

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

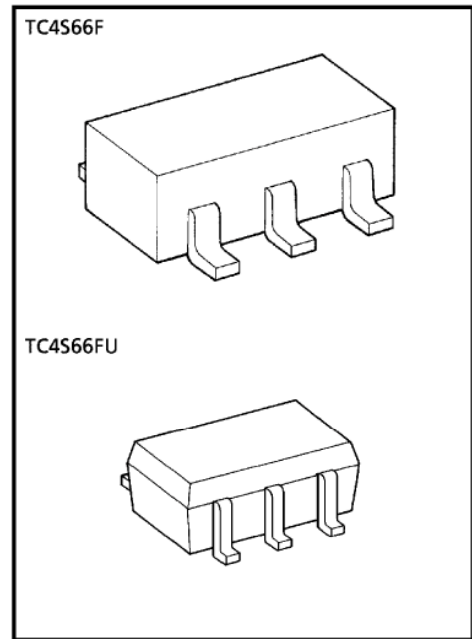
TC4S66F, TC4S66FU

BILATERAL SWITCH

TC4S66F/FU contains one circuit of bidirectional switches. When control input, CONT is set to "H" level, the impedance between input and output of the switch becomes low and when it is set to "L" level, the switch becomes high. This can be applied for switching of analog signals and digital signals.

FEATURES

- ON-resistance (R_{ON})
 - 300 Ω (Typ.) $V_{DD} - V_{SS} = 5\text{ V}$
 - 110 Ω (Typ.) $V_{DD} - V_{SS} = 10\text{ V}$
 - 70 Ω (Typ.) $V_{DD} - V_{SS} = 15\text{ V}$
- OFF-resistance (R_{OFF})
 - R_{OFF} (Typ.) $> 10^9\ \Omega$



Weight
 SSOP5-P-0.95 : 0.016 g (Typ.)
 SSOP5-P-0.65A : 0.006 g (Typ.)

MAXIMUM RATINGS

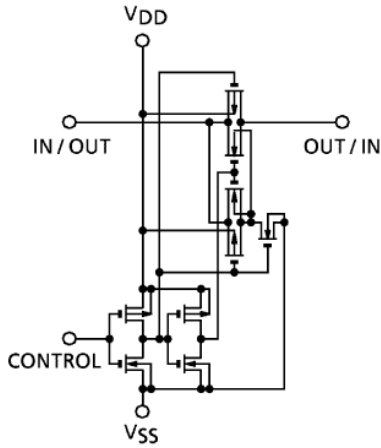
CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V_{DD}	$V_{SS} - 0.5 \sim V_{SS} + 20$	V
Control Input Voltage	$V_{C\ IN}$	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
Switch I/O Voltage	$V_{I/O}$	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
Power Dissipation	P_D	200	mW
Potential difference across I/O during ON	$V_I - V_O$	± 0.5	V
Control Input Current	$I_{C\ IN}$	± 10	mA
Operating Temperature Range	T_{opr}	-40~85	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-65~150	$^{\circ}\text{C}$
Lead Temperature (10 s)	T_L	260	$^{\circ}\text{C}$

TRUTH TABLE

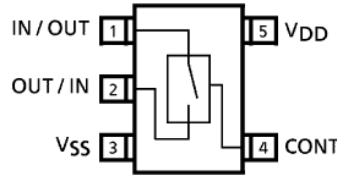
CONTROL	IMPEDANCE BETWEEN IN/OUT-OUT/IN *
H	$0.5 \sim 5 \times 10^2\ \Omega$
L	$> 10^9\ \Omega$

* : See static electrical characteristics.

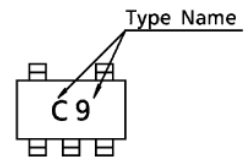
CIRCUIT DIAGRAM



PIN ASSIGNMENT (TOP VIEW)



MARKING



RECOMMENDED OPERATING CONDITIONS ($V_{SS} = 0\text{ V}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
DC Supply Voltage	V_{DD}	3	—	18	V
Input/Output Voltage	V_{IN}/V_{OUT}	0	—	V_{DD}	V

STATIC ELECTRICAL CHARACTERISTICS (In case not specifically appointed, $V_{SS} = 0\text{ V}$)

CHARACTERISTIC	SYM-BOL	TEST CONDITION	V_{DD} (V)	-40°C		25°C			85°C		UNIT
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
Control Input High Voltage	V_{IH}	$ I_{IS} = 10\ \mu\text{A}$	5	3.5	—	3.5	2.75	—	3.5	—	V
			10	7.0	—	7.0	5.50	—	7.0	—	
			15	11.0	—	11.0	8.25	—	11.0	—	
Control Input Low Voltage	V_{IL}	$ I_{IS} = 10\ \mu\text{A}$	5	—	1.5	—	2.25	1.5	—	1.5	V
			10	—	3.0	—	4.5	3.0	—	3.0	
			15	—	4.0	—	6.75	4.0	—	4.0	
On-State Resistance	R_{ON}	$0 \leq V_{IS} \leq V_{DD}$ $R_L = 10\ \text{k}\Omega$	5	—	800	—	290	950	—	1200	Ω
			10	—	210	—	120	250	—	300	
			15	—	140	—	85	160	—	200	
Input/Output Leakage Current	I_{OFF}	$V_{IN} = 18\text{ V}$ $V_{OUT} = 0\text{ V}$ $V_{IN} = 0\text{ V}$ $V_{OUT} = 18\text{ V}$	18	—	± 100	—	± 0.1	± 100	—	± 1000	nA
			18	—	± 100	—	± 0.1	± 100	—	± 1000	
Quiescent Device Current	I_{DD}	$V_{IN} = V_{DD}, V_{SS}$	5	—	0.25	—	0.001	0.25	—	7.5	μA
			10	—	0.5	—	0.001	0.5	—	15	
			15	—	1.0	—	0.002	1.0	—	30	
Input Current	H Level	I_{IH}	$V_{IH} = 18\text{ V}$	18	—	0.1	—	10^{-5}	0.1	—	μA
	L Level	I_{OL}	$V_{IL} = 0\text{ V}$	18	—	-0.1	—	-10^{-5}	-0.1	—	

DYNAMIC ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	V _{SS} (V) / V _{DD} (V)		MIN.	TYP.	MAX.	UNIT
			V _{SS} (V)	V _{DD} (V)				
Propagation Delay Time (IN-OUT)	t _{pLH} t _{pHL}	C _L = 50 pF	0	5	—	15	40	ns
			0	10	—	8	20	
			0	15	—	5	15	
Propagation Delay Time (CONTROL-OUT)	t _{pZL} t _{pZH}	R _L = 1 kΩ	0	5	—	55	120	
		C _L = 50 pF	0	10	—	25	40	
			0	15	—	20	30	
Propagation Delay Time (CONTROL-OUT)	t _{pLZ} t _{pHZ}	R _L = 1 kΩ C _L = 50 pF	0	5	—	45	80	
			0	10	—	30	70	
			0	15	—	25	60	
Max. Control Input Repetition Rate	f _{MAX} (C)	R _L = 1 kΩ C _L = 50 pF	0	5	—	10	—	MHz
			0	10	—	12	—	
			0	15	—	12	—	
-3dB Cut Off Frequency	f _{MAX} (I/O)	R _L = 1 kΩ C _L = 50 pF (*1)	-5	5	—	30	—	
Total Harmonic Distortion	—	R _L = 10 kΩ f = 1 kHz (*2)	-5	5	—	0.03	—	%
-50dB Feedthrough Frequency	—	R _L = 1 kΩ (*3)	-5	5	—	600	—	kHz
Crosstalk (CONTROL-OUT)	—	R _{IN} = 1 kΩ R _{OUT} = 10 kΩ C _L = 15 pF	0	5	—	200	—	mV
			0	10	—	400	—	
			0	15	—	600	—	
Input Capacitance	C _{IN}	Control Input	—	—	—	5	7.5	pF
		Switch I/O	—	—	—	10	—	
Feedthrough Capacitance	C _{IN-OUT}	—	—	—	—	0.5	—	

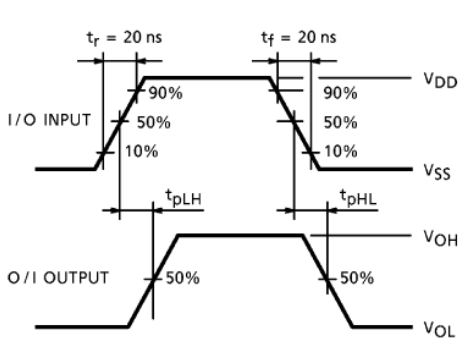
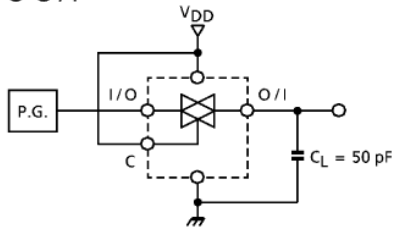
*1 : The frequency at $20\log_{10} \frac{V_{OS}}{V_{IS}} = -3$ dB shall be f_{MAX} (I/O) using sine wave of ±2.5 V_{p-p} for V_{IS}.

*2 : V_{IS} shall be sine wave of ±2.5 V.

*3 : The frequency at $20\log_{10} \frac{V_{OS}}{V_{IS}} = 50$ dB shall be the feed through using of ±2.5 V_{p-p}.

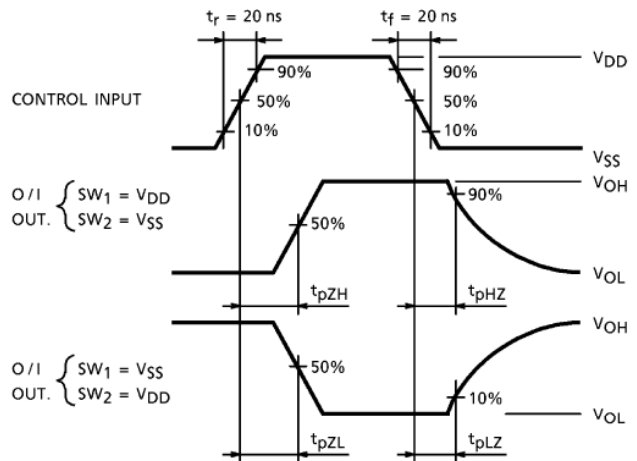
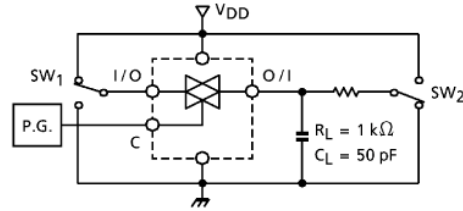
1. t_{pLH} , t_{pHL}

I/O-O/I

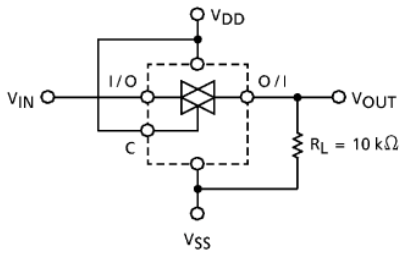


2. t_{pZL} , t_{pZH} , t_{pLZ} , t_{pHZ}

CONTROL-O/I

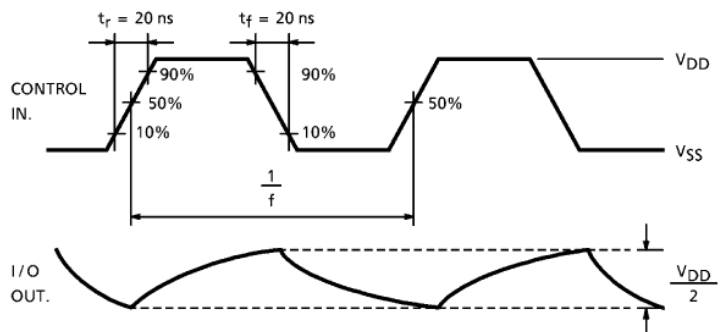
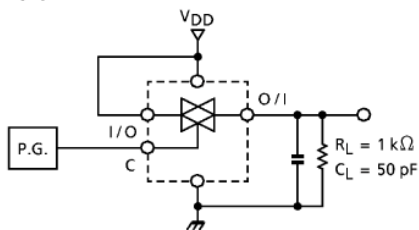


3. RON

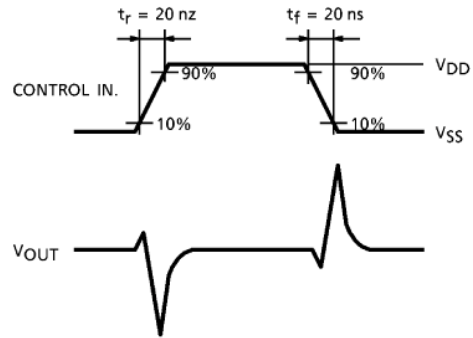
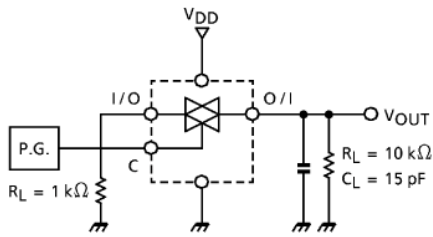


$$R_{ON} = 10 \times \frac{(V_{IN} - V_{OUT})}{V_{OUT}} \text{ (k}\Omega\text{)}$$

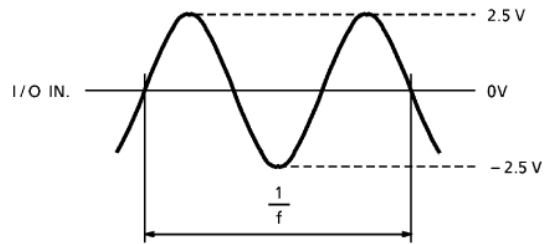
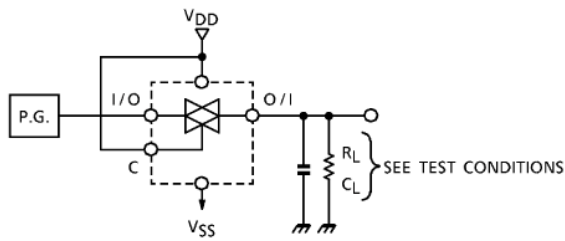
4. $f_{MAX}(C)$



5. CROSSTALK (CONTROL INPUT)

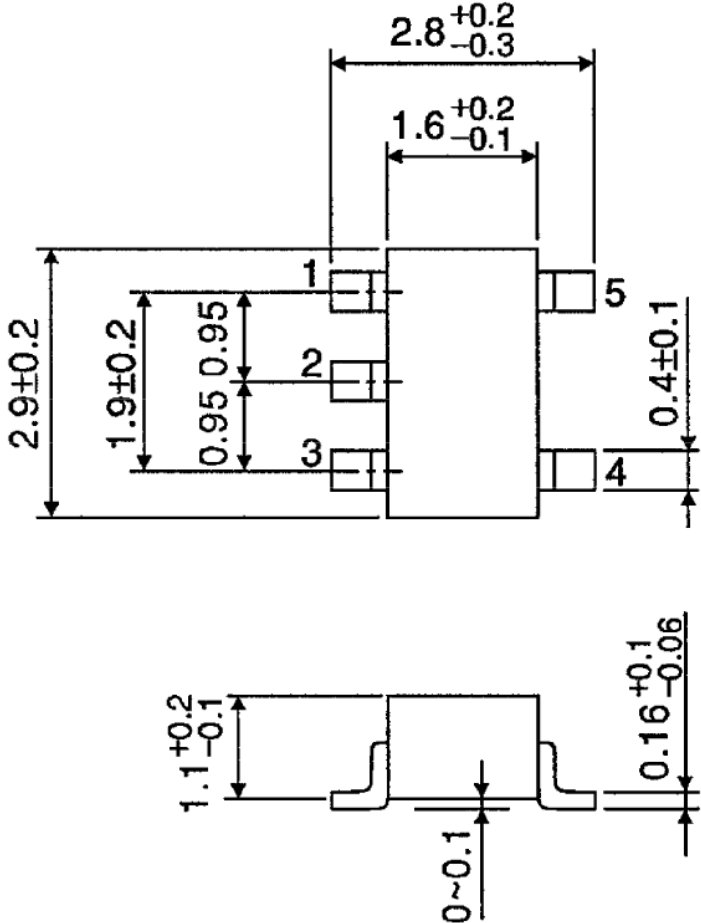


6. TOTAL HARMONIC DISTORTION, f_{MAX} (I/O-O/I), FEEDTHROUGH (SWITCH OFF)



PACKAGE DIMENSIONS
SSOP5-P-0.95

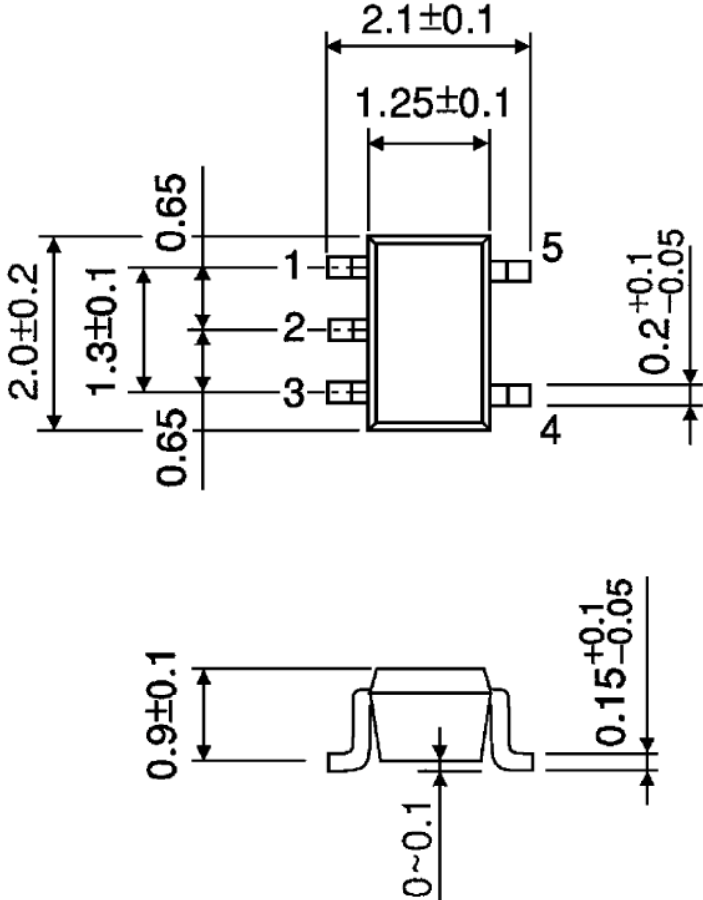
Unit : mm



Weight : 0.016 g (Typ.)

PACKAGE DIMENSIONS
SSOP5-P-0.65A

Unit : mm



Weight : 0.006 g (Typ.)

RESTRICTIONS ON PRODUCT USE

- Toshiba Corporation, and its subsidiaries and affiliates (collectively "TOSHIBA"), reserve the right to make changes to the information in this document, and related hardware, software and systems (collectively "Product") without notice.
- This document and any information herein may not be reproduced without prior written permission from TOSHIBA. Even with TOSHIBA's written permission, reproduction is permissible only if reproduction is without alteration/omission.
- Though TOSHIBA works continually to improve Product's quality and reliability, Product can malfunction or fail. Customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Before customers use the Product, create designs including the Product, or incorporate the Product into their own applications, customers must also refer to and comply with (a) the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and (b) the instructions for the application with which the Product will be used with or for. Customers are solely responsible for all aspects of their own product design or applications, including but not limited to (a) determining the appropriateness of the use of this Product in such design or applications; (b) evaluating and determining the applicability of any information contained in this document, or in charts, diagrams, programs, algorithms, sample application circuits, or any other referenced documents; and (c) validating all operating parameters for such designs and applications. **TOSHIBA ASSUMES NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.**
- Product is intended for use in general electronics applications (e.g., computers, personal equipment, office equipment, measuring equipment, industrial robots and home electronics appliances) or for specific applications as expressly stated in this document. Product is neither intended nor warranted for use in equipment or systems that require extraordinarily high levels of quality and/or reliability and/or a malfunction or failure of which may cause loss of human life, bodily injury, serious property damage or serious public impact ("Unintended Use"). Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, medical equipment, equipment used for automobiles, trains, ships and other transportation, traffic signaling equipment, equipment used to control combustions or explosions, safety devices, elevators and escalators, devices related to electric power, and equipment used in finance-related fields. Do not use Product for Unintended Use unless specifically permitted in this document.
- Do not disassemble, analyze, reverse-engineer, alter, modify, translate or copy Product, whether in whole or in part.
- Product shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.
- The information contained herein is presented only as guidance for Product use. No responsibility is assumed by TOSHIBA for any infringement of patents or any other intellectual property rights of third parties that may result from the use of Product. No license to any intellectual property right is granted by this document, whether express or implied, by estoppel or otherwise.
- **ABSENT A WRITTEN SIGNED AGREEMENT, EXCEPT AS PROVIDED IN THE RELEVANT TERMS AND CONDITIONS OF SALE FOR PRODUCT, AND TO THE MAXIMUM EXTENT ALLOWABLE BY LAW, TOSHIBA (1) ASSUMES NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (2) DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO SALE, USE OF PRODUCT, OR INFORMATION, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.**
- Do not use or otherwise make available Product or related software or technology for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). Product and related software and technology may be controlled under the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of Product or related software or technology are strictly prohibited except in compliance with all applicable export laws and regulations.
- Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. Please use Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. TOSHIBA assumes no liability for damages or losses occurring as a result of noncompliance with applicable laws and regulations.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

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

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- 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.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru