

AUTOMOTIVE BLDC GATE DRIVER WITH INTEGRATED FOC ALGORITHM

High performance, highly integrated solution for low noise and vibration

Designed for battery cooling fans and HVAC systems in EV and hybrid vehicles, the A89307 offers ultra-low noise and vibration by using a Field Oriented Control (FOC) algorithm to drive continuous sinusoidal current to the load, helping automakers reduce noise and improve battery life.

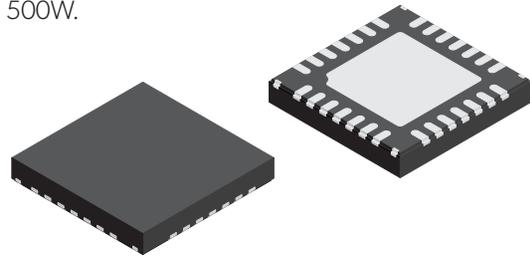
The A89307 includes a hardware-based algorithm, which requires no external sensors or software development; the user simply selects parameters using a simple GUI interface and loads them into the IC's on-chip E2EPROM.

With only five external components, the A89307 helps designers lower material costs by reducing BOM components and facilitating very small system footprints for in-motor PCBs. The A89307 is available in a small 5mm x 5mm 28L wettable flank QFN package. Its fully integrated algorithm can even eliminate the need for a separate microprocessor.

Modes of operation include open-loop PWM or fully programmable closed-loop speed control. In closed-loop mode, the customer can program the PWM-to-speed relationship to match the PWM commands provided by

an external ECU. Field weakening is included to improve performance at high speed. Low-speed operation and windmilling start-up are just a few of the features included in the A89307 hardware based digital algorithm.

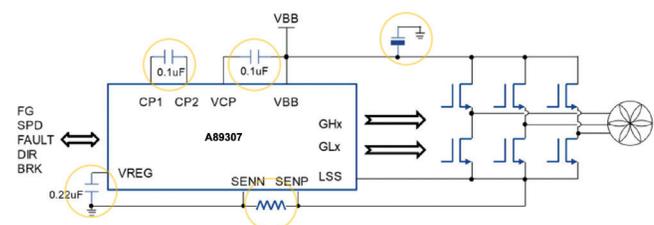
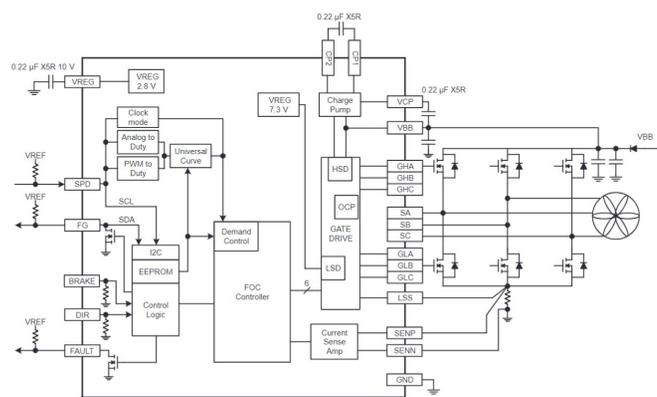
While designed for xEV battery cooling fans, the A89307 can also be used in HVAC blowers as well as liquid pumps in traction inverter cooling systems. The external gate drive allows the device to be flexible enough to drive a wide range of motor powers up to 500W.



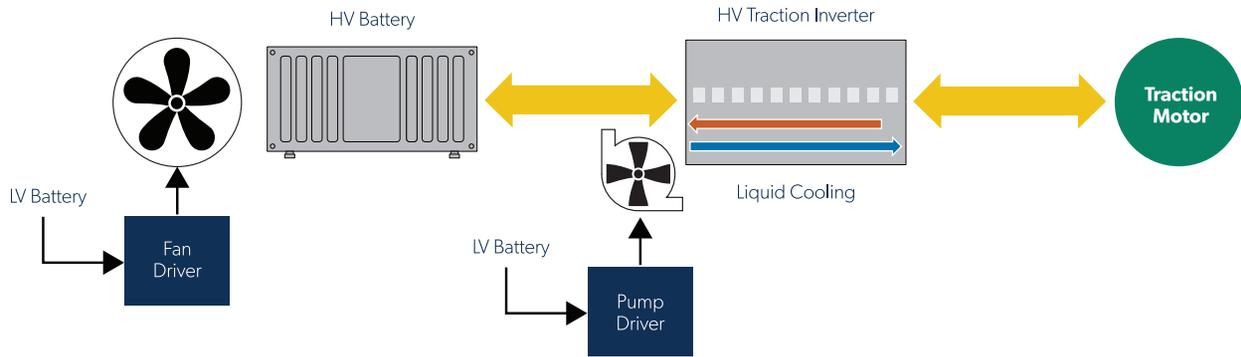
Features and Benefits

- Code-free sensorless field-oriented control (FOC)
- Ultra-quiet low speed operation
- Built in BCI filter
- Forward and reverse windmill startup operation
- Closed-loop speed control with analog, PWM, or clock input
- Short-circuit protection (OCP)
- Adjustable gate drive for EMI mitigation
- Automotive AEC-Q100 qualified

Block Diagram



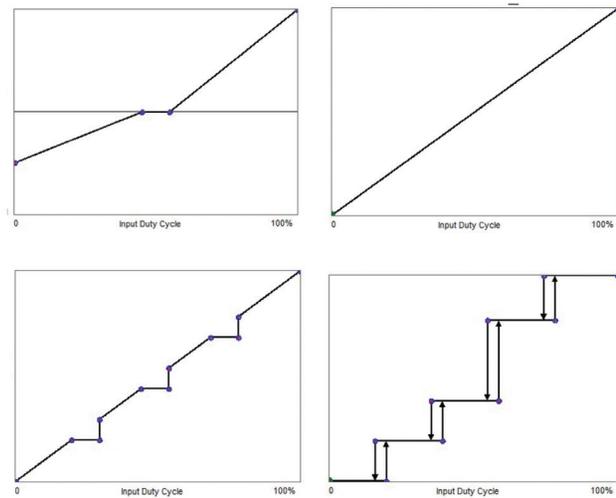
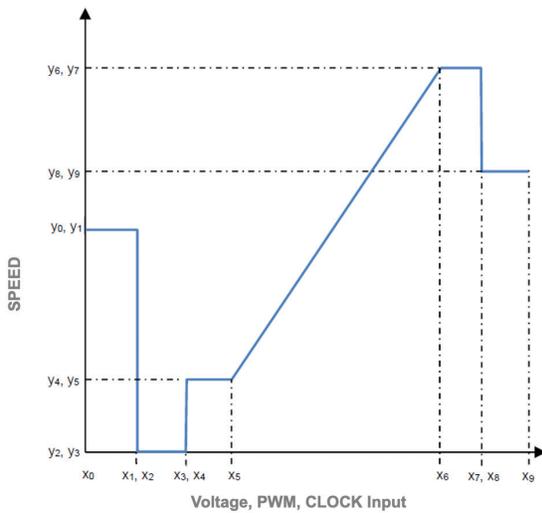
3 Phase BLDC Keeps Batteries and Inverters Running Cool:



Customer Needs:

- Hardware-based algorithm requires no software development
- Programmable PWM-to-speed mapping
- Few external components and small system footprint for in motor PCBs
- Low speed operation without stall or loss of sync
- Ultra-low-noise FOC drive

PWM-to-Speed Mapping Eliminates External Microprocessor



	in#	in %	Out #	Out %	Speed
32	0	0.0	0	0.0	0.0
33	100	19.6	100	19.6	1599.3
34	150	29.4	100	19.6	1599.3
35	150	29.4	150	29.4	2399.0
36	225	44.0	225	44.0	3598.5
37	275	53.8	225	44.0	3598.5
38	275	53.8	275	53.8	4398.2
39	350	68.5	350	68.5	5597.7
40	400	78.3	350	68.5	5597.7
41	400	78.3	400	78.3	6397.3
42	511	100.0	511	100.0	8172.6

- A89307 has analog, PWM, or clock input to control motor speed
- A programmable look-up table is used to create customized speed profile
- If the duty demand is between the look-up table, the frequency demand is linearized
- This allows nearly any input to output speed curve to be created