

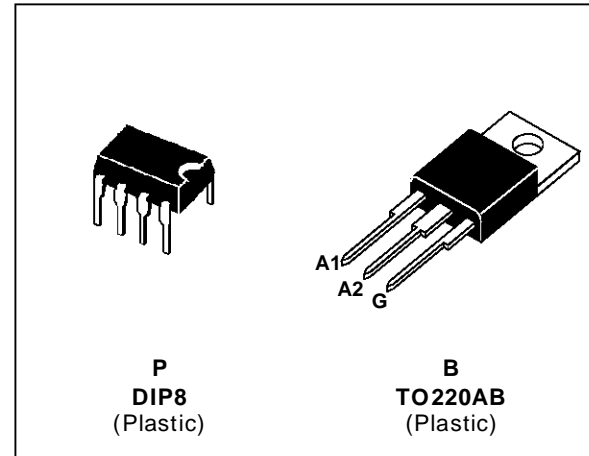
## AUTOMATIC VOLTAGE SWITCH (SMPS < 500W)

### CONTROLLER

- 50/60Hz FULL COMPATIBILITY
- INTEGRATED VOLTAGE REGULATOR
- TRIGGERING PULSE TRAIN OF THE TRIAC
- PARASITIC FILTER
- LOW POWER CONSUMPTION

### TRIAC

- HIGH EFFICIENCY AND SAFETY SWITCHING
- UNINSULATED PACKAGE : AVS12CB
- $V_{DRM} = \pm 600V$
- $I_T(RMS): 12A$

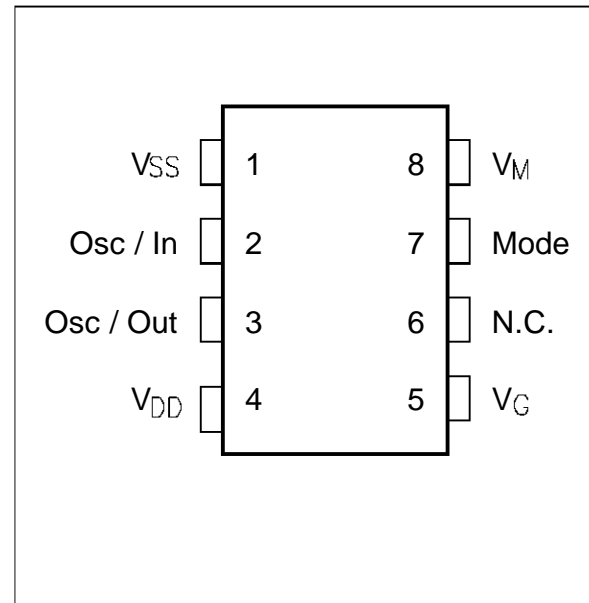


### DESCRIPTION

The AVS12 kit is an automatic mains selector (110/220V AC) to be used in SMPS < 500 W. It is composed of 2 devices :

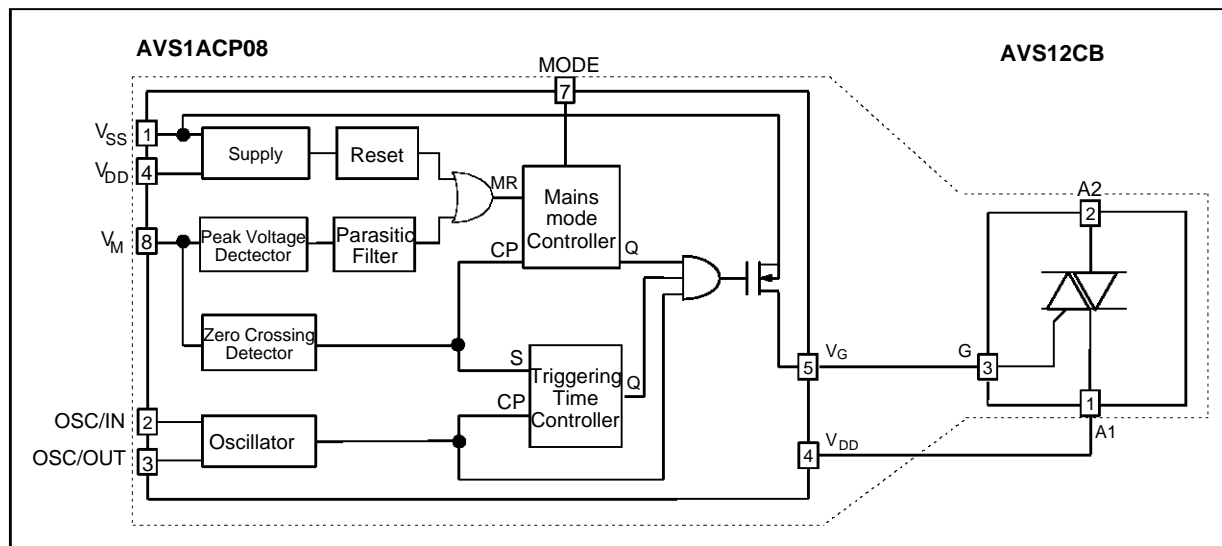
- The **Controller** is optimized for low consumption and high security triggering of the triac. When connected to  $V_{SS}$ , the **mode** input activates an additional **option**. If the main power drops from 220V to 110V, the triac control remains locked to the 220V mode and avoids any high voltage spike when the voltage comes back to 220V. When connected to  $V_{DD}$ , the **mode** input deactivates this **option**.
- The TRIAC is specially designed for this application. An optimization between sensitivity and dynamic parameters of the triac gate highly reduces the losses of supply resistor and allows excellent immunity against disturbances.

### PIN CONNECTION



# AVS12

## BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

### CONTROLLER AVS1ACP08

Symbol	Parameter	Value		Unit
		Min.	Max.	
V <sub>SS</sub>	Supply voltage	- 12	0.5	V
V <sub>I</sub> / V <sub>O</sub>	I / O voltage	V <sub>SS</sub> - 0.5	0.5	V
I <sub>I</sub> / I <sub>O</sub>	I / O current	- 40	+ 40	mA
T <sub>stg</sub>	Storage Temperature	- 60	+ 150	°C
T <sub>oper</sub>	Operating Temperature code " C "	0	+ 70	°C

### TRIAC AVS12CB T<sub>j</sub> = 25°C (unless otherwise specified)

Symbol	Parameter		Value	Unit	
V <sub>DRM</sub>	Repetitive peak off-state voltage (2)		± 600	V	
I <sub>T(RMS)</sub>	RMS on-state current (360° conduction angle)	T <sub>C</sub> = 70°C	12	A	
I <sub>TSM</sub>	Non repetitive surge peak on-state current (T <sub>j</sub> initial = 25°C)	t = 8.3ms t = 10ms	105 100	A	
i <sup>2</sup> t	i <sup>2</sup> t value		t = 10ms	50	A <sup>2</sup> s
di/dt	Critical rate of rise of on-state current (1)		Repetitive F = 50Hz	20	A/μs
			Non Repetitive	100	
dv/dt *	Linear slope up to 0.67 V <sub>DRM</sub>	Gate open	T <sub>j</sub> = 110°C	50	V/μs
T <sub>stg</sub> T <sub>j</sub>	Storage Temperature Operating Junction Temperature		- 40 + 150 0 + 110		°C

(1) Gate supply : I<sub>G</sub> = 100mA - di/dt = 1A/μs  
 (2) T<sub>j</sub> = 110°C

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

**THERMAL RESISTANCES**

## TRIAC AVS12CB

Symbol	Parameter	Value	Unit
Rth (j-a)	Junction-to-ambient	60	°C/W
Rth (j-c) DC	Junction-to-case for DC	3	°C/W
Rth (j-c) AC	Junction-to-case for 360° conduction angle ( f= 50Hz)	2.3	°C/W

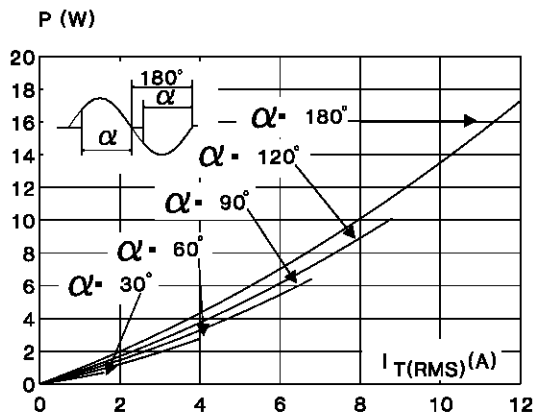
**DC GENERAL ELECTRICAL CHARACTERISTICS**

## TRIAC AVS12CB

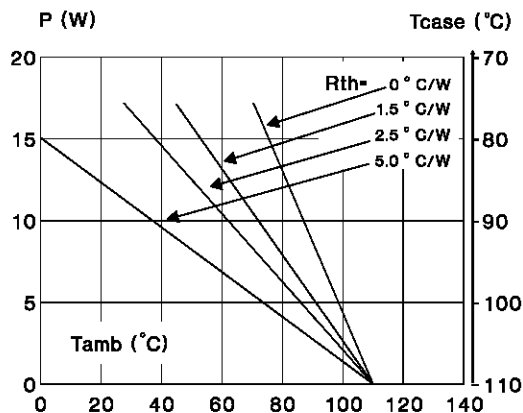
Symbol	Parameter	Value		Unit
		Min.	Max.	
V <sub>GD</sub>	V <sub>D</sub> = V <sub>DRM</sub> R <sub>L</sub> = 3.3kΩ Pulse duration > 20μs	T <sub>j</sub> = 110°C	0.2	V
V <sub>TM</sub> *	I <sub>TM</sub> = 17A tp = 10ms	T <sub>j</sub> = 25°C	1.75	V
I <sub>DRM</sub> *	V <sub>DRM</sub> rated Gate open	T <sub>j</sub> = 25°C	10	μA
		T <sub>j</sub> = 110°C	500	

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

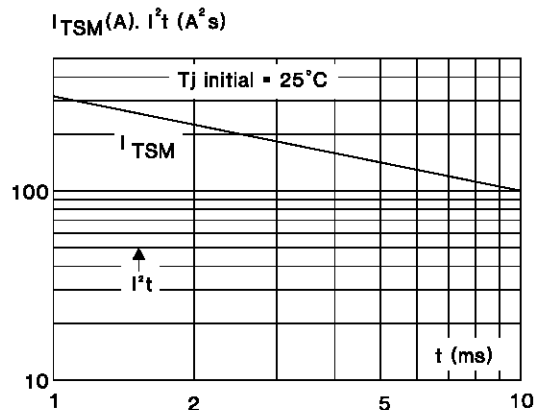
**Fig. 1 :**Maximum RMS power dissipation versus RMS on-state current (F = 60Hz).  
(Curves are cut off by (di/dt)c limitation)



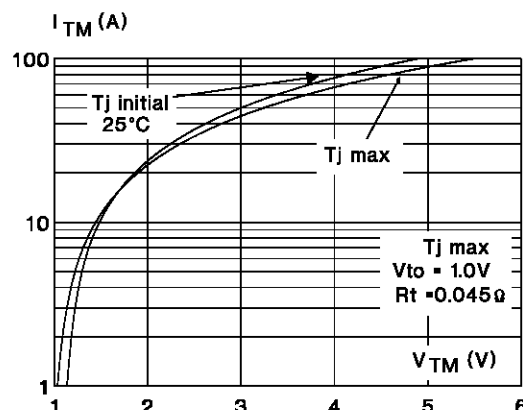
**Fig. 2 :**Correlation between maximum mean power dissipation and maximum allowable temperatures (Tamb and Tcase) for different thermal resistances heatsink + contact.



**Fig. 3 :**Non repetitive surge peak on state current for a sinusoidal pulse with width :  $t \leq 10\text{ms}$ , and corresponding value of  $I^2t$ .



**Fig. 4 :**On-state characteristics (maximum values).



**DC GENERAL ELECTRICAL CHARACTERISTICS** (continued)

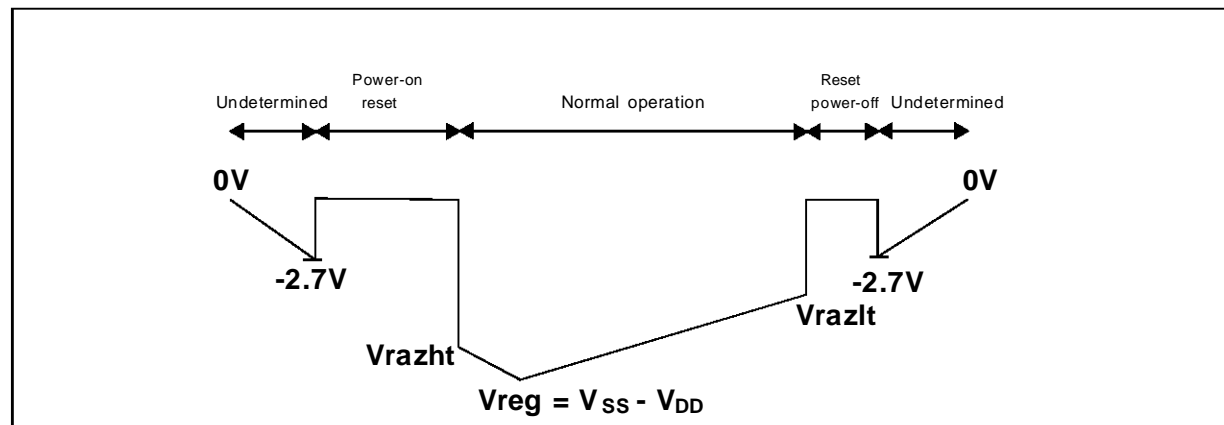
CONTROLLER AVS1ACP08  $T_{oper} = 25^{\circ}C$  (unless otherwise specified)

Symbol	Parameter	Value			Unit
		Min	Typ	Max	
$V_{SS}$ (pin 1) (Vreg)	Shunt regulator	- 10	- 9	- 8	V
$I_{SS}$ (pin 1) (Vreg) (@ $V_{SS} = 9V$ )	Supply current	0.4		30	mA
$I_{SS}$ (pin 1) (@ triac gate non connected)	Quiescent current			0.7	mA
f (pin 3) (@ $R = 91k\Omega$ ) ( $C = 100pF$ )	Oscillator frequency	42	44	46	kHz
$V_M$ (pin 8) $V_{th}$ (3)	Peak voltage of detection high-threshold	4.08	4.25	4.42	V
$V_M$ (pin 8) $V_h$ (3)	Peak voltage of detection hysteresis	0.370	0.4	0.420	V
(1) $V_M$ (pin 8) $V_{th}$ (3)	Zero-crossing detection high-threshold	95	110	125	mV
$V_M$ (pin 8) $V_h$ (3)	Zero-crossing detection hysteresis	27	50	80	mV
(2) $V_{razht}$ (4)	Power-on-reset activation threshold		$V_{reg} \times 0.89$		V
(2) $V_{razlt}$ (4)	Power-down-reset activation threshold	3		6.5	V
Mode (pin 7)	$V_{IL}$ (4) $V_{IH}$ (4)	0.7 Vreg		0.3 Vreg	v
$V_G$ (pin 5)	$V_{OL}$ ( $I_{VG} = 25mA$ ) Leakage current ( $V_G = V_{DD}$ )			650 + 10	mV $\mu A$

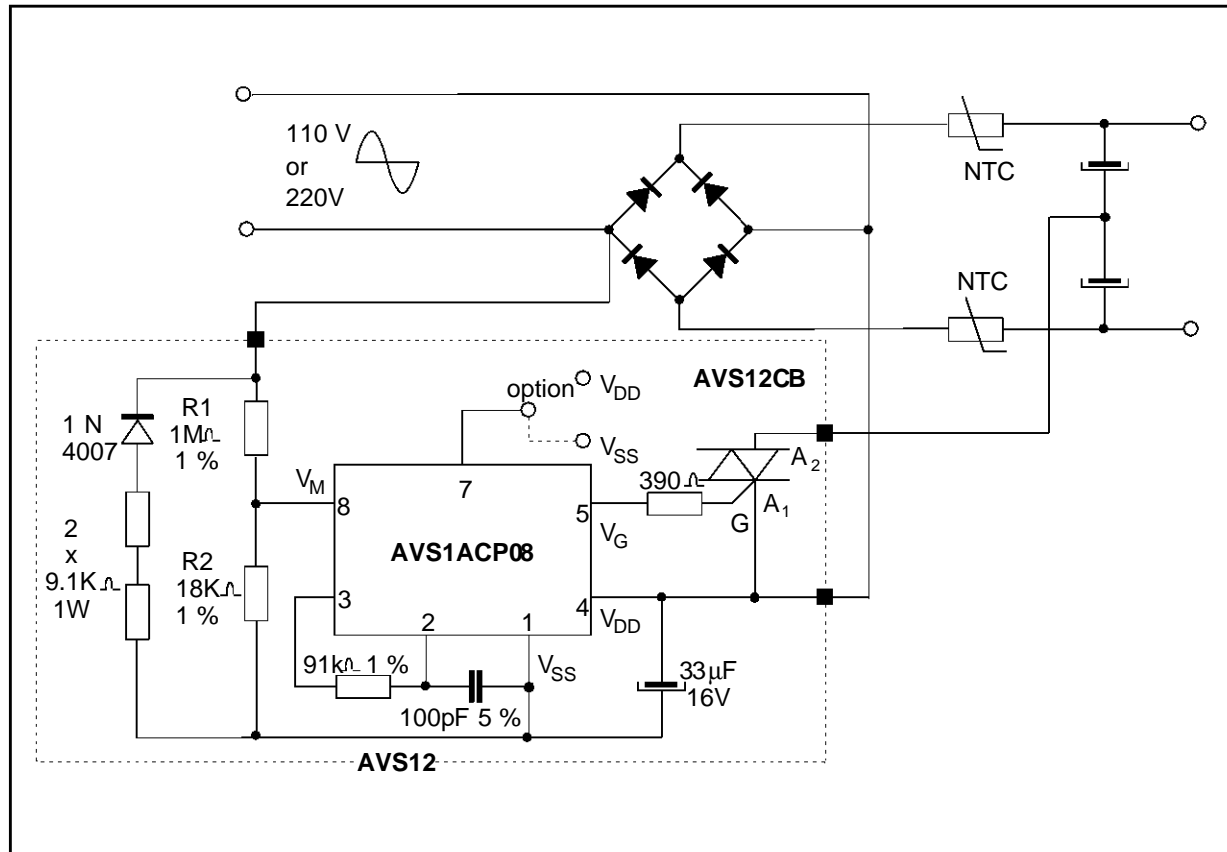
**NOTES :**

- (1) : This value gives a typical noise immunity on the zero-crossing detection of  $110mV \times 1018/18 = 6.20V$  on the main supply
- (2) : See following diagram
- (3) : Voltage referred to  $V_{SS}$
- (4) : Voltage referred to  $V_{DD}$

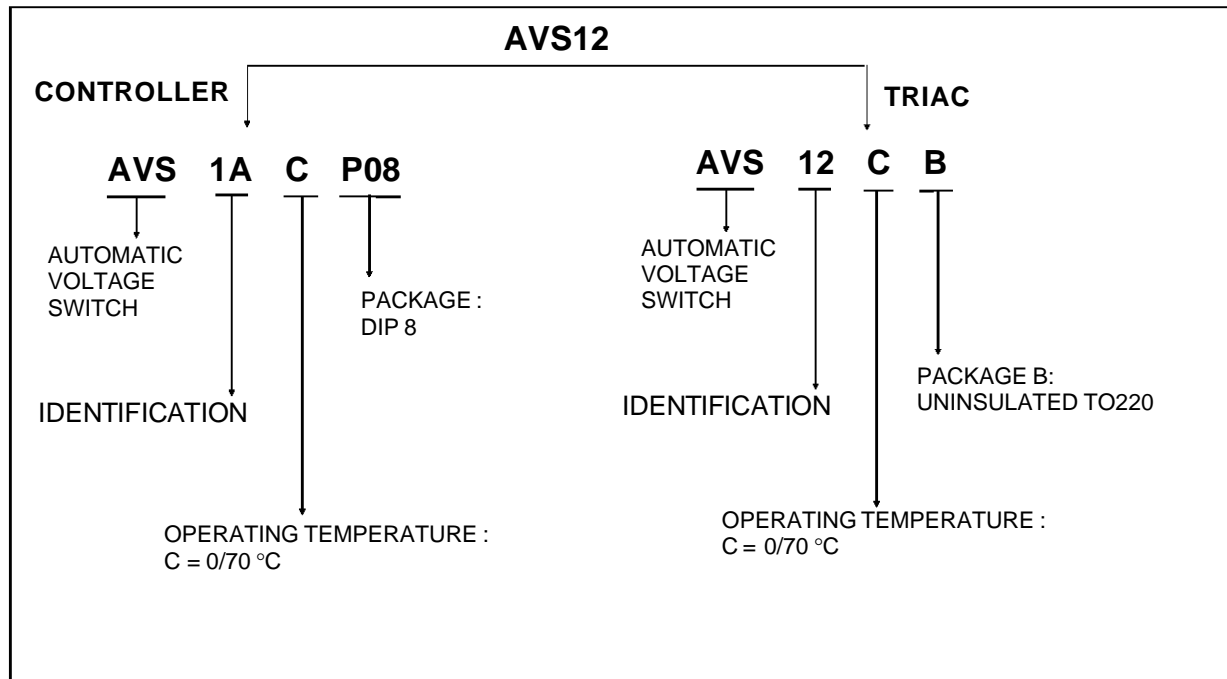
**POWER-ON AND POWER-OFF RESET BEHAVIOUR**



TYPICAL APPLICATION



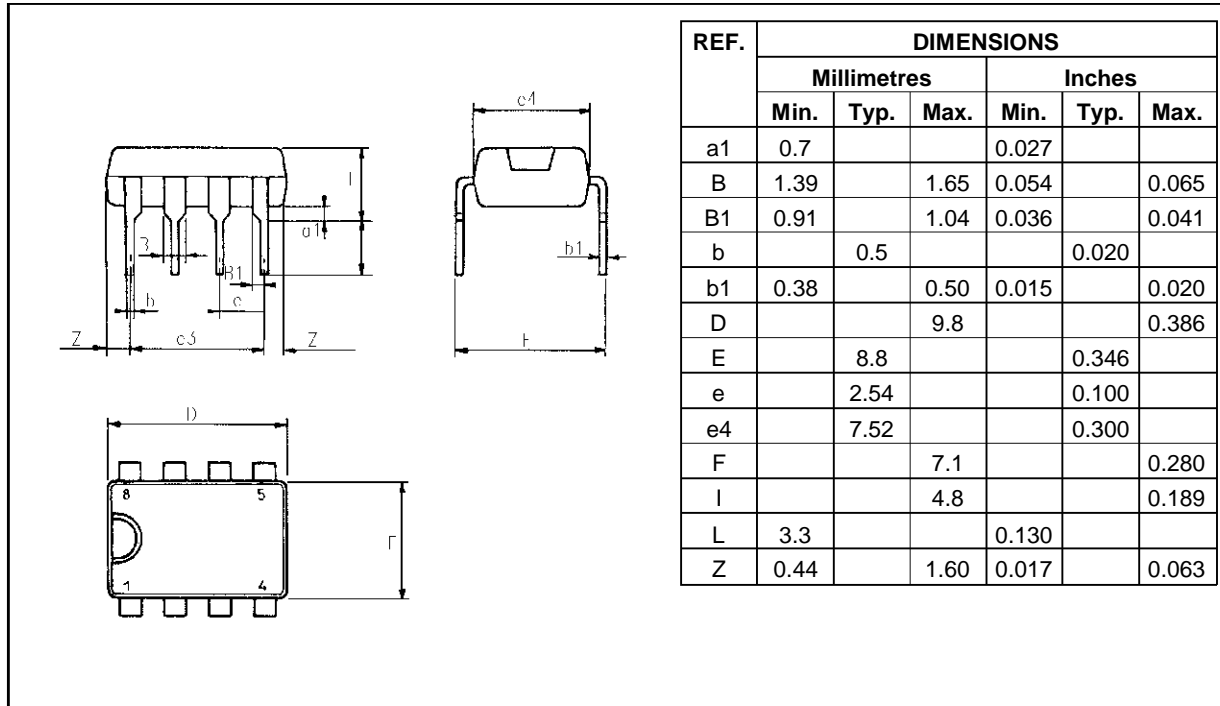
ORDERING INFORMATION



PACKAGE MECHANICAL DATA

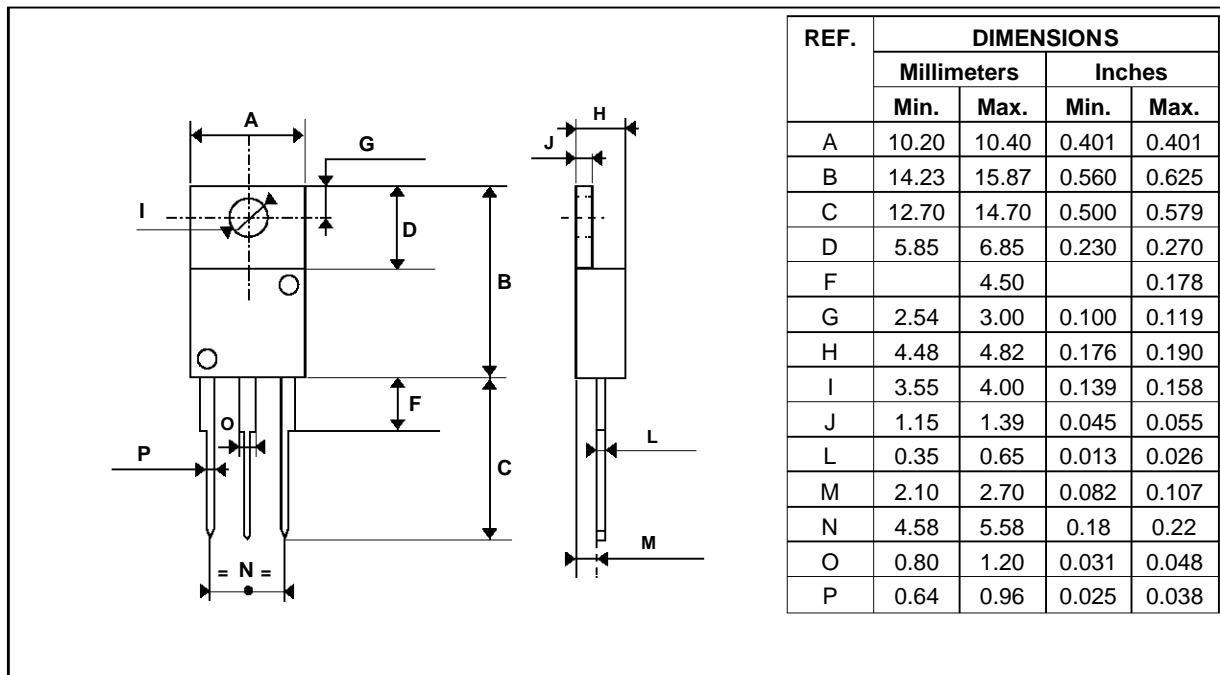
8 PINS - PLASTIC DIP

CONTROLLER



TO220AB (Plastic)

TRIAC



Cooling method : C  
 Marking : Type number  
 Weight : 2.3 g  
 Recommended torque value : 0.8 m.N.  
 Maximum torque value : 1 m.N.

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied.

SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1995 SGS-THOMSON Microelectronics - Printed in Italy - All rights reserved.

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.