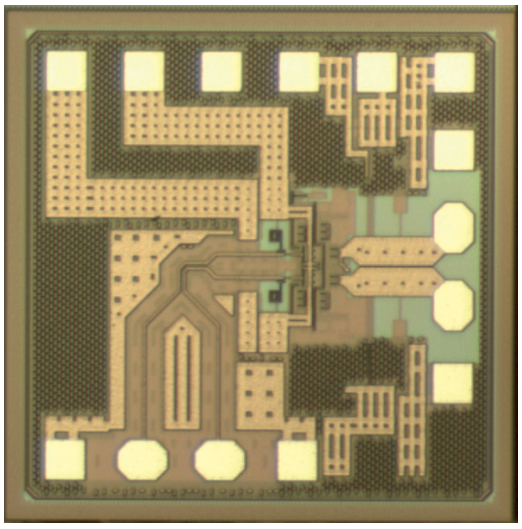
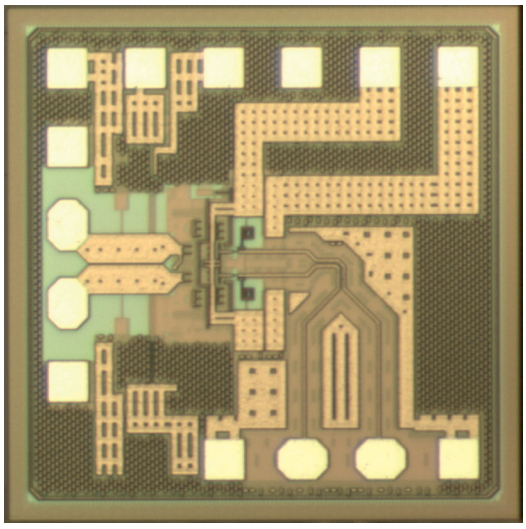
LOW-POWER 32 GBd LINEAR OPTICAL MODULATOR DRIVER

Fraunhofer HHI





AT A GLANCE

32 GBd linear differential driver for telecom and datacom applications

Features

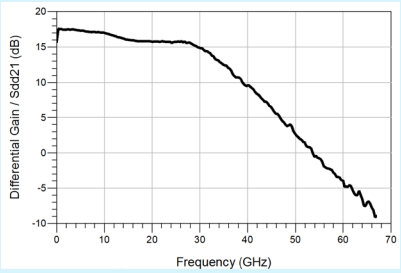
- Differential input and differential output
- Open-collector outputs
- Ultra-low power, 270 mW
- Linear Driver
- 3.0 V_{pp} differential output at 2 x 25 Ω loads
- Integrated output peak-level detectors
- 90°-bended RF input, mirrored IC available

Applications

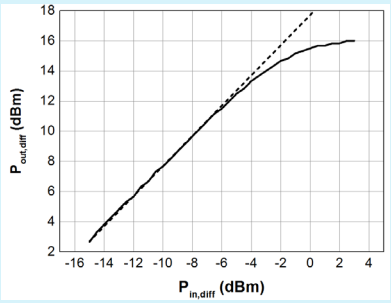
- Mach-Zehnder modulator driver
- Supports NRZ, PAM-4 Signals
- Broadband signal amplification

Low-power open-collector SiGe Driver IC

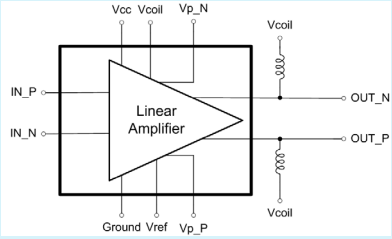
HHI provides open-collector SiGe linear driver IC for InP Mach-Zehnder modulator. Its differential output is suitable to drive InP Mach-Zehnder modulator having 2x 25 Ω. It integrates output peak-level detectors and consumes 270 mW per channel. It enables the electro-optical module to consume the lowest power.



Differential S21 measurement result (Pin,diff = -20 dBm, Temp = 23°C, Zin,diff = 100 Ω, ZLoad,diff = 50 Ω)



1-dB compression point at 1 GHz (40°C)



Circuit Block Diagram

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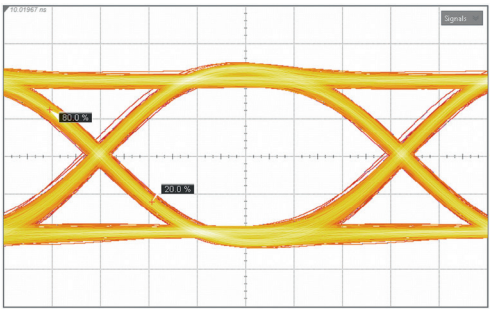
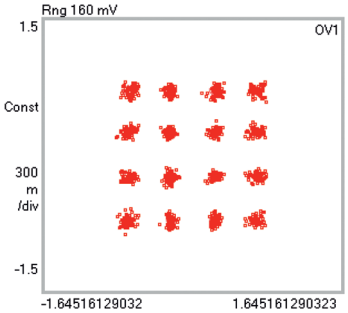
Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Bandwith	BW		30		GHz	
Power	P		270		mW	
Data Rate	DR		32		Gb/s	
Rise / fall time	t_r/t_f		10		ps	20 %-80 %
Gain*			17.5		dB	Differential S_{21} $Z_{in,diff}$ = 100 Ω, $Z_{Load,diff}$ = 50 Ω"
Group Delay Distortion*	GD			±5	ps	
Jitter (rms)			523		fs	
Jitter(p-p)			3.47		ps	
Differential Input Signal	$V_{IN,P}$-$V_{IN,N}$		600		mV_{pp}	AC-coupled
Differential Output Signal	$V_{OUT,P}$-$V_{OUT,N}$		3000		mV_{pp}	2 x 25 Ω load
P_{1dB}	P_{1dB}	13,6		14,4	dBm	output-referred, $Z_{Load,diff}$ = 50 Ω
THD	THD		3.7		%	1 GHz, 3 V_{pp} output conditions
CMRR*	CMRR		14		dB	up to 20 GHz
Input Reflection*	S_{dd11}	DC < f < 8 GHz 8 GHz < f < 24 GHz 24 GHz < f < BW		-19 -9 -8	dB	Differential input
Output Peak-level detector			170 mV		$V/V_{pp,diff}$	$Z_{Load,diff}$ = 50 Ω, each output (Vp_N, Vp_P) referenced to Vref
Operation Temperature			40		°C	

** denotes that measurements were carried out at room temperature condition, 23°C. Unless noted, measurement temperature is 40°C.*



Electrical eye waveform at 32 GBd (5 ps/div, 700 mV/div, 40°C)



Electro-optical QAM-16 Constellation at 32 GBd, EVM: 6.4 %rms