

# Presettable Divide-By-N Counter

## MC14018B

The MC14018B contains five Johnson counter stages which are asynchronously presettable and resettable. The counters are synchronous, and increment on the positive going edge of the clock.

Presetting is accomplished by a logic 1 on the preset enable input. Data on the Jam inputs will then be transferred to their respective  $\bar{Q}$  outputs (inverted). A logic 1 on the reset input will cause all  $\bar{Q}$  outputs to go to a logic 1 state.

Division by any number from 2 to 10 can be accomplished by connecting appropriate  $\bar{Q}$  outputs to the data input, as shown in the Function Selection table. Anti-lock gating is included in the MC14018B to assure proper counting sequence.

### Features

- Fully Static Operation
- Schmitt Trigger on Clock Input
- Capable of Driving Two Low-Power TTL Loads or One Low-Power Schottky TTL Load Over the Rated Temperature Range
- Pin-for-Pin Replacement for CD4018B
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- This Device is Pb-Free and is RoHS Compliant

### MAXIMUM RATINGS (Voltages Referenced to $V_{SS}$ )

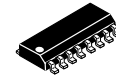
Symbol	Parameter	Value	Unit
$V_{DD}$	DC Supply Voltage Range	-0.5 to +18.0	V
$V_{in}, V_{out}$	Input or Output Voltage Range (DC or Transient)	-0.5 to $V_{DD} + 0.5$	V
$I_{in}, I_{out}$	Input or Output Current (DC or Transient) per Pin	$\pm 10$	mA
$P_D$	Power Dissipation, per Package (Note 1)	500	mW
$T_A$	Ambient Temperature Range	-55 to +125	°C
$T_{stg}$	Storage Temperature Range	-65 to +150	°C
$T_L$	Lead Temperature (8-Second Soldering)	260	°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.

1. Temperature Derating: "D/DW" Packages: -7.0 mW/°C From 65 °C To 125 °C

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation,  $V_{in}$  and  $V_{out}$  should be constrained to the range  $V_{SS} \leq (V_{in} \text{ or } V_{out}) \leq V_{DD}$ .

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either  $V_{SS}$  or  $V_{DD}$ ). Unused outputs must be left open.

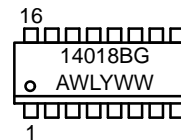


SOIC-16  
D SUFFIX  
CASE 751B

### PIN ASSIGNMENT

$D_{in}$	1	16	$V_{DD}$
JAM 1	2	15	R
JAM 2	3	14	C
$\bar{Q}_2$	4	13	$\bar{Q}_5$
$\bar{Q}_1$	5	12	JAM 5
$\bar{Q}_3$	6	11	$\bar{Q}_4$
JAM 3	7	10	PE
$V_{SS}$	8	9	JAM 4

### MARKING DIAGRAM



A = Assembly Location  
WL, L = Wafer Lot  
YY, Y = Year  
WW, W = Work Week  
G = Pb-Free Indicator

### FUNCTIONAL TRUTH TABLE

Clock	Reset	Preset Enable	Jam Input	$\bar{Q}_n$
$\sim$	0	0	X	$\bar{Q}_n$
$\sim$	0	0	X	$\bar{D}_n^*$
X	0	1	0	1
X	0	1	1	0
X	1	X	X	1

\*  $D_n$  is the Data input for that stage.  
Stage 1 has Data brought out to Pin 1.

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 2.

# MC14018B

## ELECTRICAL CHARACTERISTICS (Voltages Referenced to V<sub>SS</sub>)

Characteristic	Symbol	V <sub>DD</sub> Vdc	-55 °C		25 °C			125 °C		Unit
			Min	Max	Min	Typ (Note 2)	Max	Min	Max	
Output Voltage V <sub>in</sub> = V <sub>DD</sub> or 0  V <sub>in</sub> = 0 or V <sub>DD</sub>	“0” Level V <sub>OL</sub>	5.0	–	0.05	–	0	0.05	–	0.05	Vdc
		10	–	0.05	–	0	0.05	–	0.05	
		15	–	0.05	–	0	0.05	–	0.05	
	“1” Level V <sub>OH</sub>	5.0	4.95	–	4.95	5.0	–	4.95	–	Vdc
		10	9.95	–	9.95	10	–	9.95	–	
		15	14.95	–	14.95	15	–	14.95	–	
Input Voltage (V <sub>O</sub> = 4.5 or 0.5 Vdc) (V <sub>O</sub> = 9.0 or 1.0 Vdc) (V <sub>O</sub> = 13.5 or 1.5 Vdc)  (V <sub>O</sub> = 0.5 or 4.5 Vdc) (V <sub>O</sub> = 1.0 or 9.0 Vdc) (V <sub>O</sub> = 1.5 or 13.5 Vdc)	“0” Level V <sub>IL</sub>	5.0	–	1.5	–	2.25	1.5	–	1.5	Vdc
		10	–	3.0	–	4.50	3.0	–	3.0	
		15	–	4.0	–	6.75	4.0	–	4.0	
	“1” Level V <sub>IH</sub>	5.0	3.5	–	3.5	2.75	–	3.5	–	Vdc
		10	7.0	–	7.0	5.50	–	7.0	–	
		15	11	–	11	8.25	–	11	–	
Output Drive Current (V <sub>OH</sub> = 2.5 Vdc) (V <sub>OH</sub> = 4.6 Vdc) (V <sub>OH</sub> = 9.5 Vdc) (V <sub>OH</sub> = 13.5 Vdc)  (V <sub>OL</sub> = 0.4 Vdc) (V <sub>OL</sub> = 0.5 Vdc) (V <sub>OL</sub> = 1.5 Vdc)	Source I <sub>OH</sub>	5.0	–3.0	–	–2.4	–4.2	–	–1.7	–	mA <sub>dc</sub>
		5.0	–0.64	–	–0.51	–0.88	–	–0.36	–	
		10	–1.6	–	–1.3	–2.25	–	–0.9	–	
		15	–4.2	–	–3.4	–8.8	–	–2.4	–	
	Sink I <sub>OL</sub>	5.0	0.64	–	0.51	0.88	–	0.36	–	mA <sub>dc</sub>
		10	1.6	–	1.3	2.25	–	0.9	–	
		15	4.2	–	3.4	8.8	–	2.4	–	
Input Current	I <sub>in</sub>	15	–	±0.1	–	±0.00001	±0.1	–	±1.0	μA <sub>dc</sub>
Input Capacitance (V <sub>in</sub> = 0)	C <sub>in</sub>	–	–	–	–	5.0	7.5	–	–	pF
Quiescent Current (Per Package)	I <sub>DD</sub>	5.0	–	5.0	–	0.005	5.0	–	150	μA <sub>dc</sub>
		10	–	10	–	0.010	10	–	300	
		15	–	20	–	0.015	20	–	600	
Total Supply Current (Notes 3 & 4) (Dynamic plus Quiescent, Per Package) (C <sub>L</sub> = 50 pF on all outputs, all buffers switching)	I <sub>T</sub>	5.0 10 15	I <sub>T</sub> = (0.3 μA/kHz) f + I <sub>DD</sub> I <sub>T</sub> = (0.7 μA/kHz) f + I <sub>DD</sub> I <sub>T</sub> = (1.0 μA/kHz) f + I <sub>DD</sub>							μA <sub>dc</sub>

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Data labelled “Typ” is not to be used for design purposes but is intended as an indication of the IC’s potential performance.

3. The formulas given are for the typical characteristics only at 25 °C.

4. To calculate total supply current at loads other than 50 pF:

$$I_T(C_L) = I_T(50 \text{ pF}) + (C_L - 50) V f k$$

where: I<sub>T</sub> is in μA (per package), C<sub>L</sub> in pF, V = (V<sub>DD</sub> – V<sub>SS</sub>) in volts, f in kHz is input frequency, and k = 0.001.

## ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MC14018BDG	SOIC-16 (Pb-Free)	48 Units / Rail
MC14018BDR2G	SOIC-16 (Pb-Free)	2500 Units / Tape & Reel

## DISCONTINUED (Note 5)

NLV14018BDG*	SOIC-16 (Pb-Free)	48 Units / Rail
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<sup>†</sup> 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](#).

\* NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

5. **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](#).

# MC14018B

## SWITCHING CHARACTERISTICS (Note 6) ( $C_L = 50 \text{ pF}$ , $T_A = 25^\circ \text{C}$ )

Characteristic	Symbol	$V_{DD}$ $V_{dc}$	All Types			Unit
			Min	Typ (Note 7)	Max	
Output Rise and Fall Time $t_{TLH}$ , $t_{THL} = (1.35 \text{ ns/pF}) C_L + 32 \text{ ns}$ $t_{TLH}$ , $t_{THL} = (0.6 \text{ ns/pF}) C_L + 20 \text{ ns}$ $t_{TLH}$ , $t_{THL} = (0.4 \text{ ns/pF}) C_L + 20 \text{ ns}$	$t_{TLH}$ , $t_{THL}$	5.0 10 15	— — —	100 50 40	200 100 80	ns
Propagation Delay Time Clock to $\bar{Q}$ $t_{PLH}$ , $t_{PHL} = (0.90 \text{ ns/pF}) C_L + 265 \text{ ns}$ $t_{PLH}$ , $t_{PHL} = (0.36 \text{ ns/pF}) C_L + 102 \text{ ns}$ $t_{PLH}$ , $t_{PHL} = (0.26 \text{ ns/pF}) C_L + 72 \text{ ns}$	$t_{PLH}$ , $t_{PHL}$	5.0 10 15	— — —	310 120 85	620 240 170	ns
Reset to $\bar{Q}$ $t_{PLH} = (0.90 \text{ ns/pF}) C_L + 325 \text{ ns}$ $t_{PLH} = (0.36 \text{ ns/pF}) C_L + 132 \text{ ns}$ $t_{PLH} = (0.26 \text{ ns/pF}) C_L + 81 \text{ ns}$		5.0 10 15	— — —	370 150 100	740 300 200	ns
Preset Enable to $\bar{Q}$ $t_{PLH}$ , $t_{PHL} = (0.90 \text{ ns/pF}) C_L + 325 \text{ ns}$ $t_{PLH}$ , $t_{PHL} = (0.36 \text{ ns/pF}) C_L + 132 \text{ ns}$ $t_{PLH}$ , $t_{PHL} = (0.26 \text{ ns/pF}) C_L + 81 \text{ ns}$		5.0 10 15	— — —	370 150 100	740 300 200	ns
Setup Time Data (Pin 1) to Clock	$t_{su}$	5.0 10 15	200 100 80	0 0 0	— — —	ns
Jam Inputs to Preset Enable		5.0 10 15	200 100 80	0 0 0	— — —	ns
Data (Jam Inputs)–to–Preset Enable Hold Time	$t_h$	5.0 10 15	540 500 480	270 250 240	— — —	ns
Clock Pulse Width	$t_{WH}$	5.0 10 15	400 200 160	200 100 80	— — —	ns
Reset or Preset Enable Pulse Width	$t_{WH}$	5.0 10 15	290 130 110	145 65 55	— — —	ns
Clock Rise and Fall Time	$t_{TLH}$ , $t_{THL}$	5.0 10 15	No Limit			ns
Clock Pulse Frequency	$f_{cl}$	5.0 10 15	— — —	2.5 6.5 8.0	1.25 3.25 4.0	MHz

6. The formulas given are for the typical characteristics only at  $25^\circ \text{C}$ .

7. Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

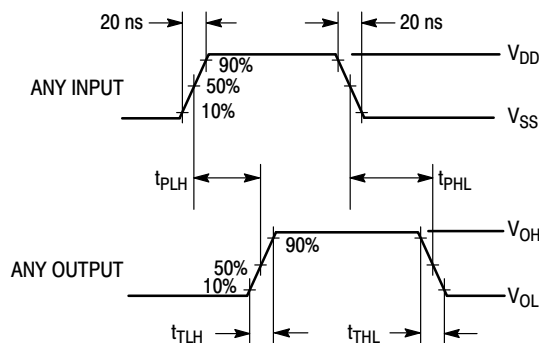
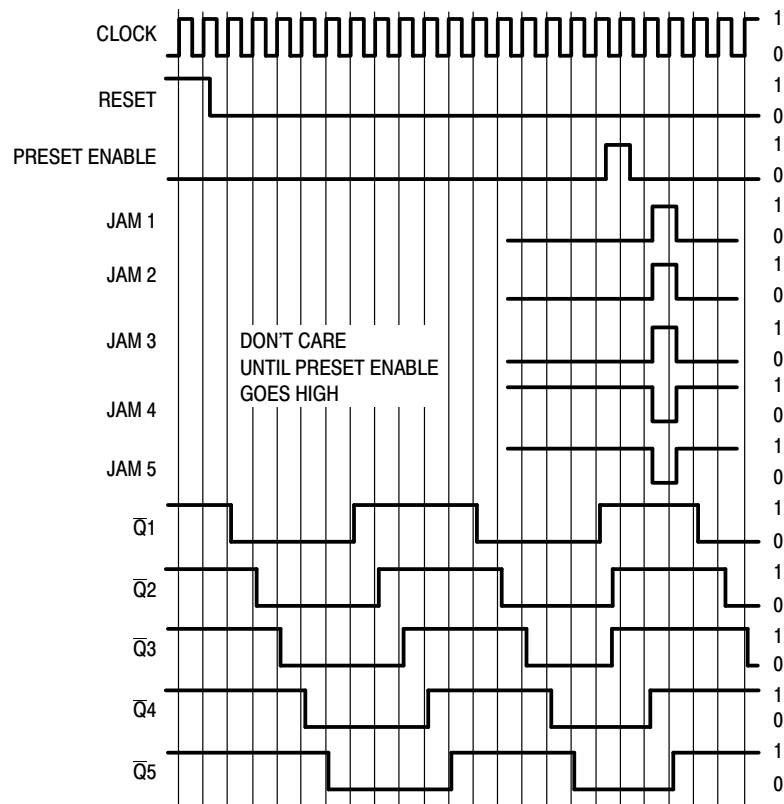


Figure 1. Switching Time Waveforms

# MC14018B

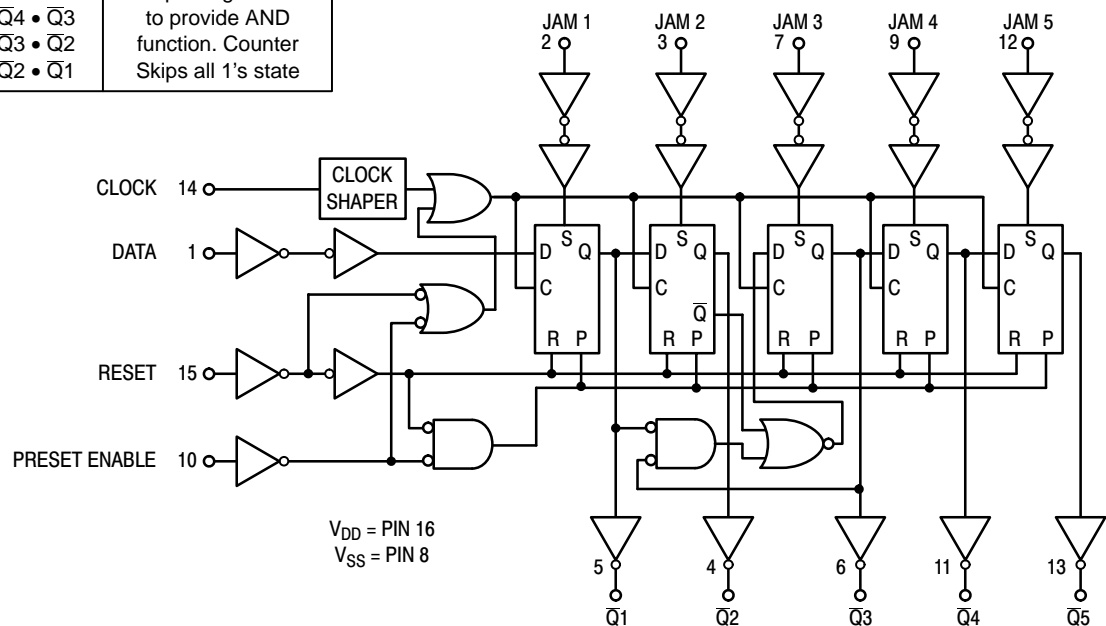
**TIMING DIAGRAM**  
( $\bar{Q}5$  Connected to Data Input)



**FUNCTION SELECTION**

Counter Mode	Connect Data Input (Pin 1) to:	Comments
Divide by 10 Divide by 8 Divide by 6 Divide by 4 Divide by 2	$\bar{Q}5$ $\bar{Q}4$ $\bar{Q}3$ $\bar{Q}2$ $\bar{Q}1$	No external components needed.
Divide by 9 Divide by 7 Divide by 5 Divide by 3	$\bar{Q}5 \cdot \bar{Q}4$ $\bar{Q}4 \cdot \bar{Q}3$ $\bar{Q}3 \cdot \bar{Q}2$ $\bar{Q}2 \cdot \bar{Q}1$	Gate package needed to provide AND function. Counter Skips all 1's state

**LOGIC DIAGRAM**

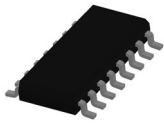


## MC14018B

### REVISION HISTORY

Revision	Description of Changes	Date
9	Rebranded the Data Sheet to <b>onsemi</b> format. NLV14018BDG OPN Marked as Discontinued.	8/22/2025

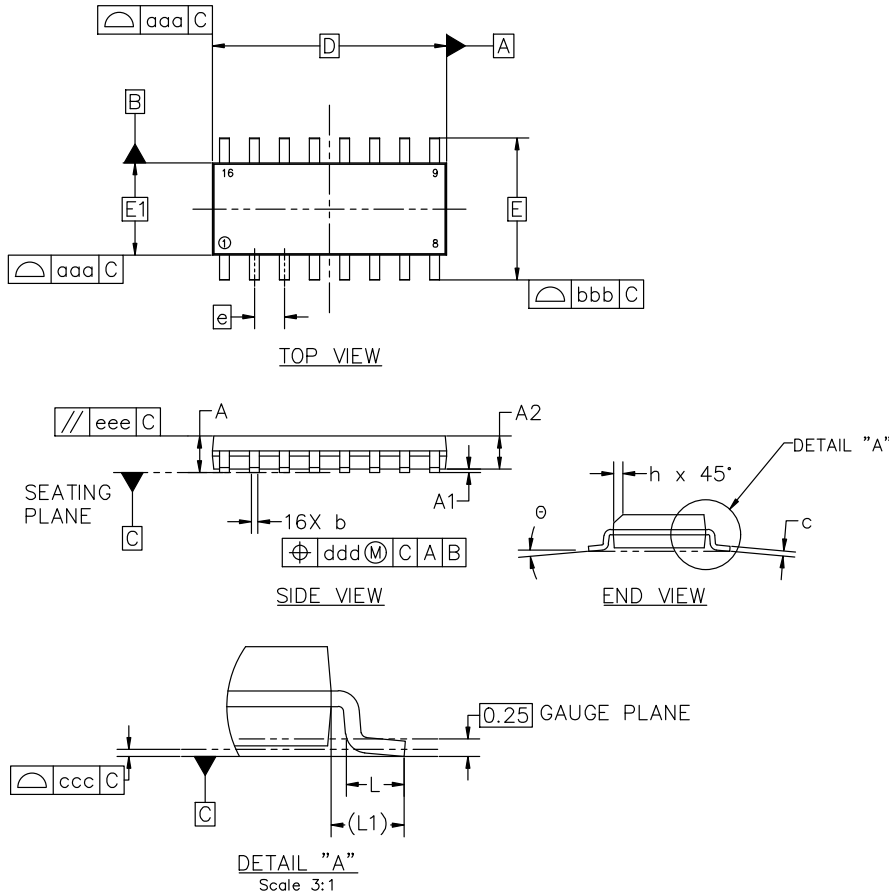
This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.


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

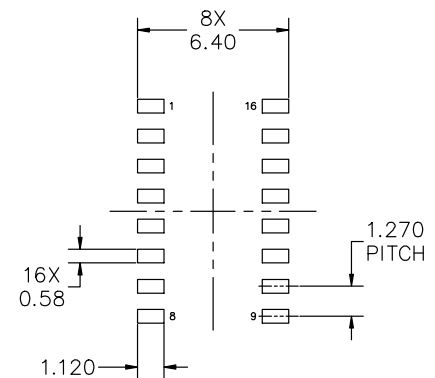
DATE 18 OCT 2024

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. DIMENSION IN MILLIMETERS. ANGLE IN DEGREES.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15mm PER SIDE.
5. 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
A	1.35	1.55	1.75
A1	0.10	0.18	0.25
A2	1.25	1.37	1.50
b	0.35	0.42	0.49
c	0.19	0.22	0.25
D	9.90 BSC		
E	6.00 BSC		
E1	3.90 BSC		
e	1.27 BSC		
h	0.25	---	0.50
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	0.10		



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

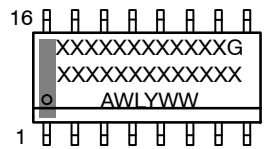
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SOIC-16 9.90x3.90x1.37 1.27P  
CASE 751B  
ISSUE M

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

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