

## Projet 3 - ALIM2575 / Alimentation à découpage +5V avec le LM2575

Projet : IUT2 – formation ORCAD version 9.x 2002/2003.

Info : [DIV372]

Révision : 1 du 9 novembre 2002.

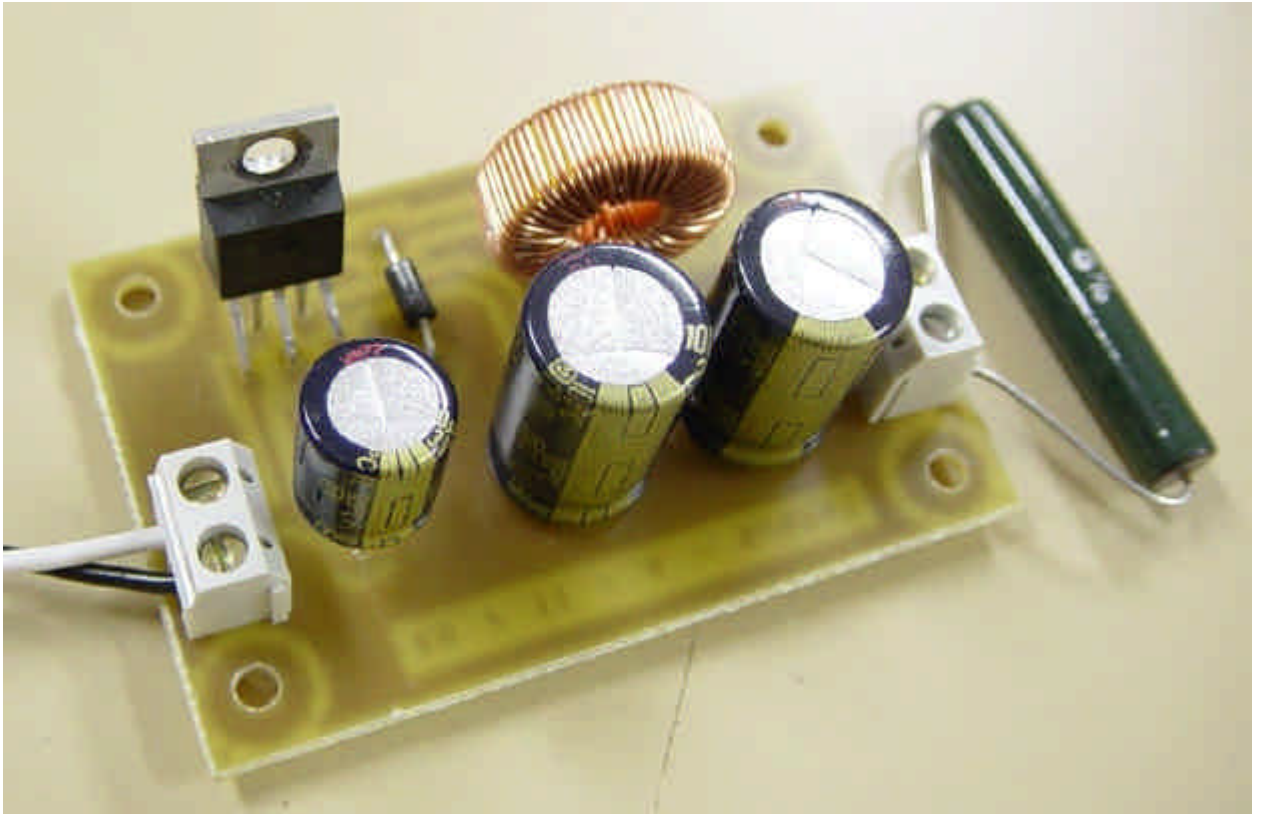


Figure 3.1. Vue de carte électronique (images-maquettes\lm2575-1.jpg).

### 3.1 Liste des documents

- Désignation des composants.
- Allure des principaux composants.
- Prix du montage.
- Schéma électronique.
- Circuit imprimé coté cuivre.
- Circuit imprimé coté composants.
- Implantation des composants.
- Documentations.

### 3.2 Désignation des composants

Tableau 3.1. Liste de composants (projets-iut2.xls / ).

N°	Quantité	Référence	Désignation	Empreinte
1	1	C1	100 uF 63V	RADIAL06
2	2	C3,C2	1 mF 10V	RADIAL13
3	1	D1	11DQ06	DO41
4	1	JP1	SORTIE	02PL2
5	1	JP2	ENTREE	02PL2
6	1	L1	300 uH 2A	WE300
7	1	U1	LM2575	TO220-5b
8	4	VIS1,VIS2,VIS3,VIS4	VISSERIE	M3

### 3.3 Allure des principaux composants

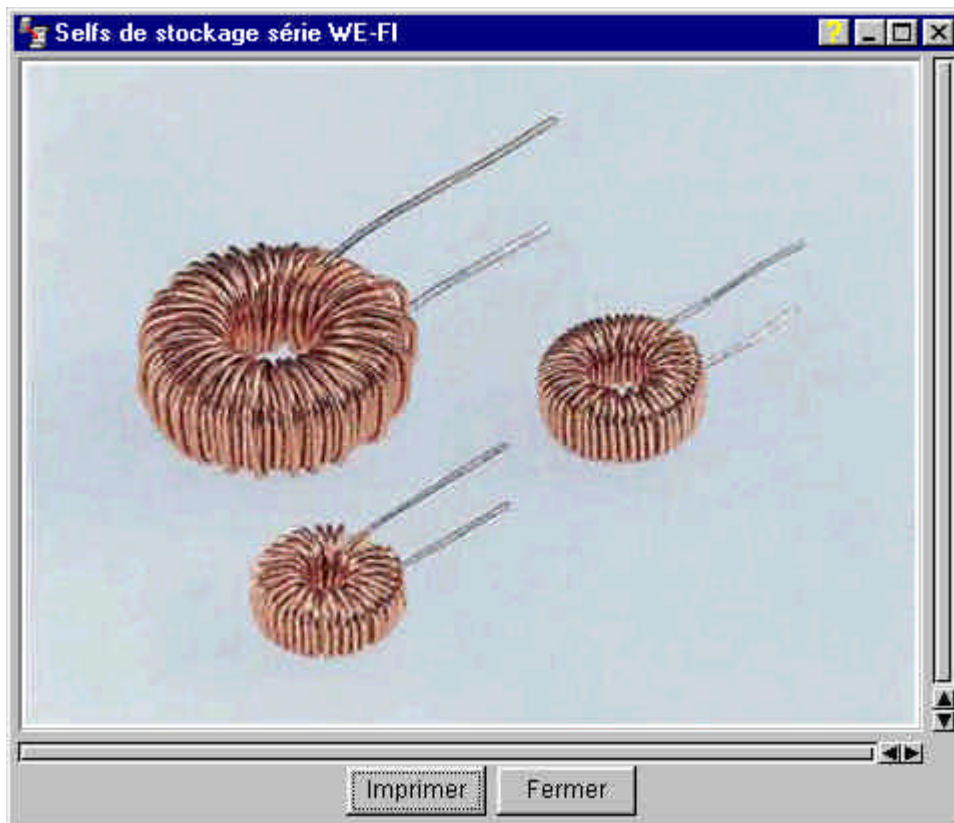


Figure 3.2. Inductance série WE-FI Würth Elektronik (images-composants\WE300FI.jpg).

### 3.4 Relevés oscillographiques

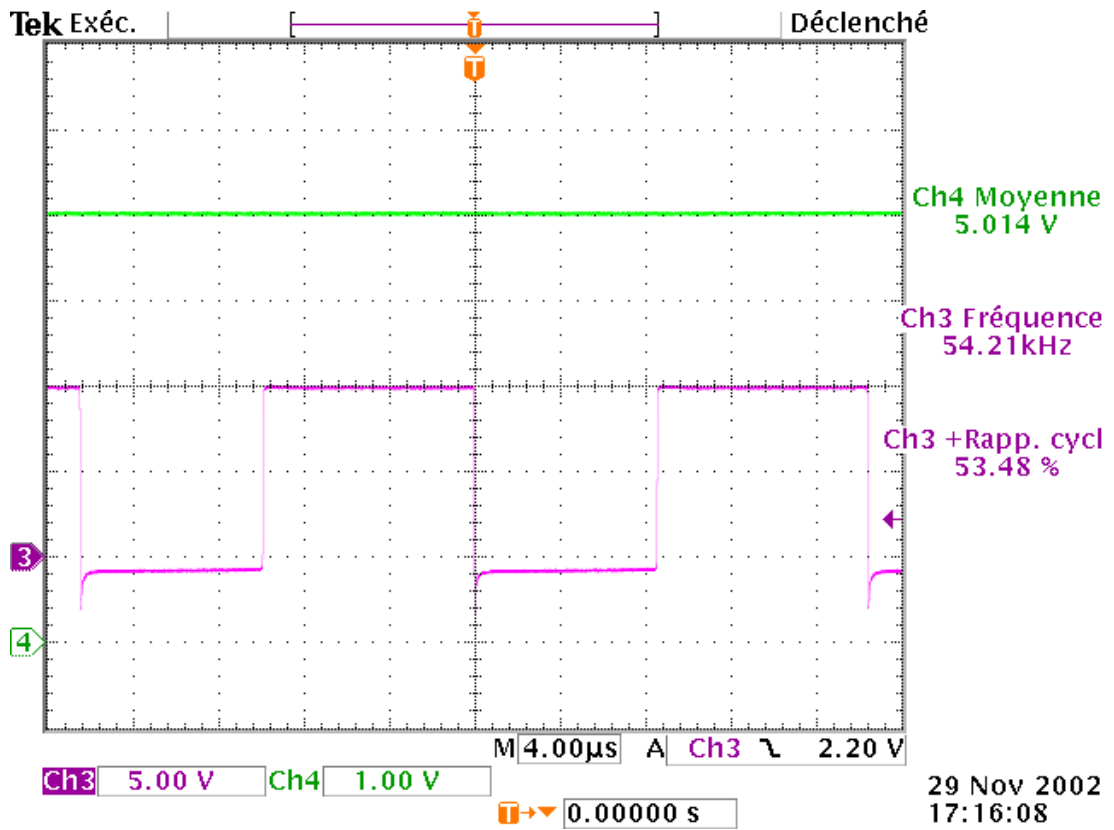


Figure 3.3. Tension diode et tension de sortie pour  $V_e = +10V$  et  $R_s = 33 \Omega$  (Tek00002.pcx).

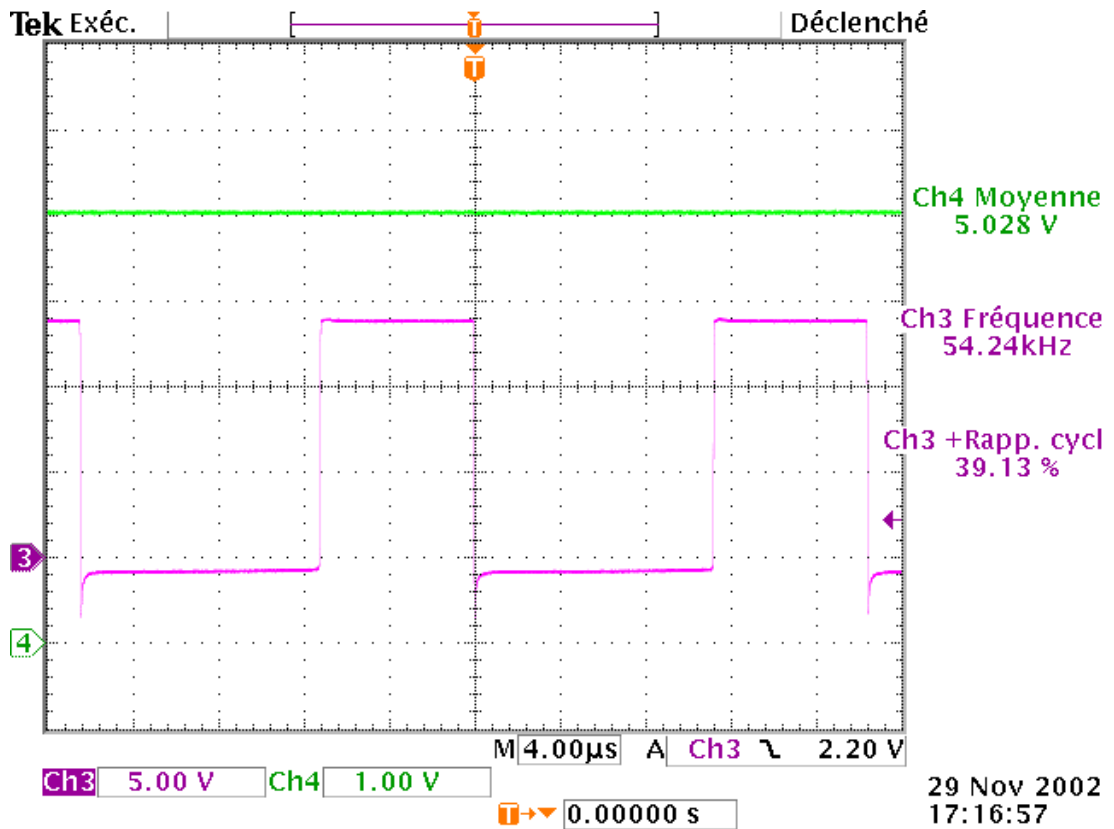


Figure 3.4. Tension diode et tension de sortie pour  $V_e = +15V$  et  $R_s = 33 \Omega$  (Tek00003.pcx).

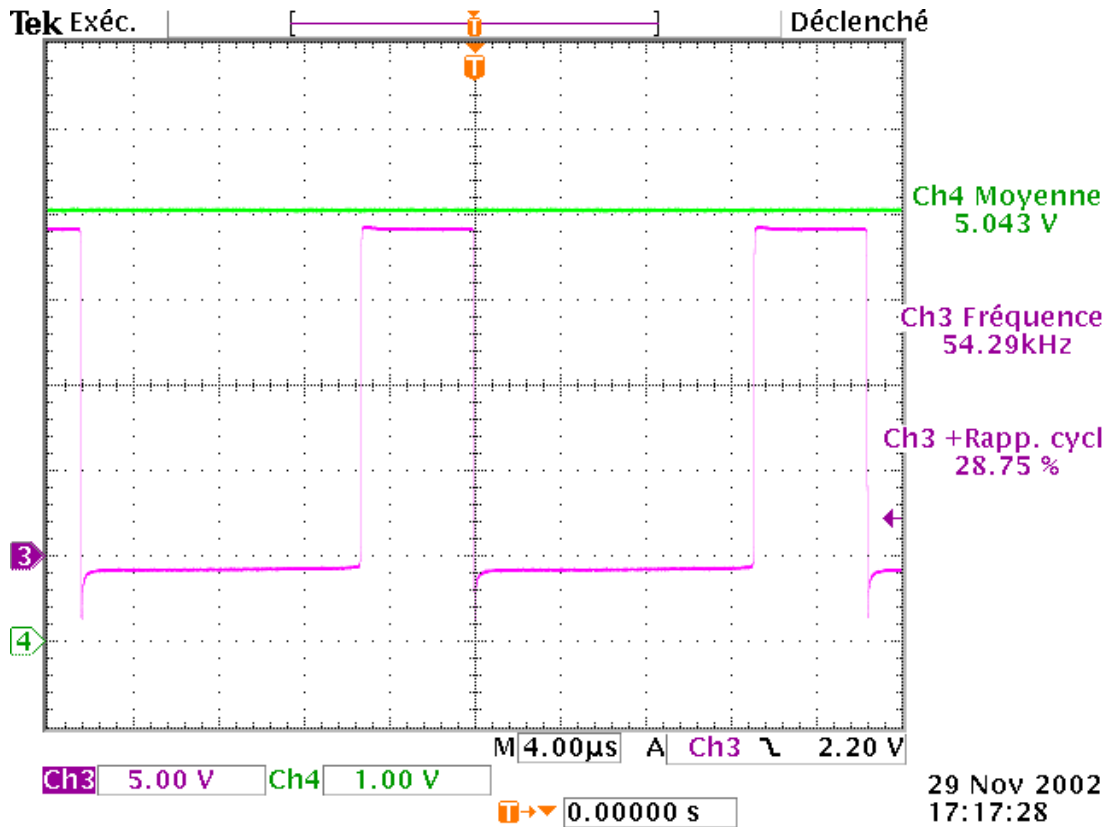


Figure 3.5. Tension diode et tension de sortie pour  $V_e = +20V$  et  $R_s = 33 \Omega$  (Tek00004.pcx).

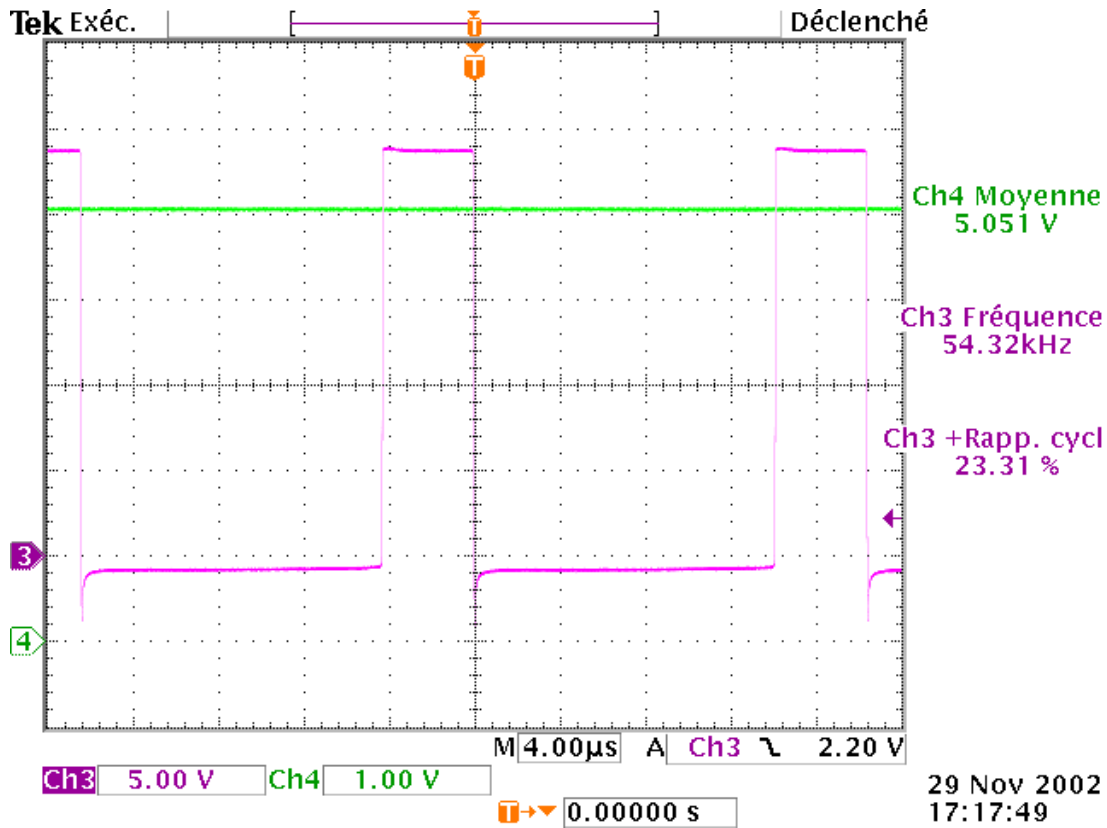


Figure 3.6. Tension diode et tension de sortie pour  $V_e = +25V$  et  $R_s = 33 \Omega$  (Tek00005.pcx).

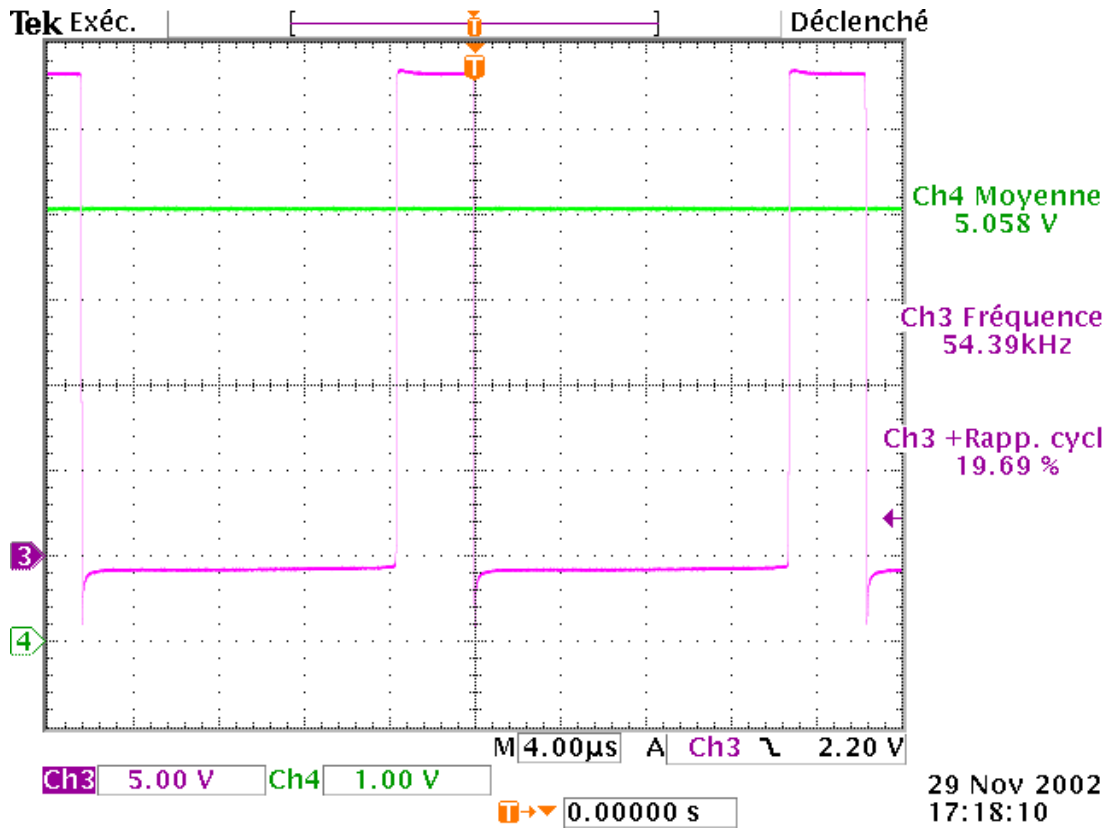


Figure 3.7. Tension diode et tension de sortie pour  $V_e = +30V$  et  $R_s = 33 \Omega$  (Tek00006.pcx).

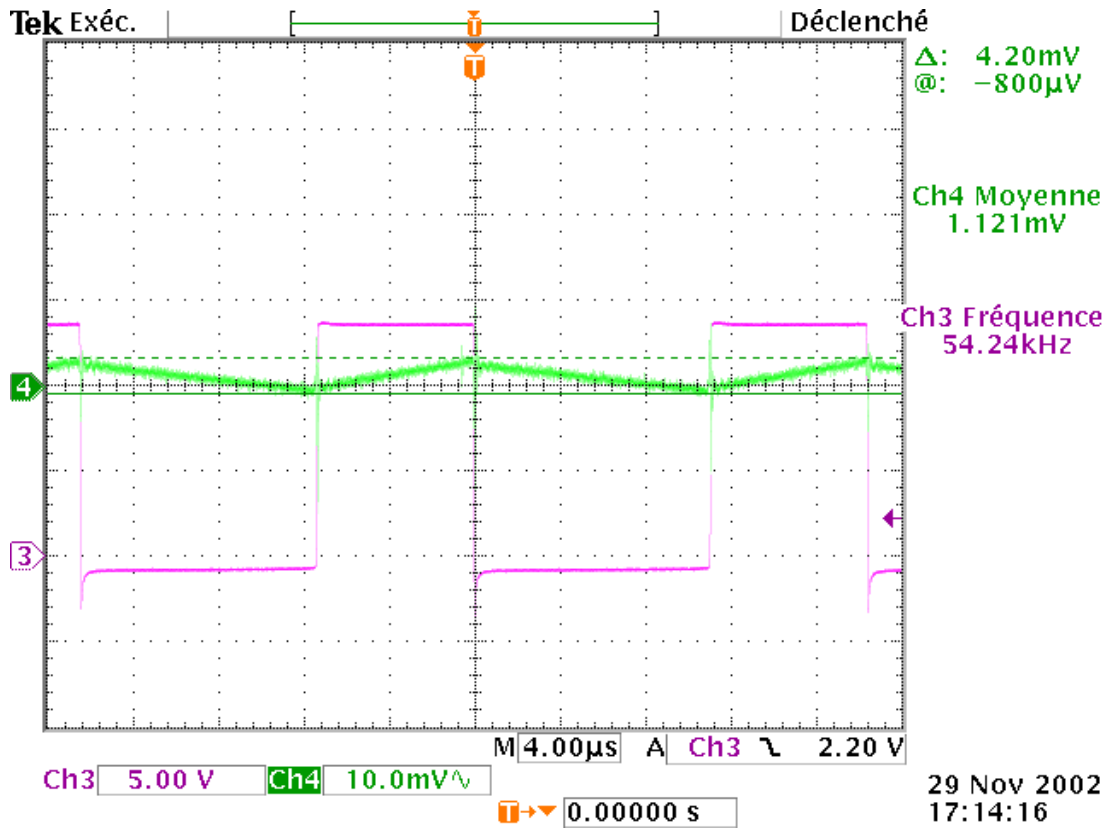


Figure 3.8. Tension diode et ondulation de la tension de sortie pour  $V_e = +15V$  et  $R_s = 33 \Omega$  (Tek00000.pcx).

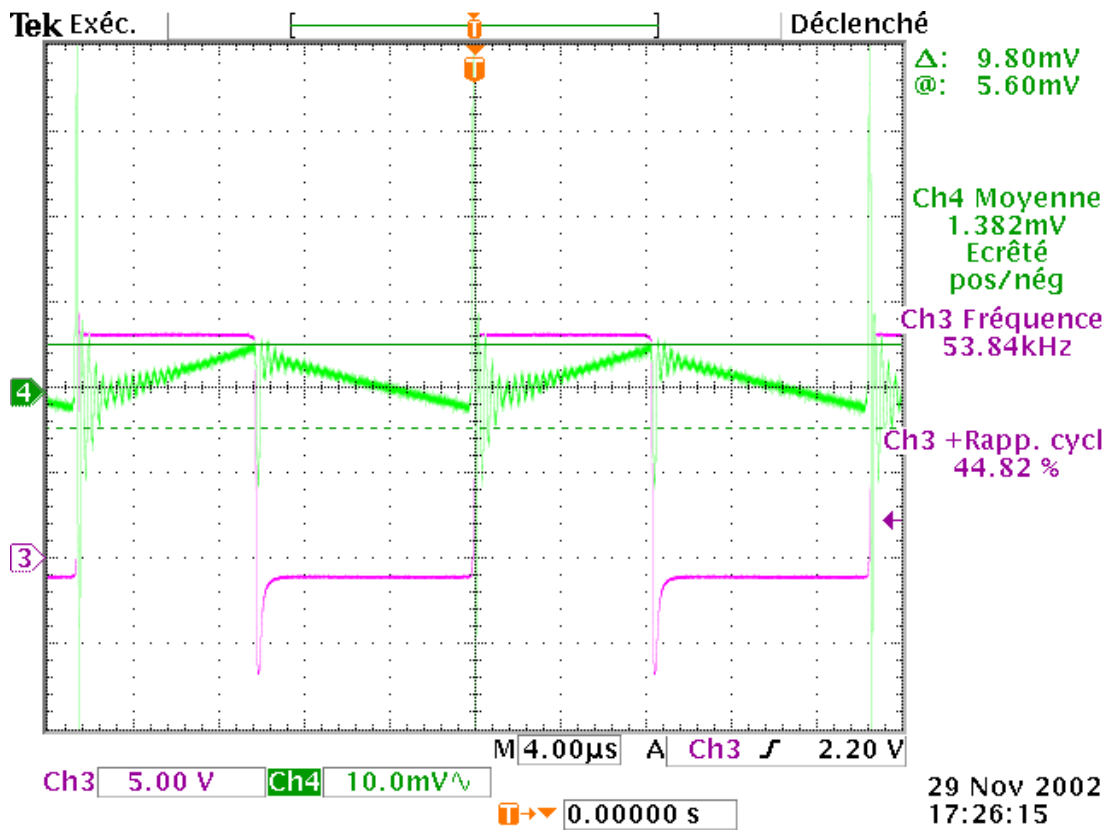


Figure 3.9. Tension diode et ondulation de la tension de sortie pour  $V_e = +15V$  et  $I_s = 2 A$  (Tek00010.pcx).

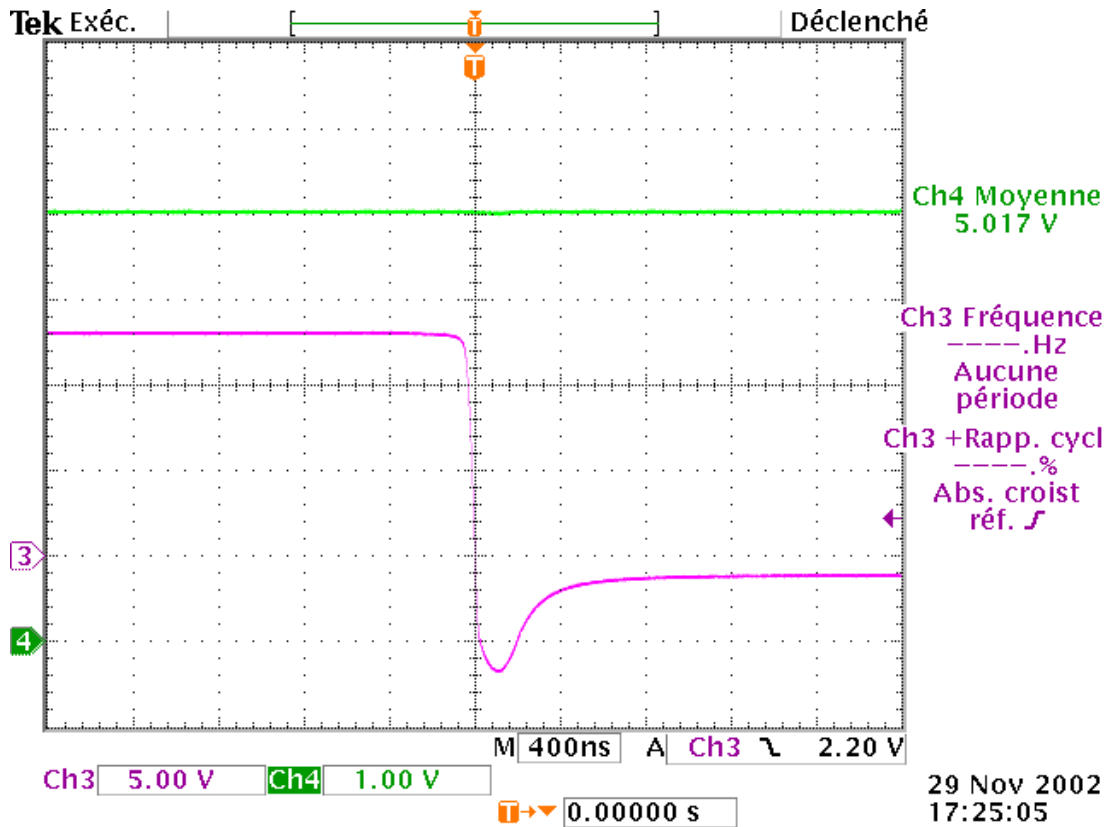


Figure 3.10. Tension diode et tension de sortie pour  $V_e = +15V$  et  $I_s = 2 A$  (zoom) (Tek00008.pcx).

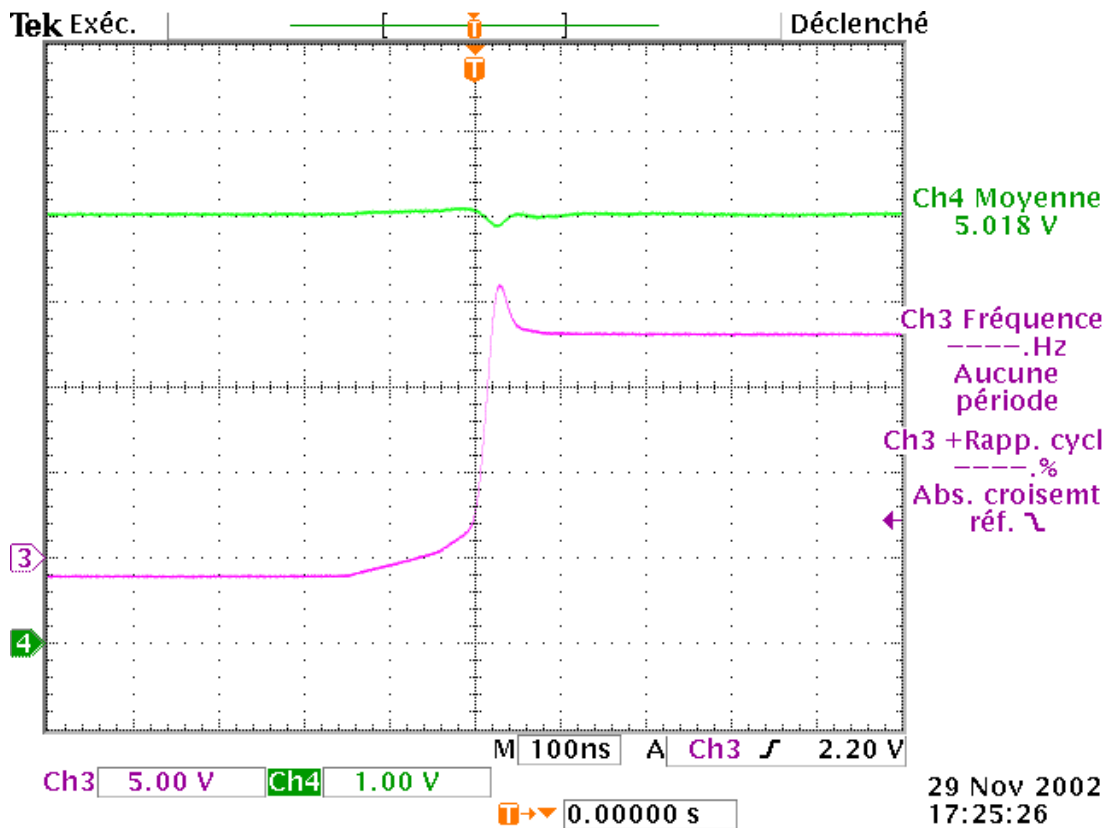


Figure 3.11. Tension diode et tension de sortie pour  $V_e = +15V$  et  $I_s = 2 A$  (zoom) (Tek00009.pcx).

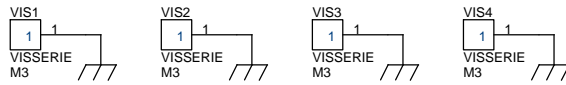
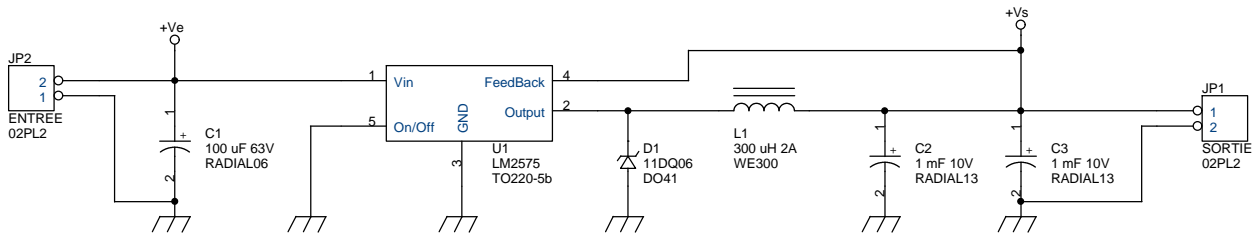
**Alimentation à découpage + V****Revised: Saturday, November 09, 2002****IUT2 \ [DIV372] \ ALIM2575 Revision: 1**

Référence	Qu.	Désignation	Fournisseur	Code Cde.	U.d.V.	Prix U.	Prix T.
C1	1	$\mu$ F V FC	Radiospares	315-0962	5	, €	, €
C3,C2	2	$\mu$ F V FC	Radiospares	315-0344	5	, €	, €
D1	1	11DQ04	Radiospares	395-6350	10	, €	, €
JP1, JP2	2	Borniers 2 plot	Radiospares	131-8920	10	, €	, €
L1	1	300 uH 2A	Radiospares	308-8772	1	, €	, €
U1	1	LM2575	Radiospares	246-7382	1	, €	, €
VIS1,VIS2, VIS3,VIS4	4	Visserie M3	IUT GEII		1	, €	, €
Divers	32	Circuit imprimé SF x mm	Radiospares	159-6091	600	, €	, €
Divers					1		, €

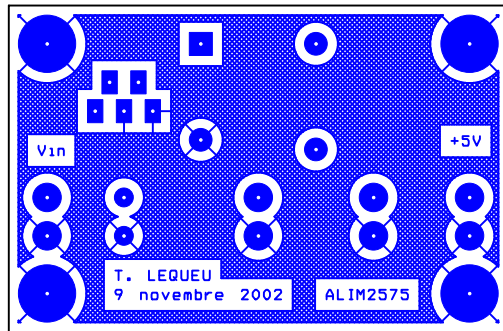
TOTAL H.T. :	, €
dont TVA : 19,60%	, €
<b>TOTAL T.T.C. :</b>	, €

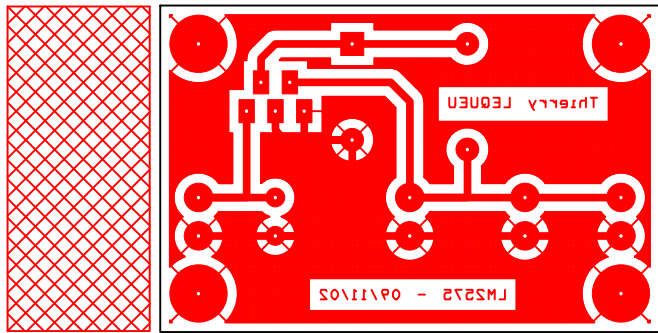


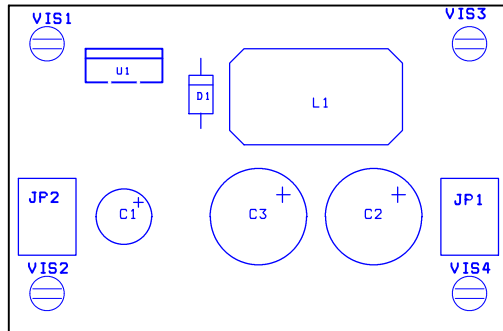
"Remplacez vos régulateurs 3 pattes"  
 Pages 34, revue N° 269, Electronique Pratique, octobre 2002.  
[http://www.iut.univ-tours.fr/geii/lequeu/doc\\_tl/REVUE358.htm](http://www.iut.univ-tours.fr/geii/lequeu/doc_tl/REVUE358.htm)

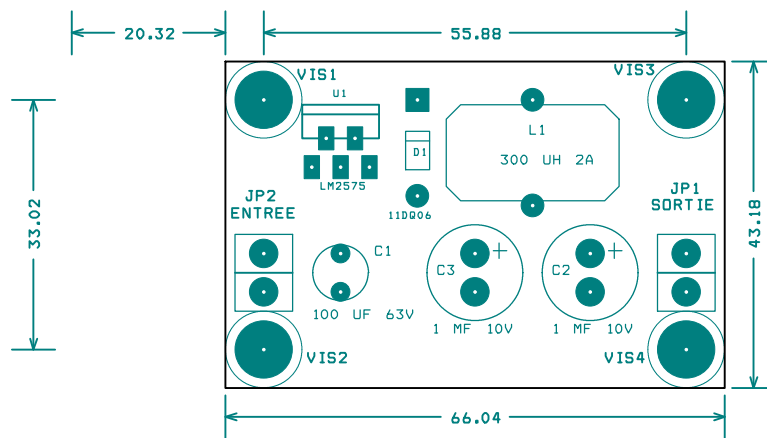


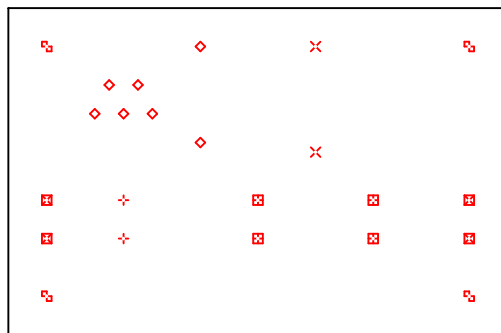
Auteur : Thierry LEQUEU		
Title Alimentation à découpage +5V		
Size A	Document Number IUT2 \ [DIV\372] \ALIM2575	Rev 1
Date:	Saturday, November 09, 2002	Sheet 1 of 1











DRILL CHART				
SYM	DIAM	TOL	QTY	NOTE
+	0.787 mm		2	
◇	0.991 mm		7	
⊠	1.000 mm		4	
⊞	1.194 mm		4	
×	1.499 mm		2	
⊜	3.200 mm		4	
TOTAL			23	

# LM1575/LM2575/LM2575HV SIMPLE SWITCHER® 1A Step-Down Voltage Regulator

## General Description

The LM2575 series of regulators are monolithic integrated circuits that provide all the active functions for a step-down (buck) switching regulator, capable of driving a 1A load with excellent line and load regulation. These devices are available in fixed output voltages of 3.3V, 5V, 12V, 15V, and an adjustable output version.

Requiring a minimum number of external components, these regulators are simple to use and include internal frequency compensation and a fixed-frequency oscillator.

The LM2575 series offers a high-efficiency replacement for popular three-terminal linear regulators. It substantially reduces the size of the heat sink, and in many cases no heat sink is required.

A standard series of inductors optimized for use with the LM2575 are available from several different manufacturers. This feature greatly simplifies the design of switch-mode power supplies.

Other features include a guaranteed  $\pm 4\%$  tolerance on output voltage within specified input voltages and output load conditions, and  $\pm 10\%$  on the oscillator frequency. External shutdown is included, featuring 50  $\mu\text{A}$  (typical) standby current. The output switch includes cycle-by-cycle current limiting, as well as thermal shutdown for full protection under fault conditions.

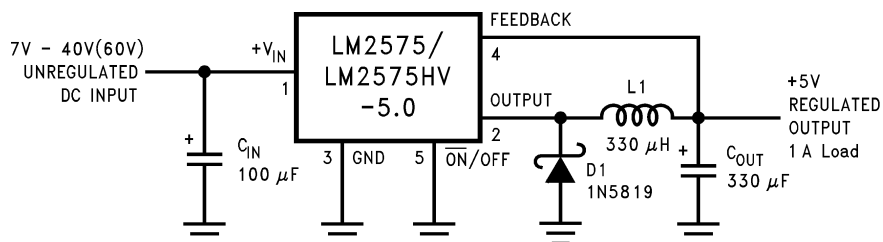
## Features

- 3.3V, 5V, 12V, 15V, and adjustable output versions
- Adjustable version output voltage range, 1.23V to 37V (57V for HV version)  $\pm 4\%$  max over line and load conditions
- Guaranteed 1A output current
- Wide input voltage range, 40V up to 60V for HV version
- Requires only 4 external components
- 52 kHz fixed frequency internal oscillator
- TTL shutdown capability, low power standby mode
- High efficiency
- Uses readily available standard inductors
- Thermal shutdown and current limit protection
- P+ Product Enhancement tested

## Applications

- Simple high-efficiency step-down (buck) regulator
- Efficient pre-regulator for linear regulators
- On-card switching regulators
- Positive to negative converter (Buck-Boost)

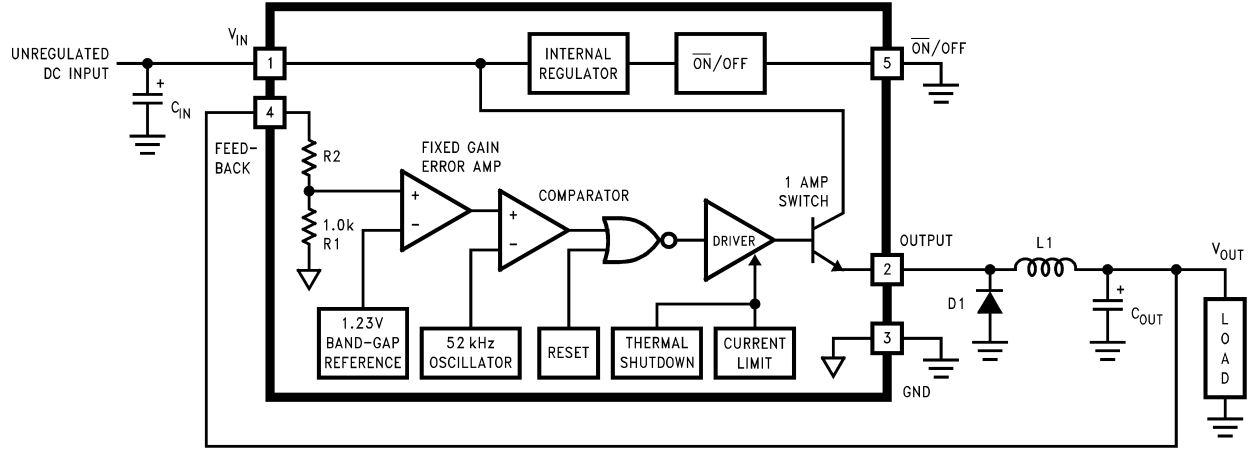
## Typical Application (Fixed Output Voltage Versions)



**Note:** Pin numbers are for the TO-220 package.

01147501

## Block Diagram and Typical Application



01147502

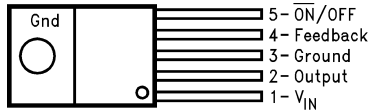
3.3V, R2 = 1.7k  
 5V, R2 = 3.1k  
 12V, R2 = 8.84k  
 15V, R2 = 11.3k  
 For ADJ. Version  
 R1 = Open, R2 = 0Ω

**Note:** Pin numbers are for the TO-220 package.

FIGURE 1.

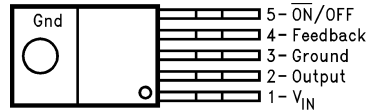
## Connection Diagrams (XX indicates output voltage option. See Ordering Information table for complete part number.)

### Straight Leads 5-Lead TO-22 (T)

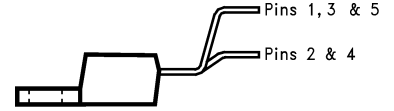


01147522

### Bent, Staggered Leads 5-Lead TO-220 (T)



01147523



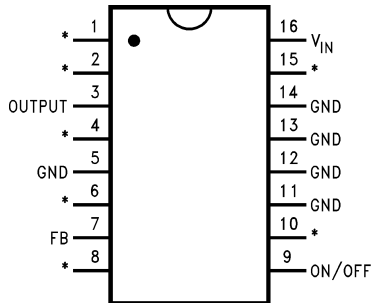
01147524

**Top View**  
 LM2575T-XX or LM2575HVT-XX  
 See NS Package Number T05A

**Top View**

**Side View**  
 LM2575T-XX Flow LB03 or  
 LM2575HVT-XX Flow LB03  
 See NS Package Number T05D

### 16-Lead DIP (N or J)

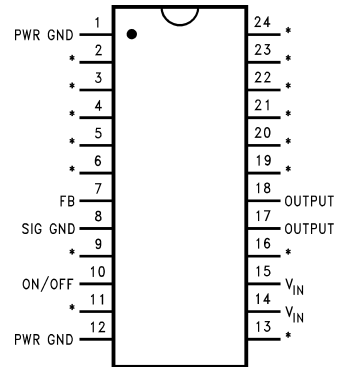


01147525

**Top View**  
 LM2575N-XX or LM2575HVN-XX  
 See NS Package Number N16A  
 LM1575J-XX-QML  
 See NS Package Number J16A

\*No Internal Connection

### 24-Lead Surface Mount (M)



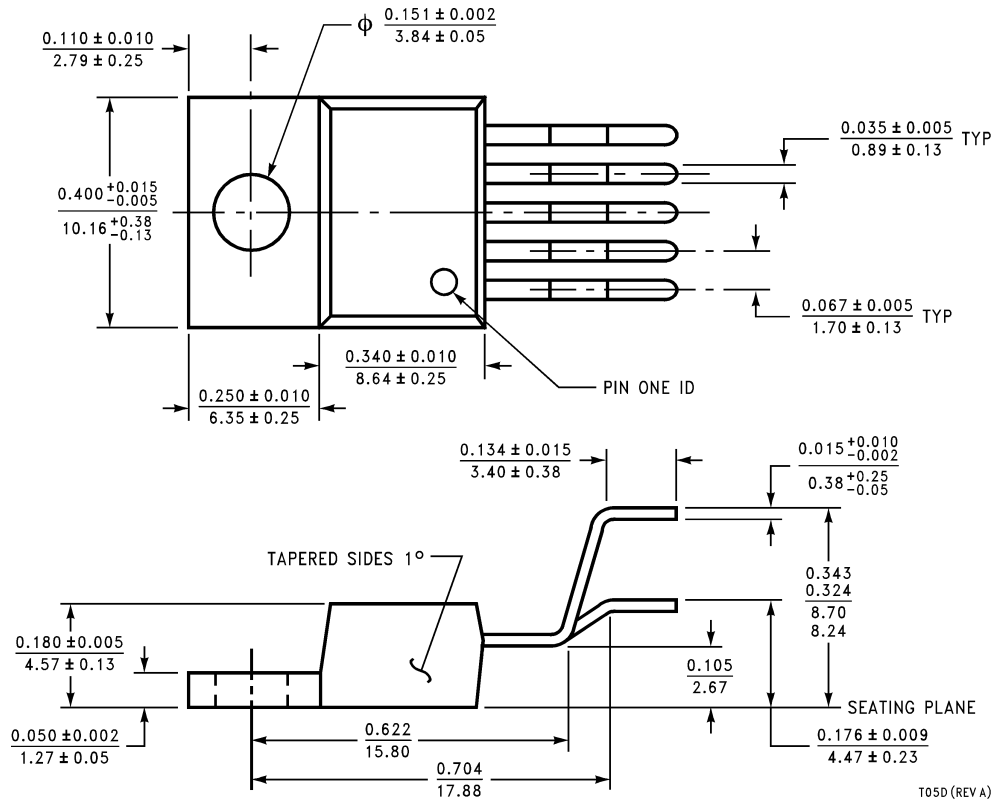
01147526

**Top View**  
 LM2575M-XX or LM2575HVM-XX  
 See NS Package Number M24B

\*No Internal Connection



**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)




**Bent, Staggered 5-Lead TO-220 (T)**  
**Order Number LM2575T-3.3 Flow LB03, LM2575HVT-3.3 Flow LB03,**  
**LM2575T-5.0 Flow LB03, LM2575HVT-5.0 Flow LB03,**  
**LM2575T-12 Flow LB03, LM2575HVT-12 Flow LB03,**  
**LM2575T-15 Flow LB03, LM2575HVT-15 Flow LB03,**  
**LM2575T-ADJ Flow LB03 or LM2575HVT-ADJ Flow LB03**  
**NS Package Number T05D**

**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 AND GENERAL COUNSEL 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**  
Americas  
Email: support@nsc.com

**National Semiconductor Europe**  
Fax: +49 (0) 180-530 85 86  
Email: europe.support@nsc.com  
Deutsch Tel: +49 (0) 69 9508 6208  
English Tel: +44 (0) 870 24 0 2171  
Français Tel: +33 (0) 1 41 91 8790

**National Semiconductor Asia Pacific Customer Response Group**  
Tel: 65-2544466  
Fax: 65-2504466  
Email: ap.support@nsc.com

**National Semiconductor Japan Ltd.**  
Tel: 81-3-5639-7560  
Fax: 81-3-5639-7507

www.national.com