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IMPROVE OPA541 CURRENT-LIMIT STABILITY

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OPA541 is the industry's highest performance monolithic power amplifier. It can operate on ±40V power supplies and put out 5A continuously (10A peak). Internal current-limit circuitry can be user-programmed with a single external resistor to protect the amplifier and load from fault conditions.

Under some conditions, the OPA541 may oscillate during current limit. In some applications, this is acceptable. However, you can improve stability during current limit by adding external compensation as shown in Figure 1.

The compensation circuit consists of an R, C network connected to the amplifier drive output as shown. Component values for the network depend on the output current limit desired. Table I below shows recommended values.

CURRENT LIMIT (A)	R_{CL} (Ω)	R_1 (Ω)	C_1 (µF)
0.08 to 0.16	10 to 5	0.68(1)	0.68
0.17 to 0.77	5 to 1	1.3(1)	0.33
0.78 to 10.0	1 to 0	2.7	0.068

NOTE: (1) You can use two or four parallel connected 2.7Ω resistors to make 1.3Ω or 0.68Ω.

TABLE I. R_1, C_1 Network Values for OPA541—see Figure 1.

CALCULATING CURRENT LIMIT RESISTOR VALUE

OPA541M

$$R_{CL} = \frac{0.809}{I_{CL}} - 0.057$$

OPA541P

$$R_{CL} = \frac{0.813}{I_{CL}} - 0.020$$

Where:

R_{CL} = Current limit resistor (Ω)

I_{CL} = Current limit (|A|)

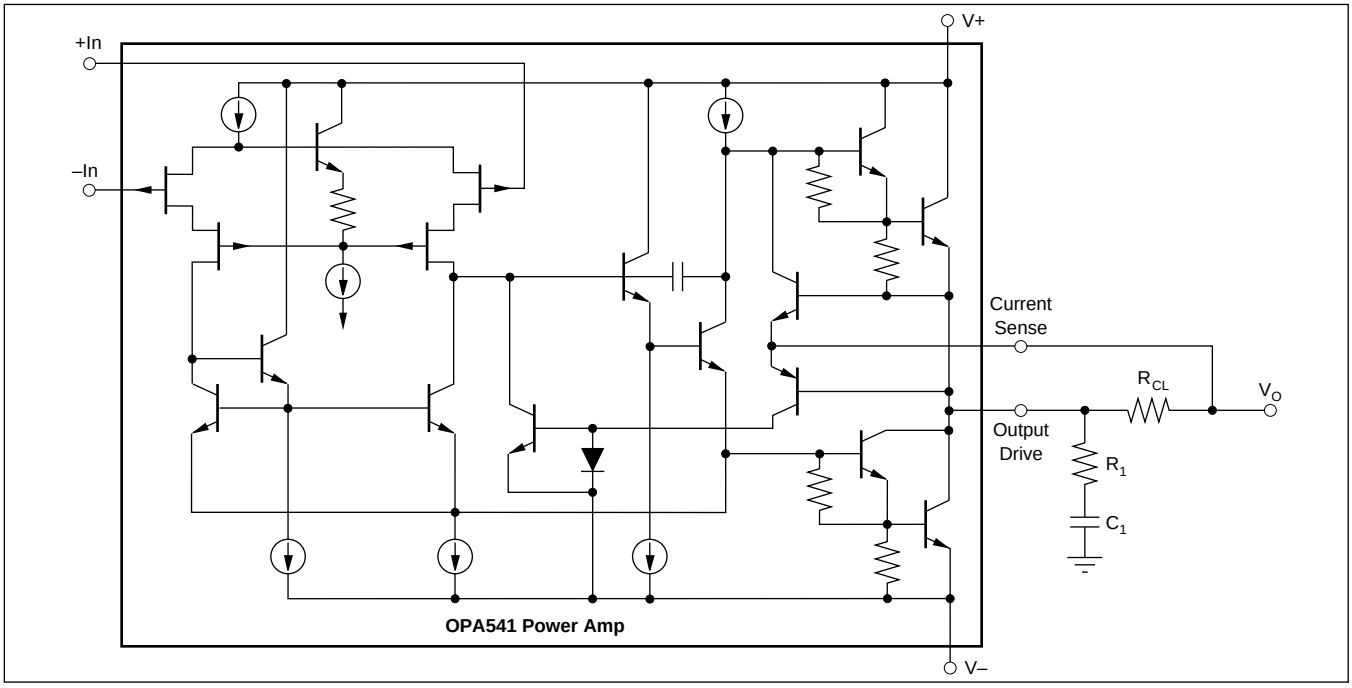

FIGURE 1. An R_1, C_1 network can be added to the OPA541 output to improve stability during current limit.

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