

## Projet 9 - ALIM15V / Alim. de laboratoire ±15V & 2x18V AC.

Projet : LMP1  
 Info : [DATA099]  
 Révision : le 14 février 1998.

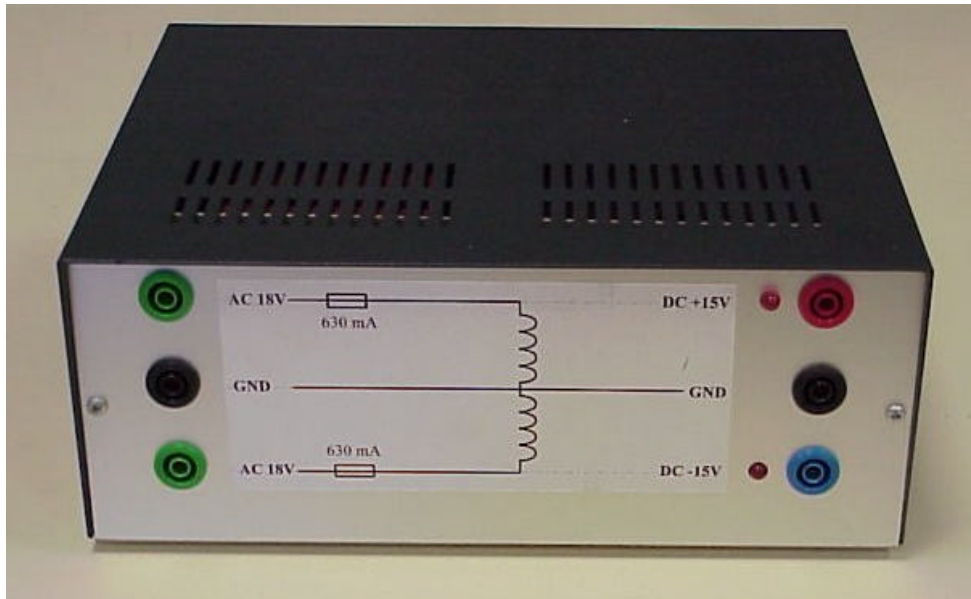


Figure 9.1. Alimentations multiples (images-maquettes\alin15v.jpg).

### 9.1 Liste des plans

- Calcul de l'alimentations +15 V / -15 V.
- Plan de la face avant.
- Schéma électronique.
- Implantation des composants.
- Circuit imprimé.

### 9.2 Calcul de l'alimentations +15 V / -15 V

On choisit un transformateur à secondaire à point milieu 2 x 15 V.

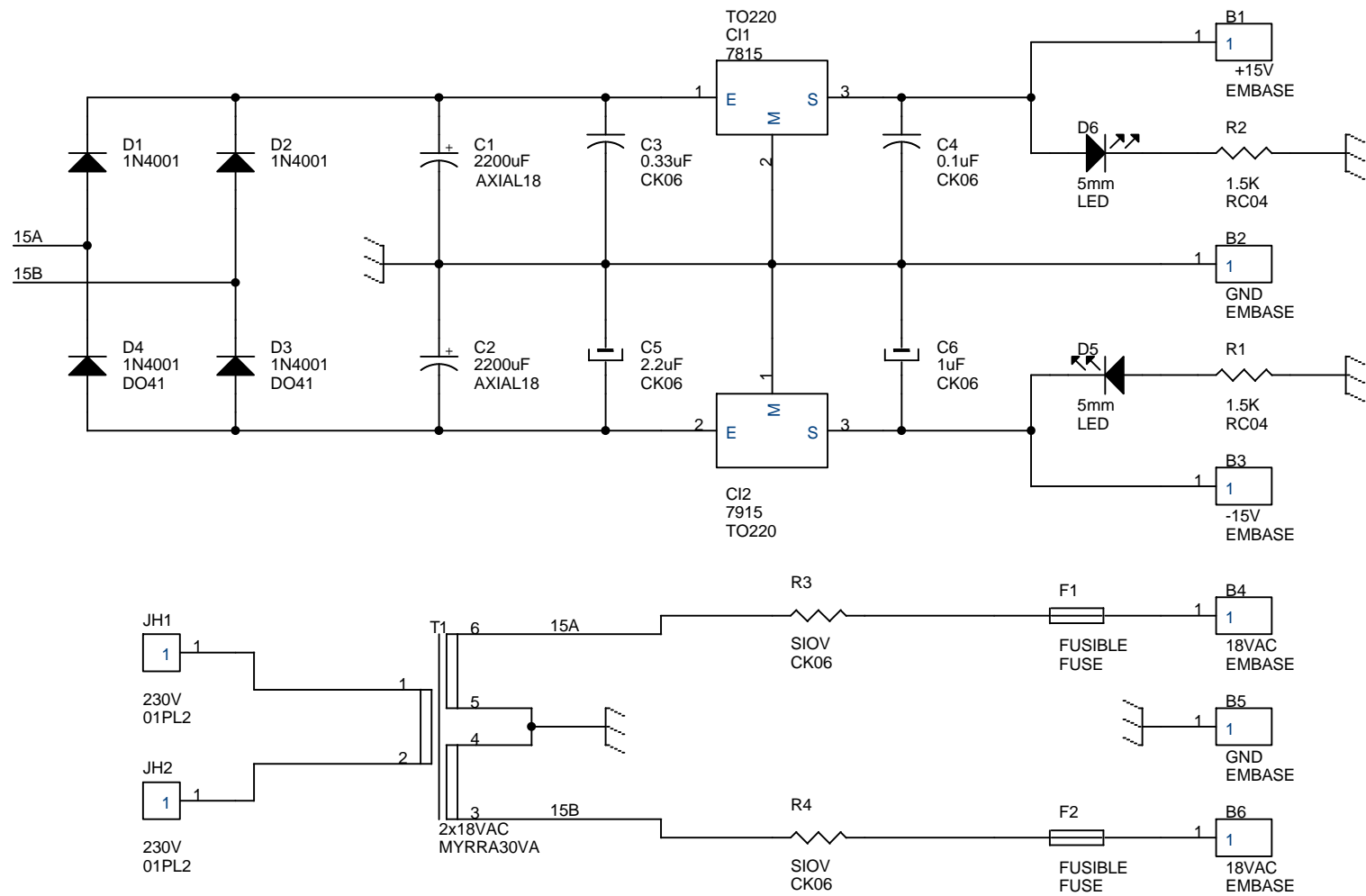
$$V_{\text{crête}} = 15\sqrt{2} = 21,2 \text{ V et } V_{\text{max}} = V_{\text{crête}} - V_{\text{diode}} = 20,5 \text{ V.}$$

Les tensions réglées sont obtenues avec les circuits 7815 et 7915 :

$$35 \text{ V} > V_{\text{in}} > 18 \text{ V et } I_{\text{max}} = 1 \text{ A.}$$

La consommation moyenne est estimée à 0,5 A. Donc  $C = \frac{I \times \Delta T}{\Delta V} = \frac{0,5 \text{ A} \times 10 \text{ ms}}{20,5 \text{ V} - 18 \text{ V}} = 1989 \text{ } \mu\text{F}$

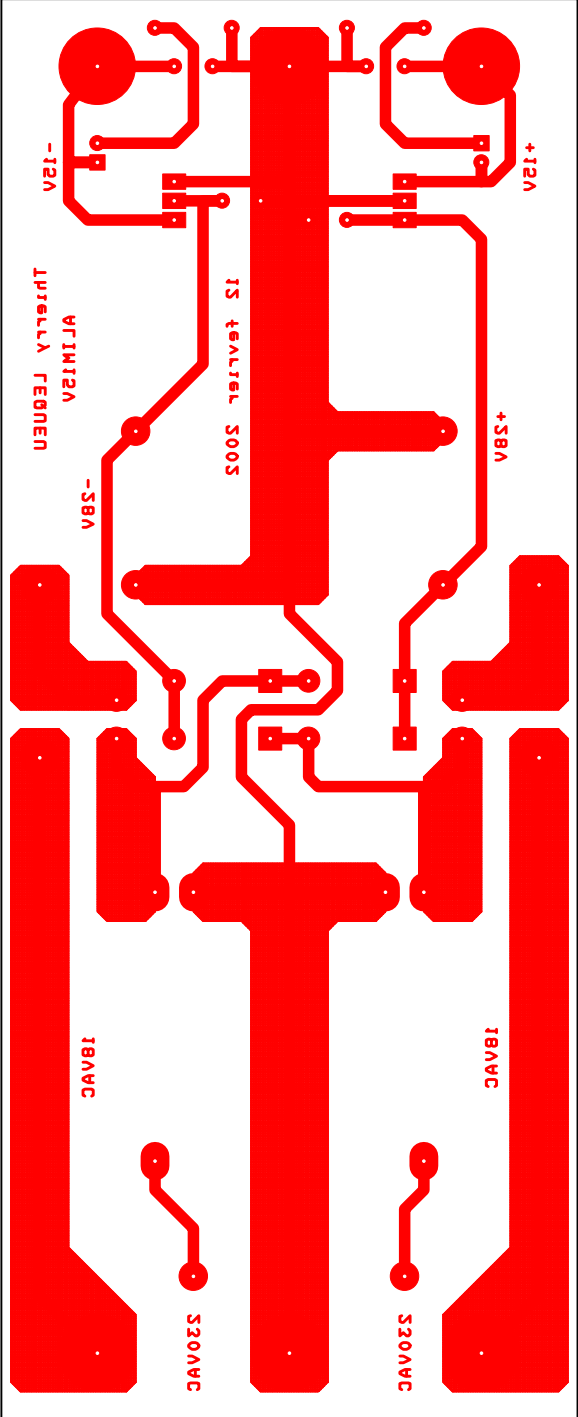
$$\boxed{C = 2200 \text{ } \mu\text{F } 35 \text{ V}}$$

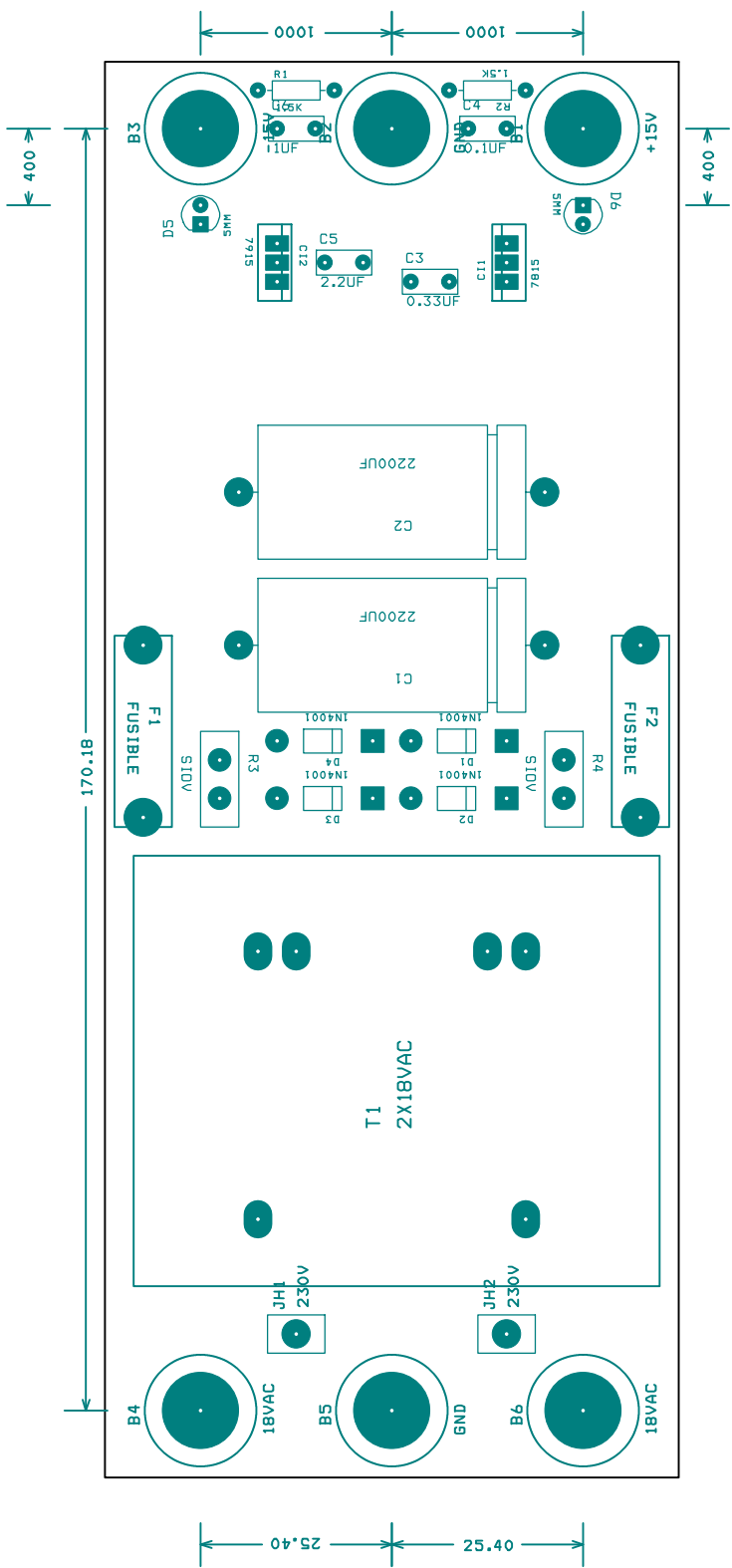


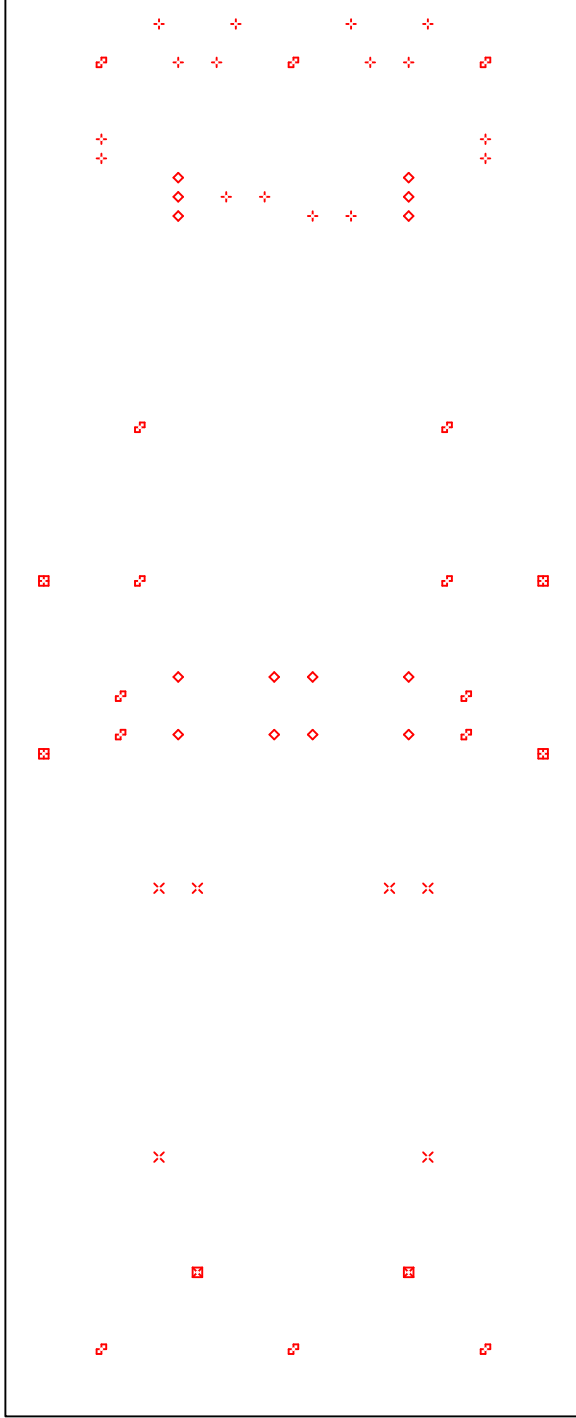
Auteur : Thierry LEQUEU		
Title Alimentation +15V / -15V et 2 x 18 VAC		
Size A	Document Number LMP1 / [DATA099] / ALIM15V	Rev 2
Date:	Tuesday, February 12, 2002	Sheet 1 of 1

Réf.	Désignation	Qu.	Fournisseur	Date	Page	Code Cde	Prix U.H.T.	Prix T.H.T.
CI1	7815	1	Radiospares	2-Feb-98	1-1195	251-9685	3.40 F	3.40 F
CI2	7915	1	Radiospares	2-Feb-98	1-1195	251-9742	3.40 F	3.40 F
C1,C2	2200uF 63V chimique axial	2	Radiospares	2-Feb-98	1-359	108-3797	17.49 F	34.97 F
C3	220 nF100V Polyester	1	Radiospares	15-Oct-98	1-807	199-6005	2.31 F	2.31 F
C4	100 nF100V Polyester	1	Radiospares	15-Oct-98	1-807	166-5973	1.57 F	1.57 F
C5	2.2uF 25V	1	Radio Son	5-Feb-98			1.02 F	1.02 F
C6	1uF 25V	1	Radio Son	5-Feb-98			1.02 F	1.02 F
D1,D2,D3,D4	1N4007	4	Radiospares	15-Oct-98	1-1048	261-980	0.58 F	2.32 F
D6,D5	LED rouge 5mm	2	Radio Son	5-Feb-98			0.54 F	1.08 F
F1,F2	FUSIBLE 630 mA	2					0.00 F	0.00 F
R2,R1	1.5K	2	Radio Son	5-Feb-98			0.06 F	0.12 F
T1	Transformateur 230V / 2 x 18V - 30 VA	1	Radiospares	2-Feb-98	1-1275	174-0232	123.78 F	123.78 F
U1,,,,U6	Douille double isolation à visser rouge	1	Radiospares	15-Oct-98	1-7	230-6344	19.90 F	19.90 F
U1,,,,U6	Douille double isolation à visser bleue	1	Radiospares	15-Oct-98	1-7	230-6366	19.90 F	19.90 F
U1,,,,U6	Douille double isolation à visser noire	2	Radiospares	15-Oct-98	1-7	230-6350	19.90 F	39.80 F
U1,,,,U6	Douille double isolation à visser verte	2	Radiospares	15-Oct-98	1-7	230-6388	19.90 F	39.80 F
Divers	Circuit imprimé S.F. 185 x 75 mm	140	IUT GEII	10-Feb-98			0.20 F	28.00 F
Divers	Radiateurs TO220 type RAWA 400	2	Radiospares	2-Feb-98	1-633	169-9875	5.25 F	10.50 F
Divers	Boitier - série ED ESM gris foncé 215 x 81 x 166	1	Radiospares	2-Feb-98	2-1557	161-9150	113.90 F	113.90 F
Divers	Prise secteur + inter + filtre + fusible	1	Radiospares	2-Feb-98	1-798	190-0462	17.50 F	17.50 F
Divers	M3x10 + écrous + rondelle	4	Radiospares	15-Oct-98	2-2098	189-311	0.61 F	2.44 F
								0.00 F

TOTAL H.T. :	466.74 F
Dont T.V.A. : 20.6%	96.15 F
TOTAL T.T.C. :	562.88 F







DRILL CHART			
SYM	DIAM	TOL	NOTE
x	0.020		6
+	0.031		16
◇	0.039		14
⊠	0.039		2
⊞	0.047		8
⊞	0.059		4
⊞	0.165		6
TOTAL			56

### 9.3 Plan de la face avant

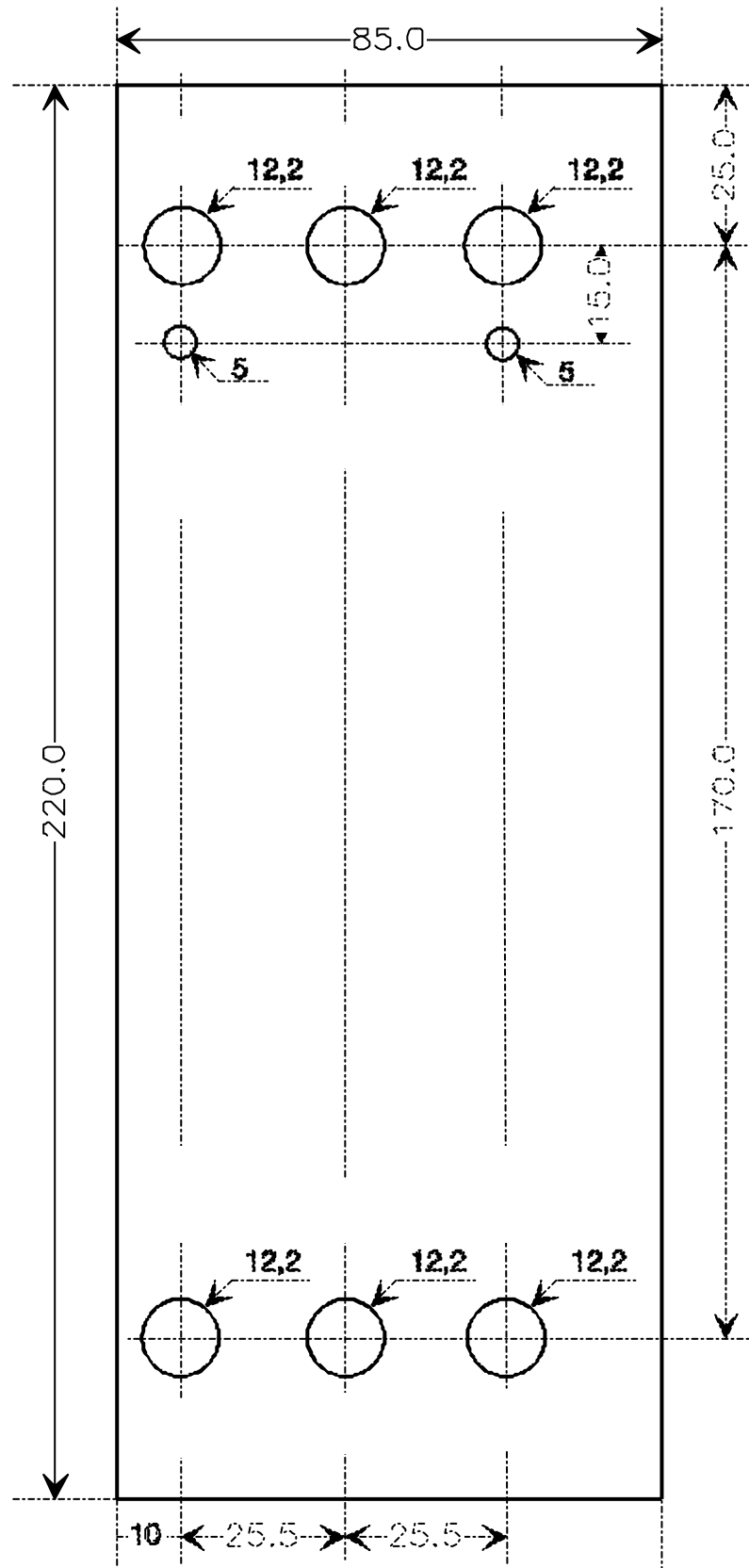


Figure 9.2. Plan de face avant (orcad\projets-lmp1\alim15v1.drw).

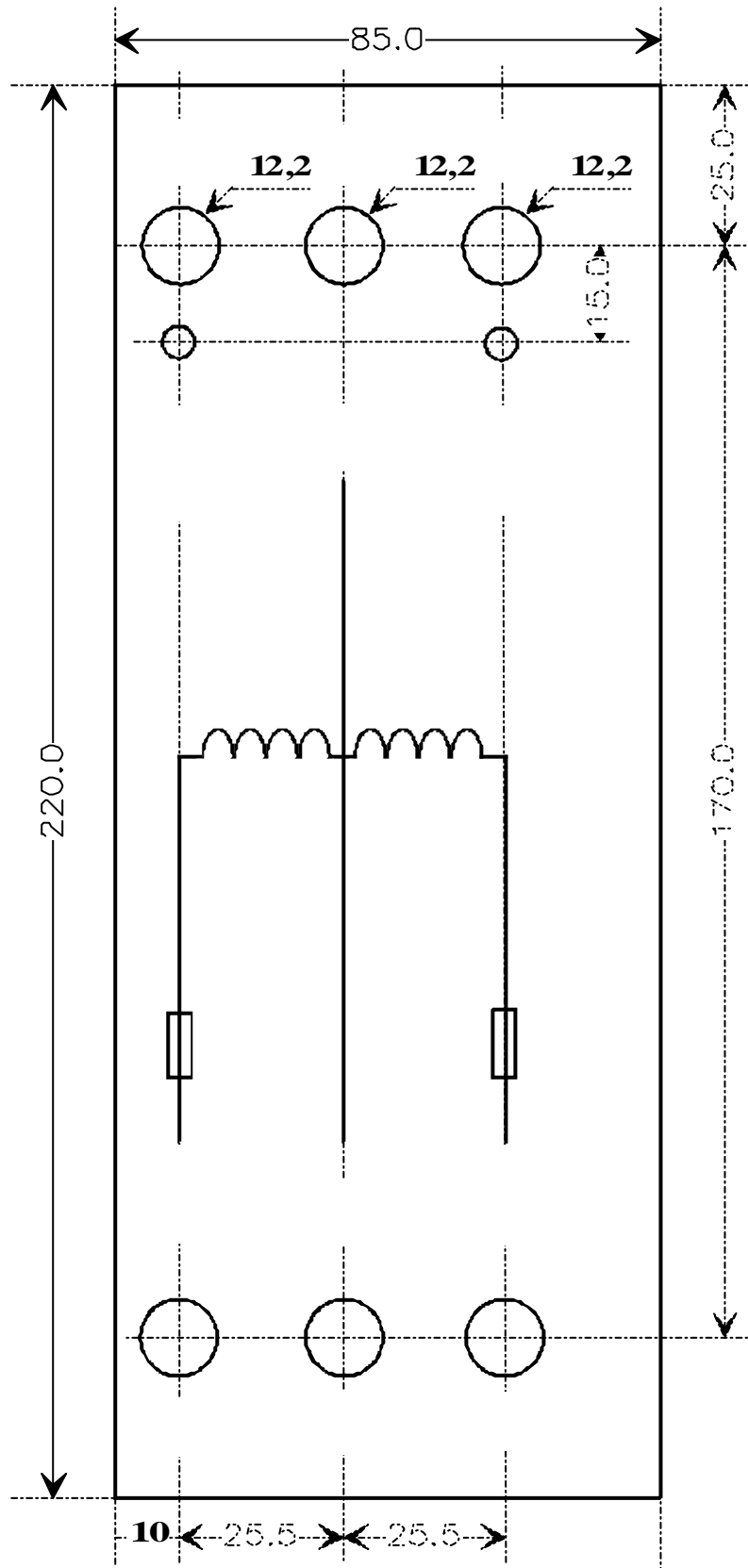


Figure 9.3. Sérigraphie de la face avant (orcad\projets-lmp1\alim15v1.drw).



## Coffrets métalliques gris pour instruments

Retex



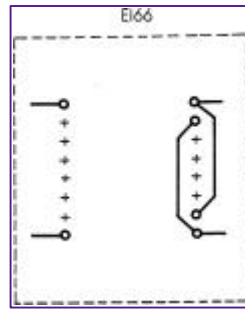
- Construits en acier émaillé au four, ces coffrets constituent un boîtier solide pour contenir les équipements d'essai et les petits prototypes.
- Le couvercle supérieur à ventilation peut être démonté pour faciliter l'accès à l'intérieur. La plaque de base comporte des fentes de ventilation et quatre pieds en caoutchouc.
- Faces en aluminium.

U.D.V.=1

dimensions (mm) h x l x P	code commande	prix de l'U.D.V.	
		1-19	20+
70 x 150 x 110	<a href="#">170-7853</a>	156.00 Fr	148.20 Fr
80 x 200 x 140	<a href="#">170-7869</a>	165.46 Fr	157.19 Fr
100 x 250 x 160	<a href="#">170-7926</a>	232.00 Fr	220.40 Fr

## Transformateurs surmoulés 30 VA - type EI 66/23,2

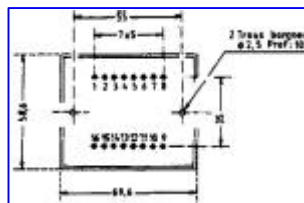
Myrra



Couplage parallèle

**Brochage:**

- primaire: 1-8
- 2 secondaires: 9-1015-16



Encombrement

- Les tensions secondaires sont des tensions nominales en charge sur charges résistives.

**Homologations: UL, VDE**

### Spécifications techniques

Tension primaire: 230 V

Intensité consommée: 160 mA

Isolément total P/S: >4000 V

U.D.V.=1

réf. Myrra	tensions second.	code commande	prix de l'U.D.V.		
			1-24	25-49	50+
44379	2 x 6 V	<a href="#">174-0181</a>	123.78 Fr	111.40 Fr	99.02 Fr
44380	2 x 9 V	<a href="#">174-0197</a>	123.78 Fr	111.40 Fr	99.02 Fr
44381	2 x 12 V	<a href="#">174-0204</a>	123.78 Fr	111.40 Fr	99.02 Fr
44382	2 x 15 V	<a href="#">174-0210</a>	123.78 Fr	111.40 Fr	99.02 Fr
44383	2 x 18 V	<a href="#">174-0232</a>	123.78 Fr	111.40 Fr	99.02 Fr
44384	2 x 24 V	<a href="#">174-0248</a>	123.78 Fr	111.40 Fr	99.02 Fr

## Prises secteur Polysnap 6 A

Bulgin



- Prises secteur 2 P + T compactes, équipées d'un interrupteur unipolaire lumineux (BZ 01002) ou non lumineux (BZ 01001), et d'un porte-fusible de 5 x 20 mm.
- Boîtier clipsable assurant une installation facile et rapide sur un support d'épaisseur comprise entre 1 et 3 mm.
- Connexion arrière par cosses faston 6,35 mm.

### Spécifications techniques

Tension d'utilisation: 250 V c.a.

Intensité: 6 A

Température d'utilisation: -40°C à +70°C

Découpe du panneau (mm): 56,6 x 34,4

Epaisseur du panneau: 1,5 mm

Matériau: corps noryl noir

U.D.V.=1

réf.	code	prix de l'U.D.V.		
		1-24	25-49	50+
<b>Bulgin</b>	<b>commande</b>			
<b>BZV 010/01</b>	<a href="#">484-149</a>	27.78 Fr	25.00 Fr	22.22 Fr
<b>BZV 010/02</b>	<a href="#">484-155</a>	40.16 Fr	36.14 Fr	32.13 Fr

## Embases de sécurité à terminaison fileté

HCK



- Embases de sécurité 4 mm à raccordement par tige fileté M4.
- La fixation de l'embase sur la face avant est réalisée par un écrou à bague.

### Spécifications techniques

Intensité: 32 A

Tension de service: 1000 V

Catégorie de surtension: III

Trou de fixation: 12,2 mm

U.D.V.=1

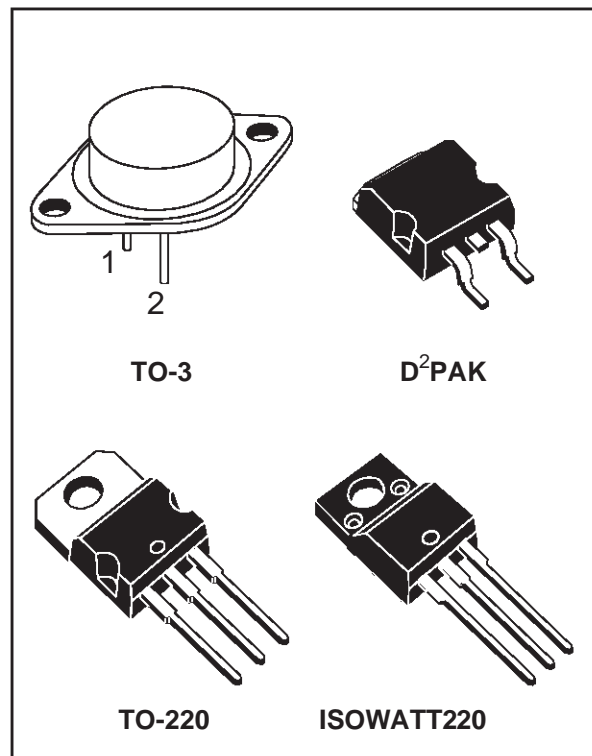
couleur	code commande	prix de l'U.D.V.		
		1-49	50-99	100+
Rouge	<a href="#">230-6344</a>	20.40 Fr	18.36 Fr	16.32 Fr
Noir	<a href="#">230-6350</a>	20.40 Fr	18.36 Fr	16.32 Fr
Bleu	<a href="#">230-6366</a>	20.40 Fr	18.36 Fr	16.32 Fr
Jaune	<a href="#">230-6372</a>	20.40 Fr	18.36 Fr	16.32 Fr
Vert	<a href="#">230-6388</a>	20.40 Fr	18.36 Fr	16.32 Fr

## POSITIVE VOLTAGE REGULATORS

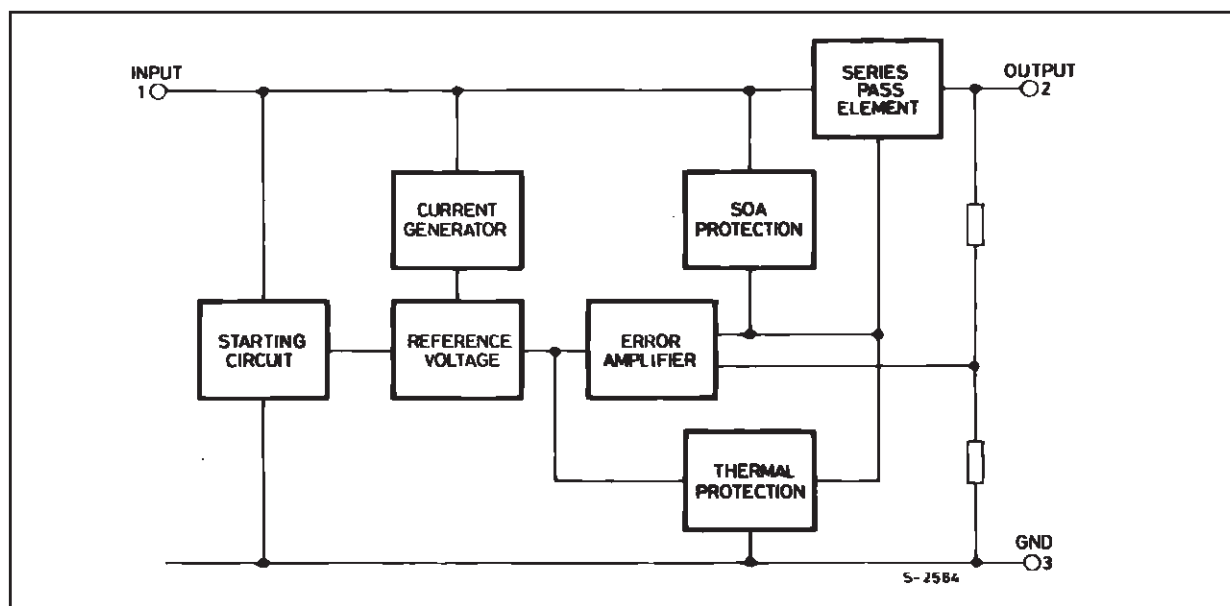
- OUTPUT CURRENT UP TO 1.5 A
- OUTPUT VOLTAGES OF 5; 5.2; 6; 8; 8.5; 9; 12; 15; 18; 24V
- THERMAL OVERLOAD PROTECTION
- SHORT CIRCUIT PROTECTION
- OUTPUT TRANSITION SOA PROTECTION

### DESCRIPTION

The L7800 series of three-terminal positive regulators is available in TO-220 ISOWATT220 TO-3 and D<sup>2</sup>PAK packages and several fixed output voltages, making it useful in a wide range of applications. These regulators can provide local on-card regulation, eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.



### BLOCK DIAGRAM



# L7800

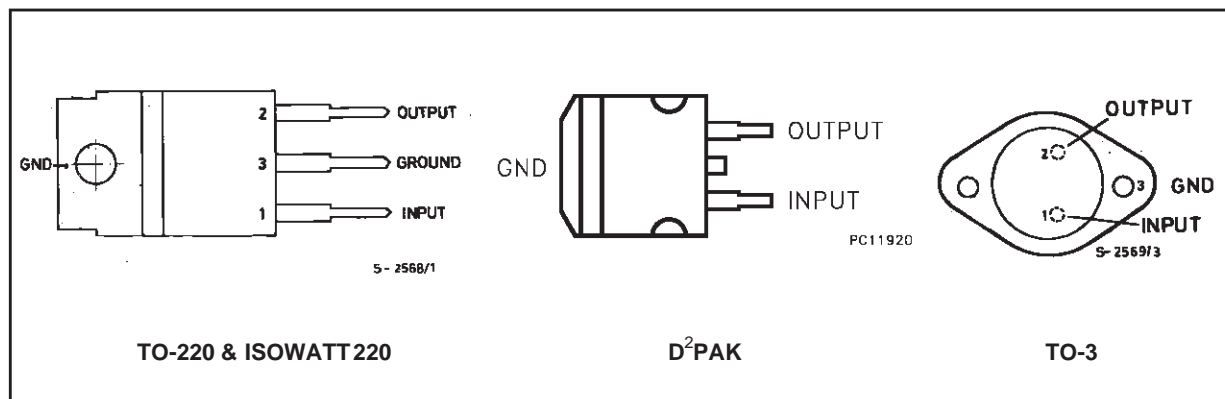
## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_i$	DC Input Voltage (for $V_O = 5$ to 18V) (for $V_O = 20, 24V$ )	35	V
		40	V
$I_o$	Output Current	Internally limited	
$P_{tot}$	Power Dissipation	Internally limited	
$T_{op}$	Operating Junction Temperature Range (for <b>L7800</b> ) (for <b>L7800C</b> )	-55 to 150	°C
		0 to 150	°C
$T_{stg}$	Storage Temperature Range	-65 to 150	°C

## THERMAL DATA

Symbol	Parameter	D <sup>2</sup> PAK	TO-220	ISOWATT220	TO-3	Unit
$R_{thj-case}$	Thermal Resistance Junction-case Max	3	3	4	4	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient Max	62.5	50	60	35	°C/W

## CONNECTION DIAGRAM AND ORDERING NUMBERS (top view)



Type	TO-220	D <sup>2</sup> PAK (*)	ISOWATT220	TO-3	Output Voltage
L7805				L7805T	5V
L7805C	L7805CV	L7805CD2T	L7805CP	L7805CT	5V
L7852C	L7852CV	L7852CD2T	L7852CP	L7852CT	5.2V
L7806				L7806T	6V
L7806C	L7806CV	L7806CD2T	L7806CP	L7806CT	6V
L7808				L7808T	8V
L7808C	L7808CV	L7808CD2T	L7808CP	L7808CT	8V
L7885C	L7885CV	L7885CD2T	L7885CP	L7885CT	8.5V
L7809C	L7809CV	L7809CD2T	L7809CP	L7809CT	9V
L7812				L7812T	12V
L7812C	L7812CV	L7812CD2T	L7812CP	L7812CT	12V
L7815				L7815T	15V
L7815C	L7815CV	L7815CD2T	L7815CP	L7815CT	15V
L7818				L7818T	18V
L7818C	L7818CV	L7818CD2T	L7818CP	L7818CT	18V
L7820				L7820T	20V
L7820C	L7820CV	L7820CD2T	L7820CP	L7820CT	20V
L7824				L7824T	24V
L7824C	L7824CV	L7824CD2T	L7824CP	L7824CT	24V

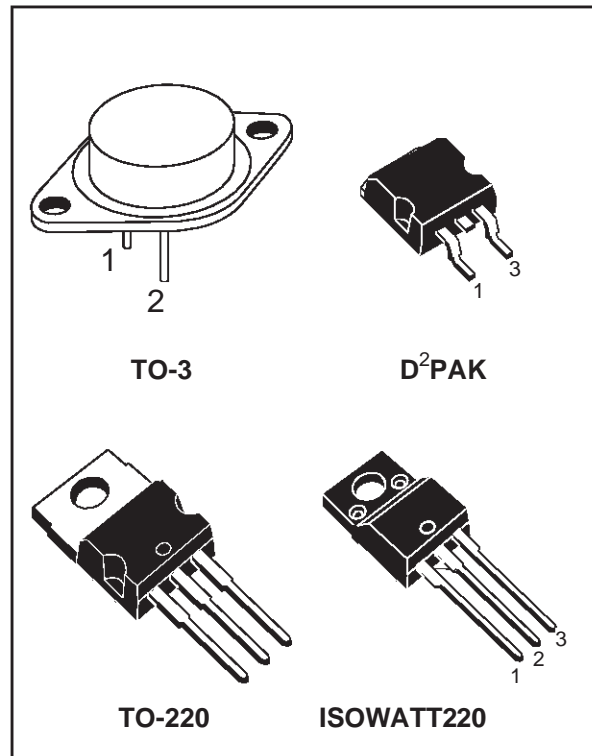
(\*) AVAILABLE IN TAPE AND REEL WITH "TR" SUFFIX

## NEGATIVE VOLTAGE REGULATORS

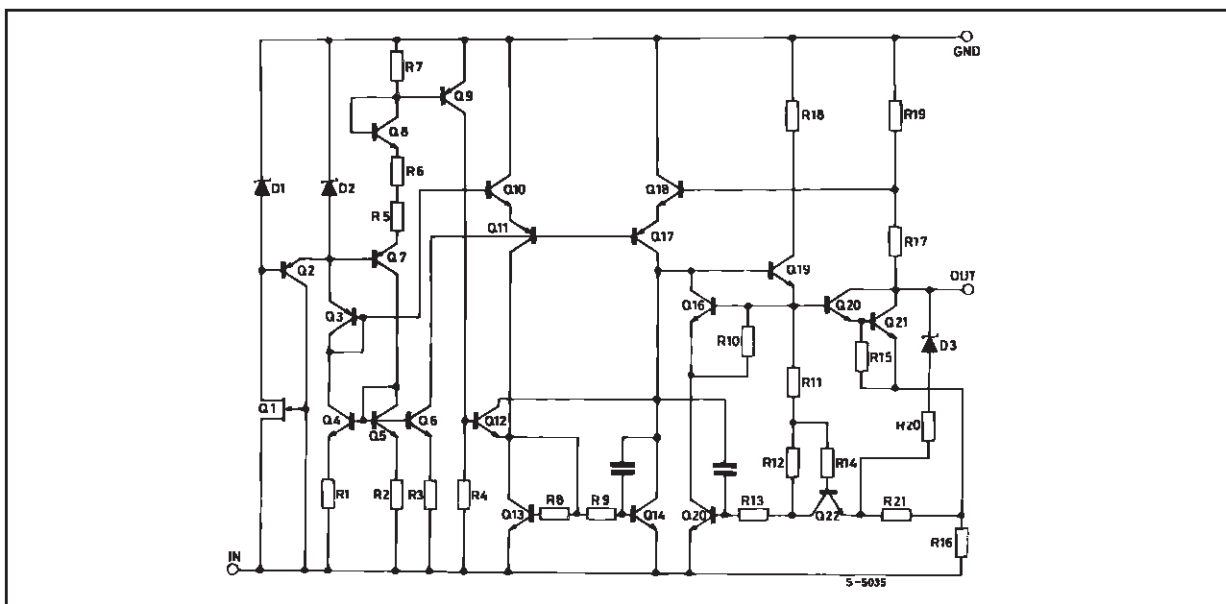
- OUTPUT CURRENT UP TO 1.5 A
- OUTPUT VOLTAGES OF -5; -5.2; -6; -8; -9; -12; -15; -18; -20; -22; -24V
- THERMAL OVERLOAD PROTECTION
- SHORT CIRCUIT PROTECTION
- OUTPUT TRANSITION SOA PROTECTION

### DESCRIPTION

The L7900 series of three-terminal negative regulators is available in TO-220, ISOWATT220 TO-3 and D<sup>2</sup>PAK packages and several fixed output voltages, making it useful in a wide range of applications. These regulators can provide local on-card regulation, eliminating the distribution problems associated with single point regulation; furthermore, having the same voltage option as the L7800 positive standard series, they are particularly suited for split power supplies. In addition, the -5.2V is also available for ECL system. If adequate heat sinking is provided, they can deliver over 1.5A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.



### SCHEMATIC DIAGRAM



# L7900

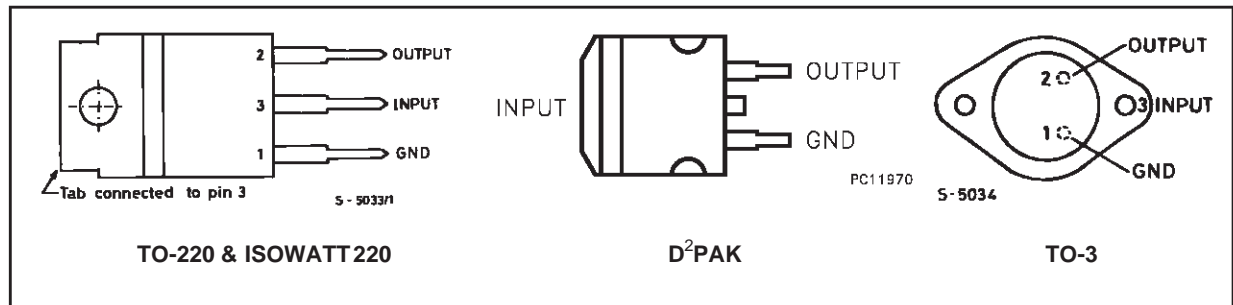
## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_i$	DC Input Voltage (for $V_o = 5$ to 18V) (for $V_o = 20, 24V$ )	-35 -40	V V
$I_o$	Output Current	Internally limited	
$P_{tot}$	Power Dissipation	Internally limited	
$T_{op}$	Operating Junction Temperature Range	0 to 150	°C
$T_{stg}$	Storage Temperature Range	- 65 to 150	°C

## THERMAL DATA

Symbol	Parameter	D <sup>2</sup> PAK	TO-220	ISOWATT220	TO-3	Unit
$R_{thj-case}$	Thermal Resistance Junction-case Max	3	3	4	4	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient Max	62.5	50	60	35	°C/W

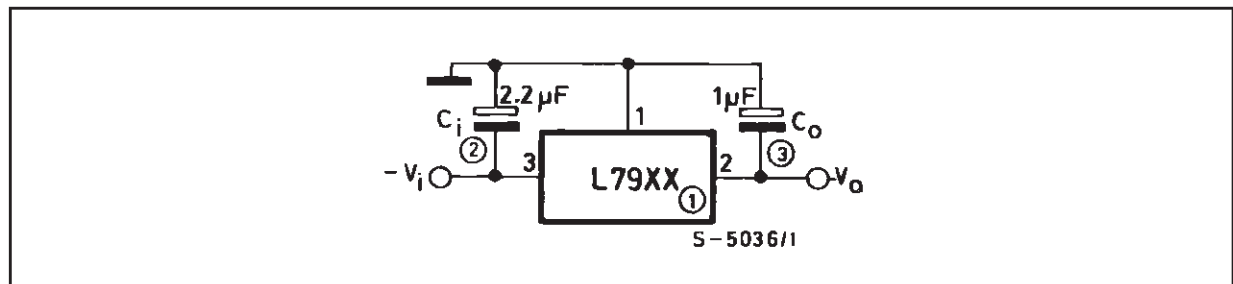
## CONNECTION DIAGRAM AND ORDERING NUMBERS (top view)



Type	TO-220	D <sup>2</sup> PAK (*)	ISOWATT220	TO-3	Output Voltage
L7905C	L7905CV	L7905CD2T	L7905CP	L7905CT	-5V
L7952C	L7952CV	L7952CD2T		L7952CT	-5.2V
L7906C	L7906CV	L7906CD2T	L7906CP	L7906CT	-6V
L7908C	L7908CV	L7908CD2T	L7908CP	L7908CT	-8V
L7912C	L7912CV	L7912CD2T	L7912CP	L7912CT	-12V
L7915C	L7915CV	L7915CD2T	L7915CP	L7915CT	-15V
L7918C	L7918CV	L7918CD2T	L7918CP	L7918CT	-18V
L7920C	L7920CV	L7920CD2T	L7920CP	L7920CT	-20V
L7922C	L7922CV	L7922CD2T		L7922CT	-22V
L7924C	L7924CV	L7924CD2T	L7924CP	L7924CT	-24V

(\*) AVAILABLE IN TAPE AND REEL WITH "-TR" SUFFIX

## APPLICATION CIRCUIT





# Axial Lead Standard Recovery Rectifiers

This data sheet provides information on subminiature size, axial lead mounted rectifiers for general-purpose low-power applications.

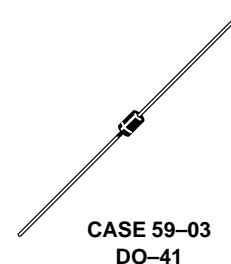
## Mechanical Characteristics

- Case: Epoxy, Molded
- Weight: 0.4 gram (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 220°C Max. for 10 Seconds, 1/16" from case
- Shipped in plastic bags, 1000 per bag.
- Available Tape and Reeled, 5000 per reel, by adding a "RL" suffix to the part number
- Polarity: Cathode Indicated by Polarity Band
- Marking: 1N4001, 1N4002, 1N4003, 1N4004, 1N4005, 1N4006, 1N4007

**1N4001  
thru  
1N4007**

1N4004 and 1N4007 are  
Motorola Preferred Devices

**LEAD MOUNTED  
RECTIFIERS  
50–1000 VOLTS  
DIFFUSED JUNCTION**



## MAXIMUM RATINGS

Rating	Symbol	1N4001	1N4002	1N4003	1N4004	1N4005	1N4006	1N4007	Unit
*Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	50	100	200	400	600	800	1000	Volts
*Non-Repetitive Peak Reverse Voltage (halfwave, single phase, 60 Hz)	$V_{RSM}$	60	120	240	480	720	1000	1200	Volts
*RMS Reverse Voltage	$V_{R(RMS)}$	35	70	140	280	420	560	700	Volts
*Average Rectified Forward Current (single phase, resistive load, 60 Hz, see Figure 8, $T_A = 75^\circ\text{C}$ )	$I_O$	1.0							Amp
*Non-Repetitive Peak Surge Current (surge applied at rated load conditions, see Figure 2)	$I_{FSM}$	30 (for 1 cycle)							Amp
Operating and Storage Junction Temperature Range	$T_J$ $T_{stg}$	– 65 to +175							$^\circ\text{C}$

## ELECTRICAL CHARACTERISTICS\*

Rating	Symbol	Typ	Max	Unit
Maximum Instantaneous Forward Voltage Drop ( $i_F = 1.0$ Amp, $T_J = 25^\circ\text{C}$ ) Figure 1	$v_F$	0.93	1.1	Volts
Maximum Full-Cycle Average Forward Voltage Drop ( $I_O = 1.0$ Amp, $T_L = 75^\circ\text{C}$ , 1 inch leads)	$V_{F(AV)}$	—	0.8	Volts
Maximum Reverse Current (rated dc voltage) ( $T_J = 25^\circ\text{C}$ ) ( $T_J = 100^\circ\text{C}$ )	$I_R$	0.05 1.0	10 50	$\mu\text{A}$
Maximum Full-Cycle Average Reverse Current ( $I_O = 1.0$ Amp, $T_L = 75^\circ\text{C}$ , 1 inch leads)	$I_{R(AV)}$	—	30	$\mu\text{A}$

\*Indicates JEDEC Registered Data

**Preferred** devices are Motorola recommended choices for future use and best overall value.