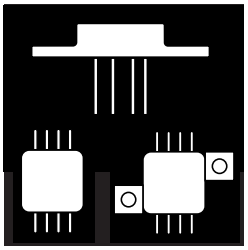
POWER OPERATIONAL AMPLIFIER IN METAL DUAL IN-LINE PACKAGE APPROVED TO DESC DRAWING 5962-88701



8-Pin, TO-3 And Isolated DIP, 10 Amp Power Operational Amplifier, DESC Drawing 5962-88701

FEATURES

- Approved to DESC Drawing 5962-88701
- Available In Isolated Standard TO-3, “Copper Slug” TO-3 And Power DIP Packages
- 10 Amp Peak Output Current
- Power Supplies to ±40V
- Programmable Current Limit
- FET Input

DESCRIPTION

The OMA541 is a power operational amplifier capable of operation from power supplies up to ±40V and continuous output current up to 5A. Internal current limit circuitry can be user-programmed with a single external resistor, protecting the amplifier and load from fault conditions. This product includes three distinctively different package styles. They are the industry standard TO-3, an enhanced TO-3 with a copper slug and the optimum style, a dual in-line power package. This device is ideally suited for Military motor driver, servo amplifier, synchro exertation as well as other power drive circuitry and approved to DESC drawing 5962-88701.

ABSOLUTE MAXIMUM RATINGS @ 25°C

Supply Voltage, $+V_S$ to $-V_S$	80V
Output Current, Peak	10A
Output Current, Continuous	5A
Power Dissipation, Internal	125W
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-55°C to 150°C
Maximum Junction Temperature	175°C
Lead Temperature (10 Sec. Soldering)	300°C

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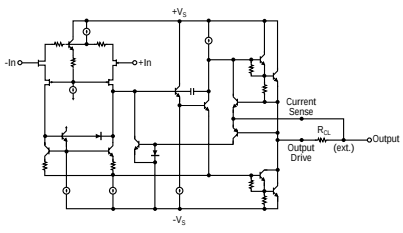
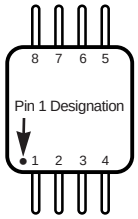
SCHEMATIC

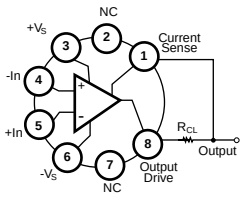


PIN CONNECTION



Pin 1: $-V_S$
Pin 2: NC
Pin 3: OUTPUT
Pin 4: CS
Pin 5: $+V_S$
Pin 6: NC
Pin 7: +IN
Pin 8: -IN

D-8 Top View



TO-3 Top View

ELECTRICAL CHARACTERISTICS (T_C = 25°C; $\pm V_{CC} = \pm 34V_{DC}$ unless otherwise noted.(1))

Parameter	Symbol	Conditions		Min.	Max.	Units
Input Offset Voltage	V_{IO}			-1	+1	mV
Input Offset Voltage Drift	$^3V_{IO}$		•	-30	+30	µV/°C
Input Bias Current	$\pm I_{IB}$			-50	+50	pA
			•	-50	+50	nA
Input Offset Current	I_{OS}			-30	+30	pA
			•	-20	+20	nA
Power Supply Rejection Ratio	+PSRR	$-V_{CC} = -34V_{DC}$, $+V_{CC} = +10$ to $+40V_{DC}$		-10	+10	µV/V
			•	-20	+20	
	-PSRR	$+V_{CC} = +34V_{DC}$, $-V_{CC} = -10$ to $-40V_{DC}$		-10	+10	µV/V
			•	-20	+20	
Common Mode Rejection Ratio	CMRR	$V_{CM} = +22V_{DC}$, f = DC		95		dB
			•	90		
Supply Currents	$\pm I_{CC}$	V_{CM} = 0V, no load condition, T_C = 25°C		-30	+30	mA
		T_C = 125°C		-25	+25	mA
		T_C = -55°C		-35	+35	mA
Output Voltage Peak	V_{OP}	I_O = 5A peak, R_L = 5.6 , 10 kHz sine wave		±28.6		V
		R_L = 10 , 10 kHz sine wave	•	±30		V
Output Current Peak (2)	I_{OP}	R_L = 5.6 , $V_{OUT} = \pm 30V_{DC}$			±5	A
		R_L = 10k , $V_{OUT} = \pm 30V_{DC}$	•		±3	mA
Voltage Gain	A_{VS}	R_L = 10k, T_C = 25°C		95		dB
		T_C = 125°C		90		
		T_C = -55°C		85		
Slew Rate	±SR	R_L = 6.5		±6		V/µs
Thermal Resistance	q_{JC}	(Junction-to-Case)				
		AC Output f 60 Hz				
		OMA541SKB			1.5	°C/W
		OMA541SKCB			1.2	°C/W
		OMA541SDB			.95	°C/W
		DC Output				
		OMA541SKB			1.9	°C/W
		OMA541SKCB			1.5	°C/W
		OMA541SDB			1.15	°C/W
	q_{JA}	(Junction-to-Ambient)			40	°C/W

NOTES: (1) $T_C = T_A$.

(2 Internal current limit circuitry is controlled by a single external resistor, R_{CL}. To calculate the value of the current limit resistor, use $R_{CL} = (0.809/I_{LIM}) - 0.057$, where I_{LIM} is equal to the desired output current (I_{OP}).

• Denotes over specified temperature range.

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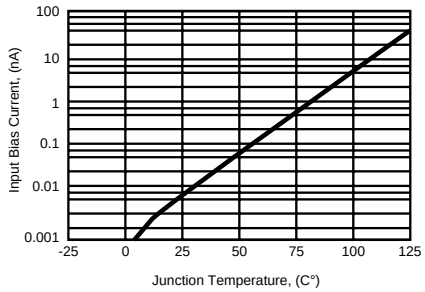
Part Number Designator

Standard Military Drawing Number	Omnirel Part Number	Package
5962-8870101XX	OMA541SKB	TO-3
5962-8870102XX	OMA541SKCB	TO-3 Copper Slug
5962-8870101YX	OMA541SDB	D-8
5962-8870101UX	OMA541SDZB	D-8Z

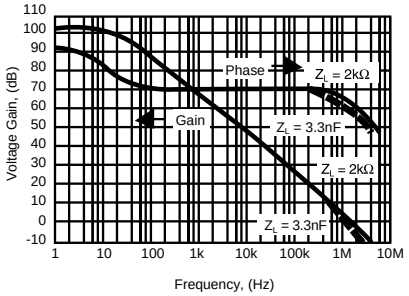
TYPICAL PERFORMANCE CURVES

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

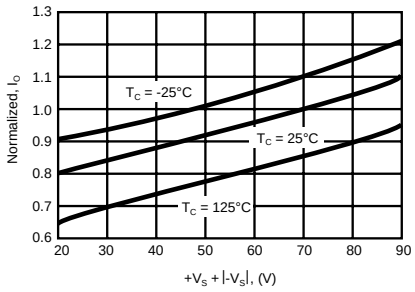
Input Bias Current VS Temperature



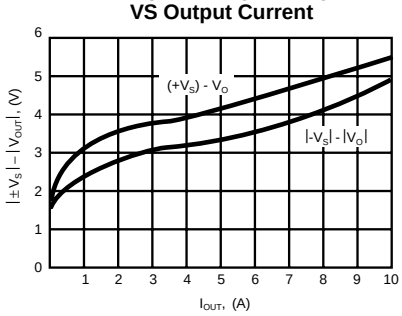
Open-Loop Gain and Phase VS Frequency



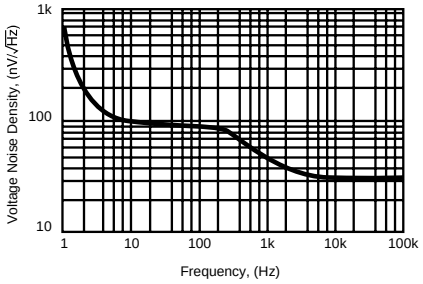
Normalized Quiescent Current VS Total Power Supply Voltage



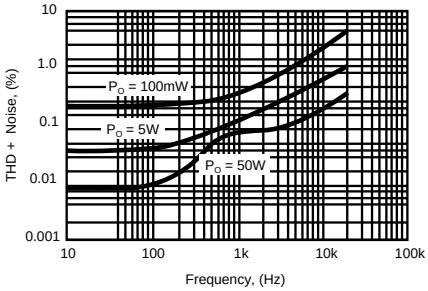
Output Voltage Swing VS Output Current



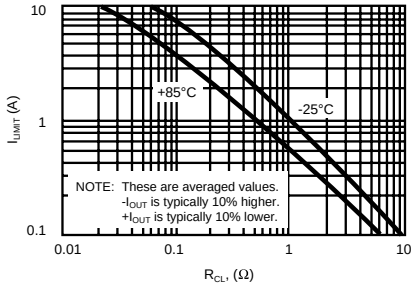
Voltage Noise Density VS Frequency



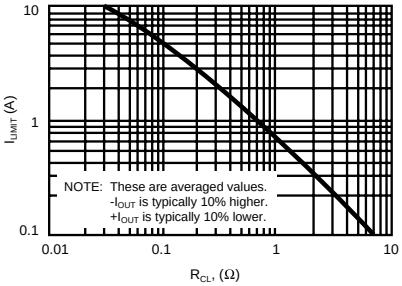
Total Harmonic Distortion VS Frequency



Current Limit VS Resistance Limit VS Temperature



Current Limit VS Resistance Limit VS Temperature



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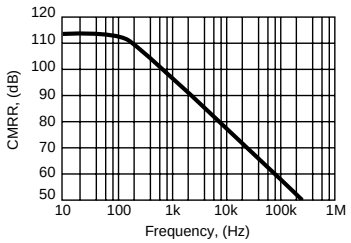
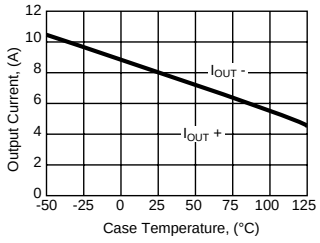
Omnirel

OMA541SKB OMA541SKCB OMA541SDB OMA541SDZB

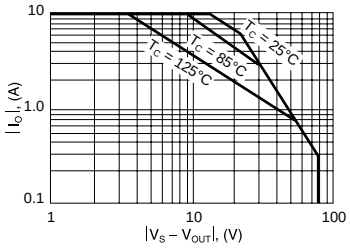
Typical Common-Mode Rejection VS Frequency (Case Dependent)



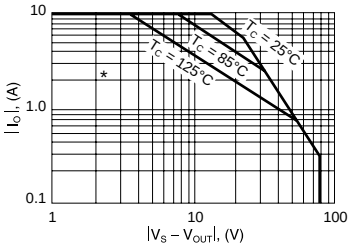
Typical Output Current VS Temperature (Case Dependent)



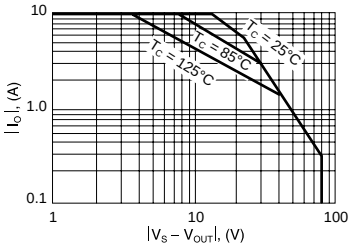
Copper Slug TO-3 Safe Operating Area OMA541SKCB



Standard TO-3 Safe Operating Area OMA541SKB

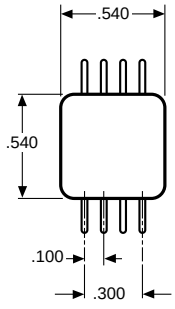


Power DIP Safe Operating Area OMA541SDB/SDZB

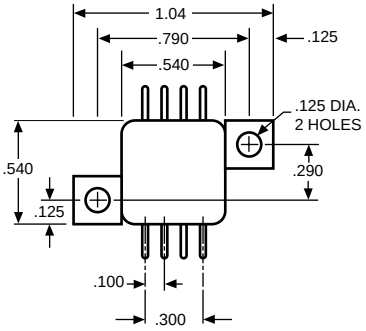


MECHANICAL OUTLINE

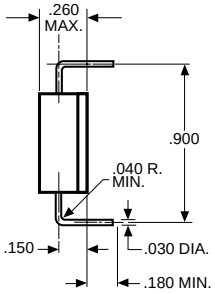
D-8



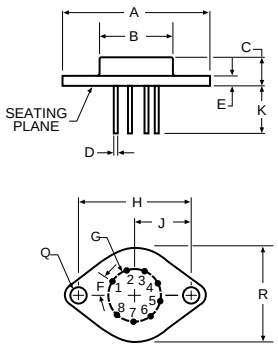
D-8Z



COMMON LEAD



TO-3-8



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.510	1.550	38.35	39.37
B	.745	.770	18.92	19.56
C	.260	.300	6.60	7.62
D	.038	.042	0.97	1.07
E	.080	.105	2.03	2.67
F	40° BASIC		40° BASIC	
G	.500 BASIC		12.7 BASIC	
H	1.186 BASIC		30.12 BASIC	
J	.593 BASIC		15.06 BASIC	
K	.400	.500	10.16	12.70
Q	.151	.161	3.84	4.09
R	.980	1.020	24.89	25.91

Note: Leads in true position within 0.010" (0.25mm) R at MMC at seating plane.

Pin numbers shown for reference only. Numbers may not be marked on package.

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