

# Dual Differential Input Operational Amplifiers And Voltage Reference

The PJ2108 is a monolithic IC that includes one independent op-amp and another op-amp for which the non inverting input is wired to a 2.5V fixed Voltage Reference. This device is offering space and cost saving in many applications like power supply management or data acquisition systems

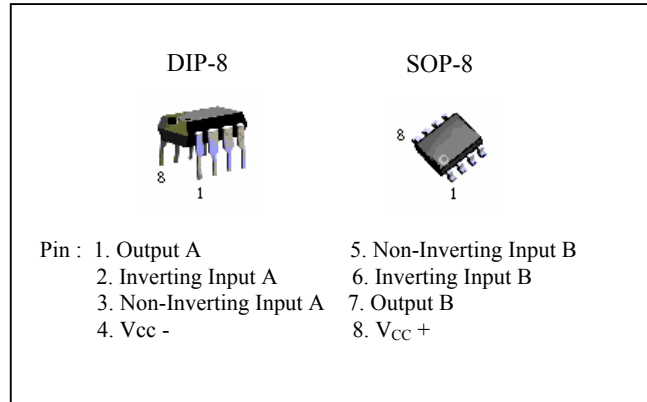
## FEATURES

### OPERATIONA AMPLIFIER

- Low input offset voltage : 0.5mV typ. For PJ2108
- Low supply current : 350µA/op. (@ V<sub>CC</sub>=5V)
- Medium bandwidth (unity gain) : 0.9MHz
- Large output voltage swing : 0V to (V<sub>CC</sub>-1.5V)
- Input common mode voltage range includes ground
- Wide power supplu range : 3 to 32V , ±1.5 to ±16

### VOLTAGE REFERENCE

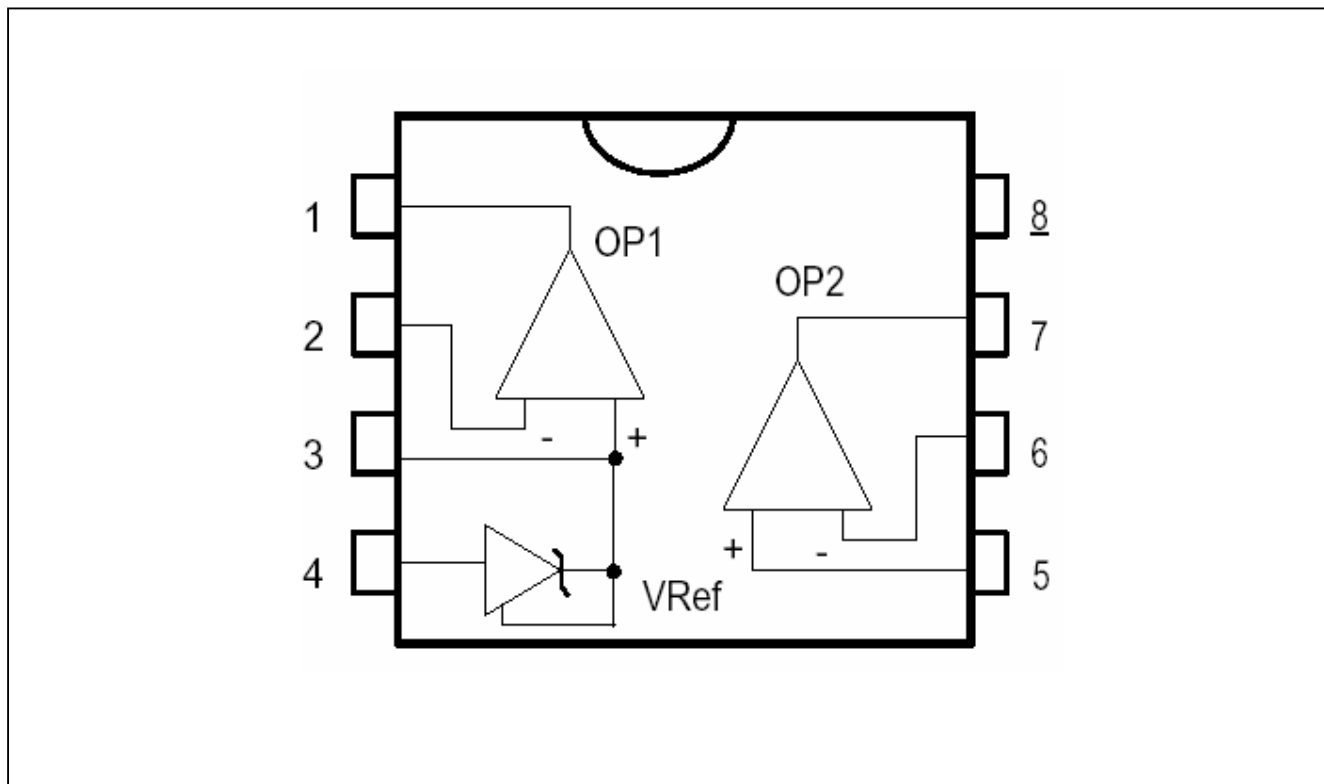
- Fixed output voltage reference 2.5V
- 0.4% and 1% voltage precision
- Sink current capability : 1 to 100mA
- Typical output impedance : 0.2Ω



## ORDERING INFORMATION

Device	Operating Temperature (Ambient)	Package
PJ2108CD	-20°C to +85°C	DIP-8
PJ2108CS		SOP-8

## BLOCK DIAGRAM



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### ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	PJ358	Unit
Power Supply Voltage Single Supply	$V_{CC}$	32	Vdc
Split Supplies	$V_{CC}, V_{EE}$	$\pm 16$	
Input Differential Voltage Range (1)	$V_{IDR}$	$\pm 32$	Vdc
Input Common Mode Voltage Range (2)	$V_{ICR}$	-0.3 to 32	Vdc
Input forward current (3) ( $V_I -0.3V$ )	$I_{IF}$	50	mA
Output Short Circuit Duration	$t_s$	Continuous	
Junction Temperature Plastic Packages	$T_J$	150	$^{\circ}C$
Storage Temperature Range Plastic Packages	$T_{stg}$	-55 to +125	$^{\circ}C$

### ELECTRICAL CHARACTERISTICS ( $T_A = 25, ^{\circ}C$ $V_{CC} = 5V$ unless otherwise noted).

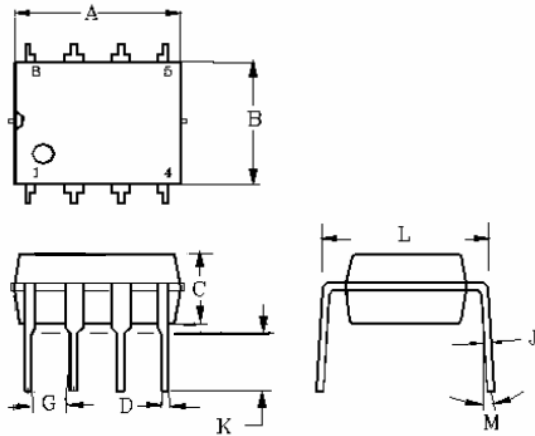
TOTAL SUPPLY VOLTAGE SECTION						
Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
Total Supply Current		$V_{CC}=0V$ , No Load				
Operational Amplifiers						
Input Offset Voltage	$V_{io}$		--	1	4.5	mA
Input Bias Current	$I_{ib}$		--	50	150	nA
Input Common-Mode Voltage Range	$V_{icm}$	$V_{CC} = 30V$ $V_{CC} = 30V, (T_A = 85^{\circ}C \text{ to } -10^{\circ}C)$	0.4	--	$V_{oc} - 1.2V$	V
Slew Rate	SR	$V_i = 10V, V_{CC} = 12V$ $R_{load} = 10K, C_{load} = 100pF$	--	0.75	--	V/ $\mu s$
Large Signal Voltage Gain	$A_{vd}$	$R_L = 2.0K, V_{CC} = 15V,$ For Large $V_O$ Swing, $T_A = 85^{\circ}C \text{ to } -20^{\circ}C$	60	100	--	dB
Common Mode Rejection Ratio	CMRR	$V_{CC} = 15V$	70	90	--	dB
Power Supply Rejection Ratio	SVRR	$V_{CC} = 5V \text{ to } 15V$	65	100	--	dB
Output Source Current	$I_{source}$	$V_O = 2.5V, V_{id} = +1V$	3	6	--	mA
Output Voltage -- High	$V_{oh}$	$V_{CC} = 15V, R_{load} = 10K$	12	13	--	V
Output Voltage -- Low	$V_{ol}$	$R_{load} = 10K$	--	100	250	mV
Gain Bandwidth	GB	$R_{load} = 10K,$ $C_{load} = 100pF, f = 100KHz$	--	1.5	--	MHz
Phase Margin	PM	$R_{load} = 10K, C_{load} = 100pF$	--	55	55	Degree
Total Harmonic Distortion	THD		--	0.05	--	%
Output Sink Current	$I_{sink}$	$V_O = 2.5V,$ $V_{id} = -1V$	3	6	--	mA

### ELECTRICAL CHARACTERISTICS ( $T_A = 25, ^{\circ}C$ $V_{CC} = 5V$ unless otherwise noted).

ADJUSTABLE SHUNT REGULATOR						
Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
Recommended Cathod Current	$I_k$		0.5	--	100	mA
Reference Input Voltage	$V_{ref}$	PJ2108	2.475	2.5	2.525	V
Reference Input Voltage Deviation	$dV_{ref}$	$V_{ka} = V_{ref}, I_k = 10mA$ $-40^{\circ}C < T_a < 105^{\circ}C$	--	7	30	mV
Load Regulation	$R_{load}$	$I_k = 1mA - 10mA$	--	3	10	mV
Minimum Cathod Current for Regulation	$I_{min}$		--	0.2	0.5	mA

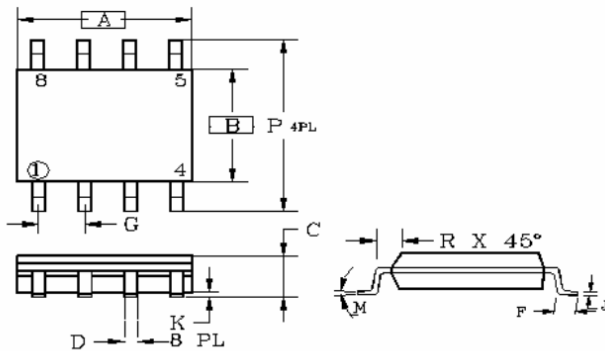
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DIP-8



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.07	9.32	0.357	0.367
B	6.22	6.48	0.245	0.255
C	3.18	4.43	0.125	0.135
D	0.35	0.55	0.019	0.020
G	2.54BSC		0.10BSC	
J	0.29	0.31	0.011	0.012
K	3.25	3.35	0.128	0.132
L	7.75	8.00	0.305	0.315
M	-	10°	-	10°

SOP-8



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27BSC		0.05BSC	
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019