

components, but particularly in the manufacture of power amplifiers. The company has developed proprietary techniques for mapping thermal profiles of FETs mounted on circuits. This technique provides information on the quality of the die attach on the completed circuit, prior to installation in the case.

Junction temperature measurement techniques also available include:

- **Infra-Red Microscope**
- **Electro-Fluorescent Fiber-Optic Probe**
- **Liquid Crystal**

Reliability and reproducibility are increased through the amplifier alignment technique of removing or changing bonds, rather than adding tuning elements. The circuit construction consists of an all-gold metal system on alumina substrates.

To achieve the highest level of reliability under operational conditions, all military products are screened to the Table I requirements. This 100% screening is based on MIL-STD-883 testing requirements.

| <b>Table I</b><br><b>MIL-STD-883</b> |               |                                           |
|--------------------------------------|---------------|-------------------------------------------|
| <b>Test</b>                          | <b>Method</b> | <b>Test Condition</b>                     |
| Pre-Cap Visual Inspection            | 2017          | Modified, QA Doc 950501                   |
| Vacuum Bake/<br>Weld Seal            | 1008          | B, 16 hrs @ +125°C<br>inert atmosphere    |
| Temperature<br>Cycling               | 1010          | -55°C to +95°C<br>30 min. cycles, 5 times |
| Pre Burn-In<br>Electrical Test       |               | Celeritek GTP                             |
| Burn-In                              | 1015          | B, 48 hrs @ +85°C                         |
| Post Burn-In<br>Electrical Test      |               | Celeritek GTP                             |
| Seal Test                            | 1014          | A and C                                   |
| Final Electrical<br>Test             |               | Celeritek GTP                             |
| Final QA<br>External Visual          | 2009          | Celeritek 950502                          |

For those customers and programs requiring full compliance to MIL-STD-883 screening, Celeritek offers additional screening to Table II requirements as an option.

In addition to these standard screening programs, custom screening procedures for specific customer requirements are available.

Celeritek products are designed and manufactured to meet the testing requirements of MIL-E-5400 (airborne), MIL-E-16400 (shipboard) and the EMI requirements of MIL-STD-461.

| <b>Table II</b><br><b>MIL-STD-883</b> |               |                                       |
|---------------------------------------|---------------|---------------------------------------|
| <b>Test</b>                           | <b>Method</b> | <b>Test Condition</b>                 |
| Stabilization<br>Bake                 | 1008          | B, 24 hrs @ +150°C                    |
| Temperature<br>Cycling                | 1010          | B, -65°C to +150°C<br>10 cycles       |
| Acceleration                          | 2001          | B, 5K gs, Y1 axis                     |
| Burn-In                               | 1015          | B, 160 hrs @ +125°C                   |
| Fine Leak                             | 1014          | A1 1 x 10 <sup>-7</sup> atm cc/sec He |

## PRODUCT SPECIFICATIONS

Specification sheets describing standard products and special capabilities are available.

- **GaAs FETs and MMICs**
- **0.5 to 8.0 GHz Low-Noise Amplifiers**  
0.5-4 GHz • 2-4 GHz • 2-6 GHz • 2-8 GHz • 4-8 GHz
- **2.0 to 8.0 GHz Power Amplifiers**  
2-4 GHz • 2-6 GHz • 2-8 GHz • 4-8 GHz
- **2.0 to 18 GHz Low-Noise Amplifiers**  
2-18 GHz • 6-13 GHz • 6-18 GHz • 8-18 GHz
- **6.0 to 18.0 GHz Power Amplifiers**  
6-13 GHz • 6-18 GHz • 8-18 GHz
- **18 to 40 GHz Amplifiers**  
18-26 GHz • 18-40 GHz • 26-40 GHz
- **Connectorless (Drop-In) Amplifiers**  
0.5-4 GHz • 2-6 GHz • 2-8 GHz • 4-16 GHz • 6-18 GHz
- **Microwave Front Ends for  
Commercial Communications**
- **Microwave Integrated Assemblies for  
Military Applications**

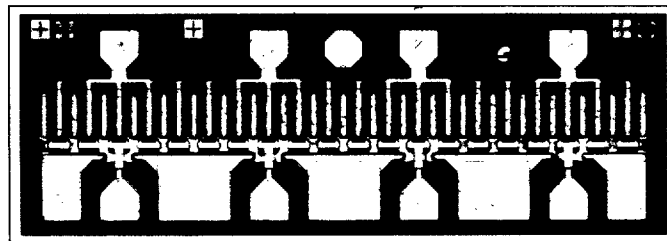
## CUSTOMER SERVICE

Through its *quality, reliability, service and value* (QRSV) philosophy, Celeritek is committed to providing the highest level of professional and technical service to our customers. This begins with timely quoting and ends with on-time delivery of reliable hardware which meets or exceeds performance specifications. Celeritek personnel are available to support program review meetings, provide ATP's, QTP's, and support other program management functions required by our customers.

The company believes it offers the technology, fast response time, quality, facilities, people and service to meet the requirements of the military and commercial electronics industry. The marketing and engineering staffs look forward to working with you.

T-31-25

- ❑ 0.3-micron GaAs MESFETs for Discrete Devices and MMICs
- ❑ High Gain: Up to 40 GHz
- ❑ Up to +28 dBm P<sub>1</sub> dB at 18 GHz
- ❑ Military High-Rel Screening
- ❑ 2-6 GHz MMIC Amplifiers with Low DC Current or Medium Power
- ❑ DC to 18 GHz MMIC SPDT with High Isolation/Low Insertion Loss
- ❑ 2-20 GHz Distributed Amplifier MMICs



### CELERITEK GaAs FETs and MMICs

Celeritek GaAs FET and MMIC chips are fabricated from wafers that have ion-implanted or epitaxial active layers. Epitaxy can be from MBE, VPE or MOCVD processes. The gate structure is sub 1/2 micron long and refractory metals are

used. The resistors for the MMIC are active GaAs layers. For crossovers, air bridges are utilized. For good grounding, via hole technology is applied. Silicon Nitride is utilized as the dielectric of the MIM capacitor and as the surface protection and passivation.

### Low-Noise and General Purpose GaAs FETs

Typical Specifications at 25° C

| Model    | Frequency Range (GHz) | Gate Width (μm) | Test Frequency (GHz) | Noise Figure (dB) | Associated Gain (dB) | Power Output @ 1dB Compression (+dBm) | Material Type | Package  |
|----------|-----------------------|-----------------|----------------------|-------------------|----------------------|---------------------------------------|---------------|----------|
| CF001-01 | 1-26                  | 300             | 12                   | 1.6               | 8.5                  | 19                                    | I/I           | Chip/A/B |
| CF001-02 | 1-26                  | 300             | 12                   | 1.2               | 9.5                  | 17                                    | EPI           | Chip/A/B |
| CF001-03 | 1-40                  | 300             | 12                   | 0.8               | 10.5                 | 17                                    | HEMT          | Chip/A/B |
| CF003-01 | 1-26                  | 600             | 12                   | 1.8               | 8.0                  | 22                                    | I/I           | Chip     |
| CF003-02 | 1-26                  | 600             | 12                   | 1.4               | 9.0                  | 20                                    | EPI           | Chip/A/B |
| CF003-03 | 1-26                  | 600             | 12                   | 1.0               | 10.0                 | 20                                    | HEMT          | Chip/A/B |
| CF004-01 | 1-40                  | 150             | 18                   | 2.2               | 7.5                  | 15                                    | I/I           | Chip     |
| CF004-02 | 1-40                  | 150             | 18                   | 1.8               | 9.0                  | 13                                    | EPI           | Chip     |
| CF004-03 | 1-40                  | 150             | 18                   | 1.5               | 10.0                 | 13                                    | HEMT          | Chip     |

### Medium-Power GaAs FETs

Typical Specifications at 25° C

| Model    | Frequency Range (GHz) | Gate Width (μm) | Test Frequency (GHz) | Associated Gain (dB) | Power Output @ 1dB Compression (+dBm) | Material Type | Package  |
|----------|-----------------------|-----------------|----------------------|----------------------|---------------------------------------|---------------|----------|
| CF003-01 | 1-20                  | 600             | 12                   | 9.0                  | 22.0                                  | I/I           | Chip/C   |
| CF003-02 | 1-20                  | 600             | 12                   | 10.0                 | 20.0                                  | EPI           | Chip/A/B |
| CF003-03 | 1-20                  | 600             | 12                   | 11.0                 | 20.0                                  | HEMT          | Chip/A/B |
| CF005-01 | 1-18                  | 1200            | 12                   | 8.5                  | 25.0                                  | I/I           | Chip/C   |
| CF005-11 | 1-18                  | 1200            | 12                   | 7.0                  | 27.0                                  | I/I           | Chip/C   |
| CF005-21 | 1-18                  | 1200            | 12                   | 6.5                  | 27.0                                  | I/I           | Chip/C   |
| CF010-01 | 1-18                  | 2400            | 12                   | 8.0                  | 28.0                                  | I/I           | Chip/C   |

### Dual-Gate GaAs FETs

Typical Specifications at 25° C

| Model    | Frequency Range (GHz) | Gate Width (μm) | Test Frequency (GHz) | Noise Figure (dB) | Associated Gain (dB) | Power Output @ 1dB Compression (+dBm) | Material Type | Package |
|----------|-----------------------|-----------------|----------------------|-------------------|----------------------|---------------------------------------|---------------|---------|
| CF007-01 | 1-26                  | 300             | 12                   | 2.2               | 12.0                 | 16.0                                  | I/I           | Chip    |

**CELERITEK**