

RoHS
Compliant



Description

This is a dual high-performance low noise operational amplifier. Compared to most of the standard operational amplifiers, it shows better noise performance, improved output drive capability and considerably higher small-signal and power bandwidths. This makes the device especially suitable for application in high-quality and professional audio equipment, instrumentation and control circuits, and telephone channel amplifiers. The op amp is internally compensated for gains equal to one.

Specification

Small-Signal Bandwidth	: 10 MHz
Output Drive Capability	: 600Ω, 10 V _{RMS}
Input Noise Voltage	: 5nV $\sqrt{\text{Hz}}$ (Typical)
DC Voltage Gain	: 50000
AC Voltage Gain	: 2200 at 10 kHz
Power Bandwidth	: 140kHz
Slew Rate	: 9V/ μs
Large Supply Voltage Range	: 3V to 20V

Maximum Ratings

Parameter	Symbol	Rating
Supply Voltage	V _S	±22V
Input Voltage	V _{IN}	±V _{SUPPLY} V
Differential Input Voltage (Note 1)	V _{DIFF}	±0.5V
Operating Temperature Range	T _{amb}	0°C to 70°C
Storage Temperature	T _{stg}	-65°C to +150°C
Junction Temperature	T _j	150°C
Maximum Power Dissipation, T _{amb} = 25°C (Still-Air)	P _D	780mW
Thermal Resistance, Junction-to-Ambient	R _{θJA}	182°C/W
Lead Soldering Temperature (10 sec max)	T _{sld}	230°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Diodes protect the inputs against overvoltage. Therefore, unless current-limiting resistors are used, large currents will flow if the differential input voltage exceeds 0.6 V. Maximum current should be limited to 10 mA.

DC Electrical Characteristics (T_{amb} = 25°C; V_s = ±15V, unless otherwise noted.) (Notes 2, 3 and 4)

Parameter Name	Symbol	Test Conditions	Min	Typ	Max	Unit
Offset Voltage	V _{OS}	- Overtemperature	-	0.5	4	mV
	-			-	5	mV,
	-			5	-	μV/°C
Offset Current	ΔV _{OS} /ΔT			10	150	nA
	-			-	200	nA
	-			200	-	pA/°C
Input Current	I _B	- Overtemperature	-	300	800	nA
	-			-	1000	nA
	-			5	-	nA/°C
	ΔI _B /ΔT					
	-					
Supply Current	I _{CC}	- Overtemperature	- -	8 -	16 -	mA
Common-Mode Input Range	V _{CM}	-	±12	±13	-	V
Common-Mode Rejection Ratio	CMRR	-	70	100	-	dB
Power Supply Rejection Ratio	PSRR	-	-	10	100	μV/V
Large-Signal Voltage Gain	A _{VOL}	R _L 2kΩ; V _O = 10V Overtemperature R _L ≥ 600Ω; V _O = 10 V Overtemperature	25 15 15 10	100 - 50 -	- - - -	V/mV
Output Swing	V _{OUT}	R _L ≥ 600Ω Overtemperature R _L ≥ 600Ω; V _S = ±18V Overtemperature R _L ≥ 2kΩ Overtemperature	±12 ±10 ±15 ±12 ±13 ±10	±13 ±12 ±16 ±14 ±13.5 ±12.5	- - - - - -	V
Input Resistance	R _{IN}	-	30	300	-	kΩ
Output Short Circuit Current	I _{SC}	-	10	38	60	mA

2. Diodes protect the inputs against overvoltage. Therefore, unless current-limiting resistors are used, large currents will voltage exceeds 0.6 V. Maximum current should be limited to ±10 mA.

3. For operation at elevated temperature, derate packages based on the package thermal resistance.

4. Output may be shorted to ground at V_s = 15V, T_{amb} = 25°C. Temperature and/or supply voltages must be limited to ensure dissipation rating is not exceeded.

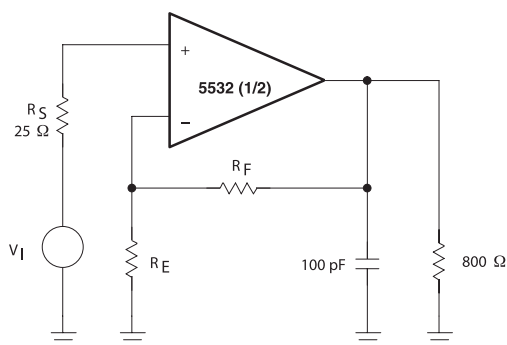
AC Electrical Characteristics (T_{amb} = 25°C; V_s = 15V, unless otherwise noted.)

Parameter Name	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Resistance	R _{OUT}	A _V = 30 dB Closed-loop f = 10 kHz, R _L = 600Ω	-	0.3	-	Ω
Overshoot	-	Voltage-Follower V _{IN} = 100 mV _{P-P} C _L = 100 pF; R _L = 600Ω	-	10	-	%
Gain	A _V	f = 10 kHz	-	2.2	-	V/mV
Gain Bandwidth Product	GBW	C _L = 100 pF; R _L = 600Ω	-	10	-	MHz
Slew Rate	SR	-	-	9	-	V/μs
Power Bandwidth	-	V _{OUT} = 10V V _{OUT} = 14V; R _L = 600 V _{CC} = 18V	- - -	140 100 -	- - -	kHz

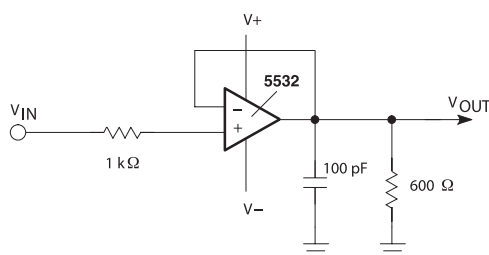
Electrical Characteristics ($T_{amb} = 25^{\circ}\text{C}$; $V_S = 15\text{V}$, unless otherwise noted.)

Parameter Name	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Noise Voltage	V_{NOISE}	$f_o = 30\text{ Hz}$ $f_o = 1\text{ kHz}$	-	8	-	$\text{nV}/\sqrt{\text{Hz}}$
Input Noise Current	V_{NOISE}		-	2.7 0.7	-	$\text{pA}/\sqrt{\text{Hz}}$
Gain Bandwidth Product	-	$f = 1\text{ kHz}$; $R_S = 5.0\text{ k}$	-	110	-	dB

Test Circuits



Closed-Loop Frequency Response



Voltage-Follower

Typical Performance Characteristics

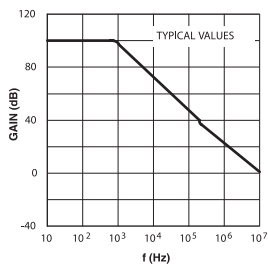


Figure 3. Open-Loop Frequency Response

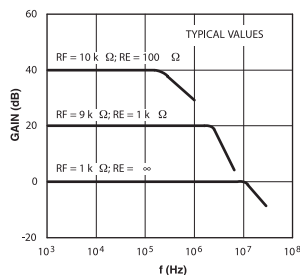


Figure 4. Closed-Loop Frequency Response

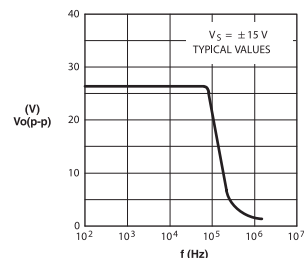


Figure 5. Large-Signal Frequency Response

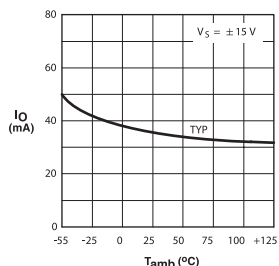


Figure 6. Output Short-Circuit Current

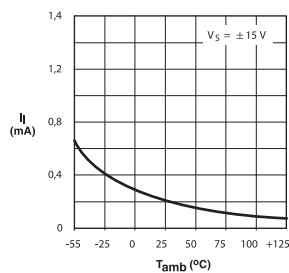


Figure 7. Input Bias Current

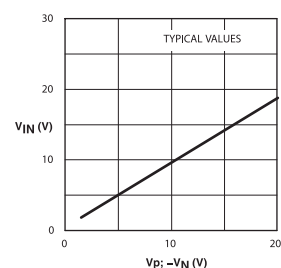


Figure 8. Input Common-Mode Voltage Range

Operational Amplifier

multicompPRO

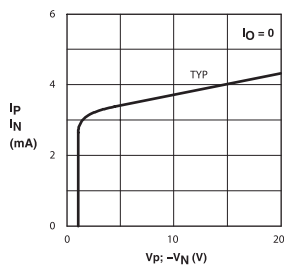


Figure 9. Supply Current

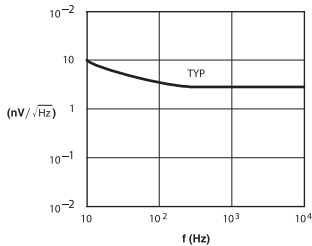
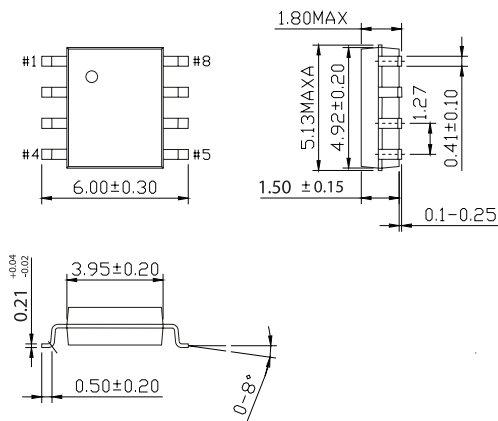


Figure 10. Input Noise Voltage Density

Diagram



Equivalent Diagram

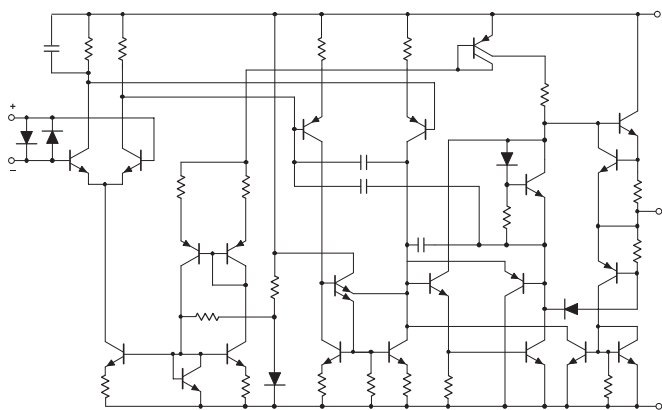
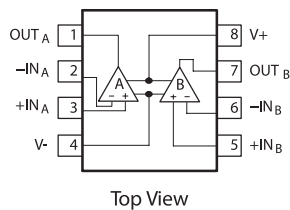


Figure 1. Equivalent Schematic (Each Amplifier)

PIN CONFIGURATION



Part Number Table

Description	Part Number
Dual High Performance Low Noise Operational Amplifier	KM5532

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