ASM3P2779A

Low Power Peak EMI Reducing Solution

Features

- Generates an EMI optimized clock signal at the output.
- Integrated loop filter components.
- Operates with a 3.3 / 2.5V Supply.
- Operating current less than 4mA.
- Low power CMOS design.
- Input frequency range: 13MHz to 30MHz for 2.5V.
  : 13MHz to 30MHz for 3.3V.
- Generates a 1X low EMI spread spectrum clock of the input frequency.
- Frequency deviation: ±1% (Typ) @16MHz Input Frequency.
- Available in 6-pin TSOT-23, 8-pin SOIC and 8-pin TSSOP packages.

Product Description

The ASM3P2779A is a versatile spread spectrum frequency modulator designed specifically for a wide range of clock frequencies. The ASM3P2779A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of all clock dependent signals. The ASM3P2779A allows significant system cost savings by reducing the number of circuit board layers ferrite beads, shielding that are traditionally required to pass EMI regulations.

The ASM3P2779A uses the most efficient and optimized modulation profile approved by the FCC and is implemented by using a proprietary all digital method.

The ASM3P2779A modulates the output of a single PLL in order to “spread” the bandwidth of a synthesized clock, and more importantly, decreases the peak amplitudes of its harmonics. This results in significantly lower system EMI compared to the typical narrow band signal produced by oscillators and most frequency generators. Lowering EMI by increasing a signal’s bandwidth is called ‘spread spectrum clock generation’.

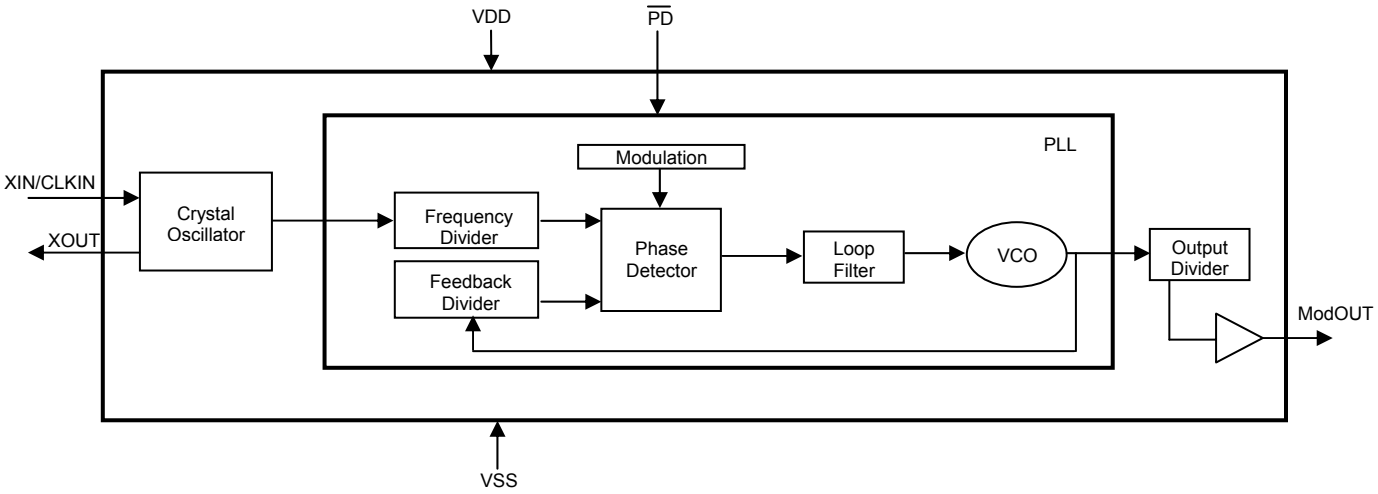
Applications

The ASM3P2779A is targeted towards all portable devices with very low power requirements like MP3 players and digital still cameras.

Key Specifications

Description	Specification
Supply voltages	V_{DD} = 3.3V / 2.5V
Cycle-to-Cycle Jitter	200pS (Max)
Output Duty Cycle	45/55%
Modulation Rate Equation	F_{IN}/640
Frequency Deviation	±1% (Typ) @ 16MHz

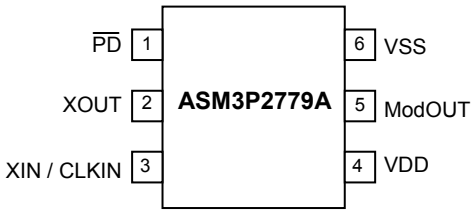
Block Diagram



PulseCore Semiconductor Corporation
1715 S. Bascom Ave Suite 200, Campbell, CA 95008 • Tel: 408-879-9077 • Fax: 408-879-9018
www.pulsecoresemi.com

Notice: The information in this document is subject to change without notice.

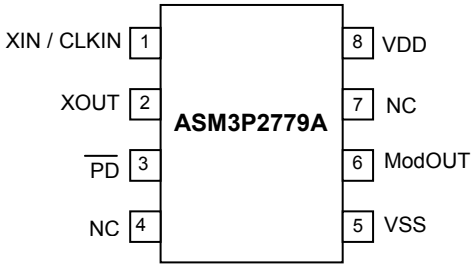
Pin Configuration (6-pin TSOT- 23 Package)



Pin Description

Pin#	Pin Name	Type	Description
1	$\overline{PD}$	I	Power-down control pin. Pull low to enable power-down mode. Connect to VDD if not used.
2	XOUT	O	Crystal connection. If using an external reference, this pin must be left unconnected.
3	XIN / CLKIN	I	Crystal connection or external reference frequency input. This pin has dual functions. It can be connected either to an external crystal or an external reference clock.
4	VDD	P	Power supply for the entire chip.
5	ModOUT	O	Spread spectrum clock output.
6	VSS	P	Ground connection.

Pin Configuration (8-pin SOIC and TSSOP Packages)

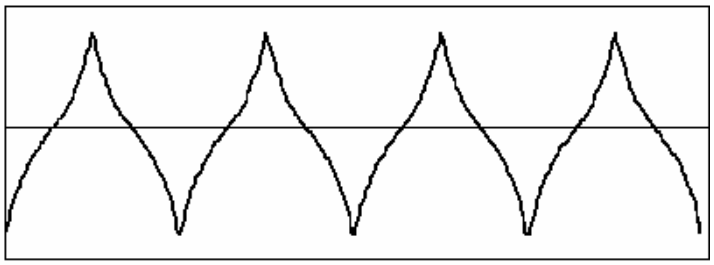


Pin Description

Pin#	Pin Name	Type	Description
1	XIN/CLKIN	I	Crystal connection or external reference frequency input. This pin has dual functions. It can be connected either to an external crystal or an external reference clock.
2	XOUT	O	Crystal connection. If using an external reference, this pin must be left unconnected.
3	$\overline{PD}$	I	Power-down control pin. Pull low to enable power-down mode. Connect to VDD if not used.
4	NC	-	No connect.
5	VSS	P	Ground connection.
6	ModOUT	O	Spread spectrum clock output.
7	NC	-	No connect.
8	VDD	P	Power supply for the entire chip.

Notice: The information in this document is subject to change without notice.

Modulation Profile



Specifications

Description		Specification
Frequency Range	For 2.5V Supply	13MHz < CLKIN < 30MHz
	For 3.3V Supply	13MHz < CLKIN < 30MHz
Modulation Equation		$F_{IN}/640$
Frequency Deviation		±1% (Typ) @ 16MHz

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VDD, V_{IN}	Voltage on any pin with respect to Ground	-0.5 to +4.6	V
T_{STG}	Storage temperature	-65 to +125	°C
T_A	Operating temperature	-40 to +85	°C
T_s	Max. Soldering Temperature (10 sec)	260	°C
T_J	Junction Temperature	150	°C
T_{DV}	Static Discharge Voltage (As per JEDEC STD22- A114-B)	2	KV

Note: These are stress ratings only and are not implied for functional use. Exposure to absolute maximum ratings for prolonged periods of time may affect device reliability.

Notice: The information in this document is subject to change without notice.

DC Electrical Characteristics for 2.5V Supply

(Test condition: All parameters are measured at room temperature (+25°C) unless otherwise stated)

Symbol	Parameter	Min	Typ	Max	Unit
V_{IL}	Input low voltage	VSS - 0.3	-	0.8	V
V_{IH}	Input high voltage	2.0	-	VDD + 0.3	V
I_{IL}	Input low current	-	-	-35	µA
I_{IH}	Input high current	-	-	35	µA
I_{XOL}	XOUT output low current (@0.5V, VDD=2.5V)	-	3	-	mA
I_{XOH}	XOUT output high current (@1.8V, VDD=2.5V)	-	3	-	mA
V_{OL}	Output low voltage (VDD = 2.5 V, I_{OL} = 8mA)	-	-	0.6	V
V_{OH}	Output high voltage (VDD = 2.5 V, I_{OH} = 8mA)	1.8	-	-	V
I_{DD}	Static supply current*	-	-	2.0	uA
I_{CC}	Dynamic supply current (2.5V, 16MHz and no load)	-	3.0	-	mA
VDD	Operating Voltage	2.375	2.5	2.625	V
t_{ON}	Power-up time (first locked cycle after power-up)**	-	-	5	mS
Z_{OUT}	Output impedance	-	50	-	Ω

* XIN /CLKIN pin and $\overline{PD}$ pin are pulled low
** V_{DD} and XIN/CLKIN input are stable, PD pin is made high from low.

AC Electrical Characteristics for 2.5V Supply

Symbol	Parameter		Min	Typ	Max	Unit
CLKIN	Input frequency		13	-	30	MHz
ModOUT	Output frequency		13	-	30	MHz
f_d	Frequency Deviation	Input Frequency = 13MHz	-	± 1.15	-	%
		Input Frequency = 30MHz	-	± 0.6	-	
t_{LH}*	Output rise time (measured from 0.7V to 1.7V)		0.7	1.4	1.8	nS
t_{HL}*	Output fall time (measured from 1.7V to 0.7V)		0.4	0.9	1.1	nS
t_{JC}	Jitter (cycle to cycle)		-	-	200	pS
t_D	Output duty cycle		45	50	55	%

* t_{LH} and t_{HL} are measured into a capacitive load of 15pF

Notice: The information in this document is subject to change without notice.

DC Electrical Characteristics for 3.3V Supply

(Test condition: All parameters are measured at room temperature (+ 25°C) unless otherwise stated)

Symbol	Parameter	Min	Typ	Max	Unit
V_{IL}	Input low voltage	VSS - 0.3	-	0.8	V
V_{IH}	Input high voltage	2.0	-	VDD + 0.3	V
I_{IL}	Input low current	-	-	-35	µA
I_{IH}	Input high current	-	-	35	µA
I_{XOL}	XOUT output low current (@0.4V, VDD=3.3V)	-	3	-	mA
I_{XOH}	XOUT output high current (@2.5V, VDD=3.3V)	-	3	-	mA
V_{OL}	Output low voltage (VDD = 3.3 V, I_{OL} = 8mA)	-	-	0.4	V
V_{OH}	Output high voltage (VDD = 3.3 V, I_{OH} = 8mA)	2.5	-	-	V
I_{DD}	Static supply current*	-	-	2.0	uA
I_{CC}	Dynamic supply current (3.3V, 16MHz and no load)	-	3.5	-	mA
VDD	Operating Voltage	2.7	3.3	3.6	V
t_{ON}	Power-up time (first locked cycle after power-up)**	-	-	5	mS
Z_{OUT}	Output impedance	-	45	-	Ω

* XIN /CLKIN pin and $\overline{PD}$ pin are pulled low
** V_{DD} and XIN/CLKIN input are stable, PD pin is made high from low.

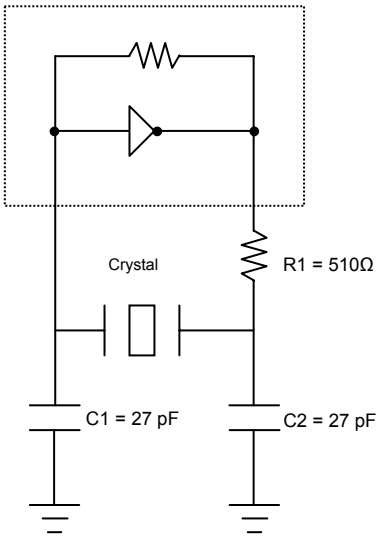
AC Electrical Characteristics for 3.3V Supply

Symbol	Parameter		Min	Typ	Max	Unit
CLKIN	Input frequency		13	-	30	MHz
ModOUT	Output frequency		13	v	30	MHz
f_d	Frequency Deviation	Input Frequency = 13MHz	-	±1.15	-	%
		Input Frequency = 30MHz	-	± 0.6	-	
t_{LH}*	Output rise time (measured from 0.8 to 2.0V)		0.5	1.1	1.3	nS
t_{HL}*	Output fall time (measured at 2.0V to 0.8V)		0.3	0.8	0.9	nS
t_{JC}	Jitter (cycle to cycle)		-	-	200	pS
t_D	Output duty cycle		45	50	55	%

*t_{LH} and t_{HL} are measured into a capacitive load of 15pF

Notice: The information in this document is subject to change without notice.

Typical Crystal Oscillator Circuit



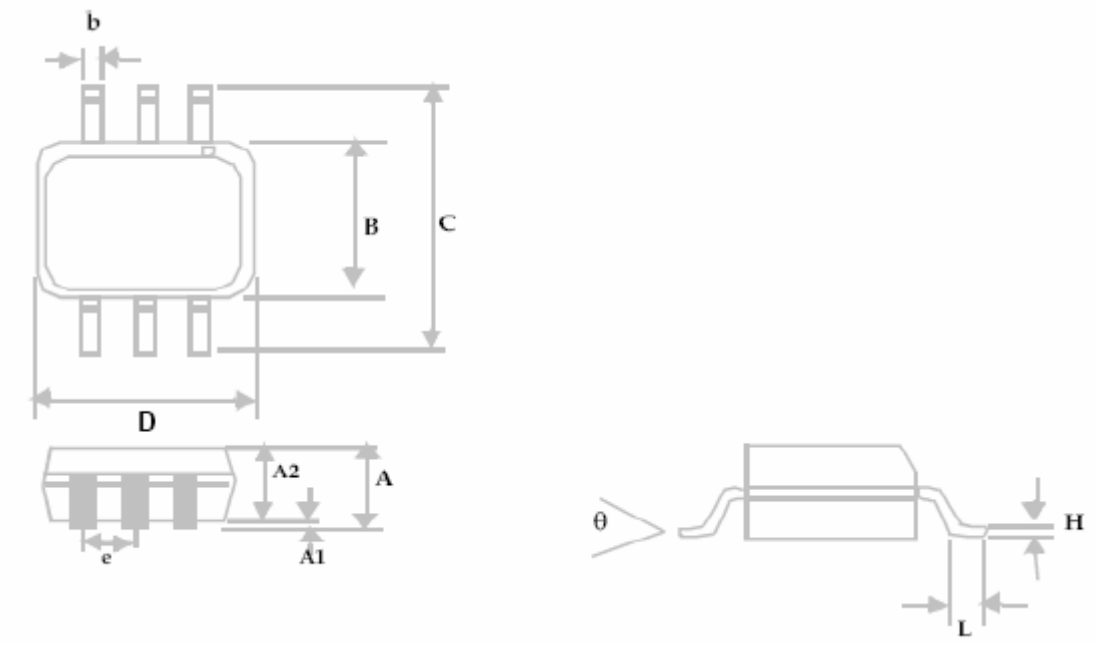
Typical Crystal Specifications

Fundamental AT cut parallel resonant crystal	
Nominal frequency	14.31818MHz
Frequency tolerance	± 50 ppm or better at 25°C
Operating temperature range	-25°C to +85°C
Storage temperature	-40°C to +85°C
Load capacitance	18pF
Shunt capacitance	7pF maximum
ESR	25Ω

Notice: The information in this document is subject to change without notice.

Package Information

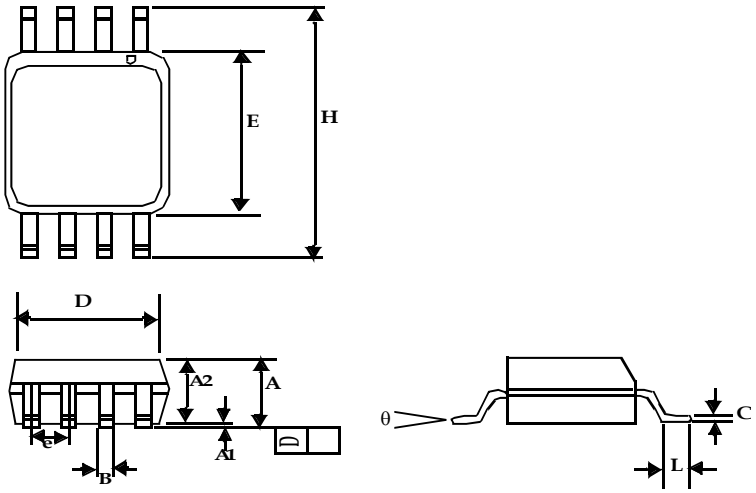
6-pin TSOT-23 Package



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.04		1.00
A1	0.00	0.004	0.00	0.10
A2	0.033	0.036	0.84	0.90
b	0.012	0.02	0.30	0.50
H	0.005 BSC		0.127 BSC	
D	0.114 BSC		2.90 BSC	
B	0.06 BSC		1.60 BSC	
e	0.0374 BSC		0.950 BSC	
C	0.11 BSC		2.80 BSC	
L	0.0118	0.02	0.30	0.50
θ	0°	4°	0°	4°

Notice: The information in this document is subject to change without notice.

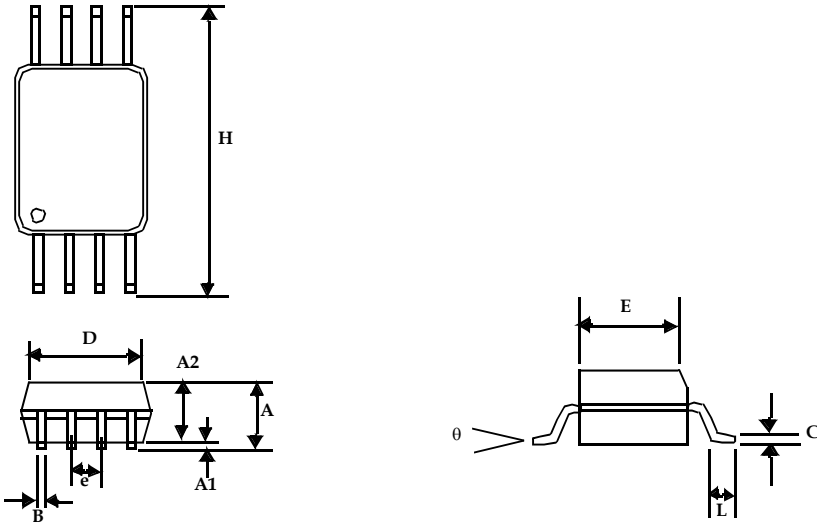
8-Pin SOIC Package



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A1	0.004	0.010	0.10	0.25
A	0.053	0.069	1.35	1.75
A2	0.049	0.059	1.25	1.50
B	0.012	0.020	0.31	0.51
C	0.007	0.010	0.18	0.25
D	0.193 BSC		4.90 BSC	
E	0.154 BSC		3.91 BSC	
e	0.050 BSC		1.27 BSC	
H	0.236 BSC		6.00 BSC	
L	0.016	0.050	0.41	1.27
θ	0°	8°	0°	8°

Notice: The information in this document is subject to change without notice.

8-Pin TSSOP Package



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.043		1.10
A1	0.002	0.006	0.05	0.15
A2	0.033	0.037	0.85	0.95
B	0.008	0.012	0.19	0.30
c	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
H	0.252 BSC		6.40 BSC	
L	0.020	0.028	0.50	0.70
θ	0°	8°	0°	8°

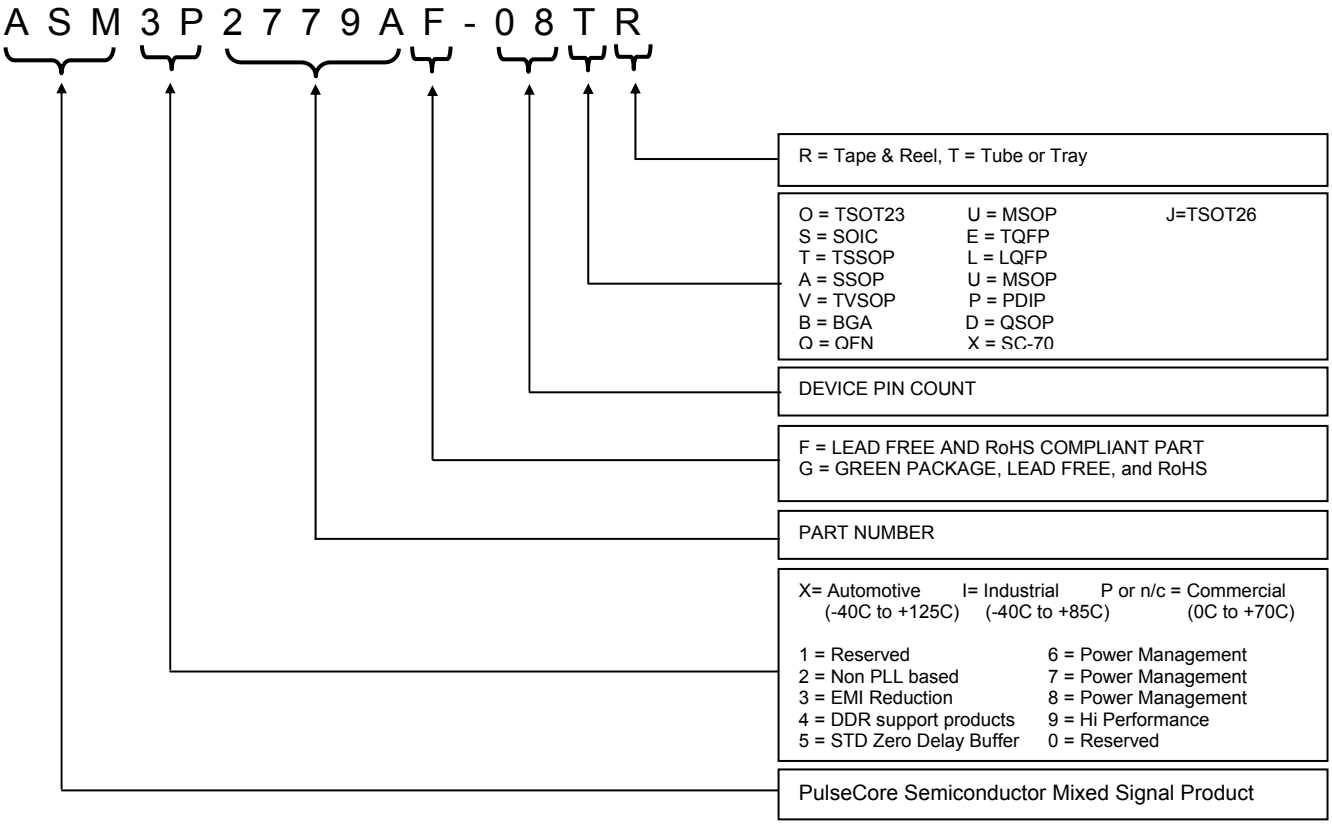
Notice: The information in this document is subject to change without notice.

Ordering Information

Part Number	Marking	Package Type	Temperature
ASM3P2779AF-06OR	A4LL	6-Pin TSOT-23, TAPE & REEL, Pb Free	Commercial
ASM3P2779AF-08TT	3P2779AF	8-Pin TSSOP, TUBE, Pb Free	Commercial
ASM3P2779AF-08TR	3P2779AF	8-Pin TSSOP, TAPE & REEL, Pb Free	Commercial
ASM3P2779AF-08ST	3P2779AF	8-Pin SOIC, TUBE, Pb Free	Commercial
ASM3P2779AF-08SR	3P2779AF	8-Pin SOIC, TAPE & REEL, Pb Free	Commercial
ASM3P2779AG-06OR	A3LL	6-Pin TSOT-23, TAPE & REEL, Green	Commercial
ASM3P2779AG-08TT	3P2779AG	8-Pin TSSOP, TUBE, Green	Commercial
ASM3P2779AG-08TR	3P2779AG	8-Pin TSSOP, TAPE & REEL, Green	Commercial
ASM3P2779AG-08ST	3P2779AG	8-Pin SOIC, TUBE, Green	Commercial
ASM3P2779AG-08SR	3P2779AG	8-Pin SOIC, TAPE & REEL, Green	Commercial
ASM3I2779AF-06OR	A5LL	6-Pin TSOT-23, TAPE & REEL, Pb Free	Industrial
ASM3I2779AF-08TT	3I2779AF	8-Pin TSSOP, TUBE, Pb Free	Industrial
ASM3I2779AF-08TR	3I2779AF	8-Pin TSSOP, TAPE & REEL, Pb Free	Industrial
ASM3I2779AF-08ST	3I2779AF	8-Pin SOIC, TUBE, Pb Free	Industrial
ASM3I2779AF-08SR	3I2779AF	8-Pin SOIC, TAPE & REEL, Pb Free	Industrial
ASM3I2779AG-06OR	A6LL	6-Pin TSOT-23, TAPE & REEL, Green	Industrial
ASM3I2779AG-08TT	3I2779AG	8-Pin TSSOP, TUBE, Green	Industrial
ASM3I2779AG-08TR	3I2779AG	8-Pin TSSOP, TAPE & REEL, Green	Industrial
ASM3I2779AG-08ST	3I2779AG	8-Pin SOIC, TUBE, Green	Industrial
ASM3I2779AG-08SR	3I2779AG	8-Pin SOIC, TAPE & REEL, Green	Industrial

Notice: The information in this document is subject to change without notice.

Device Ordering Information



Licensed under U.S Patent Nos 5,488,627 and 5,631,921

Notice: The information in this document is subject to change without notice.

PulseCore Semiconductor Corporation
1715 S. Bascom Ave Suite 200
Campbell, CA 95008
Tel: 408-879-9077
Fax: 408-879-9018
www.pulsecoresemi.com

Copyright © PulseCore Semiconductor
All Rights Reserved
Part Number: ASM3P2779A
Document Version: 3.2

Note: This product utilizes US Patent # 6,646,463 Impedance Emulator Patent issued to PulseCore Semiconductor, dated 11-11-2003

© Copyright 2006 PulseCore Semiconductor Corporation. All rights reserved. Our logo and name are trademarks or registered trademarks of PulseCore Semiconductor. All other brand and product names may be the trademarks of their respective companies. PulseCore reserves the right to make changes to this document and its products at any time without notice. PulseCore assumes no responsibility for any errors that may appear in this document. The data contained herein represents PulseCore's best data and/or estimates at the time of issuance. PulseCore 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. PulseCore 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 PulseCore 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 PulseCore's Terms and Conditions of Sale (which are available from PulseCore). All sales of PulseCore products are made exclusively according to PulseCore's Terms and Conditions of Sale. The purchase of products from PulseCore does not convey a license under any patent rights, copyrights; mask works rights, trademarks, or any other intellectual property rights of PulseCore or third parties. PulseCore 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 PulseCore products in such life-supporting systems implies that the manufacturer assumes all risk of such use and agrees to indemnify PulseCore against all claims arising from such use.

Notice: The information in this document is subject to change without notice.

TradeElectronics.ru

гарантия бесперебойности производства и качества выпускаемой продукции

О компании

ООО "ТрейдЭлектроникс" - это оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов. Реализуемая нашей компанией продукция насчитывает более полумиллиона наименований.

Благодаря этому наша компания предлагает к поставке практически не ограниченный ассортимент компонентов как оптовыми, мелкооптовыми партиями, так и в розницу.

Наличие собственной эффективной системы логистики обеспечивает надежную поставку продукции по конкурентным ценам в точно указанные сроки.

Срок поставки со стоков в **Европе и Америке – от 3 до 14 дней.**

Срок поставки из **Азии – от 10 дней.**

Благодаря развитой сети поставщиков, помогаем в поиске и приобретении экзотичных или снятых с производства компонентов.

Предоставляем спец цены на элементы для создания инженерных сэмплов.

Упорный труд, качественный результат дают нам право быть уверенными в себе и надежными для наших клиентов.

Наша компания это:

- Гарантия качества поставляемой продукции
- Широкий ассортимент
- Минимальные сроки поставок
- Техническая поддержка
- Подбор комплектации
- Индивидуальный подход
- Гибкое ценообразование

Наша организация особенно сильна в поставках модулей, микросхем, пассивных компонентов, ксайленсах (XC), EPF, EPM и силовой электроники.

Большой выбор предлагаемой продукции, различные виды оплаты и доставки, позволят Вам сэкономить время и получить максимум выгоды от сотрудничества с нами!

Trade Electronics.ru

гарантия бесперебойности производства и качества выпускаемой продукции

Перечень производителей, продукцию которых мы поставляем на российский рынок



Trade Electronics.ru

гарантия бесперебойности производства и качества выпускаемой продукции

С удовольствием будем прорабатывать для Вас поставки всех необходимых компонентов по текущим запросам для скорейшего выявления групп элементов, по которым сотрудничество именно с нашей компанией будет для Вас максимально выгодным!

С уважением,

Менеджер отдела продаж ООО

«Трейд Электроникс»

Шишлаков Евгений

8 (495)668-30-28 доб 169

manager28@tradeelectronics.ru

http://www.tradeelectronics.ru/