



## UC3552

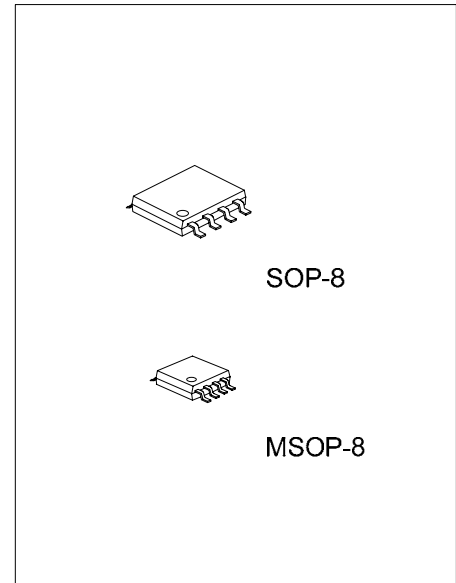
CMOS IC

### PWM DC-DC CONVERTER WITH INTERNAL SWITCH AND SOFT-START

#### DESCRIPTION

The UTC **UC3552** is a step-up PWM DC-DC converter with a internal switch which is 1.6A, 0.23Ω. UTC **UC3552** offers users flexibility in determining loop dynamics and adjusting operating frequency cause it's equipped with an external compensation pin ,and it also allows the use of small, low equivalent resistance (ESR) ceramic output capacitors. UTC **UC3552** is capable of converting a standard input of 3.3V to multiple outputs of 8V, - 8V , and 23V. Otherwise, filtering and loop performance are enhanced and facilitated by a high switching frequency of either 640 kHz or 1.3MHz.

As a power-smart design in shutdown mode a soft-start with an external capacitor that sets the input current ramp rate, reduces the current consumption to 0.1μA. A mere 2.6V input yields an impressive output voltage to 12V when operating.



\*Pb-free plating product number: UC3552L

#### FEATURES

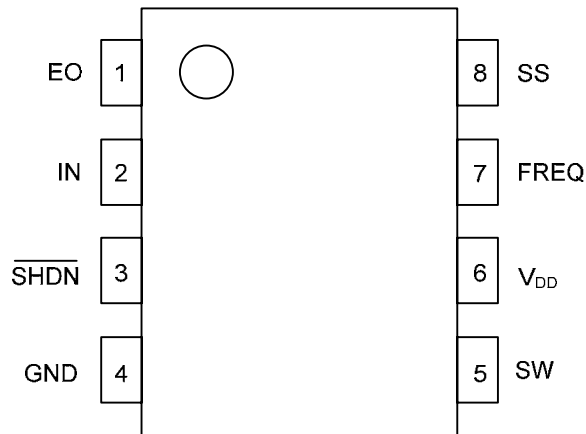
- \* 1.6A, 0.23Ω, internal switch
- \* High efficiency: 90%
- \* Adjustable output: V<sub>DD</sub> to 12V
- \* Adjustable frequency: 640kHz or 1.3MHz
- \* Wide input range: +2.6V ~ +5.5V
- \* Low shutdown current: 0.1μA
- \* Programmable soft-start

#### ORDERING INFORMATION

Ordering Number		Package	Packing
UC3552-S08-R	UC3552L-S08-R	SOP-8	Tape Reel
UC3552-S08-T	UC3552L-S08-T	SOP-8	Tube
UC3552-SM1-R	UC3552L-SM1-R	MSOP-8	Tape Reel
UC3552-SM1-T	UC3552L-SM1-T	MSOP-8	Tube

<p>UC3552L-S08-R</p>	<p>(1) Packing Type (2) Package Type (3) Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube (2) S08: SOP-8, SM1: MSOP-8 (3) L: Lead Free Plating, Blank: Pb/Sn</p>
----------------------	---	---

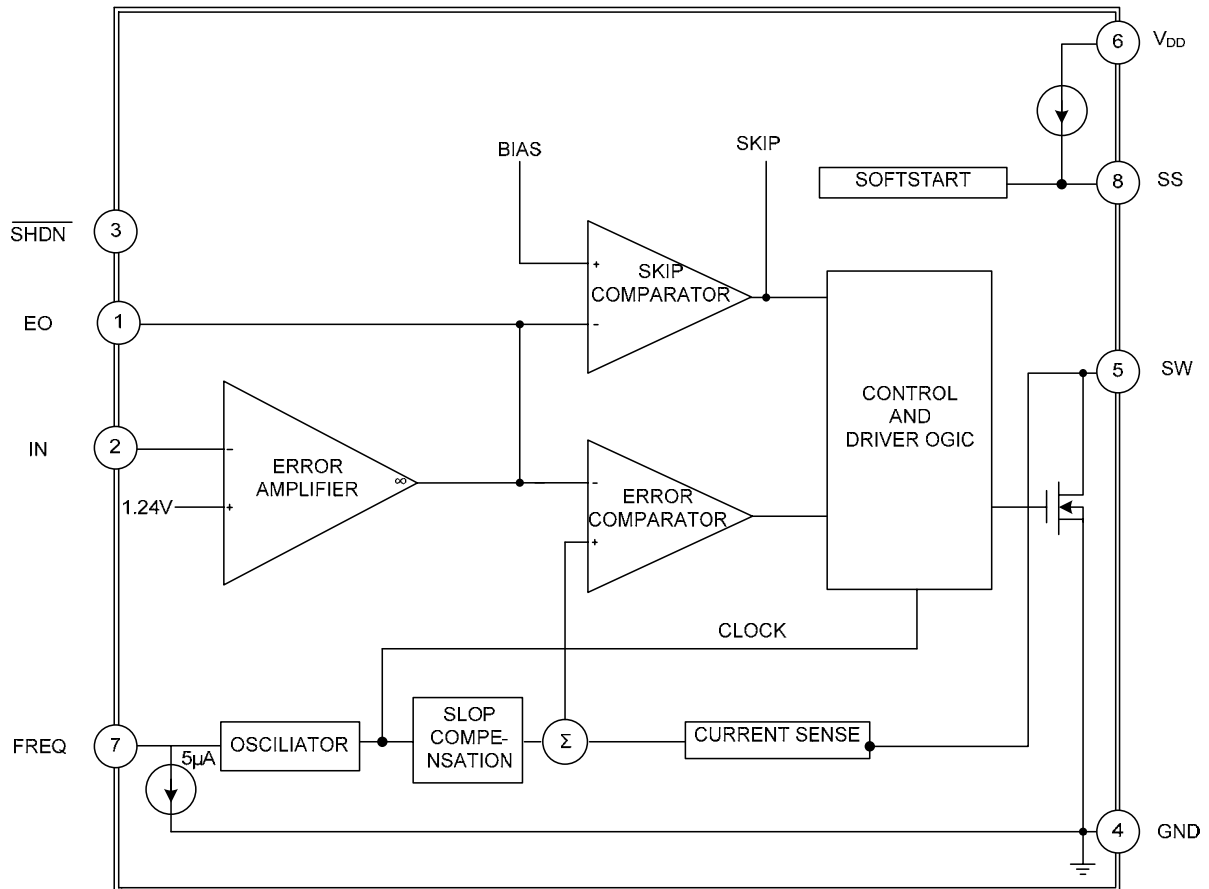
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	I/O	DESCRIPTION
1	EO	I	Compensation pin for Error Amplifier
2	IN	I	Feedback pin with a typical reference voltage of 1.24V
3	SHDN	I	Shutdown control pin. The device will turn off when SHDN is low
4	GND		Ground
5	SW	O	Switch pin
6	V <sub>DD</sub>		Power supply pin
7	FREQ	I	Frequency select pin. Switch oscillator frequency to 640kHz when FREQ is low, and 1.3MHz when FREQ is high
8	SS	I	Soft-Start control pin. No soft-start when the pin is left open

## ■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
SW to GND		-0.3 ~ +14	V
IN, $\overline{\text{SHDN}}$ , $V_{\text{DD}}$ , FREQ to GND		-0.3 ~ +6	V
SS, EO to GND		-1.3V ~ ( $V_{\text{DD}}+0.3\text{V}$ )	V
RMS SW Pin Current	$I_{\text{SW}}$	1.2	A
Continuous Power Dissipation ( $T_{\text{C}} = 70$ )	SOP-8	350	mW
	MSOP-8	300	mW
Junction Temperature	$T_{\text{J}}$	+125	
Operating Temperature	$T_{\text{OPR}}$	-20 ~ +85	
Storage Temperature	$T_{\text{STG}}$	-45 ~ +125	

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

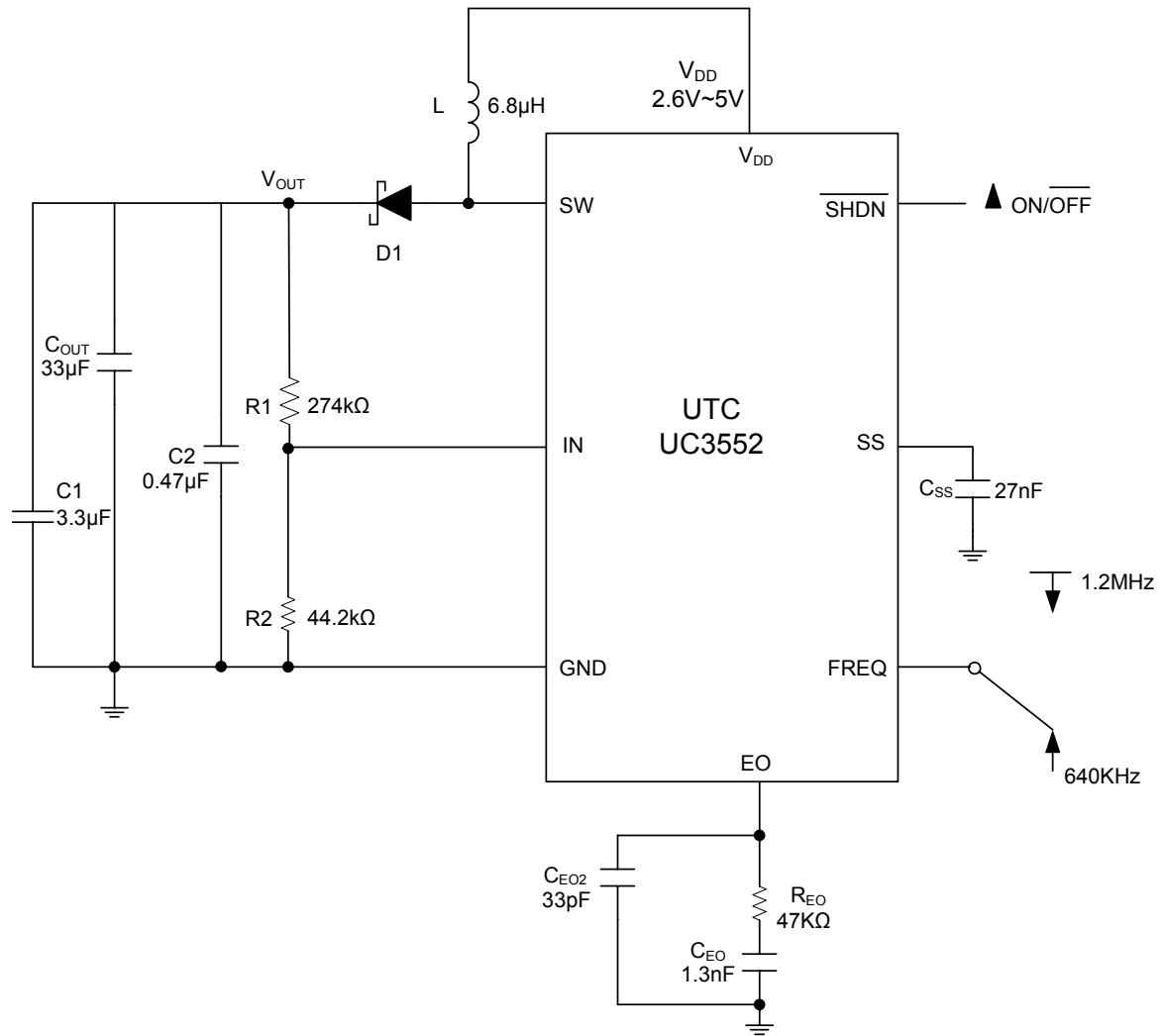
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### ■ ELECTRICAL CHARACTERISTICS

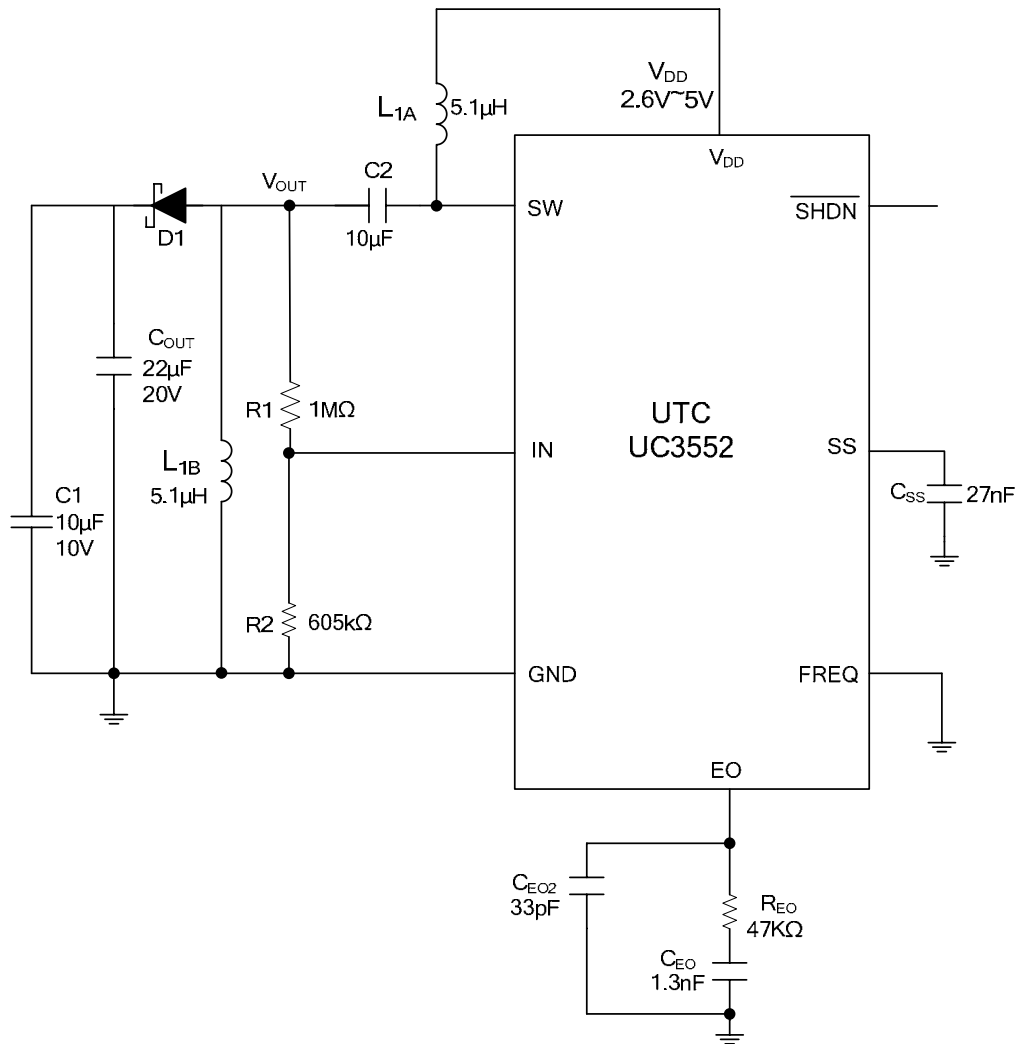
$T_{\text{C}} = +25$  ,  $V_{\text{DD}} = \overline{\text{SHDN}} = 3\text{V}$ , FREQ = GND, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Supply Voltage	$V_{\text{DD}}$		2.6		5.5	V
$V_{\text{DD}}$ Under Voltage Lockout	UVLO	When $V_{\text{DD}}$ is rising, typical hysteresis is 40mV; SW remains off below this level	2.25	2.38	2.52	V
Quiescent Current	$I_{\text{DD}}$	$V_{\text{DD}} = 1.3\text{V}$ , not switching		0.21	0.35	mA
		$V_{\text{DD}} = 1.0\text{V}$ , switching		1.2	5.0	
Shutdown Current	$I_{\text{SC}}$	SHDN = GND		0.1	10.0	$\mu\text{A}$
<b>ERROR AMPLIFIER</b>						
Feedback Voltage	$V_{\text{IN}}$	Level to produce $V_{\text{EO}} = 1.24\text{V}$	1.22	1.240	1.258	V
$V_{\text{DD}}$ Input Bias Current	$I_{\text{I(BIAS)}}$	$V_{\text{IN}} = 1.24\text{V}$		0	40	nA
Feedback-Voltage Line Regulation		Level to produce $V_{\text{EO}} = 1.24\text{V}$ , $2.6\text{V} < V_{\text{DD}} < 5.5\text{V}$		0.05	0.15	%/V
Transconductance	$g_{\text{m}}$	$\Delta I = 5\mu\text{A}$	70	105	240	$\mu\text{A/V}$
Voltage Gain	$G_{\text{V}}$			1500		V/V
<b>OSCILLATOR</b>						
Frequency	$f_{\text{OSC}}$	FREQ = GND	540	640	740	kHz
		FREQ = $V_{\text{DD}}$	1100	1320	1600	
Maximum Duty Cycle	$t_{\text{DUTY}}$	FREQ = GND	79	85	92	%
		FREQ = $V_{\text{DD}}$		85		
<b>N-CHANNEL SWITCH</b>						
Current Limit	$I_{\text{LIMIT}}$	$V_{\text{DD}} = 1\text{V}$ , Duty Cycle = 65%	1.2	1.6	2.3	A
On-Resistance	$R_{\text{ON}}$	$I_{\text{SW}} = 1.2\text{A}$		0.23	0.50	$\Omega$
Leakage Current	$I_{\text{LEAK}}$	$V_{\text{SW}} = 12\text{V}$		0.01	20.00	$\mu\text{A}$
<b>SOFT-START</b>						
Reset Switch Resistance					300	$\Omega$
Charge Current		$V_{\text{SS}} = 1.2\text{V}$	1.5	4.0	7.0	$\mu\text{A}$
<b>CONTROL INPUTS</b>						
Input Low Voltage	$V_{\text{IL}}$	$\overline{\text{SHDN}}$ , FREQ; $V_{\text{DD}} = 2.6\text{V} \sim 5.5\text{V}$			$0.3V_{\text{DD}}$	V
Input High Voltage	$V_{\text{IH}}$	$\overline{\text{SHDN}}$ , FREQ; $V_{\text{DD}} = 2.6\text{V} \sim 5.5\text{V}$	$0.7V_{\text{DD}}$			V
Hysteresis		SHDN, FREQ		$0.1V_{\text{DD}}$		V
FREQ Pull-Down Current	$I_{\text{FREQ}}$		1.8	5.0	9.0	$\mu\text{A}$
SHDN Input Current	$I_{\text{SHDN}}$			0.001	1.000	$\mu\text{A}$

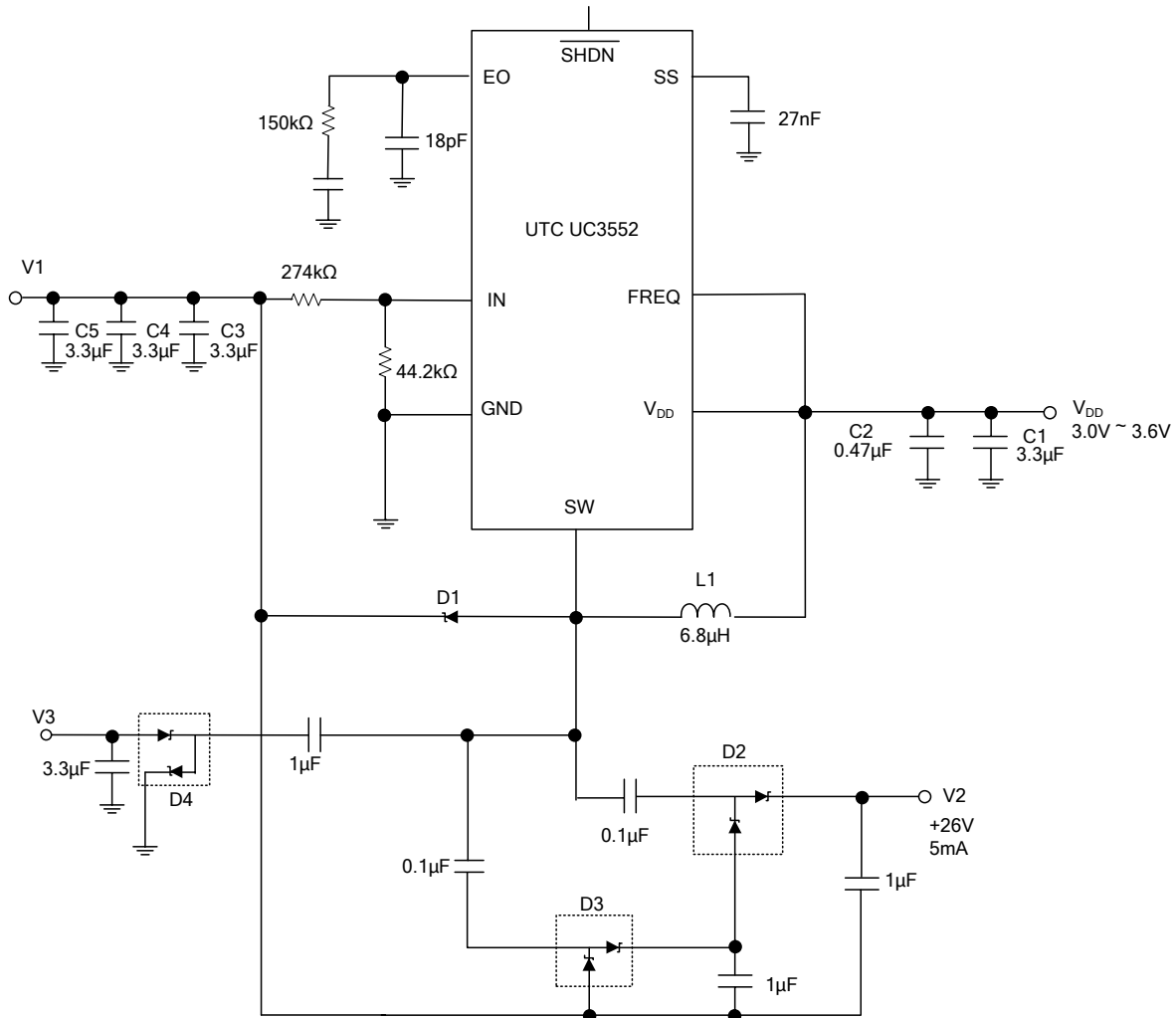
## ■ TYPICAL APPLICATION CIRCUIT



■ IN A SEPIC CONFIGURATION



## ■ MULTIPLE-OUTPUT TFT LCD POWER SUPPLY



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.