AcmeMicro Electronics (ShenZhen) Co., Ltd
ACM6288Q Version 2.1, 2022.09.29

ACM6288Q 250V 1.5A Three-Phase High/Low SidePower MOSFET/IGBT Driver Chip

Product Features

•Bootstrap-operated floating channel
•Maximum operating voltage of +250V
•Compatible with 3.3V/5V input logic
•dVS/dt immunity up to ±50 V/ns
•Vs negative bias capability up to -9V
•Gate drive voltage range of 8V to 20V
•High-side and low-side undervoltage lockout circuits--High-side undervoltage lockout positive threshold: 7.1V--High-side undervoltage lockout negative threshold: 6.9V--Low-side undervoltage lockout positive threshold: 7V--Low-side undervoltage lockout negative threshold: 6.6V
•Anti-shoot-through dead-time logic
--Dead-time setting: 200ns
•Chip propagation delay characteristics
--Turn-on/turn-off propagation delayTon/Toff=150ns/120ns--Delay matching time less than 50ns
•Wide temperature range: -40~125°C
•Output stage sourcing/sinking current capability: 1.5A/1.8A•Compliant with RoHS standards

Product Overview

ACM6288Q is a set of high-voltage, high-speed power MOSFET high-side and low-side driver chips. The high-voltage and low-voltage compatible process enables the integration of high-side and low-side gate driver circuits into a single chip. It has independent high-side and low-side reference output channels.

ACM6288Q logic input level is compatible with CMOS or LSTTL logic output levels as low as 3.3V, with high current pulse capability at the output and anti-shoot-through dead-time logic. The floating channel of ACM6288Q can be used to drive high-side N-channel power MOSFETs, and the maximum operating voltage of the floating channel is 250V. ACM6288Q is in a QFN24 package and can operate in the temperature range of -40°C to 125°C.

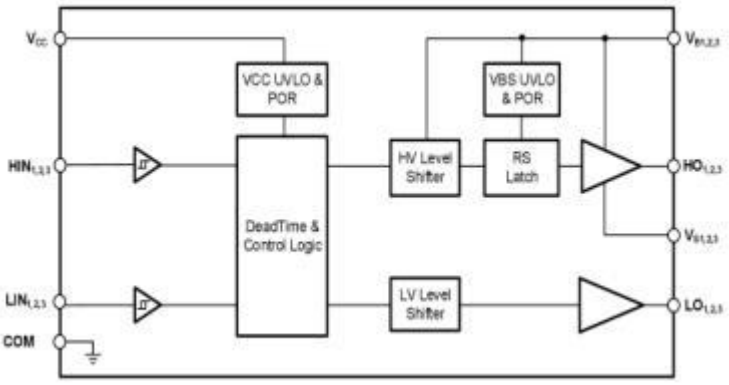
Part Information

Part Number	Package	Package Dimensions (nominal)
ACM6288Q	QFN24	4mm × 4mm

Wide temperature range: -40~125°C
Output stage sourcing/sinking current capability: 1.5A/1.8A
RoHS compliant
Simplified Schematic Diagram

Application Areas

Motor control
Air conditioners/washing
machines General inverters
Micro-inverter drives



Simplified schematic diagram

Product Selection

Product Model	Input Signal	Anti-shoot-through Logic	Dead-time	High-side UVLO	Ton/Toff(ns)	10+/10-(A)
ACM6288Q	HIN,2.3, LIN,.2.3	YES	200ns	YES	150/120	1.5/1.8

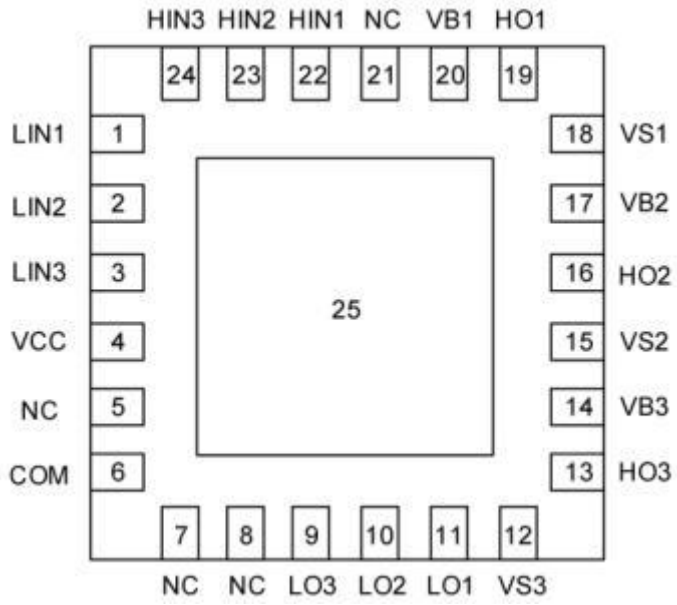
Ordering Information

Product Name	Marking	Package Type	Packaging Form	Minimum Packaging Quantity
ACM6288Q	R ACM6288Q XXXXXX	QFN24	Tape & Reel	5K/reel

Revision History

Version	Modifications	Modification Date
V1.0	Creation	2021.11.29
V2.0	Product features and application information	2022.03.17

QFN24



ACM6288Q QFN24 Top View

Chip Pin Description

Pin Number	Name	Function
1	LIN1	Phase 1 Low−Side Signal Input
2	LIN2	Phase 2 Low−Side Signal Input
3	LIN3	Phase 3 Low−Side Signal Input
4	Vcc	Power Supply Voltage
6	COM	Ground
9	LO3	Phase 3 Low−Side Output Signal
10	LO2	Phase 2 Low−Side Output Signal
11	LO1	Phase 1 Low−Side Output Signal
12	VS3	Phase 3 High−Side Floating Ground
13	HO3	

Pin Number	Name	Function
		Phase 3 High−Side Output Signal
14	VB3	Phase 3 High−Side Floating Power Supply
15	VS2	Phase 2 High−Side Floating Ground
16	HO2	Phase 2 High−Side Output Signal
17	VB2	Phase 2 High−Side Floating Power Supply
18	VS1	Phase 1 High−Side Floating Ground
19	HO1	Phase 1 High−Side Output Signal
20	VB1	Phase 1 High−Side Floating Power Supply
22	HIN1	Phase 1 High−Side Signal Input
23	HIN2	Phase 2 High−Side Signal Input
24	HIN3	Phase 3 High−Side Signal Input
25	COM	Ground

Product Specifications

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may cause permanent damage to the device. All voltage parameters are rated with respect to COM at an ambient temperature of 25°C.

Symbol	Definition	Minimum	Maximum	Unit
VB1.2.3	High−Side Floating Supply Voltage	−0.3	275	V
Vs1.2.3	High−Side Floating Ground Voltage	VB−25	VB+0.3	V
VHO1.2.3	High−Side Output Voltage	VS −0.3	VB+0.3	V
Vcc	Low−Side Supply Voltage	−0.3	25	V
VLo1.2.3	Low−Side Output Voltage	−0.3	VCC+0.3	V
VIN	Logic Input Voltage	−0.3	VCC+0.3	V
dVs/dt	Allowable Transient VS Voltage Slew Rate		50	V/ns

ESD Ratings

Symbol	Definition	Minimum	Maximum	Unit
ESD	Human Body Model	1.5		kV
	Machine Model	500		V

Power Ratings

Symbol	Definition	Minimum	Maximum	Unit
PD	Power Dissipation (TA≤25℃)		1.25	W

Thermal Information

Symbol	Definition	Minimum	Maximum	Unit
RthJA	Thermal Resistance		100	℃/W
TJ	Junction Temperature		150	℃
Ts	Storage Temperature	−55	150	℃
TL	Lead Temperature		300	℃

Recommended Operating Conditions

To ensure proper operation, the device should be used under the following recommended conditions. The bias ratings for VS and COM are measured at a supply voltage of 15V. Unless otherwise specified, all voltage parameters are rated with respect to COM at an ambient temperature of 25°C.

Symbol	Definition	Minimum	Maximum	Unit
VB1.2.3	High−Side Floating Supply Voltage	Vs+8	Vs+20	V
Vs1.2.3	High−Side Floating Ground Voltage1	−9	250	V
VHO1.2.3	High−Side Output Voltage	Vs	VB	V

Symbol	Definition	Minimum	Maximum	Unit
Vcc1.2.3	Low−Side Supply Voltage	8	20	V
VLo1.2.3	Low−Side Output Voltage	0	Vcc	V
VIN	Logic Input Voltage	0	Vcc	V
T_A	Ambient Temperature	−40	125	℃

Note 1: Can be used for transient negative VS of COM-50V with pulse width of 50ns,guaranteed by design.

Electrical Characteristics

Unless otherwise specified, $T_{A}=25^{\circ} C$, $V_{CC}=V_{BS}=15 ~V$, $CL=1nF$.

8.6.1 Dynamic Parameters

Symbol	Definition	Minimum	Typical	Maximum	Unit	Test Conditions
toN	Turn−on Propagation Delay		150	250	ns	Vs=0V
toFF	Turn−off Propagation Delay		120	250	ns	Vs=250V
tR	Rise Time		30		ns	
tF	Fall Time		30		ns	

Symbol	Definition	Minimum	Typical	Maximum	Unit	Test Conditions
DT	Dead Time	100	200	300	ns	
MT	Delay Matching Time (toN, toFF)			50	ns	

Static Parameters

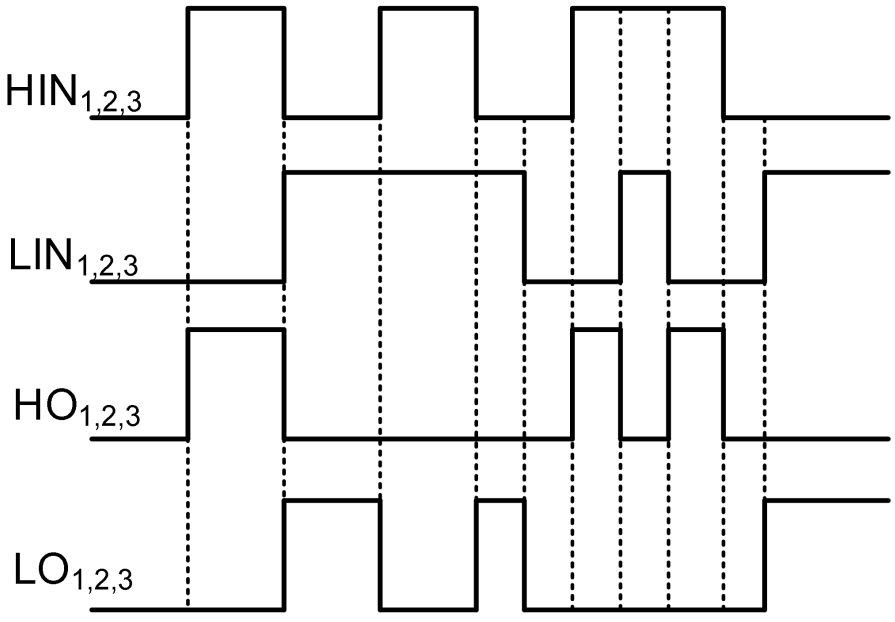
Unless otherwise specified, $V_{CC}=V_{BS}=15 ~V$, $T_{A}=25^{\circ} C$. Parameters V_{IH}, V_{IL}, and IIN are referenced to COM and apply to input pins $HIN_{1,2,3}$ and $LIN_{1,2,3}$. Parameters V_{O} and I_{O} are referenced to COM and apply to output pins HO and LO.

Symbol	Definition	Minimum	Typical	Maximum	Unit	Test Conditions
VccuV+	Vcc UVLO Positive Threshold	6.4	7.0	7.6	V	
Vccuv−	Vcc UVLO Negative Threshold	6.0	6.6	7.2	V	
VCCuVHYS	VCC UVLO Hysteresis		0.4		V	
VBSUV+	VBS UVLO Positive Threshold	6.4	7.1	7.7	V	
VBsuv−	VBS UVLO Negative Threshold	6.2	6.9	7.5	V	
VBSUVHYS	VBS UVLO Hysteresis		0.2		V	

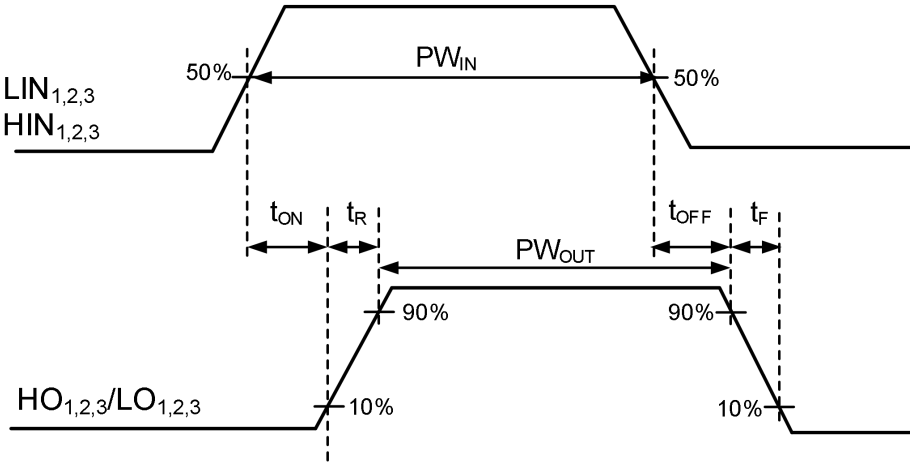
Symbol	Definition	Minimum	Typical	Maximum	Unit	Test Conditions
ILK	Leakage Current			90	uA	VB=Vs=250V
IQBs	VBS Quiescent Current		70	150	uA	VIN=0V or 5V
Iacc	VCC Quiescent Current		230	350	uA	VIN=0V or 5V
VIH	Logic High Input Threshold Voltage	2.5			V	VCC=10V to 20V
VIL	Logic Low Input Threshold Voltage			0.8	V	VCC=10V to 20V
VoH	Output High Voltage Drop (VBIAS−VO)			0.2	V	IO=0A
VoL	Output Low Voltage Drop			0.1	V	IO=0A
IIN+	Logic "1" Input Bias Current		25	50	uA	HIN=5V, LIN=5V
IN−				2	uA	HIN=0V, LIN=0V

Symbol	Definition	Minimum	Typical	Maximum	Unit	Test Conditions
	Logic "0" Input Bias Current					
Vs	Vs Negative Bias		−9		V	
Io+	Output High Short−Circuit Pulse Current	1.1	1.5		A	Vo=0V, PW≤10us
Io−	Output Low Short−Circuit Pulse Current	1.3	1.8		A	Vo=15V, PW≤10us

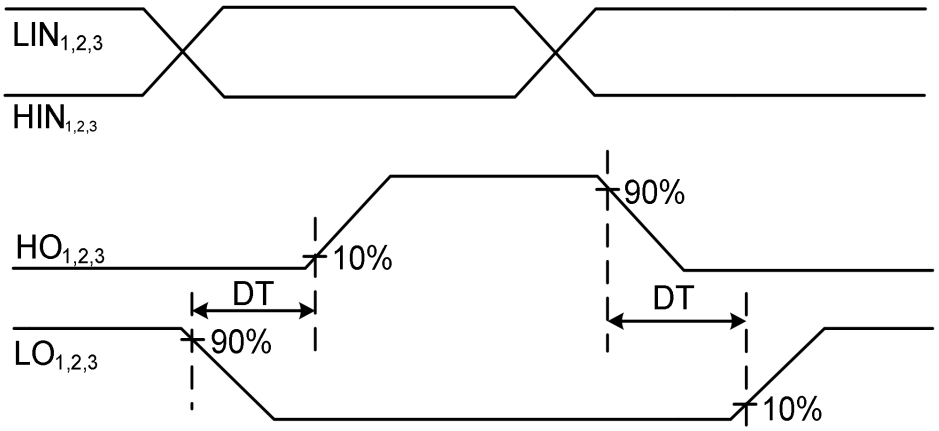
Functional Description



Input and output logic waveform

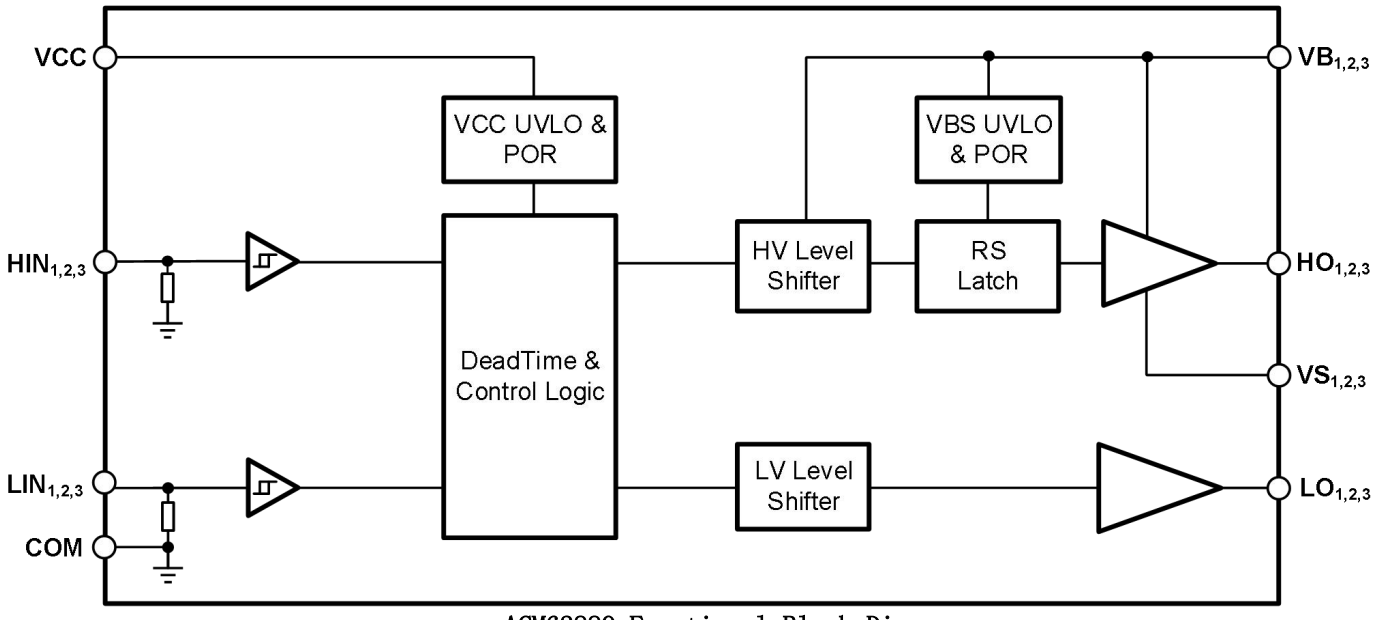


Transmission delay waveform definition



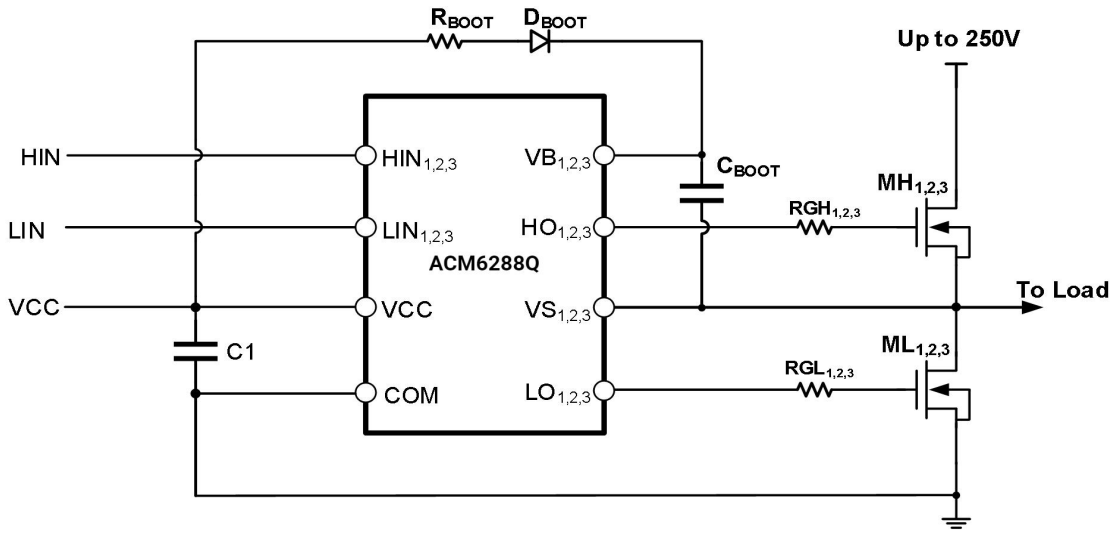
Dead Time Waveform Definition

Functional Block Diagram



ACM6288Q Functional Block Diagram

Typical application circuit



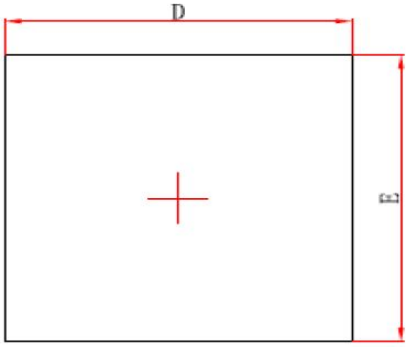
Typical application circuit diagram

Package information

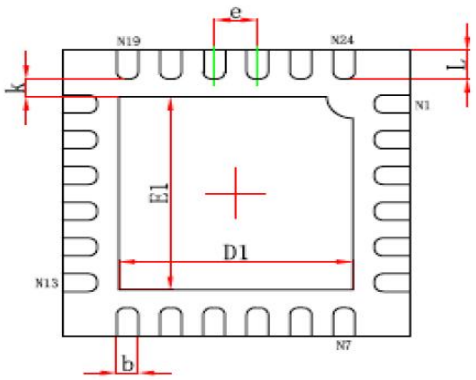
QFN24 Package Dimensions

Size / Symbol	MIN(mm)	TYP(mm)	MAX(mm)	Size / Symbol	MIN(mm)	TYP(mm)	MAX(mm)
A	0.700/0.800	-	0.800/0.900	E1	2.600	-	2.800
A1	0.000	-	0.050	K		0.200MN	
A3		0.203REF		B	0.200	-	0.300
D	3.924	-	4.076	e		0.500TYP	
E	3.924	-	4.076	L	0.324	-	0.476
D1	2.600	-	2.800				

QFN24 Package Outlines



Top View



Bottom View