## High Speed, Monolithic Pin Driver

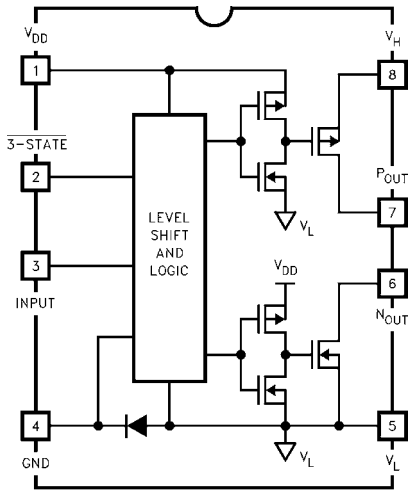
élantec

The EL7154 3-state pin driver is particularly well suited for ATE and level shifting applications. The 4A peak drive capability, makes the EL7154 an excellent choice when driving high speed capacitive lines.

The p-channel MOSFET is completely isolated from the power supply, providing a high degree of flexibility. Pin (7) can be grounded, and the output can be taken from pin (8) when a “source follower” output is desired. Then n-channel MOSFET has an isolated drain, but shares a common bus with pre-drivers and level shifter circuits. This is necessary to ensure that the nchannel device can turn off effectively when $V_L$ goes below GND. In some power-FET and IGBT applications, negative drive is desirable to insure effective turn-off. The EL7154 can be used in these applications by returning $V_L$ to a moderate negative potential.

## Pinout

**EL7154**
**(8-PIN PDIP, SOIC)**
TOP VIEW




## Truth Table

| 3-STATE | INPUT | $P_{OUT}$ | $N_{OUT}$ |
|---|---|---|---|
| 0 | 0 | Open | Open |
| 0 | 1 | Open | Open |
| 1 | 0 | HIGH | Open |
| 1 | 1 | Open | LOW |

Manufactured under U.S. Patent Nos. 5,334,883, #5,341,047, #5,352,578, #5,352,389, #5,351,012, #5,374,898

## Features

- Comparatively low cost
- 3-State output
- 3V and 5V Input compatible
- Clocking speeds up to 10MHz
- 20ns Switching/delay time
- 4A Peak drive
- Isolated drains
- Low output impedance—2.5Ω
- Low quiescent current—5mA
- Wide operating voltage—4.5V–16V
- Isolated P-channel device
- Separate ground and $V_L$ pins

## Applications

- Loaded circuit board testers
- Digital testers
- Level shifting below GND
- IGBT drivers
- CCD drivers

## Ordering Information

| PART NUMBER | TEMP. RANGE | PACKAGE | PKG. NO. |
|---|---|---|---|
| EL7154CN | -40°C to +85°C | 8-Pin PDIP | MDP0031 |
| EL7154CS | -40°C to +85°C | 8-Pin SOIC | MDP0027 |

## Nominal Operating Voltage Range

| PIN | MIN | MAX |
|---|---|---|
| $V_L$ | -3 | 0 |
| $V_{DD}–V_L$ | 5 | 15 |
| $V_H–V_L$ | 2 | 15 |
| $V_{DD}–V_H$ | -0.5 | 15 |
| $V_{DD}$ | 5 | 15 |

## Absolute Maximum Ratings ($T_A$ = 25°C)

Supply ($V_{DD}$ to $V_L$; $V_H$–$V_L$, $V_H$ to GND),
V+ to $V_H$ . . . . . 16.5V
$V_L$ to GND . . . . . -5V
Input Pins . . . . . -0.3V below $V_L$ to +0.3V above $V_{DD}$
Peak Output Current . . . . . 4A

Storage Temperature Range . . . . . -65°C to +150°C
Ambient Operating Temperature . . . . . -40°C to +85°C
Operating Junction Temperature . . . . . 125°C
Power Dissipation
SOIC . . . . . 570mW
PDIP . . . . . 1050mW

*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°C, $V_{DD}$ = +12V, $V_H$ = +12V, $V_L$ = -3V, unless otherwise specified

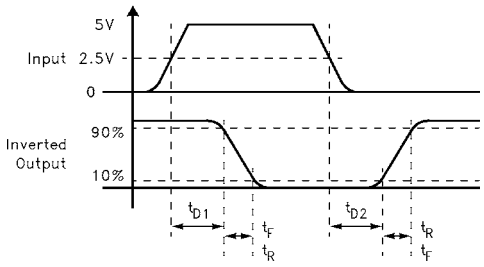
| PARAMETER | DESCRIPTION | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| **INPUT** | | | | | | |
| $V_{IH}$ | Logic "1" Input Voltage | | 2.4 | | | V |
| $I_{IH}$ | Logic "1" Input Current | $V_{IH} = V_{DD}$ | | 0.1 | 10 | µA |
| $V_{IL}$ | Logic "0" Input Voltage | | | | 0.6 | V |
| $I_{IL}$ | Logic "0" Input Current | $V_{IL}$ = 0V | | 0.1 | 10 | µA |
| $V_{HVS}$ | Input Hysteresis | | | 0.3 | | V |
| **OUTPUT** | | | | | | |
| $R_{OH}$ | Pull-Up Resistance | $I_{OUT}$ = -100mA | | 1.5 | 4 | Ω |
| $R_{OL}$ | Pull-Down Resistance | $I_{OUT}$ = +100mA | | 2 | 4 | Ω |
| $I_{OUT}$ | Output Leakage Current | $V_{DD}$/GND | | 0.2 | 10 | µA |
| $I_{PK}$ | Peak Output Current | Source<br>Sink | | 4.0<br>4.0 | | A |
| $I_{DC}$ | Continuous Output Current | Source/Sink | 200 | | | mA |
| **POWER SUPPLY** | | | | | | |
| $I_S$ | Power Supply Current | Inputs = $V_{DD}$ | | 1 | 2.5 | mA |
| $V_S$ | Operating Voltage | | 4.5 | | 16 | V |
| $I_G$ | Current to GND (Pin 4) | | | 1 | 10 | µA |
| $I_H$ | Off Leakage at $V_H$ | Pin 8 = 0V | | 1 | 10 | µA |

## AC Electrical Specifications

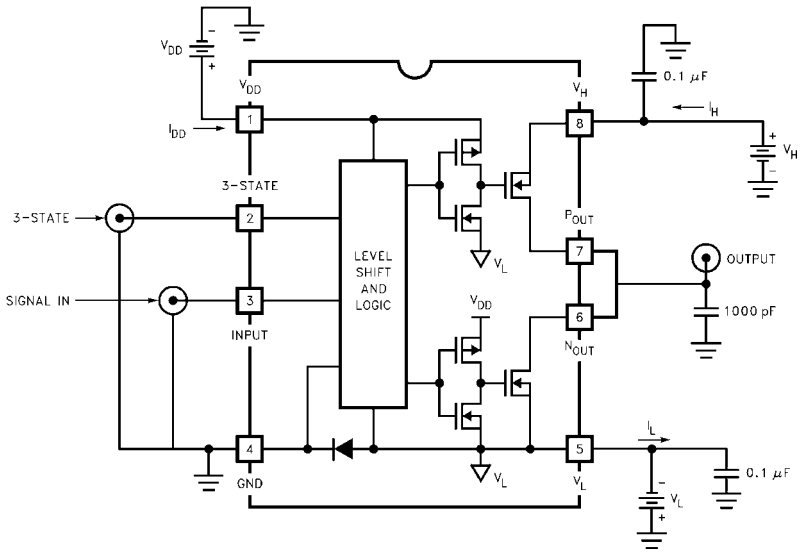
$T_A$ = 25°C unless otherwise specified

| PARAMETER | DESCRIPTION | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| **SWITCHING CHARACTERISTICS ($V_{DD}$ = $V_H$ = 12V; $V_L$ = -3V)** | | | | | | |
| $t_R$ | Rise Time | $C_L$ = 100pF | | 4 | 25 | ns |
| | | $C_L$ = 2000pF | | 20 | | |
| $t_F$ | Fall Time | $C_L$ = 100pF | | 4 | 25 | ns |
| | | $C_L$ = 2000pF | | 20 | | |
| $t_{D-1}$ | Turn-Off Delay Time | $C_L$ = 2000pF | | 20 | 25 | ns |
| $t_{D-2}$ | Turn-On Delay Time | $C_L$ = 2000pF | | 10 | 25 | ns |
| $t_{D-1}$ | 3-State Delay | | | | 25 | ns |
| $t_{D-2}$ | 3-State Delay | | | | 25 | ns |

## Timing Table

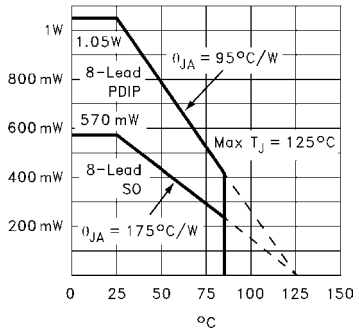



## Standard Test Configuration

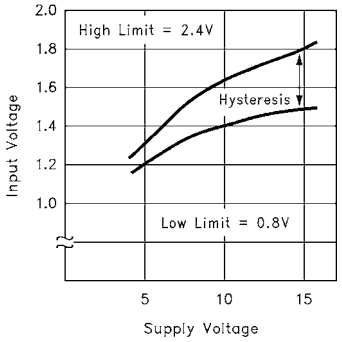


## Typical Performance Curves

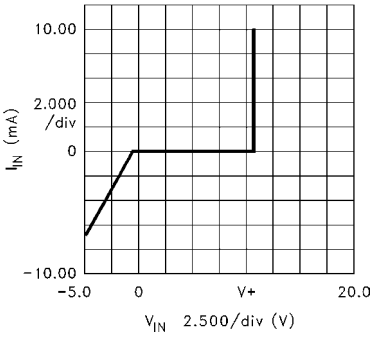
**Max Power/Derating Curves**



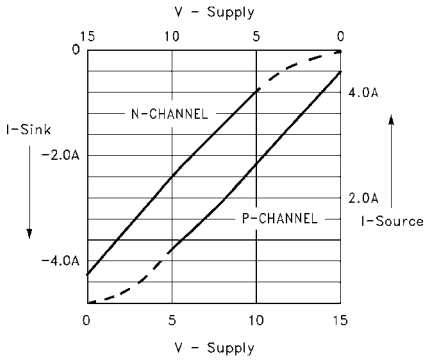

**Switch Threshold vs Supply Voltage**



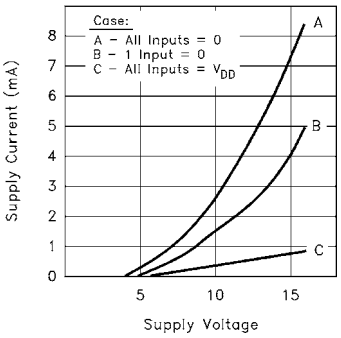

**Input Current vs Voltage**



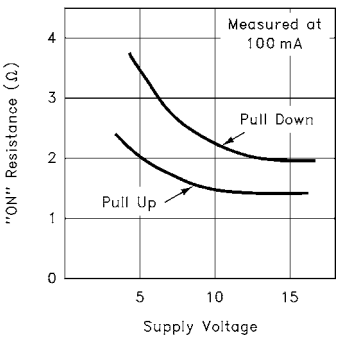

**Peak Drive vs Supply Voltage**



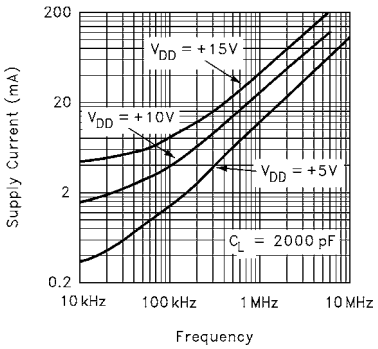

**Quiescent Supply Current**



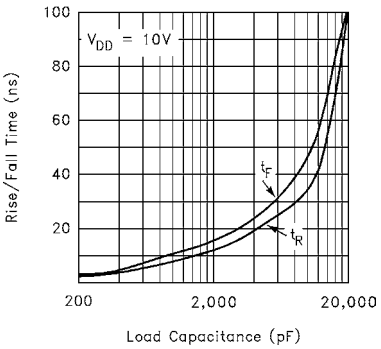

**"ON" Resistance vs Supply Voltage**




**Average Supply Current vs Voltage and Frequency**

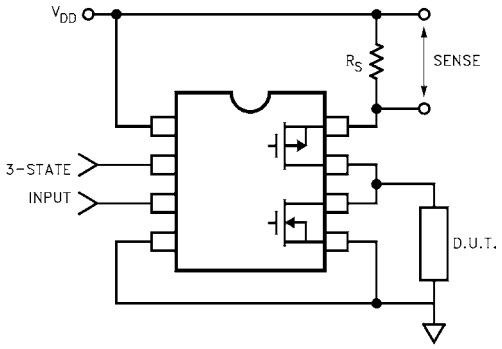



**Rise/Fall Time vs Load**

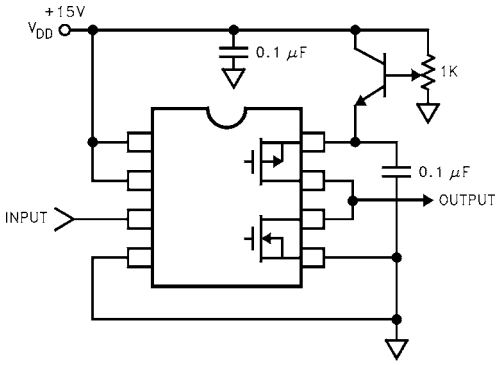


## Typical Applications

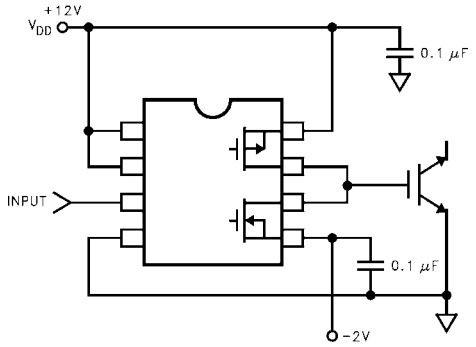
**Pin Driver**



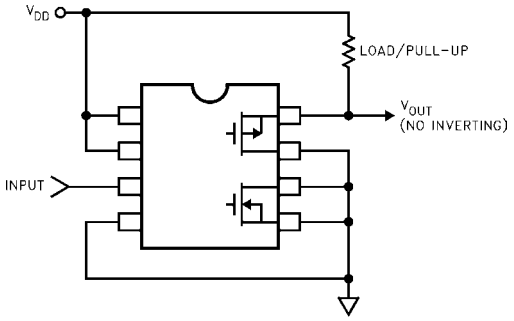

**Adjustable Amplitude Pulse Generator**



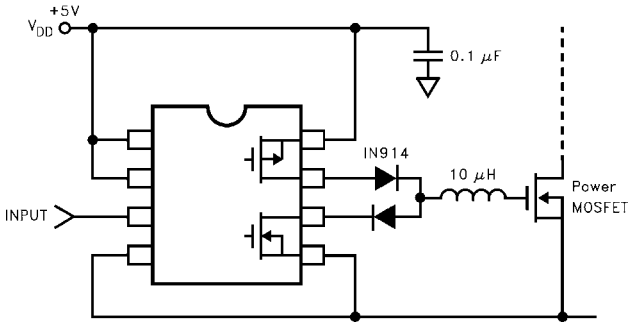

**IGBT Driver (with Negative Swing)**




**PMOS Follower**




**Resonant Gate Driver**

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