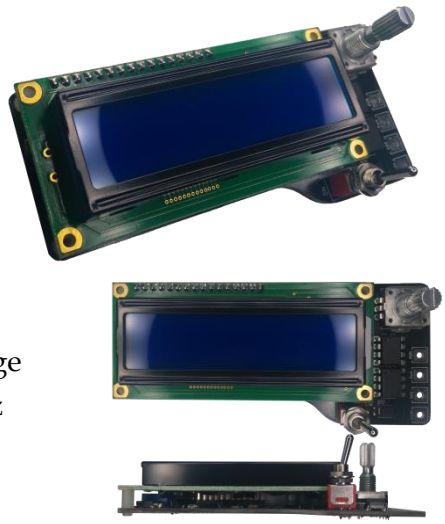
LENTARK

MOSFET / IGBT DRIVER

PS105F6A-07W21

FEATURES

- Easy-To-Use Interface.
- Wide Input Supply Voltage Operating Range: 9V-18V
- High Peak Output Current: 6A
- Low Output Impedance: 2.5Ω
- Low Output Voltage Swing: 0 – 25mV
- High Capacitive Load Drive Capability: 10.000 pF
- High-Speed Charging: 28 ns – 2.500 pF Load – 12V Charge
- Wide Output Frequency Operating Range: 4 Hz – 1 MHz
- Ramp Transition Feature: 200 ms – 25 s



APPLICATIONS

- P & N Channel MOSFET, IGBT Switching.
- H Bridge & Half Bridge Drivers.
- Switch-Mode Power Supplies.
- High Voltage Transformer and Pulse Transformer Drivers.
- Class D Switching Amplifiers.
- R, L and/or C Load Control.
- Hobby.

GENERAL DESCRIPTION

PS105F6A-07W21 is a MOSFET and IGBT gate driver device with 9-18V operating voltage and two outputs with maximum current capacity of 6A(Peak). One of the two outputs is inverted and the other is non-inverted. With Amplifier modules and driver design used in circuit board, the capacitive load on the gate terminals of MOSFETs and IGBTs quickly charges with a six-amperage peak current. (12V – 28 ns – 2.5 nF). In this way, higher current levels can be controlled without switching distortions at higher frequencies.

The control mechanism is very useful and user friendly. All the control operations are carried out with a rotary encoder at the upper right of the circuit board. Each change is saved in the internal memory of the device. For detailed information on how to use control procedures, see **Description with Image**.

DESCRIPTION WITH IMAGE

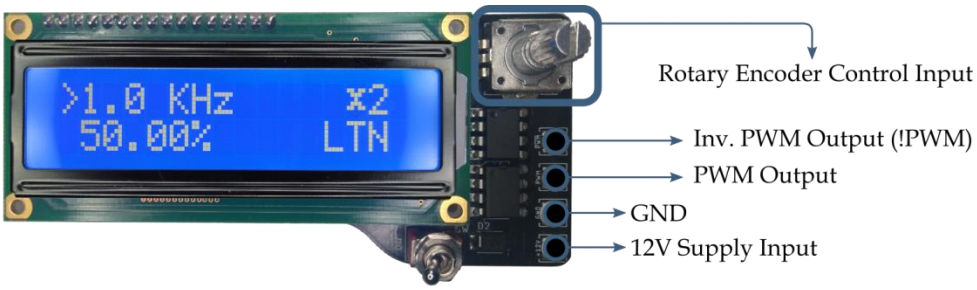
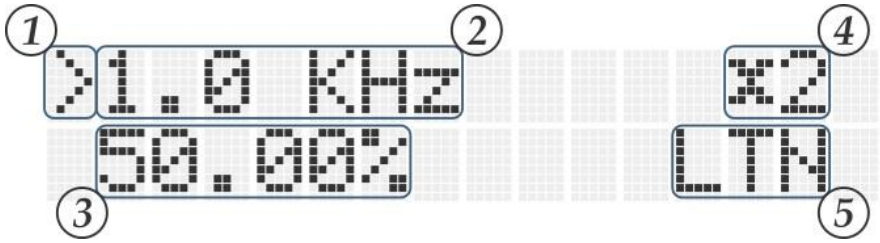


Image 1: *Display of Pin Inputs/Outputs and Control Input.*

Pin	*Description*	*Note*
Rotary Encoder Control Input	It is used to select the configuration and to change its value.	**1) Short press and release on it:** Select the next configuration. **2) Keeping it pressed for a long time [1.5 seconds]:** If the ramp transition is active, it stops. If the ramp transition is not active and the transition time is specified, it starts ramp transition. **3) Turning clockwise:** Increases the value of the selected configuration. **4) Turning counterclockwise:** Decreases the value of the selected configuration.
12V	9-18V Supply Input	Nominal 12V
GND	GND	–
!PWM Output	Inverted PWM Output.	–
PWM Output	PWM Output.	–

Table 1: *Pin Configurations*

INTRODUCING THE INDICATOR SCREEN



No.	*Description*	*Note*	
1	Cursor: Move the cursor over the value you want to change by pressing the button on the rotary encoder.	**1- Moving the cursor:** Briefly press and release the button on the rotary encoder. **2- Starting "Ramp Transition":** Press and hold the button on the rotary encoder for a long time (1.5 seconds or more). **3- Changing the value of the selected parameter:** Turn the rotary encoder clockwise or counterclockwise.	
2	Frequency Value: In the columns on the side, some examples are given for the frequency parameter on the screen.	50 Hz	635 Hz
		2.5 KHz	5.815 KHz
		10.0 KHz	200.0 KHz
3	Duty Cycle Value: In the columns on the side, some examples are given for the duty-cycle parameter on the screen.	0.00%	0.01%
		20.20%	50.00%
		85.99%	100.00%

<table>
<tr><td>4</td><td>Increase and Decrease Sensitivity:

The adjacent columns show which intervals you can select in the signal parameters for each sensitivity value to be selected.

NOTE: For detailed information about the resolution, see the “Tolerance and Resolutions” section of the Electrical Characteristics table.</td><td></td><td>Frequency Change</td><td>Duty Cycle Change</td></tr>
<tr><td></td><td></td><td>x0</td><td>1 Hz</td><td>0.01%</td></tr>
<tr><td></td><td></td><td>x1</td><td>10 Hz</td><td>0.1%</td></tr>
<tr><td></td><td></td><td>x2</td><td>100 Hz</td><td>1%</td></tr>
<tr><td></td><td></td><td>x3</td><td>1 KHz</td><td>10%</td></tr>
<tr><td></td><td></td><td>x4</td><td>10 KHz</td><td>10%</td></tr>
<tr><td></td><td></td><td>x5</td><td>100 KHz</td><td>10%</td></tr>
<tr><td>5</td><td>Operating mode:

The device has three operating modes. These;

1- INS: Every change you make is instantly processed into the signal.

2- LTN: The changes you make are processed into the signal after a short time when the angular reader is stationary.

3- 3- __._ s: It is the operating mode where you can do ramp transitions. You have to specify the total time of the ramp, the target frequency parameter and / or the duty cycle parameter. You can then start the "Ramp Transition".</td><td>INS</td><td colspan="2">INSTANT: When this operating mode is selected, changes you make to the signal parameters are instantly processed into the signal.</td></tr>
<tr><td></td><td></td><td>LTN</td><td colspan="2">LATENCY: When this operating mode selected, changes you make to the signal parameters are processed into the signal after a short time (50ms) after the angular reader is immobile.</td></tr>
<tr><td></td><td></td><td>1.2s</td><td colspan="2">With this operating mode selected, you can perform “Ramp Transition”.
The changes you make in the signal parameters are kept in memory, but the signal is not processed, these values are perceived as the targeted parameters.

The expression "1.2s" refers to the total duration of the ramp transition, which will start at your signal values and end at the values you specify as target.

You can start the “Ramp Transition” after setting target value in the frequency parameter and / or operating ratio parameter and selecting the total time. (By holding and holding the rotary encoder for a long time. See: Table 1.)</td></tr>
<tr><td></td><td></td><td colspan="3">❖ Between 0.2s and 1.5s values, you can choose at intervals of 100 milliseconds.
❖ Between 1.5s and 8.0s values, you can choose at intervals of 500 milliseconds.
❖ Between 8.0s and 15.0s values, you can choose at intervals of 1 seconds.
❖ Between 15.0s and 25.0s values, you can choose at intervals of 2.5 seconds.</td></tr>
</table>

Table 2: *Introduction of Display.*

For each change made on the Display, the device starts a series of mathematical operations and is shown on the display in 50 ms by calculating the configuration closest to the desired value to the resolution values of the device. For more information on resolution values, see **Electrical Specifications**.

Note: Each change is saved in the internal memory of the device. thus, it does not require reconfiguration on each run.
Note: You can change the display brightness with precision-tuned resistance on the left side of the circuit board below the display.

ELECTRICAL SPECIFICATIONS

∏ Pushing the device to operate above the "Max." listed in the table below may cause the device to overheat and to take up permanent damage. It is inconclusive that the device will function beyond the operating limits as set out in this technical document. Prolonged exposure to work under "maximum" rating conditions may affect device reliability.

Table 3: *Electrical Specifications.*

Conditions: Unless Otherwise Noted, $T_O = +25^oC$ and $9V \leq V_{IN} \leq 18V$.

Parameters	Sym	Min	Typ	Max	Units	Condition
Input						
Input Voltage	V_{IN}	9	12	18	V	DC
Input Current	I_{IN}	–	0.2	0.3	A	$f = 1\ KHz$
		–	0.3	0.5		$f = 1\ MHz$
Output						
Output Voltage, High	$V_{OUT,HIGH}$	$V_{IN} - 0.025$	V_{IN}	$V_{IN} + 0.025$	V	DC
Output Voltage, Low	$V_{OUT,LOW}$	0	0	0.025	V	DC
Output Resistance, High	$R_{OUT,HIGH}$	–	2.1	2.8	Ω	$V_{IN} = 18V$
Output Resistance, Low	$R_{OUT,LOW}$	–	1.5	2.5	Ω	$V_{IN} = 18V$
Peak Output Current	I_{PK}	–	6	–	A	$V_{IN} = 18V$
Latch-Up Protection Withstand Reverse Current	I_{REV}	–	>1.5	–	A	Duty: 2% $f \geq 3\ KHz$
Switching						
Rise Time	t_R	–	28	50	ns	C_L = 2.5 nF $V_{IN} = 12V$
Fall Time	t_F	–	28	50	ns	
Output Power Dissipation	W_{PD}	–	300	730	mW	**Note 1**

Tolerance & Resolution					
Parameters	**Min**	**Typ**	**Max**	**Units**	**Condition**
Frequency Tolerance	–	–	0.2	%	$4\ Hz < f_{out} < 1\ MHz$
Frequency Sensitivity	–	0.0312	–	µs	$T \geq 1\ \mu s$
Frequency Resolution (4 Hz – 1 MHz)	0.001	0.001	0.001	KHZ	$4\ Hz \leq f_{out} \leq 5\ KHz$
	0.001	0.002	0.003		$5\ KHz < f_{out} \leq 10\ KHz$
	0.003	0.02	0.076		$10\ KHz < f_{out} \leq 50\ KHz$
	0.07	0.18	0.30		$50\ KHz < f_{out} \leq 100\ KHz$
	0.3	0.5	1		$100\ KHz < f_{out} \leq 200\ KHz$
	1	5	7		$200\ KHz < f_{out} \leq 500\ KHz$
	7	10	17		$500\ KHz < f_{out} \leq 750\ KHz$
	17	20	30		$750\ KHz < f_{out} \leq MHz$
Duty Cycle Resolution (0,00 – 100,00)	0.01	–	0.01	% [percent]	$4\ Hz \leq f_{out} \leq 3.2\ KHz$
	0.01	–	0.1		$3.2\ KHz < f_{out} \leq 32\ KHz$
	0.1	–	1		$32\ KHz < f_{out} \leq 320\ KHz$
	1	–	3.125		$320\ KHz < f_{out} \leq 1\ MHz$

Note1: Power consumption is directly related to Total Gate Charge [Q_g] and Total Input Capacitance[pF] of the MOSFETs and/or IGBTs group to be controlled. See: **Figure 1, 2, 3 and 4**.

Note: Application areas with intense magnetic and electric field changes, it will be useful for both your application and device that the device and the trigger signal are not exposed to harmful effects of the environment, the surface prepared for assembly is grounded and the transmit the signal via a grounded cable.

MAXIMUM RATINGS AND SAFE OPERATION AREA

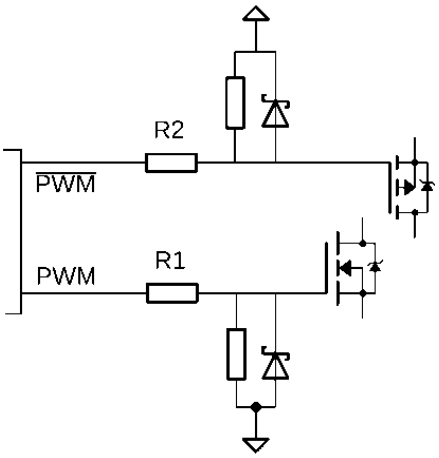


Diagram 1: *Sample Test Circuit.*

Information: The C_{iis}, Input Capacitance, mentioned in the test results presented below is the Total Input Capacitance of the MOSFETs and IGBTs used at V_{GS}=0, V_{DS}=±25V, f=1.0MHz. Q_g, Total Gate Charge, The Total Gate Charge of the MOSFETs and IGBTs used at V_{GS} =±10V, I_D=0.8I_{Dmax} V_{DS}=0.8V_{DSmax}.

Warning: MOSFETs and IGBTs that will be used in a way that does not exceed the maximum output power of the device should be placed in accordance with the mentioned characteristics **[Note1]** of the appropriate gate resistance. Operating the device outside the safe area as shown in the illustration may cause the device to overheat and to cause permanent damage.

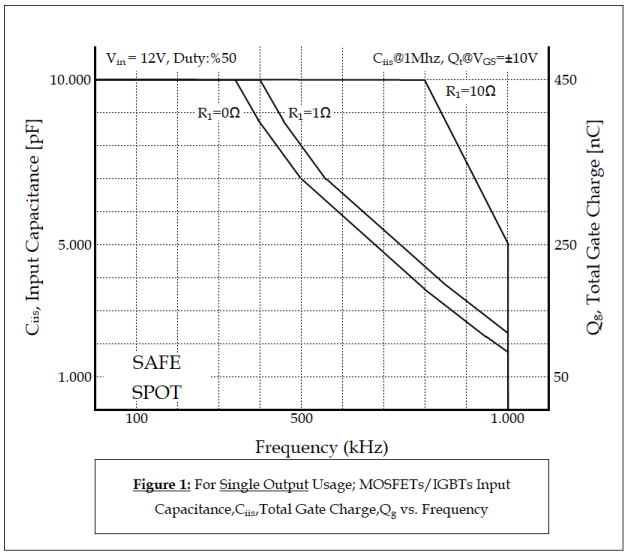


Figure 1: For Single Output Usage; MOSFETs/IGBTs Input Capacitance,C_{iis},Total Gate Charge,Q_g vs. Frequency

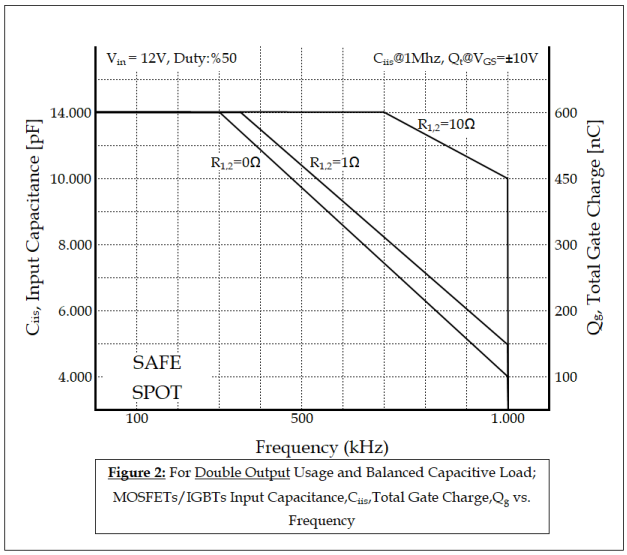


Figure 2: For Double Output Usage and Balanced Capacitive Load; MOSFETs/IGBTs Input Capacitance,C_{iis},Total Gate Charge,Q_g vs. Frequency

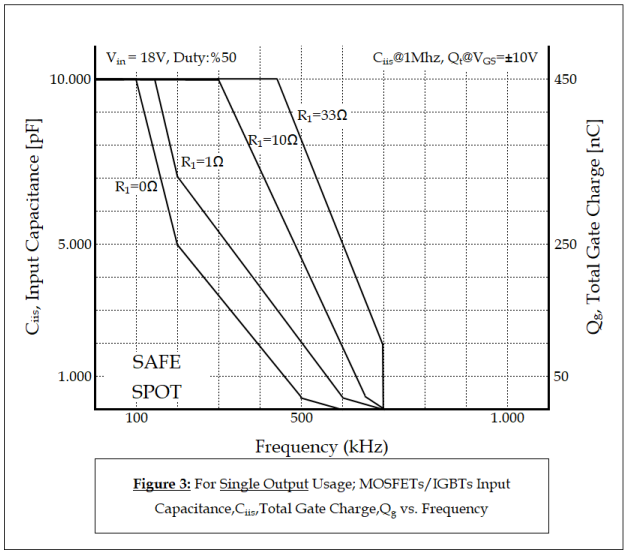


Figure 3: For Single Output Usage; MOSFETs/IGBTs Input Capacitance,C_{iis},Total Gate Charge,Q_g vs. Frequency

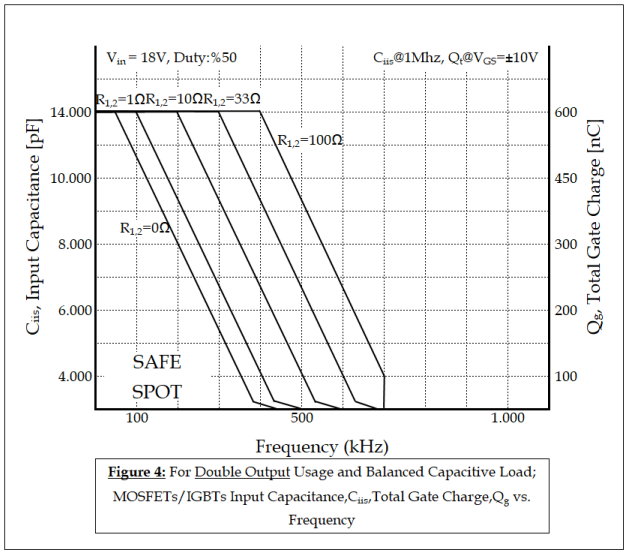


Figure 4: For Double Output Usage and Balanced Capacitive Load; MOSFETs/IGBTs Input Capacitance,C_{iis},Total Gate Charge,Q_g vs. Frequency

PRODUCT CODE

GD - P S 105F 6A - 07W 21

CATEGORY

GD : Gate Drivers
PC : Pwm-Cores
MM : Mini-Multimeters
DD : DC-DC Converters

SIGNAL TYPE P : PWM
SPWM : Sinusoidal PWM

SIGNAL CONTROL S : Frequency, Duty Cycle Control.
P : Frequency, Duty Cycle, Phase Shift Control.

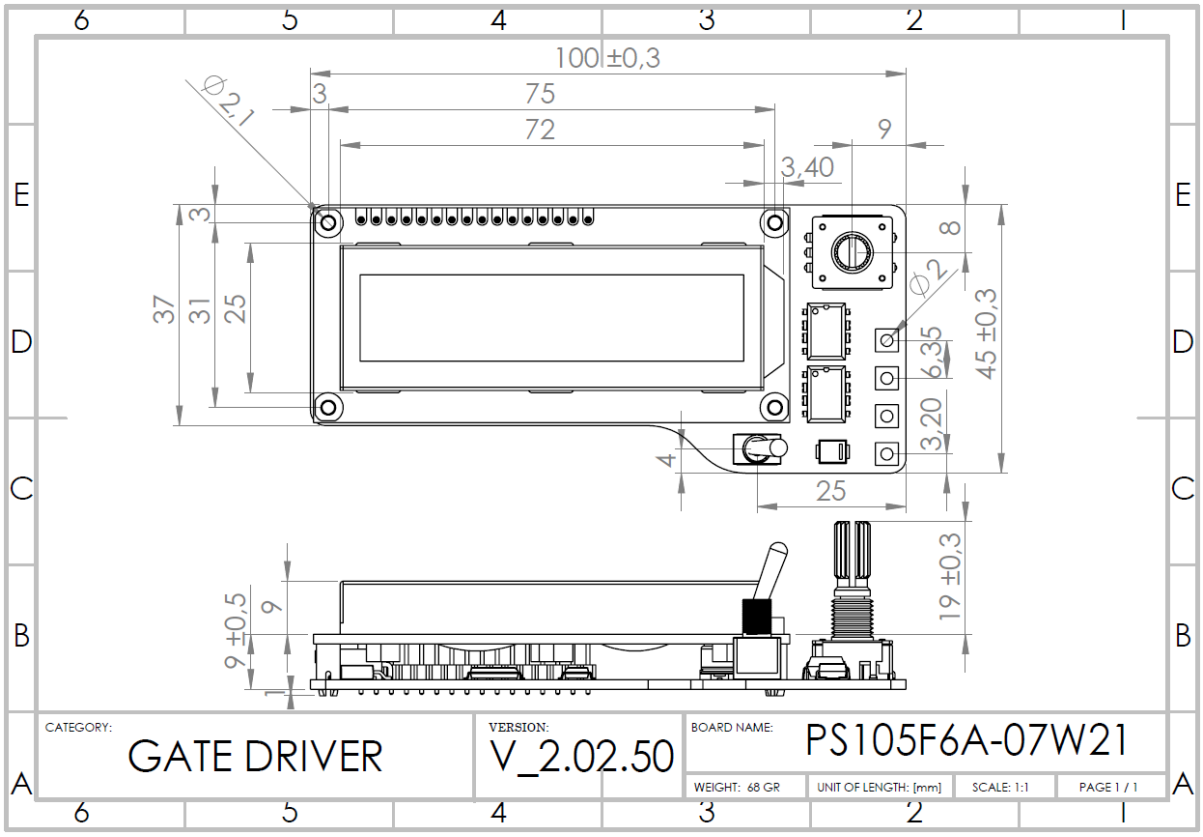
MAX. FREQUENCY xyzF = xy*10^{z} : 1 MHz Maximum Frequency.

PEAK CURRENT xA = x : 6 Amps Peak Currents For Each Outputs.

POWER DIS. xyW = x,y : 0.7 Watts For Each Outputs.

OUTPUTs xy = x : 2 Total & y : 1 Inverted Outputs.

TECHNICAL DRAWING



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