

High voltage fast switching NPN power transistor

Features

- High current capability
- Fast switching speed

Applications

- Switching mode power supplies
- Flyback and forward single transistor low power converter

Description

The device is a multiepitaxial mesa NPN transistor mounted in TO-247 plastic package. It is intended for switching and industrial applications from single and three-phase mains.

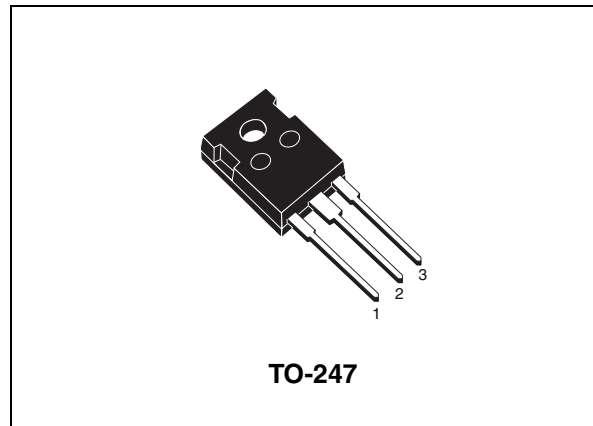


Figure 1. Internal schematic diagram

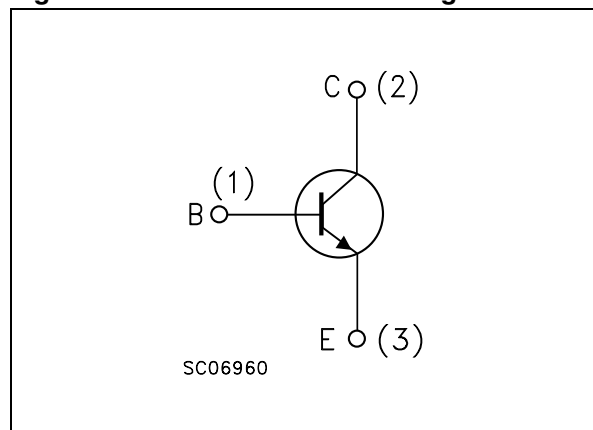


Table 1. Device summary

Order code	Marking	Package	Packaging
BUV48A	BUV48A	TO-247	Tube

1 Absolute maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CER}	Collector-emitter voltage ($R_{BE} = 10 \Omega$)	1000	V
V_{CES}	Collector-emitter voltage ($V_{BE} = 0$)	1000	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	450	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	7	V
I_C	Collector current	15	A
I_{CM}	Collector peak current	30	A
I_{CP}	Collector peak current non repetitive ($t_p < 20 \mu s$)	55	A
I_B	Base current	4	A
I_{BM}	Base peak current	20	A
P_{TOT}	Total dissipation at $T_{case} = 25 \text{ }^\circ\text{C}$	125	W
T_{STG}	Storage temperature	-65 to 150	$^\circ\text{C}$
T_J	Max. operating junction temperature	150	$^\circ\text{C}$

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case max	1	$^\circ\text{C}/\text{W}$

2 Electrical characteristics

$T_{case} = 25\text{ °C}$; unless otherwise specified.

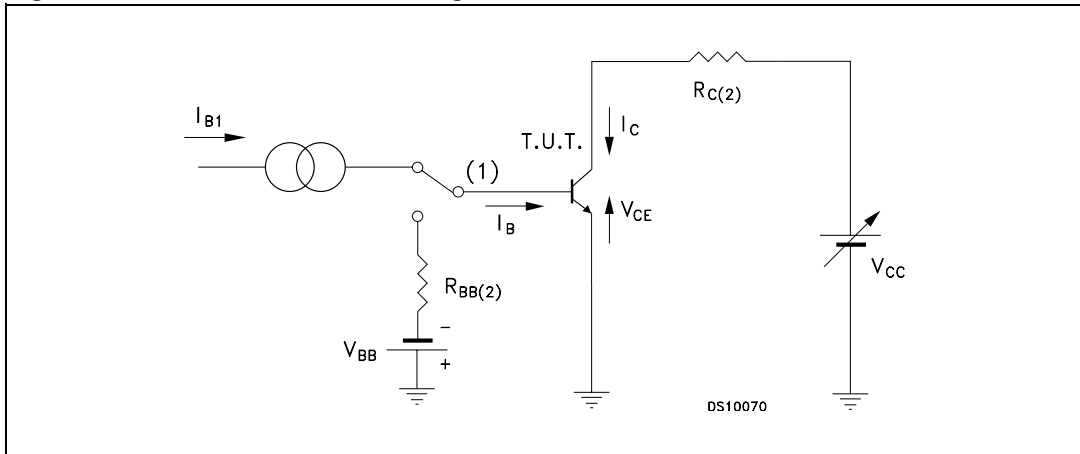
Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current ($V_{BE} = 0$)	$V_{CE} = 1000\text{ V}$ $V_{CE} = 1000\text{ V}$ $T_c = 125\text{ °C}$			200 2	μA mA
I_{CER}	Collector cut-off current ($R_{BE} = 10\Omega$)	$V_{CE} = 1000\text{ V}$ $V_{CE} = 1000\text{ V}$ $T_c = 125\text{ °C}$			500 4	μA mA
I_{EBO}	Emitter cut-off current ($I_C = 0$)	$V_{EB} = 5\text{ V}$			1	mA
$V_{CEO(sus)}^{(1)}$	Collector-emitter sustaining voltage ($I_B = 0$)	$I_C = 200\text{ mA}$	450			V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	$I_E = 50\text{ mA}$	7		30	V
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = 8\text{ A}$ $I_B = 1.6\text{ A}$ $I_C = 12\text{ A}$ $I_B = 2.4\text{ A}$			1.5 5	V V
$V_{BE(sat)}^{(1)}$	Base-emitter saturation voltage	$I_C = 8\text{ A}$ $I_B = 1.6\text{ A}$			1.6	V
$h_{FE}^{(1)}$	DC current gain	$I_C = 8\text{ A}$ $V_{CE} = 5\text{ V}$	8			
t_{on} t_s t_f	Resistive load Turn-on time Storage time Fall time	$V_{CC} = 150\text{ V}$ $I_C = 8\text{ A}$ $I_{B1} = -I_{B2} = 1.6\text{ A}$			1 3 0.8	μs μs μs
t_s t_f	Inductive load Storage time Fall time	$V_{CC} = 300\text{ V}$ $I_C = 8\text{ A}$ $V_{BE} = -5\text{ V}$ $I_{B1} = 1.6\text{ A}$ $L_B = 3\text{ }\mu\text{H}$		3 0.13		μs μs
t_s t_f	Inductive load Storage time Fall time	$V_{CC} = 300\text{ V}$ $I_C = 8\text{ A}$ $V_{BE} = -5\text{ V}$ $I_{B1} = 1.6\text{ A}$ $L_B = 3\text{ }\mu\text{H}$ $T_C = 125\text{ °C}$			5 0.4	μs μs

1. Pulse test: pulse duration $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

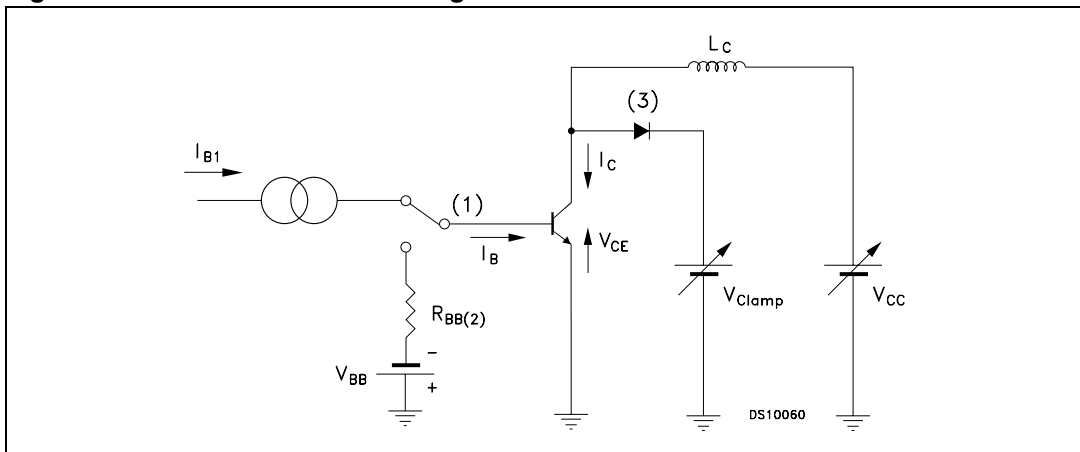
2.1 Test circuit

Figure 2. Resistive load switching test circuit



- 1. Fast electronic switch
- 2. Non-inductive resistor

Figure 3. Inductive load switching test circuit



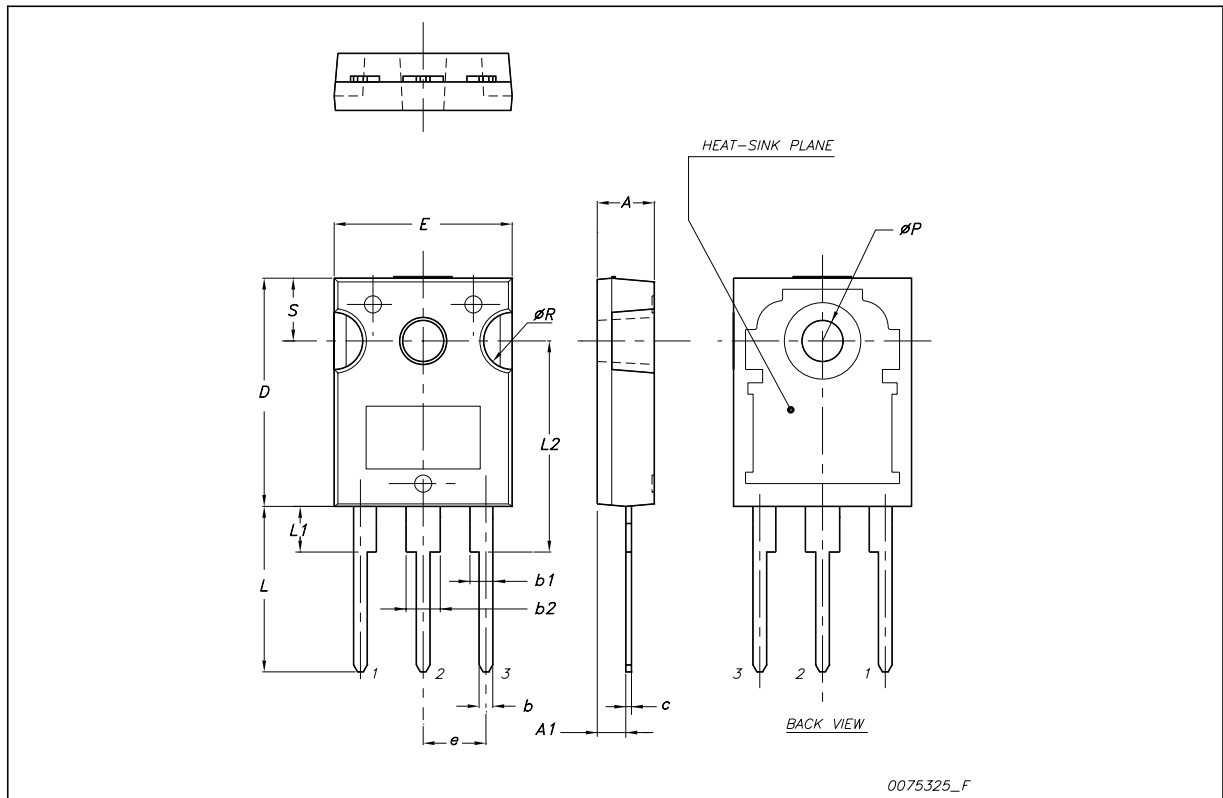
- 1. Fast electronic switch
- 2. Non-inductive resistor
- 3. Fast recovery rectifier

3 Package mechanical data

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TO-247 mechanical data

Dim.	mm.		
	Min.	Typ.	Max.
A	4.85		5.15
A1	2.20		2.60
b	1.0		1.40
b1	2.0		2.40
b2	3.0		3.40
c	0.40		0.80
D	19.85		20.15
E	15.45		15.75
e		5.45	
L	14.20		14.80
L1	3.70		4.30
L2		18.50	
øP	3.55		3.65
øR	4.50		5.50
S		5.50	



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
29-Oct-2007	8	Package change from TO-218 to TO-247.
16-Nov-2009	9	Added h_{FE} specification Table 4 on page 3 .

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