



# STX13005 STX13005-AP

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

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

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

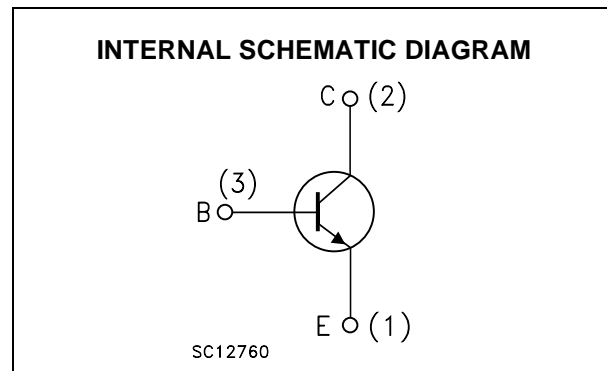
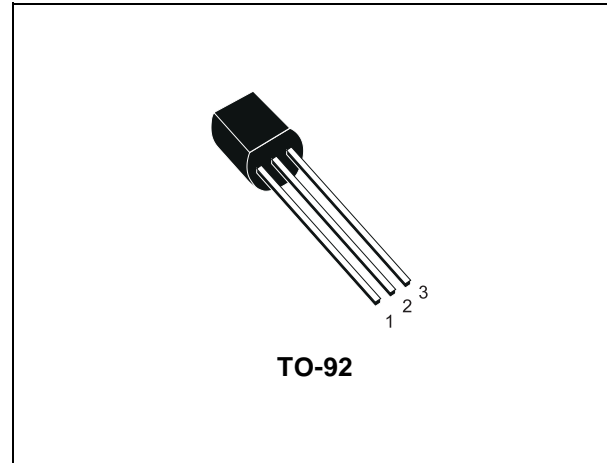
### APPLICATIONS:

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

### 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.



### 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

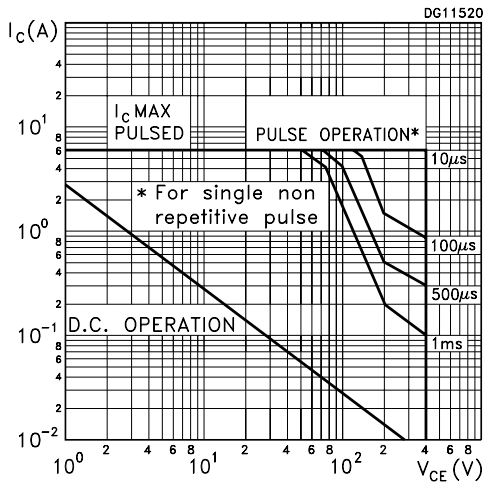
$R_{thj-case}$	Thermal Resistance Junction-case	Max	44.6	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	150	°C/W

### ELECTRICAL CHARACTERISTICS ( $T_j = 25\text{ °C}$ unless otherwise specified)

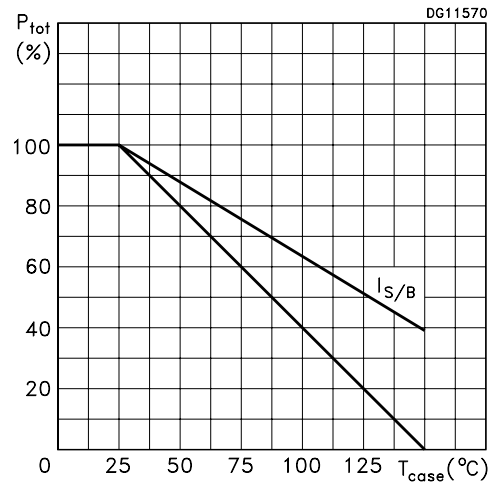
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cut-off Current ( $V_{BE} = 0$ )	$V_{CE} = 700\text{ V}$			1	mA
		$V_{CE} = 700\text{ V}$ $T_j = 100\text{ °C}$			5	mA
$I_{CEO}$	Collector Cut-off Current ( $I_B = 0$ )	$V_{CE} = 400\text{ V}$			1	mA
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ( $I_C = 0$ )	$I_E = 10\text{ mA}$	9		18	V
$V_{CEO(sus)}^*$	Collector-Emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 10\text{ mA}$	400			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 1\text{ A}$ $I_B = 200\text{ mA}$			0.5	V
		$I_C = 2\text{ A}$ $I_B = 500\text{ mA}$			0.6	V
		$I_C = 3\text{ A}$ $I_B = 750\text{ mA}$			5	V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 1\text{ A}$ $I_B = 200\text{ mA}$			1.2	V
		$I_C = 2\text{ A}$ $I_B = 500\text{ mA}$			1.6	V
$h_{FE}^*$	DC Current Gain	$I_C = 1\text{ A}$ $V_{CE} = 5\text{ V}$	10		30	
		$I_C = 2\text{ A}$ $V_{CE} = 5\text{ V}$	8		24	
$t_s$ $t_f$	RESISTIVE LOAD Storage Time Fall Time	$I_C = 2\text{ A}$ $V_{CC} = 125\text{ V}$ $I_{B1} = -I_{B2} = 400\text{ mA}$ $t_p = 30\text{ }\mu\text{s}$ (See Figure 1)		1.65 260		$\mu\text{s}$ ns
		$I_C = 1\text{ A}$ $V_{clamp} = 300\text{ V}$ $I_{B1} = 200\text{ mA}$ $V_{BE(off)} = -5\text{ V}$ $L = 50\text{ mH}$ $R_{BB} = 0$ (See Figure 2)		0.8 150		$\mu\text{s}$ ns

\* Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle = 1.5 %.

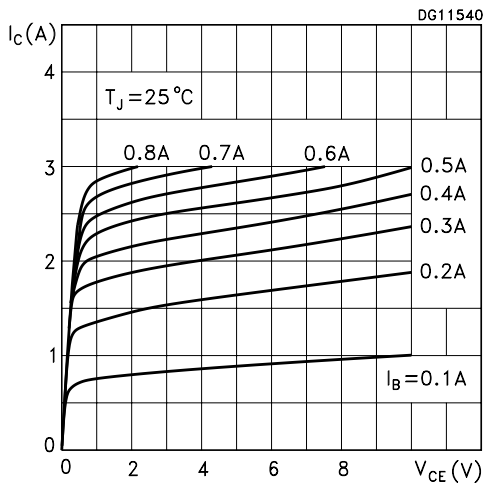
Safe Operating Area



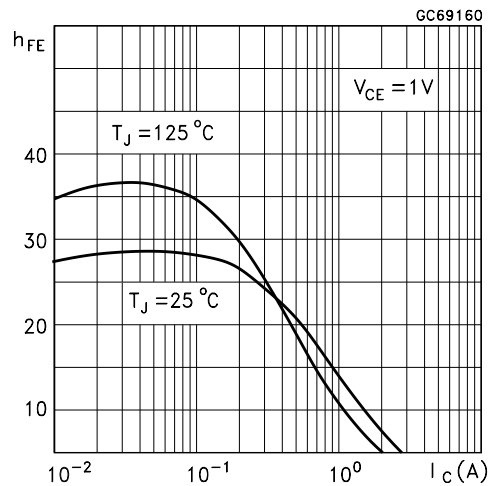
Derating Curve



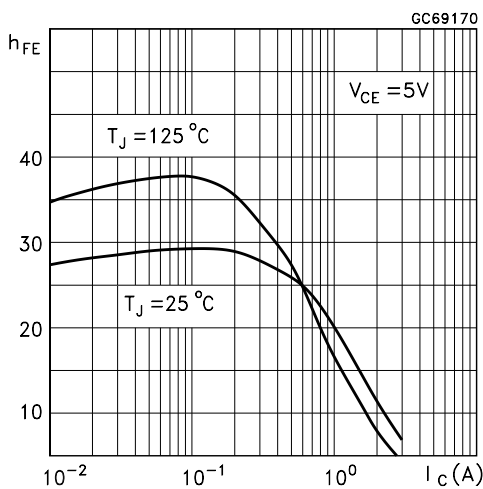
Output Characteristics



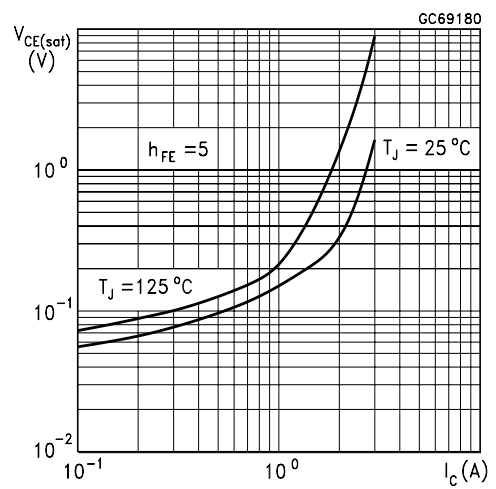
DC Current Gain



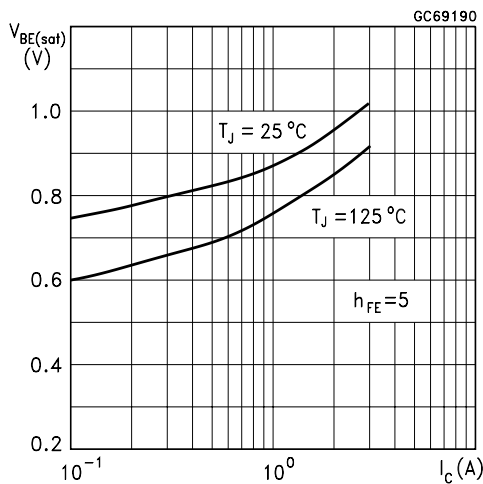
DC Current Gain



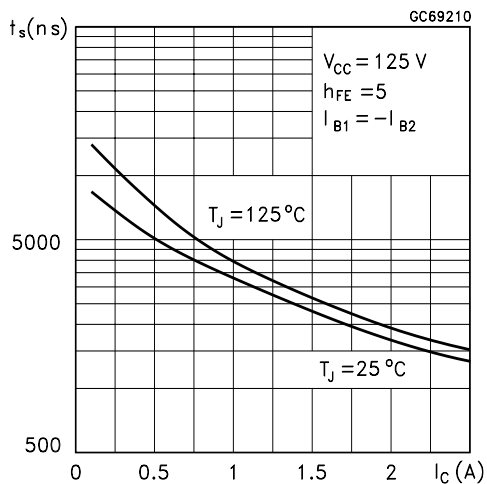
Collector-Emitter Saturation Voltage



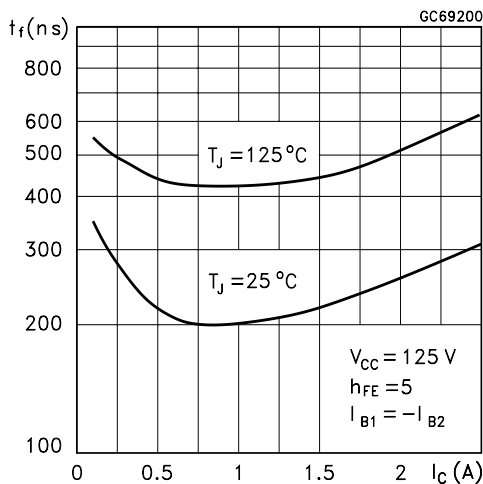
Base-Emitter Saturation Voltage



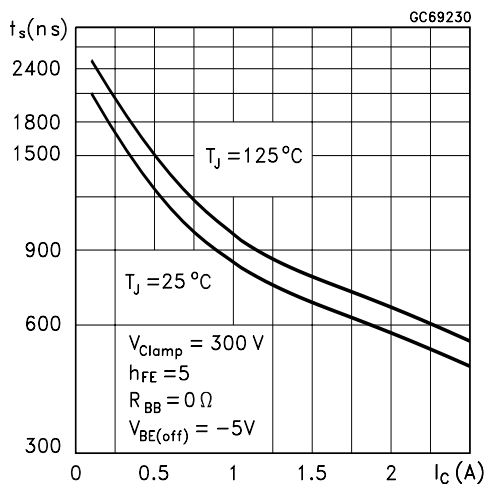
Resistive Load Storage Time



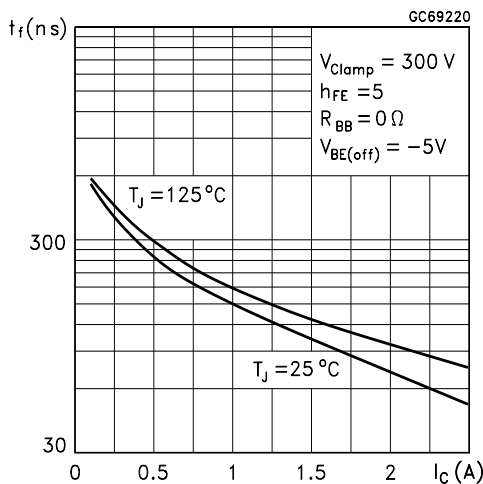
Resistive Load Fall Time



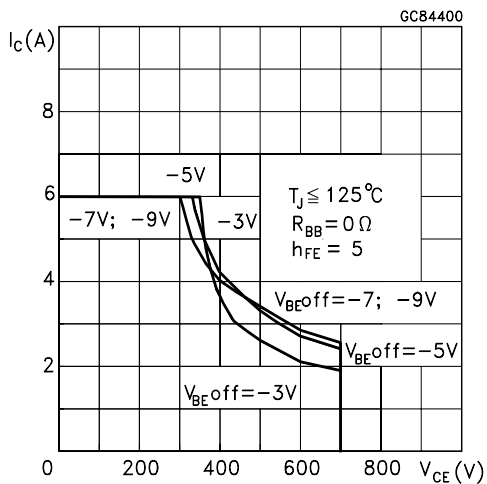
Inductive Load Storage Time



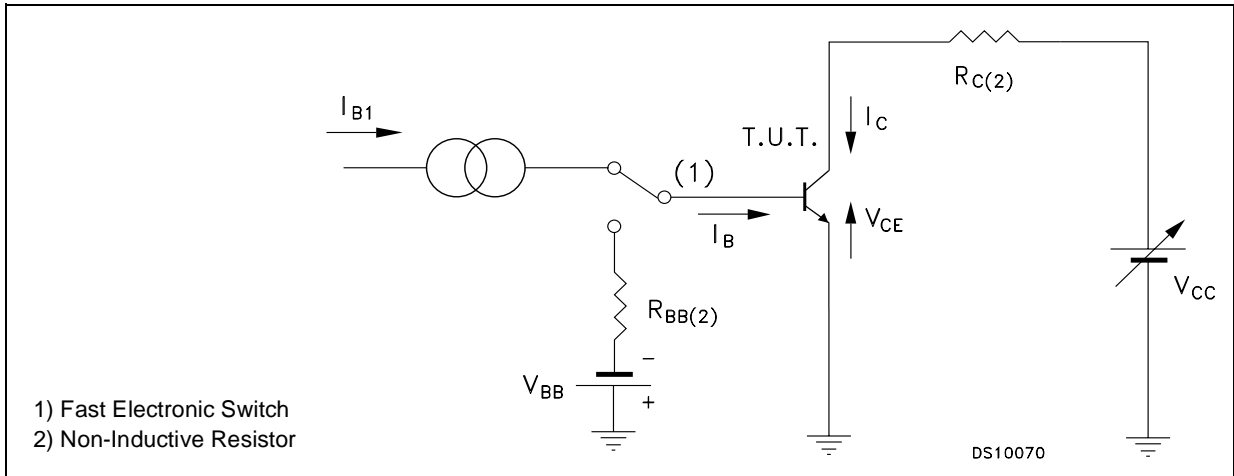
Inductive Load Fall Time



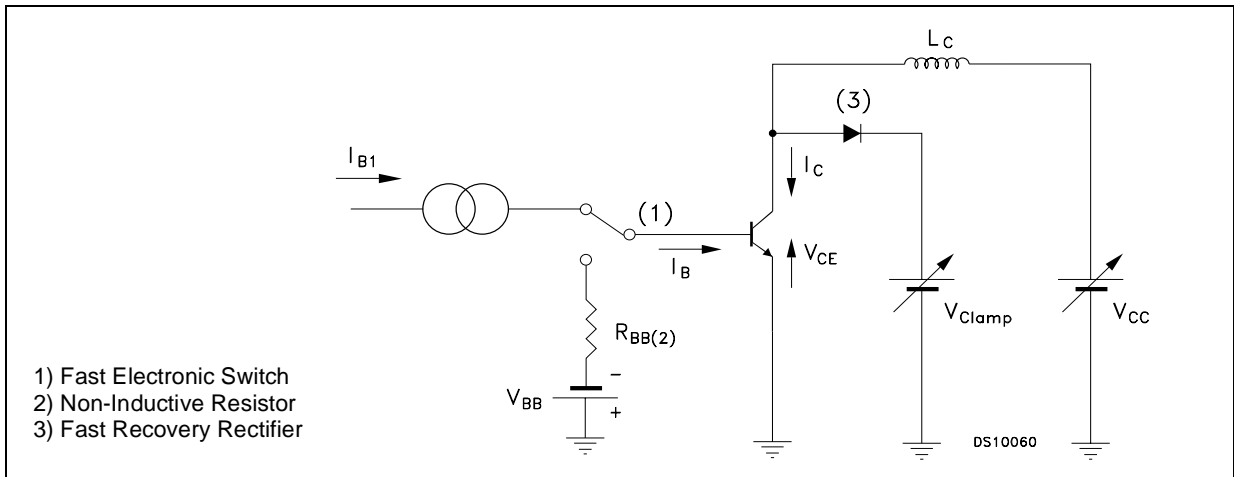
Reverse Biased Safe Operating Area



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

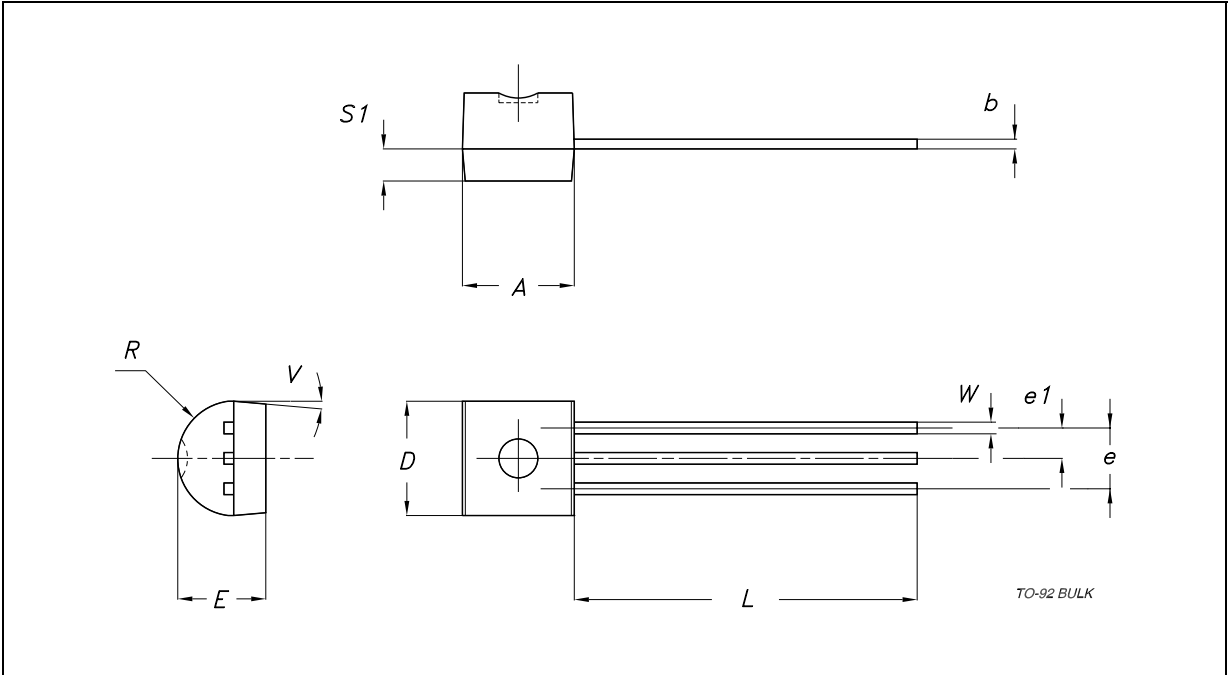


**Figure 2: Inductive Load Switching Test Circuit**



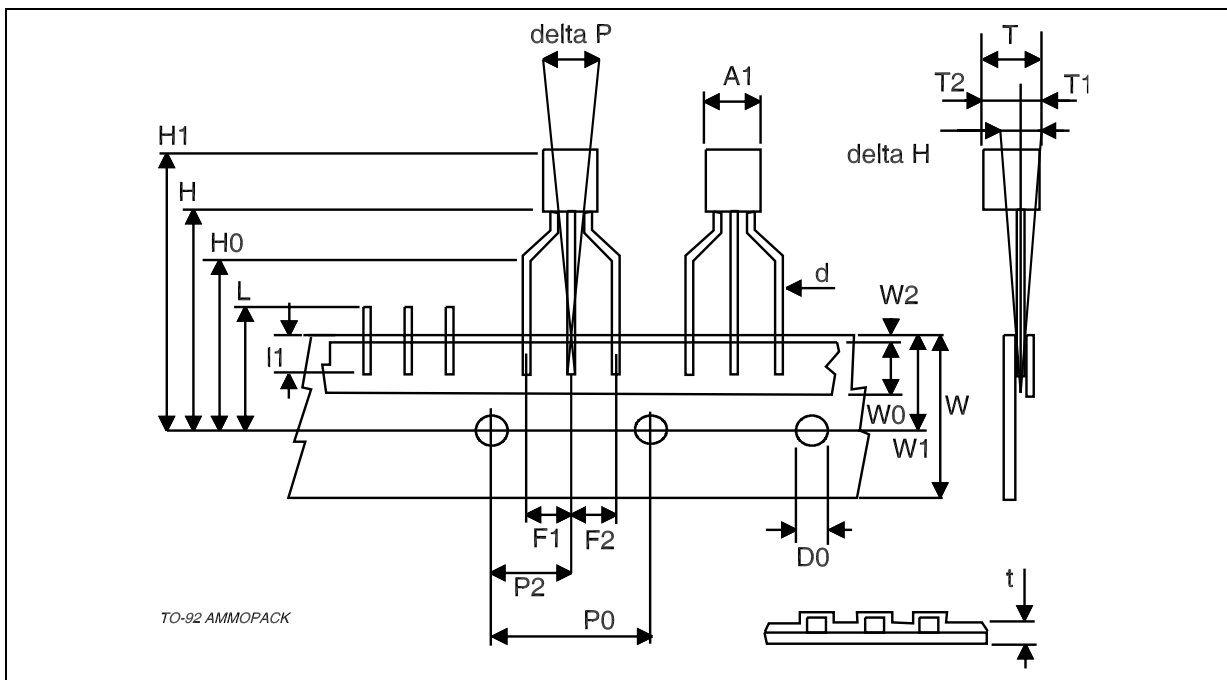
**TO-92 BULK SHIPMENT MECHANICAL DATA**

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
l1	3.00			0.118		
delta P	-1.00		1.00	-0.039		0.039



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