

EVERYTHING

IN A

NEW

LIGHT.

Description

High-speed InGaAs photodiodes from PerkinElmer Optoelectronics are designed for use in OEM fiber optic communications systems and high-speed receiver applications including trunk line, LAN, fiber-in-the-loop and data communications. Ceramic submount packages are available for easy integration into high-speed SONET, FDDI, or datalink receiver modules, or as back-facet power monitors in laser diode modules.

Photodiodes are available in hermetic TO-18 packages, or in connectorized receptacle packages with industry standard ST, FC or SC connectors. These are designed for mating to either single or multimode fibers. Photodiodes are also available in a fibered package with either single or multimode fiber pigtail, which can be terminated with either an ST, FC or SC connector. Receptacle and fibered packages use a ball-lens TO-18 package to maximize coupling efficiency. All devices are planar passivated and feature proven high reliability mounting and contacting. An MTTF of $>10^9$ hours (approximately 105 years) at 50°C has been demonstrated to date from standard production samples.

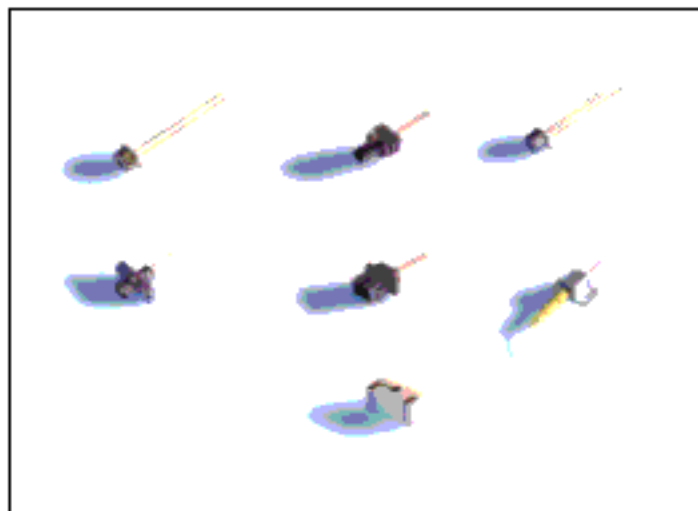
Quality and Reliability

PerkinElmer Optoelectronics is committed to supplying the highest quality product to our customers, and we are certified to meet ISO-9001 and operate to MIL-Q-9858A and AQAP-1 quality standards. Process control is maintained through annual re-qualification of production units and includes extensive electrical, thermal and mechanical stress as well as an extended lifetest. In addition, every wafer lot is individually qualified to meet responsivity, capacitance and dark current specifications, and reliability is

High-Speed InGaAs PIN

Photodiodes

C30616, C30637, C30617, C30618



demonstrated with an extended high temperature burn-in at 200°C for 168 hours ($V^R = 10V$), ensuring an MTTF $> 10^9$ hours at 50°C ($E_A = 0.7eV$). Finally, all production devices are screened with a 16 hour, 200°C burn-in ($V^R = 10V$) and tested to meet responsivity, spectral noise and dark current specifications.

Features

- 50, 75, 100, 350 μm diameters
- High responsivity at 1300 and 1550nm
- Low capacitance for high bandwidths (to 3.5GHz)
- Available in various package options

Applications

- High-speed communications
- SONET/ATM, FDDI
- Datalinks & LANs
- Fiber optic sensors

Performance Specifications (at $V_R = V_{OP}$ typical), 22°C

Parameter	C30616			C30637			Units
	Min	Typ	Max	Min	Typ	Max	
Operating Voltage	1	5	10	1	5	10	V
Breakdown Voltage	25	100		25	100		V
Active Diameter		50			75		μm
Responsivity at 1300 nm							
Ceramic (D1)	0.80	0.90		0.80	0.90		A/W
Responsivity at 1550 nm							
Ceramic (D1)	0.85	0.95		0.85	0.95		A/W
Dark Current		< 1.0	2.0		< 1.0	2.0	nA
Spectral Noise Current (10 kHz, 1.0 Hz)		< 0.02	0.15		< 0.02	0.15	pA/√Hz
Capacitance at $V_R = V_{OP}$ (typ)							
Ceramic (D1)		0.35	0.55		0.40	0.60	pF
Rise/Fall Time (10% to 90%)		0.07	0.5		0.07	0.5	ns
Bandwidth (-3 dB, $R_L = 50\Omega$)		3.5			3.5		GHz
Available Package Types		D1			D1		

Maximum Ratings

Maximum Forward Current		10		10	mA
Power Dissipation		100		100	mW
Storage Temperature	-60	125	-60	125	°C
Operating Temperature	-40	125	-40	125	°C

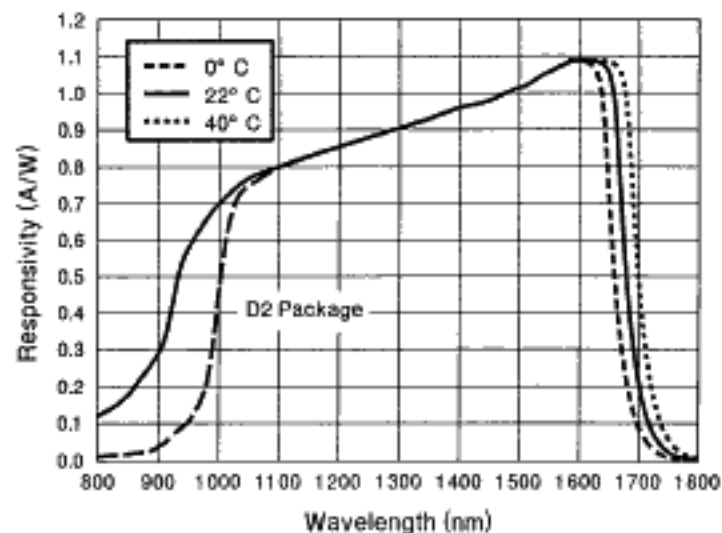


Figure 1: Typical spectral responsivity vs wavelength.
Dotted line shows response in D2 package (silicon window)

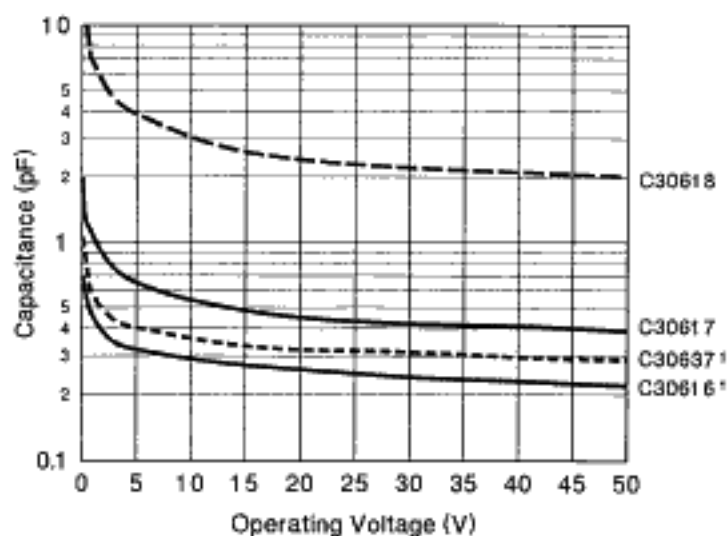


Figure 2: Typical capacitance vs operating voltage.
Note 1: Ceramic submount.

Specifications (at $V_R = V_{OP}$ typical), 22°C

Parameter	C30617			C30618			Units
	Min	Typ	Max	Min	Typ	Max	
Operating Voltage	1	5	10	1	5	10	V
Breakdown Voltage	25	100		25	80		V
Active Diameter		100			350		μm
Responsivity at 1300 nm							
Ceramic (D1)/TO-18 (D2)	0.80	0.90		0.80	0.90		A/W
Fiber (D6)/FC (D4)/ST (D3)/SC (D5) ¹	0.65	0.75		0.65	0.75		
Responsivity at 1550 nm							
Ceramic (D1)/TO-18 (D2)	0.85	0.95		0.85	0.95		A/W
Fiber (D6)/FC (D4)/ST (D3)/SC (D5) ¹	0.70	0.80		0.70	0.80		
Dark Current		< 1.0	2.0		2.0	5.0	nA
Spectral Noise Current (10 kHz, 1.0 Hz)		< 0.02	0.15		0.02	0.20	$\text{pA}/\sqrt{\text{Hz}}$
Capacitance at $V_R = V_{OP}$ (typ)							
(D1),(D6),(D3),(D5)		0.6	0.8		4.0	6.0	pF
TO-18 (D2)		0.8	1.0		4.0	6.0	
Rise/Fall Time (10% to 90%)		0.07	0.5		0.5	1.0	ns
Bandwidth (-3 dB, $R_L = 50 \Omega$)		3.5			0.75		GHz
Available Package Types		D1, D2, D3, D4, D5, D6,			D1, D2, D3, D4, D21		-

Maximum Ratings

Maximum Forward Current		10		10	mA
Power Dissipation		100		100	mW
Storage Temperature ²	-60	125	-60	125	°C
Operating Temperature ²	-40	125	-40	125	°C

Note 1. Coupled from 62.5 Fm, 0.28 NA graded index multi-mode fiber using 1300 nm SLED source.

Note 2. Maximum storage and operating temperature for connectorized and fibered devices is +85°C.

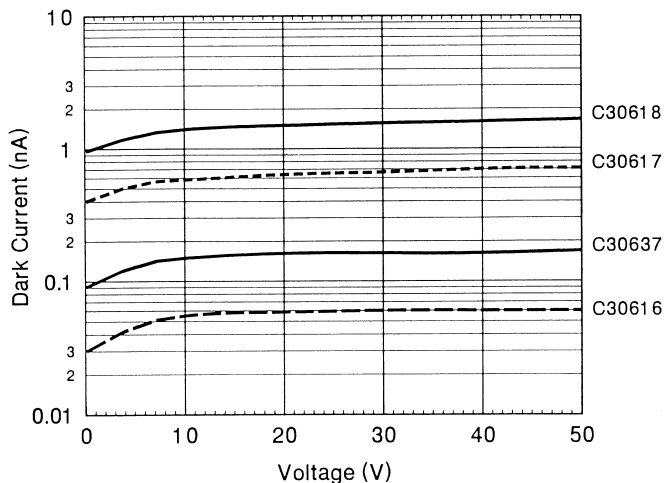


Figure 3: Typical dark current vs. voltage

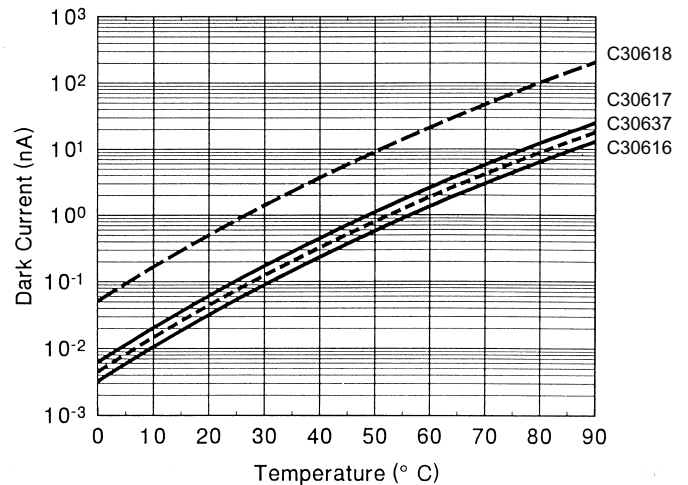


Figure 4: Typical dark current vs. temperature at $V_{OP} = -5\text{V}$.

Standard Packages

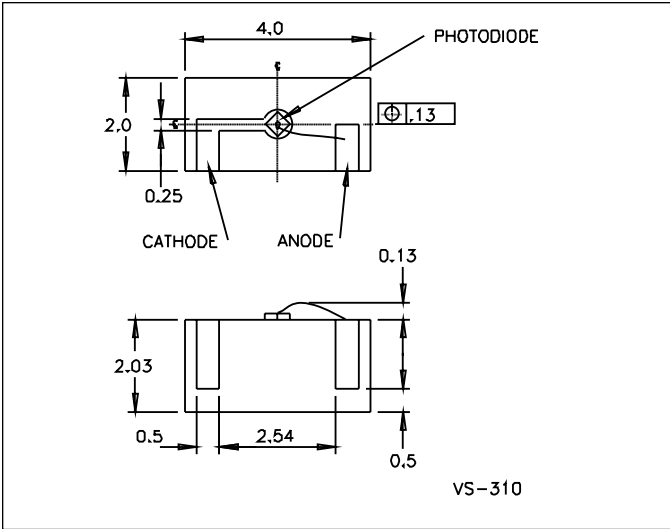


Figure 5: Package D1: Ceramic Submount

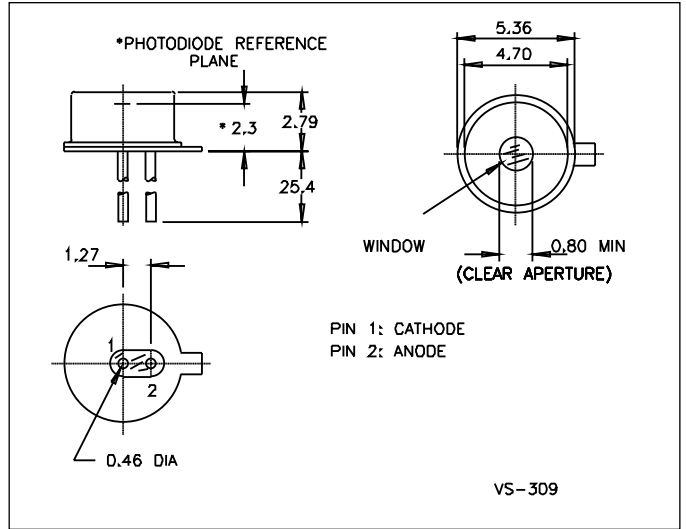


Figure 6: Package D2: TO-18 low profile

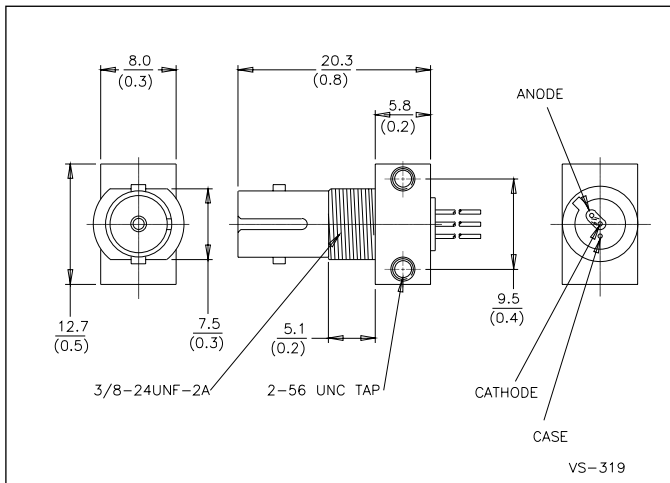


Figure 7: Package D3: ST receptacle module

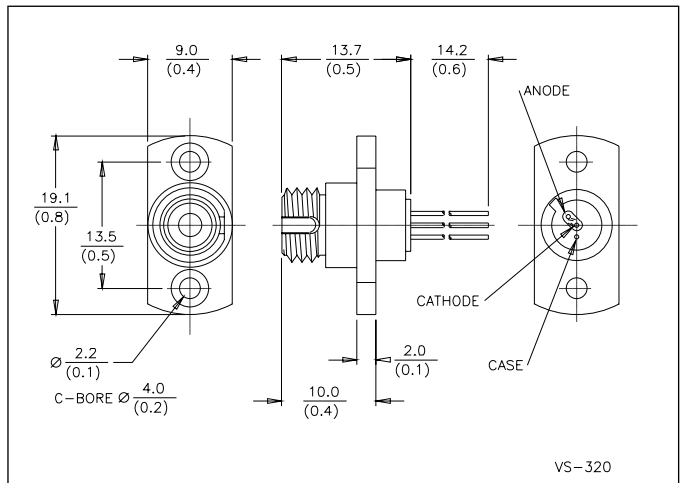


Figure 8: Package D4: FC detector module

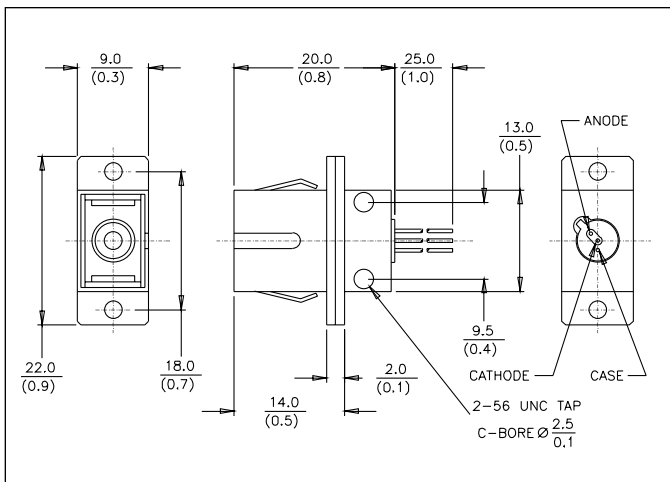


Figure 9: Package D5: SC receptacle module

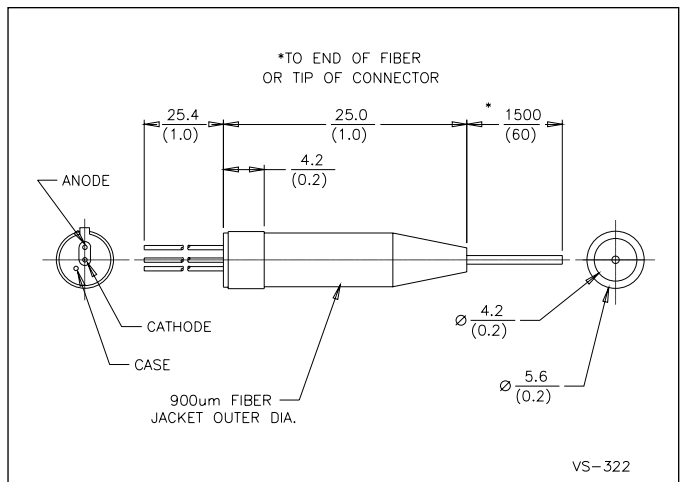


Figure 10: Package D6: Fibered detector module

Standard Packages

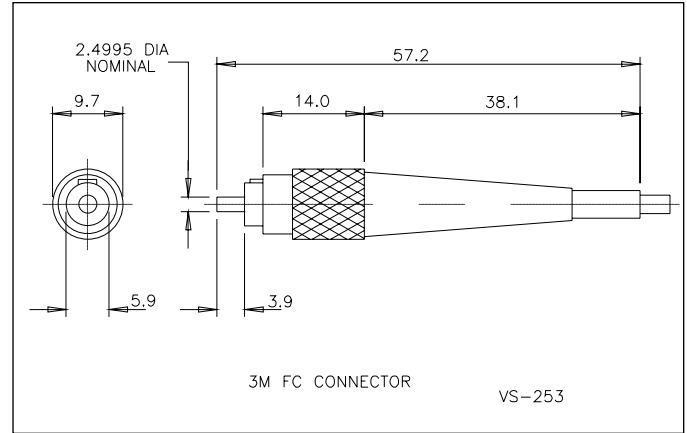
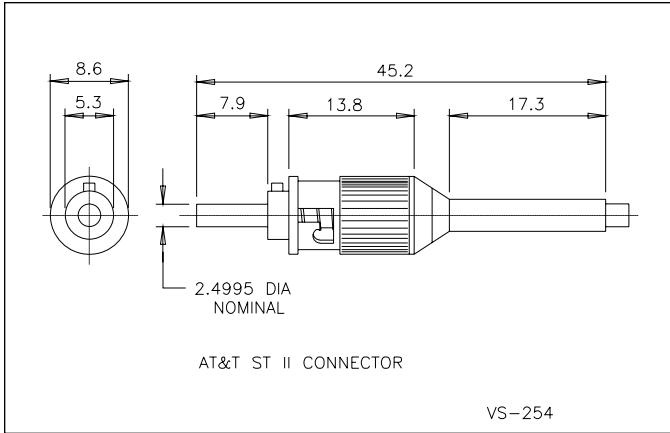


Figure 11: Termination D8: ST connector

Figure 12: Termination D9: FC connector

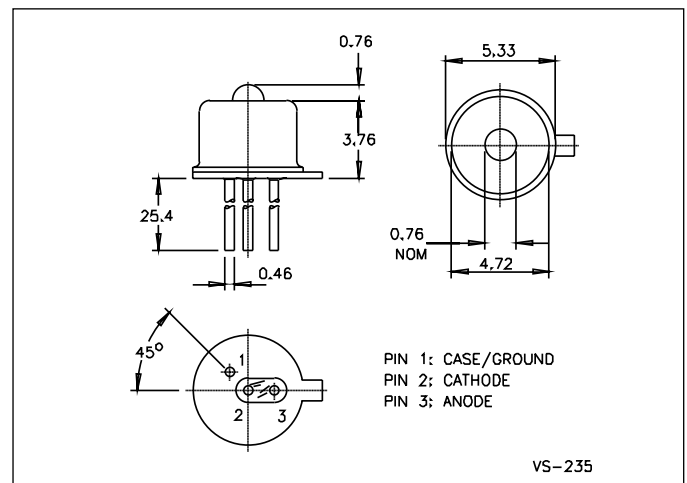
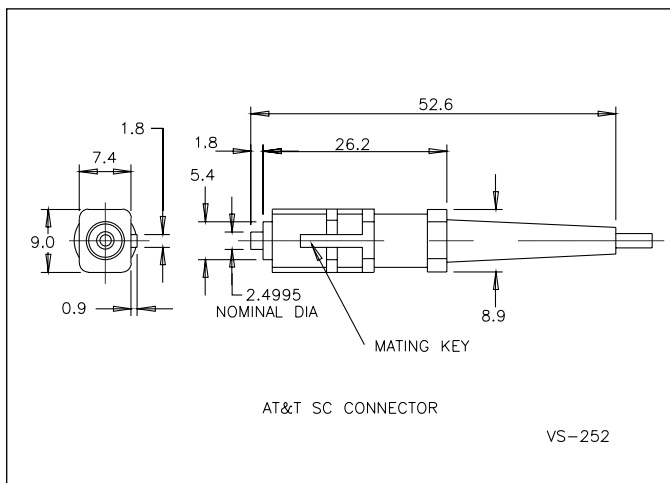
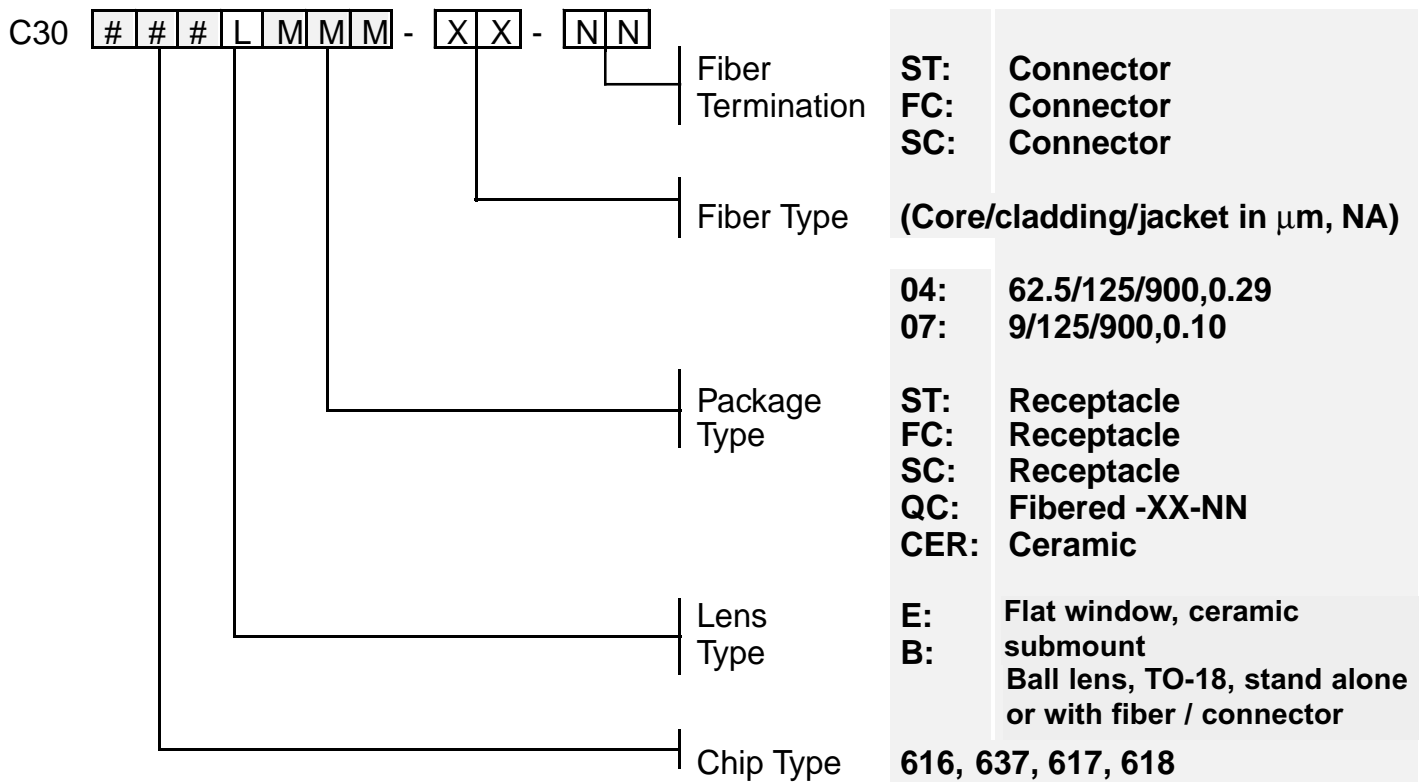


Figure 13: Termination D10: SC connector

Figure 14: Package D21: TO-18 ball-lens package



Note: Specific package types available for each photodiode are listed in the table of specifications.

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