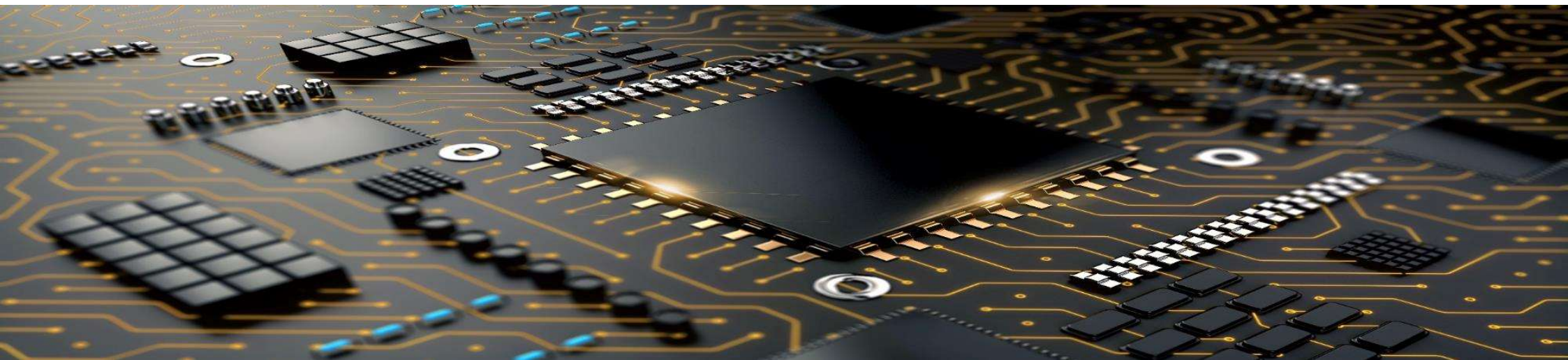




Gate Driver | 2025

Applications & Solutions



ALPINESEMI Confidential

ALPINESEMI Gate Driver Introduction



Gate driver ICs serve as the interface between control signals (digital or analog controllers) and power switches (IGBTs, MOSFETs, SiC MOSFETs, and GaN HEMTs). The integrated gate driver solutions reduce your design complexity, development time, bill of materials (BOM), and board space while improving reliability over discretely-implemented gate-drive solutions.

Every switch needs a driver, the right driver makes a difference. ALPINESEMI offers a comprehensive portfolio of gate driver ICs with a variety of configurations, voltage classes, isolation levels, protection features, and package options. ALPxxx gate driver ICs are complementary to IGBT discretes and modules, silicon (SJ MOS™, SGT MOS™ and Super Trench™) and silicon carbide MOSFETs, gallium nitride HEMTs (GaN FET), or as part of integrated power modules (smart IPM).

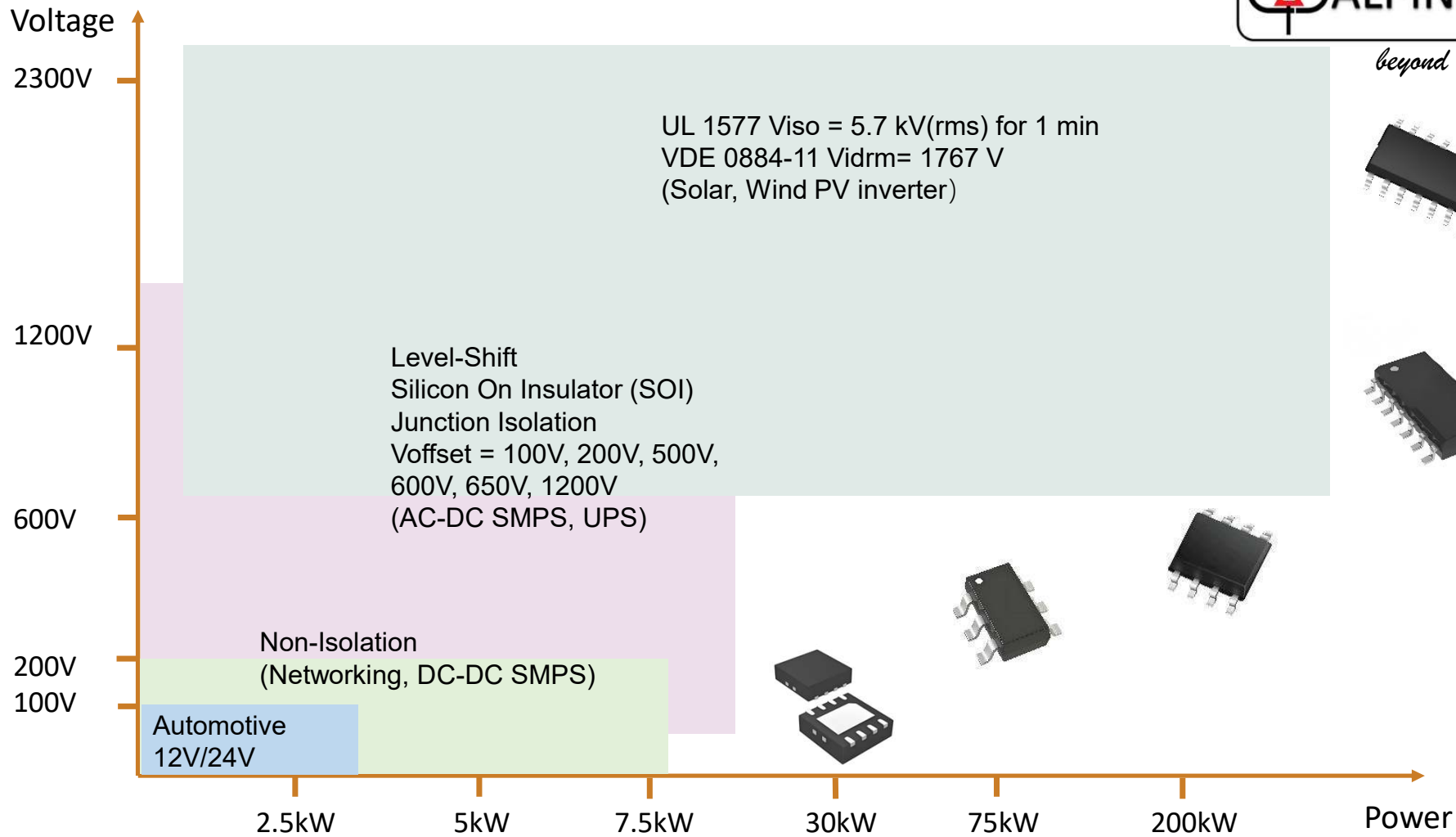
Gate driver configuration			25 V	25 - 105 V	200 V	500 V	600 V	650 V	1200 V	2300 V
Gate drivers	1-Channel	Isolated							●	●
		High-side		● ●	● ●	●	●			
		Low-side	●							
	2-Channel	Isolated			●			●	●	
		High-side		●						
		Low-side	●							
		High-side + Low side			● ●	●	● ●	●	●	
		Half-bridge		●	● ●		● ●	●	●	
	4-Channel	Full-bridge		●			●			
	6-Channel	Three-phase			●		● ●		● ●	

● Non-isolated (N-ISO)
● Junction isolation (JI)
● Silicon on insulator (SOI)
● Coreless transformer (CT)

ALPINESEMI Gate Driver Road Map



beyond boundaries...

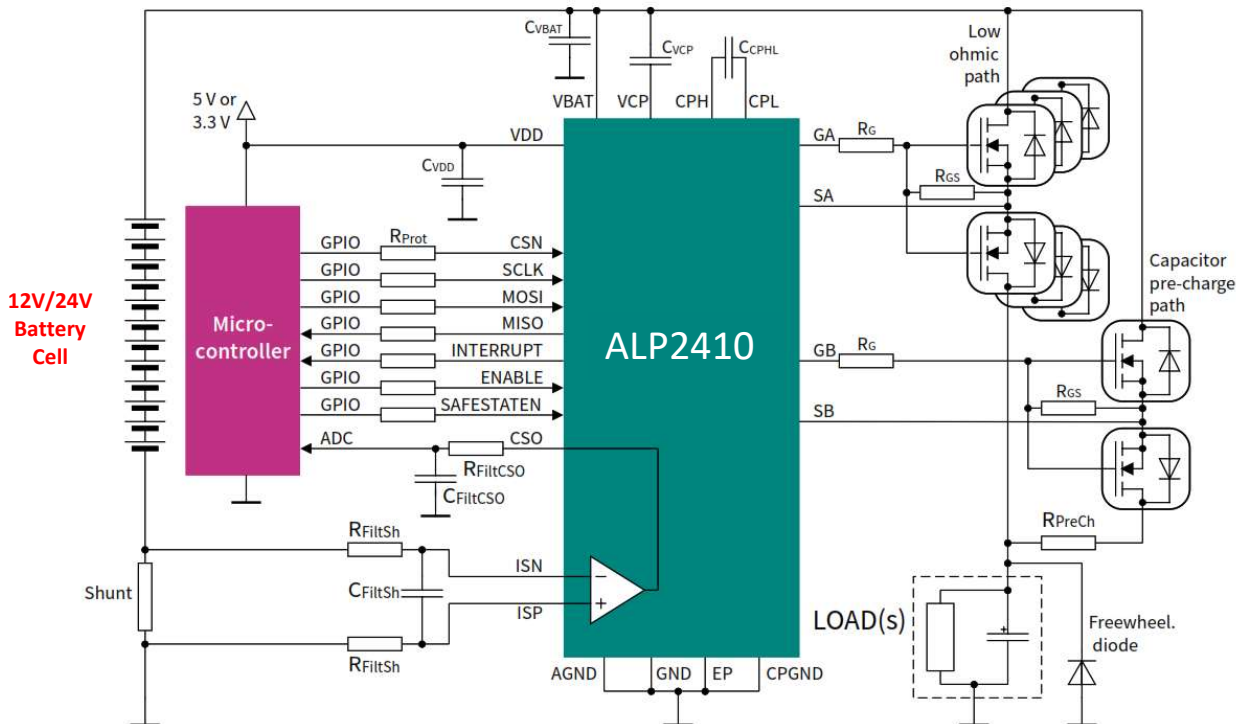


Smart Gate Driver for BMS 12V/24V Protect System



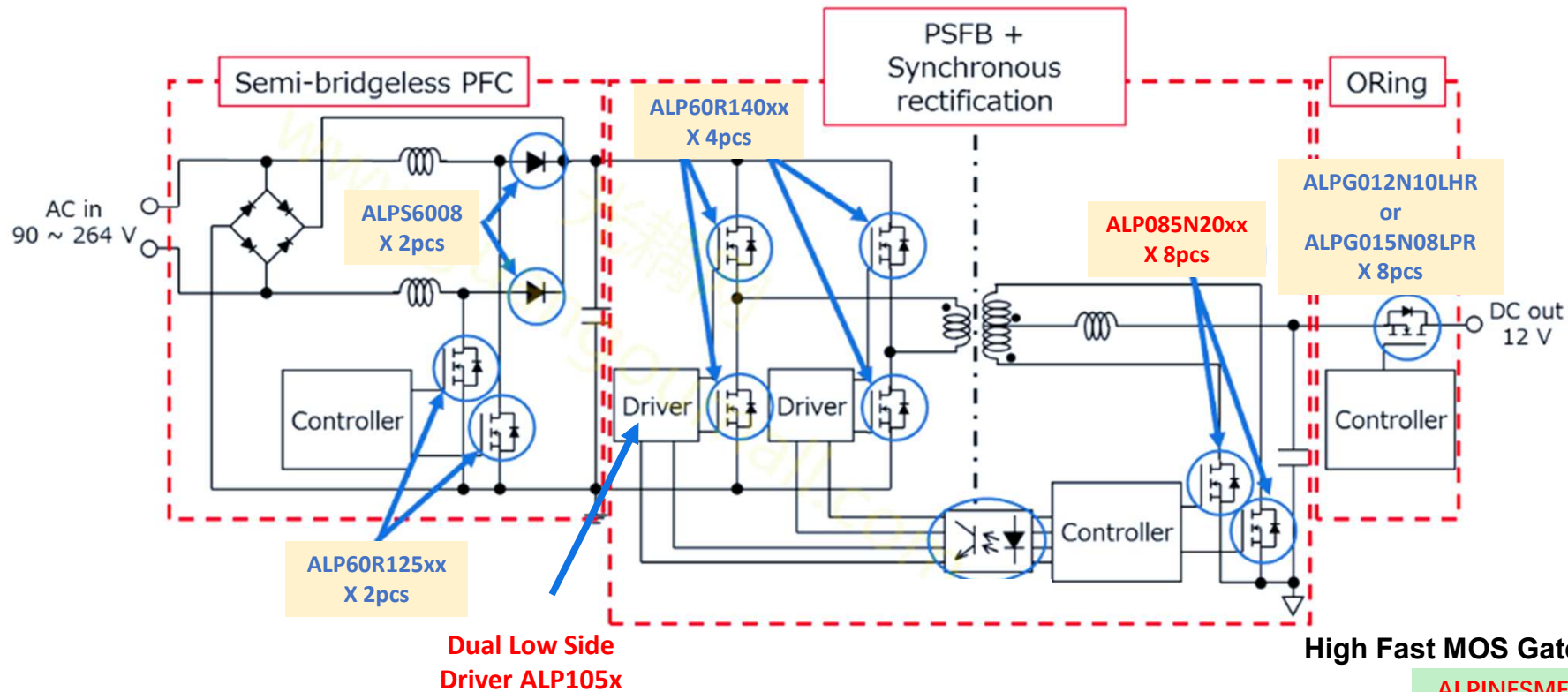
ALP2410 is a one channel gate driver with two independent gate outputs for 12 / 24 V automotive applications. It offers several protection features for connecting/disconnecting loads or different power supplies. (P2P replace Infineon 2ED2410)

- ◆ Faster reaction time ($\sim 10 \mu\text{s}$)
- ◆ Integrated bidirectional high or low side current sense amplifier
- ◆ High current source or sink support
- ◆ Robust against under-/overvoltage in the board-net - Flexible configuration of protection features plus the accessibility of diagnosis information via SPI



- ◆ One channel device with two high-side gate driver outputs
- ◆ 3Ω pull-down, 5Ω pull-up for fast switch on/off
- ◆ Support back-to-back MOSFET topologies (common drain and common source)
- ◆ Two bidirectional high-side analog current sense interfaces with externally adjustable gain
- ◆ Adjustable overcurrent/short-circuit protection
- ◆ Versatile comparator to implement: adjustable I-t wire protection, overvoltage/undervoltage or overtemperature protection

High&low Side 2 channel Gate Driver in 1.6~3.5KW 48V Networking Power Solution



**Dual Low Side
Driver ALP105x**

High Fast MOS Gate Driver IC

1 Channel

ALPINESMEI

ALP1000

Dual low Side

ALP105x

TI

1EDN7550B

4A,UCC27423

5A,UCC27524D

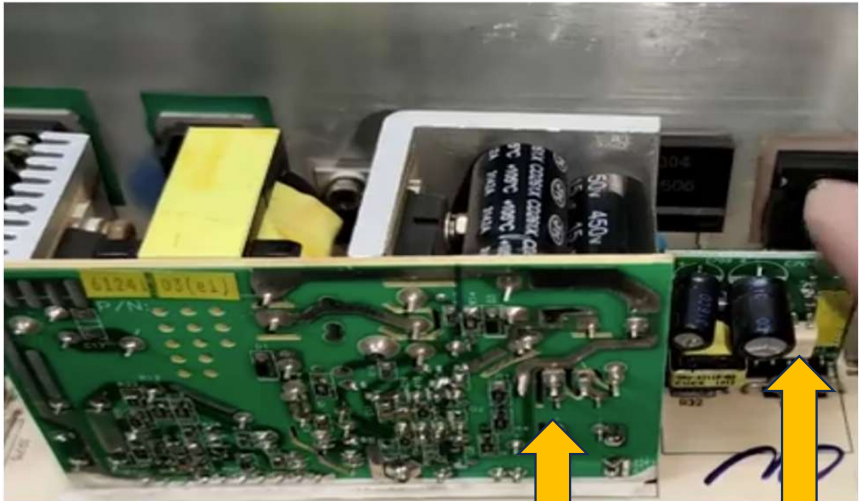
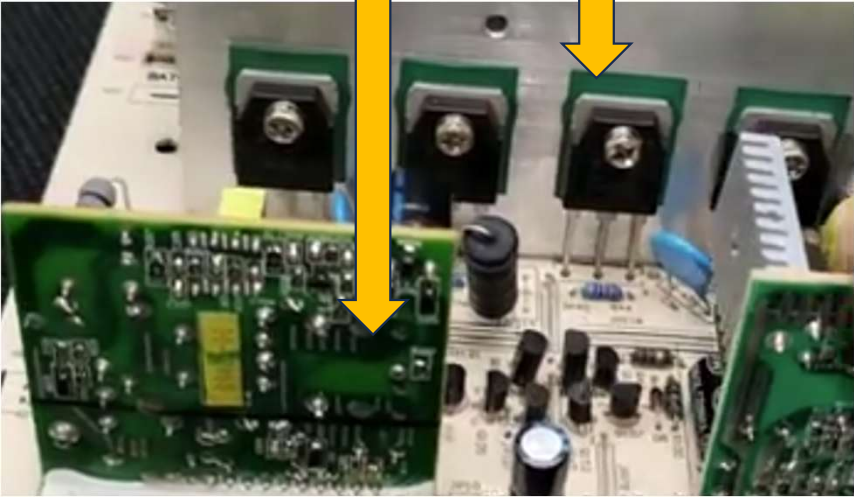
High Side<200V Half Bridge Gate Driver in UPS Application



High Fast MOS Gate Driver IC					
	ALPINESMEI	TI	INFINEON	RENESAS	IXYS
Dual low Side	ALP105x	4A,UCC27423			4A,IXD_604
		5A,UCC27524D	5A,2EDN7533		
Half Bridge	ALP102x	3A,UCC27282	3A,2ED8034		
4 Channel	ALP105x			1A,ISL83202	

SMPS Circuit
output +/-12V
Control Board
DC power
from Battery

4pcs Full Bridge
150V~200V MOSFET
TO-220-3L in DC-DC
Converter



Low-Middle MOSFET in DC-DC Converter	
ALP040N03xx	30V-120A TO220/TO263
ALP030N03xx	30V-150A TO220/TO263
ALP025N03xx	30V-200A TO220/TO263
ALP025N06xx	60V-120A TO220/TO263
ALP016N06xx	60V-180A TO220/TO263
ALP013N06xx	60V-200A TO220/TO263
ALP048N15xx	150V-150A TO220/TO263
ALP071N15xx	150V-170A TO220/TO263
ALP084N20HSPC	250V-150A TO220

SMPS Circuit
output 82V
Control Board

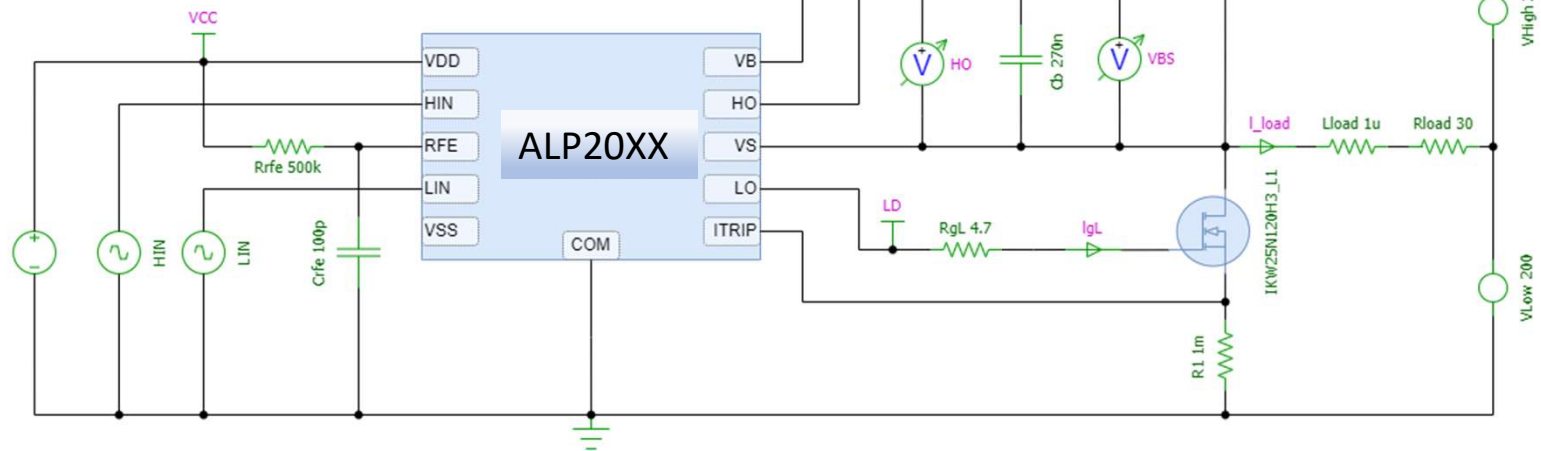
PFC Circuit

Industrial Power Market Classic PCB Driver Design (900-1700V Half Bridge IGBT&SiC MOS gate Driver IC)



- Dual channel isolated gate driver family
- For use with 650-1700V IGBT/SiC MOSFETs
- Up to 1700V functional offset voltage
- Reinforced capacitor isolated gate driver
- 35V maximum output supply voltage
- 18V maximum input supply voltage
- 5/8V Output Undervoltage Lockout (UVLO)
 - o ALPD201x, 5V
 - o ALPD302x, 8V
- 2/3A or 4/6A typical sinking and sourcing peak output current
 - o ALPD201/20, 2A source, 3A sink
 - o ALPD201/22, 4A source, 6A sink
- 50ns propagation delay
- High common-mode transient immunity CMTI > 200kV/μs
- UL1577 5.7kV (V_{rms}) for 1min
- Programmable dead time
- Fast disable for power sequencing
- SOP16 package with 8mm creepage
- Ambient operating temperature -40 ~ 125°C
- 2KV HBM ESD capability

	ALPINESEMI	TI	INFINEON
Single Channel Isolation	ALPD201x	UCC21751ADWKR	1ED31xxMU12H



ALPINESEMI Isolation Gate Driver Part List



PN	Catalogue	Peak Current (A)	Deadzone	Input PS voltage (V)	Output PS voltage (V)	Power Tube	Switch time (ns)	Isolation type	OCP function	Characteristics	100% Replacement	Package
ALP1000	Half bridge	1.7/ 2.2	Adjustable	10-20	900	MOS/IGBT	670/270	Isolation Ring			IR2184/	SOIC-14
ALP1001	Half bridge	1.7/ 2.2	Fixed	10-20	900	MOS/IGBT	350	Isolation Ring	Yes	Interlock	2ED1322	PG-DSO-16
ALP1005	Half bridge-High side	1.7/ 2.2	Fixed		900	MOS/IGBT	350	Isolation Ring	Yes		NSI6601	SOP8
ALP1027	Half bridge	1.7/ 2.2	Fixed	10-20	1200	MOS/IGBT	350	Isolation Ring	Yes	Interlock	2ED1322	PG-DSO-16
ALP1011	Half bridge	1.7/ 2.2	Fixed	10-20	650	IGBT/SIC	250	Isolation Ring	Yes	Interlock Bootstrap Diodes Power grid resistance Miller clamp	2ED1322/ 2ED020I12FA/2pcs 1ED31xxMU12H/2 pcs AU1R08152	PG-DSO-16
ALP1031	3-phase	0.35/ 0.65	Fixed	10-20	650	IGBT/SIC	250	Isolation Ring	Yes	Bootstrap Diodes Power grid resistance	6ED2230	DSO-24