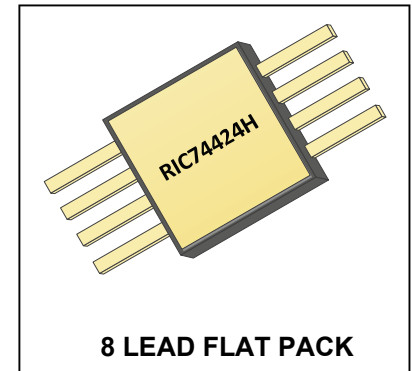


**RADIATION HARDENED
NON-INVERTING DUAL OUTPUT
MOSFET DRIVERS**



Product Summary

Part Number	Output Voltage Range	Peak Current	Typical ton/toff
RIC74424H	5 to 20V	3A	110ns/90ns

Description

The RIC7442H is part of the International Rectifier HiRel family of products. The RIC74424H is a monolithic, radiation hardened, dual high speed MOSFET driver intended for harsh radiation environments. The driver is designed specifically to drive all of IR's power MOSFETs where ultra-fast switching speed and fast propagation response time is imperative to boost the circuit efficiency. The driver is compatible with most logic devices and can be driven directly by a standard pulse width modulator such as the industry's standard 1825, 1844 and 1856 product families. The MOSFET driver is available in an 8 Lead surface-mountable Flat Pack (FP), and in die form.

The driver is designed to meet the key radiation requirements without any performance de-rating.

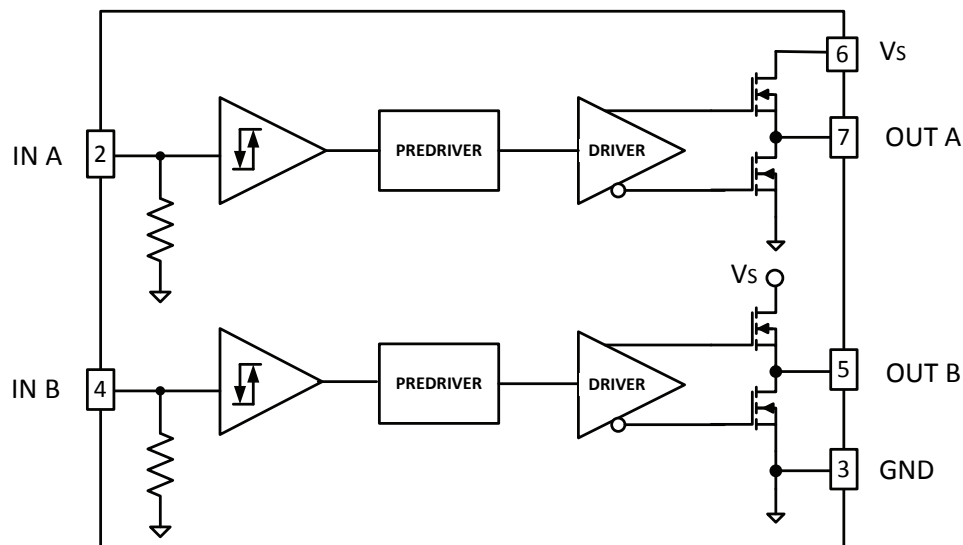
Features

- 3A Peak Drive Current
- Wide Supply Voltage Range, 5V to 20V
- Drive Voltage Compatible with MOSFET Logic Drive and Traditional Drive
- Fast Switching Speed
- Low Power Consumption
- Total Ionizing Dose (TID) 100kRads
- Single Event Phenomena. Latch-up and Upset = 82MeV.cm²/mg
- Low dose Rate (ELDRS) Characterized to 50kRads
- ESD Rating: Class 3B per MIL-STD-883, Method 3015

Applications

- Switching Power Supplies
- DC-DC Converters
- Motor Controllers

Fig 1: Functional Block Diagram



Absolute Maximum Ratings ①

Symbol	Parameter	Min	Max	Units
V_S	Supply Voltage	-0.3	20	V
V_{IN}	Input Voltage	-0.3	$V_S + 0.3$	V
I_{OPK}	Peak Output Current ② ③	—	3	A
P_D	Package Power Dissipation per Driver @ $T_A = 25^\circ\text{C}$			mW
	(based on R_{THJL}) 8 Lead FP - Single Driver On	—	312	
	(based on R_{THJL}) 8 Lead FP - Dual Drivers On	—	156	
	Package Power Dissipation per Driver @ $T_A = 25^\circ\text{C}$			W
	(based on R_{THJC}) 8 Lead FP - Single Driver On	—	10.6	
	(based on R_{THJC}) 8 Lead FP - Dual Drivers On	—	7.3	
R_{TH}	Thermal Resistance per Driver @ $T_A = 25^\circ\text{C}$			$^\circ\text{C/W}$
	(based on R_{THJL}) 8 Lead FP - Single Driver On	—	400	
	(based on R_{THJL}) 8 Lead FP - Dual Drivers On	—	800	
	Thermal Resistance per Driver @ $T_A = 25^\circ\text{C}$			
	(based on R_{THJC}) 8 Lead FP - Single Driver On	—	11.7	
	(based on R_{THJC}) 8 Lead FP - Dual Drivers On	—	17.1	
T_J	Operating Junction Temperature	-55	+150	$^\circ\text{C}$
T_S	Storage Temperature	-55	+150	
T_L	Lead Temp. (soldering, 10 sec, 0.063in (1.6mm) from case)	—	+300	
TID	Total Ionizing Dose	100	—	kRads

Recommended Operating Conditions ④

Parameter	Limits	Unit
Supply Voltage (V_S)	5 to 20	V
Input Voltage (V_{IN})	0 to V_S	
Output Voltage (V_O)	0 to V_S	
Junction Temperature Range (T_J)	-55 to +125	$^\circ\text{C}$

For Notes, refer to the page 4.

Pre and Post-Irradiation Characteristics: with $V_S = 5$ to $20V$ (unless otherwise specified) ⑤ ⑥

Parameter	Symbol	Conditions	Group A Subgroup	Limits			Unit
				Min	Typ	Max	
Input							
Logic 1 Input Voltage	V_{IH}	$V_S = 15V$	1	3.0	—	—	V
			2	3.5	—	—	
			3	2.9	—	—	
Logic 0 Input Voltage	V_{IL}	$V_S = 15V$	1	—	—	0.4	V
			2, 3	—	—	0.4	
Input Current	I_{IN1}	$V_S = 15V$ $V_{IN} = 5V$	1	—	—	10	μA
			2, 3	—	—	11	
	I_{IN2}	$V_S = 15V$ $V_{IN} = 0V$	1	—	—	5.0	
			2, 3	—	—	5.0	
	I_{IN3}	$V_S = 5V$ $V_{IN} = 0V$	1	—	—	5.0	
			2, 3	—	—	5.0	
	I_{IN4}	$V_S = 5V$ $V_{IN} = 5V$	1	—	—	10	
			2, 3	—	—	11	
Output							
High Level Output Voltage ($V_S - V_O$)	V_{OH1}	$V_S = 15V$ $I_{OH1} = 0mA$	1, 2, 3	—	—	1.3	V
Low Level Output Voltage (V_O)	V_{OL1}	$V_S = 15V$ $I_{OH1} = 0mA$	1, 2, 3	—	—	0.1	V
Switching Time							
Rise Time	t_{r1}	$V_S = 5V$ $C_L = 1nF$	9,10,11	—	50	—	ns
Fall Time	t_{f1}			—	25	—	
Turn-On Propagation Delay	t_{on1}			—	230	—	
Turn-Off Propagation Delay	t_{off1}			—	170	—	
Rise Time	t_{r2}	$V_S = 12V$ $C_L = 1nF$	9,10,11	—	25	—	
Fall Time	t_{f2}			—	15	—	
Turn-On Propagation Delay	t_{on2}			—	110	—	
Turn-Off Propagation Delay	t_{off2}			—	90	—	
Rise Time	t_{r3}	$V_S = 15V$ $C_L = 1nF$	9,10,11	—	20	—	
Fall Time	t_{f3}			—	15	—	
Turn-On Propagation Delay	t_{on3}			—	100	—	
Turn-Off Propagation Delay	t_{off3}			—	85	—	
Power Supply							
Quiescent Current	I_{QS1}	$V_S = 15V$ $V_{IN} = 0$ to $15V$	1, 2, 3	—	—	900	μA
	I_{QS2}	$V_S = 5V$ $V_{IN} = 0$ to $5V$	1, 2, 3	—	—	400	

For Notes, refer to the page 4.

Radiation Performance Characteristics

Parameter	Condition	Electrical / Functional Performance	Limit
Total Ionizing Dose (TID)	Per MIL-STD-883, Method 1019.9, Condition A (50 to 300 kRads/sec)	Within the limits as specified in Electrical Characteristics table	100 kRads minimum
Enhanced Low Dose Rate Sensitivity (ELDRS)	Per MIL-STD-883, Method 1019, Condition D (≤ 10 milli-Rads/sec)	Within the limits as specified in Electrical Characteristics table	50 kRads maximum
Single Event Phenomena (SEP) ③ ⑦	Tested per the guidelines of JESD57	No latch up or upset, no catastrophic failure	LET of 83 MeV-cm ² /mg minimum

Notes for Tables:

- ① Exceeding the absolute maximum rating may damage the device.
- ② Peak output current is limited by the package.
- ③ Guaranteed by process or design.
- ④ The device is not guaranteed to function outside the recommended operating conditions.
- ⑤ Specification for packaged part only.
- ⑥ All parameter ratings are per single driver.
- ⑦ Test performed at 0V and 20V static bias conditions as well as 20V/50kHz 50% duty cycle dynamic bias conditions.

Fig 2: Switching Time Circuit, Waveforms and Timing Definition, One Driver

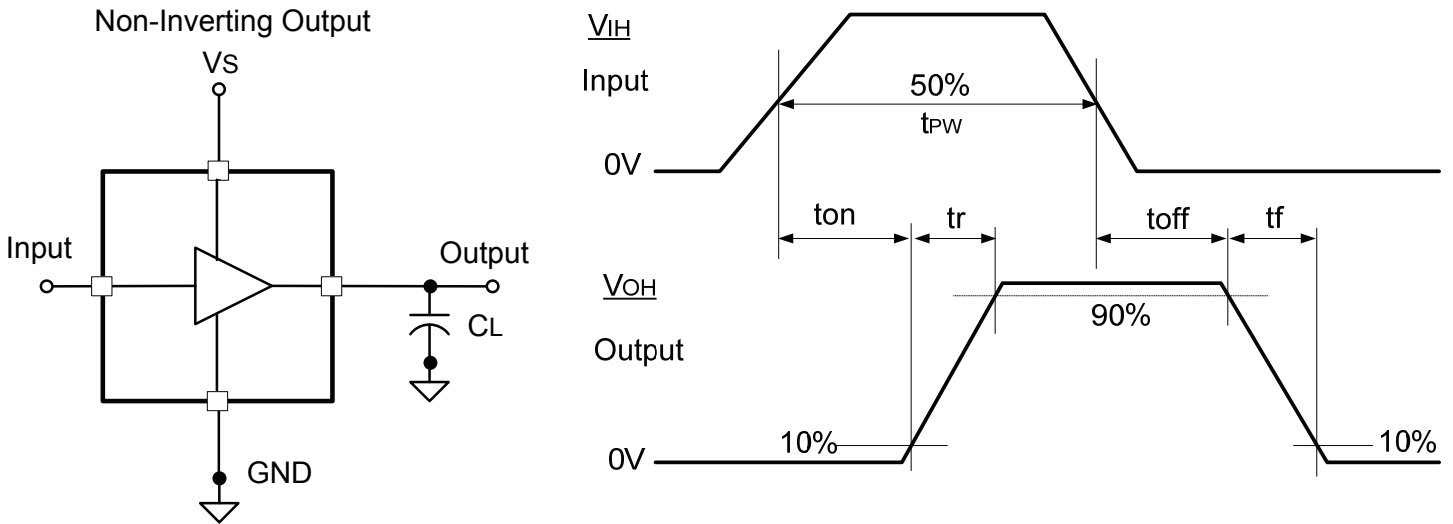
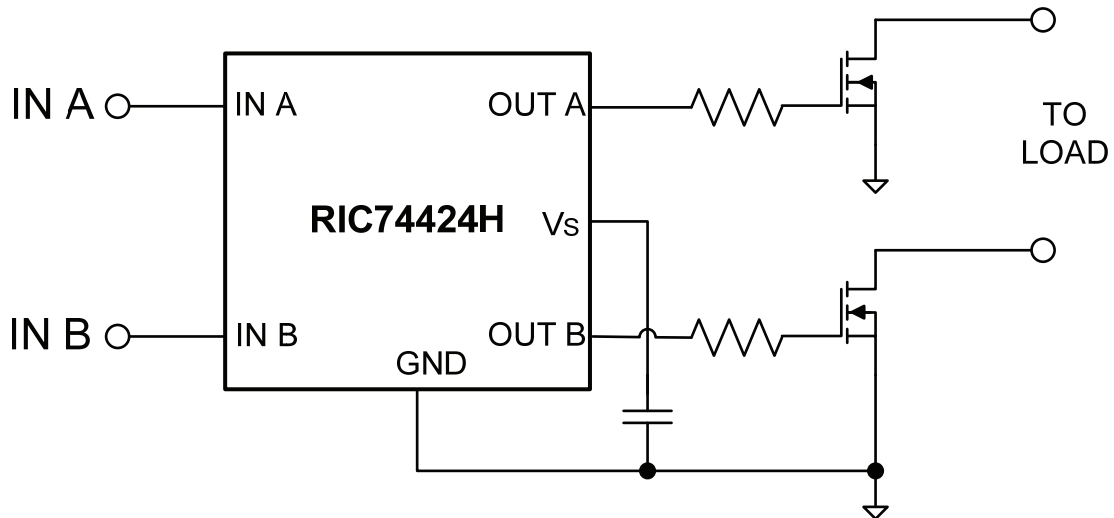
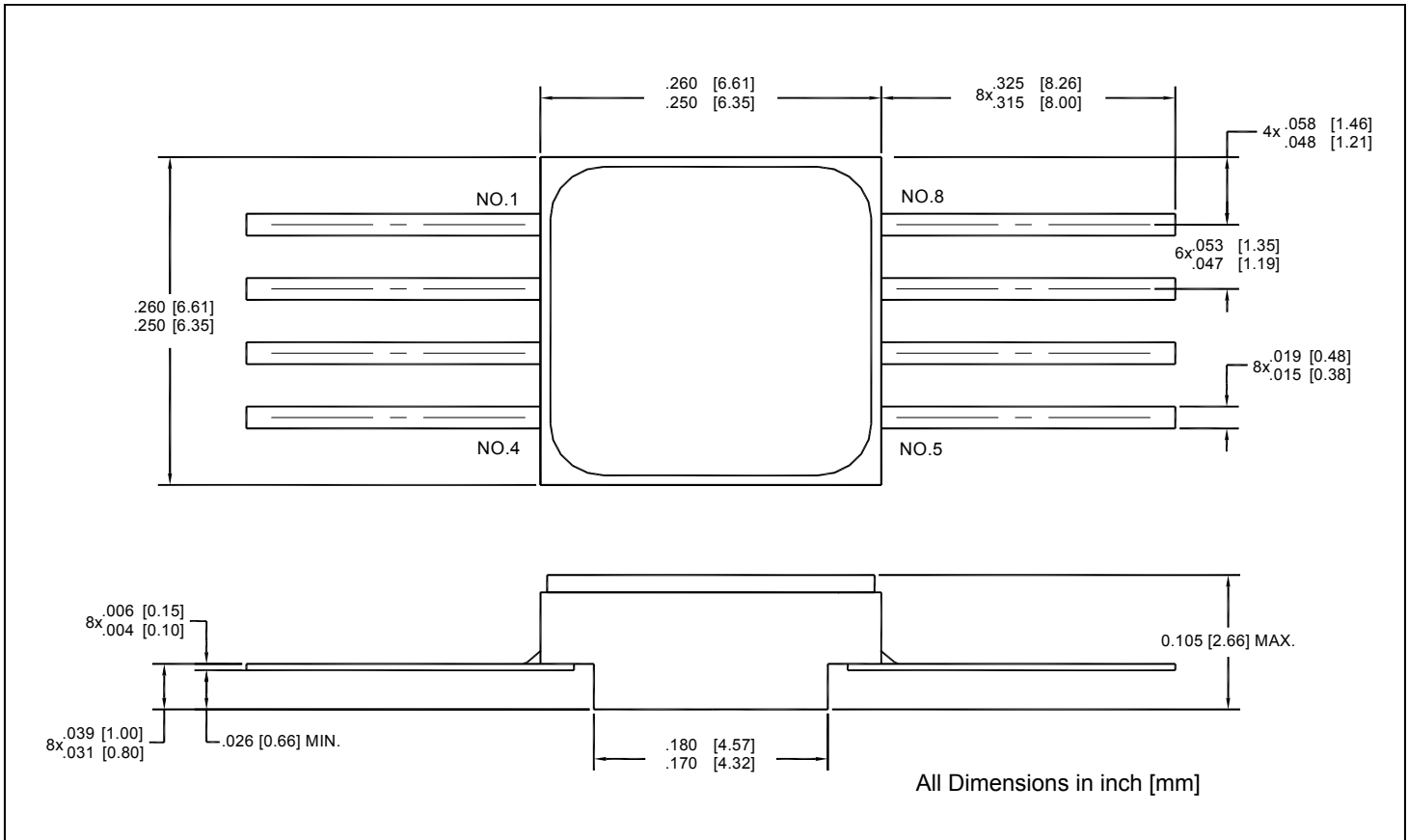


Fig 3: Typical Connections



Case Outline and Dimensions - 8 Lead Flat Pak Package

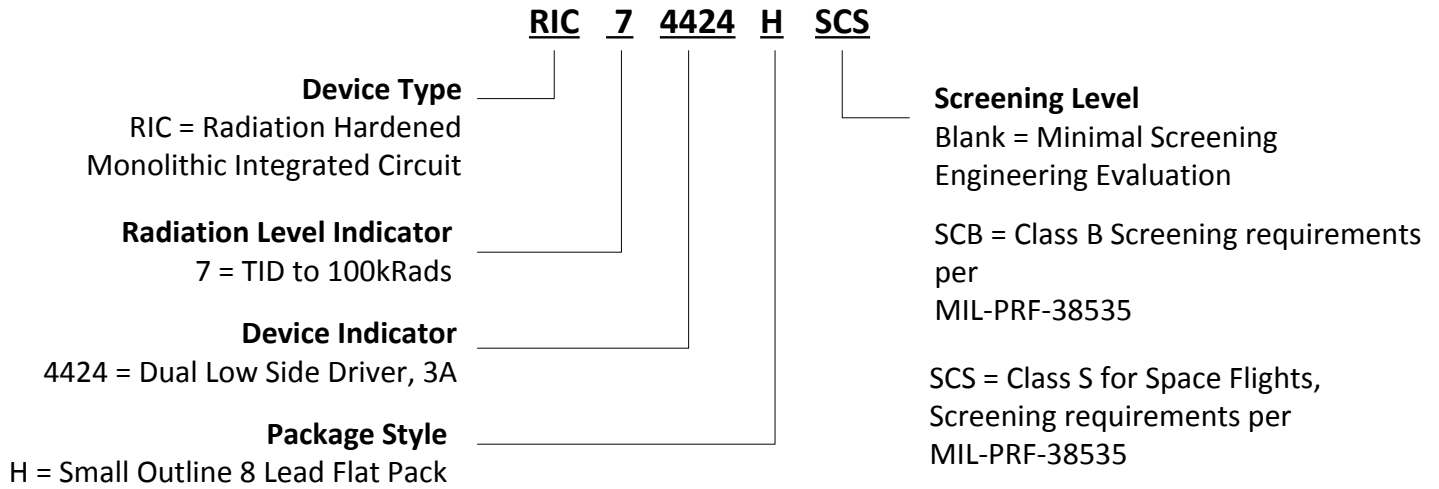


Pin Designation

Pin No.	Description	Designation
1	No Connection	NC
2	Input of Driver A	IN A
3	Supply Voltage Return	GND
4	Input of Driver B	IN B
5	Output of Driver B	OUT B
6	Supply Voltage	Vs
7	Output of Driver A	OUT A
8	No Connection	NC

Note: Refer to Fig 1. Functional Block Diagram on page 1

Part Numbering Nomenclature



IMPORTANT NOTICE

The information given in this document shall be in no event regarded as guarantee of conditions or characteristic. The data contained herein is a characterization of the component based on internal standards and is intended to demonstrate and provide guidance for typical part performance. It will require further evaluation, qualification and analysis to determine suitability in the application environment to confirm compliance to your system requirements.

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