GORE® EMI Shielding

MATERIALS

GS2100 Series

Best shielding effectiveness in lightweight materials approved for military and spaceflight applications

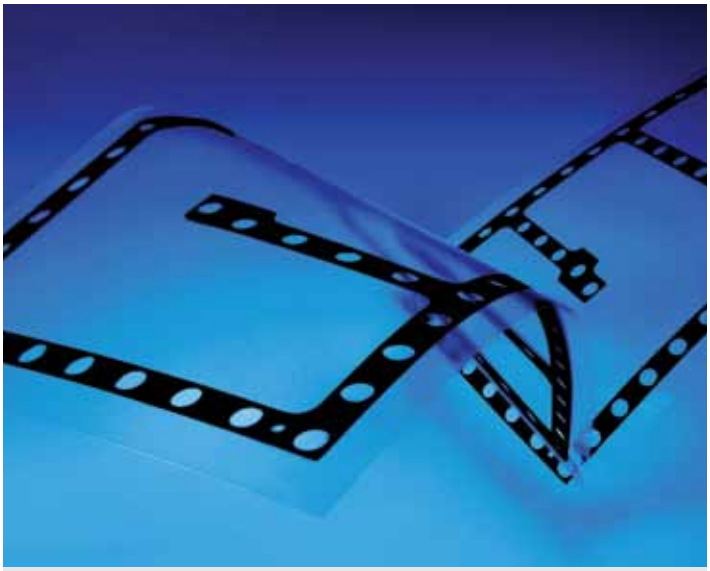
Military and aerospace applications must not only ensure reliable signal transmission but also reduce weight as much as possible. The lightweight GS2100 Series of GORE® EMI Shielding Materials reduces overall product size while providing excellent shielding performance. The low outgassing materials used in the GS2100 Series result in conductive solutions approved for DEF-STAN, MIL-SPEC, NASA, and ESA applications.

The GS2100 Series of GORE® Shielding Materials is engineered with a conductive EMI gasketing material that is moderately soft, which provides excellent shielding effectiveness in housings with surface variations like those in magnesium as-cast enclosures.

With trace widths as narrow as one millimeter, the GS2100 Series improves flexibility in complex packaging designs. Their peel-and-stick adhesive backing makes installation quick and easy, whether used in a new design or a retrofit. These gaskets can be supplied in die-cut forms or in slit-width rolls.

Typical Applications

- Aerospace communications
- Fixed and portable military communications
- Test equipment
- Connector gaskets



Benefits of GORE® EMI Shielding Materials — GS2100 Series

- Enhanced reliability from low outgassing materials approved for DEF-STAN, MIL-SPEC, NASA, and ESA applications
- Reliable electrical performance over a wide range of temperatures
- Easier installation with simple peel-and-stick adhesives
- Increased design flexibility that allows small trace widths and complex geometries
- Simplified device maintenance with materials that recover and do not require curing
- Durable materials that provide a barrier against dust and water to enable IP65 device compliance

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Table 1: Environmental and Mechanical Properties

Properties	Standard	Value
Operating temperature range (°C) with adhesive without adhesive		 -55 to 125 -200 to 200
RoHS status[a] (lead, cadmium, hexavalent chromium, mercury, bromine)		Pass
Flammability	Tested in accordance with UL methods; V0 vertical burn	Pass
Mold growth	BS 2011 – Part 2-1J	None
Hardness		(Shore A) 45
Density (gm/cc)	ASTM D1622-88	0.34
EMI seal reusability	MIL-G-83528	Pass (› 80 dB after 10 closings)
Vibration resistance	DESC 92017 and MIL-G-83528	Pass
Volume resistivity	DESC 92017 and MIL-G-83528	1.5 ohm-cm @ 500 psi, Au electrodes
Contaminant resistance	DESC 92017, MIL-G-83528, BS 3G 100-Part 2, and DEF-STAN 59-103-Part 3/1	Pass
Shielding effectiveness	DESC 92017 and MIL-G-83528	"E" field – 100 dB 200 MHz to 18 GHz
Shielding effectiveness, with adhesive	ARP-1705 modified test method[b]	› 45 dB @ 1 GHz
Corrosion resistance	DEF-STAN 59-103	Pass
Electromagnetic pulse (EMP) survivability	DEF-STAN 59-103	Pass
Water seal	DEF-STAN 59-103/Part 3 and IP65	Pass
Accelerated life (heat aging)	DEF-STAN 59-103, Part 3/1 and MIL-G-83528	Pass
Outgassing, with adhesive	ASTM E595 and ESA PSS-01-702	Pass with ‹ 1% mass loss
Electromagnetic discharge: Charge ‹ 150 volts, @ 25°C, 45% RH, loss less than 100 volts within 0.5 seconds		Pass

[a] W. L. Gore & Associates declares that we do not intentionally add substances listed in EU Directive 2011/65/EU to the GS2100 Series of GORE® EMI Shielding Materials. Independent lab tests have been performed, and results are available upon request.

[b] All measurements made using ARP-1705 modified test method through 3 GHz on 2 mm trace width

Extended Service Heights

For the GS2100 Series of GORE® EMI Shielding Materials, Gore recommends using each variant within a range of service heights (gap distances). The broad range of tolerance take-up results in multiple product choices for some gap distances. Selecting the most suitable variant for a given application depends on the following:

- Gap distance of the housing that needs to be filled
- Compression force required to achieve the specified gap distance
- Required DC resistance for grounding applications (or required shielding effectiveness for shielding applications) at a specified gap distance

Figure 1 shows recommended service heights (gap distances) for each variant.

Figure 1: Recommended Service Heights

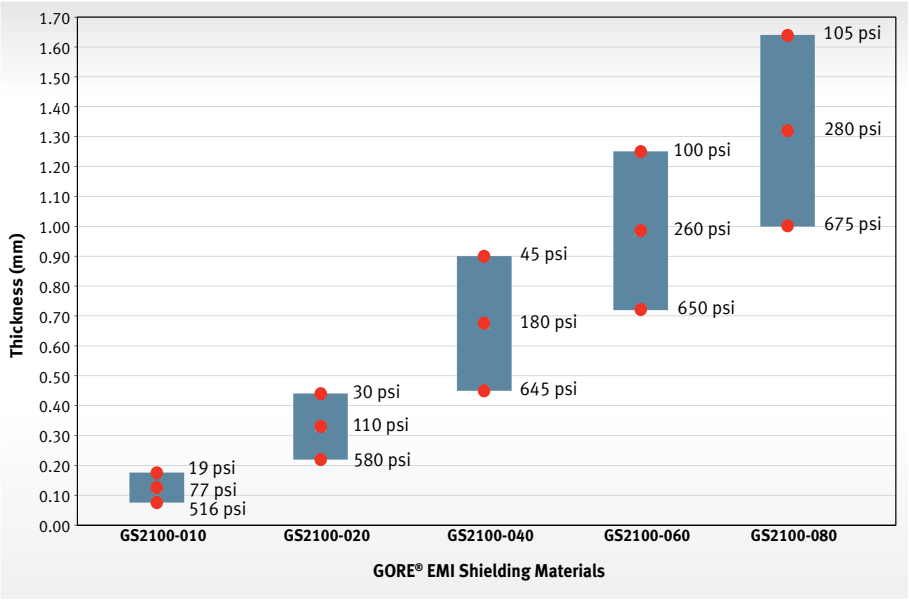


Table 2: Service Height Specifications[c]

Variant	Weight (g)	Compression Stop	Compression Stop Value mm (in)	Initial DC Resistance (ohms)	Pressure to Achieve Compression (psi)
GS2100-010	0.003	High	0.18 (0.007)	20.0	19
		Recommended	0.13 (0.005)	7.0	77
		Low	0.07 (0.003)	3.8	516
GS2100-020	0.005	High	0.44 (0.017)	9.0	30
		Recommended	0.33 (0.013)	5.6	110
		Low	0.22 (0.009)	3.3	580
GS2100-040	0.010	High	0.90 (0.035)	5.5	45
		Recommended	0.68 (0.027)	3.5	180
		Low	0.45 (0.018)	1.6	645
GS2100-060	0.014	High	1.25 (0.049)	12.0	100
		Recommended	0.99 (0.039)	5.0	260
		Low	0.72 (0.028)	1.3	650
GS2100-080	0.019	High	1.64 (0.065)	12.0	105
		Recommended	1.32 (0.052)	5.5	280
		Low	1.00 (0.039)	1.1	675

[c] Based on 5 x 5 mm grounding pad

Shielding Effectiveness

To ensure an effective seal for EMI gasketing applications, Gore recommends compressing the GS2100 Series materials to the recommended compression stop as a minimum (Table 3). Gore modified the gasket specifications of the ARP-1705 test method to include a trace width of only two millimeters, which better reflects the challenges encountered in real-world applications.

Table 3: Shielding Effectiveness

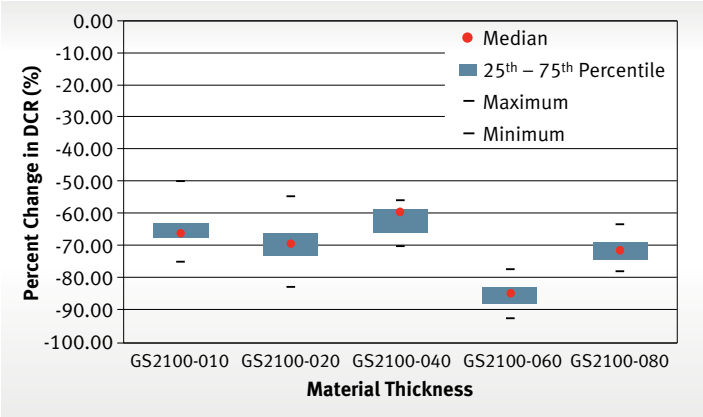
Variant	Recommended Compression Stops mm (in)		Pressure to Achieve Compression (psi)	Typical Shielding Effectiveness[d] (dB)
GS2100-010	High	0.18 (0.007)	19	› 50
	Low	0.07 (0.003)	516	› 55
GS2100-020	High	0.44 (0.017)	30	› 50
	Low	0.22 (0.009)	580	› 50
GS2100-040	High	0.90 (0.035)	45	› 50
	Low	0.45 (0.018)	645	› 50
GS2100-060	High	1.25 (0.049)	100	› 45
	Low	0.72 (0.028)	650	› 50
GS2100-080	High	1.64 (0.065)	105	› 55
	Low	1.00 (0.039)	675	› 55

[d] All measurements made using ARP-1705 modified test method through 3 GHz on 2 mm trace width

Accelerated Life Testing

A crucial factor in assessing the acceptability of gasket or grounding materials is their performance over time — performance that can be evaluated only through accelerated life testing (ALT). To evaluate the durability of the GS2100 Series, parts were tested at the recommended compression stop for 500 hours at 85°C and 85 percent relative humidity (RH). Figure 2 shows the changes in DC resistance following exposure to the outlined conditions. The minimal amount of change in DC resistance demonstrates consistent and reliable performance in demanding environments. In addition, the GS2100 Series of GORE® EMI Shielding Materials has proven its reliable performance by passing accelerated life testing in accordance to military and civil standards.

Figure 2: DC Resistance through ALT



Force Displacement Resistance

The GS2100 Series requires compression in order to achieve an electrical pathway. The amount of force and DC resistance differs for each variant, as seen in Table 2 and Figures 3 – 7.

Figure 3: GS2100-010 Force Displacement Resistance

(testing with 5 x 5 mm grounding pads)

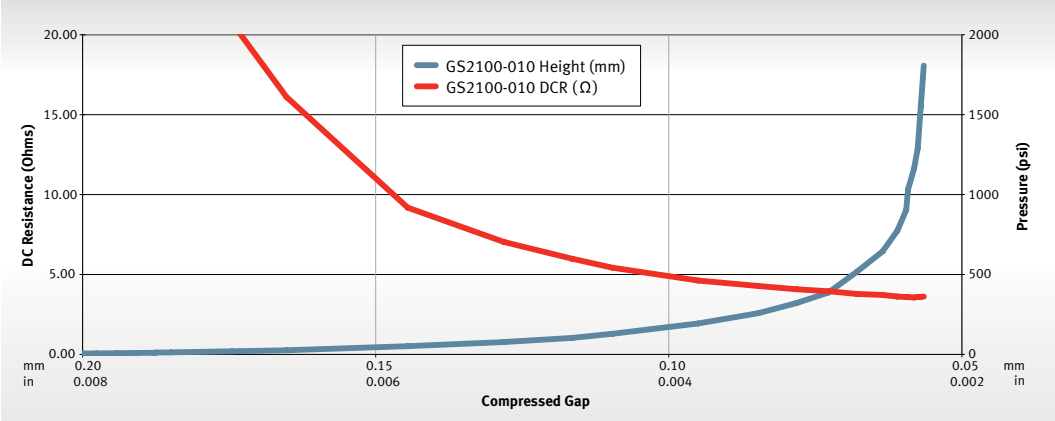


Figure 4: GS2100-020 Force Displacement Resistance

(testing with 5 x 5 mm grounding pads)

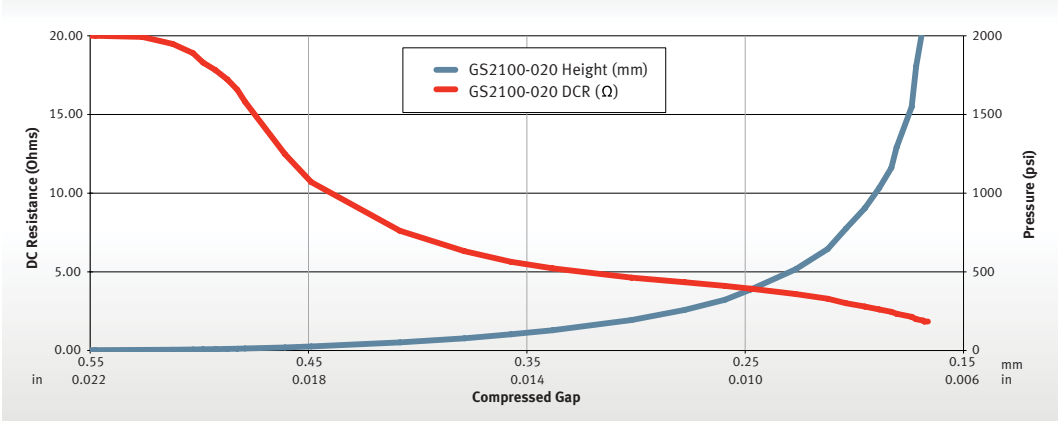


Figure 5: GS2100-040 Force Displacement Resistance

(testing with 5 x 5 mm grounding pads)

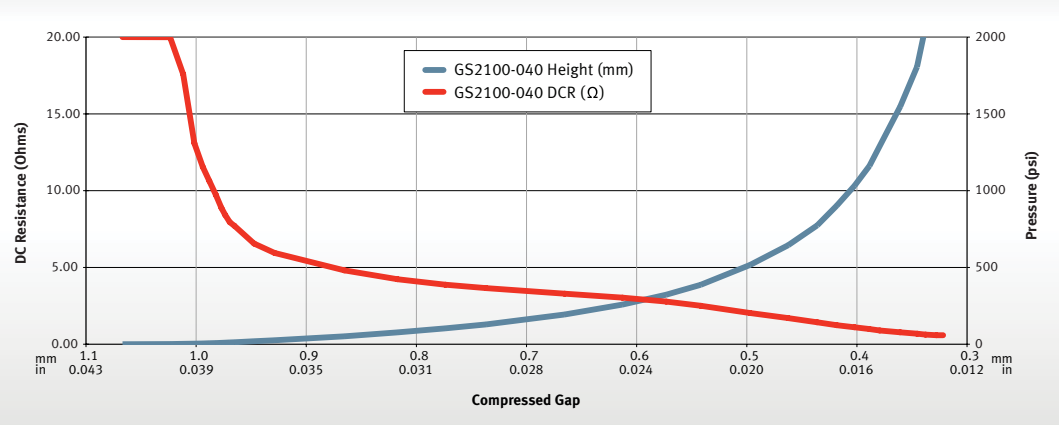


Figure 6: GS2100-060 Force Displacement Resistance

(testing with 5 x 5 mm grounding pads)

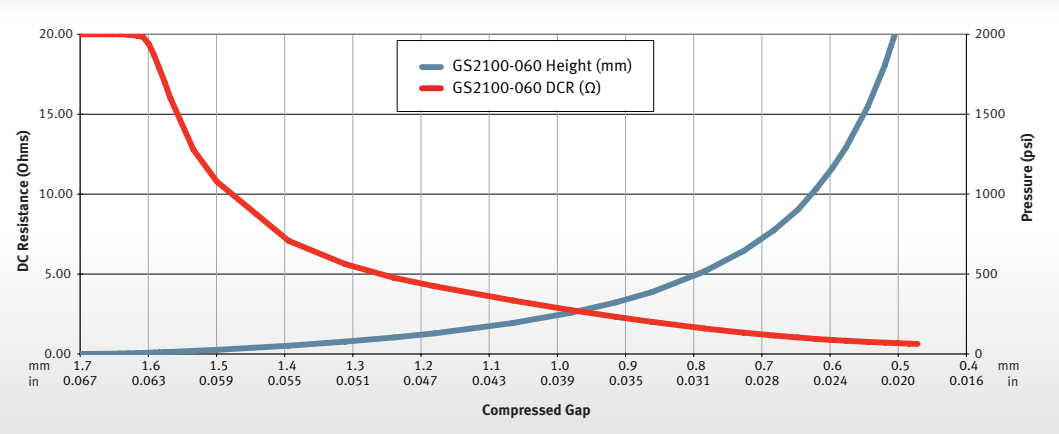
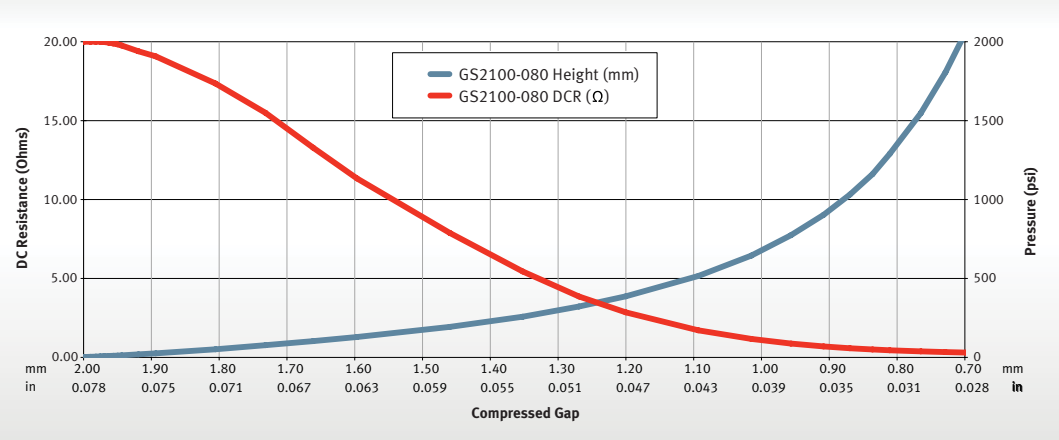


Figure 7: GS2100-080 Force Displacement Resistance

(testing with 5 x 5 mm grounding pads)



Recoverability

Recoverability is the inverse of compression set. If a device will be opened for modifications during initial production, hardware upgrades, or field repairs, the shielding materials must be able to rebound and create a consistent connection. Recoverability measures the gasket's ability to maintain some level of gap-filling following a release of a compression load. Using ASTM D395 B, Standard Test Methods for Rubber Property, Test Method B: Compression Set under Constant Deflection in Air, the GS2100 Series has demonstrated recoverability between 52 and 81 percent (Table 4). To measure the recovered thickness, samples were compressed to the compression stop and subjected to a 70°C temperature soak for 70 hours. Lastly, the samples were released from compression and allowed to recover for 30 minutes before the recovered thickness was measured. This high level of recoverability ensures that the electrical path is maintained when compression is removed and then reestablished.

Table 4: Recoverability

Variant	Recoverability After 22 Hours of Compression (%)	Recoverability After 70 Hours of Compression (%)
GS2100-010	66.4	63.9
GS2100-020	56.3	52.0
GS2100-040	60.5	59.9
GS2100-060	83.3	80.8
GS2100-080	66.3	60.9

Outgassing Performance

The GS2100 Series of GORE® EMI Shielding Materials meets the requirements for outgassing when tested against ASTM E595 (Table 5).

Table 5: Outgassing Specifications

Variant	Total Mass Loss (%)	Collected Volatile Condensable Materials (%)	Water Loss (%)
Specification Limit	1.00	0.10	Report
GS2100-010	0.34	< 0.01	0.14
GS2100-020	0.41	< 0.01	0.15
GS2100-040	0.39	< 0.01	0.15
GS2100-060	0.28	< 0.01	0.15
GS2100-080	0.48	< 0.01	0.13

Ordering Information

The GS2100 Series of GORE® EMI Shielding Materials is available as custom die-cut gaskets, strip gaskets, and grounding pads (Table 6). To order or specify GS2100 Series grounding pads and custom die-cut gaskets, contact Gore for assistance.

Standard strip gaskets in a variety of widths are available in 15-meter rolls through approved distributors (gore.com/emidistributors).

Larger widths (e.g., 6.35 mm and 3.18 mm) are manufactured with one lane of strips per roll, whereas smaller widths (e.g., 2.03 mm and 1.02 mm) are manufactured with five lanes of strips per roll. For other strip gasket configurations, contact Gore for assistance.

Table 6: Strip Gasket Ordering Information

Gore Part Number	Thickness mm (in)	Width mm (in)
EDR-21-010-0250-SC	0.25 (0.010)	6.35 (0.250)
EDR-21-010-0125-SC	0.25 (0.010)	3.18 (0.125)
EDR-21-010-0080-SC	0.25 (0.010)	2.03 (0.080)
EDR-21-010-0040-SC	0.25 (0.010)	1.02 (0.040)
EDR-21-020-0250-SC	0.51 (0.020)	6.35 (0.250)
EDR-21-020-0125-SC	0.51 (0.020)	3.18 (0.125)
EDR-21-020-0080-SC	0.51 (0.020)	2.03 (0.080)
EDR-21-020-0040-SC	0.51 (0.020)	1.02 (0.040)
EDR-21-040-0250-SC	1.02 (0.040)	6.35 (0.250)
EDR-21-040-0125-SC	1.02 (0.040)	3.18 (0.125)
EDR-21-040-0080-SC	1.02 (0.040)	2.03 (0.080)
EDR-21-040-0040-SC	1.02 (0.040)	1.02 (0.040)
EDR-21-060-0250-SC	1.52 (0.060)	6.35 (0.250)
EDR-21-060-0125-SC	1.52 (0.060)	3.18 (0.125)
EDR-21-060-0080-SC	1.52 (0.060)	2.03 (0.080)
EDR-21-060-0040-SC	1.52 (0.060)	1.02 (0.040)
EDR-21-080-0250-SC	2.03 (0.080)	6.35 (0.250)
EDR-21-080-0125-SC	2.03 (0.080)	3.18 (0.125)
EDR-21-080-0080-SC	2.03 (0.080)	2.03 (0.080)
EDR-21-080-0040-SC	2.03 (0.080)	1.02 (0.040)

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NOTICE — USE RESTRICTIONS APPLY
Not for use in food, drug, cosmetic or medical device manufacturing, processing, or packaging operations.

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Creative Technologies Worldwide

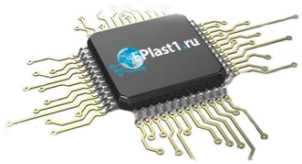
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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