Sipex Corporation
SIGNAL PROCESSING EXCELLENCE

SP-2510/12/15

High Slew Rate Operational Amplifiers

T-79-07-10

Features

- 65 V/µS Slew Rate
- 250 nS Settling Time to 0.1%
- 1 MHz Full Power Bandwidth
- 12 MHz Gain Bandwidth
- 100 MΩ Input Impedance
- Internally Compensated

Applications

- Video Amplifiers
- Pulse Amplifiers
- Signal Generators
- High Speed Sample-and-Hold Amplifiers

Description

The SP-2510/12/15 operational amplifiers are optimally compensated for bandwidth, slew rate, and settling time. These characteristics make these devices the preferred candidates for high accuracy and high frequency analog signal processing applications.

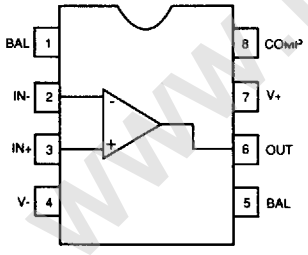
These devices are designed to allow additional compensation and offset trimming. A 100KΩ trim potentiometer is recommended for use between the balance pins (the wiper should be connected to V+).

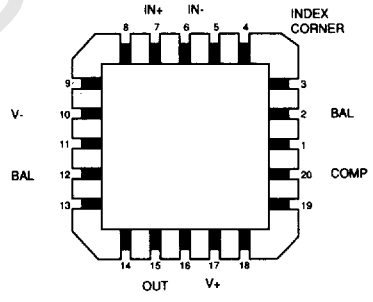
The SP-2512 and SP-2515 are the relaxed specification military temperature range and the commercial temperature range of the SP-2510.

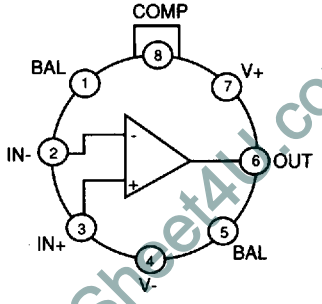
All versions are available in metal can, ceramic mini DIP packages, and in die form. The SP-2510 is also available in ceramic LCC packages.

4

Connection Diagrams







SP-2510/12/15

High Slew Rate Operational Amplifiers

Absolute Maximum Ratings

Voltage Between V^+ and V^- Terminals	40.0V	Operating Temperature Range	
Differential Input Voltage, V_d	±15.0V	SP-2510	$-55^oC \le T_A \le 125^oC$
Internal Power Dissipation , P_d	300mV	Storage Temperature Range	$-65^oC \le T_A \le 150^oC$
Peak Output Current , I_p	50mA		

Electrical Characteristics:

$V^+ = +15V$, $V^- = -15V$, $T_A = 25^oC$ unless otherwise specified in "Conditions".

SP-2510

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Characteristics						
Offset Voltage	V_{OS}			4	8	mV
		$-55^oC \le T_A \le 125^oC$			11	mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	$-55^oC \le T_A \le 125^oC$; average		20		µV/°C
Bias Current	I_B			100	200	nA
		$-55^oC \le T_A \le 125^oC$			400	nA
Offset Current	I_{OS}			10	25	nA
		$-55^oC \le T_A \le 125^oC$			50	nA
Input Impedance	Z_{in}	Guaranteed by Design	50	100		MΩ
Common Mode Range	V_{cm}	$-55^oC \le T_A \le 125^oC$	±10.0			V
Transfer Characteristics						
Large Signal Voltage Gain	Av_{OL}	$R_L = 2K\Omega$, $V_O = \pm 10V$	10K	15K		V/V
		$-55^oC \le T_A \le 125^oC$, $R_L = 2K\Omega$, $V_O = \pm 10V$	7.5K			V/V
Common Mode Rejection Ratio	CMRR	$-55^oC \le T_A \le 125^oC$, $V_{cm} = \pm 10V$	80	90		dB
Unity Gain Bandwidth Product	GBW	$A_V > 10$		12		MHz
Output Characteristics						
Output Voltage Swing	V_O	$-55^oC \le T_A \le 125^oC$, $R_L = 2K\Omega$	±10.0	±12.0		V
Output Current	I_{OUT}	$V_O = \pm 10V$	±10	±20		mA
Full Power Bandwidth	FPBW	$V_O = \pm 10V$, $FPBW = (SR)\,(2\pi V_p)^{-1}$	750	1000		KHz
Transient Response						
Rise Time	t_R	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm 200mV$		25	50	nS
Overshoot	γ	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm 200mV$		25	40	%
Slew Rate	SR	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm 5V$	50	65		V/ S
Settling Time to 0.1%	t_S	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm 5V$		0.25		S
Power Supply						
Supply Current	I_S			4	6	mA
Power Supply Rejection Ratio	PSRR	$-55^oC \le T_A \le 125^oC$	80	90		dB

SP-2510/12/15

High Slew Rate Operational Amplifiers

Absolute Maximum Ratings

Voltage Between V^+ and V^- Terminals	40.0V	Operating Temperature Range	
Differential Input Voltage, V_d	±15.0V	SP-2512	$-55^oC \le T_A \le 125^oC$
Internal Power Dissipation , P_d	300mV	Storage Temperature Range	$-65^oC \le T_A \le 150^oC$
Peak Output Current , I_p	50mA		

Electrical Characteristics:

$V^+ = +15V$, $V^- = -15V$, $T_A = 25^oC$ unless otherwise specified in "Conditions".

SP-2512

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Characteristics						
Offset Voltage	V_{OS}			5	10	mV
		$-55^oC \le T_A \le 125^oC$			14	mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	$-55^oC \le T_A \le 125^oC$; average		25		µV/°C
Bias Current	I_B			125	250	nA
		$-55^oC \le T_A \le 125^oC$			500	nA
Offset Current	I_{OS}			20	50	nA
		$-55^oC \le T_A \le 125^oC$			100	nA
Input Impedance	Z_{in}	Guaranteed by Design	40	100		MΩ
Common Mode Range	V_{cm}	$-55^oC \le T_A \le 125^oC$	±10.0			V
Transfer Characteristics						
Large Signal Voltage Gain	Av_{OL}	$R_L = 2K\Omega$, $V_O = \pm 10V$	7.5K	15K		V/V
		$-55^oC \le T_A \le 125^oC$, $R_L = 2K\Omega$, $V_O = \pm 10V$	5K			V/V
Common Mode Rejection Ratio	CMRR	$-55^oC \le T_A \le 125^oC$, $V_{cm} = \pm 10V$	74	90		dB
Unity Gain Bandwidth Product	GBW	$A_V > 10$		12		MHz
Output Characteristics						
Output Voltage Swing	V_O	$-55^oC \le T_A \le 125^oC$, $R_L = 2K\Omega$	±10.0	±12.0		V
Output Current	I_{OUT}	$V_O = \pm 10V$	±10	±20		mA
Full Power Bandwidth	FPBW	$V_O = \pm 10V$, $FPBW = (SR)\,(2\pi V_p)^{-1}$	600	1000		KHz
Transient Response						
Rise Time	t_R	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm 200mV$		25	50	nS
Overshoot	γ	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm 200mV$		25	50	%
Slew Rate	SR	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm 5V$	40	60		V/ S
Settling Time to 0.1%	t_S	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm 5V$		0.25		S
Power Supply						
Supply Current	I_S			4	6	mA
Power Supply Rejection Ratio	PSRR	$-55^oC \le T_A \le 125^oC$	74	90		dB

4

SP-2510/12/15

High Slew Rate Operational Amplifiers

Absolute Maximum Ratings

Voltage Between V^+ and V^- Terminals	40.0V	Operating Temperature Range	
Differential Input Voltage, V_d	±15.0V	SP-2515	$0\,^oC \le T_A \le 75^oC$
Internal Power Dissipation , P_d	300mV	Storage Temperature Range	$-65^oC \le T_A \le 150^oC$
Peak Output Current , I_p	50mA		

Electrical Characteristics:

$V^+ = +15V$, $V^- = -15V$, $T_A = 25^oC$ unless otherwise specified in "Conditions".

SP-2515

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Characteristics						
Offset Voltage	V_{OS}			5	10	mV
		$0\,^oC \le T_A \le 75\,^oC$			14	mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	$0\,^oC \le T_A \le 75\,^oC$; average		30		µV/°C
Bias Current	I_B			125	250	nA
		$0\,^oC \le T_A \le 75\,^oC$			500	nA
Offset Current	I_{OS}			20	50	nA
		$0\,^oC \le T_A \le 75\,^oC$			100	nA
Input Impedance	Z_{in}	Guaranteed by Design	40	100		MΩ
Common Mode Range	V_{cm}	$0\,^oC \le T_A \le 75\,^oC$	±10.0			V
Transfer Characteristics						
Large Signal Voltage Gain	Av_{OL}	$R_L = 2K\Omega$, $V_O = \pm10V$	7.5K	15K		V/V
		$0\,^oC \le T_A \le 75\,^oC$, $R_L = 2K\Omega$, $V_O = \pm10V$	5K			V/V
Common Mode Rejection Ratio	CMRR	$0\,^oC \le T_A \le 75\,^oC$, $V_{cm} = \pm10V$	74	90		dB
Unity Gain Bandwidth Product	GBW	$A_V > 10$		12		MHz
Output Characteristics						
Output Voltage Swing	V_O	$0\,^oC \le T_A \le 75\,^oC$, $R_L = 2K\Omega$	±10.0	±12.0		V
Output Current	I_{OUT}	$V_O = \pm10V$	±10	±20		mA
Full Power Bandwidth	FPBW	$V_O = \pm10V$, $FPBW = (SR)\,(2\pi V_p)^{-1}$	600	1000		KHz
Transient Response						
Rise Time	t_R	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm200mV$		25	50	nS
Overshoot	γ	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm200mV$		25	50	%
Slew Rate	SR	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm5V$	40	60		V/ S
Settling Time to 0.1%	t_S	$R_L = 2K\Omega$, $C_L = 50pF$, $V_O = \pm5V$		0.25		S
Power Supply						
Supply Current	I_S			4	6	mA
Power Supply Rejection Ratio	PSRR	$0\,^oC \le T_A \le 75\,^oC$	74	90		dB

SP-2510/12/15

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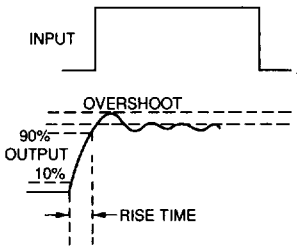
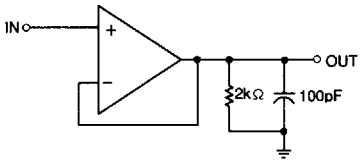
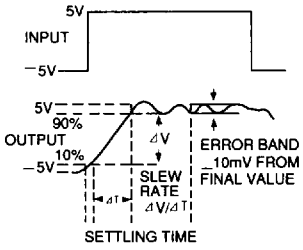
A.C. Performance



Transient Response



A.C. Test Circuit



Slew Rate/Settling Time

Ordering Information

When ordering the SP-2510/12/15, specify the package and screening according to the following :

SP 2 - 2510 - 2

Prefix: SP (SIPEX)

Generic Part #

PACKAGE :

SCREENING

1 - 14 pin ceramic DIP	-2 : -55 °C to 125 °C
2 - Metal Can	-4 : -25 °C to 85 °C
3 - 8 Pin Plastic DIP	-5 : 0 °C to 75 °C
4 - 20 Pin LCC	-6 : 25 °C 100% D.C. Probe
7 - 8-Pin CERDIP	(Dice Only)
0 - DICE	/883 : -55 °C to 125 °C
	Full Mil Processing

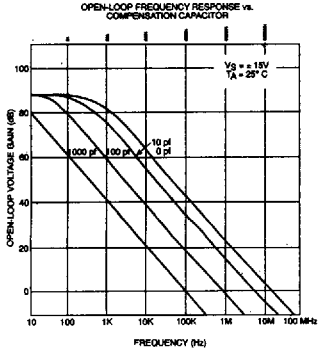
NOTES: 1. Not all package types and screening option combinations are available. Consult local sales office or factory for availability information.

2. Consult factory for special package or screening requirements.

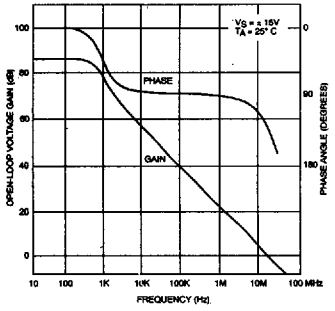
3. Consult factory for 883 revision C compliant data sheet.

4. Consult factory for package mechanical dimensions.

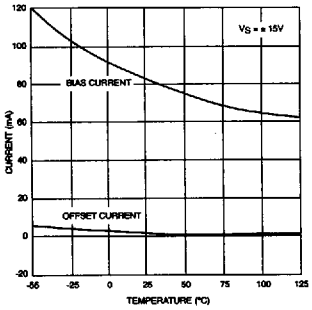
OPEN-LOOP FREQUENCY RESPONSE vs. COMPENSATION CAPACITOR



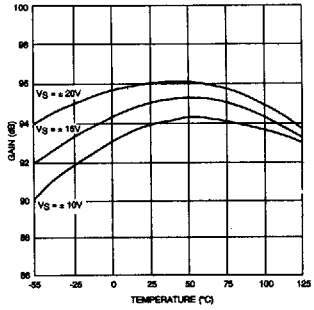
OPEN-LOOP FREQUENCY AND PHASE RESPONSE



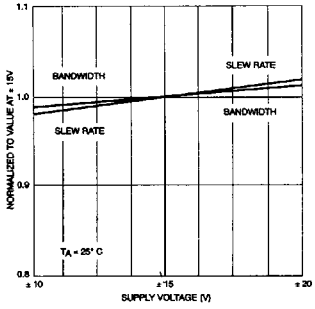
INPUT BIAS AND OFFSET CURRENT vs. TEMPERATURE



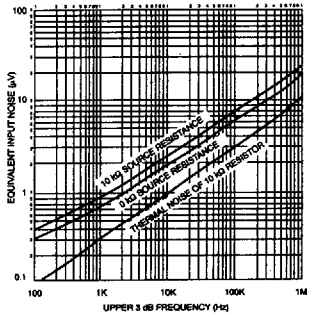
OPEN-LOOP VOLTAGE GAIN vs. TEMPERATURE



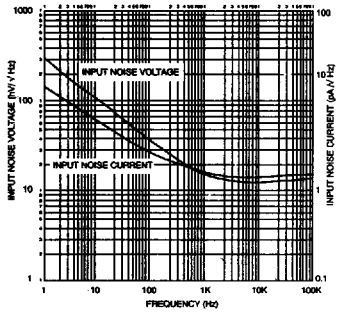
NORMALIZED AC PARAMETERS vs. SUPPLY VOLTAGE



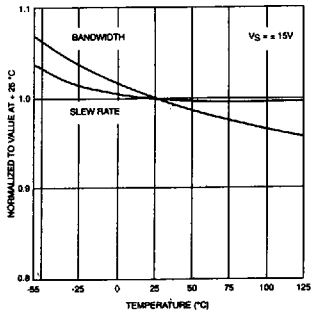
BROADBAND NOISE CHARACTERISTICS



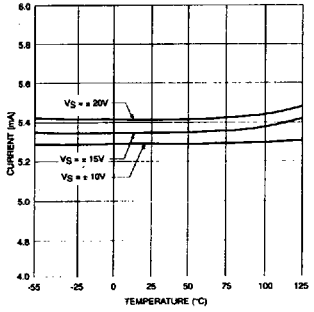
INPUT NOISE DENSITY vs. FREQUENCY



NORMALIZED AC PARAMETERS vs. TEMPERATURE



POWER SUPPLY CURRENT vs. TEMPERATURE



OUTPUT VOLTAGE SWING vs. FREQUENCY