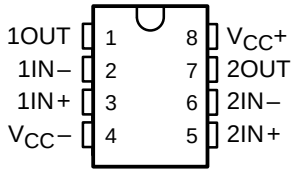
- **Continuous-Short-Circuit Protection**
- **Wide Common-Mode and Differential Voltage Ranges**
- **No Frequency Compensation Required**
- **Low Power Consumption**
- **No Latch-Up**
- **Unity Gain Bandwidth . . . 3 MHz Typ**
- **Gain and Phase Match Between Amplifiers**
- **Low Noise . . . 8 nV$\sqrt{\text{Hz}}$ Typ at 1 kHz**
- **Designed To Be Interchangeable With Raytheon RC4558, RM4558, and RV4558**

D, DB, JG, P, OR PW PACKAGE
(TOP VIEW)



description

The RC4558, RM4558, and RV4558 are dual high-performance operational amplifiers with each half electrically similar to the μA741 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, the RM4558 is characterized for operation over the full military temperature range of –55°C to 125°C, and the RV4558 is characterized for operation from –40°C to 85°C.

AVAILABLE OPTIONS

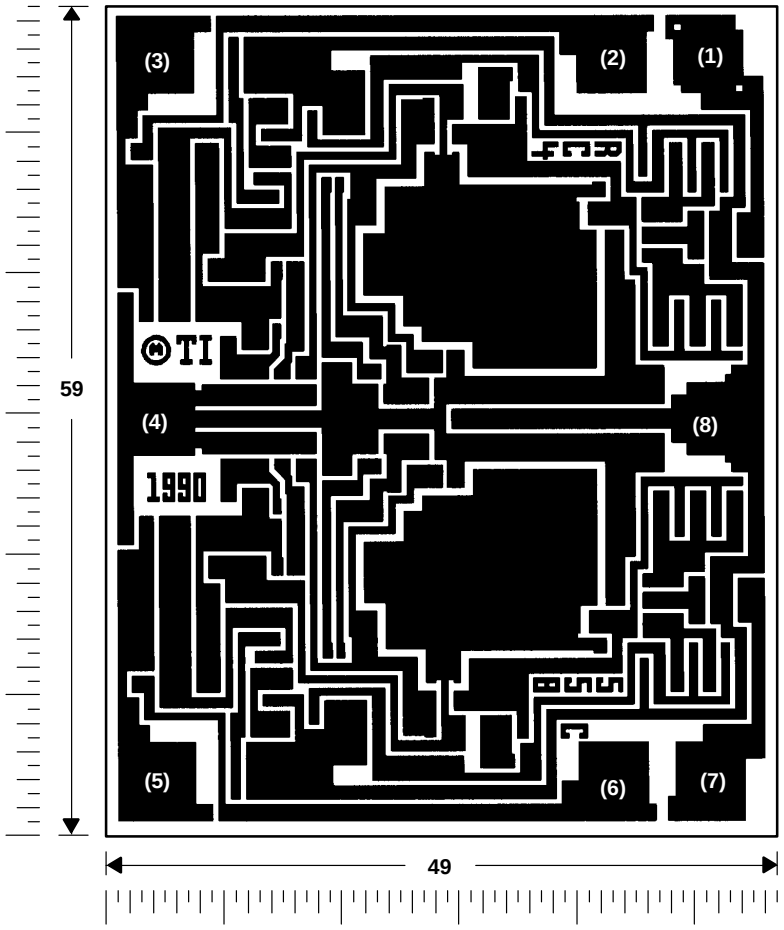
T_A	V_{IO}max AT 25°C	PACKAGED DEVICES					CHIP FORM (Y)
		SMALL OUTLINE (D)	SSOP (DBLE)	CERAMIC DIP (JG)	PLASTIC DIP (P)	SSOP (PWLE)	
0°C to 70°C	6 mV	RC4558D	RC4558DBLE	—	RC4558P	RC4558PWLE	RC4558Y
–40°C to 85°C	6 mV	RV4558D	—	—	RV4558P	—	—
–55°C to 125°C	6 mV	—	—	RM4558JG	—	—	—

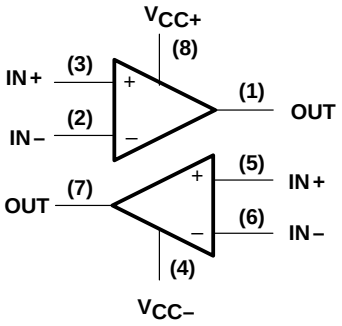
The D package is available taped and reeled. Add the suffix R to the device type (e.g., RC4558DR). The DB and PW packages are available only left-end taped and reeled. RC4558Y is tested at 25°C.

RC4558Y chip information

These chips, properly assembled, display characteristics similar to the RC4558. Thermal compression or ultrasonic bonding may be used on the doped-aluminum bonding pads. Chips may be mounted with conductive epoxy or a gold-silicon preform.

BONDING PAD ASSIGNMENTS





CHIP THICKNESS: 15 TYPICAL

BONDING PADS: 4 × 4 MINIMUM

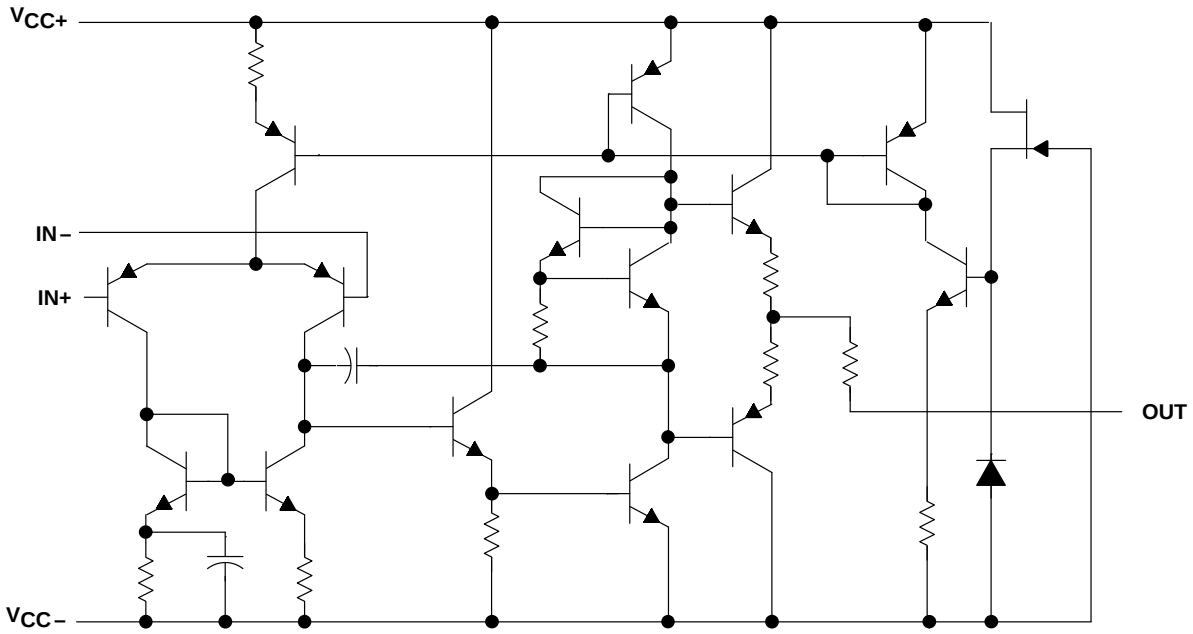
$T_J$max = 150°C

TOLERANCES ARE ±10%.

ALL DIMENSIONS ARE IN MILS.

PIN (4) IS INTERNALLY CONNECTED TO BACKSIDE OF CHIP.

schematic (each amplifier)



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

	RC4558	RM4558	RV4558	UNIT
Supply voltage V_{CC+} (see Note 1)	18	22	18	V
Supply voltage V_{CC-} (see Note 1)	–18	–22	–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	0 to 70	–55 to 125	–40 to 85	°C
Storage temperature range	–65 to 150	–65 to 150	–65 to 150	°C
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, DB, P, or PW package	260		260	°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 IN+ with respect to IN–.
3. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 V, 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	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	DERATE ABOVE T_A	$T_A = 70°C$ POWER RATING	$T_A = 85°C$ POWER RATING	$T_A = 125°C$ POWER RATING
D	680 mW	5.8 mW/°C	33°C	464 mW	377 mW	N/A
DB or PW	525 mW	4.2 mW/°C	25°C	336 mW	N/A	N/A
JG	680 mW	8.4 mW/°C	69°C	672 mW	546 mW	210 mW
P	680 mW	8.0 mW/°C	65°C	640 mW	520 mW	N/A

recommended operating conditions

	MIN	MAX	UNIT
Supply voltage, V_{CC+}	5	15	V
Supply voltage, V_{CC-}	–5	–15	V

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

PARAMETR		TEST CONDITIONS†		RC4558			RM4558			RV4558			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
V_{IO}	Input offset voltage	V_O = 0	25°C		0.5	6		0.5	5		0.5	6	mV
			Full range			7.5			6			7.5	
I_{IO}	Input offset current	V_O = 0	25°C		5	200		5	200		5	200	nA
			Full range			300			500			500	
I_{IB}	Input bias current	V_O = 0	25°C		150	500		140	500		140	500	nA
			Full range			800			1500			1500	
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 kΩ	25°C	±12	±14		±12	±14		±12	±14		V
		R_L = 2 kΩ	25°C	±10	±13		±10	±13		±10	±13		
		R_L ≥ 2 kΩ	Full range	±10			±10			±10			
A_{VD}	Large-signal differential voltage amplification	R_L ≥ 2 kΩ, V_O = ±10 V	25°C	20	300		50	350		20	300		V/mV
			Full range	15			25			15			
B_1	Unity-gain bandwith		25°C		3		2	3.5			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} = ±15 V to ±9 V	25°C		30	150		30	150		30	150	μV/V
V_n	Equivalent input noise voltage (closed loop)	A_{VD} = 100, R_S = 100 Ω, f = 1 kHz, BW = 1 Hz	25°C		8			8			8		nV√Hz
I_{CC}	Supply current (both amplifiers)	V_O = 0, No load	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		2.3	5		2	5		2.3	5	
P_D	Total power dissipation (both amplifiers)	V_O = 0, No load	25°C		75	170		75	170		75	170	mW
			MIN T_A		90	200		90	200		90	200	
			MAX T_A		70	150		60	150		70	150	
V_{O1}/V_{O2}	Crosstalk attenuation	Open loop	R_S = 1 kΩ, f = 10 kHz	25°C	85			85			85		dB
		A_{VD} = 100			105			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, –55°C to 125°C for RM4558, and –40°C to 85°C for RV4558. Minimum T_A is 0°C for RC4558, –55°C for RM4558, and –40°C for RV4558. Maximum T_A is 70°C for RC4558, 125°C for RM4558, and 85°C for RV4558.

operating characteristics, V_{CC+} = 15 V, V_{CC-} = –15 V, T_A = 25°C

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
t_r	Rise time	V_I = 20 mV,	R_L = 2 kΩ,	C_L = 100 pF		0.13		ns
	Overshoot					5%		
SR	Slew rate at unity gain	V_I = 10 V,	R_L = 2 kΩ,	C_L = 100 pF	1.1	1.7		V/μs

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electrical characteristics, V_{CC+} = 15 V, V_{CC-} = −15 V, T_A = 25°C (unless otherwise noted)

PARAMETER			TEST CONDITIONS†	RC4558Y			UNIT
				MIN	TYP	MAX	
V_{IO}	Input offset voltage		V_O = 0		0.5	6	mV
I_{IO}	Input offset current		V_O = 0		5	200	nA
I_{IB}	Input bias current		V_O = 0		150	500	nA
V_{ICR}	Common-mode input voltage range			±12	±14		V
V_{OM}	Maximum output voltage swing		R_L = 10 kΩ	±12	±14		V
			R_L = 2 kΩ	±12	±13		
A_{VD}	Large-signal differential voltage amplification		R_L = 2 kΩ, V_O = ±10 V	20	300		V/mV
B_1	Unity-gain bandwidth				3		MHz
r_i	Input resistance			0.3	5		MΩ
CMRR	Common-mode rejection ratio			70	90		dB
k_{SVS}	Supply voltage sensitivity ($\Delta V_{IO}/\Delta V_{CC}$)		V_{CC} = ±15 V to ±9 V		30	150	μV/V
V_n	Equivalent input noise voltage (closed-loop)		A_{VD} = 100, R_S = 100 Ω, f = 1 kHz, BW = 1 Hz		8		nV√Hz
I_{CC}	Supply current (both amplifiers)		V_O = 0, No load		2.5	5.6	mA
P_D	Total power dissipation (both amplifiers)		V_O = 0, No load		75	170	mW
V_{O1}/V_{O2}	Crosstalk attenuation	Open loop	R_S = 1 kΩ, f = 10 kHz		85		dB
		A_{VD} = 100			105		

† All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified.

operating characteristics, V_{CC+} = 15 V, V_{CC-} = −15 V, T_A = 25°C

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
t_r	Rise time	V_I = 20 mV,	R_L = 2 kΩ,	C_L = 100 pF		0.13		ns
	Overshoot					5%		
SR	Slew rate at unity gain	V_I = 10 V,	R_L = 2 kΩ,	C_L = 100 pF	1.1	1.7		V/μs

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