# Old Company Name in Catalogs and Other Documents

On April 1<sup>st</sup>, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1<sup>st</sup>, 2010 Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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# DATA SHEET

# PHOTOCOUPLER PS2561B-1,PS2561BL-1 PS2561BL1-1,PS2561BL2-1

# DIP PHOTOCOUPLER OPERATING AMBIENT TEMPERATURE 110°C -NEPOC Series-

#### DESCRIPTION

The PS2561B-1 is an optically coupled isolator containing a GaAs light emitting diode and an NPN silicon phototransistor.

The PS2561B-1 is in a plastic DIP (Dual In-line Package) and the PS2561BL-1 is lead bending type (Gull-wing) for surface mount.

The PS2561BL1-1 is lead bending type for long creepage distance.

The PS2561BL2-1 is lead bending type for long creepage distance (Gull-wing) for surface mount.

#### **FEATURES**

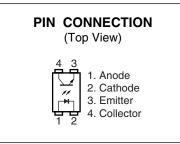
- Operating ambient temperature: 110°C
- High Isolation voltage (BV = 5 000 Vr.m.s.)
- High collector to emitter voltage (VCEO = 80 V)
- High current transfer ratio (CTR = 200% TYP.)
- High-speed switching (tr = 3  $\mu$ s TYP., tr = 5  $\mu$ s TYP.)
- <R> Ordering number of taping product: PS2561BL-1-F3 : 2 000 pcs/reel

: PS2561BL2-1-E3: 1 000 pcs/reel

- Pb-Free product
- <R> Safety standards
  - UL approved: No. E72422
  - CSA approved: No. CA 101391 (CA5A, CAN/CSA-C22.2 60065, 60950)
  - BSI approved: No. 7112/7420
  - SEMKO approved: No. 903238
  - NEMKO approved: No. P09210868
  - DEMKO approved: No. 314999
  - FIMKO approved: No. FI 25119
  - DIN EN60747-5-2 (VDE0884 Part2) approved: No. 40008862 (Option)

#### APPLICATIONS

- Power supply
- Telephone/FAX.
- FA/OA equipment
- Programmable logic controller



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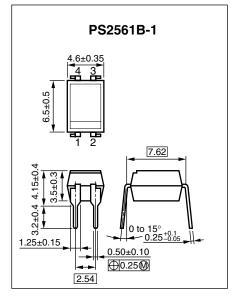
The mark <R> shows major revised points. © NEC Elect

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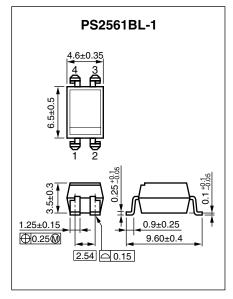
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

<R> PACKAGE DIMENSIONS (UNIT : mm)





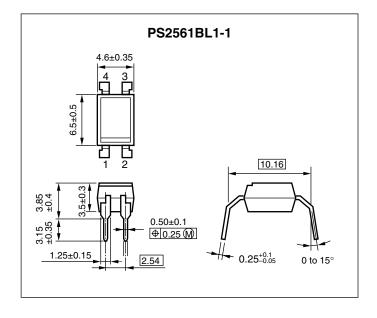
# Lead Bending Type (Gull-Wing)



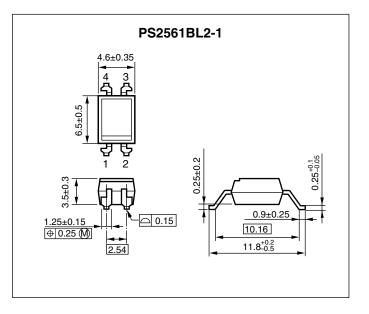
# <R> PHOTOCOUPLER CONSTRUCTION

Parameter	Unit (MIN.)
Air Distance	7 mm
Outer Creepage Distance	7 mm
Inner Creepage Distance	4 mm
Isolation Thickness	0.4 mm

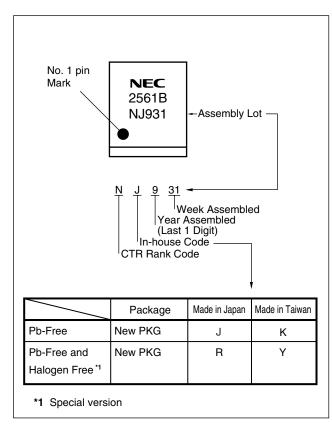
# Long Creepage Distance



# Long Creepage Distance (Gull-Wing)



<R> MARKING EXAMPLE



## <R> ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number <sup>*1</sup>
PS2561B-1	PS2561B-1-A	Pb-Free	Magazine case 100 pcs	Standard products	PS2561B-1
PS2561BL-1	PS2561BL-1-A			(UL, CSA, BSI,	
PS2561BL1-1	PS2561BL1-1-A			SEMKO, NEMKO,	
PS2561BL2-1	PS2561BL2-1-A			DEMKO, FIMKO	
PS2561BL-1-F3	PS2561BL-1-F3-A		Embossed Tape 2 000 pcs/reel	approved)	
PS2561BL2-1-E3	PS2561BL2-1-E3-A		Embossed Tape 1 000 pcs/reel		
PS2561B-1-V	PS2561B-1-V-A		Magazine case 100 pcs	DIN EN60747-5-2	
PS2561BL-1-V	PS2561BL-1-V-A			(VDE0884 Part2)	
PS2561BL1-1-V	PS2561BL1-1-V-A			approved	
PS2561BL2-1-V	PS2561BL2-1-V-A			(Option)	
PS2561BL-1-V-F3	PS2561BL-1-V-F3-A		Embossed Tape 2 000 pcs/reel		
PS2561BL2-1-V-E3	PS2561BL2-1-V-E3-A		Embossed Tape 1 000 pcs/reel		
PS2561B-1	PS2561B-1Y-A	Special version	Magazine case 100 pcs	Standard products	PS2561B-1
PS2561BL-1	PS2561BL-1Y-A	(Pb-Free and		(UL, CSA, BSI,	
PS2561BL1-1	PS2561BL1-1Y-A	Halogen Free)		SEMKO, NEMKO,	
PS2561BL2-1	PS2561BL2-1Y-A			DEMKO, FIMKO	
PS2561BL-1-F3	PS2561BL-1Y-F3-A		Embossed Tape 2 000 pcs/reel	approved)	
PS2561BL2-1-E3	PS2561BL2-1Y-E3-A		Embossed Tape 1 000 pcs/reel		
PS2561B-1-V	PS2561B-1Y-V-A		Magazine case 100 pcs	DIN EN60747-5-2	
PS2561BL-1-V	PS2561BL-1Y-V-A			(VDE0884 Part2)	
PS2561BL1-1-V	PS2561BL1-1Y-V-A			approved	
PS2561BL2-1-V	PS2561BL2-1Y-V-A			(Option)	
PS2561BL-1-V-F3	PS2561BL-1Y-V-F3-A		Embossed Tape 2 000 pcs/reel	]	
PS2561BL2-1-V-E3	PS2561BL2-1Y-V-E3-A		Embossed Tape 1 000 pcs/reel		

\*1 For the application of the Safety Standard, following part number should be used.

	Parameter		Ratings	Unit
Diode	Reverse Voltage	VR	6	V
	Forward Current (DC)	lf	40	mA
	Power Dissipation Derating	⊿Po/°C	1.5	mW/°C
	Power Dissipation	PD	150	mW
	Peak Forward Current <sup>1</sup>	IFP	1	А
Transistor	Collector to Emitter Voltage	VCEO	80	V
	Emitter to Collector Voltage	VECO	7	V
	Collector Current	lc	50	mA
	Power Dissipation Derating	⊿Pc/°C	1.5	mW/°C
	Power Dissipation	Pc	150	mW
Isolation Voltage <sup>*2</sup>		BV	5 000	Vr.m.s.
Operating Ambient Temperature		TA	–55 to +110	°C
Storage Temperature		Tstg	–55 to +150	°C

# ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C, unless otherwise specified)

\*1 PW = 100  $\mu$ s, Duty Cycle = 1%

\*2 AC voltage for 1 minute at  $T_A = 25^{\circ}$ C, RH = 60% between input and output. Pins 1-2 shorted together, 3-4 shorted together.

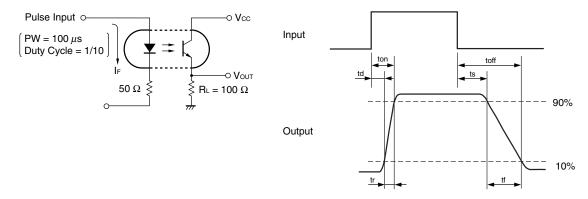
	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	VF	IF = 10 mA		1.17	1.4	V
	Reverse Current	IR	$V_R = 5 V$			5	μA
	Terminal Capacitance	Ct	V = 0 V, f = 1.0 MHz		50		pF
Transistor	Collector to Emitter Dark Current	Iceo	Vce = 48 V, IF = 0 mA			100	nA
Coupled	Current Transfer Ratio	CTR	IF = 5 mA, Vce = 5 V	100	200	400	%
	(Ic/IF) <sup>*1</sup>		IF = 1 mA, Vce = 5 V	50	100		
	Collector Saturation Voltage	VCE (sat)	IF = 10 mA, Ic = 2 mA			0.3	V
	Isolation Resistance	Ri-o	VI-O = 1.0 kVDC	10 <sup>11</sup>			Ω
	Isolation Capacitance	CI-O	V = 0 V, f = 1.0 MHz		0.5		pF
	Rise Time <sup>⁺₂</sup>	tr	$V_{CC}$ = 10 V, Ic = 2 mA, RL = 100 $\Omega$		3		μs
	Fall Time <sup><sup>2</sup></sup>	tr			5		

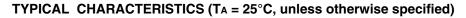
# **ELECTRICAL CHARACTERISTICS (TA = 25°C)**

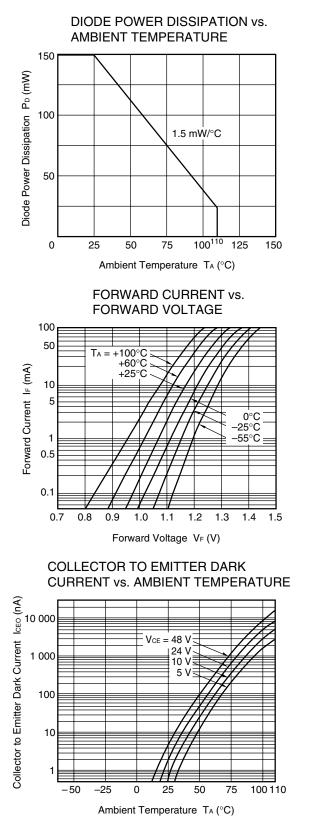
# \*1 CTR rank

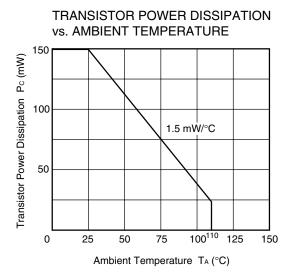
CTR Rank	CTR (%)	Conditions
	100 to 200	I⊧ = 5 mA, Vcε = 5 V
Q	50 and larger	I⊧ = 1 mA, Vcε = 5 V
14/	130 to 260	I⊧ = 5 mA, Vcε = 5 V
W	70 and larger	I⊧ = 1 mA, Vcε = 5 V
D	100 to 300	I⊧ = 5 mA, Vcε = 5 V
	50 and larger	I⊧ = 1 mA, Vcε = 5 V
	200 to 400	I⊧ = 5 mA, Vcε = 5 V
L	100 and larger	I⊧ = 1 mA, Vcε = 5 V
N	100 to 400	I⊧ = 5 mA, Vcε = 5 V
IN	50 and larger	IF = 1 mA, VCE = 5 V

#### \*2 Test circuit for switching time

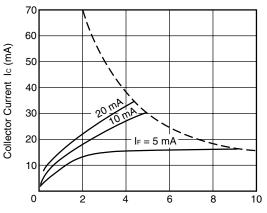






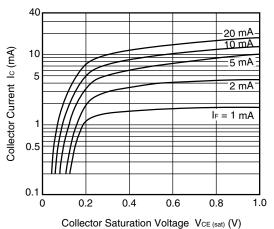


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

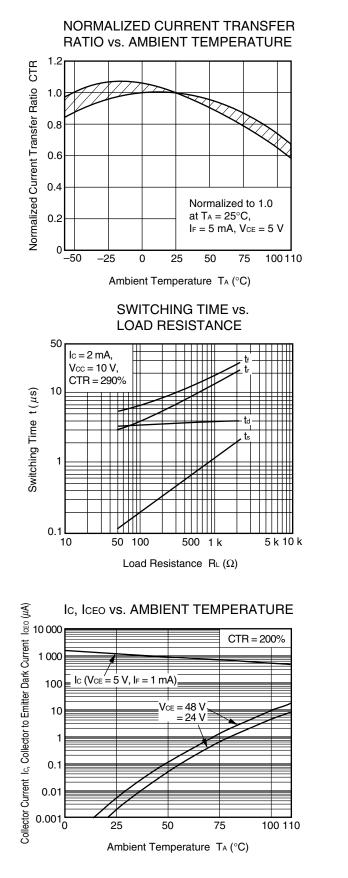


Collector to Emitter Voltage VCE (V)

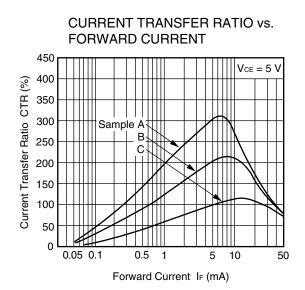
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



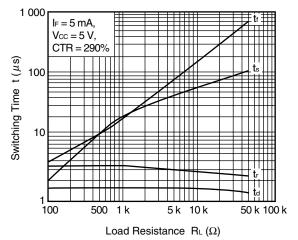
**Remark** The graphs indicate nominal characteristics.



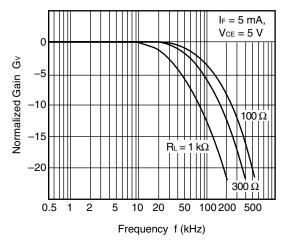
**Remark** The graphs indicate nominal characteristics.

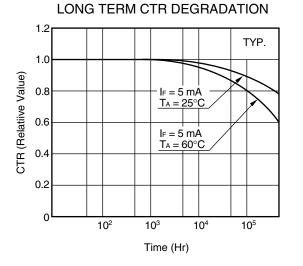


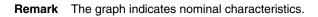
SWITCHING TIME vs. LOAD RESISTANCE



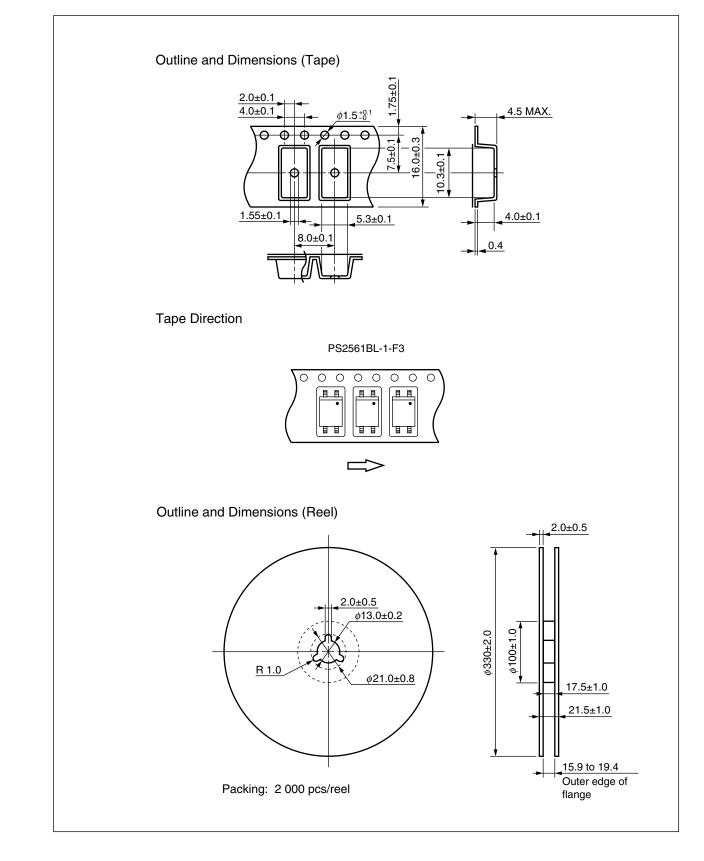
### FREQUENCY RESPONSE

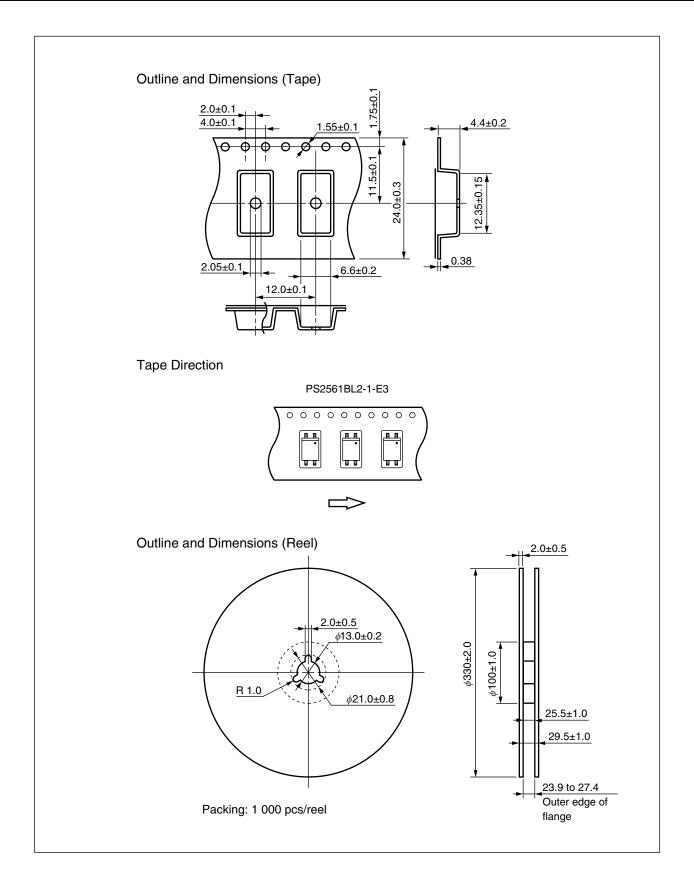






### <R> TAPING SPECIFICATIONS (UNIT : mm)





# NOTES ON HANDLING

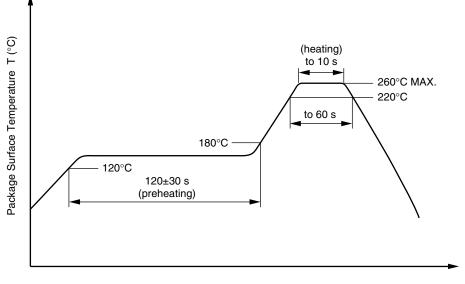
#### 1. Recommended soldering conditions

### (1) Infrared reflow soldering

- Peak reflow temperature
- Time of peak reflow temperature
- Time of temperature higher than 220°C
- Time to preheat temperature from 120 to 180°C
- Number of reflows
- Flux

260°C or below (package surface temperature) 10 seconds or less 60 seconds or less 120±30 s Three Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

#### Recommended Temperature Profile of Infrared Reflow



Time (s)

#### (2) Wave soldering

- Temperature 260°C or below (molten solder temperature)
- Time 10 seconds or less
- Preheating conditions 120°C or below (package surface temperature)
- Number of times One (Allowed to be dipped in solder including plastic mold portion.)
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

#### (3) Soldering by soldering iron

Peak temperature (lead part temperature)	350°C or below
Time (each pins)	3 seconds or less
• Flux	Rosin flux containing small amount of chlorine (The flux with a
	maximum chlorine content of 0.2 Wt% is recommended.)

- (a) Soldering of leads should be made at the point 1.5 to 2.0 mm from the root of the lead.
- (b) Please be sure that the temperature of the package would not be heated over 100°C.

#### (4) Cautions

#### Fluxes

Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.

#### 2. Cautions regarding noise

Be aware that when voltage is applied suddenly between the photocoupler's input and output or between corrector-emitters at startup, the output transistor may enter the on state, even if the voltage is within the absolute maximum ratings.

#### 3. Measurement conditions of current transfer ratios (CTR), which differ according to photocoupler

Check the setting values before use, since the forward current conditions at CTR measurement differ according to product.

When using products other than at the specified forward current, the characteristics curves may differ from the standard curves due to CTR value variations or the like. Therefore, check the characteristics under the actual operating conditions and thoroughly take variations or the like into consideration before use.

## USAGE CAUTIONS

- 1. Protect against static electricity when handling.
- 2. Avoid storage at a high temperature and high humidity.

## <R> SPECIFICATION OF VDE MARKS LICENSE DOCUMENT

Parameter	Symbol	Spec.	Unit
Climatic test class (IEC 60068-1/DIN EN 60068-1)		55/100/21	
Dielectric strength maximum operating isolation voltage Test voltage (partial discharge test, procedure a for type test and random test) $U_{pr} = 1.5 \times U_{IORM}, P_d < 5 \text{ pC}$	Uiorm Upr	890 1 335	V <sub>peak</sub> V <sub>peak</sub>
Test voltage (partial discharge test, procedure b for all devices) $U_{\text{pr}}$ = 1.875 $\times$ U_{IORM}, $P_{\text{d}}$ < 5 pC	Upr	1 669	V <sub>peak</sub>
Highest permissible overvoltage	Utr	8 000	Vpeak
Degree of pollution (DIN EN 60664-1 VDE0110 Part 1)		2	
Comparative tracking index (IEC 60112/DIN EN 60112 (VDE 0303 Part 11))	CTI	175	
Material group (DIN EN 60664-1 VDE0110 Part 1)		III a	
Storage temperature range	Tstg	-55 to +150	°C
Operating temperature range	TA	-55 to +100	°C
Isolation resistance, minimum value $V_{IO} = 500 \text{ V dc at } T_A = 25^{\circ}\text{C}$ $V_{IO} = 500 \text{ V dc at } T_A \text{ MAX. at least } 100^{\circ}\text{C}$	Ris MIN. Ris MIN.	10 <sup>12</sup> 10 <sup>11</sup>	Ω Ω
Safety maximum ratings (maximum permissible in case of fault, see thermal derating curve) Package temperature Current (input current IF, Psi = 0) Power (output or total power dissipation) Isolation resistance	Tsi Isi Psi	175 400 700	°C mA mW
V <sub>IO</sub> = 500 V dc at T <sub>A</sub> = Tsi	Ris MIN.	10 <sup>°</sup>	Ω

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M8E0904E

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	<ol> <li>Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials.</li> </ol>
	2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal.
	• Do not burn, destroy, cut, crush, or chemically dissolve the product.
	• Do not lick the product or in any way allow it to enter the mouth.

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Authorized Distributor

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Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.З, офис 1107

# Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

# http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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