

What do SAE standards offer the Automotive Electronics industry?

Just about **everything.**

Volume 2, 2009

SAE standards stand ready to serve industry's growing need for globally harmonized standards solutions. As a leading consensus standards developer and through consortia work developing and approving standards for and from the U.S. market, SAE standards:

- Reduce Costs
- Improve Quality
- Strengthen Your Competitive Advantage
- Improve Safety
- Facilitate Innovation
- Increase Speed-To-Market

Turn the page to explore the automotive electronics standards available today through SAE.



Accessories

- J1239** Four-, Five-, and Eight-Conductor Electrical Connectors for Automotive Type Trailers
J563 Standards for 12 Volt Cigarette Lighters, Power Outlets, and Accessory Plugs

Architecture

- J2356** A Graphical Model for Interactive Distributed Control
J2186 E/E Data Link Security
J2546 Model Specification Process Standard
J2056/3 Selection of Transmission Media
J2524 Vehicle Network Protocol Survey
J2748 VHDL-AMS Statistical Analysis Packages

Cables

- J2183** 60 V and 600 V Single Core Cables
J2863 Automotive Trailer Tow Connector
J156 Fusible Links
J163 Low Tension Wiring and Cable Terminals and Splice Clips
J1127 Low Voltage Battery Cable
J1128 Low Voltage Primary Cable
J1678 Low Voltage Ultra Thin Wall Primary Cable
J2031 High Tension Ignition Cable
J1654 High Voltage Primary Cable
J2840 High Voltage Shielded Primary Cable
J2032 Ignition Cable Assemblies
J2501 Round, Screened and Unscreened, 60 V and 600 V Multicore Sheathed Cables

Definitions/Terms/Naming Conventions

- J831** Electrical Definitions
J1930 Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms—Equivalent to ISO/TR 15031-2
J1416 Generator Terminal Labeling
J1213/1 Glossary of Vehicle Networks for Multiplexing and Data Communications
J139 Ignition System Nomenclature and Terminology

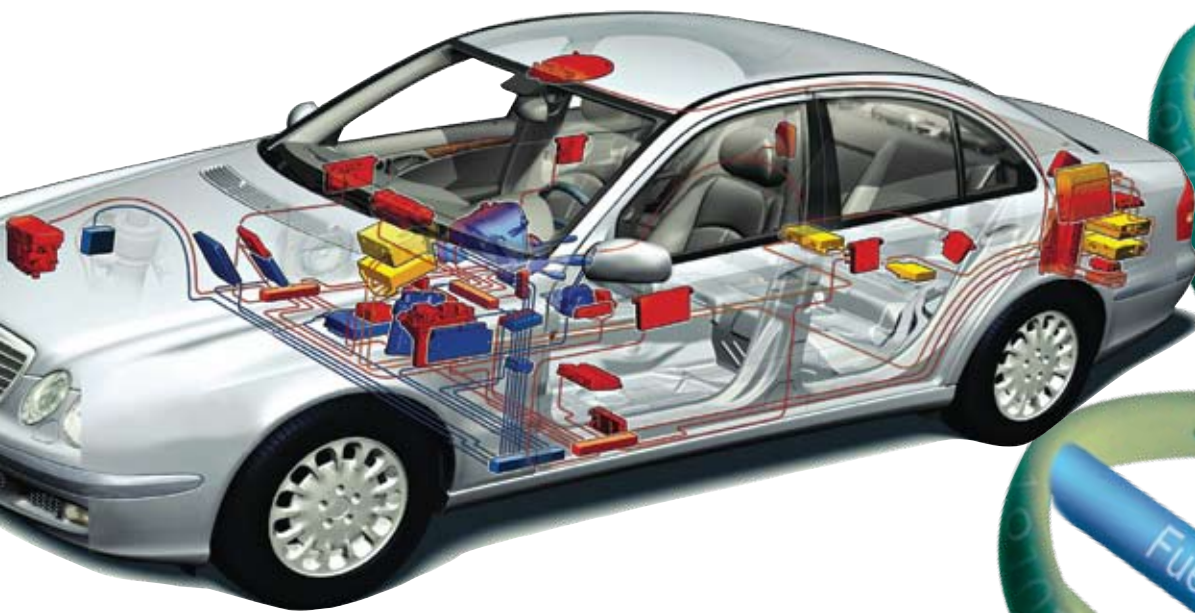
Electrical Systems

Battery

- J1494** Battery Booster Cables
- J2801** Comprehensive Life Test for 12V Automotive Storage Batteries
- J2289** Electric Drive Battery Pack System: Functional Guidelines
- J2464** Electric Vehicle Battery Abuse Testing
- J2288** Life Cycle Testing of Electric Vehicle Battery Modules
- J240** Life Test for Automotive Storage Batteries
- J2185** Life Test for Heavy-Duty Storage Batteries
- J1127** Low Voltage Battery Cable
- J1797** Recommended Practice for Packaging of Electric Vehicle Battery Modules
- J1798** Recommended Practice for Performance Rating of Electric Vehicle Battery Modules
- J537** Storage Batteries
- J1495** Test Procedure for Battery Flame Retardant Venting Systems
- J2380** Vibration Testing of Electric Vehicle Batteries

Fuses

- J2576** Blade Fuses – 42 V System
- J1284** Blade Type Electric Fuses
- J2736** Blade Type Electric Fuses
- J554** Electric Fuses (Cartridge Type)
- J2741** Fuses with Female Contacts – 32V System
- J2778** Fuses With Bolt down Contacts – 32V Systems
- J2781** Fuses with Bolt-In Contacts with Rated Voltage of 450V
- J1888** High Current Time Lag Electric Fuses
- J2077** Miniature Blade Type Electrical Fuses
- J2294** Recommended Practices for Test and Performance of Auxiliary Fuses for High Voltage Road Vehicle Wiring Systems



Voltage

- J541** Voltage Drop for Starting Motor Circuits
- J539** Voltages for Diesel Electrical Systems
- J2669** Voltage Regulators for Automotive-Type Generators
- J2232** Vehicle System Voltage Initial Recommendations

42 Volt

- J2622** Battery Connections for 42 Volt Electrical Systems Tests and General Performance Requirements
- J2576** Blade Fuses - 42 V System
- J2651** Jump Start Connections for 42 Volt Electrical Systems

Electrical Terminals

- J858** Electrical Terminals Blade Type
- J561** Electrical Terminals–Eyelet and Spade Type
- J928** Electrical Terminals–Pin and Receptacle Type

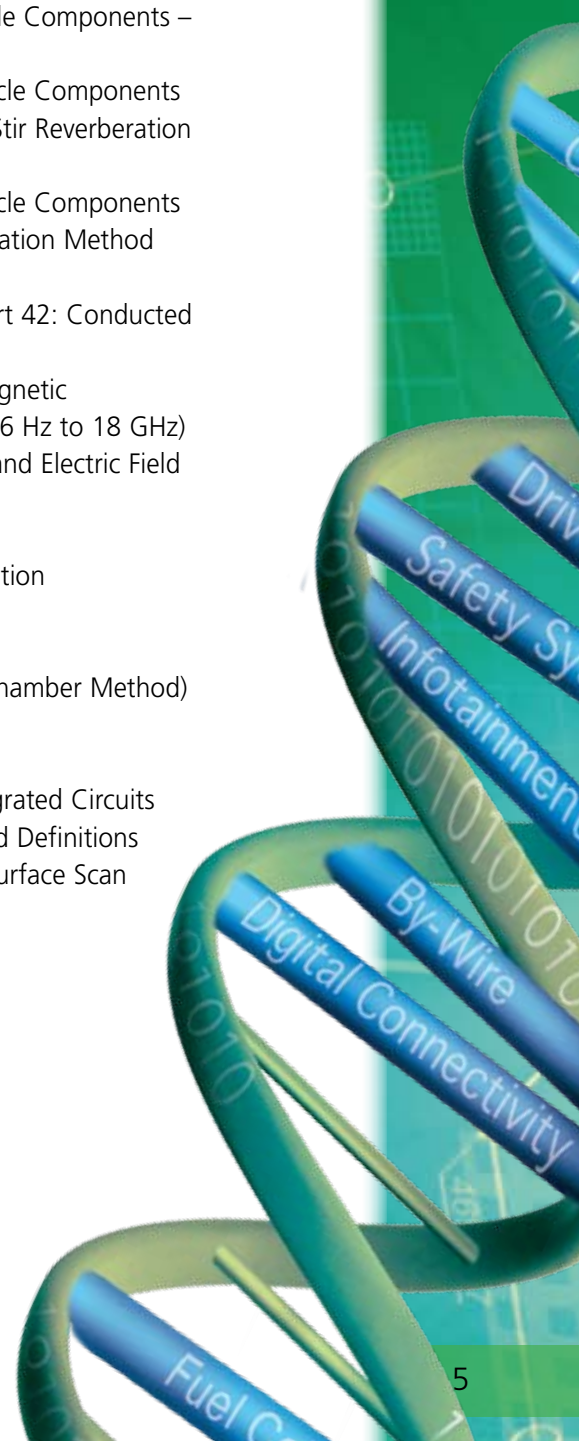
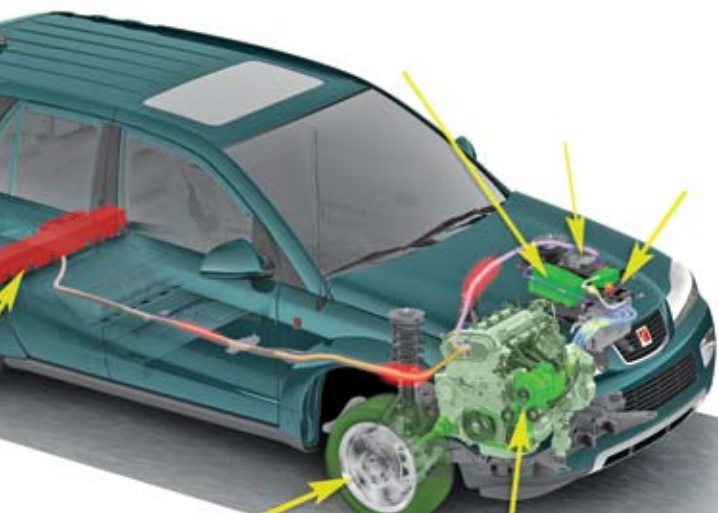
Embedded Software

- J2632** Embedded Software C Coding Practices
- J2516** Embedded Software Development Lifecycle
- J2734** Embedded Software Verification and Validation
- J2640** General Automotive Embedded Software Design Requirements
- J2602/3** LDF/NCF Data Definition and Format Recommended Practice
- J2780** Model Based Embedded Systems Engineering
- J2746** Software Assessment Repository
- J2720** Software Development for Calibration and Manufacturing

EMC

- J1113/1** Electromagnetic Compatibility Measurement Procedures and Limits for Components of Vehicles, Boats (Up to 15 M), and Machines (Except Aircraft) (16.6 Hz to 18 GHz)
- J1113/2** Electromagnetic Compatibility Measurement Procedures and Limits for Vehicle Components (Except Aircraft) – Conducted Immunity, 15 Hz to 250 kHz – All Leads
- J1113/3** Conducted Immunity, 250 KHz to 400 MHz, Direct Injection of Radio Frequency (Rf) Power
- J1113/4** Immunity to Radiated Electromagnetic Fields-Bulk Current Injection (BCI) Method
- J1113/11** Immunity to Conducted Transients on Power Leads
- J1113/12** Electrical Interference by Conduction and Coupling – Capacitive and Inductive Coupling via Lines Other than Supply Lines

- J1113/13** Electromagnetic Compatibility Measurement Procedure for Vehicle Components – Part 13: Immunity to Electrostatic Discharge
- J1113/21** Electromagnetic Compatibility Measurement Procedure for Vehicle Components – Part 21: Immunity to Electromagnetic Fields, 30 MHz to 18 GHz, Absorber-Lined Chamber
- J1113/22** Electromagnetic Compatibility Measurement Procedure for Vehicle Components – Part 22: Immunity to Radiated Magnetic Fields
- J1113/24** Immunity to Radiated Electromagnetic Fields; 10 KHz to 200 MHz – Crawford Tem Cell and 10 KHz to 5 GHz–Wideband Tem Cell
- J1113/26** Electromagnetic Compatibility Measurement Procedure for Vehicle Components – Immunity to AC Power Line Electric Fields
- J1113/27** Electromagnetic Compatibility Measurements Procedure for Vehicle Components – Part 27: Immunity to Radiated Electromagnetic Fields – Mode Stir Reverberation Method
- J1113/28** Electromagnetic Compatibility Measurements Procedure for Vehicle Components – Part 28: Immunity to Radiated Electromagnetic Fields–Reverberation Method (Mode Tuning)
- J1113/42** Electromagnetic Compatibility – Component Test Procedure – Part 42: Conducted Transient Emissions
- J551/1** Performance Levels and Methods of Measurements of Electromagnetic Compatibility of Vehicles, Boats (up to 15 m), and Machines (16.6 Hz to 18 GHz)
- J551/5** Performance Levels and Methods of Measurement of Magnetic and Electric Field Strength from Electric Vehicles, Broadband, 9 kHz to 30 MHz
- J551/11** Vehicle Electromagnetic Immunity – Off Vehicle Source
- J551/12** Vehicle Electromagnetic Immunity – On Board Transmitter Simulation
- J551/13** Vehicle Electromagnetic Immunity – Bulk Current Injection
- J551/15** Vehicle Electromagnetic Immunity – Electrostatic Discharge (ESD)
- J551/16** Electromagnetic Immunity – Off-Vehicle Source (Reverberation Chamber Method) – Part 16: Immunity to Radiated Electromagnetic Fields
- J551/17** Vehicle Electromagnetic Immunity – Power line Magnetic Fields
- J1752/1** Electromagnetic Compatibility Measurement Procedures for Integrated Circuits – Integrated Circuit EMC Measurement Procedures – General and Definitions
- J1752/2** Measurement of Radiated Emissions from Integrated Circuits – Surface Scan Method (Loop Probe Method) 10 MHz to 3 GHz



- J1752/3** Measurement of Radiated Emissions from Integrated Circuits – TEM/Wideband TEM (GTEM) Cell Method; TEM Cell (150 kHz to 1 GHz), Wideband TEM Cell (150 kHz to 8 GHz)
- J1812** Function Performance Status Classification for EMC Immunity Testing
- J2556** Radiated Emissions (RE) Narrowband Data Analysis – Power Spectral Density (PSD)
- J2628** Characterization – Conducted Immunity

Environmental

- J2456** Mercury Switch Removal Process

Electric Vehicle, PHEV, HEV

- J2293/1** Energy Transfer System for Electric Vehicles – Part 1: Functional Requirements and System Architectures
- J2293/2** Energy Transfer System for Electric Vehicles – Part 2: Communication Requirements and Network Architecture
- J2841** Definition of the Utility Factor for Plug-in Hybrid Electric Vehicles Using NHTS Data
- J2758** Determination of the Maximum Available Power from a Rechargeable Energy Storage System on a Hybrid Electric Vehicle
- J1772** SAE Electric Vehicle Conductive Charge Coupler
- J1773** SAE Electric Vehicle Inductively Coupled Charging

Battery

- J2289** Electric-Drive Battery Pack System Functional Guidelines
- J2464** Electric Vehicle Battery Abuse Testing
- J2288** Life Cycle Testing of Electric Vehicle Battery Modules
- J1797** Recommended Practice for Packaging of Electric Vehicle Battery Modules
- J1798** Recommended Practice for Performance Rating of Electric Vehicle Battery Modules
- J2380** Vibration Testing of Electric Vehicle Batteries

Emissions

- J1711** Recommended Practice for Measuring the Exhaust Emissions and Fuel Economy of Hybrid-Electric Vehicles

Plug-in Vehicles

- J2847/1** Communication between Plug-in Vehicles and the Utility Grid
- J2847/2** Communication between Plug-in Vehicles and the Supply

Safety

- J2344** Guidelines for Electric Vehicle Safety Equipment (EVSE)
- J2847/3** Communication between Plug-in Vehicles and the Utility Grid for Reverse Power Flow

Ignition System

- J259** Ignition Switch
- J973** Ignition Switch Measurements Procedure
- J139** Ignition System Nomenclature and Terminology

Manifold Absolute Pressure Transducer

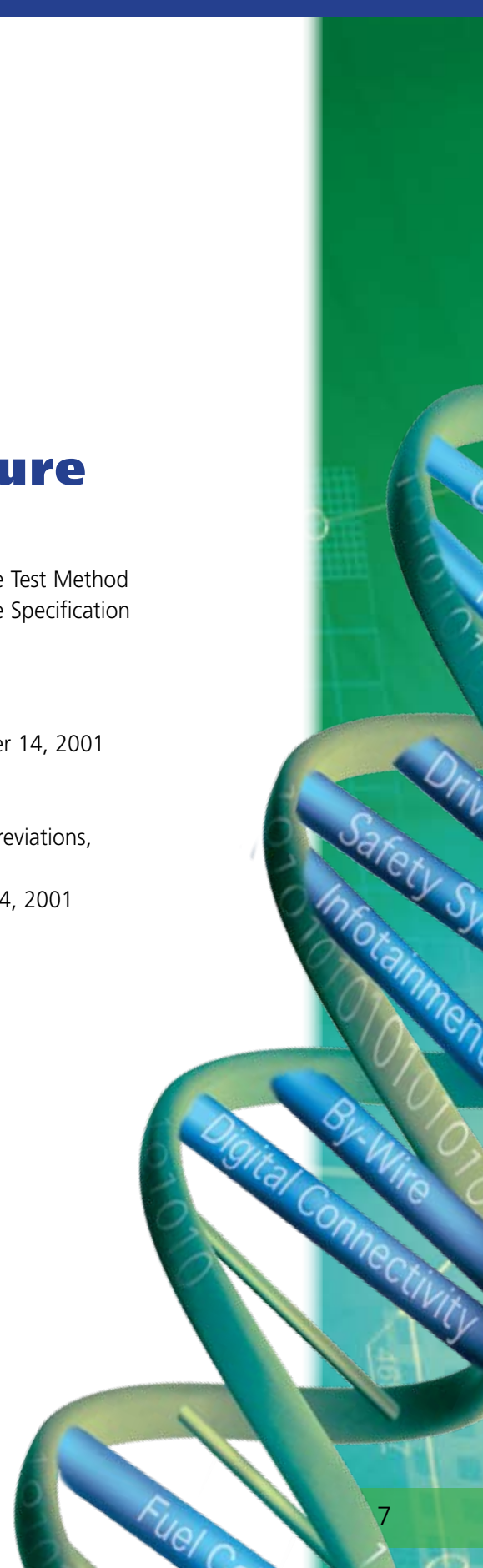
- J1346** Guide to Manifold Absolute Pressure Transducer Representative Test Method
- J1347** Guide to Manifold Absolute Pressure Transducer Representative Specification

On-Board Diagnostics

- J1962** Diagnostic Connector Equivalent to ISO/DIS 15031-3: December 14, 2001
- J2012** Diagnostic Trouble Code Definitions
- J1979** E/E Diagnostic Test Modes
- J1930** Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms – Equivalent to ISO/TR 15031-2
- J1978** OBD II Scan Tool – Equivalent to ISO/DIS 15031-4: December 14, 2001
- J2819** TP2.0 Vehicle Diagnostic Protocol
- J1699/2** OBD II Related SAE Specification Verification Test Procedures
- J1699/3** OBD II Compliance Test Cases
- J2809** Honda Diagnostic Serial Data Link Protocol – ABS/VSA System
- J2818** Keyword Protocol 1281

Programmable ECUs

- J2534/1** Recommended Practice for Pass-Thru Vehicle Programming
- J2534/2** Optional Pass-Thru Features
- J2534/3** Conformance Test Cases



Relays

- J1744** 280 Relay Footprint
- J771** Automotive Printed Circuits
- J2716** SENT Single Edge Nibble Transmission for Automotive Applications

Reliability

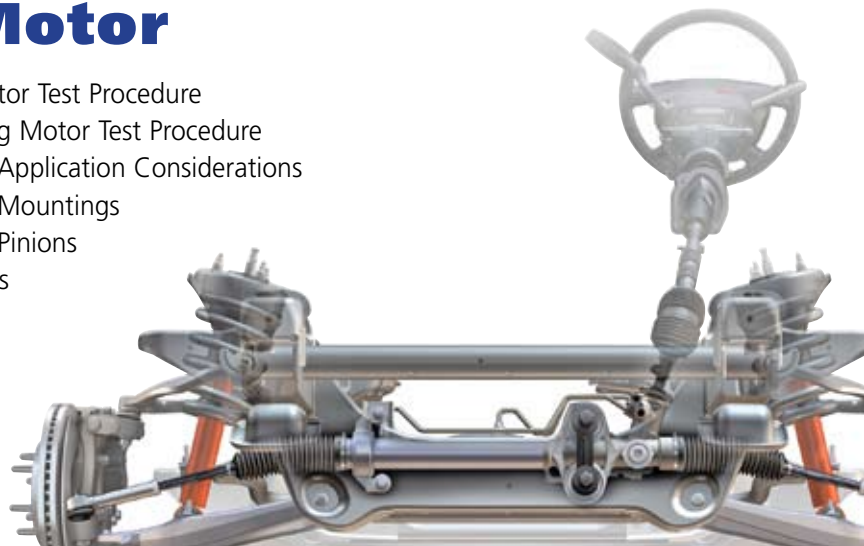
- J1850** Class B Data Communications Network Interface
- J1938** Design/Process Checklist for Vehicle Electronic Systems
- J2837** Environmental Conditions and Design Practices for Automotive Electrical/Electronic Equipment: Reference Data from J1211 Nov 1978
- J1213/2** Glossary of Reliability Terminology Associated With Automotive Electronics
- J1211** Handbook for Robustness Validation of Automotive Electrical/Electronic Modules
- J1879** Handbook for Robustness Validation of Semiconductor Devices in Automotive Applications
- J2820** Modeling and Simulation Methods for Automotive Electrical/Electronic Components and Systems
- J1699/1** SAE J1850 Verification Test Procedures
- J2450/1** SAE J2450 Supplemental Training Document
- J2128** The Reliability Disciplines
- J2450** Translation Quality Metric

Spark Plugs

- J549** Pre-ignition Rating of Spark Plugs
- J2203** SAE 17.6 Cubic Inch Spark Plug Rating Engine
- J548/1** Spark Plugs
- J548/2** Spark Plug Installation Sockets
- J2162** Spark Plug Heat Rating Classifications

Starter Motor

- J2437** Air Starter Motor Test Procedure
- J544** Electric Starting Motor Test Procedure
- J1375** Starter Motor Application Considerations
- J542** Starter Motor Mountings
- J543** Starter Motor Pinions and Ring Gears



Switches

J1076	Backup Lamp Switch
J2108	Door Courtesy Switch
J235	Electric Blower Motor Switch
J234	Electric Windshield Washer Switch
J112	Electric Windshield Wiper Switch
J910	Hazard Warning Signal Switch
J564	Headlamp Beam Switching
J253	Headlamp Switch
J249	Mechanical Stop Lamp Switch
J589	Turn Signal Switch

Test Methods

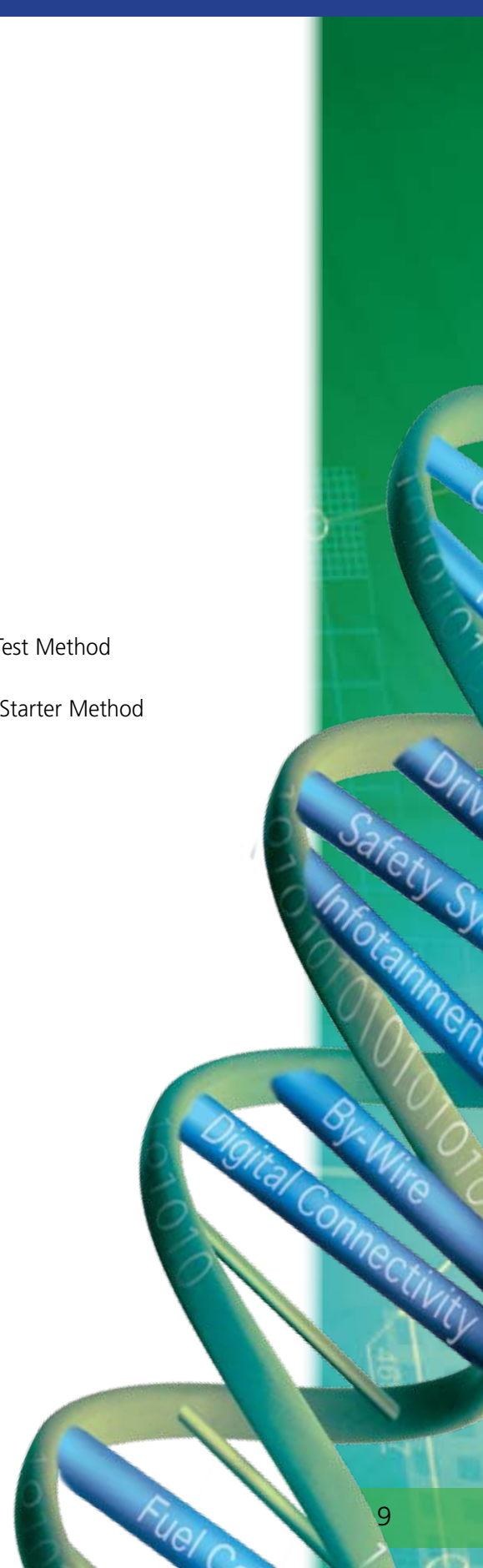
J823	Flasher Test
J1346	Guide to Manifold Absolute Pressure Transducer Representative Test Method
J1253	Low-Temperature Cranking Load Requirements of an Engine
J2438	Low-Temperature Cranking Load Requirements of an Engine-Air Starter Method
J2544	Plug-In Relay Test Methods
J56	Road Vehicles – Alternators with Regulators – Test Methods and General Requirements
J1495	Test Procedure for Battery Flame Retardant Venting Systems
J2748	VHDL-AMS Statistical Analysis Packages

Vehicle Architecture for Data Communications

J2814	Firewire for Vehicle Applications
J2813	Flexray for Vehicle Applications
J2824	Goldilocks Serial Communication Protocol Design
J2561	Bluetooth Wireless Protocol for Automotive Applications

Vehicle Displays

J1757/1	Standard Metrology for Vehicle Displays
J1757/2	Standard Metrology for Vehicle Displays – Electrical Performance
J1758	Vehicular Flat Panel Display Module



Vehicle Event Data

- J1698/1** Vehicle Event Data Interface-Output Data Definition
- J1698/2** Vehicle Event Data Interface-Vehicular Data Extraction

Vehicle Networks

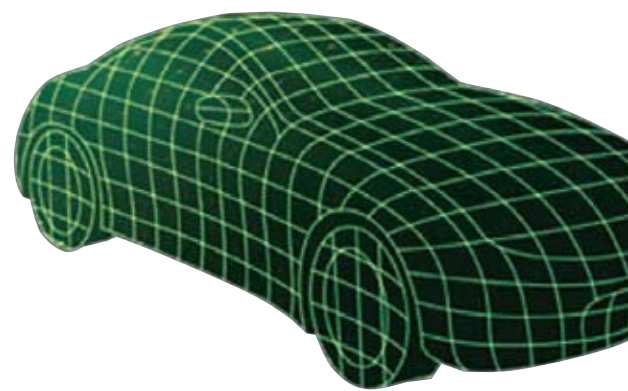
- J2740** General Motors UART Serial Data Communications
- J1213** Glossary of Vehicle Networks for Multiplexing and Data Communications
- J2610** Serial Data Communication Interface

CAN

- J2284/1** High Speed CAN (HSC) for Vehicle Applications at 125 Kbps
- J2284/2** High Speed CAN (HSC) for Vehicle Applications at 250 Kbps
- J2284/3** High-Speed CAN (HSC) for Vehicle Applications at 500 Kbps
- J2866** SafeCAN: Using CAN in Real-time Deterministic and Safety-Critical Applications
- J2411** Single Wire CAN Network for Vehicle Applications

Class A Multiplexing

- J2057/1** Class A Application/Definition
- J2057/2** Class A Multiplexing Actuators
- J2057/3** Class A Multiplexing Sensors
- J2057/4** Class A Multiplexing Architecture Strategies



Class B Data Communication Network Messages

- J1850** Class B Data Communications Network Interface
- J2178/1** Class B Data Communication Network Messages – Detailed Header Formats and Physical Address Assignments
- J2178/2** Class B Data Communication Network Messages – Part 2: Data Parameter Definitions
- J2178/3** Class B Data Communication Network Messages – Part 3: Frame IDs for Single-Byte Forms of Headers
- J2178/4** Class B Data Communication Network Messages–Message Definitions for Three Byte Headers

LIN

- J2602/1** LIN Network for Vehicle Applications
- J2602/2** LIN Network for Vehicle Applications Conformance Test

Warning Lamps/Flashers

- J1690** Flashers
- J823** Flasher Test
- J589** Turn signal switch

Wiring/Wiring Harnesses

- J1292** Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring
- J1742** Connections for High Voltage On-Board Road Vehicle Electrical Wiring Harnesses – Test Methods and General Performance Requirements
- J2223/1** Connections for On-Board Road Vehicle Electrical Wiring Harnesses – Part 1: Single-Pole Connectors – Flat Blade Terminals – Dimensional Characteristics and Specific Requirements
- J2223/2** Connections for On-Board Road Vehicle Electrical Wiring Harnesses – Part 2: Tests and General Performance Requirements
- J2223/3** Connections for On-Board Road Vehicle Electrical Wiring Harnesses – Part 3: Multi-pole Connectors – Flat Blade Terminals – Dimensional Characteristics and Specific Requirements
- J1673** High Voltage Automotive Wiring Assembly Design
- J2618** Performance Specification for Physical Protection of Wiring Harnesses
- J2192** Recommended Testing Methods for Physical Protection of Wiring Harnesses

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