élantec
HIGH PERFORMANCE ANALOG INTEGRATED CIRCUITS

EL7154C

High Speed, Monolithic Pin Driver

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—2.5Ω
- 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

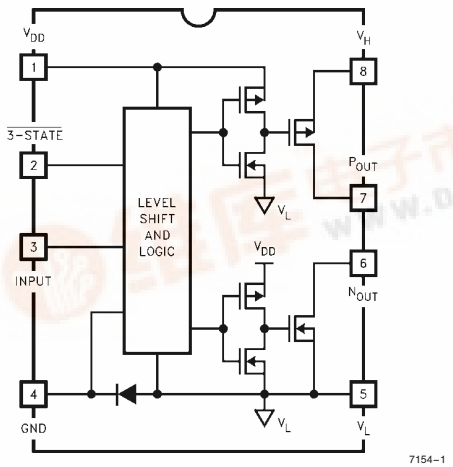
Pin	Min	Max
V_L	−3	0
V_{DD}–V_L	5	15
V_H–V_L	2	15
V_{DD}–V_H	−0.5	15
V_{DD}	5	15

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_{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

January 1996 Rev B

Absolute Maximum Ratings

Supply (V_{DD} to V_L; V_H–V_L, V_H to GND),		Ambient Operating Temperature	−40°C to +85°C
V+ to V_H	16.5V	Operating Junction Temperature	125°C
V_L to GND	−5V	Power Dissipation	
Input Pins	−0.3V below V_L to +0.3V above V_{DD}	SOIC	570 mW
		PDIP	1050 mW
Peak Output Current	4A		
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°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} = +12V, V_H = +12V, V_L = −3V, unless otherwise specified

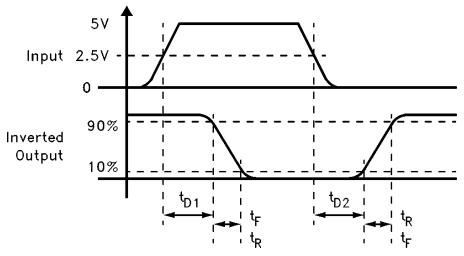
Parameter	Description	Test Conditions	Min	Typ	Max	Test Level	Units
Input							
V_{IH}	Logic "1" Input Voltage		2.4			I	V
I_{IH}	Logic "1" Input Current	$V_{IH} = V_{DD}$		0.1	10	I	µA
V_{IL}	Logic "0" Input Voltage				0.6	I	V
I_{IL}	Logic "0" Input Current	V_{IL} = 0V		0.1	10	I	µA
V_{HVS}	Input Hysteresis			0.3		V	V
Output							
R_{OH}	Pull-Up Resistance	I_{OUT} = −100 mA		1.5	4	I	Ω
R_{OL}	Pull-Down Resistance	I_{OUT} = +100 mA		2	4	I	Ω
I_{OUT}	Output Leakage Current	V_{DD}/GND		0.2	10	I	µA
I_{PK}	Peak Output Current	Source Sink		4.0 4.0		V	A
I_{DC}	Continuous Output Current	Source/Sink	200			I	mA
Power Supply							
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	µA
I_H	Off Leakage at V_H	Pin 8 = 0V		1	10	I	µA

TD is 3.6in

AC Electrical Characteristics T_A = 25°C unless otherwise specified

Parameter	Description	Test Conditions	Min	Typ	Max	Test Level	Units
Switching Characteristics (V_{DD} = V_H = 12V; V_L = −3V)							
t_R	Rise Time	C_L = 100 pF C_L = 2000 pF		4 20	25	IV	ns
t_F	Fall Time	C_L = 100 pF C_L = 2000 pF		4 20	25	IV	ns
t_{D-1}	Turn-Off Delay Time	C_L = 2000 pF		20	25	IV	ns
t_{D-2}	Turn-On Delay Time	C_L = 2000 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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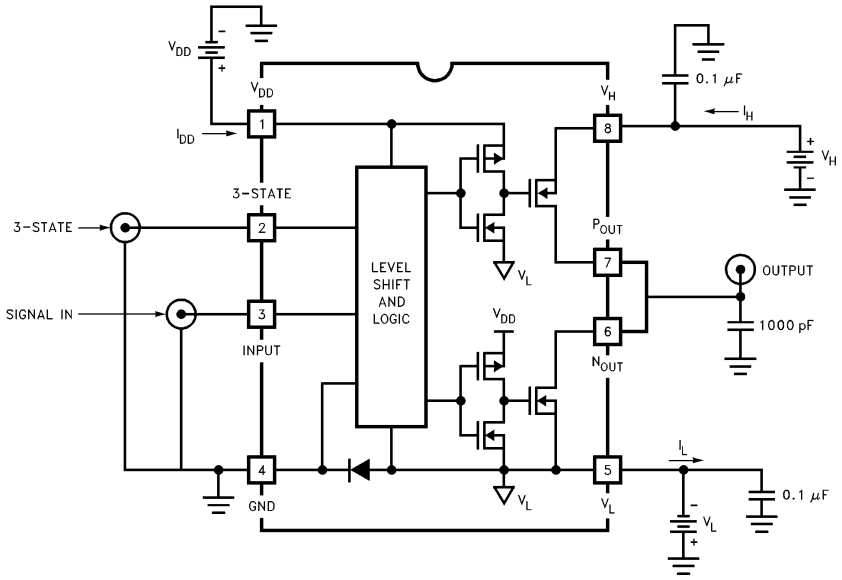
Standard Test Configuration



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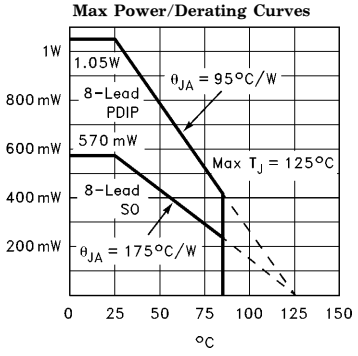
TD is 1.9in

Typical Performance Curves

Max Power/Derating Curves



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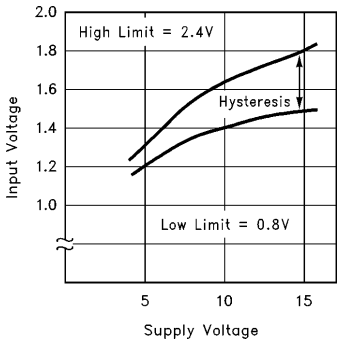
Switch Threshold vs Supply Voltage



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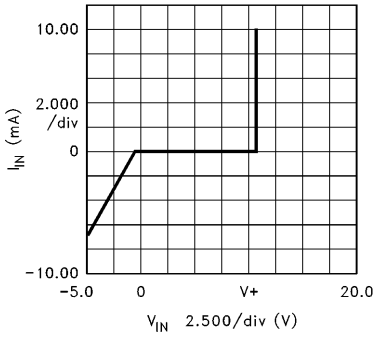
Input Current vs Voltage



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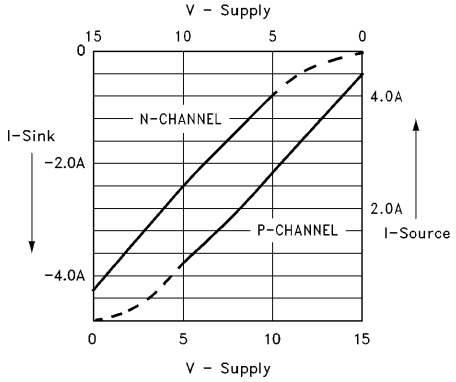
Peak Drive vs Supply Voltage



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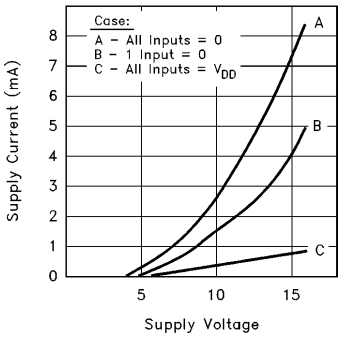
Quiescent Supply Current



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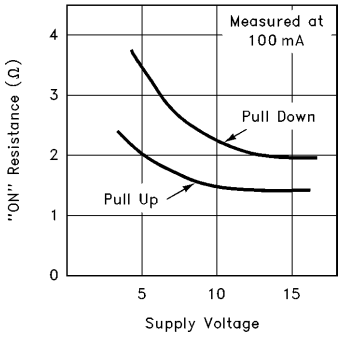
"ON" Resistance vs Supply Voltage



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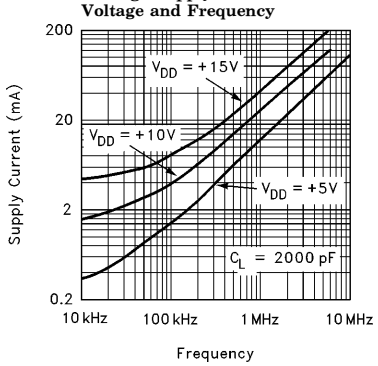
Typical Performance Curves — Contd.

Average Supply Current vs Voltage and Frequency



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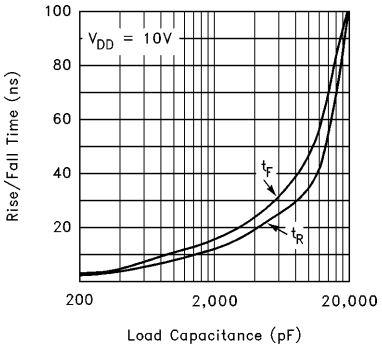
Rise/Fall Time vs Load



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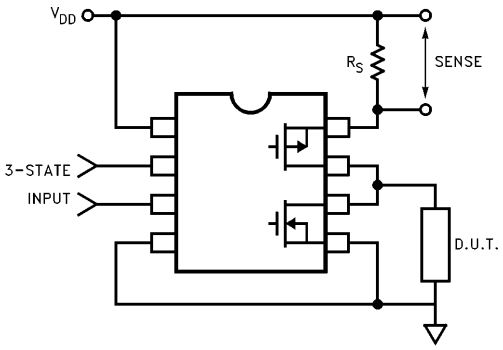
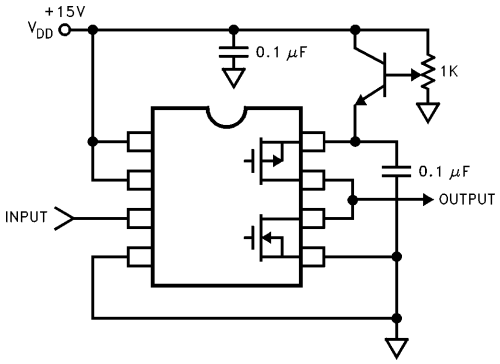
Typical Applications

Pin Driver



7154–4

Adjustable Amplitude Pulse Generator



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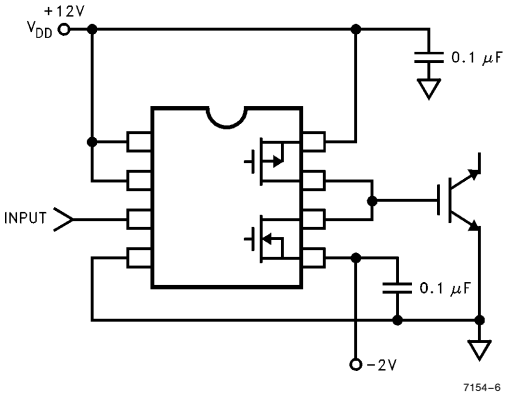
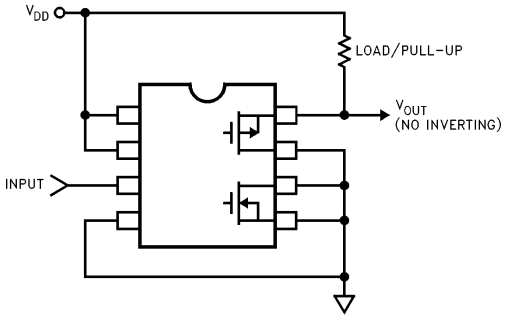
Typical Applications — Contd.

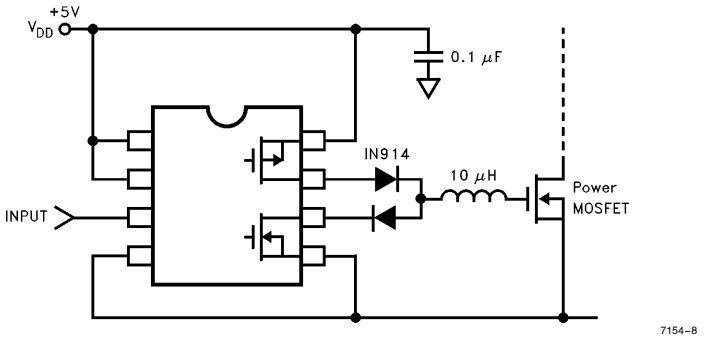
IGBT Driver (with Negative Swing)



PMOS Follower



Resonant Gate Driver



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Elantec, Inc.
1996 Tarob Court
Milpitas, CA 95035
Telephone: (408) 945-1323
(800) 333-6314
Fax: (408) 945-9305
European Office: 44-71-482-4596

January 1996 Rev B

Printed in U.S.A.