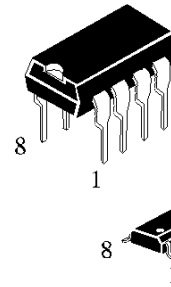


## Low Power Dual Operational Amplifier

The HT358A contains two independent high gain operational amplifiers with internal frequency compensation. The op-amps operate over a wide voltage range. The low power drain makes the HT358A a good choice for battery operation.

- Internally frequency compensated for unity gain
- Large DC voltage gain
- Single or Split Supply Operation
- Input common-mode voltage range to ground
- Large output voltage swing: 0V DC to  $V_{CC}-1.5V$  DC
- Power drain suitable for battery operation
- Low input offset voltage and offset current
- Differential input voltage range equal to the power supply voltage



N SUFFIX  
PLASTIC

D SUFFIX  
SOIC

### ORDERING INFORMATION

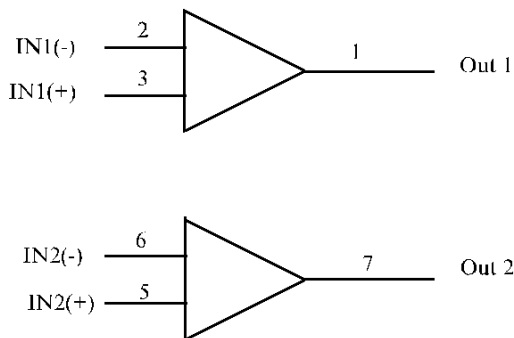
HT358AN Plastic

HT358AR SOIC

HT358AG Chip

$T_A = 0^\circ$  to  $70^\circ$  C for all packages

### BLOCK DIAGRAM



PIN 4 = GND

PIN 8 =  $V_{CC}$

**MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Power Supply Voltages		
	Single Supply	32	V
	Split Supplies	±16	
V <sub>IDR</sub>	Input Differential Voltage Range (1)	±32	V
V <sub>ICR</sub>	Input Common Mode Voltage Range	-0.3 to 32	V
t <sub>S</sub>	Short-Circuit duration of Output	100	ms
I <sub>IN</sub>	Input Current, per pin (2)	50	mA
T <sub>J</sub>	Junction Temperature Plastic Packages	150	°C
T <sub>stg</sub>	Storage Temperature Plastic Packages	-55 to +125	°C
T <sub>L</sub>	Lead Temperature, 1mm from Case for 10 Seconds	260	°C

\* Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

Notes:

1. Split Power Supplies.
2. V<sub>IN</sub><-0.3V

**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Min	Max	Unit
V <sub>CC</sub>	DC Supply Voltage	±2.5 or 5.0	±15 or 30	V
T <sub>A</sub>	Operating Temperature, All Package Types	0	+70	°C

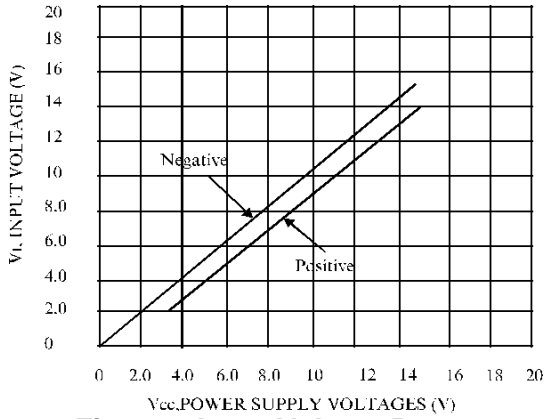
**DC ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=0 ÷ +70°C)**

Symbol	Parameter	Test Conditions	Guaranteed Limit		Unit
			Min	Max	
V <sub>IO</sub>	Maximum Input Offset Voltage	V <sub>CC</sub> =5.0-30V, R <sub>S</sub> =0Ω, V <sub>O</sub> =1.4V V <sub>ICR</sub> =0V -(V <sub>CC</sub> -1.5V)* V <sub>ICR</sub> =0V -(V <sub>CC</sub> -2.0V)	1	5.0* 7.0	mV
I <sub>IO</sub>	Maximum Input Offset Current	V <sub>CC</sub> =5.0-30V, V <sub>O</sub> =1.4V		±50* ±150	nA
I <sub>IB</sub>	Maximum Input Bias Current	V <sub>CC</sub> =5.0-30V, V <sub>O</sub> =1.4V		-250* -500	nA
V <sub>ICR</sub>	Input Common Mode Voltage Range	V <sub>CC</sub> =30V	0 0	V <sub>CC</sub> -1.5V* V <sub>CC</sub> -2.0V	V
I <sub>CC</sub>	Maximum Power Supply Current	R <sub>L</sub> =∞, V <sub>CC</sub> =30V, V <sub>O</sub> =15V R <sub>L</sub> =∞, V <sub>CC</sub> =5V, V <sub>O</sub> =2.5V		2 1.2	mA
A <sub>VOL</sub>	Minimum Large Signal Open-Loop Voltage Gain	V <sub>CC</sub> =15V, R <sub>L</sub> =2KΩ	25* 15		V/mV
V <sub>OH</sub>	Minimum Output High-Level Voltage Swing	V <sub>CC</sub> =5V, R <sub>L</sub> =2KΩ* V <sub>CC</sub> =30V, R <sub>L</sub> =2KΩ V <sub>CC</sub> =30V, R <sub>L</sub> =10KΩ	3.3* 26 27		V
V <sub>OL</sub>	Maximum Output Low-Level Voltage Swing	V <sub>CC</sub> =5V, R <sub>L</sub> =10KΩ		20	mV
CMR	Common Mode Rejection	Ω V <sub>CC</sub> =5-30V, R <sub>S</sub> =10K	65*		dB
PSR	Power Supply Rejection	V <sub>CC</sub> =5-30V	65*		dB
I <sub>SC</sub>	Maximum Output Short Circuit to GND	V <sub>CC</sub> =5.0V, V <sub>O</sub> =0V		60*	mA
I <sub>O+</sub>	Minimum Source Output Current	V <sub>CC</sub> =15V, V <sub>ID</sub> =1.0V	20*		mA
I <sub>O-</sub>	Minimum Output Sink Current	V <sub>CC</sub> =15V, V <sub>O</sub> =15V, V <sub>ID</sub> =-1.0V V <sub>CC</sub> =15V, V <sub>O</sub> =0.2V, V <sub>ID</sub> =-1.0V	10* 12*		mA ∞A
V <sub>IDR</sub>	Differential Input Voltage Range	All V <sub>IN</sub> ≥GND or V-Supply (if used)		V <sub>CC</sub> *	V

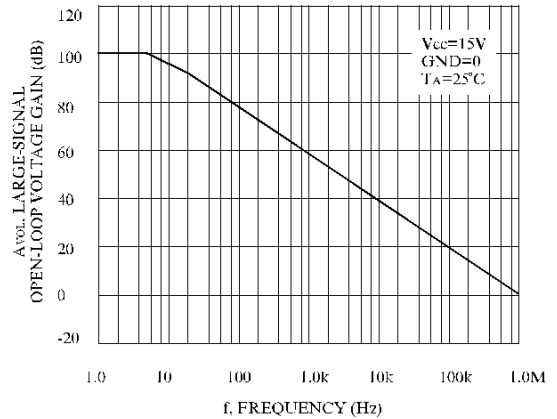
\* T<sub>A</sub>= +25°C

**NOTE:** Guaranteed Limits of DC Electrical Characteristics are given for T<sub>A</sub>=0, +70°C as the information for chips

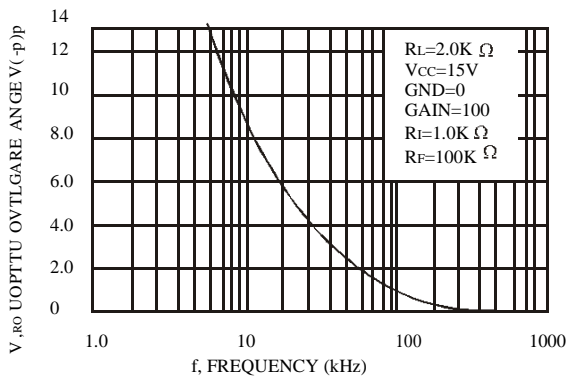
**TYPICAL PERFORMANCE CHARACTERISTICS (T<sub>A</sub>= +25°C)**



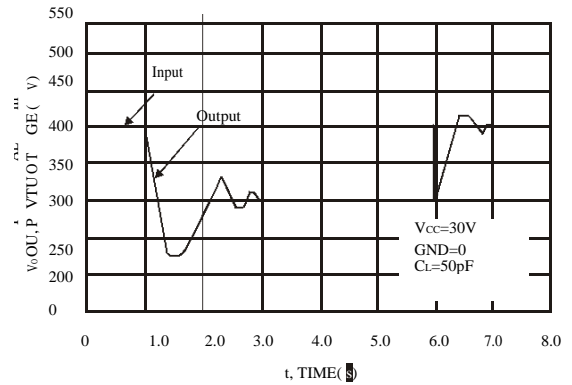
**Figure 1. Input Voltage Range**



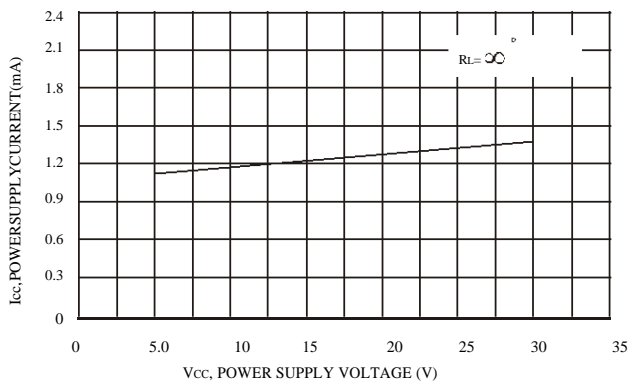
**Figure 2. Open-Loop Frequency**



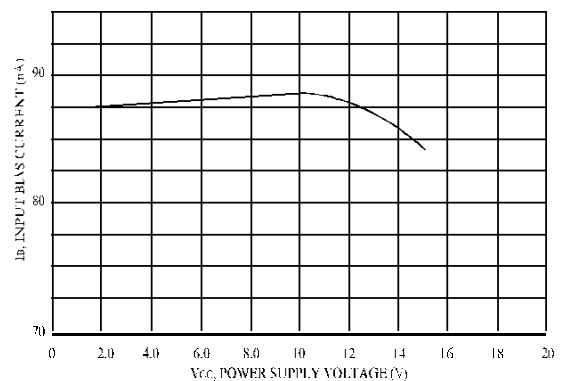
**Figure 3. Large-Signal Frequency Response**



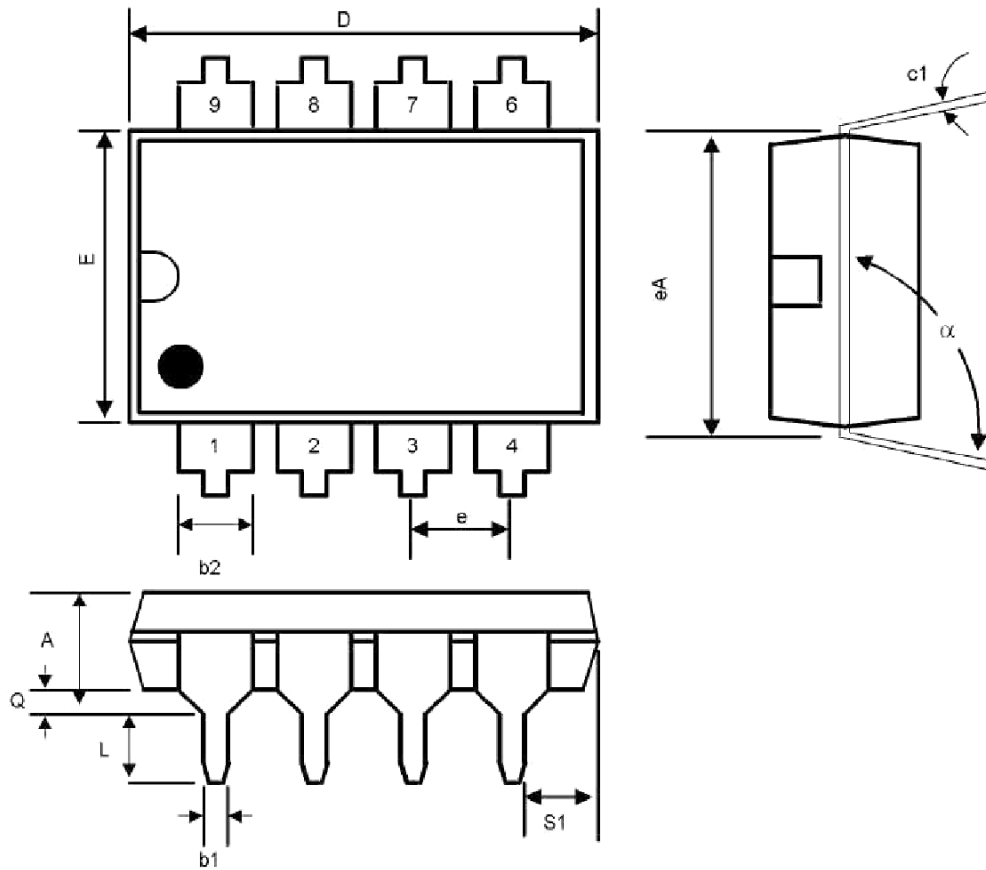
**Figure 4. Small-Signal Voltage Follower Pulse Response (Noninverting)**



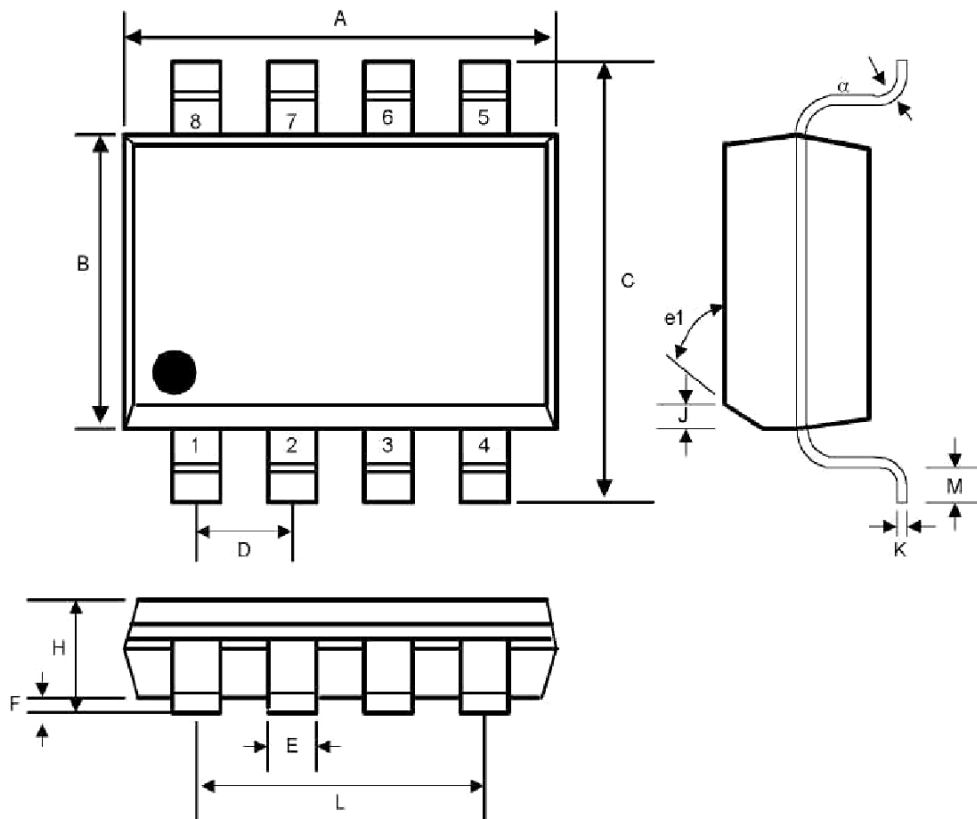
**Figure 5. Power Supply Current versus Power Supply Voltage**



**Figure 6. Input Bias Current versus Power Supply Voltage**

**Package Outlines: DIP-8**


SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	-	0.200	-	5.08	-
b1	0.014	0.023	0.36	0.58	-
b2	0.045	0.065	1.14	1.65	-
c1	0.008	0.015	0.20	0.38	-
D	0.355	0.400	9.02	10.16	-
E	0.220	0.310	5.59	7.87	-
e	0.100 BSC		2.54 BSC		-
eA	0.300 BSC		7.62 BSC		-
L	0.125	0.200	3.18	5.08	-
Q	0.015	0.060	0.38	1.52	-
s1	0.005	-	0.13	-	-
$\alpha$	$90^0$	$105^0$	$90^0$	$105^0$	-

**Small Outline SOP-8**


SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.188	0.197	4.80	5.00	-
B	0.149	0.158	3.80	4.00	-
C	0.228	0.244	5.80	6.20	-
D	0.050 BSC		1.27 BSC		-
E	0.013	0.020	0.33	0.51	-
F	0.004	0.010	0.10	0.25	-
H	0.053	0.069	1.35	1.75	-
J	0.011	0.019	0.28	0.48	-
K	0.007	0.010	0.19	0.25	-
M	0.016	0.050	0.40	1.27	-
L	0.150 REF		3.81 REF		-
e1	45 <sup>0</sup>		45 <sup>0</sup>		-
α	0 <sup>0</sup>	8 <sup>0</sup>	0 <sup>0</sup>	8 <sup>0</sup>	-

\*All specs and applications shown above subject to change without prior notice.

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