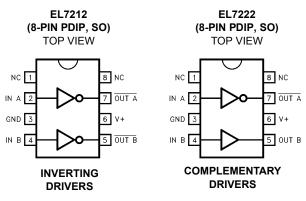
# RENESAS

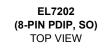
# DATASHEET

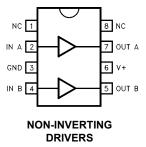
EL7202, EL7212, EL7222 High Speed, Dual Channel Power MOSFET Drivers

The EL7202, EL7212, EL7222 ICs are matched dual-drivers that improve the operation of the industry standard DS0026 clock drivers. The Elantec versions are very high speed drivers capable of delivering peak currents of 2.0 amps into highly capacitive loads. The high speed performance is achieved by means of a proprietary "Turbo-Driver" circuit that speeds up input stages by tapping the wider voltage swing at the output. Improved speed and drive capability are enhanced by matched rise and fall delay times. These matched delays maintain the integrity of input-to-output pulse-widths to reduce timing errors and clock skew problems. This improved performance is accompanied by a 10 fold reduction in supply currents over bipolar drivers, yet without the delay time problems commonly associated with CMOS devices. Dynamic switching losses are minimized with non-overlapped drive techniques.

# **Pinouts**







Manufactured under U.S. Patent Nos. 5,334,883, #5,341,047

## Features

- · Industry standard driver replacement
- Improved response times
- Matched rise and fall times
- Reduced clock skew
- Low output impedance
- Low input capacitance
- High noise immunity
- Improved clocking rate
- · Low supply current
- · Wide operating voltage range
- Pb-Free available (RoHS compliant)

# Applications

- · Clock/line drivers
- CCD Drivers
- · Ultra-sound transducer drivers
- Power MOSFET drivers
- Switch mode power supplies
- Class D switching amplifiers
- Ultrasonic and RF generators
- Pulsed circuits



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# **Ordering Information**

Part Number	PART MARKING	TAPE & REEL	PACKAGE	PKG. DWG. #
EL7202CN	EL7202CN	-	8 Ld PDIP	MDP0031
EL7202CS	7202CS	-	8 Ld SOIC	MDP0027
EL7202CS-T7	7202CS	7"	8 Ld SOIC	MDP0027
EL7202CS-T13	7202CS	13"	8 Ld SOIC	MDP0027
EL7202CSZ (See Note)	7202CSZ	-	8 Ld SOIC (Pb-free)	MDP0027
EL7202CSZ-T7 (See Note)	7202CSZ	7"	8 Ld SOIC (Pb-free)	MDP0027
EL7202CSZ-T13 (See Note)	7202CSZ	13"	8 Ld SOIC (Pb-free)	MDP0027
EL7212CN	EL7212CN	-	8 Ld PDIP	MDP0031
EL7212CNZ	EL7212CN Z	-	8 Ld PDIP* (Pb-free)	MDP0031
EL7212CS	7212CS	-	8 Ld SOIC	MDP0027
EL7212CS-T7	7212CS	7"	8 Ld SOIC	MDP0027
EL7212CS-T13	7212CS	13"	8 Ld SOIC	MDP0027
EL7212CSZ (See Note)	7212CSZ	-	8 Ld SOIC (Pb-free)	MDP0027
EL7212CSZ-T7 (See Note)	7212CSZ	7"	8 Ld SOIC (Pb-free)	MDP0027
EL7212CSZ-T13 (See Note)	7212CSZ	13"	8 Ld SOIC (Pb-free)	MDP0027
EL7222CN	EL7222CN	-	8 Ld PDIP	MDP0031
EL7222CS	7222CS	-	8 Ld SOIC	MDP0027
EL7222CS-T7	7222CS	7"	8 Ld SOIC	MDP0027
EL7222CS-T13	7222CS	13"	8 Ld SOIC	MDP0027
EL7222CSZ (See Note)	7222CSZ	-	8 Ld SOIC (Pb-free)	MDP0027
EL7222CSZ-T7 (See Note)	7222CSZ	7"	8 Ld SOIC (Pb-free)	MDP0027
EL7222CSZ-T13 (See Note)	7222CSZ	13"	8 Ld SOIC (Pb-free)	MDP0027

NOTE: Intersil Pb-free products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which are RoHS compliant and compatible with both SnPb and Pb-free soldering operations. Intersil Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020.

\*Pb-free PDIPs can be used for through hole wave solder processing only. They are not intended for use in Reflow solder processing applications.



### **Absolute Maximum Ratings** (T<sub>A</sub> = 25°C)

Supply (V+ to Gnd) 16.5V	
Input Pins0.3V to +0.3V above V+	
Combined Peak Output Current	
Storage Temperature Range65°C to +150°C	
Ambient Operating Temperature40°C to +85°C	

Operating Junction Temperature
Power Dissipation
SOIC
PDIP

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

IMPORTANT NOTE: All parameters having Min/Max specifications are guaranteed. Typical values are for information purposes only. Unless otherwise noted, all tests are at the specified temperature and are pulsed tests, therefore:  $T_J = T_C = T_A$ 

DC Electrical Specifications  $T_A = 25^{\circ}C$ , V = 15V unless otherwise specified

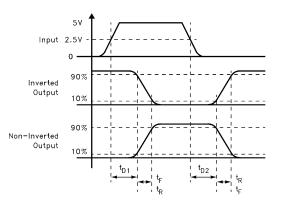
parameter	Description	Test Conditions	Min	Тур	Max	Units
INPUT						1
V <sub>IH</sub>	Logic "1" Input Voltage		2.4			V
Ιн	Logic "1" Input Current	@V+		0.1	10	μA
V <sub>IL</sub>	Logic "0" Input Voltage				0.8	V
IIL	Logic "0" Input Current	@0V		0.1	10	μA
V <sub>HVS</sub>	Input Hysteresis			0.3		V
OUTPUT					L	1
R <sub>OH</sub>	Pull-Up Resistance	I <sub>OUT</sub> = -100mA		3	6	Ω
R <sub>OL</sub>	Pull-Down Resistance	I <sub>OUT</sub> = +100mA		4	6	Ω
I <sub>PK</sub>	Peak Output Current	Source Sink		2 2		A
I <sub>DC</sub>	Continuous Output Current	Source/Sink	100			mA
POWER SUPPLY					L	1
I <sub>S</sub>	Power Supply Current	Inputs High/EL7202 Inputs High/EL7212 Inputs High/EL7222		4.5 1 2.5	7.5 2.5 5.0	mA
V <sub>S</sub>	Operating Voltage		4.5		15	V

AC Electrical Specifications

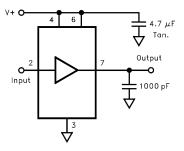
 $T_A = 25^{\circ}C$ , V = 15V unless otherwise specified

parameter	Description	Test Conditions	Min	Тур	Max	Units		
SWITCHING CHARACTERISTICS								
t <sub>R</sub>	Rise Time	C <sub>L</sub> = 500pF C <sub>L</sub> = 1000pF		7.5 10	20	ns		
t <sub>F</sub>	Fall Time	C <sub>L</sub> = 500pF C <sub>L</sub> = 1000pF		10 13	20	ns		
t <sub>D1</sub>	Turn-On Delay Time	See Timing Table		18	25	ns		
t <sub>D2</sub>	Turn-Off Delay Time	See Timing Table		20	25	ns		

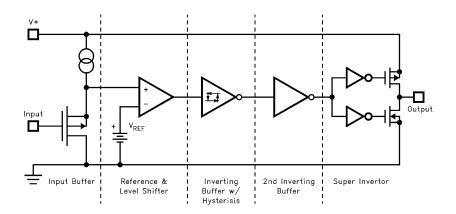
# **Timing Table**



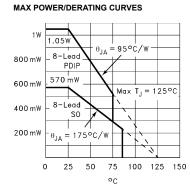
# Standard Test Configuration



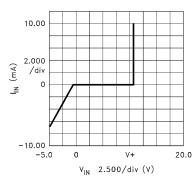
Simplified Schematic

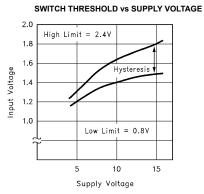


# Typical Performance Curves

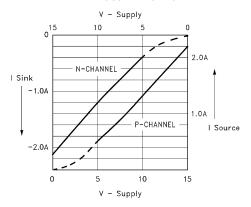




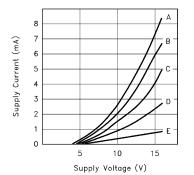




PEAK DRIVE vs SUPPLY VOLTAGE

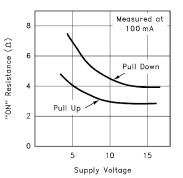


#### QUIESCENT SUPPLY CURRENT



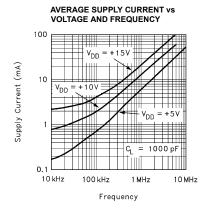
CASE:		
Device	Input Level	Curve
EL7202	GND	A
EL7202	GND, V+	B
EL7202	V+	C
EL7212	GND	C
EL7212	GND, V+	D
EL7212	V+	E
EL7222	GND	B
EL7222	GND, V+	C
EL7222	V+	D



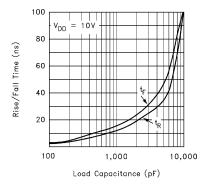


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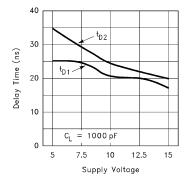
# Typical Performance Curves (Continued)



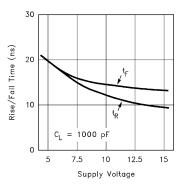
RISE/FALL TIME vs LOAD



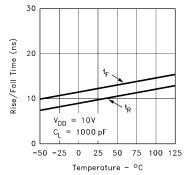
PROPAGATION DELAY vs SUPPLY VOLTAGE



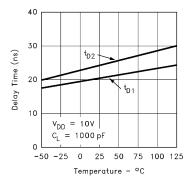
**RISE/FALL TIME vs SUPPLY VOLTAGE** 



**RISE/FALL TIME vs TEMPERATURE** 

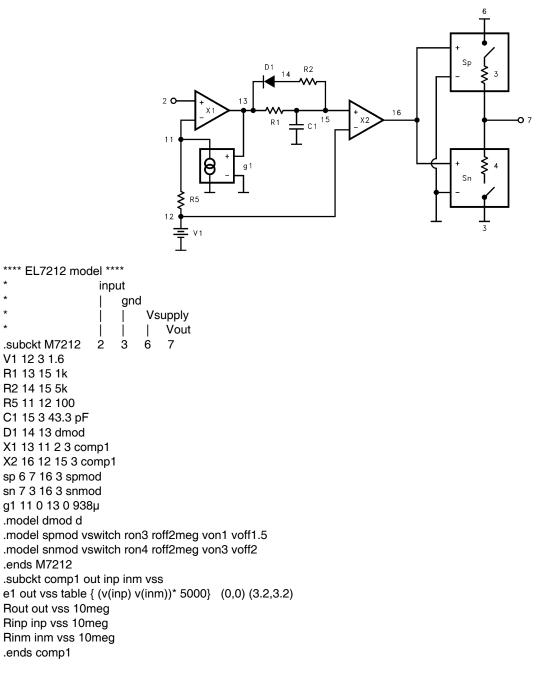


#### DELAY vs TEMPERATURE



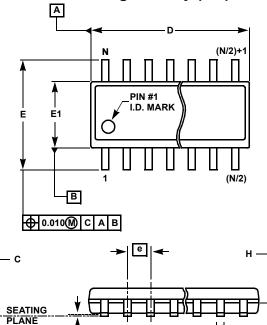


# EL7212 Macro Model



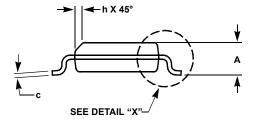


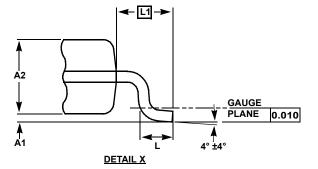




0.010 C A B

b





### **MDP0027**

SMALL OUTLINE PACKAGE FAMILY (SO)

0.004 0

NOTES	TOLERANCE	SO28 (SOL-28)	SO24 (SOL-24)	SO20 (SOL-20)	SO16 (0.300") (SOL-16)	SO16 (0.150")	SO-14	SO-8	SYMBOL
-	MAX	0.104	0.104	0.104	0.104	0.068	0.068	0.068	А
-	±0.003	0.007	0.007	0.007	0.007	0.006	0.006	0.006	A1
-	±0.002	0.092	0.092	0.092	0.092	0.057	0.057	0.057	A2
-	±0.003	0.017	0.017	0.017	0.017	0.017	0.017	0.017	b
-	±0.001	0.011	0.011	0.011	0.011	0.009	0.009	0.009	С
1, 3	±0.004	0.704	0.606	0.504	0.406	0.390	0.341	0.193	D
-	±0.008	0.406	0.406	0.406	0.406	0.236	0.236	0.236	Е
2, 3	±0.004	0.295	0.295	0.295	0.295	0.154	0.154	0.154	E1
-	Basic	0.050	0.050	0.050	0.050	0.050	0.050	0.050	е
-	±0.009	0.030	0.030	0.030	0.030	0.025	0.025	0.025	L
-	Basic	0.056	0.056	0.056	0.056	0.041	0.041	0.041	L1
-	Reference	0.020	0.020	0.020	0.020	0.013	0.013	0.013	h
-	Reference	28	24	20	16	16	14	8	Ν

NOTES:

1. Plastic or metal protrusions of 0.006" maximum per side are not included.

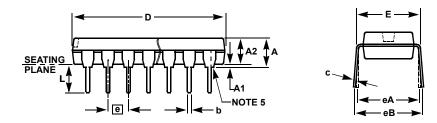
2. Plastic interlead protrusions of 0.010" maximum per side are not included.

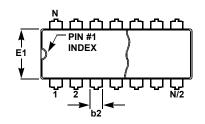
3. Dimensions "D" and "E1" are measured at Datum Plane "H".

4. Dimensioning and tolerancing per ASME Y14.5M-1994



# Plastic Dual-In-Line Packages (PDIP)





### MDP0031 PLASTIC DUAL-IN-LINE PACKAGE

SYMBOL	PDIP8	PDIP14	PDIP16	PDIP18	PDIP20	TOLERANCE	NOTES
А	0.210	0.210	0.210	0.210	0.210	MAX	
A1	0.015	0.015	0.015	0.015	0.015	MIN	
A2	0.130	0.130	0.130	0.130	0.130	±0.005	
b	0.018	0.018	0.018	0.018	0.018	±0.002	
b2	0.060	0.060	0.060	0.060	0.060	+0.010/-0.015	
С	0.010	0.010	0.010	0.010	0.010	+0.004/-0.002	
D	0.375	0.750	0.750	0.890	1.020	±0.010	1
E	0.310	0.310	0.310	0.310	0.310	+0.015/-0.010	
E1	0.250	0.250	0.250	0.250	0.250	±0.005	2
е	0.100	0.100	0.100	0.100	0.100	Basic	
eA	0.300	0.300	0.300	0.300	0.300	Basic	
eB	0.345	0.345	0.345	0.345	0.345	±0.025	
L	0.125	0.125	0.125	0.125	0.125	±0.010	
Ν	8	14	16	18	20	Reference	

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### NOTES:

- 1. Plastic or metal protrusions of 0.010" maximum per side are not included.
- 2. Plastic interlead protrusions of 0.010" maximum per side are not included.
- 3. Dimensions E and eA are measured with the leads constrained perpendicular to the seating plane.
- 4. Dimension eB is measured with the lead tips unconstrained.
- 5. 8 and 16 lead packages have half end-leads as shown.

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