National Semiconductor

February 2000

DP8310/DP8311
Octal Latched Peripheral Drivers

General Description

The DP8310 and DP8311 Octal Latched Peripheral Drivers provide the function of latching eight bits of data with open collector outputs, each driving up to 100 mA DC with an operating voltage range of 30V. Both devices are designed for low input currents, high input/output voltages, and feature a power up clear (outputs off) function.

The DP8310 is positive edge latching. Two active low write/enable inputs are available for convenient data bussing without external gating.

The DP8311 is positive edge latching. The active low strobe input latches data or allows fall through operation when held at logic "0". The latches are cleared (outputs off) with a logic "0" on the clear pin.

Features

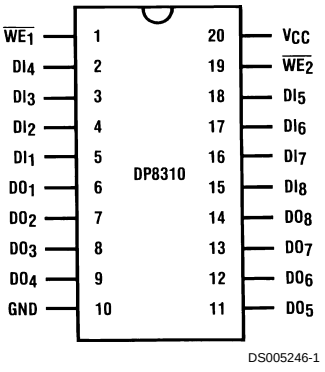
- High current, high voltage open collector outputs
- Low current, high voltage inputs
- All outputs simultaneously sink rated current "DC" with no thermal derating at maximum rated temperature
- Parallel latching or buffering
- Separate active low enables for easy data bussing
- Internal "glitch free" power up clear
- 10% V_{CC} tolerance

Applications

- High current high voltage drivers
- Relay drivers
- Lamp drivers
- LED drivers
- TRIAC drivers
- Solenoid drivers
- Stepper motor drivers
- Level translators
- Fiber-optic LED drivers

Connection Diagrams

Dual-In-Line Package



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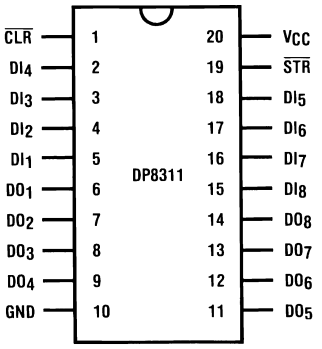
Top View

Dual-In-Line Package



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Top View

Order Number DP8310N or DP8311N
See NS Package Number N20A

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/ Distributors for availability and specifications.

Supply Voltage	7.0V
Input Voltage	35V
Output Voltage	35V
Maximum Power Dissipation* at T_A = 25˚C	
DP8310/DP8311	2005 mW
Storage Temperature Range	−65˚C to +150˚C
Lead Temperature (Soldering, 4 sec.)	260˚C

Note: *Derate N20A package 15.4 mW/˚C above T_A = 25˚C, θJ_A = 65˚C/W.

Operating Conditions

	Min	Max	Units
Supply Voltage (V_{CC})	4.5	5.5	V
Temperature			
DP8310/DP8311	0	+70	˚C
Input Voltage		30	V
Output Voltage		30	V

DC Electrical Characteristics

DP8310 and DP8311 (Notes 2, 3)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{IH}	Logical “1” Input Voltage		2.0			V
V_{IL}	Logical “0” Input Voltage				0.8	V
V_{OL}	Logical “0” Output Voltage	Data outputs latched to logical “0”, V_{CC} = Min.				
	DP8310/DP8311	I_{OL} = 100 mA		0.35	0.5	V
I_{OH}	Logical “1” Output Current	Data outputs latched to logical “1”, V_{CC} = Min.				
	DP8310/DP8311	V_{OH} = 30V		2.5	250	µA
I_{IH}	Logical “1” Input Current	V_{IH} = 2.7V, V_{CC} = Max		0.1	25	µA
I_I	Input Current at Maximum Input Voltage	V_{IN} = 30V, V_{CC} = Max		1	250	µA
I_{IL}	Logical “0” Input Current	V_{IN} = 0.4V, V_{CC} = Max		−215	−300	µA
V_{clamp}	Input Clamp Voltage	I_{IN} = 12 mA		−0.8	−1.5	V
I_{CC0}	Supply Current, Outputs On	Data outputs latched to a logical “0”. All Inputs are at logical “1”, V_{CC} = Max.				
	DP8310			100	152	mA
	DP8311			88	125	mA
I_{CC1}	Supply Current, Outputs Off	Data outputs latched to a logic “1”. Other conditions same as I_{CC0}.				
	DP8310			40	57	mA
	DP8311			25	36	mA

AC Electrical Characteristics

DP8310 only: V_{CC} = 4.5V, T_A = 25˚C

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{pd0}	High to Low Propagation Delay Write Enable Input to Output	*(Figure 1)*		40	120	ns
t_{pd1}	Low to High Propagation Delay Write Enable Input to Output	*(Figure 1)*		70	150	ns
t_{SETUP}	Minimum Set-Up Time Data in to Write Enable Input	t_{HOLD} = 0 ns *(Figure 1)*	45	20		ns
t_{pWH}, t_{pWL}	Minimum Write Enable Pulse Width	*(Figure 1)*	60	25		ns
t_{THL}	High to Low Output Transition Time	*(Figure 1)*		16	35	ns
t_{TLH}	Low to High Output Transition Time	*(Figure 1)*		38	70	ns
C_{IN}	“N” Package (Note 4)			5	15	pF

AC Electrical Characteristics

DP8311 only: V_{CC} = 5V, T_A = 25˚C

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{pd0}	High to Low Propagation Delay Data In to Output	*(Figure 2)*		30	60	ns
t_{pd1}	Low to High Propagation Delay Data to Output	*(Figure 2)*		70	100	ns
t_{SETUP}	Minimum Set-Up Time Data in to Strobe Input	t_{HOLD} = 0 ns *(Figure 2)*	0	−25		ns
t_{pWL}	Minimum Strobe Enable Pulse Width	*(Figure 2)*	60	35		ns
t_{pdC}	Propagation Delay Clear to Data Output	*(Figure 2)*		70	135	ns
t_{pWC}	Minimum Clear Input Pulse Width	*(Figure 2)*	60	25		ns
t_{THL}	High to Low Output Transition Time	*(Figure 2)*		20	35	ns
t_{TLH}	Low to High Output Transition Time	*(Figure 2)*		38	60	ns
C_{IN}	Input Capacitance — Any Input	(Note 4)		5	15	pF

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

Note 2: Unless otherwise specified min/max limits apply across the 0˚C to +70˚C for the DP8310/DP8311. All typical values are for T_A =25˚C, V_{CC} = 5V.

Note 3: All currents into device pins shown as positive, out of device pins as negative, all voltages referenced to ground unless otherwise noted.

Note 4: Input capacitance is guaranteed by periodic testing. f_{TEST} = 10 kHz at 300 mV, T_A = 25˚C.

Logic Table

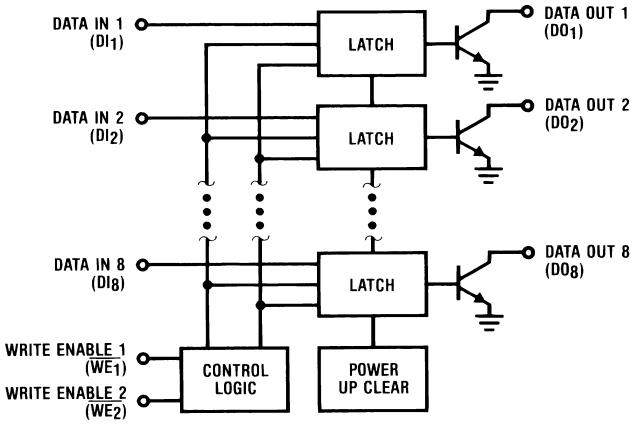
DP8310			
Write Enable 1 $\overline{WE_1}$	Write Enable 2 $\overline{WE_2}$	Data Input DI_{1-8}	Data Output DO_{1-8}
0	0	X	Q
0	↓	0	1
0	↓	1	0
↓	0	0	1
↓	0	1	0
0	1	X	Q
1	0	X	Q
1	1	X	Q

DP8311			
Clear $\overline{CLR}$	Strobe $\overline{STR}$	Data Input DI_{1-8}	Data Output DO_{1-8}
1	1	X	Q
1	0	0	1
1	0	1	0
0	X	X	1

X = Don't Care
1 = Outputs Off
0 = Outputs On
Q = Pre-existing Output
↓ = Positive Edge Transition

Block Diagrams

DP8310



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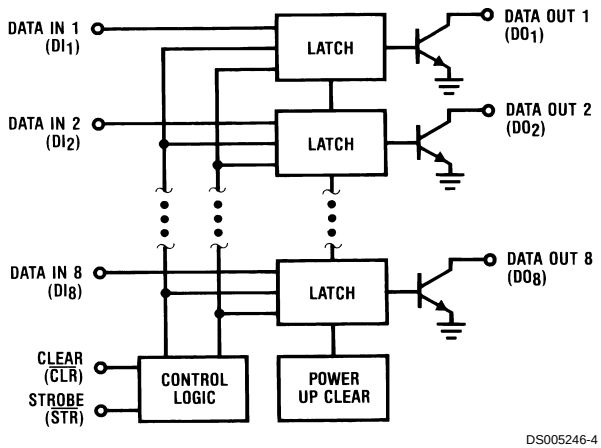
DP8311



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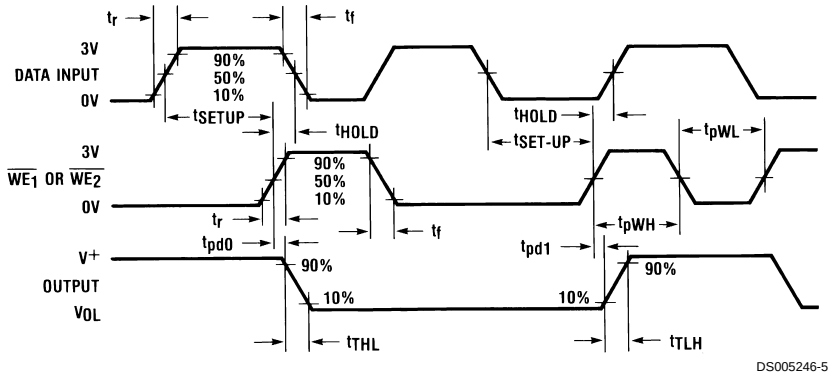
Switching Time Waveforms

DP8310



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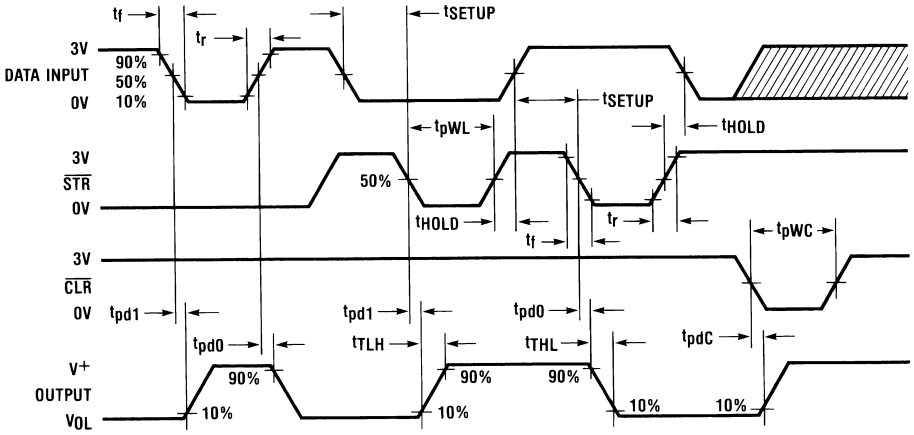
DP8311



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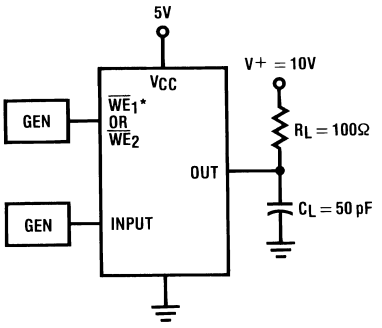
Switching Time Test Circuits



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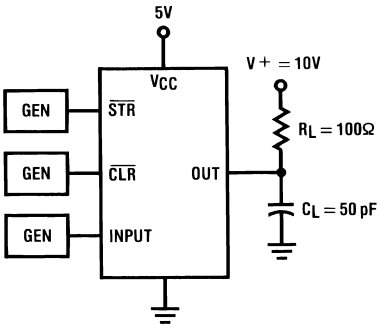
*$\overline{WE}_1$ = 0V When the Input = $\overline{WE}_2$

FIGURE 1. DP8310



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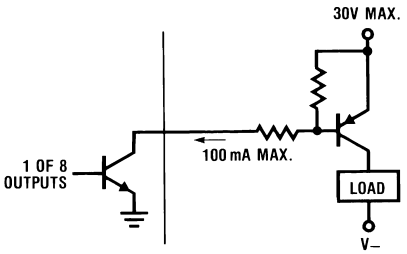
Pulse Generator Characteristics:
Z_O = 50Ω, t_r = t_f = 5 ns

FIGURE 2. DP8311

Typical Applications DP8310/11 Buffering High Current Device (Notes 5, 6)

PNP High Current Driver



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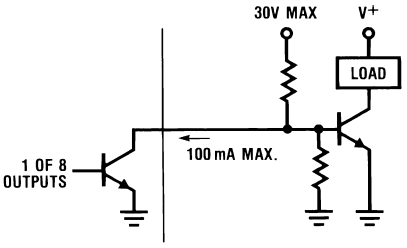
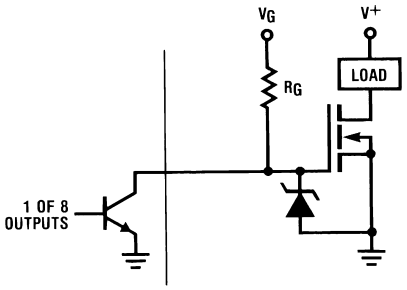
NPN High Current Driver



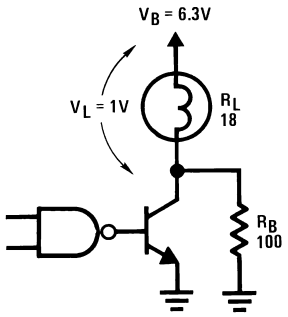
DS005246-10

VMOS High Current Driver



DS005246-11

Circuit Used to Reduce Peak Transient Lamp Current



DS005246-12

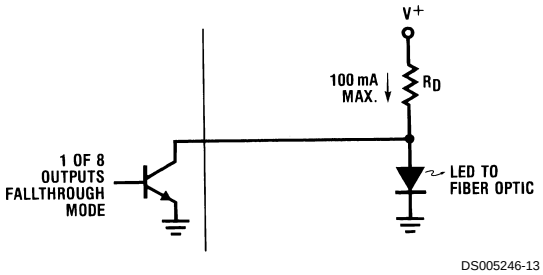
$$R_B = \left(\frac{V_B - V_L}{V_L}\right) R_L$$

$$R_B = \left(\frac{6.3 - 1}{1}\right) 18\Omega = 95.4 \approx 100\Omega$$

Typical Applications DP8310/11 Buffering High Current Device (Notes 5, 6) (Continued)

Eight Output/Four Output Fiber Optic LED Driver

DP8311 100 mA Drivers



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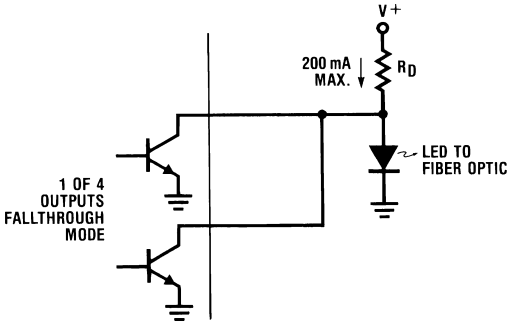
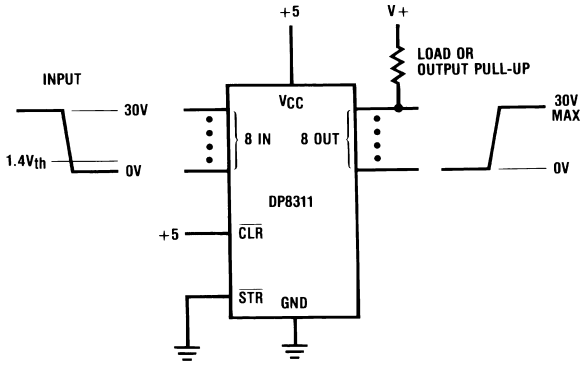
DP8311 Parallel Outputs (200 mA) Drivers*



DS005246-14

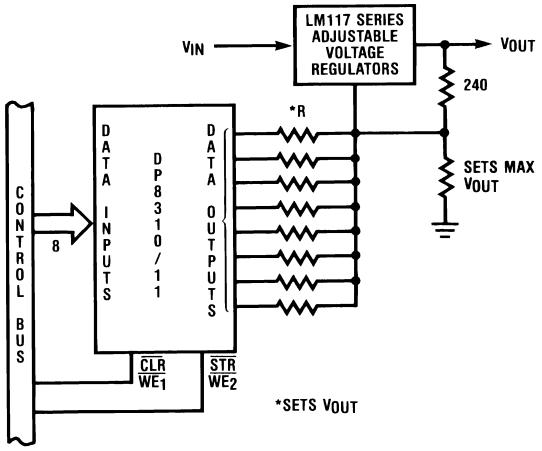
*Parallel only adjacent outputs

8-Bit Level Translator Driver



DS005246-15

Digital Controlled 256 Level Power Supply from 1.2V to 30V



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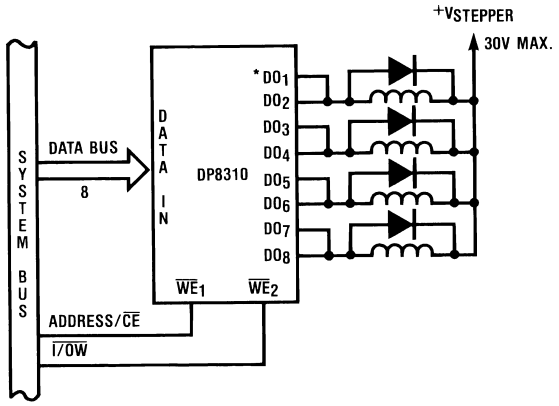
Typical Applications DP8310/11 Buffering High Current Device (Notes 5, 6) (Continued)

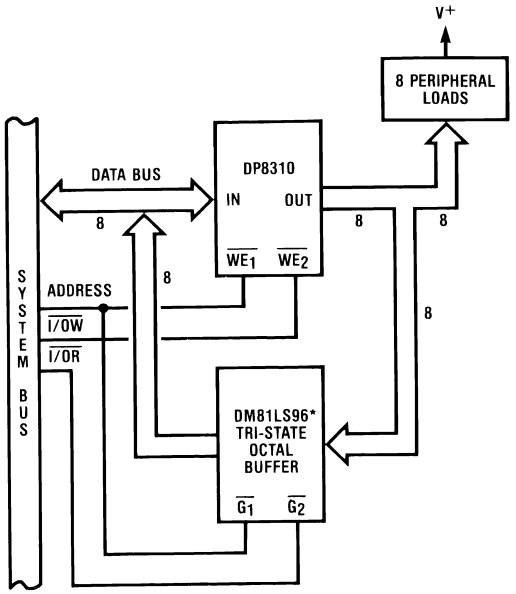
200 mA Drive for a 4 Phase Bifilar Stepper Motor



DS005246-17

*Parallel only adjacent outputs

Reading the State of the Latched Peripherals



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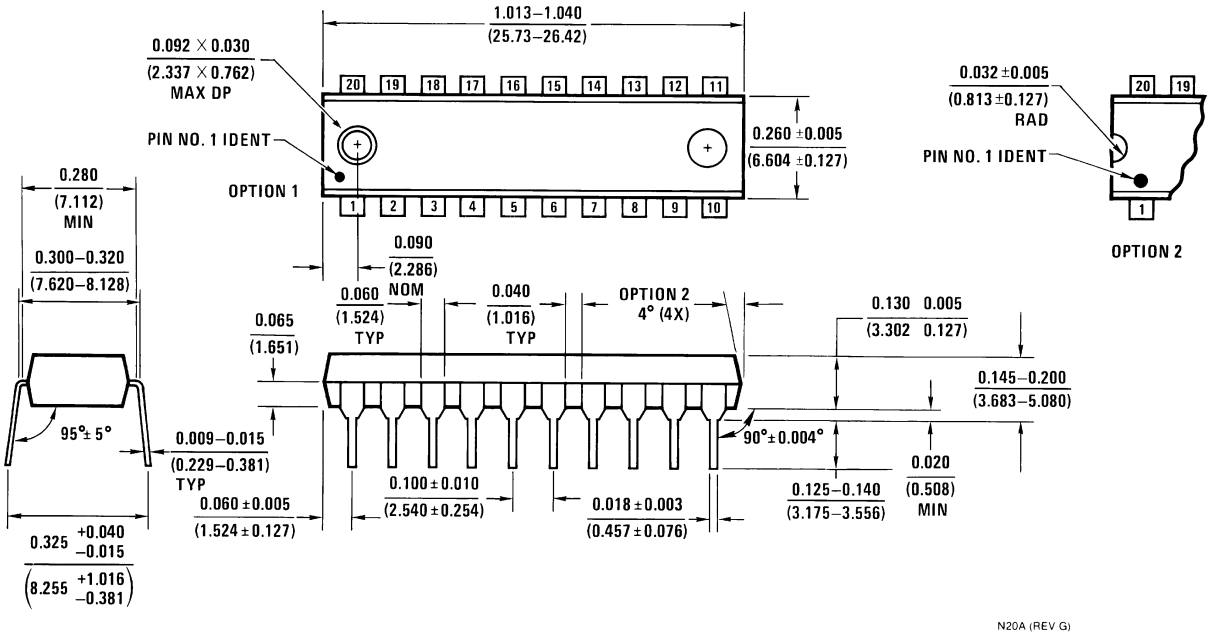
*High Level Input Voltage must not Exceed V_{CC} of the DM81LS96

Note 5: Always use good V_{CC} bypass and ground techniques to suppress transients caused by peripheral loads.

Note 6: Printed circuit board mounting is required if these devices are operated at maximum rated temperature and current (all outputs on DC).

Physical Dimensions inches (millimeters) unless otherwise noted



Molded Dual-In-Line Package (N)
Order Number DP8310N or DP8311N
NS Package Number N20A

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DP8311 Product Folder

Octal Latched Peripheral Driver

General Description | Features | Datasheet | Package & Models | Samples & Pricing | Application Notes

Parametric Table

Device Count	8
Input Logic Compatibility	TTL
Latch-Up Voltage (Volt)	-
Logic Function	-

Parametric Table

On Power Supply Current (mA)	125
Output Low Voltage (Volt)	.50
Output High Voltage (Volt)	30
Output Low Current (mA)	100
Propagation Delay, typ (ns)	40

Datasheet

Title	Size in Kbytes	Date	View Online	Download	Receive via Email
DP8310 DP8311 Octal Latched Peripheral Drivers	197 Kbytes	9-Feb-00	View Online	Download	Receive via Email

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Package Availability, Models, Samples & Pricing

Part Number	Package			Status	Models		Samples & Electronic Orders	Budgetary Pricing		Std Pack Size	Package Marking
	Type	Pins	MSL		SPICE	IBIS		Qty	$US each		
DP8311N	MDIP	20	MSL	Lifetime buy	N/A	N/A	Buy Now	1K+	$3.6000	rail of 18	[logo]¢U¢Z¢3¢T DP8311N
DP8311 MDC	Die			Full production	N/A	N/A				tray of N/A	-
DP8311 MWC	Wafer			Full production	N/A	N/A				wafer jar of N/A	-

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- Level translators
- Fiber-optic LED drivers

Application Notes

Title	Size in Kbytes	Date	View Online	Download	Receive via Email
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