



P3576

LINEAR INTEGRATED CIRCUIT

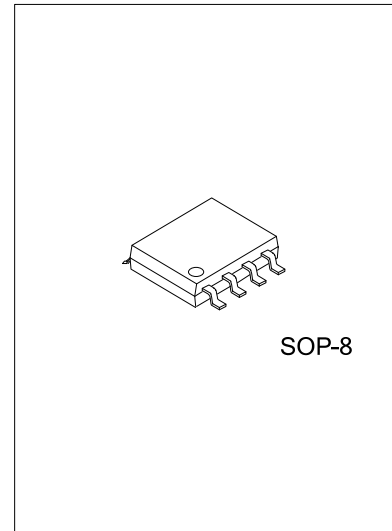
50KHz, 2A PWM BUCK DC/DC CONVERTER

DESCRIPTION

The UTC **P3576** series is a step-down switching regulator which is able to provide 2A output current. The available versions of output voltage are 2.5V, 3.3V, 5V, 12V and adjustable.

FEATURES

- * Output load current: 2A
- * Operating voltage can be up to 40V
- * Low power standby mode
- * High efficiency
- * Internal current and thermal limit
- * Built-in Switching Transistor On Chip.



ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
P3576L-xx-S08-R	P3576G-xx-S08-R	SOP-8	Tape Reel

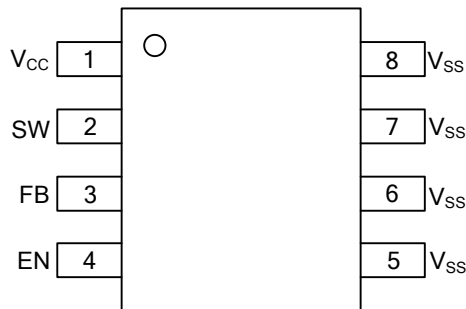
Note: xx: Output Voltage, Refer to Marking Information

<p>P3576G-xx-S08-R</p> <p>(1) Packing Type (2) Package Type (3) Output Voltage Code (4) Green Package</p>	<p>(1) R: Tape Reel (2) S08: SOP-8 (3) xx: refer to Marking information (4) G: Halogen Free and Lead Free</p>
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MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOP-8	12: 12V 33 : 3.3V 50 : 5.0V AD: ADJ	

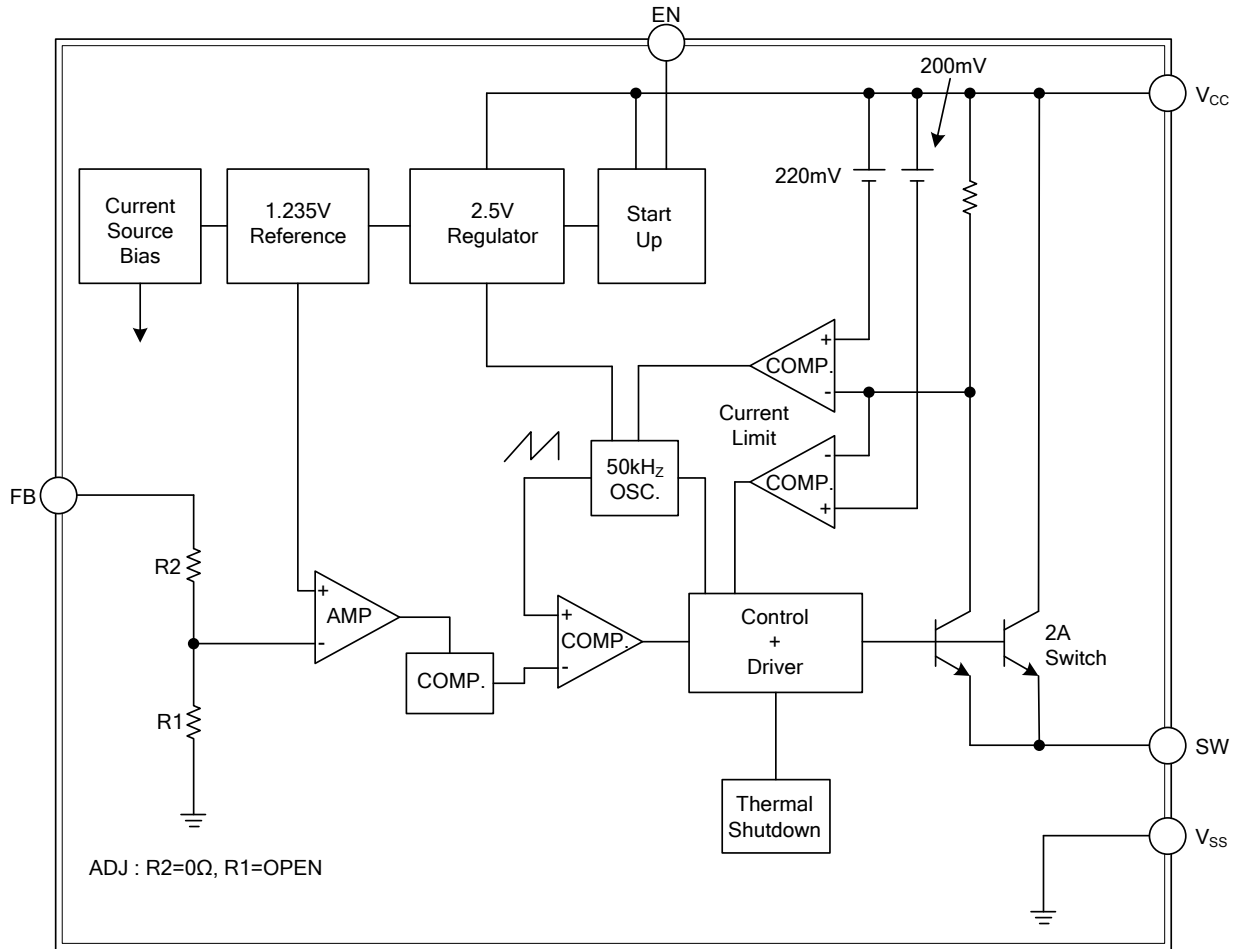
PIN CONFIGURATION



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V _{CC}	Operating voltage input
2	SW	Switching output
3	FB	Output voltage feedback control
4	EN	ON/OFF Shutdown
5~8	V _{SS}	GND pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	+45	V
ON/OFF Pin Input Voltage	V_{EN}	-0.3 ~ 40	V
Feedback Pin Voltage	V_{FB}	-0.3 ~ 12	V
Output Voltage to Ground	V_{OUT}	-0.8	V
Operating Supply Voltage	V_{OP}	+4.5 ~ +40	V
Power Dissipation	P_D	Internally Limited	W
Junction Temperature	T_J	+125	$^{\circ}\text{C}$
Operating Temperature	T_{OPR}	-40 ~ +125	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

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.

■ THERMAL DATA

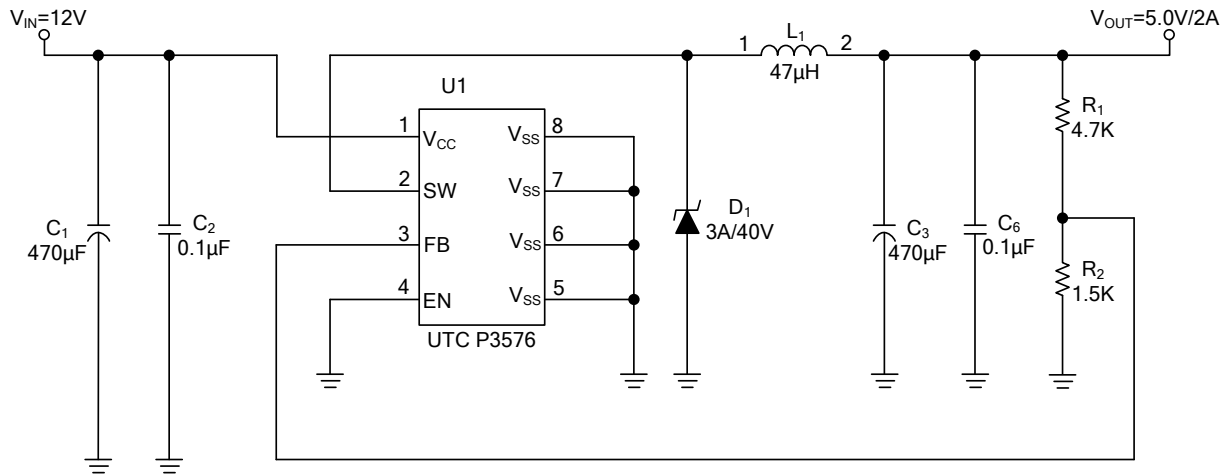
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	60	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	20	$^{\circ}\text{C}/\text{W}$

Note: θ_{JA} is measured with the PCB copper area(need connect to SW pins) of approximately 1.5 in²(Multi-layer).

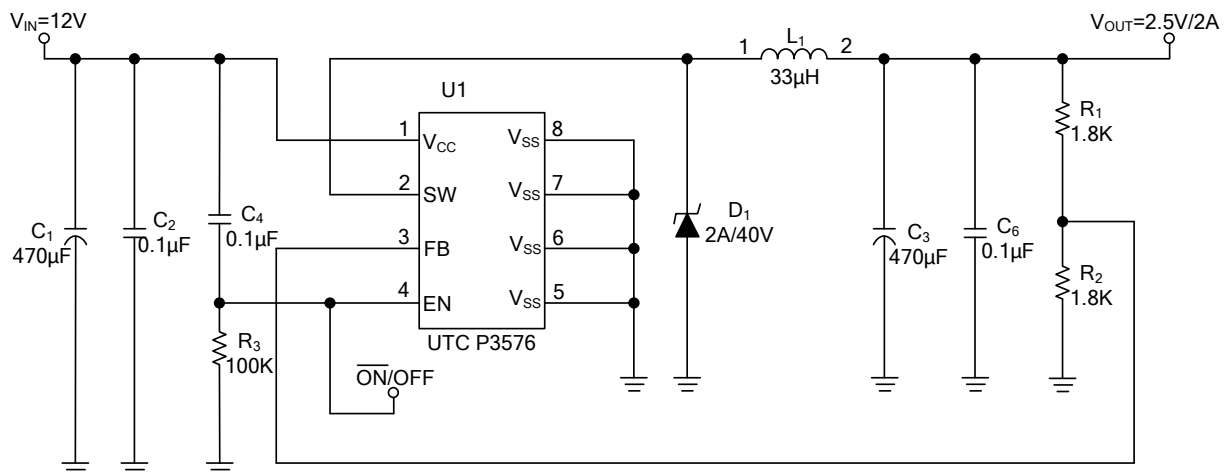
■ ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$, unless otherwise specified, $V_{CC}=12\text{V}$ for 3.3V, 5V, adjustable version and $V_{CC}=18\text{V}$ for the 12V version. $I_{LOAD}=0.2\text{A}$.)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Quiescent Current		I_Q	$V_{FB}=12\text{V}$ force driver off		4	8	mA
Feedback Bias Current	ADJ	I_{FB}	$V_{FB}=1.3\text{V}$		-10	-50	nA
Shutdown Supply Current		I_{SD}	EN pin=5V, $V_{CC}=40\text{V}$		100	200	μA
Oscillator Frequency		f_{OSC}		44	50	56	KHz
Oscillator Frequency of Short Circuit Protect	ADJ	f_{SCP}	$V_{FB}<0.5\text{V}$		25		KHz
	Fixed		$V_{OUT}<V_{OUT}*40\%$		25		KHz
Duty Cycle	MAX	DC	$V_{FB}=0\text{V}$ force driver ON		100		%
	MIN	DC	$V_{FB}=12\text{V}$ force driver OFF, $V_{FB}=18\text{V}$ for the 12V version.		0		%
Current Limit		I_{CL}	Pear current, No outside circuit $V_{FB}=0\text{V}$ force driver on	2.5			A
Load Regulation($\Delta V_{OUT}/V_{OUT}$)		ΔV_{OUT}	$I_{OUT}=0.2 \sim 2\text{A}$		0.6	1.2	%
Saturation Voltage		V_{SAT}	$I_{OUT}=2\text{A}$, No outside circuit $V_{FB}=0\text{V}$ force driver on		1.2	1.4	V
SW pin Leakage Current	SW pin=0V	I_{SWL}	No outside circuit $V_{FB}=12\text{V}$ force driver off, $V_{FB}=18\text{V}$ for the 12V version.			-200	μA
	SW pin=-0.8V		$V_{CC}=40\text{V}$ force driver off		-5		mA
EN pin Logic Input Threshold Voltage	Low	V_{IL}	regulator ON		1.3	0.6	V
	High	V_{IH}	regulator OFF	2.0	1.3		V
EN pin Logic Input Current		I_H	$V_{EN}=2.5\text{V}$ (OFF)		-0.1	-10	μA
EN pin Input Current		I_L	$V_{EN}=0.5\text{V}$ (ON)		-0.01	-1	μA
Thermal shutdown Temp		TSD			135		$^{\circ}\text{C}$
Output Feedback Voltage	ADJ	V_{FB}	$I_{LOAD}=0.2\text{A}$, V_{OUT} programmed for 3.3V	1.193	1.23	1.267	V
	3.3V		$I_{LOAD}=0.2\text{A}$	3.20	3.30	3.40	
	5.0V		$I_{LOAD}=0.2\text{A}$	4.85	5.00	5.15	
	12V		$I_{LOAD}=0.2\text{A}$	11.64	12.0	12.36	
Efficiency	ADJ	η	$V_{CC}=12\text{V}$, $I_{LOAD}=2\text{A}$		79		%
	3.3V		$V_{CC}=12\text{V}$, $I_{LOAD}=2\text{A}$		80		
	5.0V		$V_{CC}=12\text{V}$, $I_{LOAD}=2\text{A}$		84		
	12V		$V_{CC}=18\text{V}$, $I_{LOAD}=2\text{A}$		90		

■ TYPICAL APPLICATION CIRCUIT



(1) Adjustable Output Voltage Version



(2) Adjustable Output Voltage Version With Delayed Startup

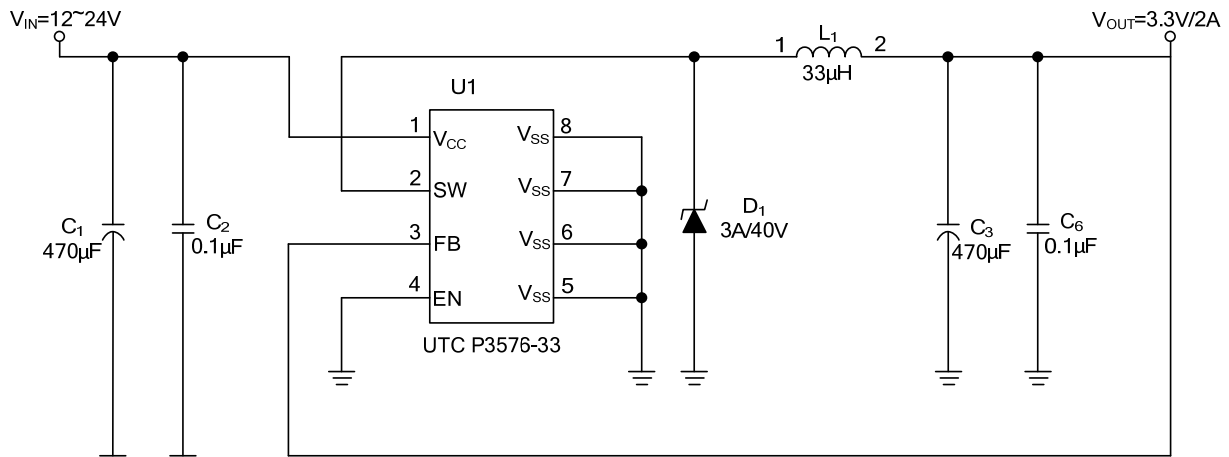
$$V_{OUT}=V_{FB} \times (1+R_1/R_2), V_{FB}=1.23V, R_2=0.47K \sim 3K$$

Table 1 Resistor select for output voltage setting

V_{OUT}	R2	R1
5V	1.5K	4.7K
	1.8K	5.6K
3.3V	1.5K	2.5K
	1.8K	3.0K
2.5V	1.8K	1.8K
1.8V	1.8K	0.82K

L1 recommend value ($I_{OUT}=2A$)				
V_{OUT}	2.5V	3.3V	5V	12V
$V_{IN}=12V$	33µH	33µH	47µH	NA
$V_{IN}=24V$	33µH	33µH	47µH	68µH

■ TYPICAL APPLICATION CIRCUIT (Cont.)



(3) Fixed Output Voltage Version

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