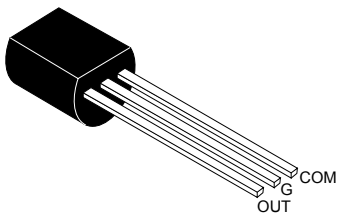
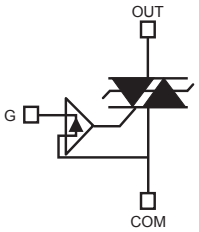
SZGKT
SEMICONDUCTOR

BT131

0.8 A - 600 V overvoltage protected AC switch (ACS)



TO-92



COM	Common drive reference to connect to the mains
OUT	Output to connect to the load.
G	Gate input to connect to the controller through gate resistor

Product status link
BT131

Product summary	
$I_{T(RMS)}$	0.8 A
V_{DRM}, V_{RRM}	600 V
I_{GT}	10 mA

Features

- Enables equipment to meet IEC 61000-4-5 surge with overvoltage crowbar technology
- High noise immunity against static dV/dt and IEC 61000-4-4 burst
- Needs no external protection snubber or varistor
- Reduces component count by up to 80% and Interfaces directly with the micro-controller
- Common package tab connection supports connection of several alternating current switches on the same cooling pad
- V_{CL} gives headroom before clamping then crowbar action

Applications

- Alternating current on/off static switching in appliances and industrial control systems
- Driving low power high inductive or resistive loads like:
  - relay, valve, solenoid, dispenser
  - pump, fan, low power motor, door lock, air flow dumper
  - lamp

Description

The BT131 belongs to the AC switch range. This high performance switch can control a load of up to 0.8 A.

This device switch includes an overvoltage crowbar structure to absorb the inductive turn-off energy, and a gate level shifter driver to separate the digital controller from the main switch. It is triggered with a negative gate current flowing out of the gate pin.

1 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	On-state rms current (full sine wave), S = 5cm²	T_{amb} = 64 °C	0.45	A
		T_{lead} = 76 °C	0.8	
I_{TSM}	Non repetitive surge peak on-state current T_j initial = 25 °C, (full cycle sine wave)	t_p = 20 ms	13	A
		t_p = 16.7 ms	13.7	
I^2t	I^2t for fuse selection	t_p = 10 ms	1.1	A^2s
dI/dt	Critical rate of rise on-state current I_G = 2 x I_{GT}, tr ≤ 100 ns	f = 120 Hz, T_j = 125 °C	100	A/µs
V_{PP}(1)	Non repetitive line peak pulse voltage		2	kV
$P_{G(AV)}$	Average gate power dissipation	T_j = 125 °C	0.1	W
V_{GM}	Peak positive gate voltage	T_j = 125 °C	10	V
I_{GM}	Peak gate current (t_p = 20 µs)	T_j = 125 °C	1	A
T_{stg}	Storage temperature range		-40 to +150	°C
T_j	Operating junction temperature range		-30 to +125	°C

1. *according to test described by standard IEC 61000-4-5, see Figure 15. Overvoltage ruggedness test circuit for resistive and inductive loads, T_{amb} = 25 °C (conditions equivalent to IEC 61000-4-5 standard) for conditions*

Table 2. Electrical characteristics (T_j = 25 °C, unless otherwise specified)

Symbol	Test conditions	Quadrant	Value		Unit
I_{GT} (1)	V_{OUT} = 12 V, R_L = 33 Ω	II - III	Max.	10	mA
V_{GT}			Max.	1.0	V
V_{GD}	V_{OUT} = V_{DRM}, R_L = 3.3 kΩ, T_j = 125 °C	II - III	Min.	0.15	V
I_H	I_{OUT} = 100 mA		Max.	10	mA
I_L	I_G = 1.2 x I_{GT}		Max.	25	mA
dV/dt	V_{OUT} = 402 V, gate open, T_j = 125 °C		Min.	2000	V/µs
(dI/dt)c	Without snubber (15 V/µs), T_j = 125 °C, turn-off time ≤20 ms		Min.	2	A/ms
V_{CL}	I_{CL} = 0.1 mA, t_p = 1 ms		Min.	650	V

1. *Minimum I_{GT} is guaranteed at 10% of I_{GT} max.*

Table 3. Static electrical characteristics

Symbol	Test conditions			Value	Unit
V_{TM} (1)	I_{TM} = 1.1 A, t_p = 500 µs	T_j = 25 °C	Max.	1.3	V
V_{T0}(1)	Threshold voltage	T_j = 125 °C	Max.	0.85	V
R_d(1)	Dynamic resistance	T_j = 125 °C	Max.	300	mΩ
I_{DRM}	V_{OUT} = V_{DRM}/ V_{RRM}	T_j = 25 °C	Max.	2	µA
I_{RRM}		T_j = 125 °C		0.2	mA

1.1 Characteristics (curves)

Figure 1. Maximum power dissipation versus rms on-state current

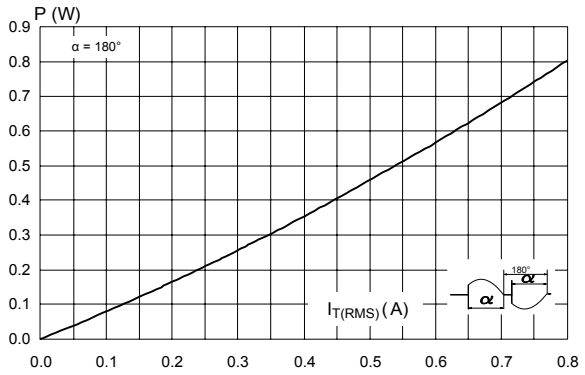


Figure 2. On-state rms current versus ambient temperature

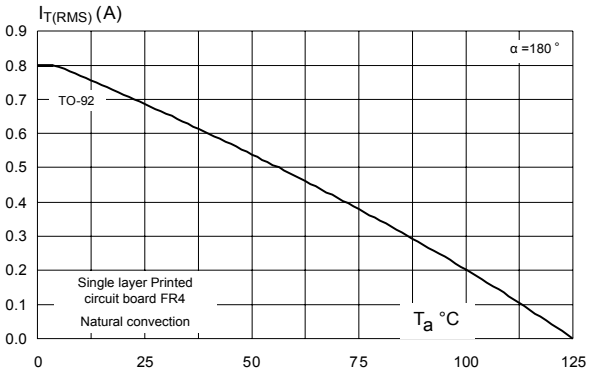


Figure 3. Relative variation of thermal impedance junction to ambient versus pulse duration

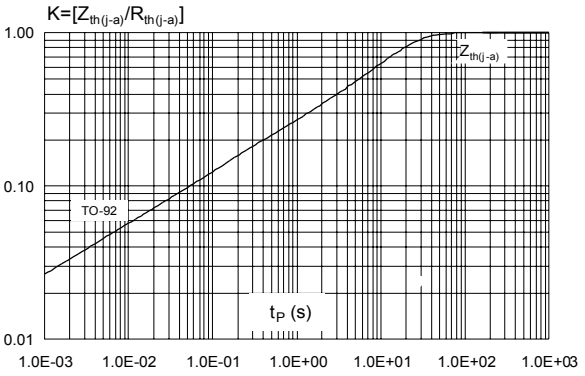


Figure 4. Relative variation of holding and latching current versus junction temperature

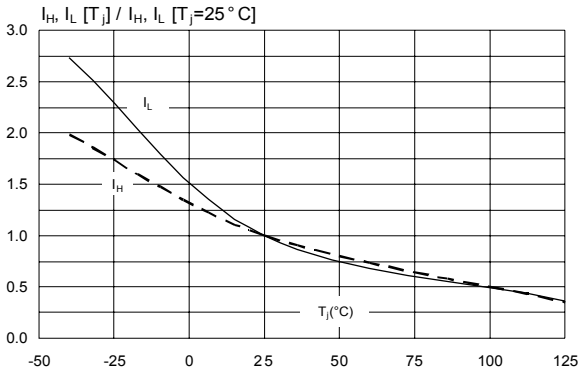


Figure 5. Relative variation of I_{GT} and V_{GT} versus junction temperature

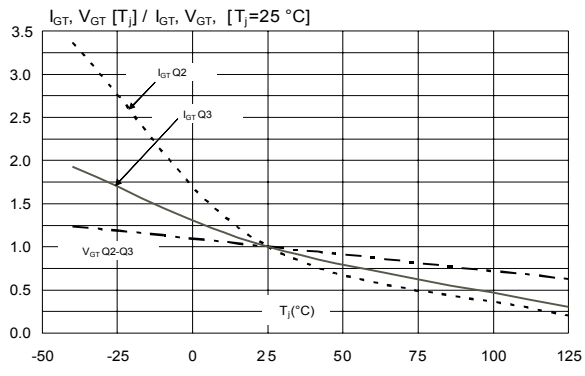
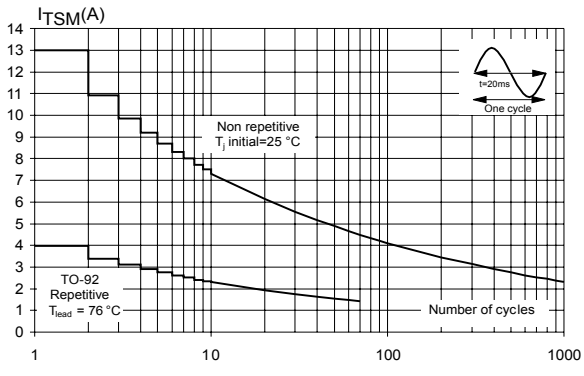


Figure 6. Surge peak on-state current versus number of cycles



2.1 TO-92 package information

- Lead free plating + halogen-free molding resin

Figure 7. **TO-92 package outline**

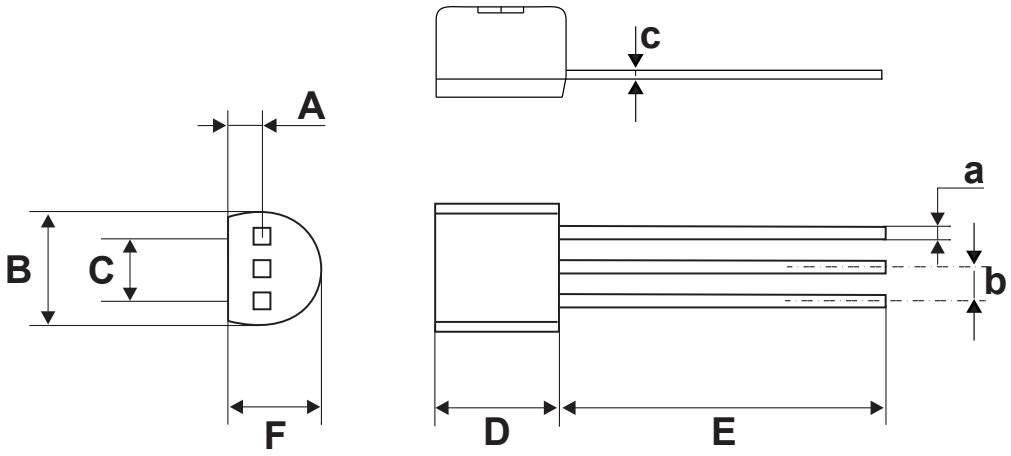


Table 4. **TO-92 package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		1.35			0.0531	
B			4.70			0.1850
C		2.54			0.1000	
D	4.40			0.1732		
E	12.70			0.5000		
F			3.70			0.1457
a			0.50			0.0197
b		1.27			0.500	
c			0.48			0.0189

1. *Inches dimensions given for information*