Disengaging Connectors Under Automotive 42 VDC Loads

Thomas J. Schoepf

Delphi Research Labs
51786 Shelby Parkway
Shelby Township, MI 48315, U.S.A.

George A. Drew

Delphi Packard Electric Systems
4551 Research Parkway
Warren, OH 44483, U.S.A.

Abstract – **Connectors are designed to pass current but are generally not designed to disconnect electrical loads under power. In some circumstances, however, connectors are mated and unmated under load, as for instance during repairs, diagnostic procedures, or when blown fuses are replaced under short circuit conditions. With the present 14 VDC automotive power network no serious consequences are associated with plugging and unplugging under load due to very short break arcs (the system voltage is approximately the same as the minimum arc voltage of the contact material). For the 42 VDC PowerNet, however, serious consequences may result; impacting the reliability of the connection, the electrical distribution system, and automotive safety. The authors show component design approaches, which minimize damage when connectors are disengaged under DC loads. The connector damage is evaluated employing insertion force readings, and contact resistance measurements as part of a field correlated life test for automotive connections.**