SGS-THOMSON MICROELECTRONICS

AVS20
AVS200

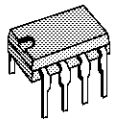
AUTOMATIC VOLTAGE SWITCH (SMPS < 300W)

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

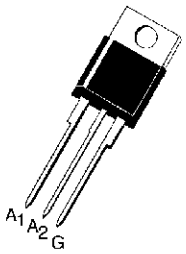
TRIAC

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



P
DIP8
(Plastic Package)

ORDER CODE : AVS2ACP08



B
TO220AB
(Plastic Package)

ORDER CODES : AVS10CB-AVS10CBI-AVS100CB

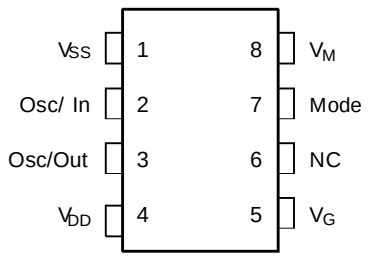
DESCRIPTION

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.

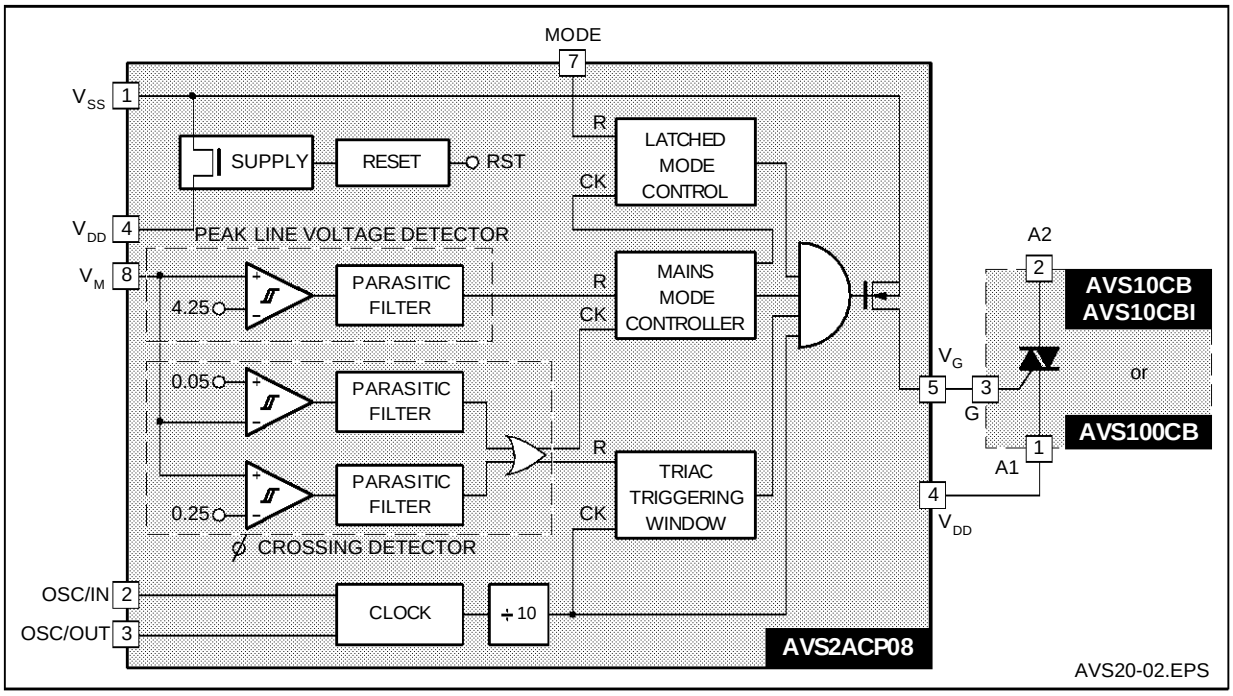
PIN CONNECTIONS

DIP8



AVS20-01.EPS

BLOCK DIAGRAM



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^2t	I^2t value (t = 10ms)	32	A^2s
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 A_2 voltage with reference to electrode A_1

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 AVS10CBI	 3.5 4.4	 °C/W °C/W
$R_{th\ (j-c)}$ AC	Junction-to-case for 360° conduction angle (f = 50Hz) AVS10CB / AVS100CB AVS10CBI	 2.6 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> 20µs (T_j = 110°C)	0.2		V
V_{TM} (1)	I_{TM} = 11A (t_p = 10ms, T_j = 25°C)		1.75	V
I_{DRM} (1)	V_{DRM} rated Gate open T_j = 25°C AVS10/AVS100 T_j = 110°C AVS10 T_j = 700°C AVS100	 	 10 500 500	 µA µA µA

AVS20-04.TBL

CONTROLLER AVS2ACP08 T_{oper} = 25°C (unless otherwise specified)

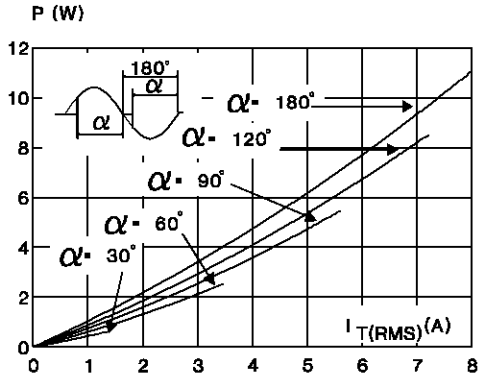
Symbol	Parameter	Min.	Typ.	Max.	Unit
MAIN CHARACTERISTICS					
V_{SS} (pin 1) (Vreg)	Shunt Regulator Voltage	- 10	- 9	- 8	V
I_{SS} (pin 1) (Vreg) (@ V_{SS} = -9V)	Supply Current	0.4		30	mA
I_{SS} (pin 1) (@ triac gate non connected)	Quiescent Current		0.6	0.7	mA
F (pin 3) (@ R = 91kΩ) (C = 100pF)	Oscillator 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_{0CR}PH (pin8)	High Threshold on Positive AC Side (3)		250		mV
V_{0CR}PL (pin8)	Low Threshold on Positive AC Side (3) (4)		200		mV
V_{0CR}NH (pin8)	High Threshold on Negative AC Side (3)		100		mV
V_{0CR}NL (pin8)	Low Threshold on Negative AC Side (3) (4)		60		mV

AVS20-05.TBL

NOTES :

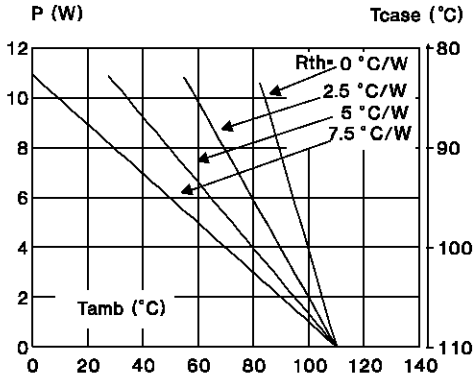
(1) : For either polarity of electrode A_2 voltage with reference to electrode A_1.
(2) : Voltage referred to V_{DD}.
(3) : Voltage referred to V_{SS}.
(4) : These values give a typical noise immunity on the zero-crossing detection of 100mV x $\frac{1018}{18}$ = 5.65V on the mains supply.

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



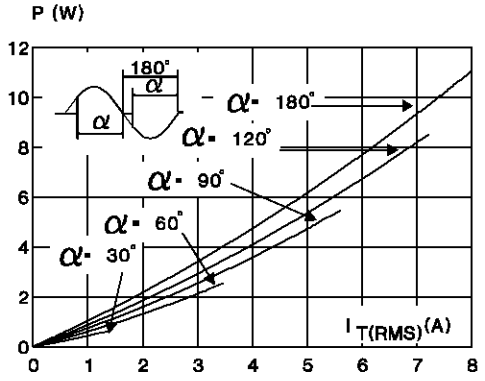
AVS20-03.EPS

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)

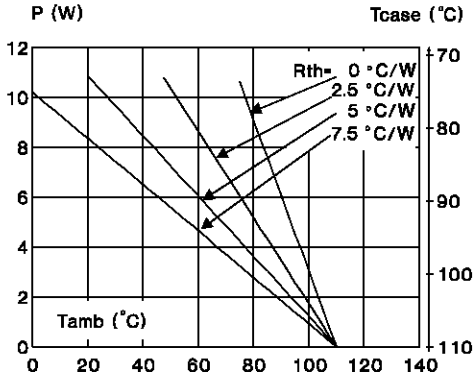


AVS20-04.EPS

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

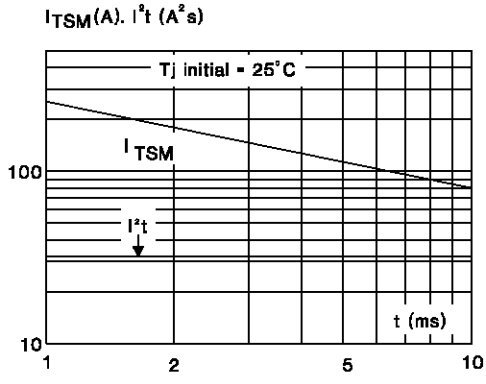


AVS20-03.EPS



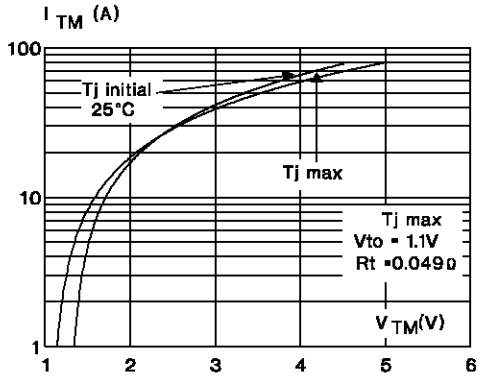
AVS20-05.EPS

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



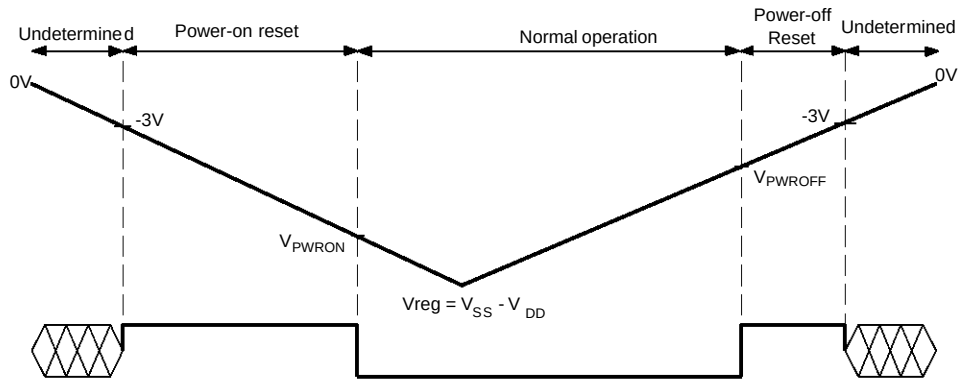
AVS20-06.EPS

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



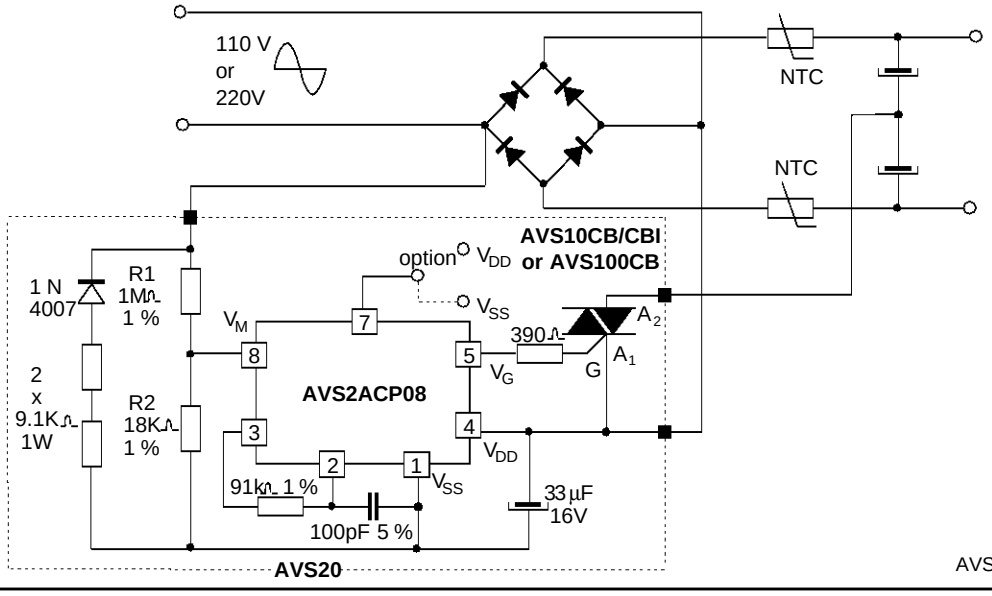
AVS20-07.EPS

POWER-ON AND POWER-OFF RESET BEHAVIOUR



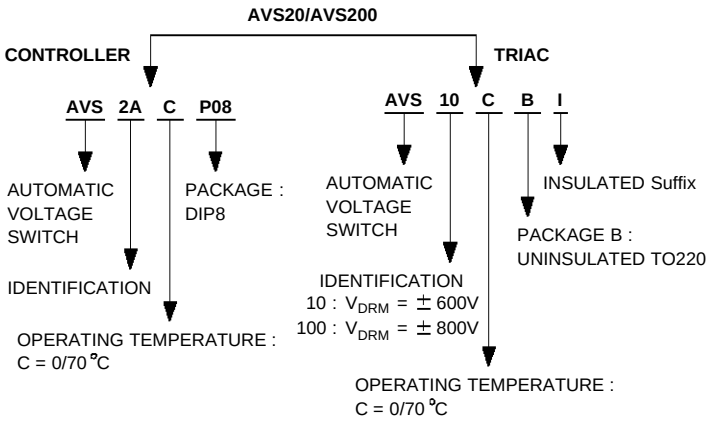
AVS20-08.EPS

TYPICAL APPLICATION DIAGRAM



AVS20-09.EPS

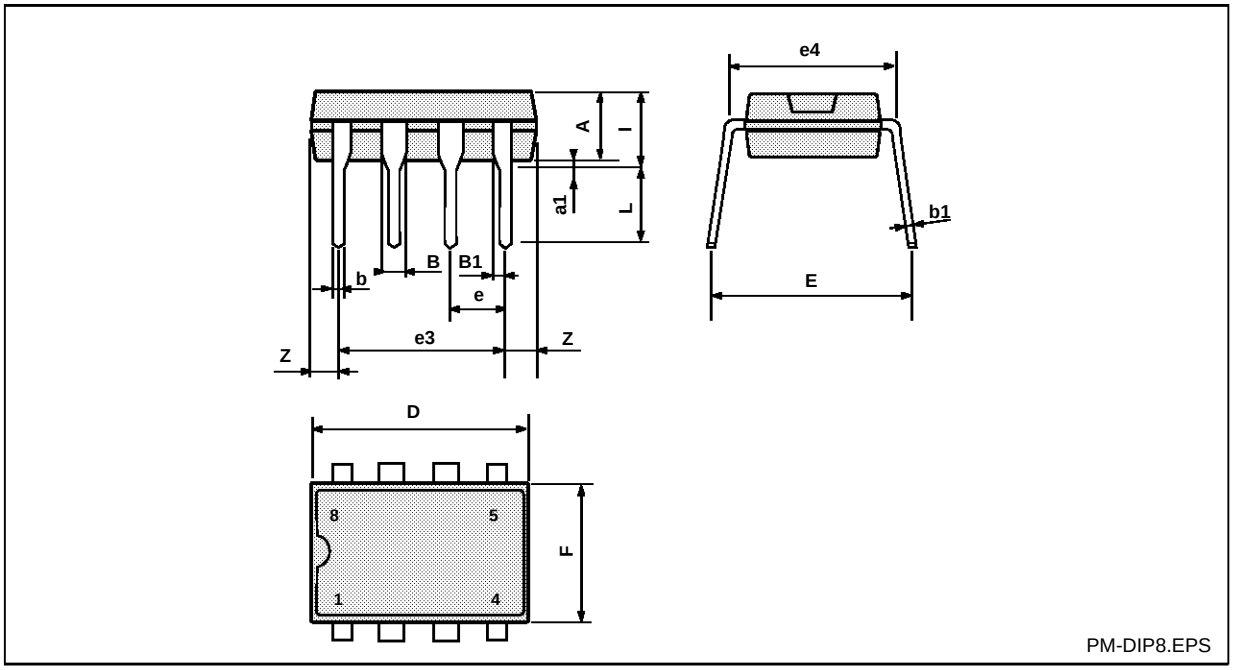
ORDERING INFORMATION



AVS20-10.EPS

PACKAGE MECHANICAL DATA

CONTROLLER
8 PINS - PLASTIC DIP

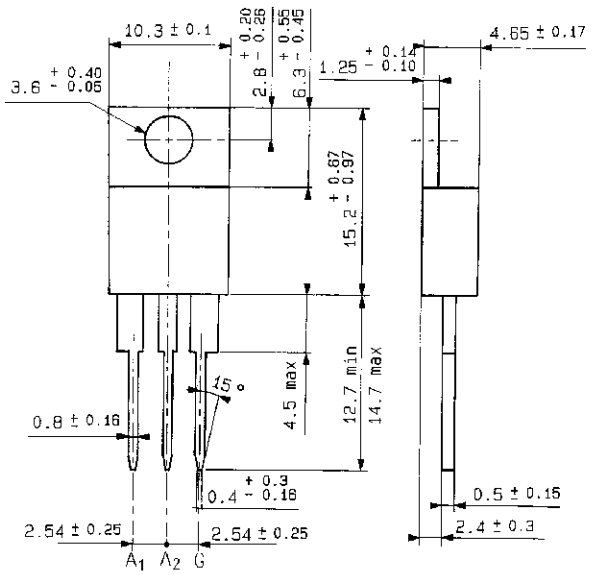


Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0260
i			5.08			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

NOTES:

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