

General Description

The EVIC420 evaluation board is a general-purpose circuit board designed to simplify the evaluation of the DEI DEIC420 gate drive IC, as well as to provide a building block for power circuit development. The DEIC420 RF-package gate driver is factory-installed in the EVIC420. The option A board enables the user to drive MOSFETs in the DEI DE-150 or DE-275 RF package types, and the Option B board driver DE-375 and DE-475 package type MOSFETs. The evaluation board design allows both the DEIC420 and the MOSFET to be attached to a heat sink, and in so doing the board assembly can be used as a ground referenced, low side power switch for both single-ended and push-pull configurations.

Figure 1 is a photograph of the EVIC420-A Evaluation Board loaded with a DEIC420 driver and a DE275-102N06A MOSFET. The low level inputs are shown on the left side of the board. J1 is a TTL high true input connected to the INA and INB pins which control the on or off state of the power switch U2. E9 is the low voltage, (8-30V) power input connected to VCC-IN of the IC, (see Figure 3 below).

For low-power configurations, the MOSFET and DEIC420 may be mounted on the top of the circuit board, as shown in Figure 1. However in this configuration, they cannot be cooled with a heatsink. For high-power applications, the DEIC420 and MOSFET are mounted on the back side of the PCB, as shown in Figure 2. In this configuration, the devices are placed in compression against a heatsink or cold plate, facilitating the very high power dissipation capability of the devices⁽¹⁾. For additional information on device power dissipation, see the DEIC420 and the appropriate MOSFET data sheets on the DEI web site at www.directedenergy.com.

Circuit Operation

The schematic diagram for the evaluation board is shown in Figure 4. The control gate (J1) is applied to R4 then on the input lead 2 of the IC U1. This signal input is followed in time by the output lead 5 of U1, which is connected to the gate of the MOSFET. Leads 1 and 3 are attached to +VCC via a de-coupling network comprised of R2 and C3 through C18. U1 leads 4 and 6 are attached to the circuit ground plane. This is the preferred arrangement of the bypassing for the Vcc input power.

The test point E7 is connected to the drain of the MOSFET. This allows the user to easily attach an oscilloscope probe and the associated ground to the circuit to verify performance.

The drain output section is designed to allow the user to install the load of choice as well as the type of high voltage bypassing. The Drain pad is labeled E7. The large pad to the right of E7 is intended for the Vds power supply connection. Surrounding the drain pad and the Vds pad is a power ground pad. In the circuit diagram this pad is labeled E4 and E8.

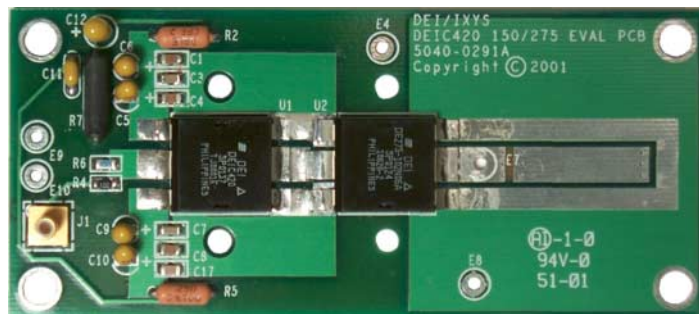


Figure 1 - EVIC420 Evaluation Board
DEI DEIC420 shown in low-power mounting configuration (see Figure 2). DE275-102N06A MOSFET installed in low-power configuration for illustration purposes only

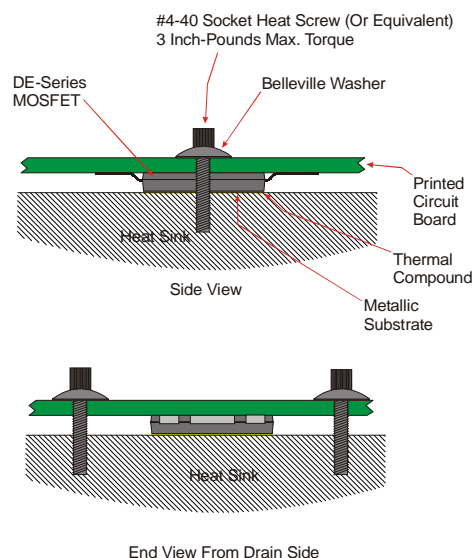


Figure 2 - EVIC420 Side Views Showing DEIC420 and DE-Series Power Devices Installed In High-Power Configurations⁽¹⁾

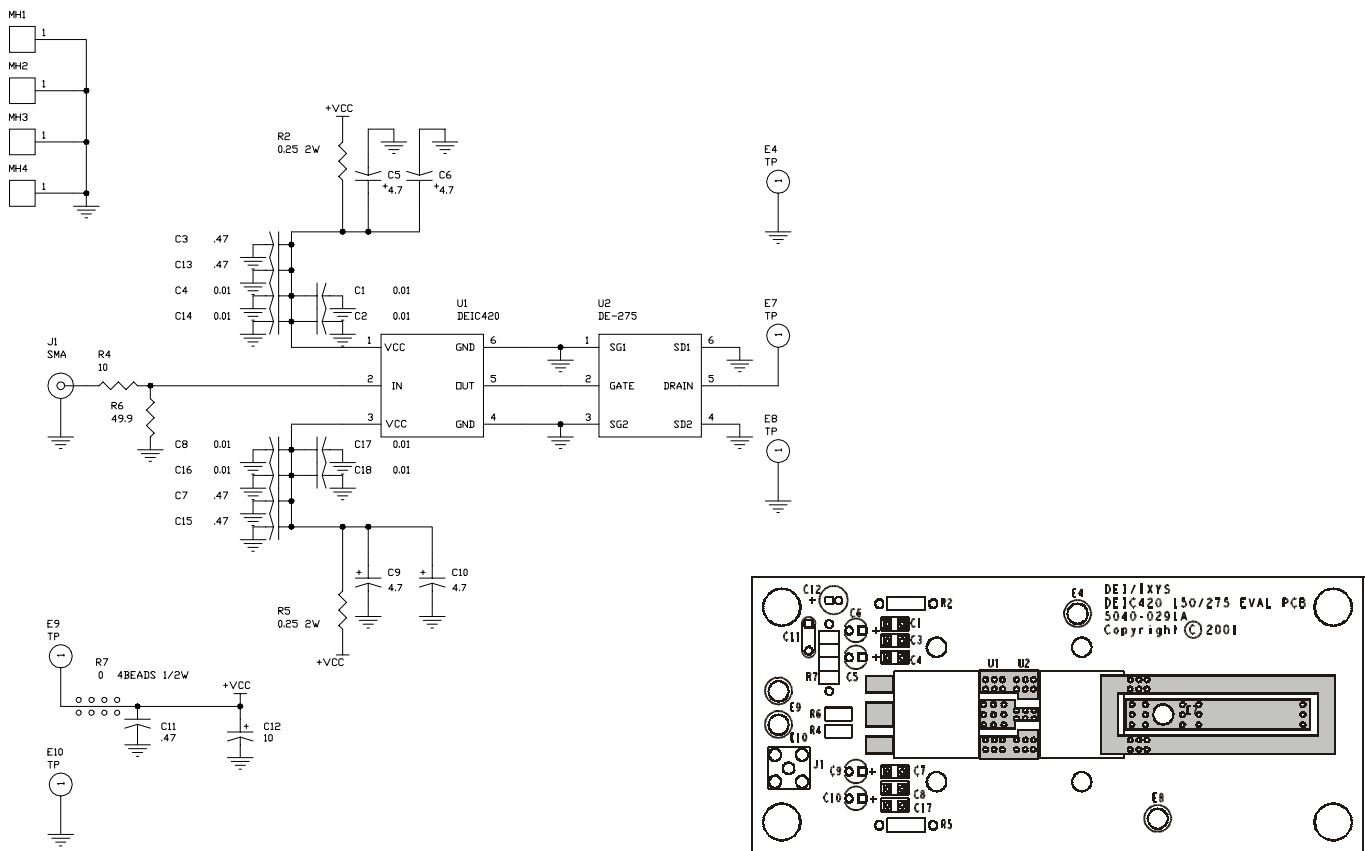
INPUT	FUNCTION
J1 (SMB)	Control Input - 3V into 1K Ohms
E4, E8, E10	Ground
E9	VCC input - 8V to 25V

Figure 3 - Input Pin-Out Table

ORDERING INFORMATION	
Part Number	Installed Device
EVIC420-A	Accommodates DEI DE-150 and DE-275 Series MOSFET Devices
EVIC420-B	Accommodates DEI DE-375 and DE-475 Series MOSFET Devices

⁽¹⁾ For additional device installation instructions, see the technical note "DE-Series MOSFET Mounting & Installation Instructions" on the DEI web site at www.directedenergy.com/apptech.htm.

Figure 4 - EVIC420 Schematic Diagram And Circuit Board Layout



NOTES: 1) The schematic shows a DE275 MOSFET, however a DEI DE-150 or DE-275 package type may be installed on the EVIC420-A, and a DE-375 or DE-475 package type may be installed on the EVIC420-B. The EVIC420 is provided without a MOSFET, so that the user can install the appropriate MOSFET for their application. DEI MOSFET data sheets are available on the DEI web site at www.directedenergy.com/Products/specs/deseries.htm.

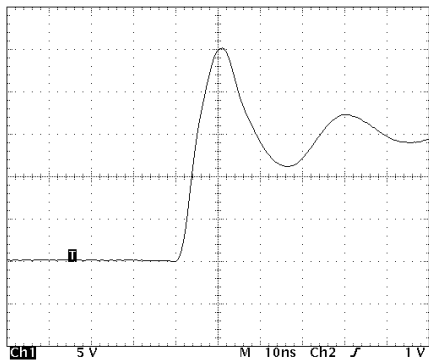


Figure 5 - EVIC420 3.0ns Gate Rise Time
 CL=1120pF

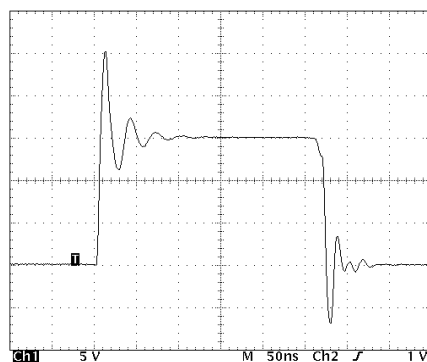


Figure 6 - EVIC420 Typical Gate Waveform
 CL=1120pF

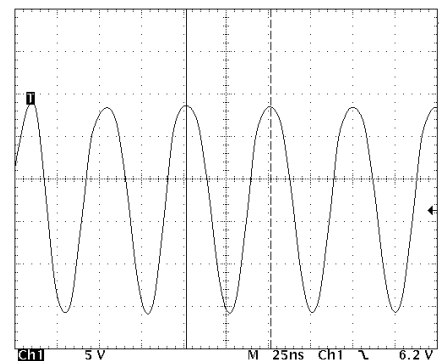


Figure 7 - EVIC420 Typical Output Waveform
 F=50MHz Burst, CL=1000pF

For additional performance data and electrical waveforms, see the DEIC420 Data Sheet on the DEI web site.

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