
PIN-PD based ONU for 10GE-PON

Naoki Suzuki, Mitsubishi Electric Corporation

Supporters

(Alphabetical order)

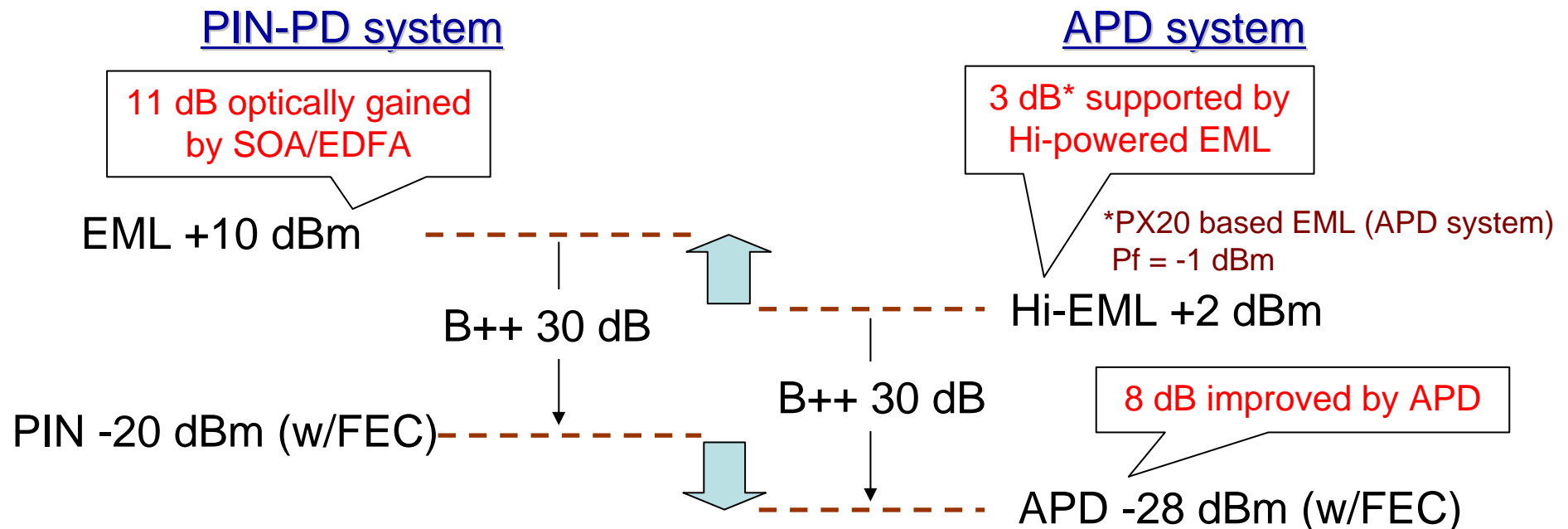
Toshiaki Mukojima, OKI

Shinji Tsuji, Sumitomo

Naoki Suzuki, Mitsubishi

Background(1/2)

- Two types of D/S power budgets have been proposed
PIN-PD system : EML+SOA/EDFA → PIN-PD ONU
APD system : EML (Hi-powered) → APD ONU



Ref. 10GE-PON Power Budget Vender Summary in Japan, Geneva,2007

Background(2/2)

- PIN-PD system vs APD system discussions ;

New device's

1. Cost-effective implementations
2. Technical advantages for mass-production

Premised on

PON's huge production volume of "ONU"

Cost assumptions

1. D/S ONU costs (Best – Worst) of 1:32 system

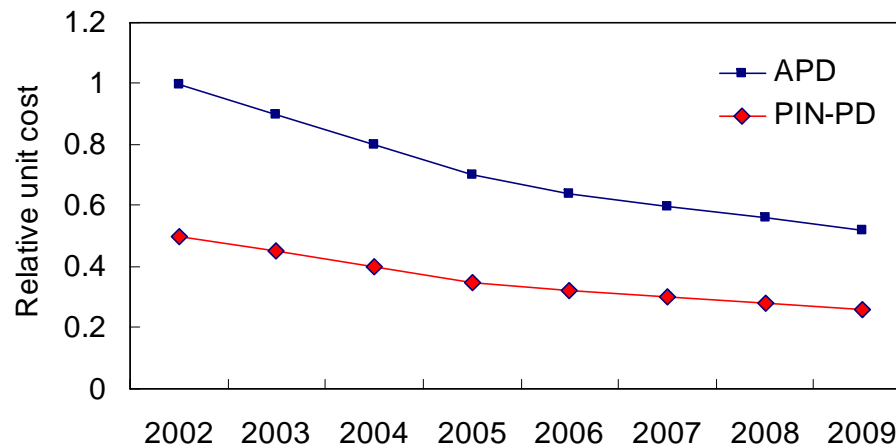
ONU	PX10	PX20	PX30(B++)
APD	3.2 – 10.3	3.2 – 10.3	3.2 – 10.3
PIN-PD	1.2 – 1.3	1.5 – 2.3	1.5 – 2.9

**PIN-PD systems are still cheaper;
Benefit to extended B++ systems**

(Note1) Cost figures are in *Ref. 3av_0703_takizawa_1*, (Note2) “1” = PIN-PD ROSA,

(Note3) Hi-powered EML = EML cost-figure, (Note4) ONU cost = ONU Rx + OLT Tx / Subscribers

2. Cost-trend (volume efficiency)



**PIN-PD systems are cheaper;
Cost reduction will be saturated**

Ref. Research Company report.

** Based on current 10G market structure*

Productivity

1. OLT : SOA/EDFA vs Hi-powered EML

Critical process in mass-production is Pf, Ex adjustment of Tx.

SOA/EDFA : Easy. Optical gain can achieve a high, constant Pf and Ex.

Hi-EML: Complex. Trade-off between **Hi-Pf** and **Hi-Ex** in EA bias set-up.

* Pf : Output optical power, Ex : Extinction ratio

2. ONU : PIN-PD ONU vs APD ONU

Critical process in mass-production is Sensitivity adjustment of Rx.

PIN-PD : Free. No adjustment process is needed.

APD : Complex. APD parameter's (M, Threshold, bias..) setup is essential.

Moreover,

PIN-PD will provide the high-yield and reliability in PON volume production, by use of existing B/GE-PON ONU production lines, supply capacity of many vendors...

PIN-PD Advantages

- Cost assumptions based on both the device unit-cost and the cost-trend show that **the PIN-PD system is cheaper.**
- Most critical issue is “Productivity in ONU mass-production”. **The PIN-PD system will be best suited PON system** with the high-yield and reliability.

Thank you!