

High-Speed Transimpedance Amplifier

Description

CXA1685M is a low noise transimpedance amplifier, particularly suitable for fiber-optic system. CXA1685M is fabricated using high-speed bipolar process.

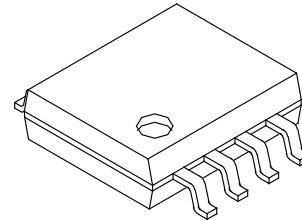
Features

- High transimpedance: Q 11.2k Ω (Typ.)
 \bar{Q} 10.8k Ω (Typ.)
- Wide band width (-3dB): Q 177MHz (Typ.)
 \bar{Q} 157MHz (Typ.)
- Maximum input current: 1mA
- Low noise: 1.7pA/ $\sqrt{\text{Hz}}$ (Typ.)

Applications

- SONET/SDH: 155Mb/s
- Fiber channel: 133Mb/s
- FDDI: 125Mb/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
(Q/\bar{Q}) (Continuous) I_o 0 to 50 mA
(Surge) 0 to 100 mA
- Storage temperature T_{stg} -65 to +150 °C

Recommended Operating Conditions

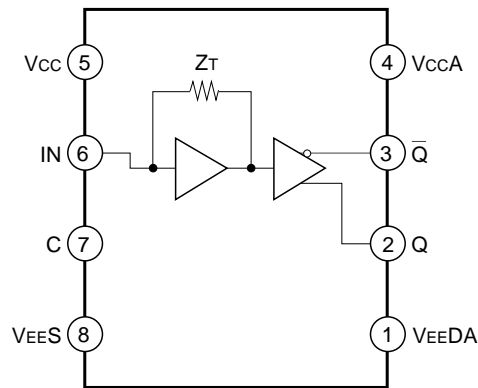
- DC power supply voltage
 $V_{CC} - V_{EE}$ 4.75 to 5.46 V
- Operating ambient temperature
 T_a 0 to +85 °C

Structure

Bipolar silicon monolithic IC

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Block Diagram and Pin Assignment



Electrical Characteristics

• **DC Electrical Characteristics** ($V_{CC} = V_{CCA} = GND, V_{EE S} = V_{EE DA} = -5.46$ to $-4.75V, T_a = 0$ to $+85^{\circ}C$)

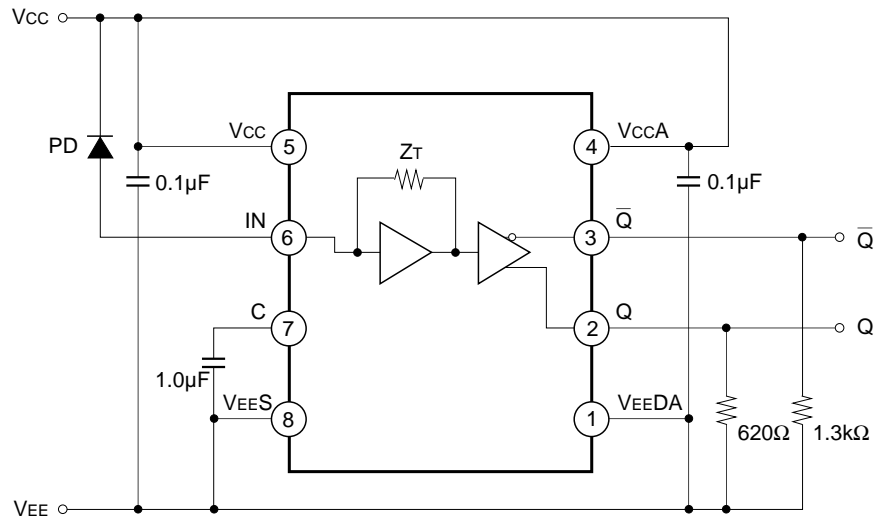
Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Supply current	I_{EE}	input pin left open	-15.3	-10.0		mA
Transimpedance	Q	Z_{TQ}	6.6	11.2	14.8	k Ω
	\bar{Q}	$Z_{T\bar{Q}}$	6.2	10.8	14.3	
Max. Input Current before clipping	I_{IN}	$T_a = 25^{\circ}C$	+40			μA
Max. Input Current			+1000			
Bias voltage	IN	V_{IN}		$V_{EE} + 2.5$		V
	Q	V_Q	input pin left open	$V_{EE} + 1.7$		
	\bar{Q}	$V_{\bar{Q}}$		$V_{CC} - 2.4$		
	C	V_C		$V_{EE} + 1.7$		
Input capacitance	C_{IN}			1.3		pF

• **AC Electrical Characteristics** ($V_{CC} = V_{CCA} = GND, V_{EE S} = V_{EE DA} = -5.46$ to $-4.75V, T_a = 0$ to $+85^{\circ}C$)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit.
Bandwidth (-3dB)	Q	$f - 3dB_Q$	*1	113	177	MHz
	\bar{Q}	$f - 3dB_{\bar{Q}}$		109	157	
Input Current Noise Spectral Density (Mean value)	I_n	fN = 1kHz to 156MHz		1.7		pA/ \sqrt{Hz}

*1 Assumes photodiode capacitance; $C_{PD} < 1.0pF$, output load capacitance; $C_{out} = 2.0pF$, output load resistor; Q: 620 Ω to V_{EE} , \bar{Q} : 1.3k Ω to V_{EE}

Application Circuit



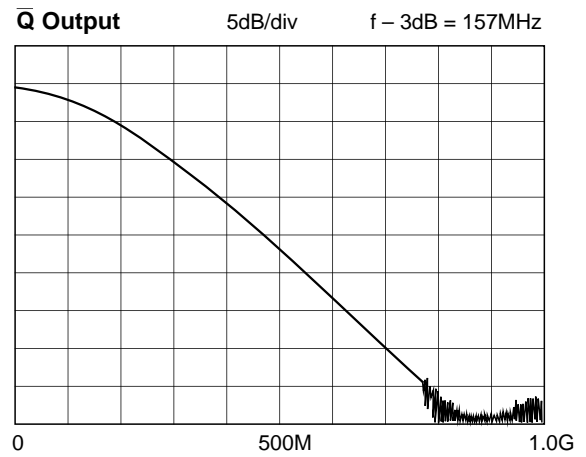
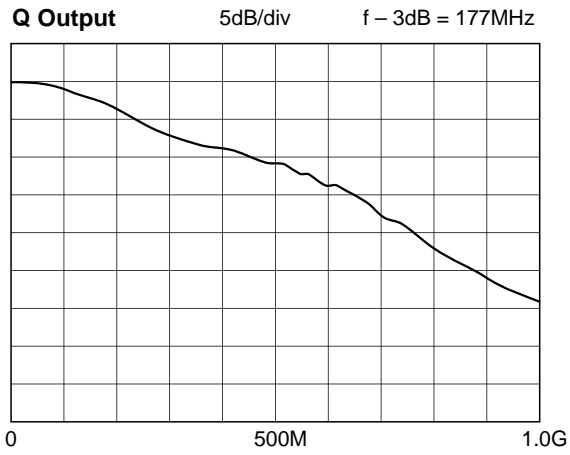
Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

Cautions for Handling

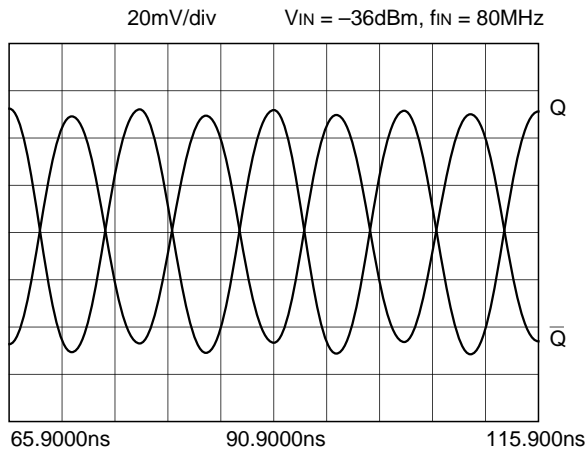
1. As the electronic breakdown level is weak, take care to handle.
2. The internal resistor of the output pin does not have the capability of drive ($R_L = 10k\Omega$). The terminal resistors must be connected. The resistance value is shown in application circuit.

Typical Performance

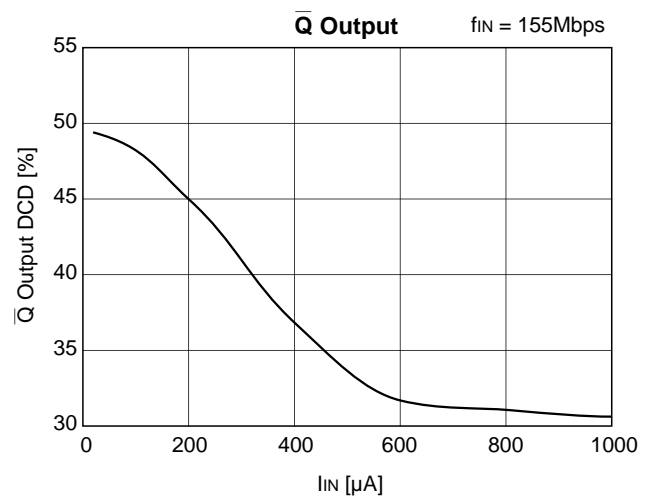
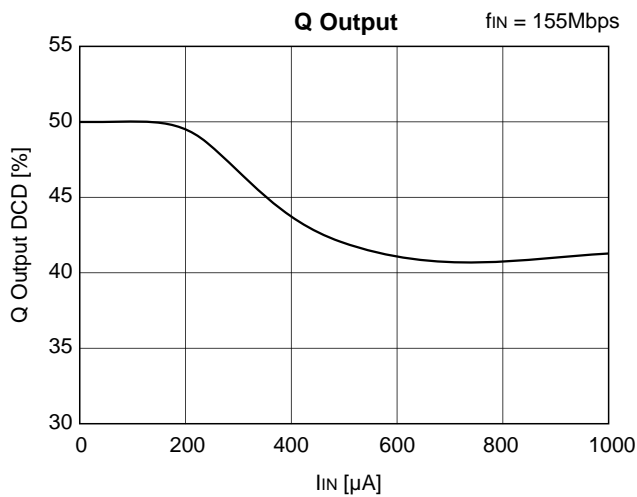
Typical frequency characteristics ($V_{CC} - V_{EE} = 5.0V$, $T_a = 25^\circ C$)

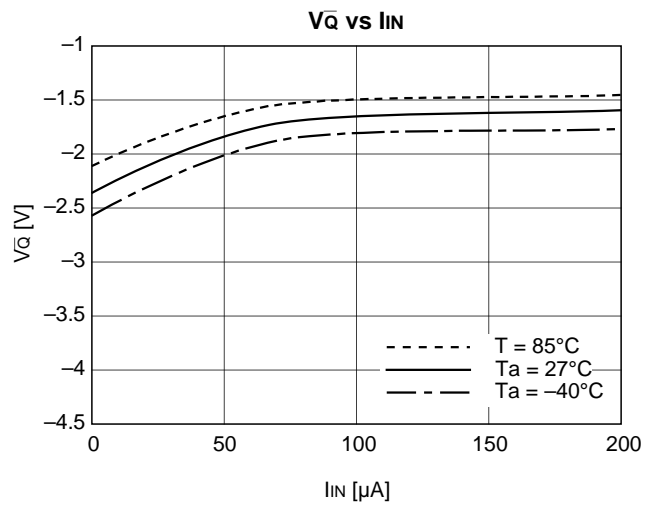
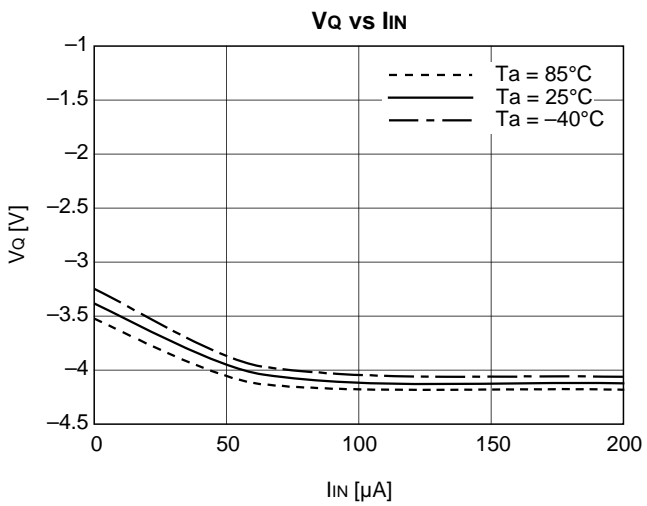
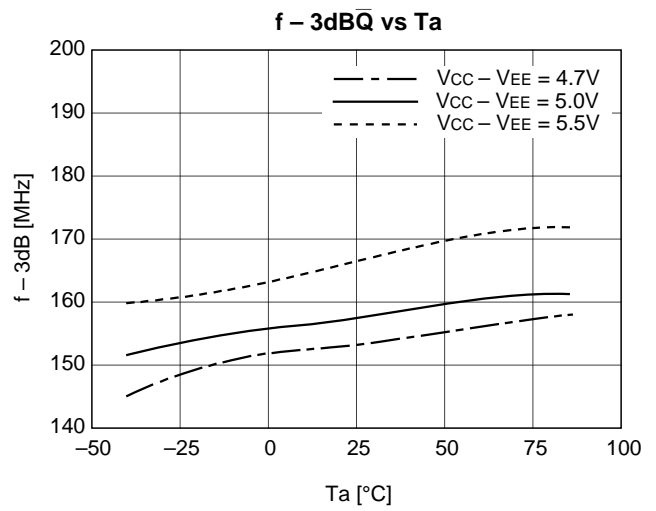
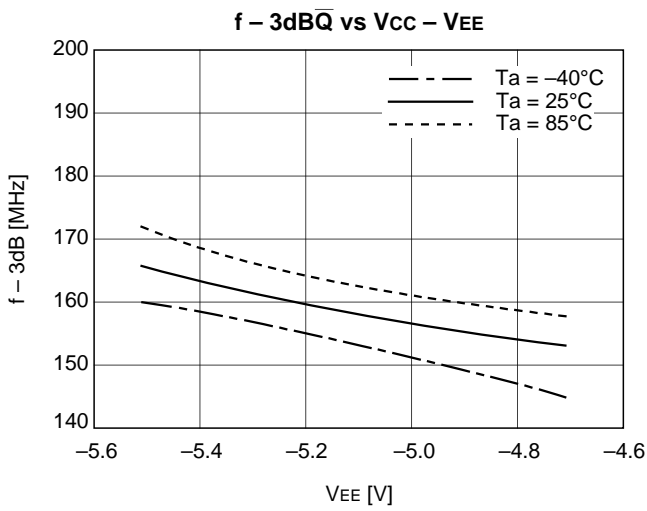
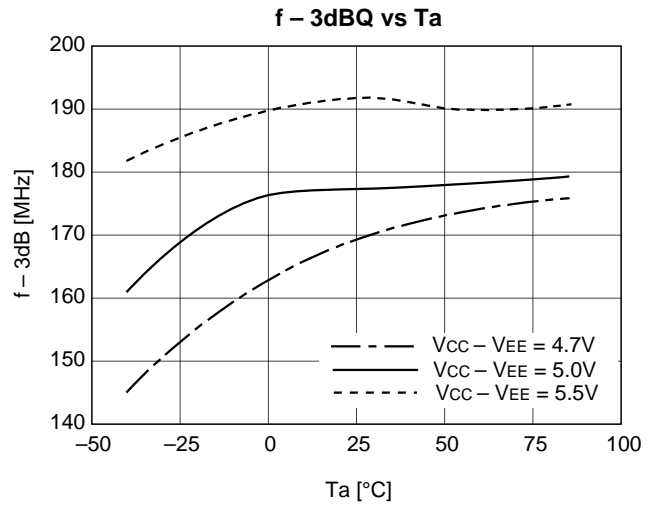
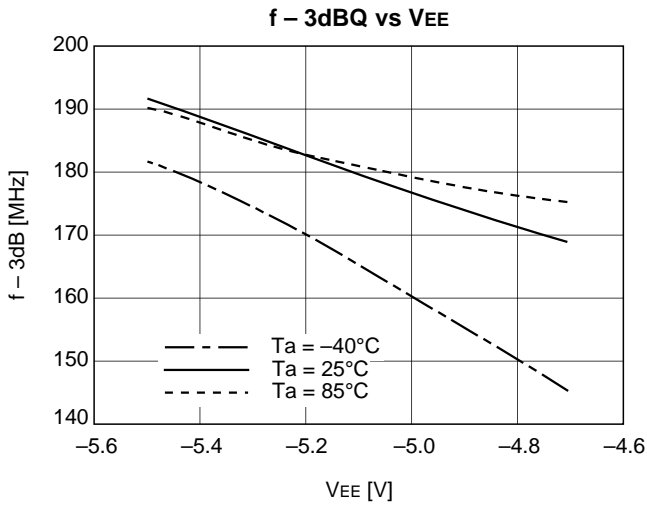


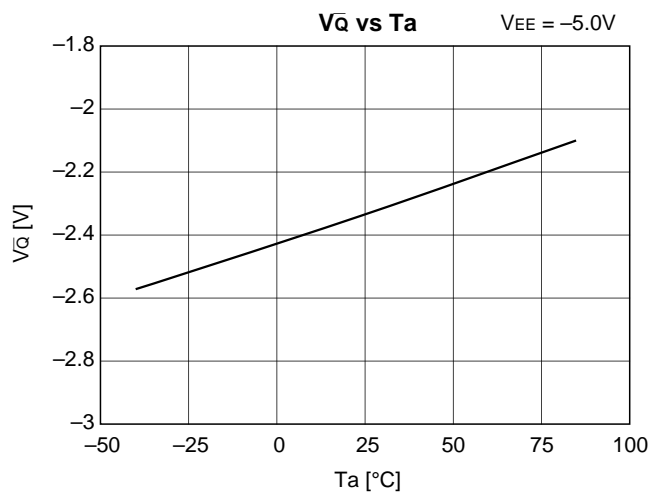
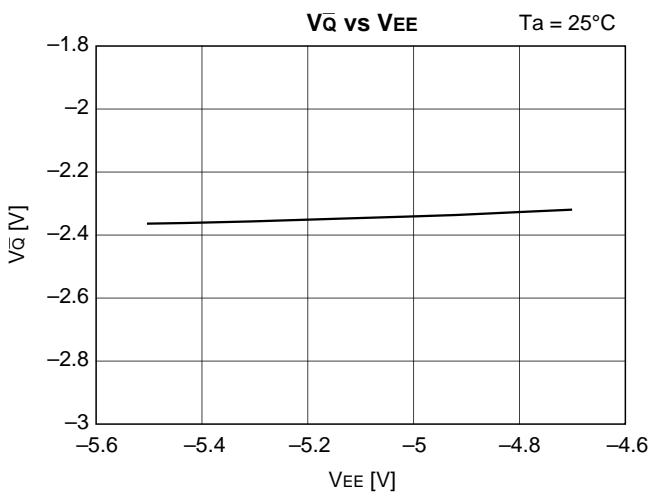
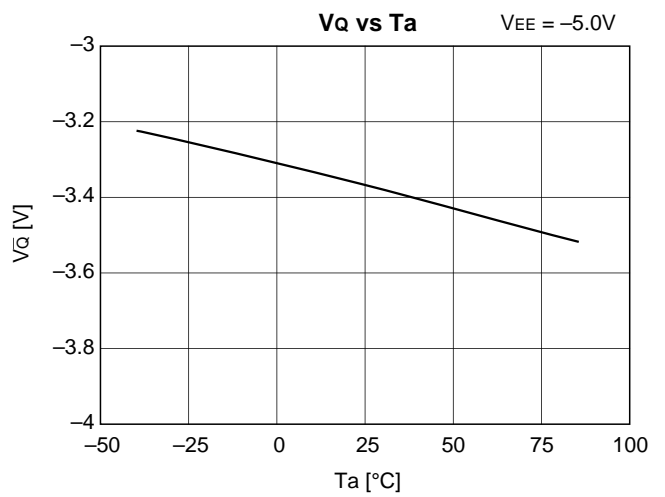
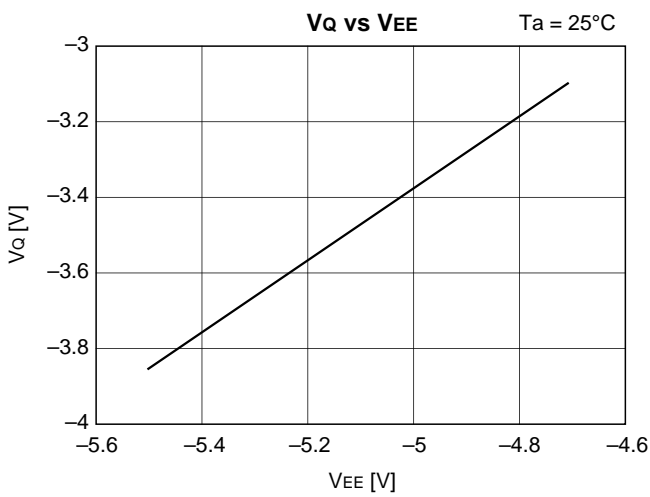
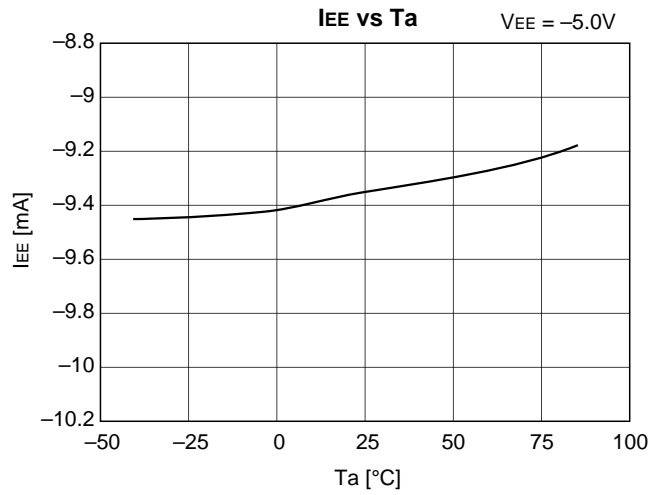
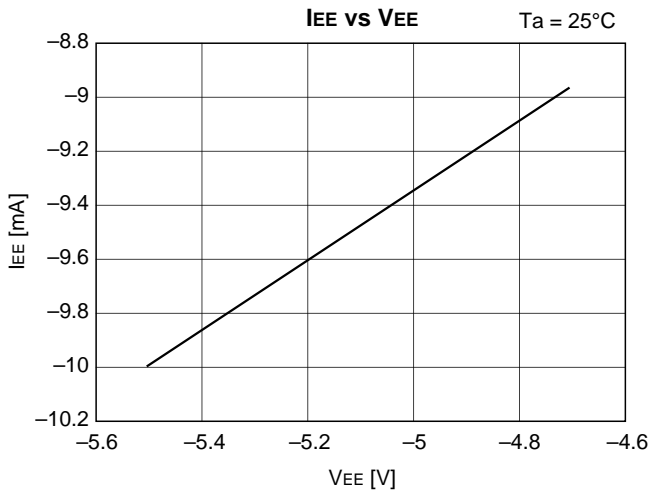
Typical Output Wave forms ($V_{CC} - V_{EE} = 5.0V$, $T_a = 25^\circ C$)



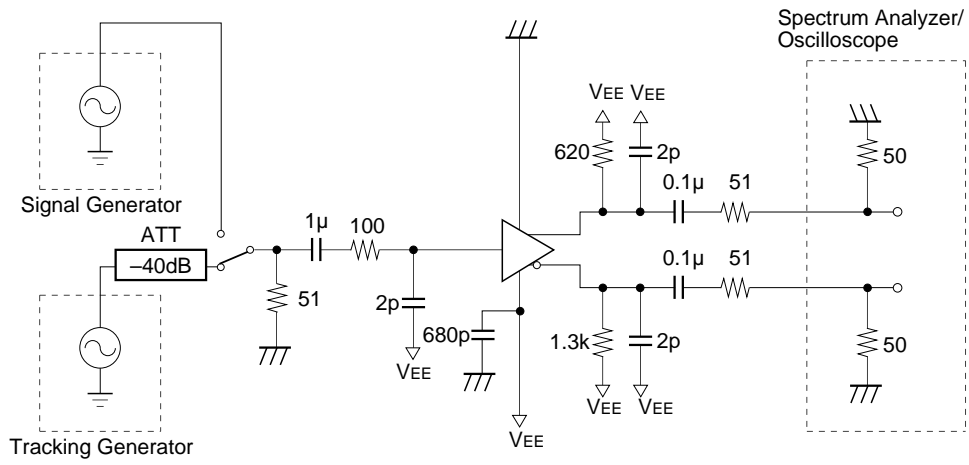
Duty Cycle Distortion vs Input Current







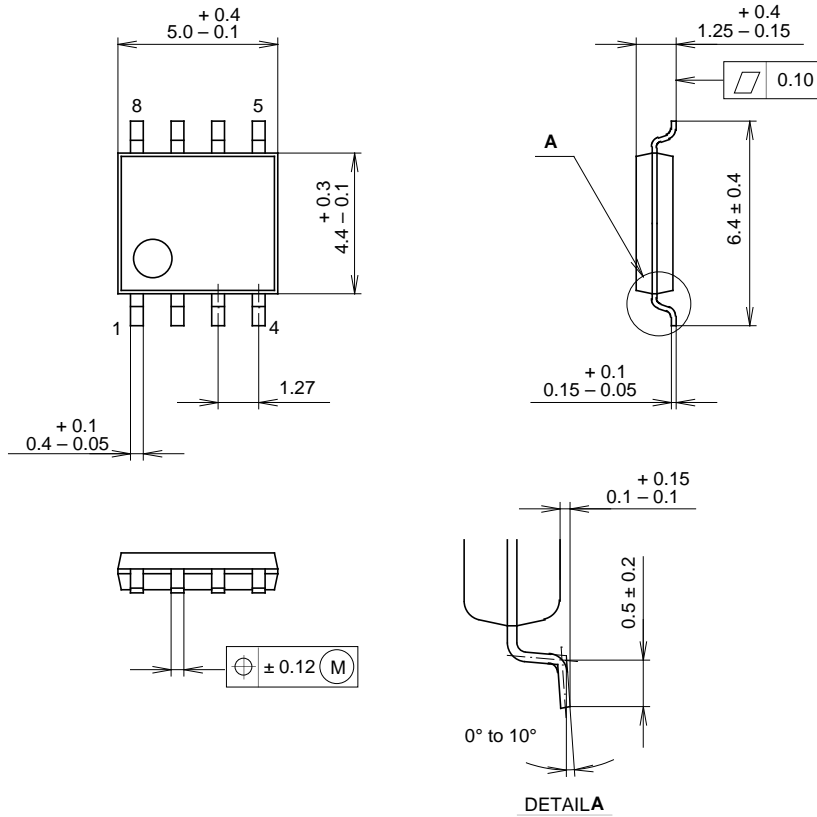
Test Circuit ($T_a = 25^\circ\text{C}$, $V_{EE} = -5.0\text{V}$)



Package Outline

Unit: mm

8PIN SOP (PLASTIC)



PACKAGE STRUCTURE

SONY CODE	SOP-8P-L03
EIAJ CODE	*SOP008-P-0225-A
JEDEC CODE	_____

MOLDING COMPOUND	EPOXY / PHENOL RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	42 ALLOY
PACKAGE WEIGHT	0.1g