

Description

The MCP1415/6 device is a low voltage power MOSFET and IGBT in phase gate driver. Proprietary latch-immune of CMOS technology enables single-chip integrated architectures with high robustness. The MCP1415/6 logic input level is compatible with CMOS or TTL logic output levels down to 3.3V. The output driver has internal Undervoltage Lockout (UVLO) circuitry with hysteresis and buffer stage of output current . The MCP1415/6 is designed to operate over a wide VCC range of 5 V to 25 V and wide temperature range of -40°C to 125°C.

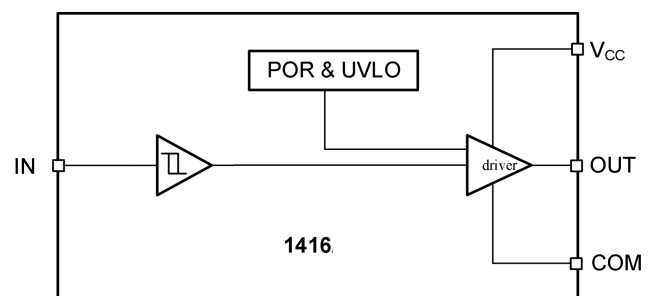
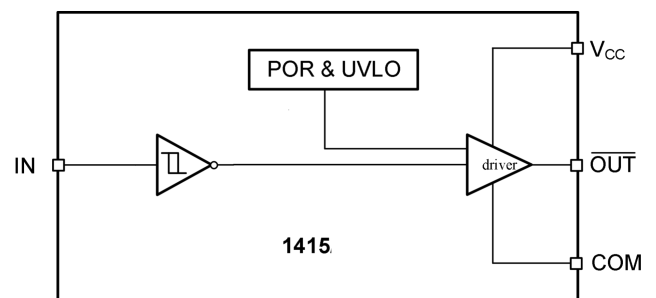
Features

- Input output in phase / out of phase
- Compatible with 3.3V、 5V input logic
- 4.5 to 25-V Single-Supply Range
- High capacitance load driving capability
- Operating Temperature Range of -40 to 125°C
- Undervoltage Lockout
- Turn on/Turn off Delays:
-- Ton/Toff =25ns/25ns
- 2-A Peak Source and Sink-Drive Current
- SOT23-5 Package

Applications

- Switch-Mode Power Supplies
- General Gate Driver
- Driving MOSFETs and IGBTs

Pin Configuration



Pin Configuration and Functions

Table 6-1 MCP1415 pin description

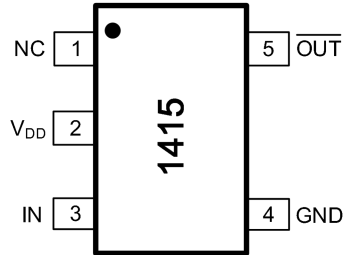
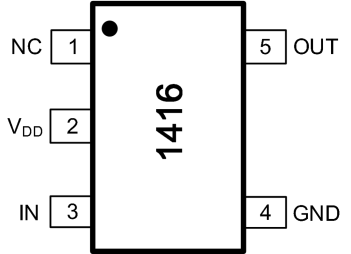
PIN	NAME	DESCRIPTION	top view
1	NC	No connection	
2	VDD	Power supply	
3	IN	Logic input	
4	GND	Ground	
5	OUT	Gate driven output(out-of-phase)	

Table 6-3 MCP1416 pin description

PIN	NAME	DESCRIPTION	top view
1	NC	No connection	
2	VDD	Power supply	
3	IN	Logic input	
4	GND	Ground	
5	OUT	Gate driven output(in-phase)	

Absolute Maximum Ratings

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. All voltages are with respect to GND unless otherwise noted, Currents are positive into, negative out of the specified terminal, environment temperature is 25 °C.

Symbol	Definition	MIN	MAX	UNIT
V _{CC}	Supply voltage range	-0.3	25	V
V _O	OUT voltage range	-0.3	V _{CC} +0.3	
V _{IN}	IN voltage	-12	V _{CC} +0.3	

Thermal Information

Symbol	Definition	MIN	MAX	UNIT
R _{thJA}	thermal resistance		151	°C/W
T _S	Storage temperature	-55	+150	°C
T _J	Operating junction temperature		+150	
T _L	Lead temperature		300	

Recommended Operating Conditions

To properly operate, device should be used in the following recommended conditions. All voltages are with respect to GND unless otherwise noted, Currents are positive into, negative out of the specified terminal, environment temperature is 25 °C.

Symbol	Definition	MIN	MAX	UNIT
V _{CC}	Supply voltage range	4.5	20	V
V _O	OUT voltage range	0	V _{CC}	
V _{IN}	IN voltage	-10	V _{CC}	
T _A	ambient temperature	-40	125	°C

Electrical Characteristics

TA= 25°C, VCC=15V(unless otherwise noted)

Symbol	Definition	MIN	TYP	MAX	UNIT	
V _{IH}	Input signal high threshold	2.5			V	
V _{IL}	Input signal low threshold			0.8	V	
V _{CCUV+}	Undervoltage Lockout (UVLO) turn-on threshold VCC		4.0		V	
V _{CCUV-}	Undervoltage Lockout (UVLO) turn-off threshold VCC		3.9		V	
V _{CCUVHY}	UVLO threshold hysteresis VCC		0.1		V	
I _{IN+}	Input current(IN=HIGH)	MCP1416	IN=5V	50	100	μA
		MCP1415	IN=0V	150	300	μA
I _{IN-}	Input current(IN= LOW)	MCP1416	IN=0V		5	μA
		MCP1415	IN=5V	100	200	μA
V _{OH}	High output voltage			0.35	V	
V _{OL}	Low output voltage			0.35	V	
I _Q	VCC quiescent supply current			500	μA	
I _{O+}	Output high short-circuit pulse current		2		A	
I _{O-}	Output low short-circuit pulse current		2		A	
t _R	Rise time(CL=1nF)			30	ns	
t _F	Fall time(CL=1nF)			30	ns	
t _{ON}	Turn-on propagation delay(CL=1nF)		25	50	ns	
t _{OFF}	Turn-off propagation delay(CL=1nF)		25	50	ns	

Function Description

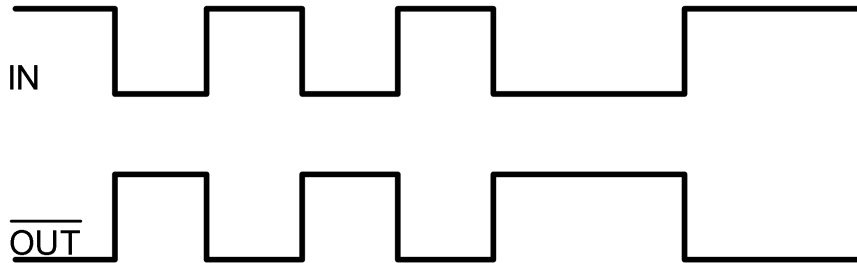


Figure 8-1 MCP1415 Input-Output waveform

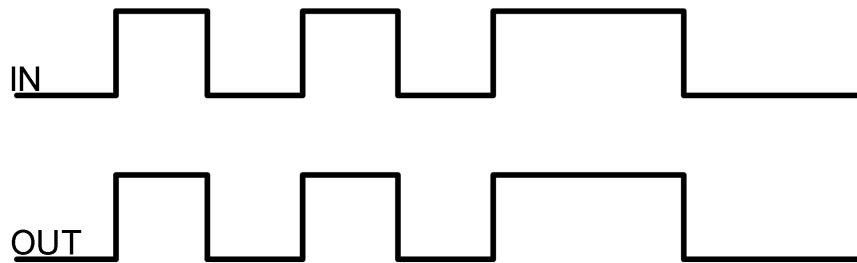


Figure 8-2 MCP1416 Input-Output waveform

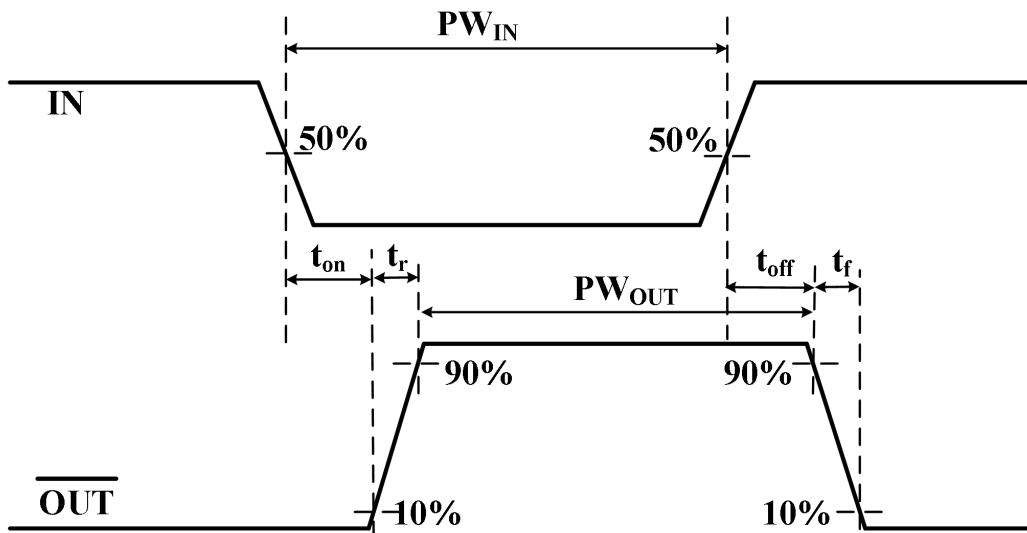


Figure 8-3 MCP1415 Propagation Time Waveform Definition

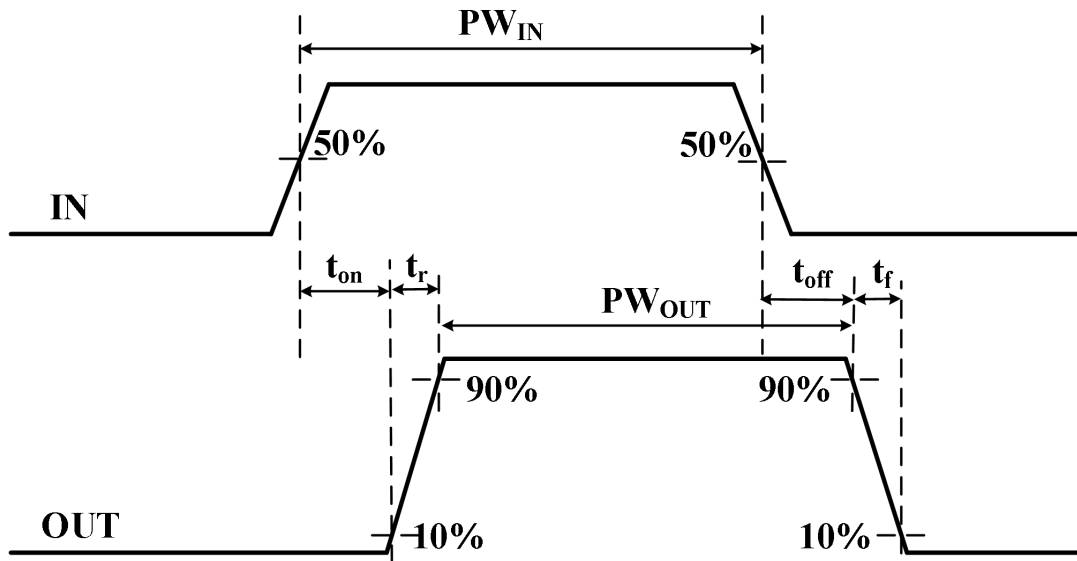


Figure 8-4 MCP1416 Propagation Time Waveform Definition

MCP1415/6 Description

Function Block Diagram

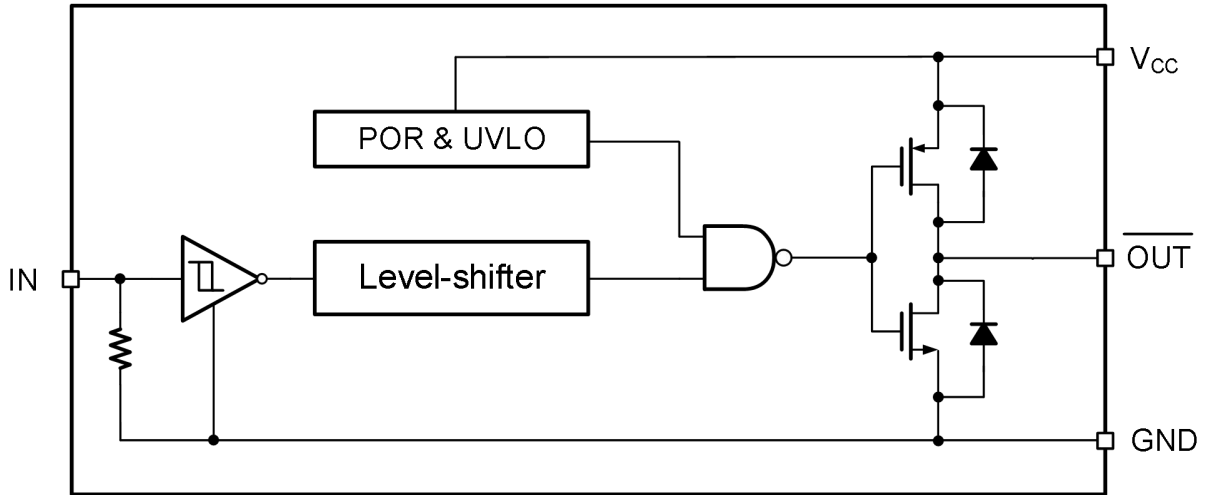


Figure 10-1 Function Block Diagram of MCP1415

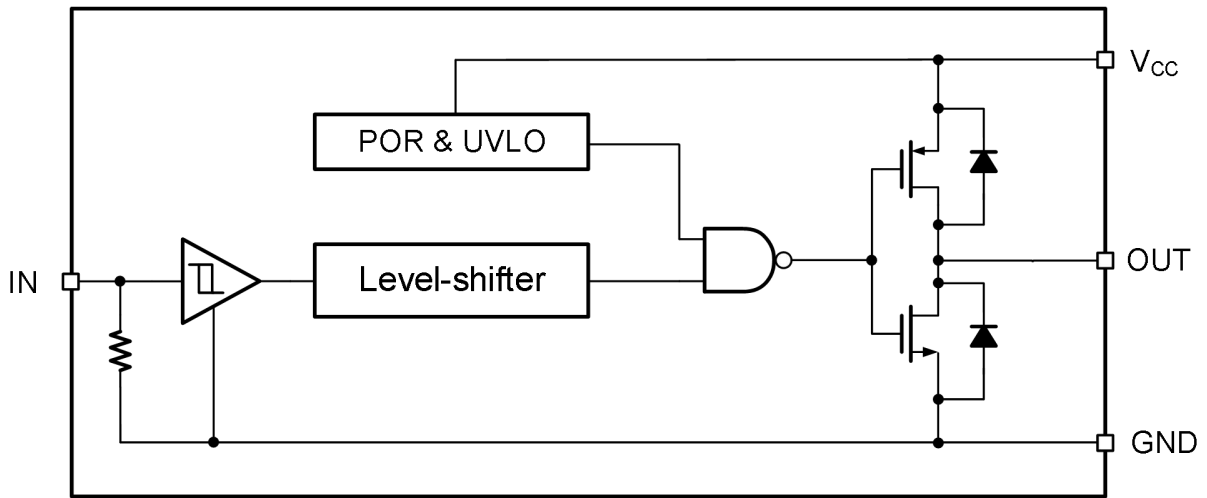


Figure 10-2 Function Block Diagram of MCP1416

Application message

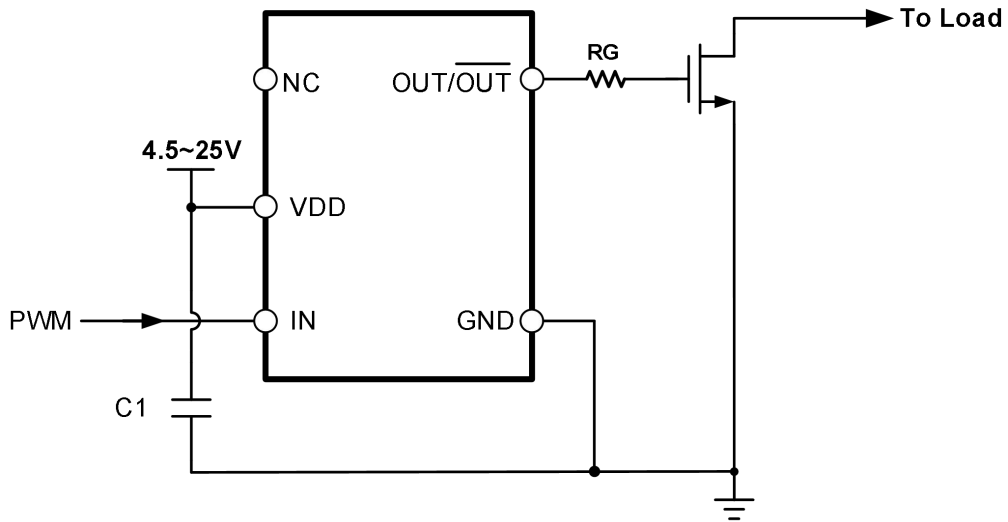
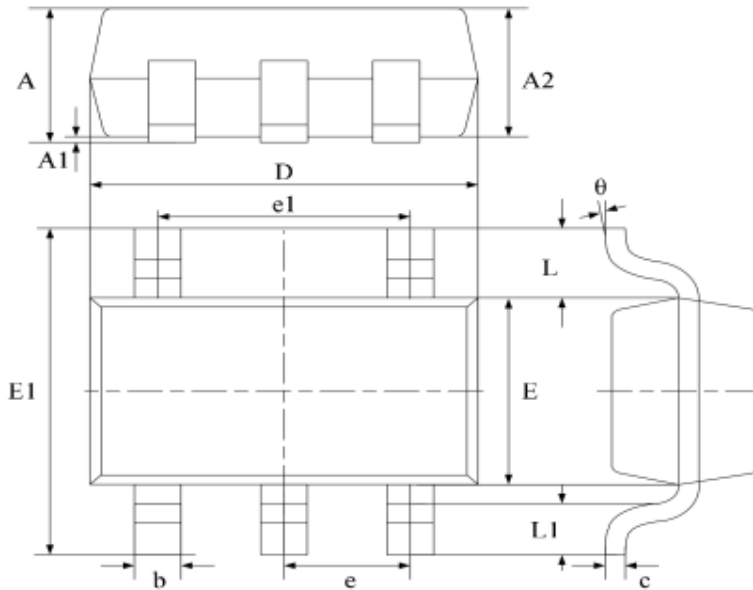


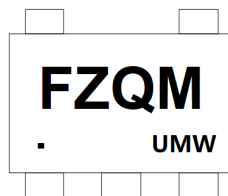
Figure10-3 Typical application circuit of MCP1415/6

SOT23-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.040	1.350	0.042	0.055
A1	0.040	0.150	0.002	0.006
A2	1.000	1.200	0.041	0.049
b	0.380	0.480	0.015	0.020
c	0.110	0.210	0.004	0.009
D	2.720	3.120	0.111	0.127
E	1.400	1.800	0.057	0.073
E1	2.600	3.000	0.106	0.122
e	0.950 typ.		0.037 typ.	
e1	1.900 typ.		0.078 typ.	
L	0.700 ref.		0.028 ref.	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode	Marking
UMW MCP1416T-E/OT	SOT23-5	3000	Tape and reel	FZQM
UMW MCP1415T-E/OT	SOT23-5	3000	Tape and reel	FYBU