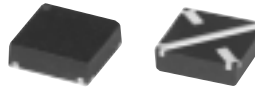


MONOLITHIC AMPLIFIERS

50Ω

BROADBAND DC to 8 GHz

NEW!



LEE

low power, up to +10.9 dBm output

all specifications at 25°C

| MODEL NO. | FREQ. GHz $f_c - f_u$ | GAIN, dB Typical | | | | | | | MAXIMUM POWER (dBm) | | | DYNAMIC RANGE | | VSWR (:1) Typ. | | | | MAX. CURRENT RATING ² I (mA) | DC OPERATING POWER ³ at Pin 3 | | | | THERMAL RESISTANCE ⁴ θ_{jc} Typ. °C/W | CASE STYLE Note B | CONNECTION Qty. (30) | PRICE \$ | |
|-----------|--------------------------|------------------|------|------|------|------|------|------|---------------------|-----------------------------------|----------------|---------------|----------------|----------------|----------------------------------|-----------------------------------|-----------------------------------|--|--|------------------|-----|-----|--|----------------------|-------------------------|----------|------|
| | | 0.1 | 1 | 2 | 4 | 5 | 8 | 10 | Min.@ 2GHz | Output (1 dB Comp.) 2GHz f_u | Input (no dmg) | NF (dB) Typ. | IP3 (dBm) Typ. | In DC-3 GHz | Out 3-f _u ** 3 GHz | DC-3 3-f _u ** 3 GHz | DC-3 3-f _u ** 3 GHz | | Current (mA) Typ. | Device Volt. Min | Max | | | | | | |
| LEE-19 | DC-8 | 12.1 | 12.0 | 12.1 | 12.0 | 11.6 | 10.6 | 9.0 | 9.6 | 10.2 | 11.3 | 15 | 6.5 | 24.5 | 1.5 | 1.2 | 1.4 | 1.8 | 55 | 40 | 3.6 | 3.2 | 4.0 | 322 | FG873 | cb | 1.19 |
| LEE-29 | DC-8 | 15.5 | 15.4 | 15.4 | 14.9 | 14.1 | 12.5 | 10.6 | 13.3 | 10.9 | 11.3 | 15 | 5.5 | 25.5 | 1.4 | 1.3 | 1.3 | 1.6 | 55 | 40 | 3.6 | 3.2 | 4.0 | 334 | FG873 | cb | 1.19 |
| LEE-39 | DC-8 | 21.9 | 21.4 | 20.8 | 18.3 | 16.6 | 13.5 | 10.5 | 18.5 | 10.4 | 11.3 | 13 | 4.5 | 23.4 | 1.3 | 1.4 | 1.3 | 1.6 | 55 | 35 | 3.5 | 3.1 | 3.9 | 321 | FG873 | cb | 1.19 |

see suggested PCB layout PL-126 for LEE models

features

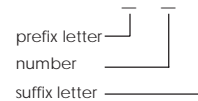
- frequency range, DC to 8 GHz useable to 10 GHz
- up to 17.3 dBm typ. output power
- excellent package for heat dissipation, exposed metal bottom
- flat output power to 10 GHz (LEE-19,-29,-39)

model identification

Model marking:

| | |
|--------|----|
| LEE-19 | 19 |
| LEE-29 | 29 |
| LEE-39 | 39 |
| LEE-49 | 49 |
| LEE-59 | 59 |

¹Prefix letter (optional) designates assembly location.
²Suffix letters (optional) are for wafer identification.

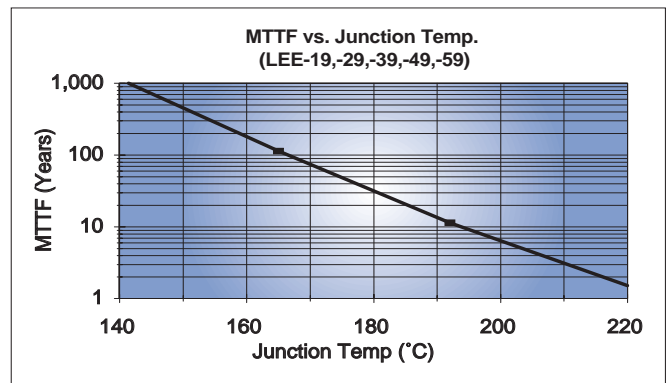


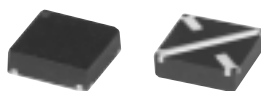
absolute maximum ratings

- operating temperature: -45°C to 85°C
- storage temperature: -65°C to 150°C

NOTES:

- ◆ Aqueous washable
- ** f_u is the upper frequency limit for each model as shown in the table.
- ⊕ Low frequency cutoff determined by external coupling capacitors.
- A. Environmental specifications and re-flow soldering information available in General Information Section.
- B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
- C. Prices and Specifications subject to change without notice.
- D. For Quality Control Procedures see Table of Contents, Section 0, "Mini-Circuits Guarantees Quality" article. For Environmental Specifications see Amplifier Selection Guide.
- 1. Model number designated by alphanumeric code marking.
- 2. Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation.
- 3. Supply voltage must be connected to pin 3 through a bias connector in order to prevent damage. See "Biasing MMIC Amplifiers" in [Mini-circuits.com/application.html](http://www.minicircuits.com/application.html) Reliability predictions and normal operating conditions are applicable at current specified.
- 4. Thermal resistance θ_{jc} is from hottest junction in device to mounting surface of leads.





LEE

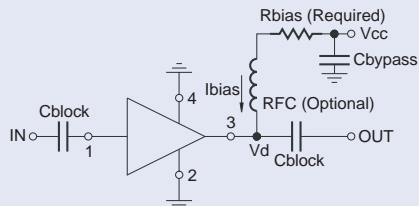
medium power, up to +17.3 dBm output

all specifications at 25°C

| MODEL NO. | FREQ. GHz $f_l - f_u$ | GAIN, dB Typical | | | | | | | | MAXIMUM POWER (dBm) | | | DYNAMIC RANGE | | VSWR (-1) Typ. | | | | MAX. CURRENT RATING ² I (mA) | DC OPERATING POWER ³ at Pin 3 | | | | THERMAL RESIS-TANCE ⁴ θ_{jc} Typ. °C/W | CASE STYLE Note B | CONNECTION | PRICE \$ Qty. (30) |
|-----------|--------------------------|---------------------|------|------|------|------|-----|----|-------------|--------------------------|----------------------|--------------|----------------|----------|-------------------------|----------|-------------------------|-------------------|--|--|-----|-----|-----|---|----------------------|------------|-----------------------|
| | | over frequency, GHz | | | | | | | | Output (1 dB Comp.) 2GHz | Input (no dmg) I_u | NF (dB) Typ. | IP3 (dBm) Typ. | In | | Out | | Device Volt. Max | | | | | | | | | |
| | | 0.1 | 1 | 2 | 4 | 5 | 8 | 10 | Min. @ 2GHz | | | | | DC-3 GHz | 3-f _u ** GHz | DC-3 GHz | 3-f _u ** GHz | Current (mA) Typ. | | Min | Max | Max | | | | | |
| LEE-49 | DC-5 | 14.0 | 13.9 | 14.3 | 14.0 | 13.1 | 7.8 | — | 12.0 | 16.4 | 10.8 | 15 | 5.5 | 33 | 1.6 | 1.2 | 1.4 | 1.4 | 85 | 65 | 4.9 | 4.5 | 5.3 | 229 | FG873 | cb | 1.79 |
| LEE-59 | DC-5 | 20.6 | 20.3 | 19.7 | 15.8 | 13.8 | 7.6 | — | 17.8 | 17.3 | 11.7 | 13 | 4.5 | 33 | 1.5 | 1.5 | 1.5 | 1.6 | 85 | 65 | 4.8 | 4.3 | 5.2 | 244 | FG873 | cb | 1.79 |

see suggested PCB layout PL-126 for LEE models

typical biasing configuration



Test Board includes case, connectors, and components (in bold) soldered to PCB

designers kits available

| KIT No. | No. of Units in KIT | Description | Price \$ per KIT |
|---------|---------------------|---|------------------|
| K1-LEE | 50 | Kit includes 1 test board plus 10 of each: LEE-19,-29,-39,-49,-59 | 99.95 |

R BIAS

"1%" Resistor Values (ohms) for Optimum Biasing of LEE Models

| Vcc | LEE-19 | LEE-29 | LEE-39 | LEE-49 | LEE-59 |
|-----|--------|--------|--------|--------|--------|
| 7 | 88.7 | 88.7 | 107 | 34.8 | 35.7 |
| 8 | 113 | 113 | 133 | 48.7 | 49.9 |
| 9 | 137 | 137 | 162 | 63.4 | 64.9 |
| 10 | 162 | 162 | 191 | 78.7 | 80.6 |
| 11 | 187 | 187 | 221 | 95.3 | 95.3 |
| 12 | 215 | 215 | 249 | 110 | 110 |
| 13 | 237 | 237 | 280 | 127 | 127 |
| 14 | 261 | 261 | 309 | 140 | 143 |
| 15 | 287 | 287 | 340 | 158 | 158 |
| 16 | 309 | 316 | 365 | 174 | 174 |
| 17 | 332 | 340 | 392 | 191 | 191 |
| 18 | 357 | 365 | 422 | 205 | 205 |
| 19 | 383 | 392 | 453 | 221 | 221 |
| 20 | 412 | 412 | 475 | 232 | 237 |

pin connections

| PORT | cb |
|------------|--------|
| RF IN | 1 |
| RF OUT | 3 |
| DC | 3 |
| GND EXT. | 2,4 |
| DEMO BOARD | LEE-TB |



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