



# STE70IE120

## Monolithic Emitter Switched Bipolar Transistor ESBT<sup>®</sup> 1200 V - 70 A - 0.014 Ω Power Module

Target data

### General features

$V_{CS(ON)}$	$I_C$	$R_{CS(ON)}$
1V	70A	0.014Ω

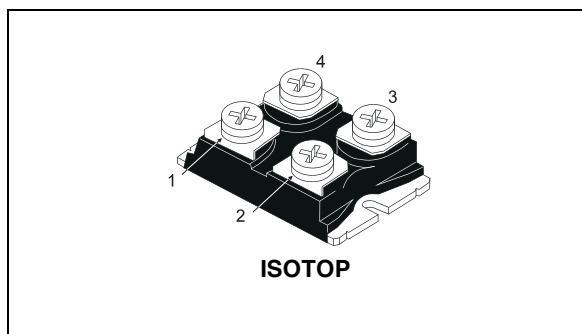
- High voltage / high current Cascode configuration
- Ultra low equivalent on resistance
- Very fast-switch, up to 150 kHz
- Ultra low  $C_{ISS}$
- Low dynamic  $V_{CS(ON)}$

### Description

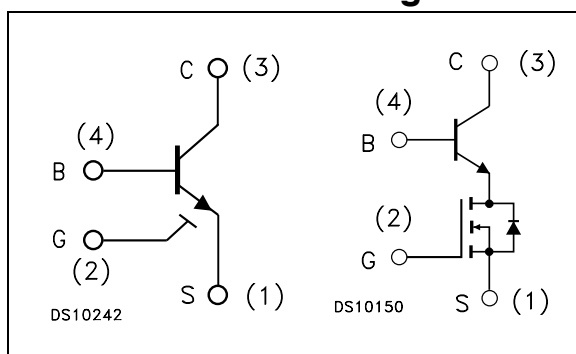
The STE70DE120 is manufactured in monolithic structure, to be used in industrial applications.

### Applications

- Solar
- Welding



### Internal schematic diagram



### Order codes

Part number	Marking	Package	Packaging
STE70IE120	E70IE120	ISOTOP	Tube

# 1 Electrical ratings

**Table 1. 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 ( $I_C = 0, V_{GS} = 0V$ )	40	V
$V_{SB(OS)}$	Source-base voltage ( $I_C = 0, V_{GS} = 0V$ )	12	V
$V_{GS}$	Gate-source voltage	$\pm 20$	V
$I_C$	Collector current	70	A
$I_{CM}$	Collector peak current ( $t_p < 5ms$ )	150	A
$I_B$	Base current	20	A
$I_{BM}$	Base peak current ( $t_p < 1ms$ )	70	A
$P_{tot}$	Total dissipation at $T_C = 25^\circ C$	TBD	W
$T_{STG}$	Storage temperature	-65 to 150	$^\circ C$
$T_J$	Maximum operating junction temperature	150	$^\circ C$
$V_{ISO}$	Insulation withstand voltage (AC-RMS) from all four leads to external heatsink	2500	V

## 1.1 Thermal data

**Table 2. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thJ-case}$	Thermal resistance junction-case (Max)	TBD	$^\circ C/W$
$R_{thc-h}$	Thermal resistance case-heatsink with conductive grease applied (Max)	TBD	$^\circ C/W$

## 2 Electrical characteristics

**Table 3. Electrical characteristics**

( $T_{Case} = 25^{\circ}C$ , unless otherwise specified)

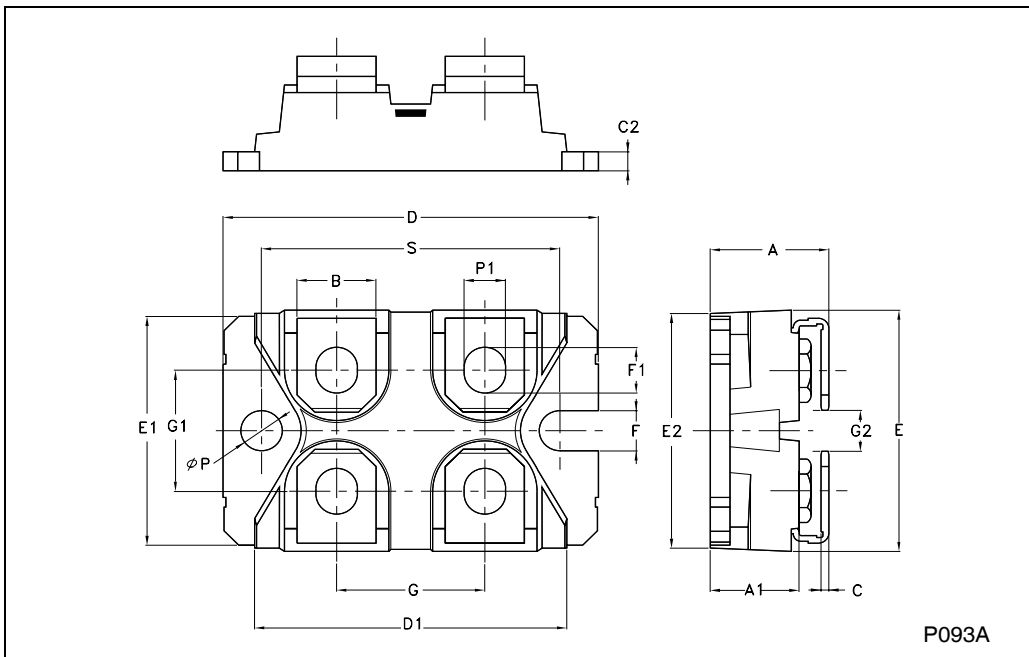
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$I_{CS(SS)}$	Collector-source current ( $V_{BS} = V_{GS} = 0$ )	$V_{CE} = 1200V$			100	$\mu A$
$I_{BS(OS)}$	Base-source current ( $I_C = 0, V_{GS} = 0V$ )	$V_{BS(OS)} = 40V$			10	$\mu A$
$I_{SB(OS)}$	Source-base current ( $I_C = 0, V_{GS} = 0$ )	$V_{SB(OS)} = 10V$			100	$\mu A$
$I_{GS(OS)}$	Gate-source leakage	$V_{GS} = \pm 20V$			500	nA
$V_{CS(ON)}$	Collector-source ON voltage	$V_{GS} = 10V \quad I_C = 70A \quad I_B = 14A$ $V_{GS} = 10V \quad I_C = 45A \quad I_B = 4.5A$		1 1		V V
$h_{FE}$	DC current gain	$V_{GS} = 10V \quad V_{CS} = 1V \quad I_C = 70A$ $V_{GS} = 10V \quad V_{CS} = 1V \quad I_C = 45A$	3 6		7 13	
$V_{BS(ON)}$	Base-emitter ON voltage	$V_{GS} = 10V \quad I_C = 70A \quad I_B = 14A$ $V_{GS} = 10V \quad I_C = 45A \quad I_B = 4.5A$		tbd tbd		V V
$V_{GS(th)}$	Gate threshold voltage	$V_{BS} = V_{GS} \quad I_B = 250\mu A$	3	3.7	4.5	V
$C_{iss}$	Input Capacitance	$V_{CS} = 25V \quad f=1MHz$ $V_{GS} = V_{CB} = 0$		tbd		pF
$Q_{GS(tot)}$	Gate-source charge	$V_{CS} = 25V \quad V_{GS} = 10$ $V_{CB} = 0 \quad I_C = 70A$		tbd		nC

### 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](http://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



## 4 Revision history

**Table 4. Document revision history**

Date	Revision	Changes
04-May-2007	1	Initial EDOCS release

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