



# STX13005

## STX13005-AP

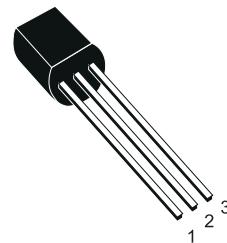
### HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

Ordering Code	Marking	Shipment
STX13005	X13005	
STX13005-AP	X13005	Bulk Ammopack

- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

#### APPLICATIONS:

- COMPACT FLUORESCENT LAMPS (CFLS)
- SWITCH MODE POWER SUPPLIES (AC / DC CONVERTERS)



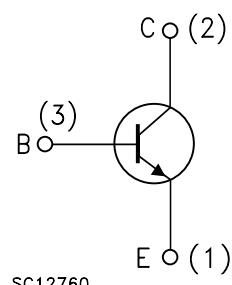
TO-92

#### DESCRIPTION

The device is manufactured using High Voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability.

It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining a wide RBSOA.

#### INTERNAL SCHEMATIC DIAGRAM



#### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )	700	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	400	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ , $I_B < 1.5$ A, $t_p < 10$ ms)	$V_{(BR)EBO}$	V
$I_C$	Collector Current	3	A
$I_{CM}$	Collector Peak Current ( $t_p < 5$ ms)	6	A
$I_B$	Base Current	1.5	A
$I_{BM}$	Base Peak Current ( $t_p < 5$ ms)	3	A
$P_{tot}$	Total Dissipation at $T_c = 25$ °C	2.8	W
$T_{stg}$	Storage Temperature	-65 to 150	°C
$T_j$	Max. Operating Junction Temperature	150	°C

## STX13005 / STX13005-AP

### THERMAL DATA

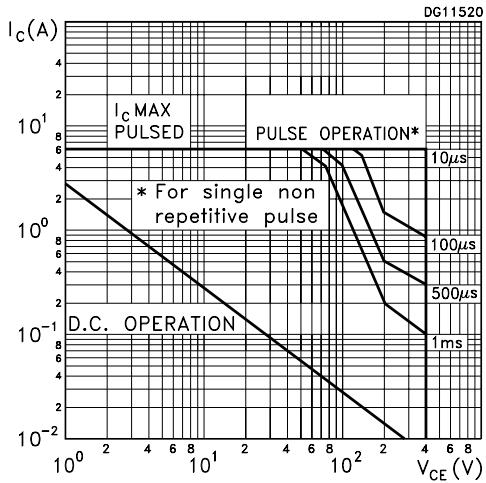
R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	44.6	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient	Max	150	°C/W

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

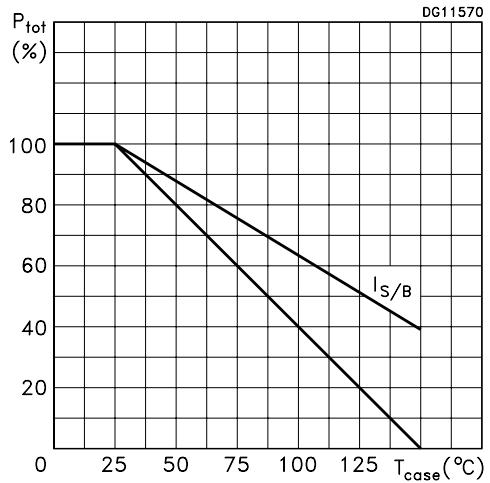
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CES</sub>	Collector Cut-off Current (V <sub>BE</sub> = 0)	V <sub>CE</sub> = 700 V V <sub>CE</sub> = 700 V T <sub>j</sub> = 100 °C			1 5	mA mA
I <sub>CEO</sub>	Collector Cut-off Current (I <sub>B</sub> = 0)	V <sub>CE</sub> = 400 V			1	mA
V <sub>(BR)EBO</sub>	Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 10 mA	9		18	V
V <sub>CCEO(sus)*</sub>	Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 10 mA	400			V
V <sub>CCE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 1 A I <sub>B</sub> = 200 mA I <sub>C</sub> = 2 A I <sub>B</sub> = 500 mA I <sub>C</sub> = 3 A I <sub>B</sub> = 750 mA			0.5 0.6 5	V V V
V <sub>BE(sat)*</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> = 1 A I <sub>B</sub> = 200 mA I <sub>C</sub> = 2 A I <sub>B</sub> = 500 mA			1.2 1.6	V V
h <sub>FE</sub> *	DC Current Gain	I <sub>C</sub> = 1 A V <sub>CE</sub> = 5 V I <sub>C</sub> = 2 A V <sub>CE</sub> = 5 V	10 8		30 24	
t <sub>s</sub> t <sub>f</sub>	RESISTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = 2 A V <sub>CC</sub> = 125 V I <sub>B1</sub> = -I <sub>B2</sub> = 400 mA t <sub>p</sub> = 30 µs (See Figure 1)			1.65 260	µs ns
t <sub>s</sub> t <sub>f</sub>	INDUCTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = 1 A V <sub>clamp</sub> = 300 V I <sub>B1</sub> = 200 mA V <sub>BE(off)</sub> = -5 V L = 50 mH R <sub>BB</sub> = 0 (See Figure 2)			0.8 150	µs ns

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

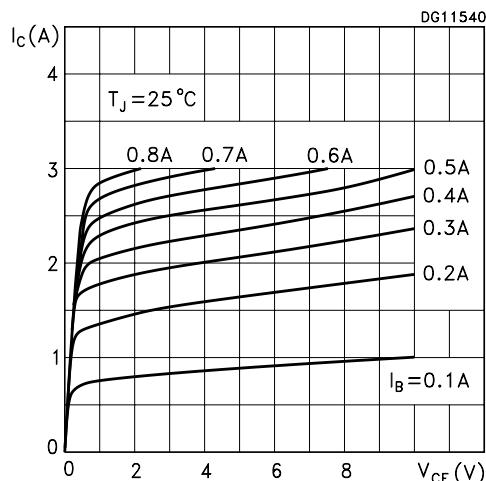
**Safe Operating Area**



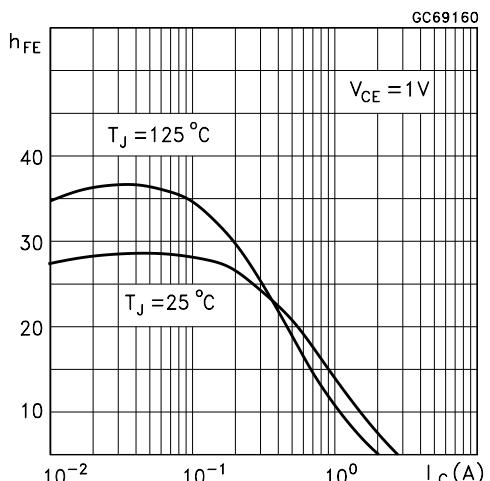
**Derating Curve**



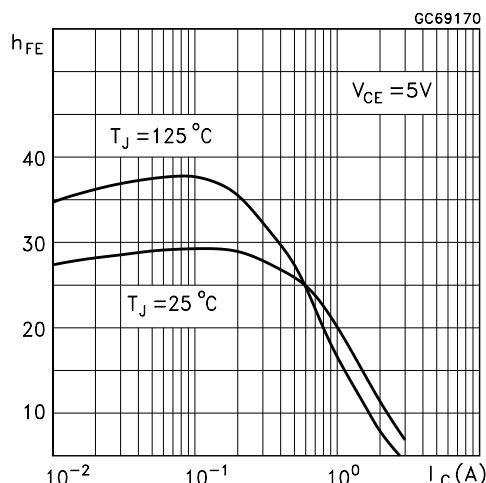
**Output Characteristics**



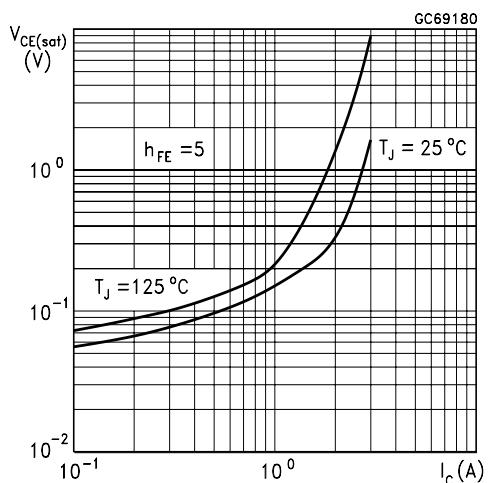
**DC Current Gain**



**DC Current Gain**

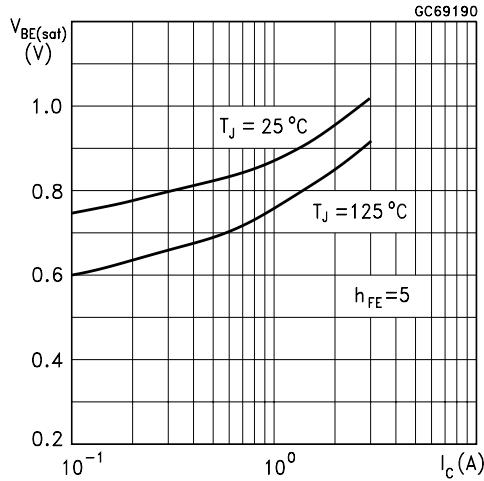


**Collector-Emitter Saturation Voltage**

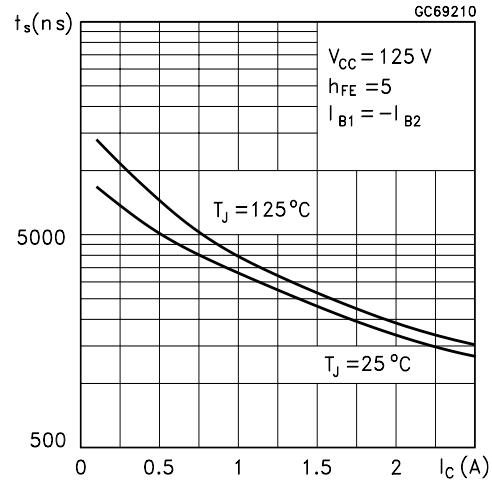


## STX13005 / STX13005-AP

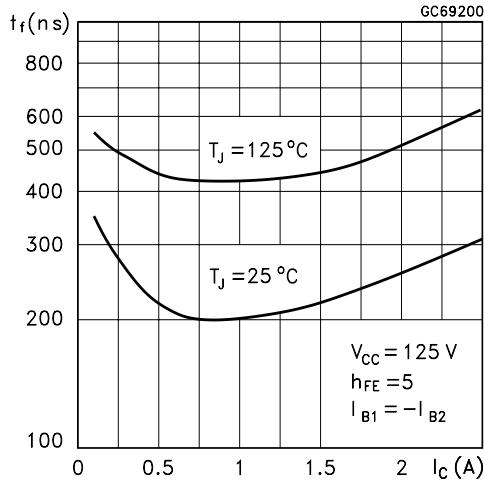
Base-Emitter Saturation Voltage



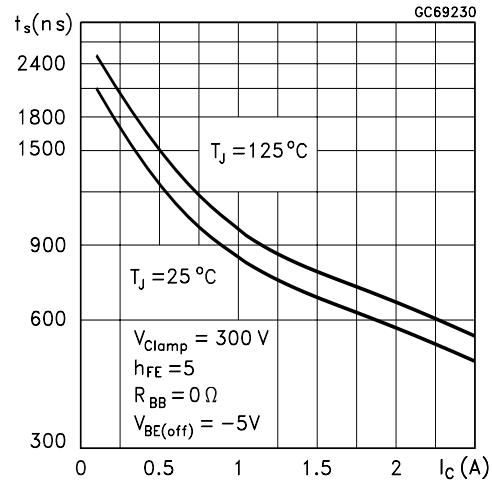
Resistive Load Storage Time



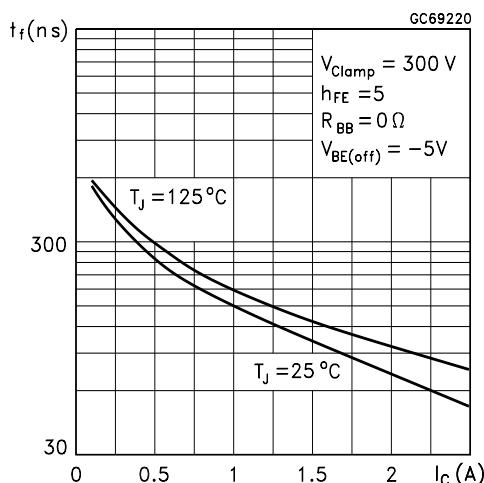
Resistive Load Fall Time



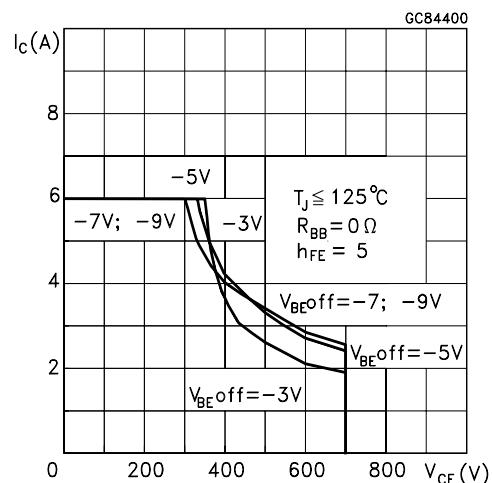
Inductive Load Storage Time



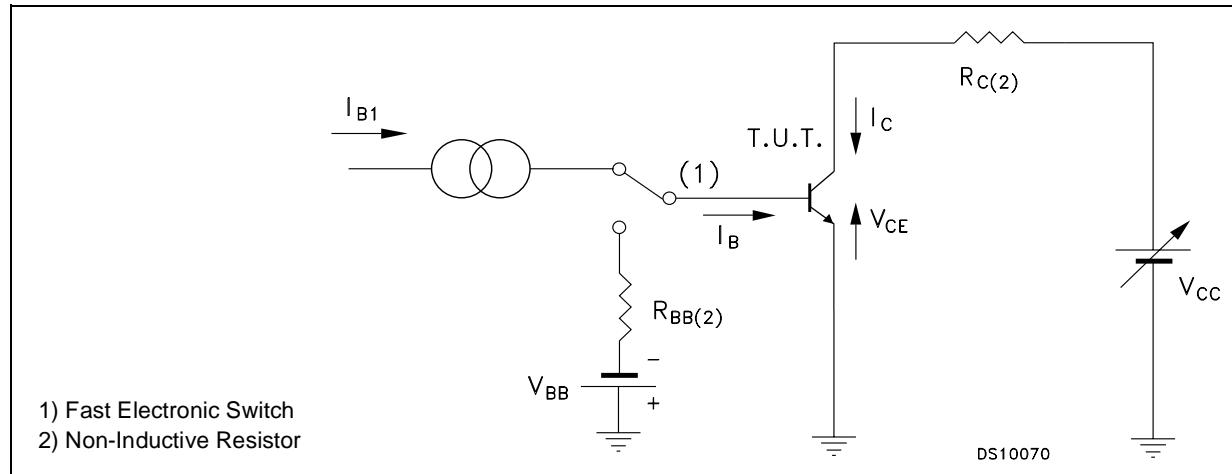
Inductive Load Fall Time



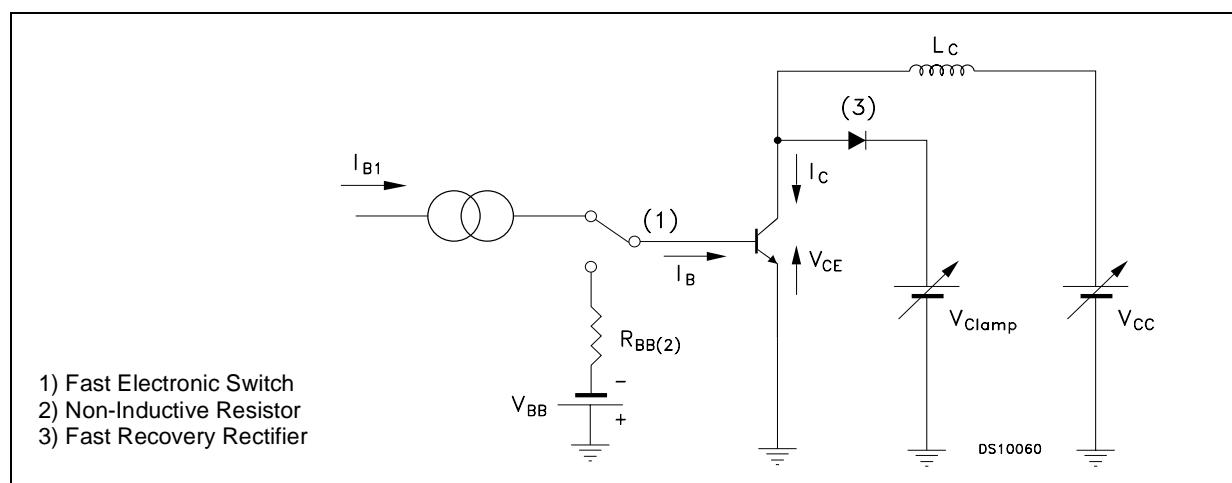
Reverse Biased Safe Operating Area



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

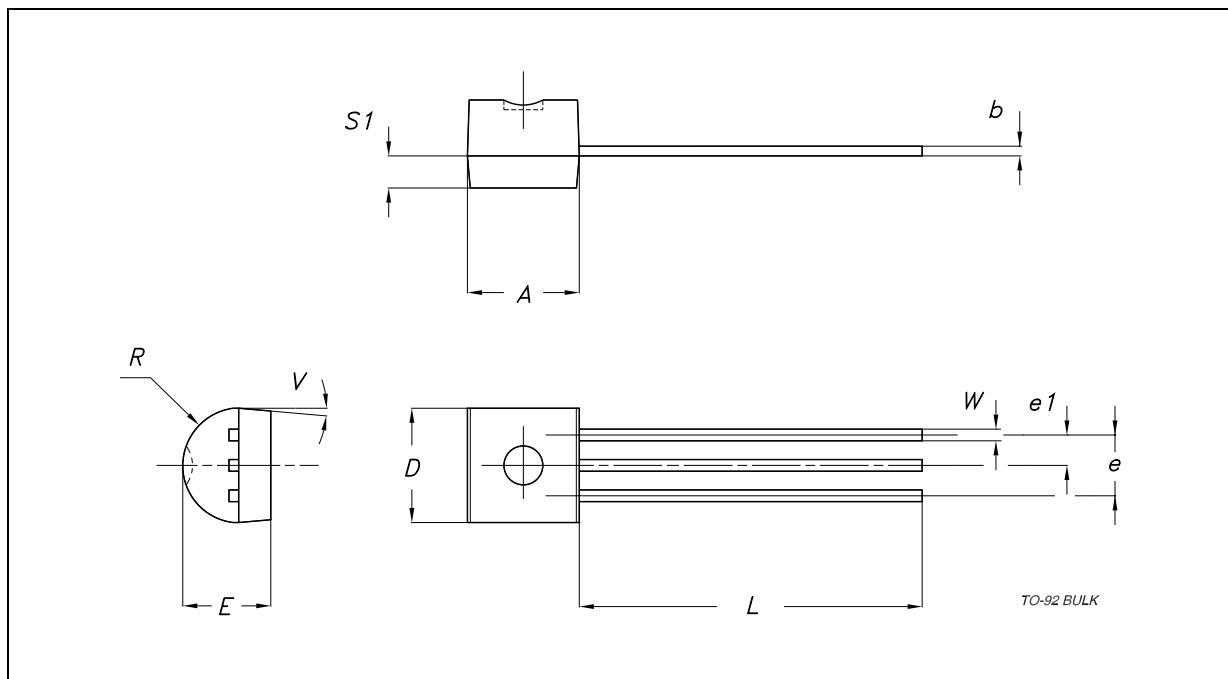


**Figure 2:** Inductive Load Switching Test Circuit



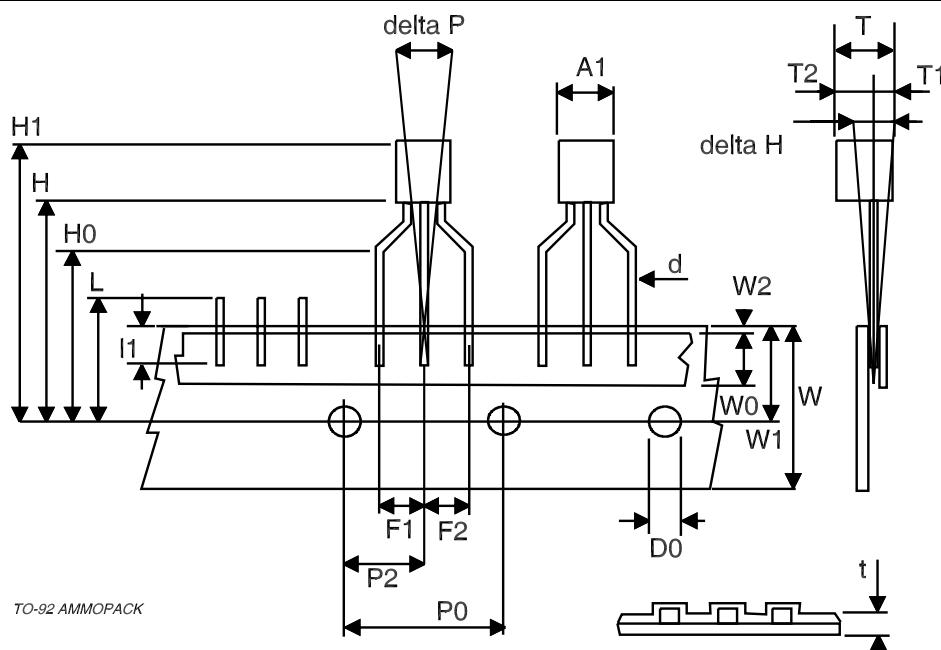
**TO-92 BULK SHIPMENT MECHANICAL DATA**

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		0.195
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		0.610
R	2.16		2.41	0.085		0.095
S1	0.92		1.52	0.036		0.060
W	0.41		0.56	0.016		0.022
V		5°			5°	



## 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



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2002 STMicroelectronics - Printed in Italy - All Rights Reserved  
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco  
Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.  
© <http://www.st.com>