



# 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

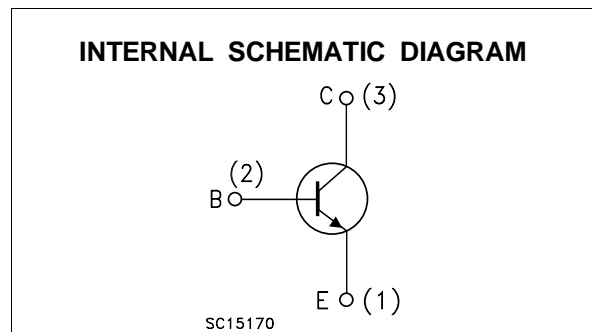
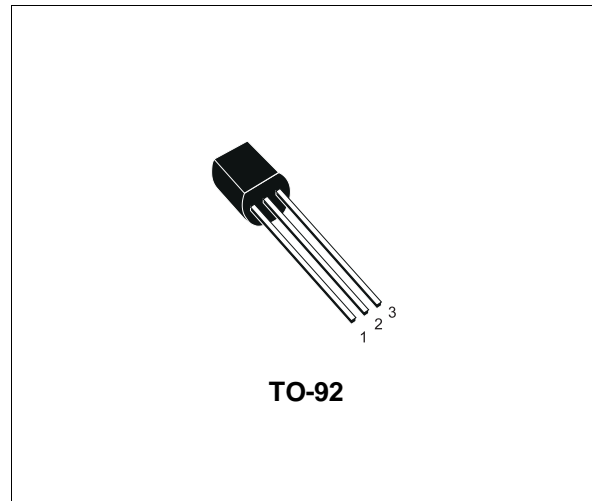
### APPLICATIONS:

- 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

## THERMAL DATA

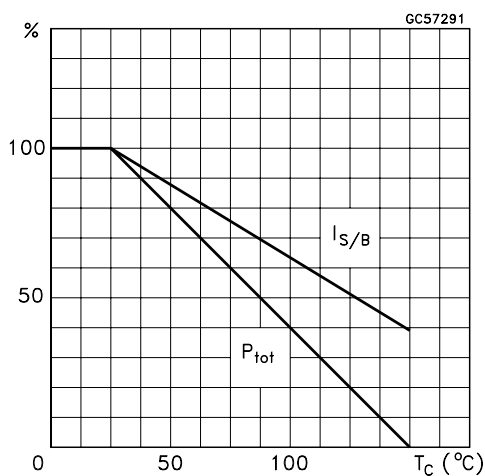
R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient	Max	114	°C/W
R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	83.3	°C/W

ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

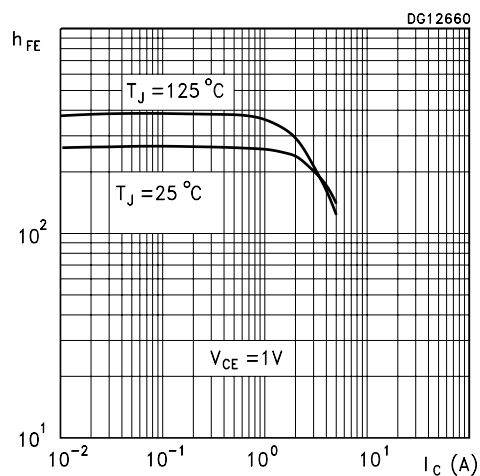
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CBO</sub>	Collector Cut-off Current (I <sub>E</sub> = 0)	V <sub>CB</sub> = 120 V V <sub>CB</sub> = 120 V    T <sub>j</sub> = 100 °C			50 1	nA μA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 7 V			10	nA
V <sub>(BR)CBO</sub> *	Collector-Base Breakdown Voltage (I <sub>E</sub> = 0)	I <sub>C</sub> = 100 μA	150			V
V <sub>(BR)CEO</sub> *	Collector-Emitter Breakdown Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 10 mA	60			V
V <sub>(BR)EBO</sub> *	Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 100 μA	7			V
V <sub>CE(sat)</sub> *	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 100 mA    I <sub>B</sub> = 5 mA I <sub>C</sub> = 1 A        I <sub>B</sub> = 50 mA I <sub>C</sub> = 2 A        I <sub>B</sub> = 50 mA I <sub>C</sub> = 5 A        I <sub>B</sub> = 200 mA		10 70 140 320	50 120 200 450	mV mV mV mV
V <sub>BE(sat)</sub> *	Base-Emitter Saturation Voltage	I <sub>C</sub> = 4 A        I <sub>B</sub> = 200 mA		1	1.15	V
V <sub>BE(on)</sub> *	Base-Emitter On Voltage	I <sub>C</sub> = 4 A        V <sub>CE</sub> = 1 V		0.89	1	V
h <sub>FE</sub> *	DC Current Gain	I <sub>C</sub> = 10 mA    V <sub>CE</sub> = 1 V I <sub>C</sub> = 2 A        V <sub>CE</sub> = 1 V I <sub>C</sub> = 5 A        V <sub>CE</sub> = 1 V I <sub>C</sub> = 10 A       V <sub>CE</sub> = 1 V	150 150 90 30	300 270 140 50	350	
f <sub>T</sub>	Transition frequency	V <sub>CE</sub> = 10 V    I <sub>C</sub> = 100 mA		130		MHz
C <sub>CBO</sub>	Collector-Base Capacitance	V <sub>CB</sub> = 10 V    f = 1 MHz		47		pF
t <sub>ON</sub> t <sub>s</sub> t <sub>f</sub>	RESISTIVE LOAD Turn- on Time Storage Time Fall Time	I <sub>C</sub> = 1 A        V <sub>CC</sub> = 10 V I <sub>B1</sub> = - I <sub>B2</sub> = 0.1 A		50 1.35 120		ns μs ns

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

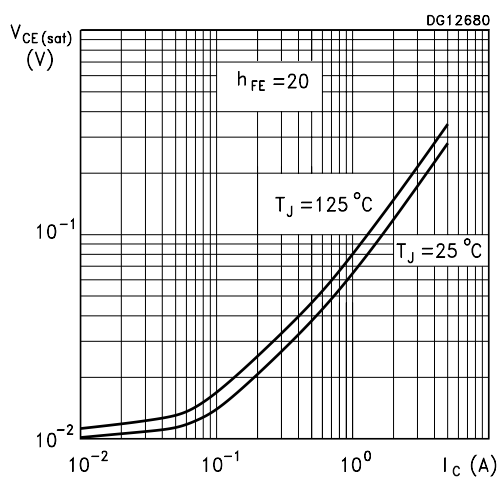
Derating Curve



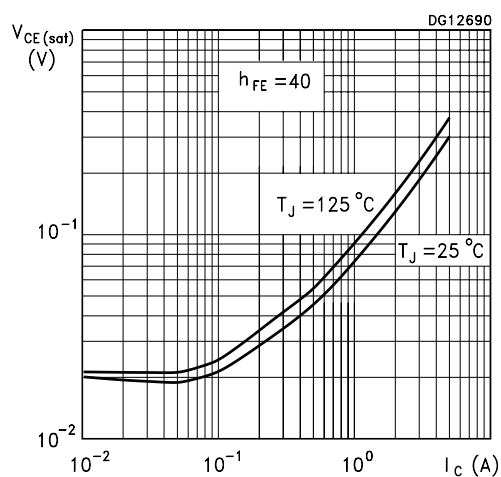
DC Current Gain



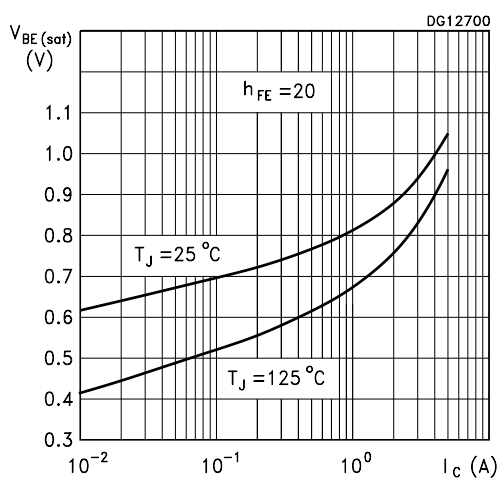
Collector-Emitter Saturation Voltage



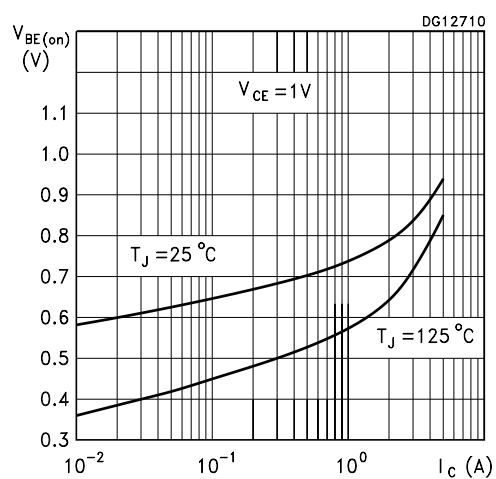
Collector-Emitter Saturation Voltage



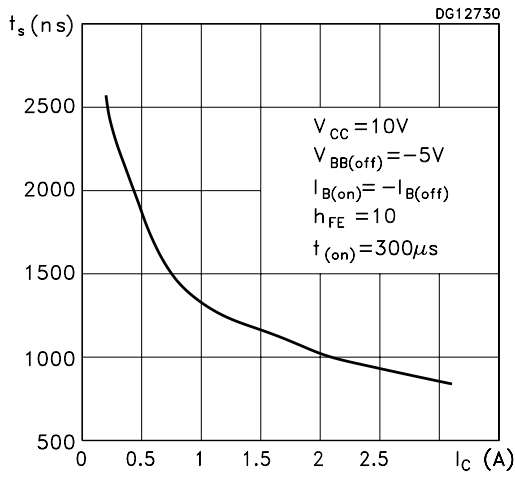
Base-Emitter Saturation Voltage



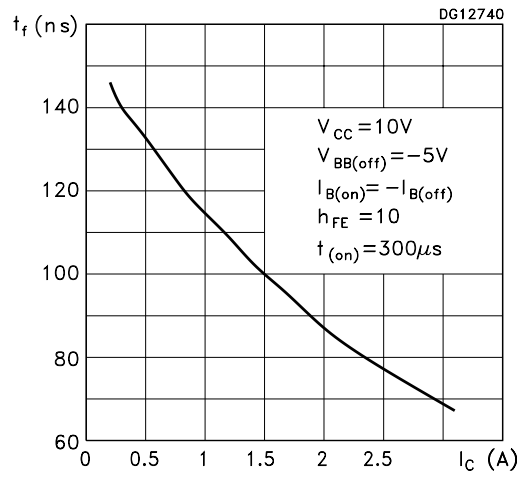
Base-Emitter On Voltage



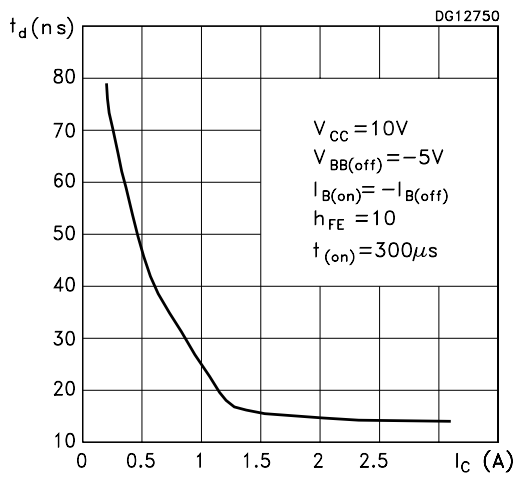
Switching Times Resistive Load



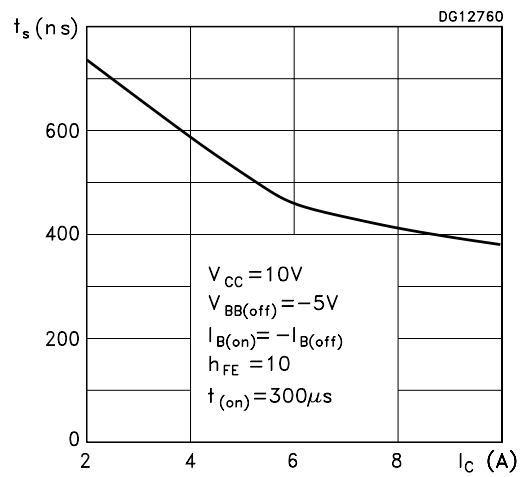
Switching Times Resistive Load



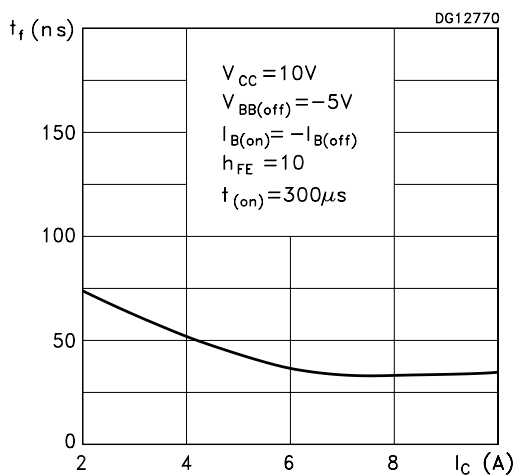
Switching Times Resistive Load

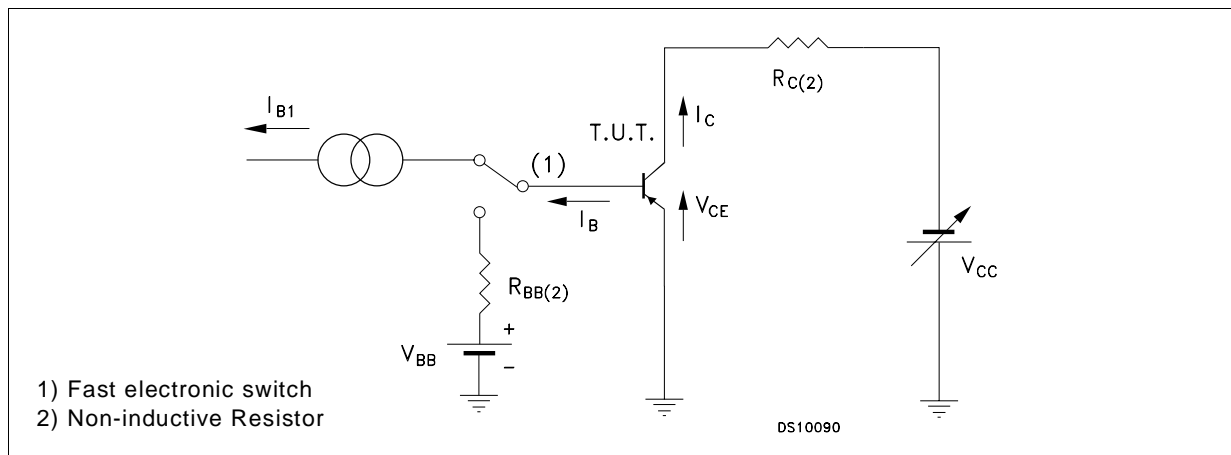


Switching Times Inductive Load



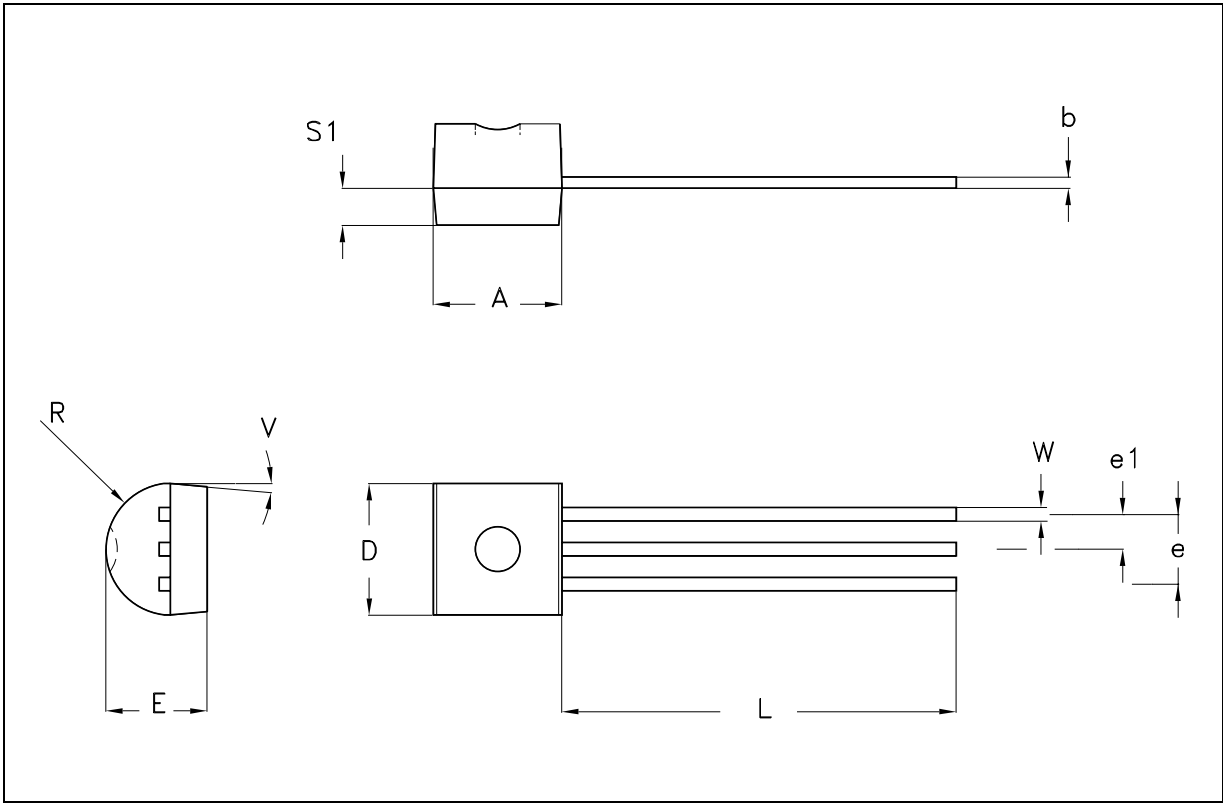
Switching Times Inductive Load



**Figure 1:** Resistive Load Switching Test Circuit.

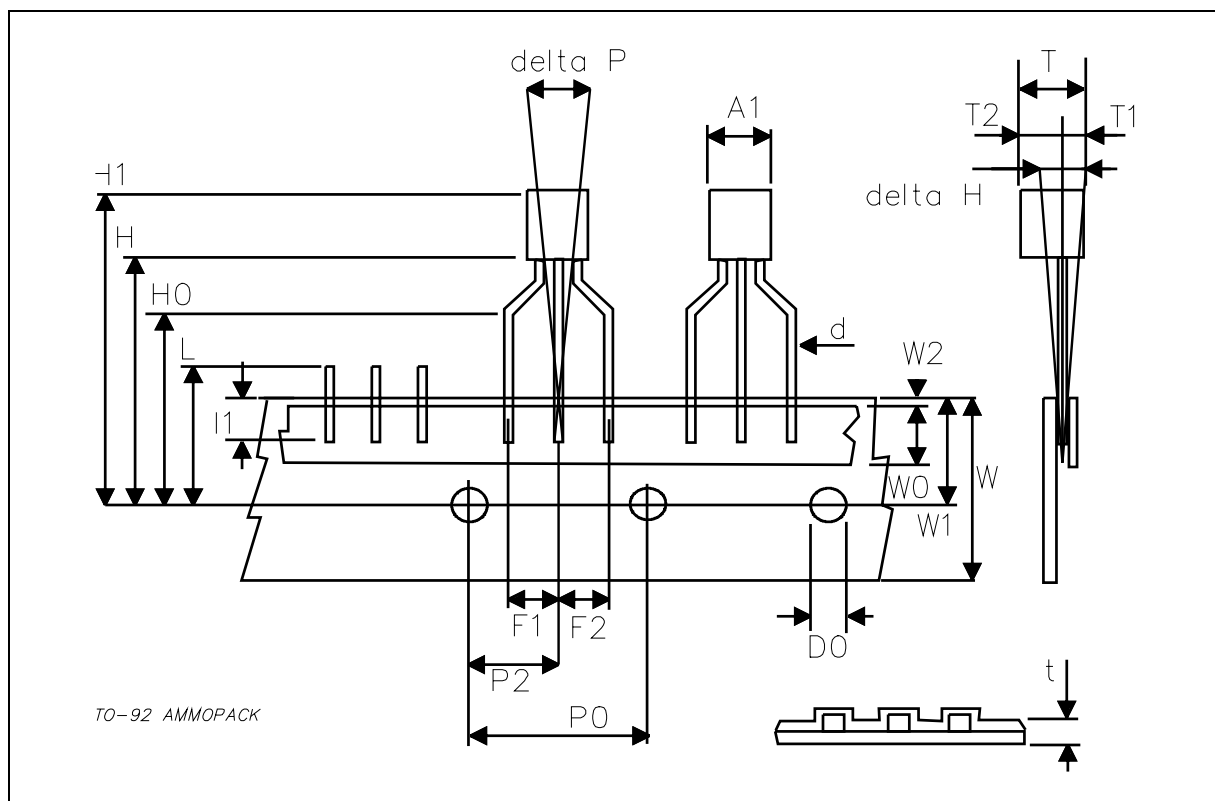
**TO-92 MECHANICAL DATA**

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
I1	3.00			0.118		
delta P	-1.00		1.00	-0.039		0.039



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