



## 3 Pin Microcontroller Power Supply Supervisor

### General Description

The ASM809/ASM810 are cost effective 3.0V, 3.3V and 5.0V power supply supervisor circuits optimized for low-power microprocessor ( $\mu$ P), microcontroller ( $\mu$ C) and digital systems. They provide a reset output during power-up, power-down and brown-out conditions. They provide excellent reliability by eliminating external components and adjustments. The ASM809/810 are improved drop-in replacements for the Maxim MAX809/810 and feature 60% lower supply current.

A reset signal is issued if the power supply voltage drops below a preset reset threshold and is asserted for at least 140ms after the supply has risen above the reset threshold. The ASM809 has an active-low  $\overline{\text{RESET}}$  output that is guaranteed to be in the correct logic state for  $V_{CC}$  down to 1.1V. The ASM810 has an active-high RESET output. The reset comparator is designed to ignore fast transients on  $V_{CC}$ .

Low supply current makes the ASM809/ASM810 ideal for use in portable and battery operated equipment. The ASM809/ASM810 are available in a compact, industry standard 3-pin SOT23 package.

Six voltage thresholds are available to support 3V to 5V systems:

RESET THRESHOLD	
Suffix	Voltage
L	4.63
M	4.38
J	4.00
T	3.08
S	2.93
R	2.63

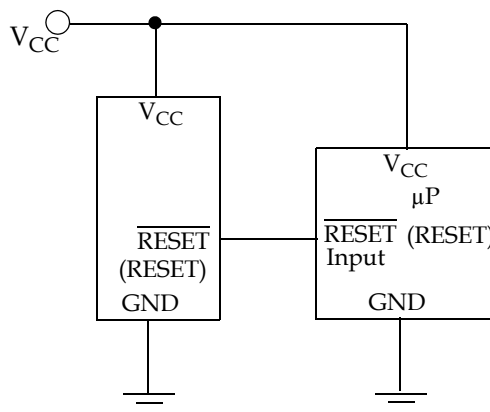
### Features:

- Monitor 5V, 3.3V and 3V supplies
- 140ms min. reset pulse width
- Active-low reset valid with 1.1V supply (ASM809)
- Small 3-pin SOT-23 package
- No external components
- Specified over full temperature range - -40°C to 105°C

### Applications

- Embedded controllers
- Portable/Battery operated systems
- Intelligent instruments
- Wireless communication systems
- PDAs and handheld equipment
- Computers

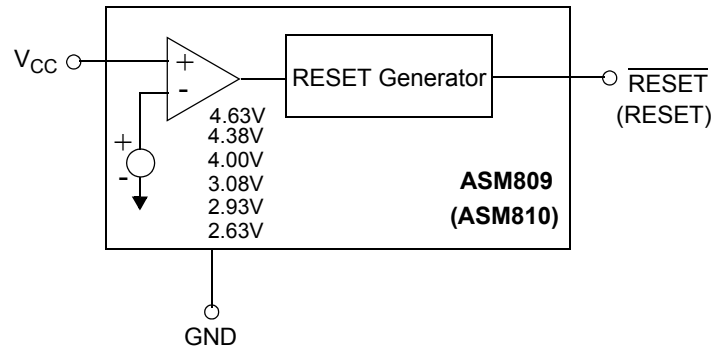
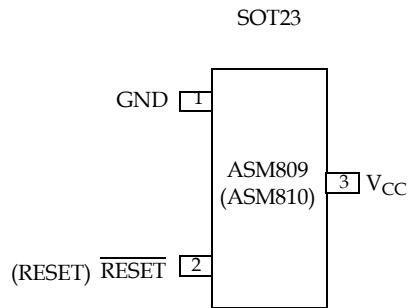
### Typical Operating Circuit





Pin Diagram

Block Diagram



Pin Description

Pin #		Pin Name	Function
ASM809	ASM810		
1	-	GND	Ground.
2	-	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$ is asserted LOW if $V_{CC}$ falls below $V_{TH}$ and remains LOW for $T_{RST}$ after $V_{CC}$ exceeds the threshold.
-	2	RESET	RESET is asserted HIGH if $V_{CC}$ falls below $V_{TH}$ and remains HIGH for $T_{RST}$ after $V_{CC}$ exceeds the threshold.
3	-	$V_{CC}$	Power supply input voltage (3.0V, 3.3V, 5.0V).

Detailed Description

A proper reset input enables a microprocessor / microcontroller to start in a known state. ASM809/810 assert reset to prevent code execution errors during power-up, power-down and brown-out conditions.

Reset Timing

The reset signal is asserted- LOW for the ASM809 and HIGH for the ASM810- when the  $V_{CC}$  supply voltage falls below the threshold trip voltage and remains asserted for 140ms minimum after the  $V_{CC}$  has risen above the threshold.

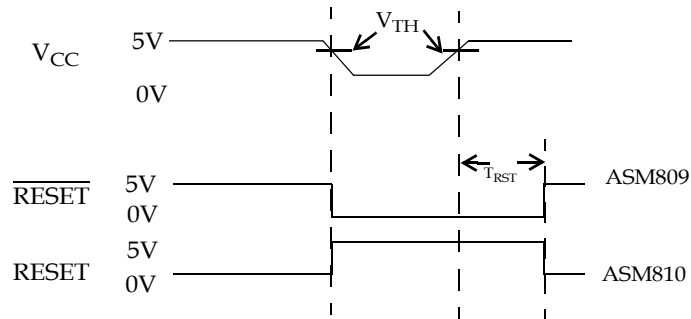


Figure 1: Reset Timing Diagram



rev 1.0

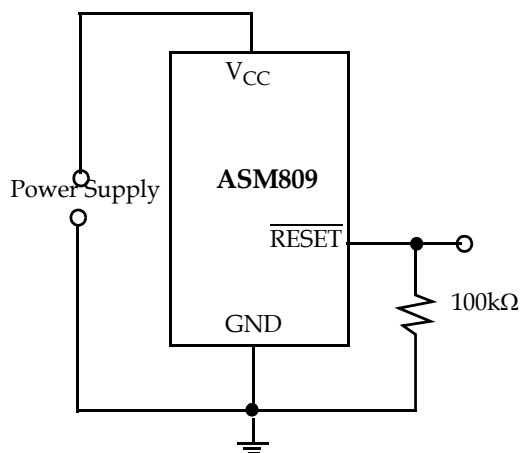
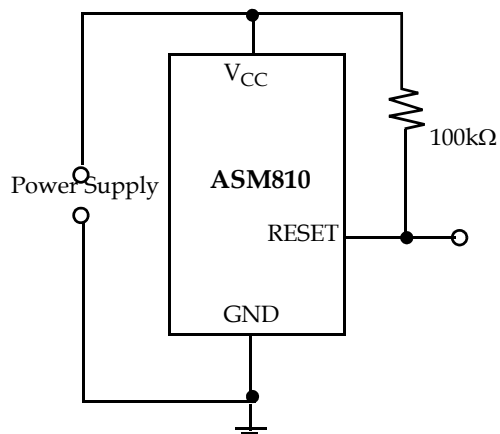
## Application Information

### Negative $V_{CC}$ Transients

The ASM809/810 protect  $\mu$ Ps from brownouts and low  $V_{CC}$ . Short duration transients of 100mV amplitude and 20 $\mu$ s or less duration typically do not cause a false RESET.

### Valid Reset with $V_{CC}$ under 1.1V

When  $V_{CC}$  is under 1.1V, to ensure logic inputs connected to the ASM809  $\overline{\text{RESET}}$  pin are in a known state, a 100k $\Omega$  pull-down resistor is needed at  $\overline{\text{RESET}}$ . The value of the resistor is not critical. A 100k $\Omega$  pull-up resistor to  $V_{CC}$  at RESET is needed with the ASM810.

Figure 2:  $\overline{\text{RESET}}$  valid with  $V_{CC}$  under 1.1VFigure 3: RESET valid with  $V_{CC}$  under 1.1V

## Bidirectional Reset Pin Interfacing

The ASM809/810 can interface with  $\mu$ P /  $\mu$ C bi-directional reset pins by connecting a 4.7k $\Omega$  resistor in series with the ASM809/810 reset output and the  $\mu$ P/ $\mu$ C bi-directional reset pin.

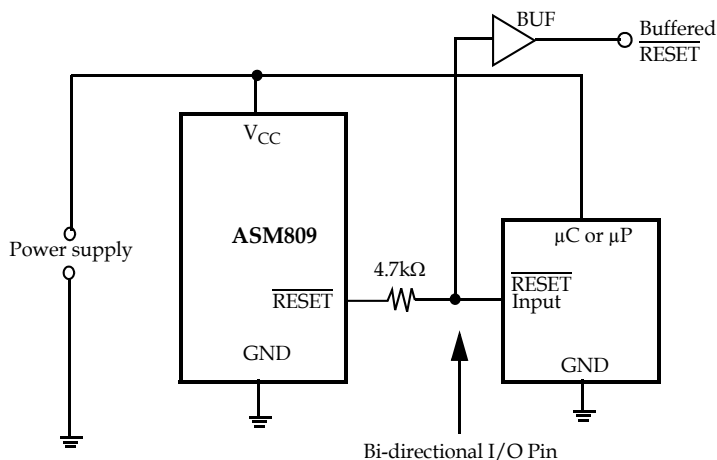


Figure 4: Bidirectional Reset Pin Interfacing

**Absolute Maximum Ratings Table 1:**

Parameter	Min	Max	Units
Pin Terminal Voltage With Respect To Ground			
$V_{CC}$	-0.3	6.0	V
RESET, $\overline{\text{RESET}}$	-0.3	$V_{CC} + 0.3$	V
Input current at $V_{CC}$		20	mA
Output current: RESET, $\overline{\text{RESET}}$		20	mA
Rate of Rise at $V_{CC}$		100	V/ $\mu$ s
Note: These are stress ratings only and the functional operation is not implied. Exposure to absolute maximum ratings for prolonged time periods may affect device reliability.			

**Absolute Maximum Ratings Table 2:**

Parameter	Min	Max	Units
Power Dissipation ( $T_A = 70^\circ\text{C}$ )		320	$\mu$ W
Operating temperature range	-40	105	$^\circ\text{C}$
Storage temperature range	-65	160	$^\circ\text{C}$
Lead temperature (Soldering, 10 sec)		300	$^\circ\text{C}$
Note: These are stress ratings only and the functional operation is not implied. Exposure to absolute maximum ratings for prolonged time periods may affect device reliability.			

**Electrical Characteristics:**

Unless otherwise noted,  $V_{CC}$  is over the full voltage range,  $T_A = -40^{\circ}\text{C}$  to  $105^{\circ}\text{C}$ .

Typical values at  $T_A = 25^{\circ}\text{C}$ ,  $V_{CC} = 5\text{V}$  for L/M/J devices,  $V_{CC} = 3.3\text{V}$  for T/S devices and  $V_{CC} = 3\text{V}$  for R devices.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{CC}$	Input Voltage Range	$T_A = 0^{\circ}\text{C}$ to $70^{\circ}\text{C}$ $T_A = -40^{\circ}\text{C}$ to $105^{\circ}\text{C}$		1.1 1.2		5.5 5.5	V V
$I_{CC}$	Supply Current	$T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ $T_A = 85^{\circ}\text{C}$ to $105^{\circ}\text{C}$ $T_A = 85^{\circ}\text{C}$ to $105^{\circ}\text{C}$	$V_{CC} < 5.5\text{V}$ , L/M/J $V_{CC} < 3.6\text{V}$ , R/S/T $V_{CC} < 5.5\text{V}$ , L/M/J $V_{CC} < 3.6\text{V}$ , R/S/T		9 6.8	15 10 25 20	$\mu\text{A}$
$V_{TH}$	Reset Threshold	L devices	$T_A = 25^{\circ}\text{C}$ $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ $T_A = 85^{\circ}\text{C}$ to $105^{\circ}\text{C}$	4.56 4.50 4.40	4.63	4.70 4.75 4.86	V
		M devices	$T_A = 25^{\circ}\text{C}$ $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ $T_A = 85^{\circ}\text{C}$ to $105^{\circ}\text{C}$	4.31 4.25 4.16	4.38	4.45 4.50 4.56	
		J devices	$T_A = 25^{\circ}\text{C}$ $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ $T_A = 85^{\circ}\text{C}$ to $105^{\circ}\text{C}$	3.93 3.89 3.80	4.00	4.06 4.10 4.20	
		T devices	$T_A = 25^{\circ}\text{C}$ $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ $T_A = 85^{\circ}\text{C}$ to $105^{\circ}\text{C}$	3.04 3.00 2.92	3.08	3.11 3.15 3.23	
		S devices	$T_A = 25^{\circ}\text{C}$ $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ $T_A = 85^{\circ}\text{C}$ to $105^{\circ}\text{C}$	2.89 2.85 2.78	2.93	2.96 3.00 3.08	
		R devices	$T_A = 25^{\circ}\text{C}$ $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ $T_A = 85^{\circ}\text{C}$ to $105^{\circ}\text{C}$	2.59 2.55 2.50	2.63	2.66 2.70 2.76	
	Reset Threshold Temp Coefficient				30		ppm/ $^{\circ}\text{C}$
	$V_{CC}$ to Reset Delay	$V_{CC} = V_{TH}$ to $V_{TH} - 100\text{mV}$			60		$\mu\text{s}$

## Notes:

1. Production testing done at  $T_A = 25^{\circ}\text{C}$ . Over-temperature specifications guaranteed by design only, using six sigma design limits.
2. RESET output is active LOW for the ASM809 and RESET output is active HIGH for the ASM810.



Symbol	Parameter	Conditions	Min	Typ	Max	Unit
	Reset Active Timeout Period	$T_A = -40^{\circ}\text{C to } 85^{\circ}\text{C}$	140	240	560	ms
		$T_A = 85^{\circ}\text{C to } 105^{\circ}\text{C}$	100		840	
$V_{OL}$	Low $\overline{\text{RESET}}$ Output Voltage (ASM809)	$V_{CC} = V_{TH \text{ min.}}, I_{SINK} = 1.2\text{mA}, \text{ASM809R/S/T}$			0.3	V
		$V_{CC} = V_{TH \text{ min.}}, I_{SINK} = 3.2\text{mA}, \text{ASM809L/M/J}$			0.4	
		$V_{CC} > 1.1\text{V}, I_{SINK} = 50\mu\text{A}$			0.3	
$V_{OH}$	High $\overline{\text{RESET}}$ Output Voltage (ASM809)	$V_{CC} > V_{TH \text{ max.}}, I_{SOURCE} = 500\mu\text{A}, \text{ASM809R/S/T}$	$0.8V_{CC}$			V
		$V_{CC} > V_{TH \text{ max.}}, I_{SOURCE} = 800\mu\text{A}, \text{ASM809L/M/J}$	$V_{CC} - 1.5$			
$V_{OL}$	Low $\overline{\text{RESET}}$ Output Voltage (ASM810)	$V_{CC} = V_{TH \text{ max.}}, I_{SINK} = 1.2\text{mA}, \text{ASM810R/S/T}$			0.3	V
		$V_{CC} = V_{TH \text{ max.}}, I_{SINK} = 3.2\text{mA}, \text{ASM810L/M/J}$			0.4	V
$V_{OH}$	High $\overline{\text{RESET}}$ Output Voltage (ASM810)	$1.8\text{V} < V_{CC} < V_{TH \text{ min.}}, I_{SOURCE} = 150\mu\text{A}$	$0.8V_{CC}$			V
$T_{RST}$	Active Reset Timeout Period	$V_{CC} > V_{TH}$	140	240		msec

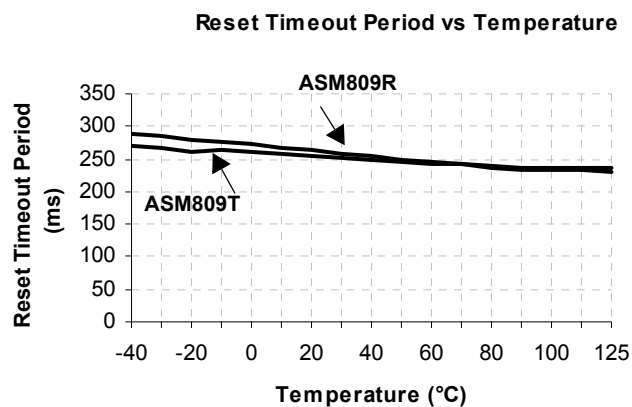
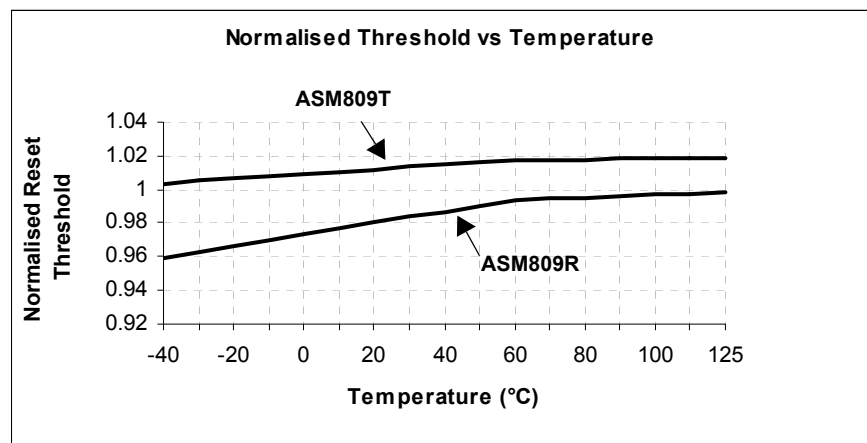
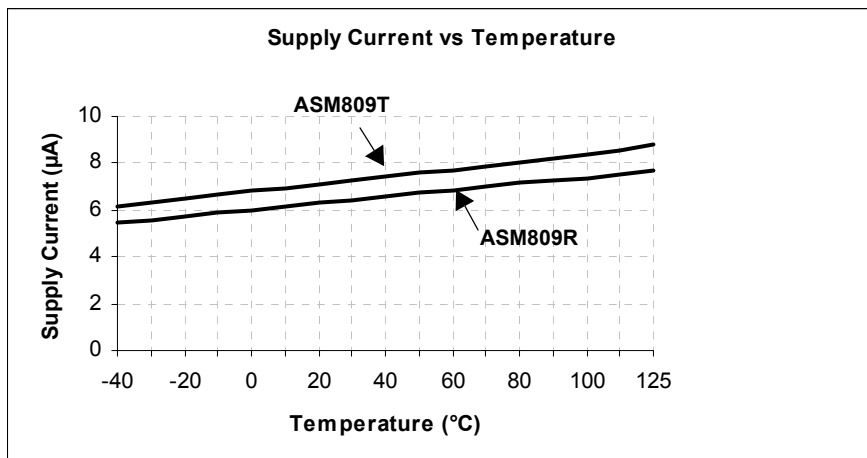
## Notes:

1. Production testing done at  $T_A = 25^{\circ}\text{C}$ . Over-temperature specifications guaranteed by design only, using six sigma design limits.
2.  $\overline{\text{RESET}}$  output is active LOW for the ASM809 and RESET output is active HIGH for the ASM810.



## Typical Operating Characteristics

Unless otherwise noted,  $V_{CC}$  is over the full voltage range,  $T_A = -40^{\circ}\text{C}$  to  $105^{\circ}\text{C}$ . Typical values at  $T_A = 25^{\circ}\text{C}$ ,  $V_{CC} = 5\text{V}$  for L/M/J devices,  $V_{CC} = 3.3\text{V}$  for T/S devices and  $V_{CC} = 3\text{V}$  for R devices.

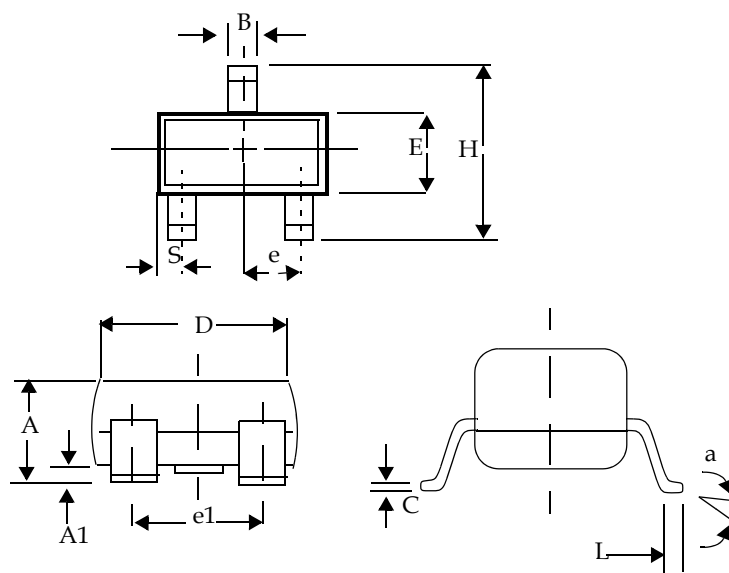




rev 1.0

## Package Dimensions

	Inches		Millimeters	
	Min	Max	Min	Max
<b>Plastic SOT-23 (3-Pin)</b>				
A	0.031	0.050	0.80	1.27
A1	0.004	0.010	0.10	0.25
B	0.015	0.020	0.37	0.51
C	0.003	0.007	0.085	0.18
D	0.110	0.120	2.80	3.04
E	0.047	0.055	1.20	1.40
e	0.035	0.040	0.89	1.03
e1	0.070	0.080	1.78	2.05
H	0.083	0.103 9	2.10	2.64
L	0.027 REF		0.069 REF	
S	0.018	0.024	0.45	0.60



**Ordering Information:**

Part Number <sup>1</sup>	Reset Threshold (V)	Temperature Range	Pin-Package	Package Marking (XX Lot Code)
ASM809 ACTIVE LOW RESET				
ASM809LEUR-T	4.63	-40°C to +105°C	3-SOT23	SAXX
ASM809MEUR-T	4.38	-40°C to +105°C	3-SOT23	SBXX
ASM809JEUR-T	4.00	-40°C to +105°C	3-SOT23	SCXX
ASM809TEUR-T	3.08	-40°C to +105°C	3-SOT23	SDXX
ASM809SEUR-T	2.93	-40°C to +105°C	3-SOT23	SEXX
ASM809REUR-T	2.63	-40°C to +105°C	3-SOT23	SFXX
ASM810 ACTIVE HIGH RESET				
ASM810LEUR-T	4.63	-40°C to +105°C	3-SOT23	SGXX
ASM810MEUR-T	4.38	-40°C to +105°C	3-SOT23	SHXX
ASM810JEUR-T	4.00	-40°C to +105°C	3-SOT23	SIXX
ASM810TEUR-T	3.08	-40°C to +105°C	3-SOT23	SJXX
ASM810SEUR-T	2.93	-40°C to +105°C	3-SOT23	SKXX
ASM810REUR-T	2.63	-40°C to +105°C	3-SOT23	SLXX
Notes:				
1. Tape and Reel packaging is indicated by the -T designation.				

**Related Products:**

	ASM809	ASM810	ASM811	ASM812
Max Supply Current	15µA	15µA	15µA	15µA
Package Pins	3	3	4	4
Manual RESET input			■	■
Package Type	SOT-23	SOT-23	SOT-143	SOT-143
Active-HIGH RESET Output		■		■
Active-LOW RESET Output	■		■	



## ASM809, ASM810



Alliance Semiconductor Corporation  
2575, Augustine Drive,  
Santa Clara, CA 95054  
Tel: 408 - 855 - 4900  
Fax: 408 - 855 - 4999  
[www.alsc.com](http://www.alsc.com)

Copyright © Alliance Semiconductor  
All Rights Reserved  
Part Number: ASM809, ASM810  
Document Version: v 1.0

© Copyright 2003 Alliance Semiconductor Corporation. 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 any time, 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.



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.