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Low voltage high performance NPN power transistor

Features

- Very low collector-emitter saturation voltage
- High current gain characteristic
- Fast switching speed

Applications

- Emergency lighting
- LED drive
- Motherboard and hard disk drive
- Mobile equipment
- DC-DC converter, voltage regulation

Description

The device is a NPN transistor manufactured using new "PB-HCD" (power bipolar high current density) technology. The resulting transistor shows exceptional high gain performances coupled with very low saturation voltage.

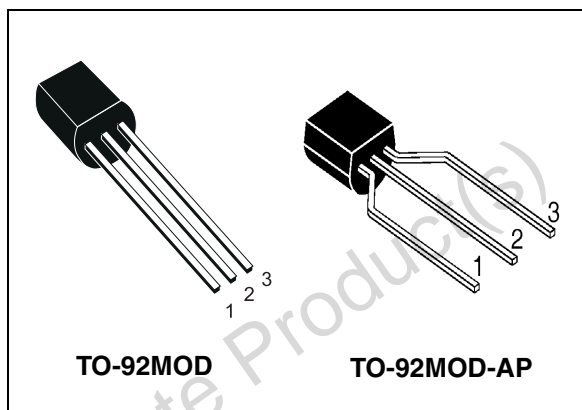


Figure 1. Internal schematic diagram

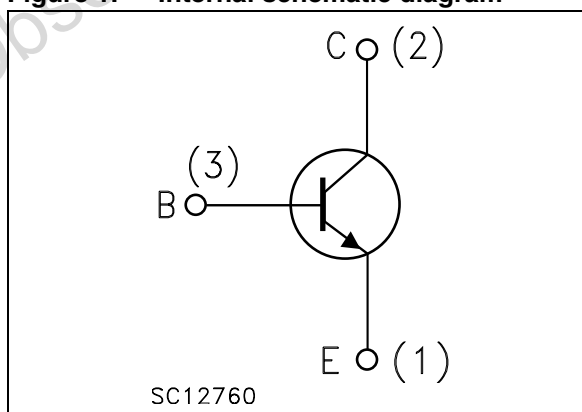


Table 1. Device summary

Order codes	Marking	Package	Packaging
2STL1525	2STL1525	TO-92MOD	Bag
2STL1525-AP	2STL1525	TO-92MOD-AP	Ammopack

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CEX}	Collector-emitter voltage ($V_{BE} = -1.5$ V)	95	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	25	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	5	V
I_C	Collector current	5	A
I_{CM}	Collector peak current ($t_P < 5$ ms)	10	A
I_B	Base current	1	A
P_{TOT}	Total dissipation at $T_{amb} = 25$ °C	1.5	W
T_{STG}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJA}	Thermal resistance junction-ambient max	83	°C/W

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current ($I_{\text{E}} = 0$)	$V_{\text{CB}} = 50\text{ V}$			0.1	μA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = 4\text{ V}$			0.1	μA
$V_{(\text{BR})\text{CEX}}$	Collector-emitter breakdown voltage ($V_{\text{BE}} = -1.5\text{ V}$)	$I_{\text{C}} = 1\text{ mA}$	95			V
$V_{(\text{BR})\text{CEO}}^{(1)}$	Collector-emitter breakdown voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = 10\text{ mA}$	25			V
$V_{(\text{BR})\text{EBO}}$	Emitter-base breakdown voltage ($I_{\text{C}} = 0$)	$I_{\text{E}} = 100\text{ }\mu\text{A}$	5			V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 0.5\text{ A}$ $V_{\text{CE}} = 2\text{ V}$ $I_{\text{C}} = 3\text{ A}$ $V_{\text{CE}} = 2\text{ V}$ $I_{\text{C}} = 5\text{ A}$ $V_{\text{CE}} = 5\text{ V}$	150 100	150	500	
$V_{\text{CE}(\text{sat})}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 3\text{ A}$ $I_{\text{B}} = 300\text{ mA}$ $I_{\text{C}} = 3.5\text{ A}$ $I_{\text{B}} = 40\text{ mA}$		220	500	mV mV
$V_{\text{BE}(\text{sat})}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 3\text{ A}$ $I_{\text{B}} = 300\text{ mA}$			1.2	V
C_{CBO}	Collector-base capacitance ($I_{\text{E}} = 0$)	$V_{\text{CB}} = 10\text{ V}$, $f = 1\text{ MHz}$		20		pF
f_{T}	Transition frequency	$V_{\text{CE}} = 10\text{ V}$ $I_{\text{C}} = 50\text{ mA}$		120		MHz
t_{on}	Resistive load Turn-on time	$I_{\text{C}} = 1.5\text{ A}$ $V_{\text{CC}} = 10\text{ V}$		60		ns
t_{off}	Turn-off time	$I_{\text{B}1} = -I_{\text{B}2} = 150\text{ mA}$		450		ns

1. Pulse test: pulse duration $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

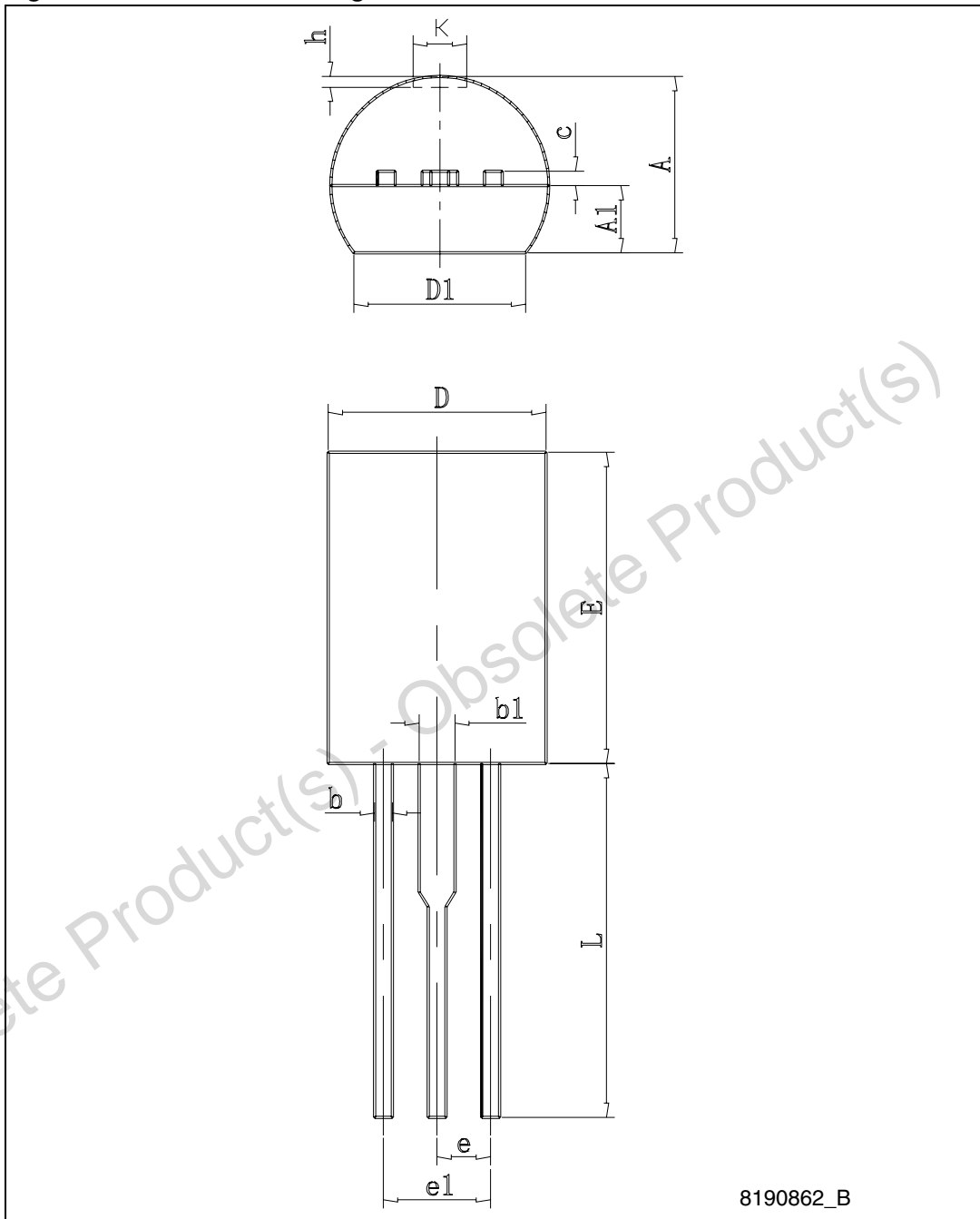
3 Package mechanical data

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Table 5. TO-92MOD mechanical data

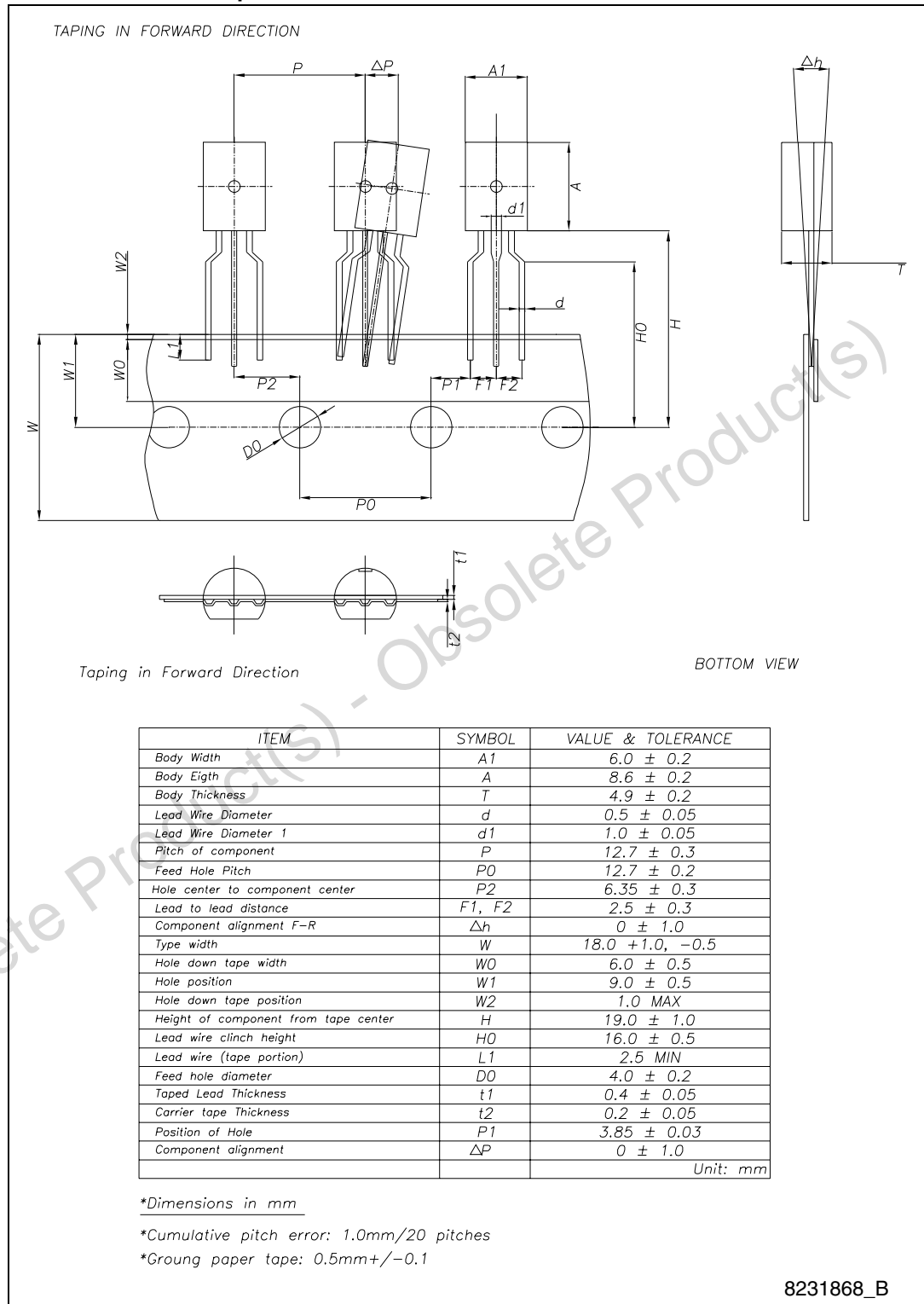
Dim.	mm.		
	Min.	Typ.	Max.
A	4.7		5.1
A1	1.730		2.030
b	0.4		0.6
b1	0.9		1.1
c	0.4		0.5
D	5.8		6.2
D1	4.0		
E	8.4		8.8
e		1.5	
e1	2.9		3.1
L	13.8		14.2
K			1.6
h	0.0		0.380

Figure 2. TO-92MOD drawing mechanical data



8190862_B

TO-92MOD-AP ammpack dimension



8231868_B

4 Revision history

Table 6. Document revision history

Date	Revision	Changes
31-Jul-2009	1	Initial release.
01-Dec-2010	2	Document status promoted from preliminary data to datasheet. Updated package mechanical data Table 5 on page 4 and Figure 2 on page 5 .

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