



Precision Monolithics Inc.

1.0 SCOPE

This specification covers the detail requirements for a quad micropower operational amplifier.

It is highly recommended that this data sheet be used as a baseline for new military or aerospace spec control drawings.

1.2 Part Number. The complete part numbers per Table I of this specification follow:

Device	Part Number	Package
B	OP-420BY/883	Y
C	OP-420CY/883	Y <i>Obs.</i>
C	OR-420SRC/883	RC

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1.2.3 Case Outline.

Letter	Case Outline (Lead finish per MIL-M-38510)
Y	14-lead ceramic dual in line package (CERDIP)
RC	20-contact hermetic leadless chip carrier (LCC)

1.3 Absolute Maximum Ratings. ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Supply Voltage.....	$\pm 18\text{V}$
Power Dissipation.....	500mW
Differential Input Voltage.....	$\pm 30\text{V}$
Input Voltage.....	Supply Voltage
Output Short-Circuit Duration.....	Continuous
Operating Temperature Range.....	-55°C to $+125^\circ\text{C}$
Storage Temperature Range.....	-65°C to $+150^\circ\text{C}$
Lead Temperature (Soldering, 60 sec).....	$+300^\circ\text{C}$
DICE Junction Temperature Range (T_J).....	-65°C to $+150^\circ\text{C}$

1.5 Thermal Characteristics:

Thermal Resistance, CERDIP (Y) package:
 Junction-to-Case (θ_{JC}) = 26°C/W MAX
 Junction-to-Ambient (θ_{JA}) = 119°C/W MAX

Thermal Resistance, LCC (RC) package:
 Junction-to-Case (θ_{JC}) = 35°C/W MAX
 Junction-to-Ambient (θ_{JA}) = 110°C/W MAX

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TABLE 1

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = 25^\circ C$ unless otherwise specified.

Characteristics	Symbol	Special Conditions	OP-420/883				Units
			LIMITS B		LIMITS C		
			Min	Max	Min	Max	
Input Offset Voltage	V_{OS}	$V_S = \pm 2.5V$ to $\pm 15V$	--	2.5	--	4.0	mV
		$V_S = \pm 2.5V$ to $\pm 15V$ $-55^\circ C \leq T_A \leq +125^\circ C$	--	3.5	--	5.5	mV
Input Offset Current	I_{OS}	$V_S = \pm 2.5V$ to $\pm 15V$	--	1.5	--	2.5	nA
		$V_S = \pm 2.5V$ to $\pm 15V$ $-55^\circ C \leq T_A \leq +125^\circ C$	--	3.0	--	4.0	nA
Input Bias Current	I_B	$V_S = \pm 2.5V$ to $\pm 15V$	--	± 20	--	± 30	nA
		$V_S = \pm 2.5V$ to $\pm 15V$ $-55^\circ C \leq T_A \leq +125^\circ C$	--	± 50	--	± 40	nA
Input Voltage Range (Note 1)	IVR	$V_+ = 5V, V_- = 0V$	0 to 3.5	--	0 to 3.5	--	V
		$V_+ = 5V, V_- = 0V$ $-55^\circ C \leq T_A \leq +125^\circ C$	0 to 3.2	--	0 to 3.2	--	V
		$-55^\circ C \leq T_A \leq +125^\circ C$	-15 to +13.5	--	-15 to +13.5	--	V
		$-55^\circ C \leq T_A \leq +125^\circ C$	-15 to +13.2	--	-15 to +13.2	--	V
Common-Mode Rejection	CMR	$V_+ = 5V, V_- = 0V$ $V_{CM} = 0V$ to $3.5V$	83	--	80	--	dB
		$V_+ = 5V, V_- = 0V$ $V_{CM} = 0V$ to $3.2V$ $-55^\circ C \leq T_A \leq +125^\circ C$	76	--	73	--	dB
		$V_{CM} = -15V$ to $13.5V$	83	--	80	--	dB
		$V_{CM} = -15V$ to $13.2V$ $-55^\circ C \leq T_A \leq +125^\circ C$	76	--	73	--	dB

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TABLE 1 (Continued)

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = 25^\circ C$ unless otherwise specified.

Characteristics	Symbol	Special Conditions	OP-420/883				Units
			LIMITS B		LIMITS C		
			Min	Max	Min	Max	
Power Supply Rejection Ratio	PSRR	$V_S = \pm 2.5V$ to $\pm 15V$ $V_+ = 5V$ to $30V$, $V_- = 0V$	--	30	--	50	$\mu V/V$
		$V_S = \pm 2.5V$ to $\pm 15V$ $V_+ = 5V$ to $30V$; $V_- = 0V$ $-55^\circ C \leq T_A \leq +125^\circ C$	--	50	--	80	$\mu V/V$
Large-Signal Voltage Gain	A_{VOL}	$V_S = \pm 10V$, $R_L = 25k\Omega$	600	--	400	--	V/mV
		$V_S = \pm 10V$, $R_L = 50k\Omega$ $-55^\circ C \leq T_A \leq +125^\circ C$	300	--	200	--	V/mV
Supply Current (All 4 Amplifiers)	I_{SY}	$V_S = \pm 2.5V$, No Load	--	200	--	300	μA
		$V_S = \pm 2.5V$, No Load	--	300	--	400	μA
		$-55^\circ C \leq T_A \leq +125^\circ C$	--	360	--	460	μA
		No Load	--	500	--	640	μA
		$-55^\circ C \leq T_A \leq +125^\circ C$	--	500	--	640	μA
Power Dissipation (All 4 Amplifiers) (Note 2)	P_d	$V_S = \pm 2.5V$, No Load	--	1.0	--	1.5	mW
		$V_S = \pm 2.5V$, No Load	--	1.5	--	2.0	mW
		$-55^\circ C \leq T_A \leq +125^\circ C$	--	10.8	--	13.8	mW
		No Load	--	15.0	--	19.2	mW
		$-55^\circ C \leq T_A \leq +125^\circ C$	--	15.0	--	19.2	mW

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TABLE 1 (Continued)

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = 25^\circ C$ unless otherwise specified.

Output Voltage Swing	V_O	$R_L = 10k\Omega$	0.7 to	--	0.8 to	--	V
		$V+ = 5V, V- = 0V$	4.1		4.0		
		$R_L = 20k\Omega$	0.9 to	--	1.0 to	--	V
		$V+ = 5V, V- = 0V$	3.9		3.8		
		$-55^\circ C \leq T_A \leq +125^\circ C$					
		$R_L = 25k\Omega$	± 14.0	--	± 14.0	--	V
		$R_L = 50k\Omega$	± 13.8	--	± 13.8	--	V
		$-55^\circ C \leq T_A \leq +125^\circ C$					

NOTES:

1. IVR is defined as the V_{CM} range used for the CMR test.
2. P_d is derived from I_{SY} by the relationship $P_d = V_S \cdot I_{SY}$.

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TABLE 2

OP-420/883

**Electrical Test Requirements
For Class B Devices**

MIL-STD-883 Test Requirements	Subgroups (see Table 3)
Interim Electrical Parameters (pre Burn-In)	1
Final Electrical Test Parameters	1*, 2, 3, 4, 5, 6
Group A Test Requirements	1, 2, 3, 4, 5, 6

* PDA applies to Subgroup 1 only.
No other Subgroups are included in PDA.

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TABLE 3

Group A Inspection

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = T_J$ unless otherwise specified.

Subgroup	Symbol	Special Conditions	OP-420/883				Units
			LIMITS B		LIMITS C		
			Min	Max	Min	Max	
Subgroup 1 $T_A = +25^\circ C$	V_{OS}	$V_S = \pm 2.5V, \pm 15V$	--	2.5	--	4.0	mV
	I_{OS}	$V_S = \pm 2.5V, \pm 15V$	--	1.5	--	2.5	nA
	I_B	$V_S = \pm 2.5V, \pm 15V$	--	± 20	--	± 30	nA
	I_{SY}	$V_S = \pm 2.5V, \text{No Load}$ No Load	--	200	--	300	μA
			--	360	--	460	μA
	CMR	$V_+ = 5V, V_- = 0V$ $V_{CM} = 0V, 3.5V$ $V_{CM} = -15V, 13.5V$	83	--	80	--	dB
			83	--	80	--	dB
--			30	--	50	$\mu V/V$	
Subgroup 2 $T_A = +125^\circ C$	V_{OS}	$V_S = \pm 2.5V, \pm 15V$	--	3.5	--	5.5	mV
	I_{OS}	$V_S = \pm 2.5V, \pm 15V$	--	3.0	--	4.0	nA
	I_B	$V_S = \pm 2.5V, \pm 15V$	--	± 30	--	± 40	nA
	CMR	$V_+ = 5V, V_- = 0V$ $V_{CM} = 0V, 3.2V$ $V_{CM} = -15V, 13.2V$	76	--	73	--	dB
			76	--	73	--	dB
			--	50	--	80	$\mu V/V$
	I_{SY}	$V_S = \pm 2.5V, \text{No Load}$ No Load	--	300	--	400	μA
		--	500	--	640	μA	



TABLE 3

Group A Inspection (Continued)

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = T_J$ unless otherwise specified.

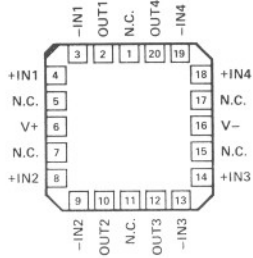
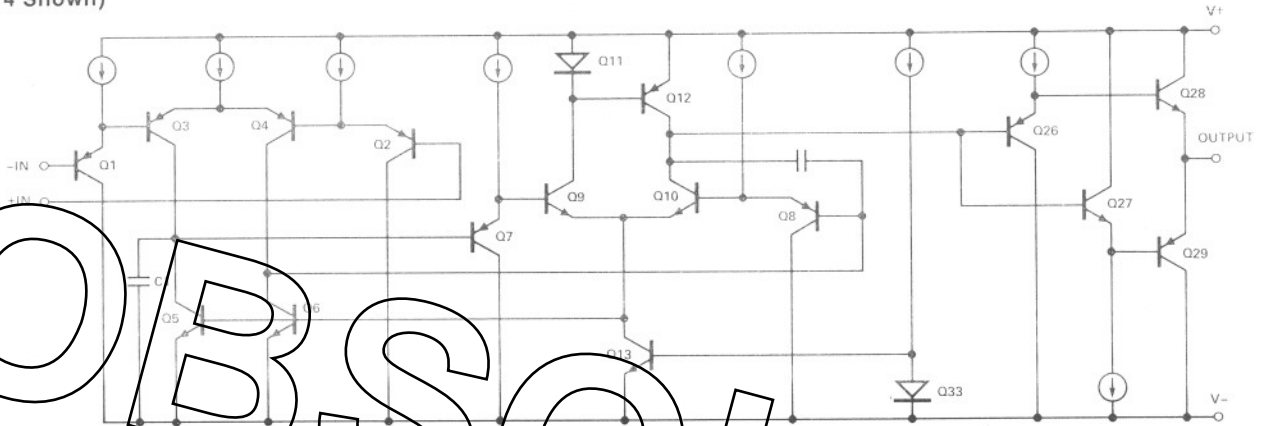
Subgroup	Symbol	Special Conditions	OP-420/883				Units
			LIMITS B		LIMITS C		
			Min	Max	Min	Max	
Subgroup 3 $T_A = -55^\circ C$		All Tests, Limits and Conditions are the same as for Subgroup 2.					
Subgroup 4 $T_A = +25^\circ C$	V_O	$R_L = 10k\Omega$ $V_+ = 5V, V_- = 0V$	0.7 to 4.1	--	0.8 to 4.0	--	V
		$R_L = 25k\Omega$	± 14.0	--	± 14.0	--	V
	A_{VO}	$V_O = \pm 10V, R_L = 25k\Omega$	600	--	400	--	V/mV
Subgroup 5 $T_A = +125^\circ C$	V_O	$R_L = 20k\Omega$ $V_+ = 5V, V_- = 0V$	0.9 to 3.9	--	1.0 to 3.8	--	V
		$R_L = 50k\Omega$	± 13.8	--	± 13.8	--	V
	A_{VO}	$V_O = \pm 10V, R_L = 50k\Omega$	300	--	200	--	V/mV
Subgroup 6 $T_A = -55^\circ C$		All Tests, Limits and Conditions are the same as for Subgroup 5.					

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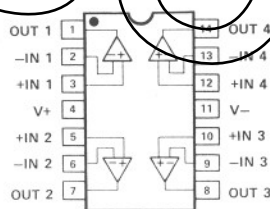


3.2.1 Simplified Schematic and Pin Connections.

(1/4 Shown)



OP-420CRC/883
20-LEAD LCC
(RC-Suffix)



14-PIN HERMETIC DIP
(Y-Suffix)

3.2.4 Microcircuit Group Assignment. This microcircuit is covered by microcircuit group 49.

4.2 Life Test/Burn-In Circuit.

