\theta_{JA}$ (see Note 5)	D package	197		°C/W
	P package	104		
	PS package	163		
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: JG package			300	°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: D or P package		260		°C
Storage temperature range, T <sub>stg</sub>		-65 to 150	-65 to 150	°C

- NOTES:
- All voltage values, unless otherwise noted, are with respect to the midpoint between V<sub>CC+</sub> and V<sub>CC-</sub>.
  - Differential voltages are at IN+ with respect to IN-.
  - The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 V, whichever is less.
  - Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.
  - The package thermal impedance is calculated in accordance with JESD 51, except for through-hole packages, which use a trace length of zero.

## recommended operating conditions

		MIN	MAX	UNIT
Supply voltage	V <sub>CC+</sub>	5	15	V
	V <sub>CC-</sub>	-5	-15	
Operating free-air temperature, T <sub>A</sub>	RC4558	0	70	°C
	RM4558	-55	125	



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# RC4558, RM4558 DUAL GENERAL-PURPOSE OPERATIONAL AMPLIFIERS

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

PARAMETER		TEST CONDITIONS†		RC4558			RM4558			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
$V_{IO}$	Input offset voltage	$V_O = 0$	25°C	0.5	6		0.5	5	mV	
			Full range		7.5		6			
$I_{IO}$	Input offset current	$V_O = 0$	25°C	5	200		5	200	nA	
			Full range		300		500			
$I_{IB}$	Input bias current	$V_O = 0$	25°C	150	500		140	500	nA	
			Full range		800		1500			
$V_{ICR}$	Common-mode input voltage range		25°C	±12	±14		±12	±14	V	
$V_{OM}$	Maximum output voltage swing	$R_L = 10\text{ k}\Omega$	25°C	±12	±14		±12	±14	V	
			$R_L = 2\text{ k}\Omega$	25°C	±10	±13		±10		±13
			$R_L \geq 2\text{ k}\Omega$	Full range	±10			±10		
$A_{VD}$	Large-signal differential voltage amplification	$R_L \geq 2\text{ k}\Omega$ , $V_O = \pm 10\text{ V}$	25°C	20	300		50	350	V/mV	
			Full range	15			25			
$B_1$	Unity-gain bandwidth		25°C	3			2	3.5	MHz	
$r_i$	Input resistance		25°C	0.3	5		0.3	5	MΩ	
$CMRR$	Common-mode rejection ratio		25°C	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	$\mu\text{V/V}$	
$V_n$	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		$\text{nV}/\sqrt{\text{Hz}}$	
$I_{CC}$	Supply current (both amplifiers)	$V_O = 0$ , No load	25°C	2.5	5.6		2.5	5.6	mA	
			$T_A(\text{min})$	3	6.6		3	6.6		
			$T_A(\text{max})$	2.3	5		2	5		
$P_D$	Total power dissipation (both amplifiers)	$V_O = 0$ , No load	25°C	75	170		75	170	mW	
			$T_A(\text{min})$	90	200		90	200		
			$T_A(\text{max})$	70	150		60	150		
$V_{O1}/V_{O2}$	Crosstalk attenuation	Open loop $A_{VD} = 100$	$R_S = 1\text{ k}\Omega$ , $f = 10\text{ kHz}$	25°C	85		85		dB	
					105		105			

† All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified. Full range is 0°C to 70°C for RC4558 and -55°C to 125°C for RM4558.  $T_A(\text{min})$  is 0°C for RC4558 and -55°C for RM4558.  $T_A(\text{max})$  is 70°C for RC4558 and 125°C for RM4558.

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

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
$t_r$ Rise time	$V_I = 20\text{ mV}$ ,	$R_L = 2\text{ k}\Omega$ ,	$C_L = 100\text{ pF}$	0.13			ns
Overshoot				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		V/ $\mu\text{s}$



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