

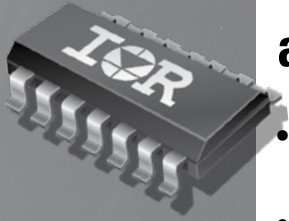
High-Voltage Gate Drive IC Product Selection Guide



For a complete list of IR HVICs go to <http://power.irf.com/hvic/>

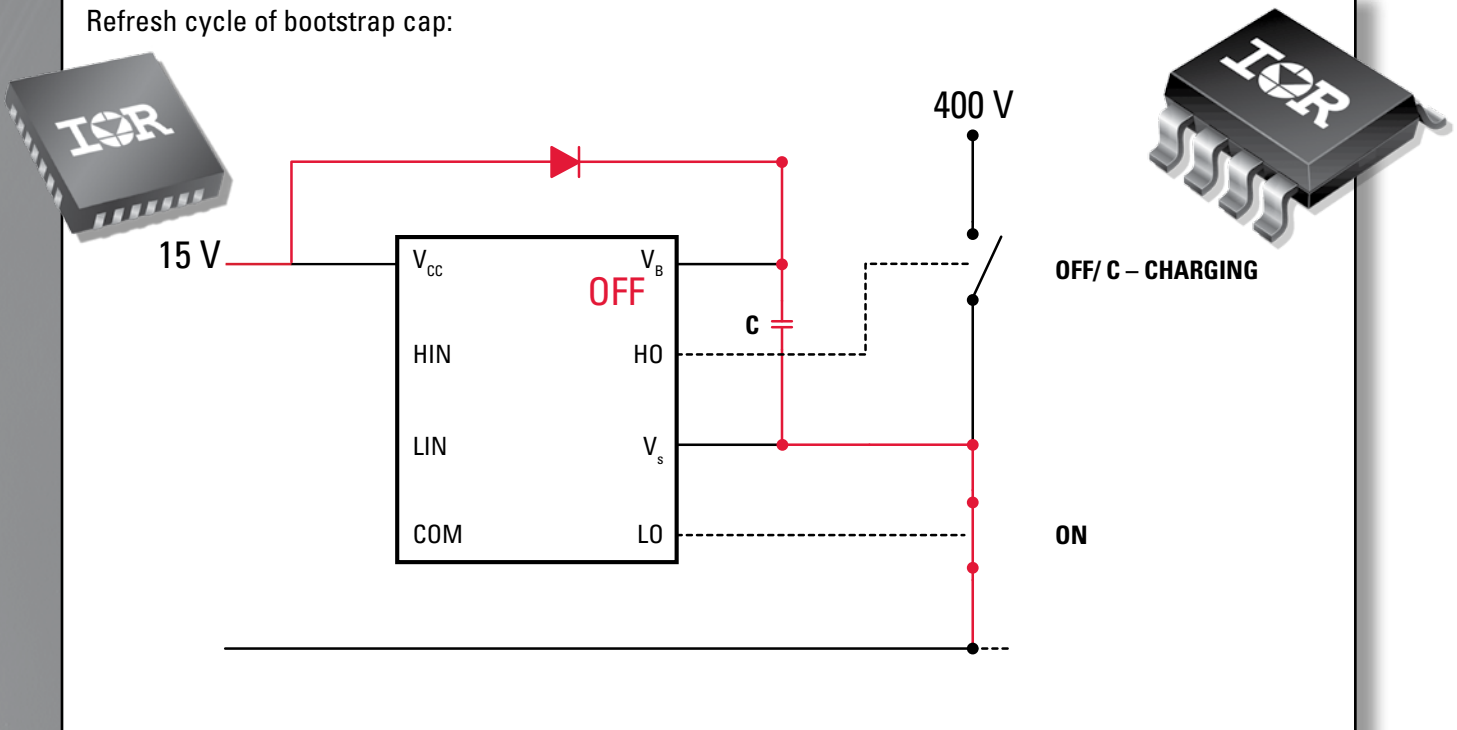
International
IR Rectifier
THE POWER MANAGEMENT LEADER

High-Voltage Gate Drive ICs eliminate the need for floating supply to simplify design and improve efficiency

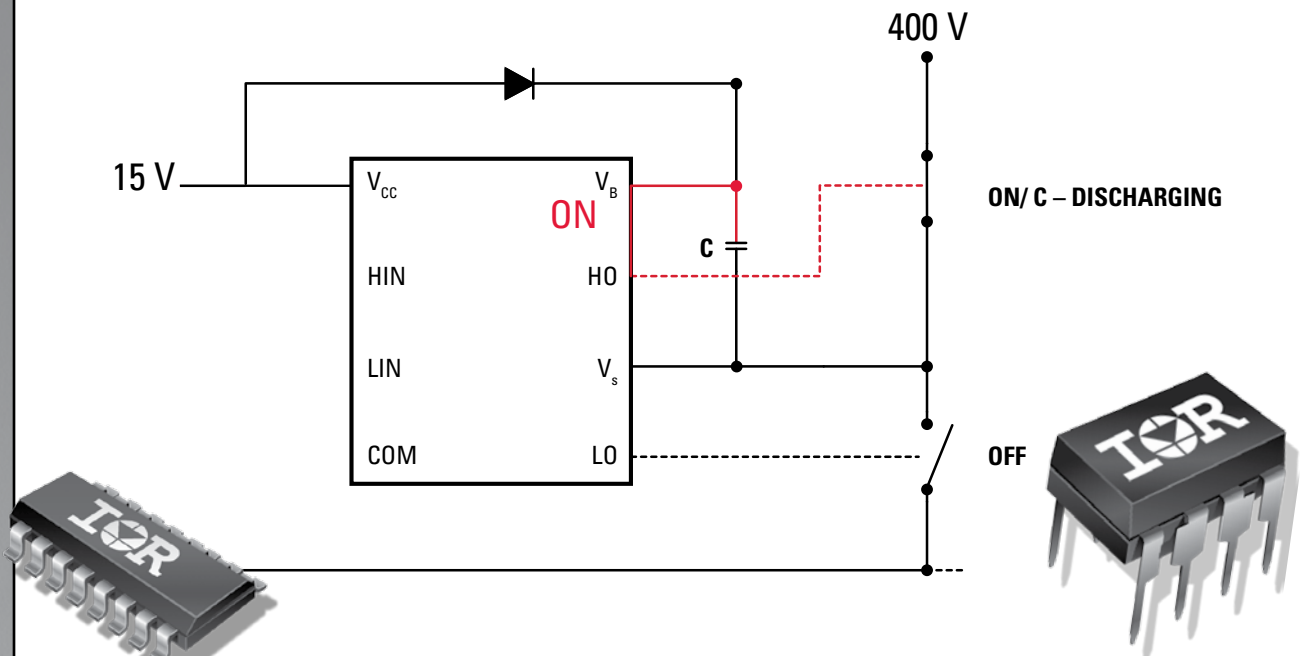


- Boot Strap Capacitor Voltage is generated above DC+ to drive High-Side GATE of IGBT/FET
- Diode, Buffer Capacitor, but no floating or isolated Power supply

Refresh cycle of bootstrap cap:



Discharge cycle of bootstrap cap:



Typical Selection Flow

Get the full table here:

<http://power.irf.com/hvic/>

Critical System Criteria

Options and Features	Details
MOSFET or IGBT Drive	UVLO Value Chosen Appropriately
Number of Channels	1-2-3-4-5-6-7
Source/Sink Drive current	Up to 4000mA Drive Current
Voltage	5V, 25V, 100V, 150V, 200V, 600V, 700V, 1200V

Step: 1

Driver Specifications

Options and Features	Details
Channels linked or Independent	Split HS-LS Channels or Interlinked (DT protected)
Inputs	Single or Split per 2 channels
Dead-Time	Programmable, Fixed or None
Ton/Toff	Switching frequency

Step: 2

Additional Features

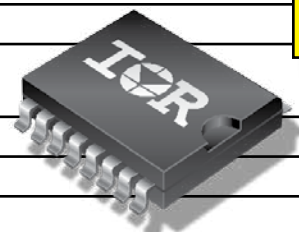
Options and Features	Details
Input On-Off Logic	Direct, Inverse, Mix
Ground Lay-Out	Separated Power Ground and Logic Ground
Shut Down / Reset	Drivers with it, or without it
Over-Current Protection	DC-Bus or Ground Detection
Negative Ground Transient Stress-Hard Ruggedness	Some ICs are designed for enhanced -VS Capability. IR Stress-Hard ICs, Poor PCB lay-out may require use of Stress-Hard IC
Package	QFN, PLCC, MQFP, SOIC, DIP
Fault Reporting	

Step: 3

Enhanced and Application Specific Features

Options and Features	Details
Boot Strap Diode Function	Integrated or not
Load Protection	
Internal Oscillator	
Motion Brake Channel	
Additional PFC Driver output Channel (7th Channel)	Extra Channel for PFC or Brake
Extra OpAmps	0, 1, 2 or 3
Current Amplifier Output	

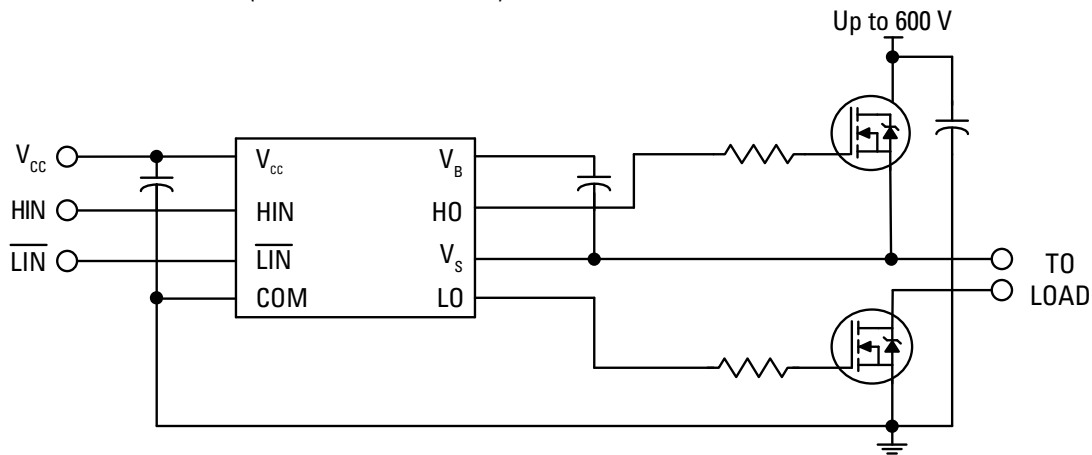
Step: 4



Low-Side or High-Side (LS or HS Drivers)

Channels	Voffset (V)	VBSUV-/VCCUV-(V)	Io- (mA) Sink	Shutdown Time	Over-Current Protection	UVLO References	Fault Reporting	Inverted Input Logic	Current Sense	Topology	Feature Note	Part	
1	5	8.9	3300	1700	X					Single Low side	Shutdown/Reset	IR2121	
	500	9.2	3300	1700	X	HS & LS	X		X	Single High side	Shutdown/Reset, Over Current Detection	IR2125	
	600	7.2	500			X	LS	X		X	Single High side	Desat Over Current detection	IR21271
		7.2	600			X	LS	X		X	Single High side	Desat Over Current detection	IRS21271
		7.2	600			X	LS	X	IN	X	Single High side	Desat Over Current detection	IRS21281
		8.6	500				HS & LS				Single High side		IR2117
		8.6	500				HS & LS		IN		Single High side		IR2118
		8.6	500				HS & LS				Single High side		IRS2123
		8.6	500				HS & LS		HIN		Single High side		IRS2124
		8.6	600				HS & LS				Single High side		IRS2117
		8.6	600				HS & LS				Single High side	Low Logic Threshold	IRS21171
		8.6	600				HS & LS		IN		Single High side		IRS2118
		8.9	4000				HS & LS				Single High side		IRS21850
		10.3	500			X	LS	X	IN	X	Single High side	Switch On Voltage Sensing, Desat Over Current detection	IR2128
		10.3	500			X	LS	X		X	Single High side	Over Current detection	IR2127
		10.3	600			X	LS	X	IN	X	Single High side	Desat Over Current detection	IRS2128
		10.3	600			X	LS	X		X	Single High side	Over Current detection	IRS2127
			n/a			X				X	Phase Current Sense IC		IR2175
			n/a			X				X	Phase Current Sense IC	Analog DSP Out	IR2177
			n/a			X				X	Phase Current Sense IC		IR21771
1200		n/a		X				X	Phase Current Sense IC	Analog DSP Out	IR2277		
		n/a		X				X	Phase Current Sense IC		IR22771		
2	25		3300							Dual Low side		IR25600*	
			3300					IN1 / IN2			Dual Low side		IR4426
			3300								Dual Low side		IR4427
			3300					IN1			Dual Low side		IR4428
			3300					IN1 / IN2			Dual Low side		IRS4426
			3300								Dual Low side		IRS4427
			3300					IN1			Dual Low side		IRS4428
	600	8.6	500				HS				Dual High side		IRS21962S
		8.7	500				HS & LS		LIN / HIN		High side and Low side	Dual Mode	IRS21956
		8.9	600				HS & LS				High side and Low side	Dual Mode, Slope Control	IRS21858
8.9		2000				HS & LS				Dual High side		IRS21853	
9		500				HS & LS		LIN / HIN		High side and Low side	Dual Mode, Slope Control	IRS21856	
3	600	8.6	500			HS & LS				High side and dual Low side	Separate Logic and Power Ground	IRS21952	
		8.6	500			HS & LS				High side and dual Low side	Separate Logic and Power Ground	IRS21953	

Typical Connections 2-Channel Drivers (Interlinked Channels)

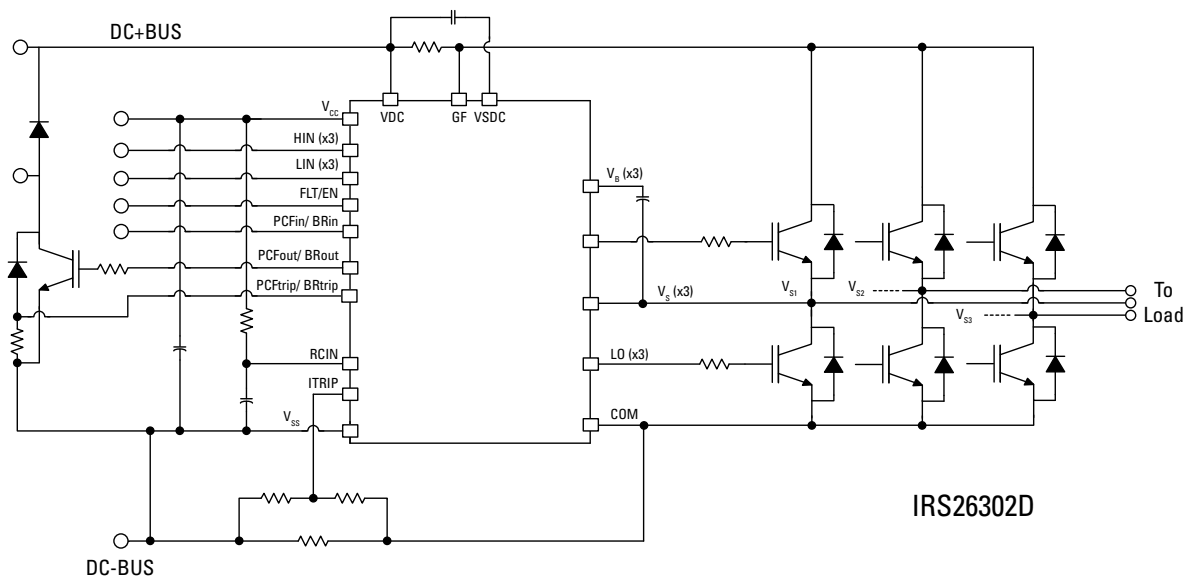


IRS2608D(S)

Three-Phase Drivers

Voffset (V)	VBSUV+/VccUV+ (V)	Io- (mA) Sink	Shutdown /Reset	Shutown Time (ns)	Separate Power and Logic Ground	Integrated Bootstrap Diode	Over Current Protection	Min Dead Time (ns)	Current Amplifier Output	Inverted Input Logic	Feature Note	Part
600	8.6	500	X	750	X		X	250	X	LIN / HIN		IR2133
	8.7	500	X	700	X		X	700		LIN/HIN	3 High side and 3 Low side	IR2131
	8.9	350			X		X	290		LIN / HIN	Vtrip 0.46V	IR2136
	8.9	350			X		X	290		LIN / HIN	Vtrip 4.3V	IR21368
	8.9	350	X	460	X		X	275		LIN / HIN	GND Shunt Overcurrent Protection, - Redundant Reset	IRS2336
	8.9	350	X	460	X	X	X	275		LIN / HIN	GND Shunt Overcurrent Protection, - Redundant Reset	IRS2336D
	9	500			X		X	2500	X	LIN / HIN		IR2130
	9	500			X		X	800	X	LIN / HIN		IR2132
	9	500			X		X	2000	X	LIN / HIN		IRS2330
	9	500			X	X	X	2000	X	LIN / HIN		IRS2330D
	9	500			X		X	700	X	LIN / HIN		IRS2332
	9	500			X	X	X	700	X	LIN / HIN		IRS2332D
	10.4	350			X		X	290		LIN	Vtrip 0.46V	IR21362
	10.4	350			X		X	290			Vtrip 0.46V	IR21364
	10.4	500	X	750	X		X	250	X	LIN / HIN		IR2135
	11.1	350			X		X	290		LIN / HIN	Vtrip 0.46V	IR21363
	11.1	350			X		X	290		LIN / HIN	Vtrip 4.3V	IR21365
	11.1	350			X		X	290		LIN / HIN	Vtrip 4.3V	IR21367
	11.1	350						290				IRS2334
	11.1	350	X	460	X	X	X	275			GND Shunt Overcurrent Protection, - Redundant Reset	IRS23365D
11.1	350	X	460	X	X	X	290			PFC/Brake driver, (7-Channel)	IRS26302D	
11.1	350	X	460	X	X	X	290			DC bus sensing with Over Voltage protection	IRS26310D	
1200	8.6	500	X	750	X		X	250	X	LIN / HIN		IR2233
	10.4	500	X	750	X		X	250	X	LIN / HIN		IR2235
	11.2	540	X	600	X		X	Prog		HIN	Brake driver (7-Channel), Programmable Dead Time Soft Shutdown, Desaturation Detection, Voltage Feedback	IR2238

Typical Connection 6- & 7-Channel Gate Driver



Half-Bridge Drivers with Interlinked Channels (Dead Time Protected)

Voffset (V)	VBSUV+/ VccUV+ (V)	Io- (mA) Sink	Shutdown /Reset	Shutown Time (ns)	Separate Power and Logic Ground	Integrated Bootstrap Diode	UVLO Reference	Programmable Dead Time	Min Dead Time (ns)	Inverted Input Logic	Single Input	Feature Note	Part	
100	7.3	1000					HS & LS	X				Self-Oscillating, Programmable Frequency	AUIR2085S	
200	8.9	600					LS		520	LIN			IRS2003	
	8.9	600	X	160			LS		520		X	Single Input	IRS2004	
600	4.1	350	X	200			HS & LS		540		X	Single Input, Logic Level	IR2302	
	4.1	350	X	240			HS & LS		540		X	Single Input, Logic Level	IRS2302	
	8.4	250					LS		1200			Self Oscillating	IR2151	
	8.4	500					LS		1200			Self Oscillating	IR2155	
	8.6	500					HS & LS		650		X	Single Input	IR2111	
	8.6	600					HS & LS		650		X	Single Input	IRS2111	
	8.9	260					HS & LS		100				IR2304	
	8.9	260					HS & LS		100				IR25601*	
	8.9	350					X	HS & LS		530	LIN		IRS2608D	
	8.9	350						HS & LS		540			IR2308	
	8.9	350						HS & LS		540			IR25606*	
	8.9	350						HS & LS		540	LIN		IR2108	
	8.9	350				X		HS & LS	X				Programmable Dead Time	IR21084
	8.9	350	X	250				HS & LS	X	Adj		X	Single Input, Programmable Dead Time	IRS25091
	8.9	350	X	200		X		HS & LS	X			X	Single Input, Programmable Dead Time	IR21094
	8.9	350	X	x				HS & LS	X			X	Single Input, Programmable Dead Time	IR21091
	8.9	350	X	250			X	HS & LS		530		X	Single Input	IRS2609D
	8.9	350	X	250				HS & LS		530		X	Single Input	IRS2509
	8.9	350	X	200				HS & LS		540		X	Single Input	IR2109
	8.9	360						LS		520	LIN			IR2103
	8.9	360	X	160				LS		520		X	Single Input	IR2104
	8.9	360	X	160				LS		520		X	Single Input	IR25602*
	8.9	600						HS & LS		540				IRS2308
	8.9	600						HS & LS		100				IRS2304
	8.9	600						HS & LS		540	LIN			IRS2108
	8.9	600				X		HS & LS	X				Programmable Dead Time	IRS21084
	8.9	600						LS		520	LIN			IRS2103
	8.9	600	X	200		X		HS & LS	X			X	Single Input, Programmable Dead Time	IRS21094
	8.9	600	X	550				HS & LS	X			X	Single Input, Programmable Dead Time	IRS21091
	8.9	600	X	200				HS & LS		540		X	Single Input	IRS2109
	8.9	600	X	160				LS		520		X	Single Input	IRS2104
	8.9	2300				X		HS & LS	X		LIN		Programmable Dead Time	IR21834
	8.9	2300				X		HS & LS	X		LIN		Programmable Dead Time	IRS21834
8.9	2300						HS & LS		400	LIN			IR2183	
8.9	2300						HS & LS		400	LIN			IRS2183	
8.9	2300				X		HS & LS	X			X	Single Input, Programmable Dead Time	IR21844	
8.9	2300	X	180		X		HS & LS	X			X	Single Input, Programmable Dead Time	IRS21844	
8.9	2300						HS & LS		400		X	Single Input	IR2184	
8.9	2300	X	180				HS & LS		400		X	Single Input	IRS2184	
9	400						LS		650			Self Oscillating	IR21531	
9	400			660			LS		1200			Self Oscillating	IR2153	
9	400			660			LS		1200			Self Oscillating	IR25603*	
10.2	3000				X		HS & LS		330			Desat Sensing Protection, Fault Reporting, Soft Shutdown, Current Sense	IR2114	
10.2	3000				X		HS & LS		330			Active Bias Desat Sense Protection, Fault Reporting, Soft Shutdown, Current Sense	IR21141	
11	260								600			Self Oscillating	IRS21531	
11	260			350		X			1100			Self Oscillating	IRS21531D	
11	260			350		X			600			Self Oscillating	IRS2153D	
1200	10.2	3000			X		HS & LS		330			Desat Sensing Protection, Fault Reporting, Soft Shutdown, Current Sense	IR2214	

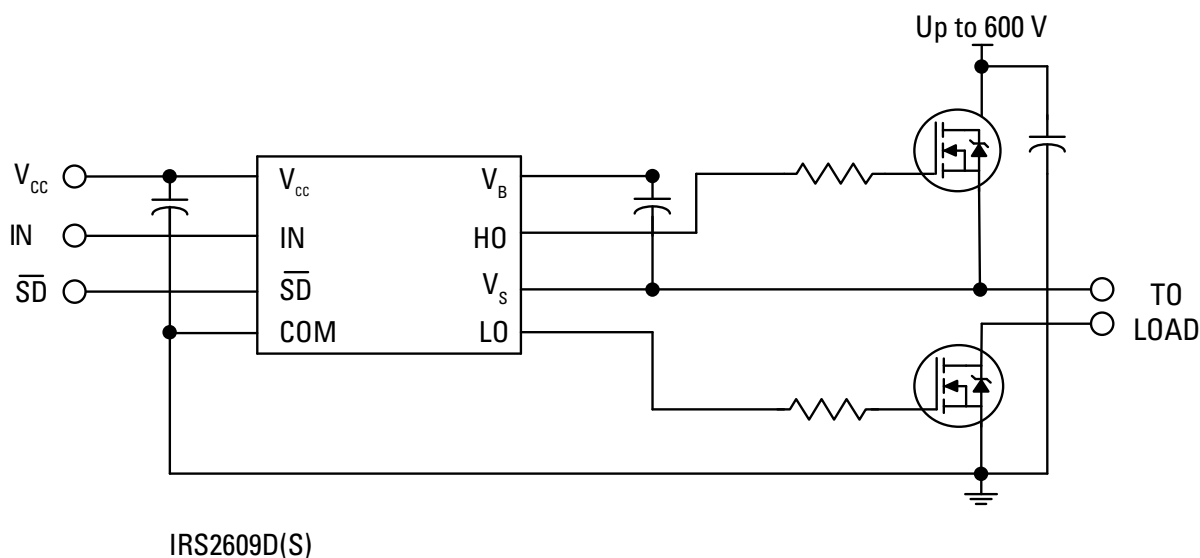
* Recently Released Product

Half-Bridge Drivers with Independent Channels

Voffset (V)	VBSUV+/VccUV+ (V)	Io- (mA) Sink	Shutdown /Reset	Shutdown Time (ns)	Separate Power and Logic Ground	Integrated Bootstrap Diode	UVLO Reference	Inverted Input Logic	Feature Note	Part
200	8.6	3000	X	70	X		HS & LS			IR2010
	8.9	600					LS			IRS2001
	9	1000					HS & LS			IR2011
	9	1000					HS & LS			IRS2011
500	8.5	2500	X	130	X		HS & LS			IRS2110
	8.6	2500	X	110	X		HS & LS			IR2110
600	4.1	350					HS & LS		Logic Level	IR2301
	4.1	350					HS & LS		Logic Level	IRS2301
	6	4000					HS & LS			IRS21867
	8.5	2500	X	130	X		HS & LS			IRS2113
	8.6	500	X	105	X		HS & LS			IR2112
	8.6	600	X	130	X		HS & LS			IRS2112
	8.6	2500	X	110	X		HS & LS			IR2113
	8.6	2500	X	110	X		HS & LS			IR25607*
	8.9	350					HS & LS			IR2106
	8.9	350				X	HS & LS			IR21064
	8.9	350					HS & LS			IR25604*
	8.9	350				X	HS & LS			IRS26072D
	8.9	350				X	HS & LS			IRS2607D
	8.9	360					LS			IR2101
	8.9	360					LS	LIN / HIN		IR2102
	8.9	600					LS			IRS2101
	8.9	600					HS & LS			IRS2106
	8.9	600				X	HS & LS			IRS210614
	8.9	600				X	HS & LS			IRS21064
	8.9	2300					HS & LS			IR2181
	8.9	2300				X	HS & LS			IR21814
	8.9	2300					HS & LS			IRS2181
	8.9	2300				X	HS & LS			IRS21814
	8.9	4000					HS & LS			IRS2186
8.9	4000				X	HS & LS			IRS21864	
1200	10.2	2500	X	230	X		HS & LS			IR2213

* Recently Released Product

Typical Connections Single-Input 2-Channel Drivers (Interlinked Channels)



Product Line	Applications	Key Products
 <p>Energy Saving Products</p> <p>Integrated design platforms that enable customers to add energy-conserving features that achieve lower operating energy costs and manufacturing Bill of Material (BOM) costs.</p>	<ul style="list-style-type: none"> • Appliances • Audio • Display • Industrial • Lighting • SMPS 	<ul style="list-style-type: none"> • Digital Control ICs • High-Voltage ICs • IGBTs • IRAM Integrated Power Modules • MERs • μIPM™
 <p>Enterprise Power</p> <p>Optimized power management system solutions that deliver benchmark power density, efficiency and performance in enterprise power.</p>	<ul style="list-style-type: none"> • Servers • Storage Networks • Switchers & Routers • Workstations • Notebooks • Game Stations • Set-Top Box 	<ul style="list-style-type: none"> • DirectFET® plus • Sup/IRBuck® • PowIRstage® • CHiL Digital Controllers
 <p>Automotive</p> <p>Automotive grade power management solutions qualified to meet the needs of 12V, 24V and HEV/EV applications with a zero defect goal.</p>	<ul style="list-style-type: none"> • AC and DC Motor Drives • Powertrain / Engine control • Body Electronics • Lighting • Class D Audio • Heavy Loads and Actuators 	<p>Automotive Qualified:</p> <ul style="list-style-type: none"> • HEXFET® Power MOSFETs • Intelligent Power Switches • Driver ICs • IGBTs • DirectFET® 2 • COOLiR™
 <p>Benchmark MOSFETs</p> <p>IR continues to lead the industry by offering power MOSFETs with the lowest $R_{DS(on)}$ and widest range of packages up to 250V for a diverse range of applications.</p>	<ul style="list-style-type: none"> • Audio • Computing • Communications • Motor Control • Power Supply • Synchronous Rectification 	<ul style="list-style-type: none"> • Discrete HEXFET® MOSFETs • Dual HEXFET® MOSFETs • FETKY® • DirectFET®
 <p>HiRel</p> <p>Our discrete components, complex hybrid power module assemblies and rugged DC-DC converters utilize leading-edge power technology which, together with demanding environmental specifications help engineers to meet their toughest design challenges.</p>	<ul style="list-style-type: none"> • Space • Military • Commercial Aviation • Rugged Industrial • Medical 	<ul style="list-style-type: none"> • RAD-Hard MOSFETs • Power Modules/Hybrid Solutions • Motor Control Solutions • DC-DC Converters