

## TSSP-PC192-xxM 10G SFP+ Direct Attach Cable

SFP+ Direct Attach Cables are compliant with the SFF-8431, SFF-8432 and SFF-8472 specifications. Various choices of wire gauge are available from 30 to 24 AWG with various choices of cable length (up to 7m).

### Features

- Compliant with SFF-8431, 8432 and 8472
- Up to 10.3125Gbps data rate per channel
- Up to 7m transmission
- Single 3.3V power supply
- Temperature Range: 0~ 70 °C
- RoHS compliant



### Applications

- Low EMI radiation switches, servers and routers
- Data center networks
- Storage area networks
- High performance computing
- Telecommunication and wireless infrastructure
- Medical diagnostics and networking
- Test and measurement equipment

### High Speed Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Differential Impedance	Zd	90	100	110	Ω	-
Differential Input Return Loss	SDDXX	$<-12+2^* \text{SQRT}(f)$ with f in GHz			dB	0.01~4.1GHz
		$<-6.3+13^* \text{Log}10(f/5.5)$ with f in GHz			dB	4.1~11.1GHz
Common Mode Output Return Loss	SCCXX	$<-7+1.6^*f$ with f in GHz			dB	0.01~2.5GHz
		-	-	-3	dB	2.5~11.1GHz
Difference Waveform Distortion Penalty	dWDPC	-	-	6.75	dB	-
VMA Loss	L	-	-	4.4	dB	-
VMA Loss to Crosstalk Ratio	VCR	32.5	-	-	dB	-

## TSSP-PC25G-xxM 25G SFP28 Direct Attach Cable

SFP28 Direct Attach Cables are compliant with SFF-8432 and SFF-8402 specifications. Various choices of wire gauge are available from 30 to 26 AWG with various choices of cable length (up to 5m).

### Features

- Up to 25.78125Gbps data rate
- Up to 5m transmission
- Hot-pluggable SFP 20PIN footprint
- Compatible to SFP28 MSA
- Compatible to SFF-8402 and SFF-8432
- Single 3.3V power supply
- Temperature Range: 0~ 70 °C
- RoHS Compliant



### Applications

- Low EMI radiation switches, servers and routers
- Data center networks
- Storage area networks
- High performance computing
- Telecommunication and wireless infrastructure
- Medical diagnostics and networking
- Test and measurement equipment

### High Speed Characteristics

Test Parameter	IEEE802.3bj Specification
Differential Insertion Loss (SDD12)	Maximum insertion loss at 12.8906GHz @22.48dB Minimum insertion loss at 12.8906GHz@8dB
Differential Insertion Loss (SDD21)	Maximum insertion loss at 12.8906GHz@22.48dB Minimum insertion loss at 12.8906GHz@8dB
Differential Return Loss (SDD22)	-16.5+2xSQRT(f) @ 0.01 to 4.1GHz -10.66+14xLog10(f/5.5) @4.1 to 19GHz
Differential Return Loss (SDD11)	-16.5+2xSQRT(f) @ 0.01 to 4.1GHz -10.66+14xLog10(f/5.5) @4.1 to 19GHz
Common Mode Reflection (SCC22)	-2dB @ 0.01 to 19GHz
Common Mode Reflection (SCC11)	-2dB @ 0.01 to 19GHz
Common Mode Conversion (SCD22)	-22+(20/25.78)*(f) @ 0.01 to 12.89GHz -15+(6/25.78)*(f) @ 12.9 to 19GHz
Common Mode Conversion (SCD11)	-22+(20/25.78)*(f) @ 0.01 to 12.89GHz -15+(6/25.78)*(f) @ 12.9 to 19GHz
Differential to Common Mode Conversion Loss (SCD12)	-10dB @ 0.01 to 12.89GHz -27+(29/22)*(f) @ 12.9 to 15.7GHz -6.3dB @ 15.71 to 19GHz
Differential to Common Mode Conversion Loss (SCD21)	-10dB @ 0.01 to 12.89GHz -27+(29/22)*(f) @ 12.9 to 15.7GHz -6.3dB @ 15.71 to 19GHz

## TSQS-PC40G-xxM 40G QSFP+ Direct Attach Cable

QSFP+ Direct Attach Cables are compliant with the SFF-8436 specifications. Various choices of wire gauge are available from 30 to 26 AWG with various choices of cable length (up to 7m).

### Features

- Up to 10.3125Gbps data rate per channel
- Up to 7m transmission
- Hot-pluggable QSFP+ 38 PIN footprint
- Compatible to SFF-8436
- Single 3.3V power supply
- Temperature Range: 0~ 70 °C
- RoHS compliant



### Applications

- Low EMI radiation switches, servers and routers
- Data center networks
- Storage area networks
- High performance computing
- Telecommunication and wireless infrastructure
- Medical diagnostics and networking
- Test and measurement equipment

### High Speed Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Differential Impedance	Zd	90	100	110	Ω	-
Differential Input Return Loss	SDDXX	$<-12+2^* \text{SQRT}(f)$ with f in GHz			dB	0.01~4.1GHz
		$<-6.3+13^* \text{Log}10(f/5.5)$ with f in GHz			dB	4.1~11.1GHz
Common Mode Output Return Loss	SCCXX	$<-7+1.6^*f$ with f in GHz			dB	0.01~2.5GHz
		-	-	-3	dB	2.5~11.1GHz
Difference Waveform Distortion Penalty	dWDPC	-	-	6.75	dB	-
VMA Loss	L	-	-	4.4	dB	-
VMA Loss to Crosstalk Ratio	VCR	32.5	-	-	dB	-

## TSQSS-PC40G-xxM 40G QSFP+ TO 4SFP+ Direct Attach Cable

QSFP+ Direct Attach Cables are compliant with the SFF-8436 specifications. SFP+ Direct Attach Cables are compliant with the SFF-8431, SFF-8432 and SFF-8472 specifications. Various choices of wire gauge are available from 30 to 24 AWG with various choices of cable length (up to 7m).

### Features

- Up to 10.3125Gbps data rate per channel
- Up to 7m transmission
- Hot-pluggable QSFP+ 38 PIN footprint
- Compatible to SFF-8436
- Single 3.3V power supply
- Temperature Range: 0~ 70 °C
- RoHS compliant



### Applications

- Low EMI radiation switches, servers and routers
- Data center networks
- Storage area networks
- High performance computing
- Telecommunication and wireless infrastructure
- Medical diagnostics and networking
- Test and measurement equipment

### High Speed Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Differential Impedance	Zd	90	100	110	Ω	-
Differential Input Return Loss	SDDXX	$<-12+2^* \text{SQRT}(f)$ with f in GHz			dB	0.01~4.1GHz
		$<-6.3+13^* \text{Log}10(f/5.5)$ with f in GHz			dB	4.1~11.1GHz
Common Mode Output Return Loss	SCCXX	$<-7+1.6^*f$ with f in GHz			dB	0.01~2.5GHz
		-	-	-3	dB	2.5~11.1GHz
Difference Waveform Distortion Penalty	dWDPC	-	-	6.75	dB	-
VMA Loss	L	-	-	4.4	dB	-
VMA Loss to Crosstalk Ratio	VCR	32.5	-	-	dB	-

## TSQS-PC1HG-xxM 100G QSFP28 Direct Attach Cable

QSFP28 Direct Attach Cables are compliant with the SFF-8665 specifications. Various choices of wire gauge are available from 30 to 26 AWG with various choices of cable length (up to 5m).

### Features

- Up to 25.78Gbps data rate per channel
- Up to 5m transmission
- Hot-pluggable QSFP+ 38 PIN footprint
- Compatible to SFF-8665
- Compliant with IEEE 802.3bj
- Single 3.3V power supply
- Temperature Range: 0~ 70 °C
- RoHS compliant



### Applications

- Low EMI radiation switches, servers and routers
- Data center networks
- Storage area networks
- High performance computing
- Telecommunication and wireless infrastructure
- Medical diagnostics and networking
- Test and measurement equipment

### High Speed Characteristics

Test Parameter	IEEE802.3bj Specification
Differential Insertion Loss (SDD12)	Maximum insertion loss at 12.8906Ghz @22.48dB Minimum insertion loss at 12.8906Ghz@8dB
Differential Insertion Loss (SDD21)	Maximum insertion loss at 12.8906Ghz@22.48dB Minimum insertion loss at 12.8906Ghz@8dB
Differential Return Loss (SDD22)	-16.5+2xSQRT(f) @ 0.01 to 4.1GHz -10.66+14xLog10(f/5.5) @4.1 to 19GHz
Differential Return Loss (SDD11)	-16.5+2xSQRT(f) @ 0.01 to 4.1GHz -10.66+14xLog10(f/5.5) @4.1 to 19GHz
Common Mode Reflection (SCC22)	-2dB @ 0.01 to 19GHz
Common Mode Reflection (SCC11)	-2dB @ 0.01 to 19GHz
Common Mode Conversion (SCD22)	-22+(20/25.78) <sup>(f)</sup> @ 0.01 to 12.89GHz -15+(6/25.78) <sup>(f)</sup> @ 12.9 to 19GHz
Common Mode Conversion (SCD11)	-22+(20/25.78) <sup>(f)</sup> @ 0.01 to 12.89GHz -15+(6/25.78) <sup>(f)</sup> @ 12.9 to 19GHz
Differential to Common Mode Conversion Loss (SCD12)	-10dB @ 0.01 to 12.89GHz -27+(29/22) <sup>(f)</sup> @ 12.9 to 15.7GHz -6.3dB @ 15.71 to 19GHz
Differential to Common Mode Conversion Loss (SCD21)	-10dB @ 0.01 to 12.89GHz -27+(29/22) <sup>(f)</sup> @ 12.9 to 15.7GHz -6.3dB @ 15.71 to 19GHz

## TSQSS-PC1HG-xxM 100G QSFP28 TO 4SFP28 Direct Attach Cable

QSFP28 Direct Attach Cables are compliant with the SFF-8665 specifications. SFP28 Direct Attach Cables are compliant with SFF-8432 and SFF-8402 specifications. Various choices of wire gauge are available from 30 to 26 AWG with various choices of cable length (up to 5m).

### Features

- Up to 25.78Gbps data rate per channel
- Up to 5m transmission
- Hot-pluggable QSFP+ 38 PIN footprint
- Compatible to SFF-8665
- Compliant with IEEE 802.3bj
- Single 3.3V power supply
- Temperature Range: 0~ 70 °C
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### Applications

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### High Speed Characteristics

Test Parameter	IEEE802.3bj Specification
Differential Insertion Loss (SDD12)	Maximum insertion loss at 12.8906Ghz @22.48dB Minimum insertion loss at 12.8906Ghz@8dB
Differential Insertion Loss (SDD21)	Maximum insertion loss at 12.8906Ghz@22.48dB Minimum insertion loss at 12.8906Ghz@8dB
Differential Return Loss (SDD22)	-16.5+2xSQRT(f) @ 0.01 to 4.1GHz -10.66+14xLog10(f/5.5) @4.1 to 19GHz
Differential Return Loss (SDD11)	-16.5+2xSQRT(f) @ 0.01 to 4.1GHz -10.66+14xLog10(f/5.5) @4.1 to 19GHz
Common Mode Reflection (SCC22)	-2dB @ 0.01 to 19GHz
Common Mode Reflection (SCC11)	-2dB @ 0.01 to 19GHz
Common Mode Conversion (SCD22)	-22+(20/25.78) <sup>(f)</sup> @ 0.01 to 12.89GHz -15+(6/25.78) <sup>(f)</sup> @ 12.9 to 19GHz
Common Mode Conversion (SCD11)	-22+(20/25.78) <sup>(f)</sup> @ 0.01 to 12.89GHz -15+(6/25.78) <sup>(f)</sup> @ 12.9 to 19GHz
Differential to Common Mode Conversion Loss (SCD12)	-10dB @ 0.01 to 12.89GHz -27+(29/22) <sup>(f)</sup> @ 12.9 to 15.7GHz -6.3dB @ 15.71 to 19GHz
Differential to Common Mode Conversion Loss (SCD21)	-10dB @ 0.01 to 12.89GHz -27+(29/22) <sup>(f)</sup> @ 12.9 to 15.7GHz -6.3dB @ 15.71 to 19GHz

**DAC Series**  
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