

LM2577 Three Output, Isolated Flyback Regulator

The flyback regulator's mode of operation is continuous, so a large primary inductance ($L_P = 300 \mu H$) is needed for the transformer. Using a Ferroxcube 812E250-3C8 E core, the primary winding requires about 50 turns. With the turns-ratios as they are shown on the schematic and the small core size, the transformer windings must be wound tightly so that they fit the core windows. Interlaying the primary winding between the secondary windings improves the transformers coupling.

The zener diode circuit (V_Z , R_Z , R_1) is added to provide the optocoupler transistor with about 20 μA of bias current, on top of the current sourced from the compensation pin (about 7 μA). The isolation resistor, between the compensation pin and the zener diode, needs to be as large as 100 k Ω , or at start-up, the compensation pin will see too large a voltage, turning the power switch fully on—thus forcing the LM2577 into current limit. Also, to ensure good line regulation, the dynamic impedance of the zener diode must be very good.

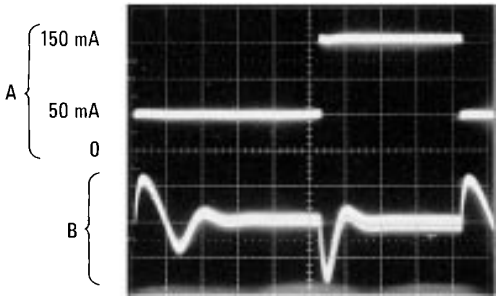
Test data for this regulator follows the schematic. Since feedback is taken from Output 1, its load and line regulation are better than that of the other two outputs, which rely on feedback through the transformer coupling. The output ripple voltage of all three outputs is largely dependent on the filter capacitors used, and could be reduced by the use of additional high-quality filter capacitors or an additional L-C filter section.

[illegible]

AN-777

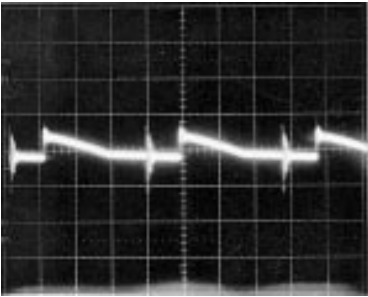
ELECTRICAL TEST DATA $V_I = 16V-36V$

Output Voltages	Line Regulation ($I_O = \text{Full Load}$)	Load Regulation ($V_I = 26V$)	Output Ripple Voltage ($T_A = 25^\circ C$)
$V_{O1} = 5V$	0.2%	0.04% 30 mA–150 mA	50 mV
$V_{O2} = 7.5V$	0.3%	3% 20 mA–100 mA	50 mV
$V_{O3} = 7.5V$	0.3%	2% 12 mA–70 mA	50 mV



Load Transient Response
A. Load Current, 50 mA/div
B. Output Voltage Change
50 mV/div (AC-Coupled)
Horizontal: 5 ms/div

TL/H/11217-2



Output Ripple Voltage
20 mV/div (AC-Coupled)
Horizontal: 5 ms/div

TL/H/11217-3

Lit. # 100777

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.



National Semiconductor Corporation
2900 Semiconductor Drive
P.O. Box 58090
Santa Clara, CA 95052-8090
Tel: (408) 272-9959
TWX: (910) 339-9240

National Semiconductor GmbH
Livy-Gargan-Str. 10
D-82256 Fürstenfeldbruck
Germany
Tel: (81-41) 35-0
Telex: 527849
Fax: (81-41) 35-1

National Semiconductor Japan Ltd.
Sumitomo Chemical Engineering Center
Bldg. 7F
1-7-1, Nakase, Mihamu-Ku
Chiba-City,
Chiba Prefecture 261
Tel: (043) 299-2300
Fax: (043) 299-2500

National Semiconductor Hong Kong Ltd.
13th Floor, Straight Block,
Ocean Centre, 5 Canton Rd.
Tsimshatsui, Kowloon
Hong Kong
Tel: (852) 2737-1600
Fax: (852) 2736-9960

National Semicondutores Do Brazil Ltda.
Rue Deputado Lacorda Franco
120-3A
Sao Paulo-SP
Brazil 05418-000
Tel: (55-11) 212-5066
Telex: 391-1131931 NSBR BR
Fax: (55-11) 212-1181

National Semiconductor (Australia) Pty. Ltd.
Building 16
Business Park Drive
Monash Business Park
Nottingham, Melbourne
Victoria 3168 Australia
Tel: (3) 558-9999
Fax: (3) 558-9998

National does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and National reserves the right at any time without notice to change said circuitry and specifications.