

## 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.

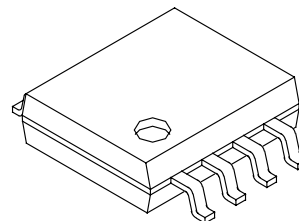
### Features

- High transimpedance:  $Q$  11.2k $\Omega$  (Typ.)  
 $\bar{Q}$  10.8k $\Omega$  (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

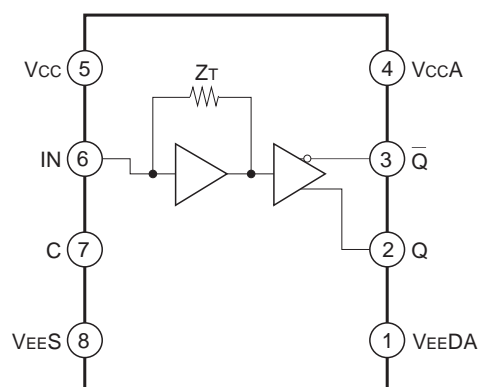
- DC power supply voltage  $V_{CC} - V_{EE}$  4.75 to 5.46 V
- Operating ambient temperature  $T_a$  0 to +85 °C

### Structure

Bipolar silicon monolithic IC

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## Block Diagram and Pin Assignment



## Electrical Characteristics

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

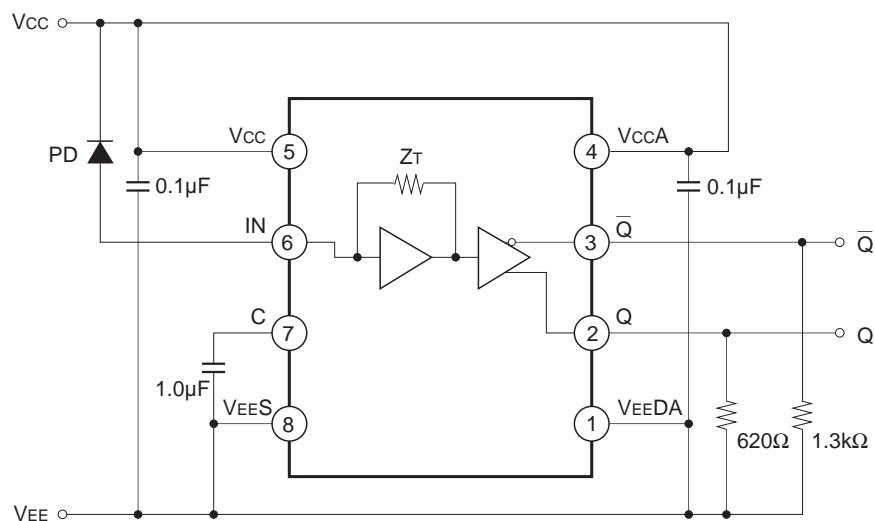
Item		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Supply current		$I_{EE}$	input pin left open	-15.3	-10.0		mA
Transimpedance	Q	$Z_{TQ}$		6.6	11.2	14.8	k $\Omega$
	$\bar{Q}$	$Z_{T\bar{Q}}$		6.2	10.8	14.3	
Max. Input Current before clipping		$I_{IN}$	$T_a = 25^\circ\text{C}$	+40			$\mu\text{A}$
Max. Input Current		$I_{IN2}$		+1000			
Bias voltage	IN	$V_{IN}$	input pin left open		$V_{EE} + 2.5$		V
	Q	$V_Q$			$V_{EE} + 1.7$		
	$\bar{Q}$	$V_{\bar{Q}}$			$V_{CC} - 2.4$		
	C	$V_C$			$V_{EE} + 1.7$		
Input capacitance		$C_{IN}$			1.3		pF

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

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)		$I_n$	$f_N = 1\text{kHz to } 156\text{MHz}$		1.7		$\text{pA}/\sqrt{\text{Hz}}$

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

## Application Circuit



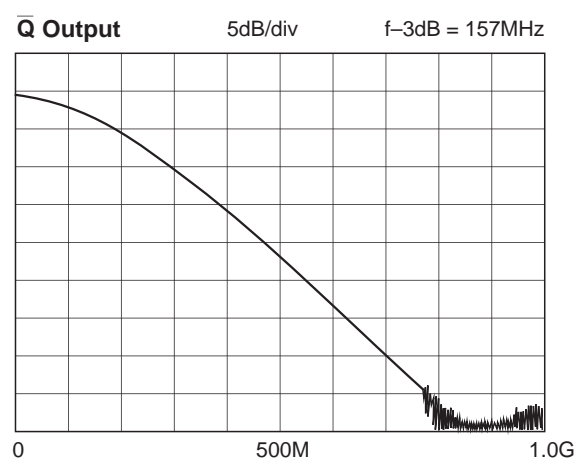
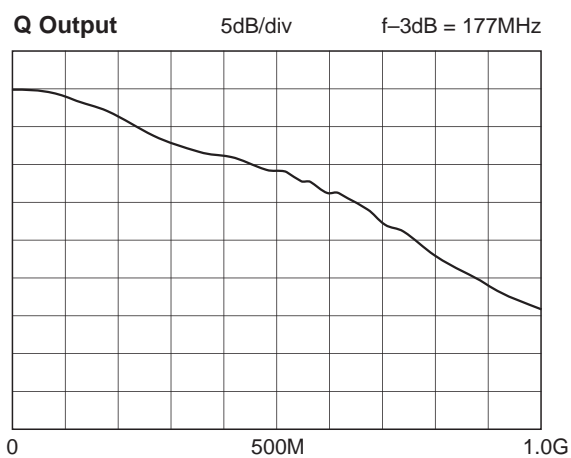
Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

## Cautions for Handling

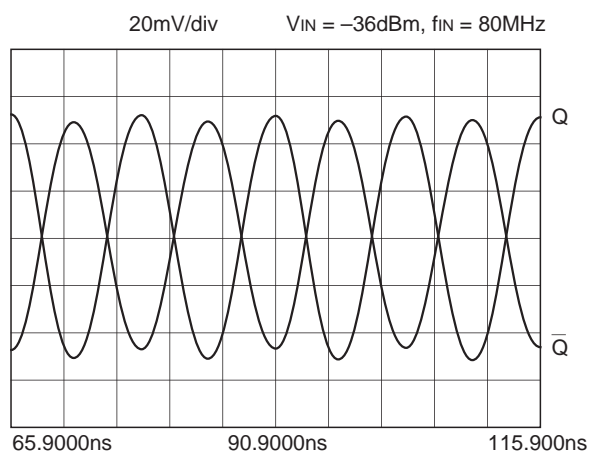
1. As the electronic breakdown level is weak, take care to handle.
2. The internal resistor of the output pin does not have the capability of drive ( $R_L = 10k\Omega$ ). The terminal resistors must be connected. The resistance value is shown in application circuit.

## Typical Performance

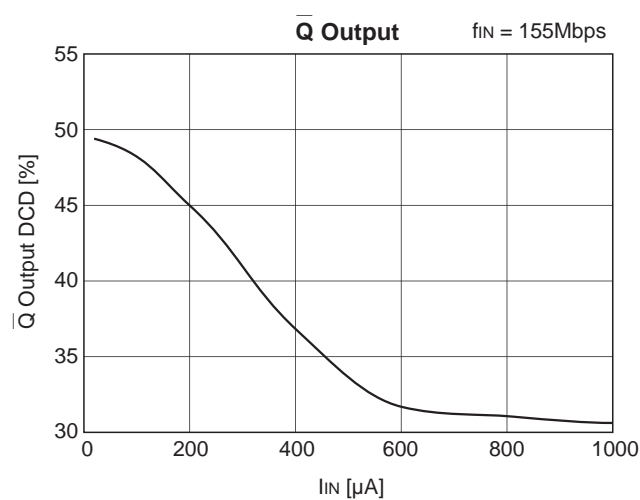
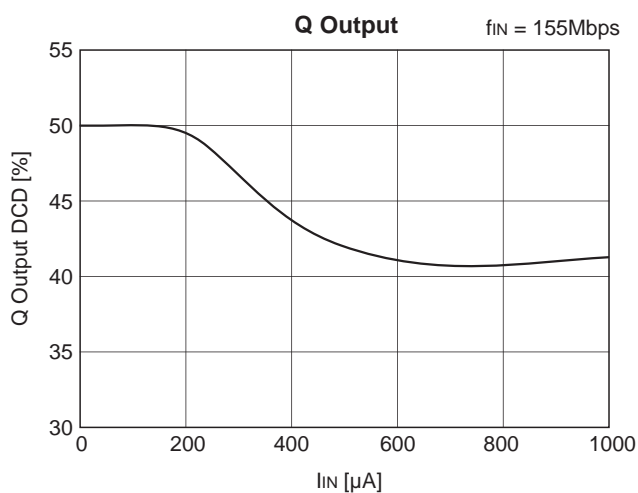
**Typical frequency characteristics** ( $V_{CC} - V_{EE} = 5.0V$ ,  $T_a = 25^\circ C$ )

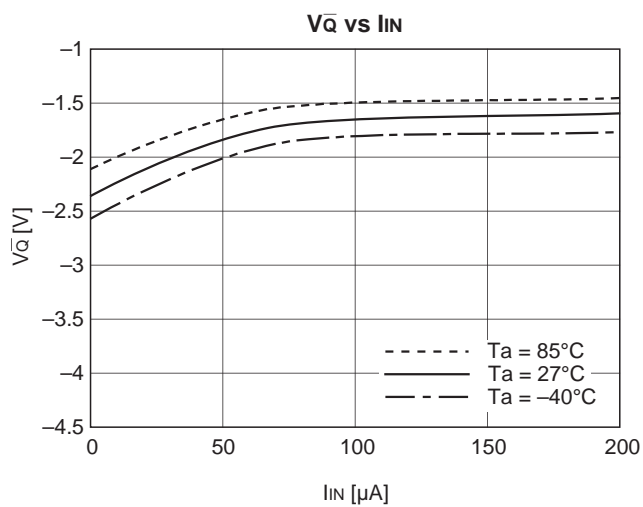
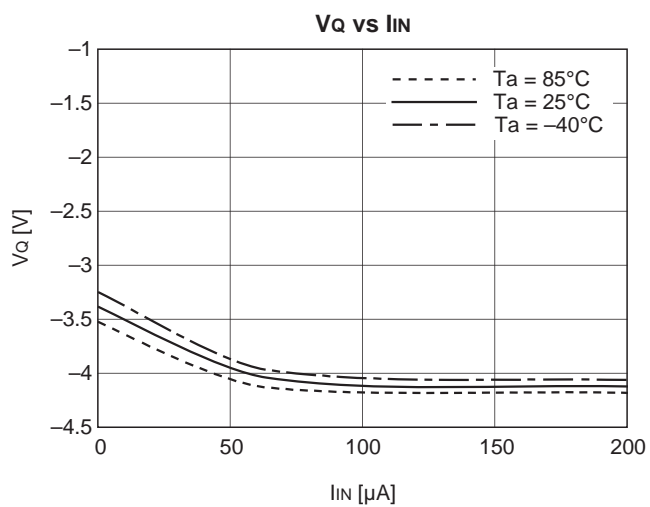
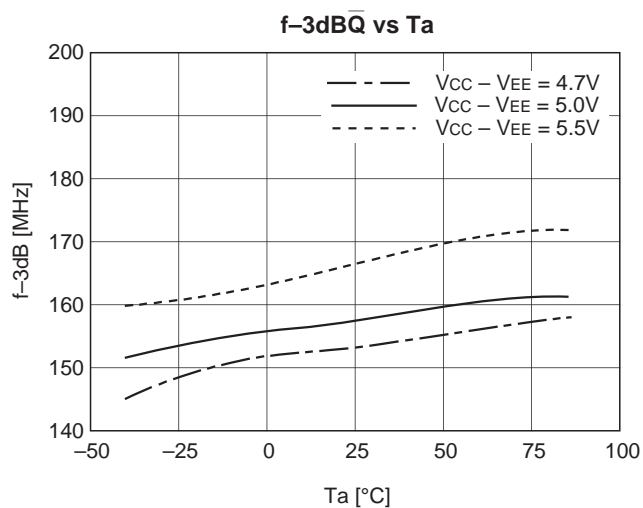
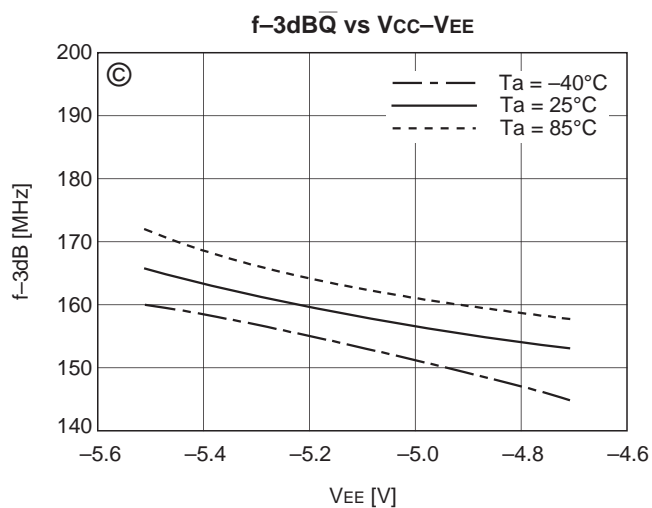
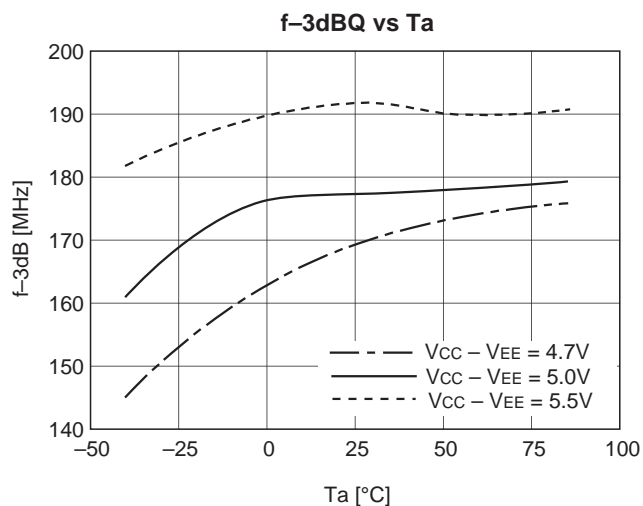
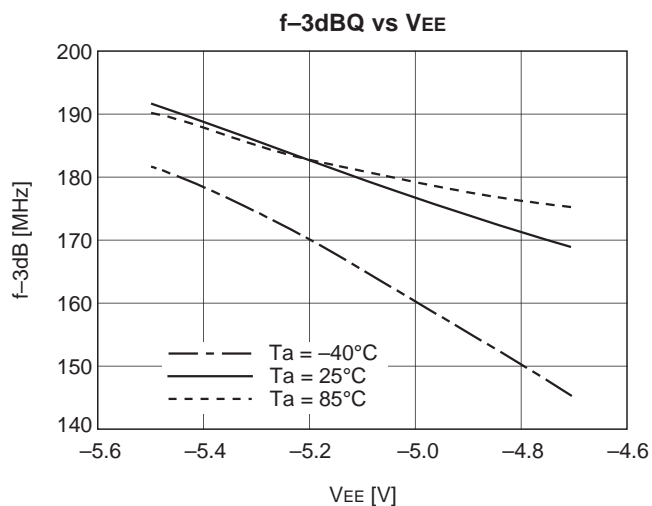


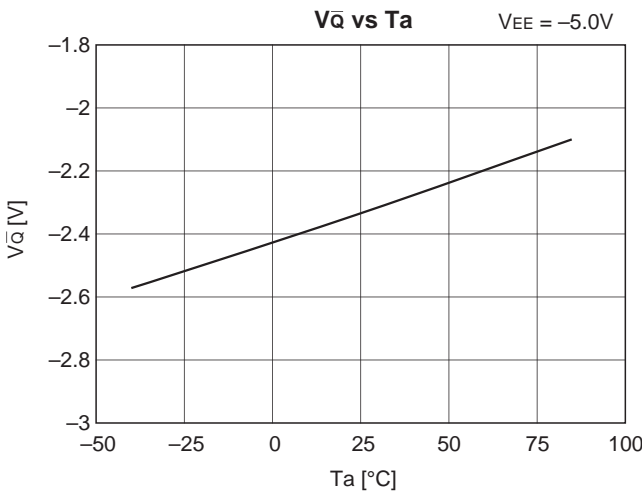
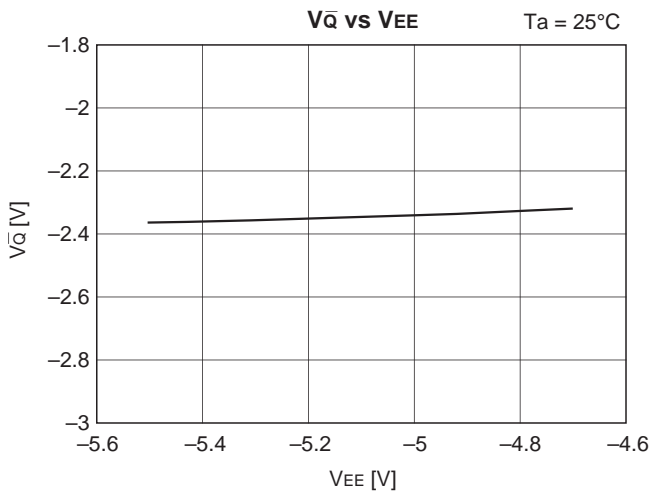
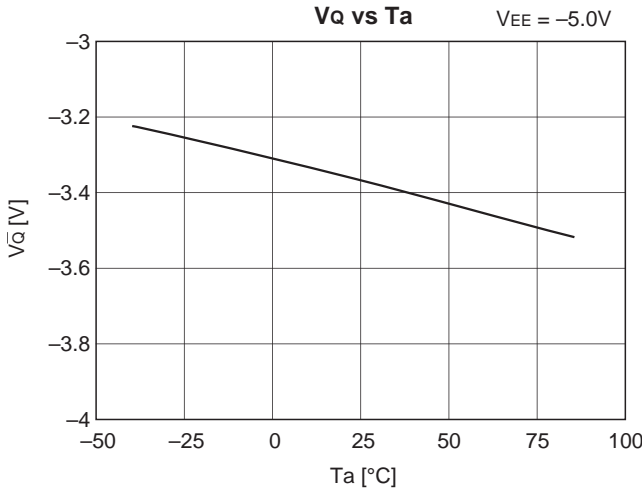
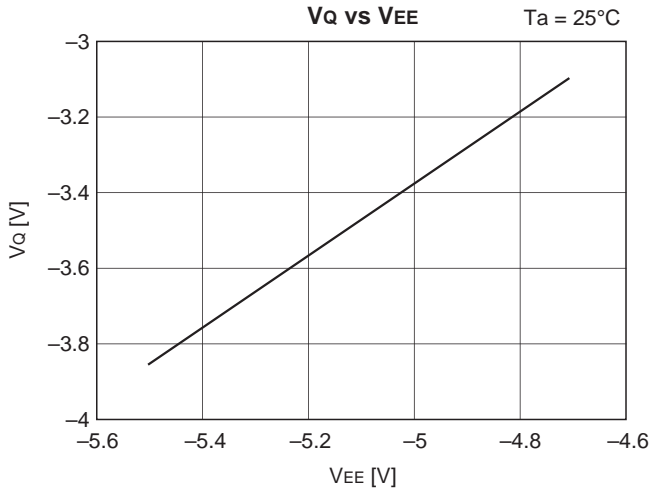
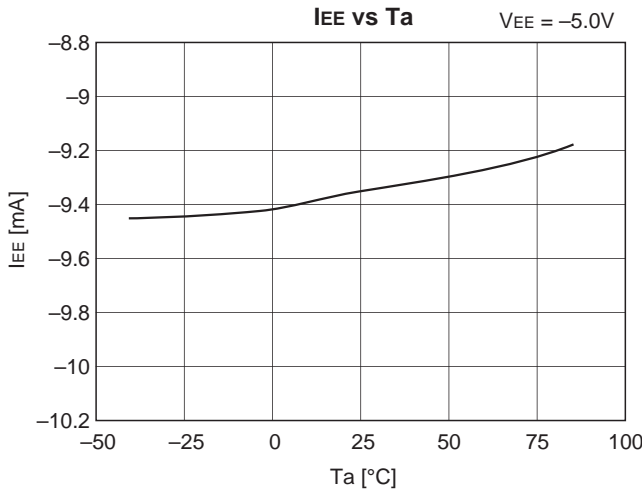
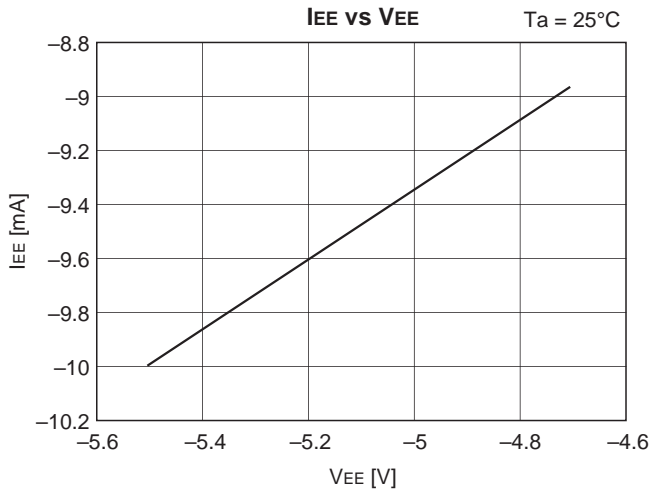
**Typical Output Wave forms** ( $V_{CC} - V_{EE} = 5.0V$ ,  $T_a = 25^\circ C$ )



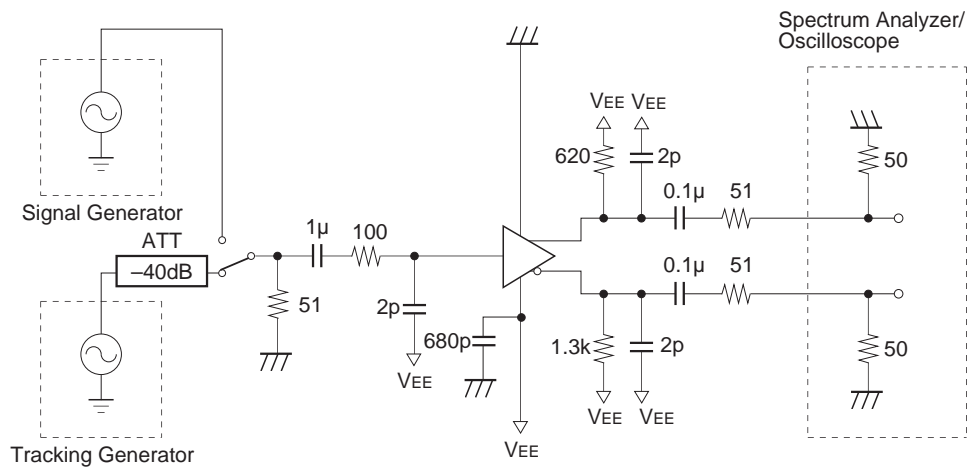
**Duty Cycle Distortion vs Input Current**







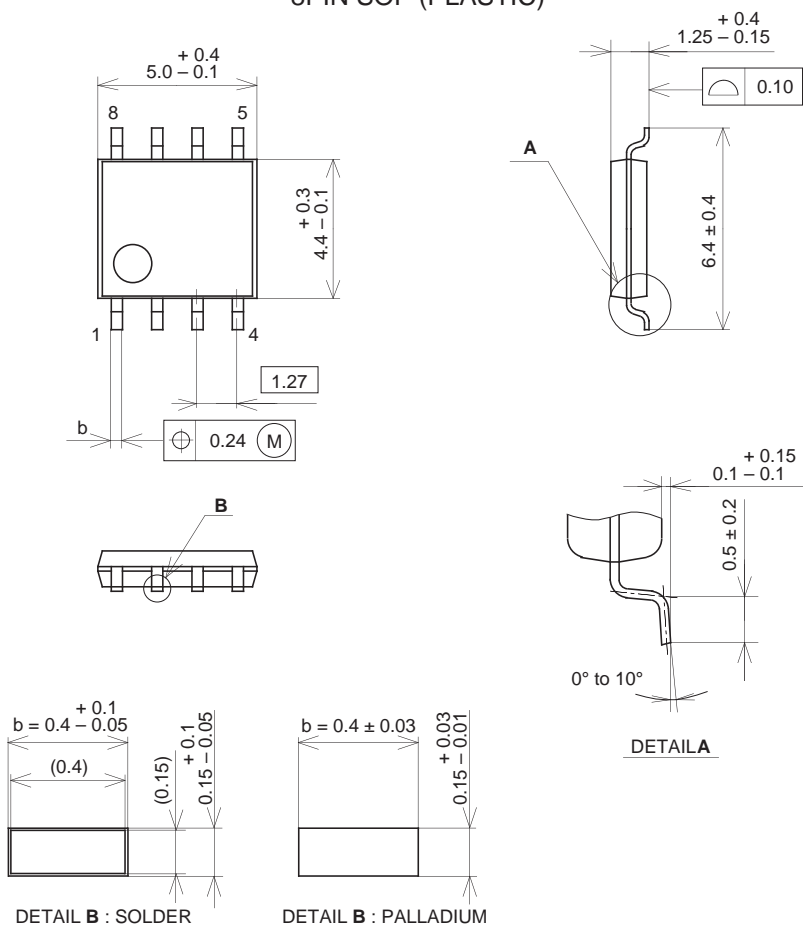
**Test Circuit** ( $T_a = 25^\circ\text{C}$ ,  $V_{EE} = -5.0\text{V}$ )



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).