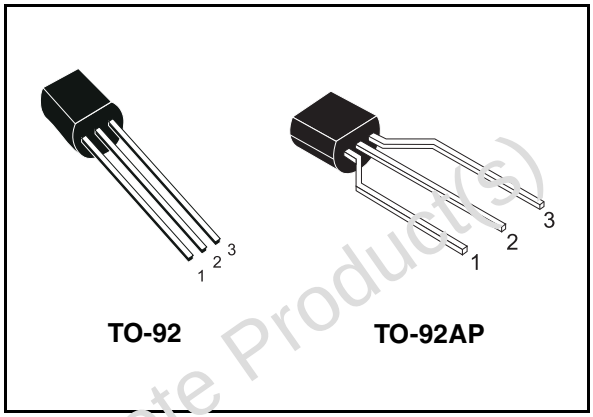
STX690A

High performance low voltage NPN transistor

Features

- Very low collector to emitter saturation voltage
- DC current gain, h_{FE} > 100
- 3 A continuous collector current
- 40 V breakdown voltage $V_{(BR)CER}$

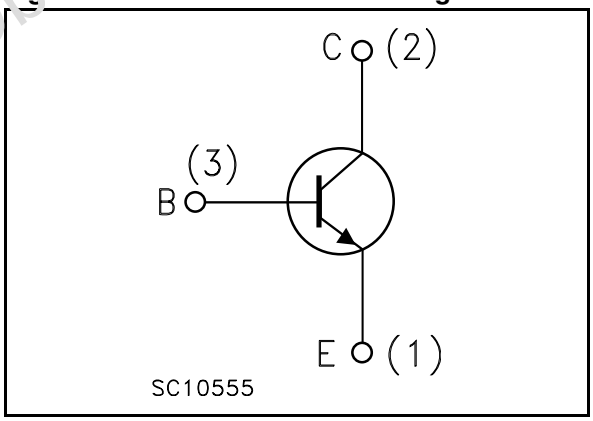


TO-92 TO-92AP

Applications

- Power management in portable equipment
- Voltage regulation in bias supply circuits
- Switching regulator in battery charger applications
- Heavy load driver

Figure 1. Internal schematic diagram



Description

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

Obsolete Product(s) - Obsolete Product(s)

Table 1. Device summary

Order code	Marking	Package	Packaging
STX690A	X690A	TO-92	Bulk
STX690A-AP	X690A	TO-92 AP	Ammopack

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage (I_E = 0)	40	V
V_{CER}	Collector-emitter voltage (R_{BE} = 47 Ω)	40	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	30	V
V_{EBO}	Emitter-base voltage (I_C = 0)	5	V
I_C	Collector current	3	A
I_{CM}	Collector peak current (t_P < 5 ms)	6	A
P_{tot}	Total dissipation at T_{amb} = 25 °C	0.9	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter		Value	Unit
$R_{thj\text{-}amb}$	Thermal resistance junction-amb	max	139	°C/W

Obsolete Product(s) - Obsolete Product(s)

2 Electrical characteristics

(T_{case} = 25 °C unless otherwise specified)

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current (I_E = 0)	V_{CB} = 30 V V_{CB} = 30 V; T_C = 100 °C			10 100	µA µA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 4 V			10	µA
$V_{(BR)CEO}$ (1)	Collector-emitter breakdown voltage (I_B = 0)	I_C = 10 mA	30			V
$V_{(BR)CER}$ (1)	Collector-emitter breakdown voltage (R_{BE} = 47 Ω)	I_C = 10 mA	40			V
$V_{(BR)CBO}$	Collector-base breakdown voltage (I_E = 0)	I_C = 100 µA	40			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = 100 µA	5			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 0.5 A I_B = 5 mA I_C = 1.2 A I_B = 20 mA I_C = 2 A I_B = 20 mA I_C = 3 A I_B = 100 mA I_C = 3 A I_B = 100 mA T_C = 100 °C		0.08 0.1 0.175 0.2 0.3	0.15 0.22 0.35 0.4 	V V V V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 1 A I_B = 10 mA		0.8	1	V
$V_{BE(on)}$ (1)	Base-emitter on voltage	I_C = 1 A V_{CE} = 2 V		0.8	1	V
h_{FE} (1)	DC current gain	I_C = 10 mA V_{CE} = 2 V I_C = 500 mA V_{CE} = 2 V I_C = 1 A V_{CE} = 2 V I_C = 2 A V_{CE} = 1 V I_C = 3 A V_{CE} = 1 V	100 100 100 100 90	200 200 160 130	400 400 	

Obsolete Product(s) - Obsolete Product(s)

Table 4. Electrical characteristics (continued)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
f_t	Transition frequency	I_C = 50 mA V_{CE} = 5 V f = 50 MHz		100		MHz
	Resistive load					
t_d	Delay time	I_C = 3 A V_{CC} = 20 V		50		ns
t_r	Rise time	I_{B1} = -I_{B2} = 60 mA		120		ns
t_s	Storage time	see *Figure 8*		465		ns
t_f	Fall time			80		ns

1. Pulse duration = 300 µs, duty cycle ≤1.5%

2.1 Electrical characteristics (curves)

Figure 2. DC current gain

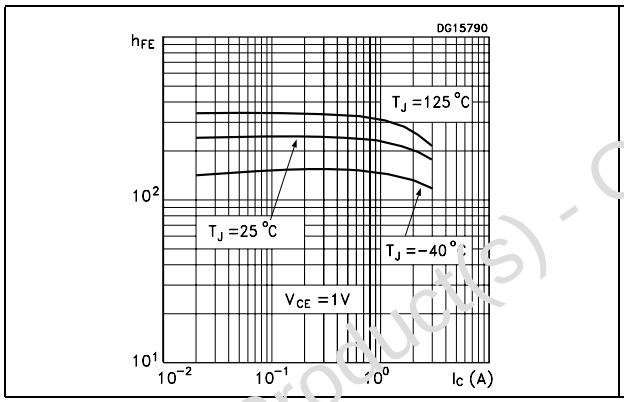


Figure 3. DC current gain

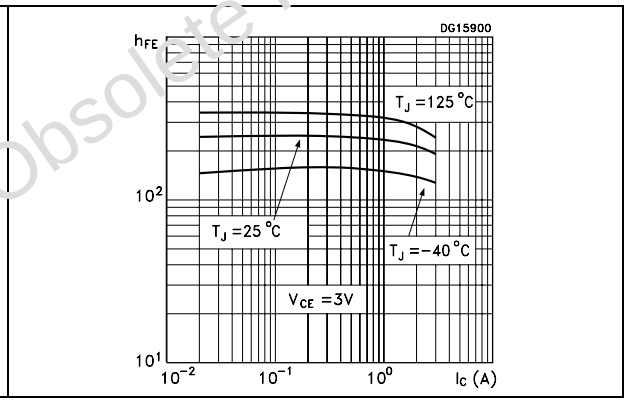


Figure 4. Collector-emitter saturation voltage

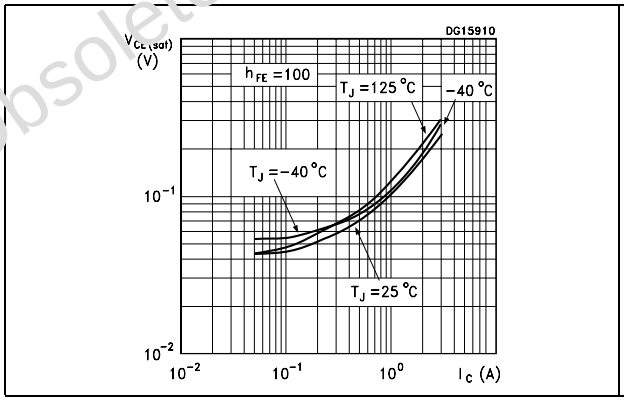
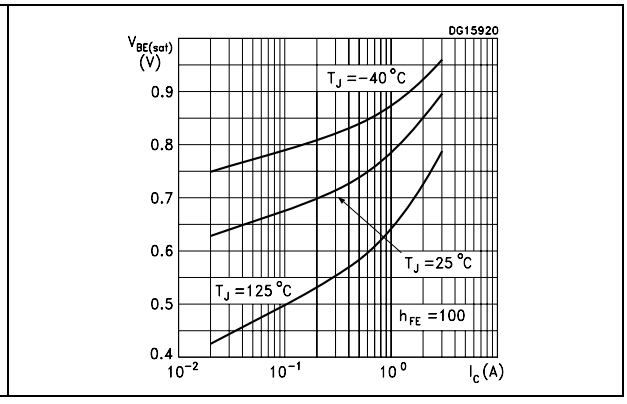


Figure 5. Base-emitter saturation voltage



Obsolete Product(s) - Obsolete Product(s)

Figure 6. Switching time resistive load

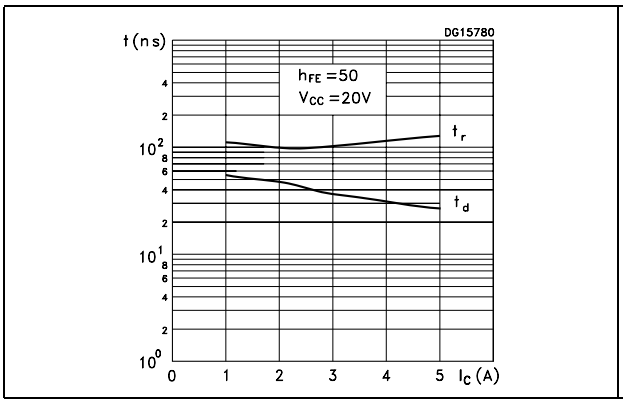
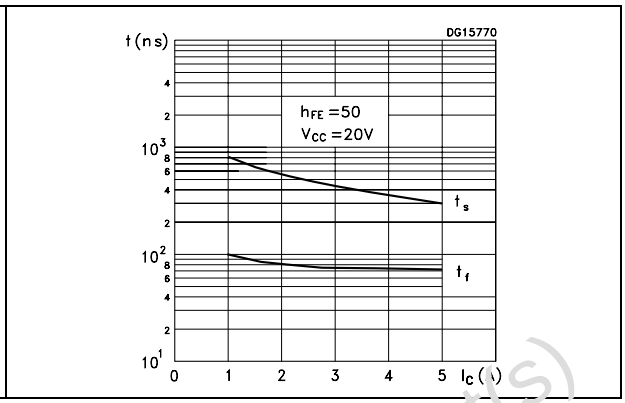
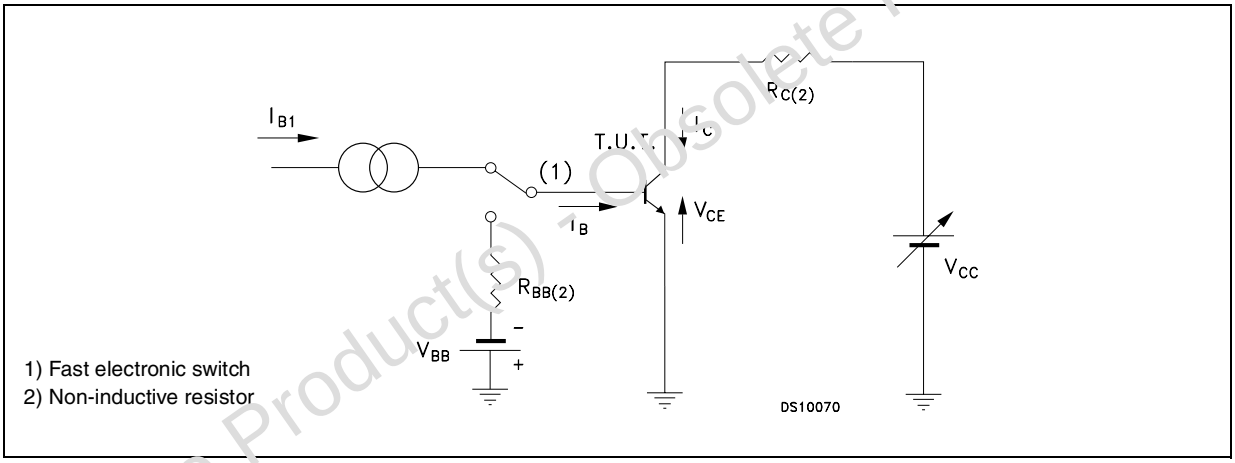


Figure 7. Switching time resistive load



2.2 Test circuit

Figure 8. Resistive load switching test circuit



Obsolete Product(s)

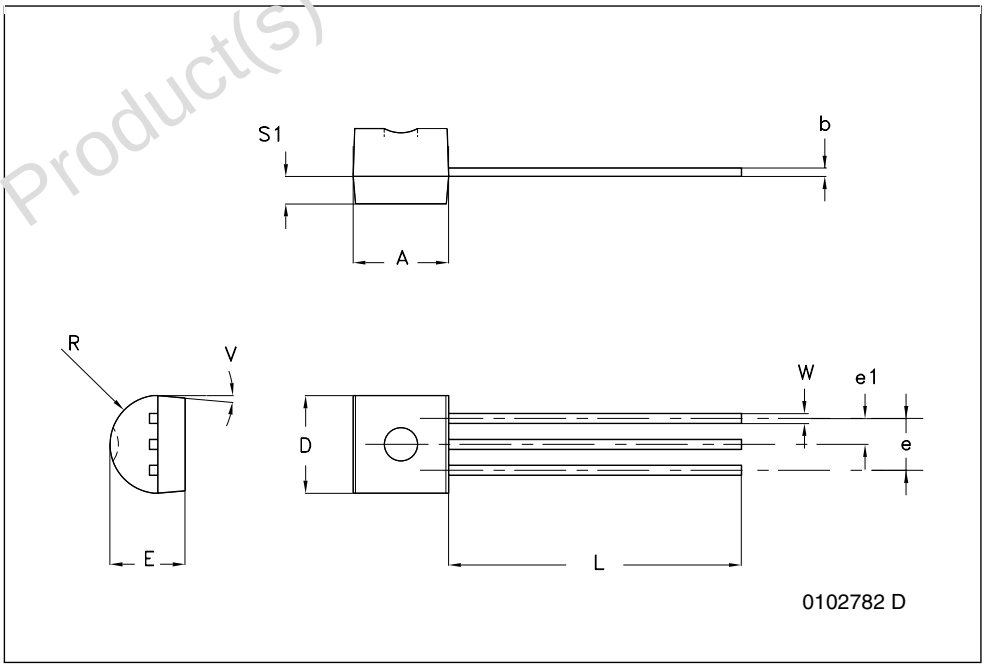
3 Package mechanical data

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 products status are available at: www.st.com. ECOPACK is an ST trademark.

Obsolete Product(s) - Obsolete Product(s)

TO-92 bulk shipment mechanical data

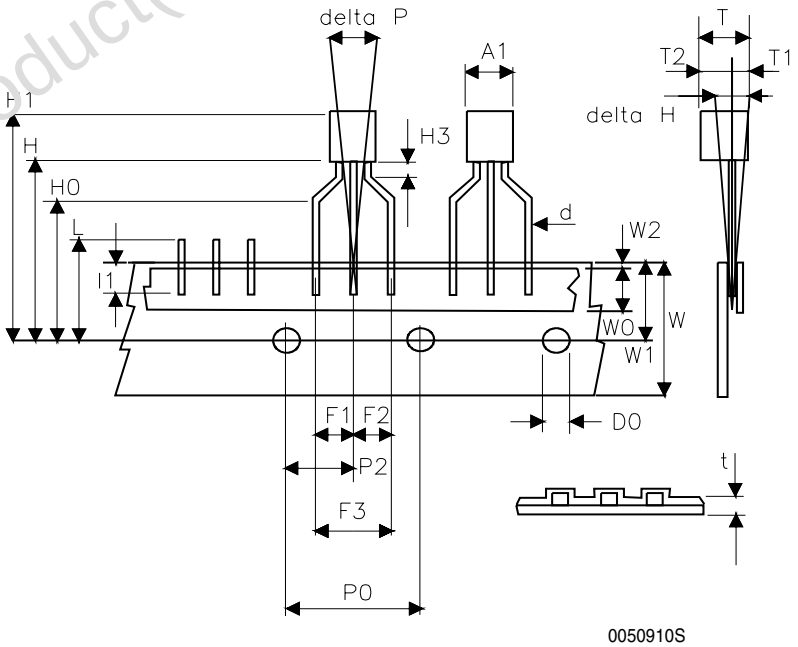
DIM.	mm.		
	MIN.	TYP	MAX.
A	4.32		4.95
b	0.36		0.51
D	4.45		4.95
E	3.30		3.94
e	2.41		2.67
e1	1.14		1.40
L	12.70		15.49
R	2.16		2.41
S1	0.92		1.52
W	0.41		0.56
V		5°	



Obsolete Product(s) - Obsolete Product(s)

TO-92 ammopack shipment (suffix"-AP") 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	5.43
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		1.5
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



Obsolete Product(s) - Obsolete Product(s)

4 Revision history

Table 5. Document revision history

Date	Revision	Changes
09-Feb-2009	1	Initial release.

Obsolete Product(s) - Obsolete Product(s)

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZE REPRESENTATIVE OF ST, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS, WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS “AUTOMOTIVE GRADE” MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2009 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

Obsolete Product(s) - Obsolete Product(s)