

1 Electrical ratings

$T_{\text{case}} = 25\text{ °C}$ unless otherwise specified.

Table 1. Electrical characteristics

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage ($I_{\text{E}} = 0\text{ A}$)	1200	V
V_{CES}	Collector-emitter voltage ($V_{\text{BE}} = 0\text{ V}$)	1200	V
V_{CEO}	Collector-emitter voltage ($I_{\text{B}} = 0\text{ A}$)	550	V
V_{EBO}	Collector-base voltage ($I_{\text{C}} = 0\text{ A}$)	9	V
I_{C}	Collector current	5	A
I_{CM}	Collector peak current ($t_{\text{p}} < 5\text{ ms}$)	8	A
I_{B}	Base current	2	A
I_{BM}	Base peak current ($t_{\text{p}} < 5\text{ ms}$)	4	A
P_{TOT}	Total power dissipation at $T_{\text{C}} = 25\text{ °C}$	100	W
T_{stg}	Storage temperature range	-65 to 150	°C
T_{J}	Operating junction temperature range		°C

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance, junction-to-case	1.25	°C/W
R_{thJA}	Thermal resistance, junction-to-ambient	62.5	°C/W

2 Electrical characteristics

$T_{\text{case}} = 25^{\circ}\text{C}$ unless otherwise specified.

Table 3. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current	$V_{\text{CE}} = 1200 \text{ V}$, $V_{\text{BE}} = 0 \text{ V}$			100	μA
I_{CEO}	Emitter cut-off current	$V_{\text{CE}} = 550 \text{ V}$			100	μA
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage	$I_{\text{C}} = 100 \text{ mA}$, $I_{\text{B}} = 0 \text{ A}$	550			V
V_{EBO}	Emitter-base voltage	$I_{\text{C}} = 0 \text{ A}$, $I_{\text{E}} = 10 \text{ mA}$	9			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 1 \text{ A}$, $I_{\text{B}} = 0.2 \text{ A}$			0.5	V
		$I_{\text{C}} = 2 \text{ A}$, $I_{\text{B}} = 0.4 \text{ A}$			0.7	
		$I_{\text{C}} = 3 \text{ A}$, $I_{\text{B}} = 1 \text{ A}$			1.5	
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 2 \text{ A}$, $I_{\text{B}} = 0.4 \text{ A}$			1.5	V
		$I_{\text{C}} = 3 \text{ A}$, $I_{\text{B}} = 1 \text{ A}$			1.5	
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 1 \text{ mA}$, $V_{\text{CE}} = 5 \text{ V}$	10			
		$I_{\text{C}} = 10 \text{ mA}$, $V_{\text{CE}} = 5 \text{ V}$	10			
		$I_{\text{C}} = 0.8 \text{ A}$, $V_{\text{CE}} = 3 \text{ V}$	14		32	
		$I_{\text{C}} = 2 \text{ A}$, $V_{\text{CE}} = 5 \text{ V}$	9		28	
	Resistive load					
t_{on}	Turn-on time	$I_{\text{C}} = 2 \text{ A}$, $I_{\text{B1}} = 0.4 \text{ A}$, $I_{\text{B2}} = -0.8 \text{ A}$, $t_{\text{p}} = 30 \mu\text{s}$, $V_{\text{CC}} = 150 \text{ V}$ (see Figure 11. Resistive load switching test circuit)			0.5	μs
t_{s}	Storage time			2.5	3.0	
t_{f}	Fall time			0.2	0.3	
E_{AR}	Repetitive avalanche energy	$L = 2 \text{ mH}$, $C = 1.8 \text{ nF}$, $V_{\text{CC}} = 50 \text{ V}$, $V_{\text{BE}} = -5 \text{ V}$ (see Figure 12. Energy rating test circuit)	6			mJ

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

2.1 Electrical characteristics (curves)

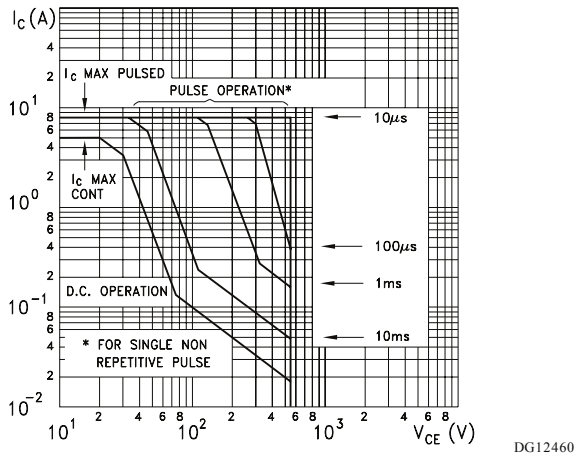
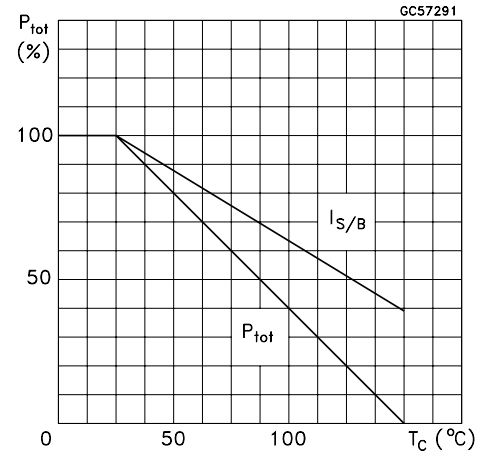
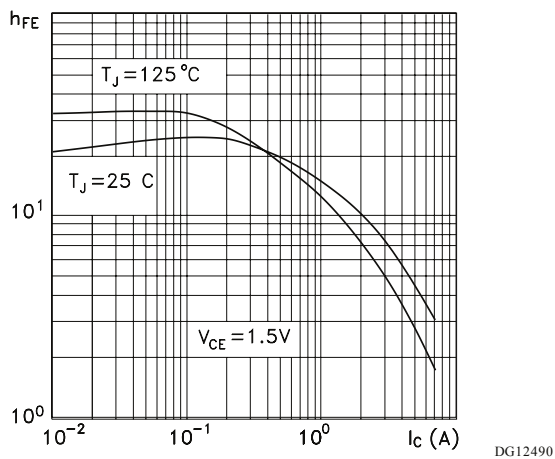
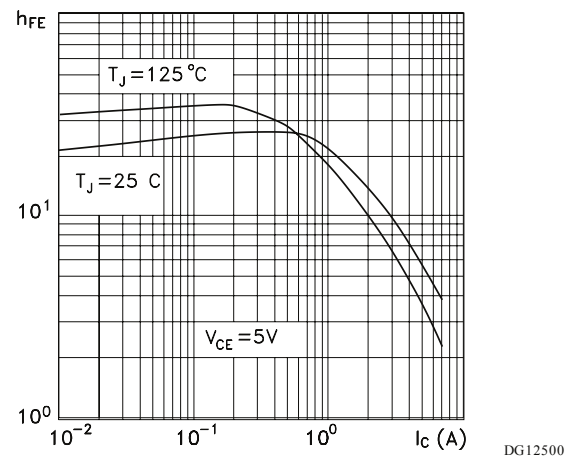
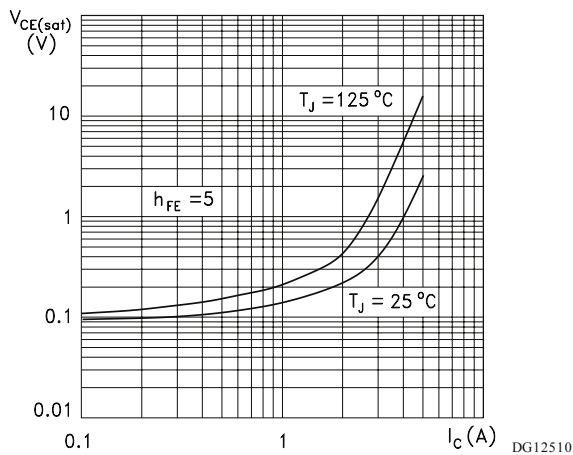
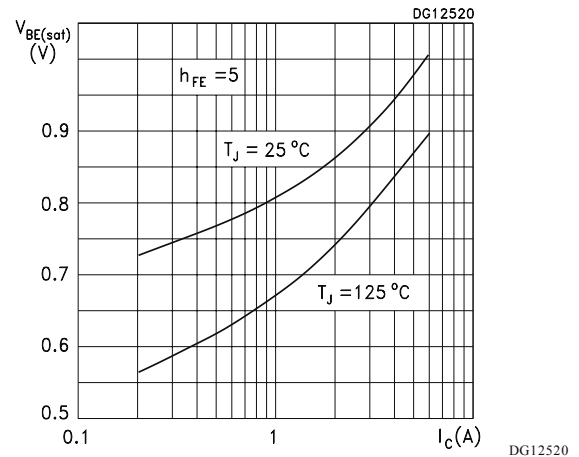
Figure 1. Safe operating area

Figure 2. Derating curve

Figure 3. DC current gain at $V_{CE} = 1.5$ V

Figure 4. DC current gain at $V_{CE} = 5$ V

Figure 5. Collector emitter saturation voltage

Figure 6. Base emitter saturation voltage


Figure 7. Inductive load storage time

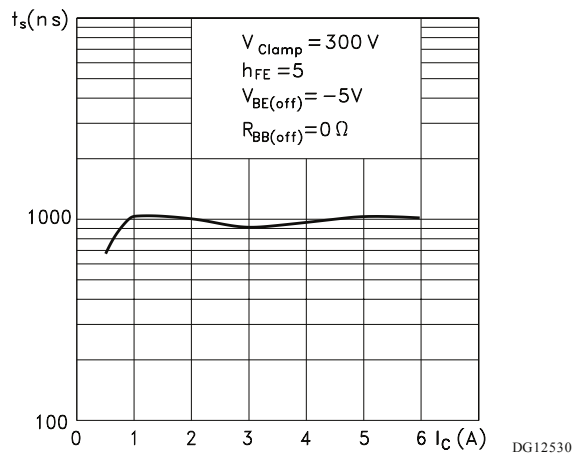


Figure 8. Inductive load fall time

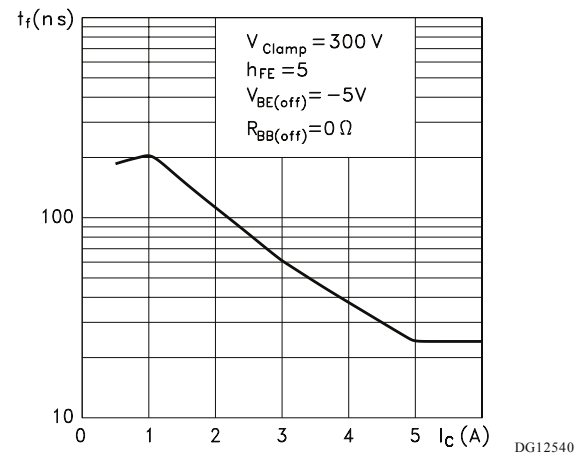
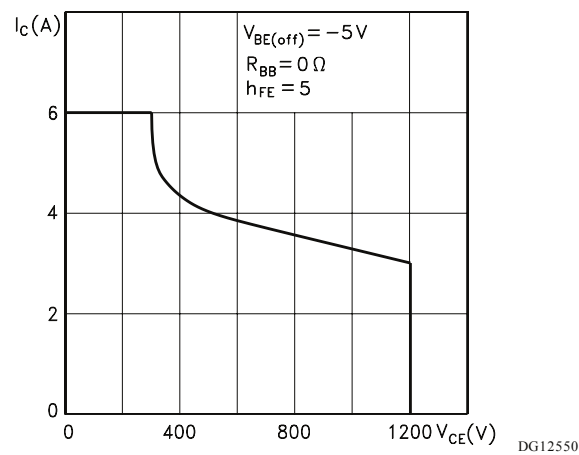


Figure 9. Reverse biased safe operating area



3 Test circuits

Figure 10. Inductive load switching test circuit

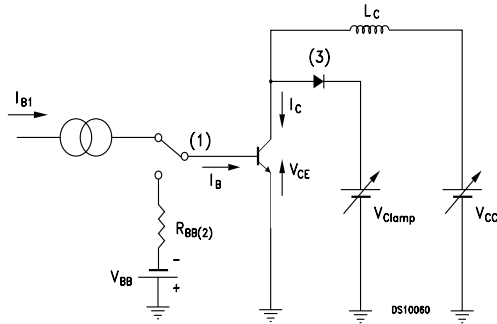


Figure 11. Resistive load switching test circuit

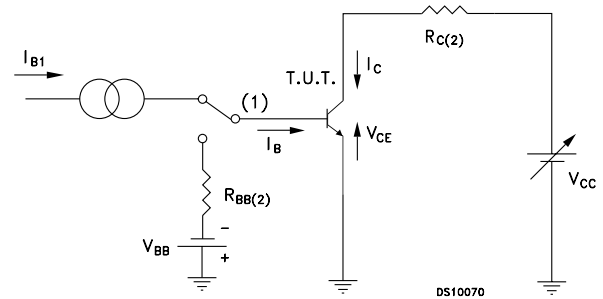
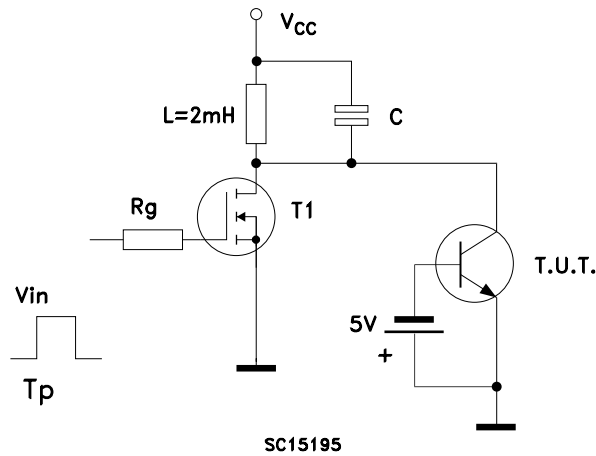


Figure 12. Energy rating test circuit

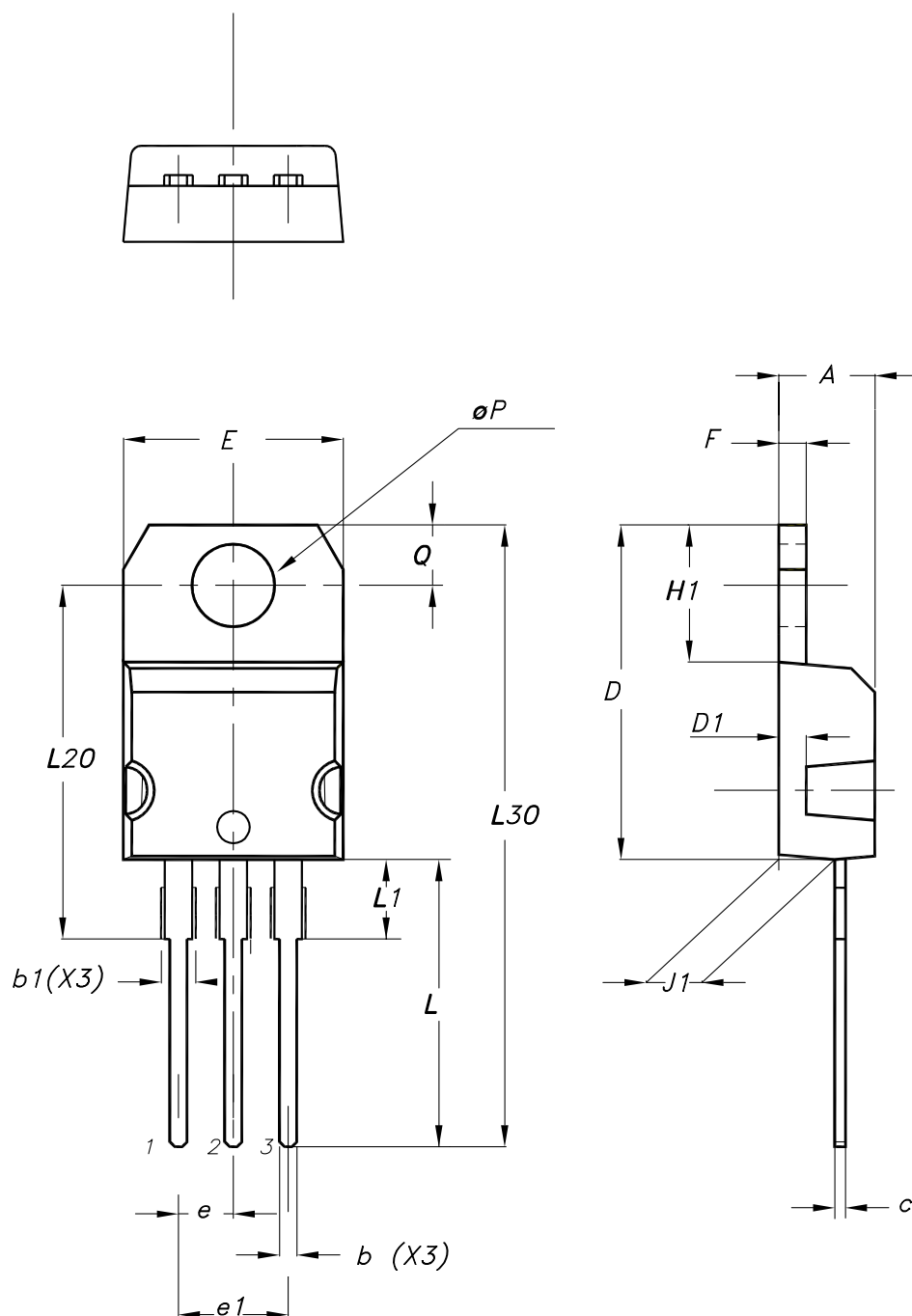


4 Package information

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.

4.1 TO-220 type A package information

Figure 13. TO-220 type A package outline



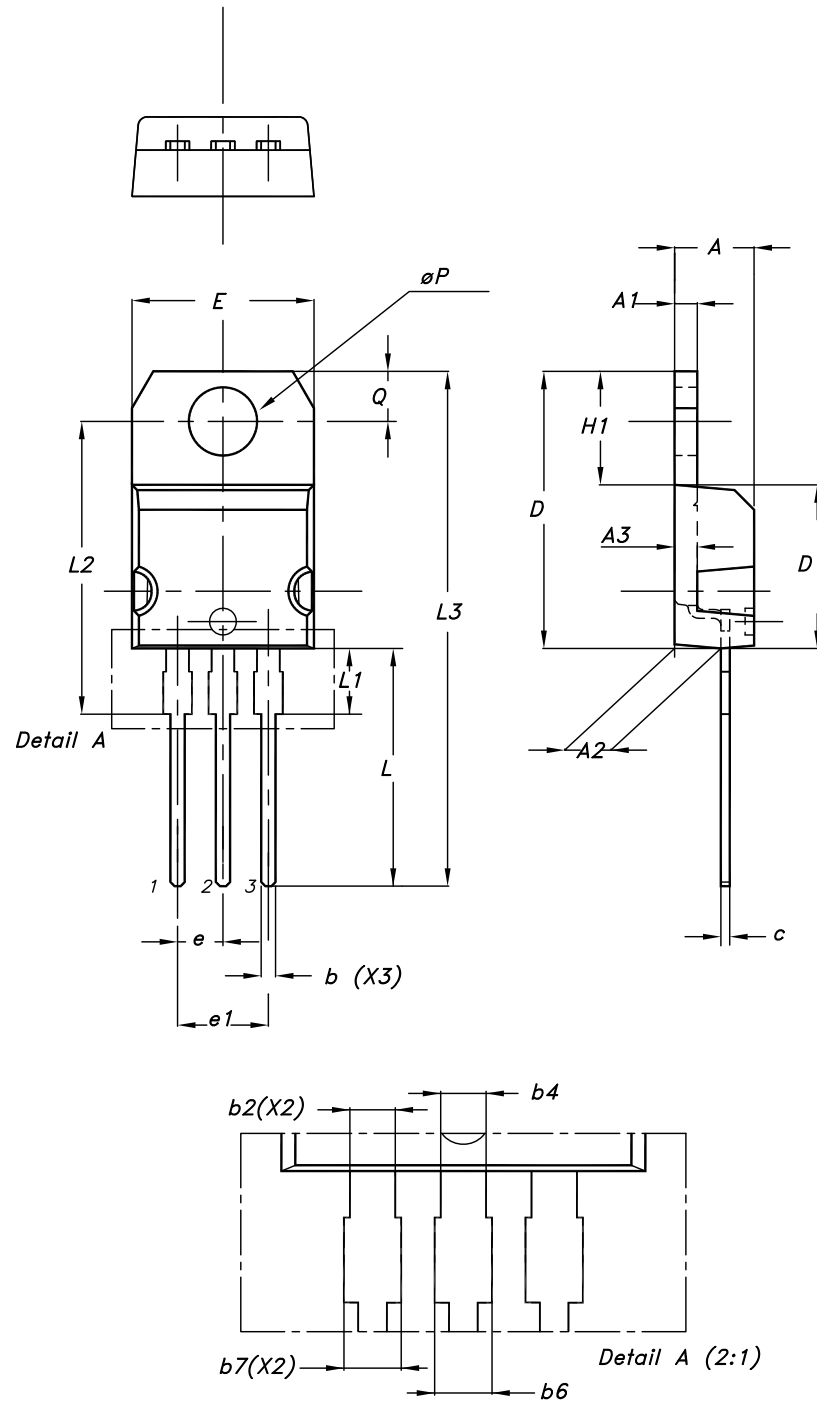
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Table 4. TO-220 type A package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.55
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10.00		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13.00		14.00
L1	3.50		3.93
L20		16.40	
L30		28.90	
øP	3.75		3.85
Q	2.65		2.95
Slug flatness		0.03	0.10

4.2 TO-220 type H package information

Figure 14. TO-220 type H package outline



0015988_H_23

Table 5. TO-220 type H package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40	4.45	4.50
A1	1.22		1.32
A2	2.49	2.59	2.69
A3	1.17	1.27	1.37
b	0.78		0.87
b2	1.25		1.34
b4	1.20		1.29
b6			1.50
b7			1.45
c	0.49		0.56
D	15.40	15.50	15.60
D1	9.05	9.15	9.25
E	10.08	10.18	10.28
e	2.44	2.54	2.64
e1	4.98	5.08	5.18
H1	6.25	6.35	6.45
L	13.20	13.40	13.60
L1	3.50	3.70	3.90
L2	16.30	16.40	16.50
L3	28.70	28.90	29.10
ØP	3.75	3.80	3.85
Q	2.70	2.80	2.90
Slug flatness		0.03	0.10

Revision history

Table 6. Document revision history

Date	Revision	Changes
8-Dec-2003	3	Minor text changes.
12-Apr-2021	4	Updated package and related information. Added Section 4.2 TO-220 type H package information. Minor text changes.

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