

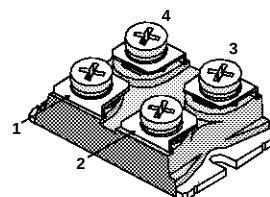
N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTOR IN ISOTOP PACKAGE

TYPE	V _{DSS}	R _{DS(on)}	I _D
STE180N05	50 V	< 0.006 Ω	180 A

- HIGH CURRENT POWER MODULE
- AVALANCHE RUGGED TECHNOLOGY (SEE STH65N05 FOR RATING)
- VERY LARGE SOA - LARGE PEAK POWER CAPABILITY
- EASY TO MOUNT
- SAME CURRENT CAPABILITY FOR THE TWO SOURCE TERMINALS
- EXTREMELY LOW R_{th} JUNCTION TO CASE
- VERY LOW DRAIN TO CASE CAPACITANCE
- VERY LOW INTERNAL PARASITIC INDUCTANCE (TYPICALLY < 5 nH)
- ISOLATED PACKAGE UL RECOGNIZED (FILE No E81743)

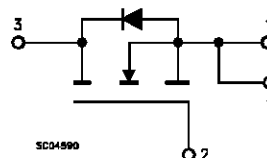
INDUSTRIAL APPLICATIONS:

- SMPS & UPS
- MOTOR CONTROL
- WELDING EQUIPMENT
- OUTPUT STAGE FOR PWM, ULTRASONIC CIRCUITS



ISOTOP

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source Voltage (V _{GS} = 0)	50	V
V _{DGR}	Drain-Gate Voltage (R _{GS} = 20 kΩ)	50	V
V _{GS}	Gate-Source Voltage	± 20	V
I _D	Drain Current (continuous) at T _c = 25 °C	180	A
I _D	Drain Current (continuous) at T _c = 100 °C	115.5	A
I _{DM} (●)	Drain Current (pulsed)	540	A
P _{tot}	Total Dissipation at T _c = 25 °C	360	W
	Derating Factor	2.9	W/°C
T _{stg}	Storage Temperature	-55 to 150	°C
T _j	Max. Operating Junction Temperature	150	°C
V _{ISO}	Insulation Withstand Voltage (AC-RMS)	2500	V

(●) Pulse width limited by safe operating area

STE180N05

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	0.35	$^{\circ}\text{C/W}$
R_{thc-h}	Thermal Resistance Case-heatsink With Conductive Grease Applied	Max	0.05	$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 1\text{ mA}$ $V_{GS} = 0\text{ V}$	50			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating} \times 0.8$ $T_c = 125^{\circ}\text{C}$			400 2	μA mA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 20\text{ V}$			± 400	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 1\text{ mA}$	2		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10\text{ V}$ $I_D = 90\text{ A}$		0.004	0.006	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} = 15\text{ V}$ $I_D = 90\text{ A}$		100		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$ $V_{GS} = 0\text{ V}$			12 5200 1200	nF pF pF

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Time Rise Time	$V_{DD} = 25\text{ V}$ $I_D = 90\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 1)		55 210		ns ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 40\text{ V}$ $I_D = 180\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 3)		900		A/ μs
Q_g	Total Gate Charge	$V_{DD} = 40\text{ V}$ $I_D = 180\text{ A}$ $V_{GS} = 10\text{ V}$		270		nC

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING OFF**

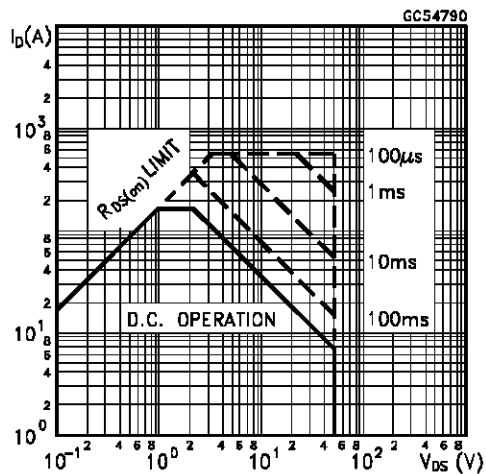
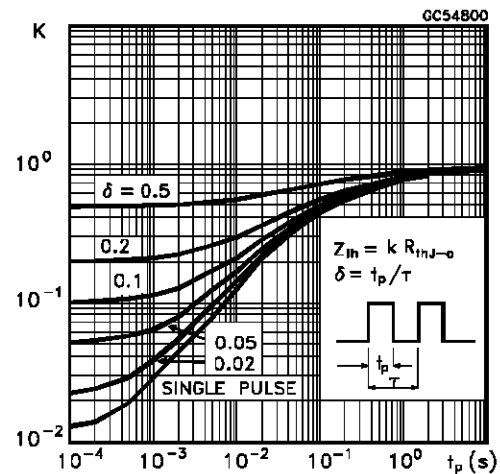
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{DD} = 40\text{ V}$ $I_D = 180\text{ A}$		40		ns
t_f	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$		315		ns
t_c	Cross-over Time	(see test circuit, figure 3)		440		ns

SOURCE DRAIN DIODE

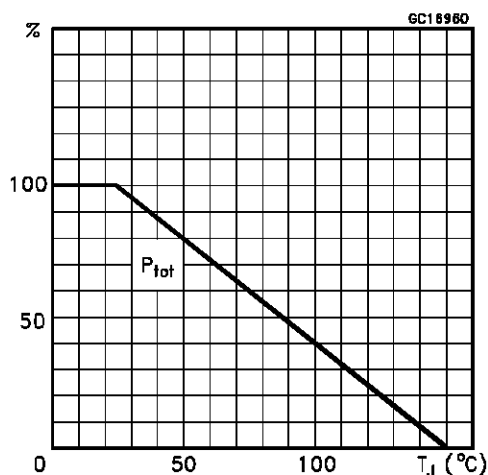
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				180	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				540	A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 180\text{ A}$ $V_{GS} = 0$			1.6	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 180\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 25\text{ V}$ $T_J = 150\text{ }^\circ\text{C}$ (see test circuit, figure 3)		160		ns
Q_{rr}	Reverse Recovery Charge			480		nC
I_{RRM}	Reverse Recovery Current			6		A

(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

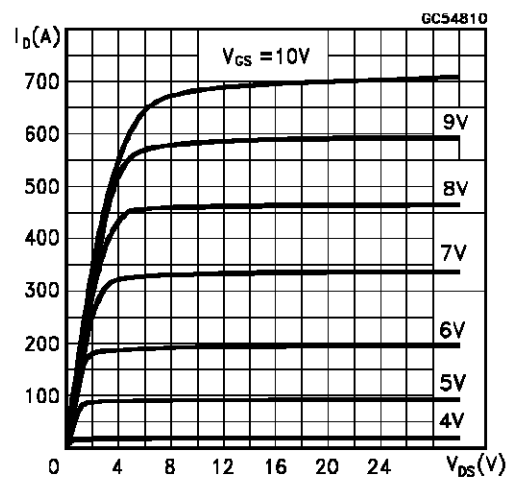
(•) Pulse width limited by safe operating area

Safe Operating Area**Thermal Impedance**

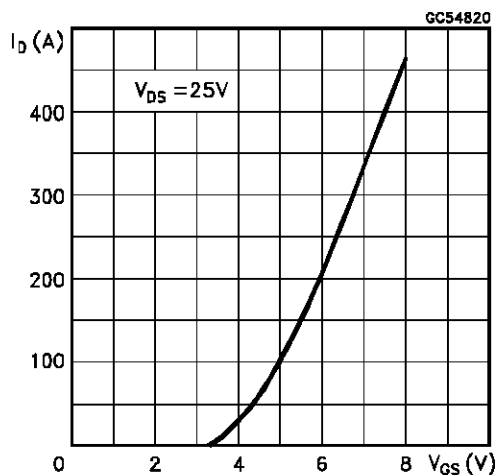
Derating Curve



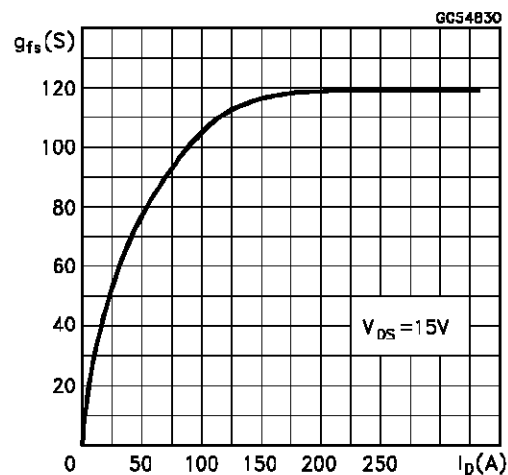
Output Characteristics



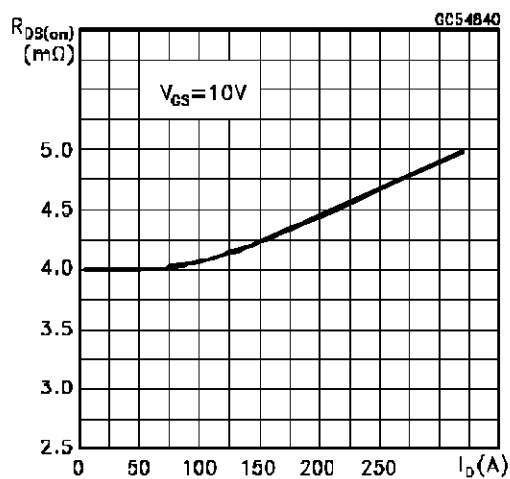
Transfer Characteristics



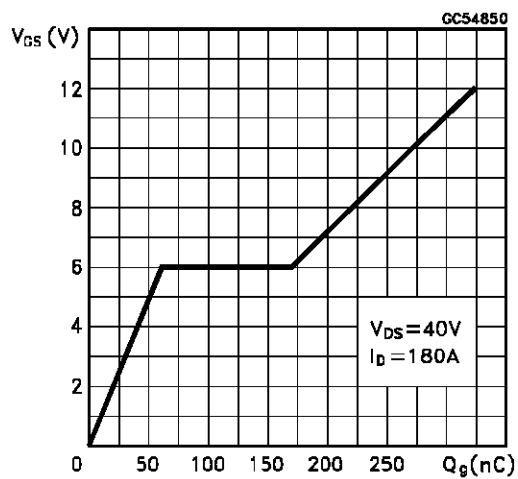
Transconductance



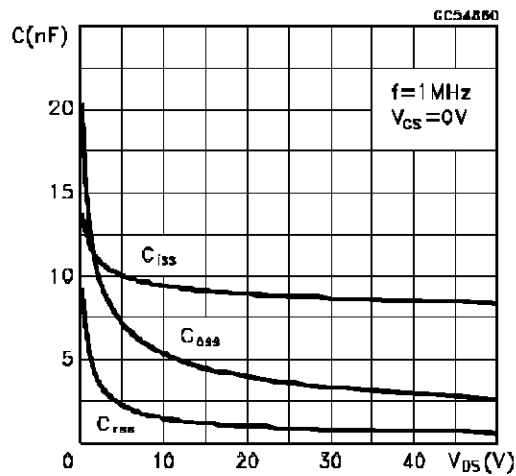
Static Drain-source On Resistance



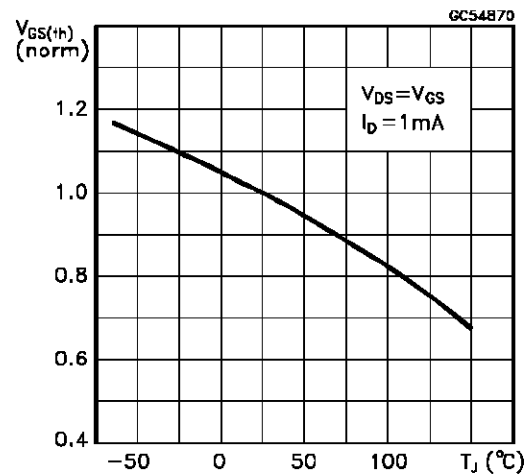
Gate Charge vs Gate-source Voltage



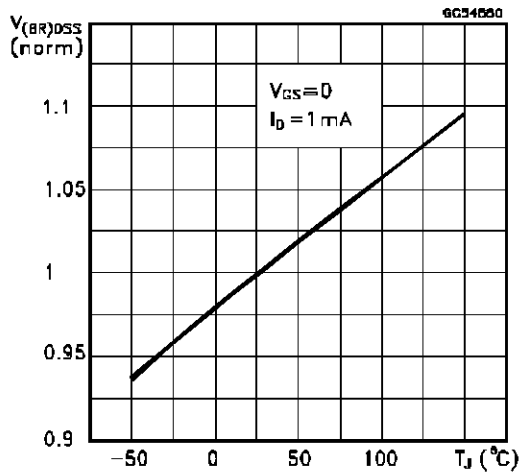
Capacitance Variations



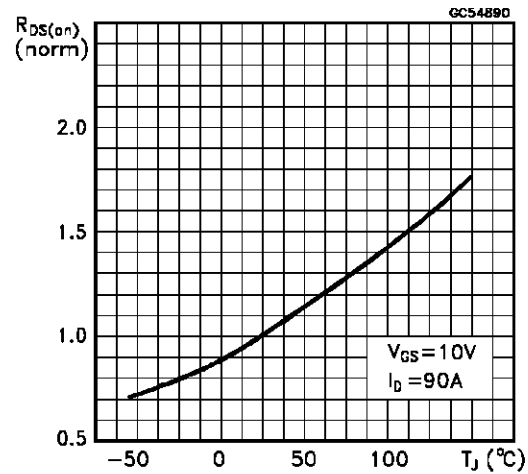
Normalized Gate Threshold Voltage vs Temperature



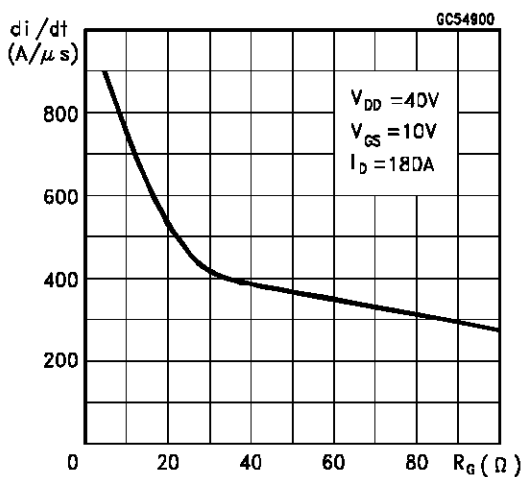
Normalized Breakdown Voltage vs Temperature



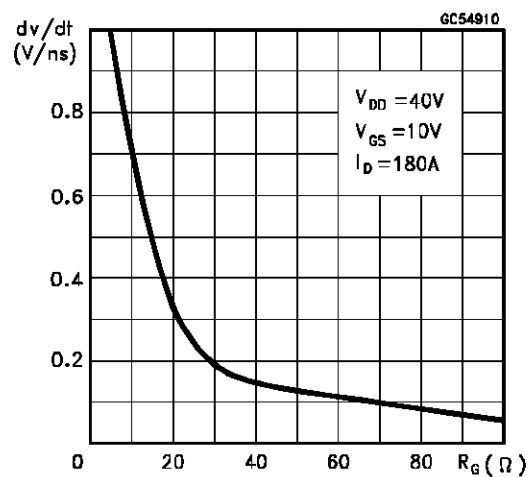
Normalized On Resistance vs Temperature



Turn-on Current Slope



Turn-off Drain-source Voltage Slope



Cross-over Time

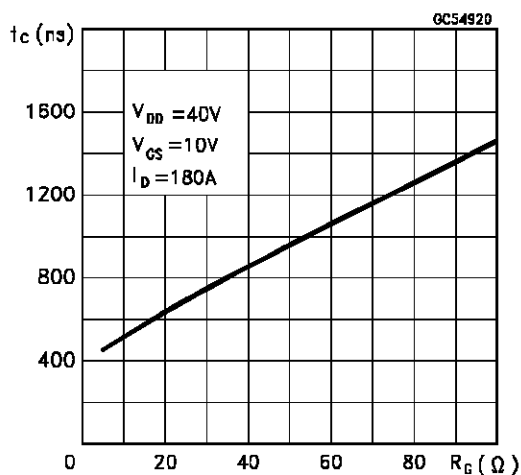
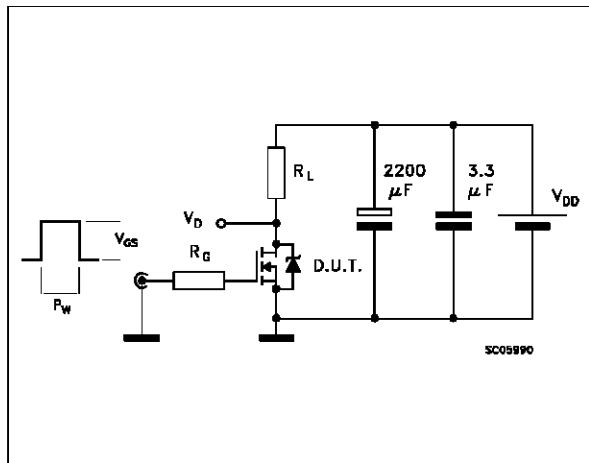


Fig. 1: Switching Times Test Circuits For Resistive Load



Source-drain Diode Forward Characteristics

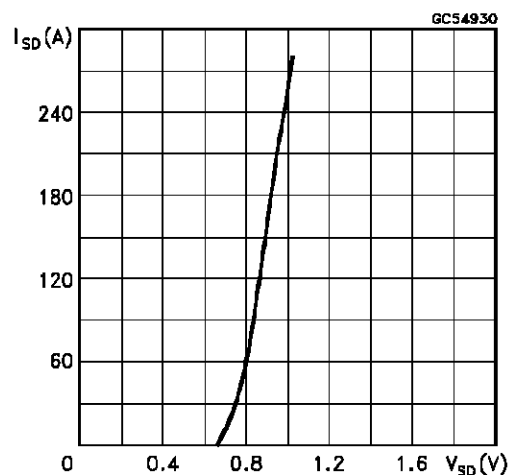


Fig. 2: Gate Charge Test Circuit

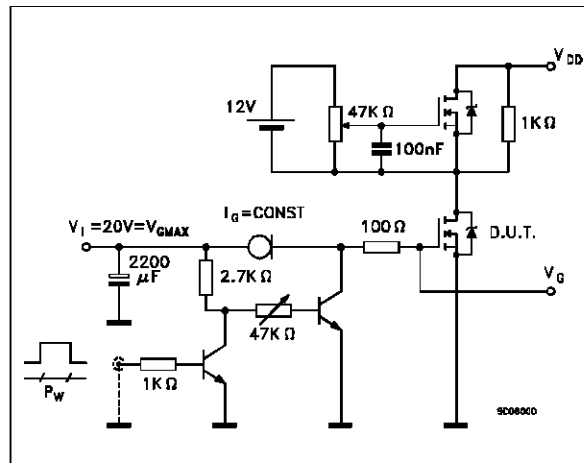
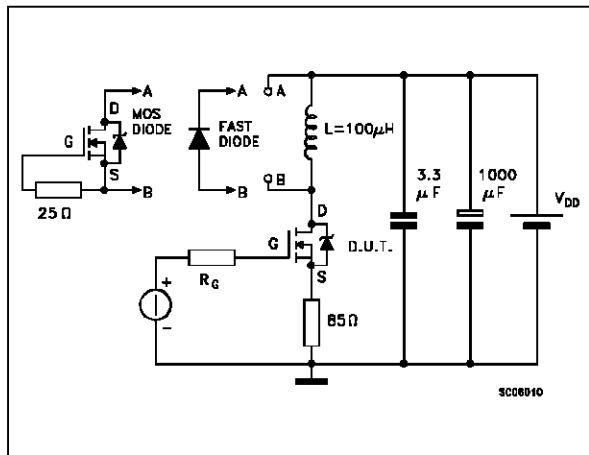
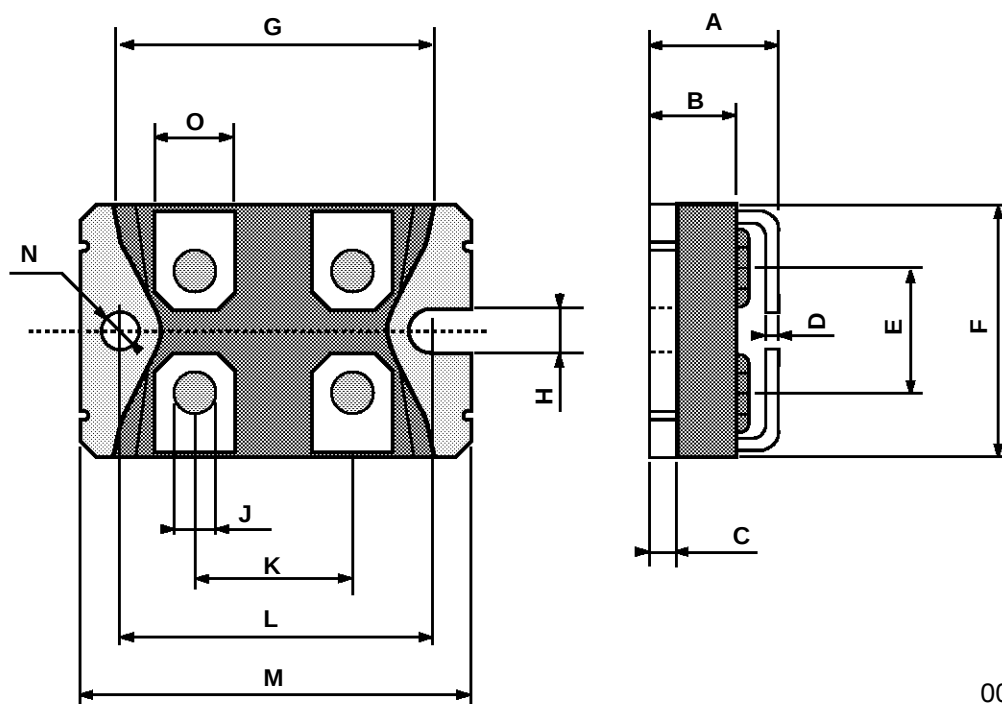


Fig. 3: Test Circuit For Inductive Load Switching And Diode Recovery Times



ISOTOP MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	11.8		12.2	0.466		0.480
B	8.9		9.1	0.350		0.358
C	1.95		2.05	0.076		0.080
D	0.75		0.85	0.029		0.033
E	12.6		12.8	0.496		0.503
F	25.15		25.5	0.990		1.003
G	31.5		31.7	1.240		1.248
H	4			0.157		
J	4.1		4.3	0.161		0.169
K	14.9		15.1	0.586		0.594
L	30.1		30.3	1.185		1.193
M	37.8		38.2	1.488		1.503
N	4			0.157		
O	7.8		8.2	0.307		0.322
P	5.5			0.216		



0041565

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics 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 SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A