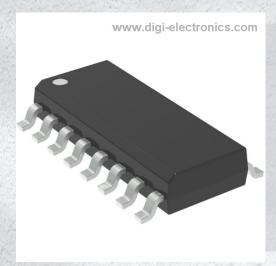


MC100EL15DG Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number MC100EL15DG-DG

Manufacturer onsemi

Manufacturer Product Number MC100EL15DG

Description IC CLK BUFFER 2:4 1.25GHZ 16SOIC

Detailed Description Clock Fanout Buffer (Distribution), Multiplexer IC 2:

4 1.25 GHz 16-SOIC (0.154", 3.90mm Width)



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.



Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
MC100EL15DG	onsemi
Series:	Product Status:
100EL	Active
Type:	Number of Circuits:
Fanout Buffer (Distribution), Multiplexer	1
Ratio - Input:Output:	Differential - Input:Output:
2:4	Yes/Yes
Input:	Output:
ECL, PECL	ECL, PECL
Frequency - Max:	Voltage - Supply:
1.25 GHz	4.2V ~ 5.7V
Operating Temperature:	Mounting Type:
-40°C ~ 85°C	Surface Mount
Package / Case:	Supplier Device Package:
16-SOIC (0.154", 3.90mm Width)	16-SOIC
Base Product Number:	
MC100EL15	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8542.39.0001	



www.onsemi.com

5 V ECL 1:4 Clock Distribution Chip

MC10EL15, MC100EL15

Description

The MC10EL/100EL15 is a low skew 1:4 clock distribution chip designed explicitly for low skew clock distribution applications. The V_{BB} pin, an internally generated voltage supply, is available to this device only. For single-ended input conditions, the unused differential input is connected to V_{BB} as a switching reference voltage. V_{BB} may also rebias AC coupled inputs. When used, decouple V_{BB} and V_{CC} via a 0.01 μF capacitor and limit current sourcing or sinking to 0.5 mA. When not used, V_{BB} should be left open.

The EL15 features a multiplexed clock input to allow for the distribution of a lower speed scan or test clock along with the high speed system clock. When LOW (or left open and pulled LOW by the input pulldown resistor) the SEL pin will select the differential clock input.

The common enable $(\overline{\text{EN}})$ is synchronous so that the outputs will only be enabled/disabled when they are already in the LOW state. This avoids any chance of generating a runt clock pulse when the device is enabled/disabled as can happen with an asynchronous control. The internal flip flop is clocked on the falling edge of the input clock, therefore all associated specification limits are referenced to the negative edge of the clock input.

The 100 series contains temperature compensation.

Features

- 50 ps Output-to-Output Skew
- Synchronous Enable/Disable
- Multiplexed Clock Input
- PECL Mode Operating Range:
 - $V_{CC} = 4.2 \text{ V to } 5.7 \text{ V with } V_{EE} = 0 \text{ V}$
- NECL Mode Operating Range:
 - $V_{CC} = 0 \text{ V}$ with $V_{EE} = -4.2 \text{ V}$ to -5.7 V
- Internal Input Pulldown Resistors on CLKs, SCLK, SEL, and EN
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant



SOIC-16 D SUFFIX CASE 751B-05

MARKING DIAGRAMS*





= Assembly Location

WL = Wafer Lot
 YY = Year
 WW = Work Week
 G = Pb-Free Package

*For additional marking information, refer to Application Note <u>AND8002/D</u>.

ORDERING INFORMATION

Device	Package	Shipping [†]
MC100EL15DG	SOIC-16 (Pb-Free)	48 Units/Tube
MC100EL15DR2G	SOIC-16 (Pb-Free)	2500 / Tape & Reel

DISCONTINUED (Note 1)

MC10EL15DR2G	SOIC-16	2500 /
	(Pb-Free)	Tape & Reel

- †For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.
- DISCONTINUED: This device is not recommended for new design. Please contact your onsemi representative for information. The most current information on this device may be available on www.onsemi.com.

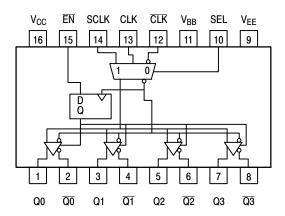


Figure 1. Logic Diagram and Pinout Assignment

Table 1. PIN DESCRIPTION

PIN	FUNCTION
CLK, CLK	ECL Diff Clock Inputs
SCLK	ECL Scan Clock Input
EN	ECL Sync Enable
SEL	ECL Clock Select Input
$Q_{0-3}, \overline{Q_{0-3}}$	ECL Diff Clock Outputs
V_{BB}	Reference Voltage Output
V _{CC}	Positive Supply
V _{EE}	Negative Supply

Table 2. FUNCTION TABLE

CLK*	SCLK*	SEL*	EN*	Q
L	X	L	L	L
H X	X L	L H	L	H L
X	H	Н	Ĺ	H
X	X	Х	H	L(1)

Table 3. ATTRIBUTES

Characteristics	Value
Internal Input Pulldown Resistor	75 kΩ
Internal Input Pullup Resistor	N/A
ESD Protection Human Body Model Machine Model Charged Device Model	> 1 kV > 100 V 2 kV
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)	Level 1
Flammability Rating Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in
Transistor Count	103
Meets or Exceeds JEDEC Spec EIA/JESD78 IC Latchup Test	•

^{1.} For additional information, see Application Note AND8003/D.

^{*}Pins will default low when left open.

1. On next negative transition of CLK or SCLK

Table 4. MAXIMUM RATINGS

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
V _{CC}	PECL Mode Power Supply	V _{EE} = 0 V		8	V
V _{EE}	NECL Mode Power Supply	V _{CC} = 0 V		-8	V
l _{out}	Output Current	Continuous Surge		50 100	mA
VI	PECL Mode Input Voltage NECL Mode Input Voltage	V _{EE} = 0 V V _{CC} = 0 V	$V_I \le V_{CC} \\ V_I \ge V_{EE}$	6 -6	V
I _{BB}	V _{BB} Sink/Source			± 0.5	mA
T _A	Operating Temperature Range			-40 to +85	°C
T _{stg}	Storage Temperature Range			-65 to +150	°C
$\theta_{\sf JA}$	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	SOIC-16	130 75	°C/W
$\theta_{\sf JC}$	Thermal Resistance (Junction-to-Case)	Standard Board	SOIC-16	33 to 36	°C/W
T _{sol}	Wave Solder (Pb-Free)	<2 to 3 sec @ 260°C		265	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Table 5. 10EL SERIES PECL DC CHARACTERISTICS ($V_{CC} = 5.0 \text{ V}$; $V_{EE} = 0.0 \text{ V}$ (Note 1))

	· •• · · · · · · · · · · · · · · · · ·										
			-40°C			25°C			85°C		
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current		25	35		25	35		25	35	mA
V _{OH}	Output HIGH Voltage (Note 2)	3920	4010	4110	4020	4105	4190	4090	4185	4280	mV
V _{OL}	Output LOW Voltage (Note 2)	3050	3200	3350	3050	3210	3370	3050	3227	3405	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	3770		4110	3870		4190	3940		4280	mV
V _{IL}	Input LOW Voltage (Single-Ended)	3050		3500	3050		3520	3050		3555	mV
V_{BB}	Output Voltage Reference	3.57		3.7	3.65		3.75	3.69		3.81	V
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 3)	2.5		4.6	2.5		4.6	2.5		4.6	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current	0.5			0.5			0.3			μΑ

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary +0.06 V / -0.5 V.
 Outputs are terminated through a 50 Ω resistor to V_{CC} 2.0 V.
 V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{PP}min and 1 V.

Table 6. 10EL SERIES NECL DC CHARACTERISTICS (V_{CC} = 0 V; V_{EE} = -5.0 V (Note 1))

		-40°C			25°C			85°C			
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current		25	35		25	35		25	35	mA
V _{OH}	Output HIGH Voltage (Note 2)	-1080	-990	-890	-980	-895	-810	-910	-815	-720	mV
V _{OL}	Output LOW Voltage (Note 2)	-1950	-1800	-1650	-1950	-1790	-1630	-1950	-1773	-1595	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	-1230		-890	-1130		-810	-1060		-720	mV
V_{IL}	Input LOW Voltage (Single-Ended)	-1950		-1500	-1950		-1480	-1950		-1445	mV
V_{BB}	Output Voltage Reference	-1.43		-1.30	-1.35		-1.25	-1.31		-1.19	V
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 3)	-2.5		-0.4	-2.5		-0.4	-2.5		-0.4	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current	0.5			0.5			0.3			μΑ

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- 1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.06 V / -0.5 V.
- 2. Outputs are terminated through a 50 Ω resistor to \overline{V}_{CC} 2.0 V.
- V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{PP}min and 1 V.

Table 7. 100EL SERIES PECL DC CHARACTERISTICS ($V_{CC} = 5.0 \text{ V}$; $V_{EE} = 0.0 \text{ V}$ (Note 1))

		-40°C			25°C			85°C			
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current		25	35		25	35		25	38	mA
V _{OH}	Output HIGH Voltage (Note 2)	3915	3995	4120	3975	4045	4120	3975	4050	4120	mV
V _{OL}	Output LOW Voltage (Note 2)	3170	3305	3445	3190	3295	3380	3190	3295	3380	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	3835		4120	3835		4120	3835		4120	mV
V_{IL}	Input LOW Voltage (Single-Ended)	3190		3525	3190		3525	3190		3525	mV
V _{BB}	Output Voltage Reference	3.62		3.74	3.62		3.74	3.62		3.74	V
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 3)	2.5		4.6	2.5		4.6	2.5		4.6	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current	0.5			0.5			0.5			μΑ

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- 1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.8 V / -0.5 V. 2. Outputs are terminated through a 50 Ω resistor to V_{CC} 2.0 V.
- 3. V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{PP}min and 1 V.

Table 8. 100EL SERIES NECL DC CHARACTERISTICS (V_{CC} = 0 V; V_{EE} = -5.0 V (Note 1))

			-40°C 25°C								
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current		25	35		25	35		25	38	mA
V _{OH}	Output HIGH Voltage (Note 2)	-1085	-1005	-880	-1025	-955	-880	-1025	-955	-880	mV
V _{OL}	Output LOW Voltage (Note 2)	-1830	-1695	-1555	-1810	-1705	-1620	-1810	-1705	-1620	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	-1165		-880	-1165		-880	-1165		-880	mV
V_{IL}	Input LOW Voltage (Single-Ended)	-1810		-1475	-1810		-1475	-1810		-1475	mV
V_{BB}	Output Voltage Reference	-1.38		-1.26	-1.38		-1.26	-1.38		-1.26	V
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 3)	-2.5		-0.4	-2.5		-0.4	-2.5		-0.4	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{ΙL}	Input LOW Current	0.5			0.5			0.5			μΑ

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- 1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.8 V / -0.5 V.
- Outputs are terminated through a 50 \(\Omega\) resistor to \(\V_{CC}\) 2.0 \(\V.\)
 V_{IHCMR} min varies 1:1 with \(\V_{EE}\), \(\V_{IHCMR}\) max varies 1:1 with \(\V_{CC}\). The \(\V_{IHCMR}\) range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between \(\V_{PP}\) min and 1 \(\V.\).

Table 9. AC CHARACTERISTICS ($V_{CC} = 5.0 \text{ V}$; $V_{EE} = 0.0 \text{ V}$ or $V_{CC} = 0 \text{ V}$; $V_{EE} = -5.0 \text{ V}$ (Note 1))

			-40°C 25°C		85°C						
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
f _{MAX}	Maximum Toggle Frequency					1.25					GHz
[†] PLH [†] PHL	Propagation Delay CLK to Q (Diff) CLK to Q (SE) SCLK to Q	460 410 410		660 710 710	470 420 420		670 720 720	500 450 470		700 750 750	ps
t _{SKEW}	Part-to-Part Skew Within-Device Skew (Note 2)			200 50			200 50			200 50	ps
t _{JITTER}	Random Clock Jitter (RMS)					2.6					ps
t _S	Setup Time EN	150			150			150			ps
t _H	Hold Time EN	400			400			400			ps
V_{PP}	Input Swing (Note 3)	150		1000	150		1000	150		1000	mV
t _r t _f	Output Rise/Fall Times Q (20% – 80%)	325		575	325		575	325		575	ps

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- 1. 10 Series: V_{EE} can vary +0.06 V / -0.5 V. 100 Series: VEE can vary +0.8 V / -0.5 V.
- 2. Skews are specified for identical LOW-to-HIGH or HIGH-to-LOW transitions.
- 3. V_{PP}(min) is minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈ 40.

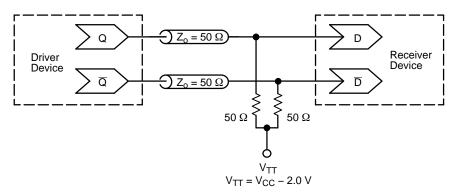


Figure 2. Typical Termination for Output Driver and Device Evaluation (See Application Note <u>AND8020/D</u> – Termination of ECL Logic Devices.)

Resource Reference of Application Notes

AN1405/D - ECL Clock Distribution Techniques

AN1406/D - Designing with PECL (ECL at +5.0 V)

AN1503/D - ECLinPS™ I/O SPiCE Modeling Kit

AN1504/D - Metastability and the ECLinPS Family

AN1568/D - Interfacing Between LVDS and ECL

AND8001/D - The ECL Translator Guide

AND8001/D - Odd Number Counters Design

AND8002/D - Marking and Date Codes

AND8020/D - Termination of ECL Logic Devices

AND8066/D - Interfacing with ECLinPS

AND8090/D - AC Characteristics of ECL Devices



MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

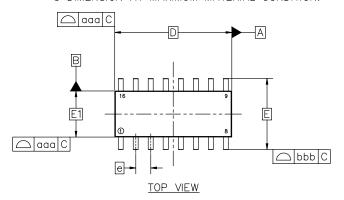


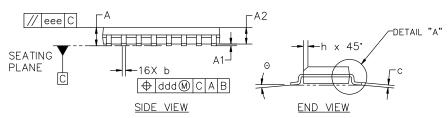
SOIC-16 9.90x3.90x1.37 1.27P CASE 751B ISSUE M

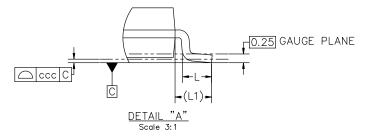
DATE 18 OCT 2024

NOTES:

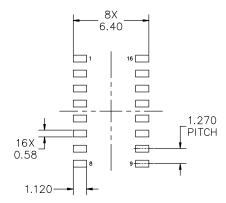
- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
- DIMENSION IN MILLIMETERS. ANGLE IN DEGREES.
- DIMENSIONS D AND E1 DO NOT INCLUDE MOLD PROTRUSION.
- MAXIMUM MOLD PROTRUSION 0.15mm PER SIDE.
- DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127mm TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION.







MILLIMETERS							
DIM	MIN	NOM	MAX				
А	1.35	1.75					
A1	0.10	0.25					
A2	1.25	1.37	1.50				
b	0.35	0.42	0.49				
С	0.19	0.22	0.25				
D	9.90 BSC						
E	6.00 BSC						
E1	3.90 BSC						
е	1.27 BSC						
h	0.25	0.25					
L	0.40	0.83	1.25				
L1	1.05 REF						
Θ	0 7						
TOLERANCE OF FORM AND POSITION							
aaa	0.10						
bbb	0.20						
ccc	0.10						
ddd	0.25						
eee	ee 0.10						



RECOMMENDED MOUNTING FOOTPRINT

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE onsemi SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D

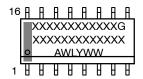
DOCUMENT NUMBER:	98ASB42566B	Electronic versions are uncontrolled except when accessed directly from the Document Report Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.				
DESCRIPTION:	SOIC-16 9.90X3.90X1.37 1	SOIC-16 9.90X3.90X1.37 1.27P				

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SOIC-16 9.90x3.90x1.37 1.27PCASE 751B ISSUE M

DATE 18 OCT 2024

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code A = Assembly Location

WL = Wafer Lot
 Y = Year
 WW = Work Week
 G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

STYLE 1:		STYLE 2:		STYLE 3:	\$	STYLE 4:	
PIN 1.	COLLECTOR	PIN 1.	CATHODE	PIN 1.	COLLECTOR, DYE #1	PIN 1.	COLLECTOR, DYE #1
2.	BASE	2.	ANODE	2.	BASE, #1	2.	COLLECTOR, #1
3.	EMITTER	3.	NO CONNECTION	3.	EMITTER, #1	3.	COLLECTOR, #2
4.	NO CONNECTION	4.	CATHODE	4.	COLLECTOR, #1	4.	COLLECTOR, #2
5.	EMITTER	5.	CATHODE	5.	COLLECTOR, #2	5.	COLLECTOR, #3
6.	BASE	6.	NO CONNECTION	6.	BASE, #2	6.	COLLECTOR, #3
7.	COLLECTOR	7.	ANODE	7.	EMITTER, #2	7.	COLLECTOR, #4
8.	COLLECTOR	8.	CATHODE	8.	COLLECTOR, #2	8.	COLLECTOR, #4
9.	BASE	9.	CATHODE	9.	COLLECTOR, #3	9.	BASE, #4
10.	EMITTER	10.	ANODE	10.	BASE, #3	10.	EMITTER, #4
11.	NO CONNECTION	11.	NO CONNECTION	11.	EMITTER, #3	11.	BASE, #3
12.	EMITTER	12.	CATHODE	12.	COLLECTOR, #3	12.	EMITTER, #3
13.	BASE	13.	CATHODE	13.	COLLECTOR, #4	13.	BASE, #2
14.	COLLECTOR	14.	NO CONNECTION	14.	BASE, #4	14.	EMITTER, #2
15.	EMITTER	15.	ANODE	15.	EMITTER, #4	15.	BASE, #1
16.	COLLECTOR	16.	CATHODE	16.	COLLECTOR, #4	16.	EMITTER, #1
STYLE 5:		STYLE 6:		STYLE 7:			
PIN 1.	DRAIN, DYE #1	PIN 1.	CATHODE	PIN 1.	SOURCE N-CH		
		PIN I.					
2.	DRAIN, #1	PIN 1. 2.	CATHODE	2.	COMMON DRAIN (OUTPUT)	
2. 3.	,						
	DRAIN, #1	2.	CATHODE	2.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT		
3.	DRAIN, #1 DRAIN, #2	2. 3.	CATHODE CATHODE	2. 3.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT	Ó	
3. 4.	DRAIN, #1 DRAIN, #2 DRAIN, #2	2. 3. 4.	CATHODE CATHODE CATHODE	2. 3. 4.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH))	
3. 4. 5.	DRAIN, #1 DRAIN, #2 DRAIN, #2 DRAIN, #3	2. 3. 4. 5.	CATHODE CATHODE CATHODE CATHODE CATHODE	2. 3. 4. 5.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH COMMON DRAIN (OUTPUT)))	
3. 4. 5. 6.	DRAIN, #1 DRAIN, #2 DRAIN, #2 DRAIN, #3 DRAIN, #3	2. 3. 4. 5.	CATHODE CATHODE CATHODE CATHODE CATHODE	2. 3. 4. 5.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT)))	
3. 4. 5. 6. 7.	DRAIN, #1 DRAIN, #2 DRAIN, #2 DRAIN, #3 DRAIN, #3 DRAIN, #4 DRAIN, #4	2. 3. 4. 5. 6. 7.	CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE	2. 3. 4. 5. 6. 7.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT)))	
3. 4. 5. 6. 7.	DRAIN, #1 DRAIN, #2 DRAIN, #2 DRAIN, #3 DRAIN, #3 DRAIN, #4 DRAIN, #4	2. 3. 4. 5. 6. 7.	CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE	2. 3. 4. 5. 6. 7.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT SOURCE P-CH)))	
3. 4. 5. 6. 7. 8. 9.	DRAIN, #1 DRAIN, #2 DRAIN, #2 DRAIN, #3 DRAIN, #3 DRAIN, #4 DRAIN, #4 GATE, #4	2. 3. 4. 5. 6. 7. 8. 9.	CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE ANODE ANODE	2. 3. 4. 5. 6. 7. 8. 9.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT SOURCE P-CH SOURCE P-CH))))	
3. 4. 5. 6. 7. 8. 9.	DRAIN, #1 DRAIN, #2 DRAIN, #2 DRAIN, #3 DRAIN, #3 DRAIN, #4 DRAIN, #4 SOURCE, #4	2. 3. 4. 5. 6. 7. 8. 9. 10.	CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE ANODE ANODE	2. 3. 4. 5. 6. 7. 8. 9.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT SOURCE P-CH COMMON DRAIN (OUTPUT SOURCE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN COMMON DRAIN COMMON DRAIN (OUTPUT COMMON DRAIN COMMON D))))	
3. 4. 5. 6. 7. 8. 9. 10.	DRAIN, #1 DRAIN, #2 DRAIN, #2 DRAIN, #3 DRAIN, #3 DRAIN, #4 DRAIN, #4 GATE, #4 GATE, #4 GATE, #3	2. 3. 4. 5. 6. 7. 8. 9. 10. 11.	CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE ANODE ANODE ANODE ANODE	2. 3. 4. 5. 6. 7. 8. 9. 10.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT SOURCE P-CH SOURCE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN COMMON DRAIN (OUTPUT COMMON DRAIN COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT COMMON DRAIN COMMON DRAIN (OUTPUT COMMON DRAIN COMMON DRAIN (OUTPUT COMMON DRAIN COMMON DRAIN COMMON DRAIN COMMON DRAIN (OUTPUT COMMON DRAIN COMMON DR))))	
3. 4. 5. 6. 7. 8. 9. 10. 11.	DRAIN, #1 DRAIN, #2 DRAIN, #2 DRAIN, #3 DRAIN, #3 DRAIN, #3 DRAIN, #4 GATE, #4 GATE, #4 SOURCE, #4 GATE, #3 SOURCE, #3	2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.	CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE ANODE ANODE ANODE ANODE ANODE ANODE ANODE	2. 3. 4. 5. 6. 7. 8. 9. 10. 11.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT SOURCE P-CH SOURCE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN C))))	
3. 4. 5. 6. 7. 8. 9. 10. 11. 12.	DRAIN, #1 DRAIN, #2 DRAIN, #2 DRAIN, #3 DRAIN, #3 DRAIN, #4 GATE, #4 SOURCE, #4 GATE, #3 SOURCE, #3 GATE, #2	2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.	CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE ANODE ANODE ANODE ANODE ANODE ANODE ANODE ANODE ANODE	2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT SOURCE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE N-CH)))))	
3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.	DRAIN, #1 DRAIN, #2 DRAIN, #2 DRAIN, #3 DRAIN, #3 DRAIN, #4 DRAIN, #4 DRAIN, #4 GATE, #4 GATE, #4 GATE, #3 SOURCE, #3 GATE, #2 SOURCE, #2	2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.	CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE CATHODE ANODE	2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.	COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT GATE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN (OUTPUT SOURCE P-CH SOURCE P-CH SOURCE P-CH COMMON DRAIN (OUTPUT COMMON DRAIN COMMON DR)))))	

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