

## 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 36V, and  $V_{CC}$  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.

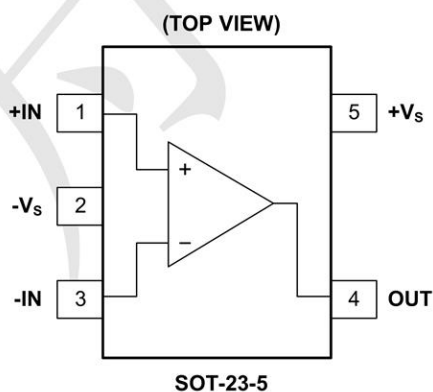
### Features

- One internally compensated OP amps
- Wide power supply range: 3V to 36V
- Large output voltage swing: 0V to  $V_{CC}-1.5V$
- 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
- SOT-23-5L package

### Applications

- Multivibrators
- Oscillators
- Switching Telephone
- Portable Systems

### Pin Assignments



### Absolute Maximum Ratings

Characteristics	Symbol	Rating	Unit
Power Supply Voltage (Single Supply)	$V_{CC}$	40	V
Power Supply Voltage (Split Supplies)	$V_{CC}, V_{SS}$	$\pm 20$	V
Input Differential Voltage Range	$V_{IDR}$	$\pm 20$	V
Input Common Mode Voltage Range	$V_{ICR}$	-0.3 to $V_{CC}$	V
Output Short Circuit Duration	$T_{SC}$	Continuous	
Power Dissipation	PD	500	mW
Storage Temperature Range	$T_{ST}$	-55 to +165	$^{\circ}C$
Operating Junction Temperature	$T_{OPJ}$	-40 to +125	$^{\circ}C$
Junction Temperature Range	$T_J$	150	$^{\circ}C$
Thermal Resistance from Junction to case	$\theta_{JC}$	110	$^{\circ}C/W$
Thermal Resistance from Junction to ambient	$\theta_{JA}$	250	$^{\circ}C/W$

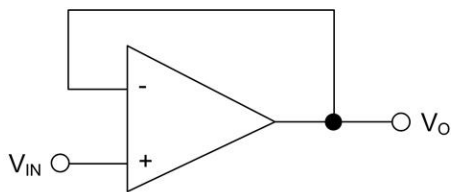
### Electrical Characteristics

( $V_{CC} = 5V$ ,  $T_A = 25^\circ C$ , unless otherwise specified)

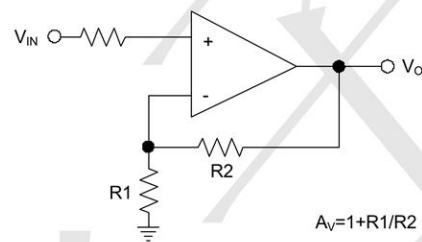
Characteristics	Symbol	Conditions (Note1)	Min	Typ	Max	Units
Input offset voltage(Note2)	$V_{IO}$	$V_{CC}=5V$ to Max, $V_{IC}=V_{ICR}$ min, $V_O=1.4V$	1	5	11	mV
Average temperature coefficient of input offset voltage	$\alpha V_{IO}$		-	7	-	$\mu V/^\circ C$
Input offset current	$I_{IO}$	$V_O=1.4V$	-	2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

**APPLICATION CIRCUIT**

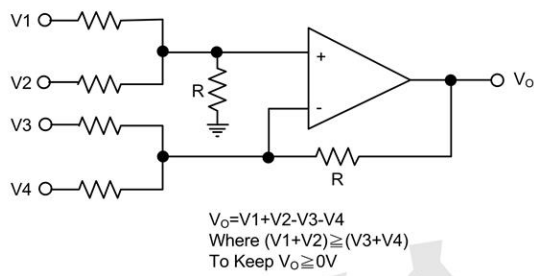
**Voltage Follower**



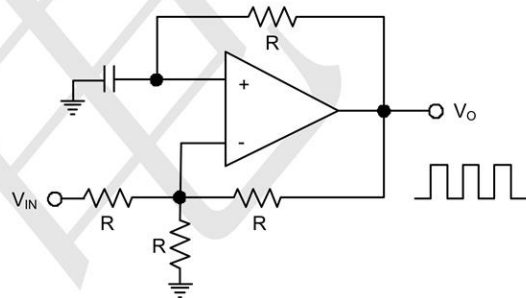
**Non Inverting DC Amplifier**



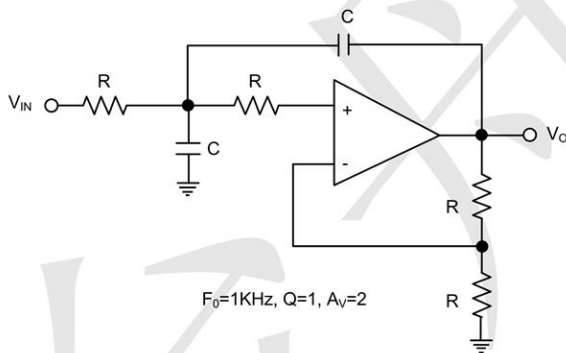
**DC Summing Amplifier**



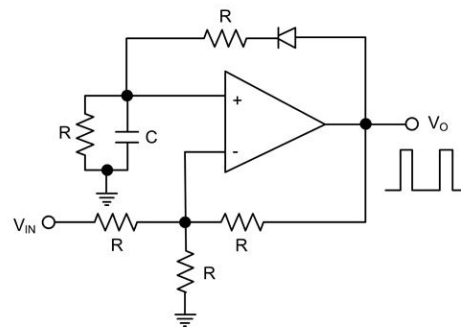
**Square-wave Oscillator**



**DC Coupled Low-Pass RC Active Filter**

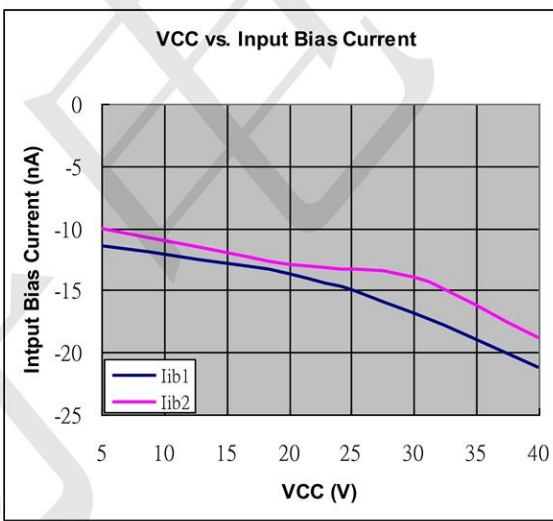
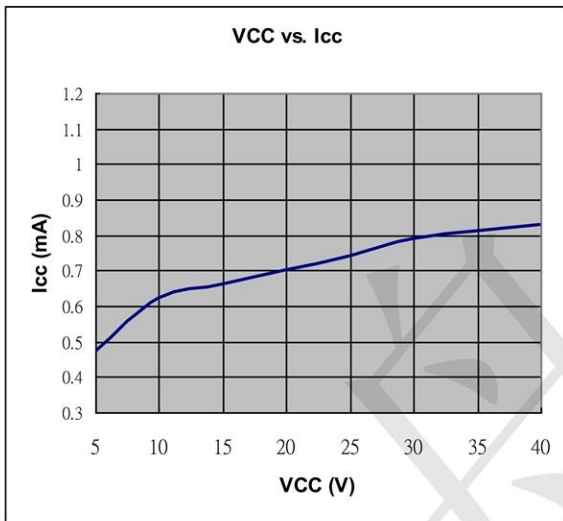
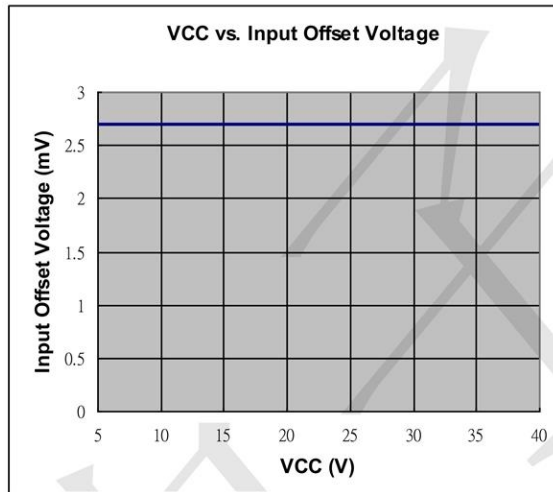
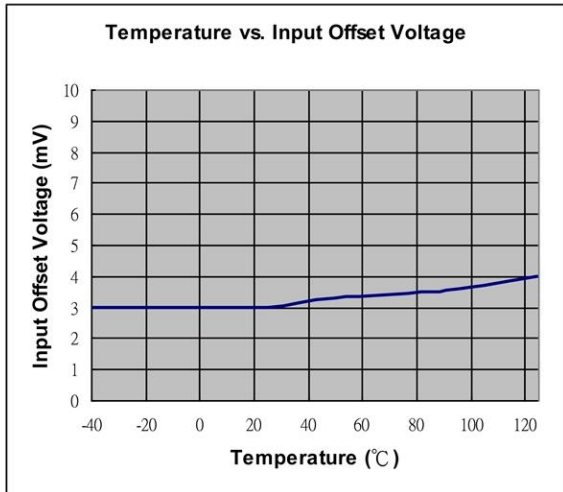


**Pulse Generator**





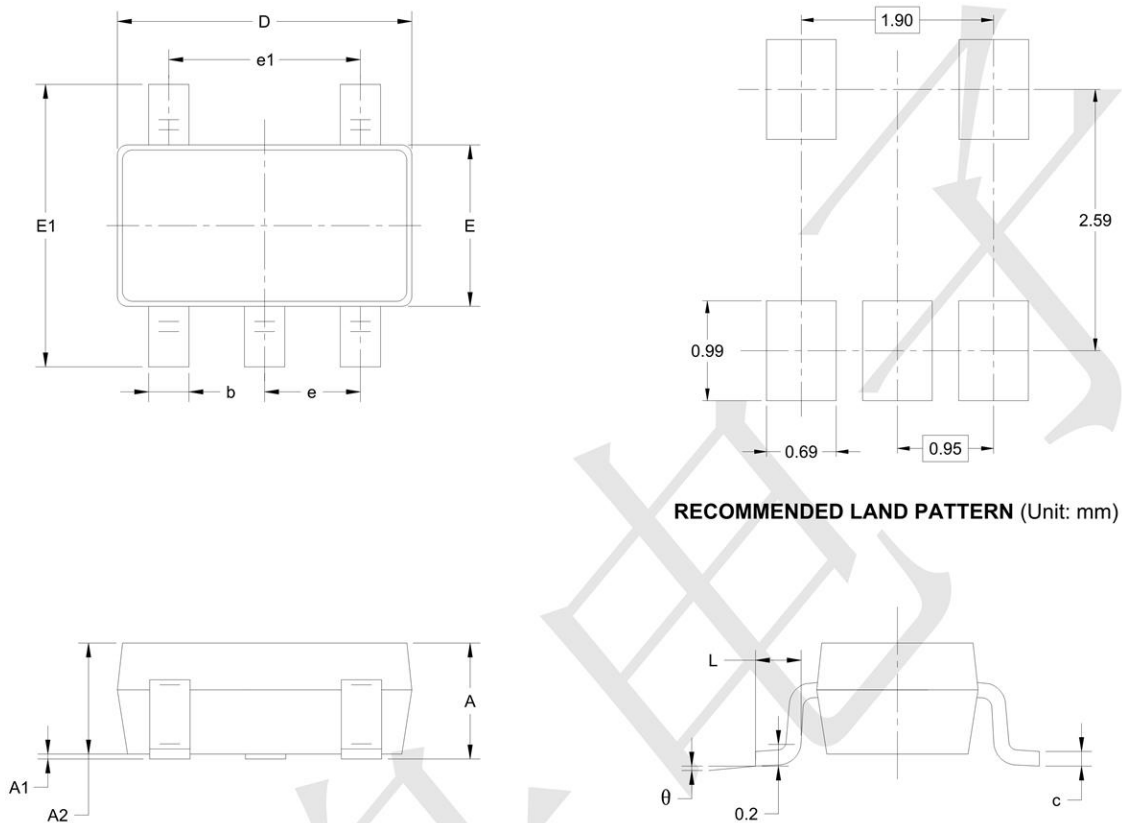
### Typical Performance Characteristics





Package Information

SOT-23-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

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