

1.0A 100KHz 80V Buck DC to DC Converter**Features**

- Operation Voltage From 8V to 80V
- Maximum Duty Cycle up to 85%
- Minimum Drop Out 2.0V
- Adjust VOUT from 1.25V to 20V
- Maximum IOUT=1.0A at VOUT=5V
- Maximum IOUT=0.5A at VOUT=15V
- Fixed 100KHz Switching Frequency
- Maximum Output Power less than 8W
- EN Pin TTL Shutdown Capability
- Internal Optimize HV Power MOSFET
- High efficiency up to 91% .
- Excellent line and load regulation
- Built in current limit function
- Built in output short shutdown function
- Available in SOP-8(EP) Packages

General Description

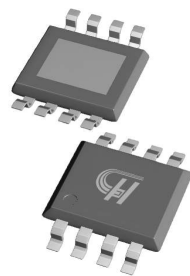
The HCR3446H is a 100KHz fixed frequency PWM buck (step-down) DC/DC converter, capable of driving a 1.0A load with high efficiency, low ripple and excellent line and load regulation.

Required a minimum number of external components, the regulator is simple to use and include internal frequency compensation and a fixed-frequency oscillator.

The PWM control circuit is able to adjust the duty ratio linearly from 0 to 85%.

Applications

- Car Charger .
- Ebike Controller Power Supply
- Telecor
- Networking Equipment



SOP-8(EP)

Figure 1. Package Type of HCR3446H

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Pin Configuration

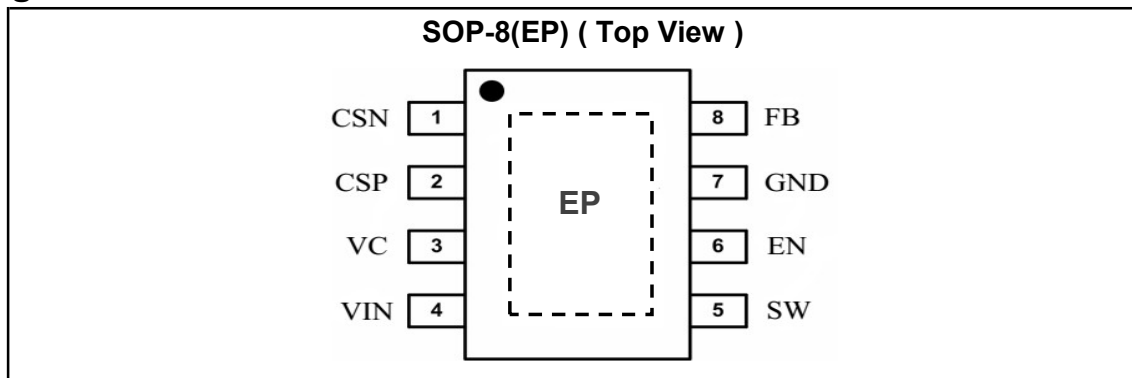
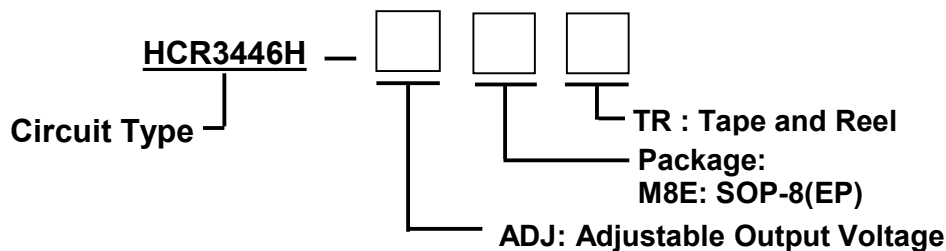


Figure 2. Pin Configuration of HCR3446H (Top View)

Pin Function Table

Pin Number	Pin Name	Function
1	CSN	Current Sense Negative Terminal.
2	CSP	Current Sense Positive Terminal.
3	VC	Internal Voltage Regulator Bypass Capacity. In typical system application, The VC pin connect a 1uF capacity to VIN.
4	VIN	Supply Voltage Input Pin. HCR3446H operates from 8V to 80V DC voltage. Bypass Vin to GND with a suitably large capacitor to eliminate noise on the input.
5	SW	Power Switch Output Pin (SW). Output is the switch node that supplies power to the output. The exposed PAD(EP) is SW.
6	EN	Enable Pin. Drive EN pin high to turn off the device, drive it low to turn it on. Floating is default low. Connect to GND to enable the voltage regulator.
7	GND	Ground Pin. Care must be taken in layout. This pin should be placed outside of the schottky diode to output capacitor ground path to prevent switching current spikes from inducing voltage noise into HCR3446H.
8	FB	Feedback Pin(FB). Through an external resistor divider network, Feedback senses the output voltage and regulates it. The feedback threshold voltage is 1.25V.

Ordering Information



Ordering Code

Part Number	Marking ^[1]	Temperature Range	Package	Package Type
HCR3446H-ADJM8ETR	HCR3446Hxx	-40°C to +85°C	SOP-8(EP)	4000pcs/Tape&Reel

Note 1.The “xx” is date code

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Functional Block Diagram

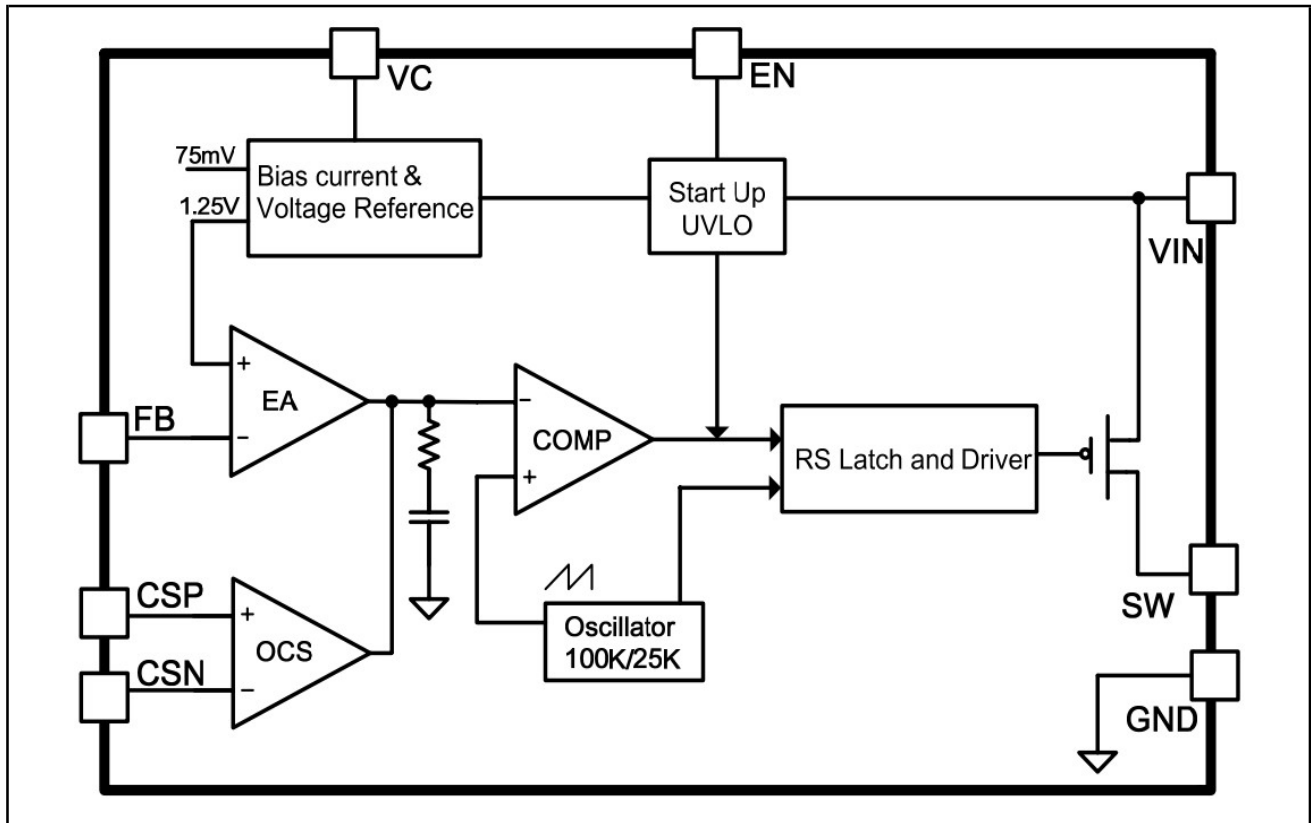


Figure 3. Functional Block Diagram of HCR3446H

Typical Application Circuit ^{note a}

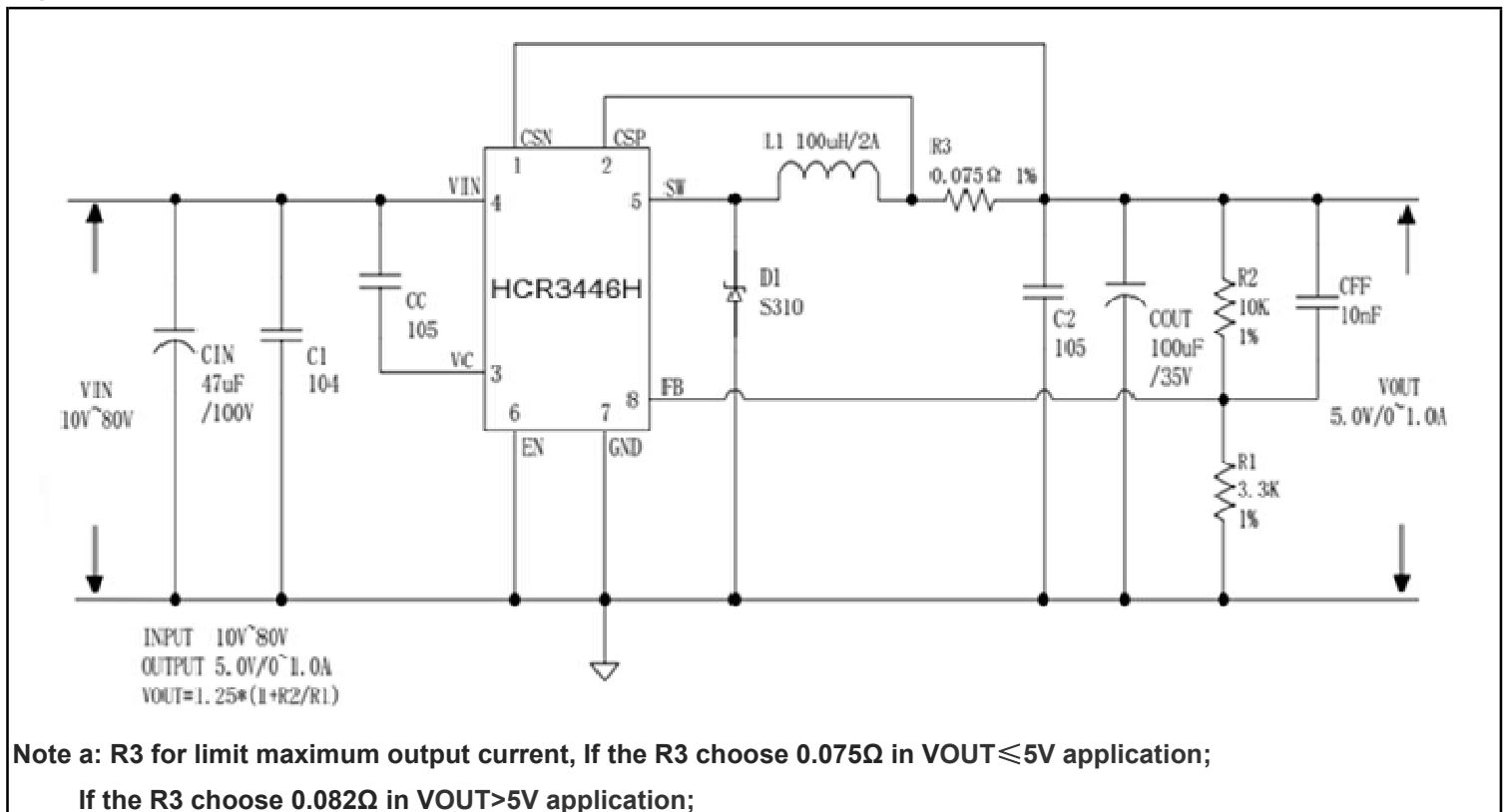


Figure 4. HCR3446H Typical Application Circuit (VIN=10V~80V, VOUT=5V/1A)

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Absolute Maximum Ratings ^{Note 1}

Parameter	Symbol	Value	Unit
VIN Input Voltage	V _{IN}	-0.3 to 90	V
EN Pin Voltage	V _{EN}	-0.3 to 20	V
Feedback (FB) Pin Voltage	V _{FB}	-0.3 to 5	V
Output Switch Pin Voltage	V _{SW}	-0.3 to VIN	V
Power Dissipation	P _D	Internally limited	mW
Thermal Resistance Junction to Ambient (No Heatsink, Free Air)	R _{θJA}	60	'C/W
Thermal Resistance Junction to Case	R _{θJC}	22	'C/W
Storage Temperature Range	T _{STG}	-65 to 150	'C
Operating Junction Temperature ^{note1}	T _J	-40 to 150	'C
Lead Temperature (Soldering, 10s)	T _{LEAD}	260	'C
Human Body Model ESD Protection	ESD HBM	> 3000	V

Note 1: Stresses greater than those listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

HCR3446H Electrical Characteristics(Ta=25'C; unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
System parameters test circuit figure-4						
Feedback(FB) Voltage	V _{FB}	V _{in} =20V to 80V, V _{out} =15V, I _{load} =0.2A	1.225	1.250	1.275	V
Efficiency	η	V _{in} =24V, V _{out} =15V I _{out} =0.5A	-	95	-	%
Efficiency	η	V _{in} =36V, V _{out} =15V I _{out} =0.5A	-	92	-	%
Efficiency	η	V _{in} =48V, V _{out} =15V I _{out} =0.5A	-	89	-	%
Efficiency	η	V _{in} =60V, V _{out} =15V I _{out} =0.5A	-	87	-	%
Efficiency	η	V _{in} =72V, V _{out} =15V I _{out} =0.5A	-	86	-	%

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Electrical Characteristics(DC Parameters)

Vin=48V, GND=0V, Vin&GND parallel connect a 47uF/100V capacitor; Iout=0.2A, Ta=25°C;

the others floating unless otherwise specified.

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Input Operation Voltage	Vin	-	8	-	80	V
VIN UVLO	Vin_UVLO	-	-	6	-	V
Shutdown Supply Current	ISTBY	VEN=2V	-	160	400	uA
Quiescent Supply Current	Iq	VEN=0V, VFB=2V	-	2.1	5	mA
Output Short Supply Current	Iosp	-	-	-	5	mA
Oscillator Frequency	Fosc	-	75	100	135	KHz
Switch Current Limit	IL	VFB=0, R3=0.075Ω	-	1.1	-	A
EN Pin Threshold	VEN_H	High(Regulator OFF)	-	2	-	V
	VEN_L	Low(Regulator ON)	-	1	-	V
Output Power PMOS	Rdson	Vin=48V, Isw=1.0A	-	-	270	mΩ

Typical Performance Characteristics

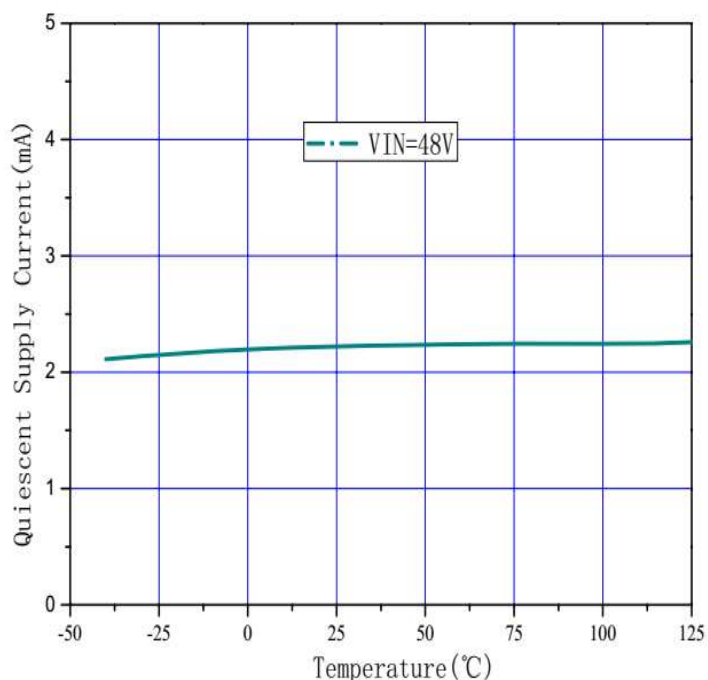


Figure 5. Quiescent Supply Current VS Temperature

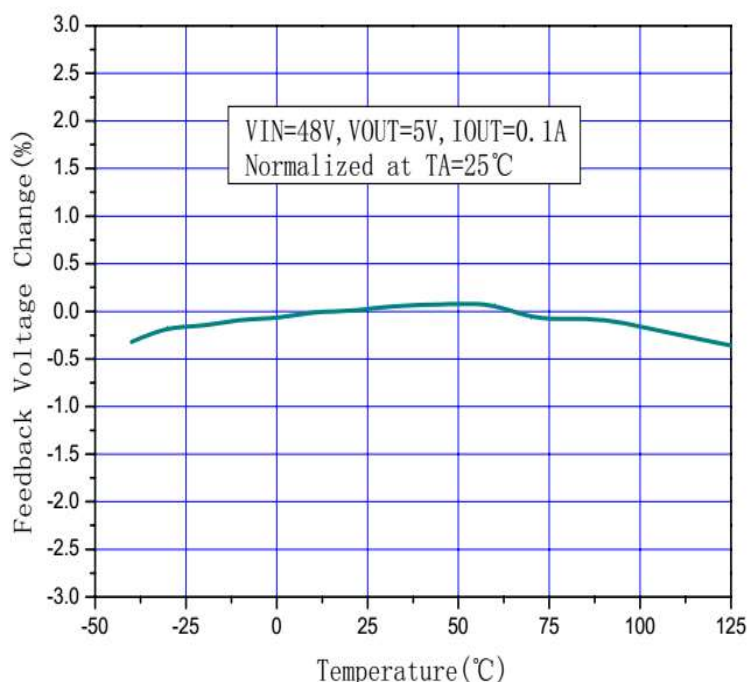


Figure 6. Feedback Voltage Change VS Temperature

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Typical Performance Characteristics (Con.)

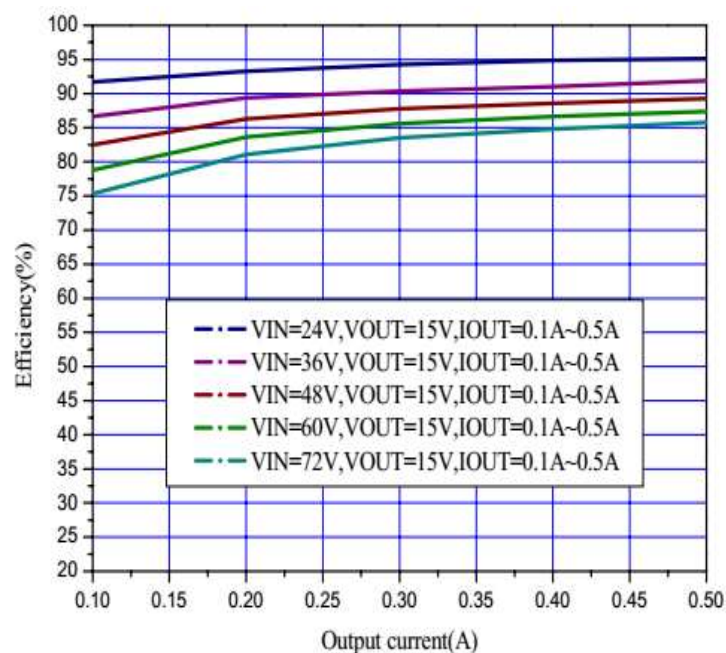


Figure 7. Efficiency VS Output Current
at $V_{IN}=20V \sim 80V$, $V_{OUT}=15V$

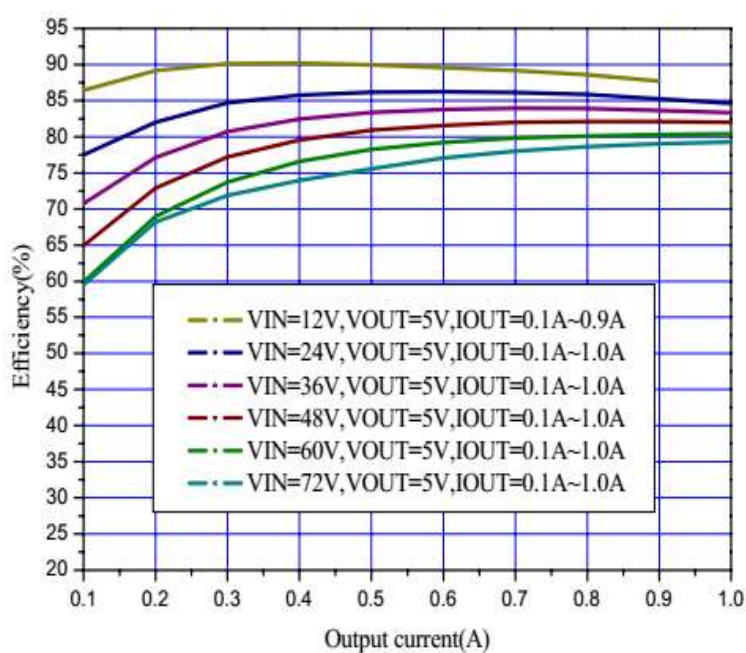


Figure 8. Efficiency VS Output Current
at $V_{IN}=10V \sim 80V$, $V_{OUT}=5.0V$

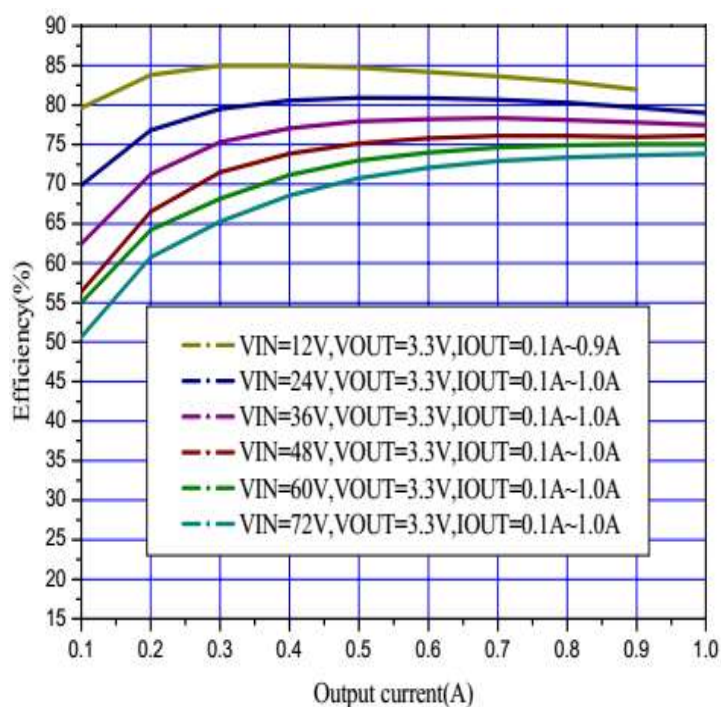


Figure 9. Efficiency VS Output Current
at $V_{IN}=8V \sim 80V$, $V_{OUT}=3.3V$

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Typical System Application ($V_{OUT}=15V$, $I_{OUT}=0\sim0.5A$)

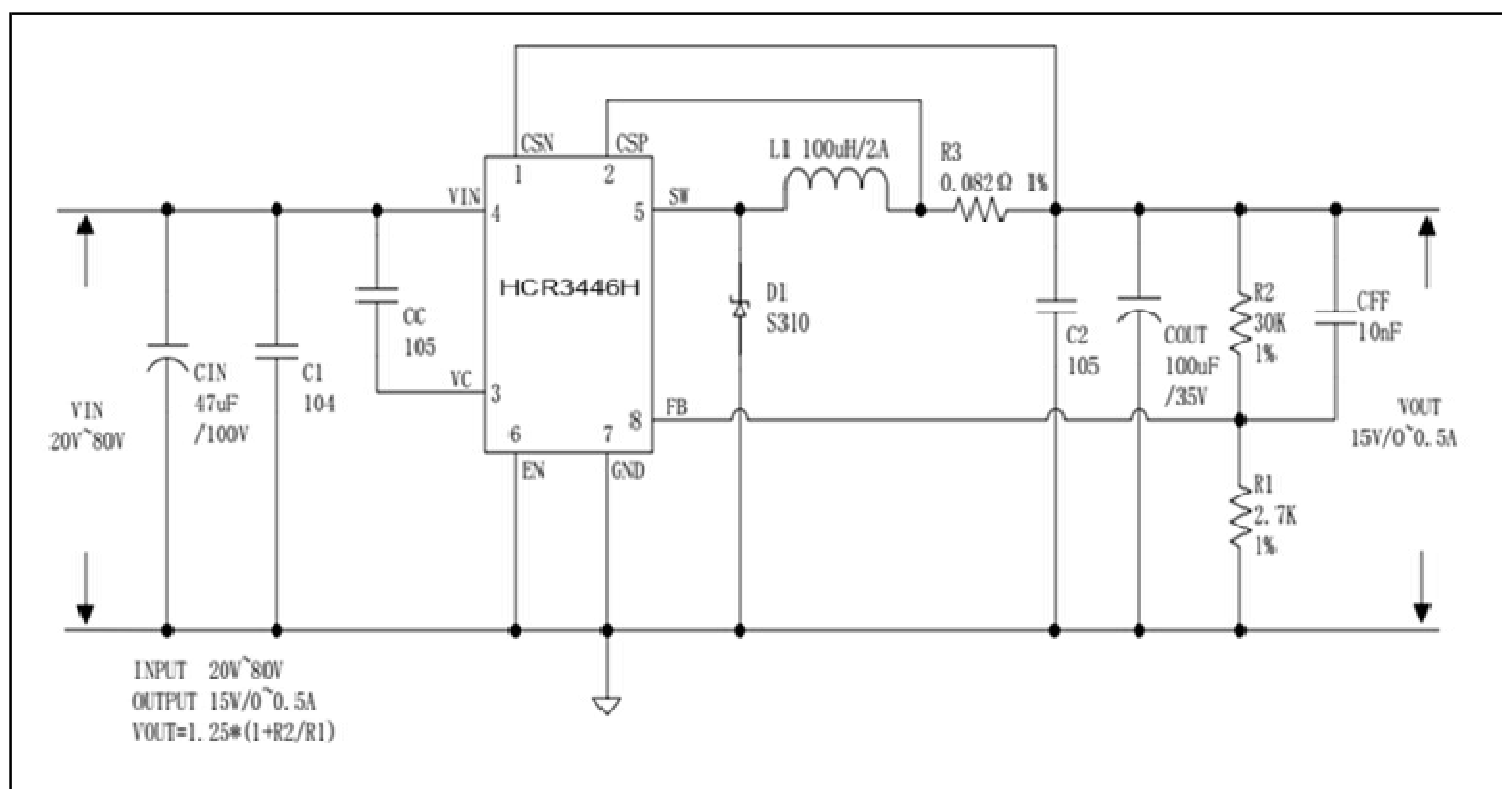


Figure 10. HCR3446H System Application ($V_{IN}=20V\sim80V$, $V_{OUT}=15V$, $I_{OUT}=0\sim0.5A$)

ON/OFF Mode Application ($V_{EN}=0/2V$)

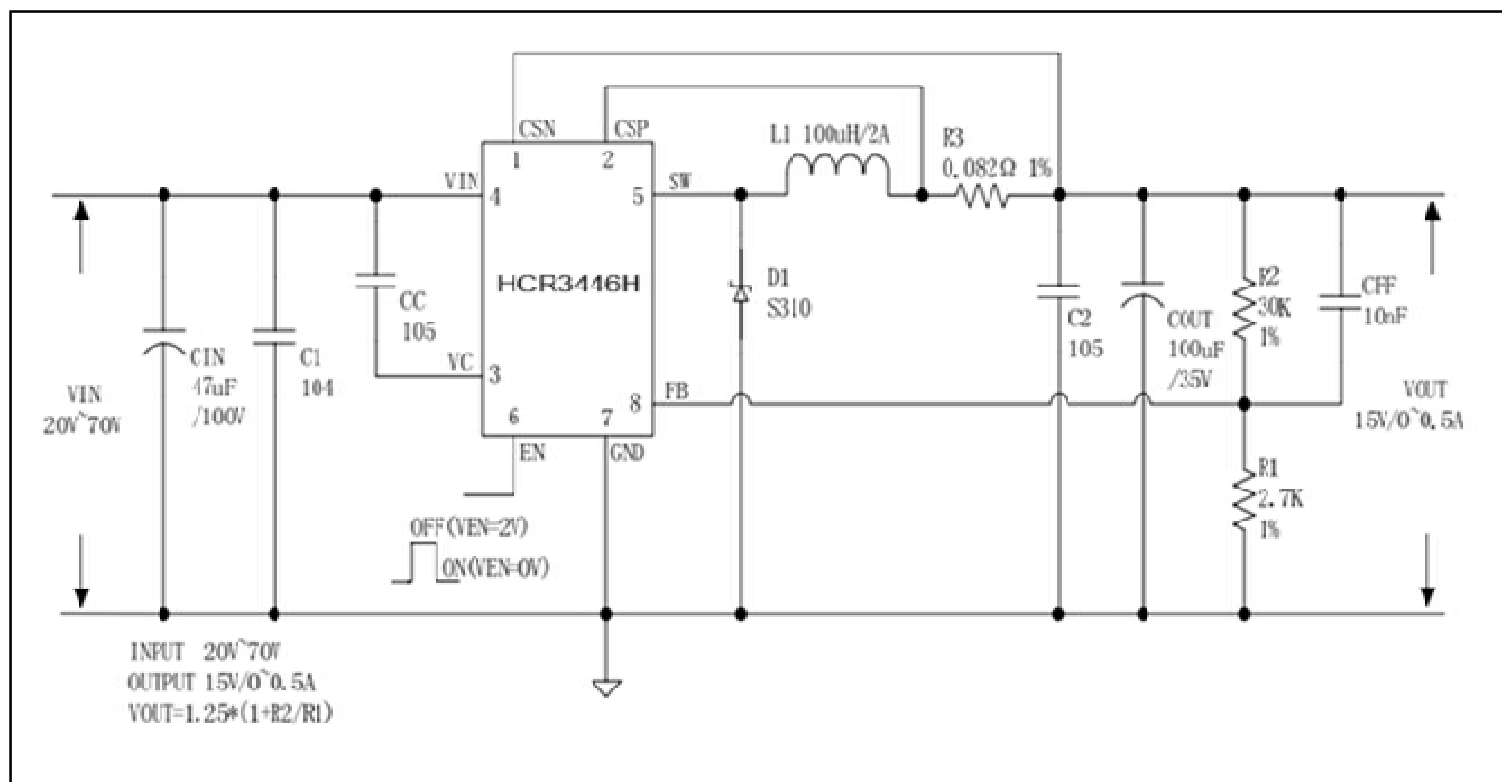


Figure 11. HCR3446H ON/OFF Mode Application ($V_{IN}=20V\sim70V$, $V_{OUT}=15V$, $I_{OUT}=0\sim0.5A$)

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Typical System Application (V_{OUT}=5V, I_{OUT}=0~1.0A)

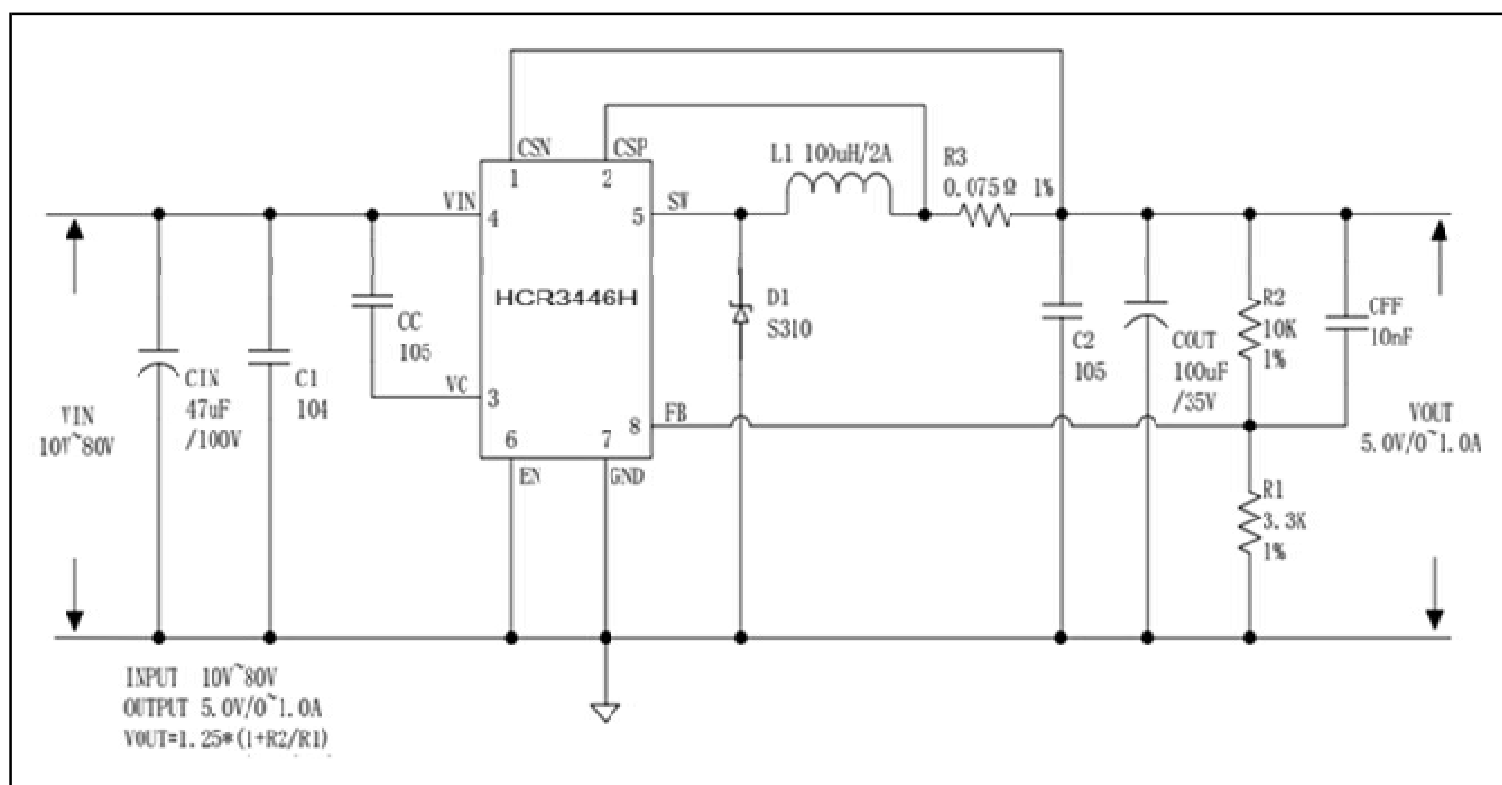


Figure 12. HCR3446H System Application (VIN=10V~80V, VOUT=5V, IOUT=0~1.0A)

ON/OFF Mode Application (VEN=0/2V)

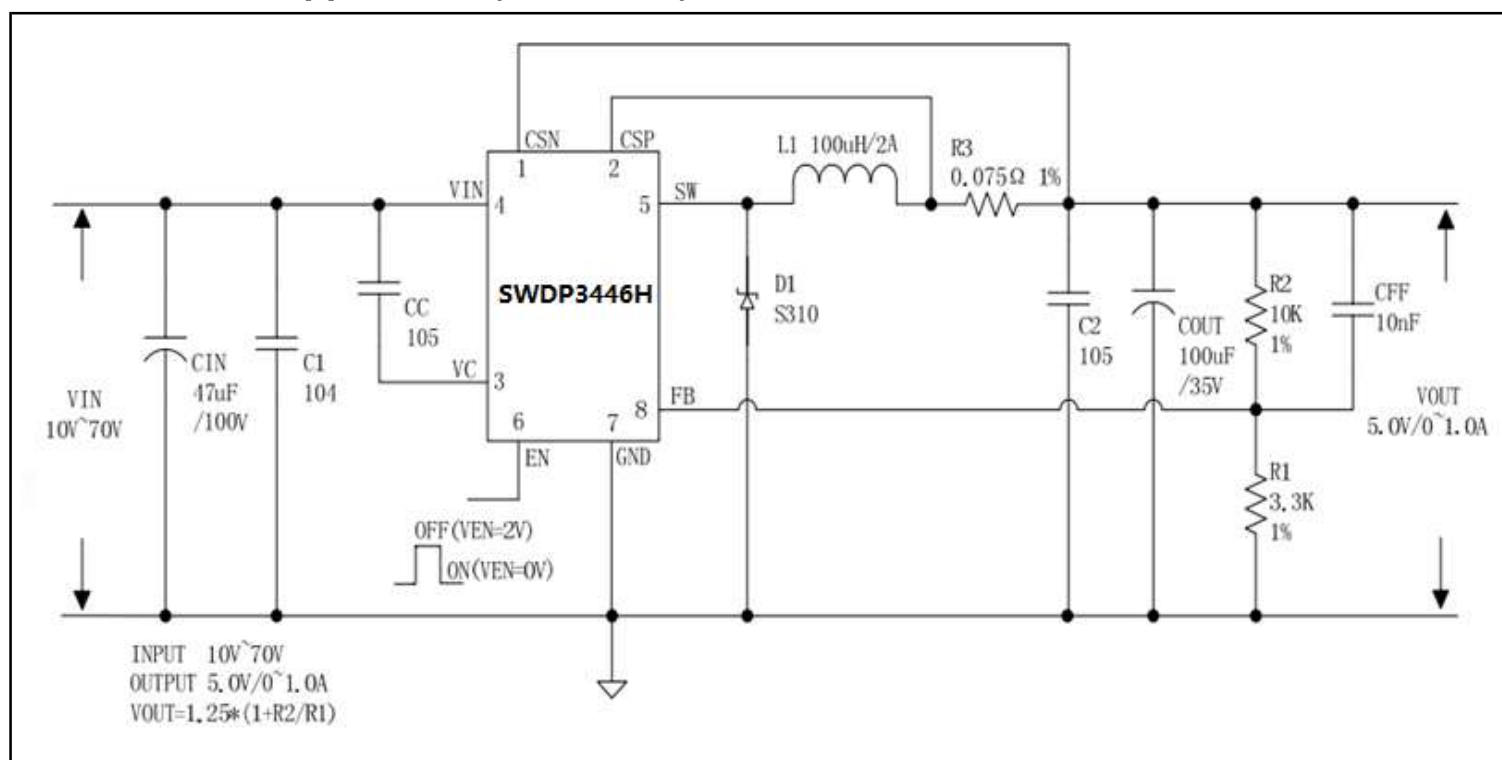


Figure 13. HCR3446H ON/OFF Mode Application (VIN=10V~70V, VOUT=5V, IOUT=0~1.0A)

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Typical System Application (V_{OUT}=3.3V, I_{OUT}=0~1.0A)

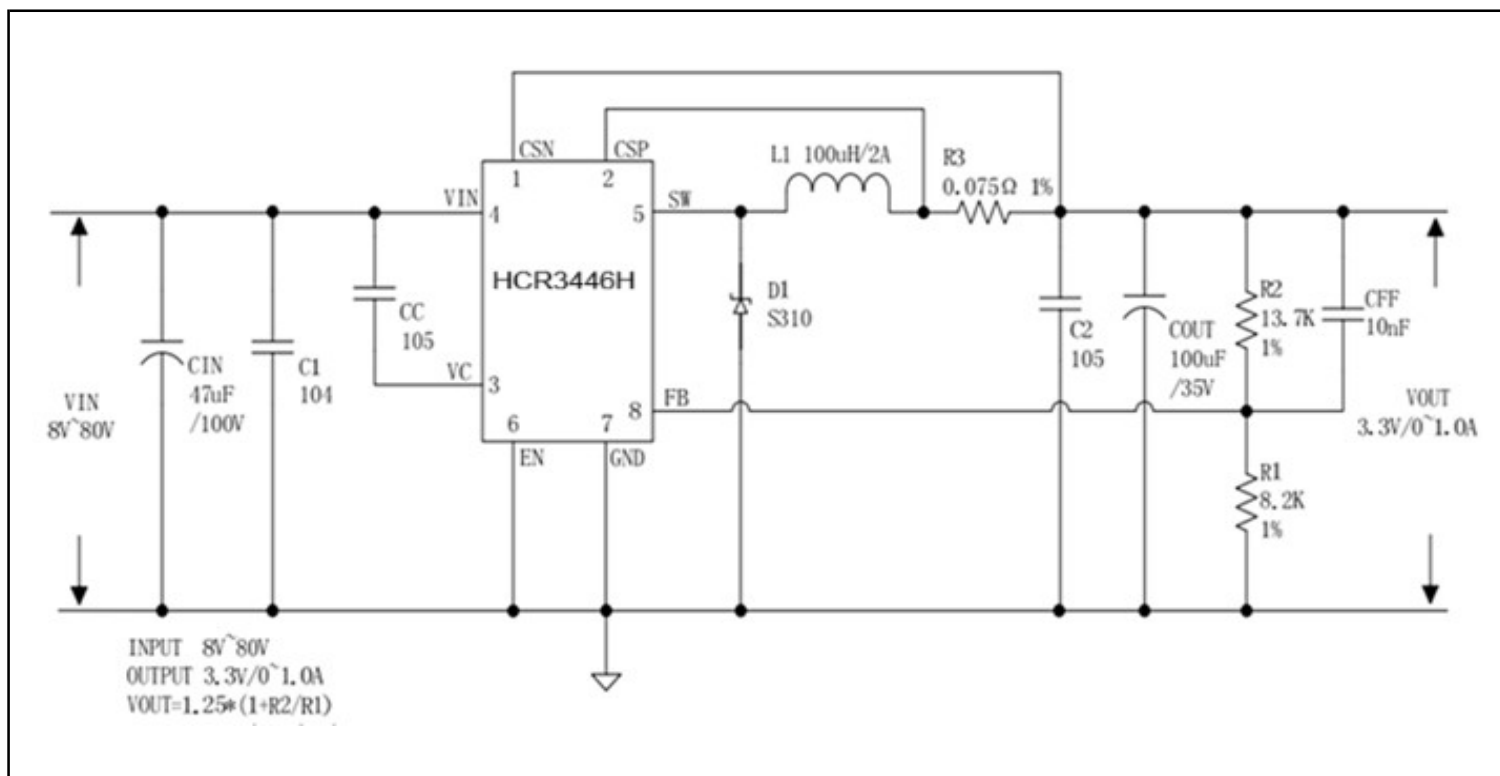


Figure 14. HCR3446H System Application (VIN=8V~80V, VOUT=3.3V, IOUT=0~1.0A)

ON/OFF Mode Application (VEN=0/2V)

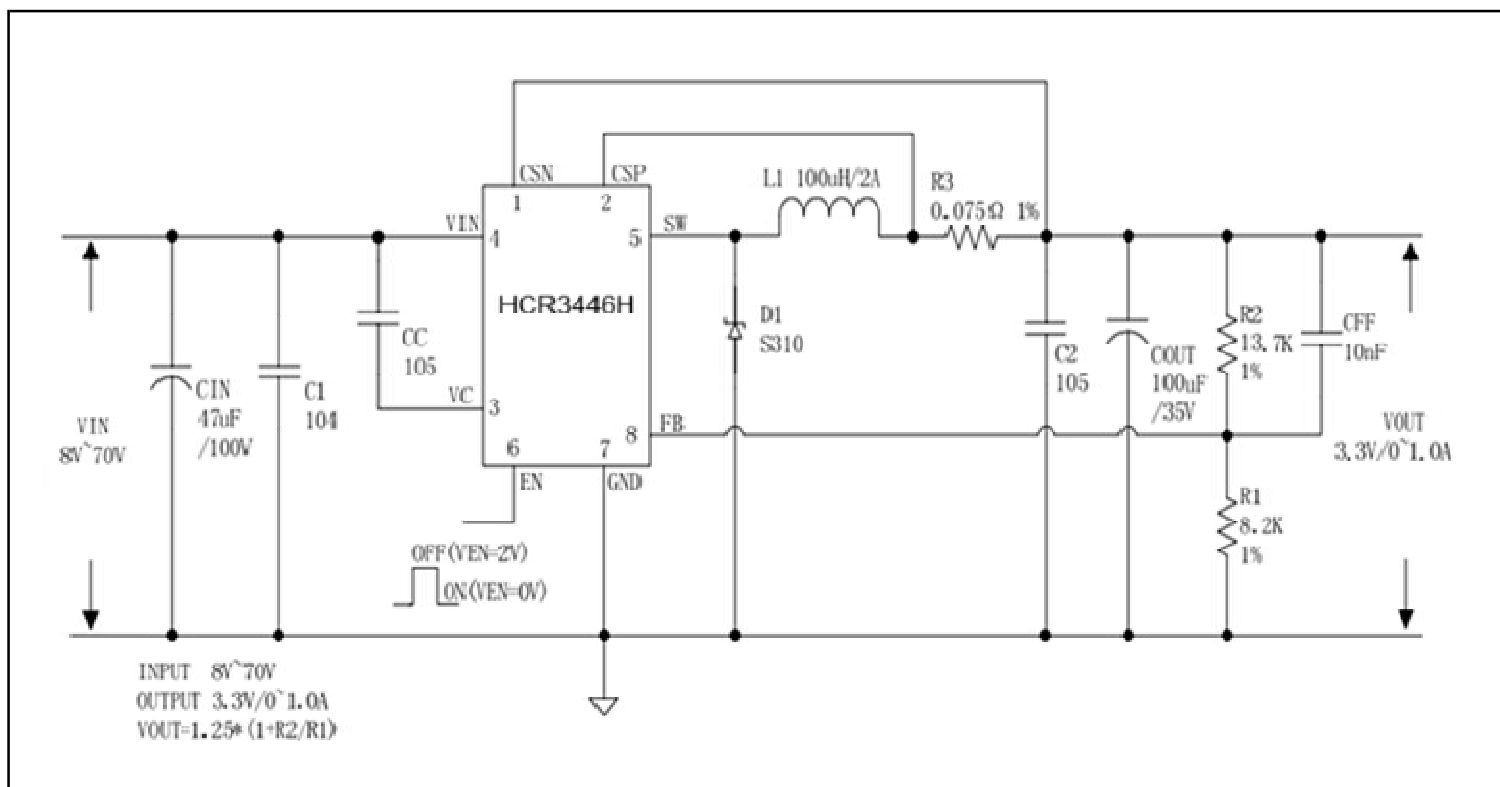


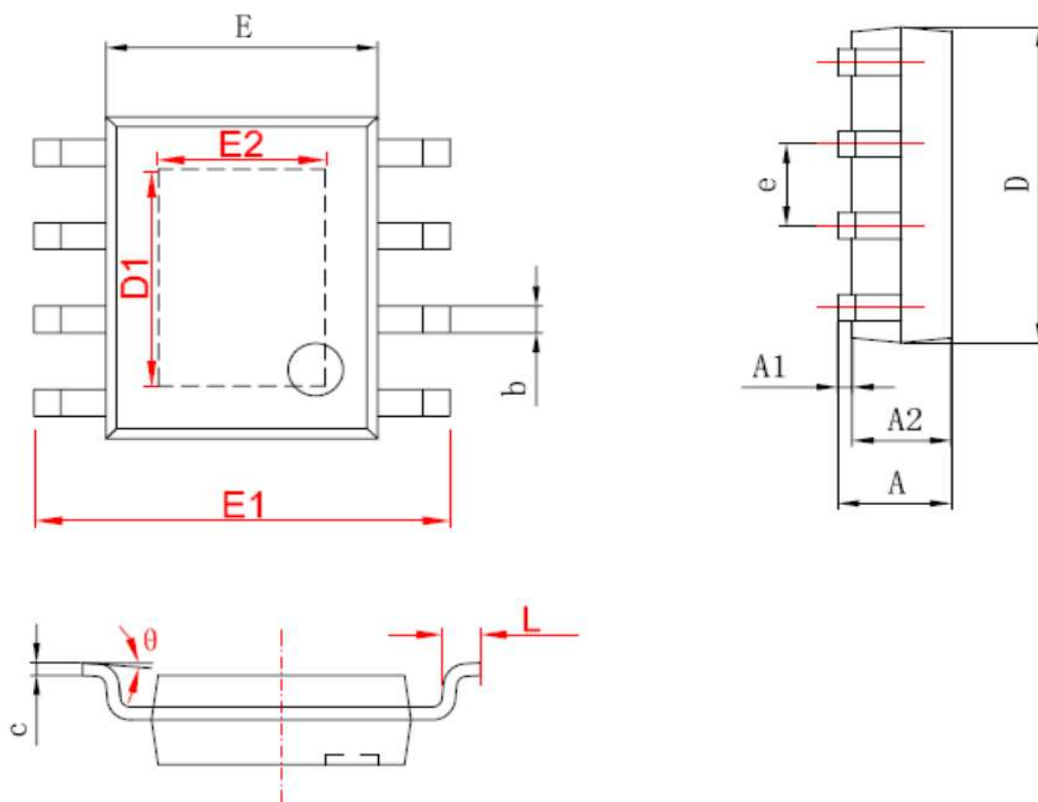
Figure 15. HCR3446H ON/OFF Mode Application (VIN=8V~70V, VOUT=3.3V, IOUT=0~1.0A)

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Mechanical Dimensions

PKG: SOP-8(EP) (M8E) Packages

Unit:mm

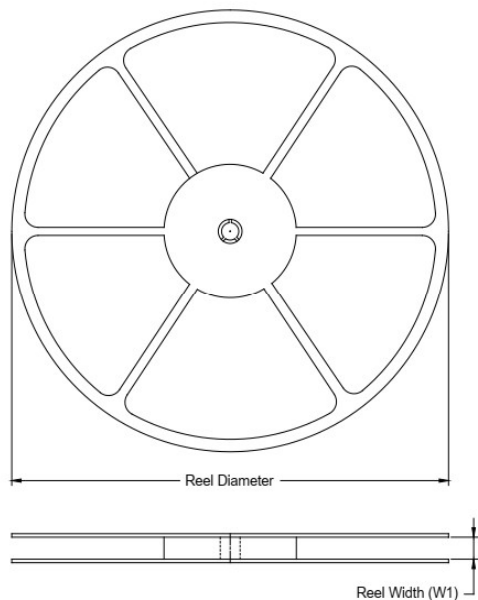


Item	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.050	0.150	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
D1	3.202	3.402	0.126	0.134
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
E2	2.313	2.513	0.091	0.099
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

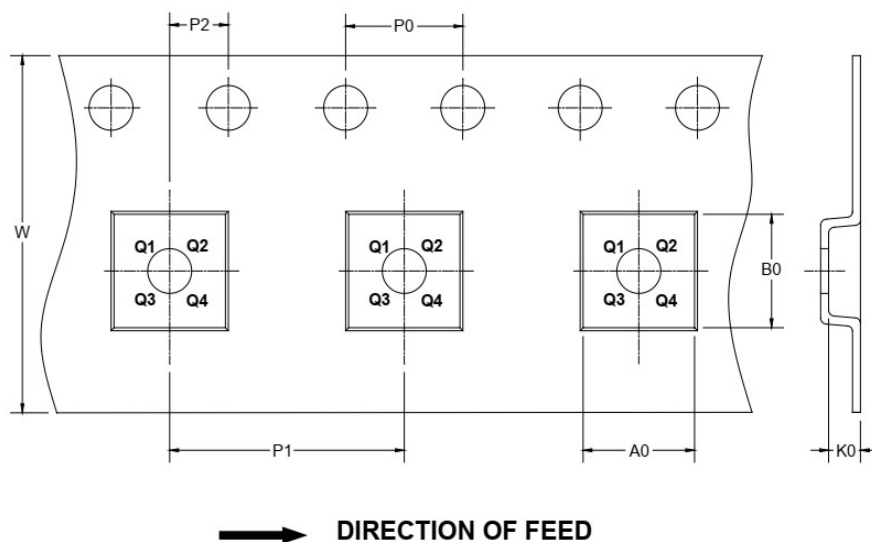
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TAPE AND REEL INFORMATION

REEL DIMENSIONS



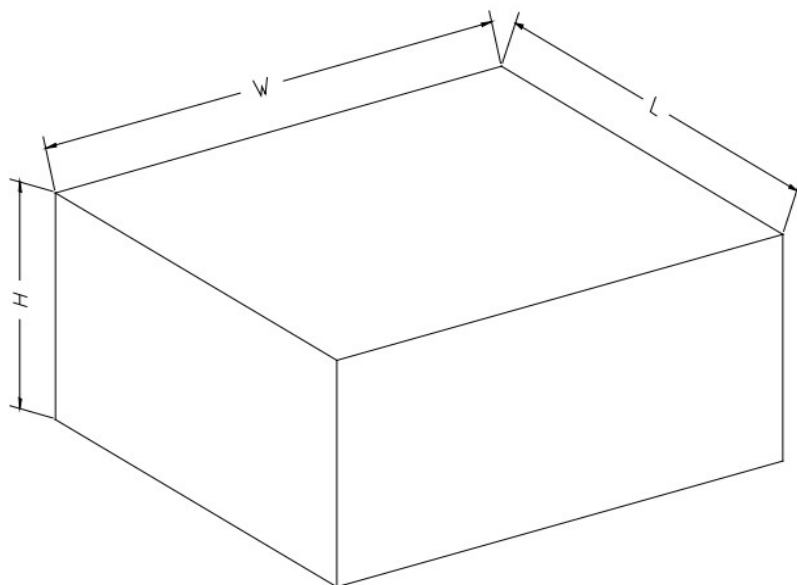
TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOP-8(EP)	13"	12.4	6.40	5.40	2.10	4.0	8.0	2.0	12.0	Q1

1.0A 100KHz 80V Buck DC to DC Converter**CARTON BOX DIMENSIONS**

NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
13"	386	280	370	5