

# Power Budget for Discrete Multi-Tone

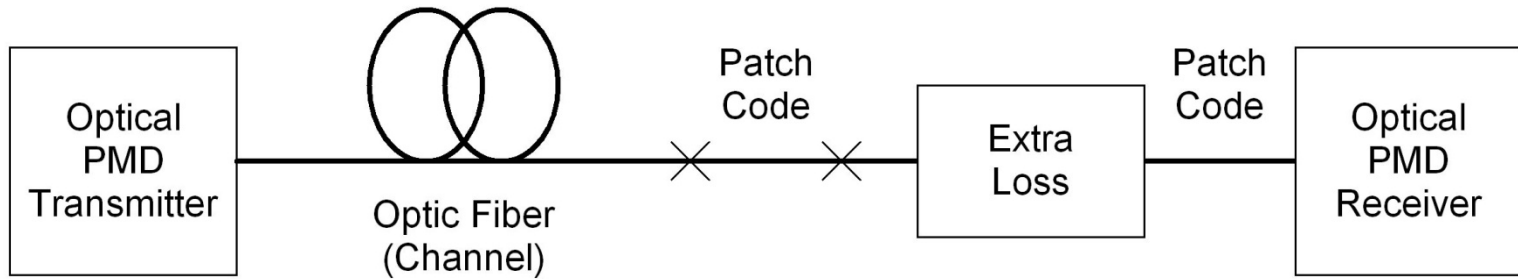
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# Power Budget from Experimental Results



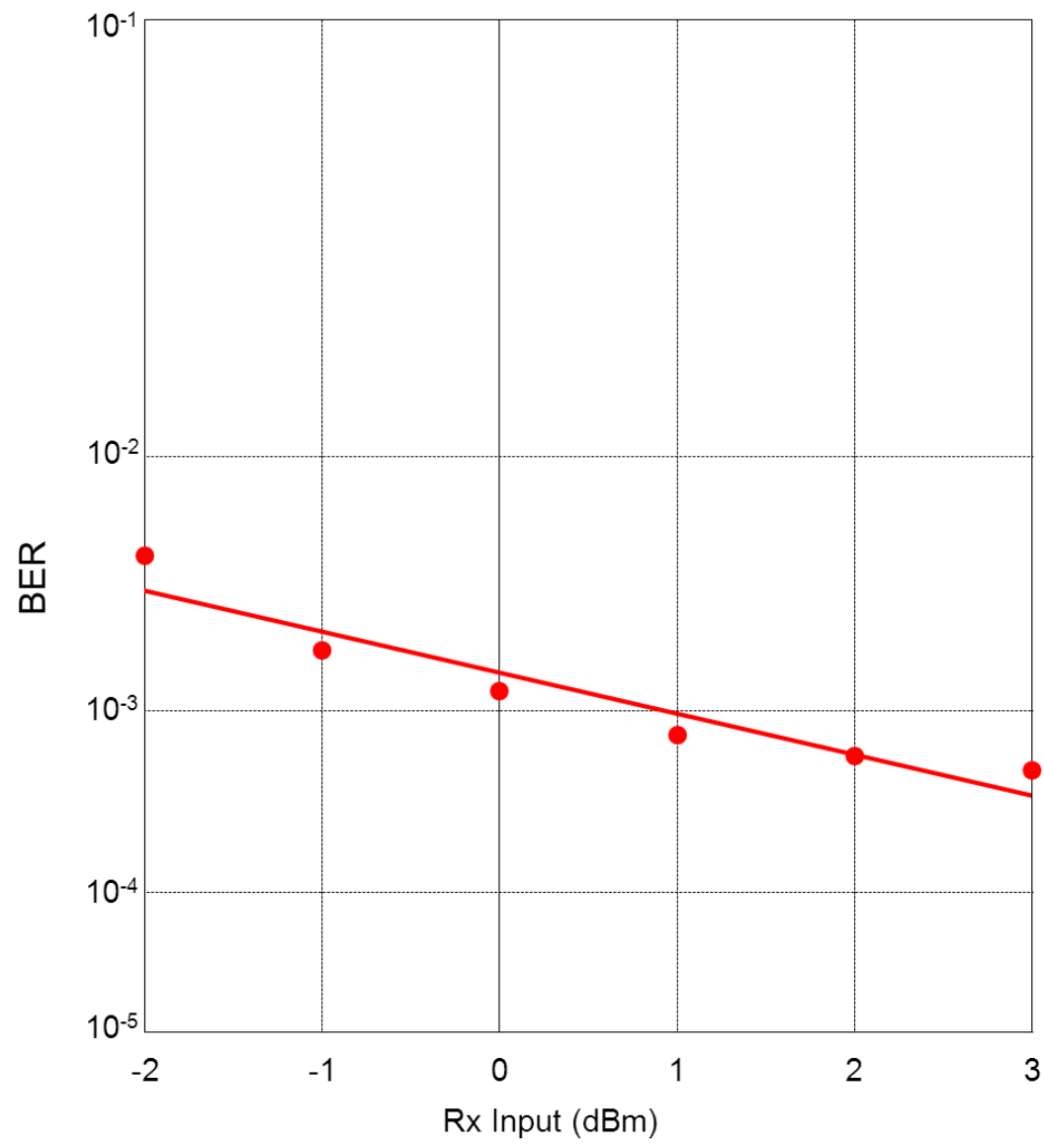
	Min.	Typ.	Max.	Unit
Tx Out	6	—	TBD	dBm
Optic Fiber	—	—	0.8	dB
Patch Panel	—	—	0.5	dB
Patch Code	—	—	0.05	dB
Patch Panel	—	—	0.5	dB
Extra Loss	—	—	2.6	dB
Patch Code	—	—	0.05	dB
Rx In	1.5	—	TBD	dBm

} 4.5 dB

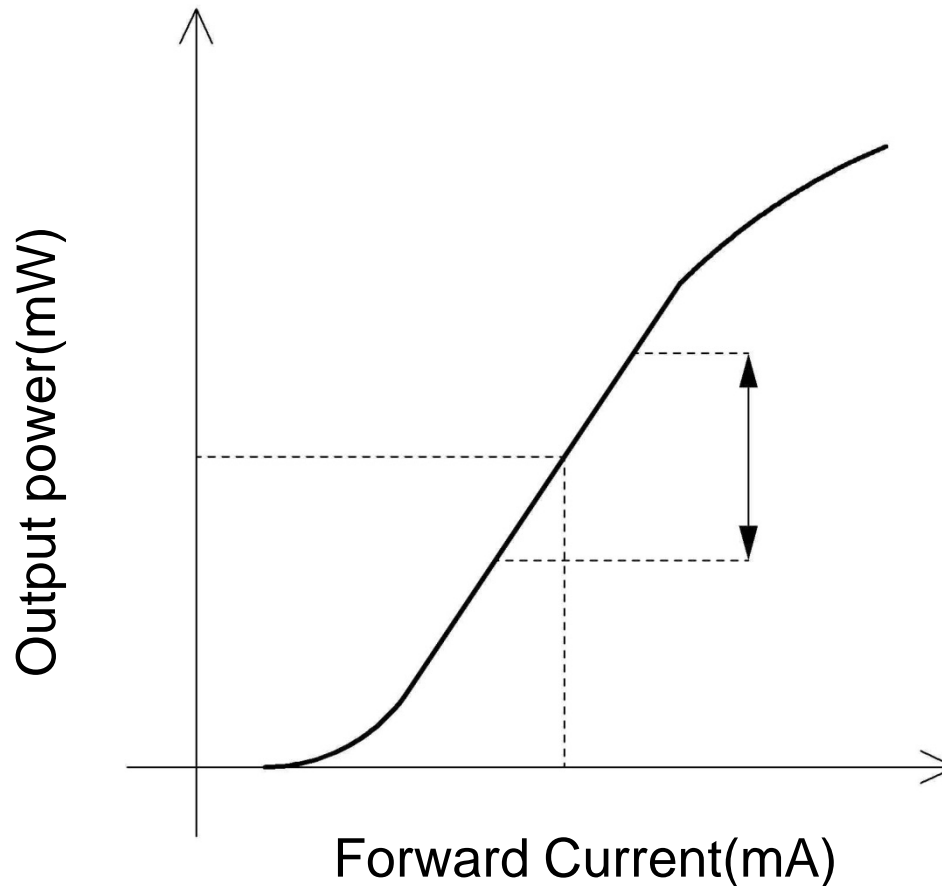
Based on our experiments, 112 Gbps was achieved for Rx In > +1 dBm.  
 Extra loss means additional patch panel, cross connect and so on.  
 This power budget will be achieved with commercial , general DML.

DML: Directly Modulated Laser

# Bit Error Rate Performance



# Driving Condition of DML

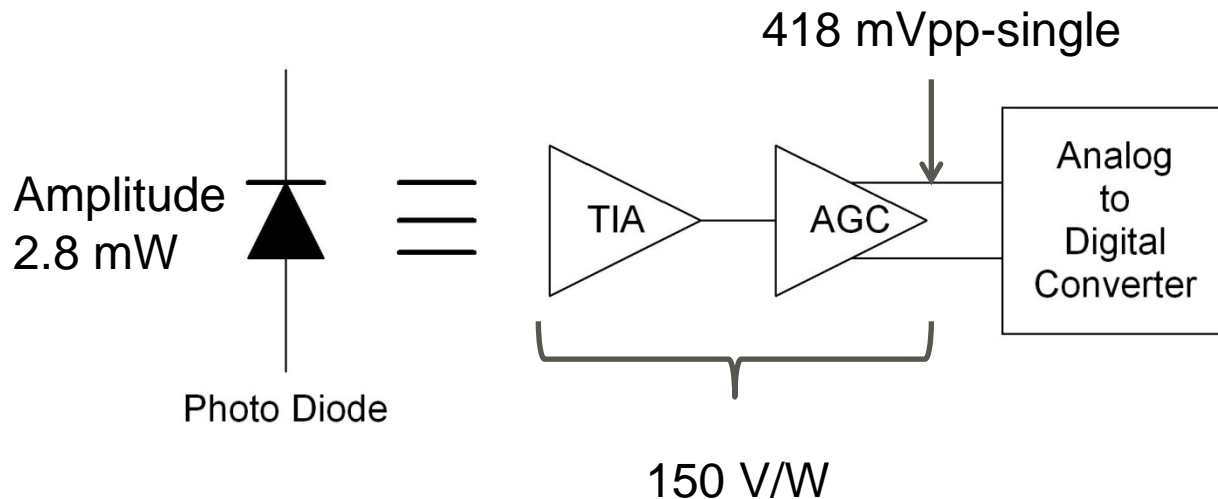


Driving voltage was limited for linear operation of commercial DMLs.  
Characteristic enhanced DML can improve power budget.

# Design Concept of Receiver

## ■ Assumptions:

- Amplitude at Transmitter is 7 mWpp.
- Loss is 4dB.



Input amplitude for ADC should be controlled around 400 mVpp-single.  
For this operation, AGC should be required for receiver.

TIA: Trans Impedance Amplifier

AGC: Automatic Gain Control Amplifier

# Tx/Rx and Channel Characteristics for DMT

Parameter		Unit
Electrical Baud Rate	25.78125	GBd
FEC	Required	
Modulation	Discrete Multi Tone	
Center Wavelength	1310	nm
Tx Average Output Power	6.0	dBm
RIN	-140	dB/Hz
Initial Negotiation	Bit and Power Loading	
Transmitter Reflectance	-35	dB
Operating Distance	500	m(*1)
Channel Insertion Loss	4.5	dB
Dispersion	-2/+1	ps/nm
Receiver Sensitivity	1.5	dBm
Receiver Reflectance	-35	dB

\*1 2 km is feasible.

# Summary

- Base line for optical DMT power budget was presented.
  - Experimental results shows that DMT system will be achieved with commercial standard DML.
  - Required power budget should be relaxed by improvement transmitter characteristics.
  
- Design concept of receiver was presented.
  - Basic power budget in the receiver was disclosed.
  - Feasibility with off-the-shelf devices was shown.



Thank you