

ANALOG-OPERATIONAL AMPLIFIERS

ELECTRICAL CHARACTERISTICS TABLE (Cont'd) $V_S = +15V$ unless otherwise specified

PARAMETER DEVICE	TEST CONDITIONS	V _{OS} (mV) Offset Voltage R _S ≤ 10KΩ			V _{OS} DRIFT (μV/°C) R _S = 0Ω			I _{OS} (mA) Offset Current			I _{OS} DRIFT pA/°C			I _{BIAS} (nA) Input Current			
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
LM324	T _A = 25°C V ⁺ = 5V		±2	±7 ³	N/A				±5	±50	N/A			I _{IN} ⁺ or I _{IN} ⁻⁴ 45nA 250nA			
	0°C ≤ T _A ≤ 70°C			±9 ³	7					±150	10			500nA			
MC1456	T _A = 25°C		5.0	10	N/A				5.0	10	N/A			15 30			
	0°C ≤ T _A ≤ 70°C			14	N/A					14	N/A			40			
MC1556	T _A = 25°C		2.0	4.0	N/A				1.0	2.0	N/A			0.8 15			
	-55 ≤ T _A ≤ 125°C			6.0	N/A			25 ≤ T _A ≤ 125°C 3.0 -55 ≤ T _A ≤ 25°C 5.0			N/A			30			
MC1458	T _A = 25°C		2.0	6.0	N/A				30	200	N/A			200 500			
	0°C ≤ T _A ≤ 70°C			7.5	N/A					300	N/A			800			
MC1558	T _A = 25°C		1.0	5.0	N/A				30	200	N/A			200 500			
	-55 ≤ T _A ≤ 125°C			6.0	N/A					500	N/A			1500			
μA709	T _A = 25°C ±9 ≤ V _S ≤ ±15		1	5	R _S = 50Ω 3.0					50	200	N/A			200nA 500nA		
	-55°C ≤ T _A ≤ +125°C			6	R _S ≤ 10K 6.0				T _A = +125°C 20 200 T _A = -55°C 100 500			N/A			T _A = -55°C 0.5 1.5		
μA709C	T _A = 25°C		2	7.5	N/A				100	500	N/A			300nA 1500nA			
	0°C ≤ T _A ≤ 70°C			10	N/A					750	N/A			N/A			
μA740	T _A = 25°C	R _S ≤ 100KΩ			N/A				60pA		N/A			0.1nA 2.0nA			
	0°C ≤ T _A ≤ +70°C	30 30			N/A				60pA		N/A			1.1nA 1.0nA			
μA741	T _A = 25°C		1.0	5.0	N/A				10	200	N/A			80nA 500nA			
	-55°C ≤ T _A ≤ +125°C		1.0	6.0	N/A			T _A = +125°C 7.0 200 T _A = -55°C 20 500			N/A			T _A = +125°C 30 500 T _A = -55°C 300 1500			
μA741C	T _A = 25°C		2.0	6.0	N/A				20	200	N/A			80 500			
	0°C ≤ T _A ≤ +70°C			7.5	N/A					300	N/A			800			

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PARAMETER DEVICE	TEST CONDITIONS	V _{CM} (V) Common Mode Voltage Range			CMRR (dB) Common Mode Rejection Ratio $R_S \leq \pm 10K\Omega$			R _{IN} (M Ω) INPUT RESISTANCE			A _{VOL} (V/MV) LARGE SIGNAL VOLTAGE GAIN $R_L \geq 2K\Omega$ V _{OUT} $\pm 10V$ V _S = $\pm 15V$		
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
LM324	T _A = 25°C V ⁺ = 5V 0°C ≤ T _A ≤ 70°C	V ⁺ = 30V ⁵ 0 V ± 1.5			65	85		N/A			V ⁺ = 15 25 100		
MC1456	T _A = 25°C 0°C ≤ T _A ≤ 70°C	±11	±12		f = 100 Hz 70 110 N/A		f = 20 Hz 3.0 N/A		70 100 40				
MC1556	T _A = 25°C -55 ≤ T _A ≤ 125°C	±12	±13		f = 100 Hz 80 110 N/A		f = 20 Hz 5.0 N/A		100 200 40				
MC1458	T _A = 25°C 0°C ≤ T _A ≤ 70°C	±12	±13		f = 100 Hz 70 90 N/A		f = 20 Hz 0.3 1.0 N/A		20 100 15				
MC1558	T _A = 25°C -55 ≤ T _A ≤ 125°C	±12	±13		f = 100 Hz 70 90 N/A		f = 20 Hz 0.3 1.0 N/A		50 200 25				
μA709	T _A = 25°C ±9 ≤ V _S ≤ ±15 -55°C ≤ T _A ≤ +125°C	N/A V _S = ±15			N/A			150 400	N/A R _L ≥ 25KΩ				
μA709C	T _A = 25°C 0°C ≤ T _A ≤ 70°C	±8.0	±10		65 90 N/A		50 250 35		15 45 12				
μA740	T _A = 25°C 0°C ≤ T _A ≤ +70°C	N/A			N/A			1,000,000	1,000				
μA741	T _A = 25°C -55°C ≤ T _A ≤ +125°C	N/A			N/A			0.3 2.0	50 200				
μA741C	T _A = 25°C 0°C ≤ T _A ≤ +70°C	±12	±13		70 90 N/A		0.3 2.0 N/A		20 200 15				

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ELECTRICAL CHARACTERISTICS TABLE (Cont'd) $V_S = +15V$ unless otherwise specified

PARAMETER DEVICE	TEST CONDITIONS	V _{OUT} OUTPUT VOLTAGE SWING (V) R _L ≥ 2KΩ			I _{CC} SUPPLY CURRENT (mA)			POWER CONSUMPTION			PSRR SUPPLY VOLTAGE REJECTION RATION (μV/V) R _S ≤ 10KΩ		
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
LM324	T _A = 25°C V ⁺ = 5V 0°C ≤ T _A ≤ 70°C	N/A V _{OH} V ⁺ = 30V 26 R _L ≥ 10KΩ 27 28 V _{OL} V ⁺ = 5V R _L ≤ 10KΩ 5 20			N/A R _L = ∞ On All Op Amps 0.8 2			N/A N/A			65 100 N/A		
MC1456	T _A = 25°C 0°C ≤ T _A ≤ 70°C	±11	±12		1.3	3.0		40	90		75	200	
		N/A			N/A			N/A			N/A		
MC1556	T _A = 25°C -55 ≤ T _A ≤ 125°C	±12	±13		1.0	1.5		30	45		50	100	
		N/A			N/A			N/A			N/A		
MC1458	T _A = 25°C 0°C ≤ T _A ≤ 70°C	R _L = 10KΩ ±12 ±14 R _L = 2KΩ ±10 ±13			2.3	5.6		70	170		30	150	
		N/A			N/A			N/A			N/A		
MC1558	T _A = 25°C -55 ≤ T _A ≤ 125°C	R _L = 10KΩ R _L = 2KΩ ±10 ±13			2.3	5.0		70	150		30	150	
		N/A			N/A			N/A			N/A		
μA709	T _A = 25°C ±9 ≤ V _S ≤ ±15 -55°C ≤ T _A ≤ +125°C	N/A			N/A			80	165		N/A		
		±10	±13		N/A			N/A			25	150	
		R _L = 10KΩ ±12 ±14											
μA709C	T _A = 25°C 0°C ≤ T _A ≤ 70°C	±10	±13		N/A			80	200		25	200	
		R _L = 10KΩ ±12 ±14 N/A			N/A			N/A			N/A		
μA740	T _A = 25°C 0°C ≤ T _A ≤ +70°C	±10	±13		4.2	3.0		126	240		N/A		
		N/A R _L ≥ 10KΩ ±12 ±14			N/A			N/A			70		
μA741	T _A = 25°C -55°C ≤ T _A ≤ +125°C	N/A			1.4	2.8		50	85		N/A		
		±10	±13		T _A = +125°C 1.5 2.5			T _A = +125°C 45 75			10	150	
		R _L ≥ 10KΩ ±12 ±14			T _A = -55°C 2.0 3.3			T _A = -55°C 45 100					
μA741C	T _A = 25°C 0°C ≤ T _A ≤ +70°C	±10	±13		1.4	2.8		50	85		10	150	
		R _L ≥ 10KΩ ±12 ±14 ±10 ±13			N/A			N/A			N/A		