

Quad High Speed Decompensated Operational Amplifier

4157

DESCRIPTION

The RM4157/RC4157 is a monolithic integrated circuit, consisting of four independent high performance operational amplifiers constructed with the planar epitaxial process.

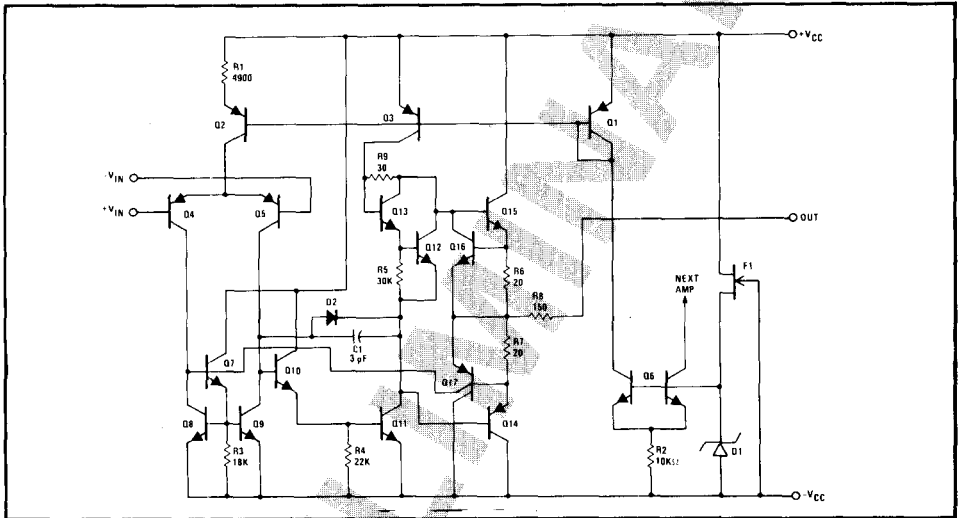
These amplifiers feature guaranteed A.C. performance which far exceeds that of the LM149 type amplifiers. Also featured are excellent input characteristics and guaranteed low noise making this device the optimum choice for audio, active filter and instrumentation applications.

FEATURES

- Gain Bandwidth Product ($A_v \geq 5$)
- High Slew Rate ($A_v=5$)
- Low Noise Voltage
- Indefinite Short Circuit Protection
- No Crossover Distortion
- Low Input Offset and Bias Parameters
- Internal Compensation

	Typical	Guaranteed
Gain Bandwidth Product ($A_v \geq 5$)	19 MHz	15 MHz
High Slew Rate ($A_v=5$)	8	6.5V/ μ s
Low Noise Voltage	1.4 μ V	2.0 μ V RMS

SCHEMATIC DIAGRAM (1/4 Shown)



CONNECTION INFORMATION

DB and DC Dual In-line Packages (Top View)	PIN	FUNCTION	Minimum Gain Configurations
1	1	OUTPUT A	<p>Minimum Gain for Stable Operation</p>
2	2	-VIN A	
3	3	+VIN A	<p>Unity Gain Inverter</p>
4	4	V+	
5	5	+VIN B	<p>The 4157 is an uncompensated version of the 4156. The characteristics are the same except the 4157 has wider bandwidths. As a result the part requires a minimum gain of 5.</p>
6	6	-VIN B	
7	7	OUTPUT B	
	8	OUTPUT C	
	9	-VIN C	
	10	+VIN C	
	11	V-	
	12	+VIN D	
	13	-VIN D	
	14	OUTPUT D	

Order Part Nos.:
 RM4157DC, RV4157DB,
 RV4157DC, RC4157DC,
 RC4157DB

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4157

ABSOLUTE MAXIMUM RATINGS Quad Wide Band Decompensated ($A_{vmin} = 5$) Operational Amplifier

Supply Voltage	$\pm 20V$	Storage Temperature Range	-65 to $+150^{\circ}C$
Internal Power Dissipation (Note 1)	880 mW	Operating Temperature Range	RM4157 -55 to $+125^{\circ}C$
Differential Input Voltage	$\pm 30V$		RV4157 -40 to $+85^{\circ}C$
Input Voltage (Note 2)	$\pm 15V$		RC4157 0 to $+70^{\circ}C$
Output Short Circuit Duration (Note 3)	Indefinite	Lead Soldering Temperature (60 sec)	$300^{\circ}C$

ELECTRICAL CHARACTERISTICS $V_{CC} \pm 15V$ $T_A +25^{\circ}C$ unless otherwise specified

PARAMETER	CONDITIONS	RM4157			RV4157/RC4157			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	$R_S \leq 10 K\Omega$		0.5	3.0	1.0	5.0	mV	
Input Offset Current			15	30	30	50	nA	
Input Bias Current			60	200	60	300	nA	
Input Resistance			0.5		0.5		M Ω	
Large Signal Voltage Gain	$R_L \geq 2 K\Omega$ $V_{OUT} \pm 10V$	50,000	100,000		25,000	100,000	V/V	
Output Voltage Swing	$R_L \geq 10 K\Omega$	± 12	± 14		± 12	± 14	V	
	$R_L \geq 2 K\Omega$	± 10	± 13		± 10	± 13	V	
Input Voltage Range		± 12	± 14		± 12	± 14	V	
Output Resistance			230		230		Ω	
Output Short Circuit Current			25		25		mA	
Common Mode Rejection Ratio	$R_S \leq 10 K\Omega$	80			80		dB	
Power Supply Rejection Ratio	$R_S \leq 10 K\Omega$	80			80		dB	
Supply Current (all amplifiers)	$R_L = \infty$		4.5	5.0		5.0	7.0	mA
Transient Response								
	Rise Time	$A_v = 5$	50		60		ns	
	Overshoot	$A_v = 5$	25%		25%		%	
Slew Rate	$A_v = 5$	6.5	8		6.5	8	V/ μs	
Gain Bandwidth Product		15	19		15	19	MHz	
Phase Margin ($A_v = 5$)	$R_L = 2 K\Omega$ $R_C = 50 pF$		50		50		degrees	
Full Power Bandwidth	$V_O \geq 20V$ p-p	100	125		100	125	kHz	
Input Noise Voltage	$f = 20$ Hz to 20 kHz		1.4	2.0	1.4	2.0	μV RMS	
Input Noise Current	$f = 20$ Hz to 20 kHz		15		15		pA RMS	
Channel Separation			-108		-108		dB	
The following specifications apply for $-55^{\circ}C \leq T_A \leq +125^{\circ}C$ for RM4157, $-40^{\circ}C \leq T_A \leq +85^{\circ}C$ for RV4157, $0^{\circ}C \leq T_A \leq +70^{\circ}C$ for RC4157.								
Input Offset Voltage	$R_S \leq 10 K\Omega$			5.0		6.5	mV	
Input Offset Current				75		100	nA	
Input Bias Current				325		400	nA	
Large Signal Voltage Gain	$R_L \geq 2 K\Omega$ $V_{OUT} \pm 10V$	25,000			15,000		V/V	
Output Voltage Swing	$R_L \geq 2 K\Omega$	± 10			± 10		V	
Supply Current			10		10		mA	
Average Offset Voltage Drift			5		5		$\mu V/^{\circ}C$	

- Notes:**
- Rating applies for case temperature of $+25^{\circ}C$ maximum; derate linearity at 6.4 mW/ $^{\circ}C$ for temperatures above $+25^{\circ}C$.
 - For supply voltages less than $\pm 15V$, the absolute maximum input voltage is equal to the supply voltage.
 - Short circuit to ground on one amplifier only.



	SYMBOL	RM/RV/RC4156 (2)			LM149/249/349 LM148/248/348			HA4741-2/5			RM/RV/RC4157			UNIT	
Maximum Ratings															
Supply Voltage Range	V _{CC}	±4 to ±20			±4 to ±22			±4 to ±20			±4 to ±20			V	
Differential Input Voltage	V _{ID}	±30			±44/±36*			±30			±30			V	
Input Voltage		±15			±22/±18*			±15			±15			V	
Power Dissipation	P _D	880			900			800			880			mW	
Electrical Characteristics		@25°C													
Test Condition V _{CC} :		±15			±15			±15			±15			V	
Input Offset Voltage	V _{IO}		0.5 1.0	3.0 5.0*		1.0 5.0*	5.0 6.0*		0.5 1.0	3.0 5.0*		0.5 1.0	3.0 5.0*	mV	
Input Offset Current	I _{IO}		15 30	30 50*		4 25 50*			15 30	30 50*		15 30	30 50*	nA	
Input Bias Current	I _{IB}		60	200 300*		30 100 200*			60	200 300*		60	200 300*	nA	
Input Common Mode Voltage Range	V _{ICR}	±12	±14		±12**			±12			±12			V	
Supply Current	I _D		4.5/5	5/7*		2.4 3.6		4.5/5	5/7*		4.5/5	5/7*		mA	
Open Loop Voltage Gain	A _{VOL}	50 25*	100		50 25*	160		50 25*	100 50*		50 25*	100		V/mV	
Output Voltage Swing	V _{OR}	±12	±14		±12**			±13			±12			V	
Common Mode Rejection Ratio	CMRR	80			70**	90		80			80			dB	
Power Supply Rejection Ratio	PSRR	80dB			77**	96		80**			80			dB	
Unity Gain Bandwidth	BW	2.8	3.5			1.0/ 4.0†(1)			3.5		15(1)			MHz	
Slew Rate	SR	1.3	1.6			0.5/ 2.0†			1.6		6.5	8		V/μs	
Output Sink Current	I _{sink}							5	15					mA	
Output Source Current	I _{source}							5	15					mA	
Channel Separation			-108			-120			-108			-108			dB
Operating Temperature Range		-55 -40 0	RM RV RC	+125 85 70	-55 -25 0	148 248 348	+125 +85 +70	-55 0	-2 -5	+125 70	-55 -25 0	RM RV RC	+125 +85 +70	°C	
Package: 14 pin Dip	Hermetic Plastic	DC DB			DC DB			DC DB			DC DB				

*Denotes commercial temperature range device

**Applies over temperature

†149/349 (A_{Vmin} = 5) parameter

‡Denotes industrial temperature range device

(1) Gain-bandwidth product (A_{Vmin} = 5)

(2) Input noise voltage = 2 μV RMS max (20 Hz to 20 kHz)