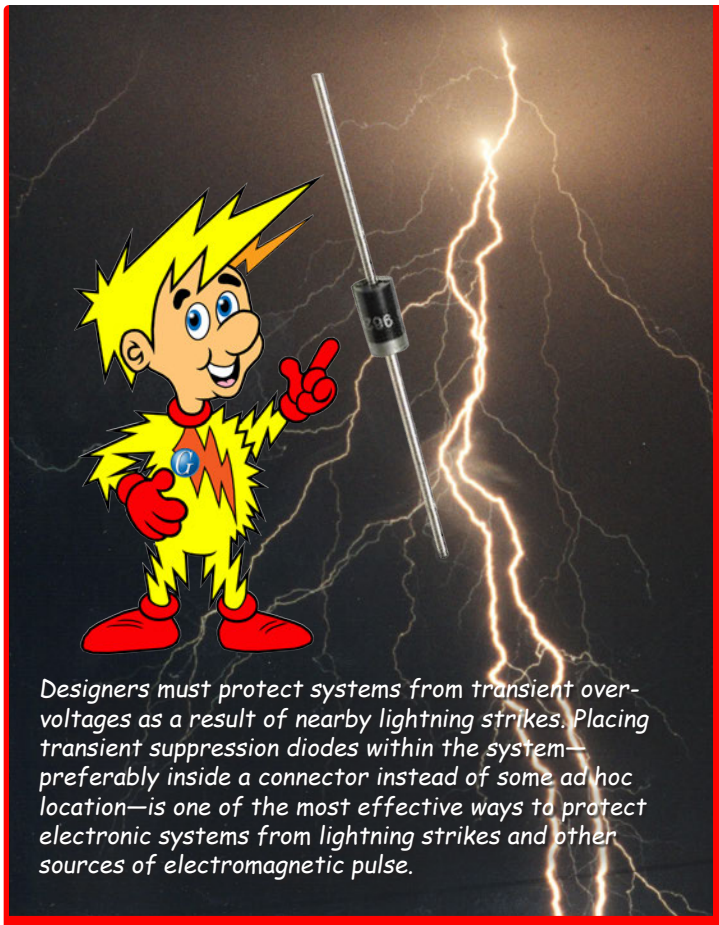
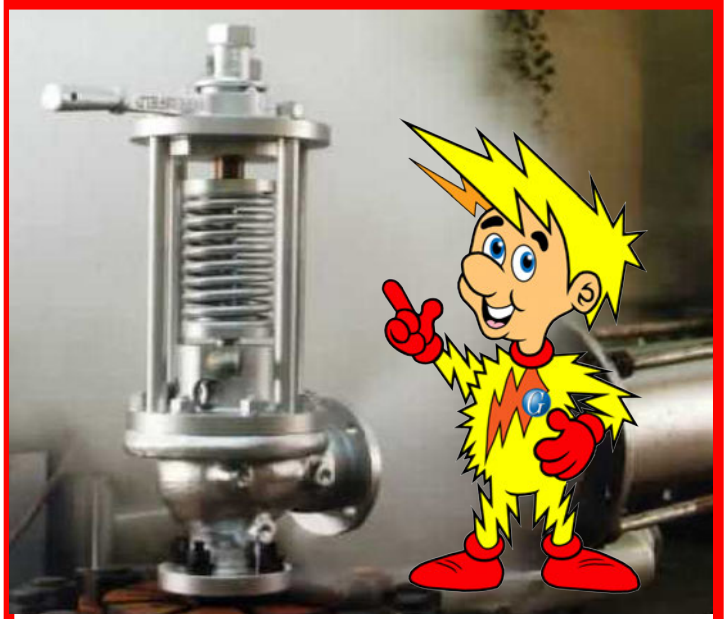
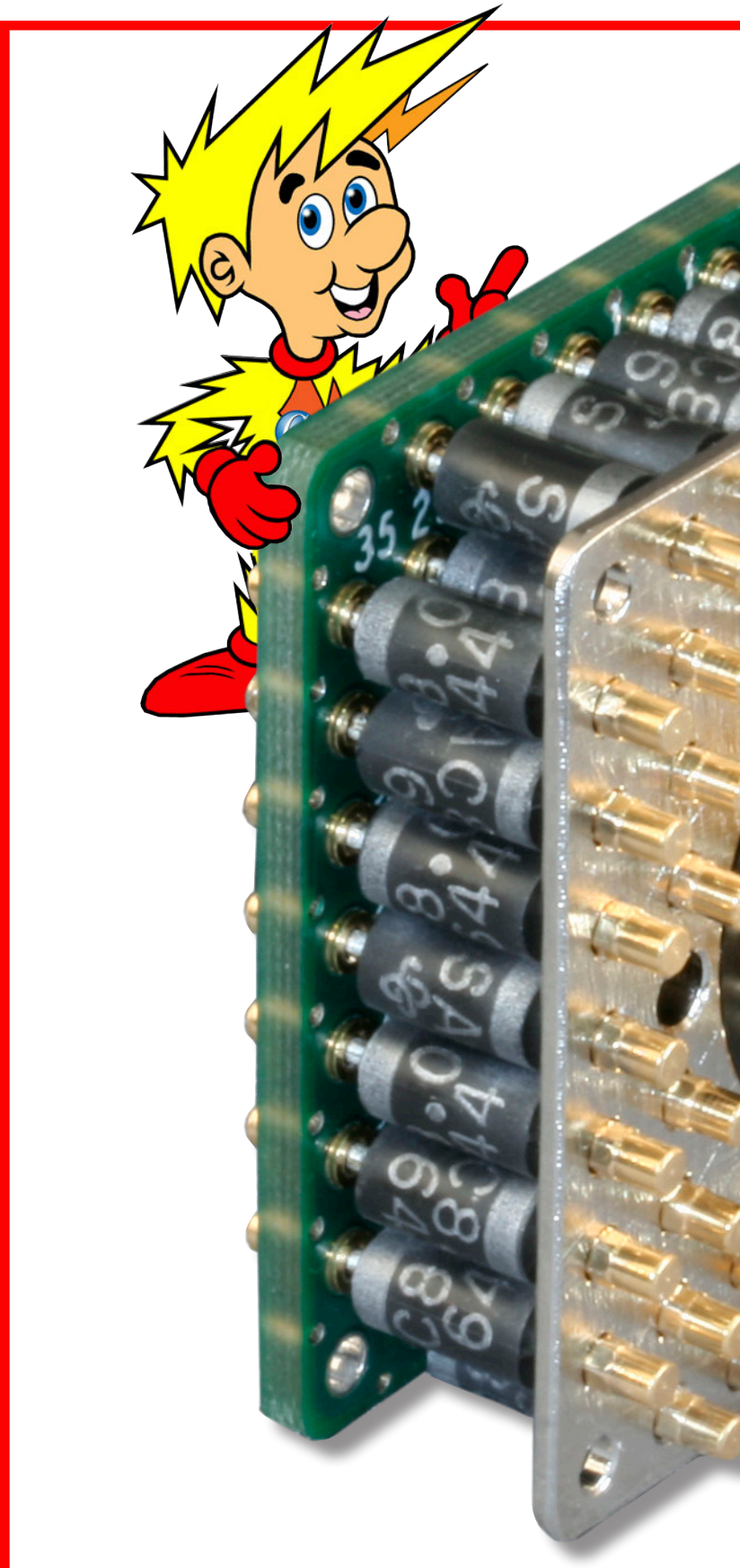
Transient Voltage Suppression



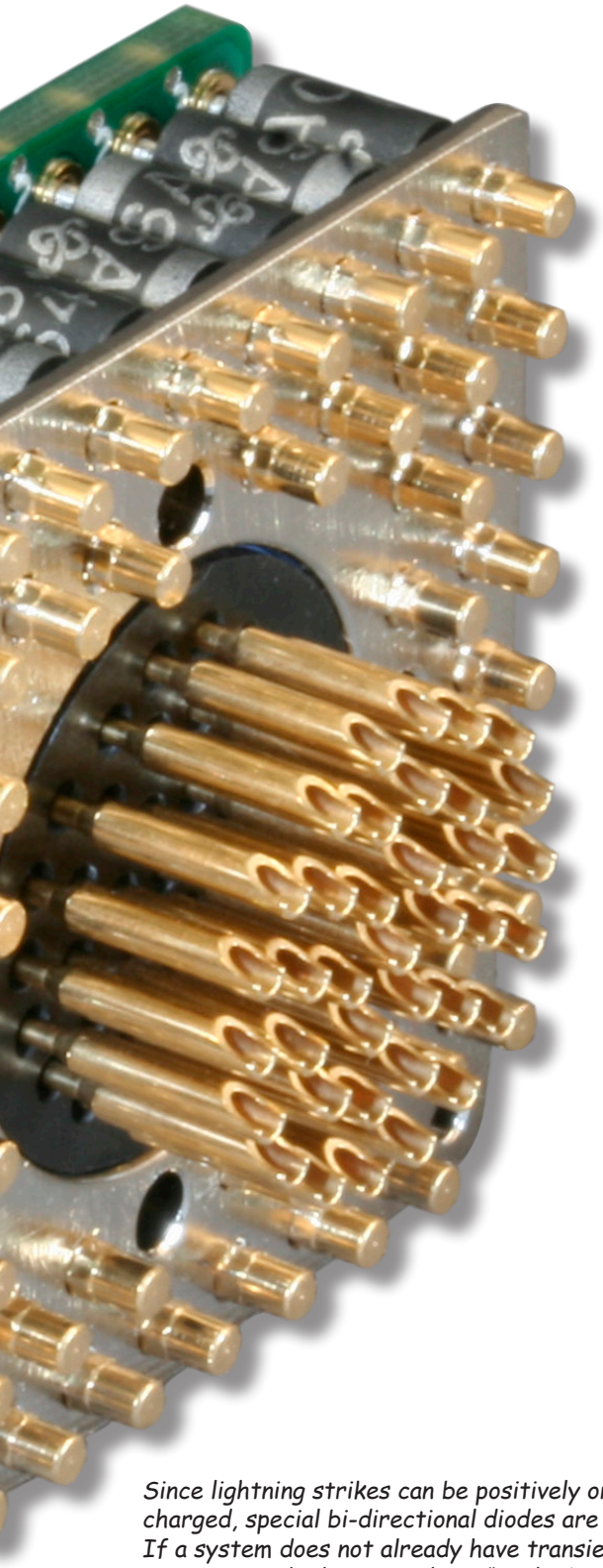
Designers must protect systems from transient over-voltages as a result of nearby lightning strikes. Placing transient suppression diodes within the system—preferably inside a connector instead of some ad hoc location—is one of the most effective ways to protect electronic systems from lightning strikes and other sources of electromagnetic pulse.



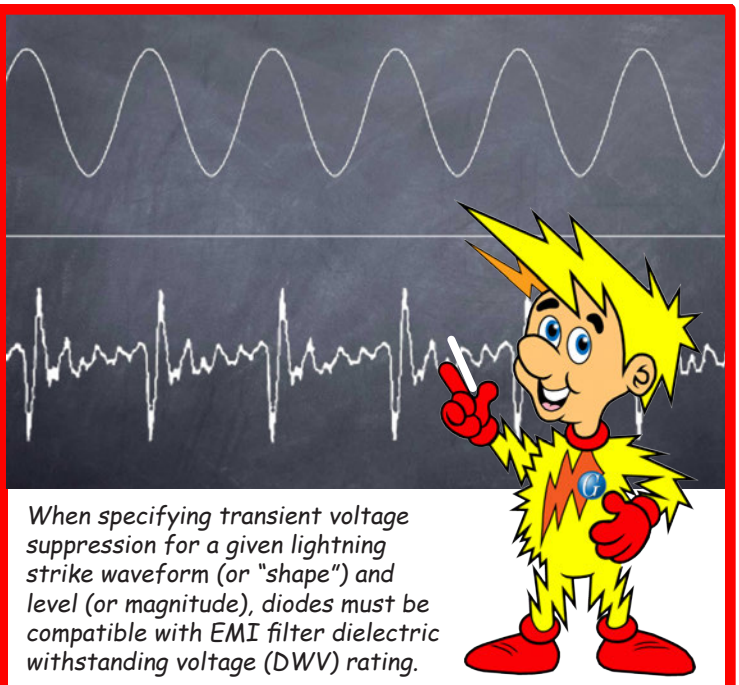
Diodes work something like a pressure valve on a home water heater—if the pressure within the chamber exceeds a certain value, the valve opens, allowing steam and liquid to escape. Similarly, diodes in electronic systems protect components within the circuit by shorting to ground transient spikes that exceed the diode's clamp voltage.



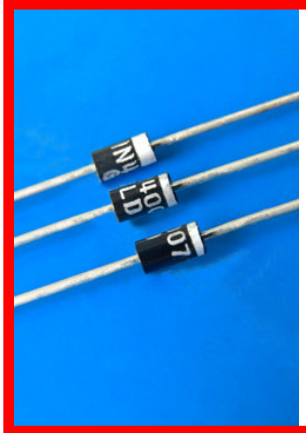
Workshop with Serge Gigawatt



Since lightning strikes can be positively or negatively charged, special bi-directional diodes are available. If a system does not already have transient suppression diodes somewhere "in the box," Glenair can include diodes on EMI filtered or non-filtered connectors.



When specifying transient voltage suppression for a given lightning strike waveform (or "shape") and level (or magnitude), diodes must be compatible with EMI filter dielectric withstanding voltage (DWV) rating.



Diode power is rated in watts for a given pulse shape and pulse duration. Typically the reference values are given for a 10/1000µs pulse. This means that the diode can absorb the peak power rated for a pulse with 10µs rise time and 1000µs fall time. If the system is subjected to a different pulse shape or duration the value must be adjusted accordingly. The table on the following page does just that for RTCA D0160 lightning strike.

For high speed applications, diode capacitance and trace inductance are critical. Glenair engineers will recommend a suitable design for each application. This may involve using extremely compact surface mount diodes within the pin field of the connector, as shown below.