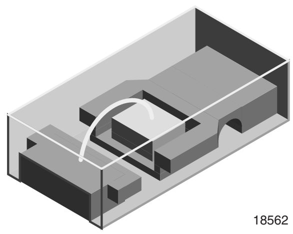
Standard 0603 SMD LED


18562

DESCRIPTION

The new 0603 LED series have been designed in the smallest SMD package. This innovative 0603 LED technology opens the way to

- smaller products of higher performance
- more design in flexibility
- enhanced applications

The 0603 LED is an obvious solution for small-scale, high power products that are expected to work reliability in an arduous environment.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD 0603
- Product series: standard
- Angle of half intensity: ± 80°

FEATURES

- Smallest SMD package 0603 with exceptional brightness
  1.6 mm x 0.8 mm x 0.6 mm (L x W x H)
- High reliability lead frame based
- Temperature range - 40 °C to + 100 °C
- Footprint compatible to 0603 chipled
- Wavelength 470 nm (blue), 570 nm (green), 560 nm (pure green), 587 nm (yellow), 606 nm (orange), 633 nm (red)
- AllnGaP and GaN technology
- Viewing angle: extremely wide 160°
- Grouping parameter: luminous intensity, wavelength
- Available in 8 mm tape
- Compatible to IR reflow soldering
- Preconditioning: acc. to JEDEC level 2
- AEC-Q101 qualified
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

e4

RoHS COMPLIANT

GREEN (5-2008)

APPLICATIONS

- Backlight keypads
- Navigation systems
- Cellular phone displays
- Displays for industrial control systems
- Automotive features
- Miniaturized color effects
- Traffic displays

PARTS TABLE

PART	COLOR	LUMINOUS INTENSITY (mcd)			at I_F (mA)	WAVELENGTH (nm)			FORWARD VOLTAGE (V)			TECHNOLOGY
		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
TLMS1100-GS08	Red	32	63	-	20	627	633	639	-	2.1	3.0	AllnGaP
TLMO1100-GS08	Orange	50	80	-	20	600	606	609	-	2.1	3.0	AllnGaP
TLMY1100-GS08	Yellow	50	80	-	20	580	587	595	-	2.1	3.0	AllnGaP
TLMG1100-GS08	Green	12.5	35	-	20	564	570	575	-	2.1	3.0	AllnGaP
TLMP1100-GS08	Pure green	6.3	15	-	20	551	558	566	-	2.1	3.0	AllnGaP
TLMB1100-GS08	Blue	4	5	-	10	-	466	-	-	3.9	4.5	InGaN

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified) **TLMS1100, TLMO1100, TLMY1100, TLMG1100, TLMP1100**				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Reverse voltage [(1)]		V_R	12	V
DC forward current	$T_{amb} \leq 75$ °C	I_F	30	mA
Surge forward current	$t_p \leq 10$ μs	I_{FSM}	0.5	A
Power dissipation		P_V	90	mW
Junction temperature		T_j	+ 120	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	acc. Vischay specification	T_{sd}	+ 260	°C
Thermal resistance junction/ambient	mounted on PC board (pad size > 5 mm^2)	R_{thJA}	480	K/W

Note

(1) Driving the LED in reverse direction is suitable for short term application

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified) **TLMB1100**				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Reverse voltage [(1)]		V_R	5	V
DC forward current	$T_{amb} \leq 60$ °C	I_F	15	mA
Surge forward current	$t_p \leq 10$ μs	I_{FSM}	0.1	A
Power dissipation		P_V	68	mW
Junction temperature		T_j	+ 100	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	acc. Vischay specification	T_{sd}	+ 260	°C
Thermal resistance junction/ambient	mounted on PC board (pad size > 5 mm^2)	R_{thJA}	480	K/W

Note

(1) Driving the LED in reverse direction is suitable for short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **TLMS1100, RED**						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 20 mA	I_V	32	63	-	mcd
Dominant wavelength	I_F = 20 mA	λ_d	627	633	639	nm
Peak wavelength	I_F = 20 mA	λ_p	-	645	-	nm
Angle of half intensity	I_F = 20 mA	φ	-	± 80	-	deg
Forward voltage	I_F = 20 mA	V_F	-	2.1	3.0	V
Reverse voltage	I_R = 10 μA	V_R	6	-	-	V
Junction capacitance	V_R = 0 V, f = 1 MHz	C_j	-	15	-	pF

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **TLMO1100, ORANGE**						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 20 mA	I_V	50	80	-	mcd
Dominant wavelength	I_F = 20 mA	λ_d	600	606	609	nm
Peak wavelength	I_F = 20 mA	λ_p	-	610	-	nm
Angle of half intensity	I_F = 20 mA	φ	-	± 80	-	deg
Forward voltage	I_F = 20 mA	V_F	-	2.1	3.0	V
Reverse voltage	I_R = 10 μA	V_R	6	-	-	V
Junction capacitance	V_R = 0 V, f = 1 MHz	C_j	-	15	-	pF

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **TLMY1100, YELLOW**						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 20 mA	I_V	50	80	-	mcd
Dominant wavelength	I_F = 20 mA	λ_d	580	587	595	nm
Peak wavelength	I_F = 20 mA	λ_p	-	572	-	nm
Angle of half intensity	I_F = 20 mA	φ	-	± 80	-	deg
Forward voltage	I_F = 20 mA	V_F	-	2.1	3.0	V
Reverse voltage	I_R = 10 μA	V_R	6	-	-	V
Junction capacitance	V_R = 0 V, f = 1 MHz	C_j	-	15	-	pF

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **TLMG1100, GREEN**						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 20 mA	I_V	12.5	35	-	mcd
Dominant wavelength	I_F = 20 mA	λ_d	564	570	575	nm
Peak wavelength	I_F = 20 mA	λ_p	-	572	-	nm
Angle of half intensity	I_F = 20 mA	φ	-	± 80	-	deg
Forward voltage	I_F = 20 mA	V_F	-	2.1	3.0	V
Reverse voltage	I_R = 10 μA	V_R	6	-	-	V
Junction capacitance	V_R = 0 V, f = 1 MHz	C_j	-	15	-	pF

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **TLMP1100, PURE GREEN**						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 20 mA	I_V	6.3	15	-	mcd
Dominant wavelength	I_F = 20 mA	λ_d	551	558	566	nm
Peak wavelength	I_F = 20 mA	λ_p	-	555	-	nm
Angle of half intensity	I_F = 20 mA	φ	-	± 80	-	deg
Forward voltage	I_F = 20 mA	V_F	-	2.1	3.0	V
Reverse voltage	I_R = 10 μA	V_R	6	-	-	V
Junction capacitance	V_R = 0 V, f = 1 MHz	C_j	-	15	-	pF

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **TLMB1100, BLUE**						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 10 mA	I_V	4	5	-	mcd
Dominant wavelength	I_F = 10 mA	λ_d	-	466	-	nm
Peak wavelength	I_F = 10 mA	λ_p	-	428	-	nm
Angle of half intensity	I_F = 10 mA	φ	-	± 80	-	deg
Forward voltage	I_F = 10 mA	V_F	-	3.9	4.5	V
Reverse voltage	I_R = 10 μA	V_R	5	-	-	V

LUMINOUS INTENSITY/FLUX CLASSIFICATION

GROUP	LUMINOUS INTENSITY I_V (mcd)	
	MIN.	MAX.
Pa	4	6.3
Pb	5	8
Qa	6.3	10
Qb	8	12.5
Ra	10	16
Rb	12.5	20
Sa	16	25
Sb	20	32
Ta	25	40
Tb	32	50
Ua	40	63
Ub	50	80
Va	63	100
Vb	80	125
Wa	100	160
Wb	125	200

Note

- Luminous intensity is tested at a current pulse duration of 25 ms.
  The above type numbers represent the order groups which include only a few brightness groups. Only one group will be shipped on each 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	DOM. WAVELENGTH (nm)									
	BLUE		PURE GREEN		GREEN		YELLOW		ORANGE	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
- 1	-	-	551	554	564	566	-	-	-	-
- 2	460	464	554	557	566	569	580	583	600	603
- 3	464	468	557	560	569	572	583	586	603	606
- 4	468	472	560	563	572	575	586	589	606	609
- 5	472	476	563	566	-	-	589	592	609	612
- 6	-	-	-	-	-	-	592	595	-	-

Note

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of ± 1 nm.

GROUP NAME ON LABEL

LUMINOUS INTENSITY GROUP	HALFGROUP	WAVELENGTH
Q	b	4

Note

- One packing unit/tape contains only one classification group of luminous intensity, color and forward voltage.
  Only one single classification groups is not available.
  The given groups are not order codes, customer specific group combinations require marketing agreement.
  No color subgrouping for super red.

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

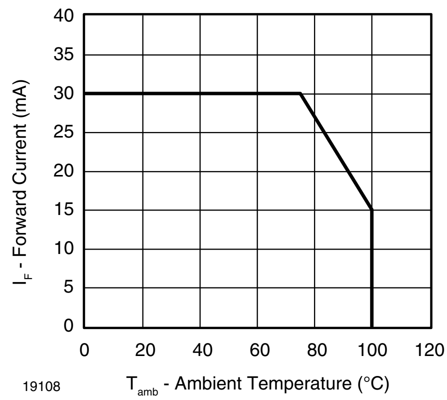


Fig. 1 - Forward Current vs. Ambient Temperature

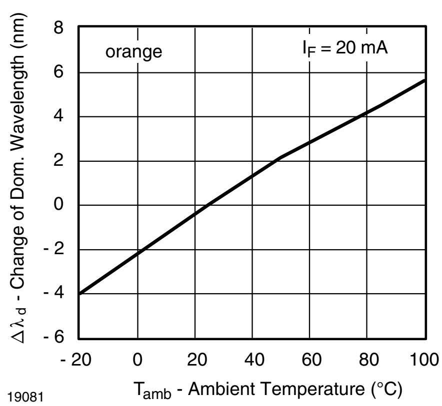


Fig. 2 - Change of Dominant Wavelength vs. Ambient Temperature

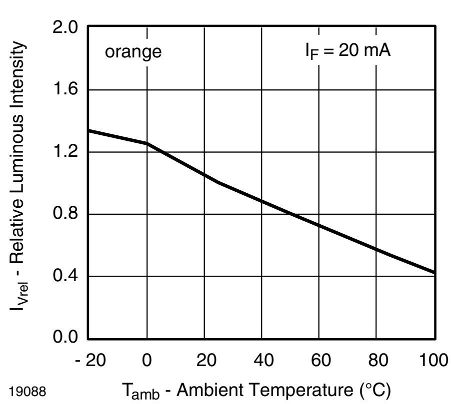


Fig. 3 - Relative Luminous Intensity vs. Ambient Temperature

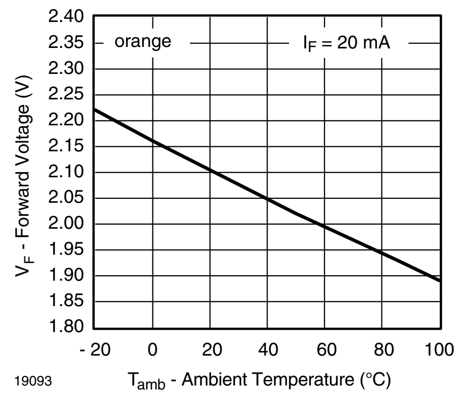


Fig. 4 - Forward Voltage vs. Ambient Temperature

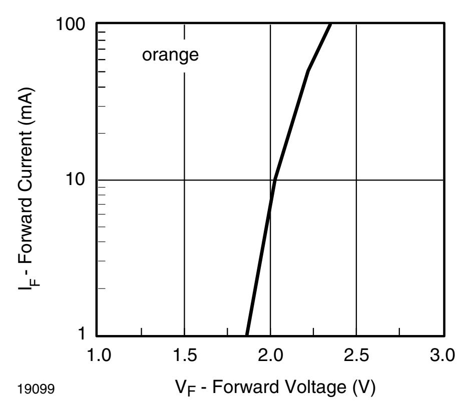


Fig. 5 - Forward Current vs. Forward Voltage

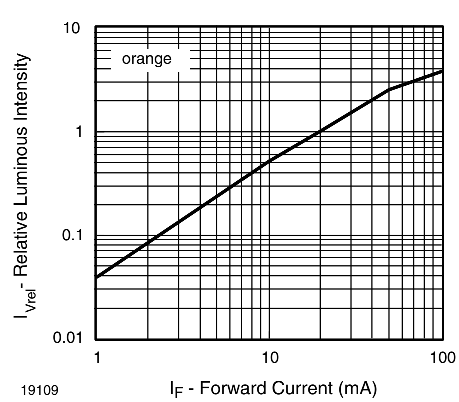


Fig. 6 - Relative Luminous Intensity vs. Forward Current

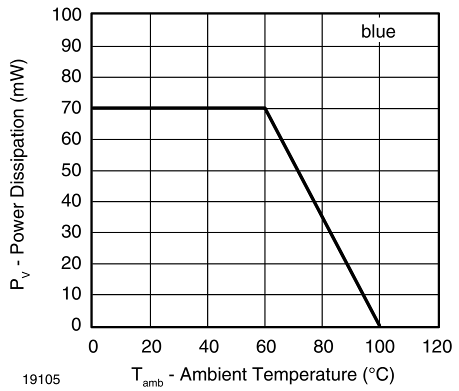


Fig. 7 - Power Dissipation vs. Ambient Temperature

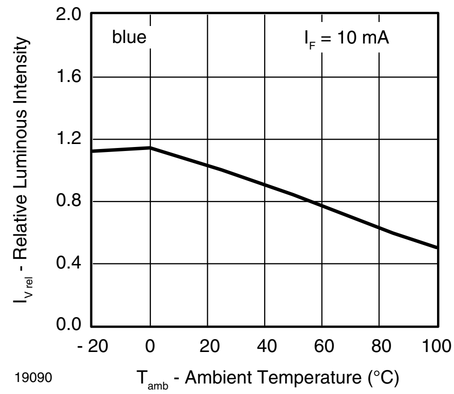


Fig. 10 - Relative Luminous Intensity vs. Ambient Temperature

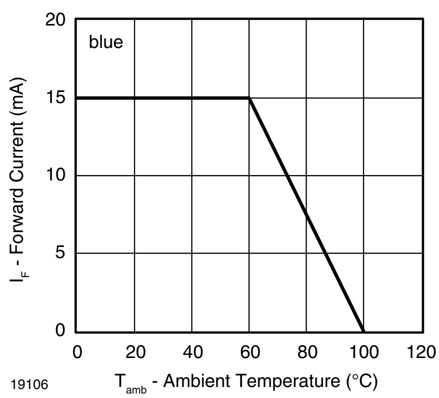


Fig. 8 - Forward Current vs. Ambient Temperature

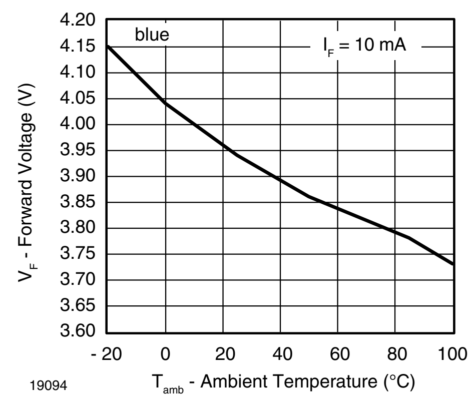


Fig. 11 - Forward Voltage vs. Ambient Temperature

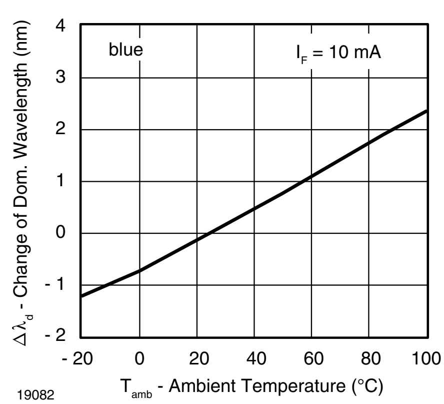


Fig. 9 - Change of Dominant Wavelength vs. Ambient Temperature

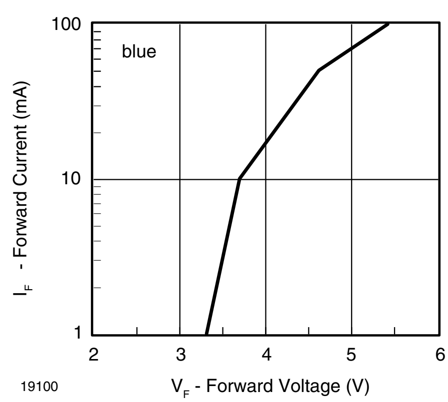


Fig. 12 - Forward Current vs. Forward Voltage

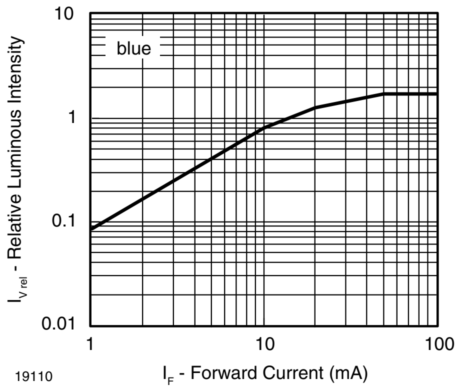


Fig. 13 - Relative Luminous Intensity vs. Forward Current

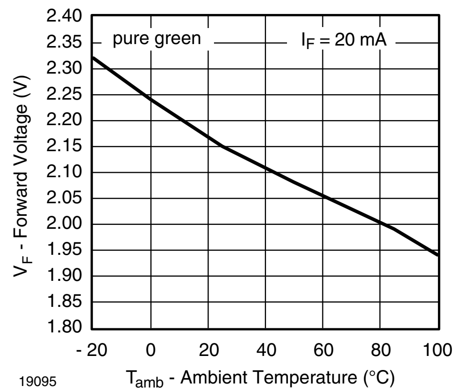


Fig. 16 - Forward Voltage vs. Ambient Temperature

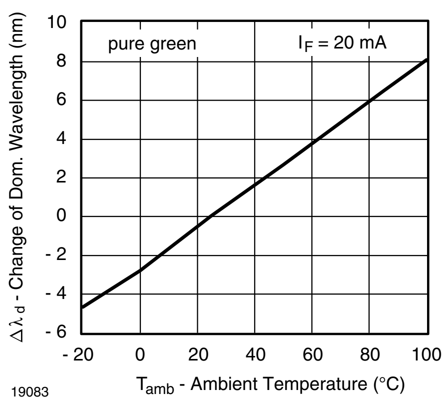


Fig. 14 - Change of Dominant Wavelength vs. Ambient Temperature

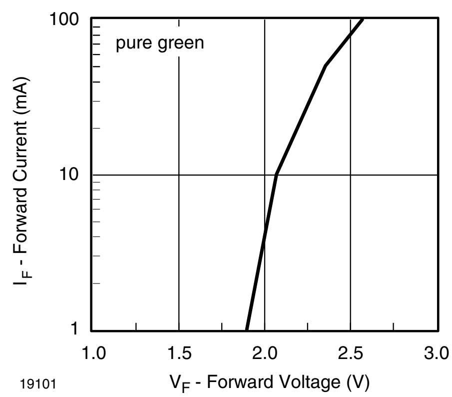


Fig. 17 - Forward Current vs. Forward Voltage

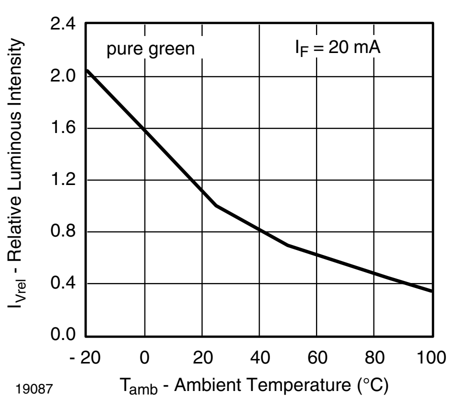


Fig. 15 - Relative Luminous Intensity vs. Ambient Temperature

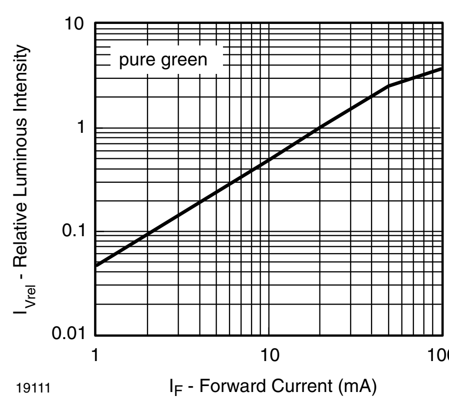


Fig. 18 - Relative Luminous Intensity vs. Forward Current

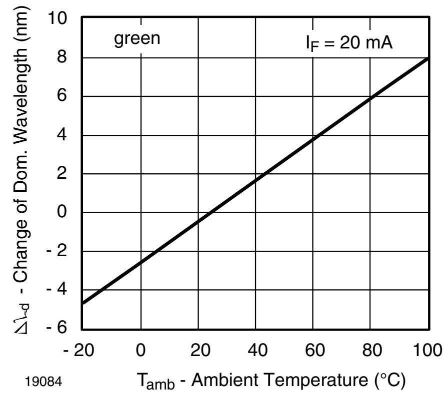


Fig. 19 - Change of Dominant Wavelength vs. Ambient Temperature

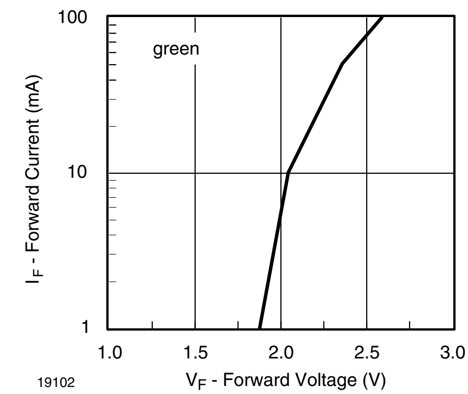


Fig. 22 - Forward Current vs. Forward Voltage

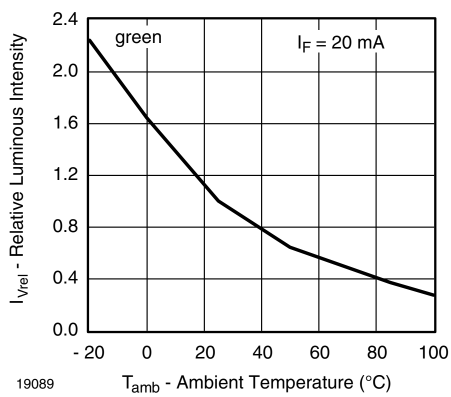


Fig. 20 - Relative Luminous Intensity vs. Ambient Temperature

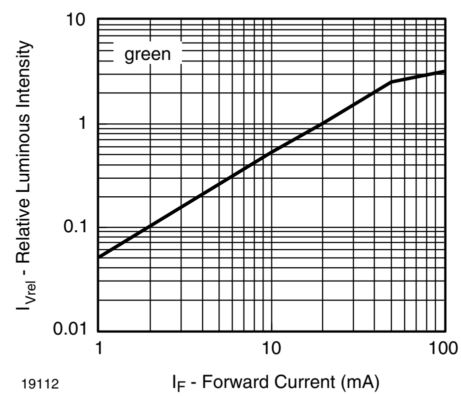


Fig. 23 - Relative Luminous Intensity vs. Forward Current

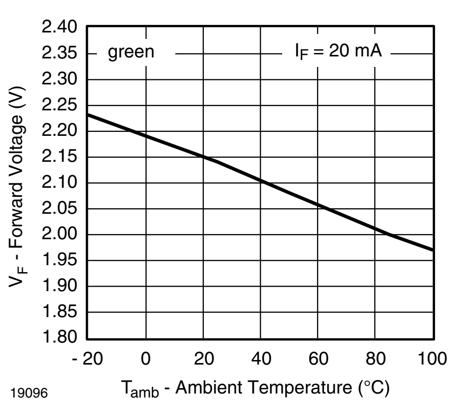


Fig. 21 - Forward Voltage vs. Ambient Temperature

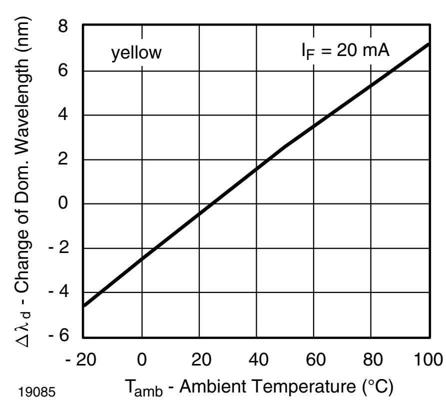


Fig. 24 - Change of Dominant Wavelength vs. Ambient Temperature

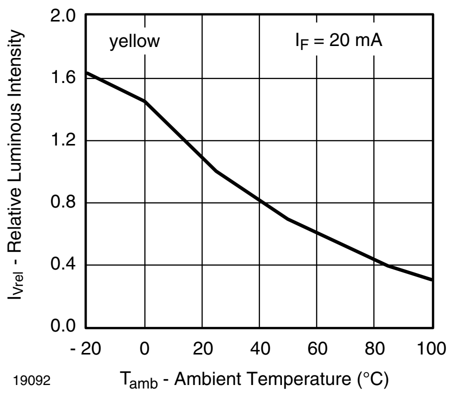


Fig. 25 - Relative Luminous Intensity vs. Ambient Temperature

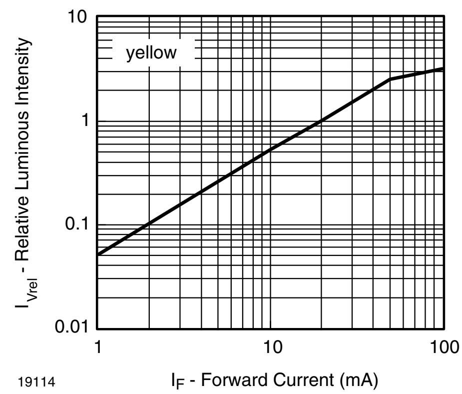


Fig. 28 - Relative Luminous Intensity vs. Forward Current

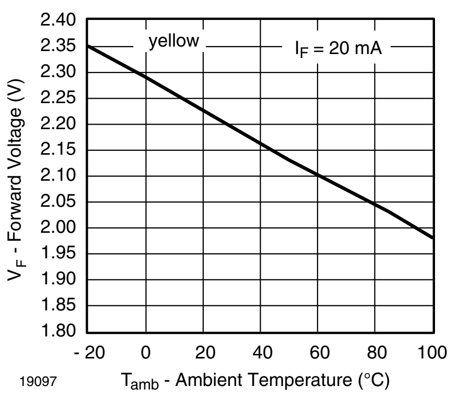


Fig. 26 - Forward Voltage vs. Ambient Temperature

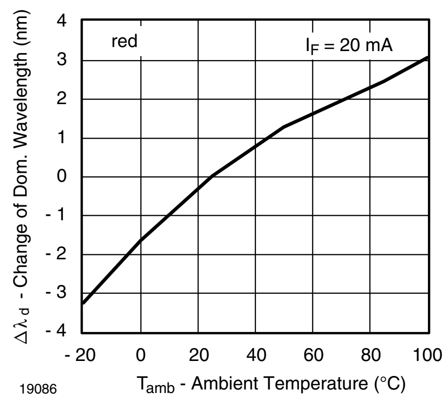


Fig. 29 - Change of Dominant Wavelength vs. Ambient Temperature

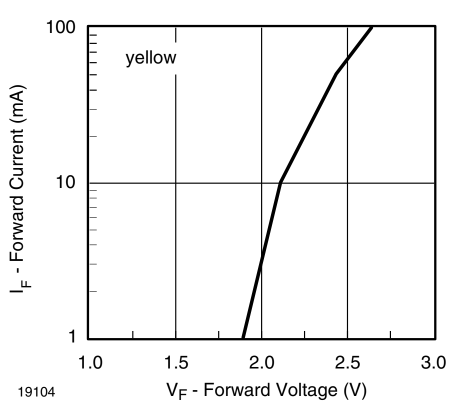


Fig. 27 - Forward Current vs. Forward Voltage

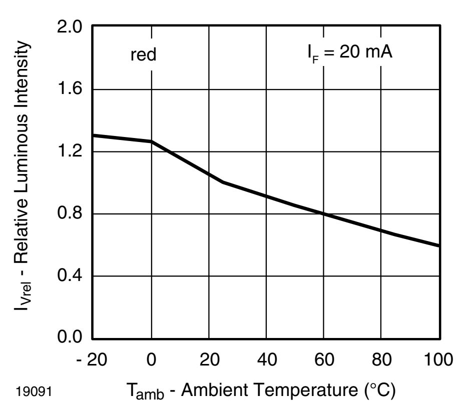


Fig. 30 - Relative Luminous Intensity vs. Ambient Temperature

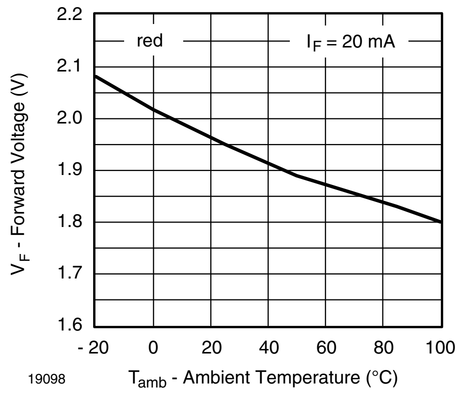


Fig. 31 - Forward Voltage vs. Ambient Temperature

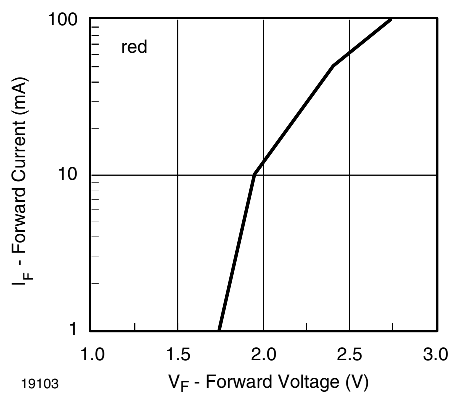


Fig. 32 - Forward Current vs. Forward Voltage

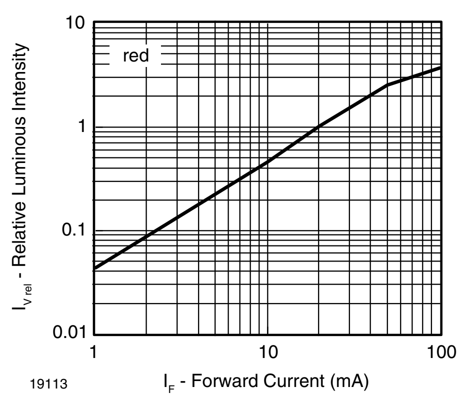
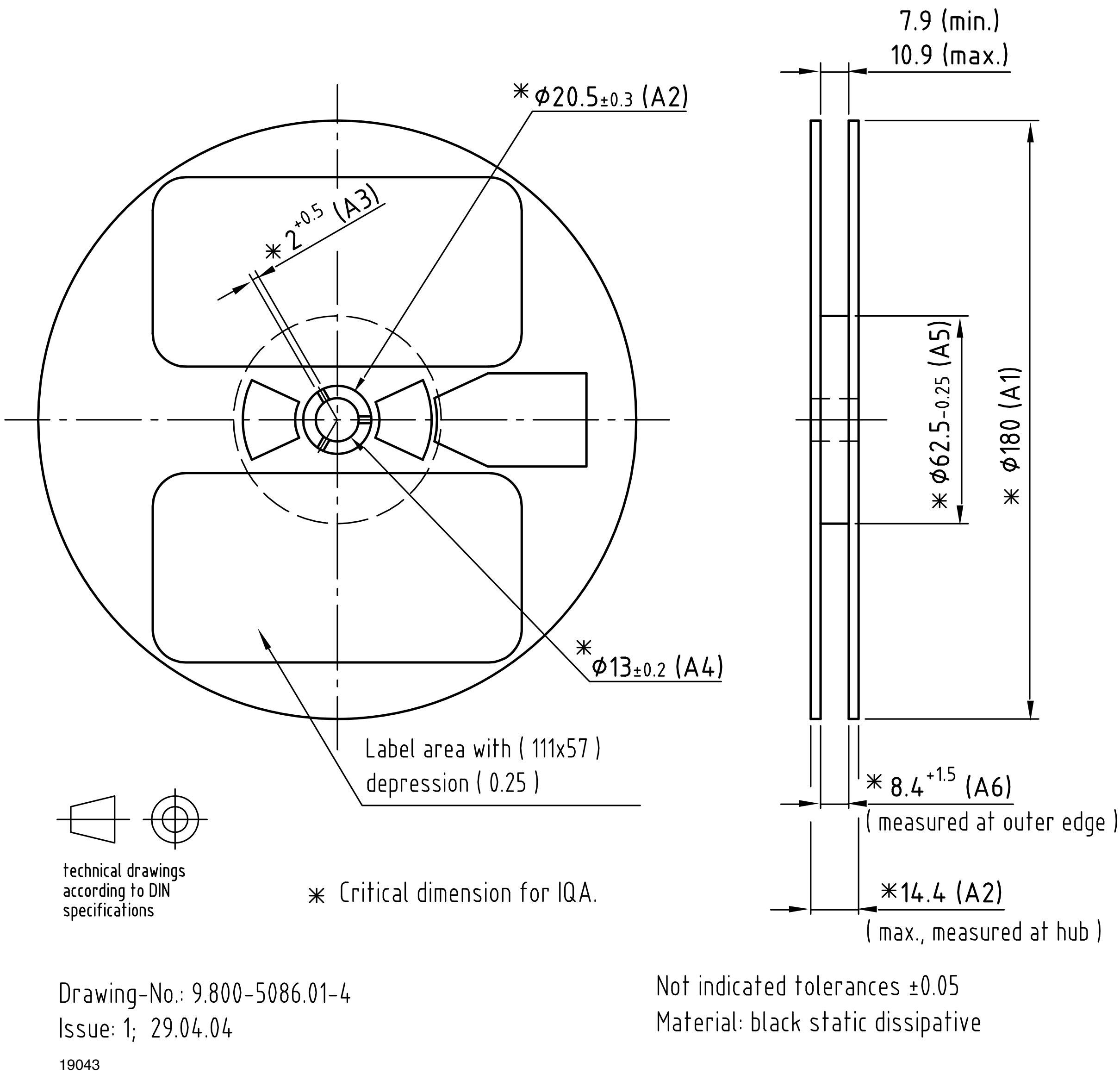
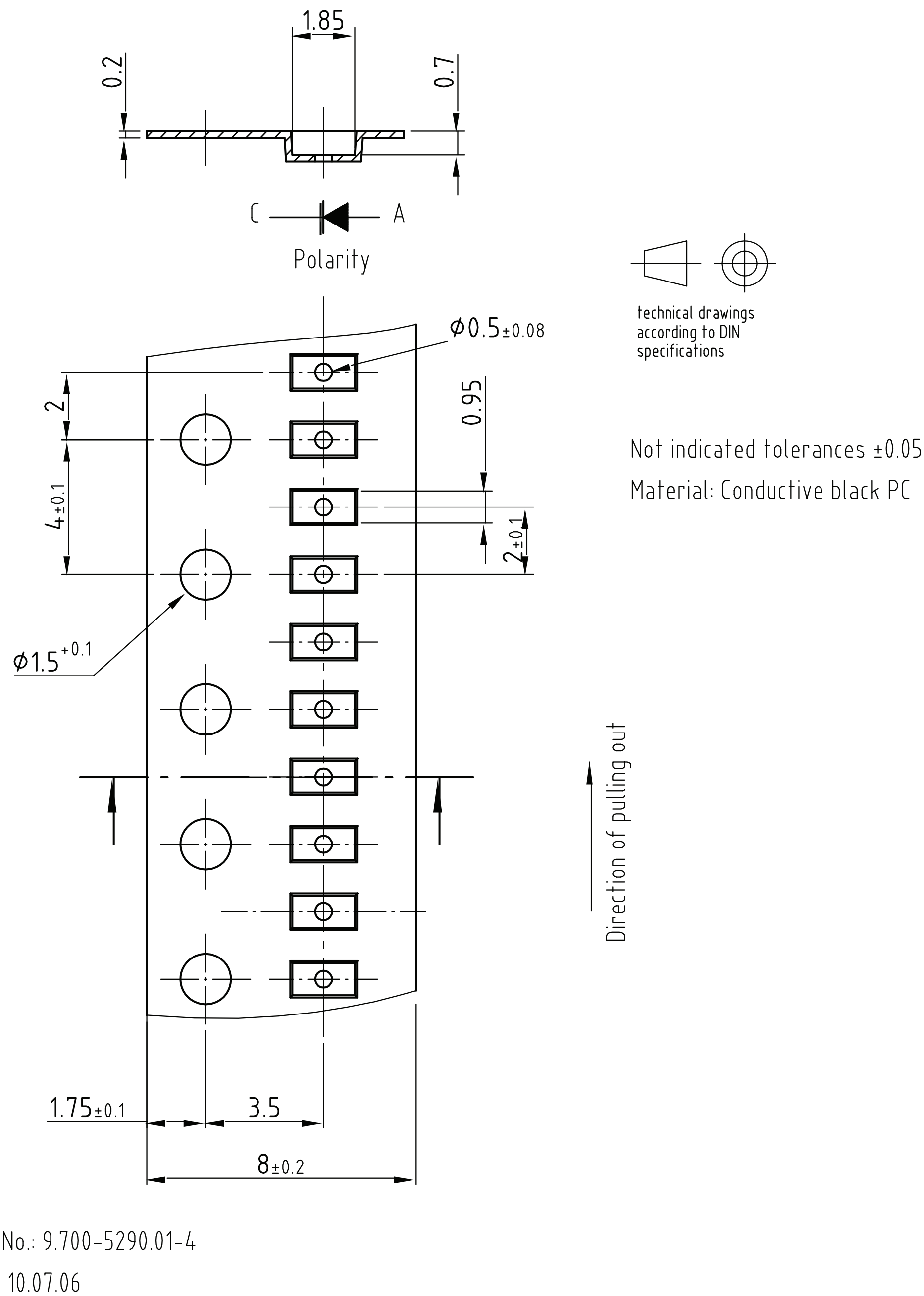


Fig. 33 - Relative Luminous Intensity vs. Forward Current

REEL DIMENSIONS in millimeters



TAPE DIMENSIONS in millimeters



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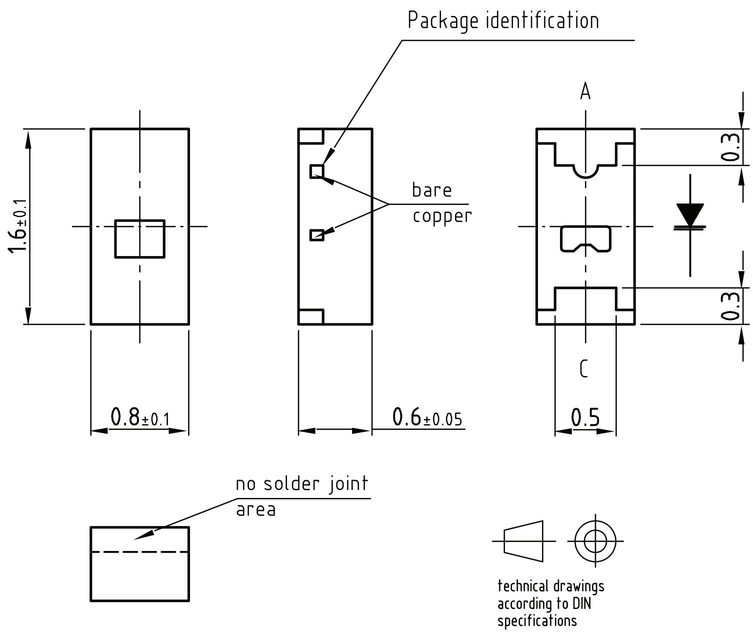
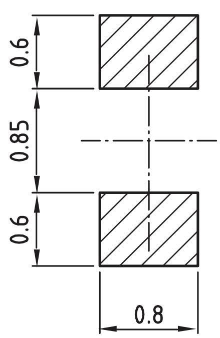
PACKAGE DIMENSIONS in millimeters



Not indicated tolerances ±0.1

Recommended solder pad



Drawing-No.: 6.541-5056.01-4

Issue: 2; 04.05.05

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SOLDERING PROFILE

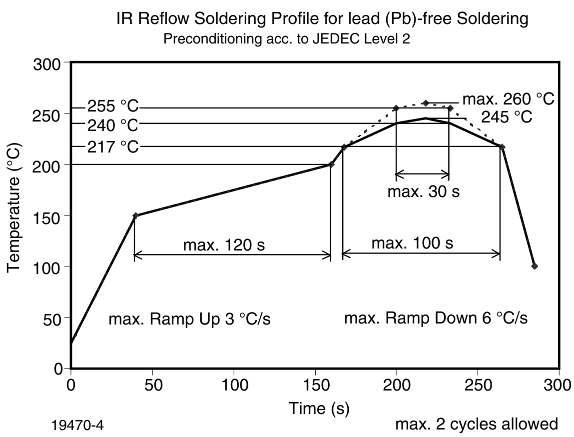
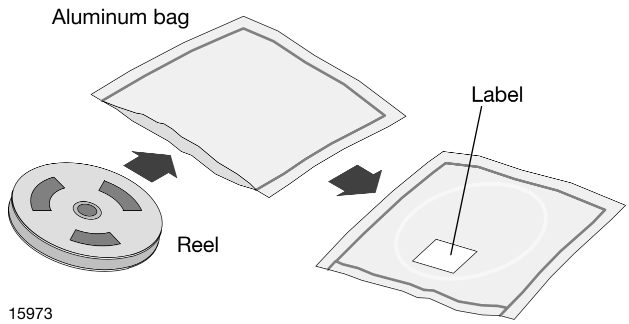


Fig. 34 - Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020C)

DRY PACKING

The reel is packed in an anti-humidity bag to protect the devices from absorbing moisture during transportation and storage.



FINAL PACKING

The sealed reel is packed into a cardboard box. A secondary cardboard box is used for shipping purposes.

RECOMMENDED METHOD OF STORAGE

Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

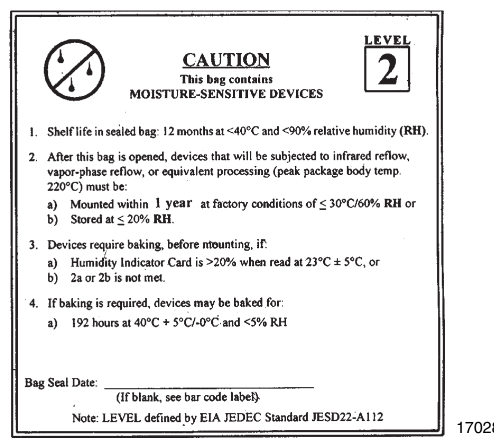
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

After more than 672 h under these conditions moisture content will be too high for reflow soldering.

In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

192 h at 40 °C + 5 °C/- 0 °C and < 5 % RH (dry air/nitrogen)
or
96 h at 60 °C + 5 °C and < 5 % RH for all device containers
or
24 h at 100 °C + 5 °C not suitable for reel or tubes.

An EIA JEDEC standard JESD22-A112 level 2a label is included on all dry bags.



Example of JESD22-A112 level 2 label

ESD PRECAUTION

Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the antistatic shielding bag. Electro-static sensitive devices warning labels are on the packaging.

VISHAY SEMICONDUCTORS STANDARD BAR CODE LABELS

The Vishay Semiconductors standard bar code labels are printed at final packing areas. The labels are on each packing unit and contain Vishay Semiconductors specific data.

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Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.

ООО «ЛайфЭлектроникс» **"LifeElectronics" LLC**

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

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С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

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- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
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- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

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