STW200NF03

N-CHANNEL 30V - 0.002 Ω - 120A TO-247
ULTRA LOW ON-RESISTANCE STripFET™ II MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STW200NF03	30V	<0.0028Ω	120A

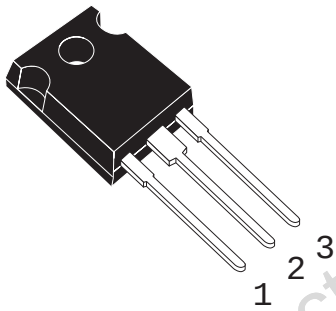
- TYPICAL $R_{DS}(on)$ = 0.002 Ω
- 100% AVALANCHE TESTED

DESCRIPTION

This Power MOSFET series realized with STMicroelectronics unique STripFET process has specifically been designed to minimize input capacitance and gate charge. It is particularly suitable in OR-ing function circuits and synchronous rectification.

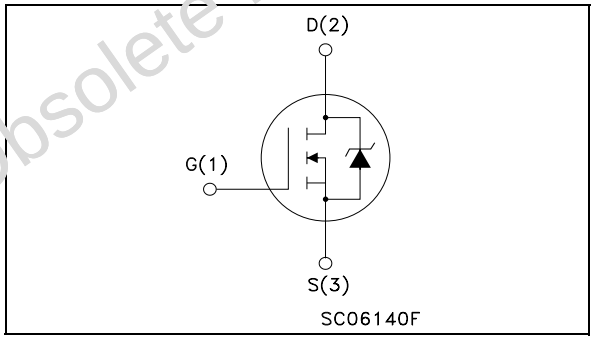
APPLICATIONS

- HIGH-EFFICIENCY DC-DC CONVERTERS
- HIGH CURRENT, HIGH SWITCHING SPEED
- OR-ING FUNCTION



TO-247

INTERNAL SCHEMATIC DIAGRAM



Obsolete Product(s) - Obsolete Product(s)

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	30	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	30	V
V_{GS}	Gate- source Voltage	± 20	V
I_D(•)	Drain Current (continuous) at T_C = 25°C	120	A
I_D	Drain Current (continuous) at T_C = 100°C	120	A
I_{DM}(••)	Drain Current (pulsed)	480	A
P_{tot}	Total Dissipation at T_C = 25°C	350	W
	Derating Factor	2.33	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	1.5	V/ns
E_{AS} (2)	Single Pulse Avalanche Energy	4	J
T_{stg}	Storage Temperature	-55 to 175	°C
T_j	Operating Junction Temperature		

(••) Pulse width limited by safe operating area.
(•)Current limited by package

(1) I_{SD} ≤120A, di/dt ≤200A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_j ≤ T_{JMAX}.
(2) Starting T_j = 25 ºC, I_D = 60 A, V_{DD}= 15V

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case	Max	0.43	°C/W
Rthj-amb	Thermal Resistance Junction-ambient	Max	50	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose	Typ	300	°C

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

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	I_D = 250 µA, V_{GS} = 0	30			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating T_C = 125°C			1 10	µA µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 20V			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} I_D = 250 µA	2	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V I_D = 60 A		0.002	0.0028	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS} = 15 V I_D = 60 A		200		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		10 3.35 385		nF nF pF

Obsolete Product(s) - Obsolete Product(s)

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD} = 15 V I_D = 60 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, Figure 3)		50 300		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}=15V I_D=120A V_{GS}= 10 V (see test circuit, Figure 4)		210 63.5 63.5	280	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 15 V I_D = 60 A R_G = 4.7Ω, V_{GS} = 10 V (Resistive Load, Figure 3)		100 80		ns ns

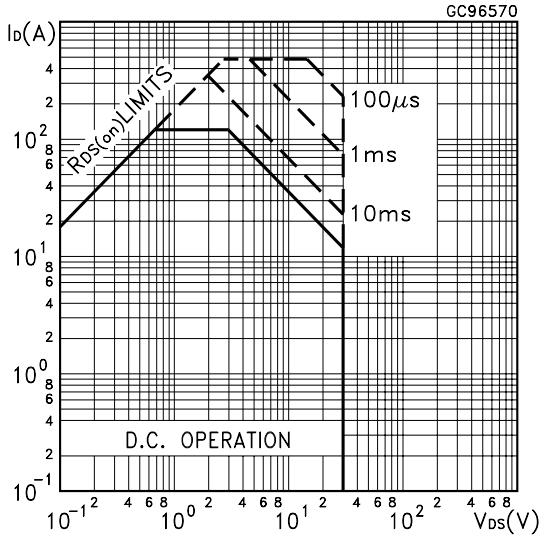
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (•)	Source-drain Current Source-drain Current (pulsed)				120 480	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 120 A V_{GS} = 0			1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 120 A di/dt = 100A/µs V_{DD} = 20 V T_j = 150°C (see test circuit, Figure 5)		90 250 5.5		ns nC A

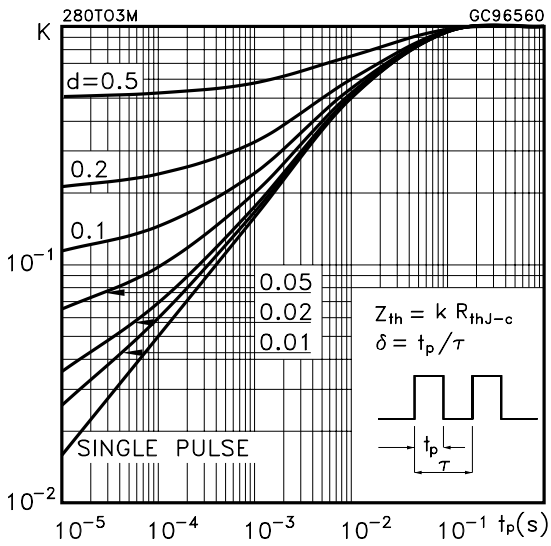
(*)Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
(•)Pulse width limited by safe operating area.

Obsolete Product(s) - Obsolete Product(s)

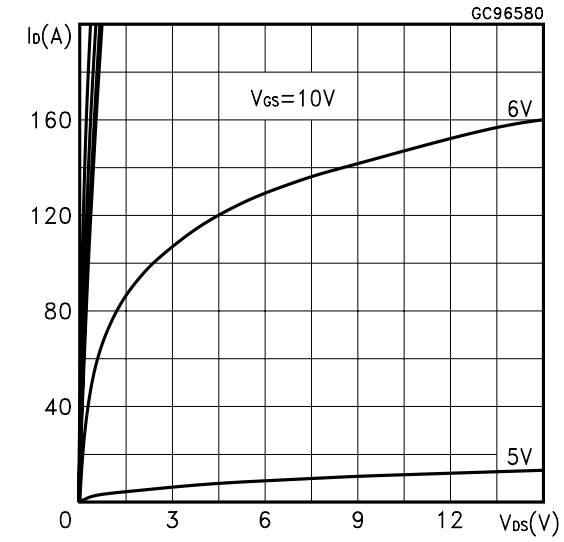
Safe Operating Area



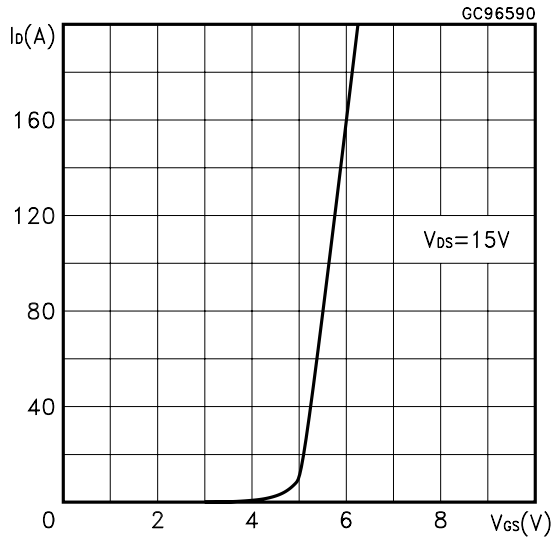
Thermal Impedance



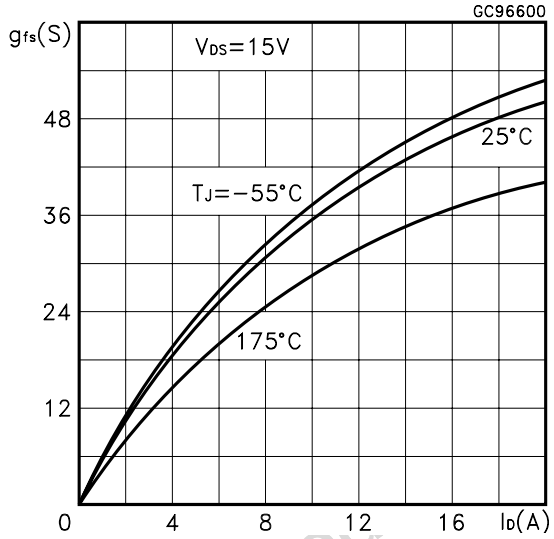
Output Characteristics



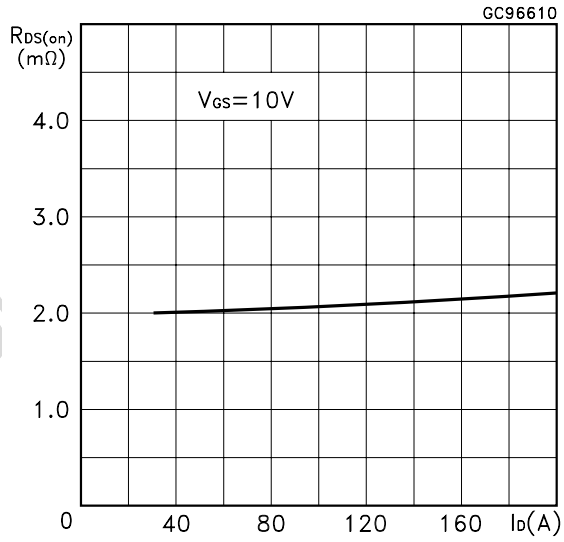
Transfer Characteristics



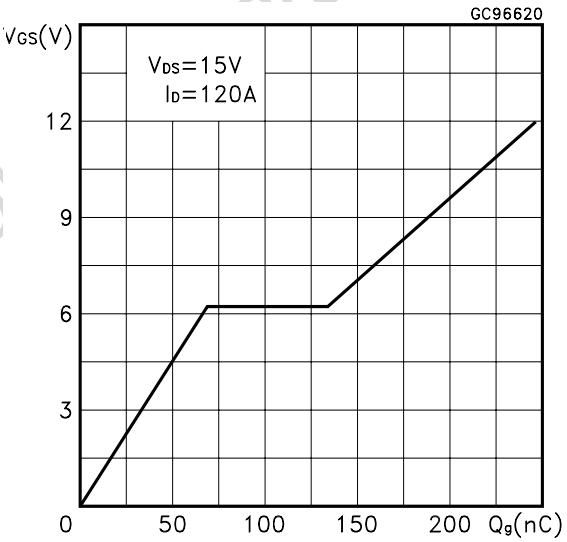
Transconductance



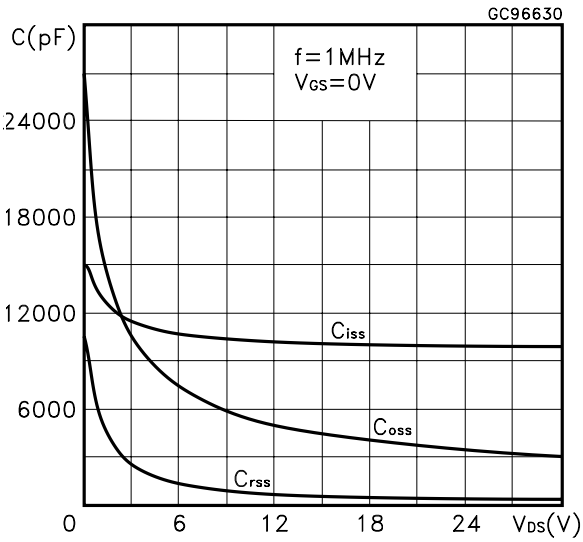
Static Drain-source On Resistance



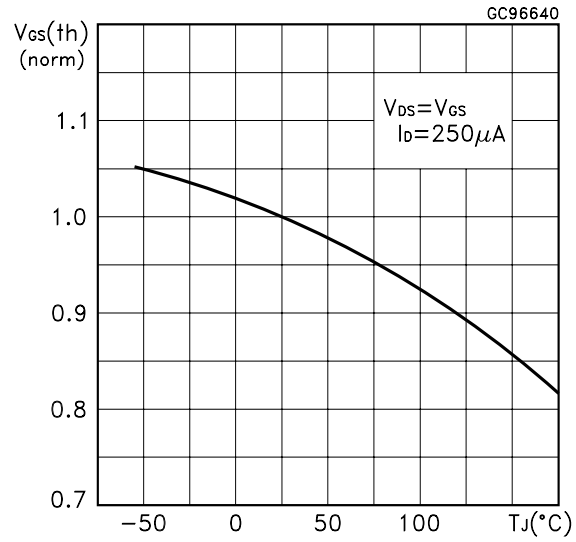
Gate Charge vs Gate-source Voltage



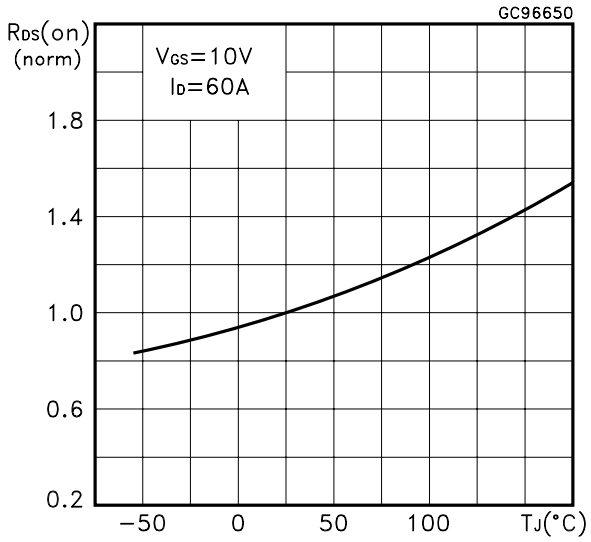
Capacitance Variations



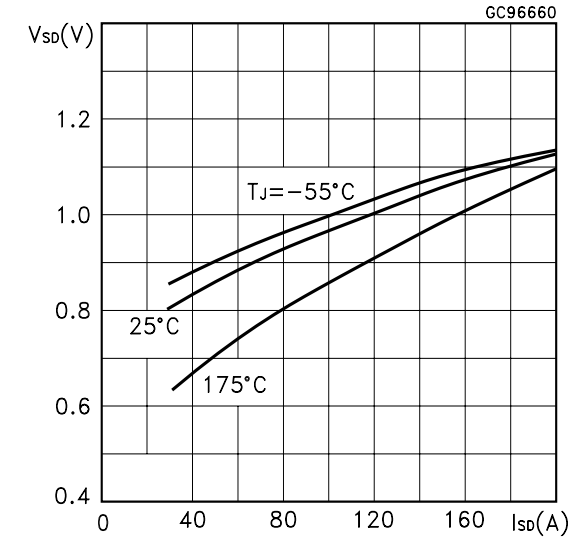
Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage vs Temperature.

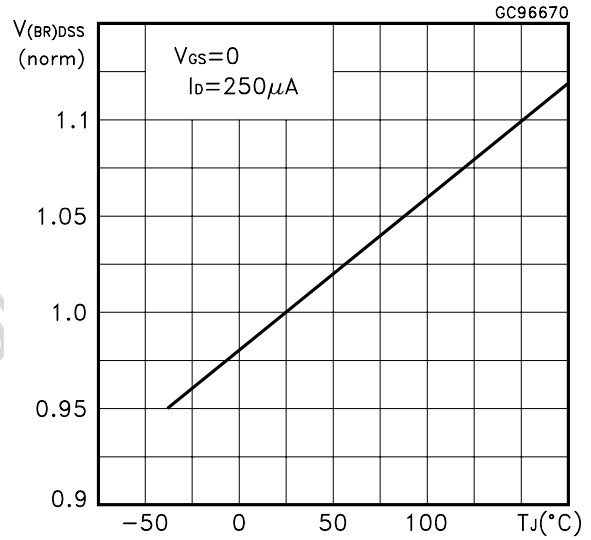


Fig. 1: Unclamped Inductive Load Test Circuit

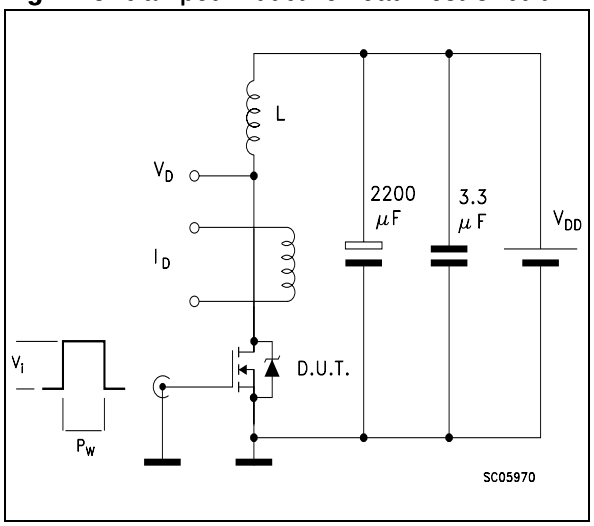


Fig. 2: Unclamped Inductive Waveform

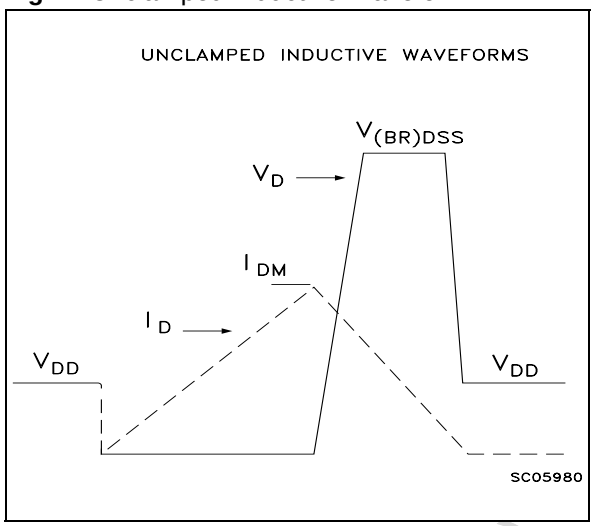


Fig. 3: Switching Times Test Circuits For Resistive Load

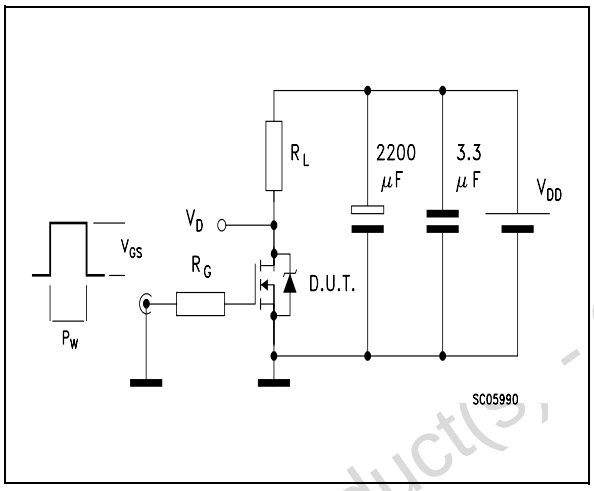


Fig. 4: Gate Charge test Circuit

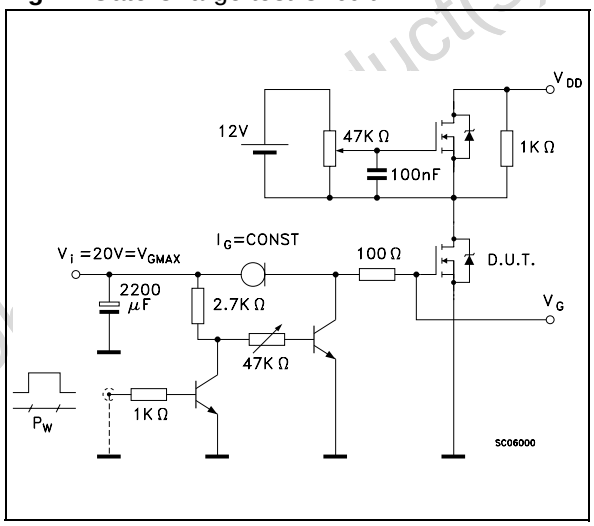
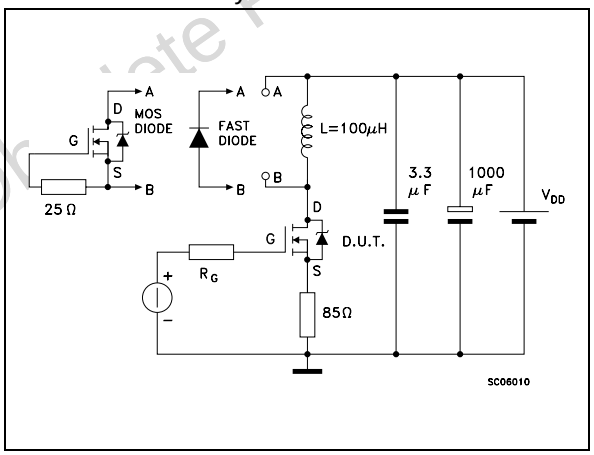


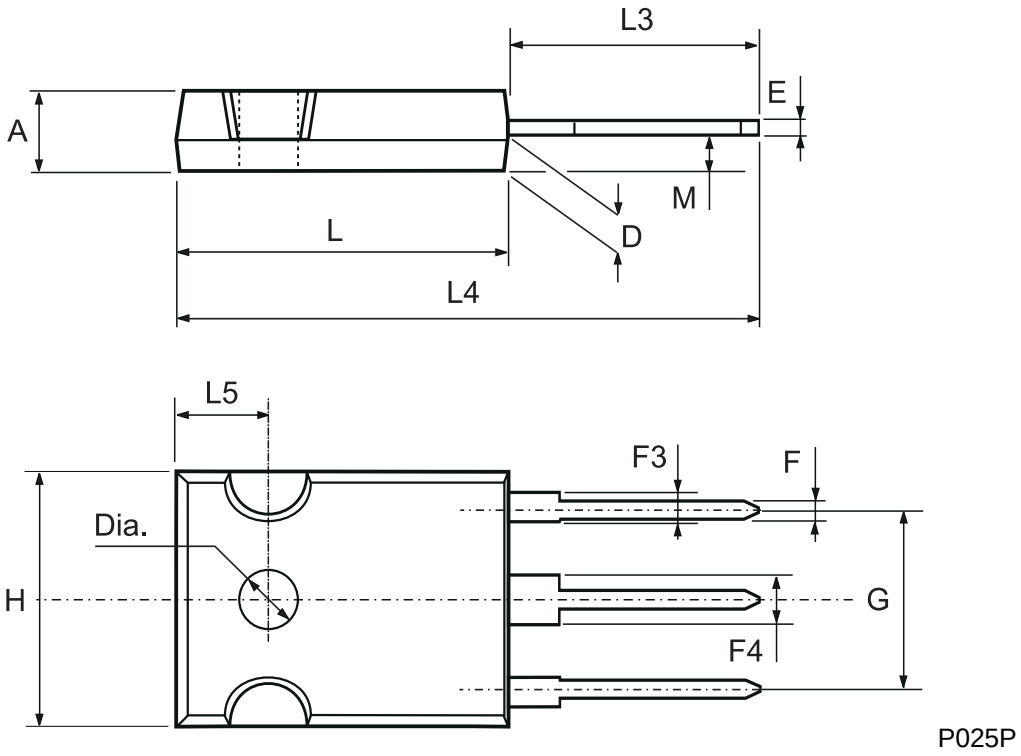
Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



Obsolete Product(s) - Obsolete Product(s)

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



P025P

Obsolete Product(s) - Obsolete Product(s)

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. Specifications 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 registered trademark of STMicroelectronics
® 2002 STMicroelectronics - All Rights Reserved

All other names are the property of their respective owners.

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