



P2172

Preliminary

LINEAR INTEGRATED CIRCUIT

100KHZ, 1.25A HIGH EFFICIENCY SWITCHING REGULATORS

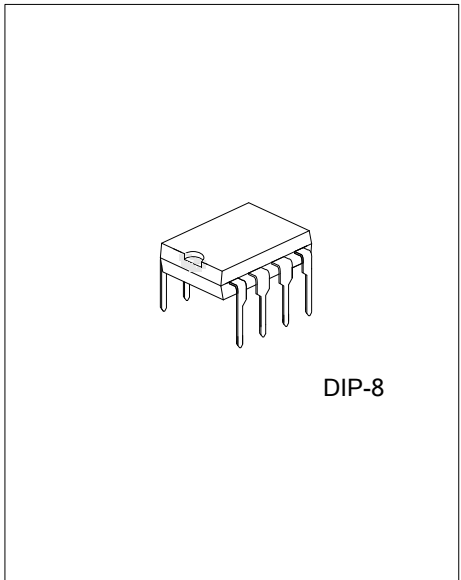
DESCRIPTION

The UTC P2172 is monolithic high power switching regulators. It can be operated in all standard switching configurations including boost, buck, fly-back, forward, inverting and "Cuk."

By utilizing current-mode switching techniques, they provide excellent AC and DC load and line regulation.

FEATURES

- * Wide Input Voltage Range: 3V~60V
- * Low Quiescent Current: 6mA
- * Very Few External Parts Required
- * Self-Protected Against Overloads
- * Operates in Nearly All Switching Topologies
- * Flyback-Regulated Mode Has Fully Floating Outputs
- * Can Be Externally Synchronized

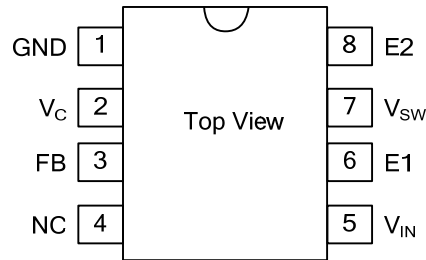


ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
P2172L-D08-T	P2172G-D08-T	DIP-8	Tube

<p>P2172G-D08-T</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Halogen Free 	<ul style="list-style-type: none"> (1) T: Tube (2) D08: DIP-8 (3) L: Lead Free, G: Halogen Free
--	--

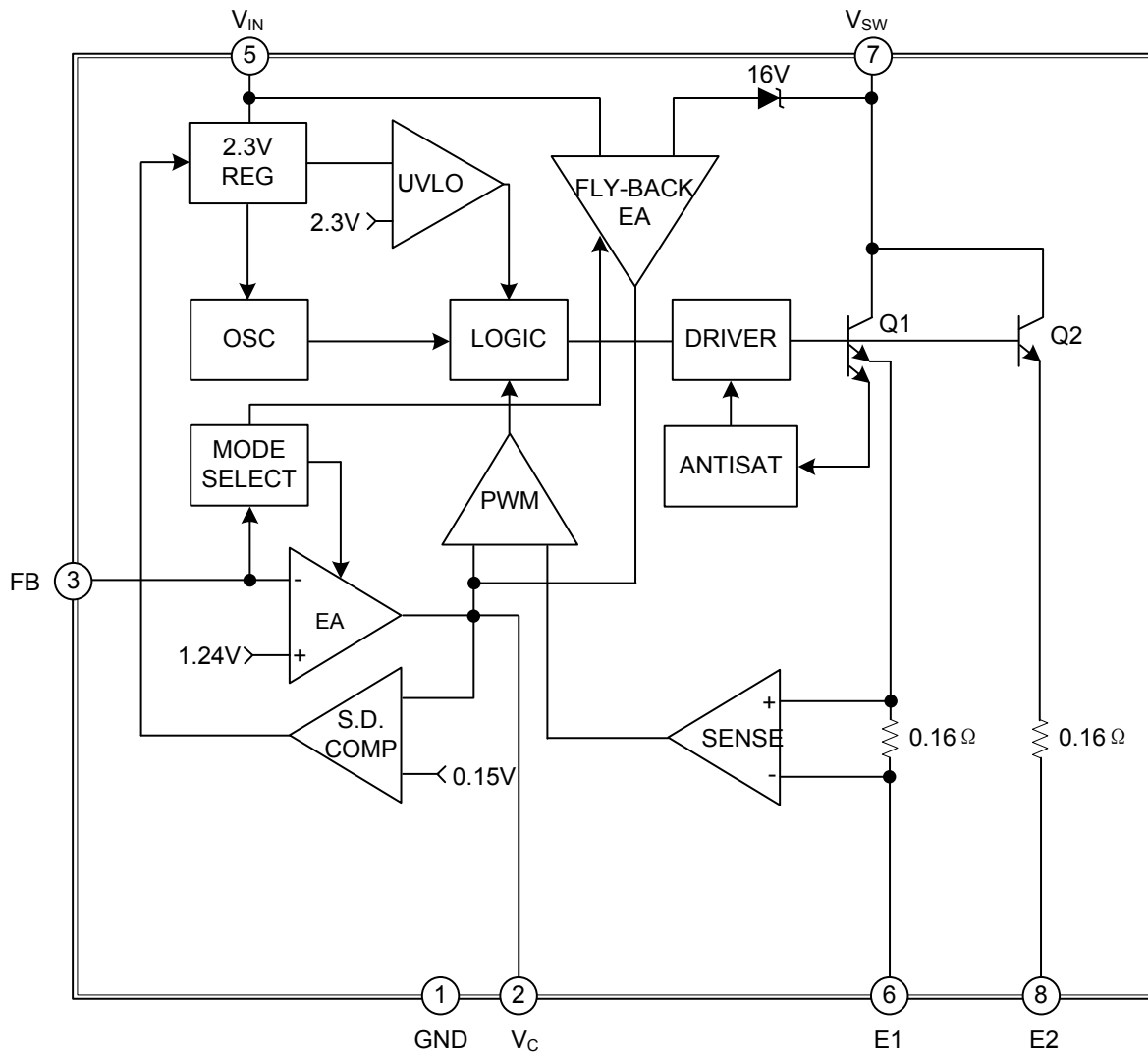
■ **PIN CONFIGURATION**



■ **PIN DESCRIPTION**

PIN NO.	PIN NAME	DESCRIPTION
1	GND	Signal ground. Keep separate from power grounds (E1 and E2).
2	V_C	Output of transconductance error amplifier.
3	FB	Error amplifier inverting input.
4	NC	Not connect
5	V_{IN}	Input supply voltage
6	E1	Power return of first transistor (Q1). This pin must be connected to ground
7	V_{SW}	Collector of output transistors.
8	E2	Grounding this pin sets the current limit point to the maximum value. If pin is left open, the current limit is set to half its maximum value

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{IN}	60	V
Switch Output Voltage	V_{SW}	60	V
Feedback Pin Voltage (Transient, 1ms)		±15	V
Operating Junction Temperature Range	T_J	-40~100	°C
Storage Temperature Range	T_{STG}	-65~150	°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.

■ ELECTRICAL CHARACTERISTICS

($V_{IN}=15V$, $V_C=0.5V$, $V_{FB}=V_{REF}$, output pin open, unless otherwise noted.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Reference Voltage	V_{REF}	Measured at Feedback Pin $V_C=0.8V$	1.224	1.244	1.264	V
Feedback Input Current	I_B	$V_{FB}=V_{REF}$		350	750	nA
Error Amplifier Transconductance	g_m	$\Delta I_C=\pm 25\mu A$	3000	4400	6000	μmho
Error Amplifier Source or Sink Current		$V_C=1.5V$	150	200	350	μA
Error Amplifier Clamp Voltage		Hi Clamp, $V_{FB}=1V$	1.80		2.30	V
		Lo Clamp, $V_{FB}=1.5V$	0.25	0.38	0.52	V
Reference Voltage Line Regulation		$3V\leq V_{IN}\leq V_{MAX}$, $V_C=0.8V$			0.03	%/V
Error Amplifier Voltage Gain	A_V	$0.9V\leq V_C\leq 1.4V$	500	800		V/V
Minimum Input Voltage (Note 3)				2.6	3.0	V
Supply Current	I_Q	$3V\leq V_{IN}\leq V_{MAX}$, $V_C=0.6V$		6	9	mA
Control Pin Threshold		Duty Cycle=0	0.8	0.9	1.08	V
Normal / Flyback Threshold on Feedback Pin			0.4	0.45	0.54	V
Flyback Reference Voltage (Note 3)	V_{FB}	$I_{FB}=50\mu A$	15.0	16.3	17.6	V
Change in Flyback Reference Voltage		$0.05\leq I_{FB}\leq 1mA$	4.5	6.8	9	V
Flyback Reference Voltage Line Regulation (Note 3)		$I_{FB}=50\mu A$ $7V\leq V_{IN}\leq V_{MAX}$		0.01	0.03	%/V
Flyback Amplifier Transconductance (g_m)		$\Delta I_C=\pm 10\mu A$	150	300	650	μmho
Flyback Amplifier Source and Sink Current		$V_C=0.6V$ Source	15	32	70	μA
		$I_{FB}=50\mu A$ Sink	25	40	70	
Output Switch Breakdown Voltage	BV	$3V\leq V_{IN}\leq V_{MAX}$, $I_{SW}=1.5mA$	65	80		V
Output Switch "On" Resistance (Note 2)	V_{SAT}			0.60	1.00	Ω
Control Voltage to Switch Current Transconductance				2		A/V
Switch Current Limit	I_{LIM}	Duty Cycle=50% Duty	1.25		3.5	A
		Cycle=80% (Note 2)	1.00		2.5	A
Supply Current Increase During Switch On-Time	$\frac{\Delta I_{IN}}{\Delta I_{SW}}$			25	35	mA/A

■ ELECTRICAL CHARACTERISTICS(Cont.)

($V_{IN}=15V$, $V_C=0.5V$, $V_{FB}=V_{REF}$, output pin open, unless otherwise noted.)

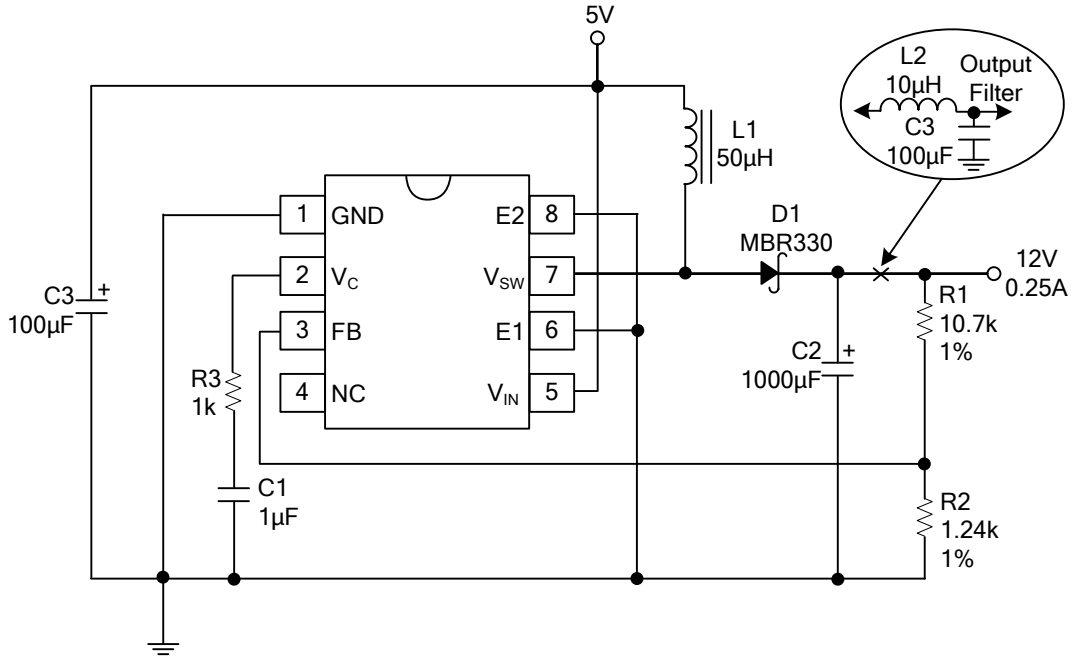
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Switching Frequency	f		88	100	112	kHz
Maximum Switch Duty Cycle	DC _{MAX}		85	92	97	%
Shutdown Mode Supply Current		$3V \leq V_{IN} \leq V_{MAX}$, $V_C=0.05V$		100	250	μA
Shutdown Mode Threshold Voltage		$3V \leq V_{IN} \leq V_{MAX}$	100	150	250	mV
Flyback Sense Delay Time (Note 3)				1.5		μs

Notes: 1. Measured with V_C in hi clamp, $V_{FB}=0.8V$, $I_{SW}=1A$.

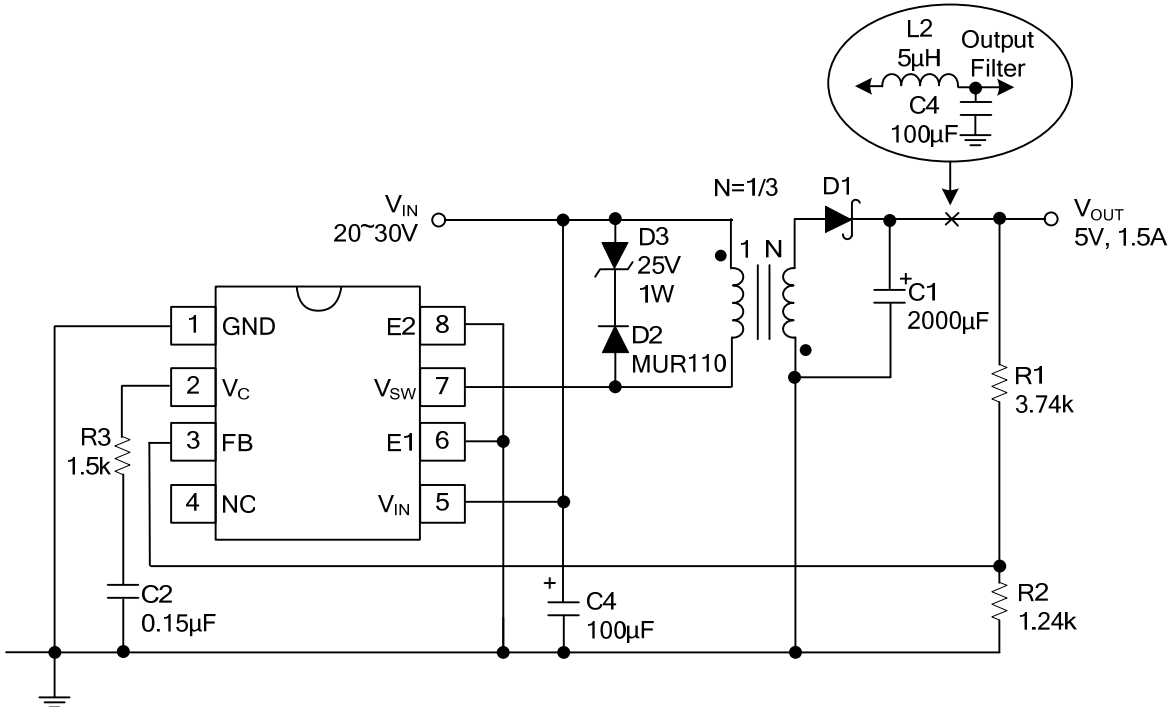
2. For duty cycles (DC) between 50% and 80%, minimum guaranteed switch current is given by $I_{LIM}=0.833 \times (2-DC)$.

3. Minimum input voltage for isolated flyback mode is 7V, $V_{MAX}=55V$ for HV grade in fully isolated mode to avoid switch breakdown.

■ TYPICAL APPLICATION CIRCUIT



Boost Converter (5V~12V)



Flyback Converter

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.