

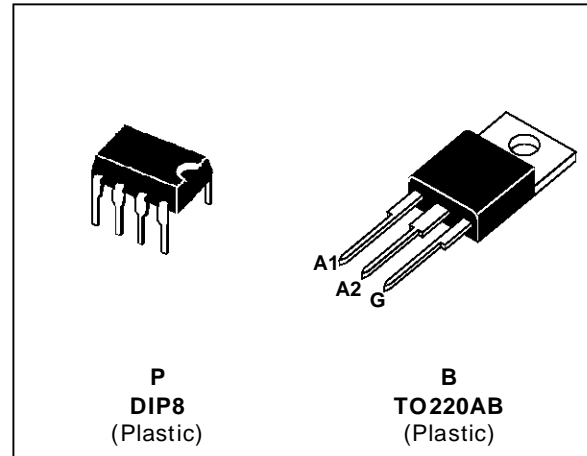
AUTOMATIC VOLTAGE SWITCH (SMPS < 300W)

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 : AVS10CB
- INSULATED PACKAGE 2500V(RMS) : AVS10CBI
- $V_{DRM} = \pm 600V$
- $I_T(RMS) : 8A$

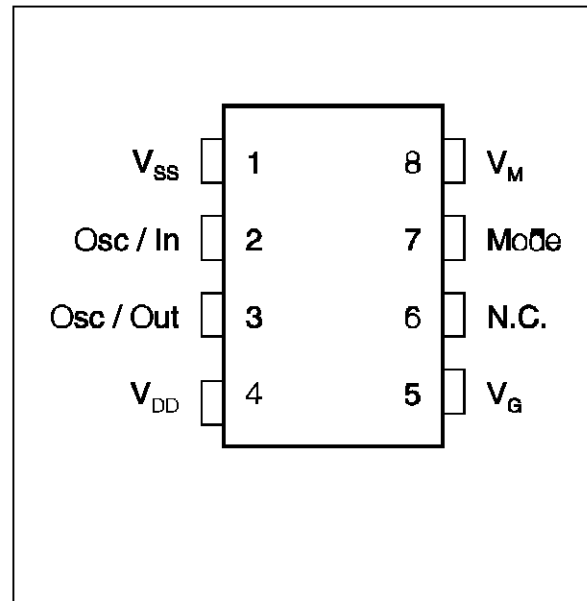


DESCRIPTION

The AVS10 kit is an automatic mains selector (110/220V AC) to be used in SMPS < 300 W. It is composed of 2 devices :

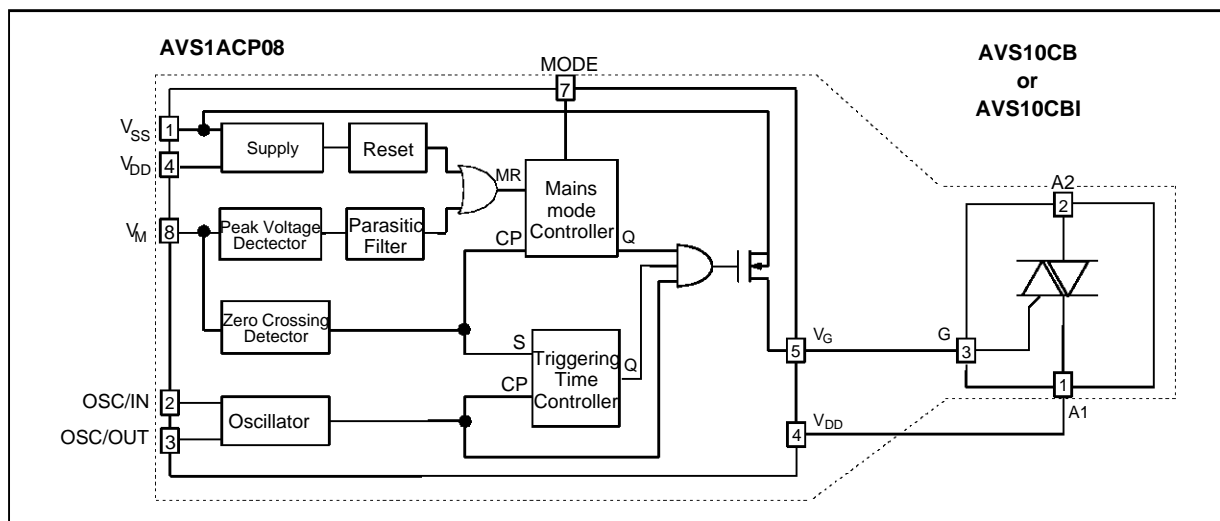
- The **Controller** is optimized for low consumption and high security triggering of the triac. When connected to V_{SS} , the **mode** input activates an additional **option**. If the main power drops from 220V to 110V, the triac control remains locked to the 220V mode and avoids any high voltage spike when the voltage is restored 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



AVS10

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

CONTROLLER AVS1ACP08

| Symbol | Parameter | Value | | Unit |
|-------------|----------------------------------|----------------|-------|------|
| | | Min. | Max. | |
| V_{SS} | Supply voltage | - 12 | 0.5 | V |
| V_I / V_O | I / O voltage | $V_{SS} - 0.5$ | 0.5 | V |
| I_I / I_O | I / O current | - 40 | + 40 | mA |
| T_{stg} | Storage Temperature | - 60 | + 150 | °C |
| T_{oper} | Operating Temperature code " C " | 0 | + 70 | °C |

TRIAC AVS10CB / AVS10CBI $T_j = +25^\circ\text{C}$ (unless otherwise specified)

| Symbol | Parameter | | Value | Unit | |
|--------------------|---|-----------------------------------|------------------------------|------|------------------------|
| V_{DRM} | Repetitive peak off-state voltage (2) | | ± 600 | V | |
| $I_T(\text{RMS})$ | RMS on-state current (360° conduction angle) | AVS10CB $T_C = 80^\circ\text{C}$ | 8 | A | |
| | | AVS10CBI $T_C = 70^\circ\text{C}$ | | | |
| I_{TSM} | Non repetitive surge peak on-state current (T_j initial = 25°C) | | $t = 8.3\text{ms}$ | 85 | A |
| | | | $t = 10\text{ms}$ | | |
| I_2t | I_2t value | | $t = 10\text{ms}$ | 32 | A^2s |
| di/dt | Critical rate of rise of on-state current (1) | | Repetitive $F = 50\text{Hz}$ | 20 | $\text{A}/\mu\text{s}$ |
| | | | Non Repetitive | 100 | |
| dv/dt^* | Linear slope up to $0.67 V_{DRM}$ | Gate open | $T_j = 110^\circ\text{C}$ | 50 | $\text{V}/\mu\text{s}$ |
| T_{stg} T_j | Storage Temperature Operating Junction Temperature | | - 40 + 150 0 + 110 | | °C |

(1) Gate supply : $I_G = 100\text{mA}$ - $di/dt = 1\text{A}/\mu\text{s}$

(2) $T_j = 110^\circ\text{C}$

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

THERMAL RESISTANCES

TRIAC AVS10CB / AVS10CBI

| Symbol | Parameter | | Value | Unit |
|--------------|--|----------|-------|------|
| Rth (j-a) | Junction-to-ambient | | 60 | °C/W |
| Rth (j-c) DC | Junction-to-case for DC | AVS10CB | 3.5 | °C/W |
| | | AVS10CBI | 4.4 | |
| Rth (j-c) AC | Junction-to-case for 360° conduction angle (F = 50Hz) | AVS10CB | 2.6 | °C/W |
| | | AVS10CBI | 3.3 | |

DC GENERAL ELECTRICAL CHARACTERISTICS

TRIAC AVS10CB / AVS10CBI

| Symbol | Parameter | Value | | Unit |
|--------------------|--|------------------------|------|------|
| | | Min. | Max. | |
| V _{GD} | V _D = V _{DRM} R _L = 3.3kΩ Pulse duration > 20μs | T _j = 110°C | 0.2 | V |
| V _{TM} * | I _{TM} = 11A t _p = 10ms | T _j = 25°C | 1.75 | V |
| I _{DRM} * | V _{DRM} rated Gate open | T _j = 25°C | 10 | μA |
| | | T _j = 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 ($F = 60\text{Hz}$).
(Curves are cut off by $(di/dt)c$ limitation)

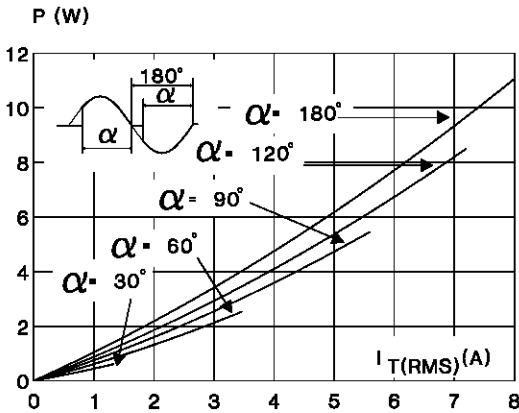


Fig. 2 : Correlation between maximum mean power dissipation and maximum allowable temperatures (T_{amb} and T_{case}) for different thermal resistances heatsink + contact (AVS10CB).

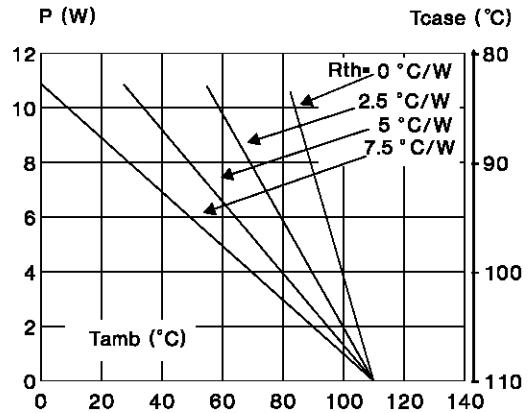


Fig. 3 : Correlation between maximum mean power dissipation and maximum allowable temperatures (T_{amb} and T_{case}) for different thermal resistances heatsink + contact (AVS10CBI).

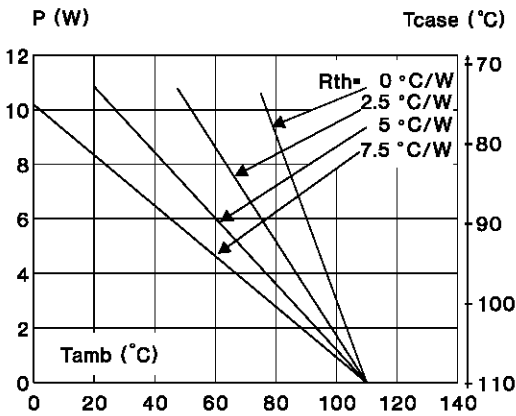


Fig. 4 : Non repetitive surge peak on-state current for a sinusoidal pulse with width : $t \leq 10\text{ms}$, and corresponding value of I^2t .

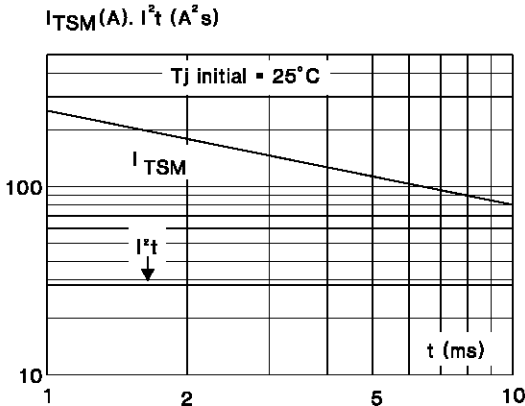
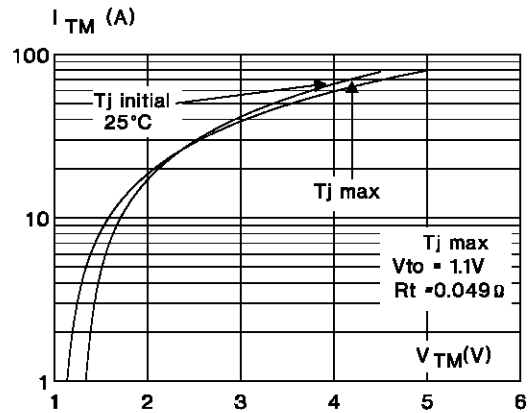


Fig. 5 : On-state characteristics (maximum values).



DC GENERAL ELECTRICAL CHARACTERISTICS (continued)

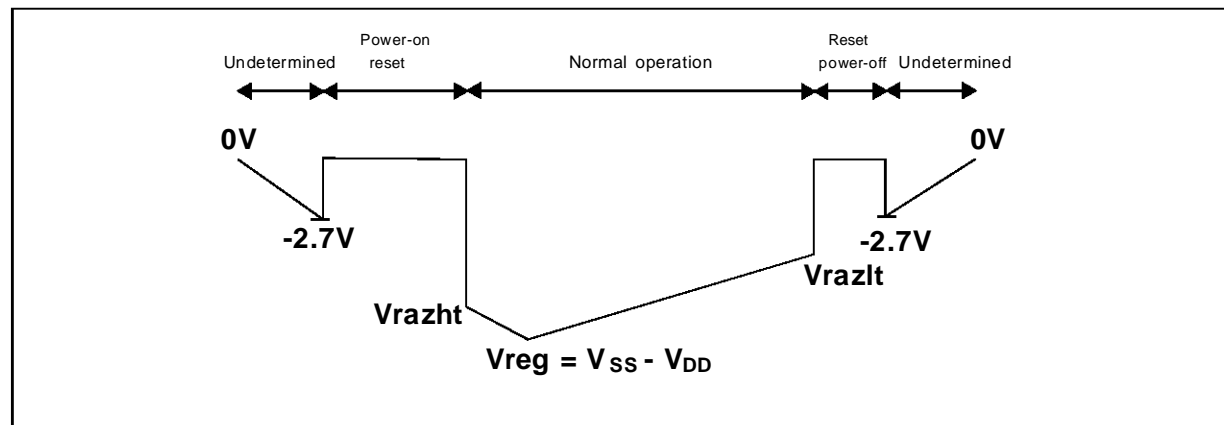
CONTROLLER AVS1ACP08 $T_{oper} = 25^{\circ}C$ (unless otherwise specified)

| Symbol | Parameter | Value | | | Unit |
|---|---|----------------------|-------------------------|----------------------|----------|
| | | Min | Typ | Max | |
| V _{SS} (pin 1) (V _{reg}) | Shunt regulator | - 10 | - 9 | - 8 | V |
| I _{SS} (pin 1) (V _{reg}) (@ 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 = 91kΩ) (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 _r azht (4) | Power-on-reset activation threshold | | V _{reg} x 0.89 | | V |
| (2) V _r azlt (4) | Power-down-reset activation threshold | 3 | | 6.5 | V |
| Mode (pin 7) | V _{IL} (4) V _{IH} (4) | 0.7 V _{reg} | | 0.3 V _{reg} | V |
| V _G (pin 5) | V _{OL} (I _{VG} = 25mA) Leakage current (V _G = V _{DD}) | | | 650 + 10 | mV μA |

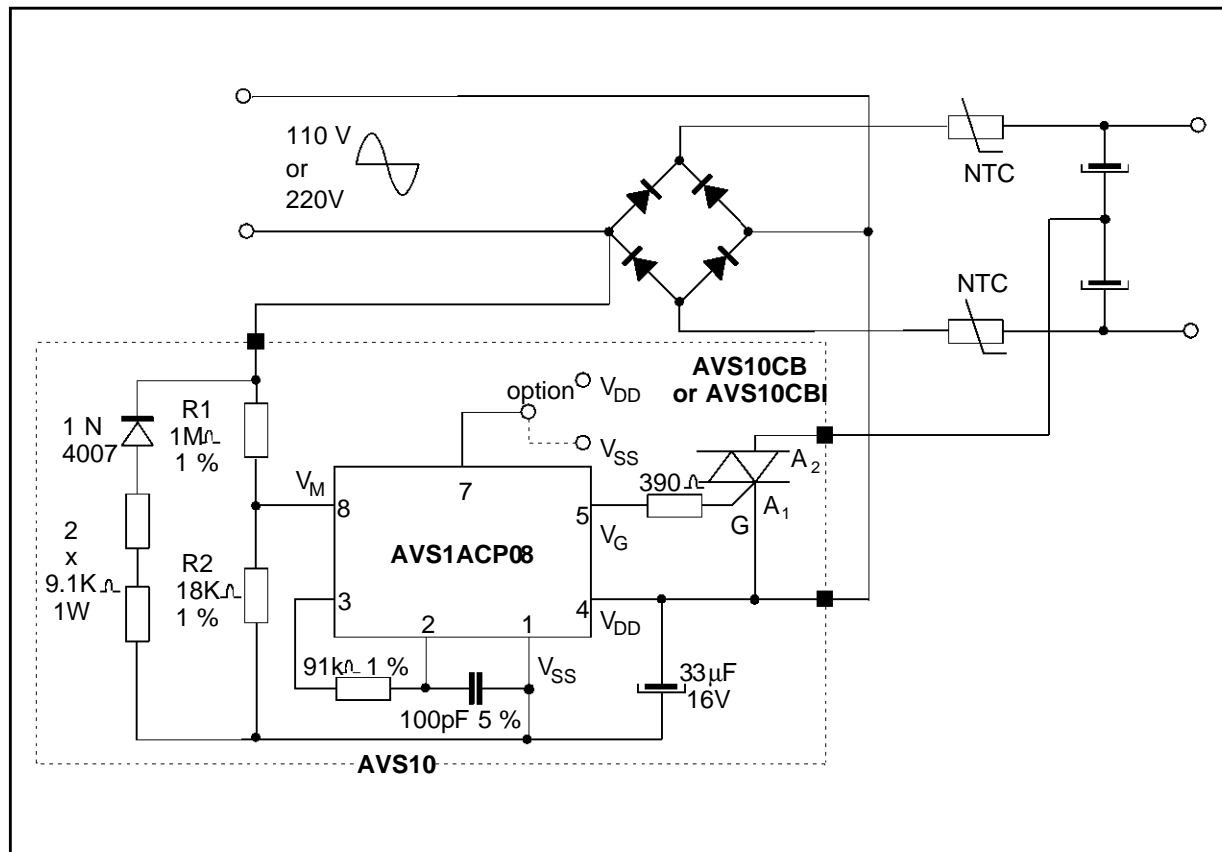
NOTES :

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

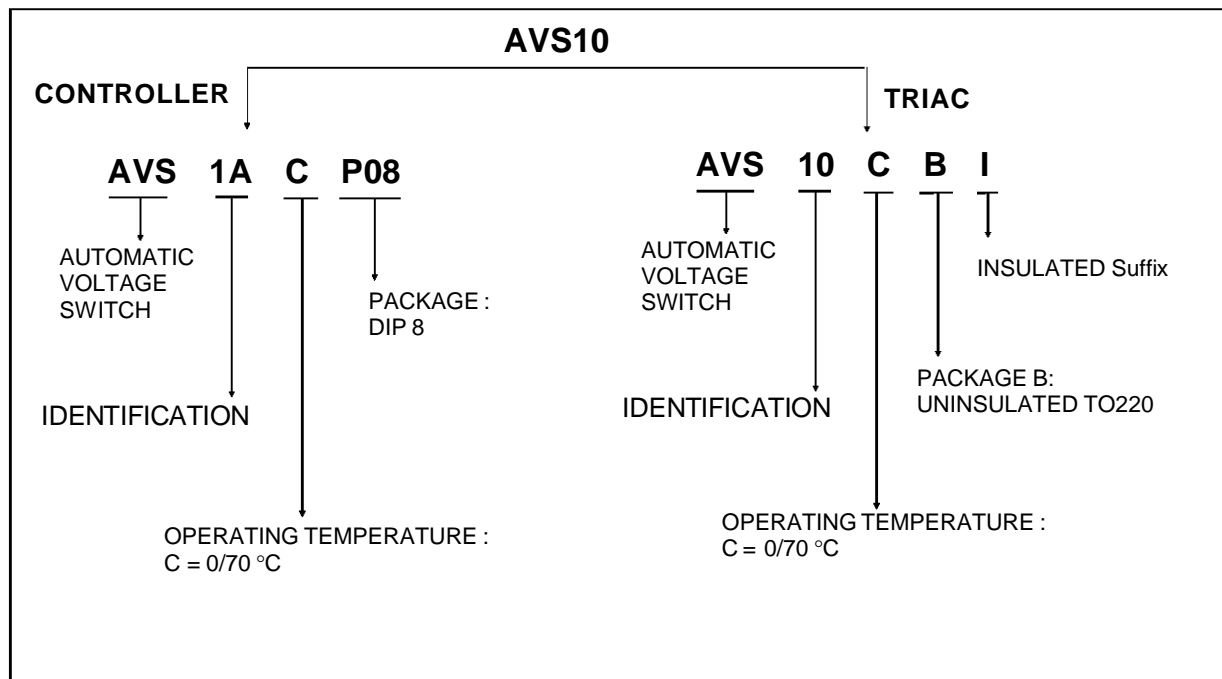
POWER-ON AND POWER-OFF RESET BEHAVIOUR



TYPICAL APPLICATION



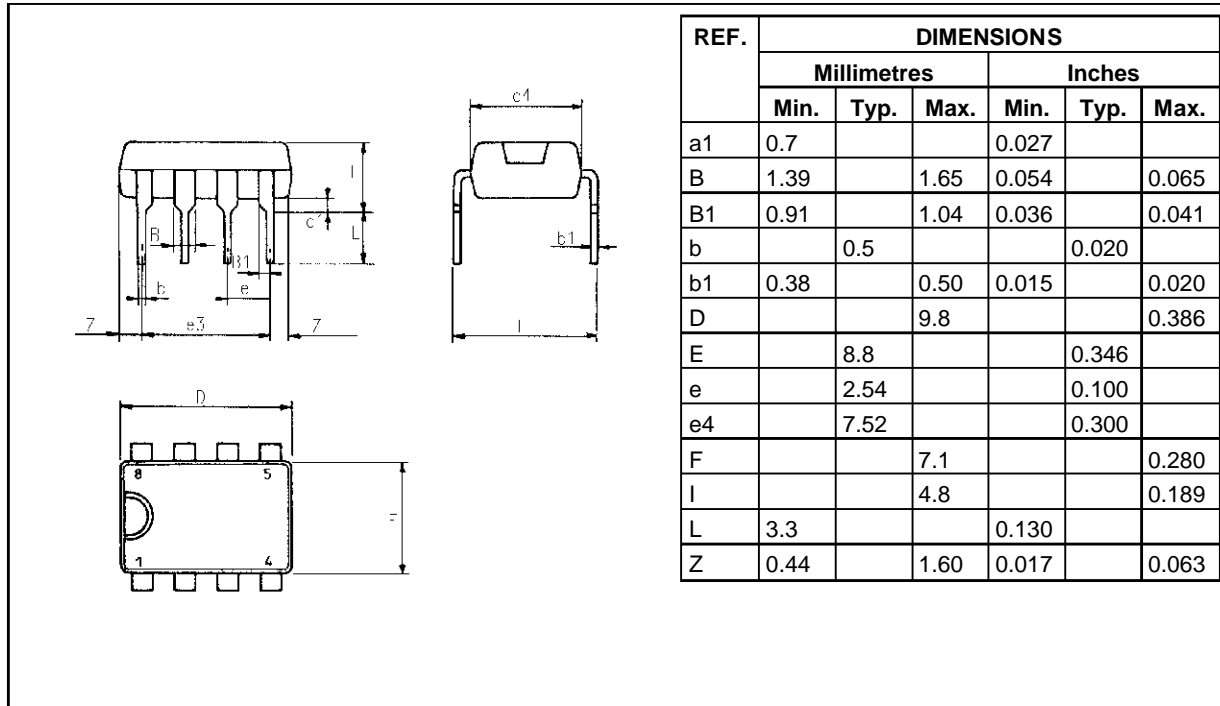
ORDERING INFORMATION



PACKAGE MECHANICAL DATA

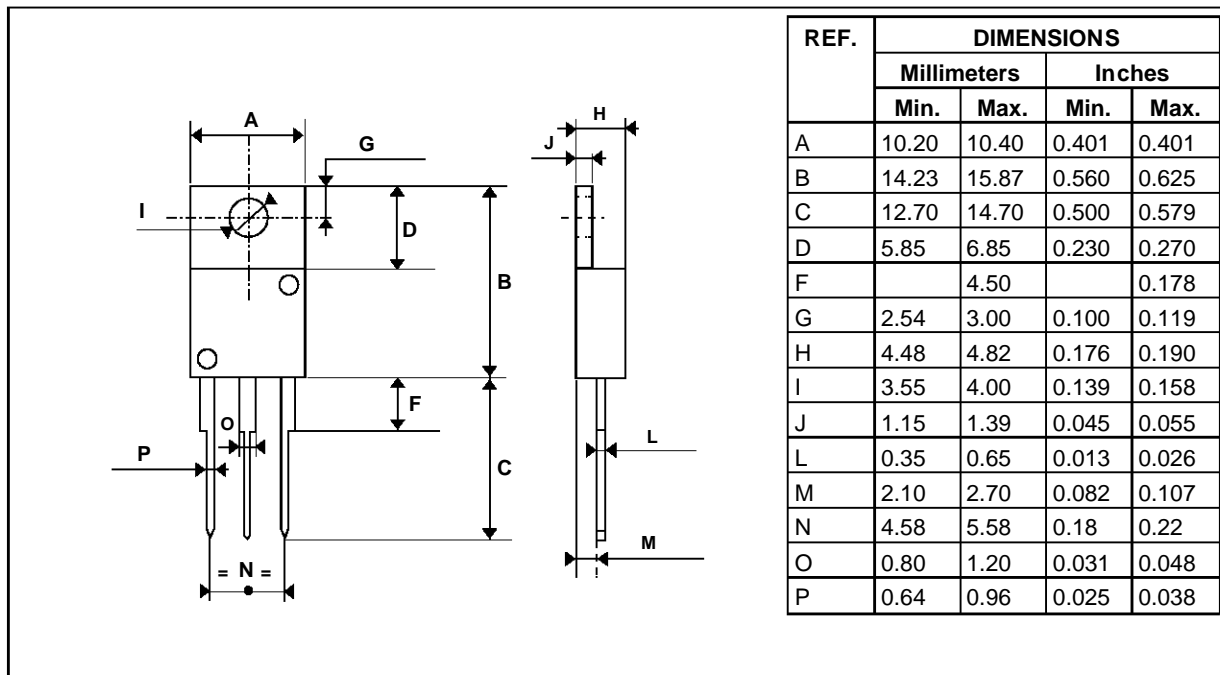
8 PINS - PLASTIC DIP

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.