

## Low Current SMD LED



### FEATURES

- SMD LED with exceptional brightness
- Compatible with automatic placement equipment
- EIA and ICE standard package
- Compatible with IR reflow, vapor phase and wave solder processes according to CECC 00802 and J-STD-020
- Available in 8 mm tape
- Low profile package
- Non-diffused lens: excellent for coupling to light pipes and backlighting
- Very low power consumption
- Luminous intensity ratio in one packaging unit  $I_{Vmax.}/I_{Vmin.} \leq 1.6$
- ESD withstand voltage: up to 2 kV according to JESD22-A114-B
- Preconditioning: according to JEDEC level 2a
- AEC-Q101 qualified
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC


**RoHS**  
COMPLIANT

### DESCRIPTION

These new devices have been designed to meet the increasing demand for AlInGaP based low current SMD LEDs.

The package of the VLM.30.. is the PLCC-2 package. It consists of a lead frame which is embedded in a white thermoplast. The reflector inside this package is filled up with clear epoxy.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD PLCC-2
- Product series: low current
- Angle of half intensity:  $\pm 60^\circ$

### APPLICATIONS

- Automotive: backlighting in dashboards and switches
- Telecommunication: indicator and backlighting in telephone and fax
- Indicator and backlight for audio and video equipment
- Indicator and backlight for battery driven equipment
- Indicator and backlight in office equipment
- Flat backlight for LCDs, switches and symbols
- General use

PARTS TABLE		
PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMS3000-GS08	Super red, $I_V > 2.8$ mcd	AlInGaP
VLMS3000-GS18	Super red, $I_V > 2.8$ mcd	AlInGaP
VLMS30J1K2-GS08	Super red, $I_V = (4.5 \text{ to } 11.2)$ mcd	AlInGaP
VLMS30J1K2-GS18	Super red, $I_V = (4.5 \text{ to } 11.2)$ mcd	AlInGaP
VLMS30K1L2-GS08	Super red, $I_V = (7.1 \text{ to } 18)$ mcd	AlInGaP
VLMS30K1L2-GS18	Super red, $I_V = (7.1 \text{ to } 18)$ mcd	AlInGaP

PARTS TABLE		
PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMS30J1L2-GS08	Super red, $I_V = (4.5 \text{ to } 18) \text{ mcd}$	AllnGaP
VLMS30J1L2-GS18	Super red, $I_V = (4.5 \text{ to } 18) \text{ mcd}$	AllnGaP
VLMS30J2K2-GS08	Super red, $I_V = (5.6 \text{ to } 11.2) \text{ mcd}$	AllnGaP
VLMS30J2K2-GS18	Super red, $I_V = (5.6 \text{ to } 11.2) \text{ mcd}$	AllnGaP
VLMS30K2L2-GS08	Super red, $I_V = (9 \text{ to } 18) \text{ mcd}$	AllnGaP
VLMO3000-GS08	Orange, $I_V > 5.6 \text{ mcd}$	AllnGaP
VLMO3000-GS18	Orange, $I_V > 5.6 \text{ mcd}$	AllnGaP
VLMO30K1L2-GS08	Orange, $I_V = (7.1 \text{ to } 18) \text{ mcd}$	AllnGaP
VLMO30K1L2-GS18	Orange, $I_V = (7.1 \text{ to } 18) \text{ mcd}$	AllnGaP
VLMO30L1M2-GS08	Orange, $I_V = (11.2 \text{ to } 28) \text{ mcd}$	AllnGaP
VLMO30L1M2-GS18	Orange, $I_V = (11.2 \text{ to } 28) \text{ mcd}$	AllnGaP
VLMO30K1M2-GS08	Orange, $I_V = (7.1 \text{ to } 28) \text{ mcd}$	AllnGaP
VLMO30K1M2-GS18	Orange, $I_V = (7.1 \text{ to } 28) \text{ mcd}$	AllnGaP
VLMY3000-GS08	Yellow, $I_V > 4.5 \text{ mcd}$	AllnGaP
VLMY3000-GS18	Yellow, $I_V > 4.5 \text{ mcd}$	AllnGaP
VLMY3001GS08	Yellow, $I_V = (7.1 \text{ to } 18) \text{ mcd}$	AllnGaP
VLMY3001-GS18	Yellow, $I_V = (7.1 \text{ to } 18) \text{ mcd}$	AllnGaP
VLMY30J2L1-GS08	Yellow, $I_V = (5.6 \text{ to } 14) \text{ mcd}$	AllnGaP
VLMY30J2L1-GS18	Yellow, $I_V = (5.6 \text{ to } 14) \text{ mcd}$	AllnGaP
VLMY30K2M1-GS08	Yellow, $I_V = (9 \text{ to } 22.4) \text{ mcd}$	AllnGaP
VLMY30K2M1-GS18	Yellow, $I_V = (9 \text{ to } 22.4) \text{ mcd}$	AllnGaP
VLMY30J2M1-GS08	Yellow, $I_V = (5.6 \text{ to } 22.4) \text{ mcd}$	AllnGaP
VLMY30J2M1-GS18	Yellow, $I_V = (5.6 \text{ to } 22.4) \text{ mcd}$	AllnGaP

ABSOLUTE MAXIMUM RATINGS <sup>1)</sup> VLM30..				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage <sup>2)</sup>		$V_R$	6	V
DC forward current		$I_F$	15	mA
Surge forward current	$t_p \leq 10 \mu\text{s}$	$I_{FSM}$	0.1	A
Power dissipation		$P_V$	40	mW
Junction temperature		$T_j$	125	°C
Operating temperature range		$T_{amb}$	- 40 to + 100	°C
Storage temperature range		$T_{stg}$	- 40 to + 100	°C
Thermal resistance junction/ambient	Mounted on PC board (pad size > 16 mm <sup>2</sup> )	$R_{thJA}$	400	K/W

Note:

<sup>1)</sup>  $T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified

<sup>2)</sup> Driving the LED in reverse direction is suitable for short term application

**OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> VLMS30..., RED**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 2 \text{ mA}$	VLMS3000	$I_V$	2.8			mcd
	$I_F = 10 \text{ mA}$	VLMS3000	$I_V$		20		mcd
	$I_F = 2 \text{ mA}$	VLMS30J1K2	$I_V$	4.5		11.2	mcd
	$I_F = 2 \text{ mA}$	VLMS30K1L2	$I_V$	7.1		18	mcd
	$I_F = 2 \text{ mA}$	VLMS30J1L2	$I_V$	4.5		18	mcd
	$I_F = 2 \text{ mA}$	VLMS30J2K2	$I_V$	5.6		11.2	mcd
	$I_F = 2 \text{ mA}$	VLMS30K2L2	$I_V$	9		18	mcd
Dominant wavelength	$I_F = 2 \text{ mA}$		$\lambda_d$	624		636	nm
Peak wavelength	$I_F = 2 \text{ mA}$		$\lambda_p$		635		nm
Angle of half intensity	$I_F = 2 \text{ mA}$		$\phi$		$\pm 60$		deg
Forward voltage	$I_F = 2 \text{ mA}$		$V_F$		1.8	2.2	V
Reverse voltage	$I_R = 10 \mu\text{A}$		$V_R$	6	15		V

Note:

<sup>1)</sup>  $T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified<sup>2)</sup> In one packing unit  $I_{Vmax}/I_{Vmin} \leq 1.6$ **OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> VLMO30..., ORANGE**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 2 \text{ mA}$	VLMO3000	$I_V$	5.6			mcd
	$I_F = 10 \text{ mA}$	VLMO3000	$I_V$		50		mcd
	$I_F = 2 \text{ mA}$	VLMO30K1L2	$I_V$	7.1		18	mcd
	$I_F = 2 \text{ mA}$	VLMO30L1M2	$I_V$	11.2		28	mcd
	$I_F = 2 \text{ mA}$	VLMO30K1M2	$I_V$	7.1		28	mcd
Dominant wavelength	$I_F = 2 \text{ mA}$		$\lambda_d$	600		609	nm
Peak wavelength	$I_F = 2 \text{ mA}$		$\lambda_p$		610		nm
Angle of half intensity	$I_F = 2 \text{ mA}$		$\phi$		$\pm 60$		deg
Forward voltage	$I_F = 2 \text{ mA}$		$V_F$		1.8	2.2	V
Reverse voltage	$I_R = 10 \mu\text{A}$		$V_R$	6	15		V

Note:

<sup>1)</sup>  $T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified<sup>2)</sup> In one packing unit  $I_{Vmax}/I_{Vmin} \leq 1.6$ **OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> VLMY30..., YELLOW**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 2 \text{ mA}$	VLMY3000	$I_V$	4.5			mcd
	$I_F = 10 \text{ mA}$	VLMY3000	$I_V$		50		mcd
	$I_F = 10 \text{ mA}$	VLMY3001	$I_V$	7.1		18	mcd
	$I_F = 2 \text{ mA}$	VLMY30J2L1	$I_V$	5.6		14	mcd
	$I_F = 2 \text{ mA}$	VLMY30K2M1	$I_V$	9		22.4	mcd
	$I_F = 2 \text{ mA}$	VLMY30J2M1	$I_V$	5.6		22.4	mcd
Dominant wavelength	$I_F = 2 \text{ mA}$		$\lambda_d$	581		594	nm
Peak wavelength	$I_F = 2 \text{ mA}$		$\lambda_p$		585		nm
Angle of half intensity	$I_F = 2 \text{ mA}$		$\phi$		$\pm 60$		deg
Forward voltage	$I_F = 2 \text{ mA}$		$V_F$		1.8	2.2	V
Reverse voltage	$I_R = 10 \mu\text{A}$		$V_R$	6	15		V

Note:

<sup>1)</sup>  $T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified<sup>2)</sup> In one packing unit  $I_{Vmax}/I_{Vmin} \leq 1.6$



LUMINOUS INTENSITY CLASSIFICATION			
GROUP	LIGHT INTENSITY (mcd)		
STANDARD	OPTIONAL	MIN.	MAX.
H	1	2.8	3.55
	2	3.55	4.5
J	1	4.5	5.6
	2	5.6	7.1
K	1	7.1	9.0
	2	9.0	11.2
L	1	11.2	14.0
	2	14.0	18.0
M	1	18.0	22.4
	2	22.4	28.0

Note:

Luminous Intensity is tested at a current pulse duration of 25 ms and an accuracy of  $\pm 11\%$ . The above type numbers represent the order groups which include only a few brightness groups. Only one group will be shipped in one reel (there will be no mixing of two groups on each reel). In order to ensure availability, single brightness groups will not be orderable. In a similar manner for colors where wavelength groups are measured and binned, single wavelength groups will be shipped in any one reel. In order to ensure availability, single wavelength groups will not be orderable.

COLOR CLASSIFICATION				
GROUP	YELLOW		ORANGE	
	DOM. WAVELENGTH (nm)			
	MIN.	MAX.	MIN.	MAX.
1	581	584		
2	583	586	600	603
3	585	588	602	605
4	587	590	604	607
5	589	592	606	609
6	591	594		

Note:

Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of  $\pm 1$  nm.

CROSSING TABLE	
VISHAY	OSRAM
VLMO30K1L2	LOT67K-K1L2
VLMO30K1M2	LOT67K-K1M2
VLMO30L1M2	LOT67K-L1M2
VLMS30J1K2	LST67K-J1K2
VLMS30J1L2	LST67K-J1L2
VLMS30K1L2	LST67K-K1L2
VLMY30J2L1	LYT67K-J2L1
VLMY30J2M1	LYT67K-J2M1
VLMY30K2M1	LYT67K-K2M1

## TYPICAL CHARACTERISTICS

$T_{amb} = 25^\circ\text{C}$ , unless otherwise specified

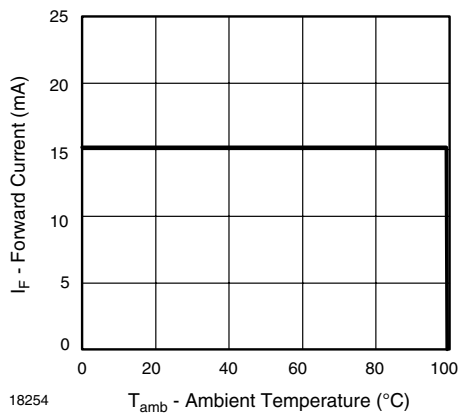


Figure 1. Forward Current vs. Ambient Temperature

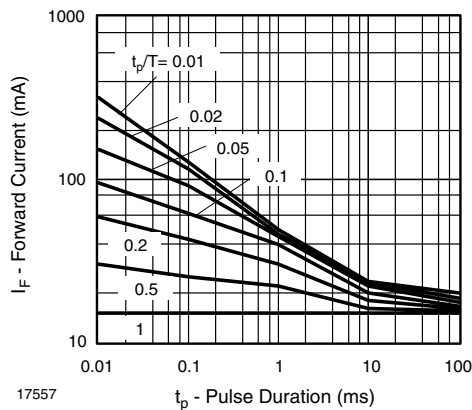


Figure 2. Forward Current vs. Pulse Length

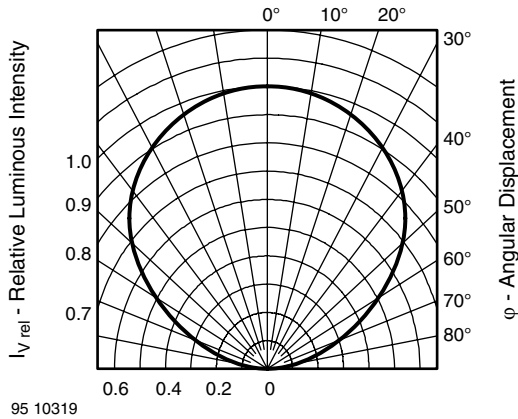


Figure 3. Rel. Luminous Intensity vs. Angular Displacement

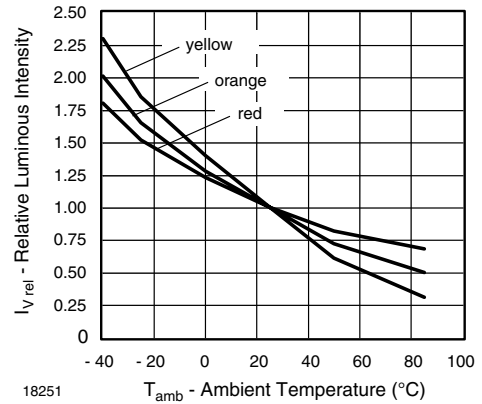


Figure 6. Rel. Luminous Intensity vs. Ambient Temperature

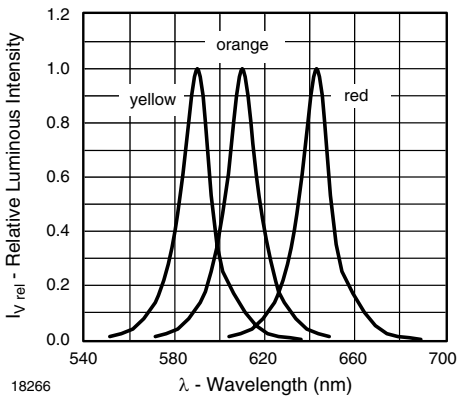


Figure 4. Relative Intensity vs. Wavelength

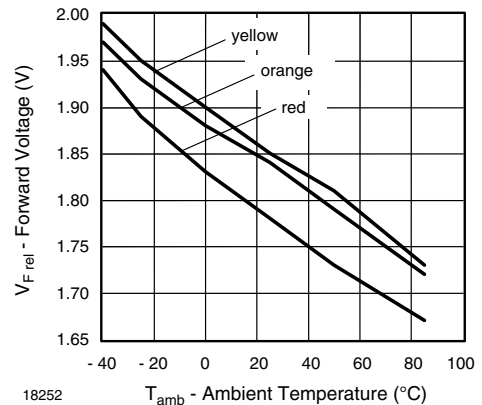


Figure 7. Forward Voltage vs. Ambient Temperature

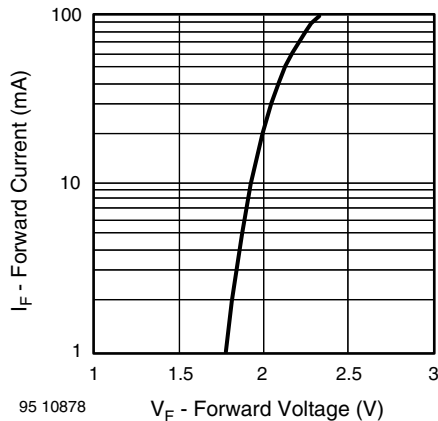
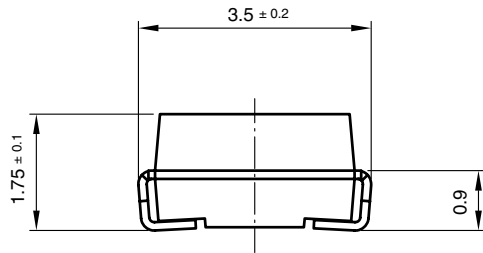
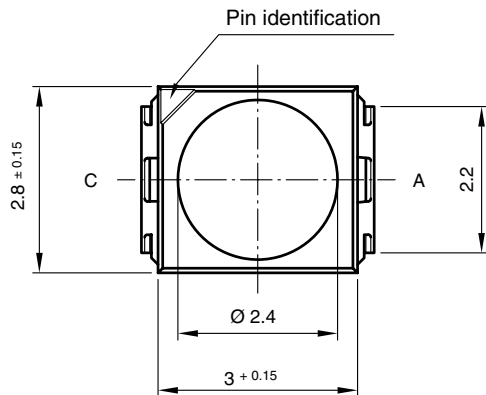


Figure 5. Forward Current vs. Forward Voltage

### PACKAGE DIMENSIONS in millimeters



technical drawings  
according to DIN  
specifications



### Mounting Pad Layout



Drawing-No.: 6.541-5067.01-4  
Issue: 5; 04.11.08  
20541

## METHOD OF TAPING/POLARITY AND TAPE AND REEL

### SMD LED (VLM.3 - SERIES)

Vishay's LEDs in SMD packages are available in an antistatic 8 mm blister tape (in accordance with DIN IEC 40 (CO) 564) for automatic component insertion. The blister tape is a plastic strip with impressed component cavities, covered by a top tape.



### REEL PACKAGE DIMENSION IN MILLIMETERS FOR SMD LEDS, TAPE OPTION GS08 (= 1500 PCS.)

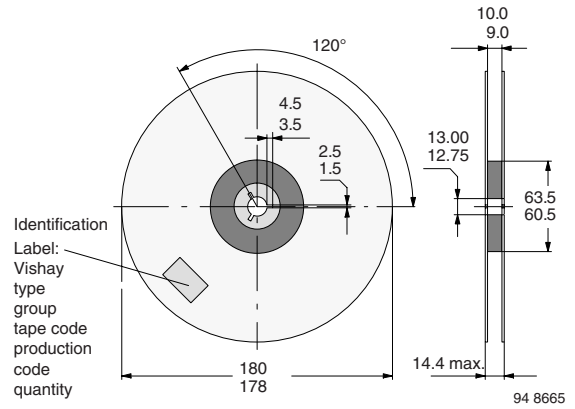


Figure 9. Reel Dimensions - GS08

### TAPING OF VLM.3...



Figure 8. Tape Dimensions in mm for PLCC-2

### REEL PACKAGE DIMENSION IN MILLIMETERS FOR SMD LEDS, TAPE OPTION GS18 (= 8000 PCS.) PREFERRED



Figure 10. Reel Dimensions - GS18

**SOLDERING PROFILE**

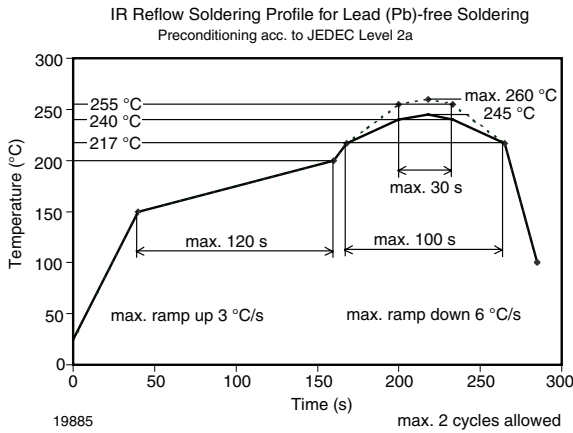


Figure 11. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

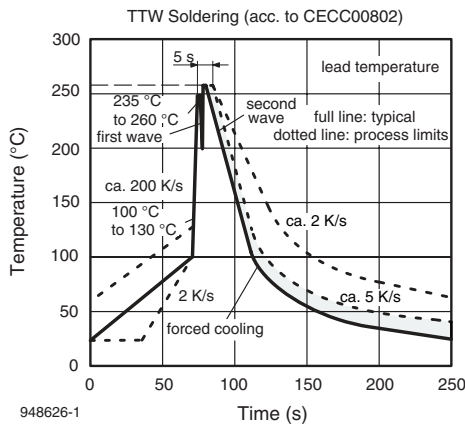
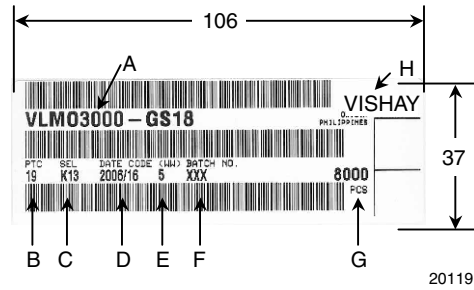


Figure 12. Double Wave Soldering of Opto Devices (all Packages)

**BAR CODE PRODUCT LABEL EXAMPLE:**



- A) Type of component
- B) Manufacturing plant
- C) SEL - selection code (bin):  
e.g.: K1 = code for luminous intensity group  
3 = code for color group
- D) Date code year/week
- E) Day code (e.g. 5: Friday)
- F) Batch no.
- G) Total quantity
- H) Company code





## Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.



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

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.