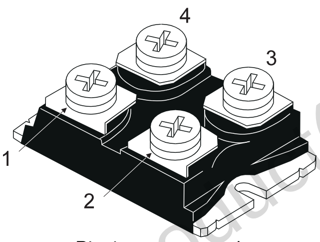
BUV298V

NPN transistor power module

General features

- NPN Transistor
- High current power bipolar module
- Very low R_{th} junction case
- Specific accidental overload areas
- Fully insulated package (U.L. compliant) for easy mounting
- Low internal parasitic inductance
- In compliance with the 2002/93/EC European Directive



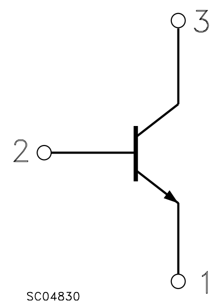
Pin 4 not connected

ISOTOP

Applications

- Motor control
- SMPS & UPS
- Welding equipment

Internal schematic diagram



Order codes

Part Number	Marking	Package	Packing
BUV298V	BUV298V	ISOTOP	Tube

Contents

1 Electrical ratings

Table 1. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CEV}	Collector-emitter voltage (V_{BE} = -5V)	850	V
$V_{CEO(sus)}$	Collector-emitter voltage (I_B = 0)	450	V
V_{EBO}	Emitter-base voltage (I_C = 0)	7	V
I_C	Collector current	50	A
I_{CM}	Collector peak current (t_P < 10ms)	75	A
I_B	Base current	10	A
I_{BM}	Base peak current (t_P < 10ms)	16	A
P_{tot}	Total dissipation at T_c = 25°C	250	W
V_{isol}	Insulation insulation withstand voltage (RMS) from all four leads to external heatsink	2500	V
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case max	0.5	°C/W
$R_{thc\text{-}h}$	Thermal resistance case heatsink with conductive grease applied max	0.05	°C/W

2 Electrical characteristics

(T_{case} = 25°C unless otherwise specified)

Table 3. Electrical characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CER}	Collector cut-off current (R_{BE} =5Ω)	V_{CE} =V_{CEV} V_{CE} =V_{CEV} T_j =100°C			0.4 2	mA mA
I_{CEV}	Collector cut-off current (V_{BE} =-5V)	V_{CE} =V_{CEV} V_{CE} =V_{CEV} T_j =100°C			0.4 2	mA mA
I_{EBO}	Emitter cut-off current (I_C =0)	V_{EB} =5V			2	mA
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C =0.2A L =25mH V_{clamp} =450V	450			V
h_{FE}	DC current gain	I_C =32A V_{CE} =5V		12		
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C =32A I_B =6.4A I_C =32A I_B =6.4A T_j =100°C		0.35 0.6	1.2 2	V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C =32A I_B =6.4A I_C =32A I_B =6.4A T_j =100°C		1 0.9	1.5 1.5	V V
di_c/dt	Rate of rise of On-state collector	V_{CC} =300V R_C =0 t_p=3µs I_{B1} =9.6A T_j =100°C	160	210		A/µs
$V_{CE(3µs)}$	Collector-emitter dynamic voltage	V_{CC} =300V R_C =9.3Ω I_{B1} =9.6A T_j =100°C		4.5	8	V
$V_{CE(5µs)}$	Collector-emitter dynamic voltage	V_{CC} =300V R_C =9.3Ω I_{B1} =9.6A T_j =100°C		2.5	4	V
t_s t_f t_c	Storage time Fall time Cross-over time	I_C =32A V_{CC} =50V V_{BB}=-5V R_{BB} =0.39Ω I_{B1} =6.4A V_{clamp} =450V L =78µH T_j =100°C		3.2 0.25 0.5	4.5 0.4 0.7	µs µs µs
V_{CEW}	Maximum collector-emitter voltage without snubber	I_{CWoff} =48A I_{B1} =6.4A V_{BB}=-5V V_{CC} =50V L =52µH R_{BB} =0.39Ω T_j =125°C	450			V

Note (1) Pulsed duration = 300µs, duty cycle ≤1.5%

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

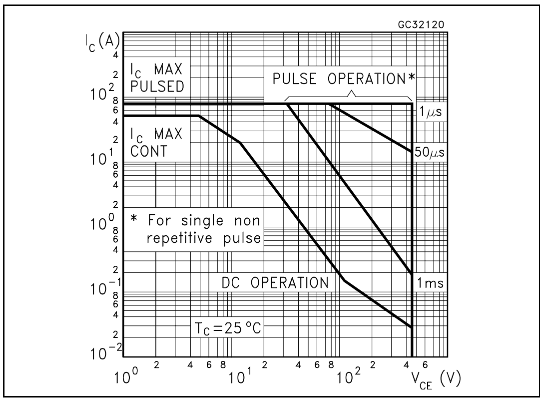


Figure 2. Thermal impedance

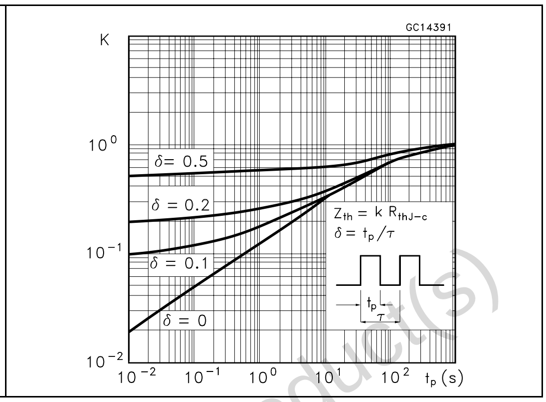


Figure 3. Derating curves

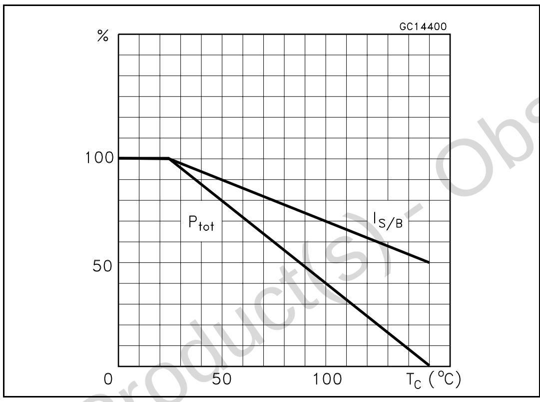


Figure 4. Collector-emitter voltage vs base-emitter resistance

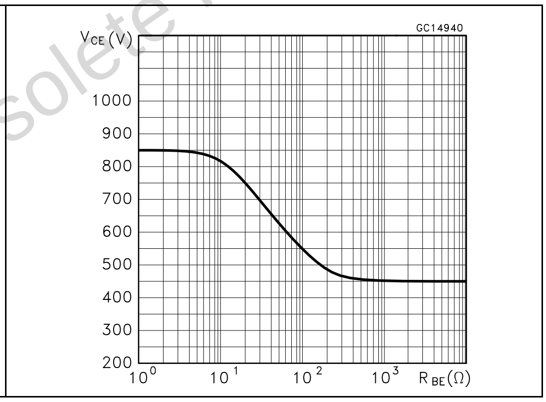


Figure 5. Collector-emitter saturation voltage

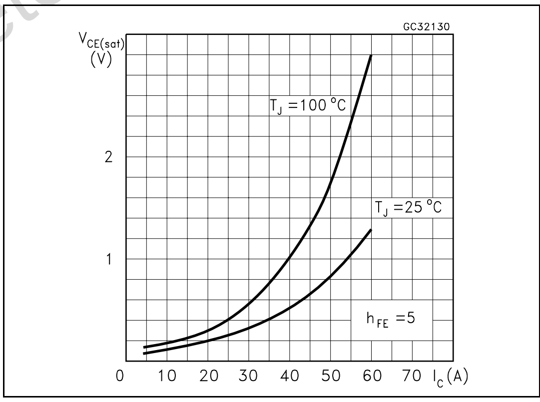


Figure 6. Base-emitter saturation voltage

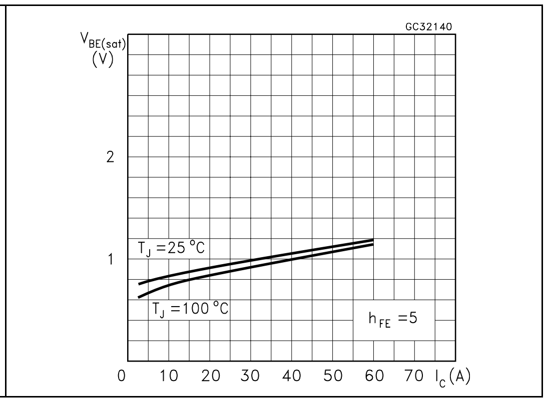


Figure 7. Reverse biased SOA

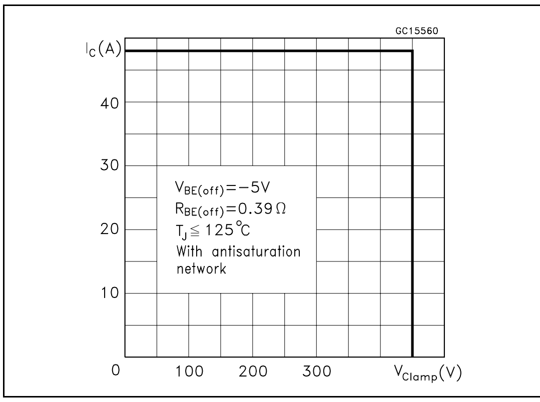


Figure 8. Forward biased SOA

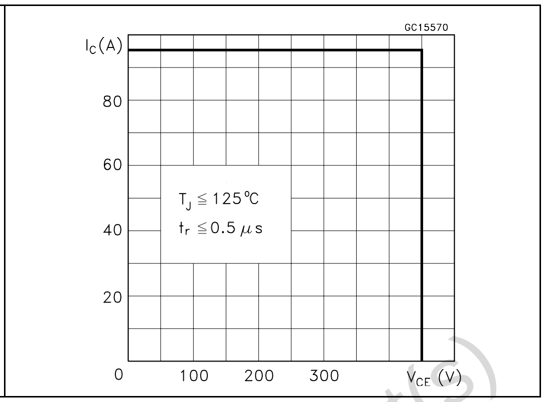


Figure 9. Reverse biased AOA

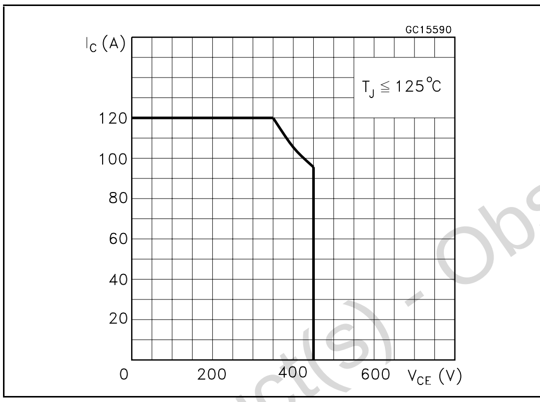


Figure 10. Forward biased AOA

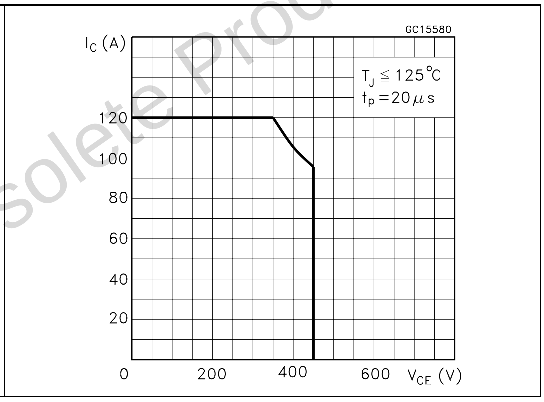


Figure 11. Switching times Inductive load

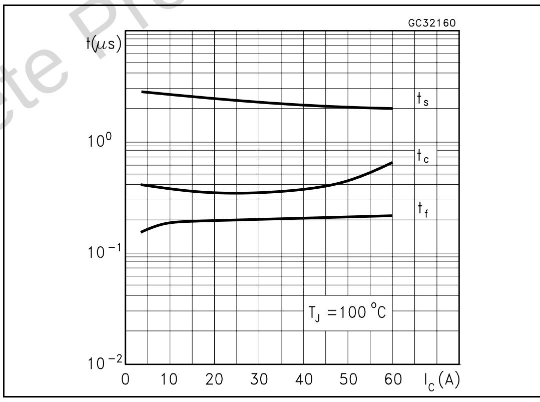


Figure 12. Switching times Inductive load vs temperature

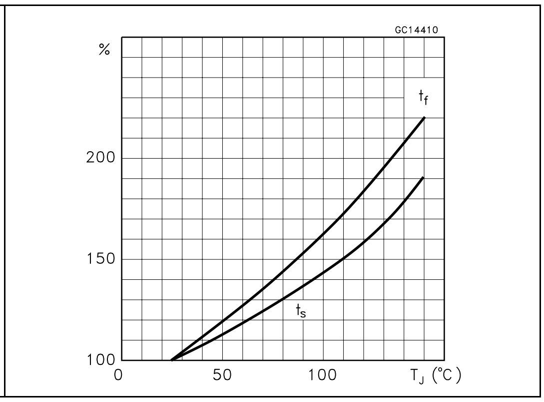
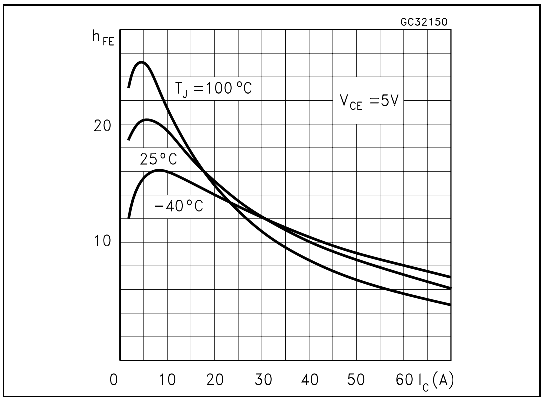


Figure 13. DC current gain



2.2 Test circuits and waveforms

Figure 14. Turn-on switching test circuit

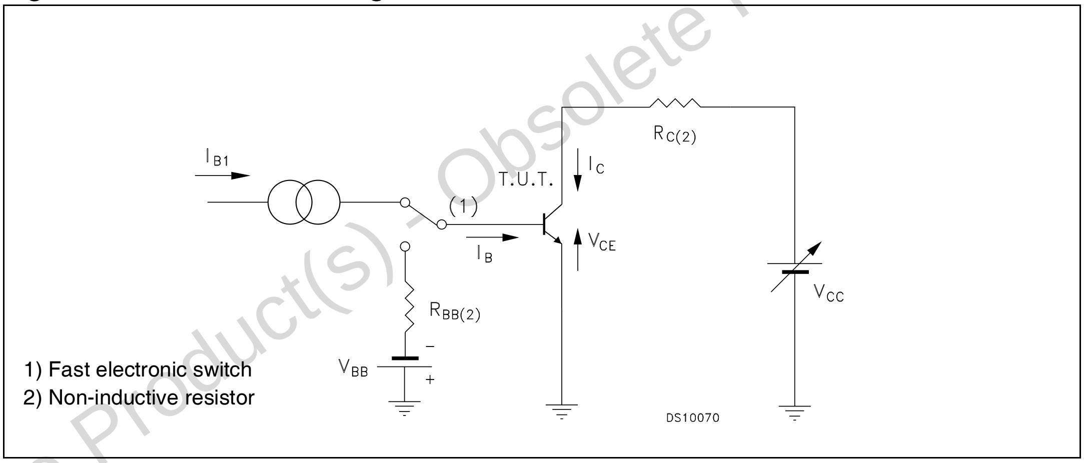


Figure 15. Turn-on switching waveforms

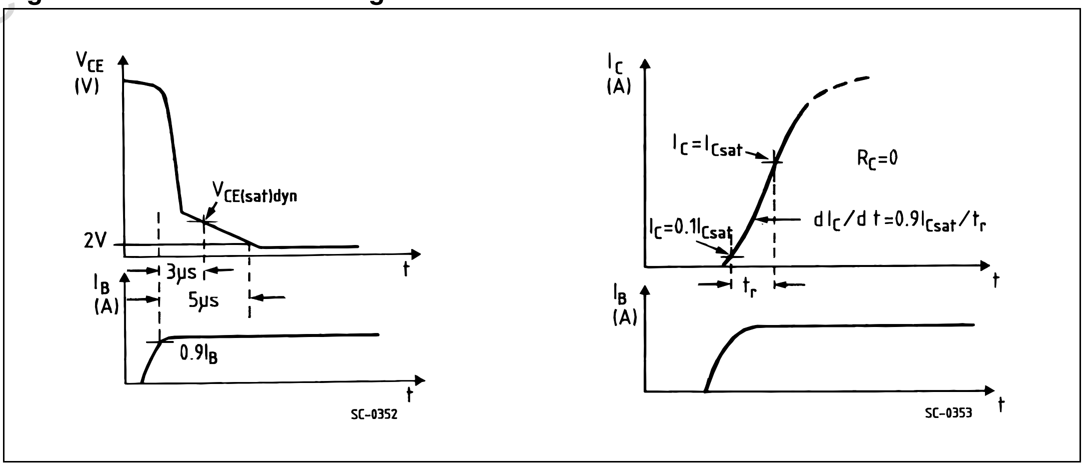
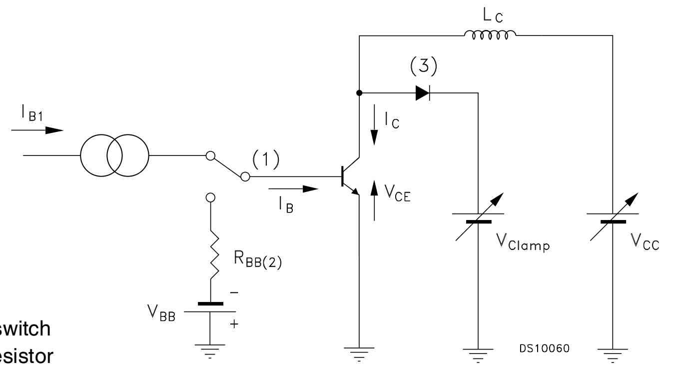
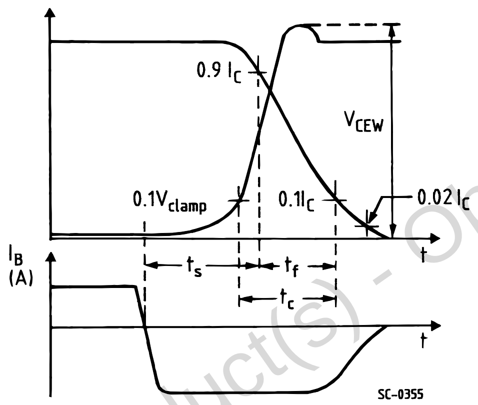


Figure 16. Turn-off switching test circuit



1) Fast electronic switch
2) Non-inductive resistor
3) Fast recovery rectifier

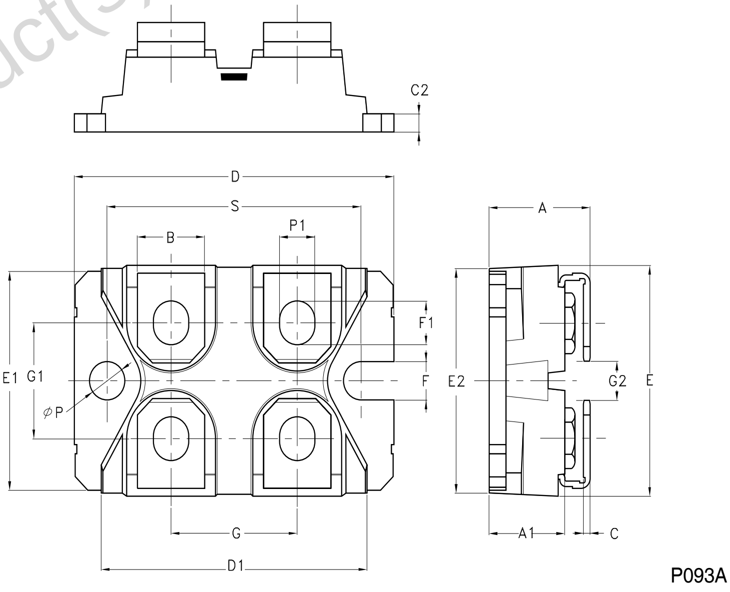
Figure 17. Turn-off switching waveforms



3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

ISOTOP MECHANICAL DATA						
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	11.8		12.2	0.465		0.480
A1	8.9		9.1	0.350		0.358
B	7.8		8.2	0.307		0.322
C	0.75		0.85	0.029		0.033
C2	1.95		2.05	0.076		0.080
D	37.8		38.2	1.488		1.503
D1	31.5		31.7	1.240		1.248
E	25.15		25.5	0.990		1.003
E1	23.85		24.15	0.938		0.950
E2		24.8			0.976	
G	14.9		15.1	0.586		0.594
G1	12.6		12.8	0.496		0.503
G2	3.5		4.3	0.137		1.169
F	4.1		4.3	0.161		0.169
F1	4.6		5	0.181		0.196
P	4		4.3	0.157		0.169
P1	4		4.4	0.157		0.173
S	30.1		30.3	1.185		1.193



4 Revision history

Table 4. Revision history

Date	Revision	Changes
01-Mar-2003	1	Initial release.
14-Jan-2004	2	Technical migration from ST-press to EDOCS
27-Nov-2006	3	The document has been reformatted