# 32K X 8 BIT LOW POWER CMOS SRAM

## FEATURES

- 32768x8 bit static CMOS RAM
- Access times 70 ns
- Common data inputs and data outputs
- Three-state outputs
- Typ. operating supply current
  - o 70 ns: 50 mA
- TTL/CMOS-compatible
- Automatical reduction of power dissipation in long Read Cycles
- Power supply voltage 5V + 10%
- Operating temperature ranges
  - o 0 to 70 °C
  - o -40 to 85 °C
- QS 9000 Quality Standard
- ESD protection > 2000 V (MIL STD 883C M3015.7)
- Latch-up immunity >100 mA
- Packages: PDIP28 (600 mil)
  SOP28 (330 mil)

## DESCRIPTION

The AS6C62256A is a static RAM manufactured using a CMOS process technology with the following operating modes:

- Read - Standby
- Write - Data Retention

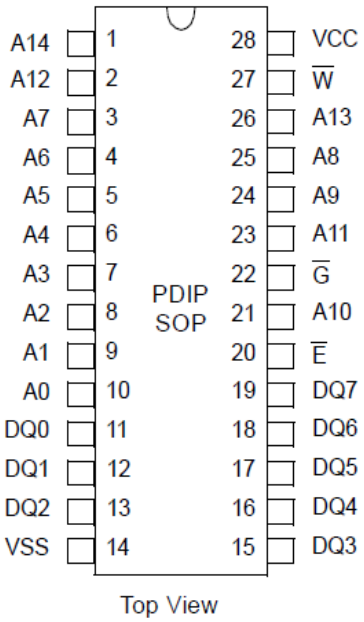
The memory array is based on a 6-transistor cell.

The circuit is activated by the falling edge of E. The address and control inputs open simultaneously. According to the information of W and G, the data inputs, or outputs, are active. In a Read cycle, the data outputs are activated by the falling edge of G, afterwards the data word read will be available at the outputs DQ0-DQ7. After the address change, the data outputs go High-Z until the new information read is available. The data outputs have not preferred state.

The Read cycle is finished by the falling edge of W, or by the rising edge of E, respectively.

Data retention is guaranteed down to 2 V. With the exception of E, all inputs consist of NOR gates, so that no pull-up/pull-down resistors are required.

## PIN CONFIGURATION

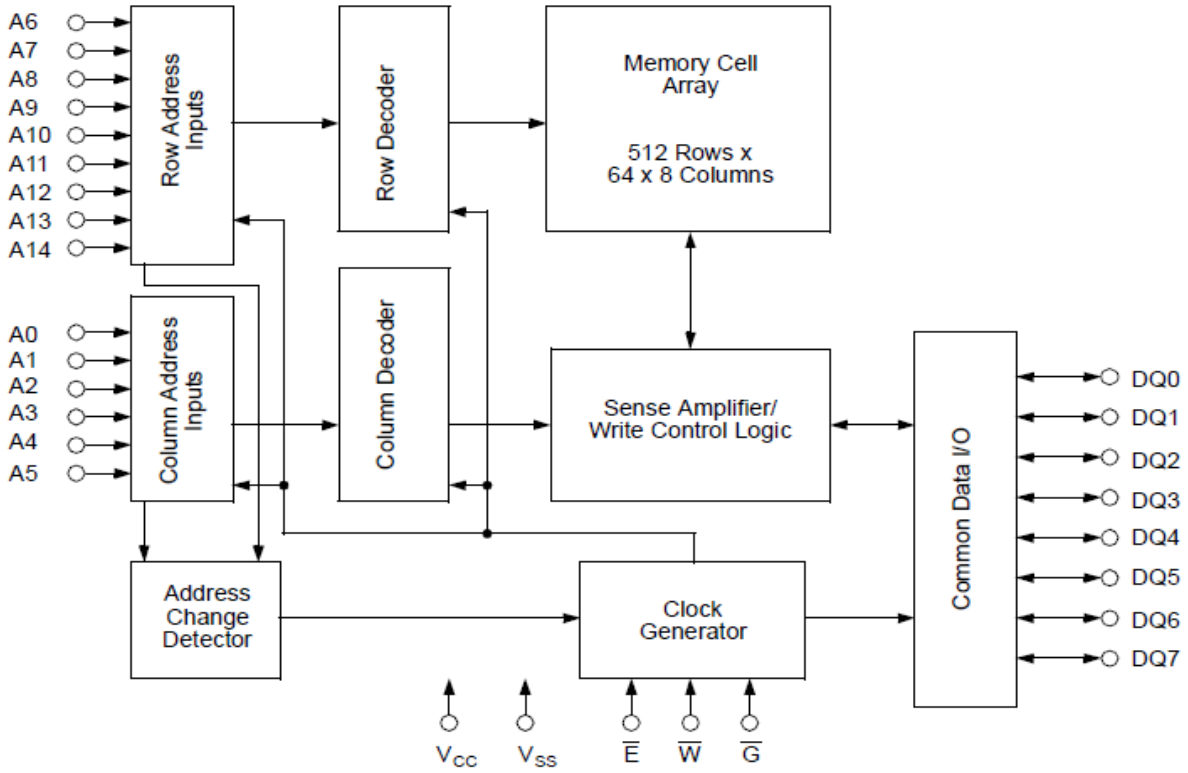



Top View

## PIN DESCRIPTION

| Signal Name | Signal Description |
|---|---|
| A0 - A14 | Address Inputs |
| DQ0 - DQ7 | Data In/Out |
| $\overline{E}$ | Chip Enable |
| $\overline{G}$ | Output Enable |
| $\overline{W}$ | Write Enable |
| VCC | Power Supply Voltage |
| VSS | Ground |

## Block Diagram




### Truth Table

| Operating Mode | $\overline{E}$ | $\overline{W}$ | $\overline{G}$ | DQ0 - DQ7 |
|---|---|---|---|---|
| Standby/not selected | H | * | * | High-Z |
| Internal Read | L | H | H | High-Z |
| Read | L | H | L | Data Outputs Low-Z |
| Write | L | L | * | Data Inputs High-Z |

* H or L

## Characteristics

All voltages are referenced to $V_{SS}$ = 0 V (ground).
All characteristics are valid in the power supply voltage range and in the operating temperature range specified.
Dynamic measurements are based on a rise and fall time of ≤ 5 ns, measured between 10 % and 90 % of $V_I$, as well as input levels of $V_{IL}$ = 0 V and $V_{IH}$ = 3 V. The timing reference level of all input and output signals is 1.5 V, with the exception of the $t_{dis}$-times and $t_{en}$-times, in which cases transition is measured ±200 mV from steady-state voltage.

| Absolute Maximum Ratings [a] | | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|---|
| Power Supply Voltage | | $V_{CC}$ | -0.5 | 7 | V |
| Input Voltage | | $V_I$ | -0.5 | $V_{CC}$ + 0.5 [b] | V |
| Output Voltage | | $V_O$ | -0.5 | $V_{CC}$ + 0.5 [b] | V |
| Power Dissipation | | $P_D$ | - | 1 | W |
| Operating Temperature | C-Type<br>I-Type | $T_a$ | 0<br>-40 | 70<br>85 | °C |
| Storage Temperature | C/I-Type | $T_{stg}$ | -65 | 125 | °C |
| Output Short-Circuit Current at $V_{CC}$ = 5 V and $V_O$ = 0 V [c] | | $\lvert I_{OS} \rvert$ | | 200 | mA |

[a] Stresses greater than those listed under „Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only, and functional operation of the device at condition above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability
[b] Maximum voltage is 7 V
[c] Not more than 1 output should be shorted at the same time. Duration of the short circuit should not exceed 30 s.

| Recommended Operating Conditions | Symbol | Conditions | Min. | Max. | Unit |
|---|---|---|---|---|---|
| Power Supply Voltage | $V_{CC}$ | | 4.5 | 5.5 | V |
| Input Low Voltage [d] | $V_{IL}$ | | -0.3 | 0.8 | V |
| Input High Voltage | $V_{IH}$ | | 2.2 | $V_{CC}$ + 0.3 | V |

[d] -2 V at Pulse Width 10 ns

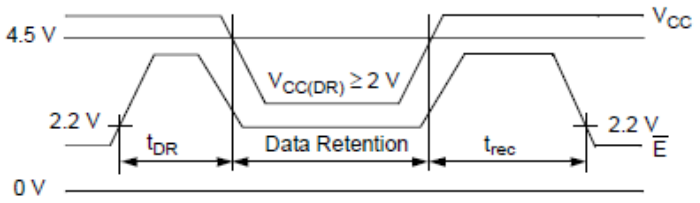
| Electrical Characteristics | Symbol | Conditions | Min. | Max. | Unit |
|---|---|---|---|---|---|
| Supply Current - Operating Mode | $I_{CC(OP)}$ | $V_{CC}$ = 5.5 V<br>$V_{IL}$ = 0.8 V<br>$V_{IH}$ = 2.2 V<br>$t_{cW}$ = 70 ns | | 70 | mA |
| Supply Current - Standby Mode (CMOS level) | $I_{CC(SB)}$ | $V_{CC}$ = 5.5 V<br>$V_{\overline{E}}$ = $V_{CC}$ - 0.2 V<br>C-Type<br>I -Type | | 5<br>10 | µA<br>µA |
| Supply Current - Standby Mode (TTL level) | $I_{CC(SB)1}$ | $V_{CC}$ = 5.5 V<br>$V_{\overline{E}}$ = 2.2 V | | 1 | mA |
| Output High Voltage | $V_{OH}$ | $V_{CC}$ = 4.5 V<br>$I_{OH}$ = -1.0 mA | 2.4 | | V |
| Output Low Voltage | $V_{OL}$ | $V_{CC}$ = 4.5 V<br>$I_{OL}$ = 3.2 mA | | 0.4 | V |
| Input High Leakage Current | $I_{IH}$ | $V_{CC}$ = 5.5 V<br>$V_{IH}$ = 5.5 V | | 2 | µA |
| Input Low Leakage Current | $I_{IL}$ | $V_{CC}$ = 5.5 V<br>$V_{IL}$ = 0 V | -2 | | µA |
| Output High Current | $I_{OH}$ | $V_{CC}$ = 4.5 V<br>$V_{OH}$ = 2.4 V | | -1 | mA |
| Output Low Current | $I_{OL}$ | $V_{CC}$ = 4.5 V<br>$V_{OL}$ = 0.4 V | 3,2 | | mA |
| Output Leakage Current<br>High at Three-State Outputs | $I_{OHZ}$ | $V_{CC}$ = 5.5 V<br>$V_{OH}$ = 5.5 V | | 1 | µA |
| Low at Three-State Outputs | $I_{OLZ}$ | $V_{CC}$ = 5.5 V<br>$V_{OL}$ = 0 V | -1 | | µA |

| Switching Characteristics Read Cycle | Symbol | | 07 | | Unit |
|---|---|---|---|---|---|
| | Alt. | IEC | Min. | Max. | |
| Read Cycle Time | $t_{RC}$ | $t_{cR}$ | 70 | | ns |
| Address Access Time to Data Valid | $t_{AA}$ | $t_{a(A)}$ | | 70 | ns |
| Chip Enable Access Time to Data Valid | $t_{ACE}$ | $t_{a(E)}$ | | 70 | ns |
| Output Enable Access Time to Data Valid | $t_{OE}$ | $t_{a(G)}$ | | 35 | ns |
| $\overline{E}$ HIGH to Output in High-Z | $t_{HZCE}$ | $t_{dis(E)}$ | | 25 | ns |
| $\overline{G}$ HIGH to Output in High-Z | $t_{HZOE}$ | $t_{dis(G)}$ | | 25 | ns |
| $\overline{E}$ LOW to Output in Low-Z | $t_{LZCE}$ | $t_{en(E)}$ | 5 | | ns |
| $\overline{G}$ LOW to Output in Low-Z | $t_{LZOE}$ | $t_{en(G)}$ | 0 | | ns |
| Output Hold Time from Address Change | $t_{OH}$ | $t_{v(A)}$ | 5 | | ns |

| Switching Characteristics Write Cycle | Symbol | | 07 | | Unit |
|---|---|---|---|---|---|
| | Alt. | IEC | Min. | Max. | |
| Write Cycle Time | $t_{WC}$ | $t_{cW}$ | 70 | | ns |
| Write Pulse Width | $t_{WP}$ | $t_{w(W)}$ | 55 | | ns |
| Write Pulse Width Setup Time | $t_{WP}$ | $t_{su(W)}$ | 55 | | ns |
| Address Setup Time | $t_{AS}$ | $t_{su(A)}$ | 0 | | ns |
| Address Valid to End of Write | $t_{AW}$ | $t_{su(A-WH)}$ | 65 | | ns |
| Chip Enable Setup Time | $t_{CW}$ | $t_{su(E)}$ | 65 | | ns |
| Pulse Width Chip Enable to End of Write | $t_{CW}$ | $t_{w(E)}$ | 65 | | ns |
| Data Setup Time | $t_{DS}$ | $t_{su(D)}$ | 30 | | ns |
| Data Hold Time | $t_{DH}$ | $t_{h(D)}$ | 0 | | ns |
| Address Hold from End of Write | $t_{AH}$ | $t_{h(A)}$ | 0 | | ns |
| $\overline{W}$ LOW to Output in High-Z | $t_{HZWE}$ | $t_{dis(W)}$ | | 25 | ns |
| $\overline{G}$ HIGH to Output in High-Z | $t_{HZOE}$ | $t_{dis(G)}$ | | 25 | ns |
| $\overline{W}$ HIGH to Output in Low-Z | $t_{LZWE}$ | $t_{en(W)}$ | 0 | | ns |
| $\overline{G}$ LOW to Output in Low-Z | $t_{LZOE}$ | $t_{en(G)}$ | 0 | | ns |

**Data Retention Mode**

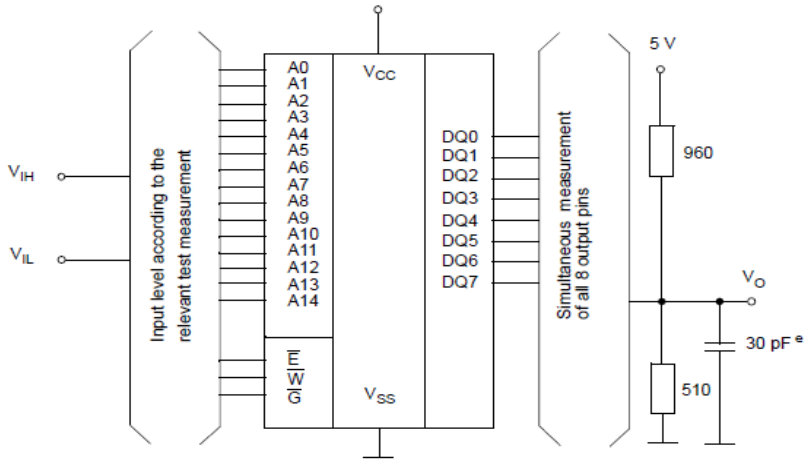
**$\overline{E}$-Controlled**




$V_{CC(DR)} - 0.2\ V \leq V_{\overline{E}(DR)} \leq V_{CC(DR)} + 0.3\ V$

| Data Retention Characteristics | Symbol Alt. | Symbol IEC | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Data Retention Supply Voltage | | $V_{CC(DR)}$ | | 2 | | 5.5 | V |
| Data Retention Supply Current | | $I_{CC(DR)}$ | $V_{CC(DR)}$ = 3 V<br>$V_{\overline{E}}$ = $V_{CC(DR)}$ - 0.2 V<br>C-Type<br>I-Type | | | <br><br>3<br>6 | <br><br>µA<br>µA |
| Data Retention Setup Time | $t_{CDR}$ | $t_{su(DR)}$ | See Data Retention Waveforms (above) | 0 | | | ns |
| Operating Recovery Time | $t_R$ | $t_{rec}$ | | $t_{cR}$ | | | ns |

**Test Configuration for Functional Check**




[e] In measurement of $t_{dis(E)}$, $t_{dis(W)}$, $t_{dis(G)}$, $t_{en(E)}$, $t_{en(W)}$, $t_{en(G)}$ the capacitance is 5 pF.

| Capacitance | Conditions | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|---|
| Input Capacitance | $V_{CC}$ = 5.0 V<br>$V_I$ = $V_{SS}$<br>f = 1 MHz<br>$T_a$ = 25 °C | $C_I$ | - | 7 | pF |
| Output Capacitance | | $C_O$ | - | 7 | pF |

All pins not under test must be connected with ground by capacitors.

**Device Marking** (example)

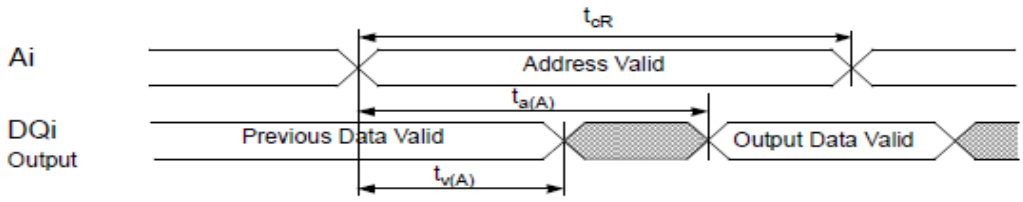
## ORDERING INFORMATION

| Alliance | Organization | VCC Range | Package | Operating Temp | Speed ns |
|---|---|---|---|---|---|
| AS6C62256A-70SCN | 32K x 8 | 4.5V – 5.5V | SOP28 (330 mil) | Commercial~ 0 C – 70 C | 70 |
| AS6C62256A-70SIN | 32K x 8 | 4.5V – 5.5V | SOP28 (330 mil) | Industrial~ 40 C– 85 C | 70 |
| AS6C62256A-70PCN | 32K x 8 | 4.5V – 5.5V | PDIP28 (600 mil) | Commercial~ 0 C – 70 C | 70 |
| AS6C62256A-70PIN | 32K x 8 | 4.5V – 5.5V | PDIP28 (600 mil) | Industrial~ 40 C– 85 C | 70 |

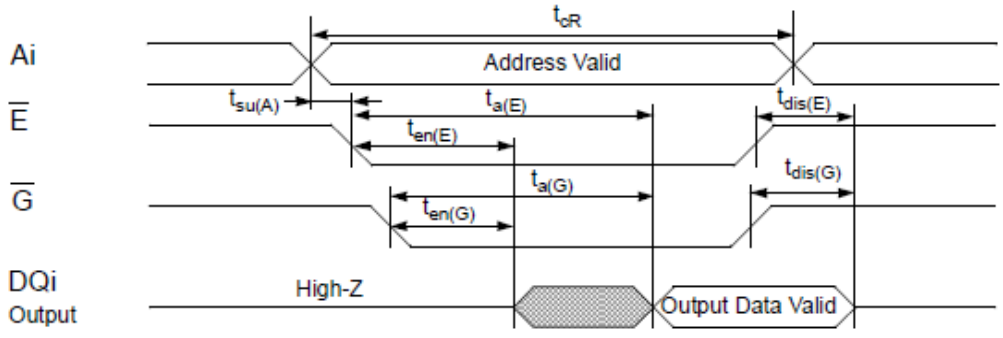
## PART NUMBERING SYSTEM

| | | | | | | |
|---|---|---|---|---|---|---|
| **AS6C** | **62256** | **A** | **-70** | **X** | **X** | **N** |
| SRAM prefix | **Device Number:** Low Power (256K) | Die Rev | Access Time | **Package Option:** P=28pin 600mil PDIP S=28pin 330mil SOP | **Temperature Range:** C = Commercial (0 to 70 C) I = Industrial (40 to 85 C) | N = Lead Free RoHS compliant part |

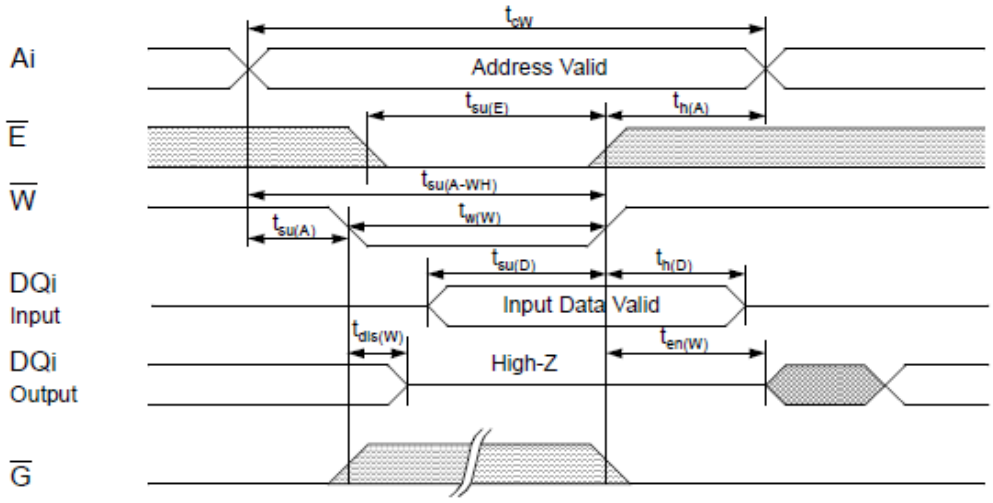
**Read Cycle 1: Ai-controlled (during Read Cycle : $\overline{E} = \overline{G} = V_{IL}$, $\overline{W} = V_{IH}$)**



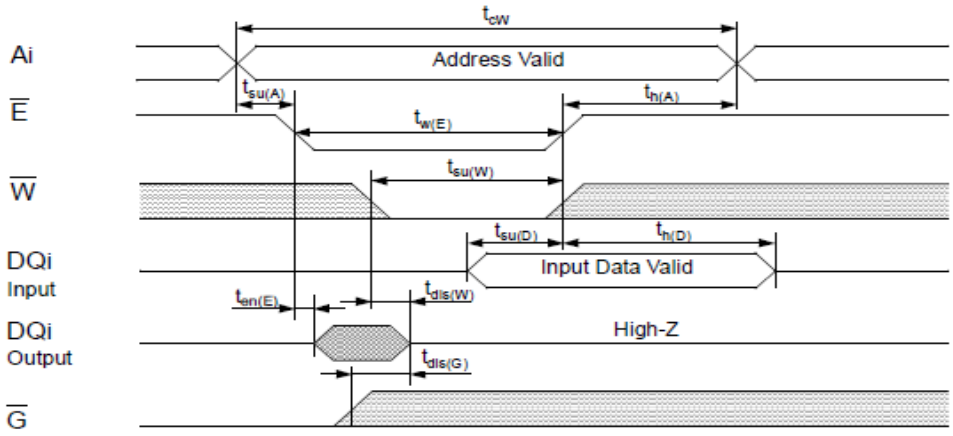

**Read Cycle 2: $\overline{G}$-, $\overline{E}$-controlled (during Read Cycle: $\overline{W} = V_{IH}$)**



**Write Cycle1: $\overline{W}$-controlled**




**Write Cycle 2: $\overline{E}$-controlled**




undefined L- to H-level H- to L-level

The information describes the type of component and shall not be considered as assured characteristics.Terms of delivery and rights to change design reserved.

Alliance Memory, Inc
511 Taylor Way,
San Carlos, CA 94070, USA
Phone: 650-610-6800
Fax: 650-620-9211
www.alliancememory.com

Copyright © Alliance Memory
All Rights Reserved

© Copyright 2009 Alliance Memory, Inc. All rights reserved. Our three-point logo, our name and Intelliwatt are trademarks or registered trademarks of Alliance. All other brand and product names may be the trademarks of their respective companies. Alliance reserves the right to make changes to this document and its products at any time without notice. Alliance assumes no responsibility for any errors that may appear in this document. The data contained herein represents Alliance's best data and/or estimates at the time of issuance. Alliance reserves the right to change or correct this data at anytime, without notice. If the product described herein is under development, significant changes to these specifications are possible. The information in this product data sheet is intended to be general descriptive information for potential customers and users, and is not intended to operate as, or provide any guarantee or warrantee to any user or customer. Alliance does not assume any responsibility or liability arising out of the application or use of any product described herein, and disclaims any express or implied warranties related to the sale and/or use of Alliance products including liability or warranties related to fitness for a particular purpose, merchantability, or infringement of any intellectual property rights, except as express agreed to in Alliance's Terms and Conditions of Sale (which are available from Alliance). All sales of Alliance products are made exclusively according to Alliance's Terms and Conditions of Sale. The purchase of products from Alliance does not convey a license under any patent rights, copyrights; mask works rights, trademarks, or any other intellectual property rights of Alliance or third parties. Alliance does not authorize its products for use as critical components in life-supporting systems where a malfunction or failure may reasonably be expected to result in significant injury to the user, and the inclusion of Alliance products in such life-supporting systems implies that the manufacturer assumes all risk of such use and agrees to indemnify Alliance against all claims arising from such use.

# OCEAN CHIPS
## Океан Электроники
## Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

**«JONHON»** (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

**«FORSTAR»** (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

FORSTAR®

Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А