



## UC3535

Preliminary

CMOS IC

### DC-DC CONTROLLER

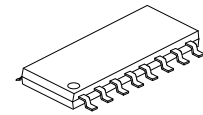
#### DESCRIPTION

Featured Device, UTC **UC3535** is a DC-DC controller with innovative technology. The controller can work in high voltage with high voltage MOS in PCB.

UTC **UC3535** provides several protection features. It includes a cycle-by-cycle current limit to the power switch; short-circuit protection;  $V_{DD}$  UVLO protection.

#### FEATURES

- \* Under-voltage lockout (UVLO) with hysteresis
- \* Provides complete protection functions
  - Cycle-by-cycle current limit
  - Short-Circuit Protection



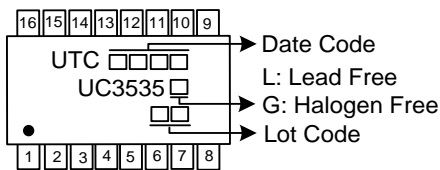
SOP-16

#### ORDERING INFORMATION

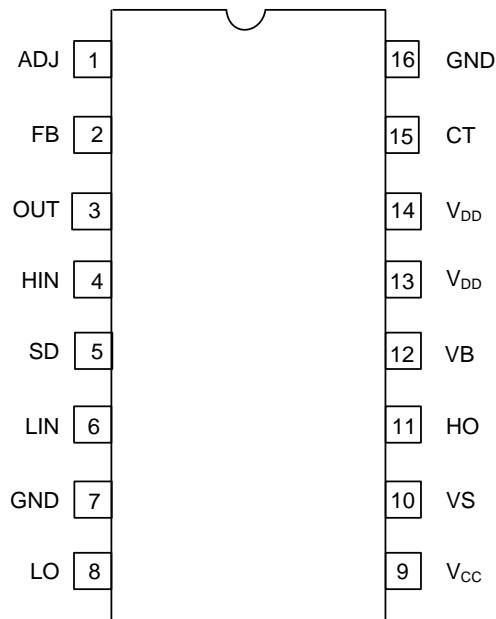
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UC3535L-S16-R	UC3535G-S16-R	SOP-16	Tape Reel

<p>UC3535G-S16-R</p> <pre>                 (1)Packing Type                 (2)Package Type                 (3)Green Package     </pre>	<p>(1) R: Tape Reel          (2) S16: SOP-16          (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



## ■ PIN CONFIGURATION

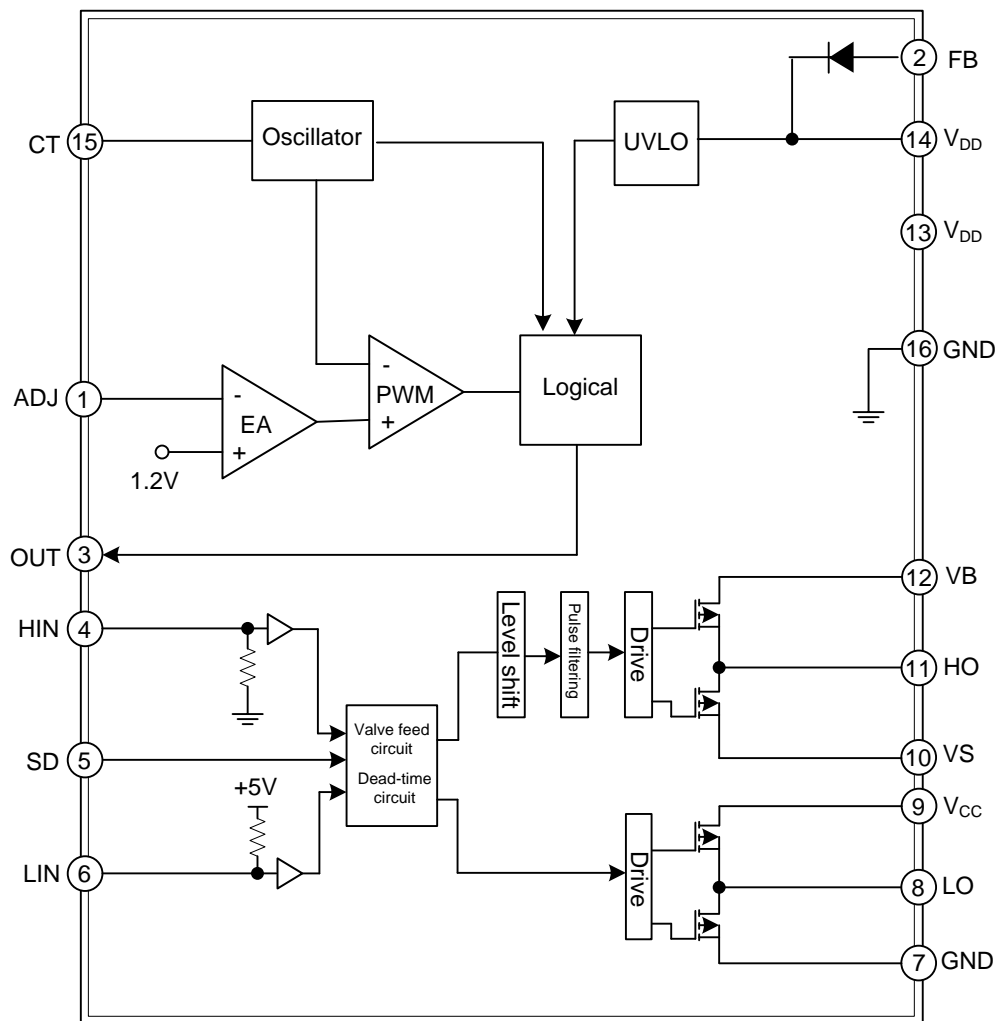


## ■ PIN DESCRIPTION

PIN NO.	I/O (Note 1)	PIN NAME	DESCRIPTION
1	I	ADJ	Output feedback.
2	I	FB	IC Power supply
3	O	OUT	PWM logic output
4	I	HIN	Input logic for controlling high side power mos
5	I	SD	Over current protection by shut down HO, LO output
6	I	LIN	Input logic for controlling low side power mos
7	Ground	GND	Power ground
8	O	LO	Output for controlling low side power mos
9	Power	V <sub>CC</sub>	Power supply
10	O	VS	Floating ground in high side
11	O	HO	Output for controlling high side power mos
12	O	VB	Floating power supply in high side
13	Power	V <sub>DD</sub>	Power supply
14	Power	V <sub>DD</sub>	Power supply
15	I	CT	Setting frequency of oscillator
16	Ground	GND	Power ground

Note: I=Input, O=Output.

■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Floating supply voltage VB	V <sub>B</sub>	-0.3 ~ 600	V
Floating ground voltage VS	V <sub>S</sub>	VB-20.0 ~ VB+0.3	V
High side output HO Pin	V <sub>HO</sub>	VS-0.3 ~ VB+0.3	V
Low side and low voltage pins, ADJ, FB, OUT	V <sub>L</sub>	-0.3 ~ 20.0	V
Low side and low voltage pins, HIN, LIN, SD	V <sub>L</sub>	-0.3 ~ 20.0	V
Maximum Operating Junction Temperature	T <sub>J</sub>	+150	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### ■ RECOMMENDED OPERATING RANGE (Note)

PARAMETER	SYMBOL	RATINGS	UNIT
VDD Supply Voltage	V <sub>DD</sub>	8 ~ 20	V
Operation Ambient Temperature	T <sub>A</sub>	-40 ~ +85	°C
Operating Junction Temperature	T <sub>J</sub>	+125	°C

### ■ THERMAL DATA (Note)

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ <sub>JA</sub>	50	°C/W
Junction to Case	θ <sub>JC</sub>	8	°C/W

Note: Not to exceed the maximum junction temperature of the IC, which relates to the operating power of the IC and the thermal resistance of the IC/package as above. The operation power of the IC can be calculated by  $P_d = V_{DD\_IN} \times I_{IN}$ , where  $V_{DD\_IN}$  represents the input voltage at the V<sub>DD</sub> pin of the IC and  $I_{IN}$  represents the current flow into the V<sub>DD</sub> pin of the IC.

### ■ ELECTRICAL CHARACTERISTICS (V<sub>DD</sub>=12V, T<sub>A</sub>=25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage						
Floating power supply	V <sub>B</sub>		3		600	V
Power supply VDD, VCC	V <sub>DD</sub>		3.5		20	V
UVLO ON voltage	U <sub>VLO_ON</sub>		7	7.5	8	V
UVLO off voltage	U <sub>VLO_OFF</sub>		3	3.5	4	V
Hysteresis of UVLO voltage	U <sub>VLO_H</sub>			4		V
Reference for Non-Inverting Input						
Reference for Non-Inverting Input	V <sub>ADJ</sub>	T <sub>A</sub> =25°C	1.1	1.2	1.3	V
Oscillator frequency	F <sub>OSC</sub>	C <sub>T</sub> =470P	60	75	90	KHz
Maximum output duty	D <sub>MAX</sub>			70		%
GATE Drive Output						
LO,HO pull current	I <sub>S</sub>		0.8	1		A
LO, HO drain current	I <sub>D</sub>		1.2	1.5		A

**■ FUNCTIONAL DESCRIPTION**

Refer to both the Block Diagram in Figure 1 and a reference design circuit in Figure 4 for the following discussions. All parameters mentioned below are typical values.

**Start-up Circuit**

Applying power to the input port in Figure 4, initiates the operation.  $V_{DD}$  voltage is lower than UVLO\_ON pwm logic is off and output voltage is 0.

After  $V_{DD}$  voltage is over UVLO\_ON normal operation starts. PWM logic is running and output voltage goes to pre-setting value gradually.

**Output voltage Setting**

Output voltage can be set by two divided-resistors. Reference voltage in the chip is 1.2V. The output voltage can be calculated by

$$V_{OUT}=(1+R1/R2)\times 1.2$$

For example, setting  $V_{OUT}$  12.12V it just select  $R1=9.1K$  and  $R2=1K$

■ TYPICAL APPLICATION CIRCUIT

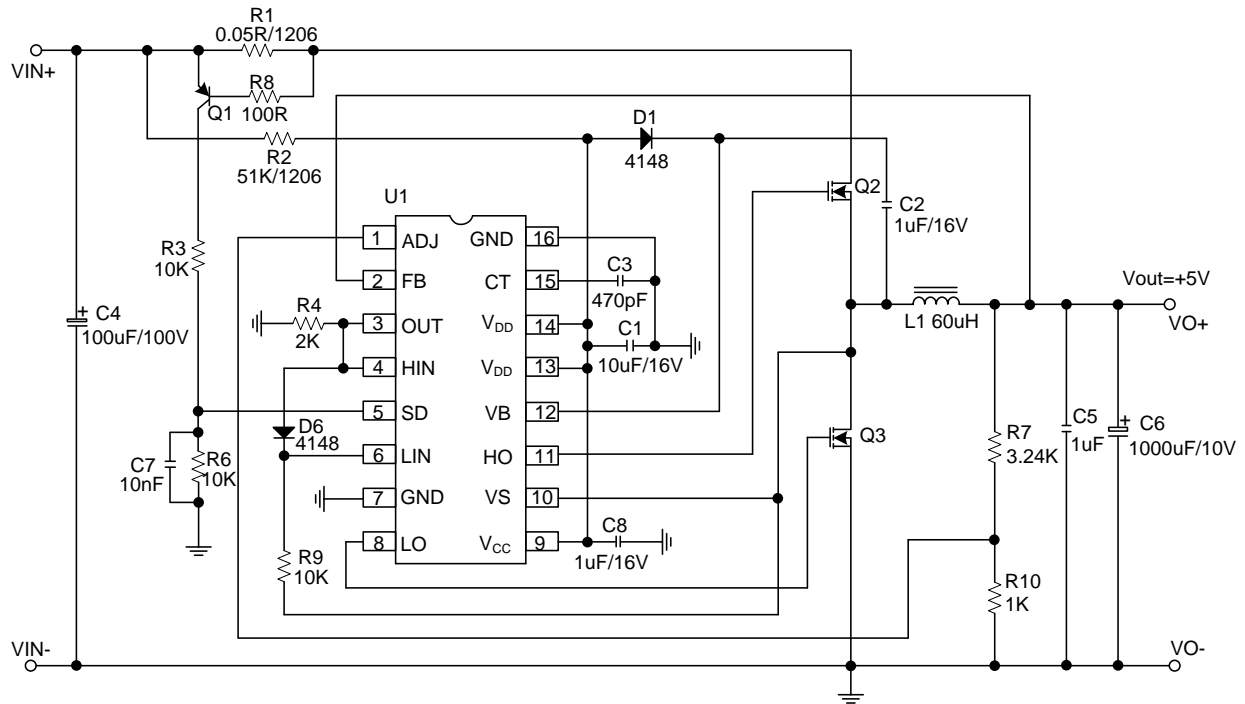


Figure 4

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