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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.

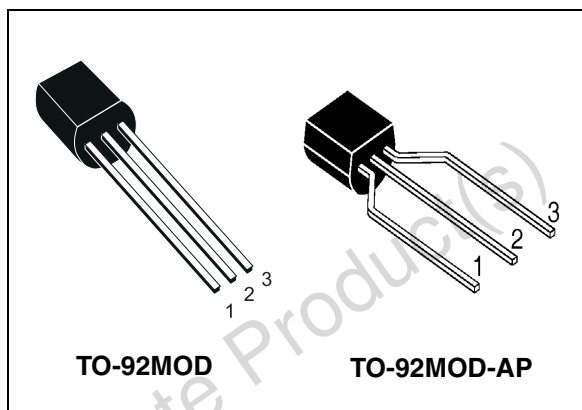


Figure 1. Internal schematic diagram

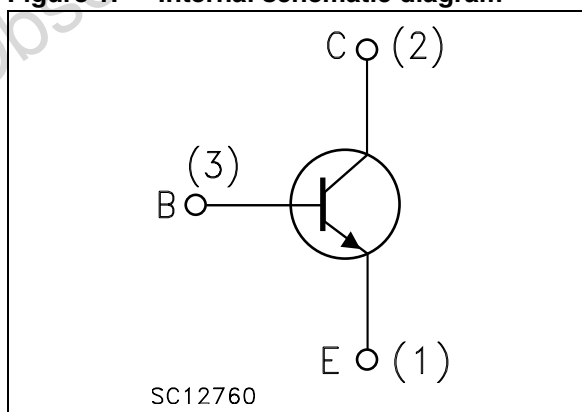


Table 1. Device summary

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	$I_{\text{C}} = 1.5\text{ A}$ $V_{\text{CC}} = 10\text{ V}$ $I_{\text{B}1} = -I_{\text{B}2} = 150\text{ mA}$		60		ns
t_{off}	Turn-off time			450		ns

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

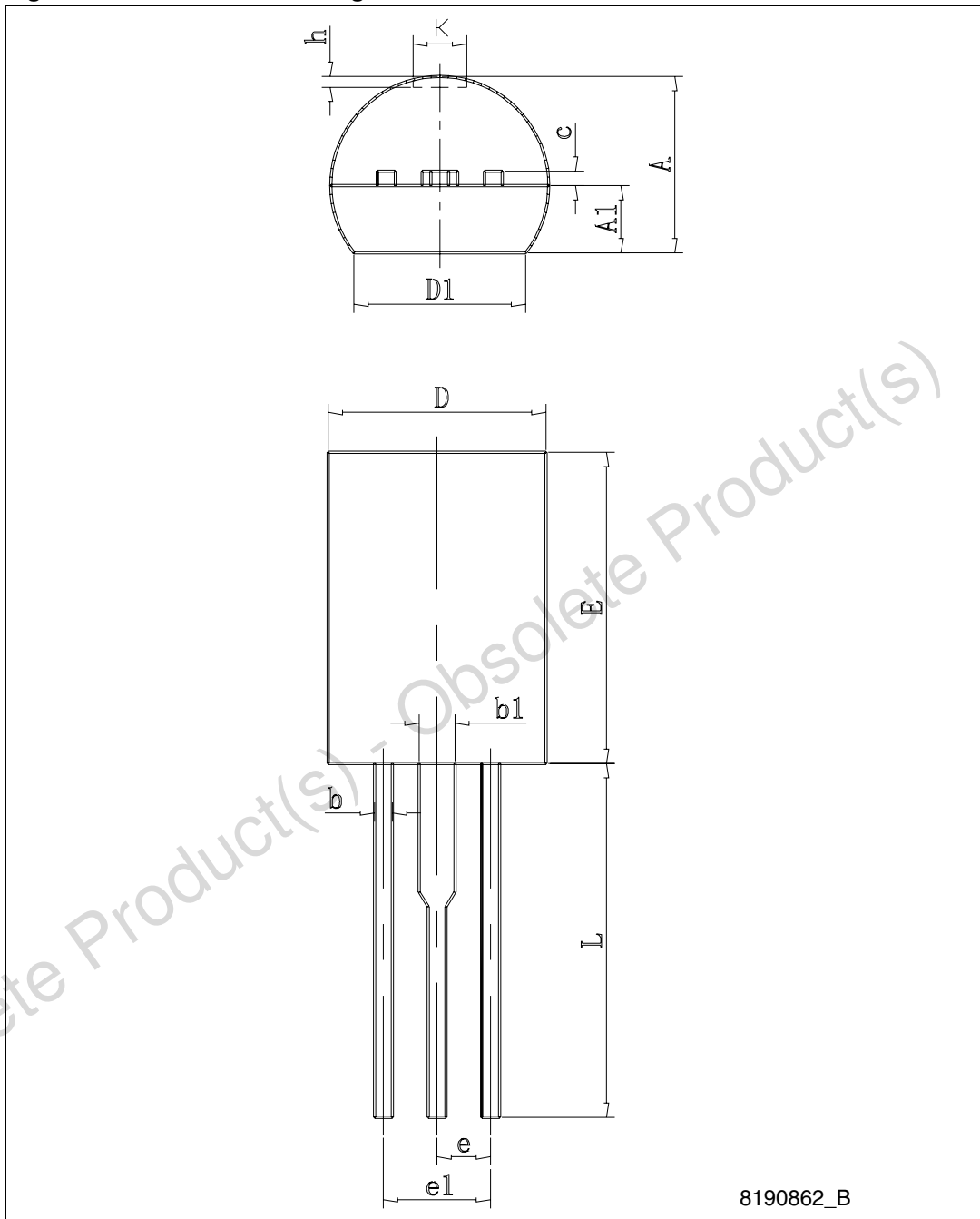
3 Package mechanical data

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.

Table 5. TO-92MOD mechanical data

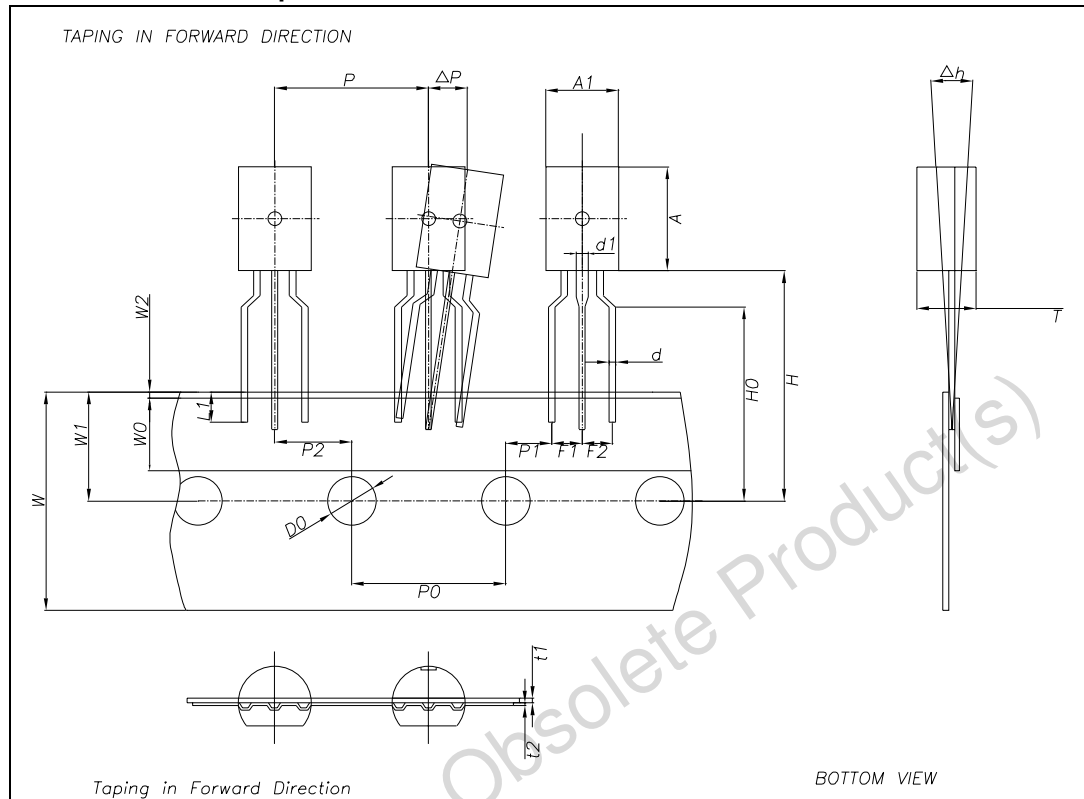
Dim.	mm.		
	Min.	Typ.	Max.
A	4.7		5.1
A1	1.730		2.030
b	0.4		0.6
b1	0.9		1.1
c	0.4		0.5
D	5.8		6.2
D1	4.0		
E	8.4		8.8
e		1.5	
e1	2.9		3.1
L	13.8		14.2
K			1.6
h	0.0		0.380

Figure 2. TO-92MOD drawing mechanical data



8190862_B

TO-92MOD-AP ammpack dimension



Taping in Forward Direction

BOTTOM VIEW

ITEM	SYMBOL	VALUE & TOLERANCE
Body Width	A1	6.0 ± 0.2
Body Eighth	A	8.6 ± 0.2
Body Thickness	T	4.9 ± 0.2
Lead Wire Diameter	d	0.5 ± 0.05
Lead Wire Diameter 1	d1	1.0 ± 0.05
Pitch of component	P	12.7 ± 0.3
Feed Hole Pitch	P0	12.7 ± 0.2
Hole center to component center	P2	6.35 ± 0.3
Lead to lead distance	F1, F2	2.5 ± 0.3
Component alignment F-R	Δh	0 ± 1.0
Type width	W	18.0 +1.0, -0.5
Hole down tape width	W0	6.0 ± 0.5
Hole position	W1	9.0 ± 0.5
Hole down tape position	W2	1.0 MAX
Height of component from tape center	H	19.0 ± 1.0
Lead wire clinch height	H0	16.0 ± 0.5
Lead wire (tape portion)	L1	2.5 MIN
Feed hole diameter	D0	4.0 ± 0.2
Taped Lead Thickness	t1	0.4 ± 0.05
Carrier tape Thickness	t2	0.2 ± 0.05
Position of Hole	P1	3.85 ± 0.03
Component alignment	ΔP	0 ± 1.0

Unit: mm

*Dimensions in mm

*Cumulative pitch error: 1.0mm/20 pitches

*Grong paper tape: 0.5mm+/-0.1

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 .

Obsolete Product(s) - Obsolete Product(s)

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