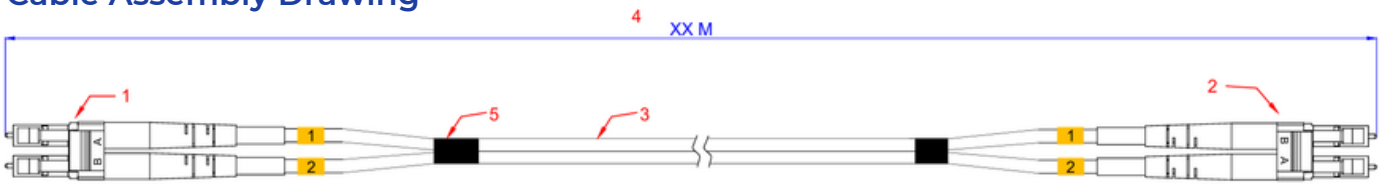
Prestaq Co., Ltd.
9F, No. 651-9, Jung Jeng Rd., Shin Juang Dist., New Taipei City, Taiwan Tel +886 2 2908 1988 www.prestaq.com e-mail: sales@grayle.com

Product specifications

Product Family: Zyberspeed
Category Fiber Optic Patch Cable
Product: LC/UPC-LC/UPC DX MM OM4 3.0mm LSZH Armoured Erika Violet
Article Number: ZS09 Series

Cable Assembly Drawing



Cable Parameter

Tight Buffer Fiber
- Fiber count: 2F
- Diameter: 0.85 ± 0.05 mm

Kevlar
- Material: Imported

Metal Tube
- Diameter: 2.2 ± 0.2 mm
- Material: Metal

Outer Jacket
- Diameter: 3.0 × 6.1 ± 0.2 mm
- Material: LSZH
- Color: Erika Violet

Specifications

1. LC/UPC Connector (1) 3.0mm
2. LC/UPC Connector (2) 3.0mm
3. 2F 3.0x6.1mm DX MM OM4 Erika Violet Cable
4. Length: XX M
5. Heat shrink

Performances

1. Insertion loss: Typical≤0.20dB,Max≤0.30dB
2. Return loss: SM≥50dB,MM≥30dB
3. Durability: <0.2dB,Typical Change:1000 Matings
4. Insert-pull Test: 500times<0.5dB
5. Opearting Temperature: -20˚C to +70˚C

Length Tolerance

Tolerance	L≤500 mm	500 L≤5000 mm	5000 L≤10000 mm	10000 L≤30000 mm	30000 L≤100000 mm	L 100000 mm
MM	+50/-0	+100/-0	+150/-0	+250/-0	+1%L/-0	+1.5%L/-0

Performances

Ethernet Speed	OM4 Max Distance
1Gbps (1000BASE-SX)	1,000 m
10Gbps (10GBASE-SR)	550 m
40Gbps (40GBASE-SR4)	150 m
100Gbps (100GBASE-SR4)	100 m
400Gbps (400GBASE-SR8/SR4.2)	70 m

Link Budget & Optical Parameters

Connector insertion loss (typical and maximum values)	typical IL ≤0.2dB, and maximum IL≤0.3dB
Return loss (RL, including UPC/APC values)	SM UPC RL ≥50dB, SM APC RL ≥60dB and MM UPC RL ≥30dB
Typical splice loss values	OM4 typical 0.12dB, OM4 typical 0.04dB
Recommended maximum channel loss / link budget guidelines	
Attenuation (max per km)	• 850nm: ≤ 3.0 dB/km • 1300nm: ≤ 1.0 dB/km
Wavelength	**OM4 (Multimode 50/125)**
850 nm	~105 – 110
1310 nm	~0 (zero dispersion zone)
1550 nm	~20 – 25

Fiber Type	Max Value per Fiber (ps/√km)	Link Design Value (ps/√km)	Typical Value (ps/√km)	Key Notes
OM4 (50/125 MMF)	≤ 0.5 (1550nm, Reference Only)	No Requirement	Negligible	Dominated by Modal Dispersion (DMD); PMD has no impact on 850/953nm short-reach

Differential Mode Delay (DMD) – Key Results	Typical Measured DMD Values (Field/Factory Data, 850 nm)	Physical Meaning
• DMD mask compliance: Pass per TIA-455-220-A / IEC 60793-1-49 template. • Effective Modal Bandwidth (EMB) @850 nm: ≥4700 MHz·km(OM3: ≥2000 MHz·km). • Maximum allowed DMD spread (Δτ): ≤0.15–0.17 ps/m (inner/outer mode group delay difference).	• DMDinner: ~0.10–0.12 ps/m (inner mode groups) • DMDouter: ~0.12–0.15 ps/m (outer mode groups) • DMDsliding: ~0.10–0.13 ps/m (sliding launch) • EMB (laser bandwidth): 4700–5500 MHz·km (typical, well above minimum) • OFL bandwidth @850 nm: ≥3500 MHz·km；@1300 nm: ≥500 MHz·km	• DMD = difference in arrival time between fastest and slowest mode groups • OM4 tightly controls refractive index profile → minimizes mode group delay spread → supports 10G/40G/100G at longer distances than OM3

Bandwidth Characterization

OFL (Overfilled Launch) Bandwidth	EMB (Effective Modal Bandwidth, "Laser Bandwidth")	DMD-Based Bandwidth
• LED-like full-core excitation; legacy OM1/OM2/OM3 compatibility • OM4 @850 nm: ≥3500 MHz·km; @1300 nm: ≥500 MHz·km	• VCSEL-specific (850 nm, restricted launch); the key metric for 10G+ • OM4 @850 nm: ≥4700 MHz·km (standard); typical 4700–5500 MHz·km	• Derived from DMD profile; most accurate for high-speed VCSEL links

Parameter	OM4 Spec	Typical Value	Purpose
EMB (MHz·km)	≥4700	4700–5500	10G/40G/100G VCSEL
OFL @850 nm (MHz·km)	≥3500	3500–4500	Legacy LED/OM3 compat.
OFL @1300 nm (MHz·km)	≥500	500–800	1300 nm backward compat.
DMD spread (ps/m)	≤0.17	0.10–0.15	Mode group delay control

Standard Specification (TIA-492AAAD / IEC 60793-2-10 A1a.3)

1. DMD mask compliance: Pass per TIA-455-220-A / IEC 60793-1-49 template
2. Effective Modal Bandwidth (EMB) @850 nm: ≥4700 MHz·km(OM3: ≥2000 MHz·km)
3. Maximum allowed DMD spread (Δτ): ≤0.15–0.17 ps/m (inner/outer mode group delay difference)

DMD & Bandwidth Test Methodology (per TIA/IEC)

Standards	DMD Test Setup (850 nm)	DMD Measurement Steps	Bandwidth Calculation Methods	Key Notes
• TIA-455-220-A (FOTP-220): Time-domain DMD measurement • IEC 60793-1-49: DMD test procedure • TIA-492AAAD: OM4 fiber specification	1. Laser: 850 nm VCSEL / mode-locked laser (~10 ps pulses) 2. Launch: radial offset scanning (0 to 25 μm core radius, 1–2 μm steps) 3. Detection: High-speed photodetector + sampling oscilloscope 4. Fiber length: 500–550m (standard for DMD testing)	Launch narrow pulses at discrete radial positions across core For each position, record mode group arrival times Construct DMD profile: time delay vs. radial offset **Compute:** • Δτ = max delay − min delay (all positions) • EMBc: effective modal bandwidth from DMD (10 VCSEL launch conditions) **Pass criteria:** • DMD profile inside standard mask • EMBc ≥4700 MHz·km	DMD Mask Method (Preferred): • Compares measured DMD profile to standard template; stricter, more reliable for high-speed. EMBc Method: • Computes worst-case EMB from DMD data; simpler, but less stringent than mask method.	• OM4 performance is dominated by modal dispersion (DMD/EMB), not chromatic dispersion or PMD • DMD is the only standardized method to verify OM4 bandwidth for 10G+ systems

Connector Specifications

- Available connector types (LC, SC, etc.) LC/SC/FC/ST/E2000
- Connector polish type (UPC or APC) UPC or APC
- End-face geometry compliance (IEC 61755)

Parameter	Compliance Requirement (IEC 61755)
Radius of Curvature	PC: 10–25 mm; UPC:12–20 mm; APC:8–12 mm
Apex Offset	≤ 50 μm (Class B)
Fiber Height	−50 nm to +50 nm
APC Angle	8° ± 0.3°
Surface Defects	Meet IEC 61755 scratch/dig/pit limits

Mechanical Characteristics

- Maximum pulling tension (installation and permanent) 200/400N
- Crush resistance (N/100 mm) 200/500 N/100mm
- Impact resistance rating ≥5J
- Minimum bend radius (clearly specified for dynamic vs static conditions) 20D/10D

Environmental Specifications

- Operating temperature range
- Installation temperature range
- Storage temperature range
- UV resistance (suitability for outdoor use) N/A
- Water/moisture protection (e.g. water blocking) N/A

Installation temperature	℃	-10～+60
Operation temperature	℃	-20～+70
Storage temperature	℃	-20～+70

Fire & Compliance (EU Requirements)

- CPR classification (e.g. B2ca, Cca, Dca) Eca
- Smoke classification (s1/s2) N/A
- Flame spread / fire performance (EN standards) IEC60332-1
- Declaration of Performance (DoP), if available N/A

Standards & Certification

- Explicit ISO/IEC classification (OM4) ISO9001
- TIA compliance (e.g. TIA-492AAAD / TIA-492CAAB) TIA-492AAAD / TIA-492CAAB
- ITU-T compliance confirmation (G.657.A1 or A2 for OS2) G652D/G657A1
- CE, RoHS, and REACH certifications ROHS Reach

Testing & Quality Assurance

- Factory test reports (insertion loss, return loss, OTDR) insertion loss, return loss, for patchcord, OTDR for armoured cable
- Batch or reel-level test documentation Cable Test report

Application Guidance

- Recommended applications (e.g. data center, backbone, FTTH) data center, backbone, FTTH
- Confirmation of indoor/outdoor installation suitability just for indoor

Revision record

Date	version	change Description
May 12, 2026	V.0	First release