

OPA547 OPA548

PRELIMINARY INFORMATION
SUBJECT TO CHANGE
WITHOUT NOTICE

High-Voltage, High-Current OPERATIONAL AMPLIFIERS

FEATURES

- **WIDE SUPPLY RANGE**
Single Supply: +8V to +70V
Dual Supply: $\pm 4V$ to $\pm 35V$
- **HIGH OUTPUT CURRENT**
OPA547: 500mA Continuous
OPA548: 3A Continuous
- **WIDE OUTPUT VOLTAGE SWING**
- **FULLY PROTECTED:**
Thermal Shutdown
Adjustable Current Limit
- **OUTPUT DISABLE CONTROL**
- **THERMAL SHUTDOWN INDICATOR**
- **HIGH SLEW RATE: 6V/ μs**
- **LOW QUIESCENT CURRENT:**
9.5mA OPA547
- **7-LEAD STAGGERED TO-220 and DDPACK SURFACE-MOUNT PLASTIC POWER PACKAGE**

APPLICATIONS

- VALVE, ACTUATOR DRIVER
- SYNCHRO, SERVO DRIVER
- POWER SUPPLIES
- TEST EQUIPMENT
- TRANSDUCER EXCITATION
- AUDIO AMPLIFIER

DESCRIPTION

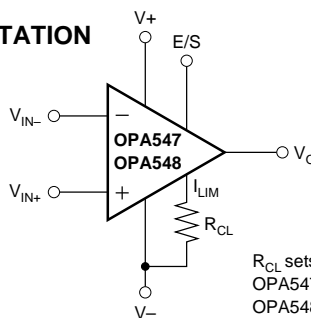
The OPA547 and OPA548 are low cost, high-voltage/high-current operational amplifiers ideal for driving a wide variety of loads. A single laser-trimmed monolithic integrated circuit provides excellent low-level signal accuracy and high output voltage swing.

The OPA547 and OPA548 can operate from either single or dual supplies for design flexibility. In single supply operation, the input common-mode range extends below ground.

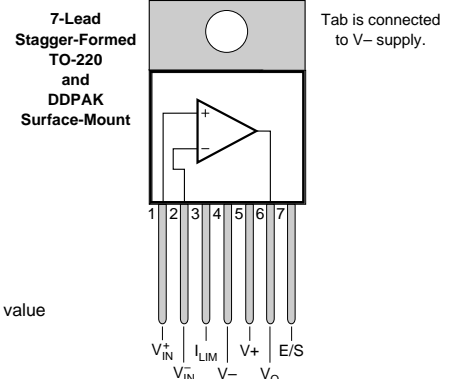
The OPA547 and OPA548 are fully protected. Internal current limit and thermal shutdown circuits prevent damage from over-temperature conditions. Current limit is accurately set from 0 to 750mA peak (OPA547) and from 0 to 5A peak (OPA548) with a single low-power resistor, R_{CL} .

The Enable/Status (E/S) pin provides two functions: an input on this pin will disable the output stage and/or the output can be monitored to determine if the device is in thermal shutdown.

The OPA547 and OPA548 packages are an industry-standard 7-lead staggered TO-220 and a 7-lead DDPACK surface-mount plastic power package. The copper tab allows easy mounting to a heat sink or circuit board for excellent thermal performance. Both products are specified for operation over the extended industrial temperature range, $-40^{\circ}C$ to $+85^{\circ}C$.



R_{CL} sets the current limit value
OPA547: 0 to 750mA
OPA548: 0 to 5A



SPECIFICATIONS

At $T_{CASE} = +25^{\circ}C$, $V_S = \pm 35V$ and E/S pin open, unless otherwise noted.

PARAMETER	CONDITION	OPA547T, F OPA548T, F			UNITS
		MIN	TYP	MAX	
OFFSET VOLTAGE Input Offset Voltage vs Temperature vs Power Supply	$V_{CM} = 0V$ Operating Temperature Range $V_S = \pm 4V$ to $\pm 35V$		± 1 ± 20 10	± 4 30	mV $\mu V/^{\circ}C$ $\mu V/V$
INPUT BIAS CURRENT⁽¹⁾ Input Bias Current vs Temperature Input Offset Current	$V_{CM} = 0V$ $V_{CM} = 0V$		-125 ± 0.5 ± 5	-500 ± 50	nA $nA/^{\circ}C$ nA
INPUT VOLTAGE RANGE Common-Mode Input Range Common-Mode Rejection	Linear Operation $V_{CM} = (V-) - 0.1V$ to $(V+) - 3V$	$(V-) - 0.1$ 85	$(V-) - 0.2 / (V+) - 2$ 95	$(V+) - 3$	V dB
OPEN-LOOP GAIN Open-Loop Voltage Gain, $f = 10Hz$ $f = 10Hz$	$V_O = \pm 30V$, $R_L = 1k\Omega$ $V_O = \pm 30V$, $R_L = 60\Omega$	100	110 90		dB dB
FREQUENCY RESPONSE Gain-Bandwidth Product Slew Rate Settling Time: $\pm 0.1\%$ Total Harmonic Distortion + Noise, $f = 1kHz$	$R_L = 60\Omega$ 60Vp-p, $R_L = 60\Omega$ G = -10, 60V Step $R_L = 60\Omega$		1 6 20 0.05		MHz V/ μs μs %
OUTPUT: OPA547 Voltage Output, Positive Negative Positive Negative Current Output, Continuous Output Current Limit Current Limit Range Current Limit Equation Current Limit Capacitive Load Drive (Stable Operation)	$I_O = 0.5A$ $I_O = 0.5A$ $I_O = 0.1A$ $I_O = 0.1A$ $R_{CL} = 31.6k\Omega$ G = +1	$(V+) - 2.2$ $(V-) + 1.6$ $(V+) - 1.8$ $(V-) + 1.2$	$(V+) - 1.9$ $(V-) + 1.3$ $(V+) - 1.5$ $(V-) + 0.8$ ± 500 0 to ± 750 $I_{SC} = 5000 \cdot 4.75 / (31600\Omega + R_{CL})$	± 385	V V V V mA mA A mA A pF
OUTPUT: OPA548 Voltage Output, Positive Negative Positive Negative Current Output, continuous Output Current Limit Current Limit Range Current Limit Equation Current Limit Capacitive Load Drive (Stable Operation)	$I_O = 3A$ $I_O = 3A$ $I_O = 0.6A$ $I_O = 0.6A$ $R_{CL} = 14.8k\Omega$ G = +1	$(V+) - 4.3$ $(V-) + 4.3$ $(V+) - 2.5$ $(V-) + 2$	$(V+) - 3.9$ $(V-) + 3.9$ $(V+) - 2$ $(V-) + 1.5$ ± 3 0 to ± 5 $I_{SC} = 15000 \cdot 4.75 / (13750\Omega + R_{CL})$	2.3 2.5 1000 2.7	V V V V A A A A pF
ENABLE /STATUS (E/S) PIN Shutdown Input Mode $V_{E/S}$ High (output enabled) $V_{E/S}$ Low (output disabled) $I_{E/S}$ High (output enabled) $I_{E/S}$ Low (output disabled) Thermal Shutdown Status Output Normal Operation Thermally Shutdown Junction Temperature, Shutdown Reset from Shutdown	E/S Pin Open or Pulled High E/S Pin Pulled Low E/S Pin Open or Pulled High E/S Pin Pulled Low Sourcing up to 20 μA Sinking up to 10 μA	$(V-) + 2.4$ V- -43 -47 $(V-) + 2.4$	 -43 -47 $(V-) + 3.3$ $(V-) + 0.2$ +160 +140	V+ $(V-) + 0.8$ $(V-) + 0.8$	V V μA μA V V $^{\circ}C$ $^{\circ}C$
POWER SUPPLY Specified Operating Voltage Operating Voltage Range Quiescent Current, OPA547 OPA548 Quiescent Current, Shutdown Mode, OPA547 OPA548	I_{LIM} Connected to V- I_{LIM} Connected to V- I_{LIM} Connected to V- I_{LIM} Connected to V-	± 4	± 35 ± 9.5 ± 15 ± 4 ± 5	± 35 ± 12 ± 20	V V mA mA mA mA
TEMPERATURE RANGE Specified Range Operating Range Thermal Resistance, θ_{JC} $f > 50Hz$ DC	(OPA547/OPA548) (OPA547/OPA548)	-40 -40	 3.5/2.5 4.5/3.5	+85 +125	$^{\circ}C$ $^{\circ}C$ $^{\circ}C/W$ $^{\circ}C/W$

NOTES: (1) High-speed test at $T_J = 25^{\circ}C$.

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OPA547/548