

Automotive Grade AUIRS2003S

HALF-BRIDGE DRIVER

Features

- Floating channel designed for bootstrap operation
- Fully operational to +200V
- Tolerant to negative transient voltage, dV/dt immune
- Gate drive supply range from 10V to 20V
- Undervoltage lockout
- 3.3V, 5V, and 15V logic compatible
- Cross-conduction prevention logic
- Matched propagation delay for both channels
- Internal set deadtime
- High-side output in phase with HIN input
- Low-side output out of phase with LIN input
- Leadfree, RoHS compliant
- Automotive qualified*

Typical Applications

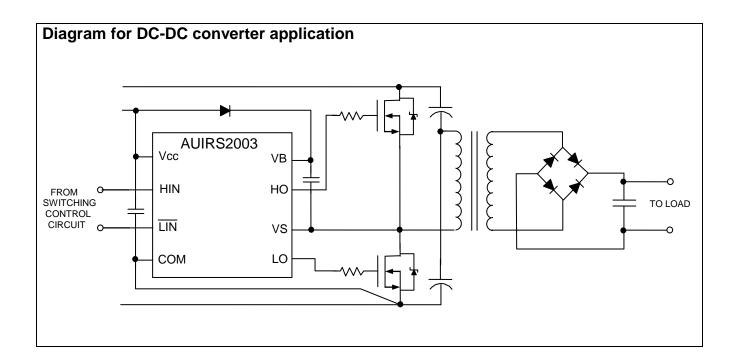
- Pre-charge Switch Drives
- Stepper / Motor Drives
- DC-DC Converters

Product Summary

Topology	General Driver		
V _{OFFSET}	≤ 200V		
V _{OUT}	10V – 20V		
I _{o+} & I _{o-} (typical)	290mA & 600mA		
t _{on} & t _{off} (typical)	680ns & 150ns		
Deadtime (typical)	520ns		

Package Options





^{*} Qualification standards can be found on IR's web site www.irf.com

AUIRS2003S



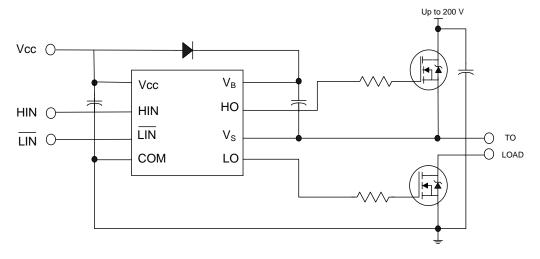
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Description

The AUIRS2003S is a high voltage, high speed power MOSFET and IGBT driver with dependent high and low side referenced output channels. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The logic input is compatible with standard CMOS or LSTTL output, down to 3.3V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver cross-conduction. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high side configuration which operates up to 200V.

Typical Connection Diagram



(Refer to Lead Assignments for correct pin configuration). This/These diagram(s) show electrical connections only. Please refer to our Application Notes and Design Tips for proper circuit board layout.



Qualification Information[†]

Qualification Level		Automotive (per AEC-Q100 ^{††})				
		Comments: This family of ICs has passed an Automotive				
		qualification. IR's Industrial ar	nd Consumer qualification level is			
		granted by extension of the high	gher Automotive level.			
Moisture Sensiti	vity I aval	SOIC8N	MSL3 ^{†††} 260°C			
Moisture Sensitivity Level		3010811	(per IPC/JEDEC J-STD-020)			
	Machine Model	Class M2				
	Macrime Model	(per AEC-Q100-003)				
ESD	Human Rady Madal	Class H2				
ESD	Human Body Model	(per AEC-Q100-002)				
	Charged Davies Madel	Class C5				
Charged Device Model		(per AEC-Q100-011)				
IO Lotale Un Toot		Class II, Level B				
IC Latch-Up Test		(per AEC-Q100-004)				
RoHS Compliant		Yes				

[†] Qualification standards can be found at International Rectifier's web site http://www.irf.com/

^{††} Exceptions to AEC-Q100 requirements are noted in the qualification report.

^{†††} Higher MSL ratings may be available for the specific package types listed here. Please contact your International Rectifier sales representative for further information.



Absolute Maximum Ratings

Absolute Maximum Ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to COM. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

Symbol	Definition	Min.	Max.	Units	
V_{B}	High side floating absolute voltage	-0.3	-0.3 225		
Vs	High side floating supply offset voltage	V _B - 25	V _B + 0.3		
V_{HO}	High side floating output voltage	V _S - 0.3	V _B + 0.3	V	
V_{CC}	Low side and logic fixed supply voltage	-0.3	25	V	
V_{LO}	Low side output voltage	-0.3	$V_{CC} + 0.3$		
V_{IN}	Logic input voltage (HIN & LIN)	-0.3	V _{CC} + 0.3		
dV _S /dt	Allowable offset supply voltage transient	_	50	V/ns	
P_{D}	Package power dissipation @ TA ≤ 25°C	_	0.625	W	
Rth_JA	Thermal resistance, junction to ambient	_	200	°C/W	
T_J	Junction temperature	_	150		
Ts	Storage temperature -55 150				
T_L	Lead temperature (soldering, 10 seconds)	_	300		

Recommended Operating Conditions

The input/output logic timing diagram is shown in Fig 1. For proper operation the device should be used within the recommended conditions. The V_s offset rating is tested with all supplies biased at 15V differential.

Symbol	Definition	Min.	Max.	Units
V _B	High side floating supply absolute voltage $V_S + 10 V_S + 2$			
Vs	High side floating supply offset voltage	†	200	
V_{HO}	High side floating output voltage	Vs	V_B	\/
V_{CC}	Low side and logic fixed supply voltage	10	20	V
V_{LO}	Low side output voltage	0	V _{CC}	
V _{IN}	Logic input voltage	0	V_{CC}	
T _A	Ambient temperature	-40	125	°C

[†] Logic operational for V_S of -5V to +200V. Logic state held for V_S of -5V to -V_{BS}. (Please refer to the Design Tip DR97-3 for more details).

Dynamic Electrical Characteristics

 $V_{CC} = V_{BS} = 15V$, $C_L = 1000 pF$, $T_A = 25^{\circ}C$ unless otherwise specified.

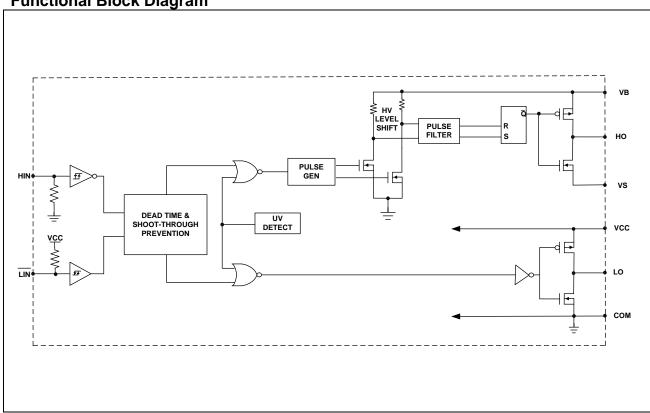
Symbol	Definition	Min	Тур	Max	Units	Test Conditions
t _{on}	Turn-on propagation delay	_	680	820		$V_S = 0V$
t _{off}	Turn-off propagation delay	_	150	220		V _S = 200V
t _r	Turn-on rise time	_	70	170		
t _f	Turn-off fall time	_	35	90	ns	
DT	Deadtime, LO turn-off to HO turn-on & HO turn-on to LO turn-off	400	520	650		
MT	Delay matching, HO & LO turn-on/off	_	_	60		

Static Electrical Characteristics

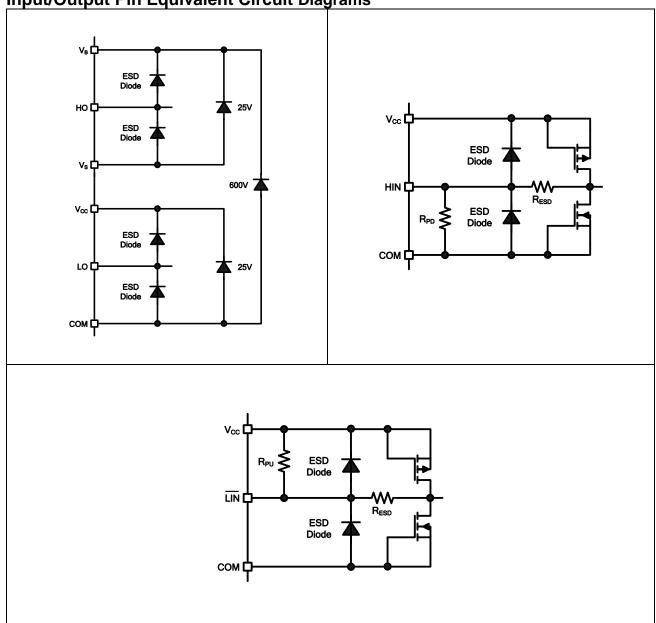
 $V_{CC} = V_{BS} = 15 V$ and $T_A = 25 ^{\circ}C$ unless otherwise specified. The V_{IN} and I_{IN} parameters are referenced to COM and are applicable to the input leads: HIN and \overline{LIN} . The V_O and I_O parameters are referenced to COM and are applicable to the respective output leads: HO and LO.

Symbol	Definition	Min	Тур	Max	Units	Test Conditions
V _{IH}	Logic "1" input voltage	2.5	_			\/ - 10\/ to 20\/
V_{IL}	Logic "0" input voltage	_	_	0.8	V	$V_{CC} = 10V \text{ to } 20V$
V_{OH}	High level output voltage, V_{CC} or V_{BS} - V_{O}	_	0.05	0.2	V	l - 2m Λ
V_{OL}	Low level output voltage, Vo	_	0.02	0.1		$I_0 = 2mA$
I _{LK}	Offset supply leakage current	_		50		$V_{B} = V_{S} = 200V$
I_{QBS}	Quiescent V _{BS} supply current	_	30	55		\/ 0\/ or E \/
I _{QCC}	Quiescent V _{CC} supply current	_	150	270	μΑ	$V_{IN} = 0V \text{ or } 5V$
I _{IN+}	Logic "1" input bias current	_	3	10		$V_{IN} = 5V$
I _{IN-}	Logic "0" input bias current	_		5		$V_{IN} = 0V$
V _{CCUV+}	V _{CC} supply undervoltage positive going threshold	8.0	8.9	9.8	V	
V _{CCUV} -	V _{CC} supply undervoltage negative going threshold	7.4	8.2	9.0	V	
I _{O+}	Output high short circuit pulsed current	130	290	_	mA.	$V_O = 0V,$ $V_{IN} = V_{IH}$ $PW \le 10 \ \mu s$
I _{O-}	Output low short circuit pulsed current	270	600	_	IIIA	$V_O = 15V$, $V_{IN} = V_{IL}$ $PW \le 10 \mu s$

Functional Block Diagram



Input/Output Pin Equivalent Circuit Diagrams

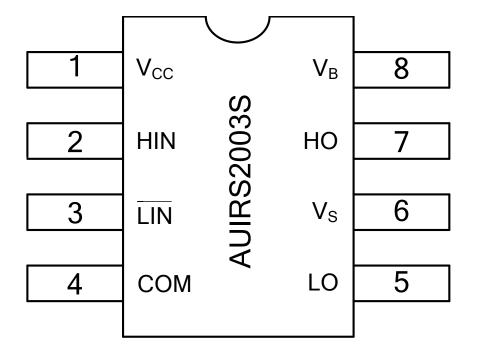




Lead Definitions

PIN	Symbol	Description			
1	V _{cc}	Low side and logic fixed supply			
2	HIN	Logic input for high side gate driver output (HO), in phase			
3	LIN	Logic input for low side driver output (LO), out of phase			
4	COM	Low side return			
5	LO	Low side gate drive output			
6	Vs	High side floating supply return			
7	НО	High side gate drive output			
8	V _B	High side floating supply			

Lead Assignments





Application Information and Additional Details

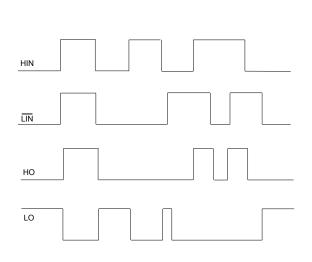


Figure 1: Input/Output Timing Diagram

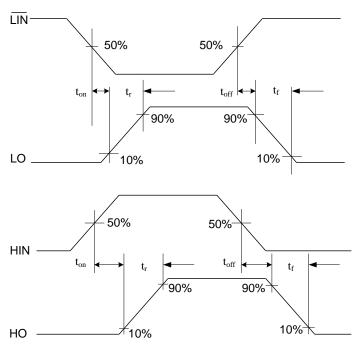


Figure 2: Switching Time Waveform Definition

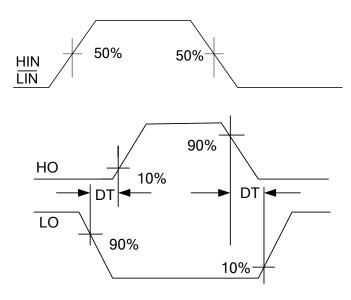
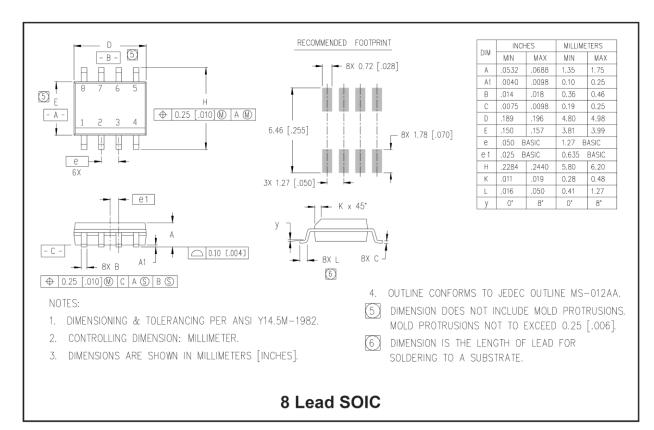


Figure 3: Delay Matching Waveform Definitions

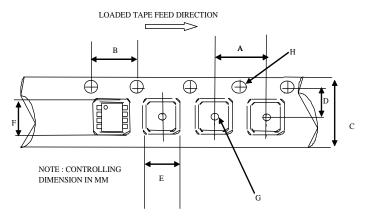
AUIRS2003S

Package Details: SOIC8N



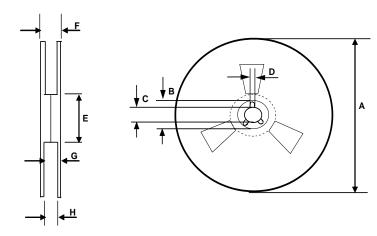
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Package Details: SOIC8N, Tape and Reel



CARRIER TAPE DIMENSION FOR 8SOICN

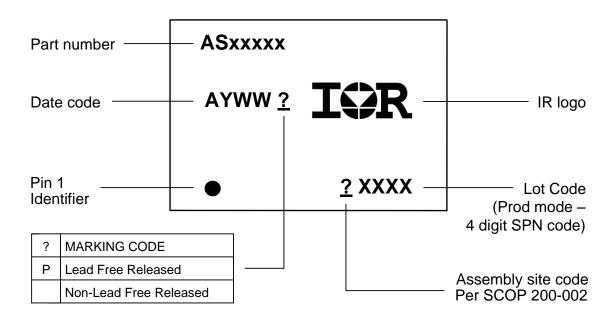
	Metric		Imperial		
Code	Min	Max	Min	Max	
Α	7.90	8.10	0.311	0.318	
В	3.90	4.10	0.153	0.161	
С	11.70	12.30	0.46	0.484	
D	5.45	5.55	0.214	0.218	
E	6.30	6.50	0.248	0.255	
F	5.10	5.30	0.200	0.208	
G	1.50	n/a	0.059	n/a	
Н	1.50	1.60	0.059	0.062	



REEL DIMENSIONS FOR 8SOICN

	Metric		Imperial		
Code	Min	Max	Min	Max	
Α	329.60	330.25	12.976	13.001	
B C D	20.95	21.45	0.824	0.844	
С	12.80	13.20	0.503	0.519	
D	1.95	2.45	0.767	0.096	
E F	98.00	102.00	3.858	4.015	
F	n/a	18.40	n/a	0.724	
G H	14.50	17.10	0.570	0.673	
Н	12.40	14.40	0.488	0.566	

Part Marking Information



Ordering Information

Bara Bara Namalar	Bashawa Tama	Standard Pack		Occupated Boot Name Lan	
Base Part Number	Package Type	Form Quantit		Complete Part Number	
AL IID COOOC	SOIC8	Tube/Bulk	95	AUIRS2003S	
AUIRS2003S		Tape and Reel	2500	AUIRS2003STR	



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