

DELPHI

Connection Systems

*High Density
Printed Circuit (HDPC)
Connectors*



Driving Tomorrow's Technology

High Density HDPC Connectors



Get connected with our expanding family of high quality connectors

Delphi Connection Systems provides the same high quality, high reliability and high density connectors that you have come to rely on when we were previously known as Packard-Hughes Interconnect.

Benefits and Features:

Delphi's HDPC family of connectors offers contact spacing of 1.27 mm [.050 in.] and features a modular insulator which is common to three standard shell sizes. This modular design offers numerous possibilities of signal, power contact, and fiber optic terminus combinations for specific customer requirements.

The HDPC plug, designed for attachment to a module board, mates with a receptacle which is mounted on a backplane. Terminations are accomplished by reflow soldering. Precision polarization-alignment guides compensate for as much as 0.76 mm [.030 in.] misalignment



The plug connector has a metal shell with mounting ears for mechanical attachment to the module board.

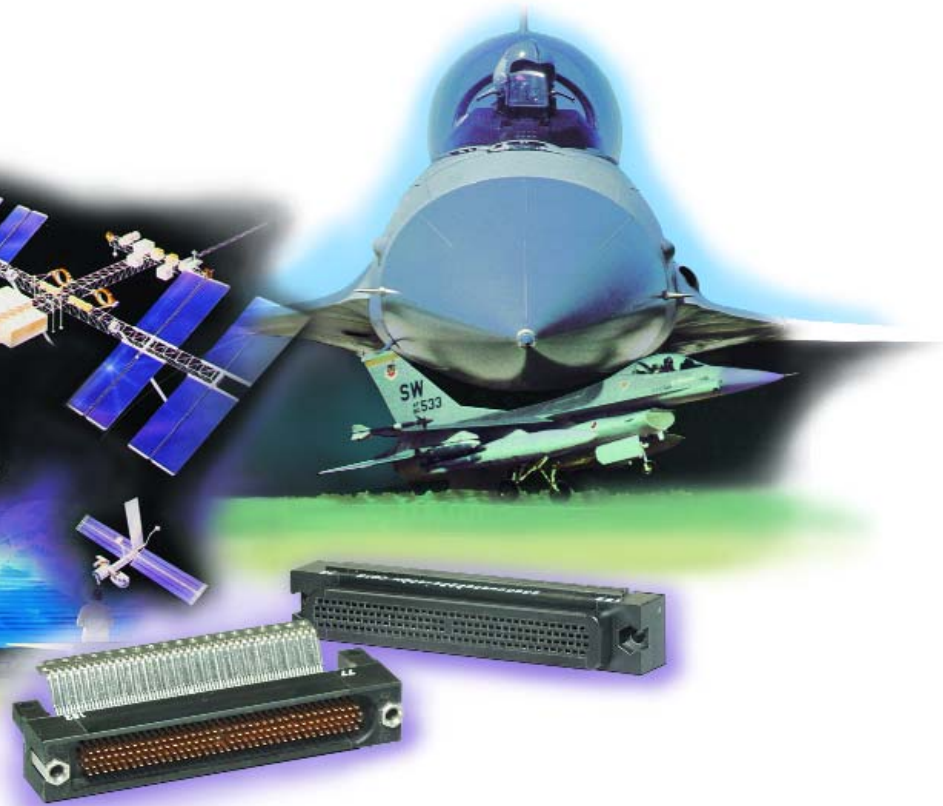
between the plug and receptacle. A proven blade (pin) and two-beam (socket) contact system offers low engage forces, yet withstands high vibration and shock levels.

Machined aluminum shells provide EMI shielding, pin protection, and can withstand rough handling experienced during field service.

The latest addition to the HDPC family, the Plastic HDPC, offers a new, economical, lightweight alternative to aluminum shells, aimed primarily at commercial applications.



The receptacle connector has a metal shell with standoffs for mechanical attachment to the backplane.



Commercial, industrial, as well as military electronics systems, benefit from the HDPC family of connectors because of its versatility of contact styles and pin counts, single piece contact system, proven mission-critical applications, low engage force, and ease of assembly.

Typical Applications:

- Telecommunications systems
- High speed computer systems
- Jet engine controls
- Satellite infrared imaging equipment
- Power control systems
- Commercial avionics
- Other applications that require a high pin count in a dense area

For more information or assistance with specific applications, contact your Delphi sales representative or the factory. See Factory Support on page 18.

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Key Words:

- MIL-SPEC* — *Military Specification*
- MIL-STD* — *Military Standard*

HDPC Performance Characteristics

Description	Specifications
Contact Engage Force/ Separation Force	(MIL-STD-1344, Method 2014) 56.70 g [2.0 oz.] maximum engagement 14.17 g [0.5 oz.] minimum separation
Low Level Contact Resistance	(MIL-STD-1344, Method 3002) 47 milliohms average
Contact Rating	2.5 amps
Contact Resistance	(MIL-STD-1344, Method 3004) 126 millivolts
Contact Life	(MIL-STD-1344, Method 2016, 1000 cycles MIL-STD-1344, Method 3002) 0.1 milliohm average change in low level contact resistance
Contact Retention	(MIL-STD-1344, Method 2007) 2.27 kg [5.0 lbs.] minimum
Durability	(MIL-STD-1344, Method 2016, 1000 cycles) No evidence of mechanical or electrical damage to connectors or contacts.
Insulation Resistance	(MIL-STD-1344, Method 3003) 5000 megohms at 500 VDC
Dielectric Withstanding Voltage	(MIL-STD-1344, Method 3001) 600 VAC RMS
Dielectric Withstanding Voltage High Altitude 70,000 ft. [21,336 m]	(MIL-STD-1344, Method 3001) 150 VAC RMS
Mating and Unmating Force	(MIL-STD-1344, Method 2013) Mating: 12.23 kg [27.0 lbs.] average, size 304 Unmating: 11.78 kg [26.0 lbs.] average, size 304
Humidity	(MIL-C-55302, Para. 4.7.15, MIL-STD-1344, Method 1002, Type II) 1000 megohms insulation resistance
Salt Spray	(MIL-C-55302, Paras. 3.17 and 4.7.11, MIL-STD-1344, Method 1001, Test Condition B) Passed
Operating Temperature	-55°C to +125°C
Temperature Cycling	(MIL-C-55302, Paras. 3.19 and 4.7.13, MIL-STD-1344, Method 1003) Passed
Vibration (Sine)	(MIL-STD-202, Method 204, Test Condition G [30 Gs]) No interruption in continuity greater than 2.0 nanoseconds
Vibration (Random)	(MIL-STD-1344, Method 2005, Test Condition V [16.9 Gs RMS]) No interruption in continuity greater than 10.0 nanoseconds
Shock	(MIL-STD-202, Method 213, Test Condition C [100 Gs, 6 ms, 1/2 sine]) No interruption in continuity greater than 10.0 nanoseconds
Resistance to Solvents	(MIL-C-55302, Para. 4.7.18) Passed
Solderability	(MIL-STD-202, Method 208) Passed
Resistance to Soldering Heat	(MIL-STD-202, Method 210, Test Condition C) Passed

Performance data based on plug part number HDPC-P304A-E-K01 and receptacle part number HDPC-R304E-S-K01.

Materials and Finishes

Materials and Finishes for products on pages 6 - 11 and 13

Description	Material	Finish
Connector Shell	Aluminum Alloy 6061-T6 per QQ-A-225/8 or QQ-A-200/8	Electroless Nickel per MIL-C-26074
Insulator and Spacer	Diallyl Ortho Phthalate per ASTM D 5948-96, type SDG-F	Color: Green
Flexible Circuit	Conductor: Beryllium Copper per ASTM B194 UNS C17200 TD02 – .08 mm [.003 in.] thick Insulation (both sides): Polyimide film per MIL-P-46112, Type 1 with modified acrylic adhesive (1 side)	Exposed conductors are Tin-Lead plated per MIL-P-81723 (.0003 min.) over Copper plate per MIL-C-14550 CL 4 (.0001 min.)
Power Contact Insulator	Acetal	
Pin Contact	Phosphor Bronze, per ASTM B103 UNS C51000 H04	Gold plate per MIL-G-45204, Type II, Class 1 (.000050 min.) over Nickel per QQ-N-290, Class 2 (.000050 min.) over Copper strike per MIL-C-14550
Socket Contact	Copper Alloy	Gold plate per MIL-G-45204, Type II, Class 1, Grade C or D (.000050 min.) over Nickel plate per QQ-N-290, Class 2, (.000050 min.) over Copper strike per MIL-C-14550
Polarizing Guide Pin	CRES, UNS S17400, Type 630 per ASTM A564	Passivated per MIL-S-5002
Polarizing Guide Socket	Stainless Steel UNS S30300 or S30323 per ASTM A581 or A582	Passivated per QQ-P-35 or MIL-S-5002

Materials and Finishes for Fiber Optic Termini, page 16

Description	Material	Finish
Guide Bushing	Stainless Steel UNS S30300 or S30323 per ASTM A581 or A582	Passivated per QQ-P-35 or MIL-S-5002
Ceramic Termini Pin and Socket Terminus Body	Stainless Steel UNS S30300 or S30323 per ASTM A581 or A582	Passivated per QQ-P-35 or MIL-S-5002
Standard Termini Pin and Socket Terminus Body	Brass Alloy 360, 1/2 Hard, QQ-B-626	Gold plate per MIL-G-45204, Type II, Grade C or D, Class 0
Ceramic Guide Bushing and Alignment Sleeve	Zirconia	
Alignment Sleeve	Beryllium Copper, Alloy 173 per ASTM 3196 or 3197	Gold plate per MIL-G-45204, Type II, Grade C or D, Class 0
Terminus Retaining Clip	Beryllium Copper, Alloy 172 per ASTM B194	
O-Ring Seal	Fluorosilicone	

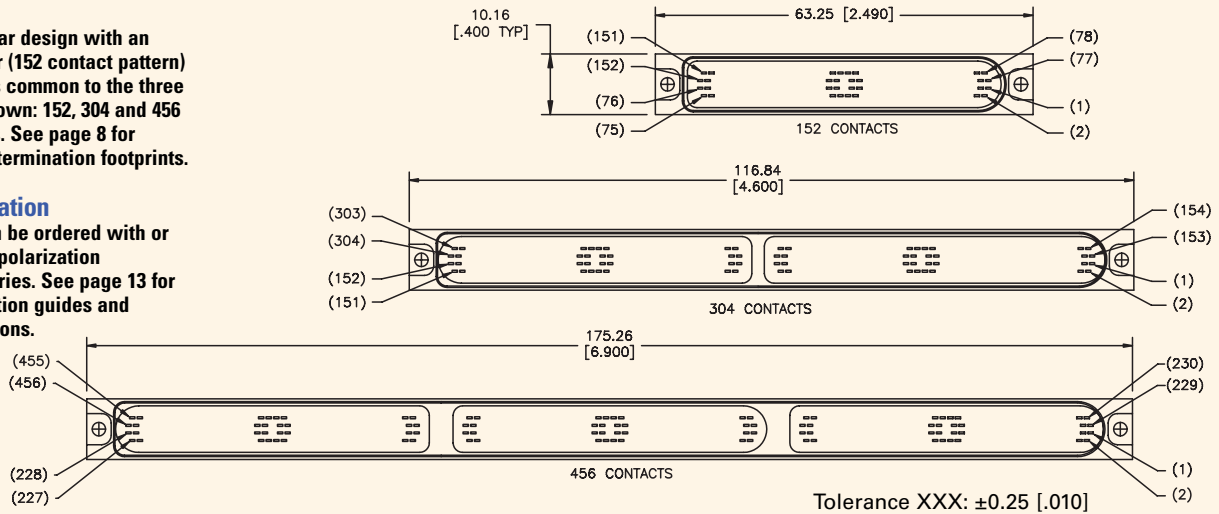
Connectors with Signal Contacts – Plug

Plug

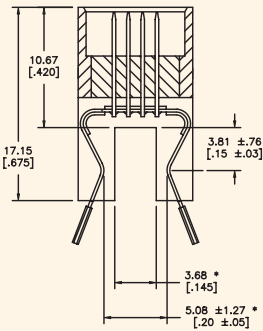
A modular design with an insulator (152 contact pattern) which is common to the three sizes shown: 152, 304 and 456 contacts. See page 8 for contact termination footprints.

Polarization

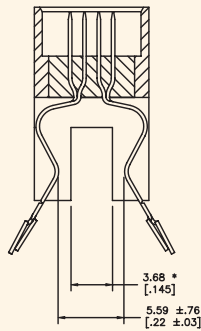
Plug can be ordered with or without polarization accessories. See page 13 for polarization guides and orientations.



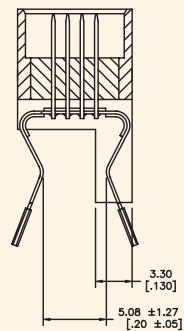
Contact and Shell Styles



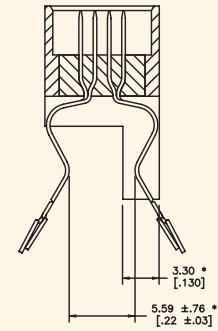
Style A – Surface Mount
Pin contacts with a flexible circuit soldered to the surface of the module circuit board.
Two ear heat sink mounting.



Style B – Surface Mount
Pin contacts with tails soldered to the surface of the module circuit board.
Two ear heat sink mounting.



Style C – Surface Mount
Pin contacts with a flexible circuit soldered to the surface of the module circuit board.
One ear heat sink mounting.



Style D – Surface Mount
Pin contacts with tails soldered to the surface of the module circuit board.
One ear heat sink mounting.

* Dimension can be changed to accommodate a different thickness board. Consult factory.

Part Number – Plug and Receptacle

HDPC – P 152 A – S – N 00 H

P: Plug
R: Receptacle

Number of Contacts: **152, 304 or 456**

Contact and Shell Style — Plug: **A, B, C or D**
Contact and Termination Style — Receptacle: **E or F**

S: General Purpose (Applies to Plug or Receptacle)

00: Polarizing guide sockets (plug), pins (receptacle), are furnished loose.
01 through 36: To select polarization orientation, see page 13. (Polarizing guide sockets or pins are furnished installed.)

N: No polarizing accessories desired.
G: Polarizing guide socket (plug) or pin (receptacle).

Dimensions shown are for reference only. Unless otherwise specified, dimensions are in millimeters and [inches].

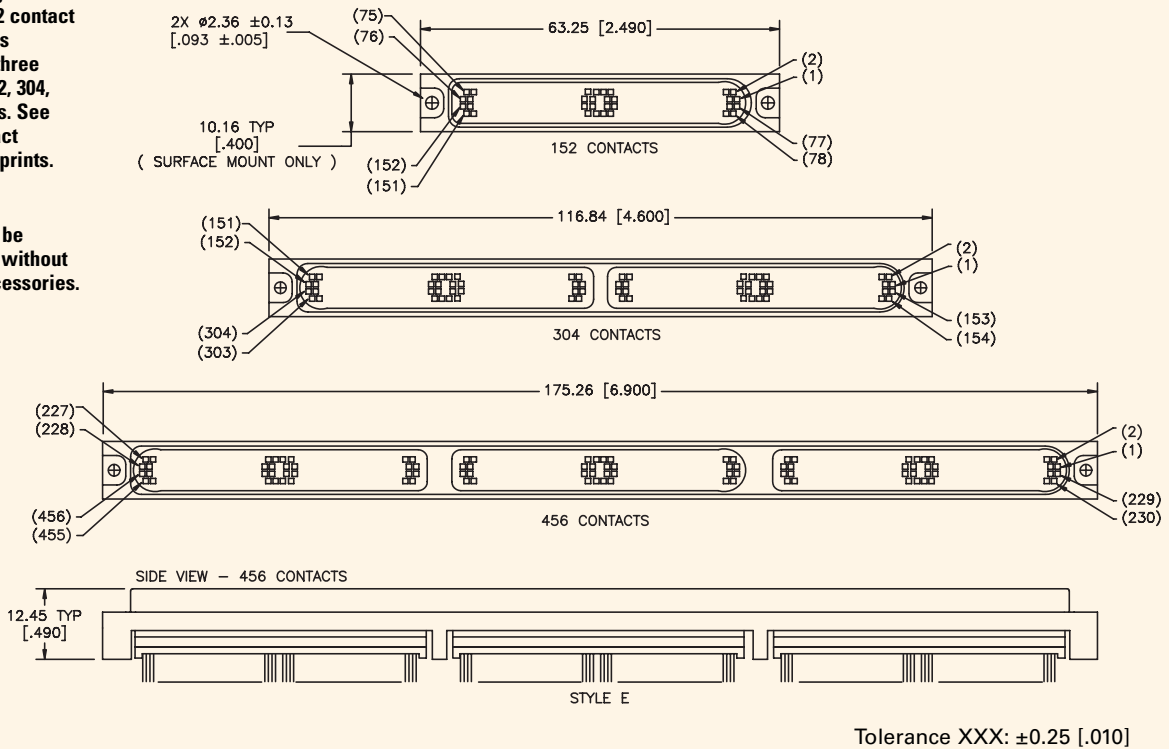
Connectors with Signal Contacts – Receptacle

Receptacle

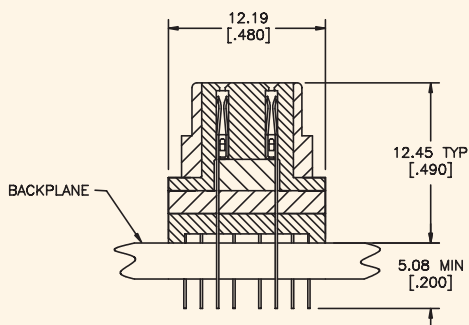
A modular design with an insulator (152 contact pattern) which is common to the three sizes shown: 152, 304, and 456 contacts. See page 9 for contact termination footprints.

Polarization

Receptacle can be ordered with or without polarization accessories.

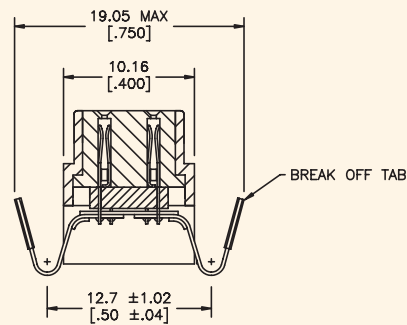


Contact Termination Styles



Style E – Through Board Mount

Socket contacts shown with tails soldered through the backplane.



Style F – Surface Mount

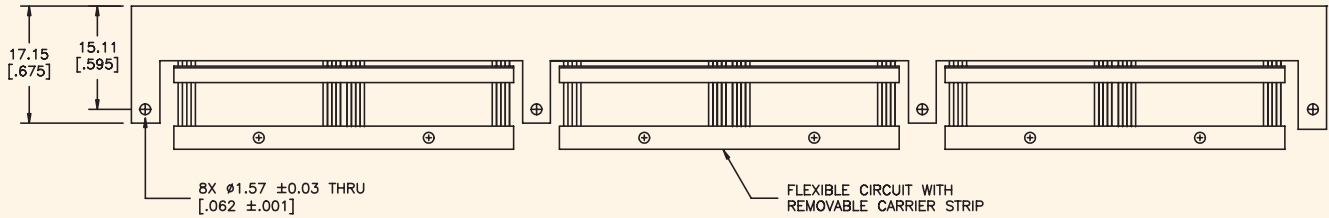
Socket contacts with a flexible circuit soldered to the surface of the backplane.

Tolerance XXX: ±0.25 [.010]

Dimensions shown are for reference only. Unless otherwise specified, dimensions are in millimeters and [inches].

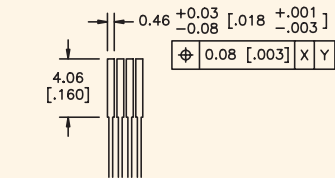
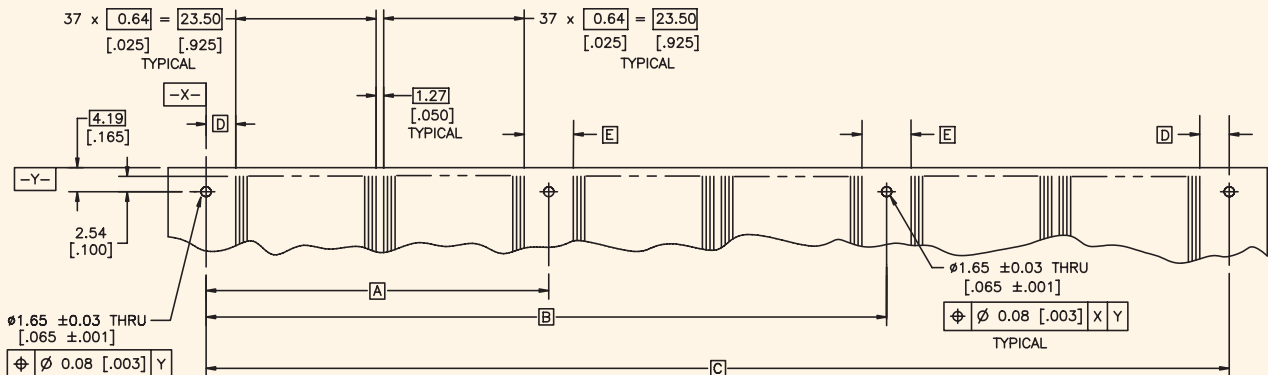
Plug Contact Termination Footprints

Side view of the 456 contact plug. Dimensions also apply to the 152 and 304 contact plugs.



Style A Shown

Module Circuit Board



PRINTED CIRCUIT BOARD TRACES AND PADS

Tolerance XXX: ± 0.25 [0.010]

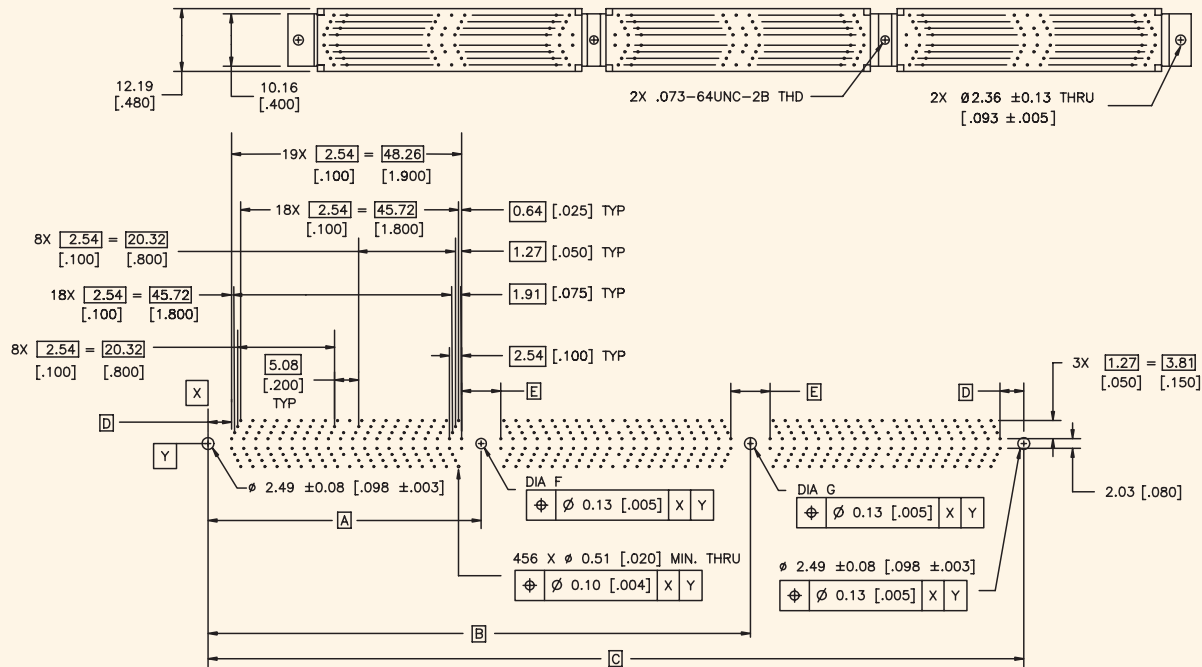
Module Circuit Board

Number of Contacts	A	B	C	D	E
152	59.18 [2.330]	—	—	5.46 [0.215]	—
304	56.39 [2.220]	112.78 [4.440]	—	4.95 [0.195]	6.35 [0.250]
456	57.33 [2.257]	113.84 [4.482]	171.20 [6.740]	4.95 [0.195]	8.26 [0.325]

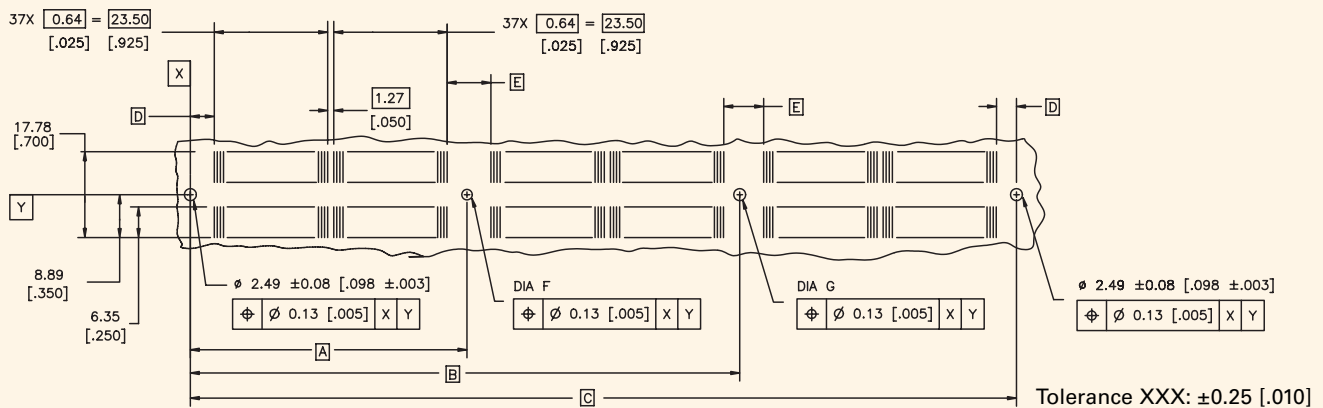
Dimensions shown are for reference only. Unless otherwise specified, dimensions are in millimeters and [inches].

Receptacle Contact Termination Footprints

Through Board Mount Rear view of the 456 contact receptacle, through board mount. Dimensions also apply to the 152 and 304 contact receptacles.



Surface Mount



Through Board Mount and Surface Mount

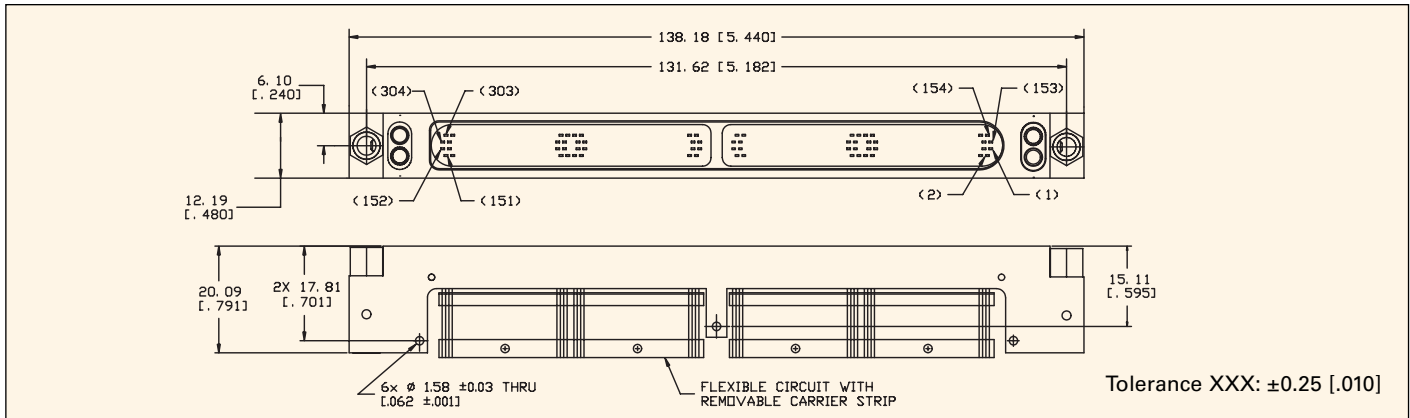
Number of Contacts	A	B	C	D	E	Dia. F	Dia. G
152	59.18 [2.330]	—	—	5.46 [.215]	—	2.49 ± 0.08 [.098 ± .003]	—
304	56.39 [2.220]	112.78 [4.440]	—	4.95 [.195]	6.35 [.250]	2.18 ± 0.08 [.086 ± .003]	2.49 ± 0.08 [.098 ± .003]
456	57.33 [2.257]	113.84 [4.482]	171.20 [6.740]	4.95 [.195]	8.26 [.325]	2.18 ± 0.08 [.086 ± .003]	2.18 ± 0.08 [.086 ± .003]

Dimensions shown are for reference only. Unless otherwise specified, dimensions are in millimeters and [inches].

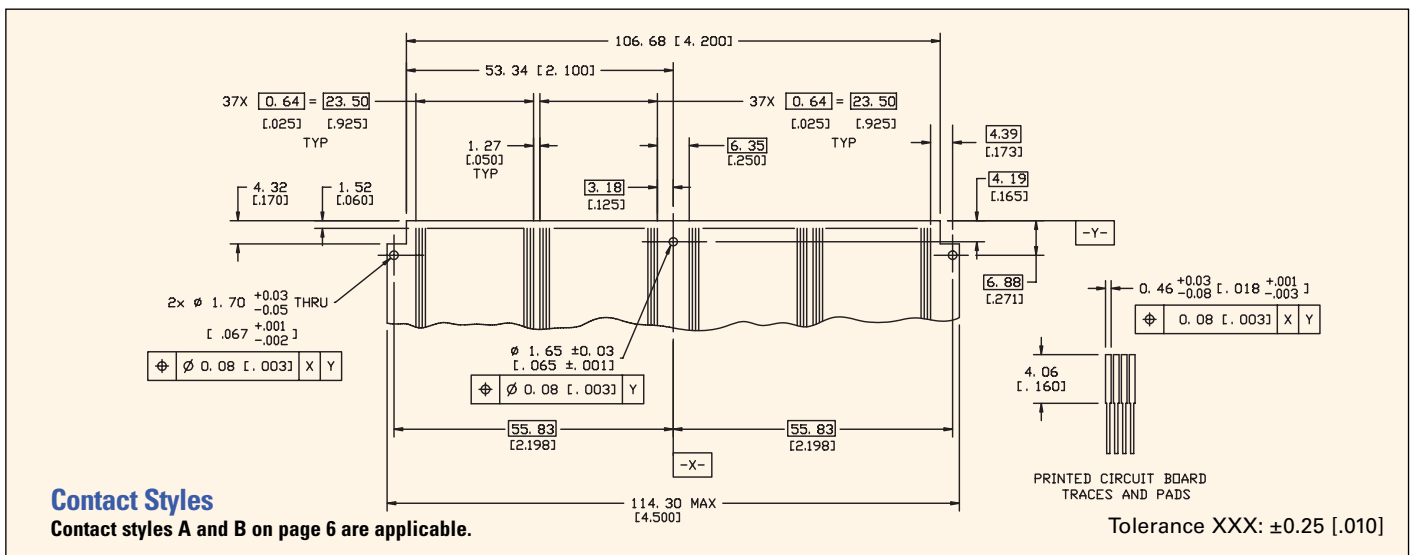
Plug 304 Signal Contacts, 4 Fiber Optic Termini

The plug shell houses 304 signal contacts and 4 fiber optic termini. Signal contacts are provided installed. See page 16 to order fiber optic termini. Consult factory for termination of fiber to termini.

Polarization: Plug can be ordered with or without polarization accessories. See part numbering below. *Note: These accessories are not interchangeable with the polarization accessories.*



Contact Termination Footprints

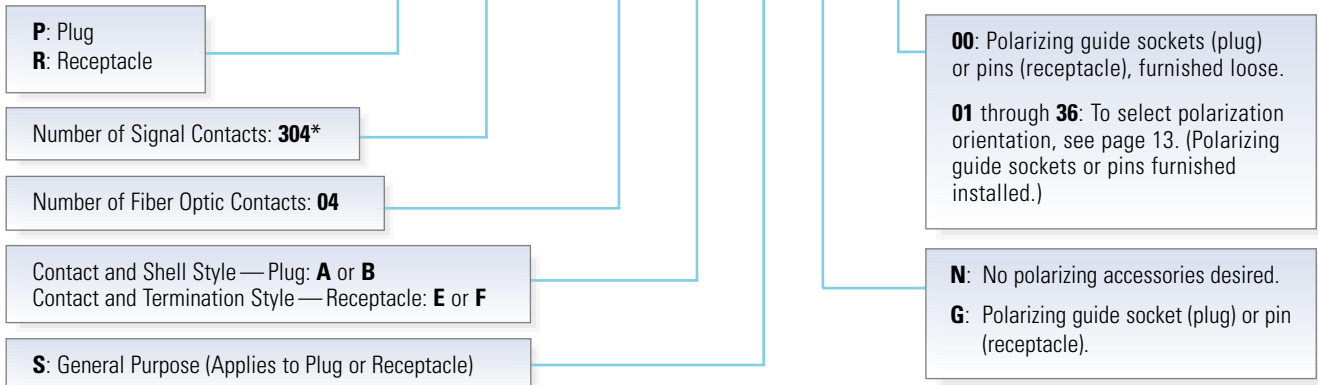


Contact Styles

Contact styles A and B on page 6 are applicable.

Part Number – Plug and Receptacle

HDFO – P 304 – 04 A S N 00 H



* Consult factory for other sizes.

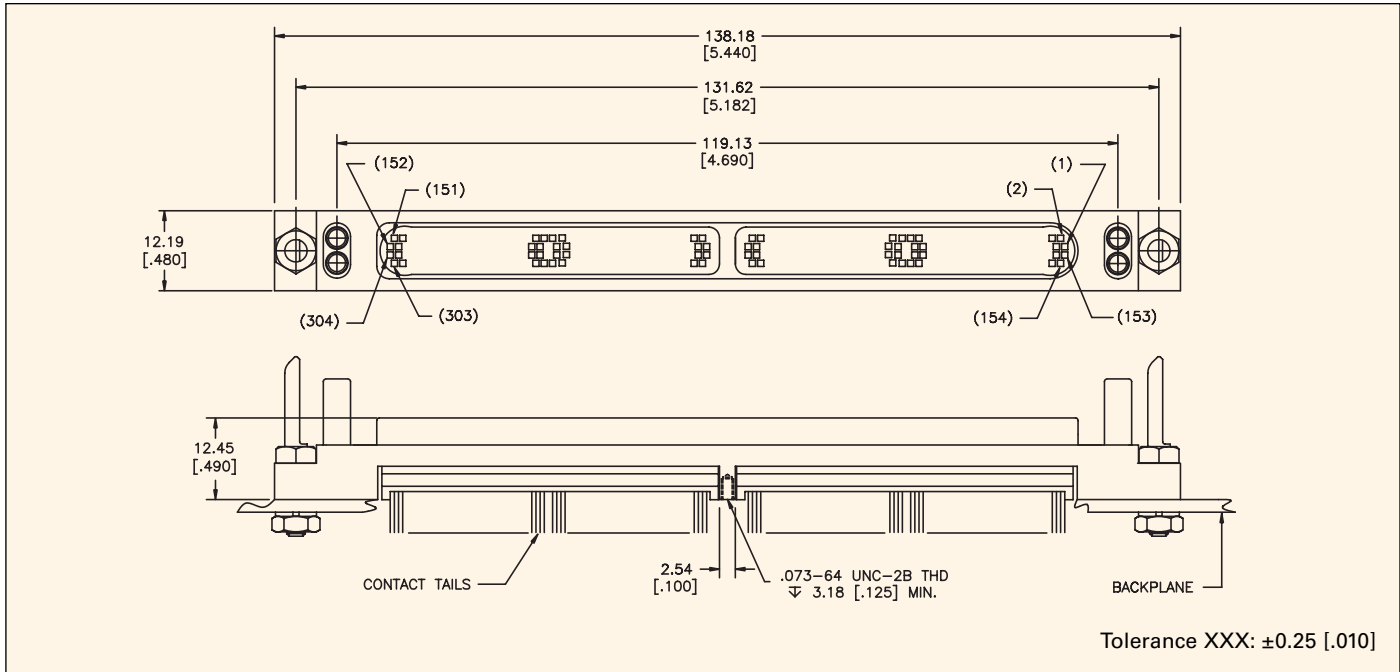
Unless otherwise specified, dimensions are in millimeters and [inches].

Receptacle

304 Signal Contacts, 4 Fiber Optic Termini

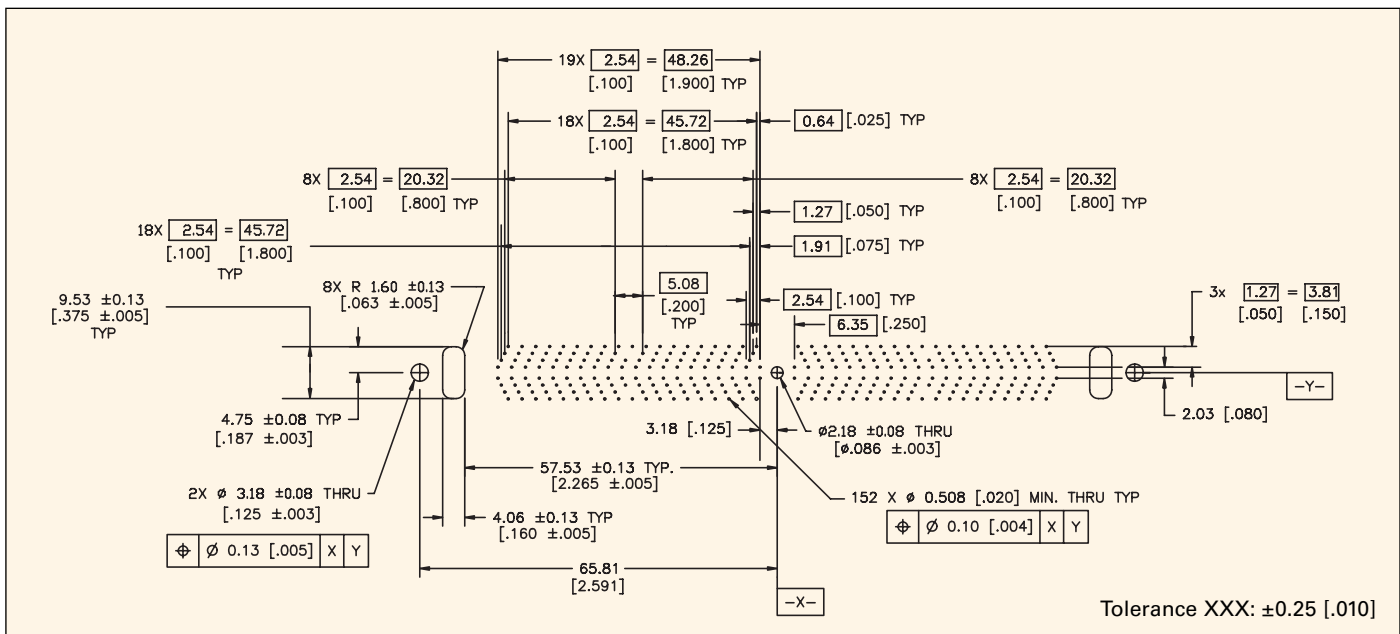
The receptacle shell houses 304 signal contacts and 4 fiber optic termini. Signal contacts are provided installed. See page 16 to order fiber optic termini. Consult factory for termination of fiber to termini.

Polarization: Receptacle can be ordered with or without polarization accessories. *Note: These accessories are not interchangeable with the polarization accessories.*



Contact Termination Footprints

Through Board Mount (Consult factory for Surface Mount.)

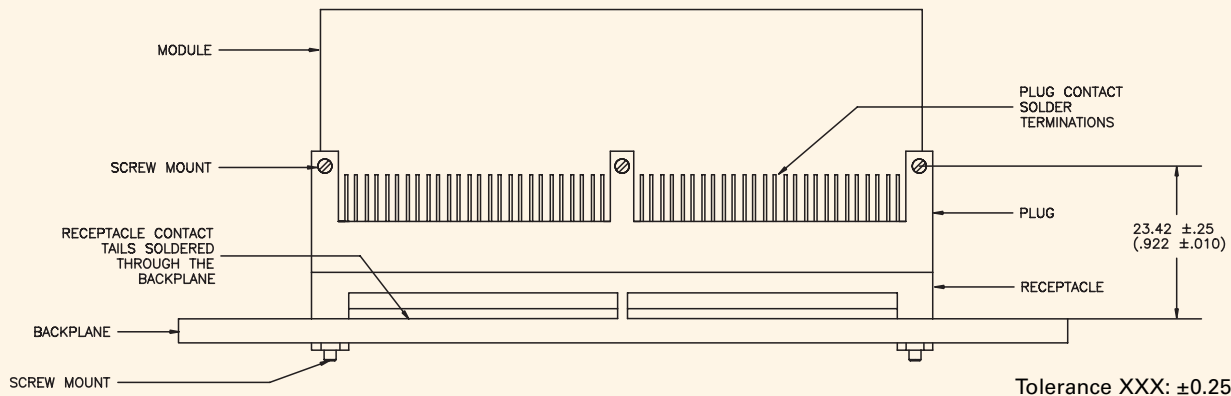


See page 7 for contact termination styles.

Dimensions shown are for reference only. Unless otherwise specified, dimensions are in millimeters and [inches].

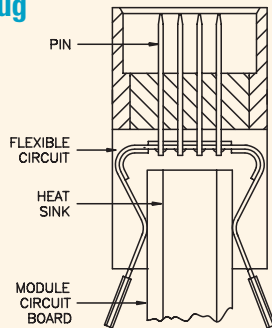
Contact Termination Styles

Plug mounted on a module circuit board mated with a receptacle mounted on a backplane.



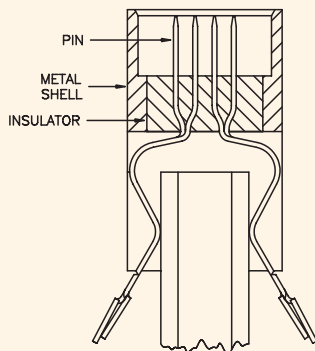
Choice of Contact Termination Styles

Plug



Style A – Surface Mount

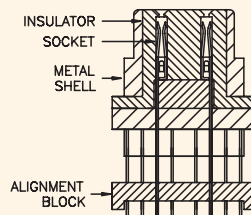
Pin contacts with flexible circuit shown soldered to the surface of the module circuit board.



Style B – Surface Mount

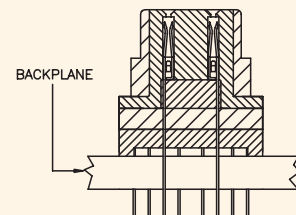
Pin contacts with tails shown soldered to the surface of the module circuit board.

Receptacle



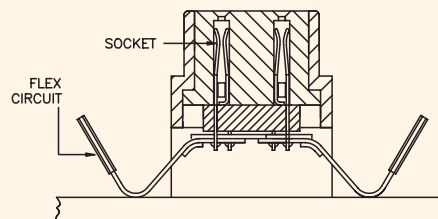
Style E – Through Board Mount

Socket contact tails shown with alignment block in the extended position prior to being mounted to the backplane.



Style E – Through Board Mount

Socket contacts shown with tails soldered through the backplane. Alignment block in fixed position.



Style F – Surface Mount

Socket contacts shown with flexible circuit soldered to the surface of the backplane.

Tolerance XXX: ± 0.25 [.010]

Dimensions shown are for reference only. Unless otherwise specified, dimensions are in millimeters and [inches].