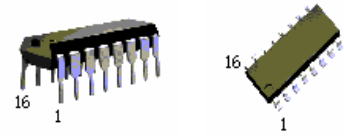
Quad Low Power Operational Amplifiers

The PJ2109 is include four independent op-amp and fixed Voltage Reference. This device is offering space and cost saving in many applications like power supply management or data acquisition systems.

The PJ2109 can operate at supply Voltages as low as 3.0V or as high as 32V with very low quiescent currents and eliminat the necessity for external biasing components in many applications. The output voltage range also includes the negative power supply voltage.

DIP-16 SOP-16



Pin:			
1.Output 1	9.Cathode
2.Input 1(-)	10.Input 3
3.Input 1(+)	11. Input 3(-)
4.Vcc	12 Input 3(+)
5.Input 2(+)	13. GND
6.Input 2(-)	14. Input4(+)
7.Output 2	15. Input4 (-)
8.Referenoe	16. Output 4

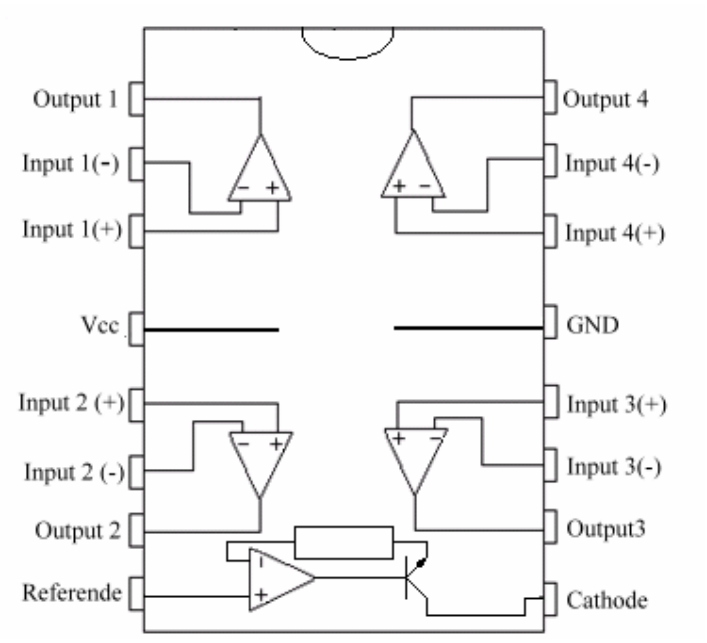
FEATURES

- Low input offset voltage 2mV.
- Low supply current:800uA/op (@Vcc=5V)
- Medium Bandwidth (unity gain):0.9MHz
- Large output voltage range includes Ground
- Wide power supply range:3 to 32V
- Fixed output voltage reference 2.5V
- Voltage precision:1%
- Sink current capability:1 to 200mA
- Typical output impedance:0.2Ω

ORDERING INFORMATION

Device	Operating Temperature	Package
PJ2109CD	-20 ~ +85℃	DIP16
PJ2109CS		SOP16

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS **(V_{CC}= 5.0V, V_{EE}=GND, T_A= 25 ℃ unless otherwise noted.)**

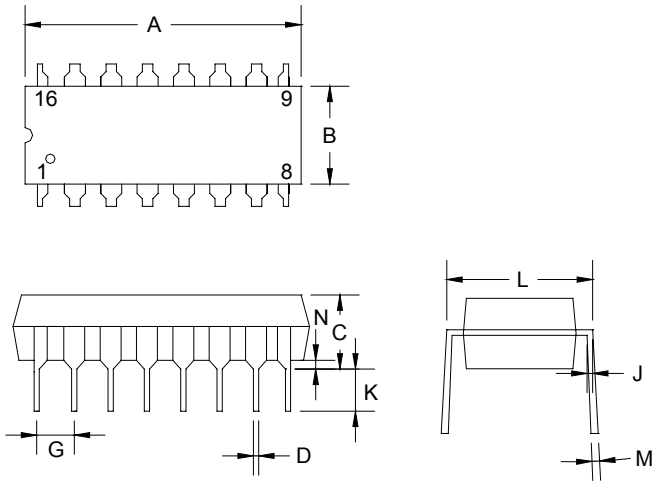
Characteristics	Symbol	PJ2109 Min	PJ2109 Typ	PJ2109 Max	Unit
Operaion Amplifier					
Input Offset Voltage V_{CC}=5.0V to 30V V_{ICR}=0 V to V_{CC}-0.7V, Vo=1.4V, Rs=0Ω T_A=25℃ T_A=T_{high} to T_{low} (Note 1)	V_{IO}	 - -	 2.0 -	 7.0 9.0	mV
Average Temperature Coefficient of Input Offset Voltage T_A=T_{hige} to T_{low} (Note 1)	$\triangle I_{IO}/\triangle T$	-	7.0	-	μ V/℃
Input Offset Current T_A=T_{hige} to T_{low} (Note 1)	I_{IO}	- -	5.0 -	50 150	nA
Average Temperature Coefficient of Input Offset Voltage T_A=T_{hige} to T_{low} (Note 1)	$\triangle I_{IO}/\triangle T$	-	10	-	pA/℃
Input Bias Current T_A=T_{hige} to T_{low} (Note 1)	I_{IB}	- -	-90 -	-250 -500	nA
Input Common Mode Voltage Range (Note 2) V_{CC}=30V V_{CC}=30V, T_A=T_{hige} to T_{low}	V_{ICR}	 0 0	 - -	 28.3 28	V
Differential Input Voltage Range	V_{IDR}	-	-	V_{CC}	V
Large Signal Open-Loop Voltage Gain R_L=2.0K , V_{CC}=15V, for Large Vo Swing T_A=T_{hige} to T_{low} (Note 1)	A_{VOL}	 25 15	 100 -	 - -	V/mV
Channel Separation 10KHz≤f≤20KHz, Input Referenced	CS	-	-120	-	dB
Common Mode Rejection Rs≤10KΩ	CMR	65	70	-	dB
Power Supply Rejection	PSR	65	100	-	dB
Output Voltage - High Limit (T_A=T_{hige} to T_{low}) (Note 1) V_{CC}=5.0V, R_L=10K ,T_A=25℃ V_{CC}=30V, R_L=2.0K V_{CC}=30V, R_L=10K	V_{OH}	 3.3 26 27	 3.5 - 28	 - - -	V
Output Voltage-Low Limit V_{CC}=5.0V, R_L=10K , T_A=T_{hige} to T_{low} (Note 1)	V_{OL}	-	5.0	20	mV
Output Source Current (V_{ID}=+1.0V, V_{CC}=15V) T_A=25℃ T_A=T_{hige} to T_{low} (Note 1)	I_O^+	 20 10	 40 20	 - -	mA
Output Sink Current (V_{ID}= -1.0V, V_{CC}=15V) T_A=25℃ T_A=T_{hige} to T_{low} (Note 1) (V_{ID}= -1.0V, V_{CC}=200mV, T_A=25℃)	Io^-	 10 5.0 12	 20 8.0 50	 - - -	mA μ A
Output Short Circuit Ground (Note 2)	Isc	-	40	60	mA
Power Supply Current (T_A=T_{hige} to T_{low}) (Note 1) V_{CC}=30V (26V for LM2902), Vo=0V, R_L=∞ V_{CC}=5.0V, Vo=0V, R_L=∞	Icc	 - -	 - -	 3.0 1.2	mA

VOLTAGE REFERENCE

Characteristic	Symbol	PJ2109			Unit
		Min	Typ	Max	
Operaion Amplifier					
Reference Input Voltage (Figure 1) V_{KA} = V_{ref} , I_K = 10 mA, T_A = +25℃ T_A = T_{low} to T_{high} (Note 1) PJ2109	Vref	2.475	2.495	2.525	
Reference Input Voltage Deviation Over Temperature Range (Figure 1, Note 1,2,4) V_{KA} = V_{ref} , I_K = 10 mA	△Vref	--	3.0	17	mV
Minimum Cathode Current for Regulation V_{KA} = V_{ref} (Figure 1)	I_{min}	--	0.15	0.3	mA
Off-State Cathode Current (Figure 3) V_{KA} = 36 V, V_{ref} = 0V	I_{off}	--	2.6	1000	nA
Dynamic Impedance (Figure 1, Note 3) V_{KA} = V_{ref}, △I_K = 1.0 mA to 100 mA, f ≤1.0 kHz	$\lvert Z_{ke} \rvert$	--	0.22	0.5	Ω

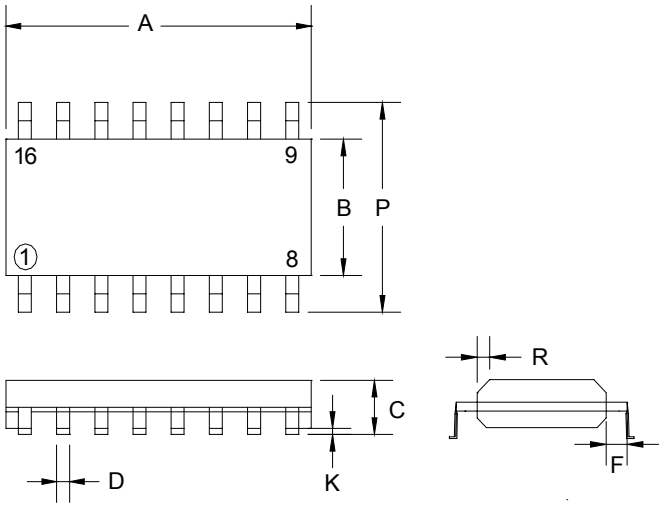
Note: 1. Short circuits from the output to Vcc can cause excessive heating and eventual destruction . Destructive dissipation can result from simultaneous shorts on all amplifiers.
2. The input common mode voltage or either input signal voltage should not be allowed to go negative by more than 0.3V The upper end of the common mode voltage range is Vcc-1.7V.

DIP-16 Unit：mm



DIP-16 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.780	18.050	0.701	0.710
B	6.250	6.450	0.292	0.299
C	2.350	2.650	0.093	0.104
D	0.350	0.490	0.014	0.019
G	1.27BSC		0.05BSC	
J	0.250	0.320	0.010	0.012
K	0.100	0.250	0.004	0.009
L	7.750	8.000	0.305	0.315
M	0°	10°	0°	10°
N	0.390	1.010	0.015	0.039

SOP-16 Unit：mm



SOP-16 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.800	10.000	0.368	0.393
B	7.400	7.600	0.292	0.299
C	2.350	2.650	0.093	0.104
D	0.350	0.490	0.014	0.019
F	0.500	0.900	0.020	0.035
G	1.27BSC		0.05BSC	
K	0.100	0.250	0.004	0.009
M	0	7	0	7
P	10.05	10.55	0.395	0.415
R	0.250	0.75	0.010	0.029