

AUTOMATIC VOLTAGE SWITCH (SMPS < 300W)

CONTROLLER

- 50/60Hz FULL COMPATIBILITY
- INTEGRATED VOLTAGE REGULATOR
- TRIAC TRIGGERING BY PULSE TRAIN
- HIGH IMMUNITY TO AC DISTURBANCES (SPIKES, MISSING CYCLE)
- HIGH RELIABILITY ON LINE VOLTAGE DETECTION (PARASITIC FILTER ON SIGNAL INPUT)
- FAST DIGITAL START-UP TIME (< 2 LINE CYCLES)
- LOW POWER CONSUMPTION

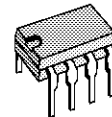
TRIAC

- HIGH EFFICIENCY AND SAFETY SWITCHING
- UNINSULATED PACKAGE : AVS10CB/AVS100CB
- INSULATED PACKAGE (2500V_{RMS}) : AVS10CBI
- V_{DRM} = ±600V (AVS10CB), ±800V (AVS100CB)
- I_{T(RMS)} : 8A

DESCRIPTION

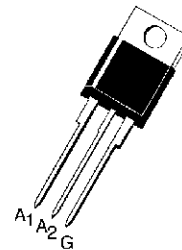
The AVS20 (AVS200) kit is an automatic mains selector (120/230V AC) to be used in SMPS with input power < 300 W. It is composed of 2 devices :

- 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** "the **latched** option". If the main power drops from 230V to 120V, the triac control remains locked to the 230V mode and avoids any high voltage spike when the voltage is restored to 230V.
When connected to V_{DD}, the **mode** input desactivates this **option** "this is the **follower** 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 line disturbances.



**P
DIP8**
(Plastic Package)

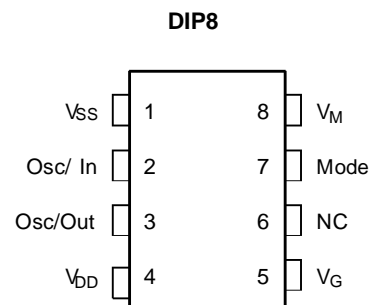
ORDER CODE : AVS2ACP08



**B
TO220AB**
(Plastic Package)

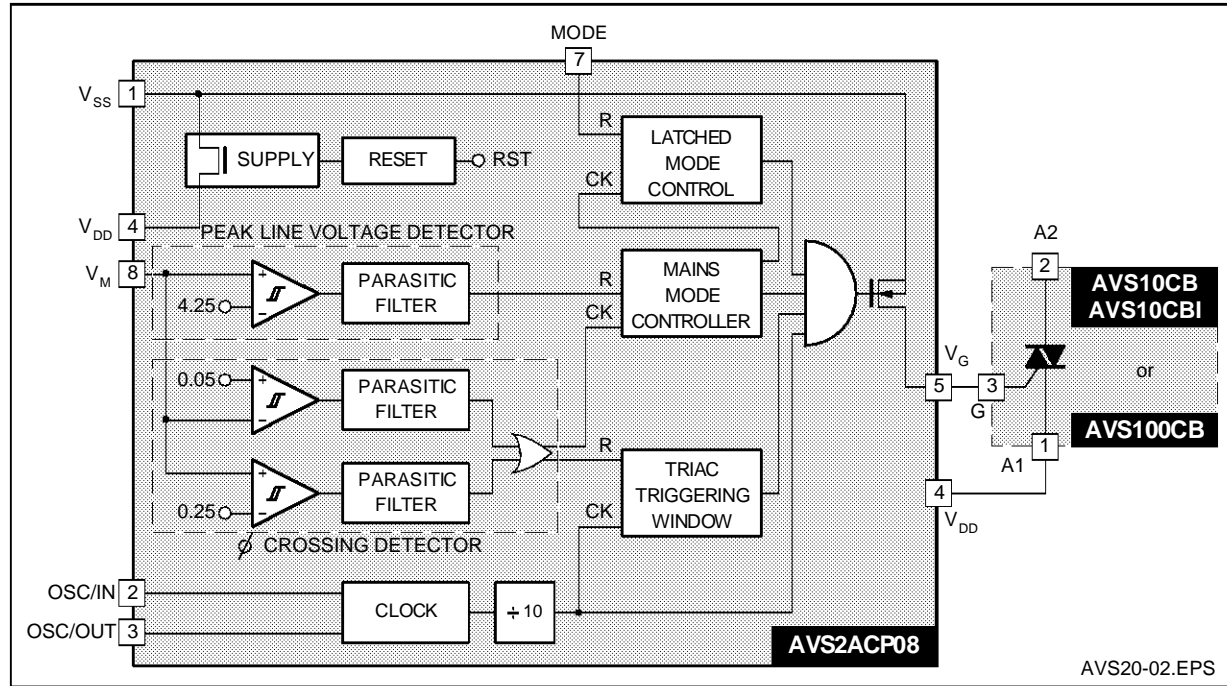
ORDER CODES : AVS10CB-AVS10CBI-AVS100CB

PIN CONNECTIONS



AVS20-01.EPS

BLOCK DIAGRAM



AVS20-02.EPS

ABSOLUTE MAXIMUM RATINGS

CONTROLLER AVS2ACP08

Symbol	Parameter	Min.	Max.	Unit
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

AVS20-01.TBL

TRIAC AVS10CB / AVS10CBI / AVS100CB T_j = +25°C (unless otherwise specified)

Symbol	Parameter	Value	Unit
V _{DRM}	Repetitive peak off-state voltage (2) AVS10 AVS100	±600 ±800	V V
I _{T(RMS)}	RMS on-state current (360° conduction angle) T _C = 80°C, AVS10CB/AVS100CB T _C = 70°C, AVS10CBI	8 8	A A
I _{TSM}	Non repetitive surge peak on-state current (T _j initial = 25°C) t = 8.3ms t = 10ms	85 80	A A
I ² t	I ² t value (t = 10ms)	32	A ² s
di/dt	Critical rate of rise of on-state current (1) Repetitive f = 50Hz Non Repetitive	20 100	A/μs A/μs
dv/dt (3)	Linear slope up to 400V (Gate open) (T _j = 70°C) AVS10 AVS100	75 150	V/μs V/μs
T _{stg}	Storage Temperature	-40, +150	°C
T _j	Operating Junction Temperature	0, +110	°C

AVS20-02.TBL

(1) Gate supply : I_G = 100mA - di/dt = 1A/μs

(2) T_j = 110°C

(3) For either polarity of electrode A₂ voltage with reference to electrode A₁

THERMAL RESISTANCES

TRIAC AVS10CB / AVS10CBI / AVS100CB

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction-to-ambient	60	°C/W
$R_{th(j-c)}$ DC	Junction-to-case for DC	AVS10CB / AVS100CB 3.5 AVS10CBI 4.4	°C/W °C/W
$R_{th(j-c)}$ AC	Junction-to-case for 360° conduction angle (f = 50Hz)	AVS10CB / AVS100CB 2.6 AVS10CBI 3.3	°C/W °C/W

AVS20-03.TBL

DC GENERAL ELECTRICAL CHARACTERISTICS

TRIAC AVS10CB / AVS10CBI / AVS100CB

Symbol	Parameter	Min.	Max.	Unit
V_{GD}	$V_D = V_{DRM}$ $R_L = 3.3k\Omega$ Pulse duration > 20 μ s ($T_j = 110^\circ C$)	0.2		V
V_{TM} (1)	$I_{TM} = 11A$ ($t_p = 10ms$, $T_j = 25^\circ C$)		1.75	V
I_{DRM} (1)	V_{DRM} rated Gate open	$T_j = 25^\circ C$ AVS10/AVS100 $T_j = 110^\circ C$ AVS10 $T_j = 700^\circ C$ AVS100	10 500 500	μA μA μA

AVS20-04.TBL

CONTROLLER AVS2ACP08 $T_{oper} = 25^\circ C$ (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
MAIN CHARACTERISTICS					
V_{SS} (pin 1) (Vreg)	Shunt Regulator Voltage	- 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		0.6	0.7	mA
F (pin 3) (@ $R = 91k\Omega$) ($C = 100pF$)	Oscillator Frequency	42	44	46	kHz
V_{PWRON} (2)	Power-on-reset Threshold		0.89 Vreg		
V_{PWROFF} (2)	Power-off-reset Threshold		4.6		V
Mode (pin 7)	V_{IL} (2) V_{IH} (2)	0.7 Vreg		0.3 Vreg	
V_G (pin 5)	V_{OL} ($I_{VG} = 25mA$) Leakage Current ($V_G = V_{DD}$)			650 + 10	mV μA

PEAK LINE VOLTAGE DETECTOR

V_{SWON} (pin 8)	Low Threshold of Trip Point (switching-on of triac triggering) (3)	3.89	4.05	4.22	V
V_{SWOFF} (pin 8)	High Threshold of Trip Point (switching-off of triac triggering) (3)	4.08	4.25	4.42	V
t_{ON} (pin 5)	Triac Turn-on Delay Time ($V_{AC} = 120V$)	1		2	Line cycles

ZERO VOLTAGE CROSSING DETECTOR

V_{0CRPH} (pin8)	High Threshold on Positive AC Side (3)		250		mV
V_{0CRPL} (pin8)	Low Threshold on Positive AC Side (3) (4)		200		mV
V_{0CRNH} (pin8)	High Threshold on Negative AC Side (3)		100		mV
V_{0CRNL} (pin8)	Low Threshold on Negative AC Side (3) (4)		60		mV

AVS20-05.TBL

NOTES :

(1) : For either polarity of electrode A_2 voltage with reference to electrode A_1 .

(2) : Voltage referred to V_{DD} .

(3) : Voltage referred to V_{SS} .

(4) : These values give a typical noise immunity on the zero-crossing detection of $100mV \times \frac{1018}{18} = 5.65V$ on the mains supply.

Figure 1: Maximum RMS power dissipation versus RMS on-state current ($f=60\text{Hz}$)
(Curves are cut-off $(di/dt)_c$ limitation)

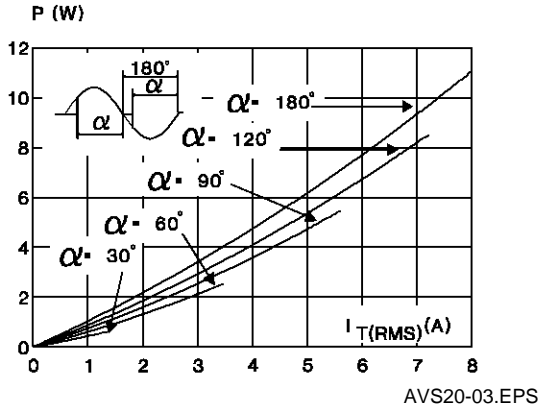


Figure 2a: Correlation between maximum mean power dissipation and maximum allowable temperatures (T_A and T_C) for different thermal resistances heatsink + contact (AVS10CB/AVS100CB)

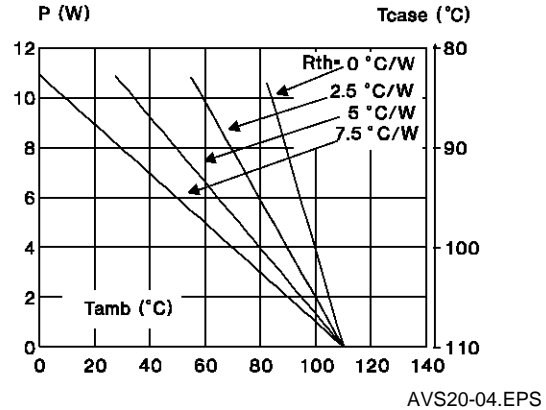


Figure 2b: Correlation between maximum mean power dissipation and maximum allowable temperatures (T_A and T_C) for different thermal resistances heatsink + contact (AVS10CBI)

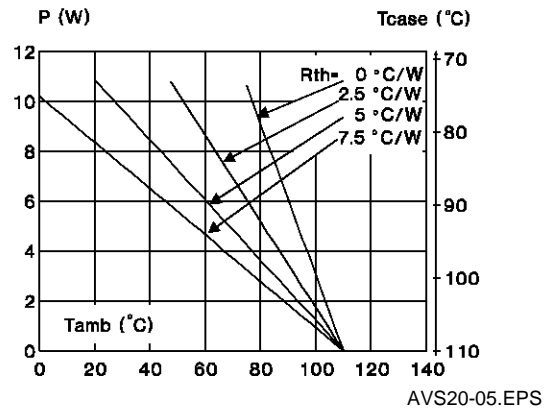
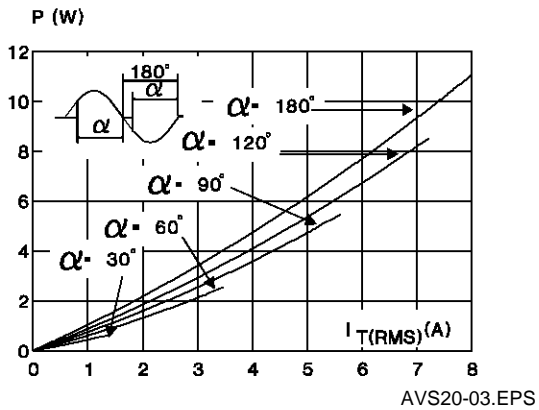


Figure 3: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t \leq 10\text{ms}$, and corresponding value of I^2t .

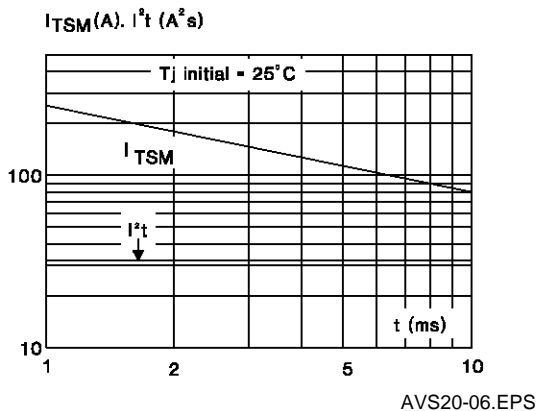
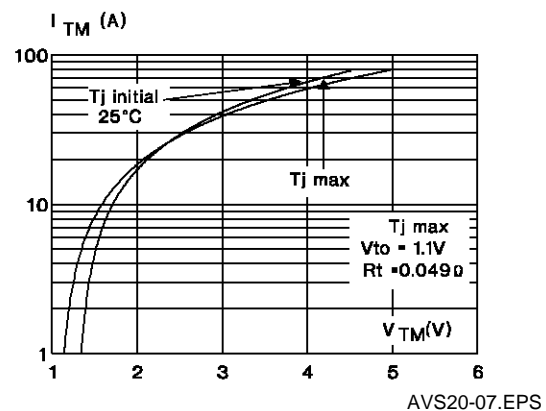
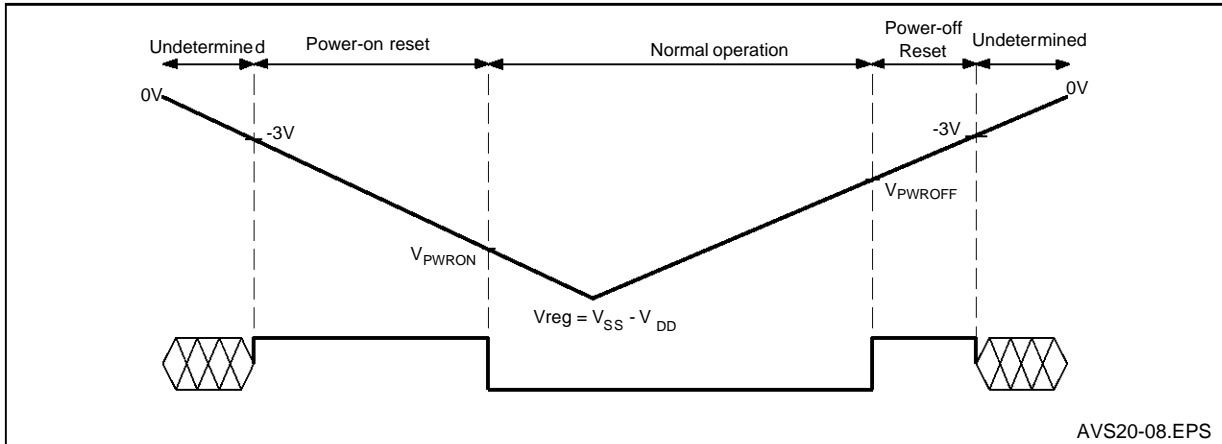


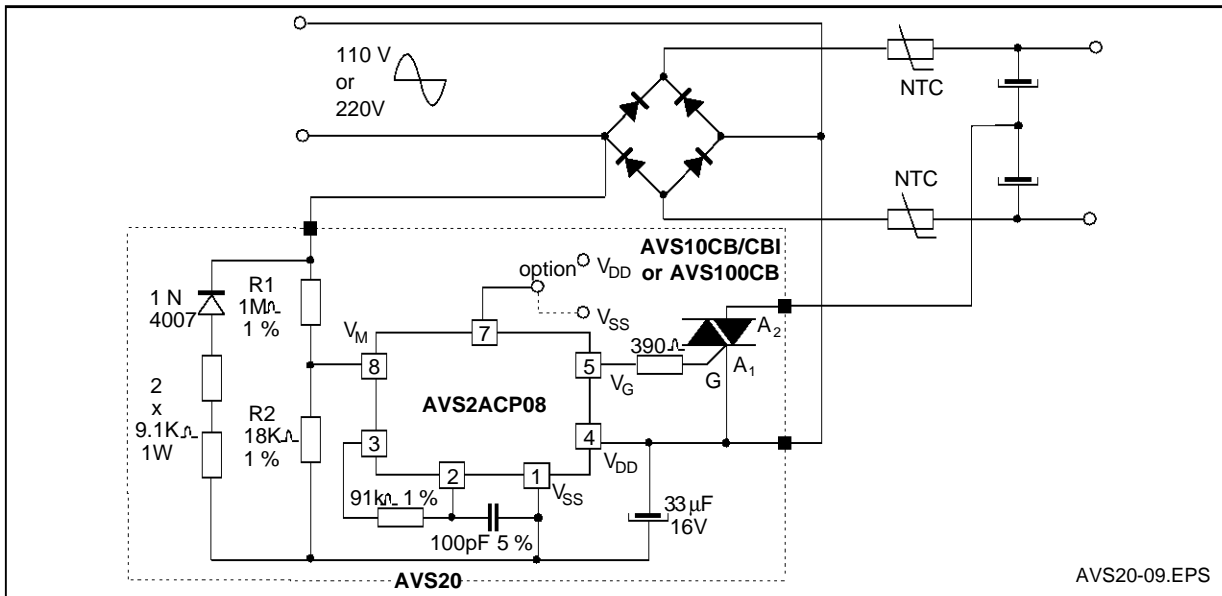
Figure 4: On-state characteristics (maximum values).



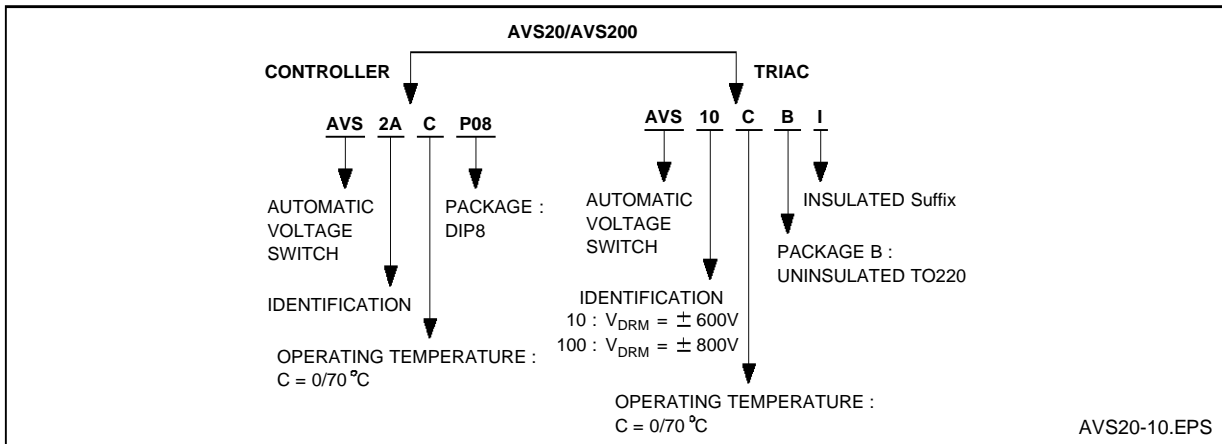
POWER-ON AND POWER-OFF RESET BEHAVIOUR



TYPICAL APPLICATION DIAGRAM

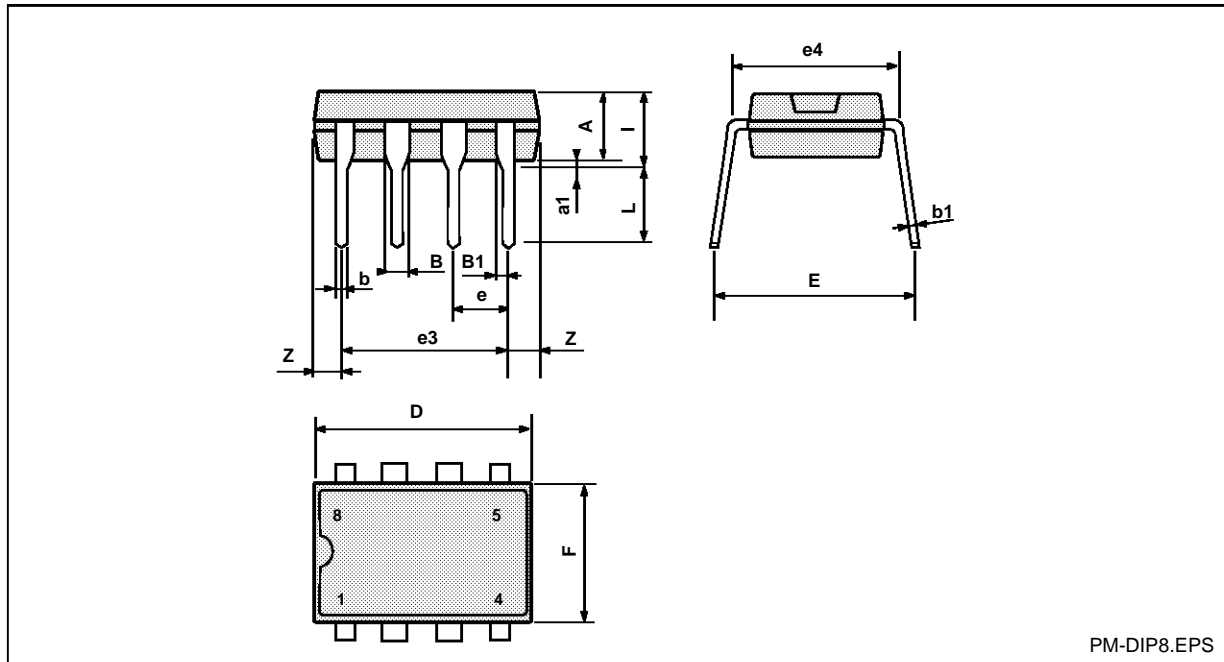


ORDERING INFORMATION



PACKAGE MECHANICAL DATA

CONTROLLER
8 PINS - PLASTIC DIP



PM-DIP8.EPS

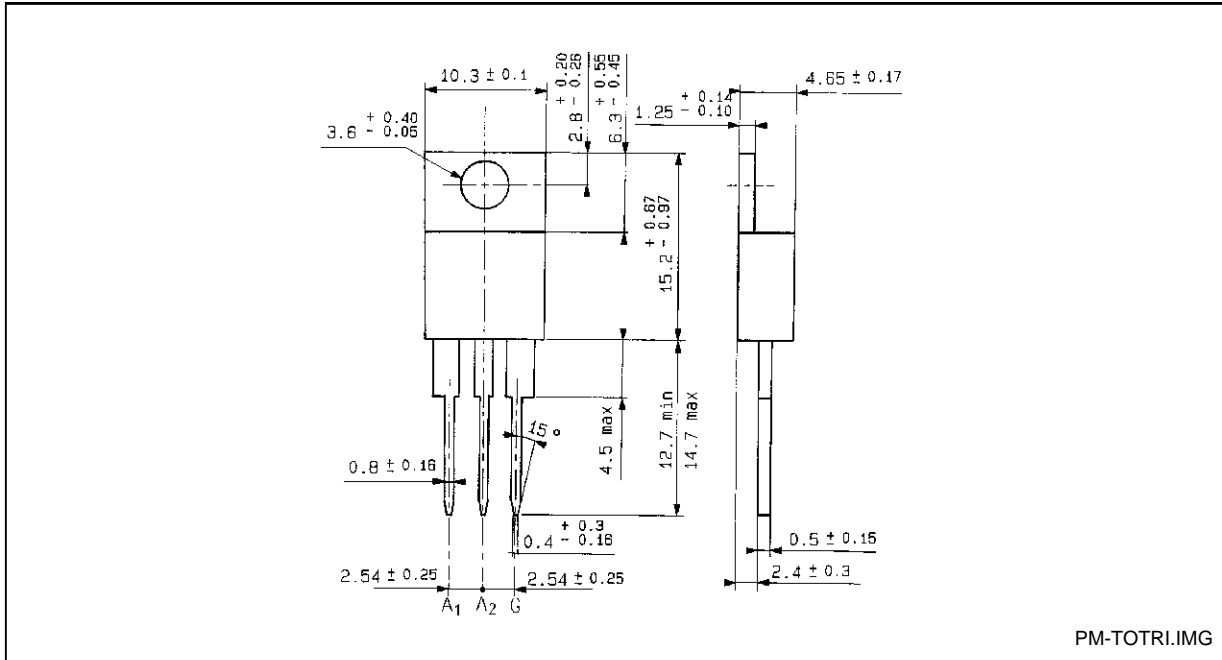
Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
i			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

DIP8.TBL

PACKAGE MECHANICAL DATA

TRIAC

3 PINS - PLASTIC TO220AB



PM-TOTRI.IMG

Cooling method : by conduction (method C)

Weight : 2 g

AVS20 - AVS200

NOTES:

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 the express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All rights reserved.

Purchase of I²C Components by SGS-THOMSON Microelectronics conveys a license under the Philips I²C Patent. Rights to use these components in an I²C system is granted provided that the system conforms to the I²C Standard Specification as defined by Philips.

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.