



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





## BUF420AW

### HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- STMicroelectronics PREFERRED SALESTYPE
- HIGH VOLTAGE CAPABILITY
- VERY HIGH SWITCHING SPEED
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- LOW BASE-DRIVE REQUIREMENTS

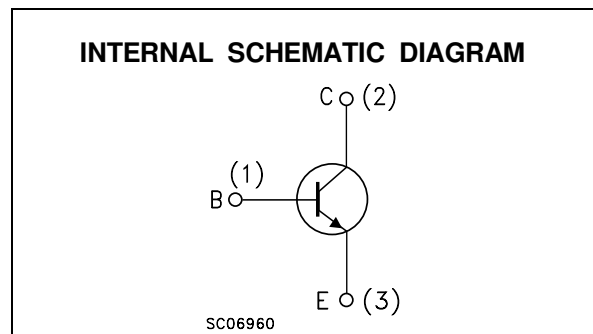
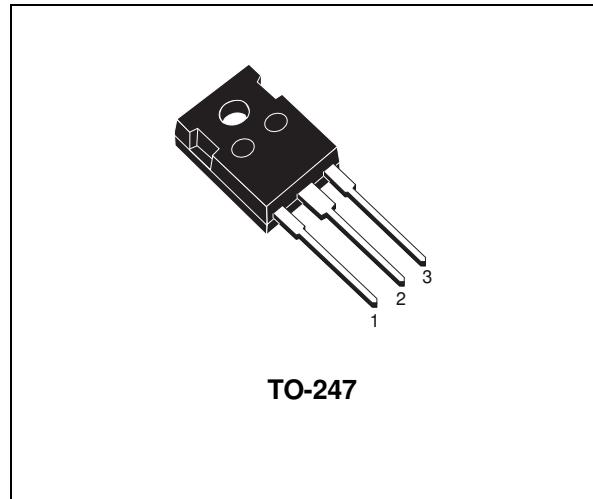
#### APPLICATIONS:

- SWITCH MODE POWER SUPPLIES
- MOTOR CONTROL

#### DESCRIPTION

The BUF420AW is manufactured using High Voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capacity. It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining a wide RBSOA.

The BUF series is designed for use in high-frequency power supplies and motor control applications.



#### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CEV}$	Collector-Emitter Voltage ( $V_{BE} = -1.5V$ )	1000	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	450	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	30	A
$I_{CM}$	Collector Peak Current ( $t_p < 5$ ms)	60	A
$I_B$	Base Current	6	A
$I_{BM}$	Base Peak Current ( $t_p < 5$ ms)	9	A
$P_{tot}$	Total Dissipation at $T_c = 25$ °C	200	W
$T_{stg}$	Storage Temperature	-65 to 150	°C
$T_j$	Max. Operating Junction Temperature	150	°C

# BUF420AW

## THERMAL DATA

R <sub>thj-case</sub>	Thermal Resistance Junction-Case	Max	0.63	°C/W
-----------------------	----------------------------------	-----	------	------

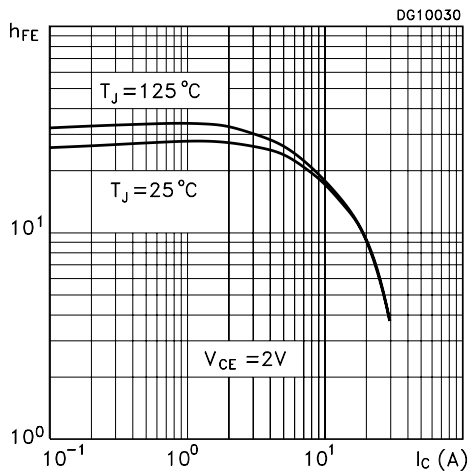
## ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CEr</sub>	Collector Cut-off Current (R <sub>BE</sub> = 5 Ω)	V <sub>CE</sub> = 1000 V V <sub>CE</sub> = 1000 V T <sub>C</sub> = 100 °C			0.2 1	mA mA
I <sub>CEV</sub>	Collector Cut-off Current (V <sub>BE</sub> = -1.5V)	V <sub>CE</sub> = 1000 V V <sub>CE</sub> = 1000 V T <sub>C</sub> = 100 °C			0.2 1	mA mA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 5 V			1	mA
V <sub>CEO(sus)*</sub>	Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 200 mA L = 25 mH	450			V
V <sub>EBO</sub>	Emitter Base Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 50 mA	7			V
V <sub>CE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 10 A I <sub>B</sub> = 1 A I <sub>C</sub> = 10 A I <sub>B</sub> = 1 A T <sub>C</sub> = 100°C I <sub>C</sub> = 20 A I <sub>B</sub> = 4 A I <sub>C</sub> = 20 A I <sub>B</sub> = 4 A T <sub>C</sub> = 100°C		0.8 0.5	2.8 2	V V V
V <sub>BE(sat)*</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> = 10 A I <sub>B</sub> = 1 A I <sub>C</sub> = 10 A I <sub>B</sub> = 1 A T <sub>C</sub> = 100°C I <sub>C</sub> = 20 A I <sub>B</sub> = 4 A I <sub>C</sub> = 20 A I <sub>B</sub> = 4 A T <sub>C</sub> = 100°C		0.9 1.1	1.5 1.5	V V V
di <sub>c</sub> /dt	Rate of rise on-state Collector Current	V <sub>CC</sub> = 300 V R <sub>C</sub> = 0 t <sub>p</sub> = 3 μs I <sub>B1</sub> = 1.5 A T <sub>C</sub> = 25°C I <sub>B1</sub> = 1.5 A T <sub>C</sub> = 100°C I <sub>B1</sub> = 6 A T <sub>C</sub> = 100°C	70 150	100		A/μs A/μs A/μs
V <sub>CE(3μs)</sub>	Collector-Emitter Dynamic Voltage	V <sub>CC</sub> = 300 V R <sub>C</sub> = 60 Ω I <sub>B1</sub> = 1.5 A T <sub>C</sub> = 25°C I <sub>B1</sub> = 1.5 A T <sub>C</sub> = 100°C		2.1	8	V V
V <sub>CE(5μs)</sub>	Collector-Emitter Dynamic Voltage	V <sub>CC</sub> = 300 V R <sub>C</sub> = 60 Ω I <sub>B1</sub> = 1.5 A T <sub>C</sub> = 25°C I <sub>B1</sub> = 1.5 A T <sub>C</sub> = 100°C		1.1	4	V V
t <sub>s</sub> t <sub>f</sub> t <sub>c</sub>	INDUCTIVE LOAD Storage Time Fall Time Cross Over Time	I <sub>C</sub> = 10 A V <sub>CC</sub> = 50 V V <sub>BB</sub> = - 5 V R <sub>BB</sub> = 0.6 Ω V <sub>clamp</sub> = 400 V I <sub>B1</sub> = 1 A L = 0.25 mH		1 0.05 0.08		μs μs μs
t <sub>s</sub> t <sub>f</sub> t <sub>c</sub>	INDUCTIVE LOAD Storage Time Fall Time Cross Over Time	I <sub>C</sub> = 10 A V <sub>CC</sub> = 50 V V <sub>BB</sub> = - 5 V R <sub>BB</sub> = 0.6 Ω V <sub>clamp</sub> = 400 V I <sub>B1</sub> = 1 A L = 0.25 mH T <sub>C</sub> = 100°C			2 0.1 0.18	μs μs μs
V <sub>CEW</sub>	Maximum Collector Emitter Voltage without Snubber	I <sub>C</sub> = 10 A V <sub>CC</sub> = 50 V V <sub>BB</sub> = - 5 V R <sub>BB</sub> = 0.6 Ω I <sub>B1</sub> = 1 A L = 0.25 mH T <sub>C</sub> = 125°C	500			V
t <sub>s</sub> t <sub>f</sub> t <sub>c</sub>	INDUCTIVE LOAD Storage Time Fall Time Cross Over Time	I <sub>C</sub> = 10 A V <sub>CC</sub> = 50 V V <sub>BB</sub> = 0 R <sub>BB</sub> = 0.15 Ω V <sub>clamp</sub> = 400 V I <sub>B1</sub> = 1 A L = 0.25 mH		1.5 0.04 0.07		μs μs μs

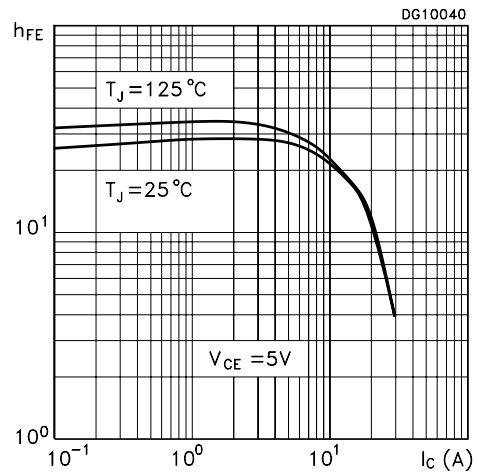
**ELECTRICAL CHARACTERISTICS** (continued)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$t_s$ $t_f$ $t_c$	INDUCTIVE LOAD Storage Time Fall Time Cross Over Time	$I_C = 10\text{ A}$ $V_{BB} = 0$ $V_{clamp} = 400\text{ V}$ $L = 0.25\text{ mH}$	$V_{CC} = 50\text{ V}$ $R_{BB} = 0.15\ \Omega$ $I_{B1} = 1\text{ A}$ $T_C = 100^\circ\text{C}$			3 0.15 0.25	$\mu\text{s}$ $\mu\text{s}$ $\mu\text{s}$
$V_{CEW}$	Maximum Collector Emitter Voltage without Snubber	$I_C = 10\text{ A}$ $V_{BB} = 0$ $I_{B1} = 1\text{ A}$ $T_C = 125^\circ\text{C}$	$V_{CC} = 50\text{ V}$ $R_{BB} = 0.15\ \Omega$ $L = 0.25\text{ mH}$	500			V
$t_s$ $t_f$ $t_c$	INDUCTIVE LOAD Storage Time Fall Time Cross Over Time	$I_C = 20\text{ A}$ $V_{BB} = -5\text{ V}$ $V_{clamp} = 400\text{ V}$ $L = 0.12\text{ mH}$	$V_{CC} = 50\text{ V}$ $R_{BB} = 0.6\ \Omega$ $I_{B1} = 4\text{ A}$		2.2 0.06 0.12		$\mu\text{s}$ $\mu\text{s}$ $\mu\text{s}$
$t_s$ $t_f$ $t_c$	INDUCTIVE LOAD Storage Time Fall Time Cross Over Time	$I_C = 20\text{ A}$ $V_{BB} = -5\text{ V}$ $V_{clamp} = 400\text{ V}$ $L = 0.12\text{ mH}$	$V_{CC} = 50\text{ V}$ $R_{BB} = 0.6\ \Omega$ $I_{B1} = 4\text{ A}$ $T_C = 125^\circ\text{C}$			3.5 0.12 0.3	$\mu\text{s}$ $\mu\text{s}$ $\mu\text{s}$
$V_{CEW}$	Maximum Collector Emitter Voltage without Snubber	$I_{C\text{Woff}} = 30\text{ A}$ $V_{BB} = -5\text{ V}$ $L = 0.12\text{ mH}$ $T_C = 125^\circ\text{C}$	$V_{CC} = 50\text{ V}$ $R_{BB} = 0.6\ \Omega$ $I_{B1} = 6\text{ A}$	400			V

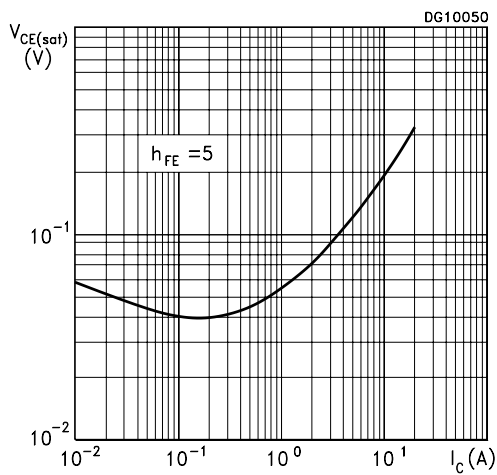
DC Current Gain



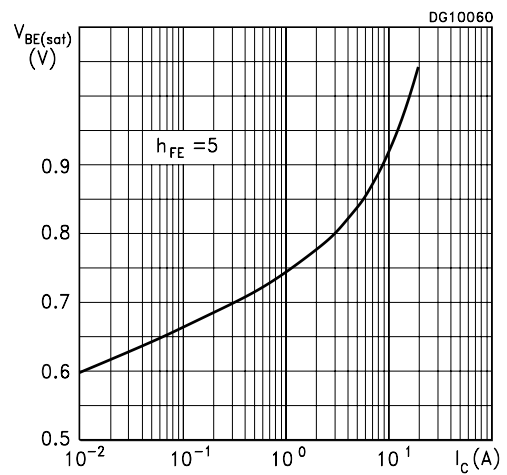
DC Current Gain



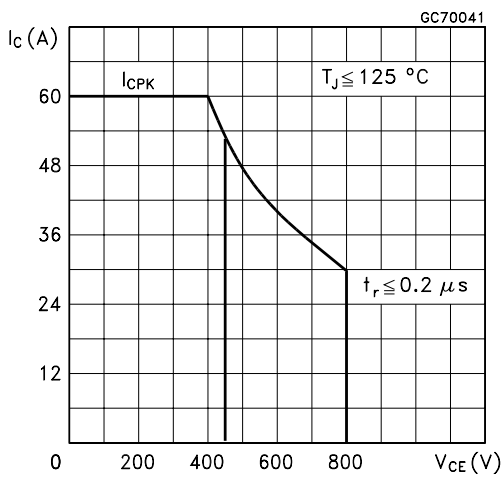
Collector Emitter Saturation Voltage



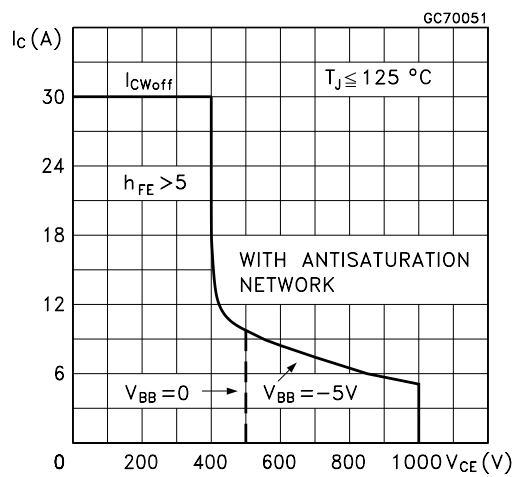
Base Emitter Saturation Voltage



Forward Biased Safe Operating Area



Reverse Biased Safe Operating Area



Storage Time Versus Pulse Time.

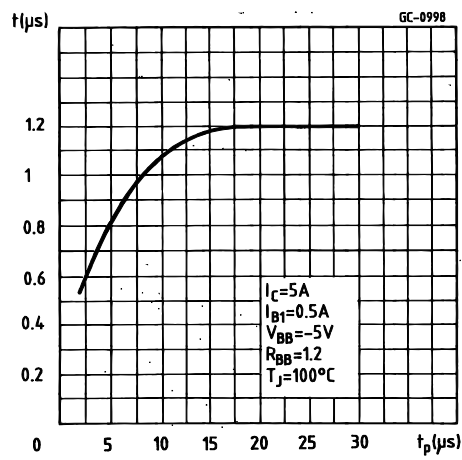
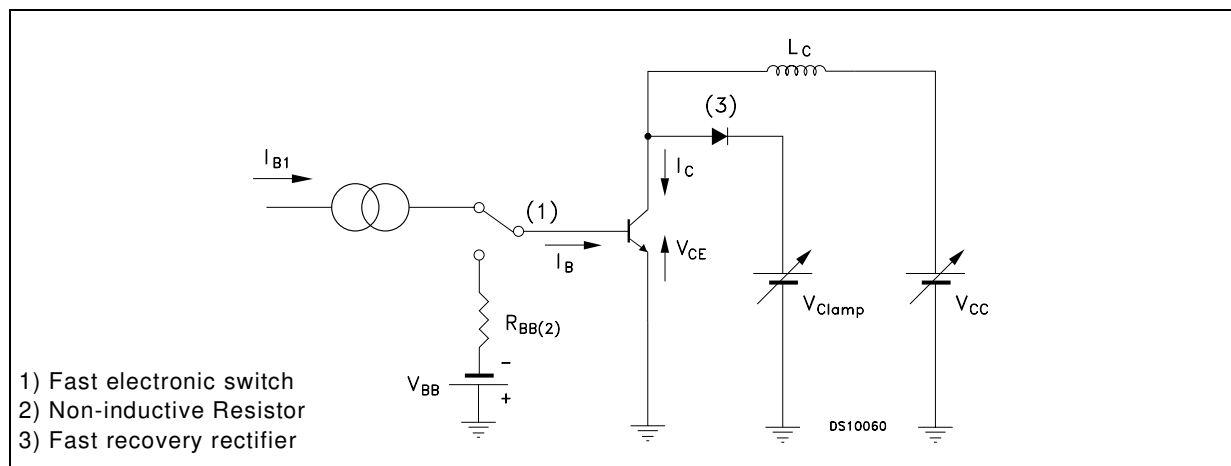
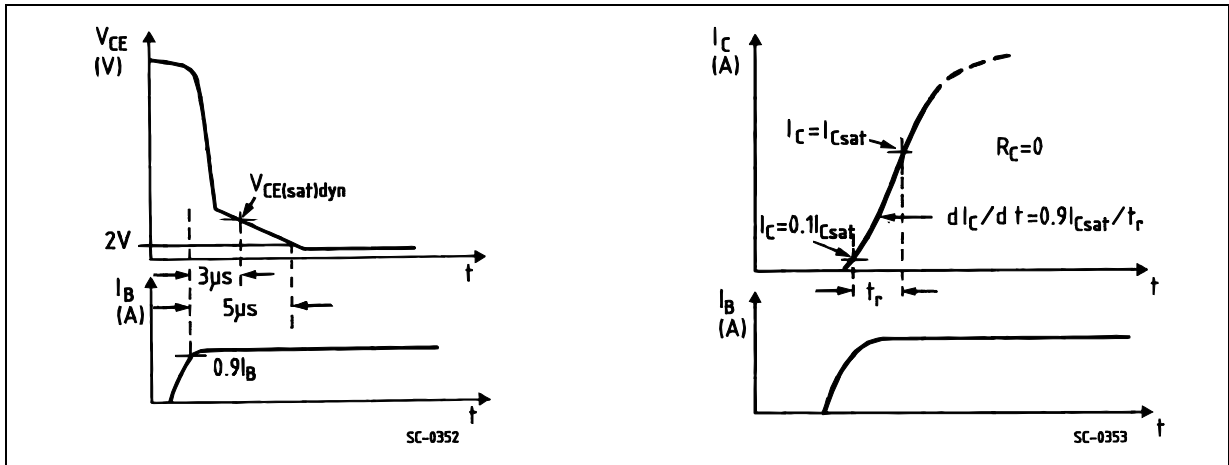


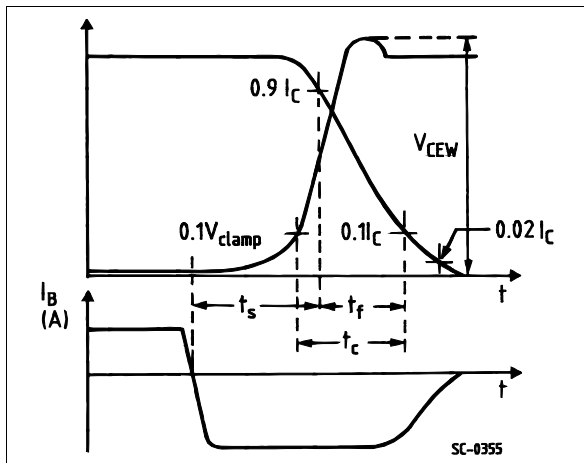
Figure 1: Inductive Load Switching Test Circuit.



Turn-on Switching Test Waveforms.

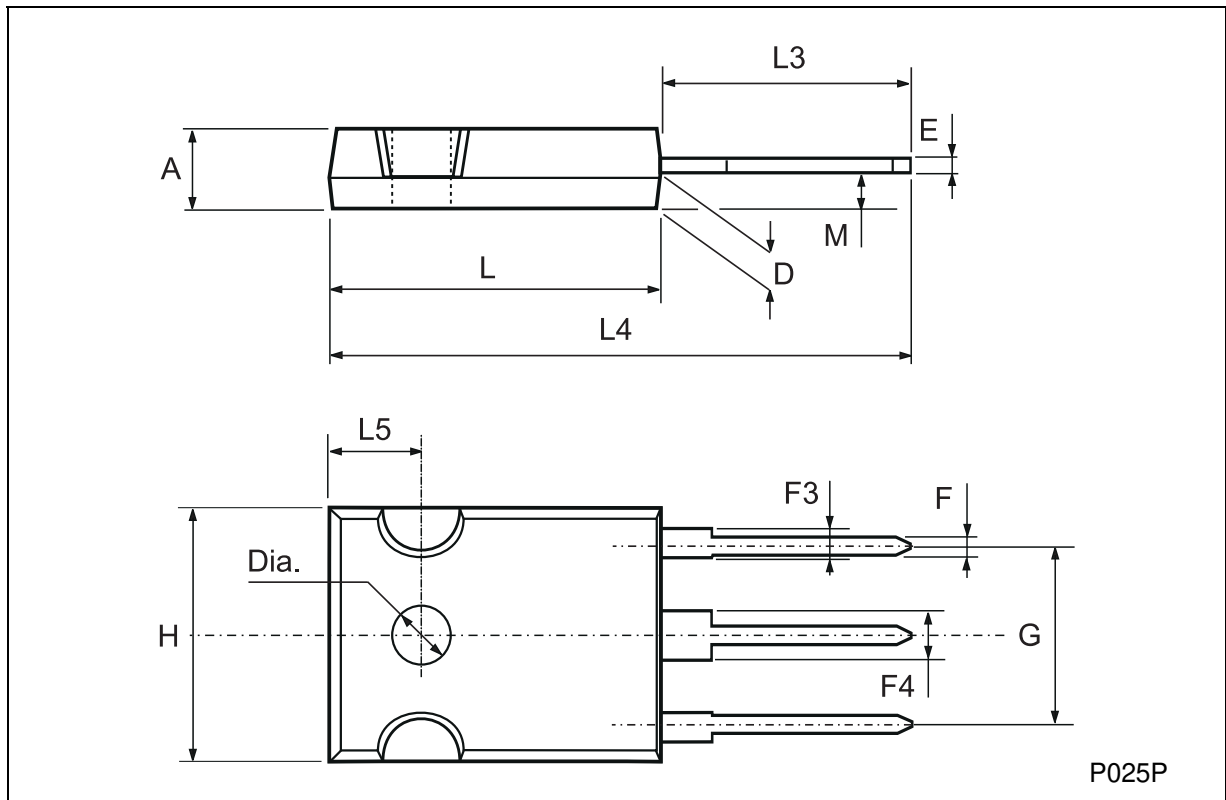


Turn-off Switching Test Waveforms (inductive load).



**TO-247 MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.7		5.3	0.185		0.209
D	2.2		2.6	0.087		0.102
E	0.4		0.8	0.016		0.031
F	1		1.4	0.039		0.055
F3	2		2.4	0.079		0.094
F4	3		3.4	0.118		0.134
G		10.9			0.429	
H	15.3		15.9	0.602		0.626
L	19.7		20.3	0.776		0.779
L3	14.2		14.8	0.559		0.582
L4		34.6			1.362	
L5		5.5			0.217	
M	2		3	0.079		0.118





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. Specification 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 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>