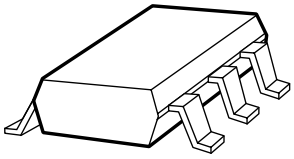
# Agilent ABA-32563
# 2.5 GHz Broadband Silicon RFIC Amplifier
## Data Sheet

### Description
Agilent's ABA-32563 is an economical, easy-to-use, internally 50Ω matched, silicon monolithic broadband amplifier that offers excellent gain and broadband response from DC to 2.5 GHz. Packaged in an ultra-miniature SOT-363 package, it requires half the board space of a SOT-143 package.

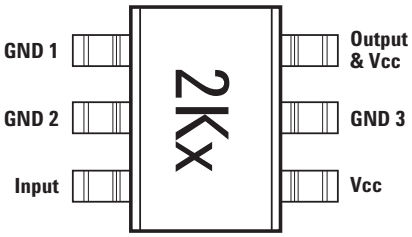
At 2 GHz, the ABA-32563 offers a small-signal gain of 19 dB, output P1dB of 8.4 dBm and 19.5 dBm output third order intercept point. It is suitable for use as wideband applications. They are designed for low cost gain blocks in cellular applications, DBS tuners, LNB and other wireless communication systems.

ABA-32563 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

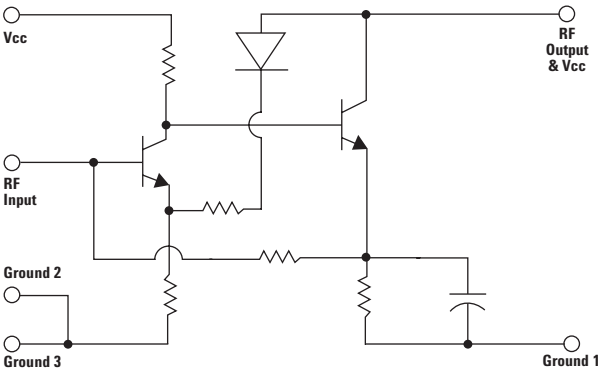


### Pin Connections and Package Marking




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

### Simplified Schematic




### Features
- Operating Frequency DC ~ 2.5 GHz
- 19 dB Gain
- VSWR < 2.0 throughout operating frequency
- 8.4 dBm Output P1dB
- 19.5 dBm Output IP3
- 3.5 dB Noise Figure
- Unconditionally Stable
- Single 3V Supply (Id = 37 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-32563 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 (Vcc = 3V) | dBm | 15 |
| $P_{diss}$ | Total Power Dissipation[3] | W | 0.6 |
| $T_j$ | Junction Temperature | °C | 150 |
| $T_{STG}$ | Storage Temperature | °C | -65 to 150 |

**Thermal Resistance[2] (Vcc = 3V)**
**$\theta_{j-c}$ = 124.3°C/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, Tc, is 25°C. Derate 8.1 mW/°C for Tc > 120.8°C.

## Electrical Specifications

$T_c$ = +25°C, $Z_o$ = 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. |
|---|---|---|---|---|---|---|
| Gp[1] | Power Gain ($\|S_{21}\|^2$) | dB | 17.5 | 19.0 | | |
| ΔGp | Power Gain Flatness, f = 0.1 ~ 1.5 GHz<br>f = 0.1 ~ 2.5 GHz | dB | | 1.0<br>3.0 | | |
| NF[1] | Noise Figure | dB | | 3.5 | 4.4 | |
| P1dB[1] | Output Power at 1dB Gain Compression | dBm | | 8.4 | | |
| OIP3[1] | Output Third Order Intercept Point | dBm | | 19.5 | | |
| $VSWR_{in}$[1] | Input VSWR | | | <1.5 | | |
| $VSWR_{out}$[1] | Output VSWR | | | <1.5 | | |
| Icc[1] | Device Current | mA | | 37 | 42.5 | |
| Td[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.

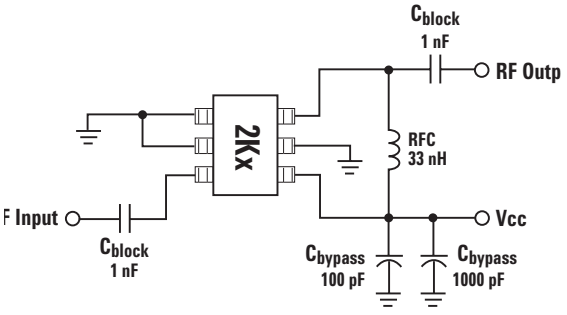



**Figure 1. ABA-32563 Production Test Circuit.**

## ABA-32563 Typical Performance

$T_c$ = +25°C, $Z_o$ = 50Ω, $V_{cc}$ = 3V unless stated otherwise.

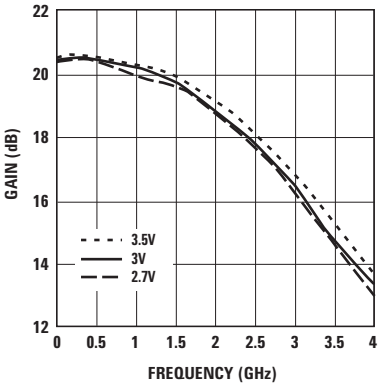



**Figure 2. Gain vs. Frequency and Voltage.**

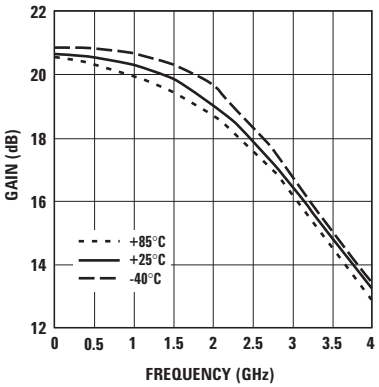



**Figure 3. Gain vs. Frequency and Temperature.**

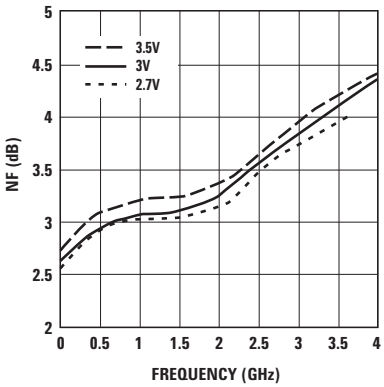



**Figure 4. Noise Figure vs. Frequency and Voltage.**

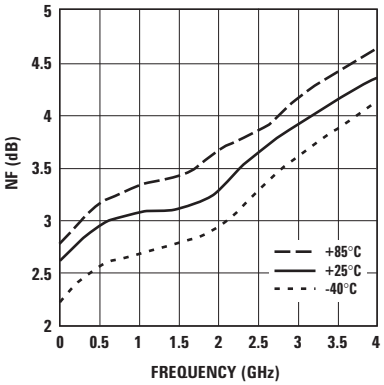



**Figure 5. Noise Figure vs. Frequency and Temperature.**

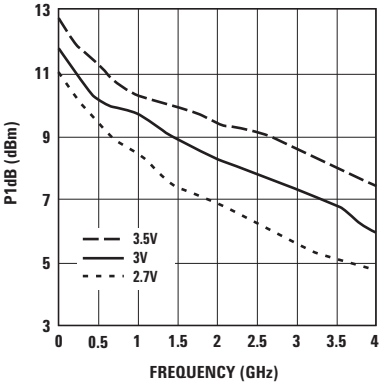



**Figure 6. Output Power for 1 dB Gain Compression vs. Frequency and Voltage.**

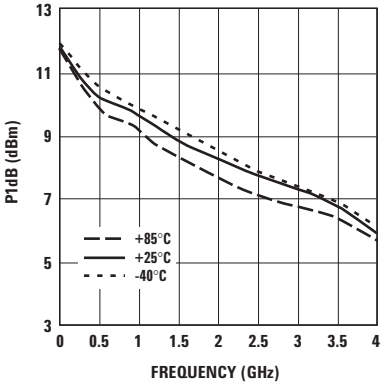



**Figure 7. Output Power for 1 dB Gain Compression vs. Frequency and Temperature.**

## ABA-32563 Typical Performance, continued

$T_c$ = +25°C, $Z_o$ = 50Ω, $V_{cc}$ = 3V unless stated otherwise.

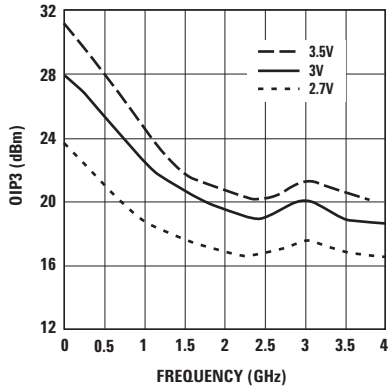



**Figure 8. Output IP3 vs. Frequency and Voltage.**

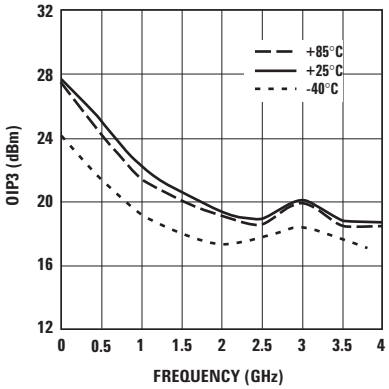



**Figure 9. Output IP3 vs. Frequency and Temperature.**

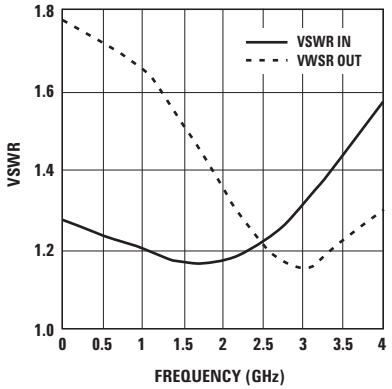



**Figure 10. Input and Output VSWR vs. Frequency.**

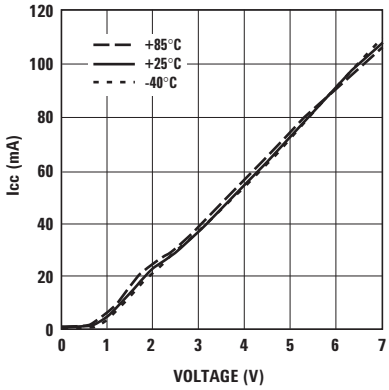



**Figure 11. Supply Current vs. Voltage and Temperature.**

## ABA-32563 Typical Scattering Parameters

$T_C$ = +25°C, $Z_O$ = 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 | 0.12 | 171.5 | 20.0 | 10.00 | -5.6 | 0.02 | 2.6 | 0.28 | -6.5 | 2.70 |
| 0.20 | 0.11 | 167.2 | 20.0 | 10.04 | -11.0 | 0.02 | 6.0 | 0.27 | -12.9 | 2.70 |
| 0.30 | 0.11 | 162.7 | 20.1 | 10.07 | -16.7 | 0.02 | 9.5 | 0.27 | -18.8 | 2.70 |
| 0.40 | 0.10 | 158.0 | 20.1 | 10.09 | -22.5 | 0.02 | 12.8 | 0.27 | -24.8 | 2.70 |
| 0.50 | 0.10 | 139.9 | 20.0 | 10.02 | -28.8 | 0.02 | 15.7 | 0.26 | -27.6 | 2.60 |
| 0.60 | 0.10 | 129.4 | 20.0 | 9.95 | -34.7 | 0.02 | 18.6 | 0.26 | -31.7 | 2.60 |
| 0.70 | 0.10 | 121.2 | 19.9 | 9.88 | -40.6 | 0.02 | 21.2 | 0.25 | -35.9 | 2.50 |
| 0.80 | 0.09 | 111.6 | 19.8 | 9.79 | -46.4 | 0.02 | 23.5 | 0.25 | -40.4 | 2.40 |
| 0.90 | 0.09 | 102.0 | 19.7 | 9.69 | -52.2 | 0.02 | 25.5 | 0.25 | -45.0 | 2.40 |
| 1.00 | 0.09 | 93.3 | 19.6 | 9.58 | -58.1 | 0.02 | 26.9 | 0.24 | -49.8 | 2.30 |
| 1.10 | 0.08 | 84.1 | 19.5 | 9.48 | -63.7 | 0.02 | 28.6 | 0.24 | -54.5 | 2.30 |
| 1.20 | 0.08 | 75.4 | 19.4 | 9.35 | -69.5 | 0.02 | 29.6 | 0.23 | -59.4 | 2.20 |
| 1.30 | 0.08 | 66.5 | 19.3 | 9.24 | -75.2 | 0.03 | 30.2 | 0.22 | -64.5 | 2.10 |
| 1.40 | 0.08 | 55.2 | 19.2 | 9.12 | -80.8 | 0.03 | 30.9 | 0.22 | -69.8 | 2.10 |
| 1.50 | 0.08 | 45.2 | 19.1 | 8.99 | -86.5 | 0.03 | 31.4 | 0.21 | -75.2 | 2.10 |
| 1.60 | 0.07 | 34.1 | 19.0 | 8.86 | -92.3 | 0.03 | 31.8 | 0.20 | -80.7 | 2.00 |
| 1.70 | 0.08 | 24.4 | 18.8 | 8.71 | -98.1 | 0.03 | 31.9 | 0.18 | -86.4 | 2.00 |
| 1.80 | 0.08 | 10.6 | 18.6 | 8.54 | -103.6 | 0.03 | 31.7 | 0.17 | -92.0 | 2.00 |
| 1.90 | 0.08 | -2.2 | 18.5 | 8.41 | -109.3 | 0.03 | 31.9 | 0.16 | -98.5 | 2.00 |
| 2.00 | 0.08 | -12.5 | 18.4 | 8.27 | -115.0 | 0.03 | 31.9 | 0.15 | -105.6 | 2.00 |
| 2.20 | 0.08 | -34.6 | 17.9 | 7.87 | -126.4 | 0.03 | 31.8 | 0.12 | -120.6 | 2.00 |
| 2.40 | 0.09 | -57.6 | 17.5 | 7.51 | -137.5 | 0.04 | 31.9 | 0.10 | -139.2 | 2.00 |
| 2.60 | 0.10 | -77.3 | 17.0 | 7.08 | -148.8 | 0.04 | 32.3 | 0.08 | -163.9 | 2.00 |
| 2.80 | 0.12 | -93.3 | 16.4 | 6.64 | -159.3 | 0.04 | 32.4 | 0.07 | 167.4 | 2.10 |
| 3.00 | 0.13 | -108.3 | 15.9 | 6.21 | -169.6 | 0.04 | 32.4 | 0.07 | 137.7 | 2.10 |
| 3.20 | 0.15 | -124.9 | 15.3 | 5.81 | -179.7 | 0.04 | 32.1 | 0.08 | 115.7 | 2.10 |
| 3.40 | 0.16 | -137.7 | 14.6 | 5.39 | 170.6 | 0.05 | 32.2 | 0.09 | 98.7 | 2.10 |
| 3.60 | 0.19 | -150.1 | 14.0 | 5.04 | 161.4 | 0.05 | 31.5 | 0.10 | 86.3 | 2.10 |
| 3.80 | 0.20 | -162.9 | 13.5 | 4.71 | 152.1 | 0.05 | 31.0 | 0.12 | 78.9 | 2.10 |
| 4.00 | 0.22 | -175.0 | 12.8 | 4.38 | 142.9 | 0.05 | 30.5 | 0.13 | 71.9 | 2.10 |
| 4.20 | 0.23 | 175.0 | 12.1 | 4.04 | 134.4 | 0.06 | 30.0 | 0.14 | 65.2 | 2.10 |
| 4.40 | 0.26 | 166.1 | 11.6 | 3.79 | 126.2 | 0.06 | 28.2 | 0.15 | 59.1 | 2.10 |
| 4.60 | 0.27 | 155.3 | 11.0 | 3.54 | 117.3 | 0.06 | 26.7 | 0.15 | 55.0 | 2.10 |
| 4.80 | 0.28 | 145.8 | 10.2 | 3.25 | 108.7 | 0.07 | 25.2 | 0.16 | 50.2 | 2.10 |
| 5.00 | 0.29 | 138.3 | 9.5 | 2.99 | 101.3 | 0.07 | 23.2 | 0.16 | 45.0 | 2.20 |
| 5.20 | 0.30 | 131.7 | 8.8 | 2.77 | 94.2 | 0.08 | 20.8 | 0.16 | 40.1 | 2.20 |
| 5.40 | 0.31 | 126.2 | 8.2 | 2.57 | 87.6 | 0.08 | 18.4 | 0.16 | 35.1 | 2.20 |
| 5.60 | 0.32 | 120.9 | 7.7 | 2.42 | 81.0 | 0.09 | 15.6 | 0.16 | 30.3 | 2.20 |
| 5.80 | 0.34 | 115.6 | 7.2 | 2.28 | 74.3 | 0.09 | 12.7 | 0.16 | 25.3 | 2.20 |
| 6.00 | 0.35 | 110.4 | 6.6 | 2.14 | 67.7 | 0.09 | 9.6 | 0.15 | 23.8 | 2.20 |

### Device Models

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

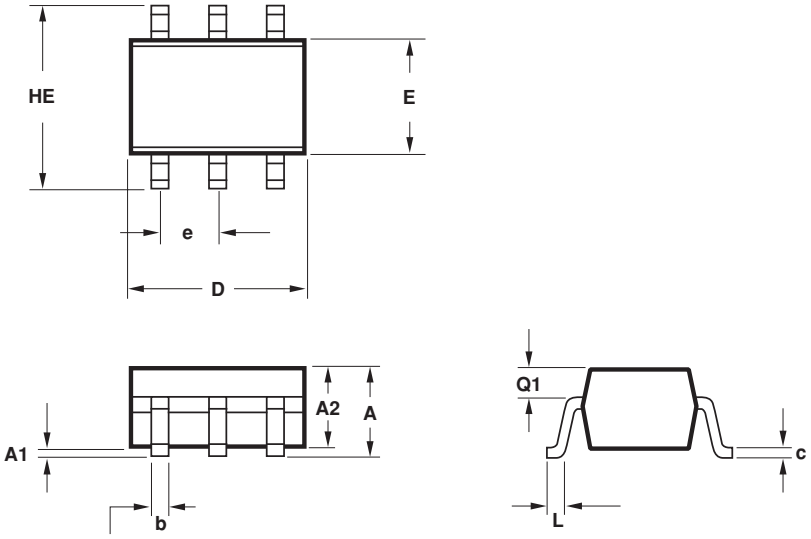
### Ordering Information

| Part Number | Devices per Container | Container |
|---|---|---|
| ABA-32563-TR1G | 3000 | 7" reel |
| ABA-32563-TR2G | 10000 | 13" reel |
| ABA-32563-BLKG | 100 | antistatic bag |

Note: Only lead-free option available.

### Package Dimensions

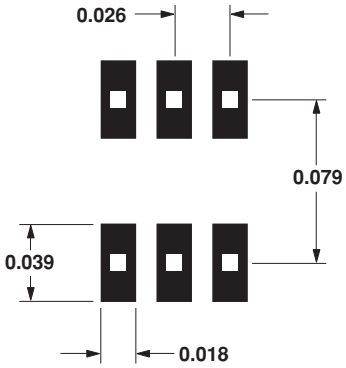
**Outline 63 (SOT-363/SC-70)**




| 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 |

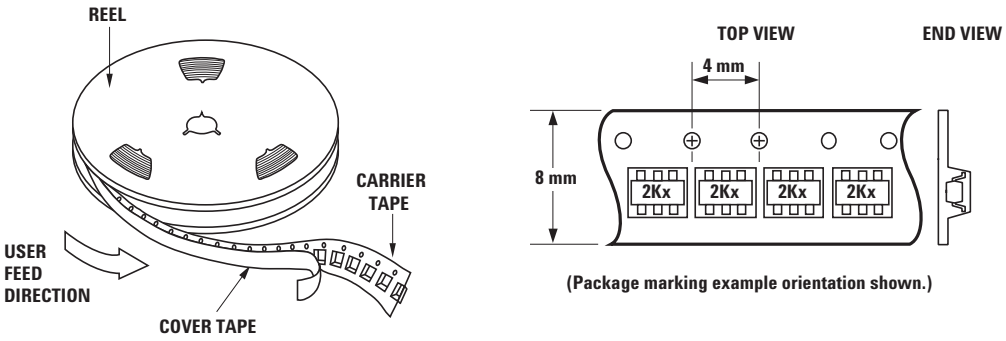
**NOTES:**
1. All dimensions are in mm.
2. Dimensions are inclusive of plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. All specifications comply to EIAJ SC70.
5. Die is facing up for mold and facing down for trim/form, ie: reverse trim/form.
6. Package surface to be mirror finish.

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

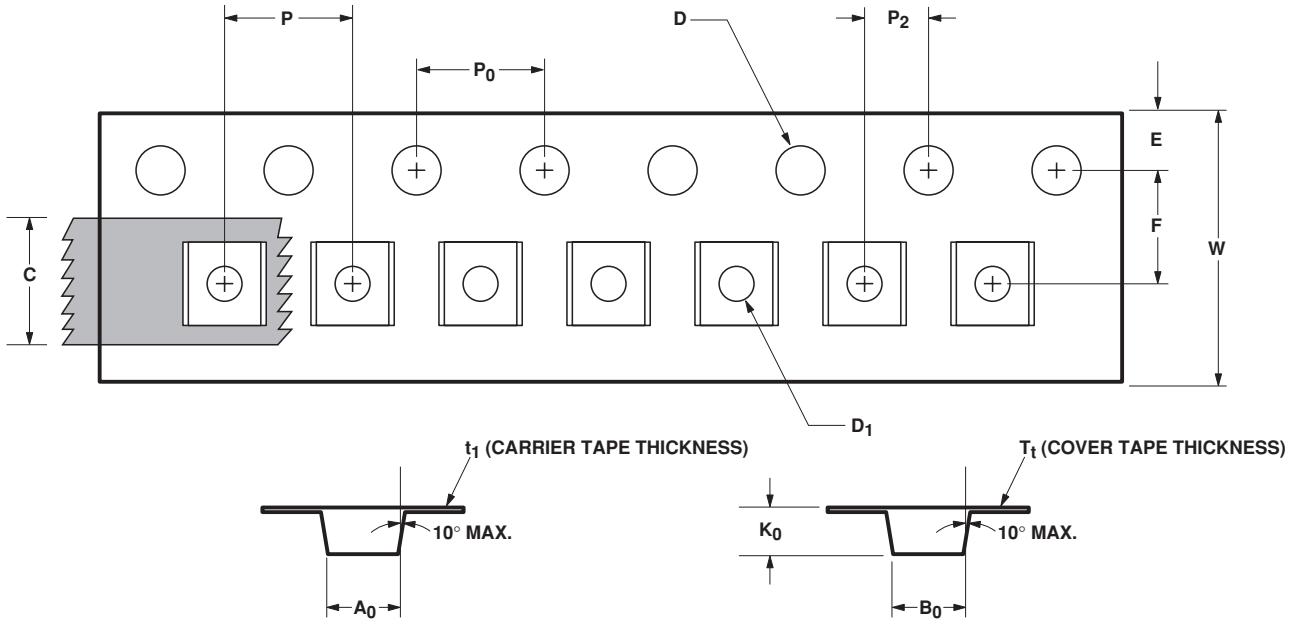



Dimensions in inches.

## 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 + 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.

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

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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.

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Obsoletes 5989-0756EN

December 4, 2004

5989-1969EN



**Agilent Technologies**

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Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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