

MC14532BDG Datasheet

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DiGi Electronics Part Number	MC14532BDG-DG
Manufacturer	onsemi
anufacturer Product Number	MC14532BDG
Description	IC PRIORITY ENCOD 1 X 8:3 16SOIC
Detailed Description	Priority Encoder 1 x 8:3 16-SOIC

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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
MC14532BDG	onsemi
Series:	Product Status:
4000B	Active
Type:	Circuit:
Priority Encoder	1 x 8:3
Independent Circuits:	Current - Output High, Low:
1	8.8mA, 8.8mA
Voltage Supply Source:	Voltage - Supply:
Dual Supply	3V ~ 18V
Operating Temperature:	Mounting Type:
-55°C ~ 125°C	Surface Mount
Package / Case:	Supplier Device Package:
16-SOIC (0.154", 3.90mm Width)	16-SOIC
Base Product Number:	
MC14532	

Environmental & Export classification

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

8-Bit Priority Encoder

The MC14532B is constructed with complementary MOS (CMOS) enhancement mode devices. The primary function of a priority encoder is to provide a binary address for the active input with the highest priority. Eight data inputs (D0 thru D7) and an enable input (E_{in}) are provided. Five outputs are available, three are address outputs (Q0 thru Q2), one group select (GS) and one enable output (E_{out}).

Features

- Diode Protection on All Inputs
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Capable of Driving Two Low–Power TTL Loads or One Low–Power Schottky TTL Load over the Rated Temperature Range
- 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 VSS)

Rating	Symbol	Value	Unit
DC Supply Voltage Range	V _{DD}	-0.5 to +18.0	V
Input or Output Voltage Range (DC or Transient)	V _{in} , V _{out}	-0.5 to V _{DD} + 0.5	V
Input or Output Current (DC or Transient) per Pin	I _{in} , I _{out}	±10	mA
Power Dissipation, per Package (Note 1)	PD	500	mW
Ambient Temperature Range	T _A	-55 to +125	°C
Storage Temperature Range	T _{stg}	-65 to +150	°C
Lead Temperature (8 Sec Soldering)	TL	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" Package: -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} or V_{out}) \leq V_{DD}.

to the range $V_{SS} \le (V_{in} \text{ or } V_{out}) \le V_{DD}$. 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.

TRUTH TABLE

Input									Outp	ut			
Ein	D7	D6	D5	D4	D3	D2	D1	D0	GS	Q2	Q1	QO	Eout
0	Х	Х	Х	Х	Х	Х	Х	Х	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	1
1	1	Х	Х	Х	Х	Х	Х	Х	1	1	1	1	0
1	0	1	Х	Х	Х	Х	Х	Х	1	1	1	0	0
1	0	0	1	Х	Х	Х	Х	Х	1	1	0	1	0
1	0	0	0	1	Х	Х	Х	Х	1	1	0	0	0
1	0	0	0	0	1	Х	Х	Х	1	0	1	1	0
1	0	0	0	0	0	1	Х	Х	1	0	1	0	0
1	0	0	0	0	0	0	1	Х	1	0	0	1	0
1	0	0	0	0	0	0	0	1	1	0	0	0	0

X = Don't Care



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PIN ASSIGNMENT

D4 [1●	16	D V _{DD}
D5 [2	15	E _{out}
D6 [3	14] gs
D7 [4	13	D3
E _{in} [5	12] D2
Q2 [6	11	D D1
Q1 [7	10	D0 [
v _{ss} [8	9] Q0

MARKING DIAGRAM



ORDERING INFORMATION

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

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ORDERING INFORMATION

Device	Package	Shipping [†]
MC14532BDG	SOIC-16 (Pb-Free)	48 Units / Rail
MC14532BDR2G	SOIC-16 (Pb-Free)	2500 / Tape & Reel
NLV14532BDR2G*	SOIC-16 (Pb-Free)	2500 / 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.

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

			- 5	5°C		25°C		125°C		
Characteristic	Symbol	V _{DD} Vdc	Min	Max	Min	Typ (Note 2)	Max	Min	Max	Unit
Output Voltage "0" Leve V _{in} = V _{DD} or 0	V _{OL}	5.0 10 15	_ _ _	0.05 0.05 0.05	_ _ _	0 0 0	0.05 0.05 0.05	_ _ _	0.05 0.05 0.05	Vdc
"1" Leve V _{in} = 0 or V _{DD}	V _{OH}	5.0 10 15	4.95 9.95 14.95		4.95 9.95 14.95	5.0 10 15	_ _ _	4.95 9.95 14.95	_ _ _	Vdc
Input Voltage "0" Leve $(V_O = 4.5 \text{ or } 0.5 \text{ Vdc})$ $(V_O = 9.0 \text{ or } 1.0 \text{ Vdc})$ $(V_O = 13.5 \text{ or } 1.5 \text{ Vdc})$	VIL	5.0 10 15		1.5 3.0 4.0	_ _ _	2.25 4.50 6.75	1.5 3.0 4.0	- - -	1.5 3.0 4.0	Vdc
"1" Leve $(V_O = 0.5 \text{ or } 4.5 \text{ Vdc})$ $(V_O = 1.0 \text{ or } 9.0 \text{ Vdc})$ $(V_O = 1.5 \text{ or } 13.5 \text{ Vdc})$	VIH	5.0 10 15	3.5 7.0 11	_ _ _	3.5 7.0 11	2.75 5.50 8.25	_ _ _	3.5 7.0 11	_ _ _	Vdc
$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	I _{ОН}	5.0 5.0 10 15	-3.0 -0.64 -1.6 -4.2	- - -	-2.4 - 0.51 -1.3 -3.4	-4.2 -0.88 -2.25 -8.8	- - -	-1.7 -0.36 -0.9 -2.4	- - -	mAdc
$\begin{array}{l} (V_{OL} = 0.4 \ \text{Vdc}) & \text{Sink} \\ (V_{OL} = 0.5 \ \text{Vdc}) & \\ (V_{OL} = 1.5 \ \text{Vdc}) & \end{array}$	i I _{OL}	5.0 10 15	0.64 1.6 4.2	_ _ _	0.51 1.3 3.4	0.88 2.25 8.8	- - -	0.36 0.9 2.4	- - -	mAdc
Input Current	l _{in}	15	-	±0.1	-	±0.00001	±0.1	_	±1.0	μAdc
Input Capacitance (V _{in} = 0)	C _{in}	-	-	-	-	5.0	7.5	-	-	pF
Quiescent Current (Per Package)	I _{DD}	5.0 10 15		5.0 10 20		0.005 0.010 0.015	5.0 10 20	_ _ _	150 300 600	μAdc
Total Supply Current (Notes 3, 4) (Dynamic plus Quiescent, Per Package) ($C_L = 50 \text{ pF}$ on all outputs, all buffers switching)	IT	5.0 10 15			I _T = (1 I _T = (3 I _T = (5	.74 μA/kHz) .65 μA/kHz) .73 μA/kHz)	f + I _{DD} f + I _{DD} f + I _{DD}			μAdc

ELECTRICAL CHARACTERISTICS (Voltages Referenced to V_{SS})

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.

The formulas given are for the typical characteristics only at 25°C.
To calculate total supply current at loads other than 50 pF:

 $I_T(C_L) = I_T(50 \text{ pF}) + (C_L - 50) \text{ Vfk}$

where: I_T is in μA (per package), C_L in pF, V = (V_{DD} - V_{SS}) in volts, f in kHz is input frequency, and k = 0.005.

SWITCHING CHARACTERISTICS ($C_L = 50 \text{ pF}, T_A = 25^{\circ}C$) (Note 5)

Characteristic	Symbol	V _{DD}	Min	Typ (Note 6)	Max	Unit
Output Rise and Fall Time t_{TLH} , $t_{THL} = (1.5 \text{ ns/pF}) C_L + 25 \text{ ns}$ t_{TLH} , $t_{THL} = (0.75 \text{ ns/pF}) C_L + 12.5 \text{ ns}$ t_{TLH} , $t_{THL} = (0.55 \text{ ns/pF}) C_L + 9.5 \text{ ns}$	t⊤LH, t⊤HL	5.0 10 15	- - -	100 50 40	200 100 80	ns
Propagation Delay Time — E_{in} to E_{out} t_{PLH} , $t_{PHL} = (1.7 \text{ ns/pF}) C_L + 120 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.66 \text{ ns/pF}) C_L + 77 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.5 \text{ ns/pF}) C_L + 55 \text{ ns}$	t _{PLH} , t _{PHL}	5.0 10 15	- - -	205 110 80	410 220 160	ns
Propagation Delay Time — E_{in} to GS t_{PLH} , $t_{PHL} = (1.7 \text{ ns/pF}) C_L + 90 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.66 \text{ ns/pF}) C_L 57 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.5 \text{ ns/pF}) C_L + 40 \text{ ns}$	t _{PLH} , t _{PHL}	5.0 10 15	- - -	175 90 65	350 180 130	ns
Propagation Delay Time — E_{in} to Q_n t_{PLH} , $t_{PHL} = (1.7 \text{ ns/pF}) C_L + 195 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.66 \text{ ns/pF}) C_L + 107 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.5 \text{ ns/pF}) C_L + 75 \text{ ns}$	t _{PHL} , t _{PLH}	5.0 10 15	- - -	280 140 100	560 280 200	ns
Propagation Delay Time — D_n to Q_n t_{PLH} , $t_{PHL} = (1.7 \text{ ns/pF}) C_L + 265 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.66 \text{ ns/pF}) C_L + 137 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.5 \text{ ns/pF}) C_L + 85 \text{ ns}$	t _{PLH} , t _{PHL}	5.0 10 15	- - -	300 170 110	600 340 220	ns
$\begin{array}{l} \mbox{Propagation Delay Time } \mbox{D}_n \mbox{ to GS} \\ t_{PLH}, t_{PHL} = (1.7 \mbox{ ns/pF}) \mbox{C}_L + 195 \mbox{ ns} \\ t_{PLH}, t_{PHL} = (0.66 \mbox{ ns/pF}) \mbox{C}_L + 107 \mbox{ ns} \\ t_{PLH}, t_{PHL} = (0.5 \mbox{ ns/pF}) \mbox{C}_L + 75 \mbox{ ns} \\ \end{array}$	t _{PLH} , t _{PHL}	5.0 10 15	_ _ _	280 140 100	560 280 200	ns

The formulas given are for the typical characteristics only at 25°C.
Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.















LOGIC EQUATIONS



Figure 4. Logic Diagram (Positive Logic)





Figure 5. Two MC14532B's Cascaded for 4–Bit Output

DIGITAL TO ANALOG CONVERSION

The digital eight–bit word to be converted is applied to the inputs of the MC14512 with the most significant bit at X7 and the least significant bit at X0. A clock input of up to 2.5 MHz (at $V_{DD} = 10$ V) is applied to the MC14520B. A compromise between I_{bias} for the MC1710 and ΔR between N and P–channel outputs gives a value of R of 33 k Ω . In order to filter out the switching frequencies, RC should be about 1.0 ms (if R = 33 k Ω , C $\approx 0.03 \,\mu$ F). The analog 3.0 dB bandwidth would then be dc to 1.0 kHz.

ANALOG TO DIGITAL CONVERSION

An analog signal is applied to the analog input of the MC1710. A digital eight-bit word known to represent a digitized level less than the analog input is applied to the MC14512 as in the D to A conversion. The word is incremented at rates sufficient to allow steady state to be reached between incrementations (i.e. 3.0 ms). The output of the MC1710 will change when the digital input represents the first digitized level above the analog input. This word is the digital representation of the analog word.



Figure 6. Digital to Analog and Analog to Digital Converter

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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.
- DIMENSION & DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127mm TOTAL IN EXCESS OF THE & DIMENSION AT MAXIMUM MATERIAL CONDITION.











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GENERIC MARKING DIAGRAM*

16	Н	H	Н	Н	Н	H	Н	Н				
	XXXXXXXXXXXXX											
	XXXXXXXXXXXXXXXXXX											
	0	AWLYWW										
1	Π	Н	Н	Н	Н	Н	Н	╥				

XXXXX = Specific Device Code

= Assembly Location

- WL = Wafer Lot
- Y = Year

Α

- 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		
2.	DRAIN, #1	2.	CATHODE	2.	COMMON DRAIN (OUTPUT)	
3.	DRAIN, #2	3.	CATHODE	3.	COMMON DRAIN OUTPUT	j	
4.	DRAIN, #2	4.	CATHODE	4.	GATE P-CH		
5.	DRAIN, #3	5.	CATHODE	5.	COMMON DRAIN (OUTPUT)	
6.	DRAIN, #3	6.	CATHODE	6.	COMMON DRAIN (OUTPUT)	
7.	DRAIN, #4	7.	CATHODE	7.	COMMON DRAIN (OUTPUT)	
8.	DRAIN, #4	8.	CATHODE	8.	SOURCE P-CH		
9.	GATE, #4	9.	ANODE	9.	SOURCE P-CH		
10.	SOURCE, #4	10.	ANODE	10.	COMMON DRAIN (OUTPUT)	
11.	GATE, #3	11.	ANODE	11.	COMMON DRAIN (OUTPUT)	
12.	SOURCE, #3	12.	ANODE	12.	COMMON DRAIN (OUTPUT)	
13.	GATE, #2	13.	ANODE	13.	GATE N-CH		
14.	SOURCE, #2	14.	ANODE	14.	COMMON DRAIN (OUTPUT)	
15.	GATE, #1	15.	ANODE	15.	COMMON DRAIN (OUTPUT)	
16.	SOURCE, #1	16.	ANODE	16.	SOURCE N-CH		

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