RM4136, RV4136, RC4136
QUAD HIGH-PERFORMANCE OPERATIONAL AMPLIFIERS

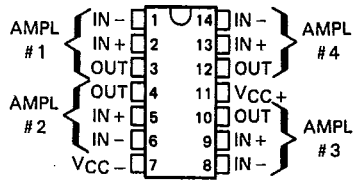
NOTICE
SEE ORDER OF DATA FOR ERRATA INFORMATION

T-79-05-40

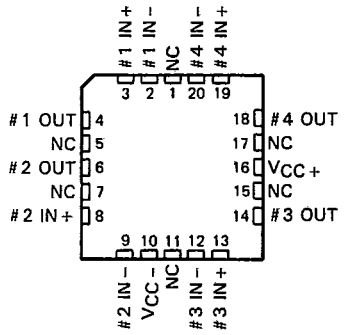
D2142, MARCH 1978—REVISED NOVEMBER 1988

- 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
- Designed to be Interchangeable with Raytheon RM4136, RV4136, and RC4136
- Low Noise . . . 8 nV/√Hz Typ at 1 kHz

RM4136 . . . J OR W PACKAGE
ALL OTHERS . . . D, J, OR N PACKAGE
(TOP VIEW)



RM4136
FK CHIP CARRIER PACKAGE
(TOP VIEW)



NC—No internal connection

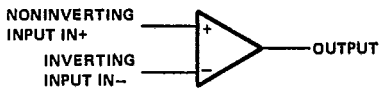
description

The RM4136, RV4136, and RC4136 are quad high-performance operational amplifiers with each amplifier electrically similar to the 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 RM4136 is characterized for operation over the full military temperature range of −55°C to 125°C, the RV4136 is characterized for operation from −40°C to 85°C, and the RC4136 is characterized for operation from 0°C to 70°C.

symbol (each amplifier)

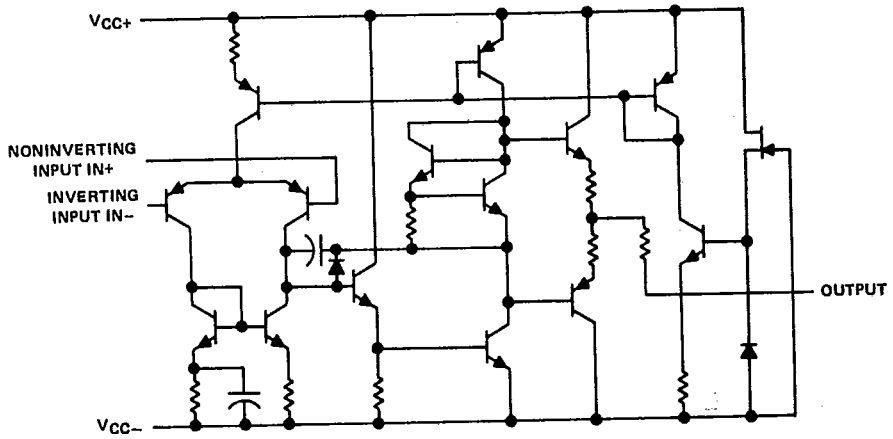


AVAILABLE OPTIONS

T_A	V_{IO} MAX at 25°C	PACKAGE				
		SMALL-OUTLINE (D)	CHIP CARRIER (FK)	CERAMIC DIP (J)	PLASTIC DIP (N)	FLAT (W)
0°C to 70°C	6 mV	RC4136D	–	RC4136J	RC4136N	–
−40°C to 85°C	6 mV	RV4136D	–	RV4136J	RV4136N	–
−55°C to 125°C	4 mV	–	RM4136FK	RM4136J	–	RM4136W

The D packages are available taped and reeled. Add the suffix R to the device type. (e.g., RC4136DR)

schematic (each amplifier)



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

		RM4136	RV4136	RC4136	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	°C
Storage temperature range		−65 to 150	−65 to 150	−65 to 150	°C
Case temperature for 60 seconds	FK package	260			°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds	J or W package	300	300	300	°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	D or N 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 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	$T_A \leq 25°C$ POWER RATING	DERATING FACTOR	DERATE ABOVE T_A	$T_A = 70°C$ POWER RATING	$T_A = 85°C$ POWER RATING	$T_A = 125°C$ POWER RATING
D	800 mW	7.6 mW/°C	45°C	608 mW	494 mW	–
FK	800 mW	11.0 mW/°C	77°C	800 mW	715 mW	275 mW
J (RM4136)	800 mW	11.0 mW/°C	77°C	800 mW	715 mW	275 mW
J (others)	800 mW	8.2 mW/°C	52°C	656 mW	533 mW	–
N	800 mW	9.2 mW/°C	63°C	736 mW	598 mW	–
W	800 mW	8.0 mW/°C	50°C	640 mW	520 mW	200 mW

TEXAS INSTRUMENTS
POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

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

PARAMETER		TEST CONDITIONS†		RM4136			RV4136			RC4136			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
V_{IO}	Input offset voltage	V_O = 0	25°C		0.5	4		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	150		5	200		5	200	nA
			Full range			500			500			300	
I_{IB}	Input bias current	V_O = 0	25°C		140	400		140	500		140	500	nA
			Full range			1500			1500			800	
V_I	Input voltage range		25°C	±12	±14		±12	±14		±12	±14		V
V_{OM}	Maximum peak 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	V_O = ±10 V, R_L ≥ 2 kΩ	25°C	50	350		20	300		20	300		V/mV
			Full range	25			15			15			
B_1	Unity-gain bandwidth		25°C		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	V_O = 0, R_S = 50 Ω	25°C	70	90		70	90		70	90		dB
k_{SVS}	Supply voltage sensitivity ($\Delta V_{IO}/\Delta V_{CC}$)	V_{CC} = ±9 V to ±15 V, V_O = 0	25°C		30	150		30	150		30	150	μV/V
V_n	Equivalent input noise voltage (closed-loop)	A_{VD} = 100, BW = 1 Hz, f = 1 kHz, R_S = 100 Ω	25°C		8			8			8		nV/√Hz
I_{CC}	Supply current (All four amplifiers)	V_O = 0, No load	25°C		5	11.3		5	11.3		5	11.3	mA
			MIN T_A		6	13.3		6	13.7		6	13.7	
			MAX T_A		4.5	10		4.5	10		4.5	10	
P_D	Total power dissipation (All four amplifiers)	V_O = 0, No load	25°C		150	340		150	340		150	340	mW
			MIN T_A		180	400		180	400		180	400	
			MAX T_A		135	300		135	300		135	300	
V_{o1}/V_{o2}	Crosstalk attenuation	A_{VD} = 100, f = 10 kHz, R_S = 1 kΩ	25°C		105			105			105		dB

† 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 RM4136, −40°C to 85°C for RV4136, and 0°C to 70°C for RC4136.

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

PARAMETER		TEST CONDITIONS		RM4136			RV4136, RC4136			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
t_r	Rise time	V_I = 20 mV, C_L = 100 pF	R_L = 2 kΩ,		0.13			0.13		μs
	Overshoot factor				5%			5%		
SR	Slew rate at unity gain	V_I = 10 V, C_L = 100 pF	R_L = 2 kΩ,		1.7			1.7		V/μs