

**élantec**  
HIGH PERFORMANCE ANALOG INTEGRATED CIRCUITS

**EL7154C**

High Speed, Monolithic Pin Driver

EL7154C

## Features

- Comparatively low cost
- 3-State output
- 3V and 5V Input compatible
- Clocking speeds up to 10 MHz
- 20 ns Switching/delay time
- 4A Peak drive
- Isolated drains
- Low output impedance— $2.5\Omega$
- Low quiescent current—5 mA
- 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 No.	Temp. Range	Pkg.	Outline #
EL7154CN	-40°C to +85°C	8-Pin P-DIP	MDP0031
EL7154CS	-40°C to +85°C	8-Pin SOIC	MDP0027

## Nominal Operating Voltage Range

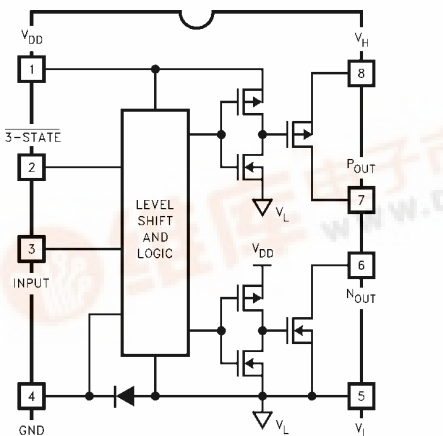
Pin	Min	Max
$V_L$	-3	0
$V_{DD}-V_L$	5	15
$V_H-V_L$	2	15
$V_{DD}-V_H$	-0.5	15
$V_{DD}$	5	15

## General Description

The EL7154C 3-state pin driver is particularly well suited for ATE and level shifting applications. The 4A peak drive capability, makes the EL7154C 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 n-channel 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.

## Connection Diagram



Top View

## Truth Table

3-State	Input	P <sub>OUT</sub>	N <sub>OUT</sub>
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

Note: All information contained in this data sheet has been carefully checked and is believed to be accurate as of the date of publication; however, this data sheet cannot be a "controlled document". Current revisions, if any, to these specifications are maintained at the factory and are available upon your request. We recommend checking the revision level before finalization of your design documentation.

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### Absolute Maximum Ratings

Supply ( $V_{DD}$ to $V_L$ ; $V_H$ – $V_L$ , $V_H$ to GND), $V+$ to $V_H$	16.5V –5V	Ambient Operating Temperature	–40°C to +85°C
$V_L$ to GND		Operating Junction Temperature	125°C
Input Pins	–0.3V below $V_L$ to +0.3V above $V_{DD}$	Power Dissipation	570 mW 1050 mW
Peak Output Current	4A	SOIC PDIP	
Storage Temperature Range	–65°C to +150°C		

#### 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 $T_A = 25^\circ\text{C}$ and QA sample tested at $T_A = 25^\circ\text{C}$ , $T_{MAX}$ 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 $T_A = 25^\circ\text{C}$ for information purposes only.

### DC Electrical Characteristics

$T_A = 25^\circ\text{C}$ ,  $V_{DD} = +12\text{V}$ ,  $V_H = +12\text{V}$ ,  $V_L = -3\text{V}$ , unless otherwise specified

Parameter	Description	Test Conditions	Min	Typ	Max	Test Level	Units
<b>Input</b>							
$V_{IH}$	Logic "1" Input Voltage		2.4			I	V
$I_{IH}$	Logic "1" Input Current	$V_{IH} = V_{DD}$		0.1	10	I	$\mu\text{A}$
$V_{IL}$	Logic "0" Input Voltage				0.6	I	V
$I_{IL}$	Logic "0" Input Current	$V_{IL} = 0\text{V}$		0.1	10	I	$\mu\text{A}$
$V_{HVS}$	Input Hysteresis			0.3		V	V
<b>Output</b>							
$R_{OH}$	Pull-Up Resistance	$I_{OUT} = -100\text{ mA}$		1.5	4	I	$\Omega$
$R_{OL}$	Pull-Down Resistance	$I_{OUT} = +100\text{ mA}$		2	4	I	$\Omega$
$I_{OUT}$	Output Leakage Current	$V_{DD}/\text{GND}$		0.2	10	I	$\mu\text{A}$
$I_{PK}$	Peak Output Current	Source Sink		4.0 4.0		V	A
$I_{DC}$	Continuous Output Current	Source/Sink	200			I	mA
<b>Power Supply</b>							
$I_S$	Power Supply Current	Inputs = $V_{DD}$		1	2.5	I	mA
$V_S$	Operating Voltage		4.5		16	I	V
$I_G$	Current to GND (Pin 4)			1	10	I	$\mu\text{A}$
$I_H$	Off Leakage at $V_H$	Pin 8 = 0V		1	10	I	$\mu\text{A}$

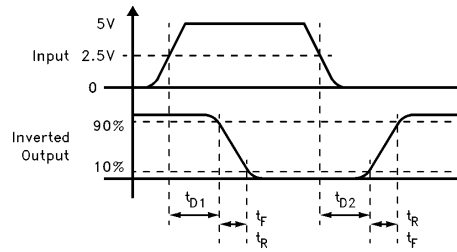
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## High Speed, Monolithic Pin Driver

### AC Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise specified

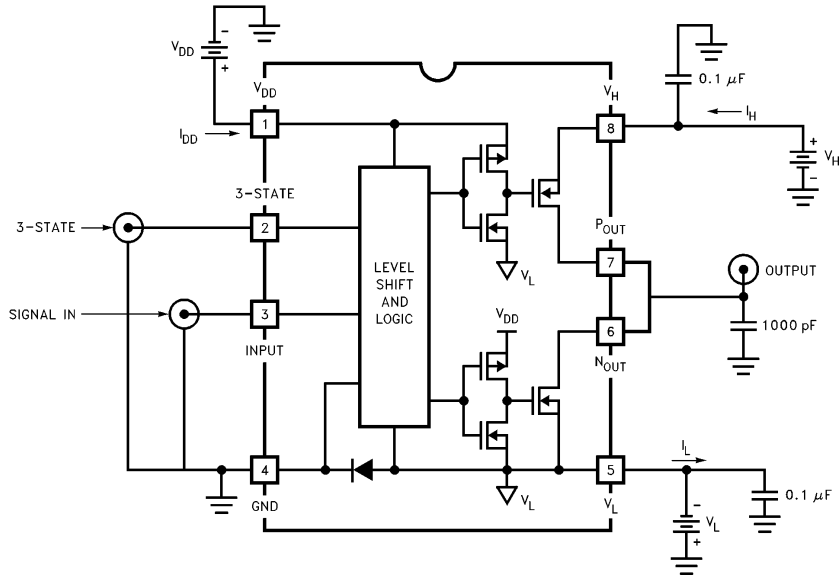
Parameter	Description	Test Conditions	Min	Typ	Max	Test Level	Units
<b>Switching Characteristics (<math>V_{DD} = V_H = 12\text{V}</math>; <math>V_L = -3\text{V}</math>)</b>							
$t_R$	Rise Time	$C_L = 100\text{ pF}$ $C_L = 2000\text{ pF}$		4 20	25	IV	ns
$t_F$	Fall Time	$C_L = 100\text{ pF}$ $C_L = 2000\text{ pF}$		4 20	25	IV	ns
$t_{D-1}$	Turn-Off Delay Time	$C_L = 2000\text{ pF}$		20	25	IV	ns
$t_{D-2}$	Turn-On Delay Time	$C_L = 2000\text{ pF}$		10	25	IV	ns
$t_{D-1}$	3-State Delay				25	IV	ns
$t_{D-2}$	3-State Delay				25	IV	ns

Timing Table



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Standard Test Configuration

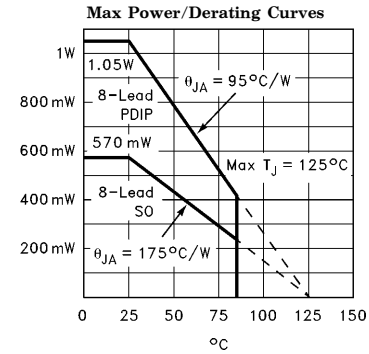


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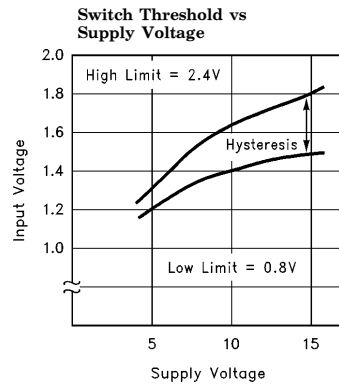
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## High Speed, Monolithic Pin Driver

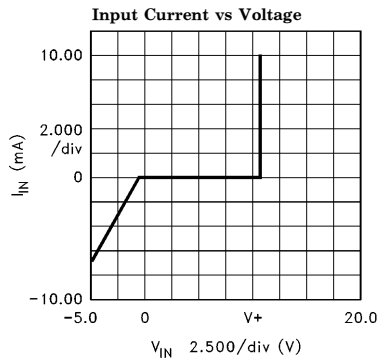
### Typical Performance Curves



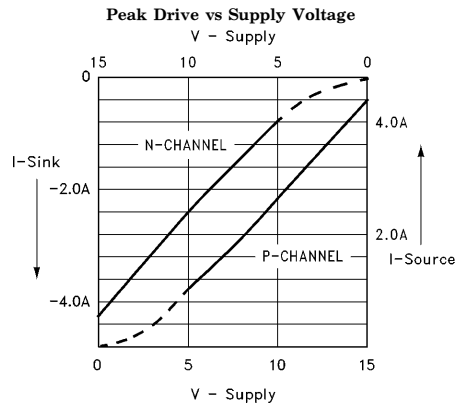
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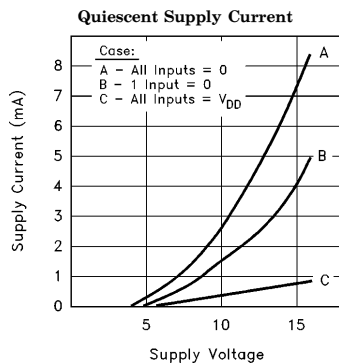
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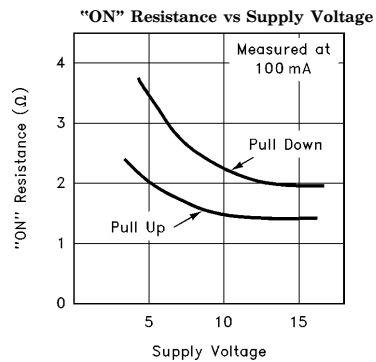
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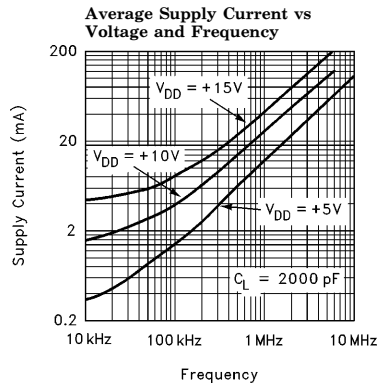


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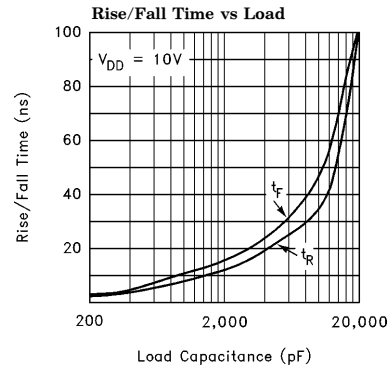
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### Typical Performance Curves — Contd.

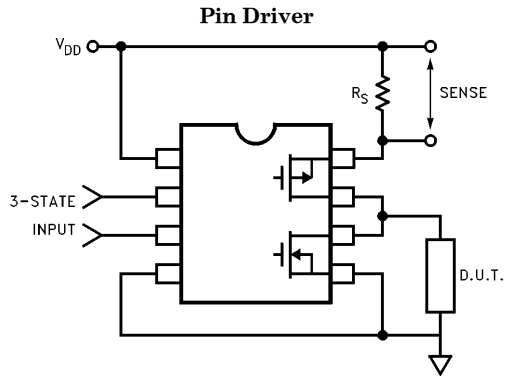


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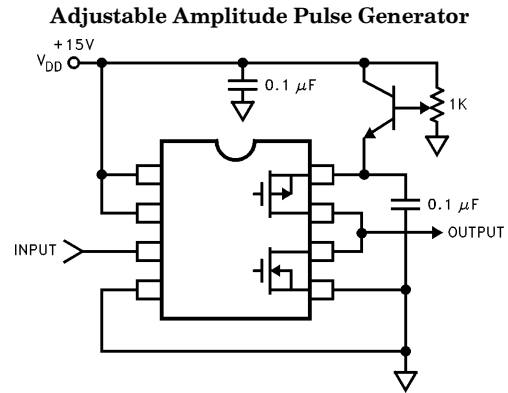


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### Typical Applications



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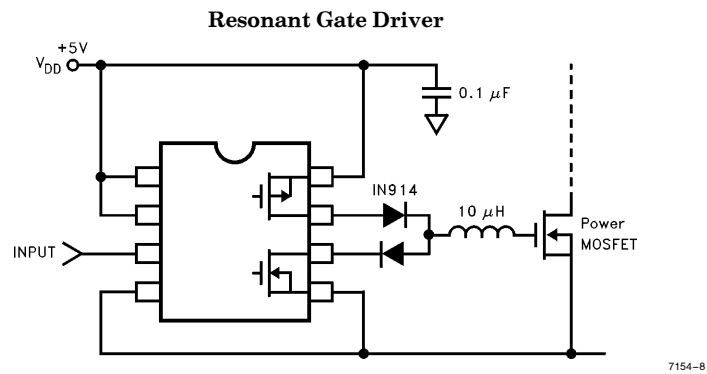
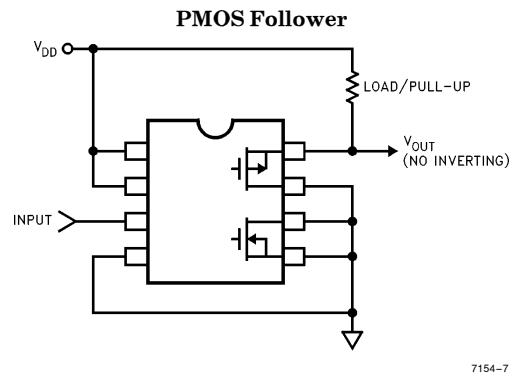
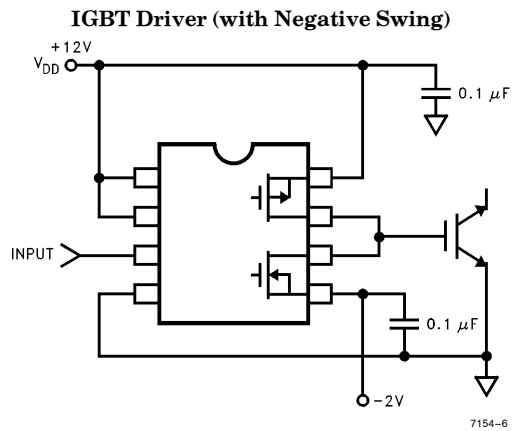


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## ***High Speed, Monolithic Pin Driver***

### **Typical Applications — Contd.**



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**EL7154C*****High Speed, Monolithic Pin Driver*****General Disclaimer**

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