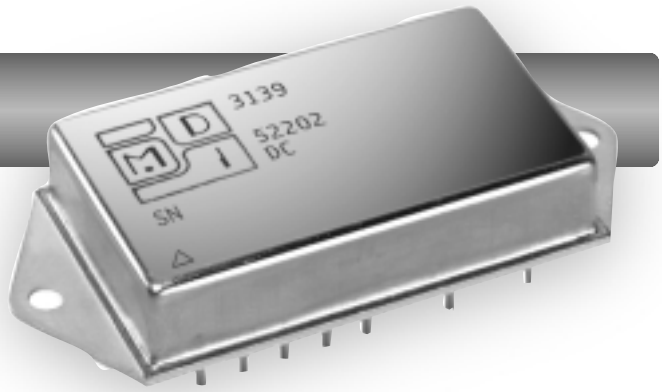

MDI provides Sequenced Power Converters for RF Applications

Power converters for FET RF amplifiers, also known as EPCs, need outputs which cause the gate voltage to appear first and are removed last. MDI can provide the sequencing as an integral part of a single converter.

MDI has designed and manufactured many such DC/DC converters for driving FET Solid State Power Amplifiers (SSPAs) in aircraft and space applications, using several different topologies for this purpose. These FET RF amplifiers require that on turn on, the negative gate bias voltage appears first before the positive drain voltage is applied. On turn off, the negative gate bias must remain on while the positive drain voltage is removed. This is because the gate of the FET is enhanced at zero voltage, so the gate is not controlled in the absence of the negative bias.

The basic power converter for higher power SSPA applications (up to 100 watts in hybrid form) is derived from a unique MDI model originally used to power the main X band SSPA in the JPL Mars Pathfinder project.

The key features of the higher power design are:

1. The power stage topology is a 200 kHz current mode flyback converter, which has good rejection of input variations.
2. A single flyback converter stage is used for all positive and negative outputs.
3. Output sequencing and inhibit is achieved with output FET switches.

The basic power converter topology for the lower power (up to 30 watts in hybrid form) SSPA applications is derived from an MDI model originally used to power a backup SSPA in a space application. The low power topology has fewer parts, so it is more suited for low power applications. However, there is slightly less control over the sequencing delays than the higher power topology. The basic low power sequenced topology is a 200 kHz current mode flyback converter, combined with a low power *forward* output. This combination of flyback and forward modes allows a naturally simple sequencing with a minimum of parts.

The negative output voltage is derived from a forward connected winding, also using a linear regulator. The positive outputs are derived from flyback windings. The principal of this topology relies on obtaining tight coupling between the flyback transformer primary and the forward winding. The initially very narrow spikes of the FET are peak detected and allow the forward voltage to appear first at turn on. The flyback voltages rise more slowly. This creates the turn on delay.

When power is removed, hold up capacitance supplies the negative output while the other outputs decay.

Consult MDI's sales and marketing department for specific requirements. The sequenced converter needed for your application may have been previously developed and manufactured.

Sequenced Converters:

Model	Main Out. V@A	Second Out. V@A	Neg. Out. V@A	Size in.	Input VDC	Const.	Power Total W
2648	9@10	7@4	-5@0.80	2.3 x 7 x 1.0	120	mixed	120
3074	7.5@8		-5@0.25	2.5 x 3 x 0.5	28	hybrid	61
3188	10@1.5		-5@0.25	2 x 4 x 1	110	SMT	16
3134	6@3.5		-2@0.10	1.35 x 2.12 x 0.495	28	hybrid	21
3139	9.45@3		-5@0.05	1.35 x 2.12 x 0.495	28	hybrid	29
53281	5@0.81	3@0.6	-5@0.15	2.6 x 2.7 x 0.495	28	hybrid	6.6
53282	6@0.75	3@0.375	-5@0.15	2.6 x 2.7 x 0.495	28	hybrid	6.4
53293	5.4@0.81	3.4@0.6	-5.4@0.15	2.6 x 2.7 x 0.495	28	hybrid	7.2

"Power Conversion any way you want it"

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