

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION: TTM Technologies, Inc. (Stafford) 4 Old Monson Road, Stafford, CT, 06075 US	PLANT LOCATION: Same Address as Manufacturer	CAGE Code: 5L706 Phone: 860-684-5881 Fax: 860-684-7425 E-Mail:
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CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
 Qualification Letters: VQE-03-003348, VQE-09-018855, VQE-11-023287, VQE-12-023366, VQE-17-031350
 Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven E-Glass, Epoxy Resin, Flame Resistant, with Inorganic Filler
 Max. Panel Size: 30" x 54"
 Max. Number of Layers: 50
 Max. Board Thickness: .4"
 Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
 Aspect Ratio: 14:1 Through-Hole
 Min. Conductor Width/Space: .004"/.003"
 Hole Preparation: Plasma Desmear, Plasma Etchback
 Hole Wall Conductive Coating: Electroless Copper
 Copper Plating: Direct Current Plate, Pulse Plate
 Hole Fill/Via Plug: Conductive, Non-Conductive
 Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
 Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
 Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, Foil Lamination, Metal Core, Press Fit Mounting, Sequential Lamination
 Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
 Qualification Letters: VQE-03-003348, VQE-09-018855, VQE-11-023287, VQE-12-023366, VQE-16-030095, VQE-17-031350
 Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
 Max. Panel Size: 24" x 36"
 Max. Number of Layers: 33
 Max. Board Thickness: .219"
 Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
 Aspect Ratio: 14:1 Through-Hole
 Min. Conductor Width/Space: .004"/.003"
 Hole Preparation: Plasma Desmear, Plasma Etchback
 Hole Wall Conductive Coating: Electroless Copper
 Copper Plating: Direct Current Plate, Pulse Plate
 Hole Fill/Via Plug: Conductive, Non-Conductive
 Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
 Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
 Additional Fab Capabilities: Blind Vias, Buried Vias, Copper Invar Copper, Embedded Resistors, Foil Lamination, Metal Core, Press Fit Mounting, Sequential Lamination
 Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
 Qualification Letters: VQE-03-003348, VQE-09-018855, VQE-11-023287, VQE-16-030095, VQE-17-031350
 Rigid Base Material: AF: Aramid Fabric, Woven, Majority Polyfunctional Epoxy Resin
 Max. Panel Size: 18" x 24"
 Max. Number of Layers: 12
 Max. Board Thickness: .1"
 Min. Hole Size: .0138" Drilled Plated-Through Hole Before Plating
 Aspect Ratio: 5:1 Through-Hole
 Min. Conductor Width/Space: .004"/.003"
 Hole Preparation: Plasma Desmear, Plasma Etchback
 Hole Wall Conductive Coating: Electroless Copper
 Copper Plating: Direct Current Plate, Pulse Plate
 Hole Fill/Via Plug: Conductive, Non-Conductive
 Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
 Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
 Additional Fab Capabilities: Blind Vias, Foil Lamination,
 Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

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CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
 Qualification Letters: VQE-03-003348, VQE-09-018855, VQE-11-023287, VQE-12-023366, VQE-16-030095, VQE-17-031350
 Rigid Base Material: BI: Aramid Fabric, Nonwoven, Polyimide Resin
 Max. Panel Size: 18" x 24"
 Max. Number of Layers: 22
 Max. Board Thickness: .129"
 Min. Hole Size: .0118" Drilled Plated-Through Hole Before Plating
 Aspect Ratio: 11:1 Through-Hole
 Min. Conductor Width/Space: .004"/.003"
 Hole Preparation: Plasma Desmear, Plasma Etchback
 Hole Wall Conductive Coating: Electroless Copper
 Copper Plating: Direct Current Plate, Pulse Plate
 Hole Fill/Via Plug: Conductive, Non-Conductive
 Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
 Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
 Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, Foil Lamination, Metal Core, Sequential Lamination
 Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
 Qualification Letters: VQE-03-003348, VQE-09-018855, VQE-11-023287
 Rigid Base Material: GM: Glass Base, Woven, Triazine and/or Bismaleimide Modified Epoxy Resin, Flame Resistant
 Max. Panel Size: 18" x 24"
 Max. Number of Layers: 10
 Max. Board Thickness: .1"
 Min. Hole Size: .032" Drilled Plated-Through Hole Before Plating
 Aspect Ratio: 3:1 Through-Hole
 Min. Conductor Width/Space: .004"/.003"
 Hole Preparation: Plasma Desmear, Plasma Etchback
 Hole Wall Conductive Coating: Electroless Copper
 Copper Plating: Direct Current Plate, Pulse Plate
 Hole Fill/Via Plug: Conductive, Non-Conductive
 Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
 Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
 Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: Custom
 Qualification Letters: VQE-03-003348, VQE-10-019855, VQE-11-023287, VQE-16-030095, VQE-17-031350
 Rigid Base Material: With or without woven or non-woven E-glass, Polytetrafluoroethylene (PTFE) resin, ceramic filler
 Max. Panel Size: 30" x 36"
 Max. Number of Layers: 16
 Max. Board Thickness: .16"
 Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating, .012" Laser Ablated Plated Hole Size Before Plating
 Aspect Ratio: .5:1 Microvia, 7.6:1 Through-Hole
 Min. Conductor Width/Space: .004"/.003"
 Hole Preparation: Plasma Desmear
 Hole Wall Conductive Coating: Electroless Copper
 Copper Plating: Direct Current Plate, Pulse Plate
 Hole Fill/Via Plug: Conductive, Non-Conductive
 Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
 Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
 Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, Sequential Lamination
 Controlled Impedance: Differential, Single-Ended

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CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2, Custom
 Qualification Letters: VQE-03-003348, VQE-10-019855, VQE-11-023287, VQE-16-030095, VQE-17-031350
 Composition: M - Mixed based material printed boards
 Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
 Max. Panel Size: 30" x 36"
 Max. Number of Layers: 30
 Max. Board Thickness: .216"
 Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating
 Aspect Ratio: 9:1 Through-Hole
 Min. Conductor Width/Space: .004"/.003"
 Hole Preparation: Plasma Desmear
 Hole Wall Conductive Coating: Electroless Copper
 Copper Plating: Direct Current Plate, Pulse Plate
 Hole Fill/Via Plug: Conductive, Non-Conductive
 Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
 Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
 Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, Foil Lamination, Metal Core, Sequential Lamination
 Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
 Qualification Letters: VQE-03-003349, VQE-09-018855, VQE-10-019456, VQE-11-023287, VQE-12-023366, VQE-16-030095, VQE-17-031350
 Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant; Woven E-Glass, Epoxy Resin, Flame Resistant, with Inorganic Filler
 Flex Base Material: Copper Clad Adhesiveless Polyimide
 Max. Panel Size: 24" x 48"
 Max. Number of Layers: 24
 Max. Board Thickness: .275"
 Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
 Aspect Ratio: 9:1 Through-Hole
 Min. Conductor Width/Space: .004"/.003"
 Hole Preparation: Plasma Desmear, Plasma Etchback
 Hole Wall Conductive Coating: Electroless Copper
 Copper Plating: Direct Current Plate, Pulse Plate
 Hole Fill/Via Plug: Conductive, Non-Conductive
 Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
 Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
 Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, Foil Lamination, Sequential Lamination
 Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

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CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
 Qualification Letters: VQE-03-003349, VQE-10-019456, VQE-11-023287, VQE-17-031350, VQE-21-036251
 Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
 Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
 Max. Panel Size: 24" x 36"
 Max. Number of Layers: 4
 Max. Board Thickness: .05"
 Min. Hole Size: .035" Drilled Plated-Through Hole Before Plating
 Aspect Ratio: 1.4:1 Through-Hole
 Min. Conductor Width/Space: .004"/.003"
 Hole Preparation: Plasma Desmear, Plasma Etchback
 Hole Wall Conductive Coating: Electroless Copper
 Copper Plating: Direct Current Plate, Pulse Plate
 Hole Fill/Via Plug: Conductive, Non-Conductive
 Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
 Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
 Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
 Controlled Impedance: Differential, Single-Ended
 Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)