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AN ISOLATION CIRCUIT FOR CONTROL ROOM POWER SUPPLIES

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Collider Accelerator Department

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AN ISOLATION CIRCUIT FOR CONTROL ROOM POWER SUPPLIES

The need occasionally arises for an isolation circuit between low power Control Room Power Supplies (CRPS) that feed low field compensating currents to various correction elements in the AGS ring. This can normally be achieved by putting diodes in series with the CRPS output. However, it becomes sometimes necessary to protect the CRPS from high oscillating voltage transients that result from high power pulsing of the correction elements.

This was the case when the skew quadrupole at E-15 was to be pulsed to 900 A. The transients are then of the order of a few hundred volts and of either polarity. A more involved combination of diodes than just a single one in series had to be considered. Since in this case some care has to be taken in the selection of diodes and their ratings and also consideration be made of the transient loads presented to the CRPS, an alternative solution shown in Fig. 1 was arrived at.

Q1 presents a constant load impedance to the CRPS. The diode D, across points A and B, shorts out any inverse transients from the correction element. The voltage ratings of D are relatively low and are independent of the load voltages. These voltages are effectively isolated by the

impedance of the high power resistor R. Transistor Q2 shorts out points A and B whenever a positive transient appears at the output terminals.

The circuit of Fig. 1 was introduced in May 1968, and has since proved entirely satisfactory whenever it was used.

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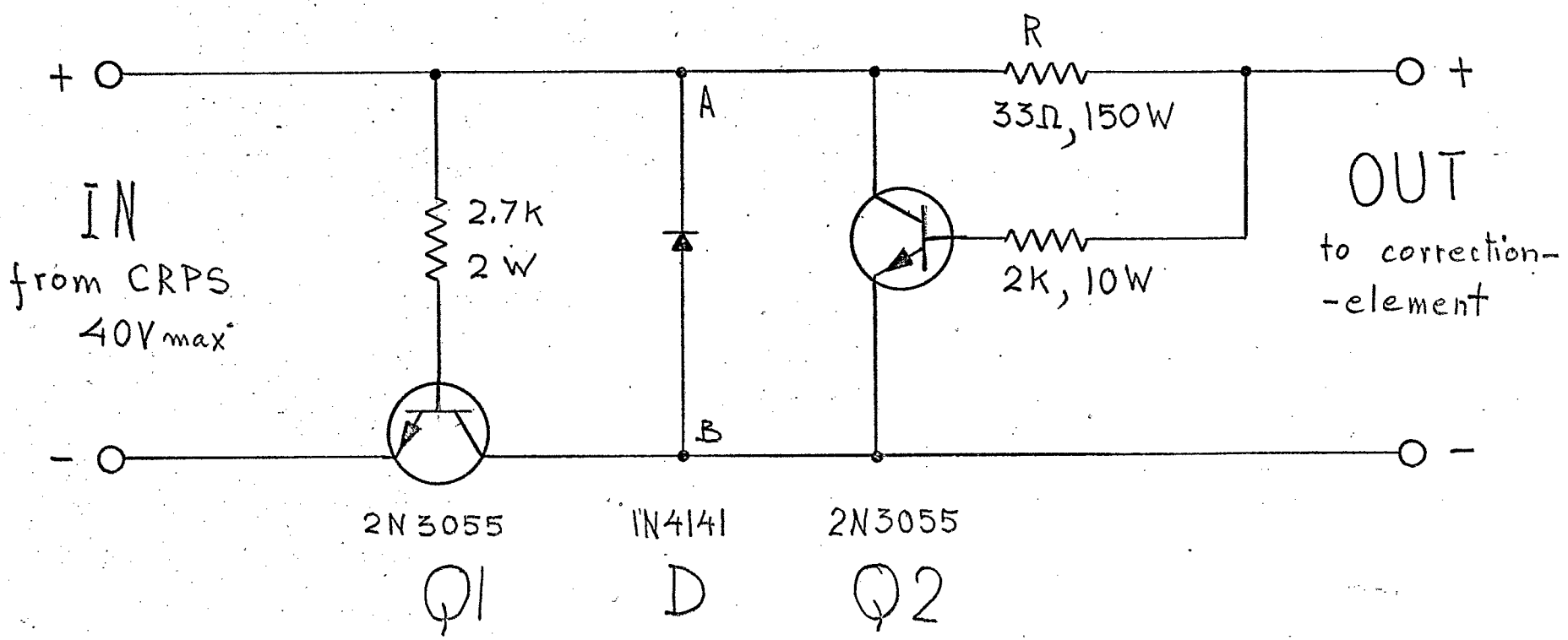
+
IN
from CRPS
40V max
2.7K
2 W
A
B
R
33Ω, 150W
2K, 10W
+
OUT
to correction-
-element
-
2N3055
Q1
1N4141
D
2N3055
Q2

Figure 1