

7597360 RAYTHEON CO.

57C 04443 D T-79-05-10

PRODUCT SPECIFICATIONS

LINEAR INTEGRATED CIRCUITS

RaytheonGeneral Purpose
Operational AmplifierLM101A/
201A/301A**Features**

- Offset voltage 3.0mV maximum over temperature
- Input current 100nA maximum over temperature
- Offset current 20nA maximum over temperature
- Offsets guaranteed over entire common-mode range and supply voltage range
- Frequency compensated 30pF
- Supply voltage $\pm 5.0\text{V}$ to $\pm 20\text{V}$

Description

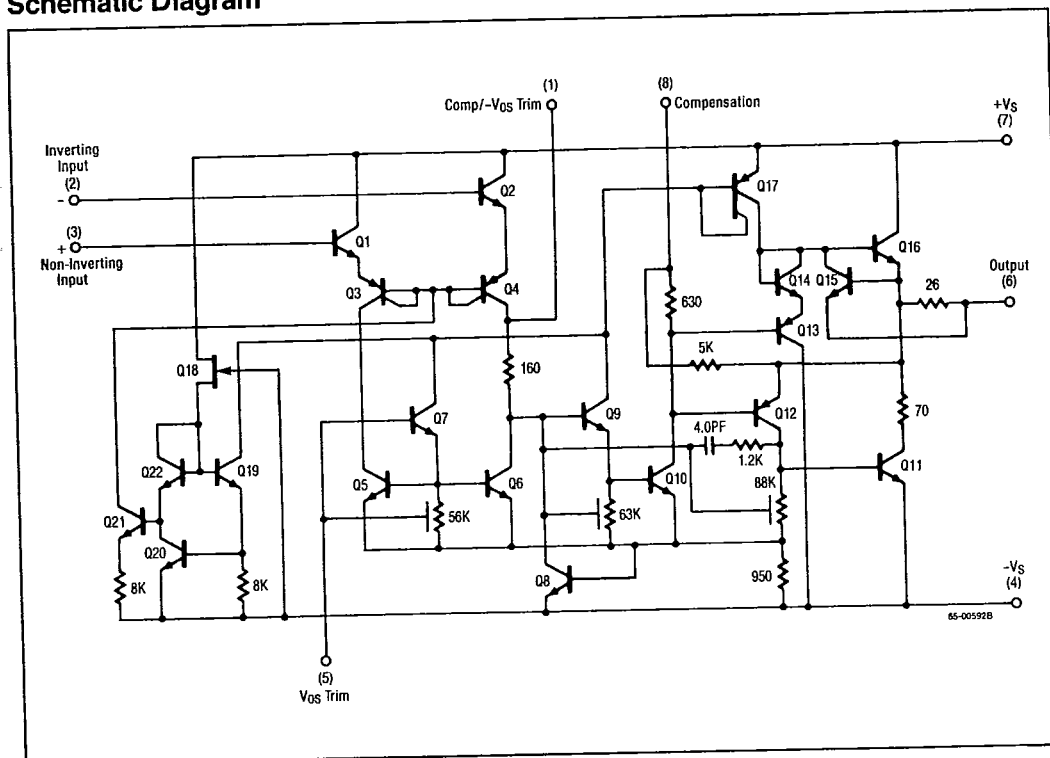
The LM101A, 201A, and 301A are general purpose high performance operational amplifiers fabricated monolithically on a silicon chip by an

advanced epitaxial process. The units may be fully compensated with the addition of a 30pF capacitor stabilizing the circuit for all feedback configurations including capacitive loads.

The device may be operated as a comparator with a differential input as high as $\pm 30\text{V}$. Used as a comparator the output can be clamped at any desired level to make it compatible with logic circuits.

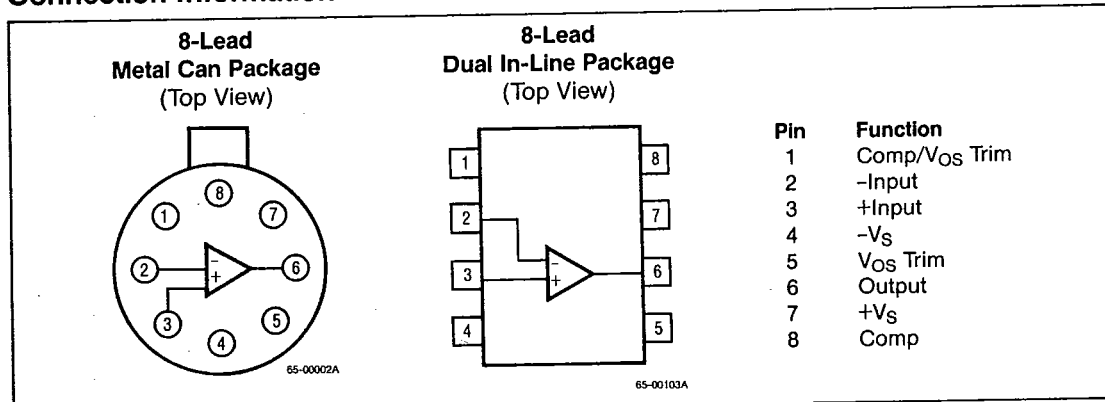
The LM101A operates over the full military temperature range from -55°C to $+125^\circ\text{C}$. The commercial version, LM301A operates over a temperature range from 0°C to $+70^\circ\text{C}$.

The LM201A is the same as the LM101A except its performance is guaranteed from -25°C to $+85^\circ\text{C}$.

Schematic Diagram

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LM101A/201A/301A**General Purpose
Operational Amplifier****Connection Information****Absolute Maximum Ratings****Supply Voltage**

LM101A/LM201A	±22V
LM301A	±18V

Differential Input Voltage 30V

Input Voltage¹ ±15VOutput Short-Circuit Duration² Indefinite

Storage Temperature

Range -65°C to +150°C

Operating Temperature Range

LM101A -55°C to +125°C

LM201A -25°C to +85°C

LM301A 0°C to +70°C

Lead Soldering Temperature

(60 Sec) +300°C

Notes: 1. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

2. Continuous short-circuit is allowed for case temperatures to +125°C and ambient temperatures to +75°C for LM107; case temperatures to +70°C and ambient temperatures to +55°C for LM307.

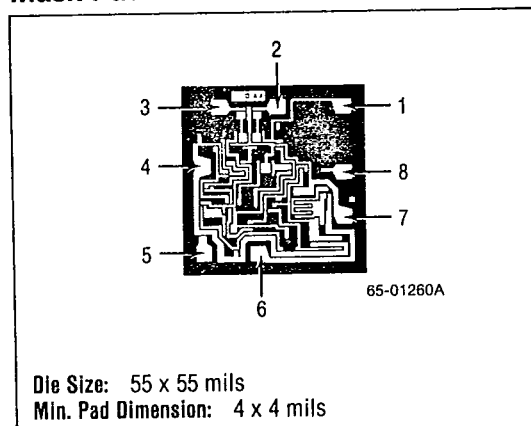
Thermal Characteristics

	8-Lead Plastic DIP	8-Lead Ceramic DIP	8-Lead TO-99 Metal Can
Max. Junc. Temp.	125°C	175°C	175°C
Max. P _D T _A < 50°C	468mW	833mW	658mW
Therm. Res. θ _{JC}	—	45°C/W	50°C/W
Therm. Res. θ _{JA}	160°C/W	150°C/W	190°C/W
For T _A > 50°C Derate at	6.25mW per °C	8.33mW per °C	5.26mW per °C

Ordering Information

Part Number	Package	Operating Temperature Range
LM101ADE	Ceramic	-55°C to +125°C
LM101ADE/883C*	Ceramic	-55°C to +125°C
LM101AH	TO-99	-55°C to +125°C
LM101AH/883C*	TO-99	-55°C to +125°C
LM201ADE	Ceramic	-25°C to +85°C
LM201ADE/883C*	Ceramic	-25°C to +85°C
LM201AH	TO-99	-25°C to +85°C
LM201AH/883C*	TO-99	-25°C to +85°C
LM301ADE	Ceramic	0°C to +70°C
LM301AH	TO-99	0°C to +70°C
LM301AN	Plastic	0°C to +70°C

*MIL-STD-883, Level C Processing

Mask Pattern

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General Purpose Operational Amplifier

LM101A/201A/301A

Electrical Characteristics

(C = 30pF; LM101A, LM201A: $\pm 5.0V \leq V_S \leq \pm 20V$; LM301A: $\pm 5.0V \leq V_S \leq \pm 15V$; see Note 1)

Parameters	Test Conditions	LM101A/LM201A			LM301A			Units
		Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage	$T_A = +25^\circ\text{C}$, $R_S \leq 50k\Omega$		0.7	2.0		2.0	7.5	mV
Input Offset Current	$T_A = +25^\circ\text{C}$		1.5	10		3.0	50	nA
Input Bias Current	$T_A = +25^\circ\text{C}$		30	75		70	250	nA
Input Resistance	$T_A = +25^\circ\text{C}$	1.5	4.0		0.5	2.0		M Ω
Supply Current	$T_A = +25^\circ\text{C}$ (Note 2)		1.8	3.0		1.8	3.0	mA
Large Signal Voltage Gain	$T_A = +25^\circ\text{C}$, $V_S = \pm 15V$, $V_{OUT} = \pm 10V$, $R_L \geq 2k\Omega$	50	160		25	160		V/mV
Input Offset Voltage	$R_S \geq 50k\Omega$			3.0			10	mV
Average Input Offset Voltage Drift			3.0	15		6.0	30	$\mu\text{V}/^\circ\text{C}$
Input Offset Current				20			70	nA
Average Input Offset Current Drift	$+25^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$		0.01	0.1				nA/ $^\circ\text{C}$
	$+25^\circ\text{C} \leq T_A \leq +70^\circ\text{C}$					0.01	0.3	
	$-55^\circ\text{C} \leq T_A \leq +25^\circ\text{C}$		0.02	0.2				
	$0^\circ\text{C} \leq T_A \leq +25^\circ\text{C}$					0.02	0.6	
Input Bias Current				100			300	nA
Supply Current	$T_A = +125^\circ\text{C}$, $V_S = \pm 20V$		1.2	2.5				mA
Large Signal Voltage Gain	$T_A = +15^\circ\text{C}$, $V_{OUT} = \pm 10V$, $R_L \geq 2k\Omega$	25			15			V/mV
Output Voltage Swing	$V_S = \pm 15V$, $R_L = 10k\Omega$	± 12	± 14		± 12	± 14		V
	$R_L \geq 2k\Omega$	± 10	± 13		± 10	± 13		
Input Voltage Range	(Note 2)	± 15			± 12			V
Common Mode Rejection Ratio	$R_S \leq 50k\Omega$	80	96		70	90		dB
Power Supply Rejection Ratio	$R_S \leq 50k\Omega$	80	96		70	96		dB

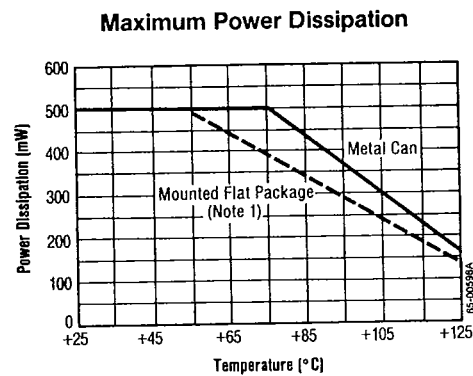
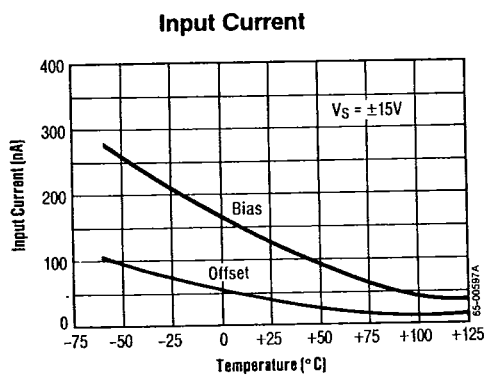
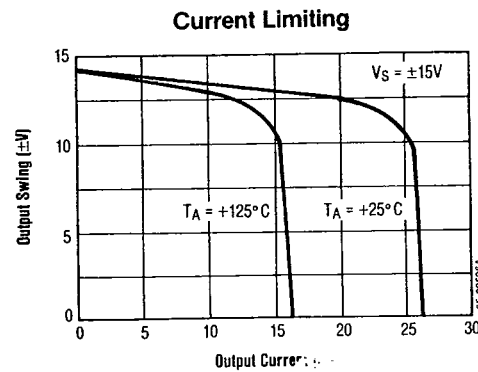
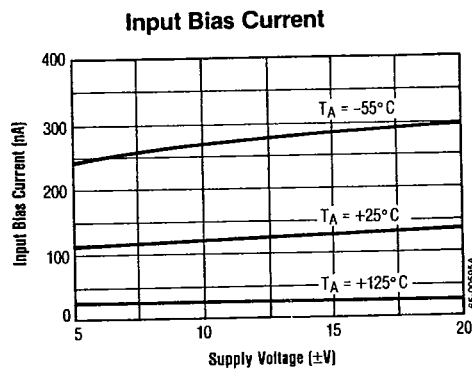
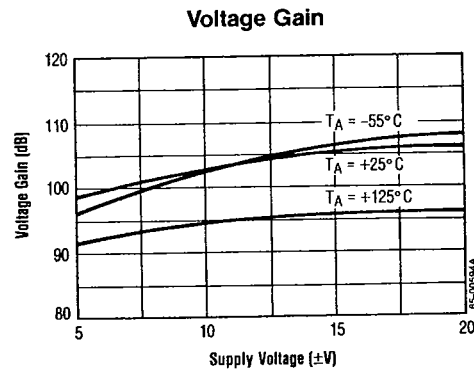
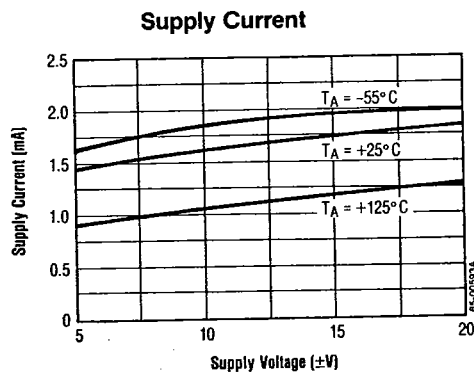
Notes: 1. These specifications apply for $-55^\circ\text{C} < T_A < +125^\circ\text{C}$ LM101A, -25°C to $+85^\circ\text{C}$ LM201A, and $0^\circ\text{C} < T_A < +70^\circ\text{C}$ LM301A, unless otherwise specified.

2. $V_S = \pm 20V$ for LM101A and LM201A, $V_S = \pm 15V$ for LM301A.

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LM101A/201A/301A**General Purpose
Operational Amplifier****Typical Performance Characteristics**

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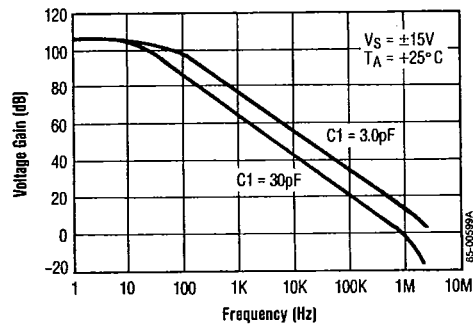
D T-79-05-10

General Purpose Operational Amplifier

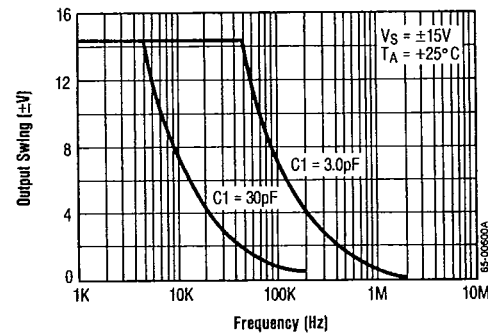
LM101A/201A/301A

Typical Performance Characteristics (Continued)

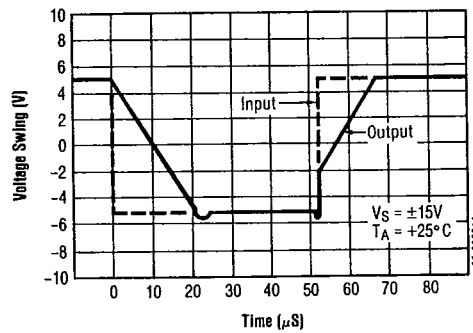
Open Loop Frequency Response



Large Signal Frequency Response



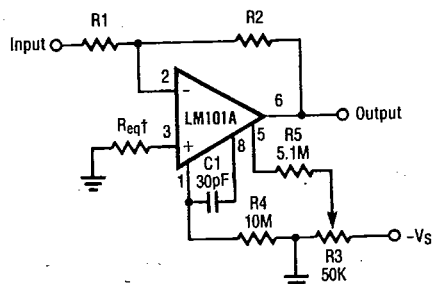
Voltage Follower Pulse Response



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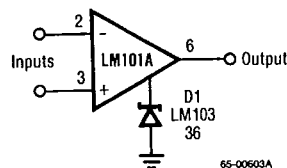
57C 04448

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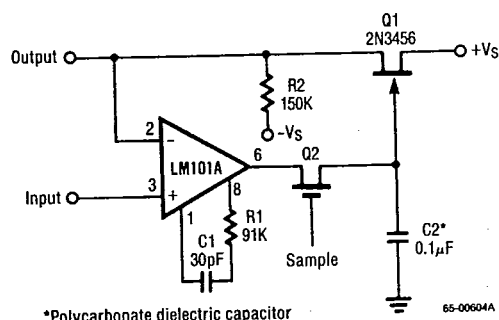
LM101A/201A/301A**General Purpose
Operational Amplifier****Typical Applications****Inverting Amplifier With Balancing Circuit**

†May be zero or equal to parallel combination of R1 and R2 for minimum offset.

65-00602A

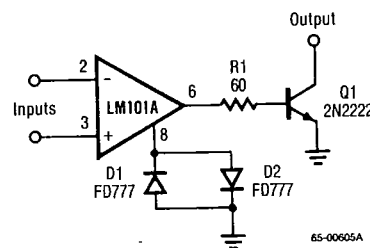
**Voltage Comparator for Driving DTL or
TTL Integrated Circuits**

65-00603A

Low Drift Sample and Hold

*Polycarbonate dielectric capacitor

65-00604A

**Voltage Comparator for Driving RTL Logic
or High Current Driver**

65-00605A