



Q2 2023

New Releases



Connecting  Mini-Circuits & Israel

 Mini-Circuits®

ADAPTERS 3

AMPLIFIERS 3

High-Frequency Amplifiers 3

Low Noise Amplifiers 3

MMIC Amplifiers..... 4

High Power Amplifiers 4

ATTENUATORS 4

BIAS TEES 4

COUPLERS 5

DC BLOCKS 5

FILTERS 5

Cavity Band Pass Filters..... 5

LTCC Low Pass Filters..... 5

LTCC High Pass Filters..... 6

MIXERS 6

MULTIPLIERS 6

SPLITTER/COMBINERS 6

TERMINATIONS 7

TEST SOLUTIONS 7

Signal Distribution..... 7

Switching Systems..... 7

Programmable Attenuators 7

Mounting Kits..... 7

THRU LINES 8

TRANSFORMERS 8

ISM RF & MW ENERGY 9

2.4 GHz Solutions..... 9

27 MHz Solutions 10

CORE TECHNOLOGIES 11

Adapters



| Model Number | Conn. 1 | Conn. 2 | F Low (GHz) | F High (GHz) | VSWR (:1) Typ. |
|--------------|---------------|---------------|-------------|--------------|----------------|
| 10F-10F+ | 1.0mm-Female | 1.0mm-Female | DC | 110 | 1.07 |
| 10F-10M+ | 1.0mm-Female | 1.0mm-Male | DC | 110 | 1.10 |
| 10M-10M+ | 1.0mm-Male | 1.0mm-Male | DC | 110 | 1.06 |
| 10F-185F+ | 1.0mm-Female | 1.85mm-Female | DC | 67 | 1.10 |
| 10F-185M+ | 1.0mm-Female | 1.85mm-Male | DC | 67 | 1.09 |
| 10M-185F+ | 1.0mm-Male | 1.85mm-Female | DC | 67 | 1.08 |
| 10M-185M+ | 1.0mm-Male | 1.85mm-Male | DC | 67 | 1.06 |
| KF-SF50+ | 1.85mm-Female | SMA-Female | DC | 18 | 1.06 |

Amplifiers



High-Frequency Amplifiers

| Model Number | Freq. Range (MHz) | Gain (dB) | NF (dB) | P1dB (dBm) | OIP3 (dBm) | Voltage (V) | DC Current (mA) | Connector Type | Heat Sink |
|---------------|-------------------|-----------|---------|------------|------------|-------------|-----------------|----------------|-----------|
| ZVA-50953GX+ | 50000-95000 | 28 | - | 17 | - | 10 | 370 | 1.0mm | No |
| ZVA-50953G+ | 50000-95000 | 28 | - | 17 | - | 10 | 370 | 1.0mm | Yes |
| ZVA-5803X+ | 500-80000 | 17 | 5 | 10 | 23 | 10 | 130 | 1.0mm | No |
| ZVA-24443G1X+ | 24000-43500 | 45 | 1.7 | 20 | 27 | 15 | 160 | 2.92mm | No |
| ZVA-24443G1+ | 24000-43500 | 45 | 1.7 | 20 | 27 | 15 | 160 | 2.92mm | Yes |
| ZVA-02443HPX+ | 2000-43500 | 37 | 5 | 17 | 25 | 15 | 280 | 2.92mm | No |
| ZVA-02443HP+ | 2000-43500 | 37 | 5 | 17 | 25 | 15 | 280 | 2.92mm | Yes |

Low Noise Amplifiers

| Model Number | Freq. Range (MHz) | Gain (dB) | NF (dB) | P1dB (dBm) | OIP3 (dBm) | Voltage (V) | DC Current (mA) | Connector Type | Heat Sink |
|--------------|-------------------|-----------|---------|------------|------------|-------------|-----------------|----------------|-----------|
| ZX60-14LN-S+ | 50-10000 | 22 | 1.5 | 21 | 32 | 6 | 72 | SMA | No |
| ZX60-83MP-S+ | 400-8000 | 20 | 3.2 | 27 | 40 | 8 | 144 | SMA | No |

MMIC Amplifiers

| Model Number | Freq. Range (MHz) | Gain (dB) | NF (dB) | P1dB (dBm) | OIP3 (dBm) | Voltage (V) | DC Current (mA) |
|---------------|-------------------|-----------|---------|------------|------------|-------------|-----------------|
| PMA3-15453+ | 15000-45000 | 17 | 3.2 | 17 | 25 | 5 | 128 |
| PMA3-24323LN+ | 24000-32000 | 17 | 2.8 | 17 | 24 | 5 | 128 |
| AVA-0233LN+ | 2000-30000 | 17 | 2.2 | 13.5 | 25.7 | 5 | 65 |
| AVA-2183+ | 2000-20000 | 16.4 | 5.2 | 19.3 | 24.7 | 4 | 210 |
| AVA-5R183+ | 500-18000 | 14.4 | 3.4 | 16.8 | 27.9 | 5 | 85 |
| AVA-183MP+ | 50-18000 | 16.5 | 1.8 | 23.8 | 31.1 | 8 | 160 |
| PMA2-252LNA+ | 1500-2500 | 17.6 | 0.8 | 17.8 | 30 | 4 | 57 |
| PMA2-162LNA+ | 700-1600 | 22.7 | 0.5 | 20 | 30 | 4 | 55 |

High Power Amplifiers

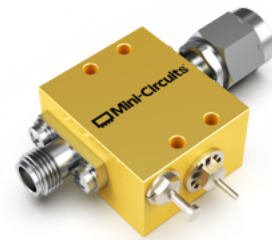
| Model Number | Freq. Range (MHz) | Gain (dB) | NF (dB) | P1dB (dBm) | OIP3 (dBm) | Voltage (V) | DC Current (mA) | Connector Type | Heat Sink |
|-----------------|-------------------|-----------|---------|------------|------------|-------------|-----------------|----------------|-----------|
| ZHL-10M4G21W0+ | 10-4200 | 37 | 6 | 32 | 44 | 28 | 800 | SMA | Yes |
| ZHL-10M4G21W0X+ | 10-4200 | 37 | 6 | 32 | 44 | 28 | 800 | SMA | No |
| ZHL-50W-GAN+ | 20-500 | 43.5 | 7 | 48 | 55 | 28 | 7400 | SMA | Yes |
| ZHL-50W-GANX+ | 20-500 | 43.5 | 7 | 48 | 55 | 28 | 7100 | SMA | No |

Attenuators



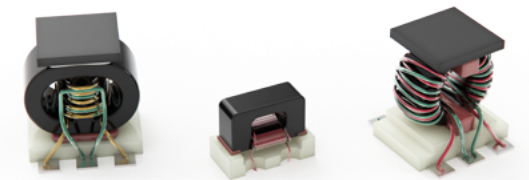
| Model Number | Freq. Range (MHz) | Attenuation (dB) | Flatness (dB) | VSWR (:1) | Input Power Max. (W) | Connector Type |
|--------------|-------------------|------------------|---------------|-----------|----------------------|----------------|
| BW-20N250W+ | DC-8000 | 20 | 0.5 | 1.14 | 250 | N |
| BW-30N250W+ | DC-8000 | 30 | 0.4 | 1.11 | 250 | N |
| BW-40N250W+ | DC-8000 | 40 | 0.7 | 1.1 | 250 | N |

Bias Tees



| Model Number | Freq. Range (MHz) | Input Current (mA) Max. | RF Power Max. (dBm) | Insertion Loss (dB) | DC Port Isolation (dB) | VSWR (:1) | Connector Type |
|--------------|-------------------|-------------------------|---------------------|---------------------|------------------------|-----------|----------------|
| ZBT-K44-FT+ | 10 to 40000 | 20 | 30 | 0.5 | 1.14 | 250 | 2.92mm |

Couplers



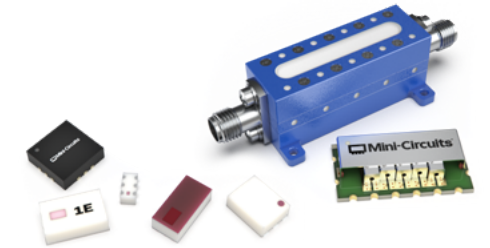
| Model Number | Impedance (Ω) | Freq. Range (MHz) | Coupling (dB) | Mainline Loss (dB) | Directivity (dB) | VSWR (:1) | Power Input Max. (W) | Type | Construction |
|-----------------|---------------|-------------------|---------------|--------------------|------------------|-----------|----------------------|-------------|--------------|
| RDC-20-232-75X+ | 75 | 5-2350 | 20 | 0.65 | 20 | 1.2 | 1 | Directional | Transformer |

DC Blocks



| Model Number | Freq. Range (MHz) | Insertion Loss (dB) | Return Loss (dB) | Connector Type |
|--------------|-------------------|---------------------|------------------|----------------|
| BLK-18W-N+ | 10-18000 | 0.24 | 25.7 | N-Type |

Filters



Cavity Band Pass Filters

| Model Number | Passband (MHz) | Stopband F3 (MHz) | Rejection @ F3 (dB) | Stopband F4 (MHz) | Rejection @ F4 (dB) | Connector Type |
|---------------|----------------|-------------------|---------------------|-------------------|---------------------|----------------|
| ZVBP-K22R5G+ | 22000-23000 | DC - 21400 | 25 | 23600 - 40000 | 23 | 2.92mm |
| ZVBP-16R3G-S+ | 15900-16700 | DC - 14700 | 58 | 17400 - 28000 | 39 | SMA |
| ZVBP-3R25G-S+ | 3000-3500 | DC - 2850 | 16 | 3650 - 7800 | 16 | SMA |
| ZVBP-3100A-S+ | 3020-3180 | DC - 2960 | 39 | 3198 - 6500 | 39 | SMA |

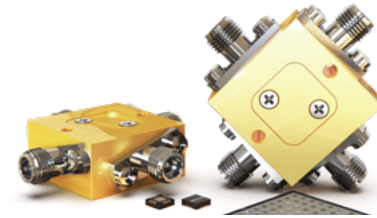
LTCC Low Pass Filters

| Model Number | Passband F1 (MHz) | Passband F2 (MHz) | Stopband F3 (MHz) | Rejection @ F3 (dB) | Stopband F4 (MHz) | Rejection @ F4 (dB) | DC Current (mA) | Connector Type | Heat Sink |
|--------------|-------------------|-------------------|-------------------|---------------------|-------------------|---------------------|-----------------|----------------|-----------|
| LFCV-2202+ | DC | 22000 | 29800-42000 | 40 | 42000-51000 | 25 | 72 | SMA | No |
| LFCV-2002+ | DC | 20000 | 25800-40000 | 36 | 40000-50000 | 25 | 144 | SMA | No |
| LFCG-2275+ | DC-2275 | 2700 | 3300-7000 | 45 | 7000-10000 | 25 | 72 | SMA | No |

LTCC High Pass Filters

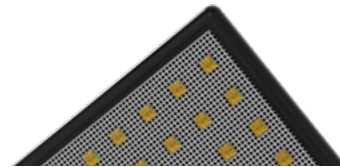
| Model Number | Passband F1 (MHz) | Passband F2 (MHz) | Stopband F3 (MHz) | Rejection @ F3 (dB) | Stopband F4 (MHz) | Rejection @ F4 (dB) | Case Style |
|--------------|-------------------|-------------------|-------------------|---------------------|-------------------|---------------------|------------|
| HFCN-2502+ | 25000 | 57000 | 100-10400 | 20.9 | 10500-19200 | 17.2 | 1206 |
| HFCV-2002+ | 19600 | 47000 | 100-8000 | 21.9 | 8100-15000 | 17.8 | 1210 |
| HFCU-1382+ | 14300-29000 | 13500 | DC-8000 | 53 | 8000-10800 | 32 | 1812 |
| HFCG-3250+ | 3650-16500 | 3250 | DC-2000 | 44 | 2000-2500 | 39 | 0805 |
| HFCG-2500+ | 2700-14500 | 2500 | DC-1550 | 48 | 1550-1950 | 30 | 0805 |
| HFCG-1780+ | 1980-11000 | 1780 | DC-1100 | 50 | 1100-1400 | 33 | 0805 |
| HFCG-1630+ | 1850-11000 | 1630 | DC-1000 | 49 | 1000-1300 | 33 | 0805 |
| HFCG-1230+ | 1400-8000 | 1230 | DC-850 | 44 | 850-1000 | 32 | 0805 |

IQ Mixers



| Model Number | interface | RF/LO Freq. Range (MHz) | IF Freq. Range (MHz) | LO Power (dBm) | Conv. Loss (dB) | L-R Iso. (dB) | L-I Iso. (dB) | IIP3 (dBm) | IP1dB (dBm) |
|--------------|-----------|-------------------------|----------------------|----------------|-----------------|---------------|---------------|------------|-------------|
| ZMIQ-653H-E+ | Connector | 18000-65000 | DC-20000 | 18 | 14 | 42 | 33 | 25 | 10 |
| SMIQ-653H-D+ | Die | 18000-65000 | DC-20000 | 18 | 10.9 | 47 | 32 | 26 | 10 |
| SMIQ-6243H+ | SMT | 6000-24000 | DC-6000 | 18 | 8.6 | 41 | 43 | 25 | 10 |

Multipliers



| Model Number | Interface | Multiply Factor [X] | Input Freq. Range (MHz) | Output Freq. Range (MHz) | RF Input Power Range (dBm) | Conv. Loss (dB) | F1 Fundamental Suppression Below F[X] (dBc) | F[X-1] Suppression Below F[X] (dBc) | F[X+1] Suppression Below F[X] (dBc) |
|--------------|-----------|---------------------|-------------------------|--------------------------|----------------------------|-----------------|---|-------------------------------------|-------------------------------------|
| CY3-64-D+ | Die | 3 | 10000-20000 | 30000-60000 | 12-19 | 21 | 30 | 33 | 42 |

Splitter/Combiners



| Model Number | Connector Type | No. of Ways | Freq. Range (MHz) | Isolation (dB) | Insertion Loss (dB) | Phase Unbalance (deg) | Amplitude Unbalance (dB) | Power Input (W) as Splitter, Max. | DC Pass? | Technology |
|---------------|----------------|-------------|-------------------|----------------|---------------------|-----------------------|--------------------------|-----------------------------------|----------|------------|
| ZC3PD-E18673+ | 1.85mm | 3 | 18000-67000 | 36 | 1.8 | 6 | 0.4 | 12 | Yes | Stripline |

Terminations



| Model Number | Connector Type | Impedance (Ω) | Freq. Range (MHz) | Input Power (W), Max. | VSWR (:1) |
|----------------|----------------|---------------|-------------------|-----------------------|-----------|
| TERM-250W-83N+ | N-Male | 50 | DC-8000 | 36 | 1.09 |

Test Solutions



Signal Distribution

| Model Number | No. of Channels | Freq. Range (MHz) | Input Power Max. (W) | Housing | Connector Type |
|----------------|-----------------|-------------------|----------------------|---------------|----------------|
| ZT-16HPS-63W-S | 16 | 700-6000 | 100 | 19" x 2U Rack | SMA/N |
| ZT-20HPS-63-S+ | 20 | 2500-6000 | 100 | 19" x 2U Rack | SMA/N |

Switching Systems

| Model Number | Switch Configuration | Switch Technology | Freq. Range (MHz) | Housing | Connector Type | Control Interface |
|-----------------|----------------------|-------------------|-------------------|---------------------------------------|----------------|-------------------------|
| USB-1SP4T-A673+ | 1 x SP4T | Solid State | 100-67000 | Compact Module (5.22 x 0.98 x 0.86") | 1.85mm | USB/Dynamic Daisy Chain |
| ZTM-4SP8T-26 | 4 x SP8T | Electromechanical | DC-26500 | 19", 3U Rack Mount Chassis | SMA | USB/Ethernet |
| RCM-3SP4T-18 | 3 x SP4T | Electromechanical | DC-18000 | Benchtop Module (8.25 x 8.25 x 4.25") | SMA | USB/Ethernet |
| RCM-6SPDT-18 | 6 x SPDT | Electromechanical | DC-18000 | Benchtop Module (8.25 x 8.25 x 4.25") | SMA | USB/Ethernet |
| ZTS-1SP80T-63H | 1 x SP80T | Solid State | 10-6000 MHz | 19", 2U Rack Mount Chassis | SMA | USB/Ethernet |

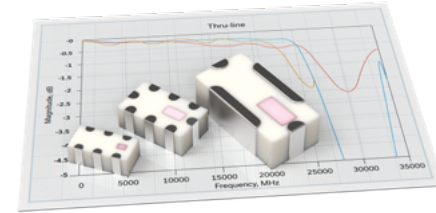
Programmable Attenuators

| Model Number | Connector Type | Freq Range (MHz) | Attenuation Range (dB) | Step Size (dB) | Attenuation Accuracy (dB) | Input Power (dBm), Max. | IP3 (dB) | Control Interface |
|--------------|----------------|------------------|------------------------|----------------|---------------------------|-------------------------|----------|-------------------|
| RCDAT-44G-63 | 2.92mm | 100-43500 | 0-63 | 0.5 | 1.0 | 28 | 50 | USB & Ethernet |

Mounting Kits

| Model Number | Description |
|--------------|--|
| RKT-RC4DAT | 19"(W) x 3U(H) rack mounting kit for 8 x RC4DAT-6G-Series programmable attenuators |
| RKT-RC4DAT-2 | 19"(W) x 1U(H) rack mounting kit for 2 x RC4DAT-8G-95 programmable attenuators |

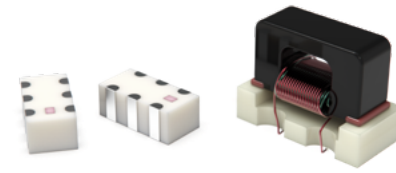
Thru lines



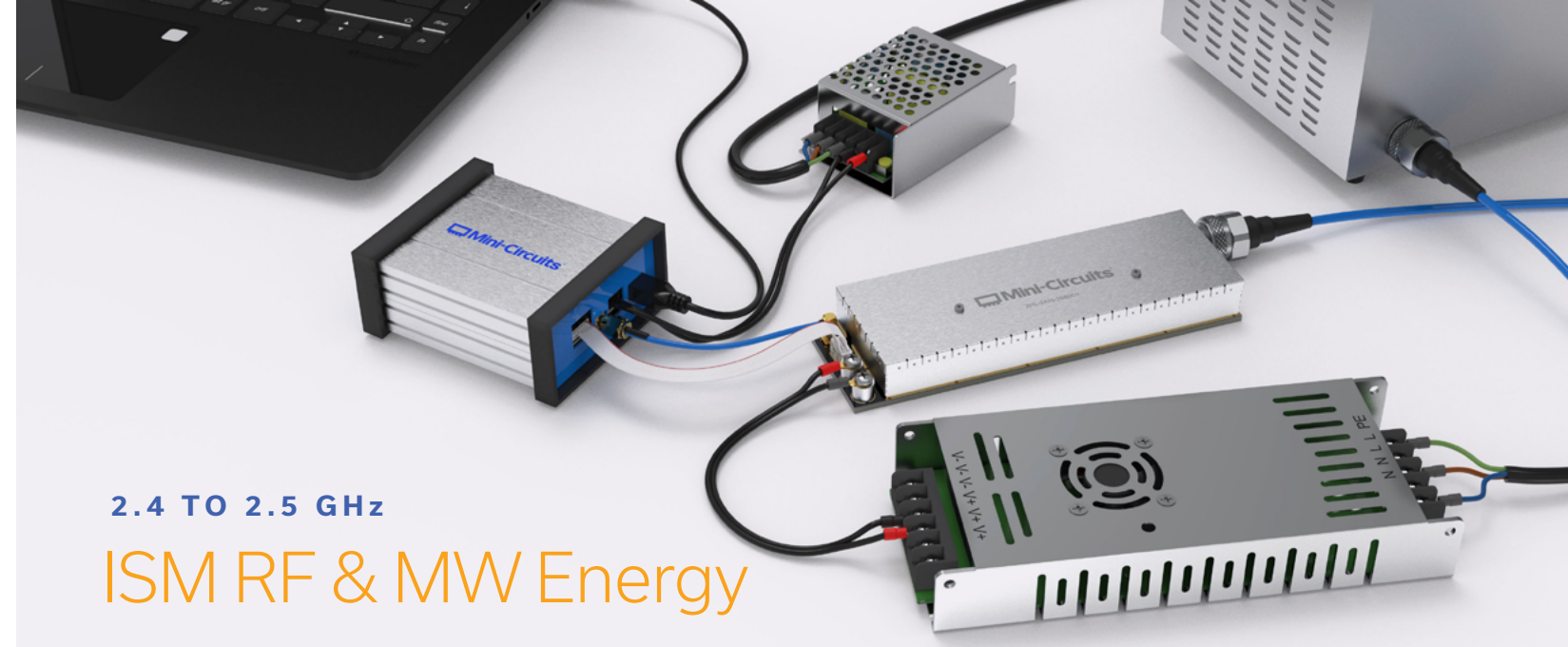
LTCC Thru Lines

| Model Number | Frequency Range (MHz) | Insertion Loss (dB) | Return Loss (dB) | technology | impedance |
|--------------|-----------------------|---------------------|------------------|------------|-----------|
| TPCG-183+ | DC-18000 | 0.5 | 10 | LTCC | 50 |
| TPCW-233+ | DC-23000 | 0.5 | | LTCC | 50 |

Transformers



| Model Number | Single-Ended to Single-Ended | Single-Ended to Balanced | Balanced to Balanced | Center Tap | DC Isolation | Frequency Range (MHz) | impedance (Ω) | Impedance Ratio | interface | Technology | config |
|--------------|------------------------------|--------------------------|----------------------|------------|--------------|-----------------------|---------------|-----------------|-----------|-------------|--------|
| TCW1-133+ | N | Y | N | N | Y | 8000-13000 | 50 | 1 | SMT | LTCC | J |
| TCW2-133+ | N | Y | N | N | Y | 7000-13000 | 50 | 2 | SMT | LTCC | J |
| TTC1-682W+ | N | Y | N | N | N | 800-6800 | 50 | 1 | SMT | CORE & WIRE | G |



2.4 TO 2.5 GHz

ISM RF & MW Energy

Signal Generator/Controller

ISC-2425-25+

- Output power from -30 to +25 dBm in 0.1 dB steps
- Frequency selection with 1 kHz steps from 2400 to 2500 MHz
- Closed loop and feed forward RF power control modes
- Standalone or multi-channel operation (in either coherent or incoherent modes)
- User-friendly GUI and full API included



300W SSPA

ZHL-2425-250X+

- 300W saturated output power typ.
- Supports CW & pulsed signals
- 42 dB gain
- 60% efficiency
- Built-in monitoring and protection for temperature, current, forward and reflected power
- User friendly I2C control interface



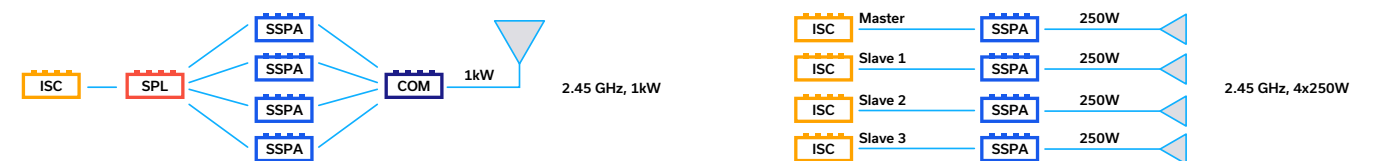
1.2 kW 4-Way Combiner

COM-2G42G51K0+

- 2.4 to 2.4 GHz frequency range
- Patented design achieves 1.2 kW power handling (sum port)
- 0.1 dB insertion loss
- 0.15 dB amplitude unbalance
- 1° phase unbalance
- N-type female to 7/16 DIN female connectors
- Allows multiple configurations of amplifier and signal controller up for up to 1 kW output power

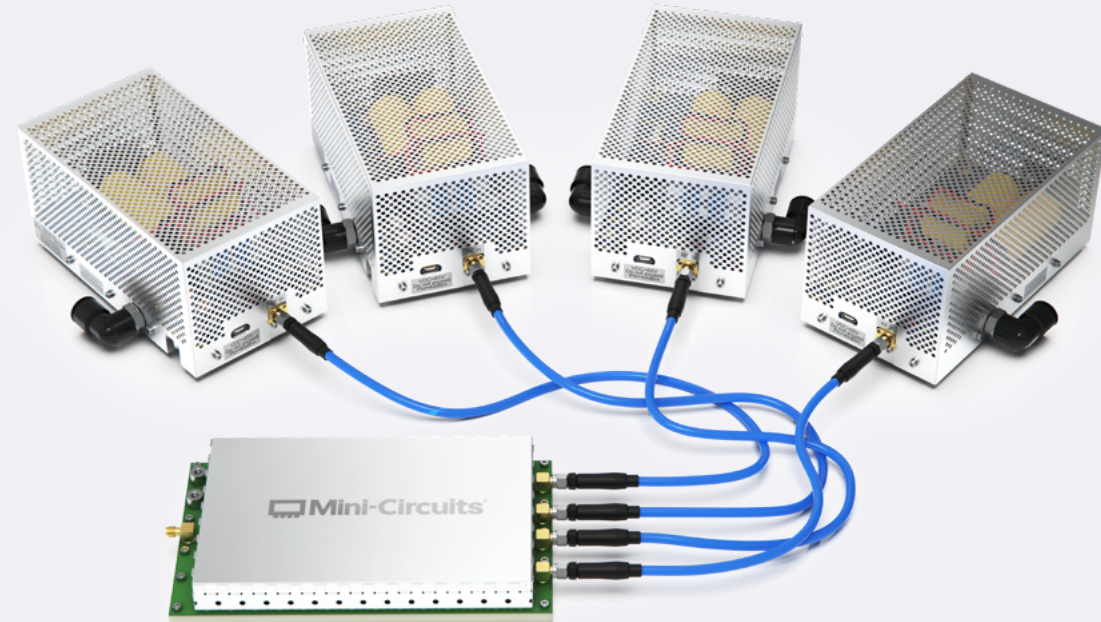


Example Configurations:



Fully Integrated 1kW Rack Mount Solution
Coming Soon!

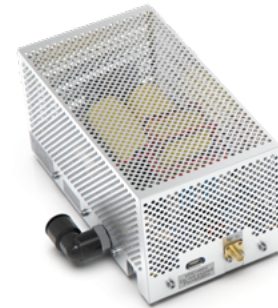
27 MHz Solutions



1.7 kW Power Amplifier

RFE-24M30M1K7X+

- 1.7kW output power
- CW & pulsed signals
- 26 dB gain
- 80% efficiency
- Built-in temperature & current monitoring
- Built-in emergency switch off
- Water cooled



4-Channel Driver

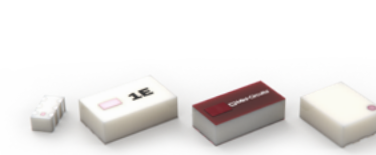
RFE-24M30M075X+

- One input, four 19W outputs
- CW & pulsed signals
- 16 dB gain at P3dB
- 55% efficiency
- Integrated harmonic suppression
- Built-in temperature & current monitoring
- Built-in emergency switch off



Components for the Entire Signal Chain

DC to mmWave



DC TO 50 GHz

LTCC Passives

World-Leading Design

LTCC devices are fabricated with capacitors, inductors and distributed structures embedded in multi-layered ceramic substrate and sintered into a single monolithic component. Our design team has the most advanced knowledge of LTCC technology in the industry building on 20+ years of R&D and multiple active patents.

- World's broadest portfolio
- 750+ in-stock models
- Custom designs
- Packages as small as 0202

Product lines:

Couplers, filters, power splitters, thru-lines, transformers/baluns



DC TO 65 GHz

MMICs

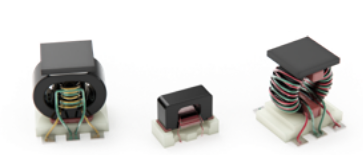
Designed & Packaged in House

MMICs are integrated circuits fabricated from semiconductor substrates, sold in surface-mount packages or as bare die for chip-and-wire assembly. Mini-Circuits MMICs utilize pHEMT, HBT and IPD fabrication processes on gallium arsenide (GaAs), designed and packaged in our own facilities.

- 700+ models in stock and growing
- Industry-leading quality
- All models available in SMT and bare die format

Product lines:

Amplifiers, attenuators, bias tees, couplers, equalizers, reflectionless filters, mixers, multipliers, power splitters, switches, transformers/baluns



DC TO 20 GHz

Core & Wire

50+ Years of Quality

Core and wire designs consist of twisted, wire-coupled structures wound around toroidal ferrite cores utilizing inductive coupling between conductors to achieve a desired function. Mini-Circuits performs all wire twisting, winding and welding in house with tight process control to ensure the highest quality and repeatability.

- Thousands of models
- Outstanding repeatability
- Footprints as small as 0.15 x 0.15"
- TopHat® feature for more accurate pick-and-place

Product lines:

Couplers, filters, power splitters, transformers/baluns

Israel Local Sales & Tech Support



Connecting  Mini-Circuits® & Israel



office@mcdi-ltd.com



077-5406075



www.mcdi-ltd.com

 **Mini-Circuits®**

www.minicircuits.com