



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





STI55NF03L

N-channel 30 V, 0.01 Ω , 55 A, I²PAK
STripFET™ II Power MOSFET

Features

Type	V _{DSS}	R _{DS(on)} max	I _D
STI55NF03L	30 V	< 0.013 Ω	55 A

- Optimized for high switching operation
- Low gate charge
- Logic level gate drive

Application

- Switching applications
 - Automotive

Description

This Power MOSFET is the latest development of STMicroelectronics unique “single feature size” strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps allowing remarkable manufacturing reproducibility.

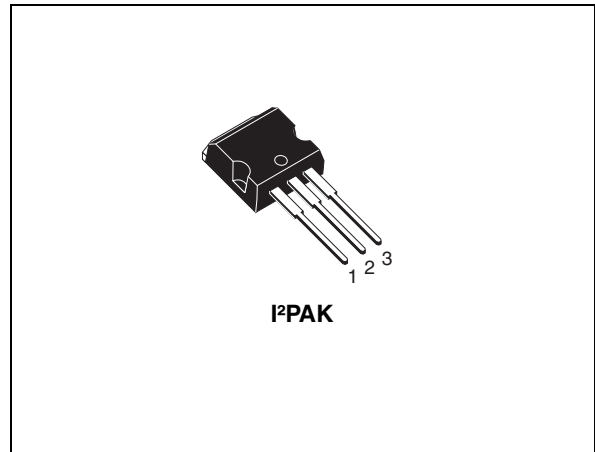


Figure 1. Internal schematic diagram

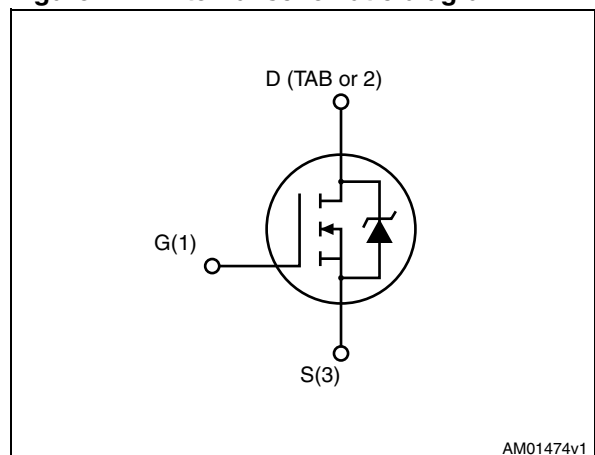


Table 1. Device summary

Order code	Marking	Package	Packaging
STI55NF03L	55NF03L	I ² PAK	Tube

Contents

1	Electrical ratings	3
2	Electrical characteristics	4
	2.1 Electrical characteristics (curves)	6
3	Test circuits	8
4	Package mechanical data	9
5	Revision history	11

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage ($V_{GS} = 0$)	30	V
V_{GS}	Gate-source voltage	± 16	V
I_D	Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	55	A
I_D	Drain current (continuous) at $T_C = 100\text{ }^\circ\text{C}$	39	A
$I_{DM}^{(1)}$	Drain current (pulsed)	220	A
P_{TOT}	Total dissipation at $T_C = 25\text{ }^\circ\text{C}$	80	W
	Derating factor	0.53	W/ $^\circ\text{C}$
$E_{AS}^{(2)}$	Single pulse avalanche energy	120	mJ
T_{stg}	Storage temperature	- 60 to 175	$^\circ\text{C}$
T_j	Max. operating junction temperature		

1. Pulse width limited by safe operating area
2. Starting $T_j = 25\text{ }^\circ\text{C}$, $I_D = 32.5\text{ A}$, $V_{DD} = 45\text{ V}$

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	1.875	$^\circ\text{C}/\text{W}$
R_{thj-a}	Thermal resistance junction-ambient max	62.5	$^\circ\text{C}/\text{W}$
T_l	Maximum lead temperature for soldering purpose	300	$^\circ\text{C}$

2 Electrical characteristics

($T_{CASE} = 25\text{ °C}$ unless otherwise specified)

Table 4. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown voltage	$I_D = 250\ \mu\text{A}$, $V_{GS} = 0$	30			V
I_{DSS}	Zero gate voltage Drain current ($V_{GS} = 0$)	$V_{DS} = \text{max rating}$ $V_{DS} = \text{max rating}$, $T_C = 125\text{ °C}$			1 10	μA μA
I_{GSS}	Gate-body leakage current ($V_{DS} = 0$)	$V_{GS} = \pm 16\text{ V}$			± 100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	1.5		2.5	V
$R_{DS(on)}$	Static drain-source on resistance	$V_{GS} = 10\text{ V}$, $I_D = 27.5\text{ A}$ $V_{GS} = 4.5\text{ V}$, $I_D = 27.5\text{ A}$		0.01 0.013	0.013 0.02	Ω

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance			1265		pF
C_{oss}	Output capacitance	$V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0$		435		pF
C_{rss}	Reverse transfer capacitance			115		pF
Q_g	Total gate charge	$V_{DD} = 24\text{ V}$, $I_D = 55\text{ A}$,		20	27	nC
Q_{gs}	Gate-source charge	$V_{GS} = 4.5\text{ V}$		7		nC
Q_{gd}	Gate-drain charge	(see Figure 14)		10		nC

Table 6. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on delay time Rise time	$V_{DD} = 15\text{ V}$, $I_D = 27.5\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 10\text{ V}$ (see Figure 13)		28 400		ns ns
$t_{d(off)}$ t_f	Turn-off-delay time Fall time	$V_{DD} = 15\text{ V}$, $I_D = 27.5\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 10\text{ V}$ (see Figure 13)		25 50		ns ns

Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max	Unit
I_{SD}	Source-drain current				55	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)				220	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 55\text{ A}$, $V_{GS} = 0$			1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	$I_{SD} = 55\text{ A}$, $V_{DD} = 30\text{ V}$ $di/dt = 100\text{ A}/\mu\text{s}$, $T_j = 150\text{ }^\circ\text{C}$ (see Figure 15)		70 160 4.5		ns nC A

1. Pulse width limited by safe operating area.
2. Pulsed: pulse duration = 300 μs , duty cycle 1.5%

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

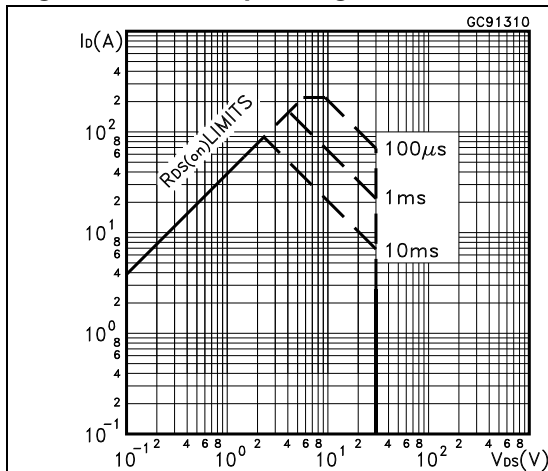


Figure 3. Thermal impedance

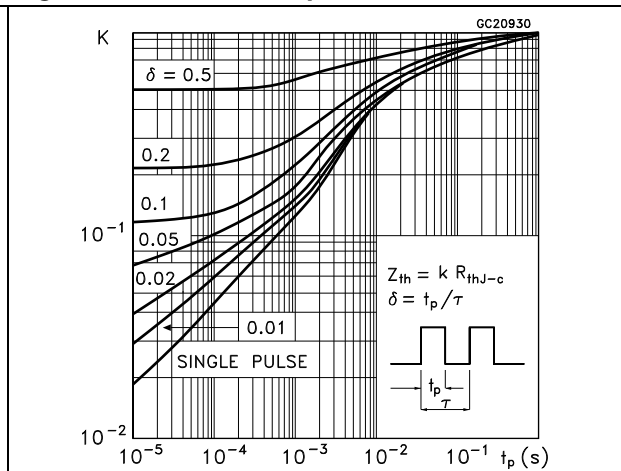


Figure 4. Output characteristics

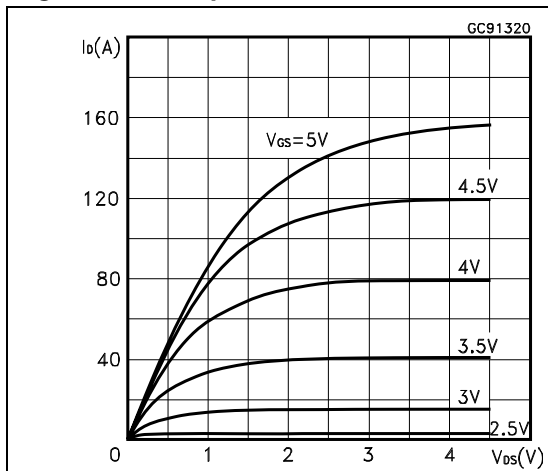


Figure 5. Transfer characteristics

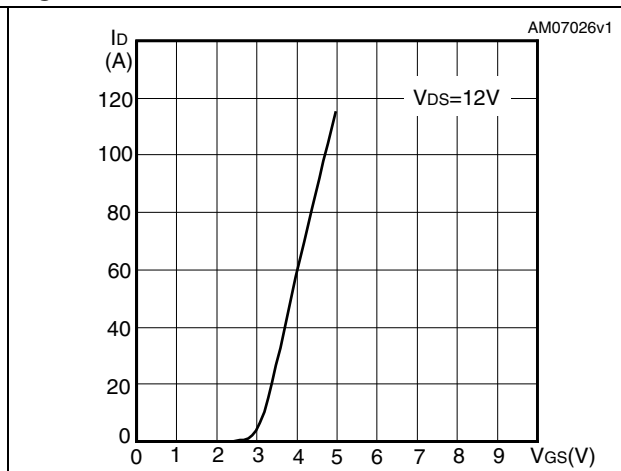


Figure 6. Normalized $B_{V_{DSS}}$ vs temperature

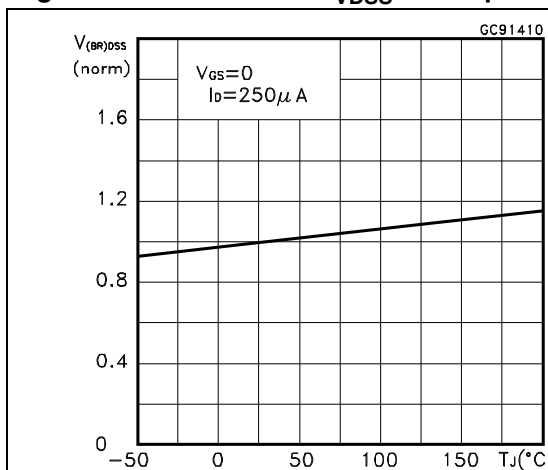


Figure 7. Static drain-source on resistance

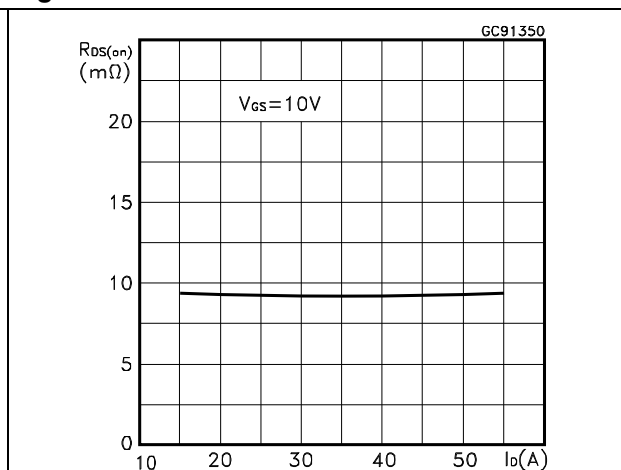


Figure 8. Gate charge vs gate-source voltage Figure 9. Capacitance variations

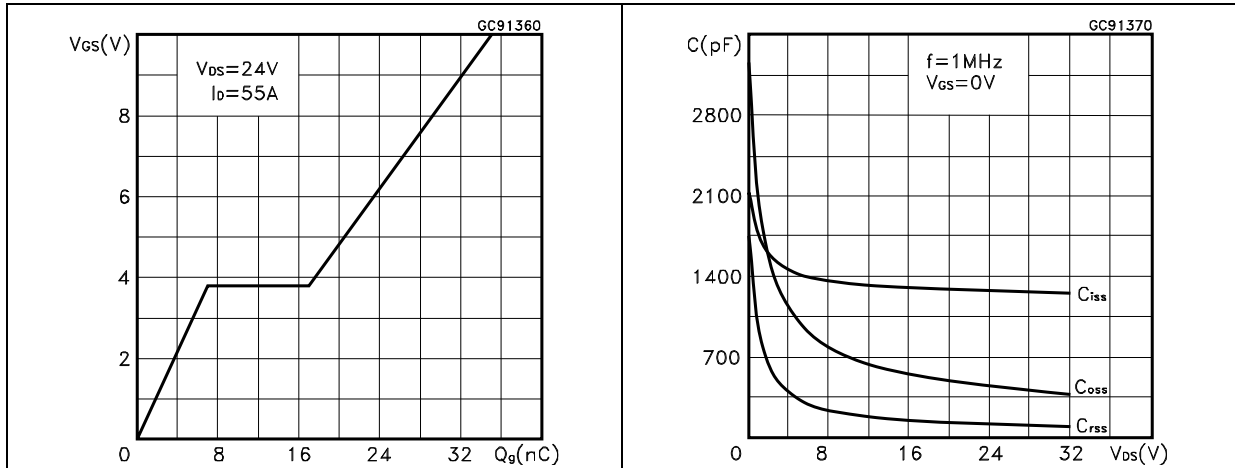


Figure 10. Normalized gate threshold voltage vs temperature Figure 11. Normalized on resistance vs temperature

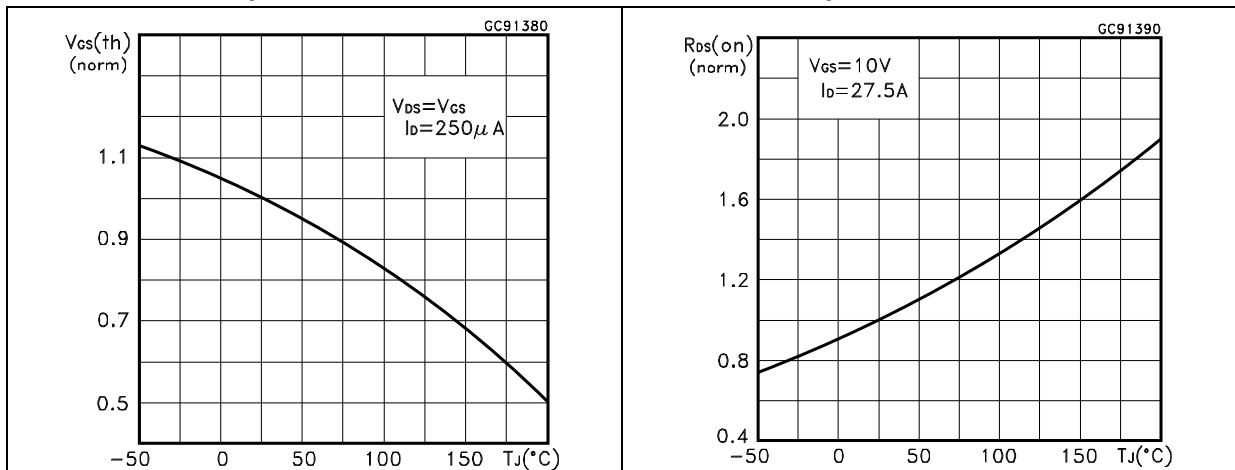
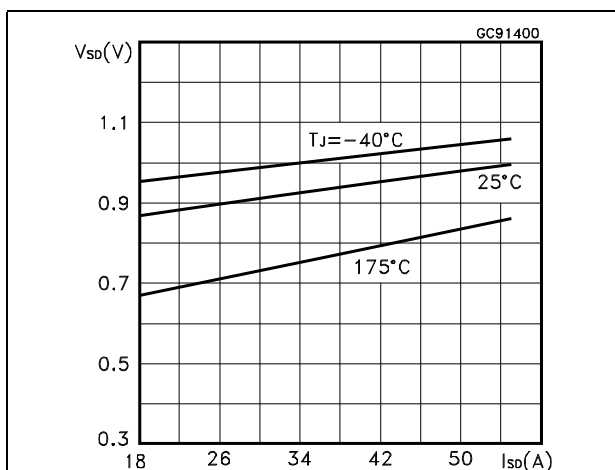


Figure 12. Source-drain diode forward characteristics



3 Test circuits

Figure 13. Switching times test circuit for resistive load

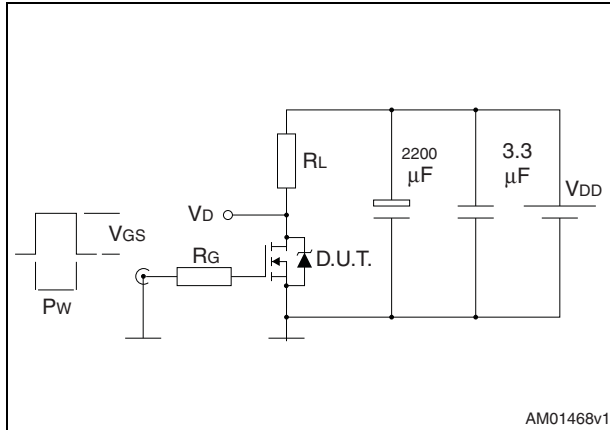


Figure 14. Gate charge test circuit

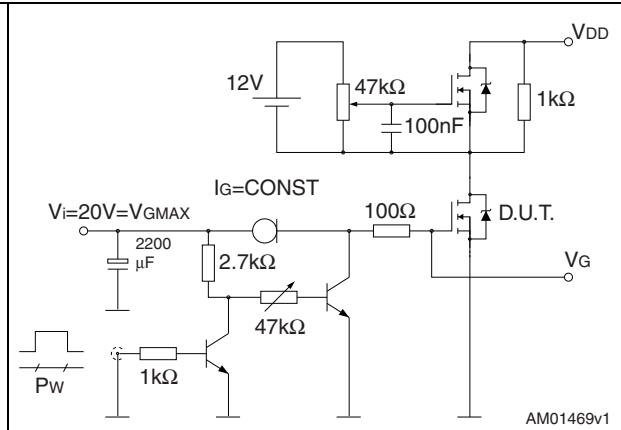


Figure 15. Test circuit for inductive load switching and diode recovery times

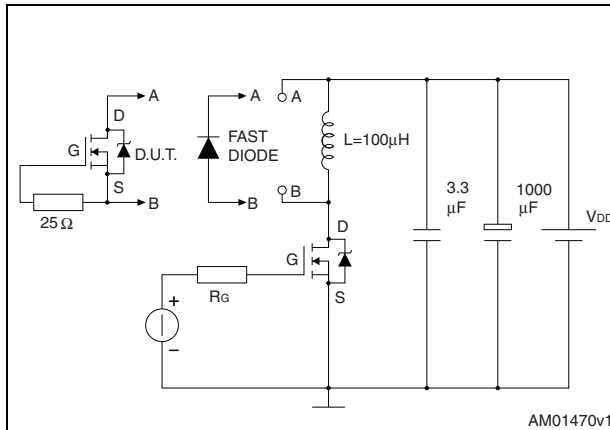


Figure 16. Unclamped inductive load test circuit

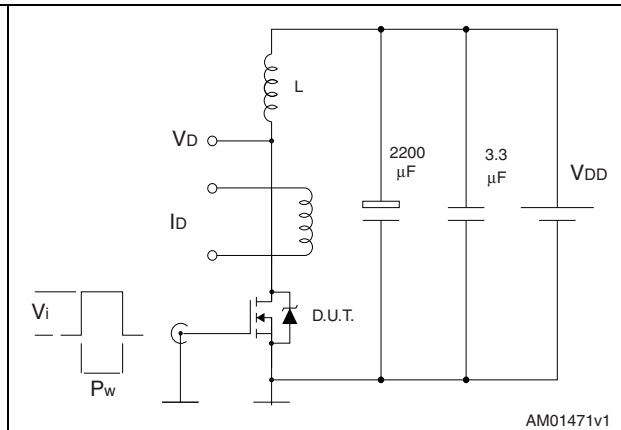


Figure 17. Unclamped inductive waveform

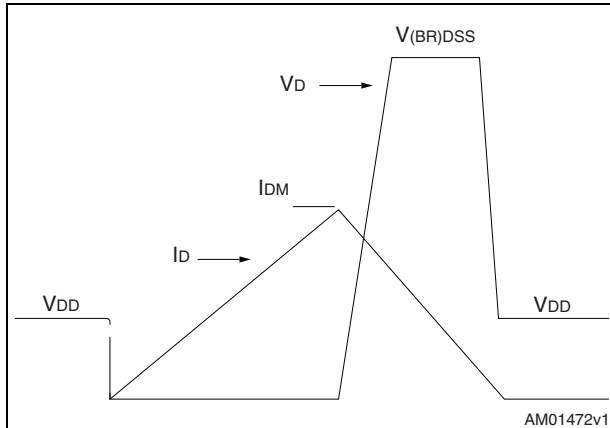
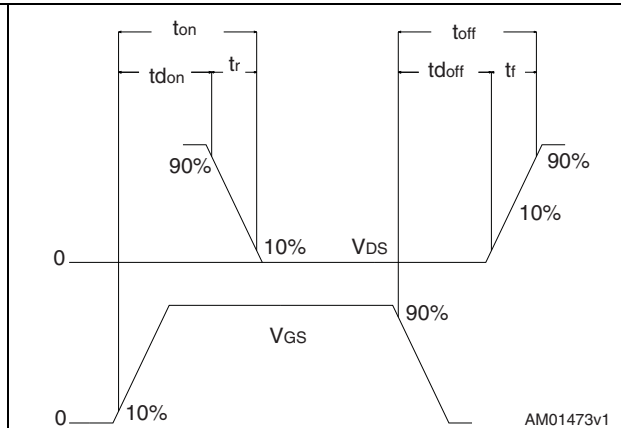


Figure 18. Switching time waveform



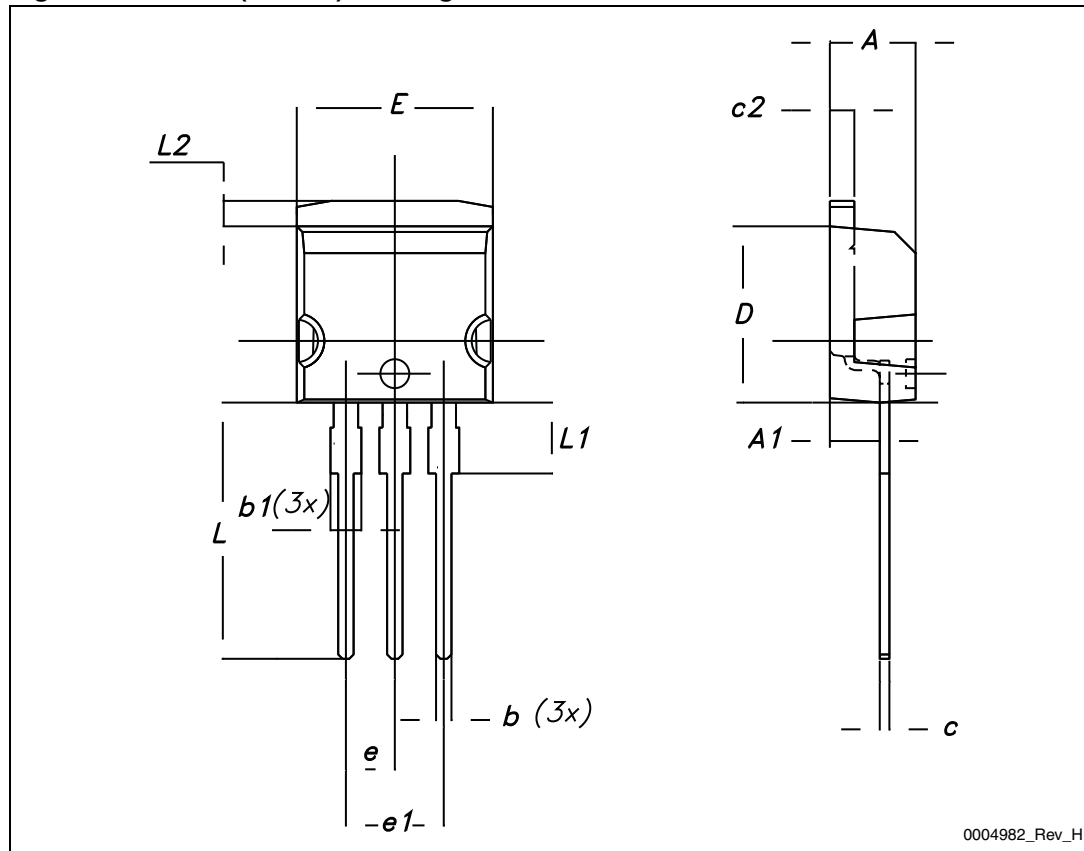
4 Package mechanical data

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 8. I²PAK (TO-262) mechanical data

DIM.	mm.		
	min.	typ	max.
A	4.40		4.60
A1	2.40		2.72
b	0.61		0.88
b1	1.14		1.70
c	0.49		0.70
c2	1.23		1.32
D	8.95		9.35
e	2.40		2.70
e1	4.95		5.15
E	10		10.40
L	13		14
L1	3.50		3.93
L2	1.27		1.40

Figure 19. I²PAK (TO-262) drawing



0004982_Rev_H

5 Revision history

Table 9. Document revision history

Date	Revision	Changes
18-May-2011	1	First release

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 AUTHORIZED ST REPRESENTATIVE, 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.

© 2011 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 - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com