STC05DE120HV

Hybrid emitter switched bipolar transistor ESBT® 1200V - 5A - 0.18 Ω

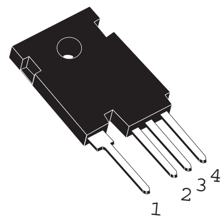
Target Specification

General features

Table 1. General features

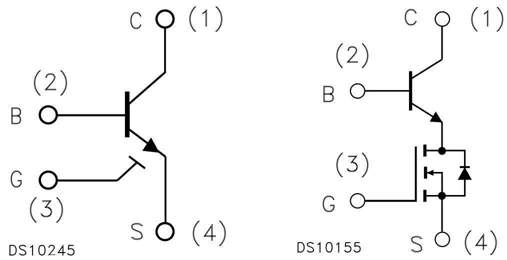
$V_{CS(ON)}$	I_C	$R_{CS(ON)}$
0.9V	5A	0.18Ω

- High voltage / low current Cascode configuration
- Low equivalent on resistance
- Very fast-switch, up to 150kHz
- Squared RBSOA, up to 1200V
- Very low C_{ISS} driven by $R_G = 47\Omega$
- In compliance with the 2002/93/EC European Directive



TO247-4L HV

Internal schematic diagrams



Description

The STC05DE120HV is manufactured in a hybrid structure, using dedicated high voltage Bipolar and low voltage MOSFET technologies, aimed to providing the best performance in ESBT topology. The STC05DE120HV is designed for use in aux flyback smps for any three phase application.

Applications

- Aux SMPS for three phase mains

Order codes

Part Number	Marking	Package	Packaging
STC05DE120HV	C05DE120HV	TO247-4L HV	Tube

This is preliminary information on a new product foreseen to be developed. Details are subject to change without notice. www.st.com

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
$V_{CS(SS)}$	Collector-source voltage (V_{BS} =V_{GS} =0V)	1200	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	5	A
I_{CM}	Collector peak current (t_P < 5ms)	8	A
I_B	Base current	3	A
I_{BM}	Base peak current (t_P < 1ms)	5	A
P_{tot}	Total dissipation at $T_c \leq 25°C$	100	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	1	°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)	$V_{CS(SS)}$ =1200V			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 =5A I_B =1A V_{GS} =10V I_C =2.5A I_B =0.25A		0.9 0.7	1.5 1.2	V V
h_{FE}	DC current gain	V_{CS} =1V V_{GS} =10V I_C =5A V_{CS} =1V V_{GS} =10V I_C =2.5A	3 7	5 10		
$V_{BS(ON)}$	Base-source ON voltage	V_{GS} =10V I_C =5A I_B =1A V_{GS} =10V I_C =2.5A I_B =0.25A		1.3 1	1.7 1.4	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}=0V		750		pF
$Q_{GS(tot)}$	Gate-source Charge	V_{CS}=15V V_{GS}=10V V_{CB}=0V I_C =1.8A		12.5		nC
V_{CSW}	Maximum collector-source voltage switched without snubber	R_G =47Ω h_{FE} =5 I_C = 5A	1200			V

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

2.1 Electrical characteristics (curves)

Figure 1. Output characteristics

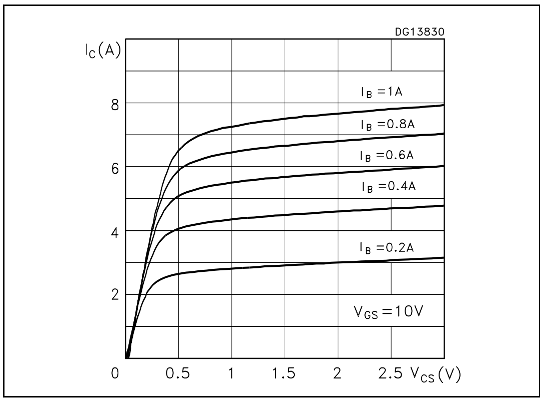


Figure 2. Gate threshold voltage vs temperature

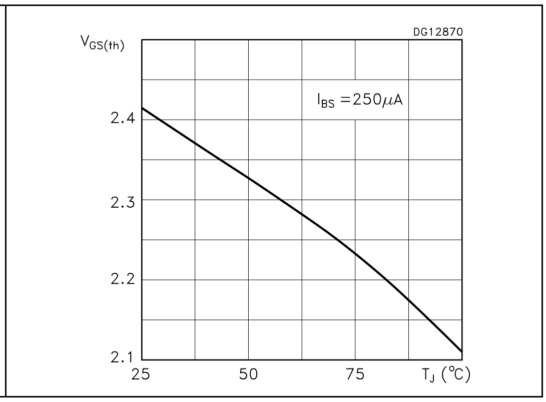


Figure 3. Reverse biased safe operating area

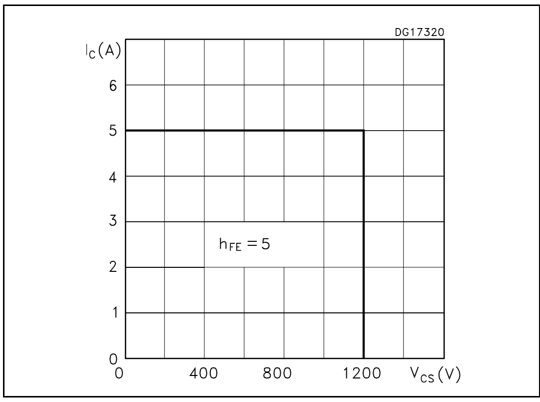


Figure 4. DC current gain

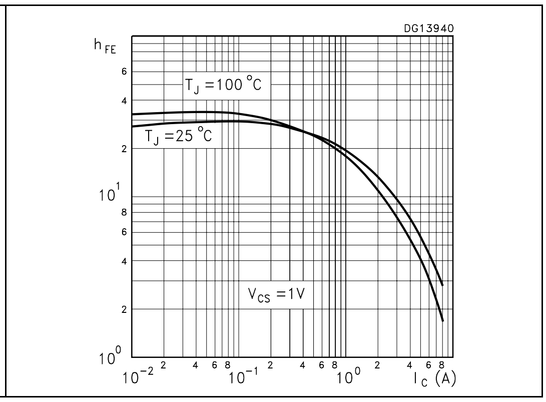


Figure 5. Collector-source On voltage

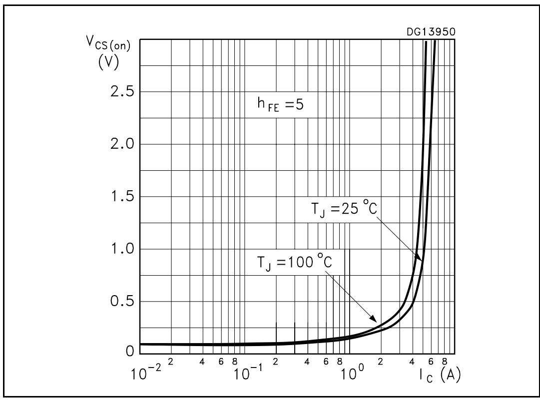


Figure 6. Collector-source On voltage

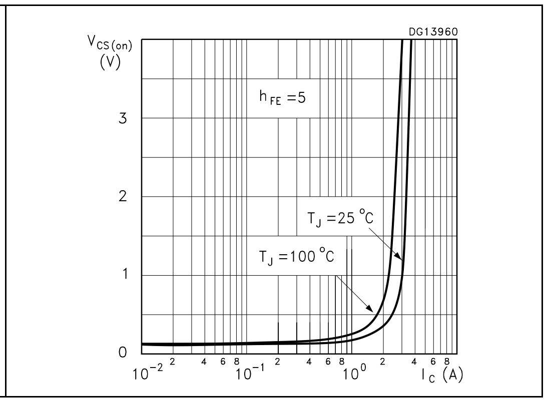


Figure 7. Base-source On voltage

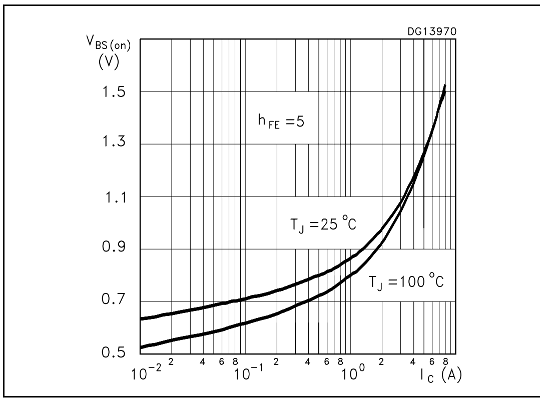
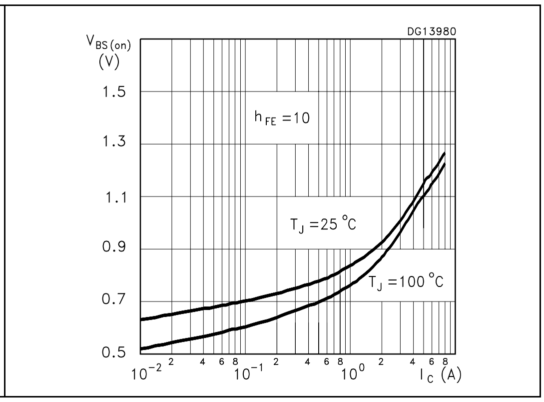


Figure 8. Base-source On voltage

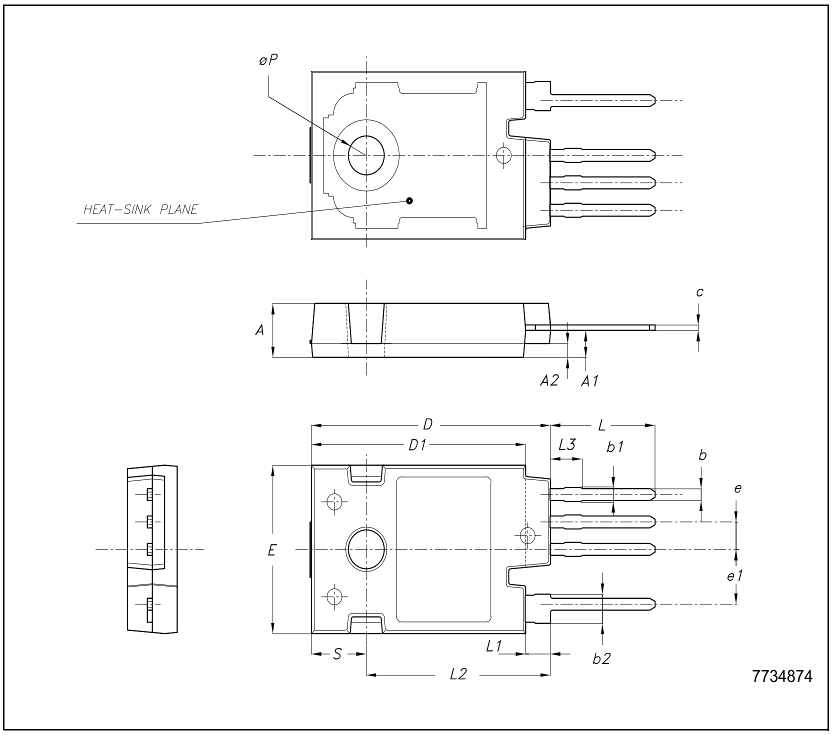


3 Package mechanical data

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

TO247-4L 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
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. Revision history

Date	Revision	Changes
09-May-2007	1	First release.