

700V High and Low Side Driver

Features

- Drives IGBT/MOSFET power devices
- Gate drive supplies up to 20V per channel
- Undervoltage lockout for V_{CC} for V_{BS}
- 3.3V, 5V, 15V input logic compatible
- Tolerant to negative transient voltage
- Designed for use with bootstrap power supplies
- Matched propagation delays for all channels
- -40°C to 125°C operating range
- RoHS compliant
- Lead-Free

Product Summary

V _{OFFSET}	≤ 700V
V _{оит}	10V – 20V
I _{o+} & I _{o-} (typ.)	200mA / 350mA
t _{ON} & t _{OFF} (typ.)	220ns & 200ns

Description

The IR7106S is a high voltage, high speed, power MOSFET and IGBT gate driver with independent high-side and low-side output channels. This IC is designed to be used with low-cost bootstrap power supplies. Proprietary HVIC and latch immune CMOS technologies have been implemented in a rugged monolithic structure. The floating logic input is compatible with standard CMOS or LSTTL outputs (down to 3.3V logic). The output drivers feature a high-pulse current buffer stage designed for minimum driver cross-conduction. Propagation delays are matched to simplify the HVIC's use in high frequency applications. The floating channel can be used to drive N-channel power MOSFETs or IGBTs in the high-side configuration, which operates up to 700V.

Package Options



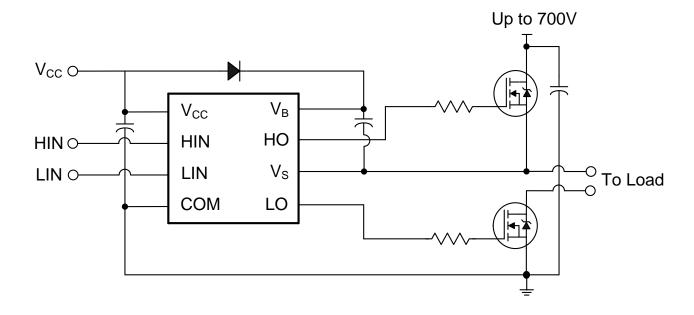
Typical Applications

- Appliance motor drives
- Servo drives
- Micro inverter drives
- General purpose three phase inverters

Barrier Brater Torre		Standar	d Pack	Onderskie Bert Neueken	
Base Part Number	Package Type	Form	Quantity	Orderable Part Number	
IR7106SPBF	SO8N	Tube	95	IR7106SPBF	
IR7106SPBF	SO8N	Tape and Reel	2500	IR7106STRPBF	



Typical Connection Diagram



(Refer to Lead Assignments for correct pin configuration). This diagram shows electrical connections only. Please refer tour Application Notes & DesignTips for proper circuit board layout.



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 unless otherwise stated in the table. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

Symbol	Definition	Min.	Max.	Units
V _{CC}	Low side supply voltage	-0.3	25 [†]	
V _{IN}	Logic input voltage	COM - 0.3	V _{CC} + 0.3	
V _B	High-side floating well supply voltage	-0.3	725	
Vs	High-side floating well supply return voltage	V _B - 25	V _B + 0.3	V
V _{HO}	Floating gate drive output voltage	V _S - 0.3	V _B + 0.3	
V _{LO}	Low-side output voltage	COM - 0.3	V _{CC} + 0.3	
СОМ	Power ground	V _{CC} - 25	V _{CC} + 0.3	
dV _S /dt	Allowable V _S offset supply transient relative to V _{SS}	_	50	V/ns
P _D	Package power dissipation @ T _A ≤+25°C	_	0.625	W
Rth _{JA}	Thermal resistance, junction to ambient	_	200	°C/W
TJ	Junction temperature	_	150	
Ts	Storage temperature	-55	150	∘C
T∟	Lead temperature (soldering, 10 seconds)		300	

[†] All supplies are tested at 25V.

Recommended Operating Conditions

For proper operation, the device should be used within the recommended conditions. All voltage parameters are absolute voltages referenced to COM unless otherwise stated in the table. The offset rating is tested with supplies of $(V_{CC} - COM) = (V_B - V_S) = 15V$.

Symbol	Definition	Min	Max	Units
V _{CC}	Low-side supply voltage	10	20	
V _{IN}	HIN, LIN, & EN input voltage	0	Vcc	
V _B	High-side floating well supply voltage	V _S +10	V _S +20	
Vs	High-side floating well supply offset voltage [†]	COM-5 [†]	700	V
V _{HO}	Floating gate drive output voltage	Vs	V _B	
V _{LO}	Low-side output voltage	COM	V _{CC}	
COM	Power ground	-5	5]
T _A	Ambient temperature	-40	125	°C

[†] Logic operation for Vs of –5 V to 700V. Logic state held for Vs of –5 V to –VBS. Please refer to Design Tip DT97-3 for more details.



Static Electrical Characteristics

 $(V_{CC} - COM) = (V_B - V_S) = 15V$. $T_A = 25^{\circ}C$ unless otherwise specified. The V_{IN} and I_{IN} parameters are referenced to COM. The V_O and I_O parameters are referenced to respective V_S and COM and are applicable to the respective output leads HO or LO. The V_{CCUV} parameters are referenced to COM. The V_{BSUV} parameters are referenced to V_S .

Symbol	Definition	Min.	Тур.	Max.	Units	Test Conditions
V _{BSUV+}	V _{BS} supply undervoltage positive going threshold	8	8.9	9.8		
V _{BSUV} -	V _{BS} supply undervoltage negative going threshold	7.4	8.2	9		
V _{BSUVHY}	V _{BS} supply undervoltage hysteresis	0.3	0.7	_	V	
V _{CCUV+}	V _{CC} supply undervoltage positive going threshold	8	8.9	9.8	V	
V _{CCUV} -	V _{CC} supply undervoltage negative going threshold	7.4	8.2	9		
V _{CCUVHY}	V _{CC} supply undervoltage hysteresis	0.3	0.7	_		
I _{LK}	High-side floating well offset supply leakage	_	_	50		$V_{B} = V_{S} = 700V$
I _{QBS}	Quiescent V _{BS} supply current	_	75	130	μΑ	V _{IN} = 0V or 5V
I _{QCC}	Quiescent V _{CC} supply current	_	120	180		
V _{OH}	High level output voltage drop, V _{BIAS} -V _O	_	0.80	1.4	V	I _O = 20mA
V _{OL}	Low level output voltage drop, Vo	_	0.30	0.6	V	
I _{o+}	Output high short circuit pulsed current	120	200	_	mA	V _O = 0V, PW ≤ 10µs
I _{o-}	Output low short circuit pulsed current	250	350	_	IIIA	V _O = 15V, PW ≤ 10μs,
V_{IH}	Logic "1" input voltage 2.9 3 —		V	\/ 10\/ to 20\/		
V _{IL}	Logic "0" input voltage	_	_	0.8]	$V_{CC} = 10V \text{ to } 20V$
I _{IN+}	Input bias current (HO = High)	_	5	20		$V_{IN} = 5V$
I _{IN-}	Input bias current (HO = Low)	_	_	2	μA	$V_{IN} = 0V$

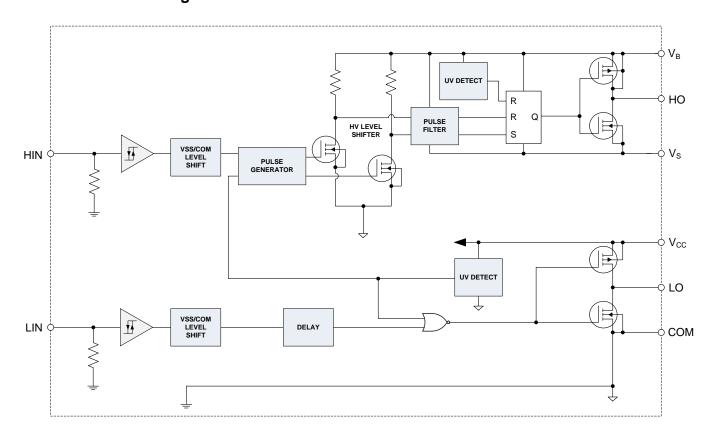
Dynamic Electrical Characteristics

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

Symbol	Definition	Min.	Тур.	Max.	Units	Test Conditions
t _{ON}	Turn-on propagation delay	_	220	300		$V_S = 0V$
t _{OFF}	Turn-off propagation delay	_	200	280		$V_S = 0V \text{ or } 700V$
t _R	Turn-on rise time	_	150	220	ns	V _S = 0V
t _F	Turn-off fall time	_	50	80		VS = 0 V
MT	Delay matching time (t _{ON} , t _{OFF})	_	0	50		



Functional Block Diagram

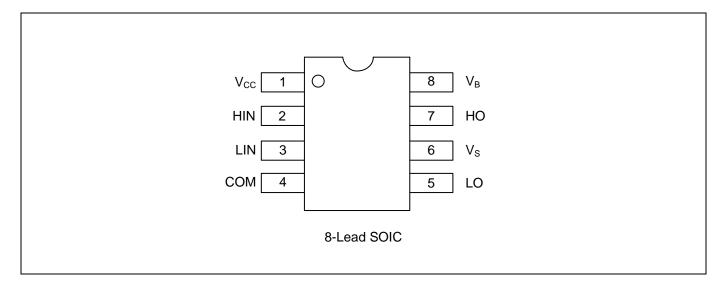




Lead Definitions

Symbol	Description
VCC	Low-side and logic supply voltage
VB	High-side gate drive floating supply
VS	High voltage floating supply return
HIN	Logic inputs for high-side gate driver output
LIN	Logic inputs for low-side gate driver output
НО	High-side driver output
LO	Low-side driver output
СОМ	Low-side gate drive return

Lead Assignments



Application Information and Additional Details

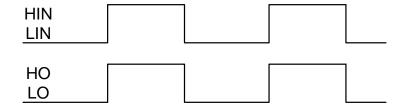


Figure 1. Input/Output Timing Diagrams

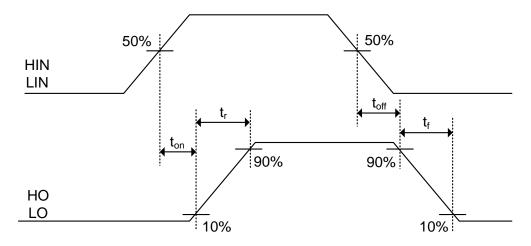


Figure 2. Switching Time Waveform Definitions

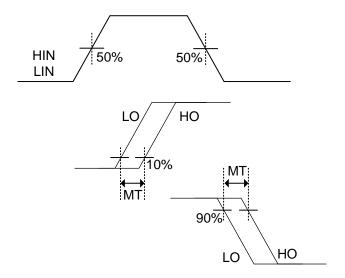
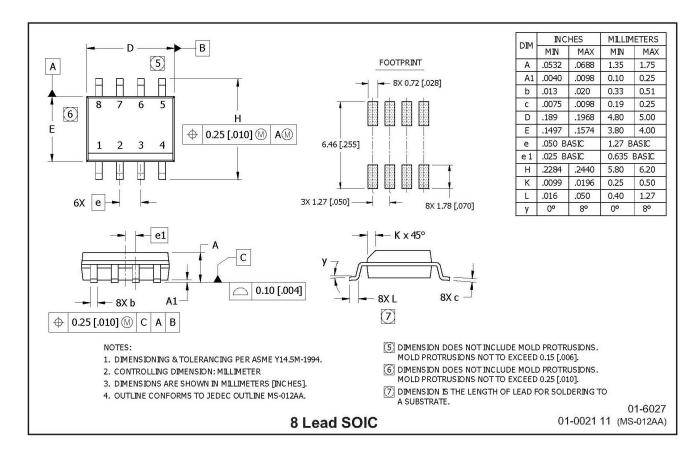


Figure 3. Delay Matching Waveform Definitions

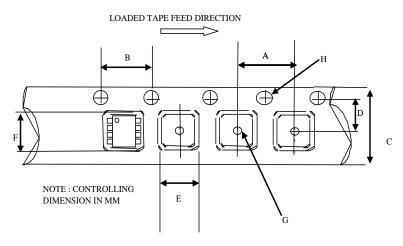


Package Details



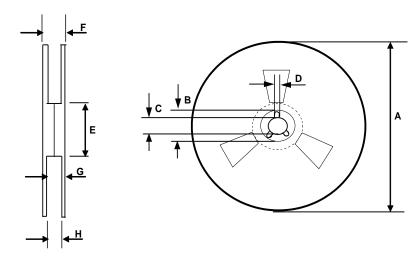


Tape and Reel Details



CARRIER TAPE DIMENSION FOR 8SOICN

	Metric		Imp	erial
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
Е	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

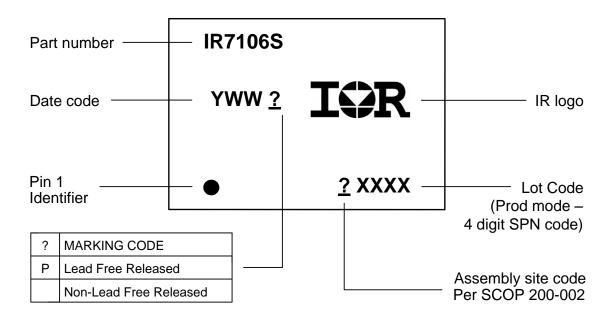


REEL DIMENSIONS FOR 8SOICN

	Metric		Imperial	
Code	Min	Max	Min	Max
Α	329.60	330.25	12.976	13.001
В	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	98.00	102.00	3.858	4.015
F	n/a	18.40	n/a	0.724
G	14.50	17.10	0.570	0.673
Н	12.40	14.40	0.488	0.566



Part Marking Information





Qualification Information[†]

Qualification Level		Organization Third families	Industrial ^{††}		
		qualification. IR's Cons	Comments: This family of ICs has passed JEDEC's Industria qualification. IR's Consumer qualification level is granted by extension of the higher Industrial level.		
Moisture Sensiti	ivity Level	8 Lead SOIC	MSL2 ^{†††} , 260°C (per IPC/JEDEC J-STD-020)		
ESD	Human Body Model	(per JEDEC s	Class 1C (per JEDEC standard JEDEC JS-001-2012)		
E2D	Machine Model	Class A (per EIA/JEDEC standard EIA/JESD22-A115)			
IC Latch-Up Test			Class I, Level A		
RoHS Compliant			(per JESD78) Yes		
Kons complian	l	Yes			

- † †† Qualification standards can be found at International Rectifier's web site http://www.irf.com/
- Higher qualification ratings may be available should the user have such requirements. Please contact your International Rectifier sales representative for further information.
- Higher MSL ratings may be available for the specific package types listed here. Please contact your International ††† Rectifier sales representative for further information.