

① Operational Amplifiers

Typical Characteristics of Linear IC Operational Amplifiers

Features	General Purpose										Wide-Band						Precision																												
	RCA Type No.	Single Supply																																											
	CA741CF, CH, CS, CT CA747CE, CF, CH, CT CA748CF, CH, CS, CT CA1458S, T [•] CA741F, L, S, T CA747E, F, T [•] CA748F, S, T [•] CA1558F, S, T [•] CA6741S, T [#] CA3401E, H [†] CA101 CA201 CA101A, CA201A CA301A CA107, CA207 CA307 CA3008, CA3010 CA3029, CA3037 CA3008A, CA3010A CA3029A, CA3037A CA3015, CA3016 CA3030, CA3038 CA3015A, CA3016A CA3030A, CA3038A CA3100F, H, S, T CA108S, T CA208S, T CA108AS, AT CA208AS, AT CA308H, S, T CA308AS, AT																																												
Characteristics	Operating Conditions	$V^+, V^- = \pm 15\text{ V}$										$V^{\pm} = \pm 5\text{ to } \pm 15\text{ V}$					$V^{\pm} = \pm 5\text{ to } \pm 15\text{ V}$					$V^+, V^- = \pm 6\text{ V}$					$V^+, V^- = \pm 12\text{ V}$					$V^+, V^- = \pm 15\text{ V}$					Typ. Values @ $V_Z = \pm 5\text{ to } \pm 15$ except for $\Delta V, V_O, V_I$ which are characterized only at $\pm 15\text{ V}$								
	Symbol																																												
Static Conditions (at $T_A = 25^\circ\text{C}$)																																													
Input Offset Voltage — mV max	V_{IO}	6	5	—	5	7.5	2	7.5	2	7.5	5	2	5	2	5	2	0.5	7.5	0.5	—																									
Input Offset Current — nA max	I_{IO}	200	200	—	200	500	10	50	10	50	5000	1500	5000	1600	2000	0.2	0.2	1	1	—																									
Input Bias Current — nA max.	I_I	500	500	300	500	1500	75	250	75	250	12,000	4000	24,000	6000	400	2	2	7	7	—																									
Input Offset Voltage Temperature Coefficient — $\mu\text{V}/^\circ\text{C}$ typ.	$V_{IO}/\Delta T$	2	2	—	3	6	3	6	3	6	1.2	1.2	3.5	1.2	10	3	1	6	1	—																									
Peak-to-Peak Output Voltage — V min.	V_{OM}	24	24	10 @ $T_A = 0$ to 75°C	24	24	24	24	24	24	4	4	12	12	18 @ $R_L = 2\text{ k}\Omega$	26	26	26	26	—																									
Peak-to-Peak Output Current — mA min.	I_{OM}	10	10	5	—	—	—	—	—	—	9 typ. at $0.5\text{ k}\Omega R_L$	18 typ. at $0.5\text{ k}\Omega R_L$	30 @ $R_L = 250\Omega$	—	—	—	—	—	—	—																									
Device Dissipation — mW max	P_D	85	85	—	—	—	—	—	—	—	30 typ.	30 typ.	175 typ.	175 typ.	—	18	18	24	24	—																									
Maximum Supply Voltage — V^+, V^-	V^+, V^-	± 18	± 22	$V^+ = 18$	± 22	± 22	± 22	± 18	± 22	± 18	± 8	± 8	± 16	± 16	± 18	± 20	± 20	± 18	± 18	—																									
Minimum Output Voltage for Single-Supply Operation (neg. gnd.) — V typ.	V_O	1.5	1.5	—	—	—	—	—	—	—	2.0	2.0	4.7	4.7	—	—	—	—	—	—																									
Common Mode Input Voltage Range V min.	V_{ICR}	± 12	± 12	—	± 12	± 15	± 12	± 12	± 15	± 12	+0.5, -4.0	+0.5, -4.0	+0.65, -8.0	+0.65, -8.0	± 12	± 13.5	± 13.5	± 14	± 14	—																									

For CA3130, CA3130A, CA3130B characteristics, see Page 17

- The characteristics values apply to each of the dual op-amps in the package.
- For CA748T & CA748CT external compensation is required
- △ No offset adjustment is provided for CA1458T, CA1558T, CA747CT or CA747T.
- # Low-noise premium version of the CA3741T that is virtually free of "popcorn" (burst) noise.
- † The characteristics values apply to each of the four operational amplifiers.
- Specifically designed for single-supply operation; the negative side of the common-mode input voltage range (V_{ICR}) is almost at the same potential as the negative supply voltage.

Features	General Purpose										Wide-Band					Precision					
	RCA Type No.			Single Supply																	
	CA741CF, CH, CS, CT CA747CE, CF, CH, CT CA748CF, CH, CS, CT CA1458S, T ●	CA741F, L, S, T CA747E, F, T ● CA748F, S, T CA1558F, S, T ● CA6741S, T #		CA3401E, H†	CA101	CA201	CA101A, CA201A		CA301A	CA107, CA207	CA307	CA3008, CA3010 CA3029, CA3037	CA3008A, CA3010A CA3029A, CA3037A	CA3015, CA3016 CA3030, CA3038	CA3015A, CA3016A CA3030A, CA3038A	CA3100F, H, S, T		CA108S, T CA208S, T	CA108AS, AT CA208AS, AT	CA308H, S, T	CA308AS, AT
Characteristics	Operating Conditions	V ⁺ , V ⁻ = ±15 V			V [±] = ±5 to ±15 V					V [±] = ±5 to ±15 V		V ⁺ , V ⁻ = ±6 V		V ⁺ , V ⁻ = ±12 V		V ⁺ , V ⁻ = ±15V		Typ. Values @ V [±] = ±5 to ±15 except for A _V , V _O , V _I , which are characterized only at ±15 V			
	Symbol																				
Dynamic Conditions (at T _A = 25°C)																					
Forward Transconductance— μmho	gm																				
Min.																					
Max.																					
Open-Loop Voltage Gain	AOL	R _L = 2 kΩ			1k	R _L = 2 kΩ				R _L = 2 kΩ		f = 1 kHz				f = 1 MHz		50k	80k	25k	80k
volts/volt min.		20k	50k			50k	20k	50k	25k	50k	25k	710	710	2k	2k	60					
dB min.		86	94	60	94	86	94	88	94	88	57	57	66	66	36	94	98	88	98		
Slew Rate (Non-Inverting Unity Gain) — V/μs typ.	SR	0.5	0.5	0.6	—	—	10	10	—	—	3.0	3.0	7.0	7.0	25	—	—	—	—		
Common Mode Rejection Ratio — dB min.	CMRR	77	77	—	70	65	80	70	80	70	70	70	80	80	76	85	96	80	96		
Gain-Bandwidth Product (Unity Gain Non-Inverting Comp.) MHz typ.	f _T (op-amp)	1.0	1.0	5							15	15	50	50	38	—	—	—	—		
Special Features																					
Short Circuit Protection		yes	yes	no	yes	yes	yes	yes	yes	yes	no	no	no	no	no	yes	yes	yes	yes		
Frequency Compensation		int.	int.	int.	ext.	ext.	ext.	ext.	int.	int.	ext.	ext.	ext.	ext.	ext.	ext.	ext.	ext.	ext.		
Adaptable to Single-Supply Operation		yes	yes	●							yes	yes	yes	yes	yes	yes	yes	yes	yes		
Offset Adjustment		yes	yes	—	yes	yes	yes	yes	no	no	yes	yes	yes	yes	yes	no	no	no	no		

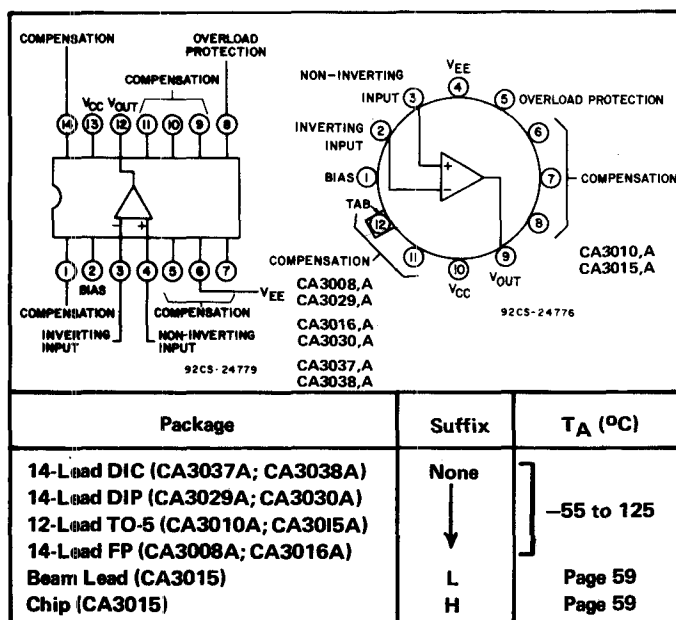
For CA3130, CA3130A, CA3130B characteristics, see Page 17

① Operational Amplifiers

Wideband Types

Wideband Operational Amplifiers

CA3008,A; CA3015,A; CA3029,A; CA3037,A;
CA3010,A; CA3016,A; CA3030,A; CA3038,A



File Nos. 310, 316; ICAN Nos. 5290, 5213, 5015*
High-Reliability Version (CA3015A) Page 41

Applications and Features

For use in telemetry, data-processing, instrumentation, and communications equipment
Balanced modulator driver
Comparator
DC and video amplifiers
Feedback amplifier
Multivibrator

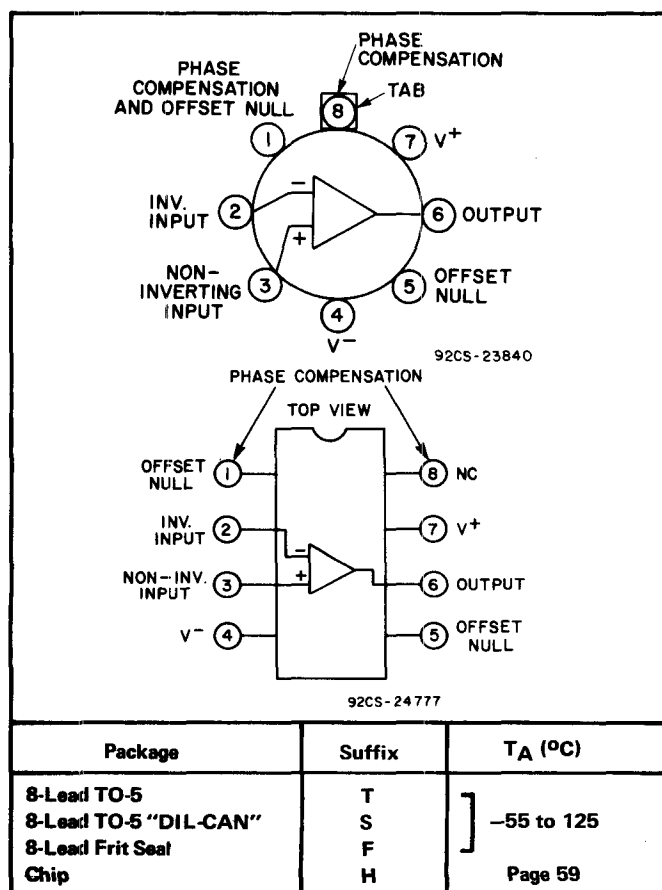
Narrow-band and band-pass amplifiers
Operational functions
Oscillator
Scaling adder
Servo driver

Electrical Characteristics at T_A = 25°C

Types with "A" Suffix	6V Types	12V Types
Input Offset Voltage	2	2 mV max.
Input Offset Current	1.5	1.6 μA max.
Input Bias Current	4	6 μA max.
Device Dissipation:		
at ±12V	—	175 mW typ.
at ±6V	30	30 mW typ.
at ±3V	7	7 mW typ.
Open-Loop Voltage Gain	57	66 dB min.
Common-Mode Rejection Ratio	70	80 dB min.
Input Impedance	15	7.5 kΩ min.

Wideband Operational Amplifiers

CA3100



File No. 625*

Applications and Features

High unity-gain crossover frequency (f_T) — 38 MHz typ.
Wide power bandwidth — V_O = 18 p-p typ. at 1.2 MHz
Fast settling time — 0.6 μs typ.
LM118, 748/LM101 pin compatibility
Single capacitor compensation
Offset null terminals

Video amplifiers
Fast peak detectors
Meter-driver amplifiers
Video pre-drivers
Oscillators
Multivibrators
High-frequency feedback amplifiers

Electrical Characteristics at T_A = 25°C

V⁺ = 15 V, V⁻ = -15 V

Input Offset Voltage	±5	mV	max.
Input Bias Current	2	μA	max.
Input Offset Current	±0.4	μA	max.
Low-frequency			
Open-loop Voltage Gain	56	dB	min.
Common-Mode Input			
Voltage Range	±12	V	min.
Common-Mode			
Rejection Ratio	76	dB	min.
Maximum Output Voltage	±9	V	min.
Maximum Output Current	±15	mA	min.
1-MHz Open-Loop			
Voltage Gain	36	dB	min.
Slew Rate 20-dB Amplifier	50	V/μs	min.
Wideband Noise Voltage			
Referred to input at 1 MHz	8	μV _{RMS}	typ.