



STSA851

LOW VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

PRELIMINARY DATA

Ordering Code	Marking	Package / Shipment
STSA851	SA851	TO-92 / Bulk
STSA851-AP	SA851	TO-92 / Ammopack

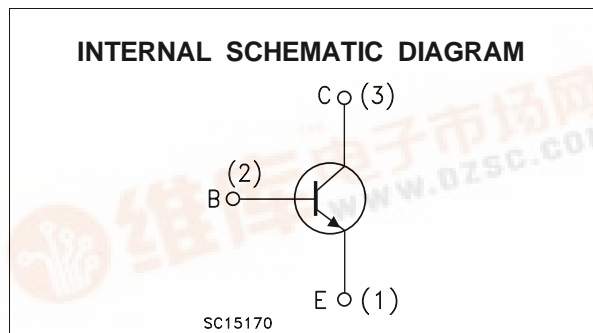
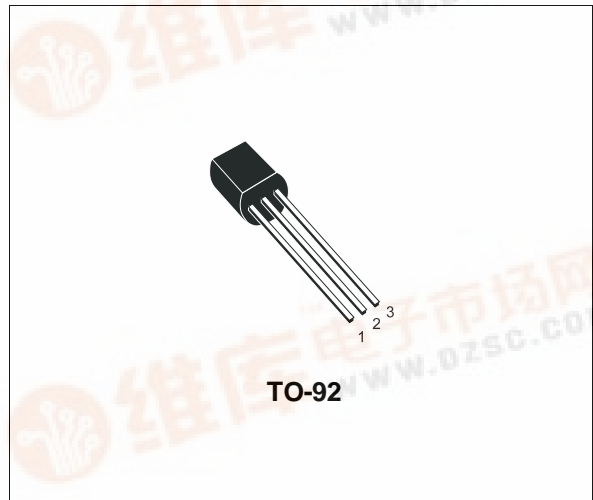
- VERY LOW COLLECTOR TO EMITTER SATURATION VOLTAGE
- HIGH CURRENT GAIN CHARACTERISTIC
- FAST-SWITCHING SPEED

APPLICATIONS:

- EMERGENCY LIGHTING
- VOLTAGE REGULATORS
- RELAY DRIVERS
- HIGH EFFICIENCY LOW VOLTAGE SWITCHING APPLICATIONS

DESCRIPTION

The device is manufactured in NPN Planar Technology by using a "Base Island" layout. The resulting Transistor shows exceptional high gain performance coupled with very low saturation voltage.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage ($I_E = 0$)	150	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	60	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	7	V
I_C	Collector Current	5	A
I_{CM}	Collector Peak Current ($t_p < 5$ ms)	15	A
I_B	Base Current	1	A
P_{tot}	Total Dissipation at $T_{amb} = 25$ °C	1.1	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

STSA851

THERMAL DATA

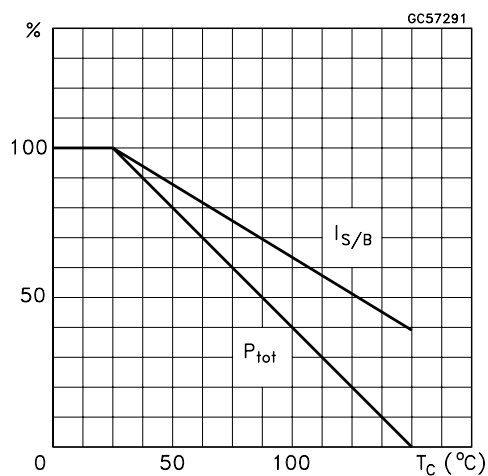
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	114	$^{\circ}\text{C}/\text{W}$
$R_{thj-case}$	Thermal Resistance Junction-case	Max	83.3	$^{\circ}\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

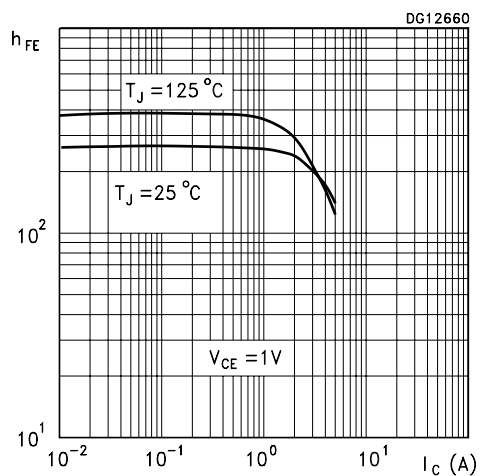
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current ($I_E = 0$)	$V_{CB} = 120\text{ V}$ $V_{CB} = 120\text{ V}$ $T_j = 100^{\circ}\text{C}$			50 1	nA μA
I_{EBO}	Emitter Cut-off Current ($I_C = 0$)	$V_{EB} = 7\text{ V}$			10	nA
$V_{(BR)CBO}^*$	Collector-Base Breakdown Voltage ($I_E = 0$)	$I_C = 100\text{ }\mu\text{A}$	150			V
$V_{(BR)CEO}^*$	Collector-Emitter Breakdown Voltage ($I_B = 0$)	$I_C = 10\text{ mA}$	60			V
$V_{(BR)EBO}^*$	Emitter-Base Breakdown Voltage ($I_C = 0$)	$I_E = 100\text{ }\mu\text{A}$	7			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 100\text{ mA}$ $I_B = 5\text{ mA}$ $I_C = 1\text{ A}$ $I_B = 50\text{ mA}$ $I_C = 2\text{ A}$ $I_B = 50\text{ mA}$ $I_C = 5\text{ A}$ $I_B = 200\text{ mA}$		10 70 140 320	50 120 200 450	mV mV mV mV
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 4\text{ A}$ $I_B = 200\text{ mA}$		1	1.15	V
$V_{BE(on)}^*$	Base-Emitter On Voltage	$I_C = 4\text{ A}$ $V_{CE} = 1\text{ V}$		0.89	1	V
h_{FE}^*	DC Current Gain	$I_C = 10\text{ mA}$ $V_{CE} = 1\text{ V}$ $I_C = 2\text{ A}$ $V_{CE} = 1\text{ V}$ $I_C = 5\text{ A}$ $V_{CE} = 1\text{ V}$ $I_C = 10\text{ A}$ $V_{CE} = 1\text{ V}$	150 150 90 30	300 270 140 50	350	
f_T	Transition frequency	$V_{CE} = 10\text{ V}$ $I_C = 100\text{ mA}$		130		MHz
C_{CBO}	Collector-Base Capacitance	$V_{CB} = 10\text{ V}$ $f = 1\text{ MHz}$		47		pF
t_{ON} t_s t_f	RESISTIVE LOAD Turn- on Time Storage Time Fall Time	$I_C = 1\text{ A}$ $V_{CC} = 10\text{ V}$ $I_{B1} = - I_{B2} = 0.1\text{ A}$		50 1.35 120		ns μs ns

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

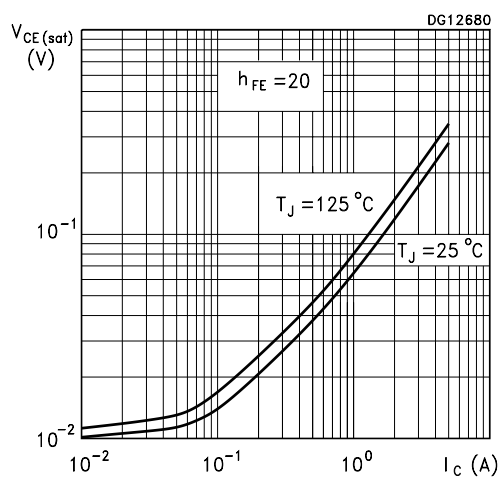
Derating Curve



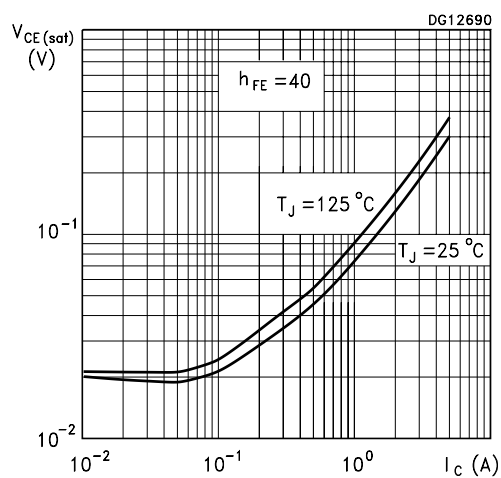
DC Current Gain



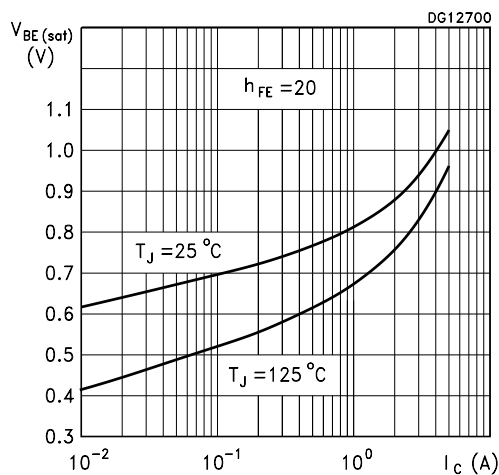
Collector-Emitter Saturation Voltage



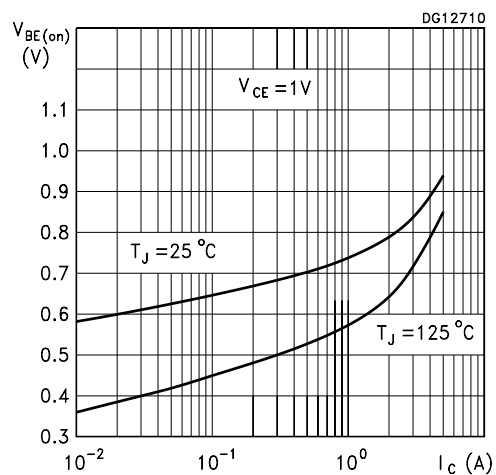
Collector-Emitter Saturation Voltage



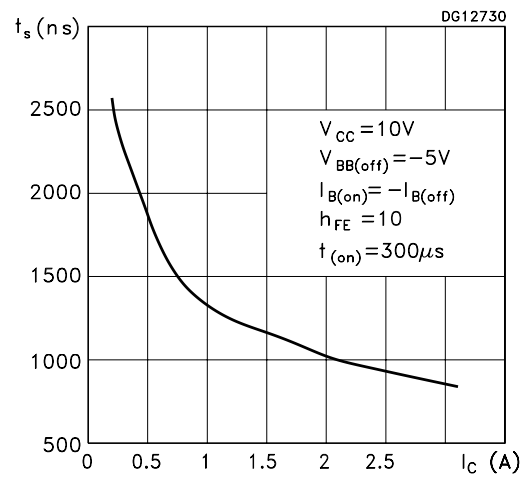
Base-Emitter Saturation Voltage



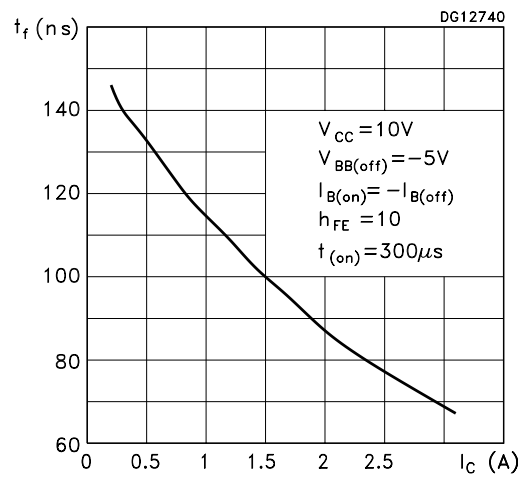
Base-Emitter On Voltage



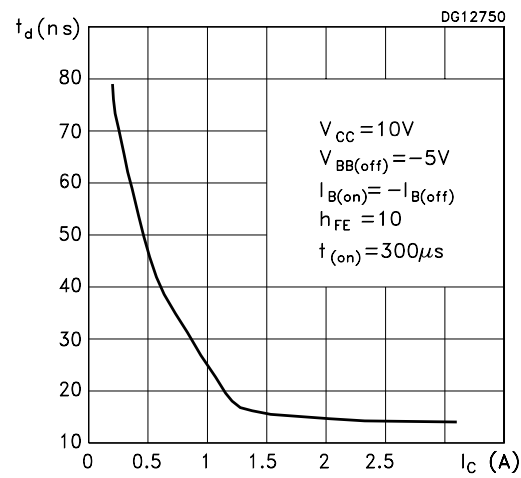
Switching Times Resistive Load



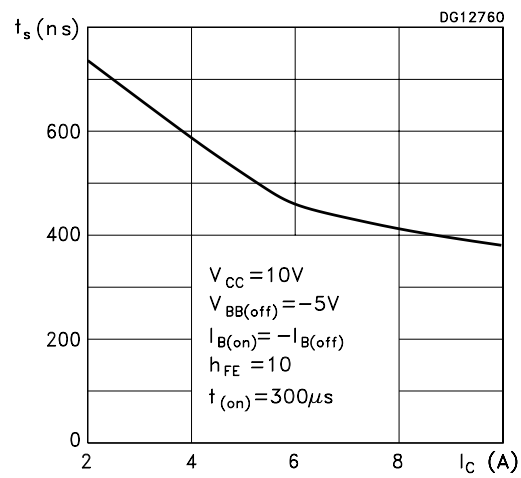
Switching Times Resistive Load



Switching Times Resistive Load



Switching Times Inductive Load



Switching Times Inductive Load

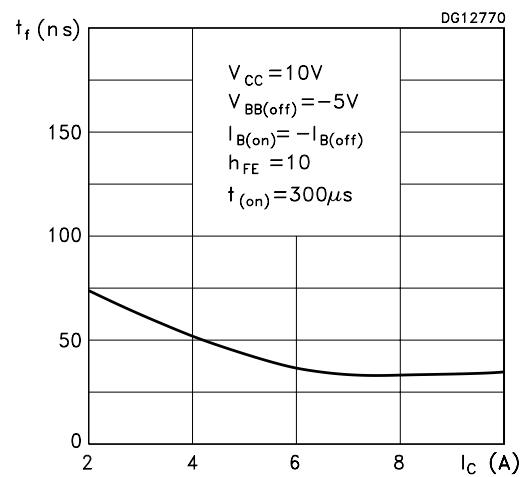
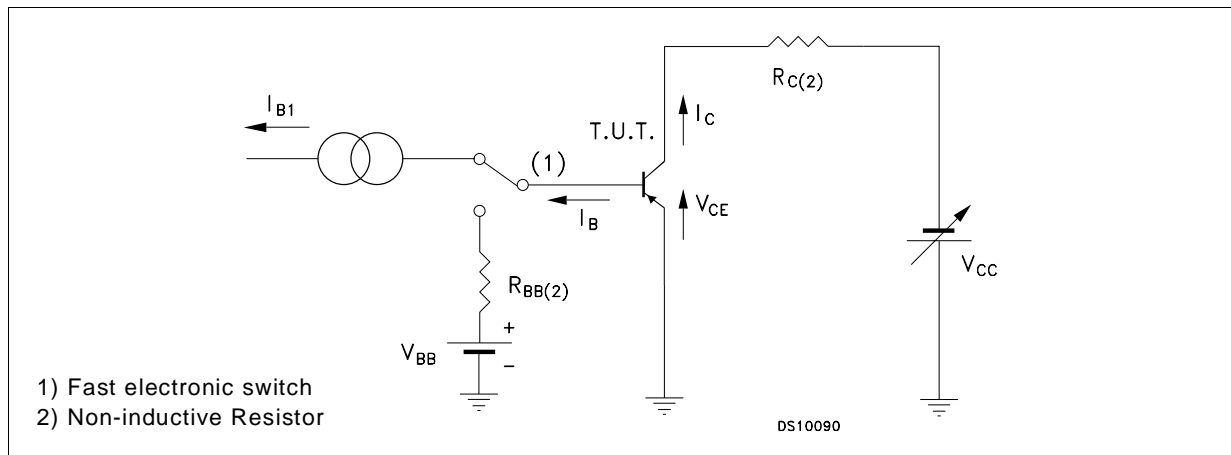
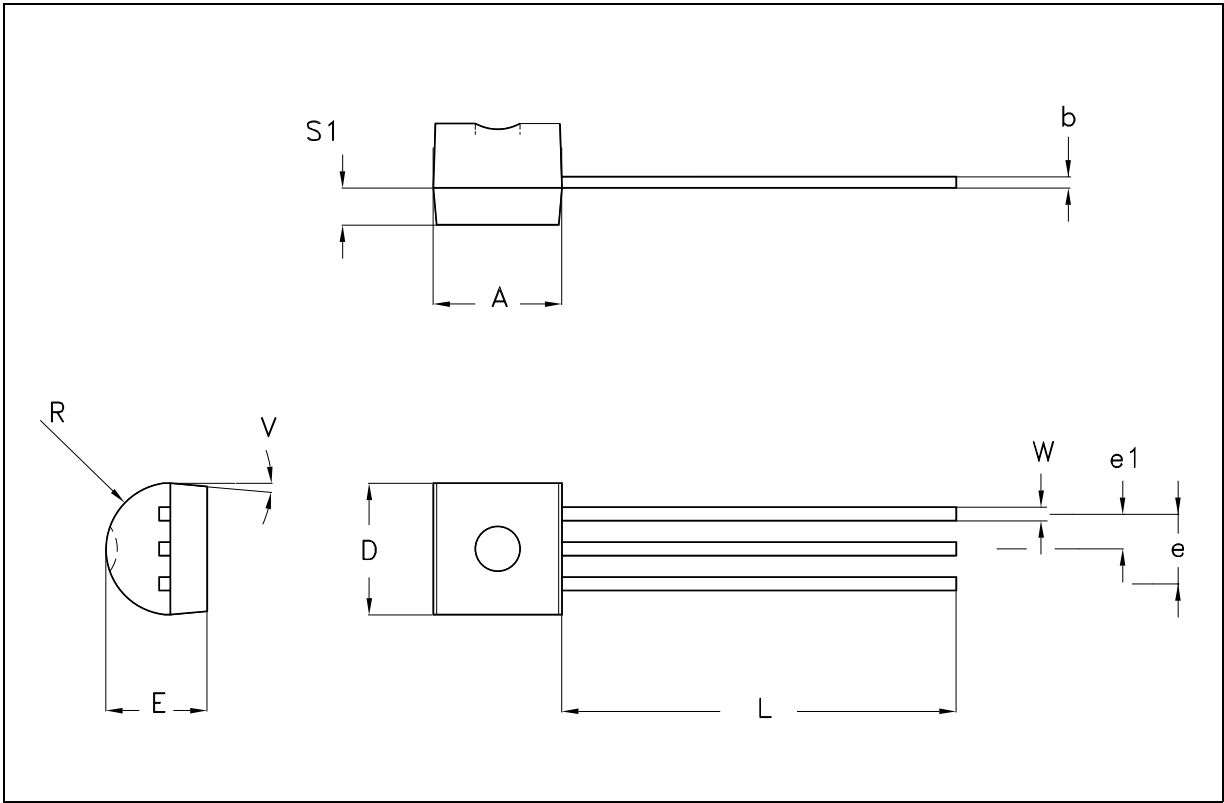


Figure 1: Resistive Load Switching Test Circuit.

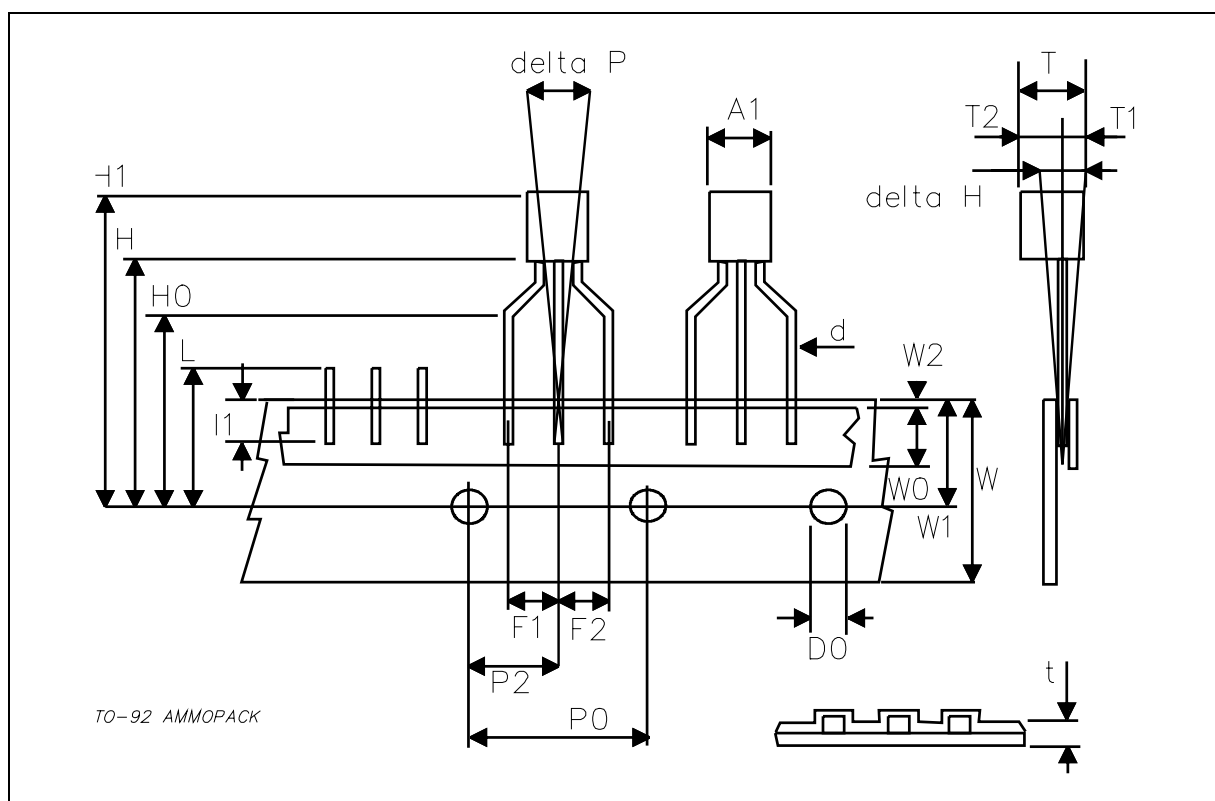
TO-92 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.32		4.95	0.170		0.195
b	0.36		0.51	0.014		0.020
D	4.45		4.95	0.175		0.194
E	3.30		3.94	0.130		0.155
e	2.41		2.67	0.095		0.105
e1	1.14		1.40	0.045		0.055
L	12.70		15.49	0.500		0.609
R	2.16		2.41	0.085		0.094
S1	1.14		1.52	0.045		0.059
W	0.41		0.56	0.016		0.022
V	4 degree		6 degree	4 degree		6 degree



TO-92 AMMOPACK SHIPMENT (Suffix "-AP") MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A1			4.80			0.189
T			3.80			0.150
T1			1.60			0.063
T2			2.30			0.091
d			0.48			0.019
P0	12.50	12.70	12.90	0.492	0.500	0.508
P2	5.65	6.35	7.05	0.222	0.250	0.278
F1,F2	2.44	2.54	2.94	0.096	0.100	0.116
delta H	-2.00		2.00	-0.079		0.079
W	17.50	18.00	19.00	0.689	0.709	0.748
W0	5.70	6.00	6.30	0.224	0.236	0.248
W1	8.50	9.00	9.25	0.335	0.354	0.364
W2			0.50			0.020
H	18.50		20.50	0.728		0.807
H0	15.50	16.00	16.50	0.610	0.630	0.650
H1			25.00			0.984
D0	3.80	4.00	4.20	0.150	0.157	0.165
t			0.90			0.035
L			11.00			0.433
l1	3.00			0.118		
delta P	-1.00		1.00	-0.039		0.039



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