



AS1004

Micropower Voltage Reference

Features

- Low voltage reference
- 10 μ A turn-on current for AS1004-1.2
- 20 μ A turn-on current for AS1004-2.5
- ± 4 mV (0.3 %) initial accuracy for AS1004-1.2
- ± 20 mV (0.8 %) initial accuracy for AS1004-2.5
- Guaranteed operation to 20 mA. Over three orders of magnitude of operating current!
- Temperature performance guaranteed
- Very low dynamic impedance

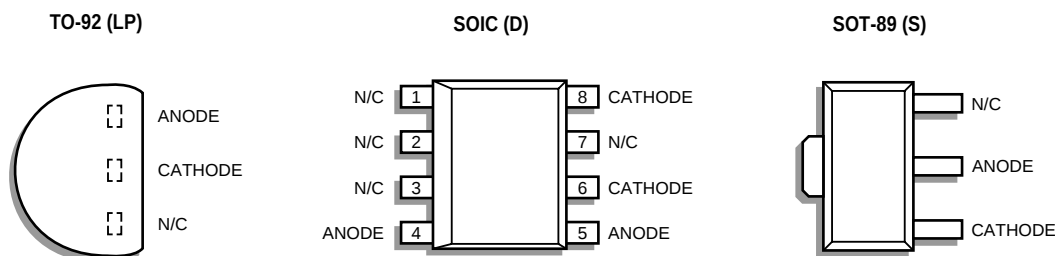
Description

The AS1004 is a two-terminal precision band-gap voltage reference with a low turn-on current of 10 μ A.

Emulating a 1.235 V zener diode, the AS1004 operates more than three orders of magnitude of output current with minute output impedance and guaranteed stability. With an initial tolerance of ± 4 mV and guaranteed temperature performance, it is ideal for precision instrumentation, especially in low power applications. Being a low-voltage reference, the AS1004 is also well-suited as a reference for low-voltage power supply applications, especially in power supplies intended for low-voltage logic systems, laptop computers and other portable or battery operated equipment.

The AS1004 is pin-for-pin compatible with the LT1004 and the LM385 and offers improved specifications over both the LM385 and the MP5010. It is also available as a 2.5 V reference with a guaranteed start-up current of 20 μ A.

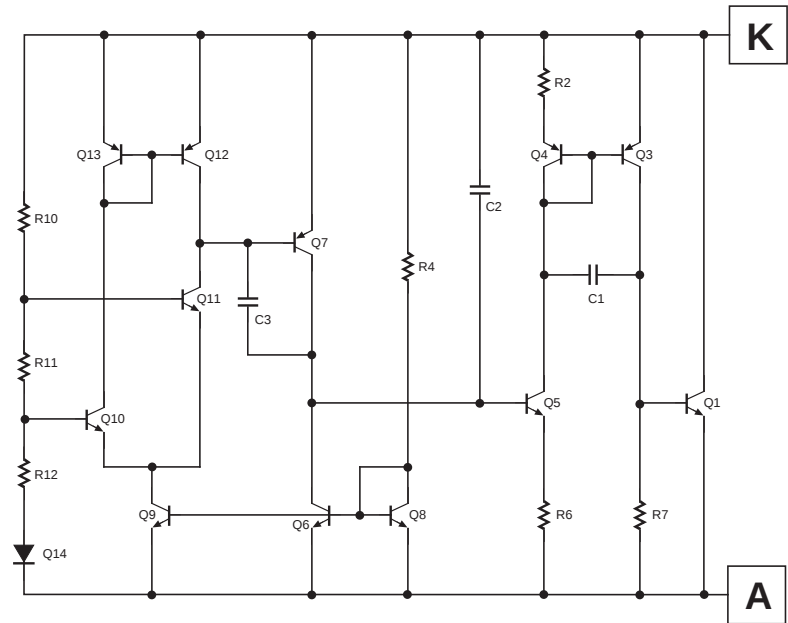
Pin Configuration — Top view



Ordering Information

Description	Temperature Range	Order Codes	
TO-92	0 to 70° C	AS1004-1.2LP	AS1004-2.5LP
8-Pin Plastic SOIC	0 to 70° C	AS1004-1.2D	AS1004-2.5D
SOT-89	0 to 70° C	AS1004-1.2S	AS1004-2.5S

Simplified Schematic



Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Reverse Breakdown Current	I_Z	30	mA
Forward Current	I_F	30	mA
Continuous Power Dissipation at 25° C	P_D		
TO-92		775	mW
8LSOIC		750	mW
SOT-89		1000	mW
Maximum Junction Temp	T_J	150	°C
Storage Temperature	T_{STG}	-65 to 150	°C
Lead Temperature, Soldering 10 Seconds	T_L	300	°C

Recommended Conditions

Parameter	Symbol	Rating	Unit
Cathode Current	I_Z	100	μA

Typical Thermal Resistances

Package	θ_{JA}	θ_{JC}	Typical Derating
TO-92	160° C/W	80° C/W	6.3 mW/°C
8L SOIC	175° C/W	45° C/W	5.7 mW/°C
SOT-89	110° C/W	8° C/W	9.1 mW/°C

Electrical Characteristics

Electrical Characteristics are guaranteed over full junction temperature range (0 to 70° C). Ambient temperature must be derated based on power dissipation and package thermal characteristics.

Parameter	Symbol	Test Condition	AS1004-1.2			AS1004-2.5			Unit
			Min	Typ	Max	Min	Typ	Max	
Reverse Breakdown Voltage	V_Z	$I_Z = 100 \mu A, T_J = 25^\circ C$	1.231	1.235	1.239	2.480	2.500	2.520	V
		$0^\circ C \leq T_A \leq 70^\circ C$	1.225	1.235	1.245	2.470	2.500	2.530	V
Average Temperature Coefficient	$\Delta V_Z / \Delta T$	$I_{min} \leq I_Z \leq 20 \text{ mA}$	20			60			ppm/°C
Minimum Operating Current	$I_{Z(min)}$		4 10			12 20			μA
Reverse Breakdown Voltage Change With Current	$\Delta V_Z / \Delta I_Z$	$I_{min} \leq I_Z \leq 1 \text{ mA}$	0.5 1			0.5 1			mV
		Over Temperature	0.5 1.5			0.5 1.5			mV
		$1 \text{ mA} \leq I_Z \leq 20 \text{ mA}$	6.5 10			6.5 10			mV
		Over Temperature	6.5 20			6.5 20			mV
Reverse Dynamic Impedance	Z_Z	$I_Z = 100 \text{ mA}, f = 25 \text{ Hz}$	0.2 0.6			0.8 0.9			Ω
		Over Temperature	1 1.5			1.5			Ω
Wide Band Noise	e_n	$I_Z = 100 \mu A$ $10 \text{ Hz} \leq f \leq 10 \text{ KHz}$	60			60			μV
Long Term Stability	$\Delta V_Z / \Delta T$	$I_Z = 100 \mu A$ $T_A = 25^\circ C \pm 0.1^\circ C$	20			60			ppm/kH

Typical Performance Curves

Calculating Average Temperature Coefficient for the AS1004-1.2 Reference

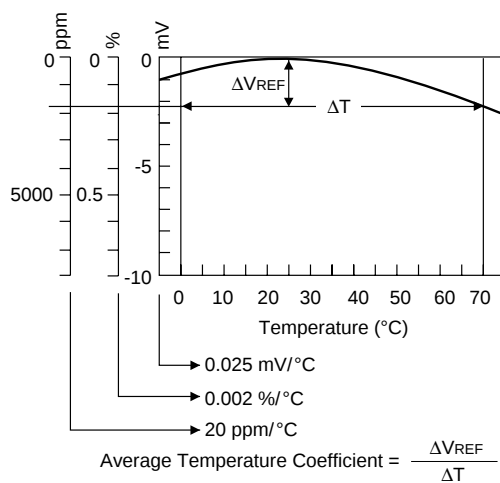


Figure 1

AS1004-1.2 Reference Voltage vs. Ambient Temperature

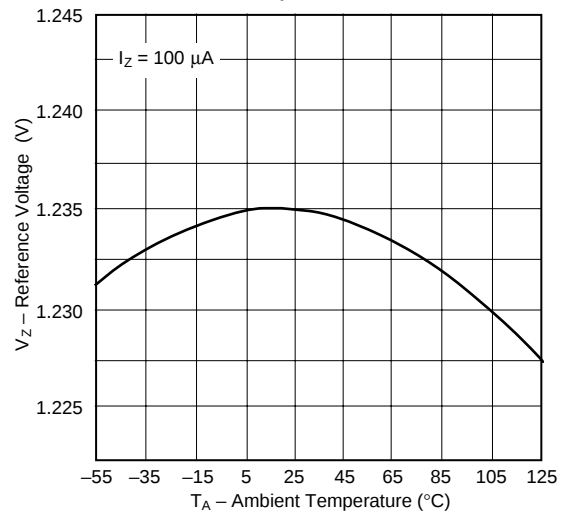


Figure 2

Typical Performance Curves

Calculating Average Temperature Coefficient for the AS1004-2.5 Reference

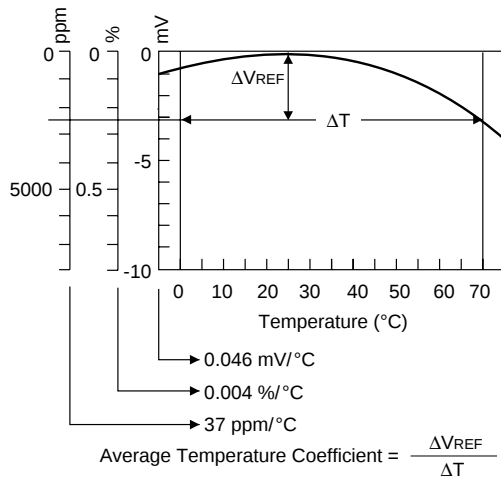


Figure 3

AS1004-2.5 Reference Voltage versus Ambient Temperature

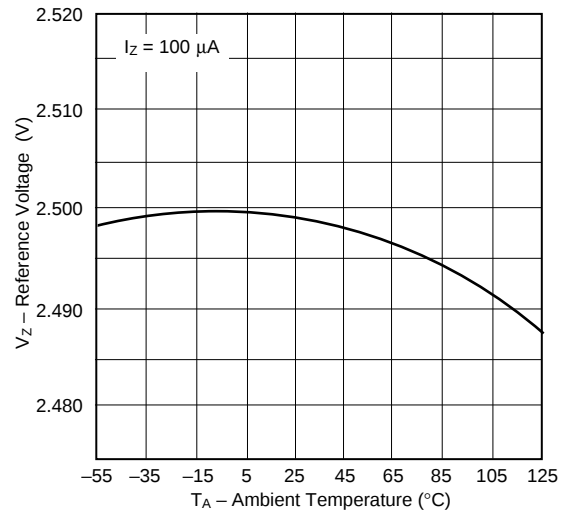


Figure 4

AS1004-1.2 Reverse Operating Characteristics

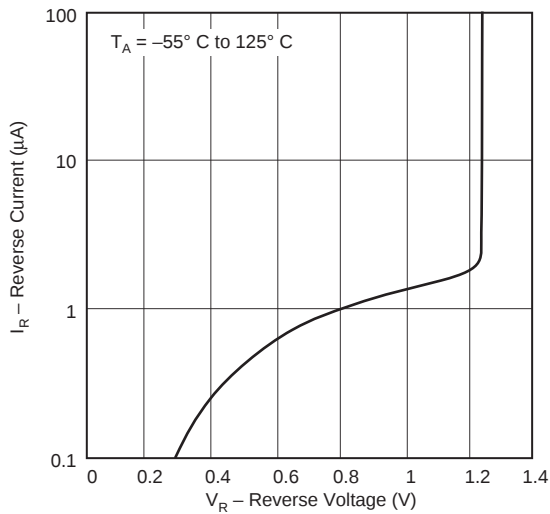


Figure 5

AS1004-2.5 Reverse Operating Characteristics

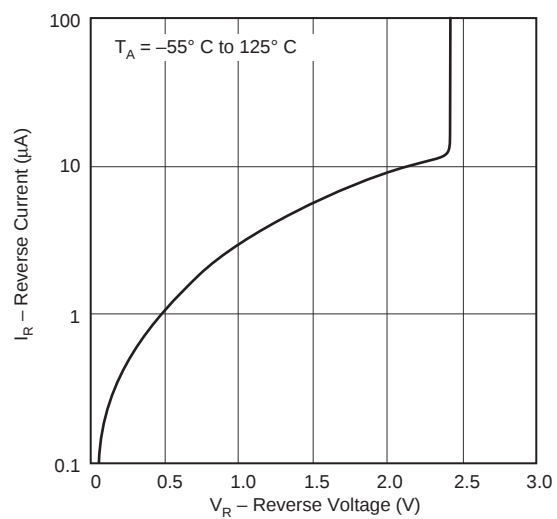


Figure 6

Typical Performance Curves

AS1004-1.2 Change in Reference Voltage versus Reverse Current

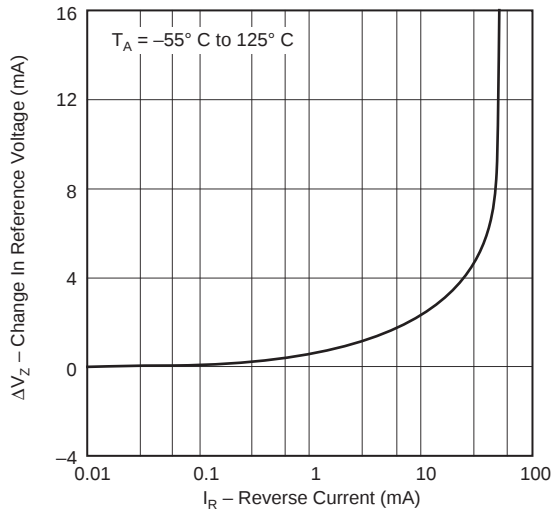


Figure 7

AS1004-2.5 Change in Reference Voltage versus Reverse Current

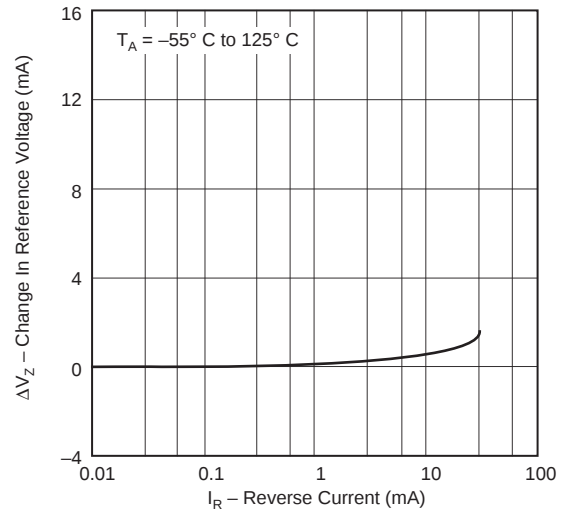


Figure 8

AS1004-1.2 Transient Response

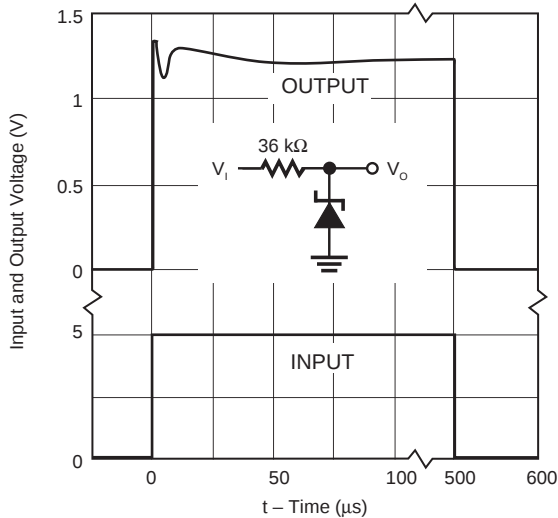


Figure 9

AS1004-2.5 Transient Response

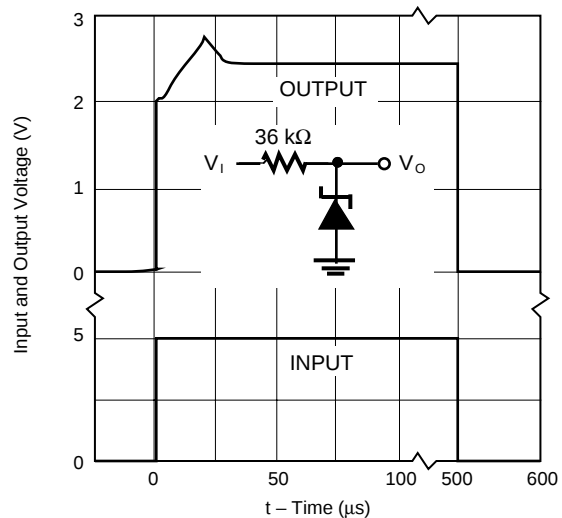


Figure 10

Typical Performance Curves

AS1004-1.2 Reverse Dynamic Impedance

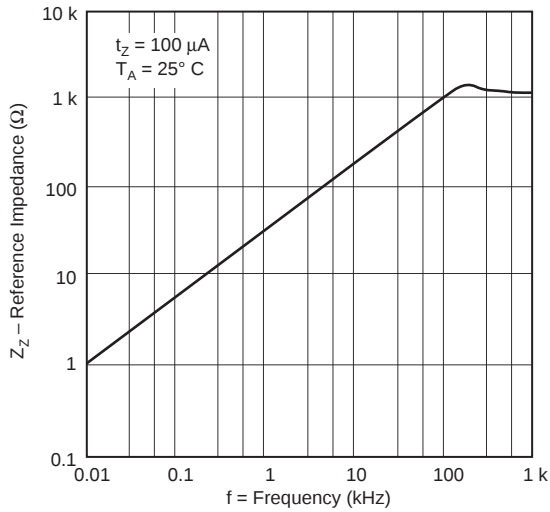


Figure 11

AS1004-2.5 Reverse Dynamic Impedance

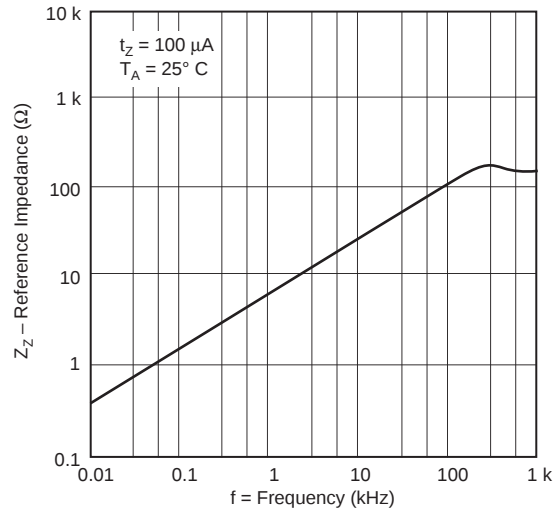


Figure 12

Forward Characteristics

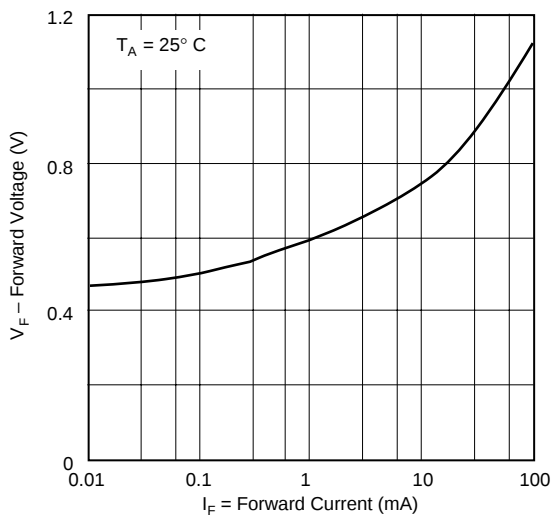


Figure 13

Low Frequency Reverse Dynamic Impedance

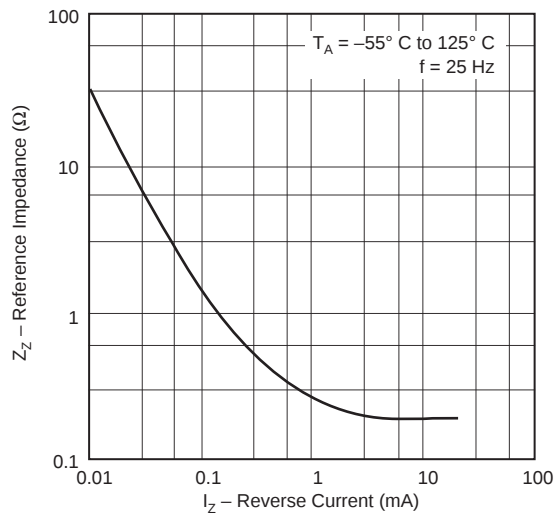


Figure 14

Typical Applications

1.235V Reference

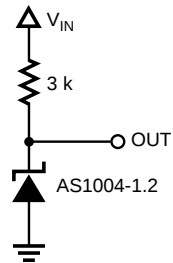


Figure 15

2.5V Reference

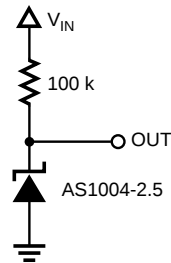


Figure 16

Low Noise Reference

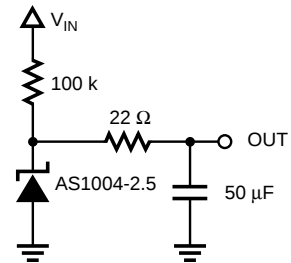


Figure 17

Variable Output Regulator

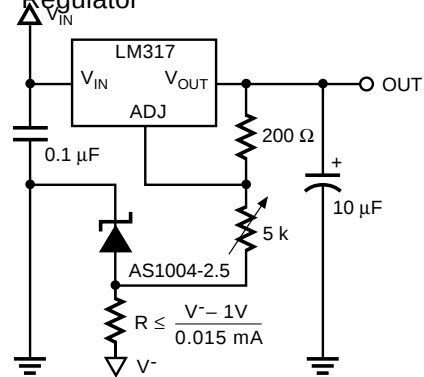


Figure 18

High Stability 5V Regulator

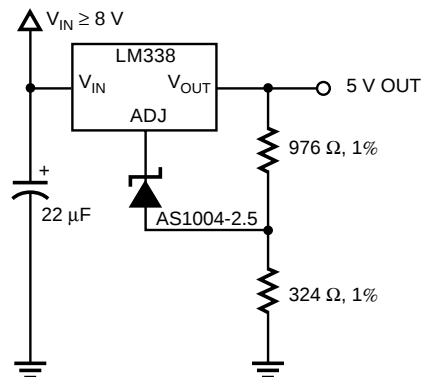


Figure 19

Lead Acid Low Battery Detector

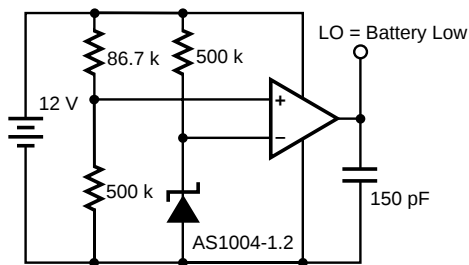


Figure 20

Micropower 10V Reference

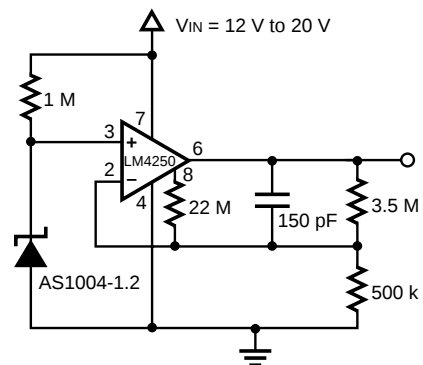


Figure 21

Notes



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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