RETICON®

Application Note #127

Clock Drivers for P-series Linear Photodiode Array Imagers

Description

For driving P-series linear CCD sensors, PerkinElmer recommends the following drivers. Each driver has conditions listed with it; consult the appropriate driver datasheet for more specific information regarding use and specifications.

Table 1. Driver Matrix

	$Ø_{TG}$	$Ø_{PG}$	$Ø_{AB}$	$Ø_{H1}$	$Ø_{H2}$	$Ø_{RG}$
14µm 1 output	Vishay TelCom	Vishay TelCom	Vishay TelCom	Pericom	Pericom	Pericom ON [1]
14µm 2 output	Vishay TelCom	Vishay TelCom	Vishay TelCom	Pericom	Pericom	Pericom ON [1]
14µm 4 output	Vishay TelCom	Vishay TelCom	Vishay TelCom	Pericom Elantec	Pericom Elantec	Pericom Elantec
7µm 2 output	Vishay TelCom	Vishay TelCom	Vishay TelCom	Elantec	Elantec	Elantec
7µm 4 output	Vishay TelCom	Vishay TelCom	Vishay TelCom	Elantec	Elantec	Elantec

Note 1. When driving the 14µm 1 or 2 output sensors $Ø_{RG}$ at a 40MHz 25% duty clock cycle, use the ON Semiconductor driver only. This is due to the 6ns minimum pulse width of the Pericom driver.

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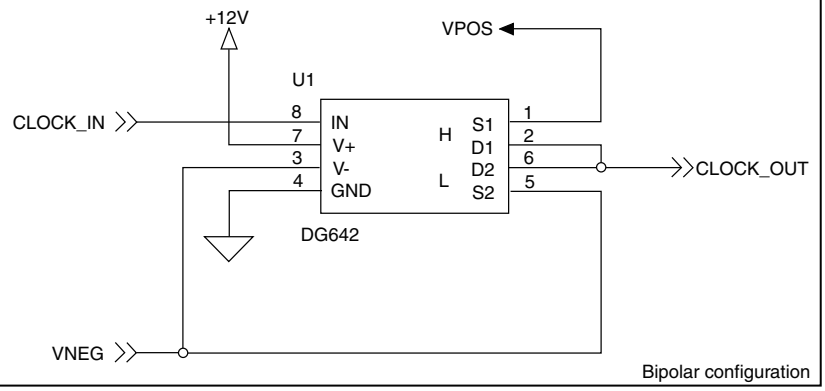
Vishay Driver Configuration

The Vishay driver is based on an analog switch (Vishay DG642). It provides bipolar clock outputs (i.e. -5V to 5V) up to 10 MHz at a 50% duty cycle clock. It is to be used on $Ø_{TG}$, $Ø_{PG}$, and $Ø_{AB}$. Unipolar clock outputs (0V to 5V) are possible if Vneg is set to GROUND. This driver can be used with all P-series sensors. This driver will use fewer components and less board space than the TelCom, but will be more expensive. The CLOCK_IN is TTL. See Figure 1 for configuration.

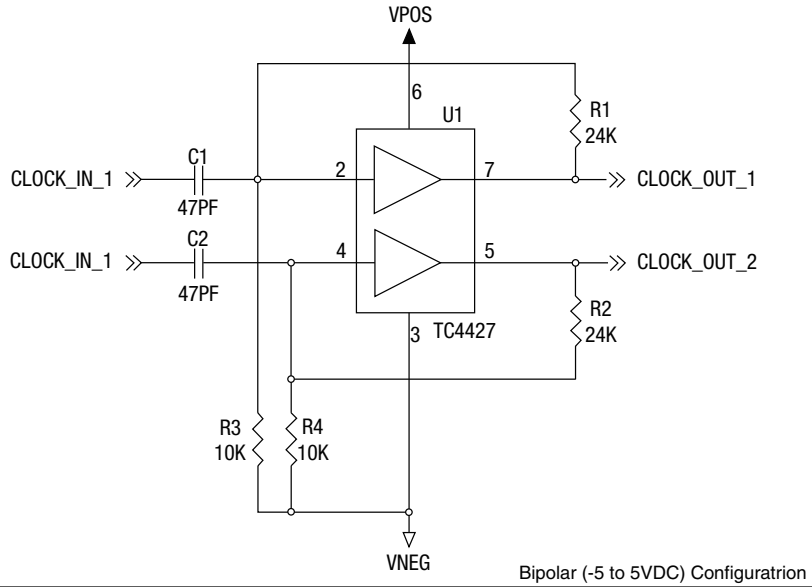
Figure 1. Vishay Driver Configuration



TelCom Driver Configuration

This TelCom driver is based on a MOSFET driver (TelCom TC4427). It provides bipolar clock outputs (i.e. -5V to 5V) up to 10 MHz at a 50% duty cycle clock. It is to be used on $Ø_{TG}$, $Ø_{PG}$, and $Ø_{AB}$. Unipolar clock outputs (0V to 5V) are possible if Vneg is set to GROUND. It has a maximum of 18V at 1.5A. This driver can be used with all P-series sensors. This driver will use more components and board space than the Vishay, but will be less costly. In unipolar configuration with TTL inputs, C1-C2 and R1-R4 are not needed. R1-R4 are selected for -5 to +5VDC output clocks. The CLOCK_IN is TTL. See Figure 2 for configuration.

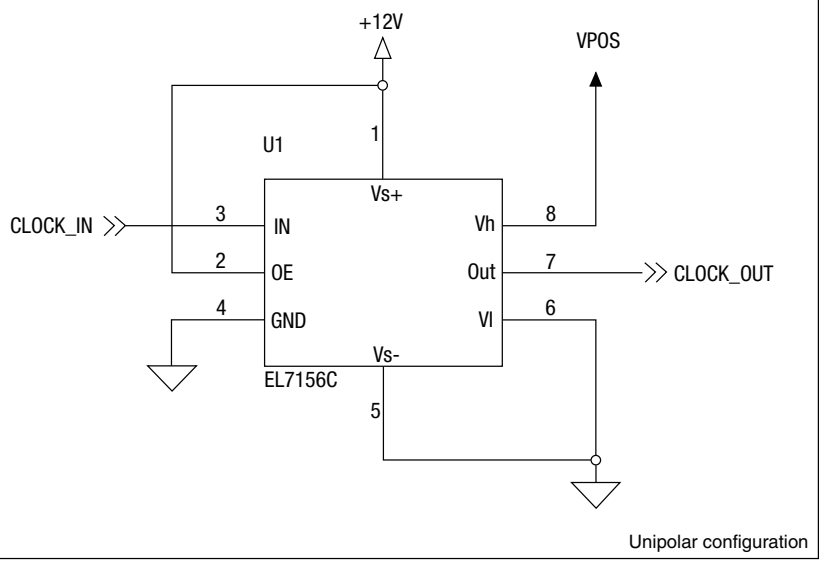
Figure 2. TelCom Driver Configuration



Elantec Driver Configuration

This driver is based on an Elantec CCD driver (EL7156). It will provide unipolar clock outputs up to a 40 MHz 50% duty cycle clock. It is used in $Ø_{H1}$, $Ø_{H2}$, and $Ø_{RG}$. Bipolar circuit configurations are also possible. The maximum voltage limit (V_{pos} - V_{neg}) is 15V. This driver is recommended for the P-series 7µm sensors, as well as the 14µm 4 output devices. The CLOCK_IN is TTL. See Figure 3 for configuration.

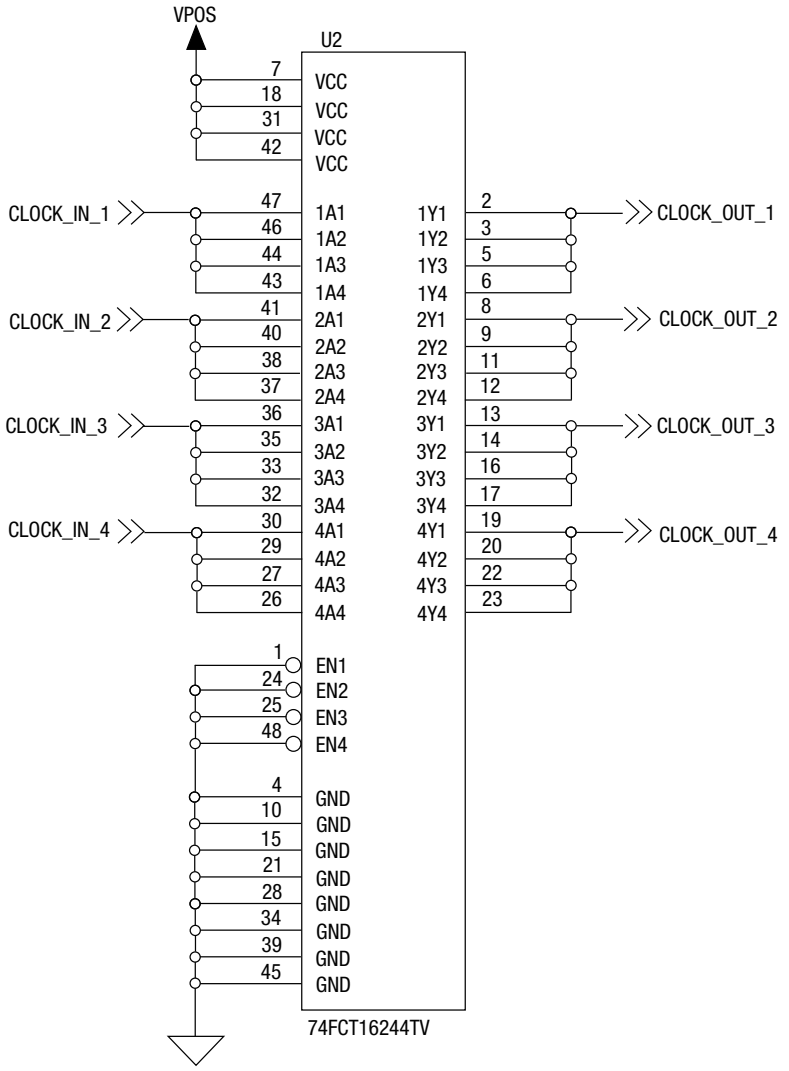
Figure 3. Elantec Driver Configuration



Pericom Driver Configuration

This driver is based on a Pericom TTL logic buffer (PI74FCT16244). It will provide unipolar clock outputs up to a 40MHz 50% duty clock cycle. It is used in $Ø_{H1}$, $Ø_{H2}$, and $Ø_{RG}$. Bipolar circuit configurations are not possible with this driver. V_{POS} is limited to 4.5V to 5.5V. This part is recommended for all P-series 14µm 1, 2, and 4 output devices. The configuration shown uses parallel outputs to increase current drive capacity. Four parallel buffers will drive an 8192 pixel sensor at 20MHz. See Figure 4 for configuration.

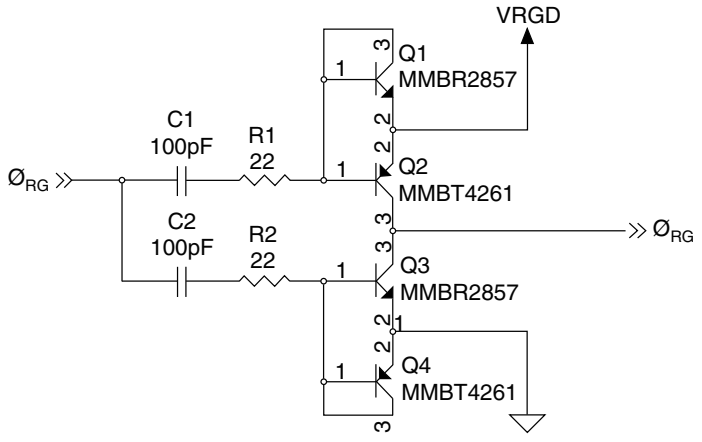
Figure 4. Pericom Driver Configuraiton



ON Semiconductor Driver Configuration

This driver is based on a matched pair of ON Semiconductor (formerly Motorola) RF switching transistors. This is to be used exclusively with the P-series 1 and 2 output sensors when driving $Ø_{RG}$ at 40 MHz. The circuit shown is a "push-pull" transistor configuration. Other RF switching transistors are possible. Q1 and Q4 can be replaced with diodes. $Ø_{RG}$ is TTL. See Figure 5 for configuration.

Figure 5. On Semiconductor Driver Configuration



ESD Warning

While P-series imagers have been designed to resist electrostatic damage (ESD), they can be damaged from such discharges. Always observer proper ESD precautions when handling and storing these imagers.

Trace Length

All drivers should be located no more than a 1 inch trace from the sensor pin. Additionally, it is recommended that faster drivers be located closer to the sensor than slower drivers. Traces should always be as short as possible.

For more information e-mail us at opto@perkinelmer.com or visit our web site at www.perkinelmer.com/opto. All values are nominal; specifications subject to change without notice.

While the information provided in this application note is intended to describe the form, fit, and function of this product, PerkinElmer reserves the right to make changes without notice. Additionally, users are cautioned to always verify the function and operation of these drivers with the manufacturer before use.

Table 2. Web Links for Data Sheets

Elantec	http://www.elantec.com
On	http://www.onsemi.com
Pericom	http://www.pericom.com
TelCom	http://www.telcom-semi.com
Vishay	http://www.Vishay.com

Table 3. Sales Offices

	North America
United States	PerkinElmer Optoelectronics 2175 Mission College Blvd. Santa Clara, CA 95054 Toll Free: 800-775-OPTO (6786) Phone: +1-408-565-0830 Fax: +1-408-565-0703
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