STC08DE150HP

Hybrid emitter switched bipolar transistor
ESBT® 1500V - 8A - 0.075 Ω

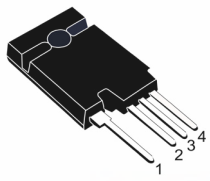
Preliminary Data

General features

Table 1. General features

$V_{CS(ON)}$	I_C	$R_{CS(ON)}$
0.6V	8A	0.075Ω

- Low equivalent on resistance
- Very fast-switch, up to 150 kHz
- Squared RBSOA, up to 1500 V
- Very low C_{ISS} driven by R_G = 47 Ω
- In compliance with the 2002/93/EC European Directive



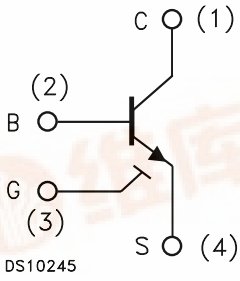
TO247-4L HP

Description

The STC08DE150HP is manufactured in a hybrid structure, using dedicated high voltage Bipolar and low voltage MOSFET technologies, aimed at providing the best performance in ESBT topology.

The STC08DE150HP is designed for use in aux flyback smps for any three phase application.

Internal schematic diagrams



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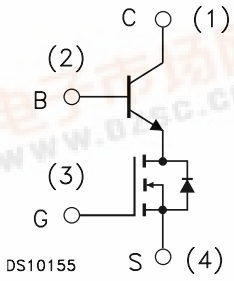


DS10155

Applications

- Single switch SMPS based on three phase mains

Order codes

Part Number	Marking	Package	Packing
STC08DE150HP	C08DE150HP	TO247-4L HP	Tube

Contents

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
$V_{CS(SS)}$	Collector-source voltage (V_{BS} =V_{GS} =0V)	1500	V
$V_{BS(OS)}$	Base-source voltage (I_C =0, V_{GS} =0V)	30	V
$V_{SB(OS)}$	Source-base voltage (I_C =0, V_{GS} =0V)	9	V
V_{GS}	Gate-source voltage	± 20	V
I_C	Collector current	8	A
I_{CM}	Collector peak current (t_P < 5ms)	15	A
I_B	Base current	4	A
I_{BM}	Base peak current (t_P < 1ms)	8	A
P_{tot}	Total dissipation at $T_c \leq 25°C$	42	W
T_{stg}	Storage temperature	-40 to 150	°C
T_J	Max. operating junction temperature	125	°C

Table 3. Thermal data

Symbol	Parameter		Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case	max	2.4	°C/W

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CS(SS)}$	Collector-source current (V_{BS} =V_{GS} =0V)	$V_{CS(SS)}$ =1500V			100	µA
$I_{BS(OS)}$	Base-source current (I_C =0, V_{GS} =0V)	$V_{BS(OS)}$ =30V			10	µA
$I_{SB(OS)}$	Source-base current (I_C =0, V_{GS} =0V)	$V_{SB(OS)}$ =9V			100	µA
$I_{GS(OS)}$	Gate-source leakage (V_{BS} =0V)	V_{GS} = ± 20V			500	nA
$V_{CS(ON)}$	Collector-source ON voltage	V_{GS} =10V I_C =8A I_B =1.6A V_{GS} =10V I_C =5A I_B =0.5A		0.6 0.6	1.4	V V
h_{FE}	DC current gain	I_C =8A V_{CS} =1V V_{GS} =10V I_C =5A V_{CS} =1V V_{GS} =10V	4.5 8	7.5 10		
$V_{BS(ON)}$	Base-source ON voltage	V_{GS} =10V I_C =8A I_B =1.6A V_{GS} =10V I_C =5A I_B =0.5A		1.5 1	2	V V
$V_{GS(th)}$	Gate threshold voltage	V_{BS} =V_{GS} I_B =250µA	1.5	2.2	3	V
C_{iss}	Input capacitance	V_{CS} =25V f =1MHz V_{GS}=V_{CB}=0V		750		pF
$Q_{GS(tot)}$	Gate-source Charge	V_{GS} =10V I_C =8A V_{CS} =25V V_{CB}=0V		12.5		nC
 t_s t_f	INDUCTIVE LOAD Storage time Fall time	V_{GS} =10V R_G =47Ω V_{Clamp} =1200V t_p =4µs I_C =5A I_B =0.5A		 526 8.5		 ns ns
 t_s t_f	INDUCTIVE LOAD Storage time Fall time	V_{GS} =10V R_G =47Ω V_{Clamp} =1200V t_p =4µs I_C =5A I_B =1A		 884 16		 ns ns
V_{CSW}	Maximum collector-source voltage switched without snubber	R_G =47Ω h_{FE} =5 I_C = 8A	1500			V

Table 4. Electrical characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CS(dyn)}$	Collector-source dynamic voltage (500ns)	V_{CC} =V_{Clamp} =300V V_{GS} =10V I_C = 4A I_B = 0.8A t_{peak} =500ns R_G =47Ω I_{Bpeak} = 8A (2I_C)		6		V
$V_{CS(dyn)}$	Collector-source dynamic voltage (1µs)	V_{CC} =V_{Clamp} =300V V_{GS} =10V I_C = 4A I_B = 0.8A t_{peak} =500ns R_G =47Ω I_{Bpeak} = 8A (2I_C)		2.2		V

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

2.1 Electrical characteristics (curves)

Figure 1. Output characteristics

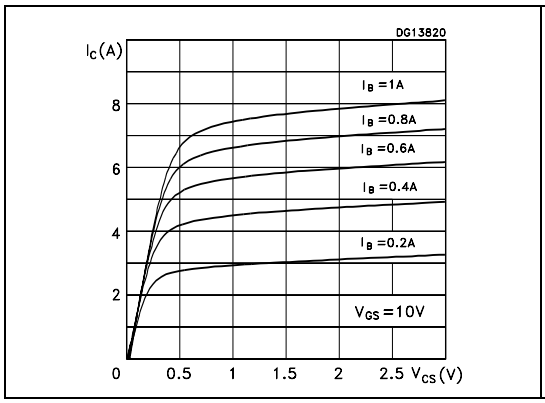


Figure 2. Dynamic collector-emitter saturation voltage

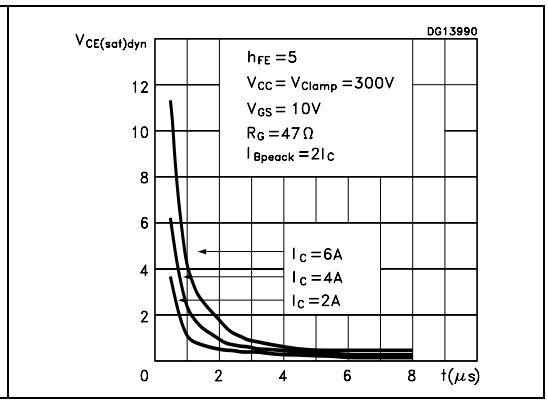


Figure 3. DC current gain

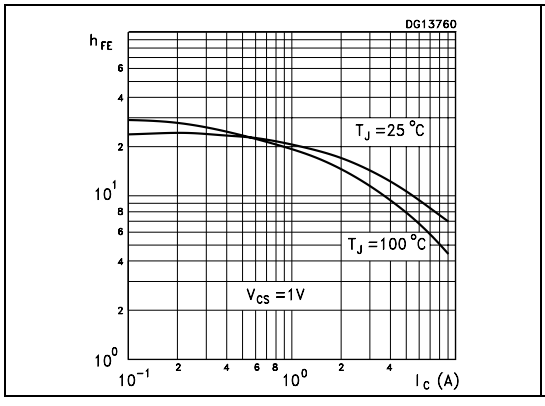


Figure 4. Gate threshold voltage vs temperature

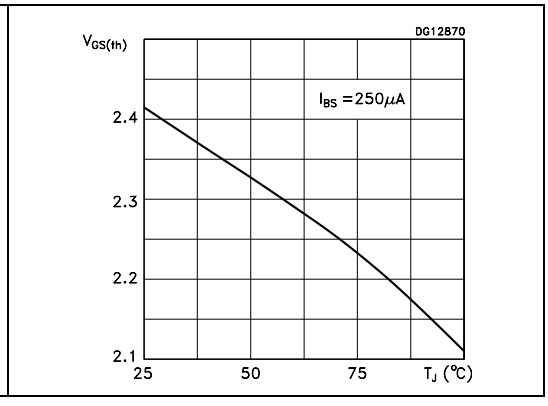


Figure 5. Collector-source On voltage

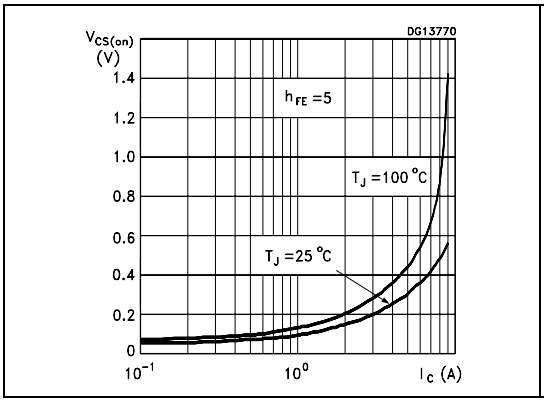


Figure 6. Collector-source On voltage

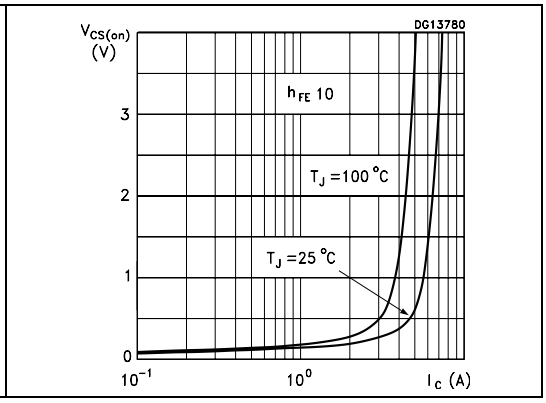


Figure 7. Base-source On voltage

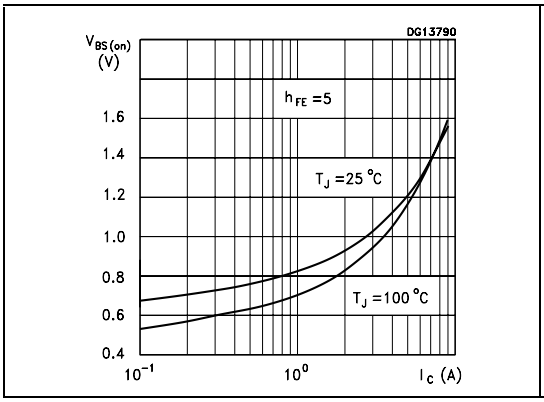


Figure 8. Base-source On voltage

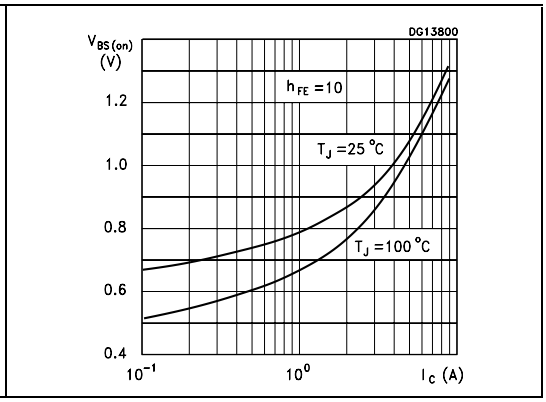


Figure 9. Inductive load switching time

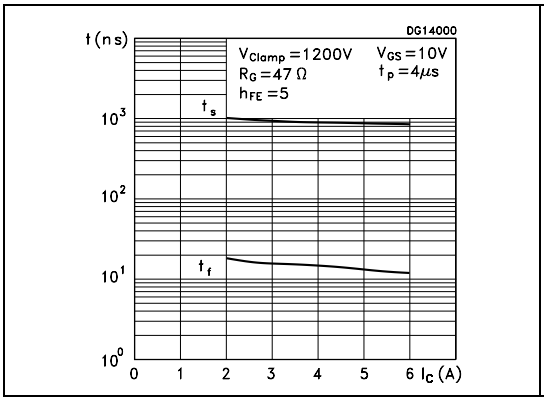


Figure 10. Inductive load switching time

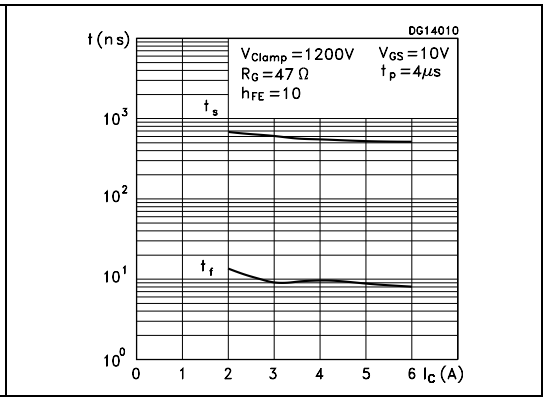
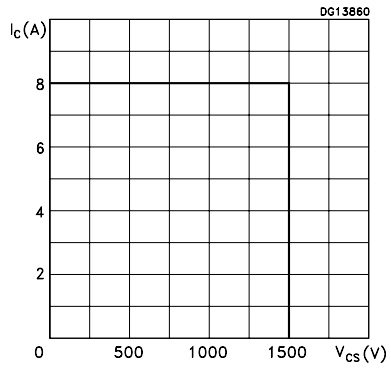


Figure 11. Reverse biased safe operating area



2.2 Test circuits

Figure 12. Enlargement FBSOA circuit

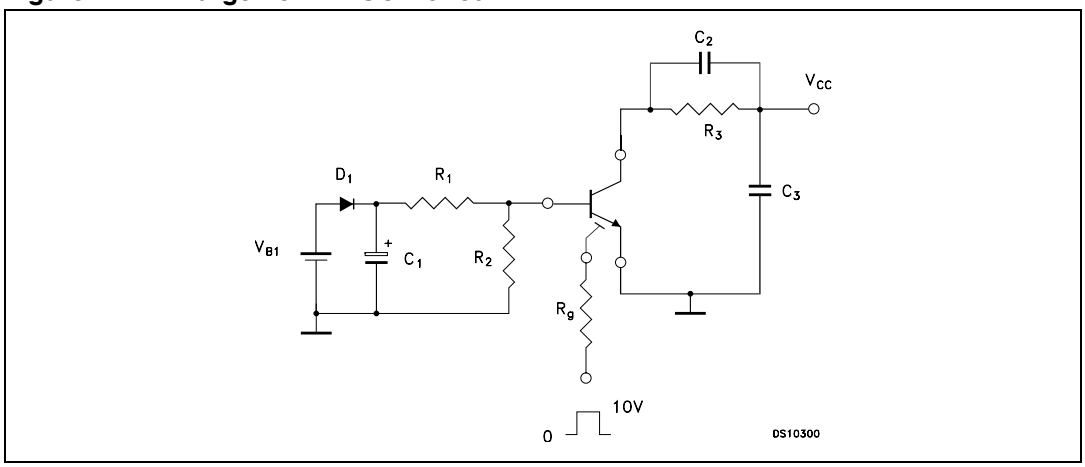


Table 5. Components, values

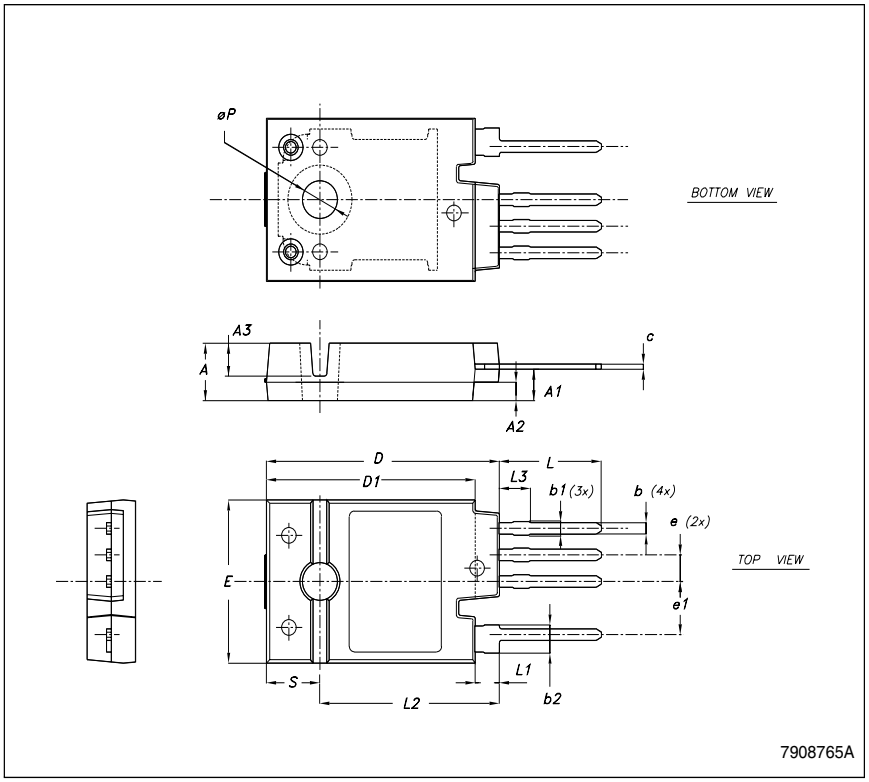
V_{B1} =4.16V	C_1 =4700µF
D_1 =BA157	C_2 ≤1000pF
R_1 =1Ω	V_{CC} =1500V
R_2 =100Ω	V_g =10V
R_3 =180Ω	Pulse time = 5µs
R_g =47Ω	

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

TO247-4LHP MECHANICAL DATA

DIM.	mm.		
	MIN.	TYP	MAX.
A	5.50	5.65	5.80
A1	2.85	3.15	3.25
A2		1.92	
A3		3.18	
b	0.95	1.10	1.30
b1	1.10		1.50
b2	2.50		2.90
c	0.40		0.80
D	23.85	24	24.15
D1		21.50	
E	15.45	15.60	15.75
e	2.54		
e1		5.08	
L	10.20		10.80
L1	2.20	2.50	2.80
L2		18.50	
L3		3	
øP	3.55		3.65
S		5.50	



4 Revision history

Table 6. Revision history

Date	Revision	Changes
26-Oct-2006	1	First release.

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