

Product Change Notification - SYST-28KGMN085

Date:

29 Jan 2020

Product Category:

Clock and Timing - Clock and Data Distribution

Affected CPNs:



Notification subject:

Data Sheet - SY100EL16V-5V/3.3V ECL Differential Receiver Data Sheet

Notification text: SYST-

28KGMN085

Microchip has released a new Product Documents for the SY100EL16V-5V/3.3V ECL Differential Receiver Data Sheet of devices. If you are using one of these devices please read the document located at <a href="https://example.com/sys-ex-alpha-english-sys-ex-alpha-e

- 1) Updated minimum values for Common Mode Range voltage in PECL DC Electrical Characteristicstable and NECL DC Electrical Characteristics table.
- 2) Minor stylistic updates to align data sheet with current style.
- 3) Added Marking Spec for MSOP Package Option in Section 3.1 " Package Marking Information & rdquo;.
- 4) Added MSOP examples to the Product Identification System section.

Impacts to Data Sheet: None

Reason for Change: To Improve Manufacturability

Change Implementation Status: Complete

Date Document Changes Effective: 29 Jan 2020

NOTE: Please be advised that this is a change to the document only the product has not been changed.

Markings to Distinguish Revised from Unrevised Devices: N/A Attachment(s):

SY100EL16V-5V/3.3V ECL Differential Receiver Data Sheet

Please contact your local <u>Microchip sales office</u> with questions or concerns regarding this notification.

Terms and Conditions:

If you wish to <u>receive Microchip PCNs via email</u> please register for our PCN email service at our <u>PCN home page</u> select register then fill in the required fields. You will find instructions about registering for Microchips PCN email service in the <u>PCN FAQ</u> section.

If you wish to <u>change your PCN profile, including opt out,</u> please go to the <u>PCN home page</u> select login and sign into your myMicrochip account. Select a profile option from the left navigation bar and make the applicable selections.



SY100EL16V

5V/3.3V ECL Differential Receiver

Features

- 3.3V and 5V Power Supply Options
- · 250 ps Propagation Delay (Typical)
- · High Bandwidth Output Transitions
- Internal 75 kΩ Input Pull-Down Resistors
- Available in 8-pin (3 mm x 3 mm) MSOP and SOIC Packages

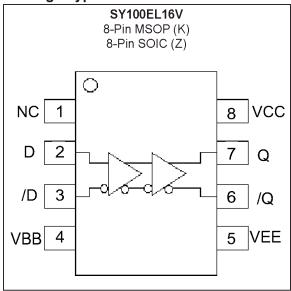
General Description

The SY100EL16V is a differential receiver. With fast output transition times, the SY100EL16V is ideally suited for interfacing with high-frequency sources.

The SY100EL16V provides a VBB output for either single-ended use or as a DC bias for AC coupling to the device. The VBB pin should be used only as a bias for the SY100EL16V as its current sink/source capability is limited. Whenever used, the VBB pin should be bypassed to ground via a 0.01 μ F capacitor.

Under open input conditions (pulled to VEE), internal input clamps will force the Q output low.

Package Type



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

PECL Power Supply Voltage (V _{CC}) (Note 1)	+8V
NECL Power Supply Voltage (V _{EE}) (Note 2)	
PECL Mode Input Voltage (V _{IN}) (Note 3)	+6V
NECL Mode Input Voltage (V _{IN}) (Note 4)	
Continuous Output Current (I _{OUT})	
Surge Output Current (I _{OUT})	
ESD Rating (Note 5)	>2 kV

† Notice: Stresses above those listed under "Absolute Maximum ratings" may cause permanent damage to the device. Exposure to maximum rating conditions for extended periods may affect device reliability.

Note 1: $V_{EE} = 0V$

2: $V_{CC} = 0V$

3: $V_{EE} = 0V$, $V_{IN} \le V_{CC}$

4: $V_{CC} = 0V$, $V_{IN} \ge V_{FF}$

5: Mil Std. 883 Human Body Model, all pins

PECL DC ELECTRICAL CHARACTERISTICS

Electrical Specifications PECL: $V_{CC} = 3.0V$ to 5.5V; $V_{EE} = 0V$; $T_A = -40^{\circ}C$ to +85°C, unless otherwise stated (Note 1)

Parameter	Symbol	Min.	Тур.	Max.	Units	Conditions
Davis Commission Command	I _{EE}		- 18		m Λ	$T_A = -40^{\circ}C \text{ to } +25^{\circ}C$
Power Supply Current		_	21	26	mA	T _A = +85°C
Output High Voltage	\/	V _{CC} - 1.085	V _{CC} - 1.005	V _{CC} - 0.88	V	T _A = -40°C
(Note 2)	V _{OH}	V _{CC} - 1.025	V _{CC} - 0.955	V _{CC} - 0.88	V	$T_A = 0$ °C to +85°C
Output Low Voltage	V _{OL}	V _{CC} - 1.830	V _{CC} - 1.695	V _{CC} – 1.555	V	$T_A = -40^{\circ}C$
(Note 2)	VOL	V _{CC} - 1.810	V _{CC} - 1.705	V _{CC} - 1.620	٧	$T_A = 0$ °C to +85°C
Input High Voltage (Single-Ended)	V _{IH}	V _{CC} – 1.165	_	V _{CC} - 0.880	V	_
Input Low Voltage (Single-Ended)	V _{IL}	V _{CC} – 1.810		V _{CC} – 1.475	V	_
Output Reference Voltage	V _{BB}	V _{CC} -1.38	— V _{CC} – 1.26		V	_
Common Mode Range	\/	2.0	_	$V_{CC} - 0.4$	V	$T_A = -40^{\circ}C$
(Note 3)	VIHCMR	1.9		$V_{CC} - 0.4$		$T_A = 0$ °C to +85°C
Input High Current	Ι _{ΙΗ}	_	_	150	μΑ	_
Input Low Current	Ι _Ι L	0.5		_	μA	$V_{IN} = V_{IL(MIN)}$

- **Note 1:** Devices are designed to meet the DC specifications shown in the above table after thermal equilibration has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500 lfpm is maintained.
 - 2: Outputs are terminated through a 50Ω resistor to $V_{CC} 2.0V$.
 - 3: The CMR range is referenced to the most positive side of the differential input voltage. Normal operation is obtained if the high level falls within the specified range and the peak-to-peak voltage lies between 150 mV and 1V.

NECL DC ELECTRICAL CHARACTERISTICS

Electrical Specifications NECL: $V_{EE} = -5.5V$ to -3.0V; $V_{CC} = 0V$; $T_A = -40^{\circ}C$ to $+85^{\circ}C$, unless otherwise stated (Note 1)

Parameter	Symbol	Min.	Тур.	Max.	Units	Conditions
Dower Cumply Current			18	18 22		$T_A = -40^{\circ}C \text{ to } +25^{\circ}C$
Power Supply Current	l lEE	_	21	26	mA mA	T _A = +85°C
Output High Voltage	\/	-1.085	-1.005	-0.88	V	T _A = -40°C
(Note 2)	V _{OH}	-1.025	-0.955	-0.88]	$T_A = 0$ °C to +85°C
Output Low Voltage	V	-1.830	-1.695	-1.555	V	T _A = -40°C
(Note 2)	V _{OL}	-1.810	-1.705	-1.620	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	$T_A = 0$ °C to +85°C
Input High Voltage (Single-Ended)	V _{IH}	-1.165	_	-0.880	V	_
Input Low Voltage (Single-Ended)	V _{IL}	-1.810	— —1.475		V	_
Output Reference Voltage	V _{BB}	-1.38	_	-1.26	V	_
Common Mode Range	\/	V _{EE} + 2.0	_	-0.4	V	$T_A = -40^{\circ}C$
(Note 3)	VIHCMR	V _{EE} + 1.9	_	-0.4] V	$T_A = 0$ °C to +85°C
Input High Current	l _{IH}			150	μA	_
Input Low Current	կլ	0.5		_	μA	$V_{IN} = V_{IL(MIN)}$

- **Note 1:** Devices are designed to meet the DC specifications shown in the above table after thermal equilibration has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500 lfpm is maintained.
 - 2: Outputs are terminated through a 50\(\Omega\) resistor to V_{CC}-2.0V.
 - 3: The CMR range is referenced to the most positive side of the differential input voltage. Normal operation is obtained if the high level falls within the specified range and the peak-to-peak voltage lies between 150 mV and 1V.

AC ELECTRICAL CHARACTERISTICS

Electrical Characteristics: V_{CC} = 3.0V to 5.5V; V_{EE} = 0V or V_{EE} = -5.5V to -3.0V; V_{CC} = 0V; T_A = -40°C to +85°C, unless otherwise stated, (Note 1)

Parameter	Symbol	Min.	Тур.	Max.	Units	Conditions
	4	125	250	375	-	T _A = -40°C
Propagation Delay D to Q D (Differential)	фин фии	175	250	325		T _A = 0°C, +25°C
(Billerential)	PHL	205	280	355		T _A = +85°C
Propagation Delay D to Q (Single-Ended)	ф _{LH} фнL	75	250	425		T _A = -40°C
		125	250	375	ps	T _A = 0°C, +25°C
		155	280	405		T _A = +85°C
Duty Cycle Skew (Note 2)	t _{SKEW}		5	_	nc	T _A = -40°C
			5	20	ps	T _A = 0°C to +85°C
Input Swing (Note 3)	V_{PP}	150	_	1000	mV	_
Output Rise/Fall Time Q (20% to 80%)	t _r /t _f	100	225	350	ps	_

Note 1: Specification for packaged product only.

- 2: Duty cycle skew is the difference between a t_{PLH} and t_{PHL} propagation delay through a device.
- 3: Input swing for which AC parameters are ensured. The device has a DC gain of ≈40.

SY100EL16V

TEMPERATURE SPECIFICATIONS

Parameters	Sym.	Min.	Тур.	Max.	Units	Conditions			
Temperature Ranges									
Operating Temperature Range	T _A	-40		+85	°C	_			
Storage Temperature Range	T _S	- 65	_	+150	°C	_			
Lead Temperature	T _{LEAD}	_	_	+260	°C	Soldering, 20 sec.			
Thermal Resistance									
D . T	θ_{JA}	_	160	_	°C/W	Still-Air			
Package Thermal Resistance, SOIC 8-Ld		_	109	_		500 Ifpm			
0- <u>L</u> u	θ _{JC}	_	39	_	°C/W	_			
D 1 TI 1D 11 NOOD	0	_	206	_	°C/W	Still-Air			
Package Thermal Resistance, MSOP 8-Ld	θ_{JA}	_	155	_		500 Ifpm			
0-Lu	θ _{JC}	_	39	_	°C/W	_			

2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 2-1.

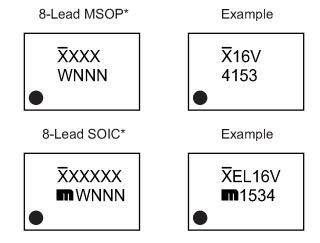
TABLE 2-1: PIN FUNCTION TABLE

Pin Name	Description					
D	Data Input					
Q	Data Output					
VBB	Reference Voltage Output					
NC	Not Connected					
VCC	Positive Power Supply					
VEE	Negative Power Supply					

Note:

3.0 PACKAGING INFORMATION

3.1 Package Marking Information



 Legend:
 XX...X
 Product code or customer-specific information

 Y
 Year code (last digit of calendar year)

 YY
 Year code (last 2 digits of calendar year)

 WW
 Week code (week of January 1 is week '01')

 NNN
 Alphanumeric traceability code

 Pb-free JEDEC® designator for Matte Tin (Sn)

 This package is Pb-free. The Pb-free JEDEC designator (€3)

 can be found on the outer packaging for this package.

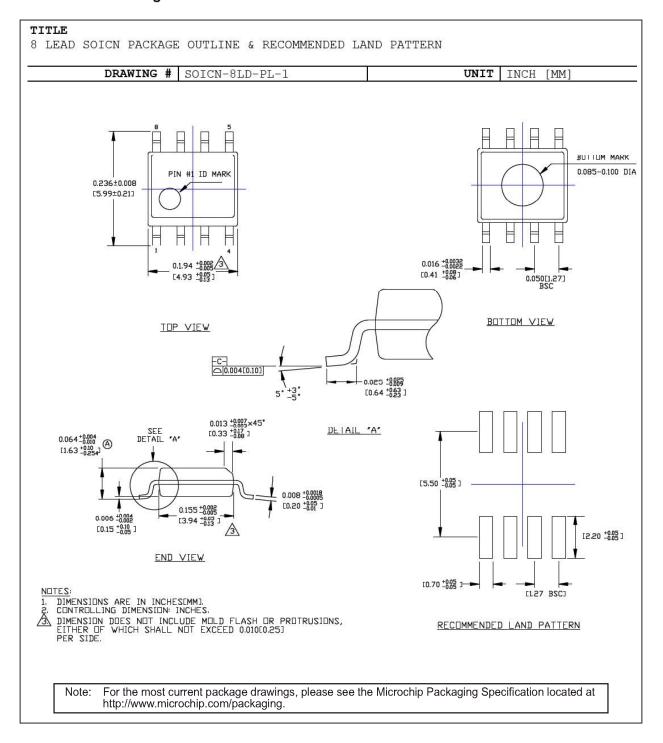
 •, ♠, ♠, ▼ Pin one index is identified by a dot, delta up, or delta down (triangle

mark).

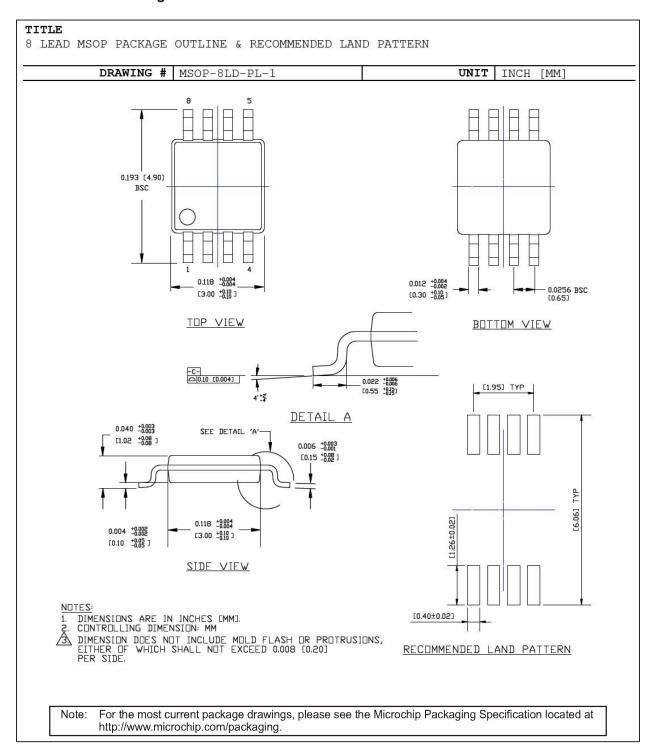
In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

Underbar (_) and/or Overbar (¬) symbol may not be to scale.

8-Lead SOIC Package Outline and Recommended Land Pattern



8-Lead MSOP Package Outline and Recommended Land Pattern



DS20006115B-page 8

APPENDIX A: REVISION HISTORY

Revision A (November 2018)

- Converted Micrel document SY100EL16V to Microchip data sheet template DS20006115A.
- Made minor text changes throughout the document.
- Removed all reference to the EOL SY10EL16V version.

Revision B (January 2020)

- Updated minimum values for Common Mode Range voltage in PECL DC Electrical Characteristics table and NECL DC Electrical Characteristics table
- Minor stylistic updates to align data sheet with current style.
- Added Marking Spec for MSOP Package Option in Section 3.1 "Package Marking Information".
- Added MSOP examples to the Product Identification System section.

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

PART NO.	Х	Х	Х	-XX	Exampl	es:	
Device	T Supply Voltage	Package T	Temperature Range	Special Processing	a) SY100	DEL16VZG:	SY100EL16, 3.3V/5V, 8-Lead SOIC (Pb-Free NiPdAu), -40°C to +85°C, 95/Tube
Device: Supply Voltage	SY100EL1	6: 5V/3.3V EC	L Differential Re	eceiver	b) SY100	DEL16VZG-TR:	SY100EL16, 3.3V/5V, 8-Lead SOIC (Pb-Free NiPdAu), -40°C to +85°C, 1,000/ReeI
Range: Package:	Z = K =	8-Lead SOIC	(Pb-Free NiPd P (Pb-Free NiP		c) SY100	DEL16VKG:	SY100EL16, 3.3V/5V, 8-Lead MSOP (Pb-Free NiPdAu), -40°C to +85°C, 95/Tube
Temperature Range:	G =	–40°C to +85°	°C		d) SY100	DEL16VKG-TR:	SY100EL16, 3.3V/5V, 8-Lead MSOP (Pb-Free NiPdAu), -40°C to +85°C, 1,000/Reel
Special Processing:	 blank>= TR =	95/Tube 1,000/Reel			Note 1:	catalog part num used for ordering the device packa	lentifier only appears in the ber description. This identifier is purposes and is not printed on ge. Check with your Microchip backage availability with the ption.

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our
 knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data
 Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, Adaptec, AnyRate, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, chipKlT, chipKlT logo, CryptoMemory, CryptoRF, dsPlC, FlashFlex, flexPWR, HELDO, IGLOO, JukeBlox, KeeLoq, Kleer, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PackeTime, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricom, SyncServer, Tachyon, TempTrackr, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

APT, ClockWorks, The Embedded Control Solutions Company, EtherSynch, FlashTec, Hyper Speed Control, HyperLight Load, IntelliMOS, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, Temux, TimeCesium, TimeHub, TimePictra, TimeProvider, Vite, WinPath, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BlueSky, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, INICnet, Inter-Chip Connectivity, JitterBlocker, KleerNet, KleerNet logo, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, SAM-ICE, Serial Quad I/O, SMART-I.S., SQI, SuperSwitcher, SuperSwitcher II, Total Endurance, TSHARC, USBCheck, VariSense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

 $\ensuremath{\mathsf{SQTP}}$ is a service mark of Microchip Technology Incorporated in the U.S.A.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2018-2020, Microchip Technology Incorporated, All Rights Reserved.

ISBN: 978-1-5224-5531-8

For information regarding Microchip's Quality Management Systems, please visit www.microchip.com/quality.



Worldwide Sales and Service

AMERICAS

Corporate Office 2355 West Chandler Blvd. Chandler, AZ 85224-6199 Tel: 480-792-7200 Fax: 480-792-7277 Technical Support:

http://www.microchip.com/ support

Web Address: www.microchip.com

Atlanta Duluth, GA Tel: 678-957-9614 Fax: 678-957-1455

Austin, TX Tel: 512-257-3370

Boston Westborough, MA

Tel: 774-760-0087 Fax: 774-760-0088

Chicago Itasca, IL Tel: 630-285-0071 Fax: 630-285-0075

Dallas Addison, TX Tel: 972-818-7423 Fax: 972-818-2924

Detroit Novi, MI

Tel: 248-848-4000

Houston, TX Tel: 281-894-5983

Indianapolis Noblesville, IN Tel: 317-773-8323 Fax: 317-773-5453 Tel: 317-536-2380

Los Angeles Mission Viejo, CA Tel: 949-462-9523 Fax: 949-462-9608 Tel: 951-273-7800

Raleigh, NC Tel: 919-844-7510

New York, NY Tel: 631-435-6000

San Jose, CA Tel: 408-735-9110 Tel: 408-436-4270 Canada - Toronto

Tel: 905-695-1980 Fax: 905-695-2078

ASIA/PACIFIC

Australia - Sydney Tel: 61-2-9868-6733

China - Beijing Tel: 86-10-8569-7000

China - Chengdu Tel: 86-28-8665-5511

China - Chongqing Tel: 86-23-8980-9588

China - Dongguan Tel: 86-769-8702-9880

China - Guangzhou Tel: 86-20-8755-8029

China - Hangzhou Tel: 86-571-8792-8115

China - Hong Kong SAR Tel: 852-2943-5100

China - Nanjing Tel: 86-25-8473-2460

China - Qingdao Tel: 86-532-8502-7355

China - Shanghai Tel: 86-21-3326-8000

China - Shenyang Tel: 86-24-2334-2829

China - Shenzhen Tel: 86-755-8864-2200

China - Suzhou Tel: 86-186-6233-1526

China - Wuhan Tel: 86-27-5980-5300

China - Xian Tel: 86-29-8833-7252

China - Xiamen Tel: 86-592-2388138

China - Zhuhai Tel: 86-756-3210040

ASIA/PACIFIC

India - Bangalore Tel: 91-80-3090-4444

India - New Delhi Tel: 91-11-4160-8631

India - Pune Tel: 91-20-4121-0141

Japan - Osaka Tel: 81-6-6152-7160

Japan - Tokyo Tel: 81-3-6880- 3770

Korea - Daegu Tel: 82-53-744-4301

Korea - Seoul Tel: 82-2-554-7200

Malaysia - Kuala Lumpur Tel: 60-3-7651-7906

Malaysia - Penang Tel: 60-4-227-8870

Philippines - Manila Tel: 63-2-634-9065

Singapore Tel: 65-6334-8870

Taiwan - Hsin Chu Tel: 886-3-577-8366

Taiwan - Kaohsiung Tel: 886-7-213-7830

Taiwan - Taipei Tel: 886-2-2508-8600

Thailand - Bangkok Tel: 66-2-694-1351

Vietnam - Ho Chi Minh Tel: 84-28-5448-2100

EUROPE

Austria - Wels Tel: 43-7242-2244-39 Fax: 43-7242-2244-393

Denmark - Copenhagen Tel: 45-4450-2828 Fax: 45-4485-2829

Finland - Espoo Tel: 358-9-4520-820

France - Paris Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79

Germany - Garching Tel: 49-8931-9700

Germany - Haan Tel: 49-2129-3766400

Germany - Heilbronn Tel: 49-7131-72400

Germany - Karlsruhe Tel: 49-721-625370

Germany - Munich Tel: 49-89-627-144-0 Fax: 49-89-627-144-44

Germany - Rosenheim Tel: 49-8031-354-560

Israel - Ra'anana Tel: 972-9-744-7705

Italy - Milan Tel: 39-0331-742611 Fax: 39-0331-466781

Italy - Padova Tel: 39-049-7625286

Netherlands - Drunen Tel: 31-416-690399 Fax: 31-416-690340

Norway - Trondheim Tel: 47-7288-4388

Poland - Warsaw Tel: 48-22-3325737

Romania - Bucharest Tel: 40-21-407-87-50

Spain - Madrid Tel: 34-91-708-08-90 Fax: 34-91-708-08-91

Sweden - Gothenberg Tel: 46-31-704-60-40

Sweden - Stockholm Tel: 46-8-5090-4654

UK - Wokingham Tel: 44-118-921-5800 Fax: 44-118-921-5820

SYST-28KGMN085 - Data Sheet - SY100EL16V-5V/3.3V ECL Differential Receiver Data Sheet

Affected Catalog Part Numbers(CPN)

SY100EL16VCKG

SY100EL16VCKG-TR

SY100EL16VDKG

SY100EL16VDKG-TR

SY100EL16VDWC

SY100EL16VFKG

SY100EL16VFKG-TR

SY100EL16VKG

SY100EL16VKG-TR

SY100EL16VSKG

SY100EL16VSKG-TR

SY100EL16VZG

SY100EL16VZG-TR