

Features

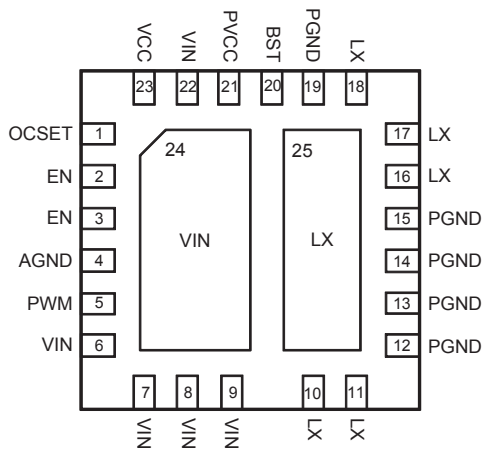
- Integrated Low Side NMOS: $R_{DS(on)}=12m\Omega @ V_{CC}=5V$
- Integrated High Side NMOS: $R_{DS(on)}=30m\Omega @ V_{CC}=5V$
- Integrated OCP function with over current trigger point adjustable using an external resistor
- Integrated OTP function
- Enable pin (EN) controls the output status
- Package type: 23-pin QFN

General Description

The HT45B0016 is a two-in-one power half-bridge chip developed by Holtek for wireless charger applications. The half-bridge power stage with integrated NMOS, can work with the HT66FW2230 or HT66FW2350 to achieve complete wireless charger solutions. The VIN input range is 4.5V~25V covering various wireless charger transmitter types. The HT45B0016 chip can be flexibly used in different architectures, a single chip for half-bridge driver LC series resonance and two chips for full-bridge driver LC series resonance. Combined with the HT66FW2230 or HT66FW2350 software architecture, a half-bridge solution can be used for low power applications while a full-bridge solution can be used for medium power applications.

The HT45B0016 is supplied in the 23-pin QFN package type. The PCB layout and other important information are provided in the following sections.

Pin Assignment



HT45B0016
23 QFN-A

Order Number	Marking	Temp. Range	Package (Green)
HT45B0016QT1U	HT45B0016	-40°C to +85°C	23QFN (4mm×4mm)

Note: QT: QFN4X4-23; 1: Bonding Code; U: Tape & Reel;

Green: Lead Free / Halogen Free.

Pin Description

No.	Pin Name	Description
1	OCSET	OCSET setup; connects a resistor to ground for OCP trigger setup.
2, 3	EN	Enable pin. High=enable; Low=disable. Can not be floating.
4	AGND	Analog ground
5	PWM	Driver PWM input
6, 7, 8, 9, 22, 24	VIN	Power supply
10, 11, 16, 17, 18, 25	LX	High side and low side MOSFET node. PWM output voltage connects the output LC resonance circuit.
12, 13, 14, 15, 19	PGND	Power supply ground
20	BST	Boost capacitor connection; externally connects a capacitor to LX.
21	PVCC	Driver power supply
23	VCC	Analog power supply for internal circuits; connects a bypass capacitor to AGND.

Absolute Maximum Ratings

VIN to AGND	-0.3V to 30V	LX to BST	-6V to 0.3V
VCC to AGND	-0.3V to 6V	Thermal Resistance of Junction to Ambient, (θJA)	
PVCC to AGND	-0.3V to 6V	QFN4X4-23	25°C/W
EN, OCSET, PWM to AGND	-0.3V to 6V	Junction Temperature	150°C
BST to PGND	-0.3V to 35V	Storage Temperature	-65°C to 150°C
		Reflow Temperature (soldering, 10 seconds)	300°C

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of the device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect devices reliability.

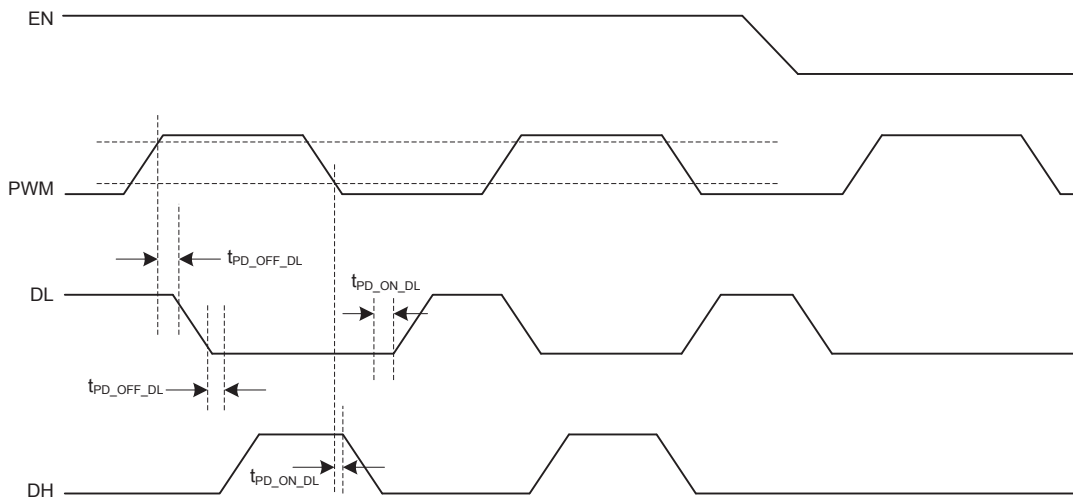
Electrical Characteristics

The device is not guaranteed to function outside its operating conditions. Parameters with Min. and/or Max. limits are 100% tested at +25°C, unless otherwise specified.

Parameter	Conditions	Min.	Typ.	Max.	Unit
VIN Input Voltage Range	V _{IN}	4.5	—	25	V
VCC Input Voltage Range	V _{CC}	4.5	5	5.5	V
Quiescent Supply Current (VCC)	EN=High, PWM=Low	—	210	250	μA
Shutdown Current (VCC)	EN=Low	—	—	1	μA
VCC Rising POR Threshold	—	3.7	4.0	4.3	V
VCC POR Hysteresis	—	150	200	250	mV
Zero Current Detect	LX-PGND	-5	—	5	mV
OCSET Current Source	—	9	10	11	μA
Thermal Shutdown Threshold	Hysteresis=45°C	—	145	—	°C
High Side Switch Resistance	BST-LX forced to 5V, V _{CC} =5V	—	30	—	mΩ
Low Side Switch Resistance	V _{CC} =5V	—	12	—	mΩ
PWM Input Logic Threshold	PWM Rising (V _{TH_PWM_R})	3.6	3.9	4.1	V
	PWM Falling (V _{TH_PWM_F})	1.0	1.2	1.4	
Tri-state Input Rising Logic Threshold	PWM Rising (V _{TH_PWM_R})	1.0	1.3	1.6	V
	Hysteresis	140	280	420	mV

Parameter	Conditions	Min.	Typ.	Max.	Unit
Tri-state Input Falling Logic Threshold	PWM Falling ($V_{TH_PWM_F}$)	3.4	3.7	4.0	V
	Hysteresis	85	170	255	mV
Logic Input High Voltage	EN	2.0	—	—	V
Logic Input Low Voltage	EN	—	—	0.8	V
PWM to High Side Gate ($t_{PD_OFF_DH}$)	PWM High to Low to DH High to Low	—	20	—	ns
PWM to Low Side Gate ($t_{PD_OFF_DL}$)	PWM Low to High to DL High to Low	—	20	—	ns
Low to High Side Gate Deadtime ($t_{PD_ON_DH}$)	DL High to Low to DH Low to High	—	20	—	ns
High to Low Side Gate Deadtime ($t_{PD_ON_DL}$)	DH High to Low to DL Low to High	—	20	—	ns

PWM Timing Diagram



PWM Logic Output vs. EN Status

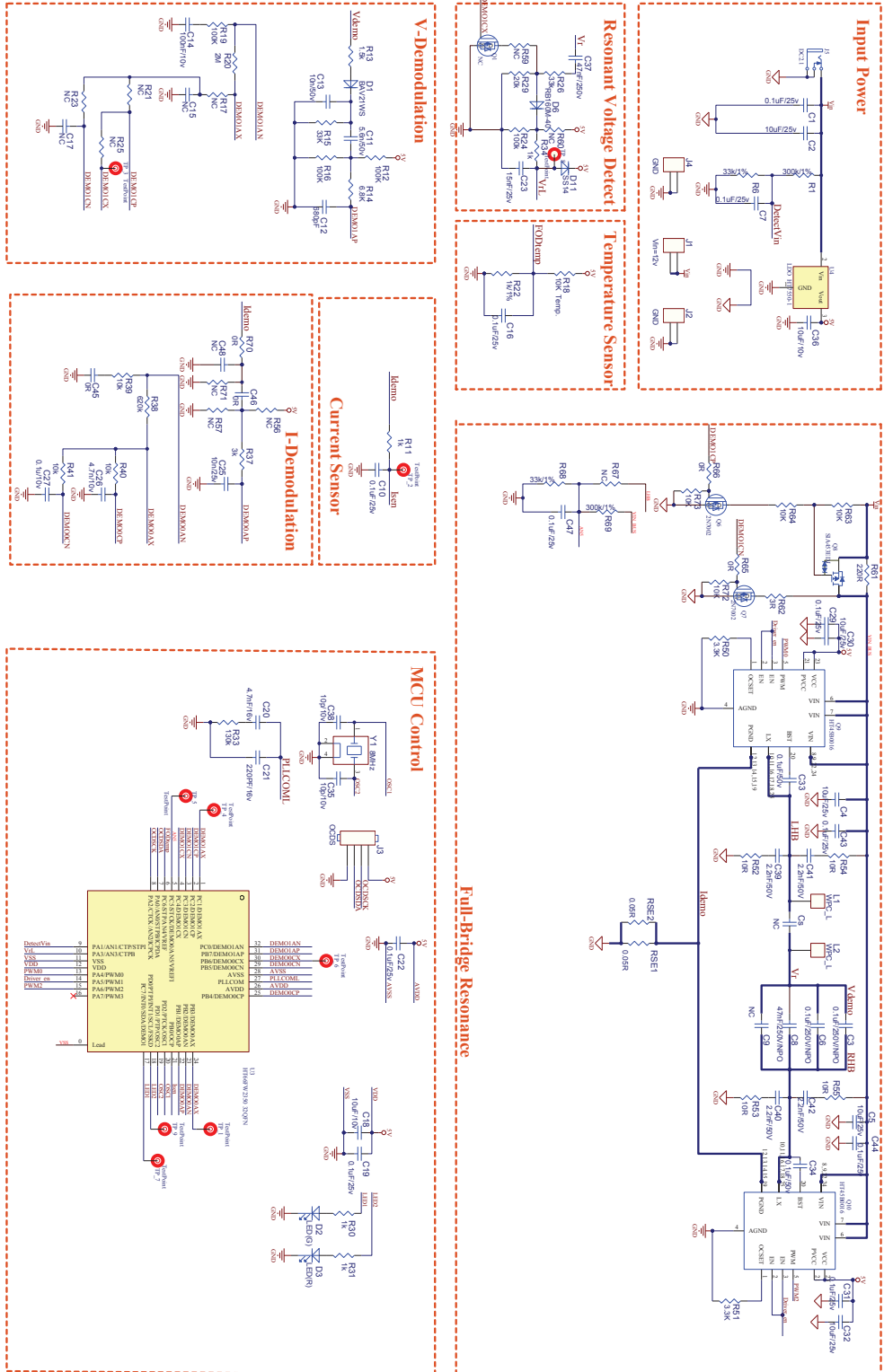
EN	PWM	DH	DL
L	x	L	L
H	H	H	L
H	L	L	H

Note: L=Low; H=High; x=Don't care.

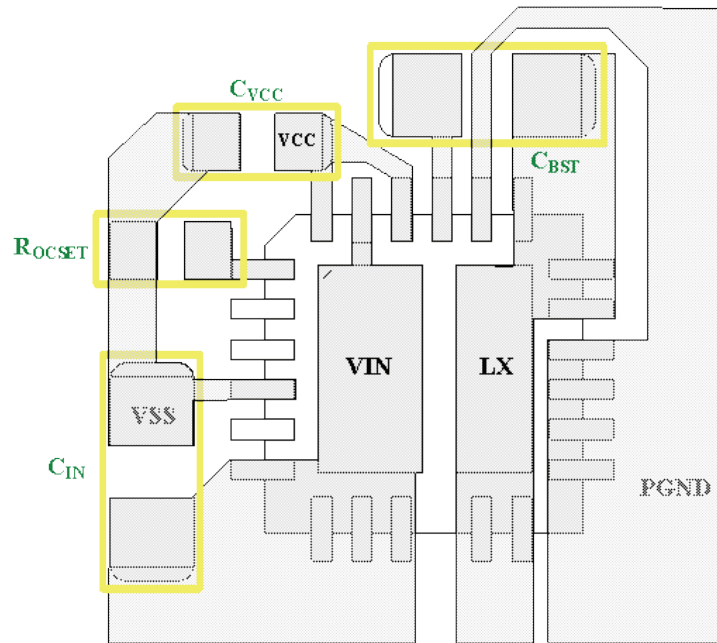
Output Truth Table

Application Circuits

15W Wireless Charger TX MP-A2 Type



Layout Guide



Layout Reference Circuit

Component Reference:

CVCC	0.1 μ F/0603
CIN	10 μ F/0805
CBST	0.1 μ F/0805
ROCSET	0603

Layout Considerations:

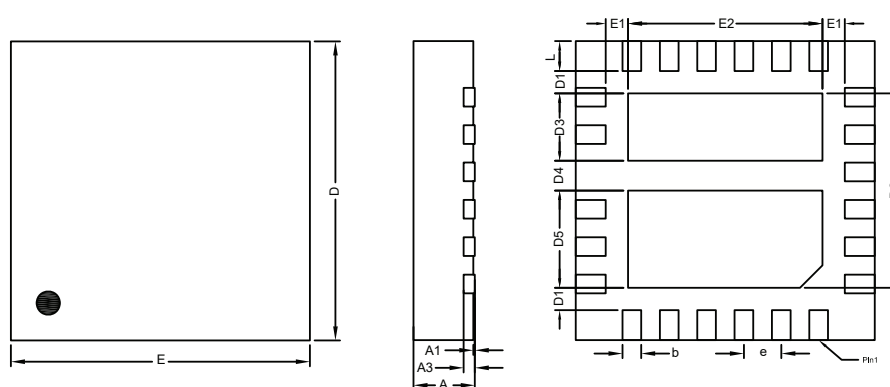
1. The input capacitor CIN should be placed as close to the VIN pin as possible. The power flows through CIN first and then enters the VIN pin.
2. The inductor should be placed as close to the LX pin as possible to reduce system noise interference resulting from the copper.
3. All analog signals should be as far away from the high voltage switching (LX, BST, etc) as possible.

Package Information

Note that the package information provided here is for consultation purposes only. As this information may be updated at regular intervals users are reminded to consult the [Holtek website](#) for the latest version of the [package information](#).

Additional supplementary information with regard to packaging is listed below. Click on the relevant section to be transferred to the relevant website page.

- Further Package Information (include Outline Dimensions, Product Tape and Reel Specifications)
- Packing Materials Information
- Carton information

SAW Type 23-pin QFN (4mm×4mm×0.8mm) Outline Dimensions


Symbol	Dimensions in inch		
	Min.	Nom.	Max.
A	0.028	0.031	0.035
A1	0.000	—	0.002
A3	—	0.008 BSC	—
b	0.008	0.010	0.012
D	0.156	0.157	0.159
E	0.156	0.157	0.159
e	—	0.020 BSC	—
D1	—	0.012 BSC	—
E1	—	0.012 BSC	—
D2	0.098	0.102	0.106
E2	0.098	0.102	0.106
D3	0.033	0.035	0.037
D4	0.014	0.016	0.018
D5	0.049	0.051	0.053
L	0.014	0.016	0.018

Symbol	Dimensions in mm		
	Min.	Nom.	Max.
A	0.70	0.80	0.90
A1	0.00	—	0.05
A3	—	0.20 BSC	—
b	0.20	0.25	0.30
D	3.95	4.00	4.05
E	3.95	4.00	4.05
e	—	0.50 BSC	—
D1	—	0.30 BSC	—
E1	—	0.30 BSC	—
D2	2.50	2.60	2.70
E2	2.50	2.60	2.70
D3	0.85	0.90	0.95
D4	0.35	0.40	0.45
D5	1.25	1.30	1.35
L	0.35	0.40	0.45

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