ACST6

Overvoltage protected AC switch

Datasheet - production data

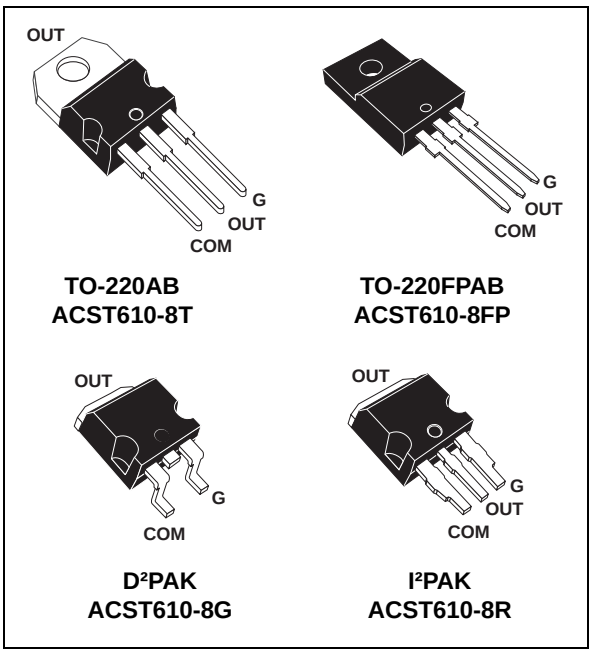
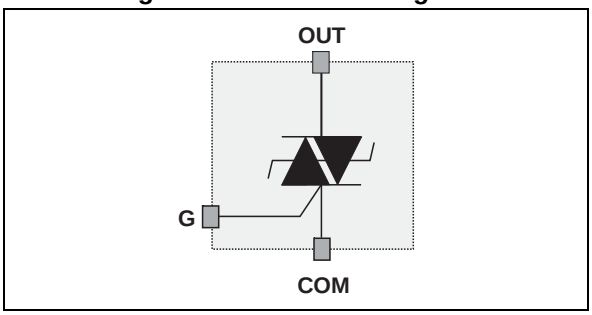


Figure 1. Functional diagram



Features

- Triac with overvoltage protection
- Low I_{GT} (< 10 mA)
- TO-220FPAB insulated package:
  - complies with UL standards (file ref: E81734)
  - insulation voltage: 2000 V_{RMS}

Benefits

- Enables equipment to meet IEC 61000-4-5
- High off-state reliability with planar technology
- Needs no external overvoltage protection
- Reduces the power passive component count
- High immunity against fast transients described in IEC 61000-4-4 standards

Applications

- AC mains static switching in appliance and industrial control systems
- Drive of medium power AC loads such as:
  - Universal motor of washing machine drum
  - Compressor for fridge or air conditioner

Description

The ACST6 series belongs to the ACS/ACST power switch family built with A.S.D. (application specific discrete) technology. This high performance device is suited to home appliances or industrial systems, and drives loads up to 6 A.

This ACST6 switch embeds a Triac structure and a high voltage clamping device able to absorb the inductive turn-off energy and withstand line transients such as those described in the IEC 61000-4-5 standards. The ACST610 needs only low gate current to be activated (I_{GT} < 10 mA) and still shows a high noise immunity complying with IEC standards such as IEC 61000-4-4 (fast transient burst test).

Table 1. Device summary

Symbol	Value	Unit
$I_{T(RMS)}$	6	A
V_{DRM}/V_{RRM}	800	V
I_{GT}	10	mA

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (full sine wave)	TO-220FPAB	T_c = 92 °C	6	A
		TO-220AB/ D^2PAK / I^2PAK	T_c = 106 °C		
		D^2PAK with 1 cm^2 copper	T_{amb} = 62 °C	1.5	
I_{TSM}	Non repetitive surge peak on-state current T_j initial = 25 °C, (full cycle sine wave)	F = 60 Hz	t_p = 16.7 ms	47	A
		F = 50 Hz	t_p = 20 ms	45	A
I^2t	I^2t for fuse selection		t_p = 10 ms	13	A^2s
dI/dt	Critical rate of rise on-state current I_G = 2 x $I_{GT,}$ ($t_r \leq$ 100 ns)	F = 120 Hz	T_j = 125 °C	100	A/µs
V_{PP}	Non repetitive line peak pulse voltage (1)		T_j = 25 °C	2	kV
$P_{G(AV)}$	Average gate power dissipation		T_j = 125 °C	0.1	W
P_{GM}	Peak gate power dissipation (t_p = 20 µs)		T_j = 125 °C	10	W
I_{GM}	Peak gate current (t_p = 20 µs)		T_j = 125 °C	1.6	A
T_{stg}	Storage temperature range			-40 to +150	°C
T_j	Operating junction temperature range			-40 to +125	°C
T_l	Maximum lead solder temperature during 10 ms (at 3 mm from plastic case)			260	°C
$V_{INS(RMS)}$	Insulation RMS voltage (60 seconds)	TO-220FPAB		2000	V

1. According to test described in IEC 61000-4-5 standard and *Figure 18.*

Table 3. Electrical characteristics

Symbol	Test conditions	Quadrant	T_j		Value	Unit
I_{GT}(1)	V_{OUT} = 12 V, R_L = 33 Ω	I - II - III	25 °C	MAX.	10	mA
V_{GT}	V_{OUT} = 12 V, R_L = 33 Ω	I - II - III	25 °C	MAX.	1.0	V
V_{GD}	V_{OUT} = V_{DRM}, R_L = 3.3 kΩ	I - II - III	125 °C	MIN.	0.2	V
I_H(2)	I_{OUT} = 500 mA		25 °C	MAX.	25	mA
I_L	I_G = 1.2 x I_{GT}	I - III	25 °C	MAX.	30	mA
I_L	I_G = 1.2 x I_{GT}	II	25 °C	MAX.	40	mA
dV/dt(2)	V_{OUT} = 67 % V_{DRM}, gate open		125 °C	MIN.	500	V/µs
$(dI/dt)_c$(2)	$(dV/dt)_c$ = 15 V/µs		125 °C	MIN.	3.5	A/ms
V_{CL}	I_{CL} = 0.1 mA, t_p = 1 ms		25 °C	MIN.	850	V

1. Minimum I_{GT} is guaranteed at 5% of I_{GT} max
2. For both polarities of OUT pin referenced to COM pin