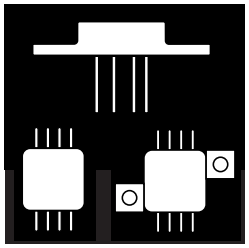
HIGH POWER, HIGH CURRENT OPERATIONAL AMPLIFIER



8-Pin, TO-3 And DIP, 10 Amp Monolithic Power Operational Amplifier

FEATURES

- 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
- Available Screened to MIL-STD-883

DESCRIPTION

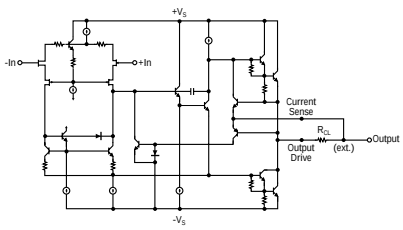
The OMA541 is a power operational amplifier capable of operation from power supplies up to ±40V and continuous output current up to 5A. Internal current limit circuitry can be user-programmed with a single external resistor, protecting the amplifier and load from fault conditions. The OMA541 pinout is compatible with popular power operational amplifiers such as the OPA511, OPA512 and OPA3573. This device is ideally suited for Military motor driver, servo amplifier, synchro exertation as well as other power drive circuitry. The OMA541SKC incorporates a copper slug to the header for improved thermal performance.

ABSOLUTE MAXIMUM RATINGS @ 25°C

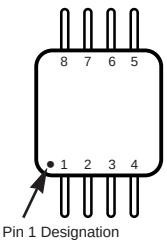
Supply Voltage, $+V_S$ To $-V_S$	80V
Output Current, Continuous	5A
Power Dissipation, Internal	125W
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-55°C to 150°C
Maximum Junction Temperature	150°C
Lead Temperature (10 Sec. Soldering)	300°C

3.4

SCHEMATIC

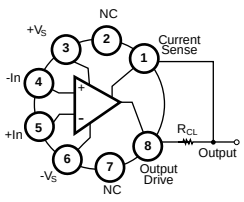


PIN CONNECTION



D-8 Top View

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



TO-3 Top View

ELECTRICAL CHARACTERISTICS (T_C = 25°C; V_S = ±34 V_{DC} unless otherwise noted.)

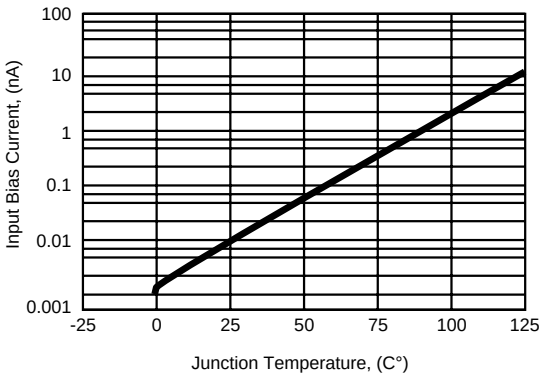
Parameter	Conditions	Min.	Typ.	Max.	Units
Input Offset Voltage					
V_{OS}			±.01	±2	mV
vs Temperature	-25°C to +125°C		±15	±30	µV/°C
vs Temperature	-55°C to -25°C		±20	±40	µV/°C
vs Supply Voltage	V_S = ±10V to ± V_{MAX}		±2.5	±10	µV/V
vs Power			±20	±60	µV/W
Input Bias Current					
I_B			4	50	pA
Input Offset Current			±1	±30	pA
I_{OS}	Specified Temperature Range		±5	±20	nA
Input Characteristics					
Common-Mode Voltage Range	-55°C to +85°C	±(œV$_S$œ- 6)	±(œV$_S$œ- 3)		V
	+85°C to +125°C	±(œV$_S$œ- 6.5)	±(œV$_S$œ- 3.2)		V
Common-Mode Rejection	V_{CM} = ±(œV$_S$œ- 6V)		113		dB
	V_{CM} = ±22V	95			dB
Input Capacitance*			5		pF
Input Capacitance, DC*			1		T
Gain Characteristics					
Open Loop Gain at 10Hz	R_L = 10k	90	97		dB
Gain Bandwidth Product*			1.6		MHz
Output					
Voltage Swing	I_o = 5A, Continuous	±(œV$_S$œ- 5.5)	±(œV$_S$œ- 4.5)		V
	I_o = 2A	±(œV$_S$œ- 4.5)	±(œV$_S$œ- 3.6)		V
	I_o = 0.5A	±(œV$_S$œ- 4)	±(œV$_S$œ- 3.2)		V
Current Peak		9	10		A
AC Performance					
Slew Rate		6	10		V/µS
Power Bandwidth*	R_L = 8 , V_o = 20V_{rms}		55		KHz
Setting Time to 0.1%*	2V Step		2		µS
Capacitive Load*	Specified Temperature Range, G =1	3.3			A
	Specified Temperature Range, G >10			SOA	
Phase Margin*	Specified Temperature Range, R_L = 8		40		Degrees
Power Supply					
Power Supply Voltage, ±V_S		±10	±35	±40	V
Current Quiescent			20	25	mA
	Specified Temperature Range		25	35	mA
Thermal Resistance					
q_{JC} (Junction-to-Case)	AC Output f 60 Hz				
	OMA541SK		1.25	1.5	°C/W
	OMA541SKC		1.00	1.2	°C/W
	OMA541SD		.85	.95	°C/W
	DC Output				
	OMA541SK		1.60	1.9	°C/W
	OMA541SKC		1.20	1.5	°C/W
	OMA541SD		1.00	1.15	°C/W
q_{JA} (Junction-to-Ambient)			30		°C/W

Note: *Guaranteed - not tested 100%.

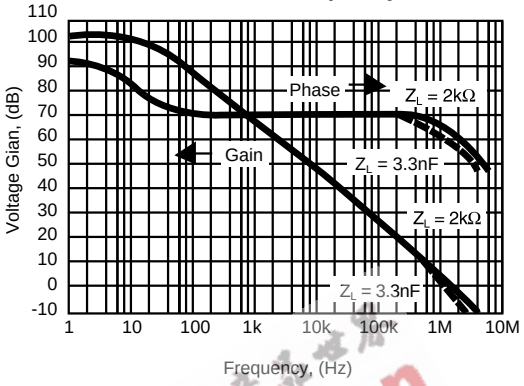
TYPICAL PERFORMANCE CURVES

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

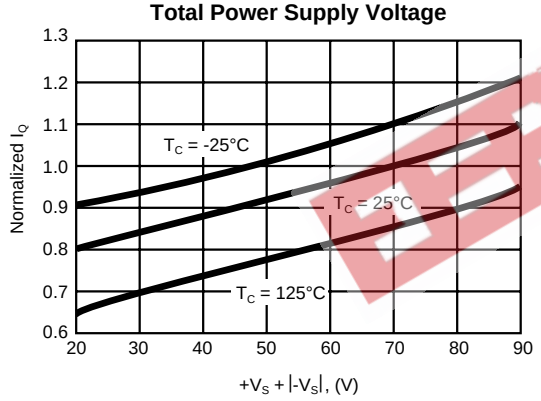
Input Bias Current VS Temperature



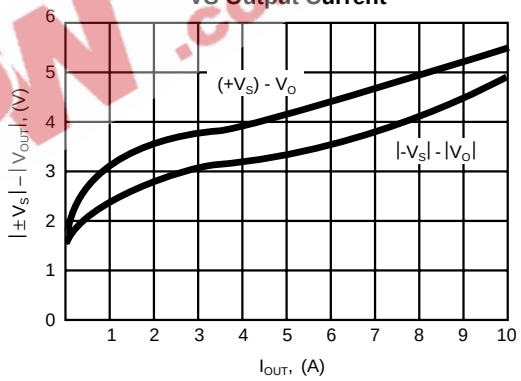
Open-Loop Gain and Phase VS Frequency



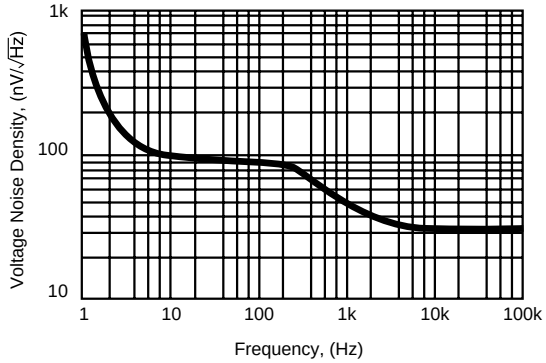
Normalized Quiescent Current VS Total Power Supply Voltage



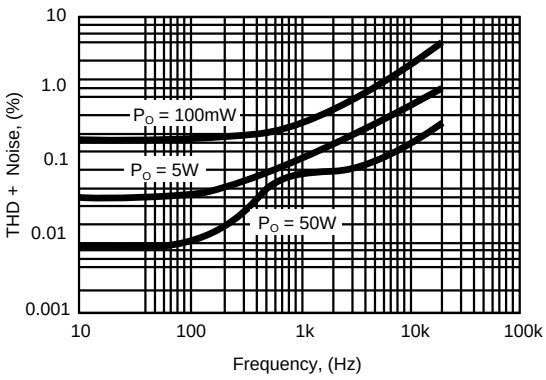
Output Voltage Swing VS Output Current



Voltage Noise Density VS Frequency



Total Harmonic Distortion VS Frequency



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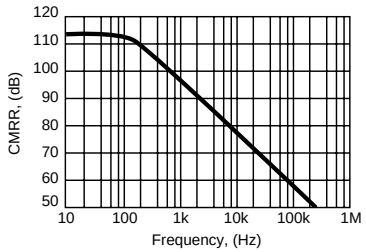
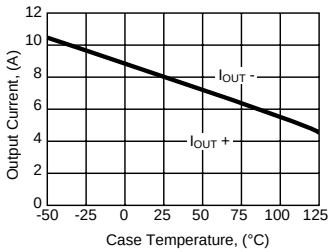
Omnirel

OMA541SK OMA541SKC OMA541SD OMA541SDZ

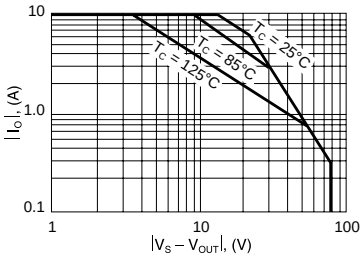
Typical Common-Mode Rejection VS Frequency (Case Dependent)



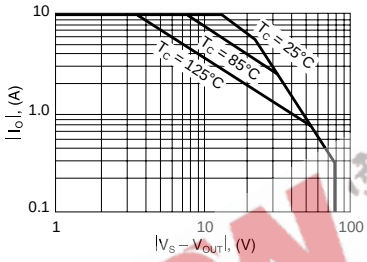
Typical Output Current VS Temperature (Case Dependent)



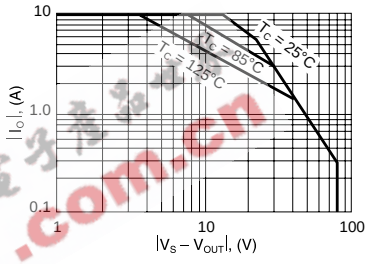
Copper Slug TO-3 Safe Operating Area OMA541SKC



Standard TO-3 Safe Operating Area OMA541SK

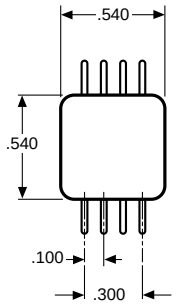


Power DIP Safe Operating Area OMA541SD/SDZ

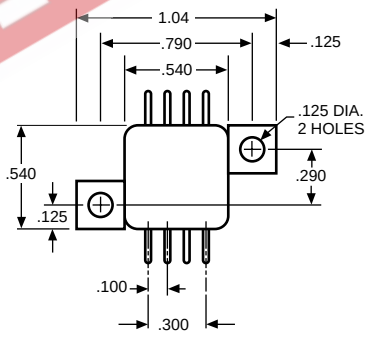


MECHANICAL OUTLINE

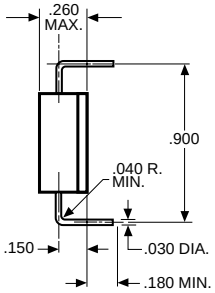
D-8



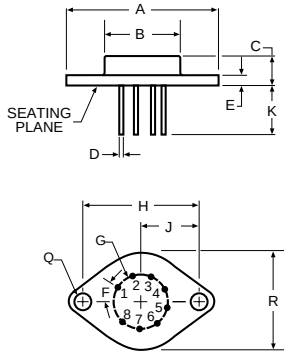
D-8Z



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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