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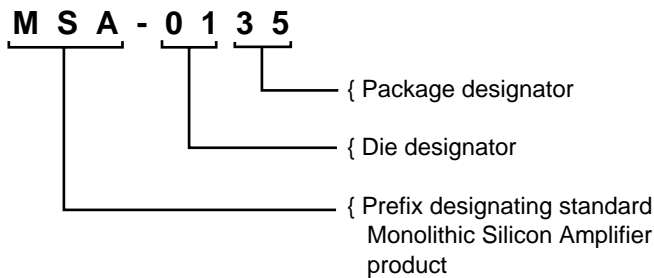
# MODAMP™ MMIC

## Nomenclature

### Application Note S002

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Hewlett-Packard's MODAMP™ series of Monolithic Microwave Integrated Circuits are numbered using a significant numbering system. The user can, therefore, tell a fair amount about the product he or she is using from its name alone. The details of this numbering system are described below.



The prefix “MSA” is used to designate a product that is a “standard” (catalog) Monolithic Silicon Amplifier MMIC. All MSA products are feedback amplifiers consisting of two bipolar transistors connected in Darlington and surrounded by an on-chip network of resistors to provide feedback and biasing.

### Die Geometries

The first two digits following the prefix specify the MODAMP die used in the product. There are presently eleven geometries available:

#### General Purpose

- 01:** low power (+1 dBm), high gain (19 dB), low frequency (dc to 1.2 GHz 3 dB bandwidth), moderate noise figure (5.5 dB)
- 02:** moderate power (+4 dBm), medium gain (12 dB), moderate frequency (dc to 2.5 GHz 3 dB bandwidth), moderate noise figure (6.5 dB)
- 03:** higher power (+10 dBm), medium gain (12 dB), moderate frequency (dc to 2.5 GHz 3 dB bandwidth), moderate noise figure (6 dB)

**Medium Power**

- 04:** up to +19 dBm, moderate gain (8 dB), high frequency (dc to 4 GHz 3 dB bandwidth), moderate noise figure (6.5 dB)
- 05:** up to +26 dBm, moderate gain (8 dB), moderate frequency (50 MHz to 2.8 GHz 3 dB bandwidth), moderate noise figure (6.5 dB)
- 10:** up to +29 dBm, moderate gain (8 dB), moderate frequency (50 MHz to 2.6 GHz 3 dB bandwidth), moderate noise figure (7 dB), 25  $\Omega$  characteristic impedance for push-pull use

**Low Noise**

- 06:** low noise (2.8 dB), lower operating voltage version of 01
- 07:** low noise (4.5 dB), lower operating voltage version of 02
- 20:** low noise (4.3 dB), moderate power (+9 dBm)
- 21:** low noise (3.3 dB), moderate power (+10 dBm), low operating voltage
- 31:** low noise (3.5 dB), moderate power (+9 dBm)

**Special Purpose**

- 08:** minimum feedback design: trades flat frequency response and unconditional stability for gain and high frequency operation (30 dB @ 100 MHz, 10 dB @ 4 GHz); low noise (3 dB), medium power (+12 dBm)
- 09:** ultra broadband (100 MHz to 6 GHz 3 dB bandwidth), medium noise (6 dB), medium power (+11.5 dBm)
- 99:** high gain, open loop design, user selectable external feedback, moderate power (+14.5 dBm)
- 11:** high dynamic range: combines up to +18 dBm power with 3.5 dB noise figure; medium gain (12 dB), moderate frequency (50 MHz to 1.5 GHz 3 dB bandwidth), 50  $\Omega$  or 70  $\Omega$  operation

## Package Description

The third and fourth digits are package specifiers. The package options are:

<b>00:</b>	chip	unpackaged semiconductor die
<b>04:</b>	plastic package	145 mil plastic microstripline, low cost with some sacrifice in high frequency performance
<b>05:</b>	surface mount plastic package	145 mil plastic microstripline, low cost package with leads formed and trimmed for automated assembly; some high frequency performance is lost due to the higher parasitics of the formed lead
<b>10:</b>	100 mil hermetic stripline	100 mil hermetic microstripline package for high reliability, premium performance applications
<b>11:</b>	surface mount SOT-143	Industry standard plastic surface mount low cost package; significant degradation in thermal and high frequency performance due to package conductivity and parasitics
<b>20:</b>	BeO package	200 mil surface mountable microstripline ceramic package with excellent thermal conductivity for higher power applications
<b>23:</b>	BeO flange package	230 mil metal/beryllia flange mount package with excellent thermal conductivity for higher power applications
<b>35:</b>	“micro-X” package	100 mil economical glass sealed surface mountable microstripline package with excellent high frequency characteristics
<b>36:</b>	short lead “micro-X”	100 mil economical glass sealed microstripline package with leads trimmed for automated assembly, excellent high frequency characteristics
<b>70:</b>	70 mil hermetic stripline	70 mil surface mountable gold/alumina hi-rel microstripline package for premium performance applications
<b>85:</b>	“micro plastic” package	85 mil low cost plastic microstripline package with high frequency performance comparable to that of the “micro-X”
<b>86:</b>	surface mount “micro-plastic” package	85 mil low cost surface mountable plastic microstripline package with leads formed and trimmed for automated assembly; some high frequency performance is lost due to the higher parasitics of the formed leads



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Data Subject to Change

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