



ITA-06300

MagIC™ Silicon Bipolar MMIC

1.5 Gb/s Transimpedance Amplifier Chip

Features

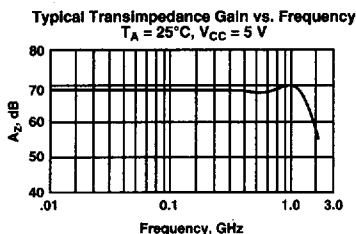
- High Transimpedance Gain: $A_Z = 2800 \Omega$ (69 dB)
- High Data Rates: 1.5 Gb/s NRZ
- Wide Bandwidth: 1.5 GHz
- Low Noise: 3.5 pA/√Hz at 100 MHz
- Single Power Supply: +5 V or -5.2 V
- Low Power Consumption: 170 mW

Description

The ITA-06300 series of high-performance transimpedance amplifier chip. It is designed for use in fiber-optic receivers that require high transimpedance gain, wide bandwidth, reduced power consumption, and low noise.

Typical applications include fiber-optic systems such as high-speed data communications, point to point (Fiber Channel), networks (LAN, MAN), and telecommunications (SONET) with data rates up to 1.8 Gb/s.

The ITA series of transimpedance amplifiers is fabricated using HP's 10 GHz f_T , 25 GHz f_{max} ISOSAT™-1 silicon bipolar process which uses nitride self-alignment, submicrometer lithography, trench isolation, ion implantation, gold metalization and polyimide inter-metal dielectric and scratch protection to achieve excellent performance, uniformity and reliability. The recommended assembly procedure is gold eutectic die attach at 400°C and either wedge or ball bonding using 0.7 mil. gold wire.¹

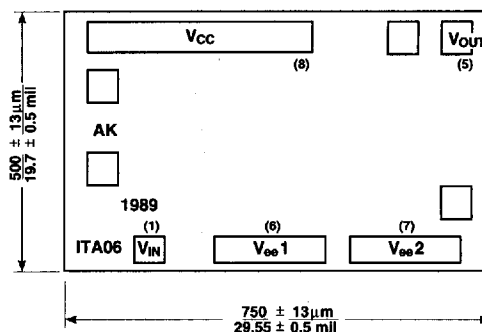
Electrical Specifications^{2,3}, $T_A = 25^\circ\text{C}$

Symbol	Parameters and Test Conditions ⁴ : $V_{CC} = 5\text{ V}$, $V_{EE} = 0\text{ V}$, $Z_L = 50 \Omega$	Units	Min.	Typ.	Max.
A_Z	Transimpedance Gain $f = 100\text{ MHz}$	ohms		2800	
F_{3dB}	Small Signal -3 dB Bandwidth ^{5,6}	GHz		1.5	
ΔA_Z	Frequency Response Gain Peak ^{5,6}	dB	0.0	1.0	
I_n	Input Current Noise Spectral Density ⁵ $f = 100\text{ MHz}$	pA/√Hz		3.5	
V_{op-p}	Output V_o Swing (peak to peak) $f = 50\text{ MHz}$	V _{p-p}		0.95	
VSWR	Output VSWR $f = 100\text{ MHz}$			2.2:1	
I_{MAX}	Maximum Input Current Before Input Overload ⁷ $f = 50\text{ MHz}$	μA_{p-p}		450	
I_d	Device Quiescent Current	mA		34	
V_{in}	Input Quiescent Voltage	Vdc		1.5	
V_{OUT}	Output Quiescent Voltage	Vdc		2.5	

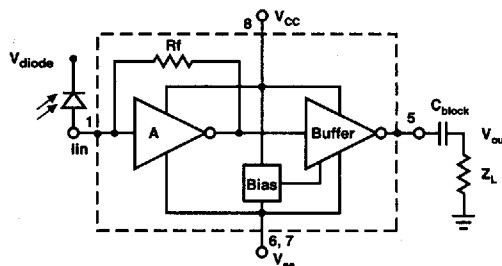
Notes: 1. See Application Note, "AN-005: Transistor Chip Use" for additional information.
2. The recommended operating voltage range for this device is 4.5 to 5.5 V.
3. Tested in HP 180 mil package.
4. RF performance of chip is determined by packaging and testing 10 devices per wafer.

5. Assumes photodiode capacitance, C_{PD} , <0.3 pF.
6. Referenced from 100 MHz.
7. Output duty cycle distortion $\leq \pm 10\%$.
8. See Data Sheet, "ITA-06318, MagIC™ Silicon Bipolar MMIC"

Chip Outline



Chip Thickness is 140 μm / 5.5 mil.
Bond Pads are 50 μm / 1.97 mil.

Typical Biasing Configuration⁸

ITA-06300, Silicon Bipolar MMIC 1.5 Gb/s Transimpedance Amplifier Chip

Absolute Maximum Ratings

Parameter	Absolute Maximum ¹
Device Voltage	8 V
Power Dissipation ^{2, 3}	700 mW
$V_{in}-V_{ee}$	2.0 V
Junction Temperature	200°C
Storage Temperature	-65 to 200°C

Thermal Resistance: $\theta_{jc} = 25^\circ\text{C/W}$

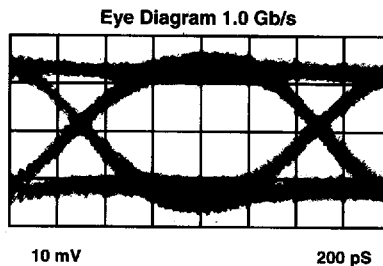
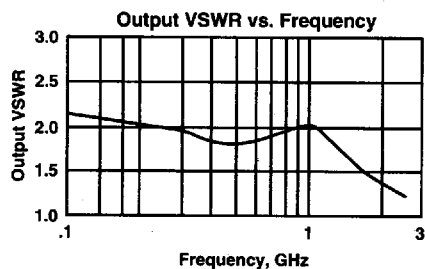
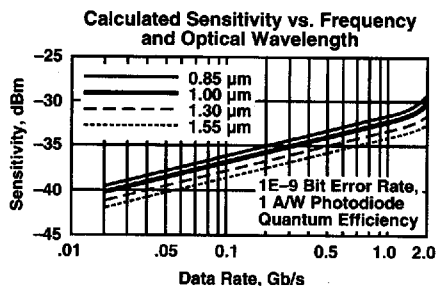
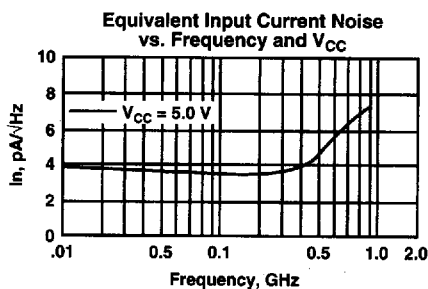
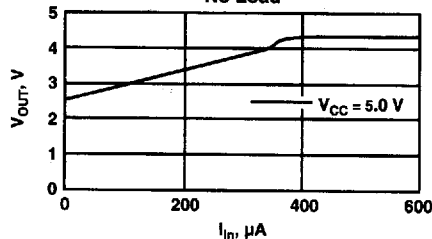
Notes:

1. Permanent damage may occur if any of these limits are exceeded.
2. $T_{\text{mounting surface}} (T_{ms}) = 25^\circ\text{C}$.
3. Derate at $40 \text{ mW}/^\circ\text{C}$ for $T_{ms} > 182^\circ\text{C}$.

Typical Performance, $T_A = 25^\circ\text{C}$,

$V_{cc} = 5 \text{ V}$, $V_{ee} = 0 \text{ V}$, $Z_L = 50 \Omega$, $C_{PD} < 0.3 \text{ pF}$
(Unless otherwise noted)

DC Input/Output Characteristics No Load



Motion Control ICS – HCTL-XXXX Series

Package Outline Drawing	Part No.	Package	Description	Page No.
	HCTL-1100	PDIP	CMOS General Purpose Motion Control IC	1-104
	HCTL-1100 OPT PLC	PLCC	CMOS General Purpose Motion Control IC	
	HCTL-2000	PDIP	CMOS Quadrature Decoder/Counter IC, 12-bit Counter	1-86
	HCTL-2016	PDIP	CMOS Quadrature Decoder/Counter IC, 16-bit Counter	
	New HCTL-2016 OPT PLC	PLCC	CMOS Quadrature Decoder/Counter IC, 16-bit Counter	1-102
	HCTL-2020	PDIP	CMOS Quadrature Decoder/Counter IC, 16-bit Counter, Quadrature Decoder Output Signals, Cascade Output Signals	1-86
	New HCTL-2020 OPT PLC	PLCC	CMOS Quadrature Decoder/Counter IC, 16-bit Counter, Quadrature Decoder Output Signals, Cascade Output Signals	1-102

Accessories for Encoders and Encoder Modules

Package Outline Drawing	Part No.	Description	Page No.
	HEDS-8902	4-wire connector with 15.5 cm (6.1 in.) flying leads. Locks into HEDS-5500 and HEDS-5600 2 channel encoders. Also fits HEDS-9000, HEDS-9100, and HEDS-9200 2 channel encoder modules.	1-61 1-22 1-28
	HEDS-8903	5-wire connector with 15.5 cm (6.1 in.) flying leads. Locks into HEDS-5540 and HEDS-5640 three channel encoders. Also fits HEDS-9040 and HEDS-9140 three channel encoder modules.	1-61 1-32
	HEDS-8905	Alignment Tool for HEDS-9140	1-32
	HEDS-8906	Alignment Tool for HEDS-9040	1-32
	HEDS-8901	Gap Setting shown for film codewheels	1-51
	HEDS-8932	Gap Setting shown for glass codewheels	1-51
	HEDS-8910 OPT 0 □□	Alignment Tool for HEDS-5540/5545 and HEDS-5640/5645. Order in appropriate shaft size.	1-61