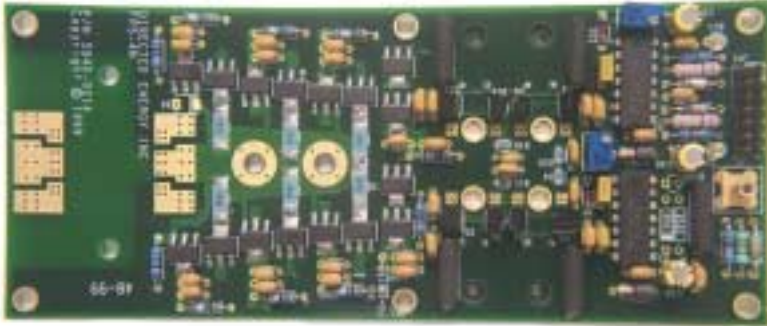


## FPS-4N DC To 28MHz Pulse Width Agile Gate Drive Module



- **High Frequency Gate Drive Module For DE-Series MOSFETs**
- **DC to 28MHz Frequency**
- **<15ns to DC Pulse Width**
- **3nS Typical Rise Time**
- **30ns Throughput Delay**

The FPS-4N Gate Drive Module is designed for use with DE-SERIES power MOSFETs. It was developed as a design tool to support the system designer in the evaluation of and prototyping using the DE-SERIES devices. It provides gate drive and MOSFET mounting, thereby freeing the designer to focus on the specifics of the system under development.

By utilizing design techniques developed by DEI, the FPS-4N can drive DE-150 and DE-275 Series MOSFETs at frequencies to 28MHz with pulse width agility from <15ns to continuous, and rise times of 3-4ns. The FPS-4N can also drive the DE-375 at frequencies to 18MHz, with comparable pulse width and switching speeds.

Provisions for heat sinking the MOSFET and a stripline drain and source interconnect topology allow the user to easily incorporate the FPS-4N driver and power MOSFET as a pulse width agile module in high speed, high power circuits such as class D and class E RF generators, high speed pulsed voltage sources and pulsed current sources.

The control gate input to the FPS4N is a TTL into 50Ω, high true logic signal. This drive is a voltage

source that is level shifted to +15V before being applied to the DE-SERIES gate. Therefore gate drive will follow the input control gate in time, with a delay (TD) as specified in the specifications section of this data sheet.

The output section provides for drain and source connections (SD1 and SD2) in a stripline topology. Mounting holes are provided at the four corners so that the PCB may be secured to a chassis, and there are two holes on either side of the device for high power mounting of the DE-Series device to a heat sink. LEDs are used as support power indicators.

A detailed discussion of the design and topology of the FPS-4N is addressed in the "Gate Driver Design For Switch Mode Applications" technical note, available for download from DEI's web site at <http://www.directedenergy.com>. For users interested in designing this circuit into their systems, the circuit board layout and fabrication package is available from DEI. Contact DEI for more information.

The FPS-4N is provided as a fully assembled and tested module. The DE-Series MOSFET is sold separately.

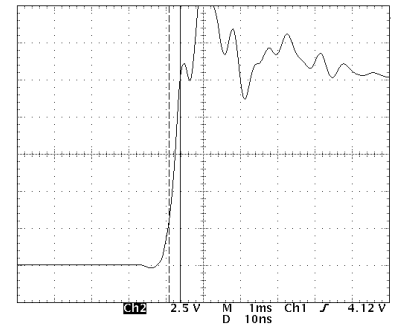


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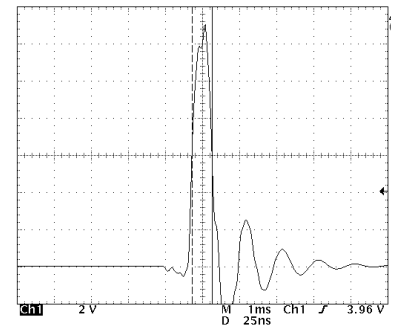
**SPECIFICATIONS** (All specifications measured into a 2000pF load (typical DE-275 MOSFET input capacitance))

PARAMETER	VALUE
<b>Output Gate Drive</b>	
Rise Time (10% to 90%)	3ns ±1ns
Max. Pulse Recurrence Frequency	28MHz driving a 2000pF load (typical DE-275 C <sub>ISS</sub> ) 19MHz driving a 3500pF load (typical DE-375 C <sub>ISS</sub> )
Pulse Width	<15ns to DC
Throughput Delay	30ns typical
Jitter	<50ps 1st Sigma
<b>Inputs</b>	
Input Control Gate	TTL into 50Ω
Support Power	+5VDC @ <0.1A +15VDC @ 0.5A (no gate drive), ~2.5A @ 13.56MHz, 2000pF load <sup>(1)</sup>
<b>General</b>	
Dimensions	6.0" (15.2cm) L x 2.5" (6.35 cm) W
Cooling	50-100CFM air flow required, depending upon frequency
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE	

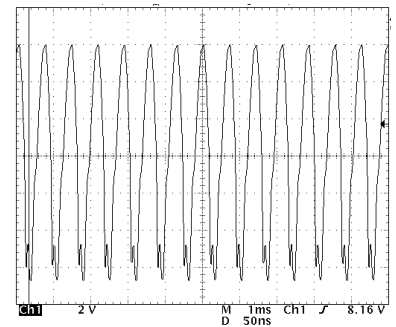
<sup>(1)</sup> +15VDC support power requirements are highly dependent on frequency and load capacitance. The +15VDC power requirements are approximated by the formula  $0.5A + CV^2F$ , where C is the input capacitance (C<sub>ISS</sub>) of the MOSFET being driven, V is the gate drive voltage (typically 15V), and F is the pulse repetition frequency.



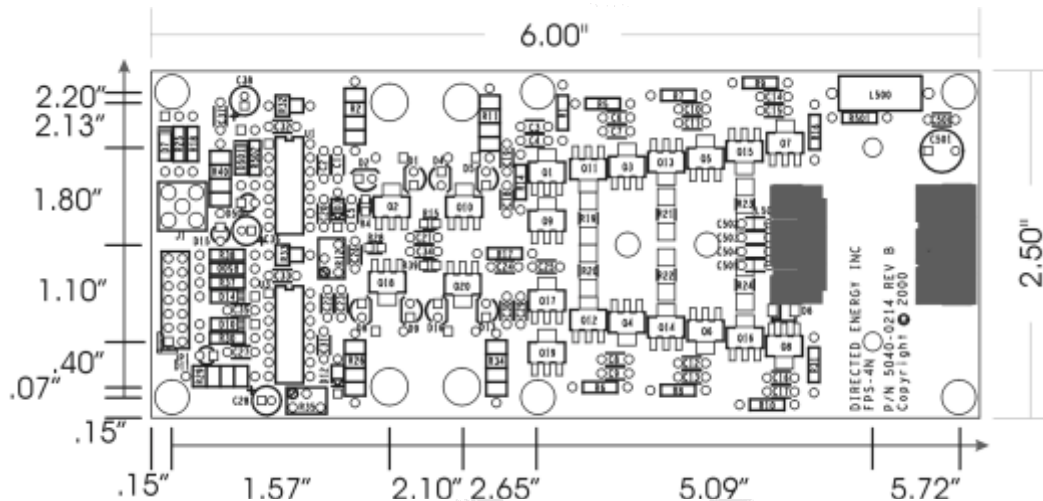
**3ns Typical Rise Time, 2000pF Load**  
(2.5V/Div Vert. Scale, 10ns/Div Horiz. Scale)



**<15ns Min. Pulse Width, 2000pF Load**  
(2V/Div Vert. Scale, 25ns/Div Horiz. Scale)



**28MHz Max. Frequency, 2000pF Load**  
(2V/Div Vert. Scale, 50ns/Div Horiz. Scale)



FPS-4N Mechanical Layout And Mounting Hole Locations

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Directed Energy, Inc.  
An IXYS Company  
2401 Research Blvd., Suite 108  
Fort Collins, CO USA 80526  
970-493-1901 Fax: 970-493-1903  
Email: deiinfo@directedenergy.com  
Web: http://www.directedenergy.com