



STC08DE150

HYBRID EMITTER SWITCHED BIPOLAR TRANSISTOR ESBT™ 1500 V - 8 A - 0.075 Ω

PRELIMINARY DATA

Table 1: General 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 $R_G = 47 \Omega$

APPLICATION

- SINGLE SWITCH SMPS BASED ON THREE PHASE MAINS

DESCRIPTION

The STC08DE150 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 STC08DE150 is designed for use in aux flyback smps for any three phase application.

Figure 1: Package

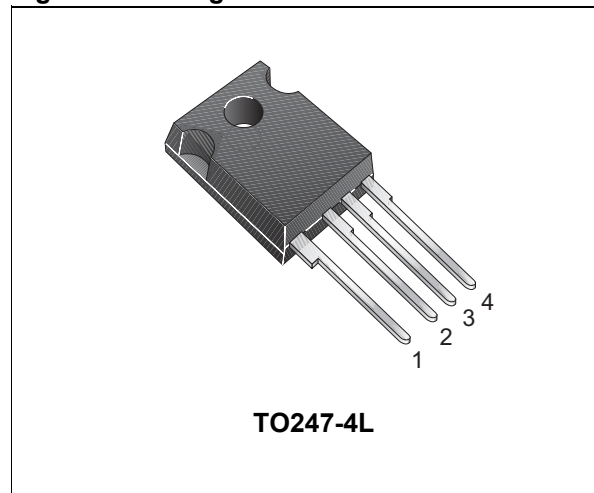


Figure 2: Internal Schematic Diagram

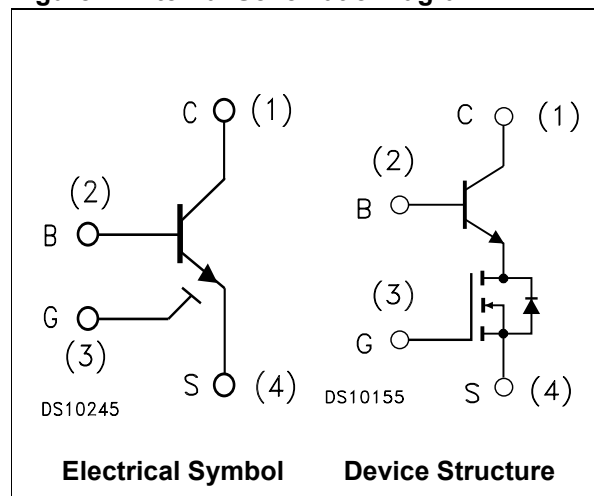


Table 2: Order Code

Part Number	Marking	Package	Packaging
STC08DE150	C08DE150	TO247-4L	TUBE

Table 3: Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
$V_{CS(SS)}$	Collector-Source Voltage ($V_{BS} = V_{GS} = 0\text{ V}$)	1500	V
$V_{BS(OS)}$	Base-Source Voltage ($I_C = 0, V_{GS} = 0\text{ V}$)	30	V
$V_{SB(OS)}$	Source-Base Voltage ($I_C = 0, V_{GS} = 0\text{ V}$)	9	V
V_{GS}	Gate-Source Voltage	± 20	V
I_C	Collector Current	8	A
I_{CM}	Collector Peak Current ($t_p < 5\text{ ms}$)	15	A
I_B	Base Current	4	A
I_{BM}	Base Peak Current ($t_p < 1\text{ ms}$)	8	A
P_{tot}	Total Dissipation at $T_C = 25\text{ }^\circ\text{C}$	155	W
T_{stg}	Storage Temperature	-65 to 125	$^\circ\text{C}$
T_J	Max. Operating Junction Temperature	125	$^\circ\text{C}$

Table 4: Thermal Data

Symbol	Parameter	Unit
$R_{thj-case}$	Thermal Resistance Junction-Case Max	0.64 $^\circ\text{C/W}$

Table 5: Electrical Characteristics ($T_{case} = 25\text{ }^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CS(SS)}$	Collector-Source Current ($V_{BS} = V_{GS} = 0\text{ V}$)	$V_{CS(SS)} = 1500\text{ V}$			100	μA
$I_{BS(OS)}$	Base-Source Current ($I_C = 0, V_{GS} = 0\text{ V}$)	$V_{BS(OS)} = 30\text{ V}$			10	μA
$I_{SB(OS)}$	Source-Base Current ($I_C = 0, V_{GS} = 0\text{ V}$)	$V_{SB(OS)} = 9\text{ V}$			100	μA
$I_{GS(OS)}$	Gate-Source Leakage ($V_{BS} = 0\text{ V}$)	$V_{GS} = \pm 20\text{ V}$			500	nA
$V_{CS(ON)}$	Collector-Source ON Voltage	$V_{GS} = 10\text{ V } I_C = 8\text{ A } I_B = 1.6\text{ A}$ $V_{GS} = 10\text{ V } I_C = 5\text{ A } I_B = 0.5\text{ A}$		0.6 0.6	1.4	V V
h_{FE}	DC Current Gain	$I_C = 8\text{ A } V_{CS} = 1\text{ V } V_{GS} = 10\text{ V}$ $I_C = 5\text{ A } V_{CS} = 1\text{ V } V_{GS} = 10\text{ V}$	4.5 8	7.5 10		
$V_{BS(ON)}$	Base-Source ON Voltage	$V_{GS} = 10\text{ V } I_C = 8\text{ A } I_B = 1.6\text{ A}$ $V_{GS} = 10\text{ V } I_C = 5\text{ A } I_B = 0.5\text{ A}$		1.5 1	2	V V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{BS} = V_{GS} I_B = 250\text{ }\mu\text{A}$	1.5	2.2	3	V
C_{iss}	Input Capacitance	$V_{CS} = 25\text{ V } f = 1\text{ MHz } V_{GS} = V_{CB} = 0$		750		pF
$Q_{GS(tot)}$	Gate-Source Charge	$I_C = 8\text{ A } V_{GS} = 10\text{ V}$ $V_{CS} = 25\text{ V } V_{CB} = 0$		12.5		nC
t_s	INDUCTIVE LOAD Storage Time	$V_{GS} = 10\text{ V } R_G = 47\text{ }\Omega$ $V_{Clamp} = 1200\text{ V } t_p = 4\text{ }\mu\text{s}$		526		ns
t_f	Fall Time	$I_C = 5\text{ A } I_B = 0.5\text{ A}$		8.5		ns
V_{CSW}	Maximum Collector-Source Voltage Switched Without Snubber	$R_G = 47\text{ }\Omega h_{FE} = 5\text{ A } I_C = 8\text{ A}$	15			V

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CS(dyn)}$	Collector-Source Dynamic Voltage (500 ns)	$V_{CC} = V_{Clamp} = 300\text{ V}$ $V_{GS} = 10\text{ V}$ $R_G = 47\ \Omega$ $I_C = 4\text{ A}$ $I_B = 0.8\text{ A}$ $t_{peak} = 500\text{ ns}$ $I_{Bpeak} = 8\text{ A (2 } I_C)$		6		V
$V_{CS(dyn)}$	Collector-Source Dynamic Voltage (1 μ s)	$V_{CC} = V_{Clamp} = 300\text{ V}$ $V_{GS} = 10\text{ V}$ $R_G = 47\ \Omega$ $I_C = 4\text{ A}$ $I_B = 0.8\text{ A}$ $t_{peak} = 500\text{ ns}$ $I_{Bpeak} = 8\text{ A (2 } I_C)$		2.2		V

Figure 3: Output Characteristics

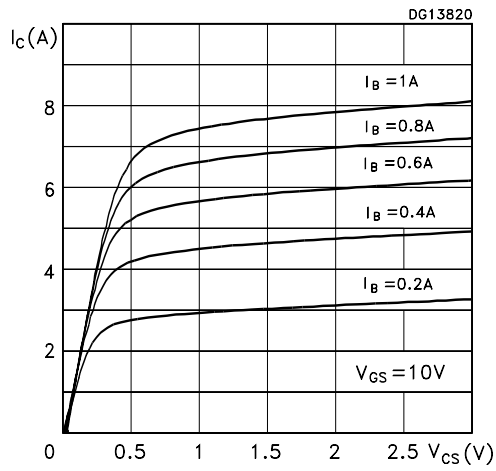


Figure 4: Reverse Biased Safe Operating Area

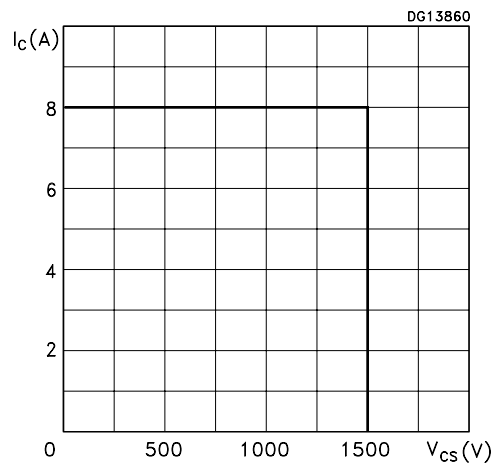


Figure 5: DC Current Gain

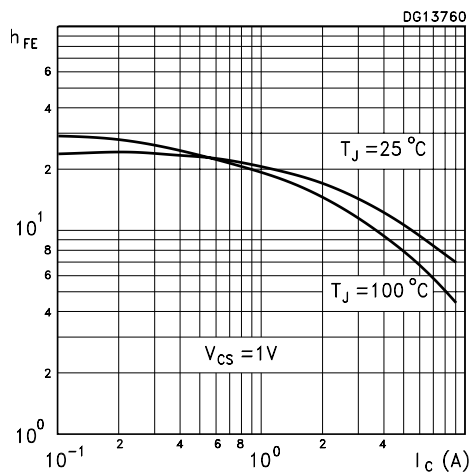


Figure 6: Dynamic Collector-Emitter Saturation Voltage

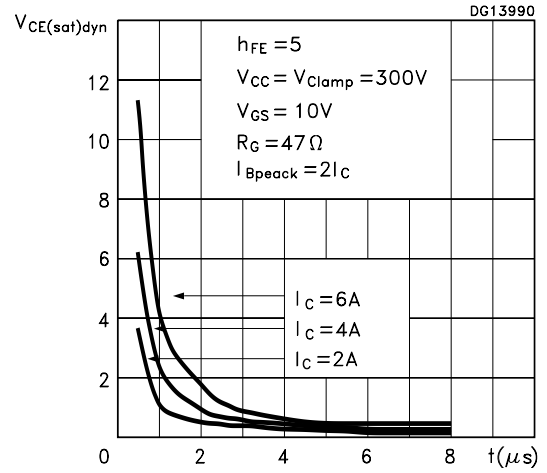


Figure 7: Gate Threshold Voltage vs Temperature

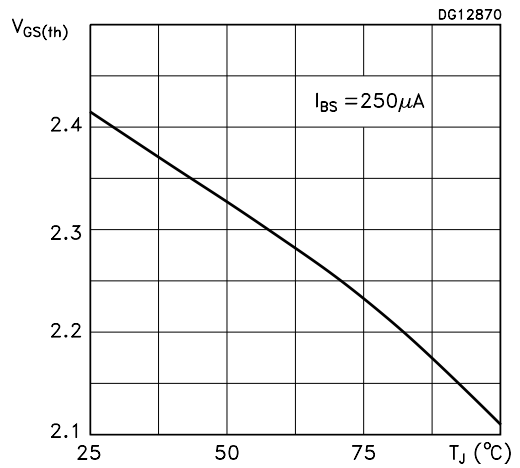


Figure 8: Collector-Source On Voltage

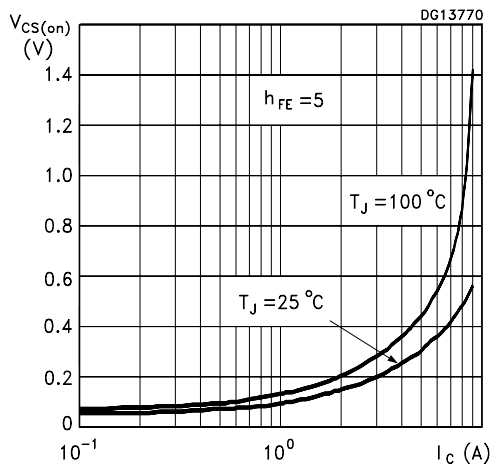


Figure 9: Base-Source On Voltage

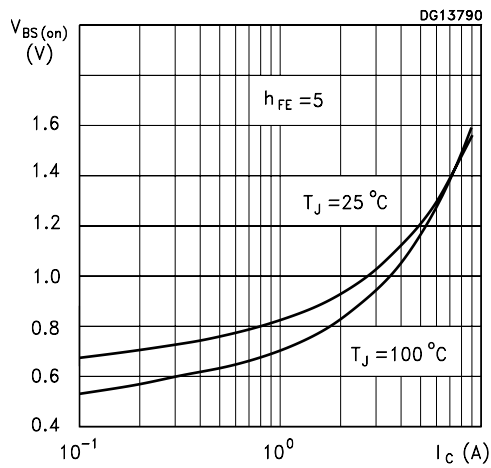


Figure 10: Inductive Load Switching Time

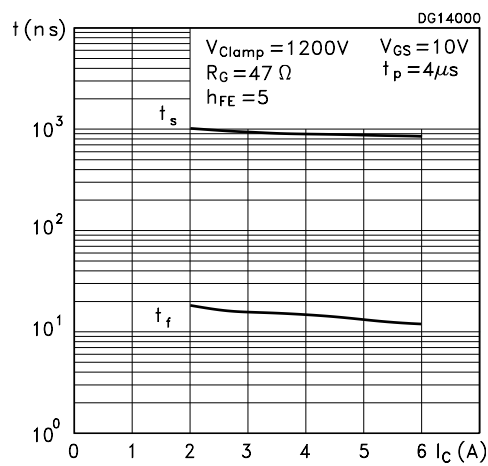


Figure 11: Collector-Source On Voltage

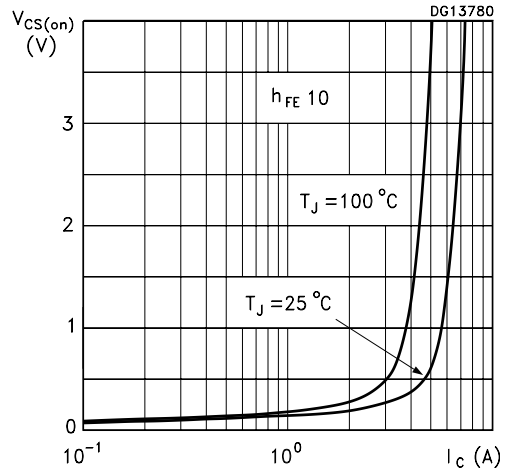


Figure 12: Base-Source On Voltage

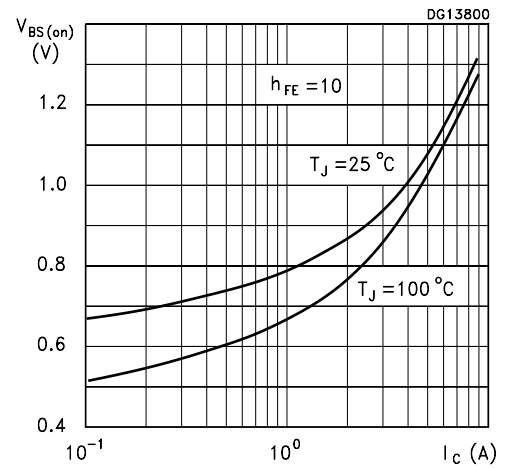


Figure 13: Inductive Load Switching Time

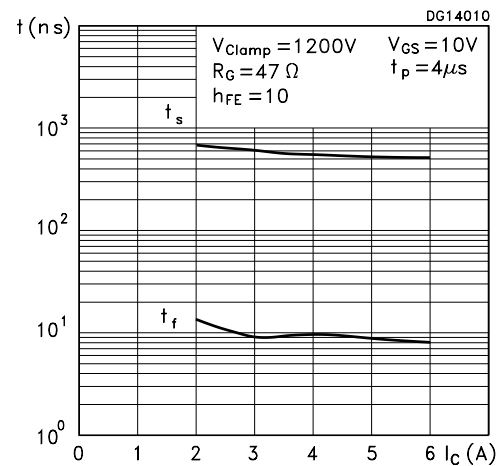


Figure 14: Enlargement FBSOA Circuit

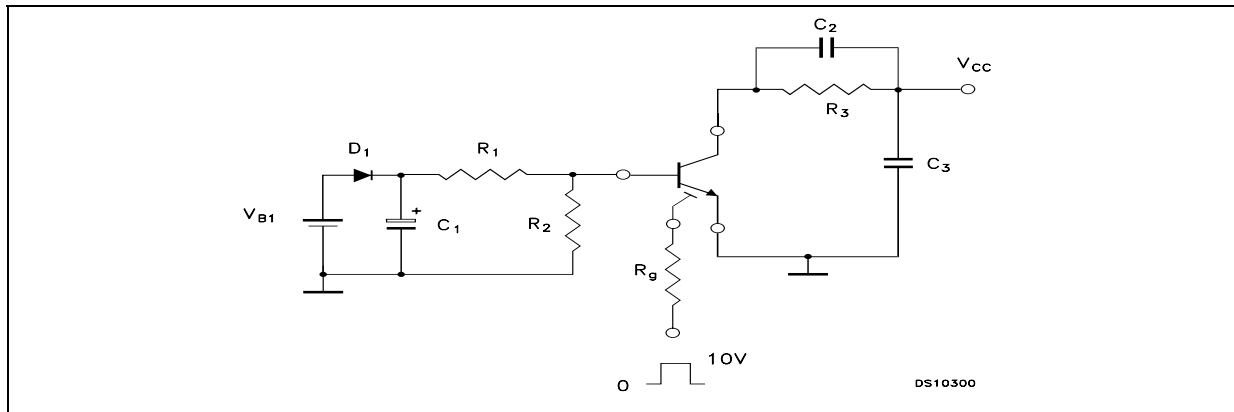


Table 6: Components, Values

$V_{B1} = 4.16 \text{ V}$	$C_1 = 4700 \text{ }\mu\text{F}$
$D_1 = \text{BA157}$	$C_2 \leq 1000 \text{ pF}$
$R_1 = 1 \text{ }\Omega$	$V_{CC} = 1500 \text{ V}$
$R_2 = 100 \text{ }\Omega$	$V_g = 10 \text{ V}$
$R_3 = 180 \text{ }\Omega$	Pulse Time = $5 \text{ }\mu\text{s}$
$R_g = 47 \text{ }\Omega$	

TO247-4L MECHANICAL DATA

DIM.	mm		
	MIN.	TYP.	MAX.
A	4.85		5.15
A1	2.20		2.60
b	0.95	1.10	1.30
b1	1.30		1.70
b2	2.50		2.90
c	0.40		0.80
D	19.85		20.15
E	15.45		15.75
e		2.54	
e1		5.08	
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	

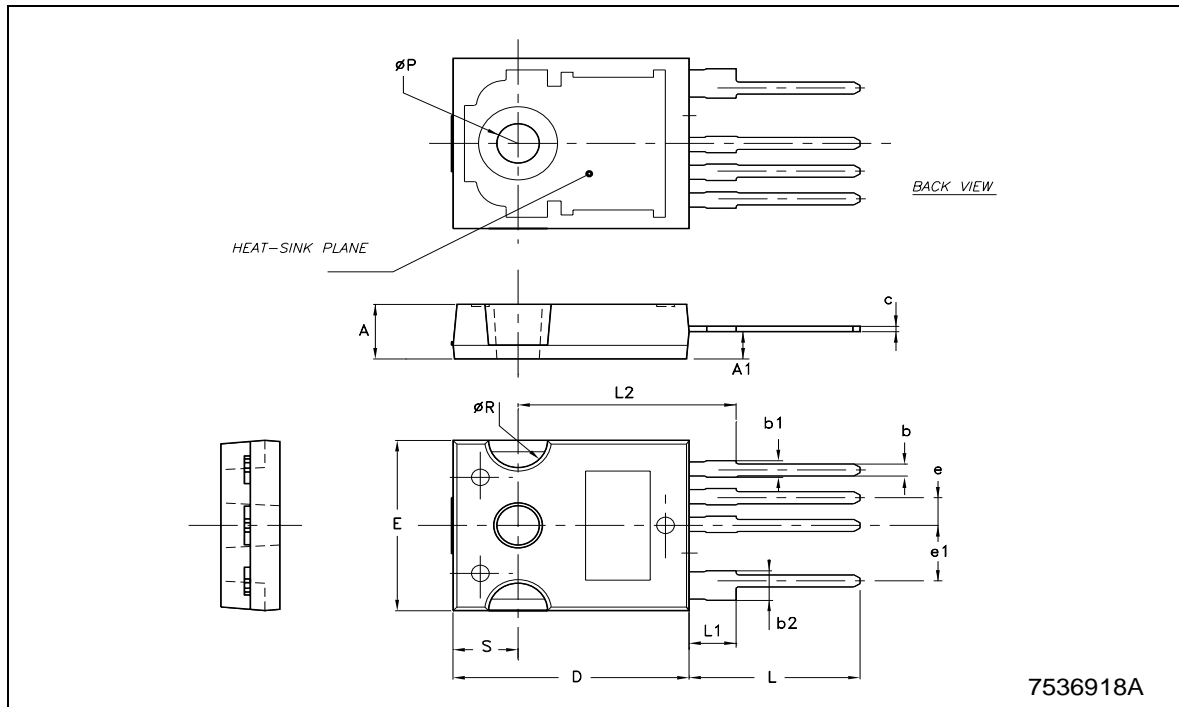


Table 7: Revision History

Date	Release	Change Designator
20-Jan-2005	1	First Release.

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