TELEDYNE
MICROWAVE SOLUTIONS
Everywhereyoulook™

# Voltage-Controlled AGC Amplifier 10 to 500 MHz

## Technical Data

**AGC-553**

### Features

- **Frequency Range: 10 to 500 MHz**
- **MODAMP Silicon Monolithic Gain Stages**
- **AGC Range: 45 dB (Typ)**
- **0 to 5 V Control Voltage**

### Applications

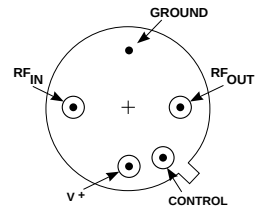
- **Open or Closed Loop Gain Control**
- **Receiver Output Gain Control**
- **Transmitter Output Leveling Control**

### Description

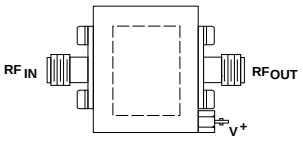
The AGC-553 combines three MMIC RF amplifiers with 44 dB (typ) gain, and PIN diodes with 0 to +5 VDC control voltage for gain control. This amplifier has blocking capacitors which couple the RF signal through the amplifier, and bypass capacitors to filter the bias voltage line.

### Pin Configuration

**TO-8F**




**TC-1**




### Maximum Ratings

| Parameter | Maximum |
|---|---|
| DC Voltage | +17 Volts |
| Continuous RF Input Power | +17 dBm |
| Operating Case Temperature | –55 to +125°C |
| Storage Temperature | –62 to +150°C |
| "R" Series Burn-In Temperature | +125°C |

### Thermal Characteristics[1]

| | |
|---|---|
| $\theta_{JC}$ | 135/135/135°C/W |
| Active Transistor Power Dissipation | 85/85/85 mW |
| Junction Temperature Above Case Temperature | 12/12/12°C |
| MTBF (MIL-HDBK-217E, $A_{UF}$ @ 90°C) | 413,834 Hrs. |

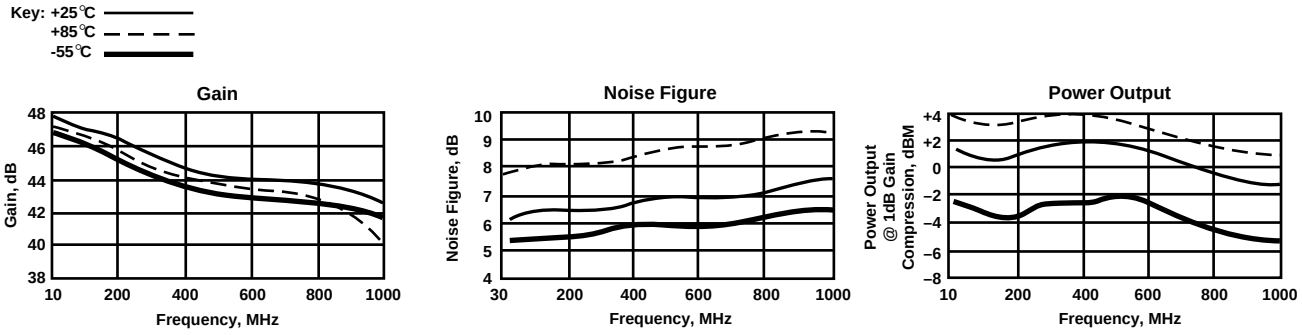
**Weight:** (typical) 2.1 grams

## Electrical Specifications

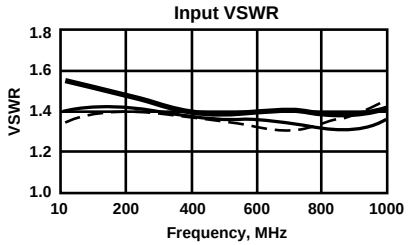
(Measured in 50 Ω system @ +15 VDC nominal unless otherwise noted)

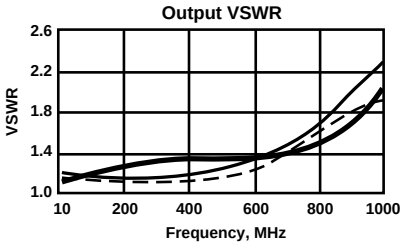
| Symbol | Characteristic | Typical $T_C$ = 25°C | Guaranteed Specifications $T_C$ = 0 to 50°C | Guaranteed Specifications $T_C$ = –55 to +85°C | Unit |
|---|---|---|---|---|---|
| BW | Frequency Range | 10-500 | 10-500 | 10-500 | MHz |
| GP | Small Signal Gain (Min.) | 44 | 40 | 40 | dB |
| — | Gain Flatness, $V_{AGC}$ = 0 to +5 Volts (Max.) | ±2.0 | ±3.0 | ±3.0 | dB |
| — | AGC Range | 45 | — | — | dB |
| NF | Noise Figure, $V_{AGC}$ = 0 (Max.) | 6.0 | 8.0 | 9.0 | dB |
| $P_{1dB}$ | Power Output @ +1 dB Compression $V_{AGC}$ = 0 (Min.) | 0 | –4.0 | –6.0 | dBm |
| — | Input VSWR, $V_{AGC}$ = 0 to +5 Volts (Max.) | 1.5:1 | 2.0:1 | 2.0:1 | — |
| — | Output VSWR, $V_{AGC}$ = 0 to +5 Volts (Max.) | 1.5:1 | 2.0:1 | 2.0:1 | — |
| $IP_3$ | Two Tone 3rd Order Intercept Point | +12.0 | — | — | dBm |
| $IP_2$ | Two Tone 2nd Order Intercept Point | +12.0 | — | — | dBm |
| $HP_2$ | One Tone 2nd Harmonic Intercept Point | +32.0 | — | — | dBm |
| — | Response Time | 25 | — | — | µs |
| VDC | Bias Voltage | +15 | — | — | Volts |
| $I_D$ | Bias Current | 50 | — | — | mA |
| $V_{AGC}$ | AGC Voltage | 0 to +5 | — | — | Volts |
| $I_{AGC}$ | AGC Current | 0 to 12 | — | — | mA |

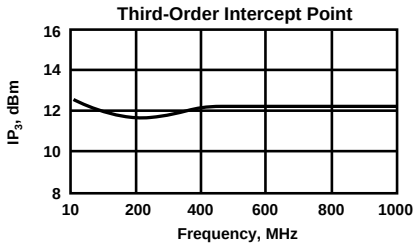
## Typical Performance at 25°C (@ +15 VDC unless otherwise noted)

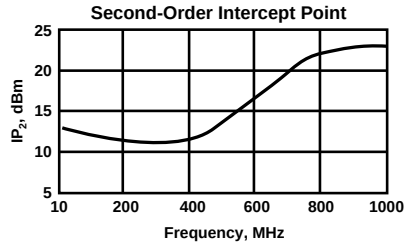


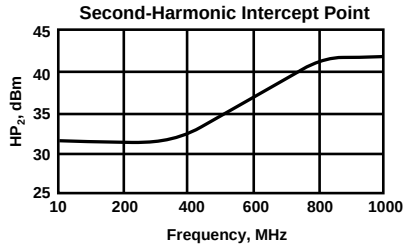
## Typical Performance at 25°C (continued)

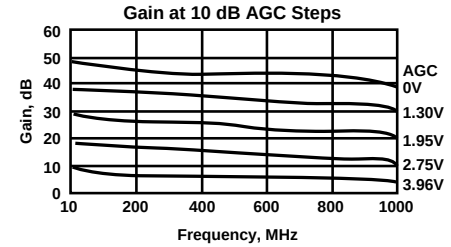


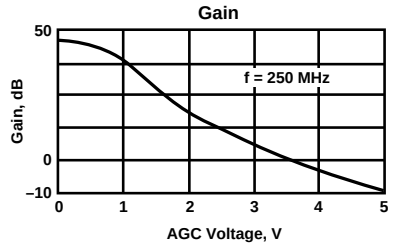



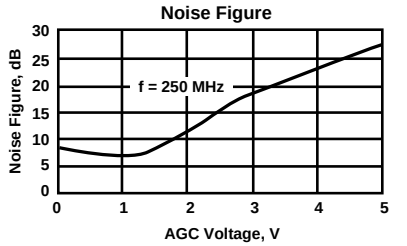



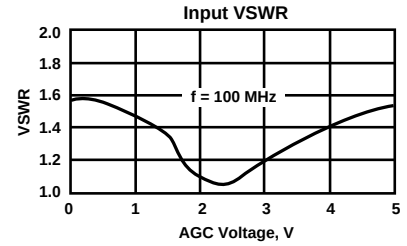



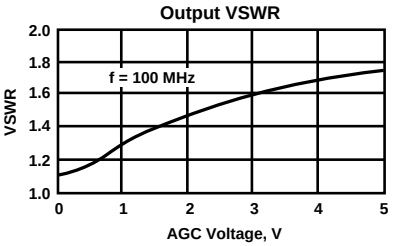



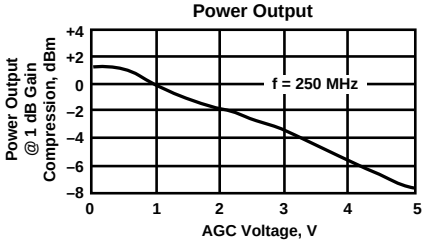



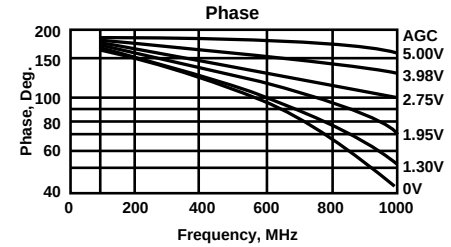



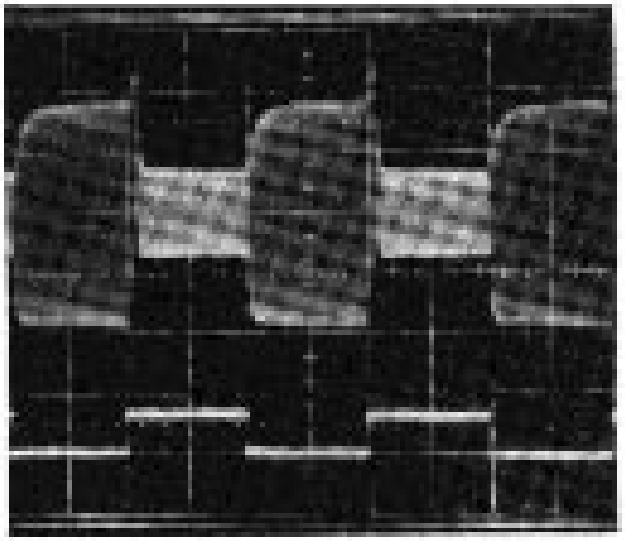



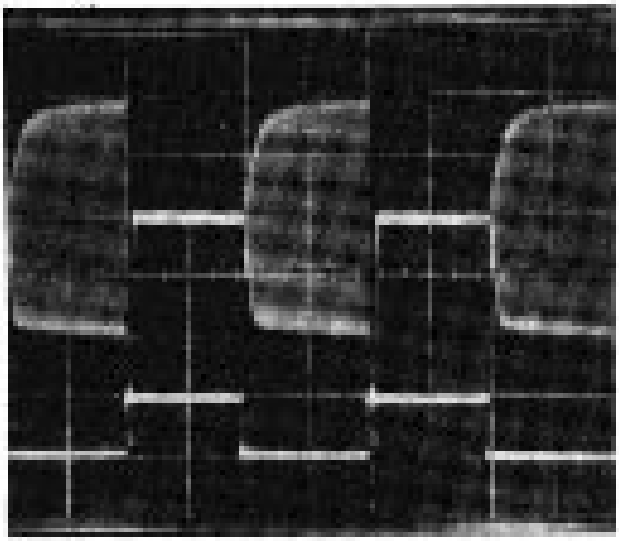
## Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

**S-Parameters** **Bias = 15.00 Volts, Current = 47 mA**

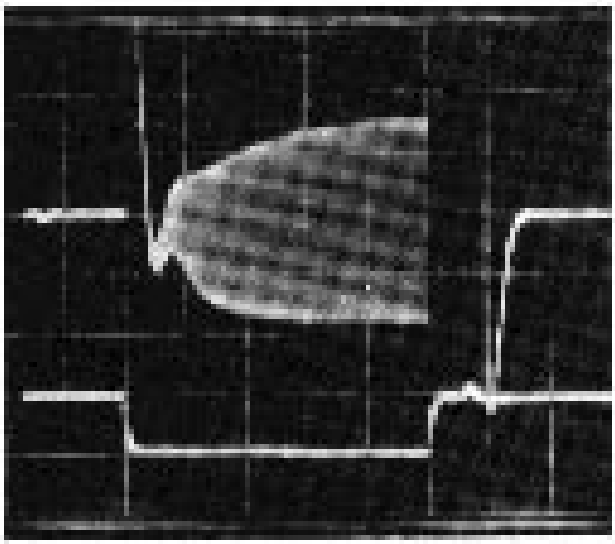
| FREQUENCY | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | |
|---|---|---|---|---|---|---|---|---|
| MHz | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .170 | –1.5 | 46.381 | 150.7 | –77.830 | –77.9 | .051 | 74.7 |
| 150.00 | .178 | –3.0 | 46.125 | 135.3 | –70.117 | 104.4 | .060 | 50.5 |
| 200.00 | .172 | –3.6 | 45.486 | 122.7 | –67.013 | 77.2 | .070 | 33.4 |
| 250.00 | .171 | –5.3 | 44.935 | 110.9 | –65.898 | 93.5 | .074 | 8.2 |
| 300.00 | .157 | –5.6 | 44.021 | 100.4 | –60.433 | 96.5 | .035 | –2.4 |
| 350.00 | .157 | –7.1 | 43.933 | 91.9 | –61.634 | 79.5 | .092 | –2.1 |
| 400.00 | .157 | –11.7 | 43.735 | 80.9 | –61.614 | 89.5 | .095 | –29.8 |
| 450.00 | .155 | –11.5 | 43.520 | 70.4 | –60.694 | 88.1 | .097 | –48.9 |
| 500.00 | .155 | –13.0 | 43.379 | 60.3 | –61.248 | 100.0 | .123 | –92.3 |
| 550.00 | .156 | –14.4 | 43.217 | 50.2 | –58.353 | 100.2 | .123 | –92.3 |
| 600.00 | .151 | –11.8 | 43.058 | 39.8 | –58.173 | 104.1 | .136 | –110.4 |
| 650.00 | .143 | –6.5 | 42.897 | 29.4 | –57.308 | 113.5 | .161 | –127.6 |
| 700.00 | .132 | –4.0 | 42.824 | 18.9 | –56.308 | 112.0 | .196 | –145.2 |
| 750.00 | .122 | –6.2 | 42.785 | 6.6 | –55.176 | 115.3 | .221 | –162.5 |
| 800.00 | .130 | –7.6 | 42.875 | –6.2 | –53.638 | 116.1 | .245 | –176.0 |
| 850.00 | .128 | –8.5 | 42.766 | –20.3 | –53.403 | 115.0 | .298 | 168.8 |
| 900.00 | .131 | –10.0 | 42.617 | –33.6 | –52.473 | 115.8 | .335 | 152.4 |
| 950.00 | .140 | –14.0 | 42.155 | –47.2 | –50.734 | 112.8 | .352 | 136.5 |
| 1000.00 | .157 | –14.0 | 41.886 | –61.1 | –51.425 | 115.7 | .386 | 122.0 |



**Frequency = 100 MHz**
**50 μs/Div.**
**10 dB Gain Change**

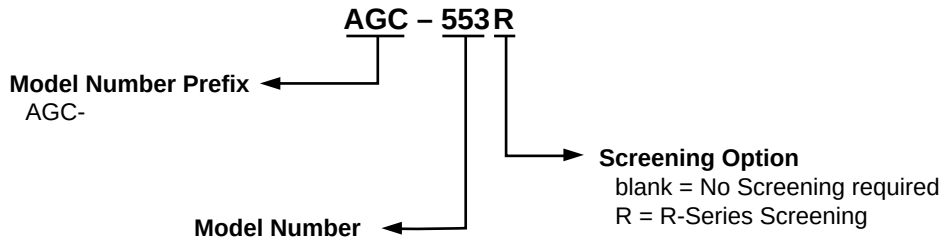


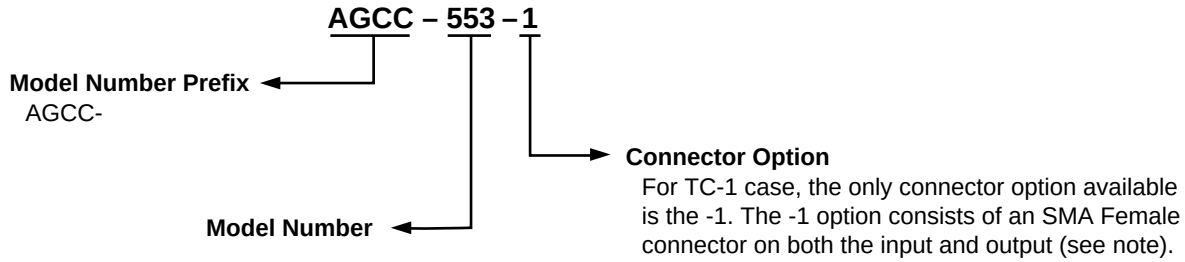
**Frequency = 100 MHz**
**50 μs/Div.**
**Full AGC Voltage**



**Frequency = 100 MHz**
**5 μs/Div.**
**Full AGC Voltage**

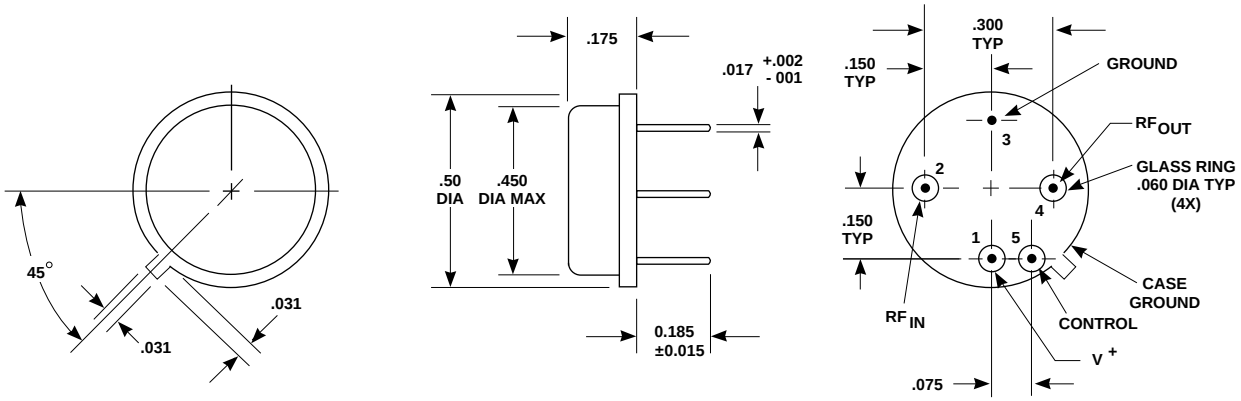
## Product Options




Note: No R-Series screening is available in the TC-1 case as the case is non-hermetic.

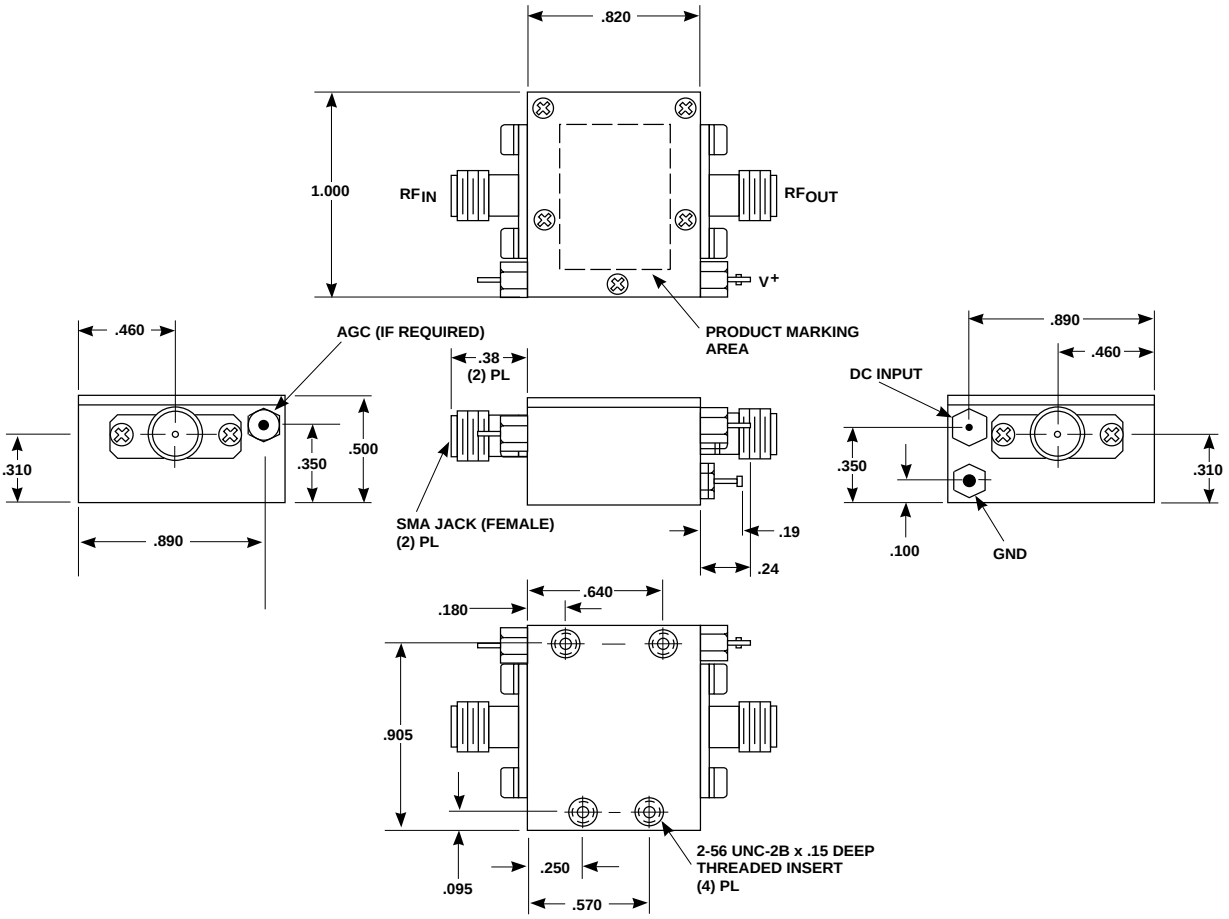
## Case Drawings
## TO-8F




APPROXIMATE WEIGHT 2.1 GRAMS

NOTES (UNLESS OTHERWISE SPECIFIED):
1. DIMENSIONS ARE SPECIFIED IN INCHES
2. TOLERANCES: xx ± .02
   xxx ± .010

## Case Drawings
## TC-1




TYPICAL WEIGHT WITH CONNECTORS = 21.5 GRAMS

NOTES: 1. THE TC-1 CASE IS A NON-HERMETIC CASE.
2. THE ONLY CONNECTOR OPTION AVAILABLE FOR THE TC-1 CASE IS THE –1, SMA FEMALE CONNECTORS AT BOTH INPUT AND OUTPUT PORTS.

**NOTES (UNLESS OTHERWISE SPECIFIED):**
1. **DIMENSIONS ARE SPECIFIED IN INCHES**
2. **TOLERANCES: xx ± .02**
**xxx ± .010**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