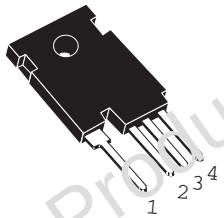
STC08DE150HV

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

Features

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

- 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



TO247-4L HV

Application

- Single switch SMPS based on three-phase mains

Description

The STC08DE150HV is manufactured in a hybrid structure, using dedicated high voltage bipolar and low voltage MOSFET technologies, aimed at providing the best performance in an ESBT topology.

The STC08DE150HV is designed for use in auxiliary flyback SMPS for any three-phase application.

Figure 1. Internal schematic diagrams

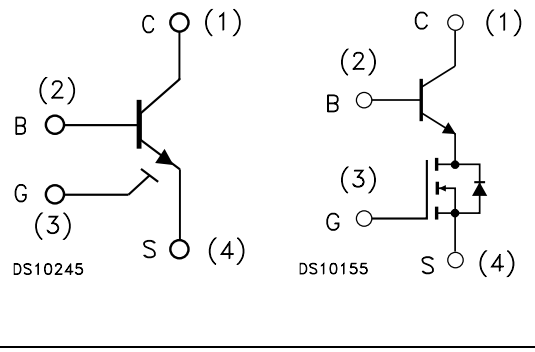


Table 1. Device summary

Order code	Marking	Package	Packing
STC08DE150HV	C08DE150HV	TO247-4L HV	Tube

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
$V_{CS(SS)}$	Collector-source voltage (V_{BS} = V_{GS} = 0)	1500	V
$V_{BS(OS)}$	Base-source voltage (I_C = 0, V_{GS} = 0)	30	V
$V_{SB(OS)}$	Source-base voltage (I_C = 0, V_{GS} = 0)	9	V
V_{GS}	Gate-source voltage	± 20	V
I_C	Collector current	8	A
I_{CM}	Collector peak current (t_P < 5 ms)	15	A
I_B	Base current	8	A
I_{BM}	Base peak current (t_P < 1 ms)	15	A
P_{tot}	Total dissipation at $T_c \leq 25$ °C	156	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_{thJC}	Thermal resistance junction-case	0.64	°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 cut-off current (V_{BS} = V_{GS} = 0)	V_{CS} = 1500 V			100	µA
$I_{BS(OS)}$	Base cut-off current (I_C = 0, V_{GS} = 0)	V_{BS} = 30 V			10	µA
$I_{SB(OS)}$	Source cut-off current (I_C = 0, V_{GS} = 0)	V_{SB} = 9 V			100	µA
$I_{GS(OS)}$	Gate-source leakage current (V_{BS} = 0)	V_{GS} = ± 20 V			500	nA
$V_{CS(ON)}$	Collector-source ON voltage	V_{GS} = 10 V I_C = 8 A I_B = 1.6 A V_{GS} = 10 V I_C = 5 A I_B = 0.5 A		0.6 0.6	1.4	V V
h_{FE} (1)	DC current gain	I_C = 8 A V_{CS} = 1 V V_{GS} = 10 V I_C = 5 A V_{CS} = 1 V V_{GS} = 10 V	4.5 8	7.5 10		
$V_{BS(ON)}$	Base-source ON voltage	V_{GS} = 10 V I_C = 8 A I_B = 1.6 A V_{GS} = 10 V I_C = 5 A I_B = 0.5 A		1.5 1	2	V V
$V_{GS(th)}$	Gate threshold voltage	V_{BS} = V_{GS} I_B = 250 µA	1.5	2.2	3	V
C_{iss}	Input capacitance (V_{GS} = V_{CB} = 0)	V_{CS} = 25 V f = 1 MHz		750		pF
$Q_{GS(tot)}$	Gate-source charge V_{CB} = 0	V_{GS} = 10 V I_C = 8 A V_{CS} = 25 V		12.5		nC
 t_s t_f	Inductive load Storage time Fall time	V_{GS} = 10 V R_G = 47 Ω V_{Clamp} = 1200 V t_p = 4 µs I_C = 5 A I_B = 0.5 A		 526 8.5		 ns ns
 t_s t_f	Inductive load Storage time Fall time	V_{GS} = 10 V R_G = 47 Ω V_{Clamp} = 1200 V t_p = 4 µs I_C = 5 A I_B = 1 A		 884 16		 ns ns
V_{CSW}	Maximum collector-source voltage at turn-off without snubber	R_G = 47 Ω h_{FE} = 5 I_C = 8 A	1500			V
$V_{CS(dyn)}$	Collector-source dynamic voltage (0.5 µs)	V_{CC} = V_{Clamp} = 300 V V_{GS} = 10 V I_C = 4 A I_B = 0.8 A t_{peak} = 500 ns R_G = 47 Ω I_{Bpeak} = 8 A (2I_C)		6		V
$V_{CS(dyn)}$	Collector-source dynamic voltage (1 µs)	V_{CC} = V_{Clamp} = 300 V V_{GS} = 10 V I_C = 4 A I_B = 0.8 A t_{peak} = 500ns R_G = 47 Ω I_{Bpeak} = 8 A (2I_C)		2.2		V

1. Pulsed duration = 300 µs, duty cycle ≤ 1.5%

2.1 Electrical characteristics (curves)

Figure 2. Output characteristics

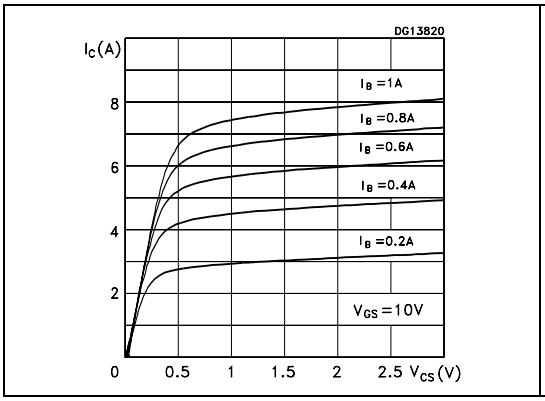


Figure 3. Collector-source dynamic voltage

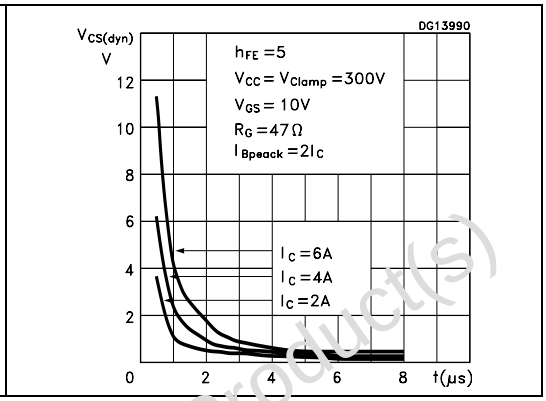


Figure 4. DC current gain

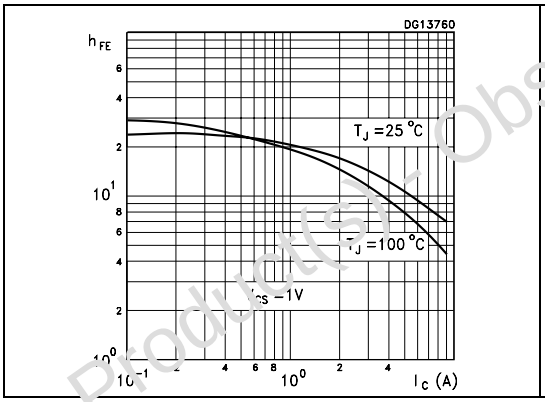


Figure 5. Gate threshold voltage vs. temperature

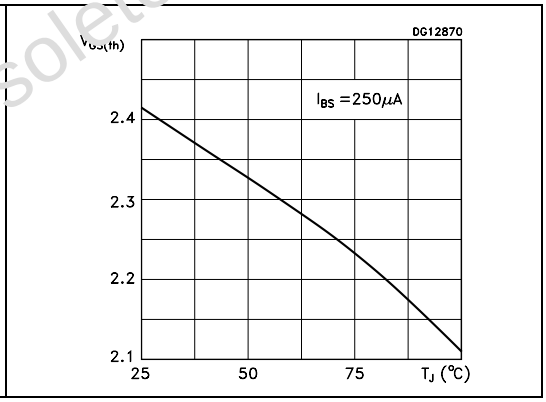


Figure 6. Collector-source ON voltage (h_{FE} = 5)

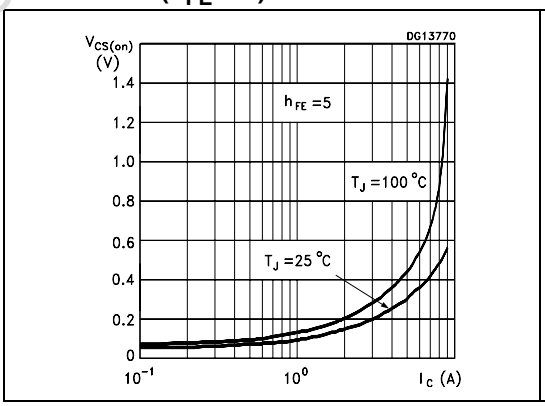


Figure 7. Collector-source ON voltage (h_{FE} = 10)

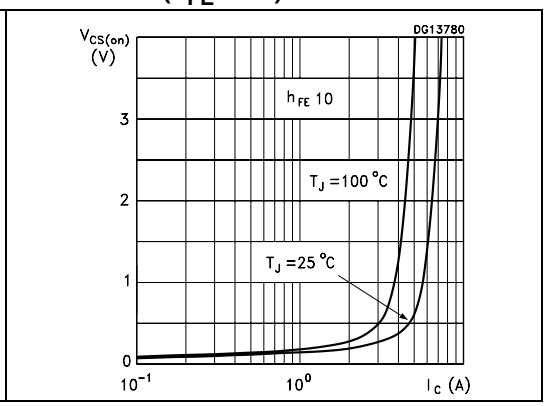


Figure 8. Base-source ON voltage (h_{FE} = 5)

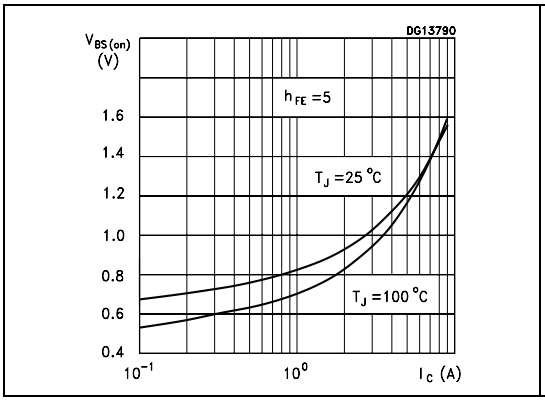


Figure 9. Base-source ON voltage (h_{FE} = 10)

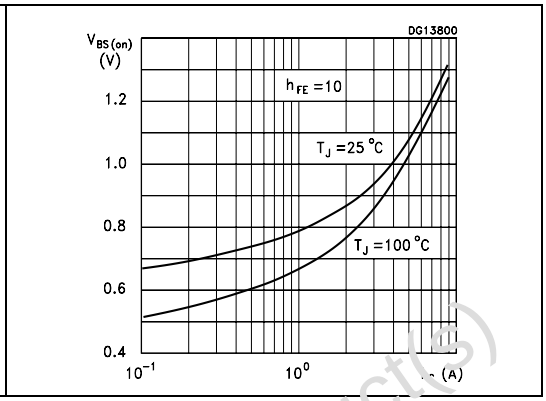


Figure 10. Inductive load switching time (h_{FE} = 5)

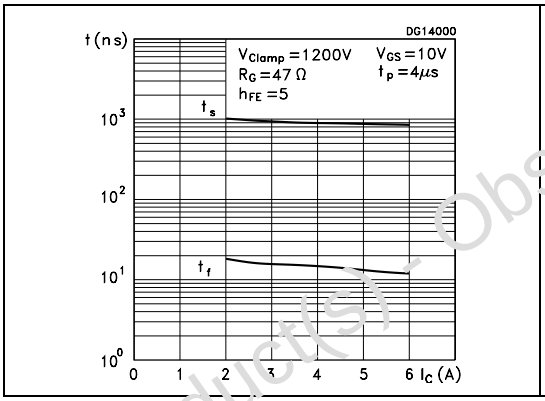


Figure 11. Inductive load switching time (h_{FE} = 10)

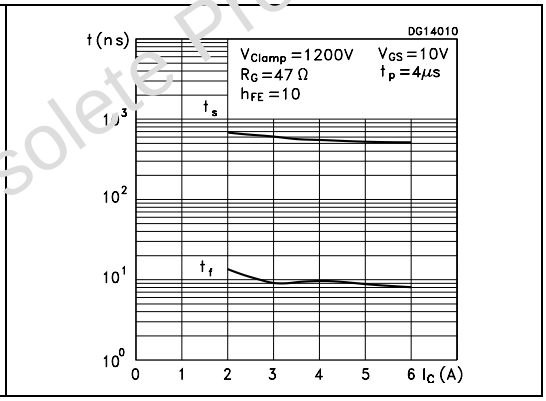
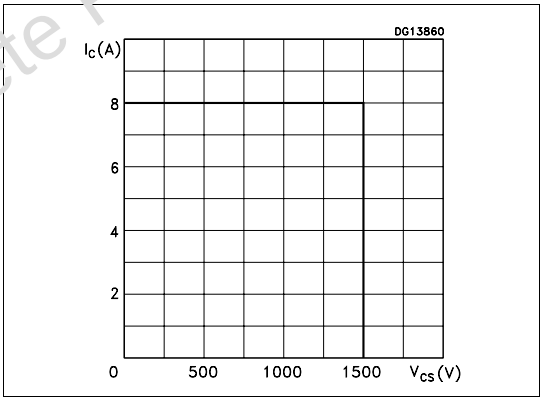


Figure 12. Reverse biased safe operating area

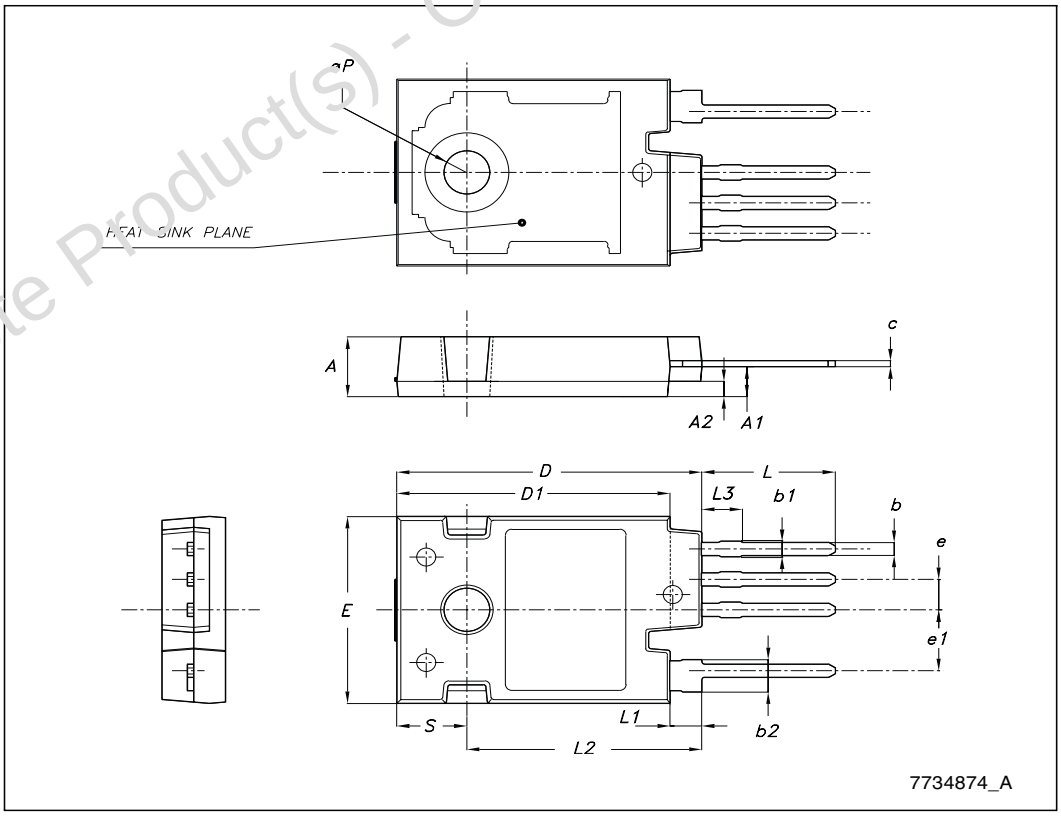


3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

TO247-4L HV mechanical data

DIM.	mm.		
	MIN.	TYP	MAX.
A	4.85		5.15
A1	2.20	2.50	2.60
A2		1.27	
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 5. Document revision history

Date	Revision	Changes
25-Oct-2006	1	First release.
17-Jun-2009	2	Document status promoted from preliminary data to datasheet.

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