

### 1.0 SCOPE

This specification covers the detail requirements for a dual precision JFET input 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:

<u>Device</u>	<u>Part Number</u>	<u>Package</u>
A	OP-215AJ/883	J
B	OP-215BJ/883	J
C	OP-215CJ/883	J
A	OP-215AZ/883	Z
B	OP-215BZ/883	Z
C	OP-215CZ/883	Z
B	OP-215BRC/883	RC

### 1.2.3 Case Outline.

<u>Letter</u>	<u>Case Outline (Lead finish per MIL-M-38510)</u>
J	8-lead metal can (TO-99)
Z	8-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 OP-215A, OP-215B .....	$\pm 22\text{V}$
OP-215C .....	$\pm 18\text{V}$
Power Dissipation .....	500mW
Differential Input Voltage OP-215A, OP-215B .....	$\pm 40\text{V}$
OP-215C .....	$\pm 30\text{V}$
Input Voltage (Note 1) OP-215A, OP-215B .....	$\pm 20\text{V}$
OP-215C .....	$\pm 16\text{V}$
Output Short-Circuit Duration .....	Indefinite
Operating Temperature Range .....	$-55^\circ\text{C}$ to $+125^\circ\text{C}$
Storage Temperature Range .....	$-65^\circ\text{C}$ to $+150^\circ\text{C}$
Lead Temperature (Soldering, 60 sec) .....	$+300^\circ\text{C}$
Maximum Junction Temperature ( $T_J$ ) .....	$+150^\circ\text{C}$

#### NOTES:

1. Unless otherwise specified, the absolute maximum negative input voltage is equal to the negative power supply voltages.

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## 1.5 Thermal Characteristics:

Thermal Resistance, TO-99 (J) package:

Junction-to-Case ( $\theta_{JC}$ ) = 45°C/W MAX

Junction-to-Ambient ( $\theta_{JA}$ ) = 150°C/W MAX

Thermal Resistance, CERDIP (Z) package:

Junction-to-Case ( $\theta_{JC}$ ) = 26°C/W MAX

Junction-to-Ambient ( $\theta_{JA}$ ) = 119°C/W MAX

Thermal Resistance, LCC (RC) package:

Junction-to-Case ( $\theta_{JC}$ ) = 35°C/W MAX

Junction-to-Ambient ( $\theta_{JA}$ ) = 110°C/W MAX

TABLE 1

$V_S = \pm 15V$ ;  $R_S = 50\Omega$ ;  $V_{CM} = 0V$ ;  $T_A = 25^\circ C$  unless otherwise specified.

Characteristics	Symbol	Special Conditions	OP-215/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Input Offset Voltage	$V_{OS}$		--	1.0	--	2.0	mV
		$-55^\circ C \leq T_A \leq +125^\circ C$	--	2.0	--	3.0	mV
Input Offset Current	$I_{OS}$	$T_J = +25^\circ C$	--	50	--	50	pA
		$T_J = +125^\circ C$	--	8	--	8	nA
Input Bias Current	$I_B$	$T_J = +25^\circ C$	--	$\pm 100$	--	$\pm 200$	pA
		$T_J = +125^\circ C$	--	$\pm 10$	--	$\pm 10$	nA
Large-Signal Voltage Gain	$A_{VO}$	$V_O = \pm 10V, R_L \geq 2k\Omega$	150	--	75	--	V/mV
		$V_O = \pm 10V, R_L \geq 2k\Omega$ $-55^\circ C \leq T_A \leq +125^\circ C$	30	--	30	--	V/mV
Output Voltage Swing	$V_O$	$R_L \geq 2k\Omega$	$\pm 11.0$	--	$\pm 11.0$	--	V
		$R_L \geq 10k\Omega$ $-55^\circ C \leq T_A \leq +125^\circ C$	$\pm 12.0$	--	$\pm 12.0$	--	V
Supply Current	$I_{SY}$	$V_O = 0V$	--	8.5	--	8.5	mA
Power Dissipation	$P_d$	$V_O = 0V$	--	255	--	255	mW
Slew Rate	SR	$A_{VCL} = +1$ $R_L \geq 2k\Omega, C_L = 100pF$	10.0	--	7.5	--	V/ $\mu s$
Common-Mode Rejection	CMR	$V_{CM} = IVR = \pm 10.2V$	86	--	86	--	dB
		$V_{CM} = IVR = \pm 10.2V$ $-55^\circ C \leq T_A \leq +125^\circ C$	82	--	82	--	dB
Power Supply Rejection Ratio	PSRR	$V_S = \pm 10V$ to $\pm 16V$	--	51	--	80	$\mu V/V$
		$V_S = \pm 10V$ to $\pm 16V$ $-55^\circ C \leq T_A \leq +125^\circ C$	--	100	--	100	$\mu V/V$

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**TABLE 1 (Continued)**

$V_S = \pm 15V$ ;  $R_S = 50\Omega$ ;  $V_{CM} = 0V$ ;  $T_A = 25^\circ C$  unless otherwise specified.

Characteristics	Symbol	Special Conditions	OP-215/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
<b>Input Voltage</b>	IVR	$-55^\circ C \leq T_A \leq +125^\circ C$	$\pm 10.2$	--	$\pm 10.2$	--	V
<b>Range (Note 1)</b>			$\pm 10.2$	--	$\pm 10.2$	--	V
<b>Gain Bandwidth Product</b>	GBW	$f_O = 87.5kHz$	3.5	--	3.5	--	MHz

**NOTES:**

1. IVR is defined as the  $V_{CM}$  range used for the CMR test.

**TABLE 1 (Continued)**

$V_S = \pm 15V$ ;  $R_S = 50\Omega$ ;  $V_{CM} = 0V$ ;  $T_A = 25^\circ C$  unless otherwise specified.

Characteristics	Symbol	Special Conditions	OP-215/883		Units
			LIMITS C		
			Min	Max	
Input Offset Voltage	$V_{OS}$		--	4.0	mV
		$-55^\circ C \leq T_A \leq +125^\circ C$	--	6.0	mV
Input Offset Current	$I_{OS}$	$T_J = +25^\circ C$	--	100	pA
		$T_J = +125^\circ C$	--	12	nA
Input Bias Current	$I_B$	$T_J = +25^\circ C$	--	$\pm 300$	pA
		$T_J = +125^\circ C$	--	$\pm 15$	nA
Large-Signal Voltage Gain	$A_{VO}$	$V_O = \pm 10V, R_L \geq 2k\Omega$	50	--	V/mV
		$V_O = \pm 10V, R_L \geq 2k\Omega$ $-55^\circ C \leq T_A \leq +125^\circ C$	25	--	V/mV
Output Voltage Swing	$V_O$	$R_L \geq 2k\Omega$	$\pm 11$	--	V
		$R_L \geq 10k\Omega$ $-55^\circ C \leq T_A \leq +125^\circ C$	$\pm 12$	--	V
Supply Current	$I_{SY}$	$V_O = 0V$	--	10	mA
Power Dissipation	$P_d$	$V_O = 0V$	--	300	mW
Slew Rate	SR	$A_{VCL} = +1$ $R_L \geq 2k\Omega, C_L = 100pF$	5.0	--	V/ $\mu s$
Common-Mode Rejection	CMR	$V_{CM} = IVR = \pm 10.1V$	82	--	dB
		$V_{CM} = IVR = \pm 10.1V$ $-55^\circ C \leq T_A \leq +125^\circ C$	80	--	dB
Power Supply Rejection Ratio	PSRR	$V_S = \pm 10V$ to $\pm 15V$	--	100	$\mu V/V$
		$V_S = \pm 10V$ to $\pm 15V$ $-55^\circ C \leq T_A \leq +125^\circ C$	--	126	$\mu V/V$

**TABLE 1 (Continued)**

$V_S = \pm 15V$ ;  $R_S = 50\Omega$ ;  $V_{CM} = 0V$ ;  $T_A = 25^\circ C$  unless otherwise specified.

Characteristics	Symbol	Special Conditions	OP-215/883		Units
			LIMITS C		
			Min	Max	
Input Voltage	IVR		-	$\pm 10.1$	V
Range (Note 1)		$-55^\circ C \leq T_A \leq +125^\circ C$	-	$\pm 10.1$	V
Gain Bandwidth Product	GBW	$f_O = 75kHz$	3.0	-	MHz

**NOTES:**

1. IVR is defined as the  $V_{CM}$  range used for the CMR test.

**TABLE 2**

**OP-215/883**

**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, 7

\* PDA applies to Subgroup 1 only.

No other Subgroups are included in PDA.

$V_{OS}$  is excluded from PDA for OP-215A and OP-215B grade product.

**TABLE 3**

**Group A Inspection**

$V_S = \pm 15V$ ;  $R_S = 50\Omega$ ;  $V_{CM} = 0V$ ;  $T_A = T_J$  unless otherwise specified.

Subgroup	Symbol	Special Conditions	OP-215/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Subgroup 1 $T_A = +25^\circ C$	$V_{OS}$		--	1.0	--	2.0	mV
	$I_{OS}$		--	50	--	50	pA
	$I_B$		--	$\pm 100$	--	$\pm 200$	pA
	$I_{SY}$		--	8.5	--	8.5	mA
	CMR	$V_{CM} = \pm 10.2V$	86	--	86	--	dB
	PSRR	$V_S = \pm 10V, \pm 16V$	--	51	--	80	$\mu V/V$
Subgroup 2 $T_A = +125^\circ C$	$V_{OS}$		--	2.0	--	3.0	mV
	$I_{OS}$		--	8	--	8	nA
	$I_B$		--	$\pm 10$	--	$\pm 10$	nA
	CMR	$V_{CM} = \pm 10.2V$	82	--	82	--	dB
	PSRR	$V_S = \pm 10V, \pm 16V$	--	100	--	100	$\mu V/V$
Subgroup 3 $T_A = -55^\circ C$	$V_{OS}$		--	2.0	--	3.0	mV
	CMR	$V_{CM} = \pm 10.2$	82	--	82	--	dB
	PSRR	$V_S = \pm 10V, \pm 16V$	--	100	--	100	$\mu V/V$
Subgroup 4 $T_A = +25^\circ C$	$V_O$	$R_L = 2k\Omega$	$\pm 11$	--	$\pm 11$	-	V
	$A_{VO}$	$V_O = \pm 10V, R_L = 2k\Omega$	150	--	75	--	V/mV
Subgroup 5 $T_A = +125^\circ C$	$V_O$	$R_L = 10k\Omega$	$\pm 12$	--	$\pm 12$	--	V
	$A_{VO}$	$V_O = \pm 10V, R_L = 2k\Omega$	30	--	30	--	V/mV

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**TABLE 3**

**Group A Inspection (Continued)**

$V_S = \pm 15V$ ;  $R_S = 50\Omega$ ;  $V_{CM} = 0V$ ;  $T_A = T_J$  unless otherwise specified.

Subgroup	Symbol	Special Conditions	OP-215/883				Units
			<u>LIMITS A</u>		<u>LIMITS B</u>		
			Min	Max	Min	Max	
<b>Subgroup 6</b> $T_A = -55^\circ C$		All Tests, Limits and Conditions are the same as for Subgroup 5.					
<b>Subgroup 7</b> $T_A = +25^\circ C$	SR	$A_{VCL} = +1$ $R_L = 2k\Omega, C_L = 100pF$	10.0	--	7.5	-	V/ $\mu$ s
	GBW	$f_O = 87.5kHz$	3.5	--	3.5	--	MHz



TABLE 3

Group A Inspection (Continued)

$V_S = \pm 15V$ ;  $R_S = 50\Omega$ ;  $V_{CM} = 0V$ ;  $T_A = T_J$  unless otherwise specified.

Subgroup	Symbol	Special Conditions	OP-215/883		Units
			LIMITS C		
			Min	Max	
Subgroup 1 $T_A = +25^\circ C$	$V_{OS}$		-	4.0	mV
	$I_{OS}$		-	100	pA
	$I_B$		-	$\pm 300$	pA
	$I_{SY}$	$V_O = 0V$	-	10	mA
	CMR	$V_{CM} = \pm 10.1V$	82	-	dB
	PSRR	$V_S = \pm 10V, \pm 15V$	-	100	$\mu V/V$
Subgroup 2 $T_A = +125^\circ C$	$V_{OS}$		-	6.0	mV
	$I_{OS}$		-	12	nA
	$I_B$		-	$\pm 15$	nA
	CMR	$V_{CM} = \pm 10.1V$	80	-	dB
	PSRR	$V_S = \pm 10V, \pm 15V$	-	126	$\mu V/V$
Subgroup 3 $T_A = -55^\circ C$	$V_{OS}$		-	6.0	mV
	CMR	$V_{CM} = \pm 10.1V$	80	-	dB
	PSRR	$V_S = \pm 10V, \pm 15V$	-	126	$\mu V/V$
Subgroup 4 $T_A = +25^\circ C$	$V_O$	$R_L = 2k\Omega$	$\pm 11$	-	V
	$A_{VO}$	$V_O = \pm 10V, R_L = 2k\Omega$	50	-	V/mV
Subgroup 5 $T_A = +125^\circ C$	$V_O$	$R_L = 10k\Omega$	$\pm 12$	-	V
	$A_{VO}$	$V_O = \pm 10V, R_L = 2k\Omega$	25	-	V/mV

12 OPERATIONAL AMPLIFIERS

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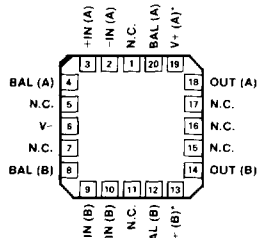
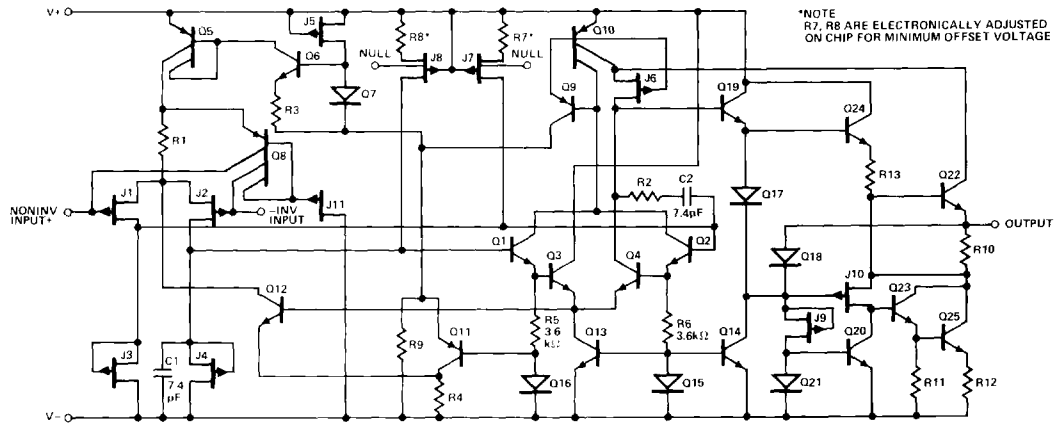
**TABLE 3**

**Group A Inspection (Continued)**

$V_S = \pm 15V$ ;  $R_S = 50\Omega$ ;  $V_{CM} = 0V$ ;  $T_A = T_J$  unless otherwise specified.

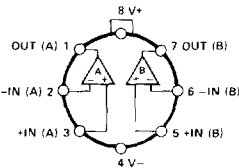
Subgroup	Symbol	Special Conditions	LIMITS C		Units
			Min	Max	
OP-215/883					
Subgroup 6 $T_A = -55^\circ C$		All Tests, Limits and Conditions are the same as for Subgroup 5.			
Subgroup 7 $T_A = +25^\circ C$	SR	$A_{VCL} = +1$ $R_L = 2k\Omega, CL = 100pF$	5.0	—	V/ $\mu s$
	GBW	$f_O = 75kHz$	3.0	—	MHz

## 3.2.1 Simplified Schematic and Pin Connections. (1/2 OP-215)

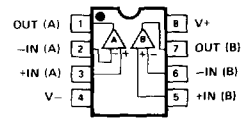


\*V+ (A) & V+ (B) INTERNALLY CONNECTED.

**LCC PACKAGE  
(RC-Suffix)**



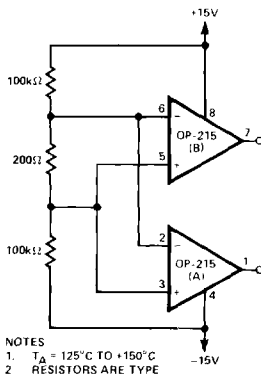
**TO-99  
(J-Suffix)**



**8-PIN HERMETIC DIP  
(Z-Suffix)**

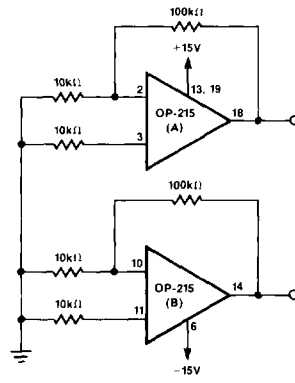
## 3.2.4 Microcircuit Group Assignment. This microcircuit is covered by microcircuit group 49.

## 4.2 Life Test/Burn-In Circuit.



NOTES  
1.  $T_A = 125^\circ\text{C TO } 150^\circ\text{C}$   
2. RESISTORS ARE TYPE RN55D, 1/4

**("J" AND "Z" PACKAGES ONLY)**



**("RC" PACKAGE)**