PBD 3510, PBD 3511

GENERAL DESCRIPTION

The PBD 3510 and PBD 3511 are monolithic digital integrated circuits especially designed to interface DTL/TTL logic into high current, e.g. relays, electromagnetic valves, solenoids etc. They may also be used to drive resistive loads.

Both of them are manufactured in a high voltage process, giving extremely high breakdown values for the transistors which are integral parts of the circuits.

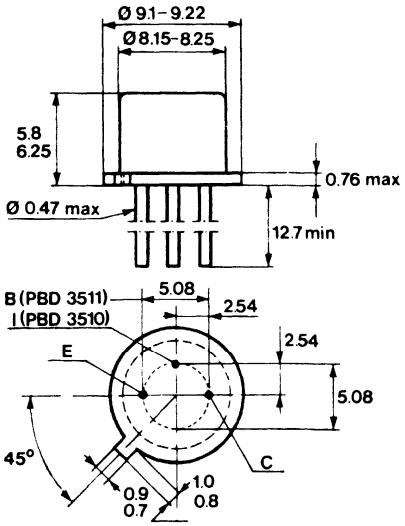
PBD 3511 is a current-controlled Darlington transistor with two levels on the output; driving or non-driving. The greatest advantage of the circuit is its ability to dissipate the load energy at turn-off. An integrated zenerdiode allows the voltage to rise to approximately 110 V over the output transistor when turning off the load current. This is done very quickly (0.2—0.5 ms). The energy is dissipated without any need for a protecting diode or RC network across the load because the breakdown value of the zenerdiode is at least 30 V lower than the corresponding values for all transistors. This prevents the transistors from going into a breakdown condition. However, at inductive loads, with the current exceeding 125 mA, an external protecting diode is recommended.

PBD 3510 operates in the same way as PBD 3511. The difference between them is that PBD 3510 has a PNP transistor at the input which gives level-shift so that the circuit can drive loads where positive ground is used.

Mechanical data
The collector is connected to the case.
All JEDEC TO-39 dimensions are applicable.
All dimensions in mm unless otherwise specified.

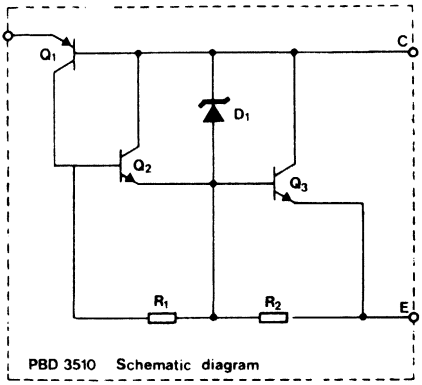
Ordering instructions

Rifa Type No.	Application	Encapsulation
PBD 3510	Load positive grounded	TO-39
PBD 3511	Load negative grounded	TO-39



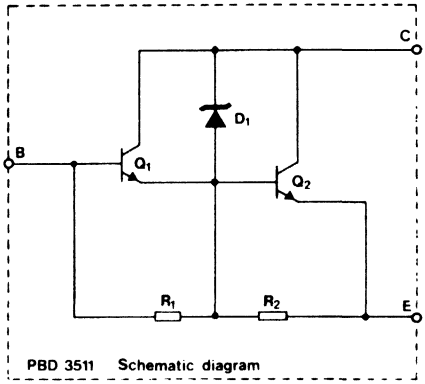
Schematic diagrams

PBD 3510



PBD 3510 Schematic diagram

PBD 3511



PBD 3511 Schematic diagram

Maximum ratings	PBD 3510	PBD 3511
Voltage and currents		
Relay voltage (V_R)	—85 V	+85 V
Load current (I_C)	300 mA	
Current at inductive load without external clamp diode (I_C)	125 mA	
Input current (I_I)	15 mA (typ. 0.9 mA)	
Inductive load without external clamp diode	2 H	
Power		
Dissipation at 25°C case temperature (Note 1) (P_d)	3.8 W	
Dissipation at 25°C case ambient temperature (Note 2) (P_d)	0.7 W	
Temperature		
Storage temperature (T_S)	—55°C to +150°C	
Operating junction temperature (T_J)	+150°C	
Lead temperature (soldering 10 s time limit) (T_L)	+260°C	

Note 1 Derate linearly to 150°C case temperature at the rate of 30.4 mW/°C.
Note 2 Derate linearly to 150°C free air temperature at the rate of 5.6 mW/°C.

PBD 3510, PBD 3511

ELECTRICAL CHARACTERISTICS (25°C ambient temperature unless otherwise noted)

PBD 3510

Symbol	Parameter	Test Condition	Typ	Max	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_I=1.2 mA, I_C=10 mA	0.8	1.3	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_I=1.4 mA, I_C=50 mA	0.9	1.4	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_I=1.6 mA, I_C=250 mA	1.0	1.5	V
I_{CEO}	Leakage Current	V_{CE}=70 V		50	μA
V_{IC}	Input Saturation Voltage	I_C=100 mA, I_I=1 mA	0.8	1.0	V
V_{IC}	Input Saturation Voltage	I_C=100 mA, I_I=5 mA	0.9	1.1	V

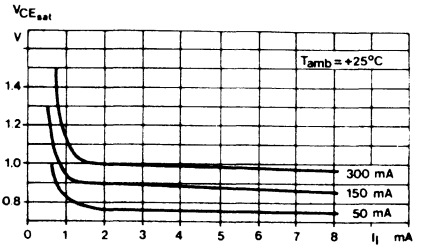
PBD 3511

Symbol	Parameter	Test Condition	Typ	Max	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_B=0.9 mA, I_C=10 mA	0.8	1.3	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_B=1.1 mA, I_C=50 mA	0.9	1.4	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_B=1.3 mA, I_C=250 mA	1.0	1.5	V
I_{CEO}	Leakage Current	V_{CE}=70 V		50	μA
V_{BE}	Input Saturation Voltage	I_C=100 mA, I_B=1 mA	1.35	1.55	V
V_{BE}	Input Saturation Voltage	I_C=100 mA, I_B=100 mA	1.4	1.6	V

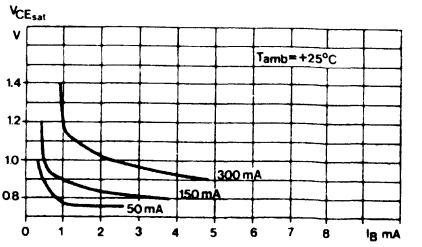
TYPICAL CHARACTERISTICS

Collector-Emitter Saturation Voltage versus Input Current

PBD 3510



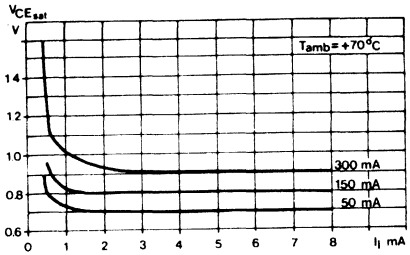
PBD 3511



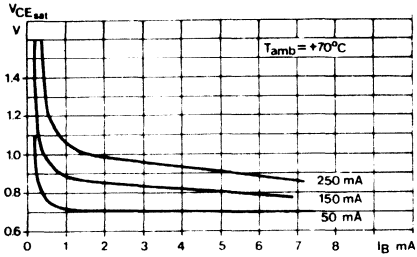
TYPICAL CHARACTERISTICS

Collector—Emitter Saturation Voltage versus Input Current

PBD 3510

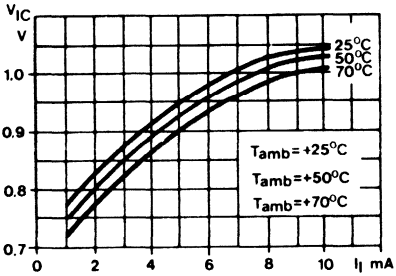


PBD 3511



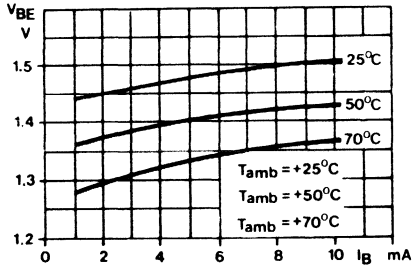
Input-Collector Voltage versus Input Current

PBD 3510 only



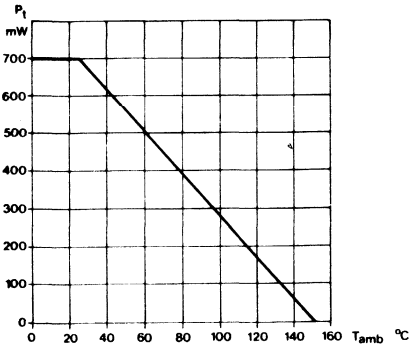
Base-Emitter Voltage versus Base Current

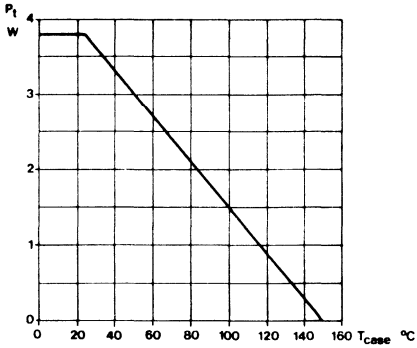
PBD 3511 only



Typical derating curve for the power dissipation versus the ambient temperature

PBD 3510/PBD 3511



Typical derating curve for the power dissipation versus the case temperature

PBD 3510/PBD 3511