élantec
HIGH PERFORMANCE ANALOG INTEGRATED CIRCUITS

EL7501C
100V High Side Driver

Features
- 100V High Side Voltage
- Rail to Rail Output
- 1 MHz Operation
- 1.0A Peak Current
- Matched Rise and Fall Times
- Direct Coupled
- No Start Up Ambiguity

Applications
- Uninterruptible Power Supplies
- DC-DC Converters
- Motor Control
- Power MOSFET Driver

Ordering Information

Part No.	Temp. Range	Package	Outline #
EL7501CN	−40°C to +85°C	8-Pin P-Dip	MDP0031
EL7501CS	−40°C to +85°C	8-Lead SO	MDP0027

General Description
The EL7501 provides a low cost solution to many high side drive applications. The EL7501 is DC coupled so there are no start up problems associated with AC coupled schemes. The EL7501 is driven by user supplied complementary signals.

Connection Diagram

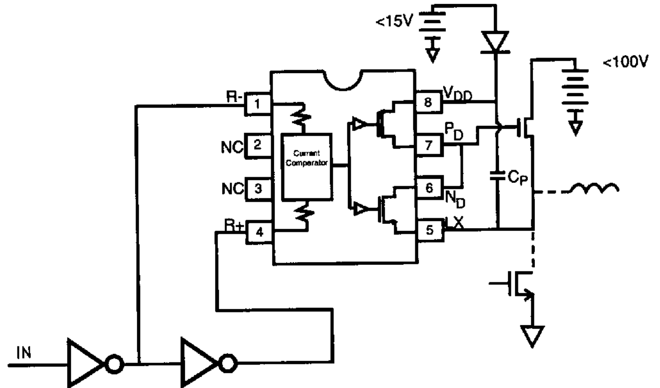
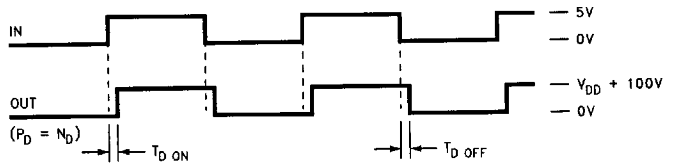


Figure 1

7501 Waveform Example



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Absolute Maximum Ratings (T_A = 25°C)

Supply (V_{DD} or LX to R− or R+)	100V	Ambient Operating Temperature		−40°C to +85°C
Supply (V_{DD} to LX)	16.5V	Storage Temperature Range		−65°C to +150°C
Output Pins	−0.3V below GND, +0.3V above V_{DD}	Operating Junction Temperature		125°C
		Power Dissipation	SOIC	570 mW
Peak Output Current	2A		PDIP	1050 mW

Important Note:
All parameters having Min/Max specifications are guaranteed. The Test Level column indicates the specific device testing actually performed during production and Quality inspection. Elantec performs most electrical tests using modern high-speed automatic test equipment, specifically the LTX77 Series system. Unless otherwise noted, all tests are pulsed tests, therefore $T_J = T_C = T_A$.

Test Level	Test Procedure
I	100% production tested and QA sample tested per QA test plan QCX0002.
II	100% production tested at T_A = 25°C and QA sample tested at T_A = 25°C, T_{MAX} and T_{MIN} per QA test plan QCX0002.
III	QA sample tested per QA test plan QCX0002.
IV	Parameter is guaranteed (but not tested) by Design and Characterization Data.
V	Parameter is typical value at T_A = 25°C for information purposes only.

DC Electrical Characteristics (T_A = 25°C, V_{DD} = 15V, C_{LOAD} = 1000 pF, unless otherwise specified)

Parameter	Description	Test Conditions	Min.	Typ.	Max.	Test Level	Units
Input/Output							
$V_{DIFF\ (Min)}$	Minimum Differential Input Signal to Switch Output		1.0			I	V
$I_{DS\ OFF}$	Output Leakage	GND < V_{OUT} < V_{DD}	−10.0	0.2	+10.0	I	μA
R_{OH}	Pull-up Resistance	I_{OUT} = −100 mA		5.0	10.0	I	Ω
R_{OL}	Pull-down Resistance	I_{OUT} = +100 mA		5.0	10.0	I	Ω
I_{PK}	Peak Output Current			1.0		IV	A
I_{DC}	Continuous Output Current Source/Sink		50.0			IV	mA
Power Supply							
I_{DD}	Supply Current into V_{DD}				4.0	I	mA
V_{DD}	Operating Voltage		4.5		15.0	I	V

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AC Electrical Characteristics (T_A = 25°C, V_{DD} = 15V, C_{LOAD} = 1000 pF, unless otherwise specified)

Parameter	Description	Test Conditions	Min.	Typ.	Max.	Test Level	Units
Switching Characteristics							
t_R	Rise Time	C_L = 500 pF C_L = 1000 pF		15.0 20.0	 40.0	IV	ns
t_F	Fall Time	C_L = 500 pF C_L = 1000 pF		15.0 20.0	 40.0	IV	ns
$t_{D\ OFF}$	Turn Off Delay Time			90.0	140.0	IV	ns
$t_{D\ ON}$	Turn On Delay Time			90.0	140.0	IV	ns

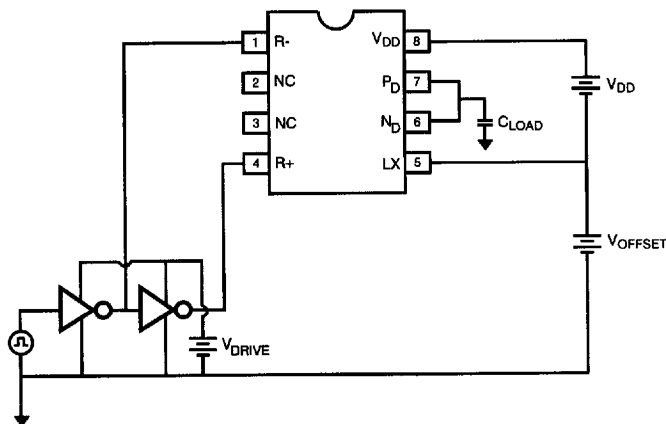


Figure 2. EL7501 Test Circuit

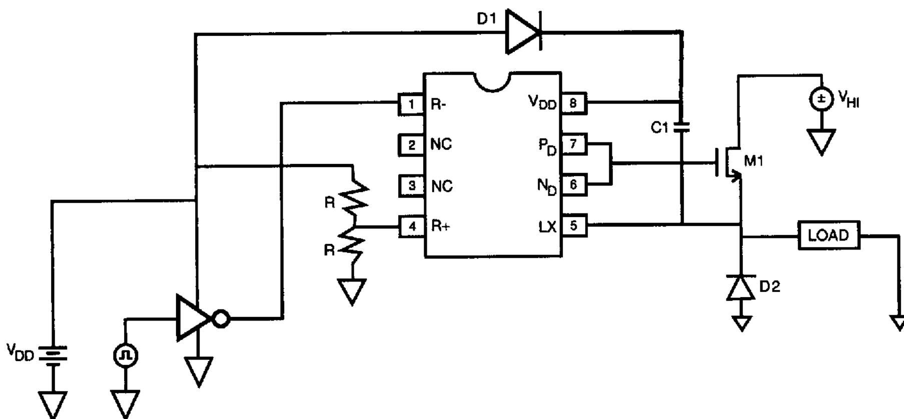
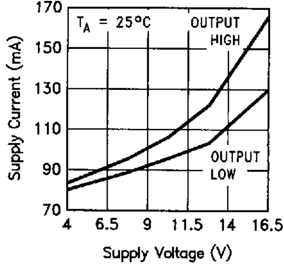


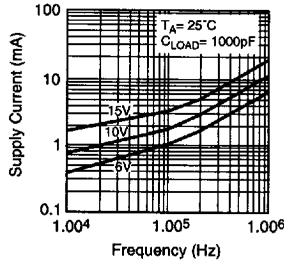
Figure 3. EL7501 Alternate Drive Method

Typical Performance Curves

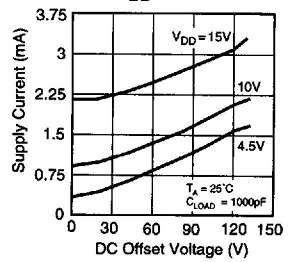
Quiescent Supply Current vs Supply Voltage



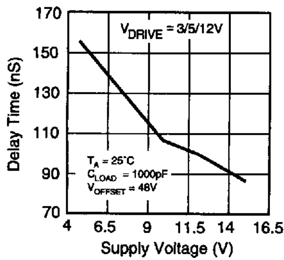
Average Supply Current vs Voltage and Frequency



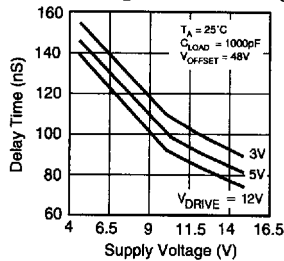
Supply Current vs DC Offset Voltage and V_{DD}



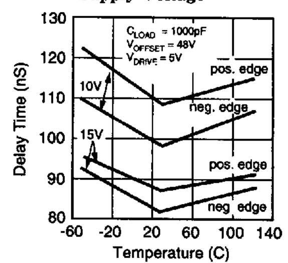
Output Rising Edge Delay Time vs Supply Voltage and Drive Voltage



Output Falling Edge Delay Time vs Supply Voltage and Drive Voltage



Delay Time vs Temperature and Supply Voltage



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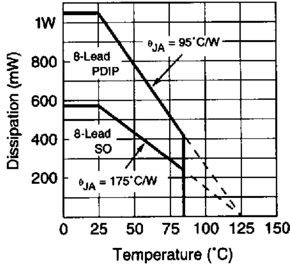
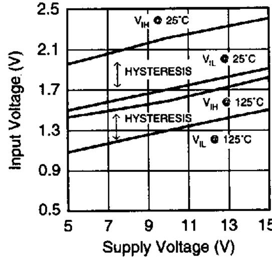
EL7501C
100V High Side Driver

Typical Performance Curves — Contd.

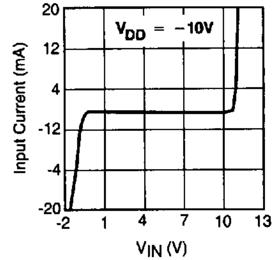
Max. Power/ Derating Curves 8-Pin Package



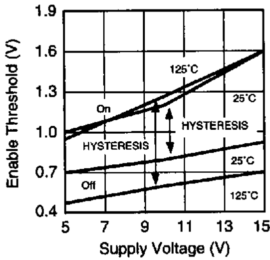
Input Threshold vs Supply Voltage



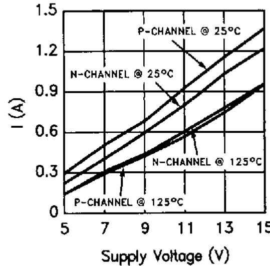
Input Current vs Input Voltage



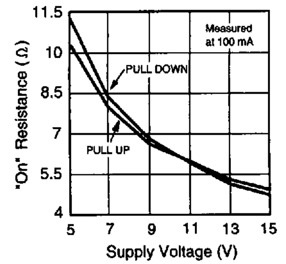
Enable Threshold vs Supply Voltage



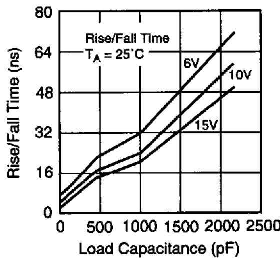
Peak Drive vs Supply Voltage



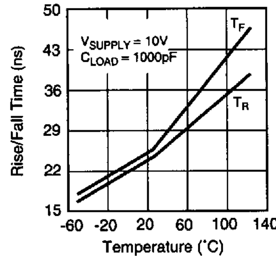
"On" Resistance vs Supply Voltage



Rise/Fall Time vs Load and Supply



Rise/Fall Time vs Temperature



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Soldering Packages to PC Boards

DIP Packages

Wave soldering is recommended for DIP packages. Solder plated boards are recommended. Rosin mildly activated (RMA) flux is needed. Wave soldering using a dual wave system at 250°C ±10°C for two seconds per wave is preferable. Thorough cleaning of boards after soldering is required.

Hand soldering, Elantec's DIP packages will survive a peak temperature of 300°C (at leads) for a maximum period of 10 seconds.

Surface Mount Packages

Wave soldering and vapor phase or infrared (IR) reflow can be used for soldering surface mount packages to PC boards. Solder plated boards are recommended for wave soldering and vapor phase or IR reflow methods.

Wave Soldering: Adhesive is used to hold components on the boards during wave soldering. Place components on the board and cure adhesive before wave soldering. Rosin mildly activated (RMA) flux or organic flux is needed. Wave soldering using a dual wave system at 250°C ±10°C for a maximum of two seconds per wave is preferable. Thorough cleaning of boards after soldering is required.

Reflow Soldering: Screen solder paste on board and attach components to board. Solder paste with RMA flux is recommended. Bake boards at 65°C–90°C for 15 minutes. Preheat boards to within 60°C–70°C of the solder temperature. To reflow solder paste with vapor phase method, the solder paste temperature must be maintained at or above 200°C for at least 30 seconds. The components temperature can not exceed 215°C. For the IR reflow method, the solder paste temperature must be maintained at or above 200°C for at least 30 seconds. The components temperature can not exceed 220°C. The temperature/time ramp-up during vapor phase or IR reflow shall be no greater than 2°C/sec.

Hand soldering, Elantec's surface mount packages will survive a peak temperature of 260°C (at leads) for a maximum period of 10 seconds.

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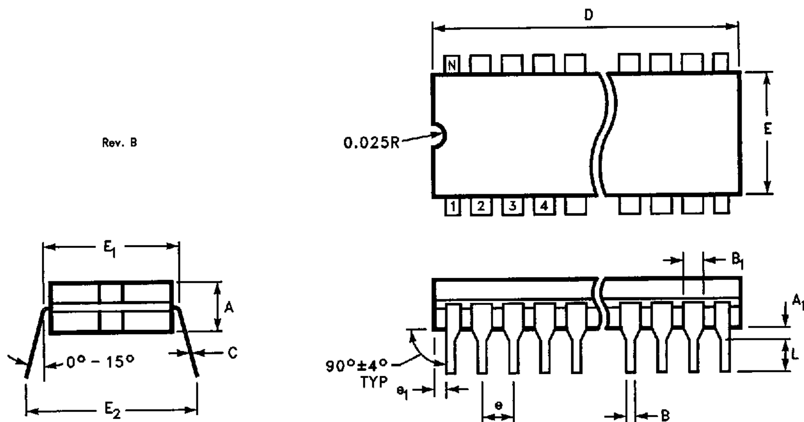
Package Outlines



MDP0016 Rev. B
CerDIP Package
Lead Finish (Coml)—Tin Plate or Hot Solder DIP
Lead Finish (Mil)—Hot Solder DIP

Common Dimensions	Min	Max	Min	Max	Min	Max	Min	Max
A	0.140	0.160	0.140	0.160	0.140	0.160	0.140	0.160
A_1	0.115	0.055	0.020	0.050	0.015	0.060	0.020	0.050
B	0.016	0.023	0.016	0.021	0.014	0.026	0.016	0.021
B_1	0.050	0.065	0.050	0.060	0.038	0.068	0.050	0.060
C	0.008	0.012	0.008	0.012	0.008	0.018	0.008	0.012
D	0.375	0.395	0.760	0.785	0.940	0.960	1040.925	1.060
E	0.245	0.265	0.220	0.291	0.220	0.310	0.2780	0.298
E_1	0.300	0.320	0.300	0.320	0.290	0.320	0.300	0.320
E_2	0.340	0.390	0.340	0.390	0.360	0.410	0.340	0.390
e	0.090	0.110	0.090	0.110	0.090	0.110	0.090	0.110
e_1	0.020	0.055	0.078	0.098	0.068	0.098	0.078	0.098
L	0.125	0.150	0.125	0.150	0.125	0.150	0.130	0.150
N	8-Lead		14-Lead		18-Lead		20-Lead	

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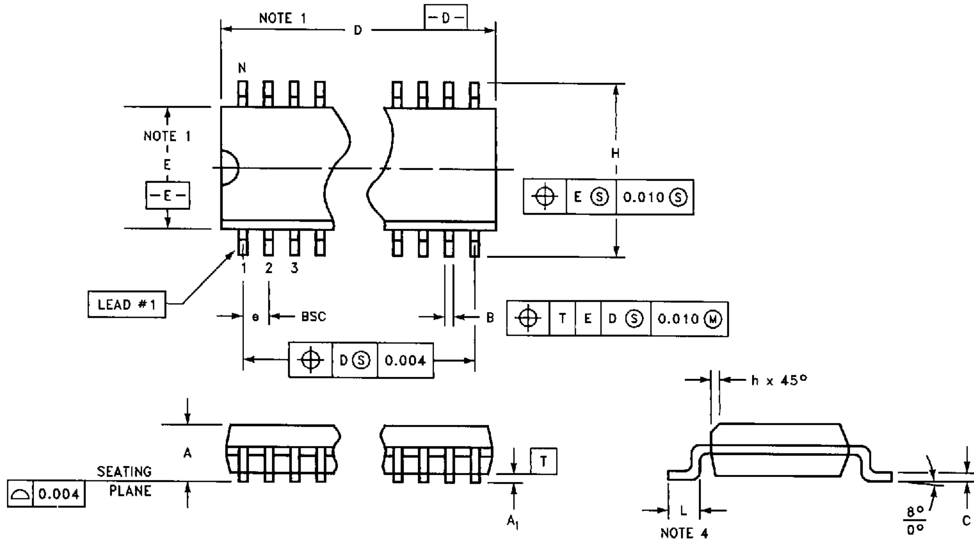

Note 1: These dimensions do not include mold flash or protrusions. Mold flash protrusion shall not exceed .006" on any side.
Note 2: SO-8, SO-14, S0-16 packages are narrow body (0.150").
Note 3: Dimensions and tolerancing per ANSI Y14.5M-1982.
Note 4: Flat area of lead foot.
Note 5: SOL-24T2 (thermal package) has 2 fused leads on each side of package.
Note 6: SOL-20T (thermal package) has 4 fused leads on each side of package.
Note 7: SOL-28T contains a thermal metal slug.

MDP0027 Rev. C
Package Outline—SOIC
Lead Finish—Solder Plate

Symbol	Lead Count													
	SOL-28		SOL-20		SOL-16		SO-16		SO-14		SO-8		SOL-24	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
A	0.096	0.104	0.096	0.104	0.096	0.104	0.061	0.068	0.061	0.068	0.061	0.068	0.096	0.104
A_1	0.004	0.011	0.004	0.011	0.004	0.011	0.004	0.010	0.004	0.010	0.004	0.010	0.004	0.011
B	0.014	0.019	0.014	0.019	0.014	0.019	0.014	0.019	0.014	0.019	0.014	0.019	0.014	0.019
C	0.009	0.012	0.009	0.012	0.009	0.012	0.008	0.010	0.008	0.010	0.008	0.010	0.009	0.012
D	0.696	0.712	0.498	0.510	0.397	0.430	0.386	0.394	0.337	0.344	0.189	0.196	0.598	0.614
E	0.291	0.299	0.291	0.299	0.291	0.299	0.150	0.157	0.150	0.157	0.150	0.157	0.291	0.299
e	0.050 BSC		0.050 BSC		0.050 BSC		0.050 BSC		0.050 BSC		0.050 BSC		0.050 BSC	
H	0.398	0.414	0.398	0.414	0.398	0.414	0.230	0.244	0.230	0.244	0.230	0.244	0.398	0.414
h	0.010	0.016	0.010	0.016	0.010	0.016	0.010	0.016	0.010	0.016	0.010	0.016	0.010	0.016
L	0.016	0.024	0.016	0.024	0.016	0.024	0.016	0.024	0.016	0.024	0.016	0.024	0.016	0.024

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Package Outlines

0.165-0.185 (4.19-4.70)
0.045-0.055 (1.14-1.40)
0.146-0.156 (3.71-3.96)
0.390-0.410 (9.906-10.414)
0.100-0.120 (2.540-3.048)
0.238-0.258 (6.05-6.55)
0.569-0.609 (14.45-15.47)
0.73 (18.54) REF
0.820 (20.82) REF
0.980-1.03 (24.89-26.16)
1.07-1.17 (27.18-29.72)
5°
0.095-0.115 (2.41-2.92)
0.170-0.180 (4.32-4.57)
0.327-0.335 (8.31-8.51)
0.012-0.025 (0.30-0.64)
0.030-0.040 (0.76-1.02)
0.062-0.072 (1.57-1.83)
SEATING PLANE
REV. A

MDP0028 Rev. A
5-Lead TO-220
Lead Finish—Solder Plate

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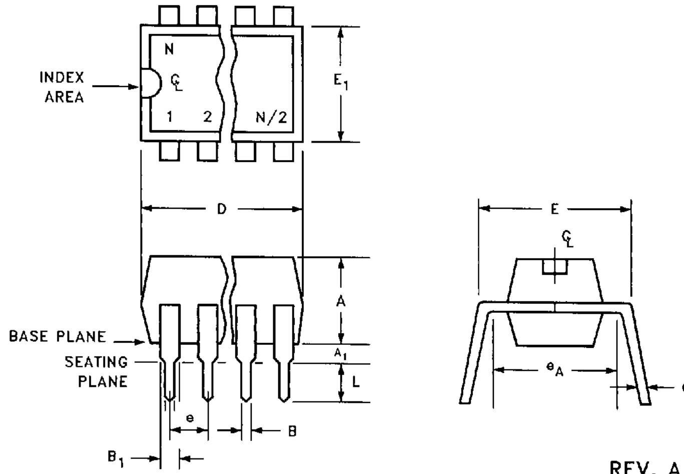

MDP0031 Rev. A
Plastic Package
Lead Finish—Hot Solder DIP

Common Dimensions	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
A_1	0.020	0.040	0.020	0.040	0.020	0.040	0.020	0.040	0.020	0.040
A	0.125	0.145	0.125	0.145	0.125	0.145	0.125	0.145	0.125	0.145
B	0.016	0.020	0.016	0.020	0.016	0.020	0.016	0.020	0.015	0.021
B_1	0.050	0.070	0.050	0.070	0.050	0.070	0.050	0.070	0.050	0.070
C	0.008	0.012	0.008	0.012	0.008	0.012	0.008	0.012	0.008	0.012
D	0.350	0.385	0.745	0.755	0.745	0.755	0.875	0.905	0.925	1.045
E	0.295	0.320	0.295	0.320	0.295	0.320	0.295	0.320	0.295	0.320
E_1	0.245	0.255	0.245	0.255	0.245	0.255	0.245	0.255	0.245	0.255
e	0.100 Typ		0.100 Typ		0.100 Typ		0.100 Typ		0.100 Typ	
e_A	0.300 Ref		0.300 Ref		0.300 Ref		0.300 Ref		0.300 Ref	
L	0.115	0.135	0.115	0.135	0.115	0.135	0.115	0.135	0.115	0.135
N	8		14		16		18		20	

Note: Package outline exclusive of any mold flashes. Mold flash protrusion shall not exceed 0.006″ on any side.