STX0560

High voltage fast-switching NPN power transistor

Features

- High voltage capability
- Very high switching speed

Applications

- Compact fluorescent lamps (CFLs)
- SMPS for battery charger

Description

This 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.

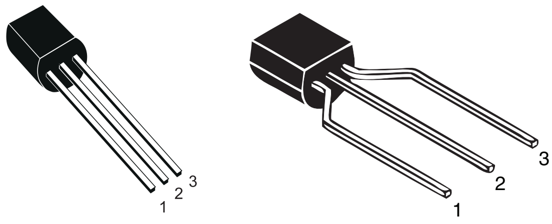


Figure 1. Internal schematic diagram

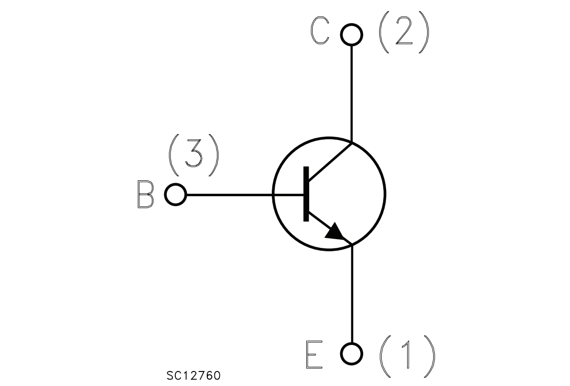


Table 1. Device summary

Order codes	Marking	Package	Packaging
STX0560	X0560	TO-92	Bag
STX0560-AP	X0560	TO-92AP	Ammopack

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V_{BE} = 0)	800	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	600	V
V_{EBO}	Emitter-base voltage (I_C = 0)	7	V
I_C	Collector current	1	A
I_{CM}	Collector peak current (t_P < 5 ms)	2	A
I_B	Base current	0.5	A
I_{BM}	Base peak current (t_P < 5 ms)	1	A
P_{TOT}	Total dissipation at T_a = 25 °C	1.5	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJa}	Thermal resistance junction-ambient max	83	°C/W

2 Electrical characteristics

T_{case} = 25 °C unless otherwise specified.

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current (V_{BE} = 0)	V_{CE} = 800 V			10	µA
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = 10 mA	7			V
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 10 mA	600			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 0.5 A I_B = 100 mA			1	V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 0.5 A I_B = 100 mA			1	V
h_{FE}	DC current gain	I_C = 5 mA V_{CE} = 5 V I_C = 20 mA V_{CE} = 5 V	70	 90		
 t_r t_s t_f	Resistive load Rise time Storage time Fall time	 V_{CC}=200 V, I_C=0.3 A I_{B1}=60 mA, I_{B2}=-120 mA T_p=30 µs		 140 4.4 220		 ns µs ns

1. Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2 %.

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

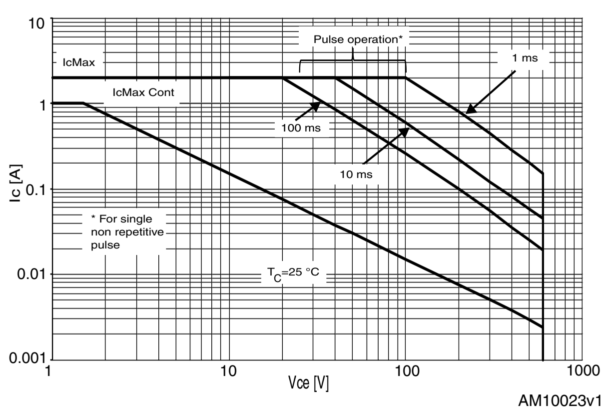


Figure 3. Derating curve

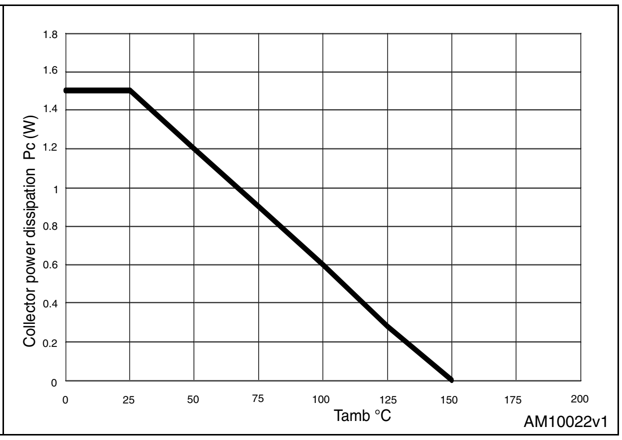


Figure 4. Output curves up to V_{CE}=2 V

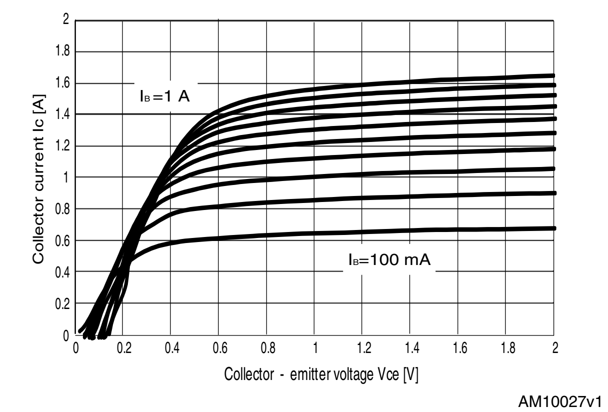


Figure 5. Output curves up to V_{CE}=10 V

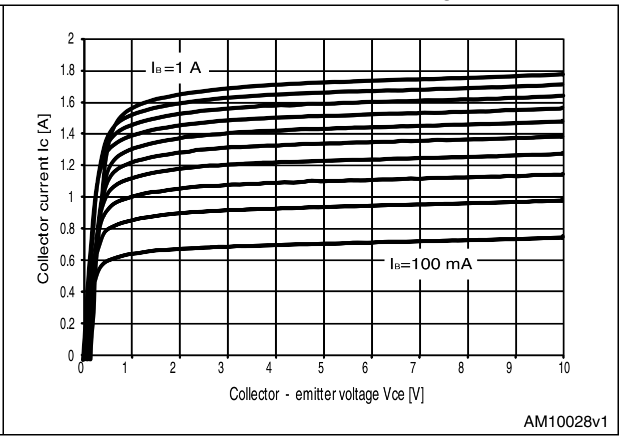


Figure 6. DC current gain (V_{CE} = 1 V)

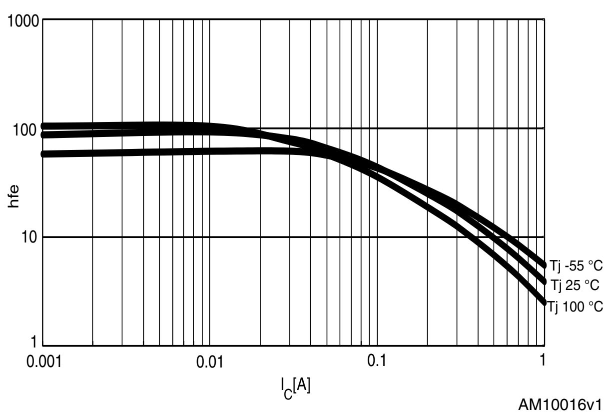


Figure 7. DC current gain (V_{CE} = 5 V)

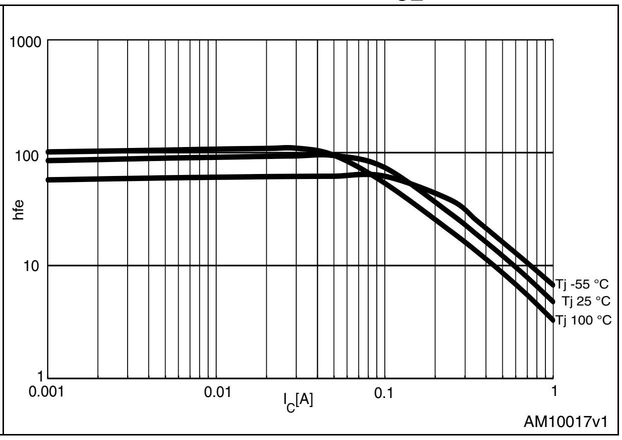


Figure 8. Collector-emitter saturation voltage

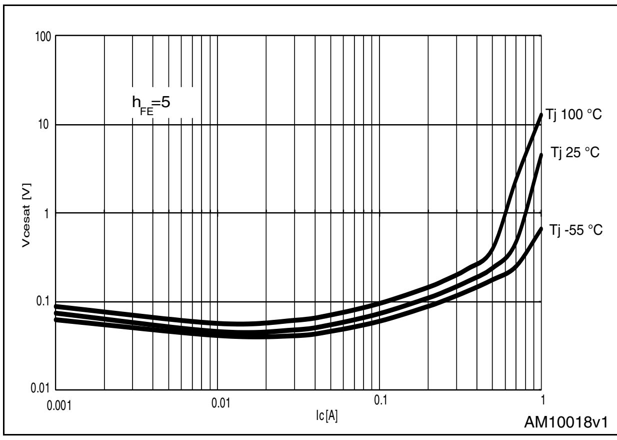


Figure 9. Base-emitter saturation voltage

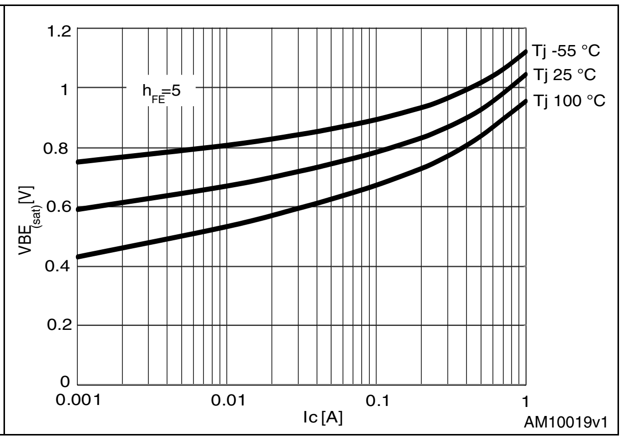


Figure 10. Base-emitter on voltage

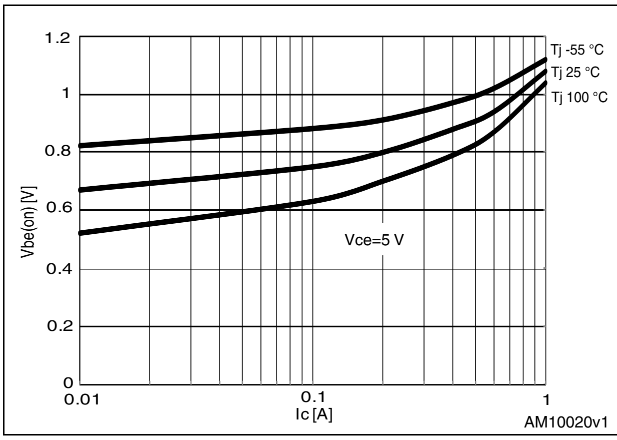


Figure 11. Capacitance variation

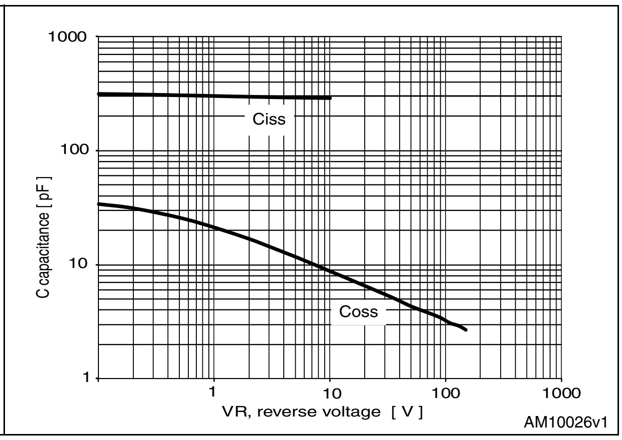


Figure 12. Resistive switching time

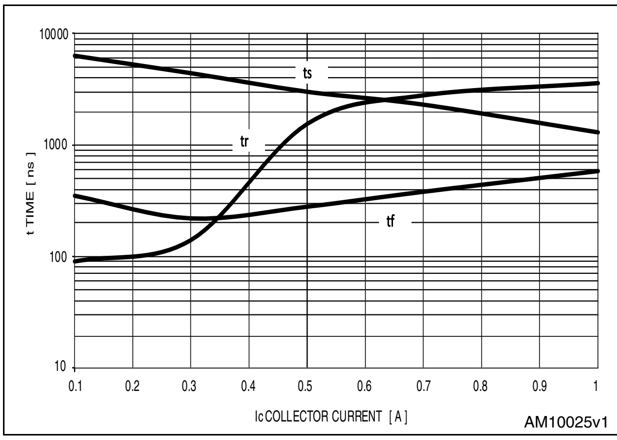


Figure 13. $V_{be(sat)}$ vs. I_C

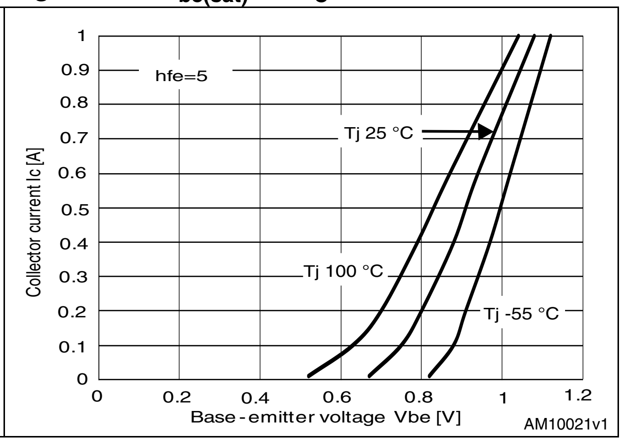
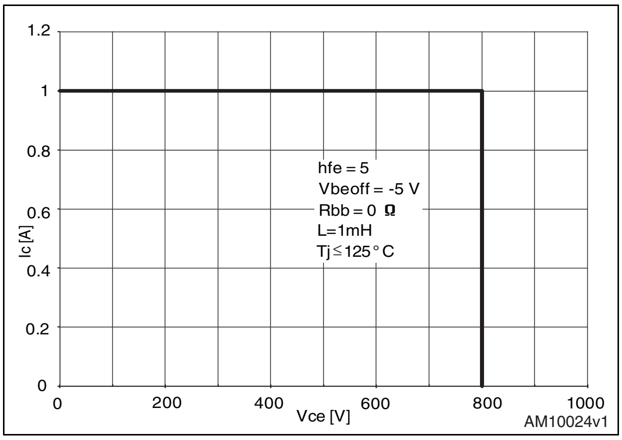
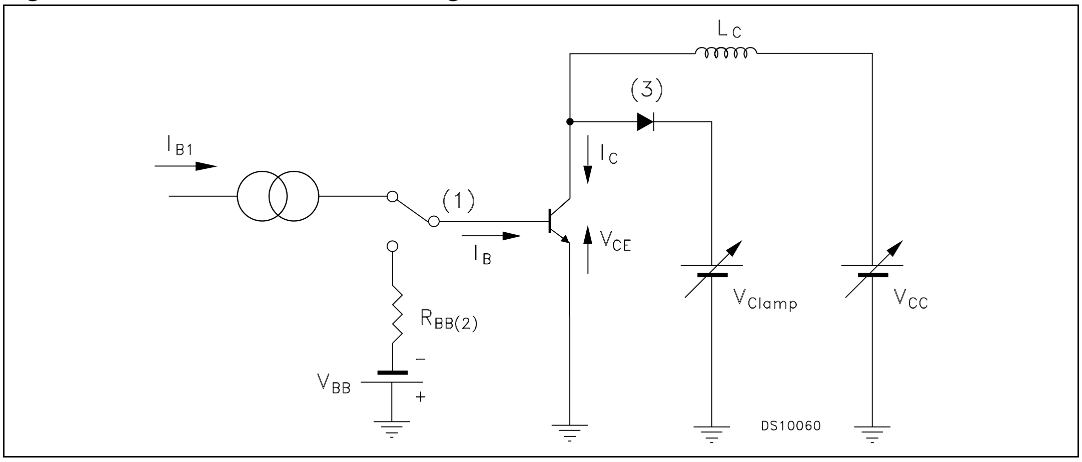


Figure 14. Reverse biased operating area



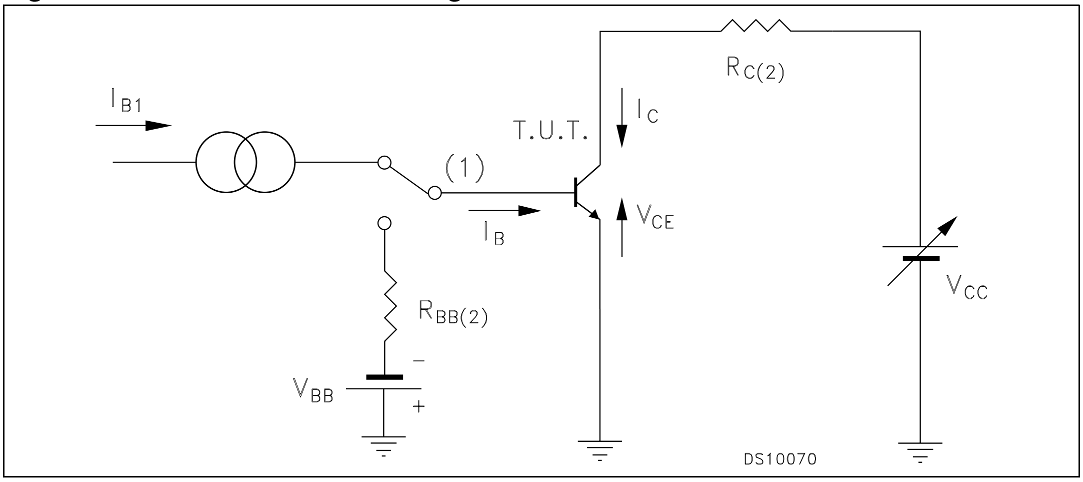
2.2 Test circuits

Figure 15. Resistive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor

Figure 16. Inductive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor
3. Fast recovery rectifier

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-92 mechanical data

Dim.	mm.		
	Min.	Typ.	Max.
A	4.32		4.95
b	0.36		0.51
D	4.45		4.95
E	3.30		3.94
e	2.41		2.67
e1	1.14		1.40
L	12.70		15.49
R	2.16		2.41
S1	0.92		1.52
W	0.41		0.56
V		5°	

Figure 17. TO-92 drawing

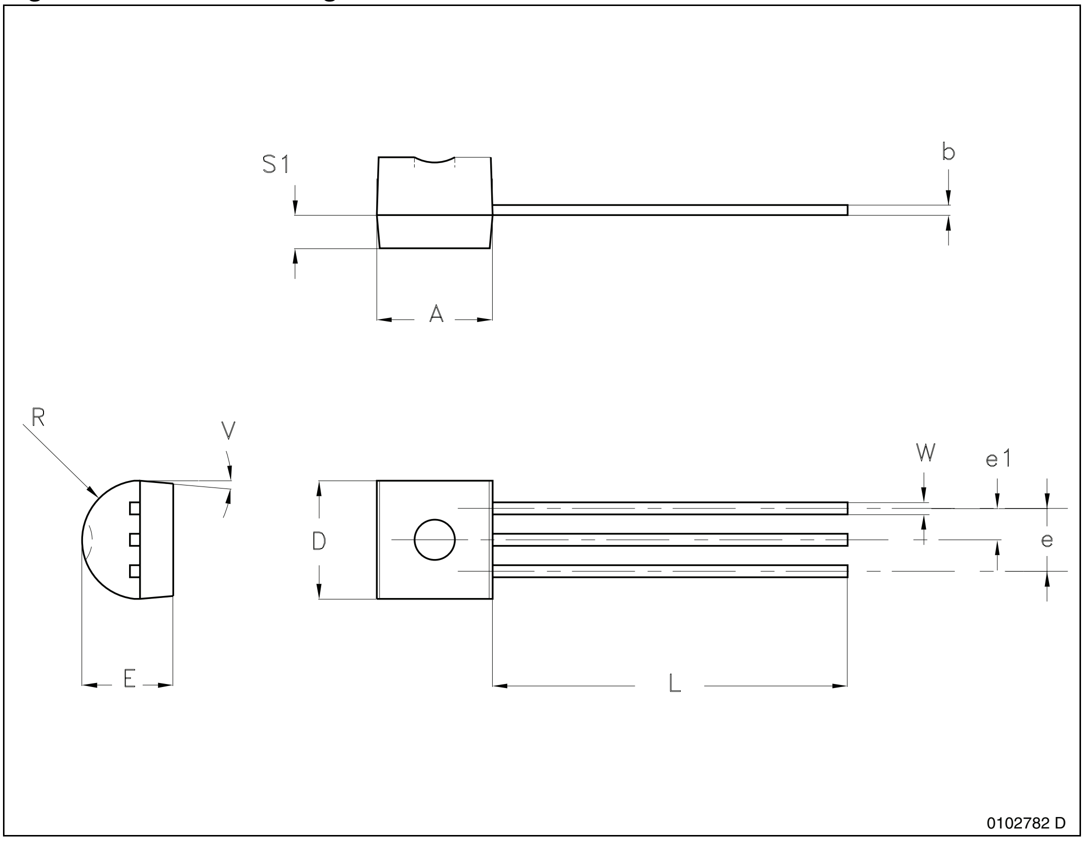
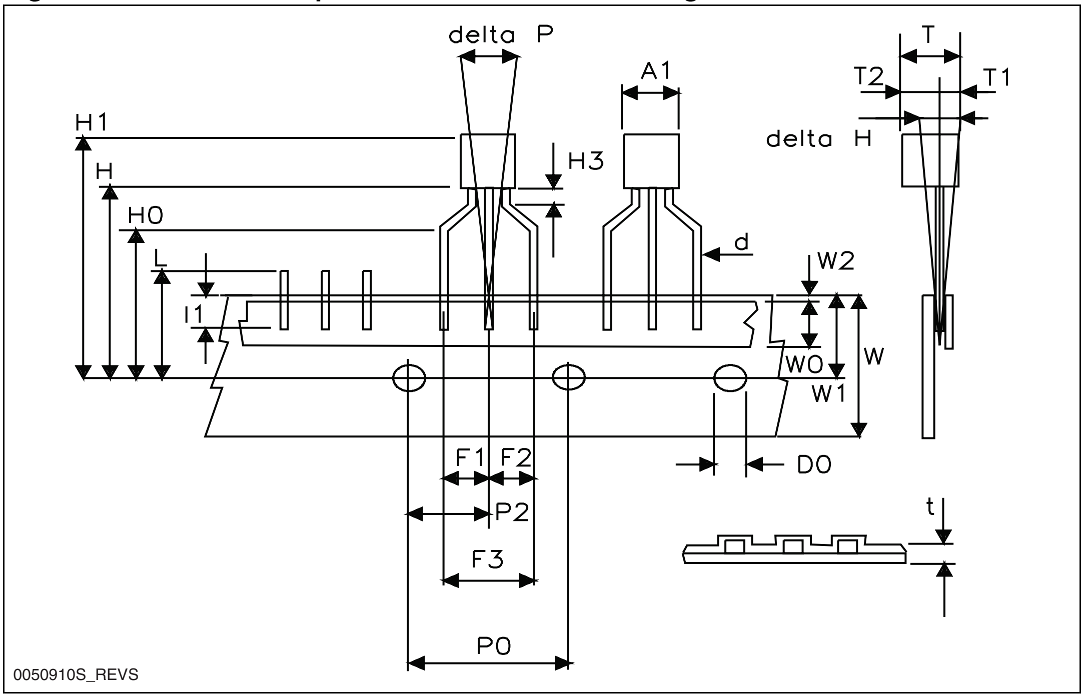


Table 6. TO-92 ammopack mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A1			4.80
T			3.80
T1			1.60
T2			2.30
d			0.48
P0	12.50	12.70	12.90
P2	5.65	6.35	7.05
F1, F2	2.44	2.54	2.94
F3	4.98	5.08	5.48
delta H	-2.00		2.00
W	17.50	18.00	19.00
W0	5.70	6.00	6.30
W1	8.50	9.00	9.25
W2			0.50
H	18.50		20.50
H3	0.5	1	1.5
H0	15.50	16.00	16.50
H1			25.00
D0	3.80	4.00	4.20
t			0.90
L			11.00
I1	3.00		
delta P	-1.00		1.00

Figure 18. TO-92 ammopack mechanical data drawing



4 Revision history

Table 7. Document revision history

Date	Revision	Changes
15-Dec-2010	1	Initial release.
20-Jul-2011	2	Removed: TO-92 Ammopak package
13-Feb-2012	3	Added: TO-92 Ammopak package