

1.3 μm VCSEL for SMF 2, 10 km

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1.3 um VCSELs are coming (1)

GaAsSb VCSEL

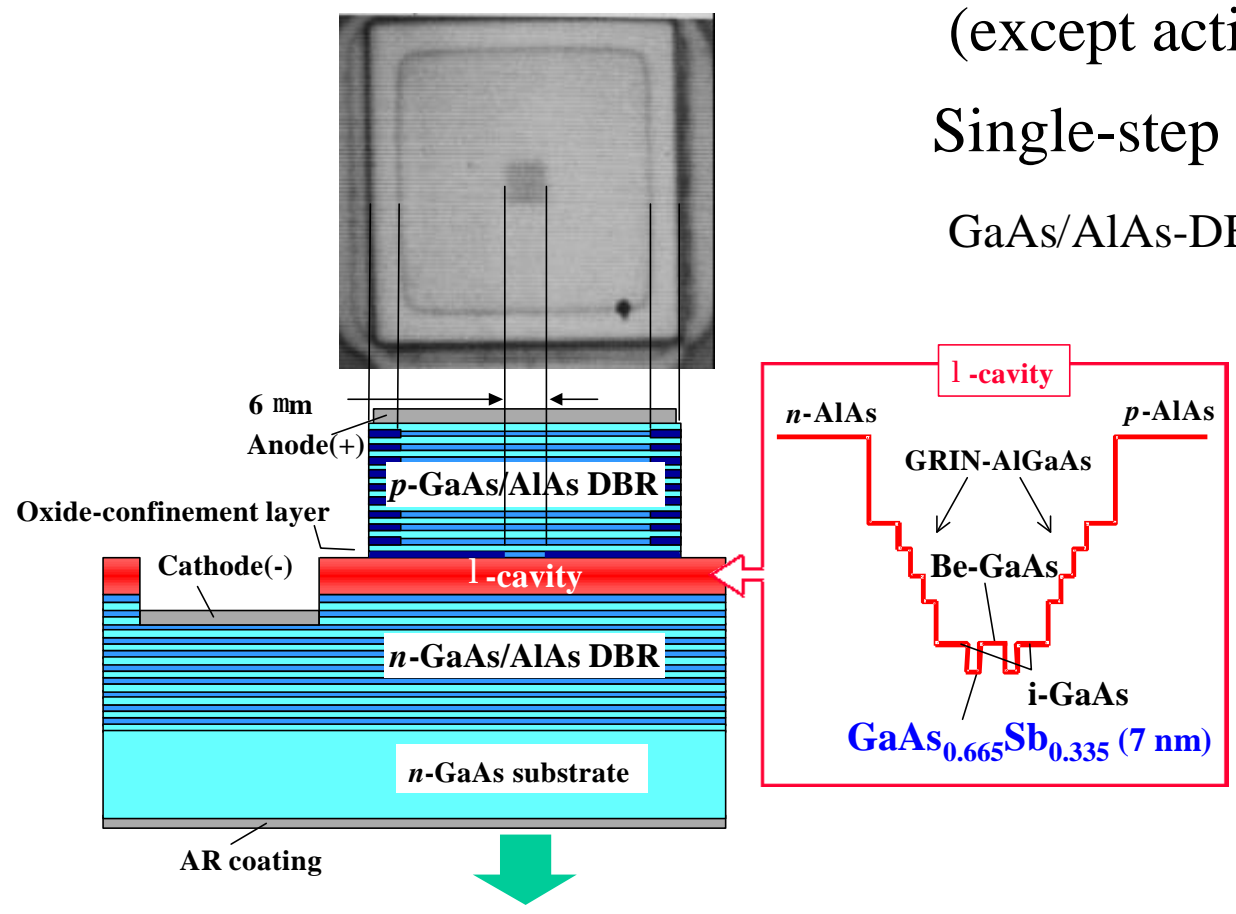
Potentially low-cost

~1/10 of DFB

Same structure as 850-nm VCSEL
(except active layer)

Single-step growth

GaAs/AlAs-DBR on GaAs substrate



Others

InGaAs/GaAsP

http://grouper.ieee.org/groups/802/3/ae/public/mar00/jewell_1_0300.pdf

GaInNAs

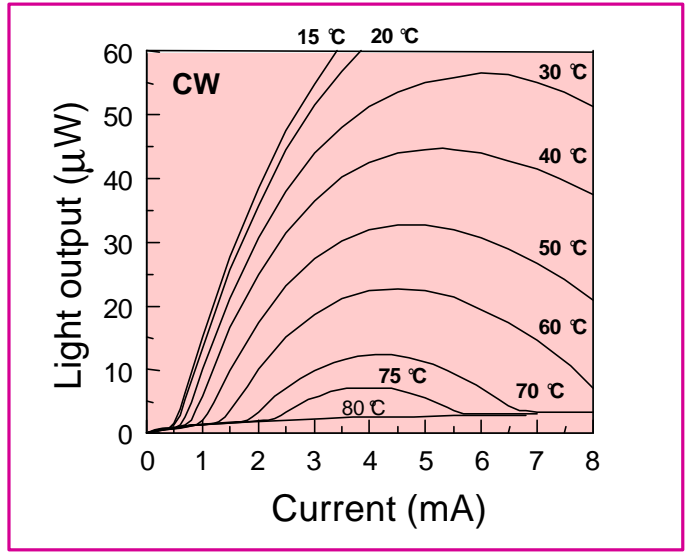
InGaAsP/GaAs(bonding)
etc.

1.3 um VCSELs are coming (2)

Already achieved

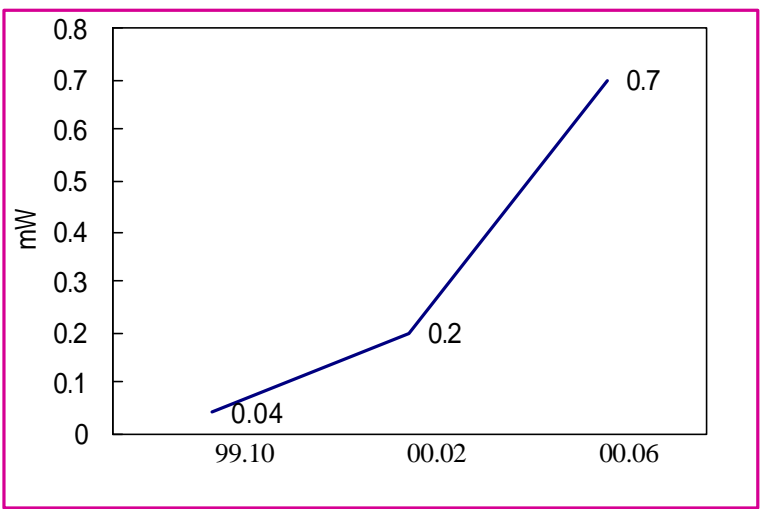
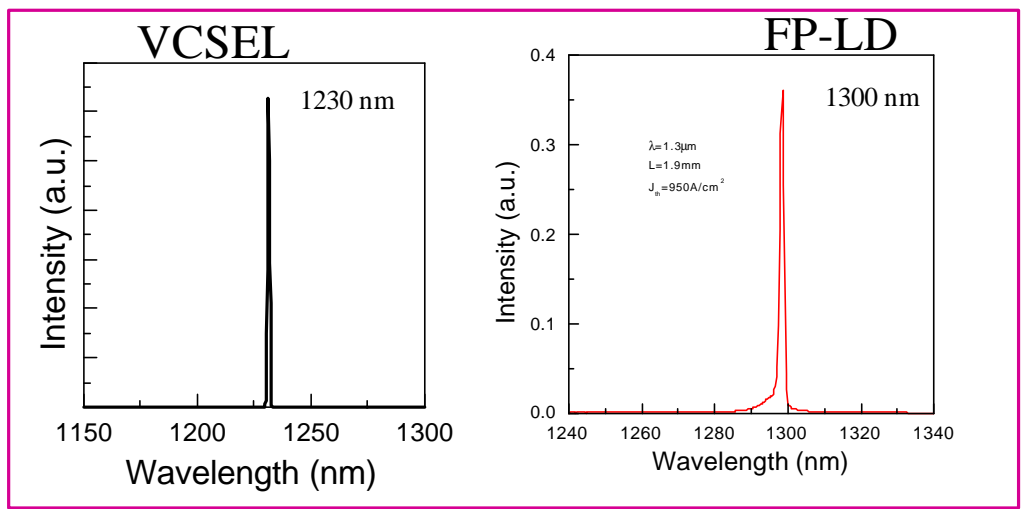
Low threshold current →

Rapidly improving



Wavelength ↓

output power →



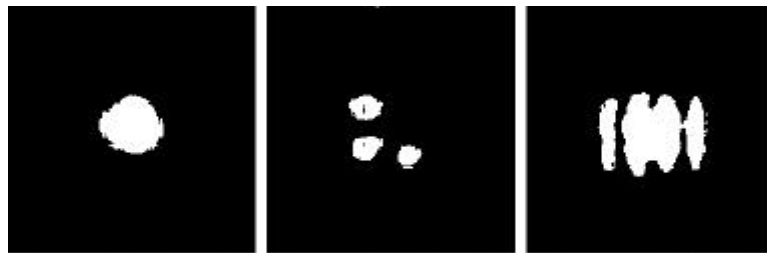
concerns

Low output power under single transverse mode operation

small aperture
single transverse mode
low power (0~3 dBm max)

Trade off

large aperture
multi mode
high power



6 μm \square 2mA 8 μm \square 3 mA 10 μm \square 6 mA

*980 nm VCSEL

Low output power for long wavelength emission

High Sb content
long wavelength (1.3 μm)
low power

Trade off

low Sb content
shorter wavelength (1.26 μm)
high power

They will be resolved but not so soon.

Conclusion

Specify 1.3 um serial PMD for both 2 km and 10 km is preferable

High demand for 2 km in campus

Decrease Avg. launch power (min) -6 dBm or lower

Widen wavelength range 1260 nm - 1330 nm or wider

If specify only 10 km

Decrease Receiver sensitivity -17 dBm or lower

4 (or 3) PMD sets

				15-um EMA/DFB	high
			1.3-um DFB		medium
	1.3-um WWDM				low
	850-nm VCSEL	13-um VCSEL			
I-MMF-100m	MMF-300m	SMF-2km	SMF-10km	SMF-40km	Cost link