Projet 3 - GRADATOR / Gradateur à TRIAC

Projet : EXTRA1

Info : [DATA216]

Révision : novembre 2000

Figure 3.1. Vue du circuit imprimé (images-composants\xx.jpg).

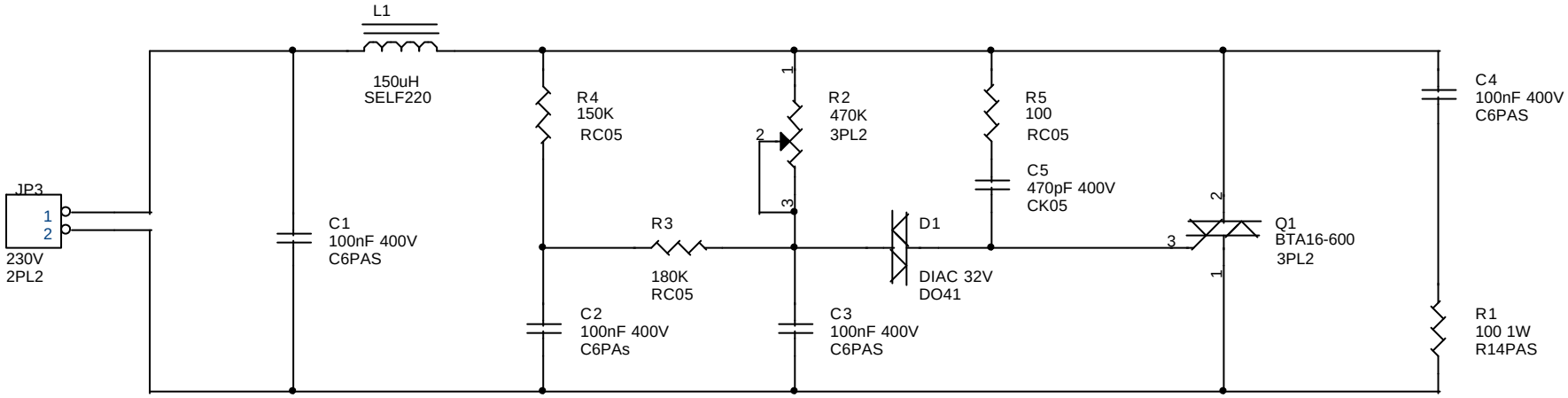
3.1 Liste des documents

- Allure des principaux composants.
- Prix du montage.
- Schéma ORCAD ver 9.x.
- Circuit imprimé LAYOUT.
- Documentation du HEF4049B.

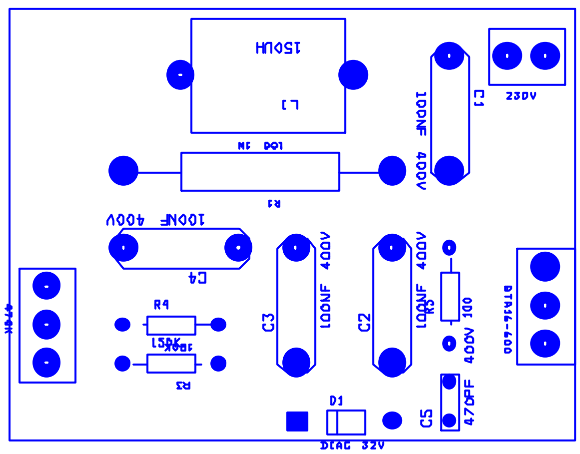
3.2 Liste des composants

Tableau 3.3. Liste de composants (Projets-EXTRA1.xls / GRADATOR).

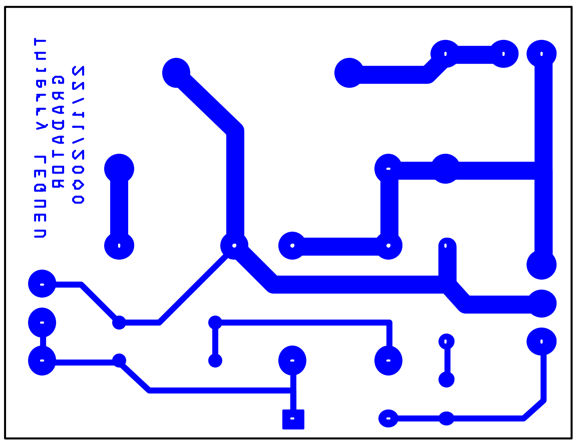
No	Quantité	Référence	Désignation	Empreinte
1	4	C1,C2,C3,C4	100nF 400V	C6PAS
2	1	C5	470pF 400V	C6PAS
3	1	D1	DIAC 32V	DO41
4	1	JP3	230V	2PL2
5	1	L1	150uH	SELF220
6	1	Q1	BTA16-600	3PL2
7	1	R1	100 1W	R14PAS
8	1	R2	470K	3PL2
9	1	R3	180K	RC05
10	1	R4	150K	RC05
11	1	R5	100	RC05



Auteur : Thierry LEQUEU		
Size A	Document Number Gradateur 220 V / 500W	Rev 1
Date: Wednesday, November 22, 2000	Sheet 1 of 1	



150UH
L1
R1
C1
100NF 400V
230V
100NF 400V
C4
C3
C2
R4
R3
R5
D1
DIAC 32V
C5
470PF



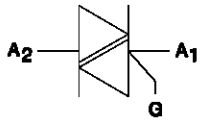
SGS-THOMSON MICROELECTRONICS

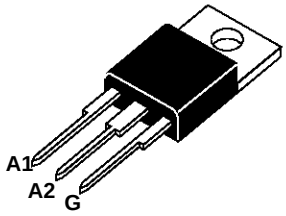
BTA12 BW/CW
BTB12 BW/CW

SNUBBERLESS TRIACS

FEATURES

- HIGH COMMUTATION : (dI/dt)c > 12A/ms without snubber
- HIGH SURGE CURRENT : I_{TSM} = 120A
- V_{DRM} UP TO 800V
- BTA Family : INSULATING VOLTAGE = 2500$V_{(RMS)}$ (UL RECOGNIZED : E81734)





TO220AB
(Plastic)

DESCRIPTION

The BTA/BTB12 BW/CW triac family are high performance glass passivated chips technology.
The SNUBBERLESS™ concept offer suppression of RC network and it is suitable for application such as phase control and static switching on inductive or resistive load.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (360° conduction angle)	BTA	Tc = 85 °C	12	A
		BTB	Tc = 95 °C		
I_{TSM}	Non repetitive surge peak on-state current (Tj initial = 25°C)		tp = 8.3 ms	126	A
			tp = 10 ms	120	
I^2t	I^2t value		tp = 10 ms	72	A^2s
dI/dt	Critical rate of rise of on-state current Gate supply : I_G = 500mA di_G/dt = 1A/µs		Repetitive F = 50 Hz	20	A/µs
			Non Repetitive	100	
Tstg Tj	Storage and operating junction temperature range			- 40 to + 150 - 40 to + 125	°C °C
Tl	Maximum lead temperature for soldering during 10 s at 4.5 mm from case			260	°C

Symbol	Parameter	BTA / BTB12-... BW/CW				Unit
		400	600	700	800	
V_{DRM} V_{RRM}	Repetitive peak off-state voltage Tj = 125 °C	400	600	700	800	V

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth (j-a)	Junction to ambient		60	°C/W
Rth (j-c) DC	Junction to case for DC	BTA	3.3	°C/W
		BTB	2.7	
Rth (j-c) AC	Junction to case for 360° conduction angle (F= 50 Hz)	BTA	2.5	°C/W
		BTB	2.0	

GATE CHARACTERISTICS (maximum values)

$P_{G\ (AV)}$ = 1W P_{GM} = 10W (tp = 20 µs) I_{GM} = 4A (tp = 20 µs) V_{GM} = 16V (tp = 20 µs).

ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions		Quadrant		Suffix		Unit
					BW	CW	
I_{GT}	V_D=12V (DC) R_L=33Ω	Tj=25°C	I-II-III	MIN	2	1	mA
				MAX	50	35	
V_{GT}	V_D=12V (DC) R_L=33Ω	Tj=25°C	I-II-III	MAX	1.5		V
V_{GD}	V_D=V_{DRM} R_L=3.3kΩ	Tj=125°C	I-II-III	MIN	0.2		V
tgt	V_D=V_{DRM} I_G = 500mA dI_G/dt = 3A/µs	Tj=25°C	I-II-III	TYP	2		µs
I_L	I_G=1.2 I_{GT}	Tj=25°C	I-III	TYP	40	-	mA
			II	TYP	80	-	
			I-III	MAX	-	50	
			II	MAX	-	80	
I_H *	I_T= 500mA gate open	Tj=25°C		MAX	50	35	mA
V_{TM} *	I_{TM}= 17A tp= 380µs	Tj=25°C		MAX	1.60		V
I_{DRM} I_{RRM}	V_{DRM} Rated V_{RRM} Rated	Tj=25°C		MAX	0.01		mA
		Tj=125°C		MAX	2		
dV/dt *	Linear slope up to V_D=67%V_{DRM} gate open	Tj=125°C		MIN	500	250	V/µs
				TYP	750	500	
(dI/dt)c *	Without snubber	Tj=125°C		MIN	12	6.5	A/ms
				TYP	24	13	

* For either polarity of electrode A2 voltage with reference to electrode A1.

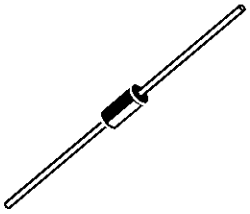
SGS-THOMSON MICROELECTRONICS

DB3 /DB4 / DC34

TRIGGER DIODES

FEATURES

- V_{BO} : 32V / 34V / 40V VERSIONS
- LOW BREAKOVER CURRENT



DO 35
(Glass)

DESCRIPTION

High reliability glass passivation insuring parameter stability and protection against junction contamination.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
P	Power dissipation on printed circuit (L = 10 mm)	Ta = 65 °C	150	mW
I_{TRM}	Repetitive peak on-state current	tp = 20 µs F= 100 Hz	2	A
Tstg Tj	Storage and operating junction temperature range		- 40 to + 125 - 40 to + 125	°C °C

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction to ambient	400	°C/W
$R_{th\ (j-l)}$	Junction-leads	150	°C/W

ELECTRICAL CHARACTERISTICS (Tj = 25°C)

Symbol	Parameter	Test Conditions		Value			Unit
				DB3	DC34	DB4	
V_{BO}	Breakover voltage *	C = 22nF ** see diagram 1	MIN	28	30	35	V
			TYP	32	34	40	
			MAX	36	38	45	
$[I+V_{BO}I-I-V_{BO}I]$	Breakover voltage symmetry	C = 22nF ** see diagram 1	MAX	± 3			V
$I\Delta V\pm I$	Dynamic breakover voltage *	$\Delta I = [I_{BO}$ to I_F=10mA] see diagram 1	MIN	5			V
V_O	Output voltage *	see diagram 2	MIN	5			V
I_{BO}	Breakover current *	C = 22nF **	MAX	100	50	100	µA
tr	Rise time *	see diagram 3	TYP	1.5			µs
I_B	Leakage current *	V_B = 0.5 V_{BO} max see diagram 1	MAX	10			µA

* Electrical characteristic applicable in both forward and reverse directions.

** Connected in parallel with the devices.

DIAGRAM 1 : Current-voltage characteristics

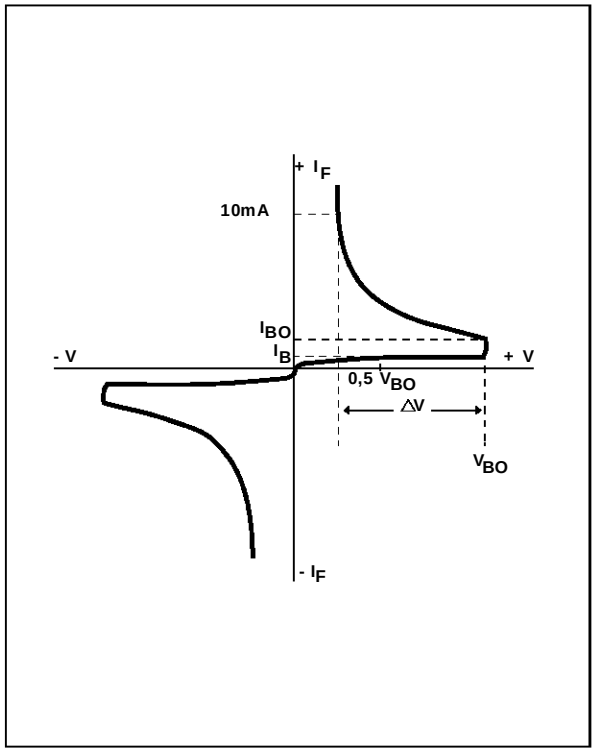


DIAGRAM 2 : Test circuit for output voltage

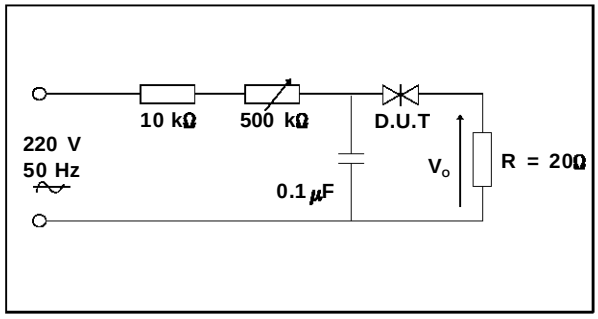


DIAGRAM 3 : Test circuit see diagram 2.
Adjust R for Ip=0.5A