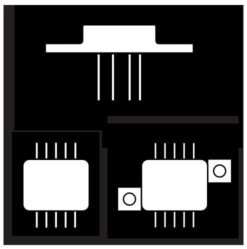
OMA511SK OMA511SKC
OMA511SD OMA511SDZ

HIGH POWER, HIGH CURRENT OPERATIONAL AMPLIFIER



5 Amp Peak Operational Amplifier, Low Distortion A/B Output Stage

FEATURES

- Available In Isolated Standard TO-3, “Copper Slug” TO-3 And Power DIP Packages
- 5 Amp Peak Output Current
- ±10V to ±30V Supply Range
- Low Distortion, Class A/B Output Stage

DESCRIPTION

The OMA511 series is a high voltage, high current power operational amplifier designed to drive a wide variety of resistive and reactive loads. Its complimentary class A/B output stage provides superior performance in applications requiring freedom from cross over distortion. This hybrid is housed in a variety of isolated hermetic packages and is ideally suited for critical environments such as motor drivers, servo amplifiers, audio amplifiers and synchro exertation.

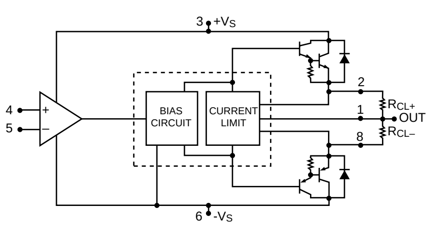
ABSOLUTE MAXIMUM RATINGS @ 25°C

Supply Voltage, $+V_S$ to $-V_S$	68V
Output Current: Source	5A
Sink	See SOA
Power Dissipation, Internal	67W*
Input Voltage: Differential	±(‰V_S‰ - 3V)
Common Mode	$\pm V_S$
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-55°C to 150°C
Lead Temperature (10 Sec. Soldering)	300°C

3.4

SCHEMATIC

TO-3



OMA511SK APPLICATIONS INFORMATION

Power Supplies

Specifications for the OMA511SK are based on a nominal operating voltage of ±28V. A single power supply or unbalanced supplies may be used so long as the maximum total operating voltage (total of $+V_S$ and $-V_S$) is not greater than 68V.

Current Limits

Current limit resistors must be provided for proper operation. Independent positive and negative current limit values may be selected by choice of R_{CL}+ and R_{CL}- respectively. Resistor values are calculated by:

$$R_{CL} = 0.65/I_{LIM}\text{ (amps)} - 0.01$$

This is the nominal current limit value at room temperature. The maximum output current decreases at high temperature as shown in the typical performance curve. Most wire-wound resistors are satisfactory, but some highly inductive types may cause loop stability problems. Be sure to evaluate performance with the actual resistors to be used in production.

ELECTRICAL CHARACTERISTICS (T_C = 25°C; V_S = ±28 V_{DC} unless otherwise noted.)

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Offset Voltage					
Initial Offset			±5	±10	mV
vs Temperature	Full Temperature Range		±10	±65	µV/°C
vs Supply Voltage			±35	±200	µV/V
vs Power			±20		µV/W
Input Bias Current					
Initial			±15	±40	nA
vs Temperature	Full Temperature Range		±0.05	±0.4	nA/°C
vs Supply Voltage			±0.02		nA/V
Input Offset Current					
Initial			±5	±10	nA
vs Temperature	Full Temperature Range		±0.01		nA/°C
Input Impedance*					
Common-Mode			200		M
Differential			10		M
Voltage Range(1)					
Common-Mode Voltage	Full Temperature Range	±(|V_S| - 6)	±(|V_S| - 3)		V
Common-Mode Rejection	V_{CM} = V_S -6V	70	110		dB
Gain Characteristics*					
Open Loop Gain at 10Hz	Full Temperature Range, full load	91	113		dB
Gain Bandwidth Product at 1MHz	T_C = 25°C, full load		1		MHz
Power Bandwidth	T_C = 25°C, I_O = 4A, V_O = 40V p-p	15	23		kHz
Phase Margin	Full Temperature Range		45		Degrees
Output					
Voltage Swing	I_O = 5A	±(|V_S| - 8)	±(|V_S| - 5)		V
	Full Temperature Range, I_O = 2A	±(|V_S| - 6)	±(|V_S| - 5)		V
	Full Temperature Range, I_O = 56mA	±(|V_S| - 5)			V
Current Peak		±5			A
Settling Time to 0.1%*	2V Step		2		µS
Slew Rate	R_L = 2.5	±1.0	1.8		V/µS
Capacitive Load: Unity Gain*	Full Temperature Range			3.3	nF
Gain > 4	Full Temperature Range			SOA(2)	
Power Supply					
Voltage		±10	±28	±30	V
Current, Quiescent	Full Temperature Range		20	30	mA

Thermal Resistance(3) Typical	Conditions	Standard TO-3	Copper Slug TO-3	Power DIP	Units
AC Junction-to-Case		2.1	1.7	1.30	
DC Junction-to-Case	f < 60Hz	2.6	2.0	1.55	°C/W
Junction-to-Air		30	30	25	

Notes: (1) +V_S and -V_S denotes the positive and negative supply voltage respectively. Total V_S is Operating from +V_S to -V_S.

(2) SOA = Safe Operating Area.

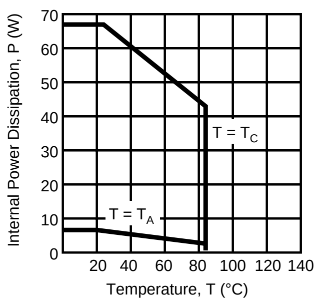
(3) Rating applies only if the output current alternates between both output transistors at a rate faster than 60 Hz.

*Guaranteed - not tested 100%.

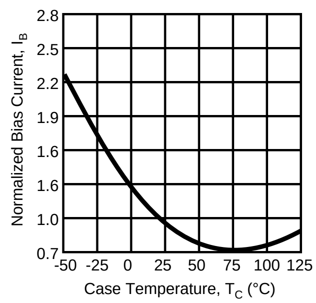
TYPICAL PERFORMANCE CURVES

T_A = +25°C, V_S = ±V_{DC} unless otherwise noted

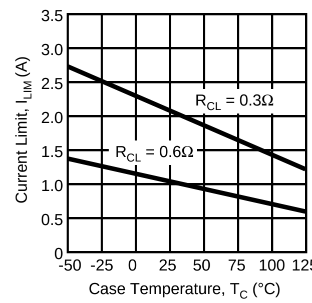
Power Derating



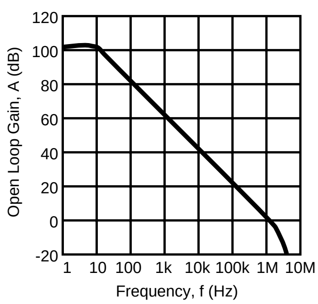
Bias Current



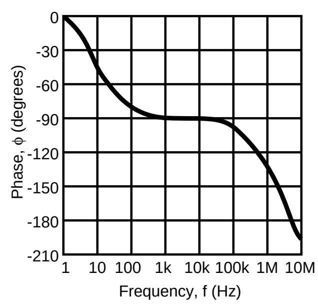
Current Limit



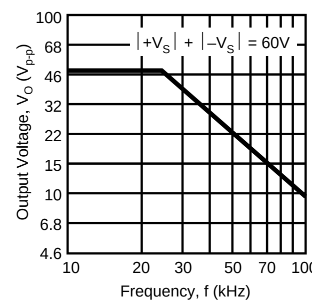
Small Signal Response



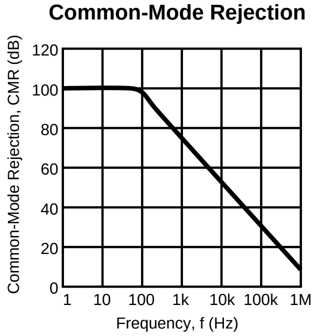
Phase Response



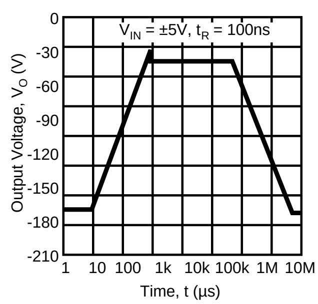
Power Response



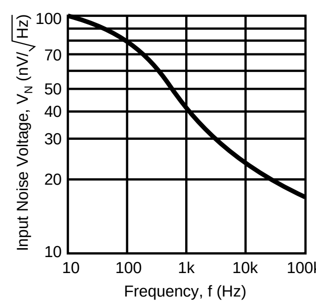
Common-Mode Rejection



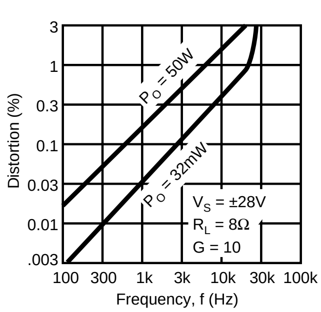
Pulse Response



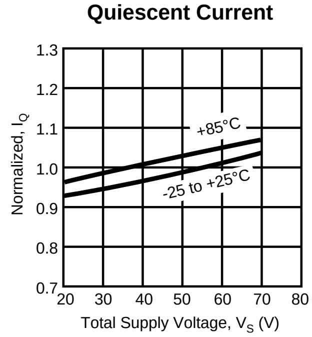
Input Noise



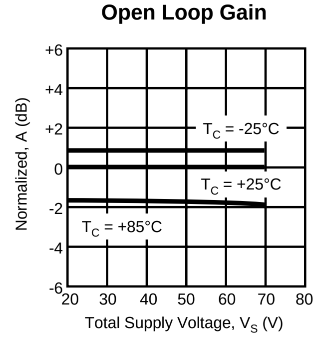
Harmonic Distortion



Quiescent Current



Open Loop Gain



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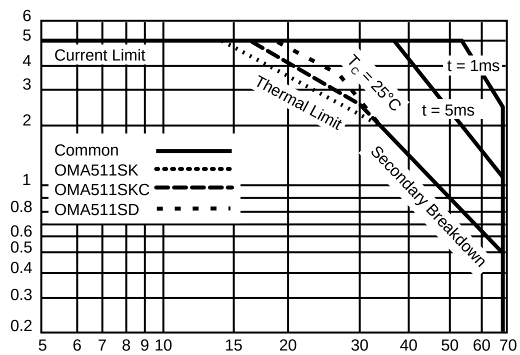
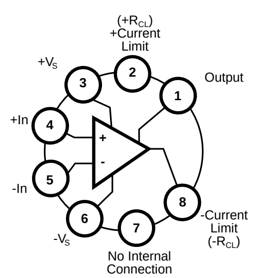
TRANSISTOR SAFE OPERATING AREA (SOA)



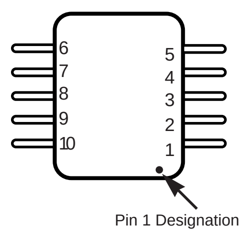
Safe Operating Area (SOA)

The safe operating area plot provides a comprehensive summary of the power handling limitations of a power amplifier, including maximum current, voltage and power as well as the secondary breakdown region. It shows the allowable output current as a function of the power supply to output voltage differential (voltage across the conducting power device).

PIN CONNECTIONS



TOP VIEW TO-3



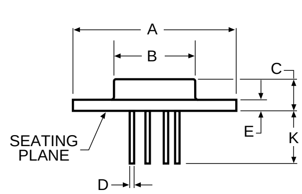
TOP VIEW D-10

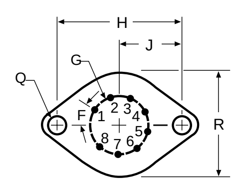
Pin 1: $+R_{CL}$
Pin 2: $+V_S$
Pin 3: +IN
Pin 4: -IN
Pin 5: $-V_S$
Pin 6: $-R_{CL}$
Pin 7: N/C
Pin 8: N/C
Pin 9: N/C
Pin 10: Output

MECHANICAL OUTLINE

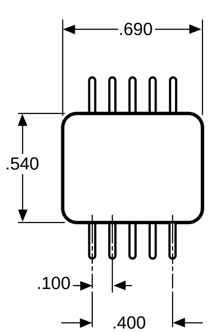
TO-3-8

	INCHES			INCHES	
DIM	MIN	MAX	DIM	MIN	MAX
A	1.510	1.550	G	.500 BASIC	
B	.745	.770	H	1.186 BASIC	
C	.260	.300	J	.593 BASIC	
D	.038	.042	K	.400	.500
E	.080	.105	Q	.151	.161
F	40° BASIC		R	.980	1.020

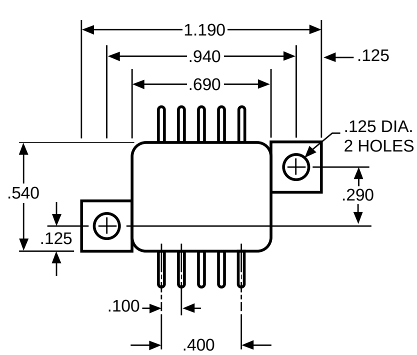




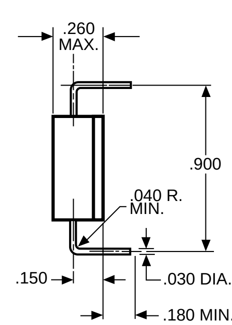
D-10



D-10Z



Common Lead



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