

High-Speed Transimpedance Amplifier

Description

CXA1684M is a low noise transimpedance amplifier, particularly suitable for fiber-optic system. CXA1684M is fabricated using high-speed bipolar process.

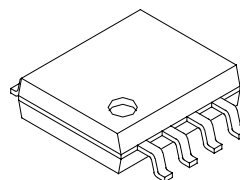
Features

- High transimpedance: (Q) 3.9 k Ω (Typ.)
(QB) 3.7 k Ω (Typ.)
- Wide band width (-3dB): (Q) 630 MHz (Typ.)
(QB) 390 MHz (Typ.)
- Maximum input current: 1 mA

Applications

- Q output
SONET/SDH: 622 Mb/s
Fiber channel: 532 Mb/s
- Differential output
SONET/SDH: 155 Mb/s
Fiber channel: 133,266 Mb/s
ESCON: 200 Mb/s

8 pin SOP (Plastic)



Absolute Maximum Ratings

- Supply voltage $V_{CC-V_{EE}}$ -0.3 to +7.0 V
- Minimum input voltage V_{IN} V_{EE} V
- Input current I_{IN} -1 to +1 mA
- Output current
(Continuous) I_O 0 to 50 mA
(Q/QB) (Surge) 0 to 100 mA
- Storage temperature T_{stg} -65 to +150 °C

Recommended Operating Conditions

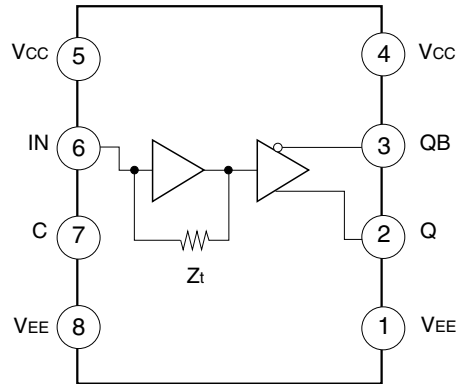
- DC power supply voltage $V_{CC-V_{EE}}$ 4.75 to 5.46 V
- Operating ambient temperature T_a 0 to +85 °C

Structure

Bipolar silicon monolithic IC

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Block Diagram and Pin Assignment



Electrical Characteristics

• DC Electrical Characteristics

(VCC=GND, VEE=-5.46 to -4.75V, Ta=0 to +85°C)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Supply current	IEE	input pin left open	-15.1	-11.2		mA
Transimpedance	Q	ZTQ	2.3	3.9	5.6	kΩ
	QB	ZTQB	1.9	3.7	5.4	
Max. Input Current before clipping	IIN		+100			μA
Max. Input Current	IIN2		+1000			
Input voltage	VIN			VEE+2.5		V
Output voltage	Q	VOUTQ	input pin left open	VEE+1.9		
	QB	VOUTQB		VCC-2.6		
	VC			VEE+1.7		
Input capacitance	CIN			2.0		pF

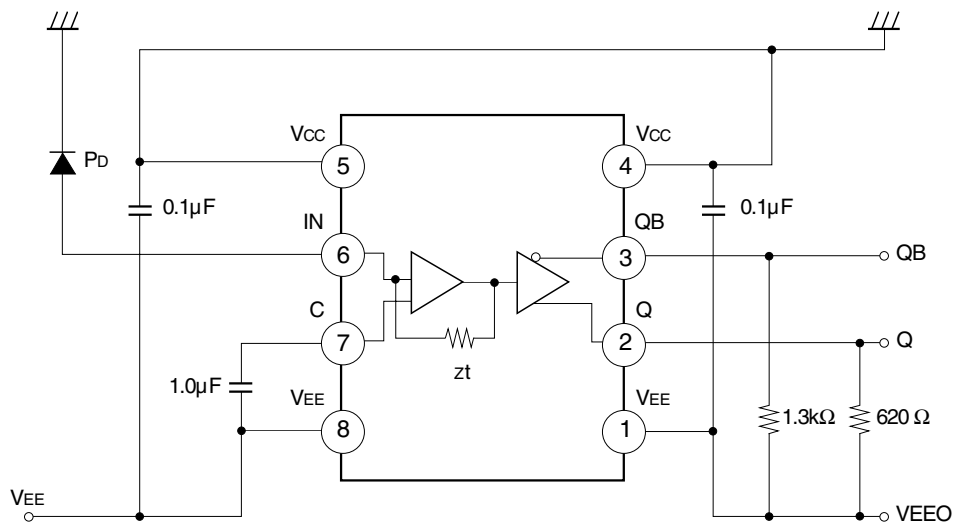
• AC Electrical Characteristics

(VCC=GND, VEE=-5.46 to -4.75 V, Ta=0 to +85 °C)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Bandwidth (-3 dB)	Q	f-3 dBQ	*1	435	630	MHz
	QB	f-3 dBQB		187	390	
Input Current Noise Spectral Density (Mean value)	In	fN=1 kHz to 622 MHz		4.0		pA/√Hz

*1 Assumes photodiode capacitance; CPD<1.0 pF, output load capacitance; Cout=2.0 pF, Q: 620 Ω to VEE, QB: 1.3k Ω to VEE

Application Circuit



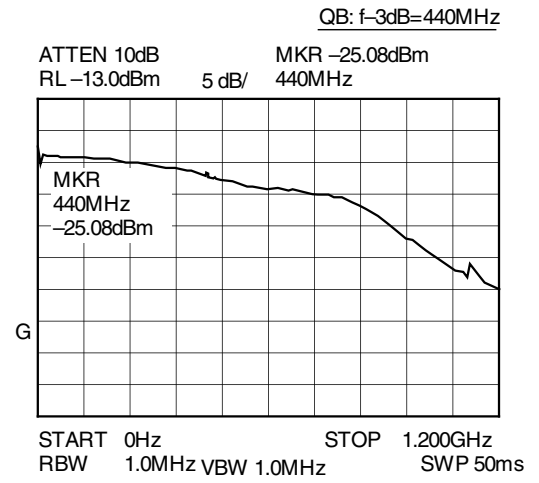
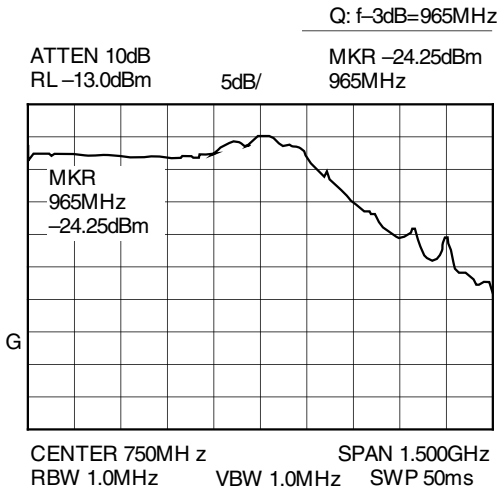
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Cautions for Handling

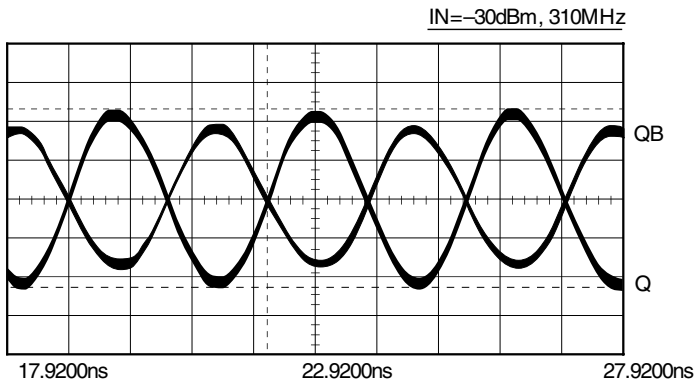
1. As the electronic breakdown level is weak, take care to handle.
2. The internal resistor of the output pin does not have the capability of drive. The terminal resistors must be connected. The resistance value is shown in application circuit.

Typical Performance

• Typical Frequency Characteristics



• Typical Output Waveforms

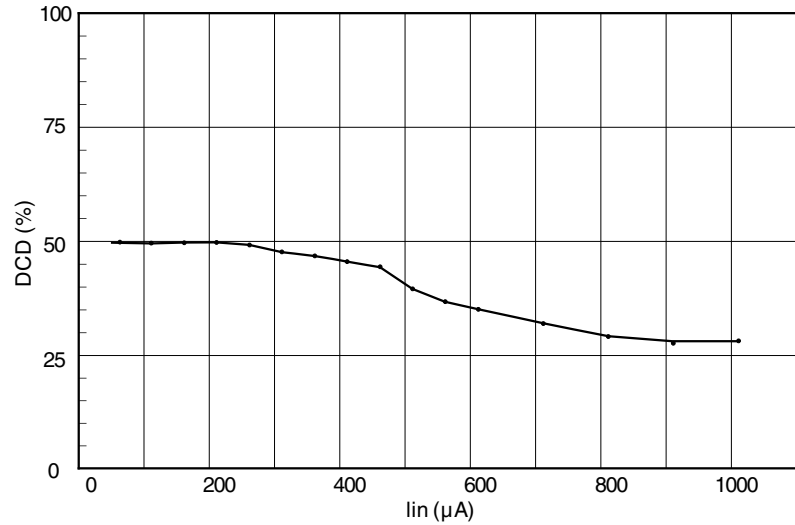


Ch.1 = 20.00mVolts/div
Ch.2 = 20.00mVolts/div
Timebase = 1.00ns/div

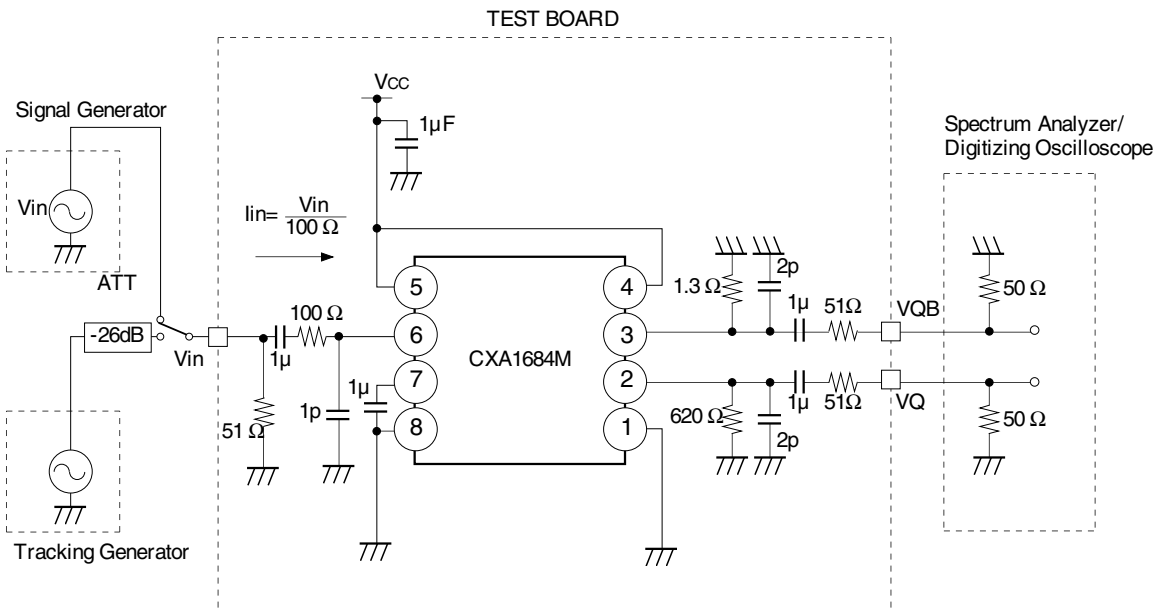
Ch.1 Parameters
Rise Time = 941.4ps
Freq. = 310.540MHz
+Width = 1.6036ns
Overshoot = 0.000%
RMS Volts = 30.818mVolts

Offset = 0.000Volts
Offset = 0.000Volts
Delay = 17.9200ns
p-p Volts = 90.625mVolts
Fall Time = 1.0630ns
Period = 3.2202ns
-Width = 1.6166ns
Preshoot = 0.000%
Dutycycle = 49.79%

• Output Duty Cycle Distortion VS. Input Current



• Test Circuit





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