TECH BRIEF

High Power RF Components

Switches, Limiters & IMAs

20 MHz to 18 GHz – Peak Power Levels up to 2000W

Mercury Systems' high power switches range from SP1T to SP3T devices up to 1 kW CW for reflective configurations and input matched topologies up to 400W CW. Each is available in octave bandwidths from 20 MHz to 18 GHz with as low as 0.4 dB insertion loss and 40-60 dB isolation. Custom transfer and cross matrices through 24 ports and SWaP optimized solutions combining switches with control functions are available, as well as our standard configurations.

Understanding High Power Switching

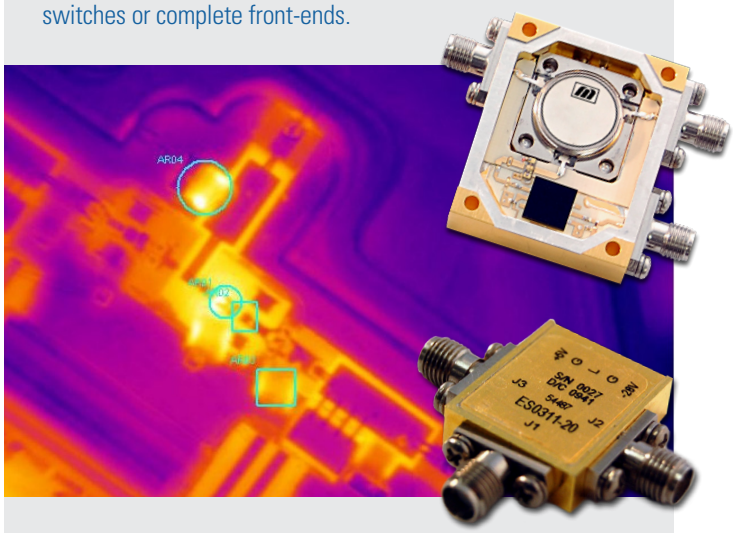
Where to use our high power PIN devices: PIN switches may be applied to any control situation found in today's systems. T/R switches, antenna selectors, polarity switches, switch filters, switched attenuators, duplexers and receiver protectors have been successfully configured with Mercury Systems' high power control designs.

What can high power PIN switches do: Mercury Systems PIN switches are available in single or multi-throw layouts; ported in both waveguide and coax with reciprocal power. They are usually reflective, which means that power presented at any OFF port will be reflected. This is important to bear in mind when deciding where to locate isolators or circulators in the system to protect system elements sensitive to excessive reflected power.

High power PIN switches are often designed to be cold-switched when there is no significant RF power in the system. We also design hot-switched products; just let us know the details of your pulse characteristics and layout of the system elements nearby the switch.

Generally low loss devices, our PIN switches usually require only modest heat sinking; although thermal path management should be discussed under special circumstances.

High power capabilities include custom control devices and multifunction assemblies; purpose built to suit your application needs. These may combine active and passive circuit elements, such as switch filters, switched attenuators, phase shift switches or complete front-ends.



Some options available for many of our designs are listed below.

- RF Connectors: TNC, Type N, SC, SMA, pins, tabs
- Logic alternatives: TTL, RS-422
- Logic connection: Pins, SMA, DEM, custom multi-pin
- Position Indicating
- BITE
- Transfer switches (DPDT)
- Switched attenuator
- On-board DC power conversion
- Sub-assemblies
- Absorptive (terminated, matched) switches
- TR switches (SPDT with one low power high isolation path)

Depending on the peak power (RF voltage) levels encountered, our switches will switch from one position to another in the range of 50 nano-seconds to a few microseconds; faster than electro-mechanical switches which take from 20 to 100 milliseconds to switch. High power PIN switches are also three to five times faster than ferrite switches.

Typically they offer higher isolation; 40 to 50 dB for most standard high power PIN switches, versus 20 to 25 dB for ferrite hybrid/circulator switches and 70 dB for electromechanical switches.

Properly specified and applied, a PIN switch should last the life of the system. The PIN device is all solid state, so there is virtually nothing to wear out. Electromechanical switches have a practical life-time ranging from 250,000 cycles to 2,000,000 cycles, after which they must be replaced. Consider the cost of system repair over the expected life of the system when choosing mechanical versus PIN switches, and you will usually find that the PIN switch is easily cost justified.

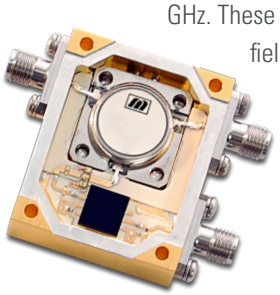
Mercury Systems designs and manufactures a vast selection of medium to high power switch products. A representation of these high power switches offer ultra-fast switching in under 800 nano-seconds while handling up to 5 kW of power.

High Power Switches & Limiters

High power PIN switches from 0.5 to18 GHz offer faster switching, low-insertion loss, smaller size and weight while providing higher reliability and greater versatility. These switches offer a practical solution for use in frontend high-power systems. Our PIN diode switches area also available in waveguide designs.

Medium power broadband single pole double throw (SPDT) series of switches are designed for reliable operation at power levels of 5 W, 10 W, 20 W, 50 W and 100 W averages from 100 MHz to 18 GHz. These are robust PIN diode switches with proven field reliability. Proprietary PIN diode architecture minimizes junction temperatures to assure long life under medium power conditions.

High power limiters from 0.5 to 18 GHz and power levels up to 2 kW peak, and broadband high power limiters from 2 GHz to 20 GHz. These are robust PIN diode limiters with proven field reliability, featuring fast recovery time and low insertions loss. Optimized PIN diode architecture minimizes junction temperatures to assure long life under high power conditions. Connector configurations include, SMA, Type N, drop in, blind mate, and others.



Learn more about the high power products and thermal management at http://rf.mrcy.com

 2965.00E-0513-TB-High-Pwr-RF

www.mrcy.com

MERCURY SYSTEMS™

Innovation That Matters™

Corporate Headquarters
201 Riverneck Road
Chelmsford, MA 01824-2820 USA
(978) 967-1401 • (866) 627-6951
Fax (978) 256-3599
www.mrcy.com

Mercury Commercial Electronics
RF Microwave Components
1096 Mellon Avenue
Manteca, CA 95337
(209) 825-3977
email: salesRF@mrcy.com
http://rf.mrcy.com