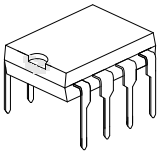
100KHZ, 1.25A HIGH EFFICIENCY SWITCHING REGULATORS



DIP-8

■ 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

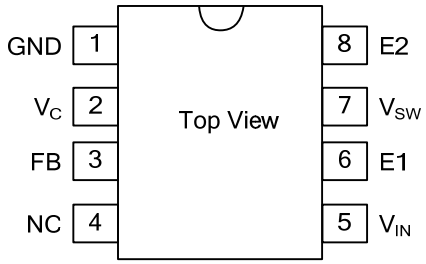
* Wide Input Voltage Range: 3V~60V
* Low Quiescent Current: 6mA
* Very Few External Parts Required
* Self-Protected Against Overloads
* Operates in Nearly All Switching Topologies
* Flyback-Regulated Mode Has Fully Floating Outputs
* Can Be Externally Synchronized

■ ORDERING INFORMATION

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

P2172G-D08-T (1)Packing Type (2)Package Type (3)Halogen Free	(1) T: Tube (2) D08: DIP-8 (3) L: Lead Free, G: Halogen Free

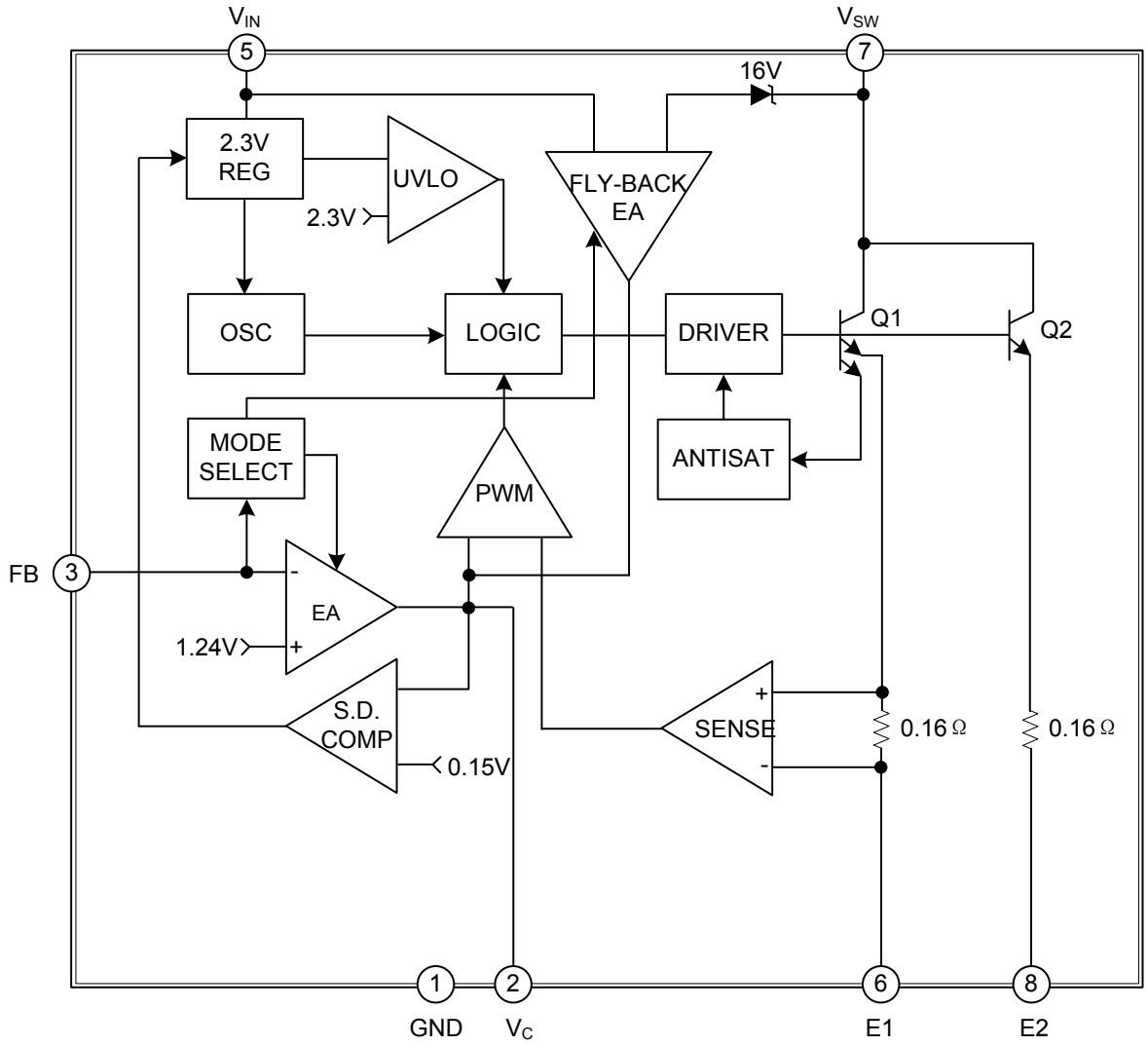
■ PIN CONFIGURATION



■ 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	△I_C=±25μA	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≤V_{IN} ≤V_{MAX}, V_C=0.8V			0.03	%/V
Error Amplifier Voltage Gain	A_V	0.9V≤ V_C ≤1.4V	500	800		V/V
Minimum Input Voltage (Note 3)				2.6	3.0	V
Supply Current	I_Q	3V≤V_{IN} ≤VMAX, 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}=50μA	15.0	16.3	17.6	V
Change in Flyback Reference Voltage		0.05≤I_{FB}≤1mA	4.5	6.8	9	V
Flyback Reference Voltage Line Regulation (Note 3)		I_{FB}=50μA 7V≤V_{IN} ≤V_{MAX}		0.01	0.03	%/V
Flyback Amplifier Transconductance (g_m)		△I_C=±10μA	150	300	650	μmho
Flyback Amplifier Source and Sink Current		V_C=0.6V Source	15	32	70	μA
		I_{FB}=50μA Sink	25	40	70	
Output Switch Breakdown Voltage	BV	3V≤V_{IN} ≤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

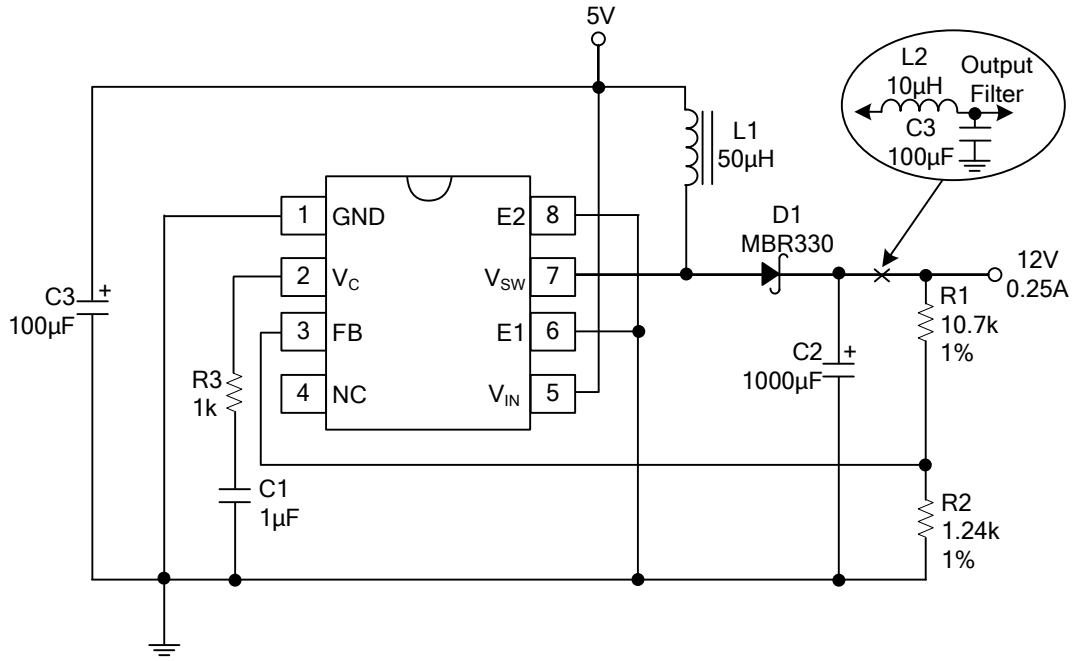
■ ELECTRICAL CHARACTERISTICS(Cont.)

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

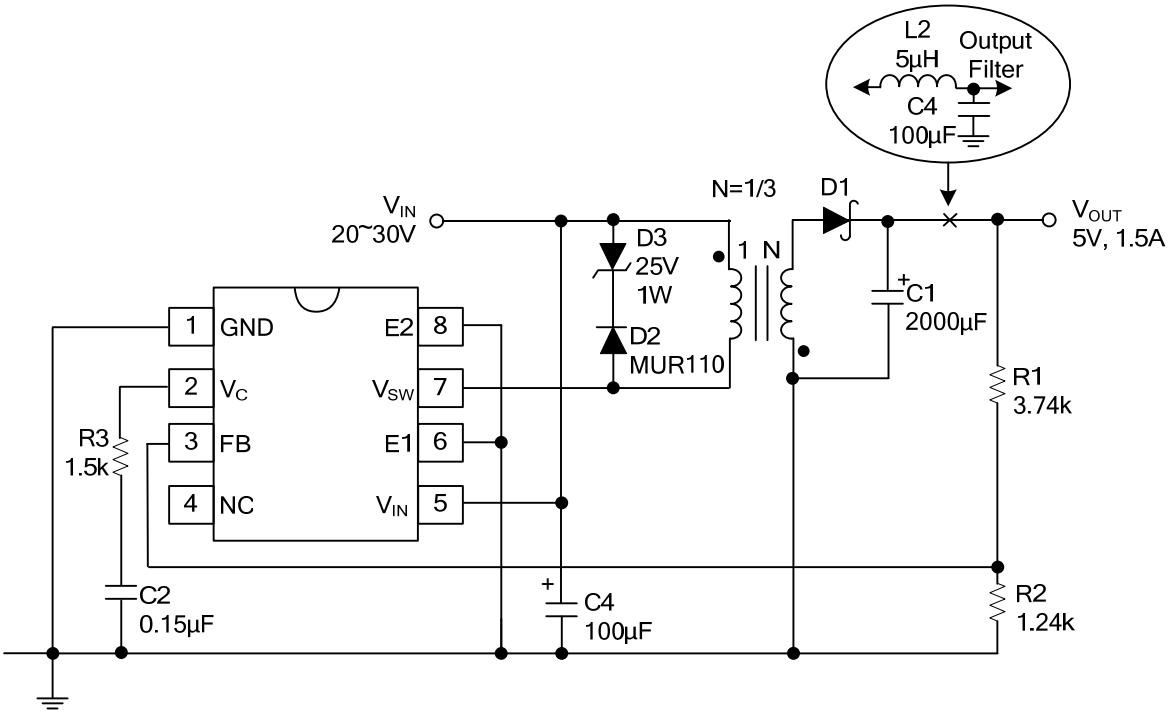
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Switching Frequency	f		88	100	112	kHz
Maximum Switch Duty Cycle	DC_{MAX}		85	92	97	%
Shutdown Mode Supply Current		3V≤V_{IN}≤V_{MAX}, V_C=0.05V		100	250	μA
Shutdown Mode Threshold Voltage		3V≤V_{IN}≤V_{MAX}	100	150	250	mV
Flyback Sense Delay Time (Note 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 ILIM=0.833×(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