

High-Speed Transimpedance Amplifier

Description

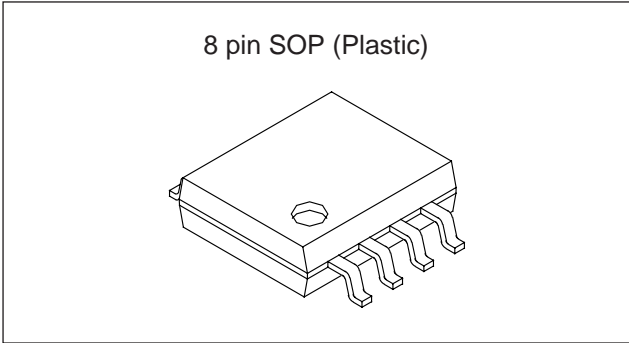
CXA1685M is a low noise transimpedance amplifier, particularly suitable for fiber-optic system. CXA1685M is fabricated using high-speed bipolar process.

Features

- High transimpedance: \bar{Q} 11.2k Ω (Typ.)
 \bar{Q} 10.8k Ω (Typ.)
- Wide band width (-3dB): \bar{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



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 I_O 0 to 50 mA
(\bar{Q}/\bar{Q}) (Continuous)
0 to 100 mA (Surge)
- Storage temperature T_{stg} -65 to +150 °C

Recommended Operating Conditions

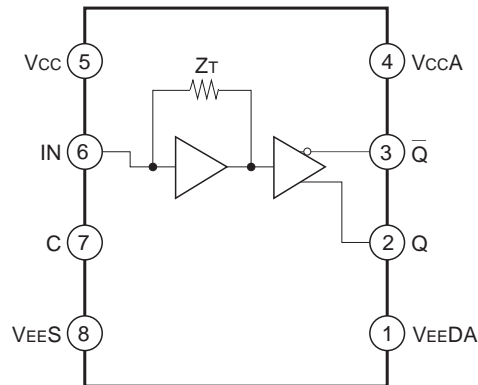
- DC power supply voltage $V_{CC} - V_{EE}$ 4.75 to 5.46 V
- Operating ambient temperature T_a 0 to +85 °C

Structure

Bipolar silicon monolithic IC

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Block Diagram and Pin Assignment



Electrical Characteristics

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

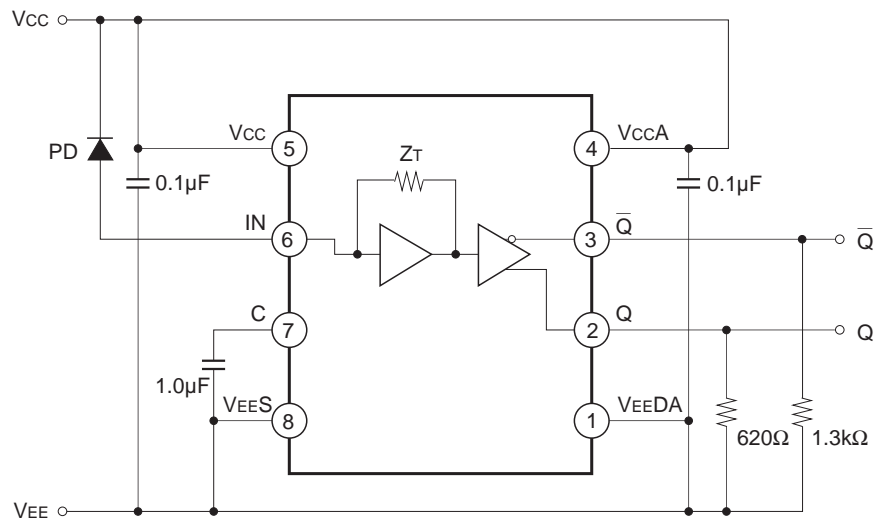
Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Supply current	I_{EE}	input pin left open	-15.3	-10.0		mA
Transimpedance	Q	Z_{TQ}	6.6	11.2	14.8	k Ω
	\bar{Q}	$Z_{T\bar{Q}}$	6.2	10.8	14.3	
Max. Input Current before clipping	I_{IN}	$T_a = 25^{\circ}C$	+40			μA
Max. Input Current			+1000			
Bias voltage	IN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

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

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit.
Bandwidth (-3dB)	Q	f_{-3dBQ}	*1	113	177	MHz
	\bar{Q}	$f_{-3dB\bar{Q}}$		109	157	
Input Current Noise Spectral Density (Mean value)	I_n	$f_N = 1kHz$ 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: 620Ω to V_{EE} , \bar{Q} : $1.3k\Omega$ to V_{EE}

Application Circuit



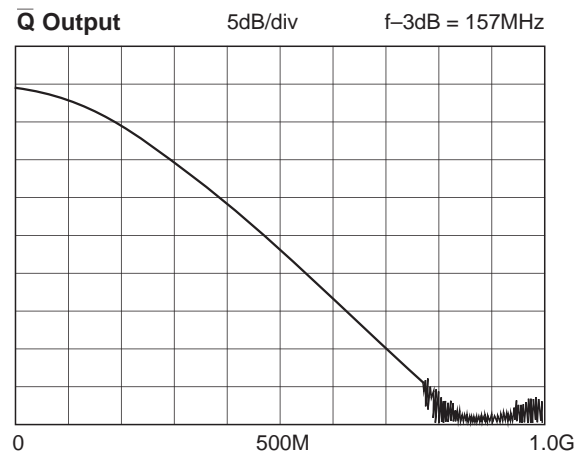
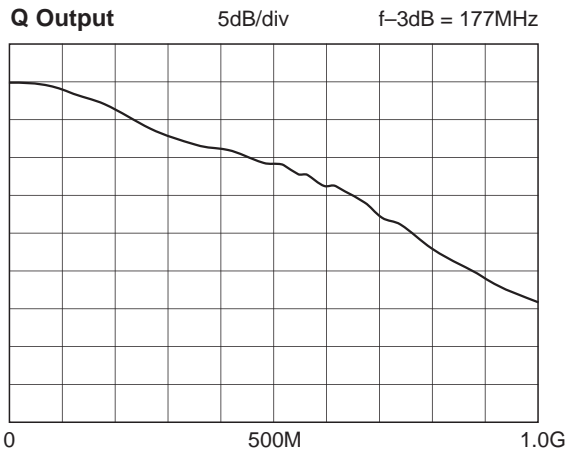
Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

Cautions for Handling

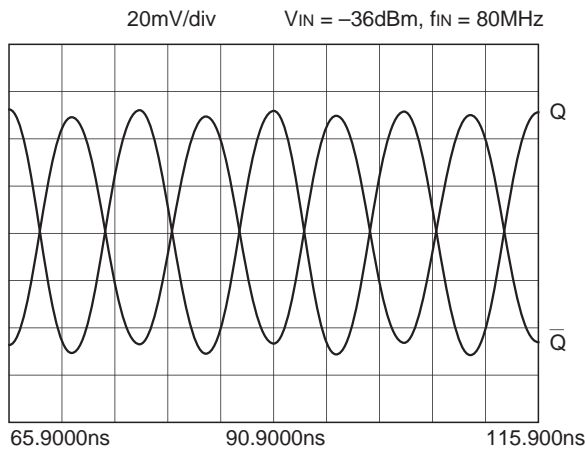
1. As the electronic breakdown level is weak, take care to handle.
2. The internal resistor of the output pin does not have the capability of drive ($R_L = 10k\Omega$). The terminal resistors must be connected. The resistance value is shown in application circuit.

Typical Performance

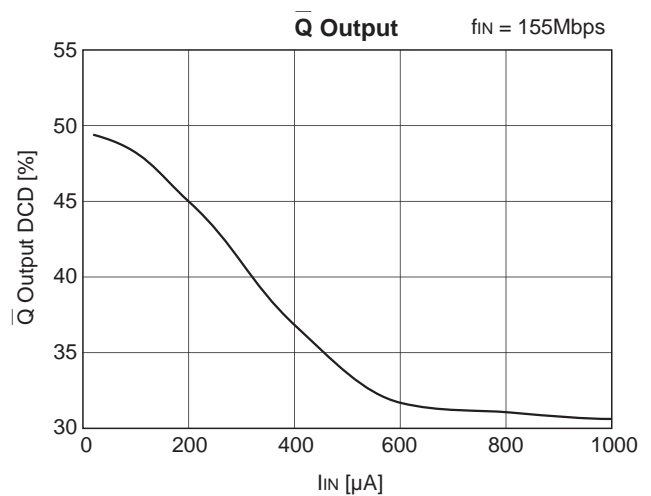
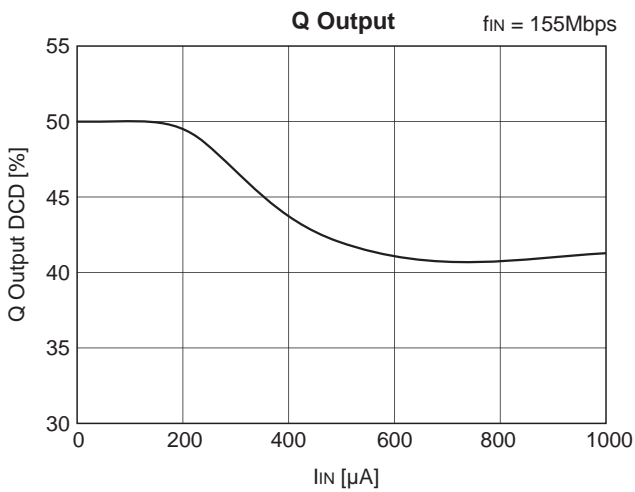
Typical frequency characteristics ($V_{CC} - V_{EE} = 5.0V$, $T_a = 25^\circ C$)

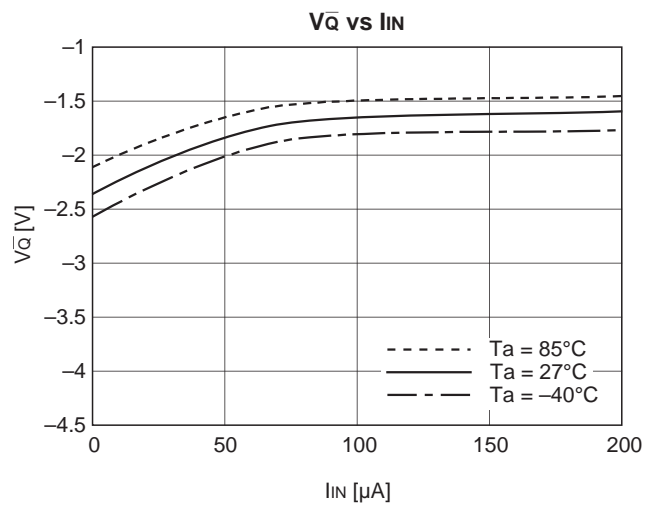
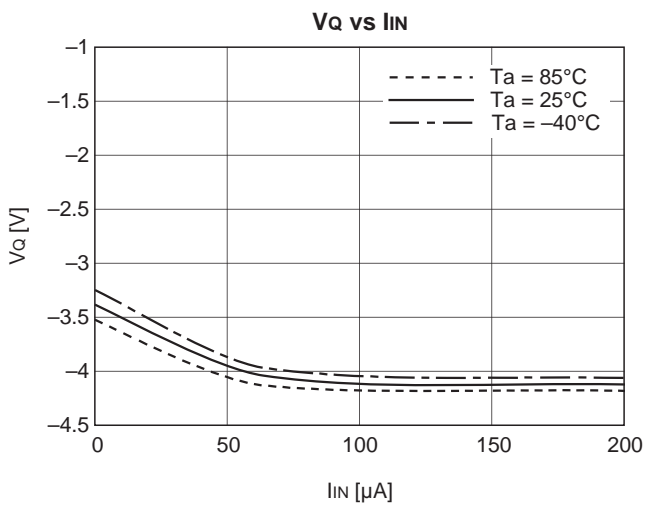
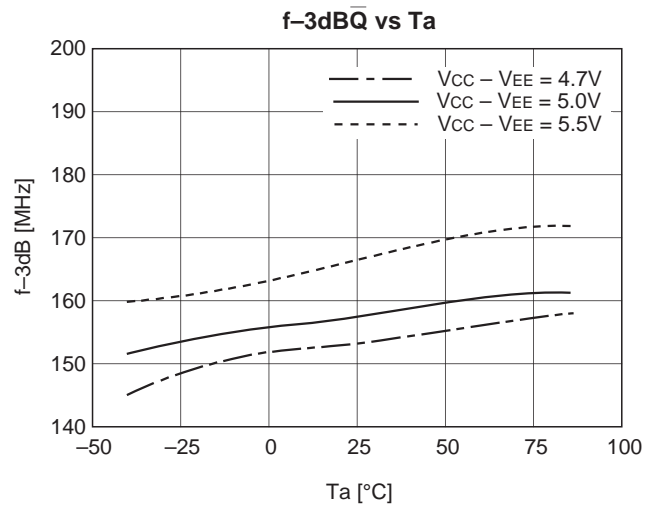
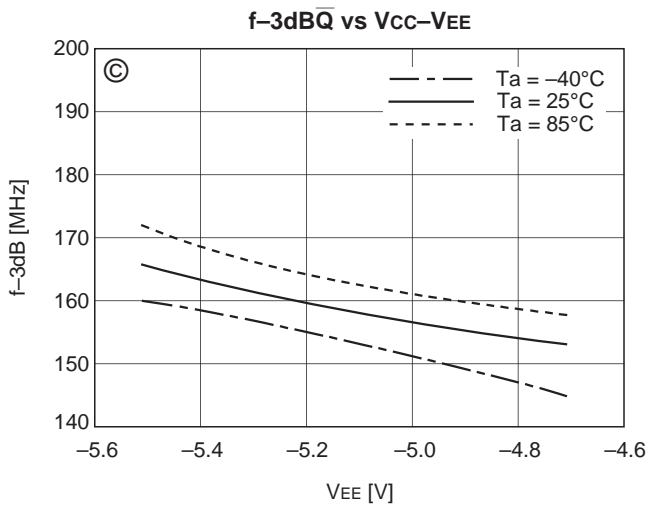
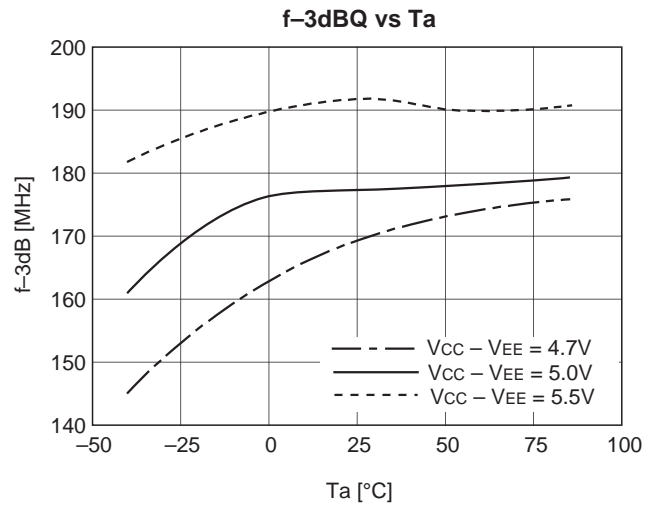
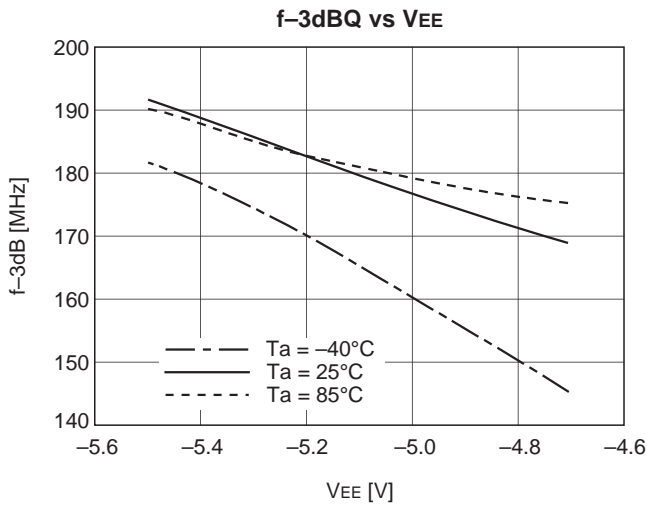


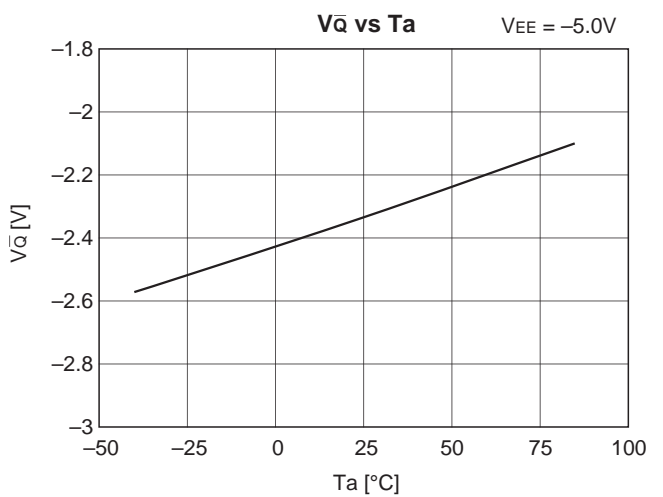
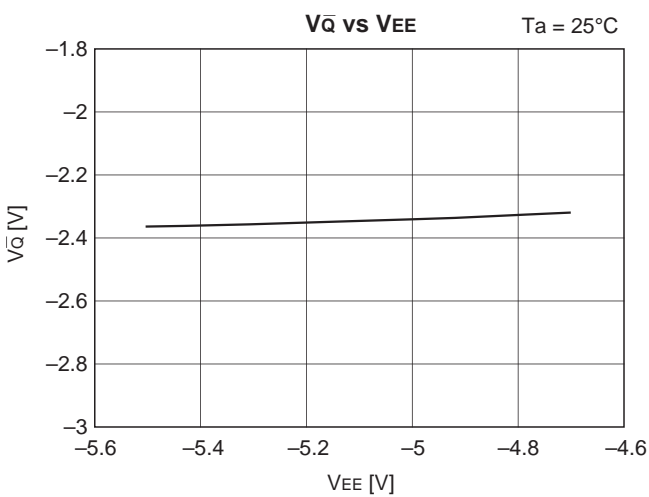
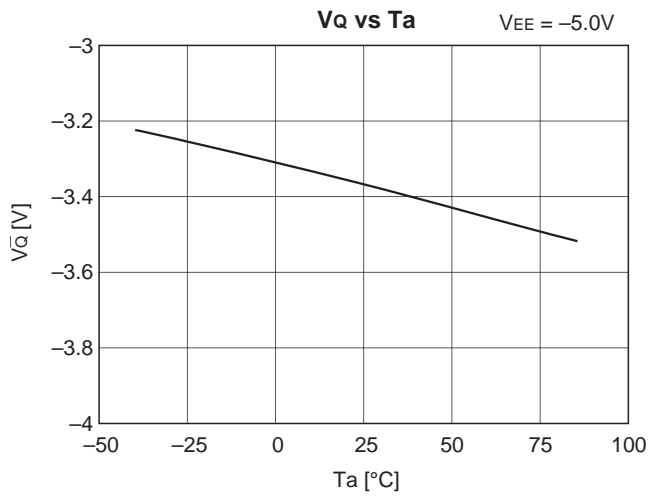
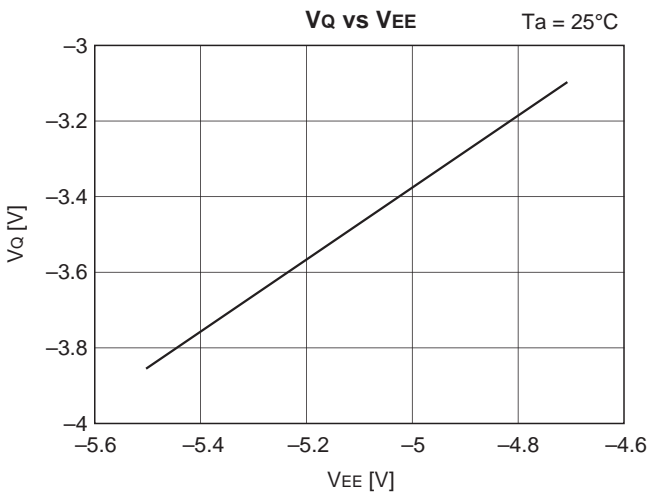
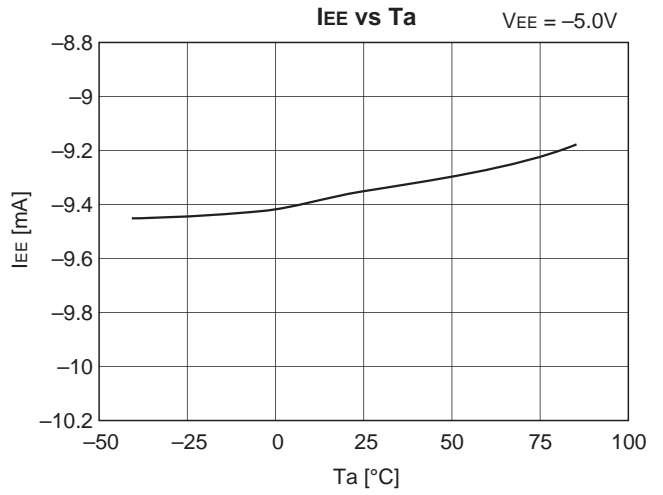
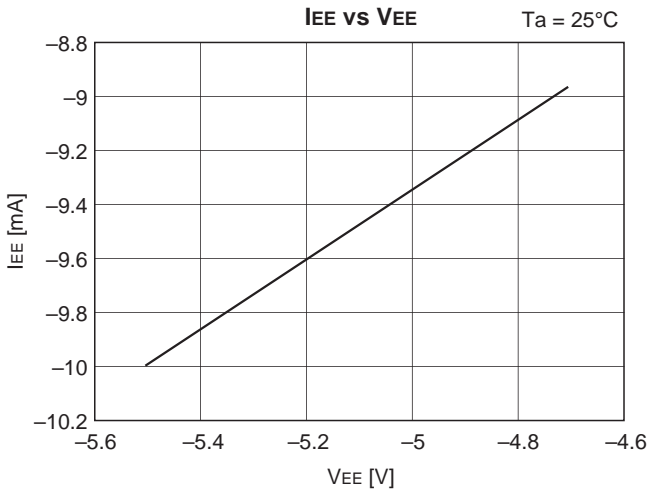
Typical Output Wave forms ($V_{CC} - V_{EE} = 5.0V$, $T_a = 25^\circ C$)



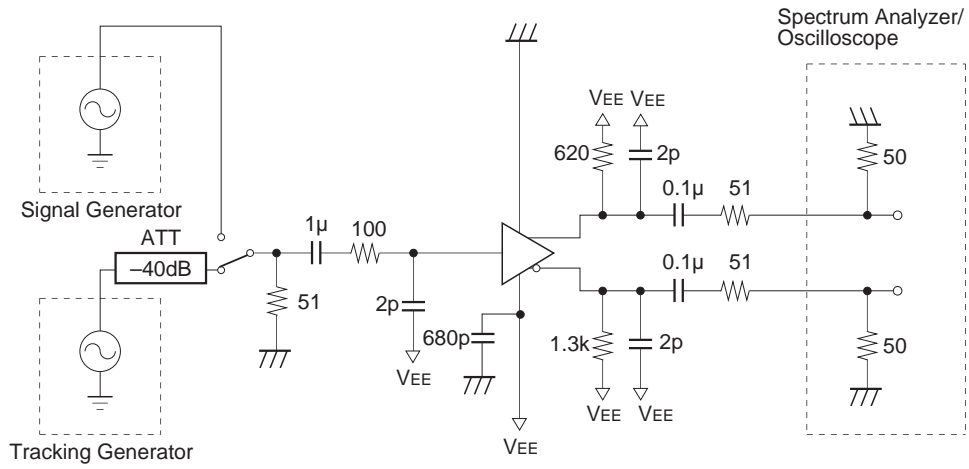
Duty Cycle Distortion vs Input Current







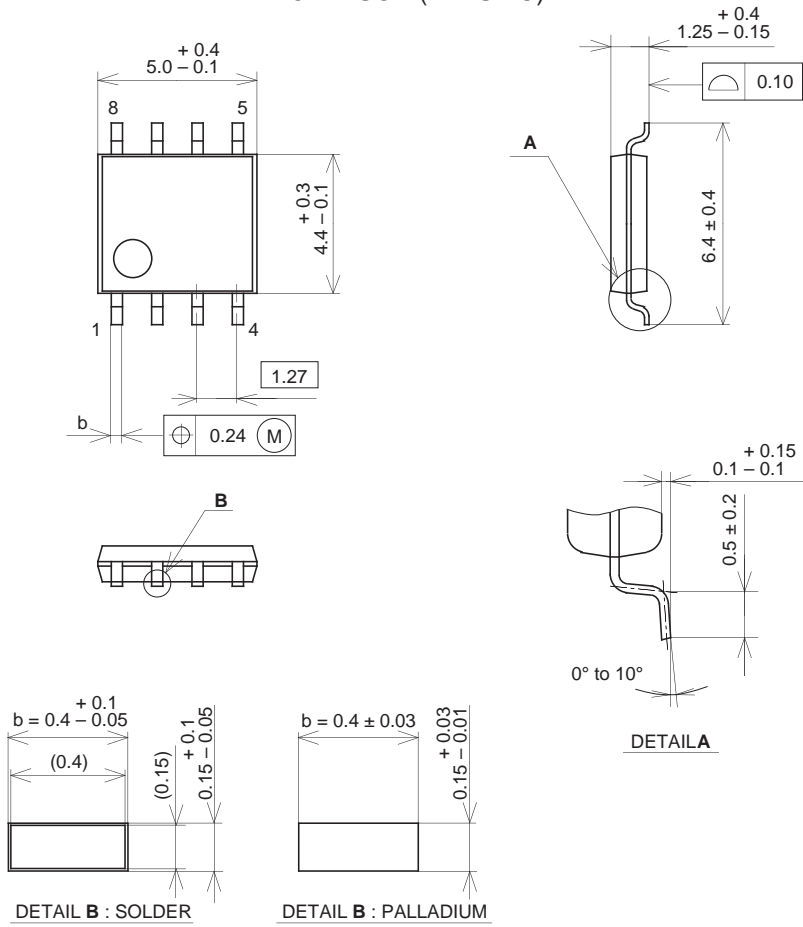
Test Circuit ($T_a = 25^\circ\text{C}$, $V_{EE} = -5.0\text{V}$)



Package Outline

Unit: mm

8PIN SOP (PLASTIC)



PACKAGE STRUCTURE

SONY CODE	SOP-8P-L03
EIAJ CODE	SOP008-P-0225
JEDEC CODE	

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER/PALLADIUM PLATING
LEAD MATERIAL	42/COPPER ALLOY
PACKAGE MASS	0.1g

NOTE : PALLADIUM PLATING

This product uses S-PdPPF (Sony Spec.-Palladium Pre-Plated Lead Frame).