SY100EL56V

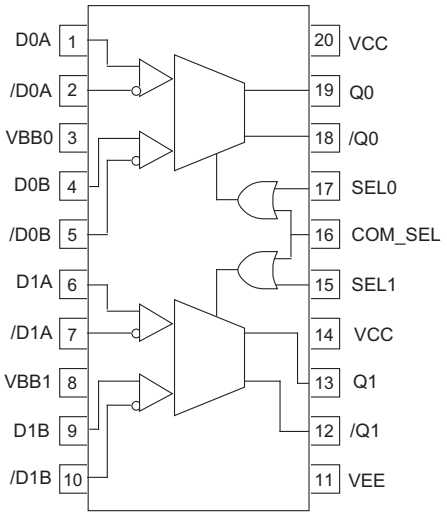
5V/3.3V Dual Differential 2:1 Multiplexer

Features

- 3.3V and 5V Power Supply Option
- 440 ps Typical Propagation Delay
- Separate and Common Select
- High Bandwidth Output Transitions
- Internal 75 kΩ Input Pull Down Resistors
- Available in 20-Pin SOIC Package

Package Type

SY100EL56V
20-Lead SOIC (Z)



General Description

The SY100EL56V is a dual, fully differential 2:1 multiplexer. The differential data path makes the device ideal for multiplexing low skew clock or other skew sensitive signals. Multiple VBB pins are provided to ease AC coupling input signals.

The device features both individual and common select inputs to address both data path and random logic applications.

The differential inputs have special circuitry which ensures device stability under open input conditions. When both differential inputs are left open the D input will pull down to V_{EE}, the /D input will bias around $V_{CC}/2$ forcing the Q output LOW.

1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

PECL Power Supply Voltage (V_{CC}) (Note 1) ..... +8V
NECL Power Supply Voltage (V_{EE}) (Note 2) ..... –8V
PECL Mode Input Voltage (V_{IN}) (Note 3) ..... +6V
NECL Mode Input Voltage (V_{IN}) (Note 4) ..... –6V
Continuous Output Current (I_{OUT}) ..... 50 mA
Surge Output Current (I_{OUT}) ..... 100 mA
ESD Rating (Note 5) ..... >1.5 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, $V_{IN} \leq V_{CC}$.

4: V_{CC} = 0V, $V_{IN} \geq V_{EE}$.

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

DC 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.	Typ.	Max.	Units	Conditions
Power Supply Current	I_{EE}	—	20	24	mA	—
Output High Voltage (Note 2)	V_{OH}	V_{CC} – 1.085	V_{CC} – 1.005	V_{CC} – 0.88	V	T_A = –40°C
		V_{CC} – 1.025	V_{CC} – 0.955	V_{CC} – 0.88		T_A = 0°C to +85°C
Output Low Voltage (Note 2)	V_{OL}	V_{CC} – 1.830	V_{CC} – 1.695	V_{CC} – 1.555	V	T_A = –40°C
		V_{CC} – 1.810	V_{CC} – 1.705	V_{CC} – 1.620		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 (Note 3)	V_{IHCMR}	V_{EE} + 1.3	—	V_{CC} – 0.4	V	T_A = –40°C, V_{PP} < 500 mV
		V_{EE} + 1.2	—	V_{CC} – 0.4		T_A = 0°C to 85°C, V_{PP} < 500 mV
		V_{EE} + 1.5	—	V_{CC} – 0.4		T_A = –40°C, V_{PP} ≥ 500 mV
		V_{EE} + 1.4	—	V_{CC} – 0.4		T_A = 0°C to 85°C, V_{PP} ≥ 500 mV
Input Sensitivity (Note 4)	V_{PP} (DC)	50	—	—	mV	—
Input High Current	I_{IH}	—	—	150	µA	—
Input Low Current	I_{IL}	0.5	—	—	µA	D, SEL, COM_SEL
		–300	—	—	µA	/D

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.

4: Differential input voltage required to obtain a full ECL swing on the outputs.

AC ELECTRICAL CHARACTERISTICS

Electrical Characteristics: V_{CC} = +3.0V to +5.5V, V_{EE} = 0V or V_{EE} = –5.5V to –3.02V, V_{CC} = 0V; T_A = –40°C to +85°C, R_L = 50Ω to V_{CC} - 2V; unless otherwise stated.

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Propagation Delay D to Q (Differential)	t_{PLH}, t_{PHL}	340	—	540	ps	T_A = –40°C
		350	—	550		T_A = 0°C
		360	—	560		T_A = +25°C
		380	—	580		T_A = +85°C
Propagation Delay D to Q (Single-Ended)		290	—	590		T_A = –40°C
		300	—	600		T_A = 0°C
		310	—	610		T_A = +25°C
		330	—	630		T_A = +85°C
Propagation Delay SEL, COM_SEL to Q		430	—	730		T_A = –40°C
		440	—	740		T_A = 0°C, +25°C
		450	—	750		T_A = +85°C
Within Device Skew (Note 1)	t_{SKEW}	—	40	80	ps	—
Duty Cycle Skew (Note 2)		—	—	100		—
Input Swing (Note 3)	V_{PP}(AC)	150	—	1000	mV	—
Output Rise/Fall Time Q (20% to 80%)	t_r/t_f	200	—	540	ps	—

Note 1: Within-device skew defined as identical transitions on similar paths through a device.

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.

TEMPERATURE SPECIFICATIONS

Parameters	Symbol	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Operating Temperature Range	T_A	–40	—	+85	°C	—
Storage Temperature	T_S	–65	—	+150	°C	—
Lead Temperature	T_{LEAD}	—	—	+260	°C	Soldering, 20 sec.
Package Thermal Resistance (SOIC)						
Junction-to-Ambient	θ_{JA}	—	90	—	°C/W	Still Air
		—	60	—		500 lfpm
Junction-to-Case	θ_{JC}	—	35	—	°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
D0A - D1A	Input Data A.
D0B - D1B	Input Data B.
SEL0 - SEL1	Individual Select Input.
COM_SEL	Common Select Input.
Q0 - Q1	True Outputs.
/Q0 - /Q1	Inverted Outputs.

2.1 Truth Table

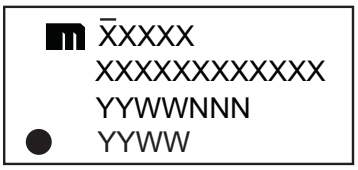
TABLE 2-2: TRUTH TABLE

SEL	DATA
H	A
L	B

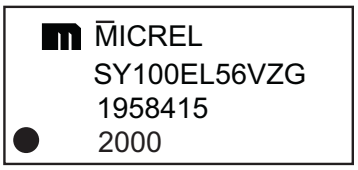
3.0 PACKAGING INFORMATION

3.1 Package Marking Information

20-Lead SOIC*



Example



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
	(e3)	Pb-free JEDEC® designator for Matte Tin (Sn)
	*	This package is Pb-free. The Pb-free JEDEC designator ((e3)) 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).

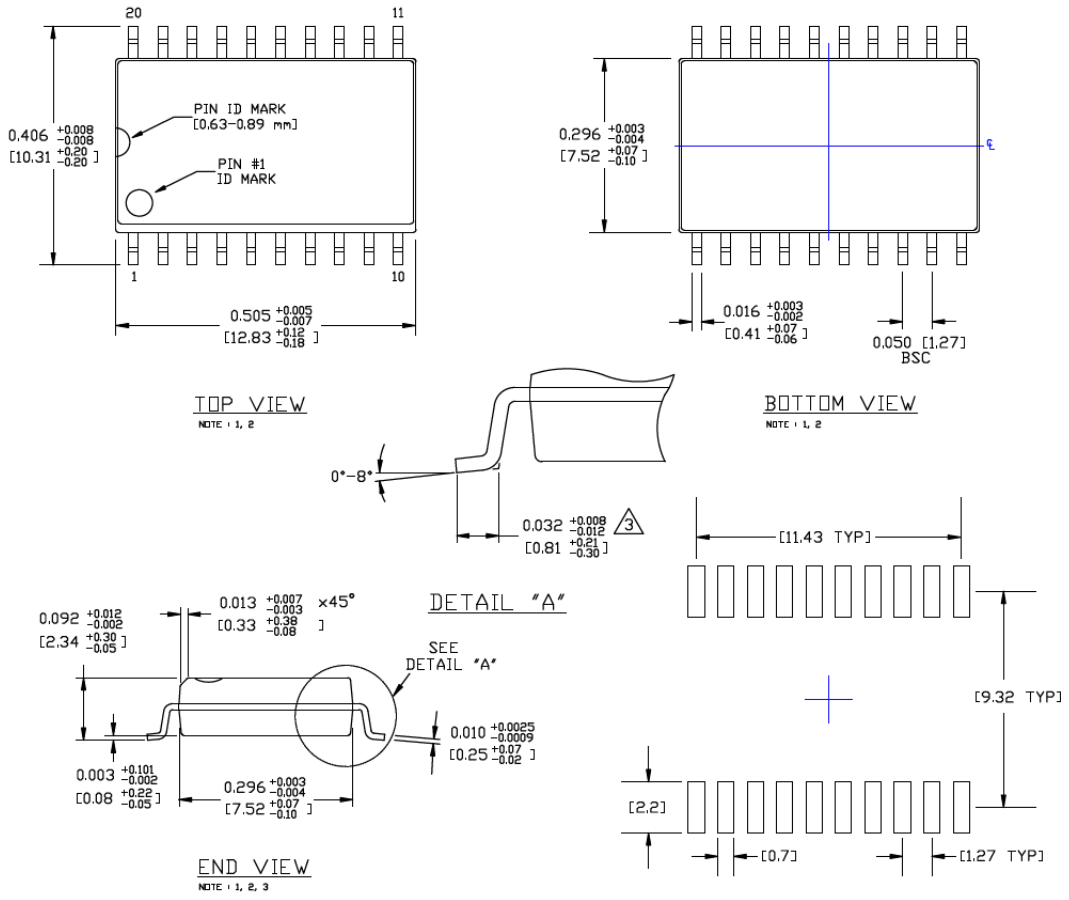
Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

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

TITLE

20 LEAD SOICW PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICW-20LD-PL-1	UNIT	INCH [MM]



NOTES:

1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.006[0.15] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

APPENDIX A: REVISION HISTORY

Revision A (August 2019)

- Converted Micrel document SY100EL56V to Microchip data sheet DS20006242A.
- Minor text changes throughout.

NOTES:

PRODUCT IDENTIFICATION SYSTEM

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

PART NO.	-XX	X	X	-XX
Device	Supply Voltage Range	Package	Temperature Range	Special Processing

Device:	SY100EL56:	Dual Differential 2:1 Multiplexer	
Supply Voltage Range:	V	=	3.3V/5V
Package:	Z	=	20-Lead SOIC (Pb-Free NiPdAu)
Temperature Range:	G	=	–40°C to +85°C
Special Processing:	<blank>	=	38/Tube
	TR	=	1,000/Reel

Examples:

a) SY100EL56VZG: SY100EL56, 3.3V/5V, 20-Lead SOIC, –40°C to +85°C, 38/Tube

b) SY100EL56VZG-TR: SY100EL56, 3.3V/5V, 20-Lead, SOIC, –40°C to +85°C, 1,000/Reel

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

NOTES:

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