STE07DE220

Hybrid emitter switched bipolar transistor
ESBT® 2200V - 7A - 0.07 Ω power module

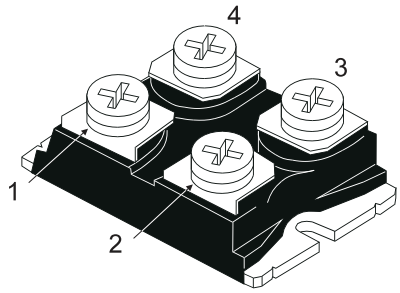
Preliminary Data

Features

Table 1.

$V_{CS(ON)}$	I_C	$R_{CS(ON)}$
0.5V	7A	0.07 Ω

- High voltage / high current cascode configuration
- Ultra low equivalent on resistance
- Very fast-switch, up to 150 kHz
- Ultra low C_{ISS}
- Low dynamic $V_{CS(ON)}$



ISOTOP

Applications

- Industrial converters
- Welding

Description

The STE07DE220 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 STE07DE220 is designed for use in industrial mains flyback converters and/or special applications.

Figure 1. Internal schematic diagrams

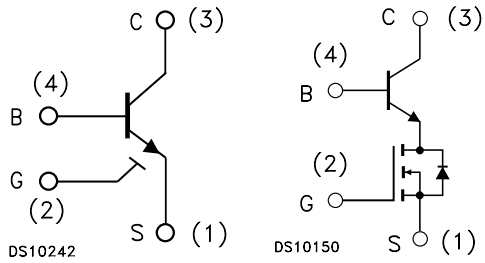


Table 2. Device summary

Order code	Marking	Package	Packaging
STE07DE220	E07DE220	ISOTOP	Tube

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
$V_{CS(SS)}$	Collector-source voltage (V_{BS} =V_{GS} = 0)	2200	V
$V_{BS(OS)}$	Base-source voltage (I_C =0, V_{GS} = 0)	40	V
$V_{SB(OS)}$	Source-base voltage (I_C =0, V_{GS} = 0)	10	V
V_{GS}	Gate-source voltage	± 20	V
I_C	Collector current	7	A
I_{CM}	Collector peak current (t_P < 5 ms)	14	A
I_B	Base current	7	A
I_{BM}	Base peak current (t_P < 1 ms)	14	A
P_{tot}	Total dissipation at T_c ≤25 °C	220	W
T_{stg}	Storage temperature	-40 to 150	°C
T_J	Max. operating junction temperature	125	°C
V_{ISO}	Insulation withstand voltage (AC-RMS) from all four leads to external heatsink	2500	V

Table 3. Thermal data

Symbol	Parameter		Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case	max	0.45	°C/W

2 Electrical characteristics

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

Table 4. Electrical characteristics

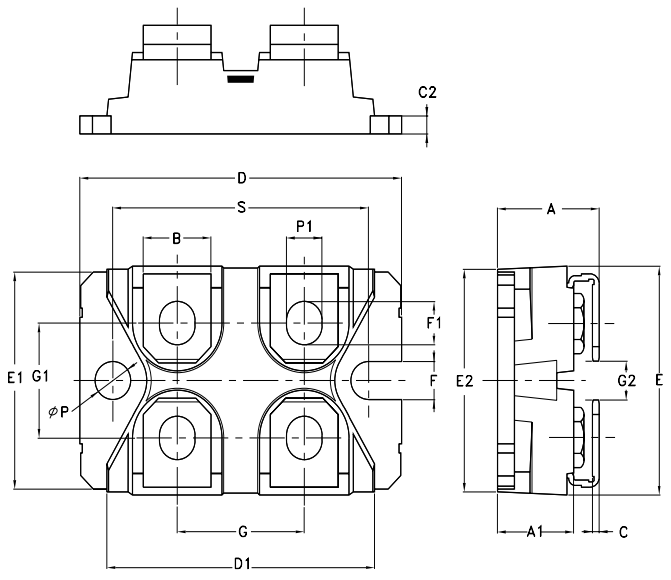
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{CS(SS)}$	Collector-source current (V_{BS} =V_{GS} = 0)	V_{CS} = 2200 V			100	µA
$I_{BS(OS)}$	Base-source current (I_C =0, V_{GS} = 0)	V_{BS} = 40 V			10	µA
$I_{SB(OS)}$	Source-base current (I_C =0, V_{GS} = 0)	V_{SB} = 9 V			100	µA
$I_{GS(OS)}$	Gate-source leakage (V_{BS} = 0)	V_{GS} = ± 20 V			500	nA
$V_{CS(ON)}$	Collector-source ON voltage	V_{GS} = 10 V I_C = 7 A I_B = 1.4 A V_{GS} = 10 V I_C = 3.5 A I_B = 0.35 A		0.5 0.4		V V
h_{FE}	DC current gain	V_{GS} = 10 V V_{CS} = 1 V I_C = 7 A V_{GS} = 10 V V_{CS} = 1 V I_C = 3.5 A		9 15		
$V_{BS(ON)}$	Base-source ON voltage	V_{GS} = 10 V I_C = 7 A I_B = 1.4 A V_{GS} = 10 V I_C = 3.5 A I_B = 0.35 A		1 0.8		V V
$V_{GS(th)}$	Gate threshold voltage	V_{BS} = V_{GS} I_B = 250 µA	3	3.7	4.5	V
C_{iss}	Input capacitance (V_{GS} = V_{CB} = 0)	V_{CS} = 25 V f = 1 MHz		t.b.d.		pF
$Q_{GS(tot)}$	Gate-source charge (V_{CB} = 0)	V_{CS} = 25 V V_{GS} = 10 V I_C = 7 A		t.b.d.		nC
 t_s t_f	Inductive load Storage time Fall time	V_{GS} = 10 V R_G = 47 Ω V_{Clamp} = 1760 V t_p = 4 µs I_C = 3.5 A I_B = 0.7 A		 t.b.d. t.b.d.		 ns ns
 t_s t_f	Inductive load Storage time Fall time	V_{GS} = 10 V R_G = 47 Ω V_{Clamp} = 1760 V t_p = 4 µs I_C = 3 .5 A I_B = 0.35 A		 t.b.d. t.b.d.		 ns ns

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

ISOTOP MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	11.8		12.2	0.465		0.480
A1	8.9		9.1	0.350		0.358
B	7.8		8.2	0.307		0.322
C	0.75		0.85	0.029		0.033
C2	1.95		2.05	0.076		0.080
D	37.8		38.2	1.488		1.503
D1	31.5		31.7	1.240		1.248
E	25.15		25.5	0.990		1.003
E1	23.85		24.15	0.938		0.950
E2		24.8			0.976	
G	14.9		15.1	0.586		0.594
G1	12.6		12.8	0.496		0.503
G2	3.5		4.3	0.137		1.169
F	4.1		4.3	0.161		0.169
F1	4.6		5	0.181		0.196
P	4		4.3	0.157		0.169
P1	4		4.4	0.157		0.173
S	30.1		30.3	1.185		1.193



P093A

4 Revision history

Table 5. Document revision history

Date	Revision	Changes
20-May-2008	1	First release.

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