

Agilent ABA-31563 3.5 GHz Broadband Silicon RFIC Amplifier Data Sheet

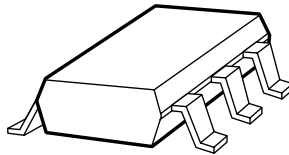
Description

Agilent's ABA-31563 is an economical, easy-to-use, internally 50Ω matched, silicon monolithic broadband amplifier that offers excellent gain and broadband response from DC to 3.5 GHz. Packaged in an ultra-miniature SOT-363 package, it requires half the board space of a SOT-143 package.

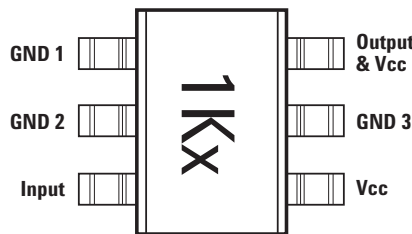
At 2 GHz, the ABA-31563 offers a small-signal gain of 21.5 dB, output P1dB of 2.2 dBm and 13.1 dBm output third order intercept point. It is suitable for use as wideband applications. They are designed for low cost gain blocks in cellular applications, DBS tuners, LNB and other wireless communication systems.

ABA-31563 is fabricated using Agilent's HP25 silicon bipolar process, which employs a double-diffused single polysilicon process with self-aligned submicron emitter geometry. The process is capable of simultaneous high f_T and high NPN breakdown (25 GHz f_T at 6V BVCEO). The process utilizes industry standard device oxide isolation technologies and submicron aluminum multilayer interconnect to achieve superior performance, high uniformity, and proven reliability.

Surface Mount Package SOT-363/SC70

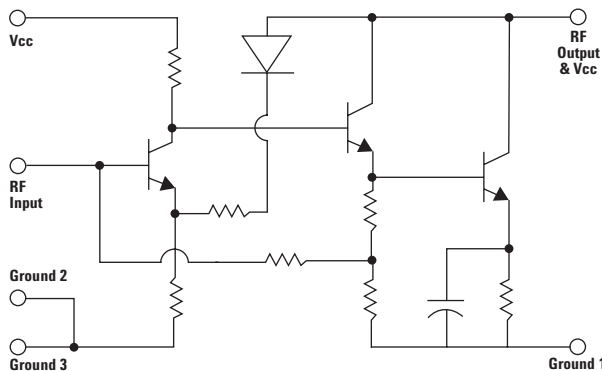


Pin Connections and Package Marking



Note:
Top View. Package marking provides orientation and identification. "x" is the date code.

Simplified Schematic



Features

- Operating Frequency DC ~ 3.5GHz
- 21.5 dB Gain
- VSWR < 2.0 throughout operating frequency
- 2.2 dBm Output P1dB
- 13.1 dBm Output IP3
- 3.8 dB Noise Figure
- Unconditionally Stable
- Single 3V Supply ($I_d = 14$ mA)
- Lead-free

Applications

- Amplifier for Cellular, Cordless, Special Mobile Radio, PCS, ISM, Wireless LAN, DBS, TVRO, and TV Tuner Applications



Attention:
Observe precautions for handling electrostatic sensitive devices.

ESD Machine Model (Class A)

ESD Human Body Model (Class 1B)

Refer to Agilent Application Note A004R:
Electrostatic Discharge Damage and Control.



Agilent Technologies

ABA-31563 Absolute Maximum Ratings^[1]

Symbol	Parameter	Units	Absolute Max.
V_{cc}	Device Voltage, RF output to ground (T = 25°C)	V	6
P_{in}	CW RF Input Power (V _{cc} = 3V)	dBm	15
P_{diss}	Total Power Dissipation ^[3]	W	0.3
T_j	Junction Temperature	°C	150
T_{STG}	Storage Temperature	°C	-65 to 150

Thermal Resistance^[2] (V_{cc} = 3V)
 $\theta_{j-c} = 125^{\circ}\text{C}/\text{W}$

Notes:

1. Operation of this device in excess of any of these limits may cause permanent damage.
2. Thermal resistance measured using 150°C Liquid Crystal Measurement Technique.
3. Board (package belly) temperature, T_c, is 25°C. Derate 2.3 mW/°C for T_c > 120.8°C.

Electrical Specifications

T_c = +25°C, Z₀ = 50 Ω, P_{in} = -30 dBm, V_{cc} = 3V, Freq = 2 GHz, unless stated otherwise.

Symbol	Parameter and Test Condition	Units	Min.	Typ.	Max.	Std Dev.
G _p ^[1]	Power Gain ($ S_{21} ^2$)	dB	20.0	21.5		
ΔG _p	Power Gain Flatness, f = 0.1 ~ 2.5 GHz f = 0.1 ~ 3.5 GHz	dB		0.2 1.3		
NF ^[1]	Noise Figure	dB		3.8	4.8	
P1dB ^[1]	Output Power at 1dB Gain Compression	dBm		2.2		
OIP3 ^[1]	Output Third Order Intercept Point	dBm		13.1		
VSWR _{in} ^[1]	Input VSWR			<1.5		
VSWR _{out} ^[1]	Output VSWR			<1.5		
I _{cc} ^[1]	Device Current	mA		14	16	
T _d ^[1]	Group Delay	ps		140		

Notes:

1. Measurements taken on 50Ω test board shown on Figure 1. Excess circuit losses had been de-embedded from actual measurements. Standard deviation and typical data based on at least 500 parts sample size from 2 wafer lots. Future wafers allocated to this product may have nominal values anywhere within the upper and lower spec limits.

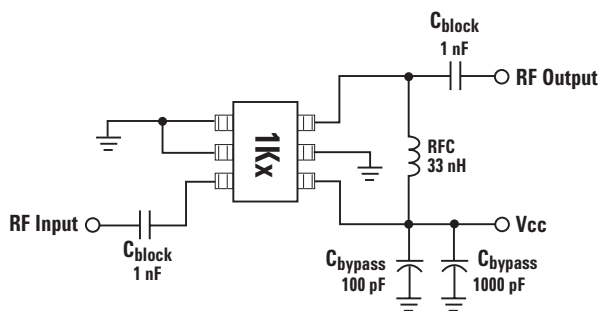


Figure 1. ABA-31563 Production Test Circuit.

ABA-31563 Typical Performance

$T_c = +25^\circ\text{C}$, $Z_o = 50\Omega$, $V_{cc} = 3\text{V}$ unless stated otherwise.

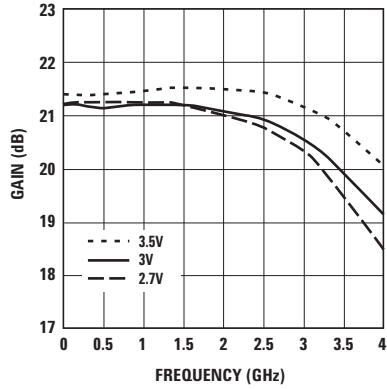


Figure 2. Gain vs. Frequency and Voltage.

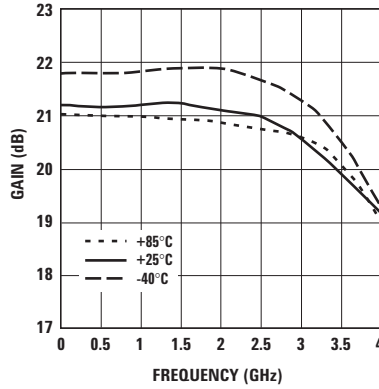


Figure 3. Gain vs. Frequency and Temperature.

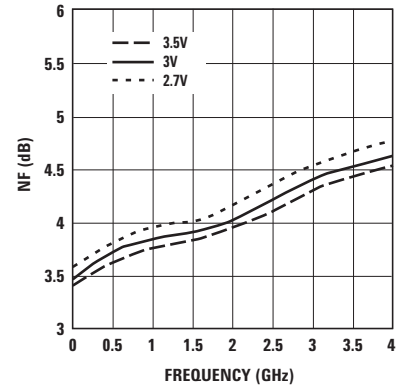


Figure 4. Noise Figure vs. Frequency and Voltage.

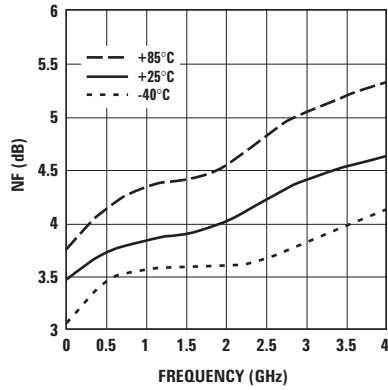


Figure 5. Noise Figure vs. Frequency and Temperature.

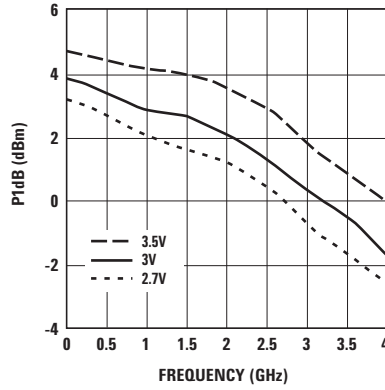


Figure 6. Output Power for 1 dB Gain Compression vs. Frequency and Voltage.

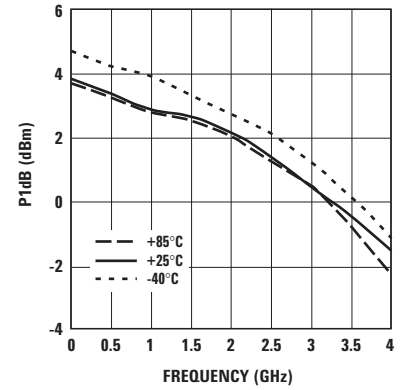


Figure 7. Output Power for 1 dB Gain Compression vs. Frequency and Temperature.

ABA-31563 Typical Performance, continued

$T_c = +25^\circ\text{C}$, $Z_o = 50\Omega$, $V_{cc} = 3\text{V}$ unless stated otherwise.

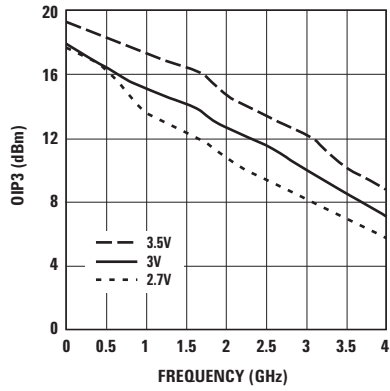


Figure 8. Output IP3 vs. Frequency and Voltage.

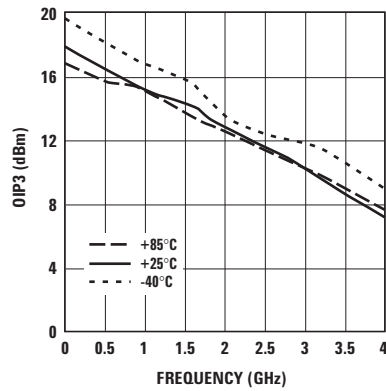


Figure 9. Output IP3 vs. Frequency and Temperature.

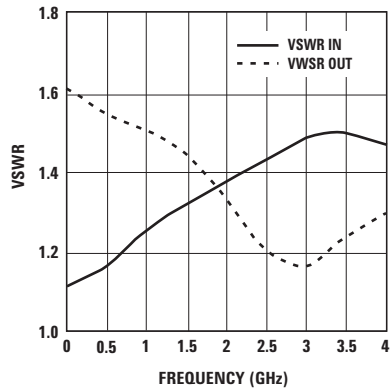


Figure 10. Input and Output VSWR vs. Frequency.

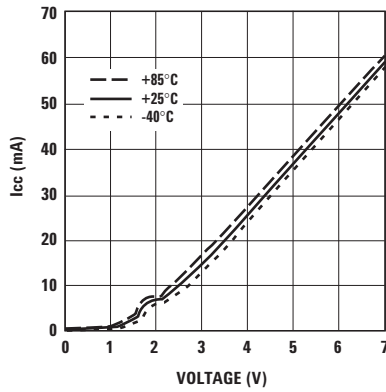


Figure 11. Supply Current vs. Voltage and Temperature.

ABA-31563 Typical Scattering Parameters

T_C = +25°C, Z₀ = 50Ω, V_{CC} = 3V, unless stated otherwise

Freq (GHz)	S ₁₁ Mag.	S ₁₁ Ang.	S ₂₁ dB	S ₂₁ Mag.	S ₂₁ Ang.	S ₁₂ Mag.	S ₁₂ Ang.	S ₂₂ Mag.	S ₂₂ Ang.	K Factor
0.10	0.05	3.1	21.25	11.54	-4.1	0.03	-0.6	0.23	-4.9	1.800
0.20	0.06	1.6	21.26	11.56	-8.3	0.03	-0.7	0.23	-9.3	1.800
0.30	0.06	1.1	21.28	11.59	-12.5	0.02	-0.6	0.23	-13.6	1.800
0.40	0.06	0.3	21.31	11.62	-16.9	0.02	-0.4	0.23	-18.0	1.800
0.50	0.07	18.4	21.3	11.62	-21.7	0.02	-0.4	0.21	-18.4	1.800
0.60	0.08	21.0	21.3	11.61	-26.3	0.02	0.0	0.21	-20.1	1.900
0.70	0.09	21.0	21.31	11.62	-30.8	0.02	0.8	0.21	-21.9	1.900
0.80	0.10	20.7	21.31	11.62	-35.3	0.02	1.5	0.21	-24.0	1.900
0.90	0.10	18.8	21.32	11.64	-39.8	0.02	2.4	0.20	-26.1	1.900
1.00	0.11	19.2	21.32	11.64	-44.4	0.02	3.2	0.20	-28.1	1.900
1.10	0.12	15.5	21.32	11.65	-48.9	0.02	4.2	0.20	-30.2	1.900
1.20	0.12	14.0	21.32	11.64	-53.4	0.02	5.4	0.20	-32.2	1.900
1.30	0.12	12.4	21.33	11.65	-58.0	0.02	6.5	0.19	-34.6	1.900
1.40	0.13	9.5	21.32	11.64	-62.6	0.02	7.7	0.19	-36.9	1.900
1.50	0.13	7.5	21.35	11.69	-67.2	0.02	8.9	0.18	-39.1	1.900
1.60	0.14	5.0	21.37	11.71	-71.9	0.02	10.2	0.17	-41.2	1.900
1.70	0.14	3.7	21.36	11.70	-76.8	0.02	11.5	0.17	-43.1	1.900
1.80	0.15	0.5	21.36	11.70	-81.4	0.02	12.5	0.16	-44.7	1.900
1.90	0.15	-2.6	21.37	11.71	-86.2	0.02	13.4	0.15	-46.1	1.900
2.00	0.16	-4.2	21.37	11.71	-91.2	0.02	14.8	0.14	-47.8	1.900
2.20	0.17	-9.7	21.33	11.66	-100.7	0.02	16.8	0.12	-48.2	1.800
2.40	0.17	-15.7	21.32	11.64	-110.8	0.03	18.5	0.10	-46.8	1.800
2.60	0.18	-20.1	21.21	11.50	-121.2	0.03	21.0	0.08	-39.7	1.800
2.80	0.19	-27.1	21.1	11.35	-131.2	0.03	21.9	0.07	-23.6	1.700
3.00	0.19	-34.0	20.94	11.15	-141.5	0.03	22.3	0.08	-9.9	1.700
3.20	0.20	-41.7	20.73	10.87	-152.0	0.03	23.2	0.08	0.4	1.700
3.40	0.20	-48.8	20.43	10.51	-162.2	0.03	24.2	0.10	6.3	1.600
3.60	0.20	-57.6	20.12	10.14	-172.3	0.03	24.6	0.11	7.6	1.600
3.80	0.19	-67.0	19.77	9.74	177.7	0.03	25.2	0.12	6.6	1.600
4.00	0.19	-76.0	19.38	9.31	167.9	0.04	25.2	0.13	6.6	1.600
4.20	0.18	-85.5	18.94	8.85	158.6	0.04	25.8	0.14	5.7	1.600
4.40	0.17	-98.2	18.57	8.48	149.1	0.04	24.9	0.14	1.6	1.600
4.60	0.16	-111.5	18.16	8.09	139.4	0.04	24.2	0.14	-2.9	1.600
4.80	0.15	-123.8	17.66	7.64	129.7	0.04	23.2	0.15	-6.5	1.600
5.00	0.14	-136.6	17.08	7.14	120.6	0.05	22.0	0.15	-10.1	1.600
5.20	0.13	-149.9	16.52	6.70	111.9	0.05	20.6	0.15	-15.1	1.600
5.40	0.13	-162.5	15.9	6.24	103.5	0.05	19.2	0.15	-19.7	1.600
5.60	0.14	-175.1	15.37	5.87	95.5	0.06	16.9	0.15	-27.2	1.600
5.80	0.14	170.6	14.81	5.50	87.5	0.06	13.9	0.14	-33.8	1.600
6.00	0.14	164.1	14.22	5.14	80.0	0.06	11.8	0.13	-38.1	1.700

Device Models

Refer to Agilent's web site
www.agilent.com/view/rf

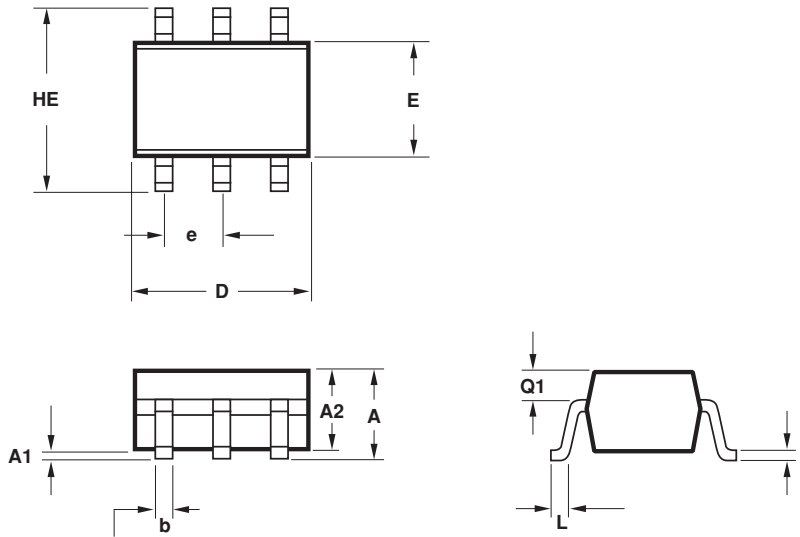
Ordering Information

Part Number	Devices per Container	Container
ABA-31563-TR1G	3000	7" reel
ABA-31563-TR2G	10000	13" reel
ABA-31563-BLKG	100	antistatic bag

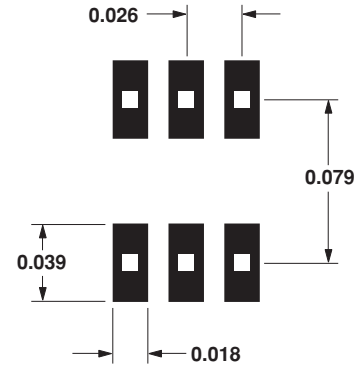
Note: Only lead-free option available.

Package Dimensions

Outline 63 (SOT-363/SC-70)



Recommended PCB Pad Layout for Agilent's SC70 6L/SOT-363 Products



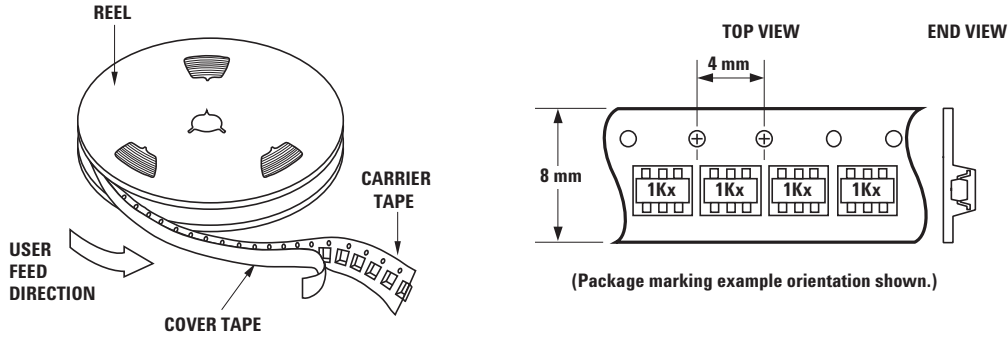
Dimensions in inches.

SYMBOL	DIMENSIONS (mm)	
	MIN.	MAX.
E	1.15	1.35
D	1.80	2.25
HE	1.80	2.40
A	0.80	1.10
A2	0.80	1.00
A1	0.00	0.10
Q1	0.10	0.40
e	0.650 BCS	
b	0.15	0.30
c	0.10	0.20
L	0.10	0.30

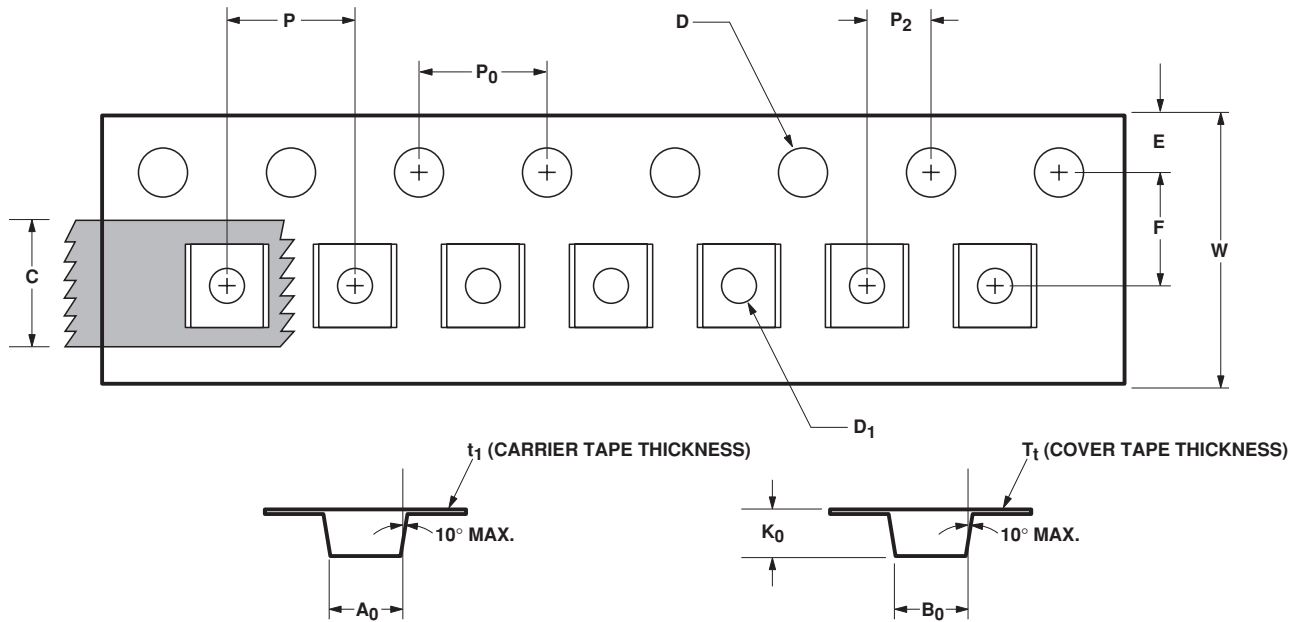
NOTES:

- All dimensions are in mm.
- Dimensions are inclusive of plating.
- Dimensions are exclusive of mold flash & metal burr.
- All specifications comply to EIAJ SC70.
- Die is facing up for mold and facing down for trim/form, ie: reverse trim/form.
- Package surface to be mirror finish.

Device Orientation



Tape Dimensions and Product Orientation for Outline 63



DESCRIPTION		SYMBOL	SIZE (mm)	SIZE (INCHES)
CAVITY	LENGTH	A_0	2.40 ± 0.10	0.094 ± 0.004
	WIDTH	B_0	2.40 ± 0.10	0.094 ± 0.004
	DEPTH	K_0	1.20 ± 0.10	0.047 ± 0.004
	PITCH	P	4.00 ± 0.10	0.157 ± 0.004
	BOTTOM HOLE DIAMETER	D_1	1.00 ± 0.25	0.039 ± 0.010
PERFORATION	DIAMETER	D	1.50 ± 0.10	0.061 ± 0.002
	PITCH	P_0	4.00 ± 0.10	0.157 ± 0.004
	POSITION	E	1.75 ± 0.10	0.069 ± 0.004
CARRIER TAPE	WIDTH	W	$8.00 \pm 0.30 - 0.10$	0.315 ± 0.012
	THICKNESS	t_1	0.254 ± 0.02	0.0100 ± 0.0008
COVER TAPE	WIDTH	C	5.40 ± 0.10	0.205 ± 0.004
	TAPE THICKNESS	T_t	0.062 ± 0.001	0.0025 ± 0.0004
DISTANCE	CAVITY TO PERFORATION (WIDTH DIRECTION)	F	3.50 ± 0.05	0.138 ± 0.002
	CAVITY TO PERFORATION (LENGTH DIRECTION)	P_2	2.00 ± 0.05	0.079 ± 0.002

www.agilent.com/semiconductors

For product information and a complete list of distributors, please go to our web site.

For technical assistance call:

Americas/Canada: +1 (800) 235-0312 or (916) 788-6763

Europe: +49 (0) 6441 92460

China: 10800 650 0017

Hong Kong: (65) 6756 2394

India, Australia, New Zealand: (65) 6755 1939

Japan: (+81 3) 3335-8152(Domestic/International), or 0120-61-1280(Domestic Only)

Korea: (65) 6755 1989

Singapore, Malaysia, Vietnam, Thailand, Philippines, Indonesia: (65) 6755 2044

Taiwan: (65) 6755 1843

Data subject to change.

Copyright © 2004 Agilent Technologies, Inc.

Obsoletes 5989-0755EN

November 30, 2004

5989-1968EN



Agilent Technologies

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru