

Dual Operational Amplifiers

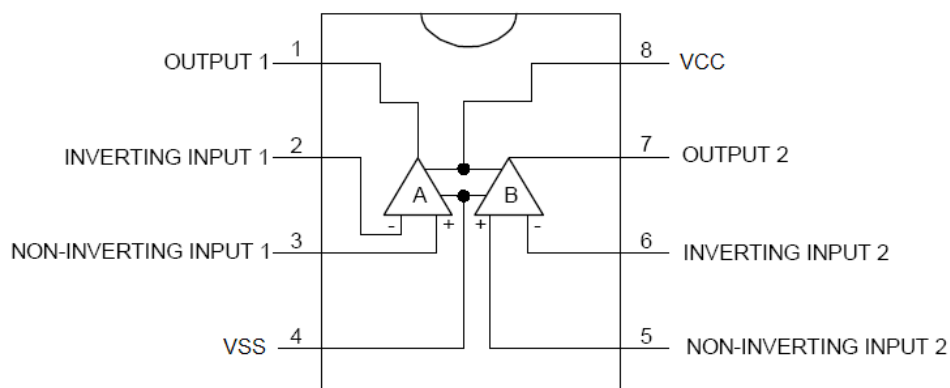
❖ GENERAL DESCRIPTION

These devices consist of two independent, high gain, internally frequency-compensated operational amplifiers designed operate from a single supply over a wide range of voltages. Operation from split supplies also is possible if the difference between the two supplies is 3V to 40V, and Vcc is at least 1.5V more positive than the input common-mode voltage, the low supply-current drain is independent of the magnitude of the power supply voltage.

❖ FEATURES

- Two internally compensated OP amps
- Wide power supply range: 3V to 40V
- Large output voltage swing: 0V to Vcc-1.5V
- Low input bias current
- Low input offset voltage and offset current
- Internally frequency compensated for unity gain
- Short Circuit Protected Outputs
- Input common-mode voltage range includes ground
- SOP-8 Pb-Free package

❖ Block Diagram



❖ Electrical Characteristics ($V_{CC} = 5V$, $T_a = 25^\circ C$, unless otherwise specified)

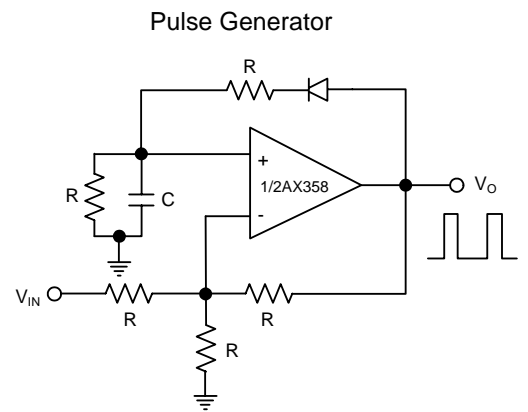
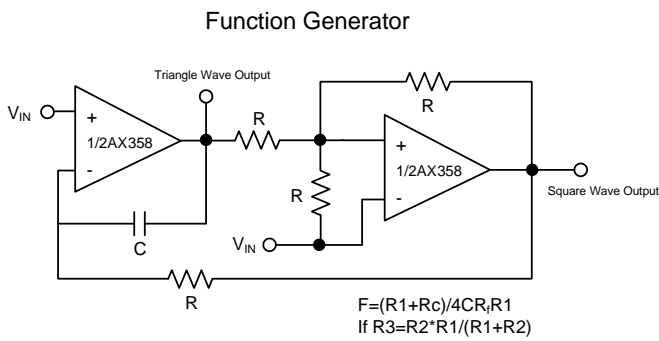
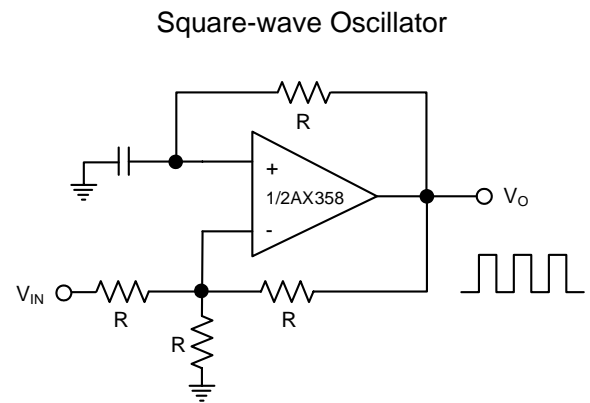
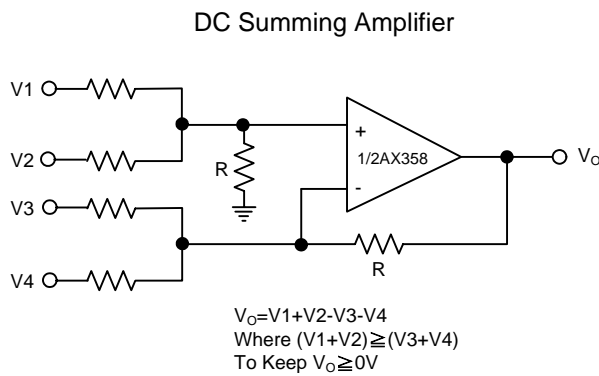
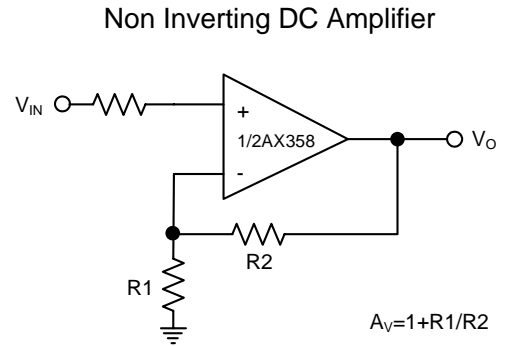
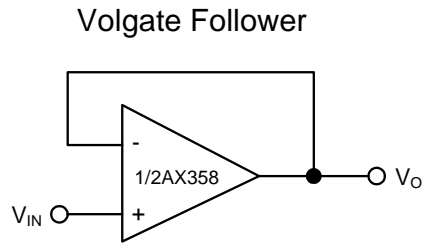
Characteristics	Symbol	Conditions (Note1)	Min	Typ	Max	Units	
Input offset voltage(Note2)	V_{IO}	$V_{CC}=5V$ to MAX, $V_{IC}=V_{ICR}$ min, $V_O=1.4V$	Full ange	1	5	11	mV
Average temperature coefficient of input offset voltage	dV_{IO}		Full range	-	7	-	$\mu V/^\circ C$
Input offset current	I_{IO}	$V_O=1.4V$	25 $^\circ C$	-	2	50	nA
			Full range	-	-	150	
Average temperature coefficient of input offset current	αI_{IO}		Full range	-	10	-	$\mu A/^\circ C$
Input bias current	I_{IB}	I_{IN+} or I_{IN-}	25 $^\circ C$	-	-20	-250	nA
			Full range	-	-	-500	
Common-mode input voltage range	V_{ICR}	$V_{CC}=5V$ to MAX	25 $^\circ C$	0 to $V_{CC}-1.5$	-	-	V
			Full range	0 to $V_{CC}-2$	-	-	V
High-level output voltage	V_{OH}	$V_{CC}=MAX$, $R_L=2K\Omega$	Full range	26	-	-	V
		$V_{CC}=MAX$, $R_L \geq 10K\Omega$	Full range	27	28	-	
Low-level output voltage	V_{OL}	$R_L \geq 10K\Omega$	Full range	-	5	20	mV
Large-signal differential voltage amplification	A_{VD}	$V_{CC}=15V$, $V_O=1V$ to 11V, $R_L \geq 2K\Omega$	25 $^\circ C$	25	100	-	V/mV
			Full range	15	-	-	
Common-mode rejection ratio	CMRR	$V_{CC}=5V$ to MAX, $V_{IC}=V_{ICR}$ min.	25 $^\circ C$	65	80	-	dB
Supply voltage rejection ratio ($\Delta V_{CC}/\Delta V_{IO}$)	K_{SVR}	$V_{CC}=5V$ to MAX	25 $^\circ C$	65	100	-	dB
Crosstalk attenuation	V_{O1}/V_{O2}	$F=1KHz$ to 20KHz	25 $^\circ C$	-	120	-	dB
Output current	I_O	$V_{CC}=15V$, $V_{ID}=1V$, $V_O=0V$	25 $^\circ C$	-20	-30	-	mA
			Full range	-10	-	-	
		$V_{CC}=15V$, $V_{ID}=-1V$, $V_O=2V$	25 $^\circ C$	10	20	-	mA
			Full range	5	-	-	
		$V_{ID}=-1V$, $V_O=200mV$	25 $^\circ C$	12	30	-	μA
Short-circuit output current	I_{OS}	$V_{CC}=15V$, $V_O=0V$	25 $^\circ C$	-	40	-	mA
Supply current (two amplifiers)	I_{CC}	$V_O=2.5V$, No Load	Full range	-	0.7	1.2	mA
		$V_{CC}=MAX$, $V_O=0.5V_{CC}$, No Load	Full range	-	1	2	

Note1: All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified.

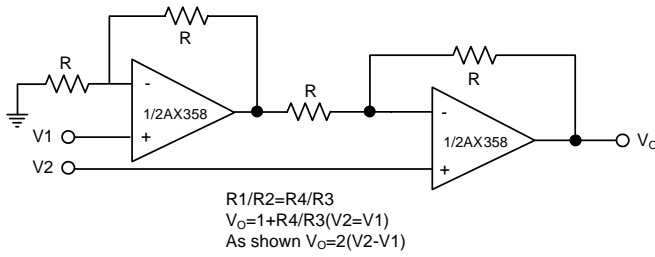
"MAX" VCC for testing purposes is 36 V. Full range is 0 $^\circ C$ to 70 $^\circ C$.

Note2: $(V_{IN+}) - (V_{IN-}) > +1mV$ (min.) for $V_O=1.4V$.

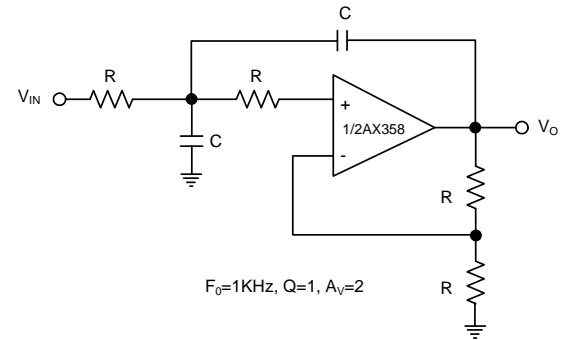
❖ **Application Circuit**



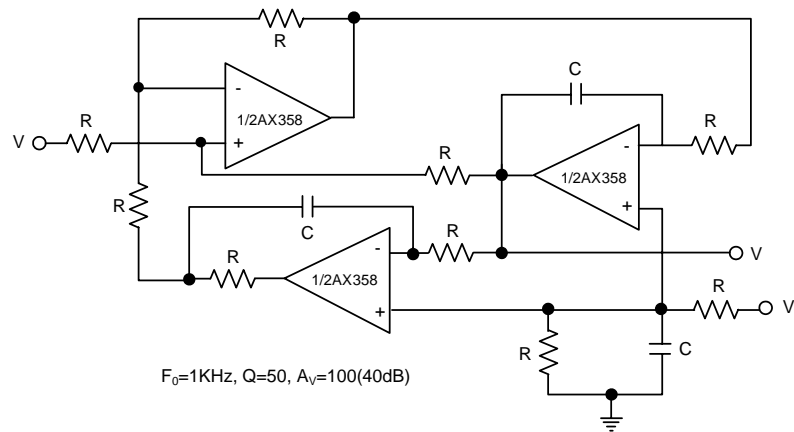
High Input Z, DC differential Amplifier



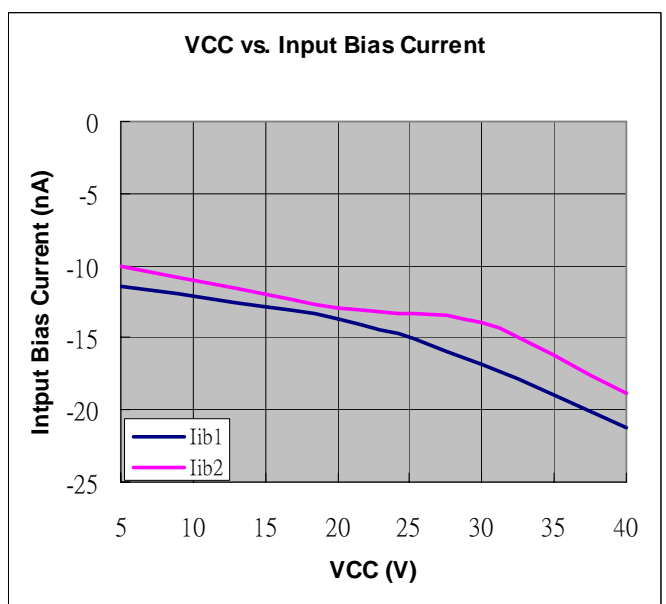
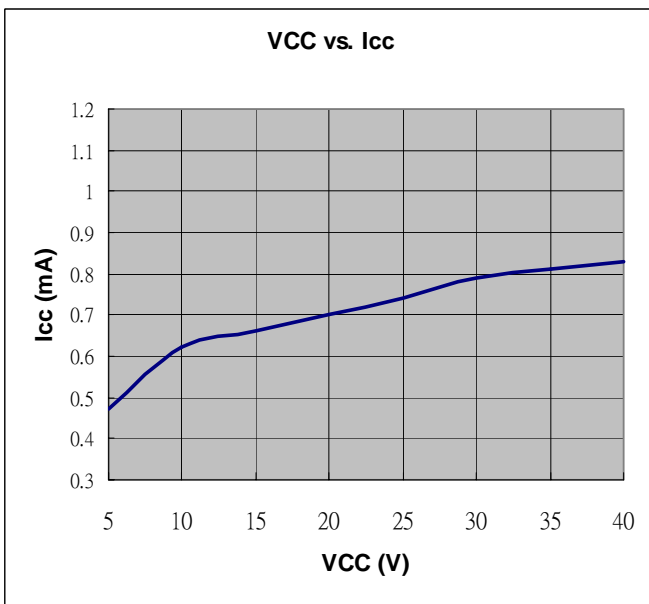
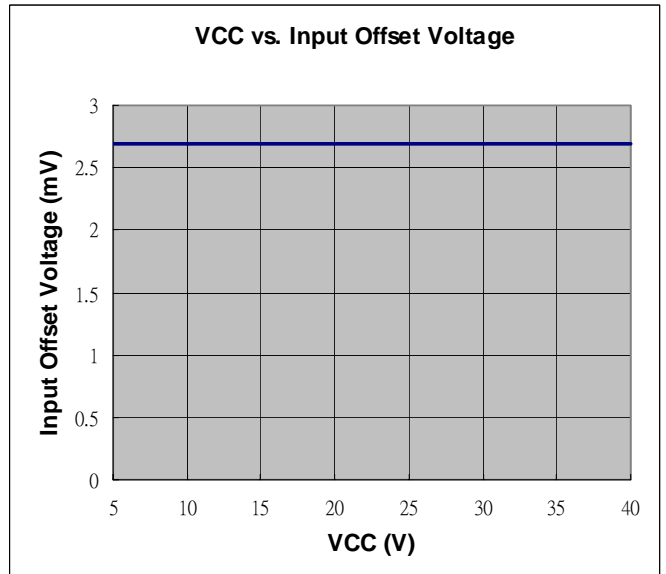
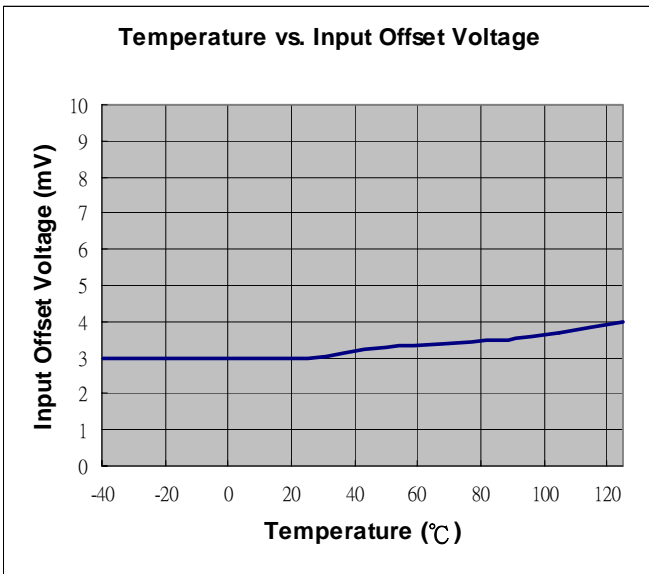
DC Coupled Low-Pass RC Active Filter



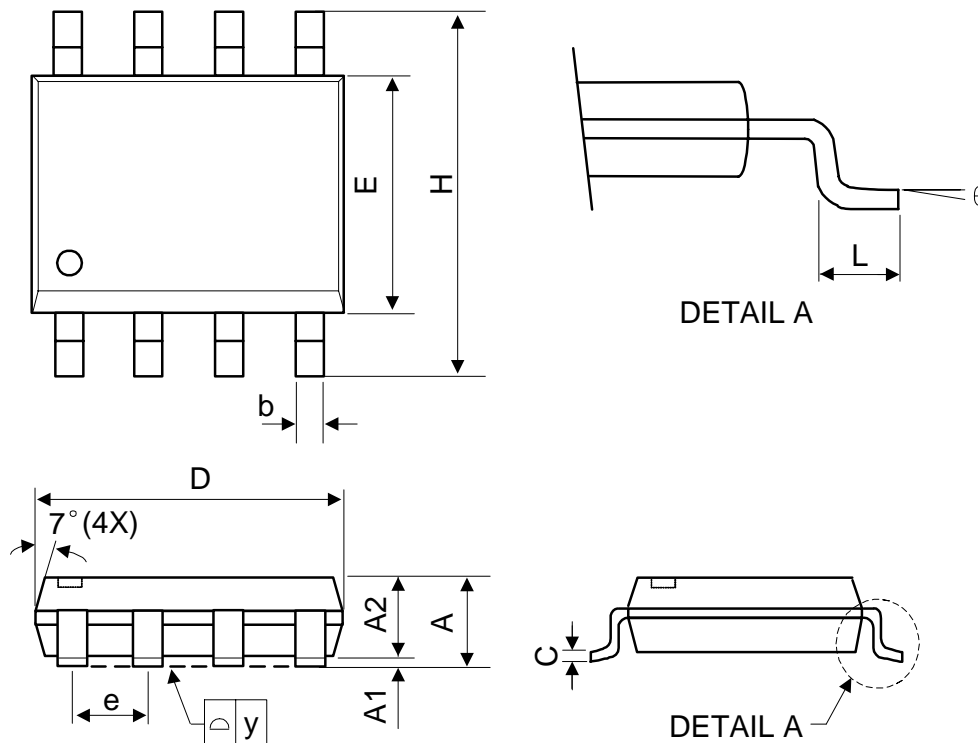
Active Band-Pass Filter



❖ Typical Characteristics



❖ Package Outlines



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.40	1.60	1.75	0.055	0.063	0.069
A1	0.10	-	0.25	0.040	-	0.100
A2	1.30	1.45	1.50	0.051	0.057	0.059
C	0.19	0.20	0.25	0.0075	0.008	0.010
D	4.80	4.90	5.00	0.189	0.193	0.197
E	3.80	3.90	4.00	0.150	0.154	0.157
H	5.79	5.99	6.20	0.228	0.236	0.244
L	0.38	0.71	1.27	0.015	0.028	0.050
b	0.33	0.41	0.51	0.013	0.016	0.020
e	1.27 TYP			0.050 TYP		
y	-	-	0.10	-	-	0.004
θ	0°	-	8°	0°	-	8°