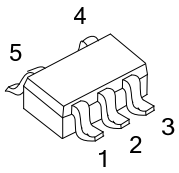
600mA, 3MHz, SYNCHRONOUS STEP-DOWN DC/DC CONVERTER



SOT-25

■ DESCRIPTION

The UTC **UC3206X** is a high efficiency synchronous, step-down DC/DC converter. Its input voltage range is from 2V to 6V, and Output voltage is internally set in a range from 0.8V to 4.0V in increments of 50mV (accuracy: ±2.0%).

The device is operated by 3.0MHz, and includes 0.42Ω P-channel driver transistor and 0.52Ω N-channel switching transistor. The device provides short-time turn-on by the soft start function internally set in 0.25 ms (TYP).

■ FEATURES

* Input voltage: 2.0V~6.0V
* Output voltage: 0.8V~4.0V (+2.0%)
* P-ch ON resistance: 0.42Ω
* N-ch ON resistance: 0.52Ω
* Output current: 600mA
* Oscillation frequency: 3.0MHz (+15%)
* Maximum duty cycle: 100%
* High efficiency : 92% (TYP.)
* High speed soft-start circuit and Current limiter circuit built-in
* CL high speed auto discharge
* Low ESR ceramic capacitor compatible

■ ORDERING INFORMATION

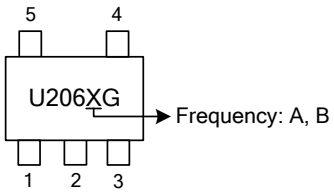
Ordering Number	Package	Packing
UC3206XG-xx-AF5-R	SOT-25	Tape Reel

Note: xx: Output Voltage, refer to Marking Information.

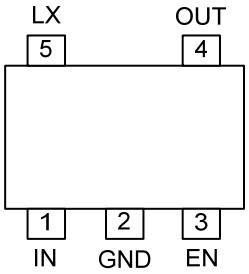
UC3206XG-xx-AF5-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) AF5: SOT-25
(3)Output Voltage Code	(3) xx: Refer to Marking Information
(4)Green Package	(4) G: Halogen Free and Lead Free
(5)Frequency	(5) A:1.45MHz, B: 2.8MHz

■ MARKING



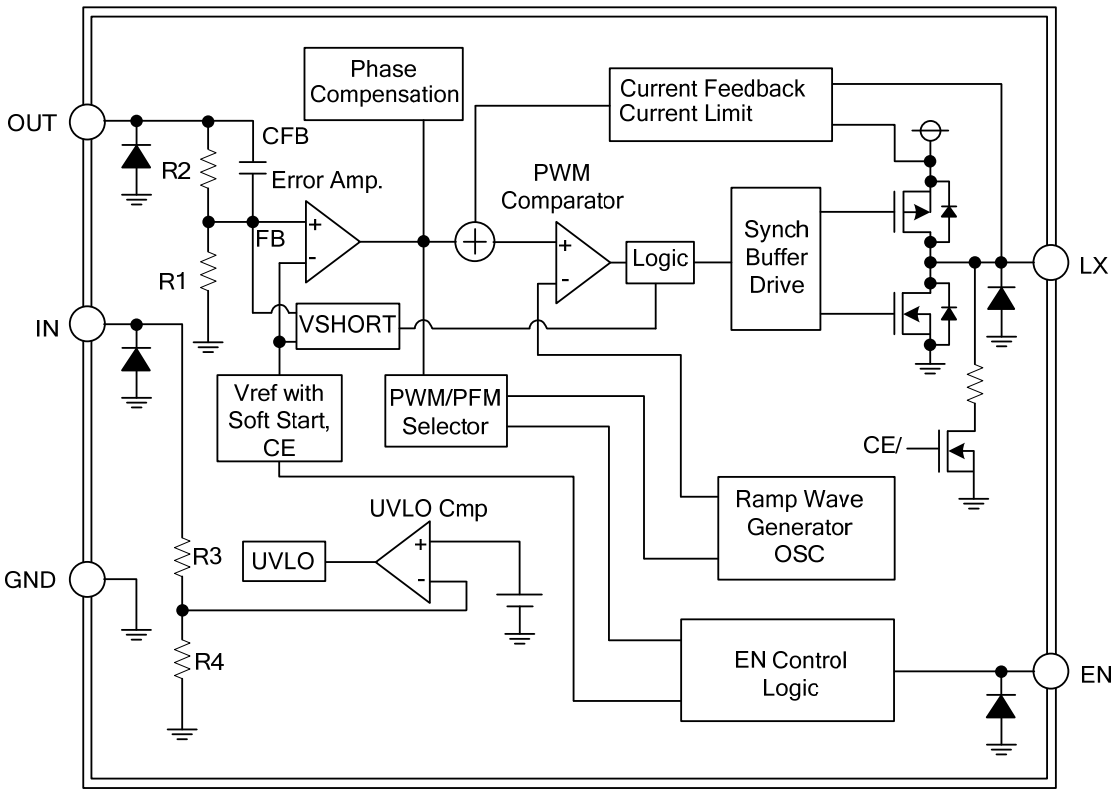
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	IN	Power Input
2	GND	Ground
3	EN	Chip Enable & Mode Switch
4	OUT	Output Voltage
5	LX	Switching Output

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
IN Pin Voltage	V_{IN}	6.5	V
LX Pin Voltage	VLx	6.5	V
OUT Pin Voltage	V_{OUT}	6.5	V
EN Pin Voltage	V_{EN}	6.5	V
Power Dissipation	P_D	250	mW
Operating Temperature Range	T_{OPR}	-40 ~ +85	°C
Storage Temperature Range	T_{STG}	-55 ~ +125	°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.

■ ELECTRICAL CHARACTERISTICS (V_{OUT}=1.8V, F_{OSC}=3.0MHz, T_A=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	V_{IN}=V_{EN}=5.0V, I_{OUT}=30mA		1.764	1.800	1.836	V
Operating Voltage Range	V_{IN}					6.0	V
Maximum Output Current	I_{OUTMAX}	V_{IN}=$V_{OUT(E)}$+2.0V, V_{EN}=1.0V,		600			mA
U.V.L.O. Voltage	V_{UVLO}			1.00	1.40	1.78	V
Supply Current	I_{DD}	V_{IN}=V_{EN}=5.0V, V_{OUT}=$V_{OUT(E)}$×1.1V			60		μA
Stand-by Current	I_{STB}	V_{IN}=5.0V, V_{EN}=0V, V_{OUT}=$V_{OUT(E)}$×1.1V			0	1.0	μA
Oscillation Frequency	F_{OSC}	V_{IN}=$V_{OUT(E)}$+2.0V, V_{EN}=1.0V, I_{OUT}=100mA	UC3206A		1.45		MHz
			UC3206B		2.8		MHz
PFM Switching Current	I_{PFM}	V_{IN}=$V_{OUT(E)}$+2.0V, V_{EN}=V_{IN}, I_{OUT}=1mA			350		mA
Maximum Duty Cycle	D_{MAX}	V_{IN}=V_{EN}=5.0V, V_{OUT}=$V_{OUT(E)}$×0.9V			100		%
Minimum Duty Cycle	D_{MIN}	V_{IN}=V_{EN}=5.0V, V_{OUT}=$V_{OUT(E)}$×0.1V			0		%
Efficiency	E_{FFI}	V_{EN}=V_{IN}=$V_{OUT(E)}$+1.2V, I_{OUT}=100mA			92		%
Lx SW "H" ON Resistance 2	R_{LxH}	V_{IN}=V_{EN}=3.6V, V_{OUT}=0V, I_{Lx}=100mA			0.42	0.67	Ω
Lx SW "L" ON Resistance 2	R_{LxL}	V_{IN}=V_{EN}=3.6V			0.52	0.77	Ω
Lx SW "H" Leak Current (Note 1)	I_{LeakH}	V_{IN}=V_{OUT}=5.0V, V_{EN}=0V, Lx=0V			0.01	1.0	μA
Current Limit	I_{LIM}	V_{IN}=V_{EN}=5.0V, V_{OUT}=$V_{OUT(E)}$×0.9V		900			mA
Output Voltage Temperature Characteristics	$\triangle V_{OUT}/(V_{OUT}\cdot\triangle T_{OPR})$	I_{OUT}=30mA, -40°C ≤Topr≤85°C			±100		ppm/°C
EN "H" Voltage	V_{ENH}	V_{OUT}=0V		1.5		V_{IN}	V
EN "L" Voltage	V_{ENL}	V_{OUT}=0V		0		0.25	V
EN "H" Current	I_{ENH}	V_{IN}=V_{EN}=5.0V, V_{OUT}=0V		-0.1		0.1	μA
EN "L" Current	I_{ENL}	V_{IN}=5.0V, V_{EN}=0V, V_{OUT}=0V		-0.1		0.1	μA
Soft Start Time	t_{SS}	V_{EN}=0V→V_{IN} , I_{OUT}=1mA		-	0.3	0.4	ms
Latch Time	t_{LAT}	V_{IN}=V_{EN}=5.0V, V_{OUT}=0.8×$V_{OUT(E)}$ Short Lx at 1Ω Resistance			4		ms
Short Protection Threshold Voltage	V_{SHORT}	V_{IN}=V_{EN}=5.0V, Short Lx at 1Ω Resistance			0.900		V
CL Discharge	R_{Dischg}	V_{IN}=5.0V, Lx=5.0V, V_{EN}=0V			100		Ω

Note: When temperature is high, a current of approximately 10μA (maximum) may leak.

■ OPERATIONAL DESCRIPTION

Soft Start

The UTC **UC3206X** provides 0.25ms (Typ.) high speed soft-start. Soft start time is defined as the time to reach 90% of the output nominal voltage when the EN pin is turned on.

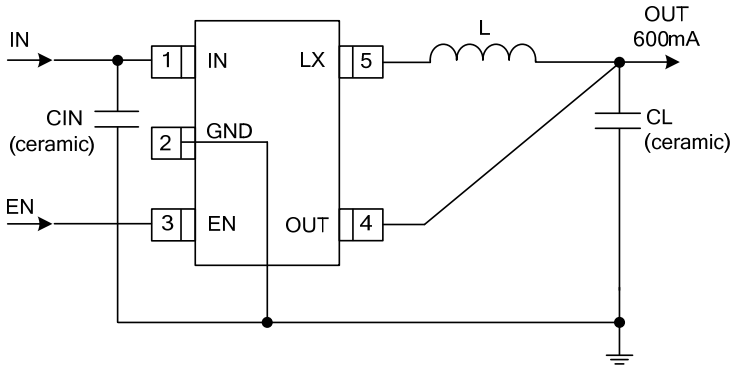
UVLO Circuit

When the IN pin voltage becomes 1.4V or lower, the P-channel output driver transistor is forced OFF to prevent false pulse output caused by unstable operation of the internal circuitry. When the IN pin voltage becomes 1.8V or higher, switching operation takes place.

CL High Speed Discharge

The UTC **UC3206X** can quickly discharge the electric charge at the output capacitor (CL) when a low signal to the EN pin which enables a whole IC circuit put into OFF state, is inputted via the N-channel transistor located between the LX pin and the GND pin.

■ TYPICAL APPLICATION CIRCUIT



FOSC=3.0MHz

L: 1.5μH (NR3015, TAIYO YUDEN)

C_{IN}: 4.7μF (Ceramic)

C_L: 10μF (Ceramic)