



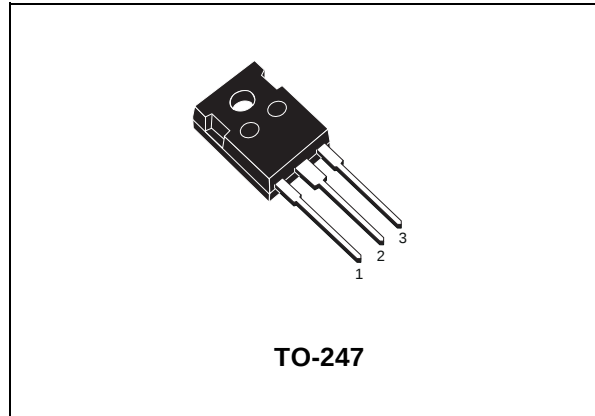
STGW30NB60HD

N-CHANNEL 30A - 600V - TO-247

PowerMESH™ IGBT

TYPE	V _{CES}	V _{CE(sat)} (Max)	I _C
STGW30NB60HD	600 V	< 2.8 V	30 A

- HIGH INPUT IMPEDANCE (VOLTAGE DRIVEN)
- LOW ON-VOLTAGE DROP (V_{CESAT})
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY
- VERY HIGH FREQUENCY OPERATION
- OFF LOSSES INCLUDE TAIL CURRENT
- CO-PACKAGED WITH TORBOSWITCH™ ANTIPARALLEL DIODE

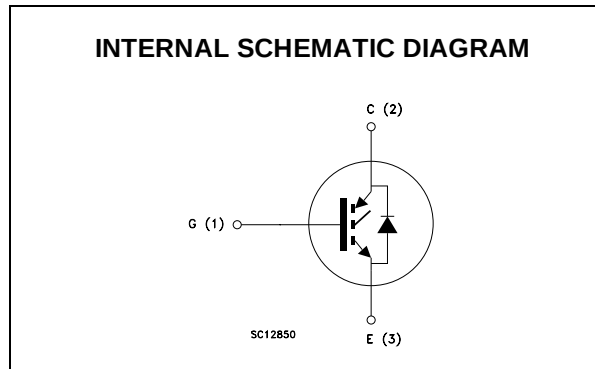


DESCRIPTION

Using the latest high voltage technology based on a patented strip layout, STMicroelectronics has designed an advanced family of IGBTs, the PowerMESH™ IGBTs, with outstanding performances. The suffix "H" identifies a family optimized to achieve very low switching times for high frequency applications (<120KHz).

APPLICATIONS

- HIGH FREQUENCY MOTOR CONTROLS
- WELDING EQUIPMENTS
- SMPS AND PFC IN BOTH HARD SWITCH AND RESONANT TOPOLOGIES



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CES}	Collector-Emitter Voltage (V _{GS} = 0)	600	V
V _{ECR}	Emitter-Collector Voltage	20	V
V _{GE}	Gate-Emitter Voltage	± 20	V
I _C	Collector Current (continuous) at T _C = 25°C	60	A
I _C	Collector Current (continuous) at T _C = 100°C	30	A
I _{CM} (■)	Collector Current (pulsed)	240	A
P _{TOT}	Total Dissipation at T _C = 25°C	190	W
	Derating Factor	1.52	W/°C
T _{stg}	Storage Temperature	-65 to 150	°C
T _j	Max. Operating Junction Temperature	150	°C

Note: NEW DATASHEET ACCORDING TO PCN DSG/CT/XXXX
March 2003

(●) Pulse width limited by safe operating area

STGW30NB60HD

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case Max	0.66	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	30	°C/W
Rthc-h	Thermal Resistance Case-heatsink Typ	0.1	°C/W

ELECTRICAL CHARACTERISTICS (T_{CASE} = 25 °C UNLESS OTHERWISE SPECIFIED)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{BR} (CES)	Collectro-Emitter Breakdown Voltage	I _C = 250 µA, V _{GE} = 0	600			V
I _{CES}	Collector cut-off (V _{GE} = 0)	V _{CE} = Max Rating, T _C = 25 °C V _{CE} = Max Rating, T _C = 125 °C			100 1000	µA µA
I _{GES}	Gate-Emitter Leakage Current (V _{CE} = 0)	V _{GE} = ± 20 V, V _{CE} = 0			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GE} (th)	Gate Threshold Voltage	V _{CE} = V _{GE} , I _C = 250 µA	3		5	V
V _{CE} (sat)	Collector-Emitter Saturation Voltage	V _{GE} =15 V, I _C =30 A V _{GE} =15 V, I _C =30 A, T _C =125°C		2.2 1.8	2.8	V V

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs}	Forward Transconductance	V _{CE} = 25 V, I _C = 30 A		20		S
C _{ies}	Input Capacitance	V _{CE} = 25 V, f = 1 MHz, V _{GE} = 0		2300		pF
C _{oes}	Output Capacitance			250		pF
C _{res}	Reverse Transfer Capacitance			72		pF
Q _g Q _{ge} Q _{gc}	Total Gate Charge Gate-Emitter Charge Gate-Collector Charge	V _{CE} = 480 V, I _C = 30 A, V _{GE} = 15 V		150 15 72	210	nC nC nC
I _{CL}	Latching Current	V _{clamp} = 480 V, R _G = 10 Ω V _{GE} = 15 V, T _J = 150°C	120			A

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t _{d(on)} t _r	Delay Time Rise Time	V _{CC} = 480 V, I _C = 30 A V _{GE} = 15 V, R _G = 10Ω		15 35		ns ns
(di/dt) _{on} E _{on}	Turn-on Current Slope Turn-on Switching Losses	V _{CC} = 480 V, I _C = 30 A, R _G =10 Ω V _{GE} = 15 V, T _J = 125°C		1000 1000		A/µs µJ

ELECTRICAL CHARACTERISTICS (CONTINUED)**SWITCHING OFF**

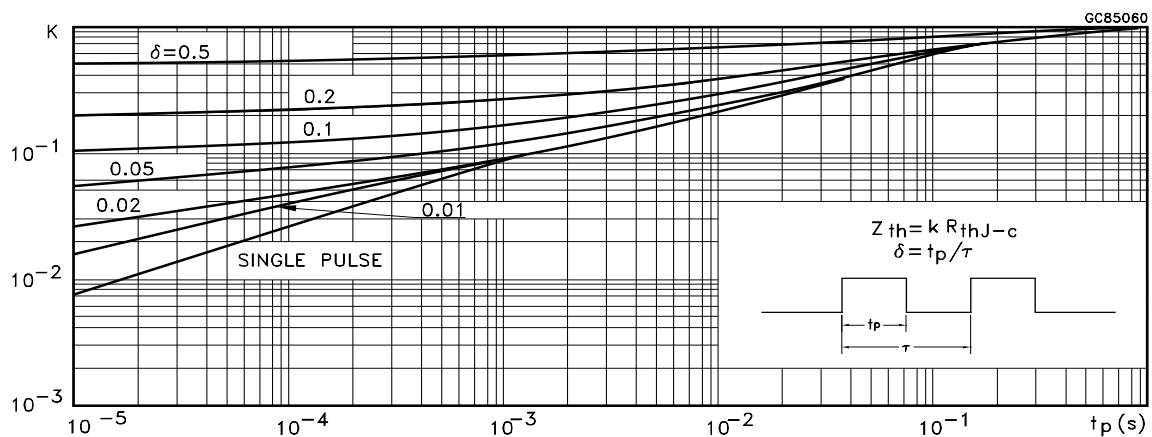
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_c	Cross-over Time	$V_{CC} = 480\text{ V}$, $I_C = 30\text{ A}$, $R_{GE} = 10\ \Omega$, $V_{GE} = 15\text{ V}$		150		ns
$t_r(V_{off})$	Off Voltage Rise Time			40		ns
$t_d(off)$	Delay Time			210		ns
t_f	Fall Time			90		ns
$E_{off}(^{**})$	Turn-off Switching Loss			1.10		mJ
E_{TS}	Total Switching Loss			2.0		mJ
t_c	Cross-over Time	$V_{CC} = 480\text{ V}$, $I_C = 30\text{ A}$, $R_{GE} = 10\ \Omega$, $V_{GE} = 15\text{ V}$ $T_j = 125\text{ }^\circ\text{C}$		250		ns
$t_r(V_{off})$	Off Voltage Rise Time			70		ns
$t_d(off)$	Delay Time			250		ns
t_f	Fall Time			160		ns
$E_{off}(^{**})$	Turn-off Switching Loss			1.6		mJ
E_{TS}	Total Switching Loss			2.65		mJ

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

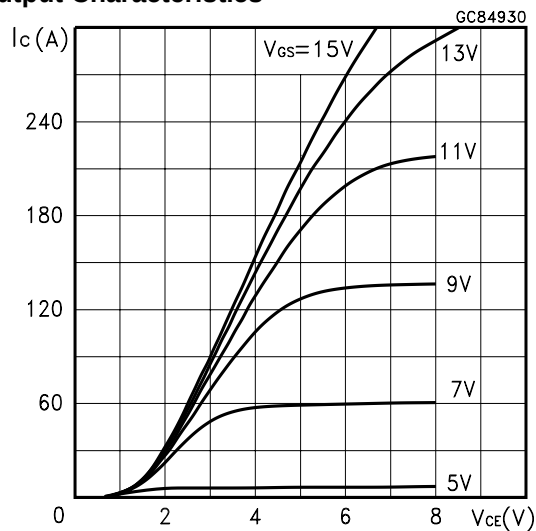
(**)Losses include Also the Tail (Jedec Standardization)

COLLECTOR-EMITTER DIODE

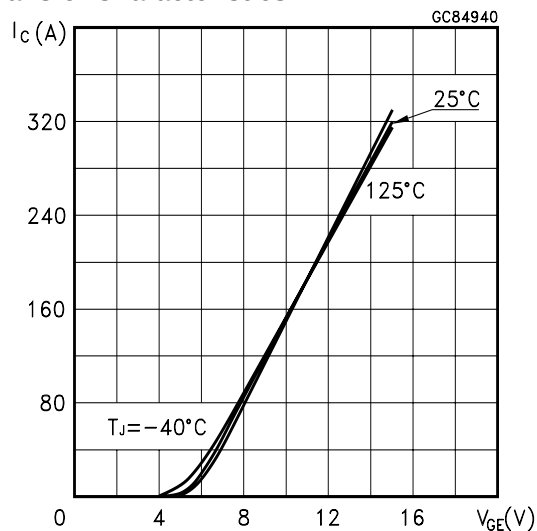
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_f	Forward Current				15	A
I_{fm}	Forward Current pulsed				120	A
V_f	Forward On-Voltage	$I_f = 15\text{ A}$		1.4	2.0	V
		$I_f = 15\text{ A}$, $T_j = 125\text{ }^\circ\text{C}$		1.25		V
t_{rr}	Reverse Recovery Time	$I_f = 15\text{ A}$, $V_R = 27\text{ V}$, $T_j = 125\text{ }^\circ\text{C}$, $di/dt = 100\text{ A}/\mu\text{s}$		84		ns
Q_{rr}	Reverse Recovery Charge			201		nC
I_{rrm}	Reverse Recovery Current			4.8		A

Thermal Impedance

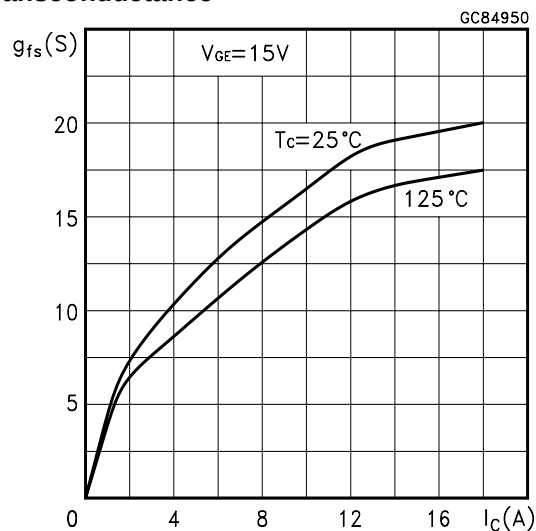
Output Characteristics



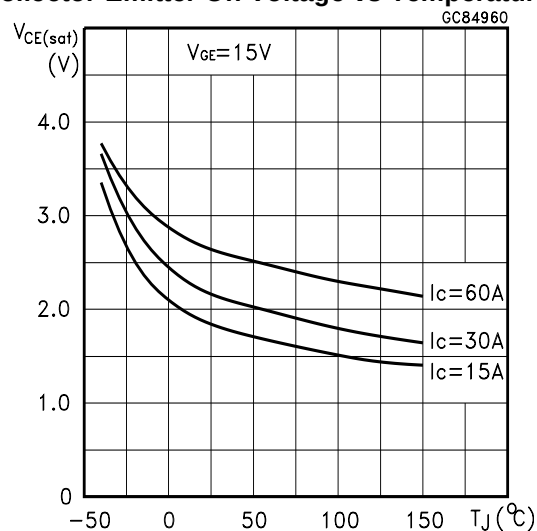
Transfer Characteristics



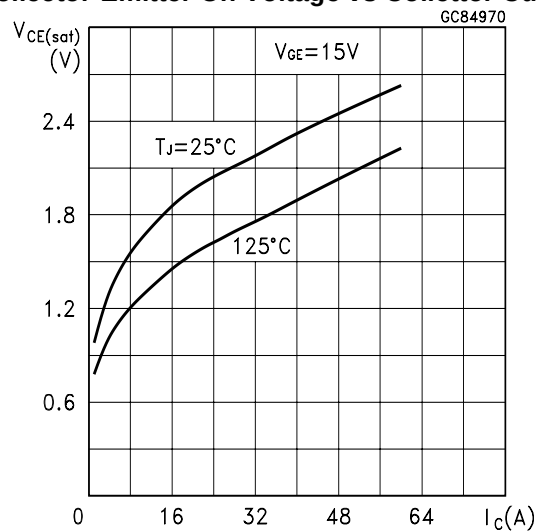
Transconductance



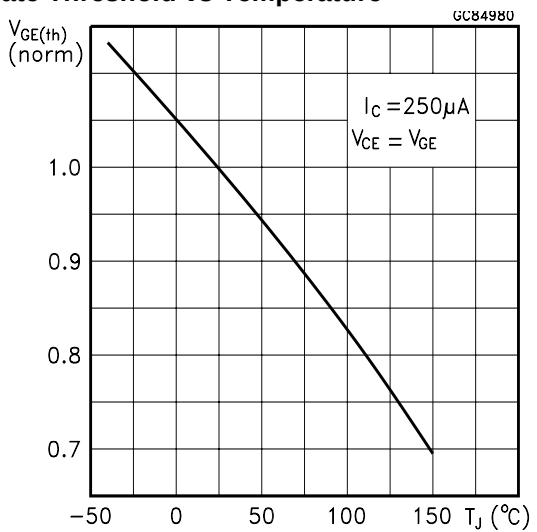
Collector-Emitter On Voltage vs Temperature



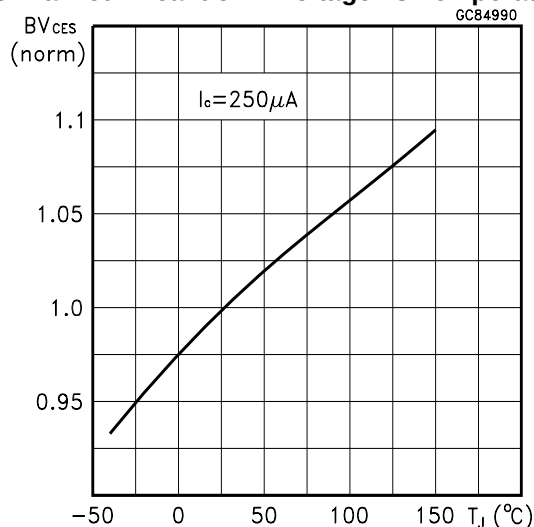
Collector-Emitter On Voltage vs Collector Current



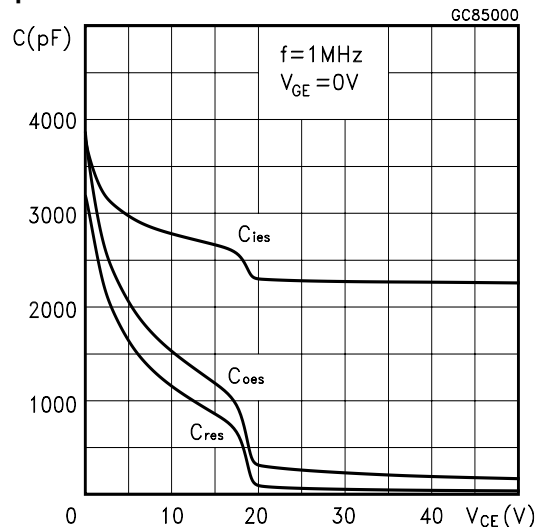
Gate Threshold vs Temperature



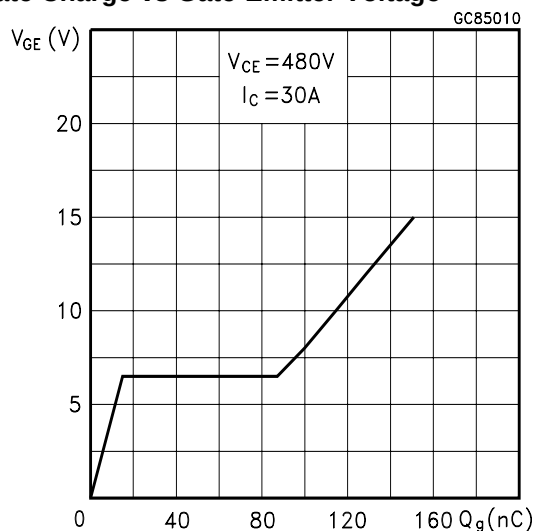
Normalized Breakdown Voltage vs Temperature



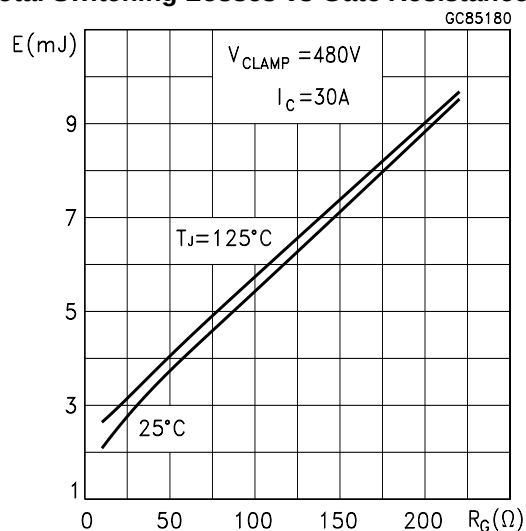
Capacitance Variations



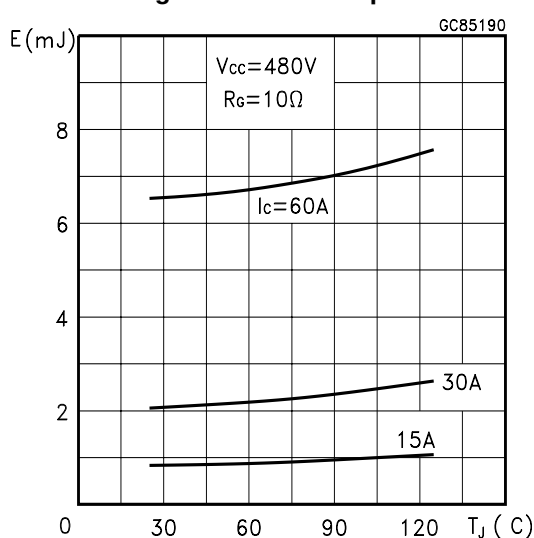
Gate Charge vs Gate-Emmitter Voltage



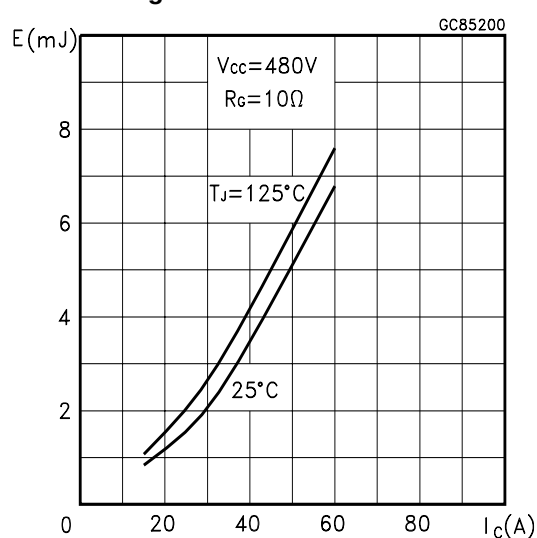
Total Switching Losses vs Gate Resistance



Total Switching Losses vs Temperature



Total Switching Losses vs Collector Current



Switching Off Safe Operating Area

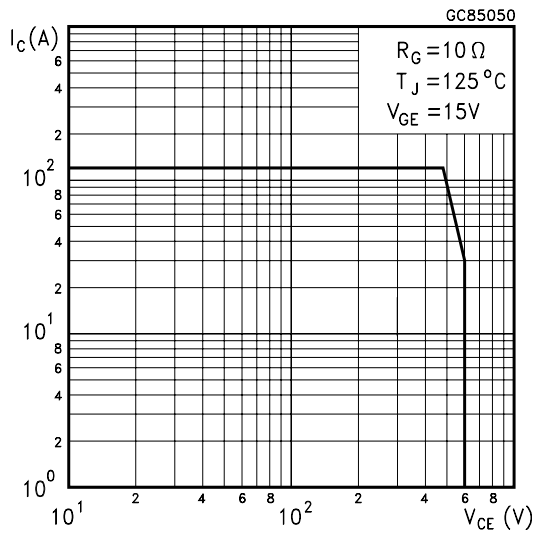
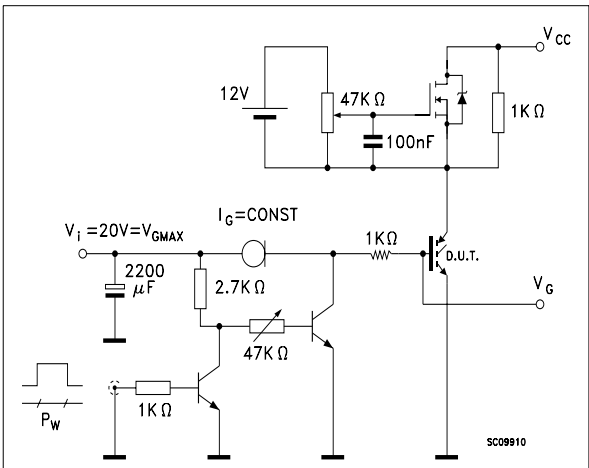


Fig. 1: Gate Charge test Circuit



Diode Forward Voltage

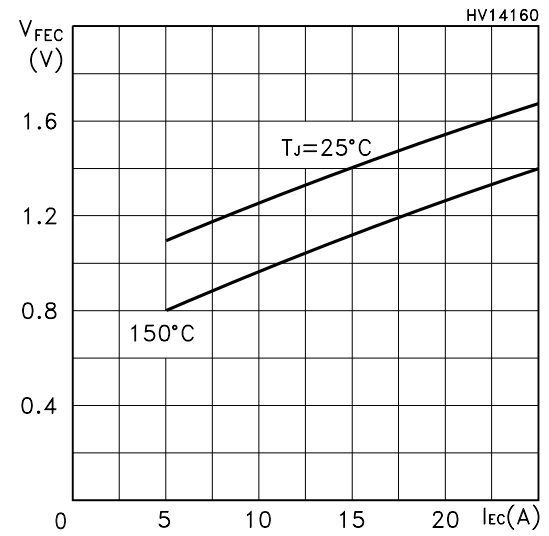
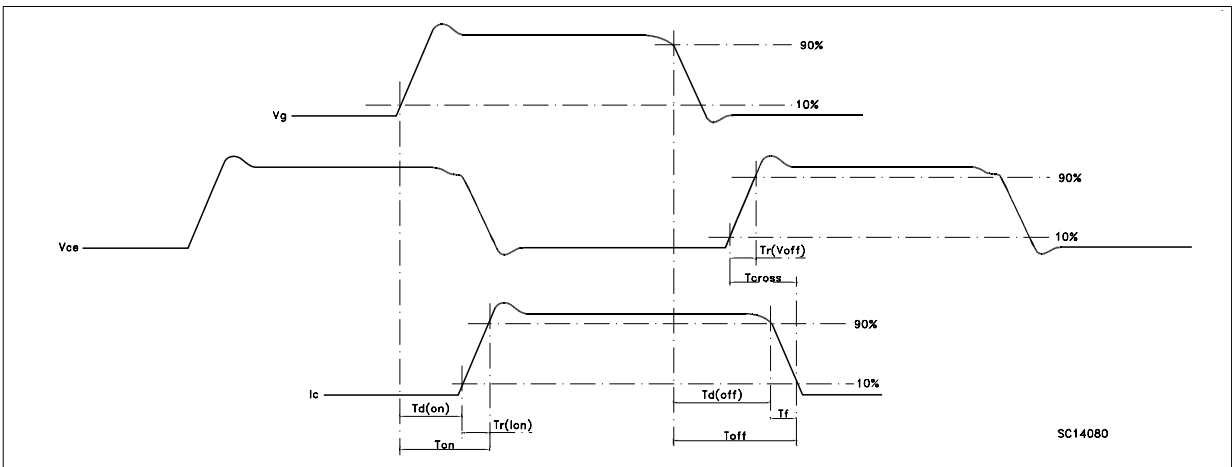
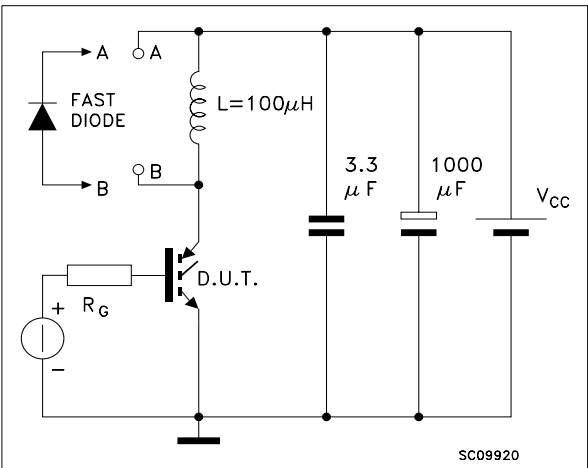
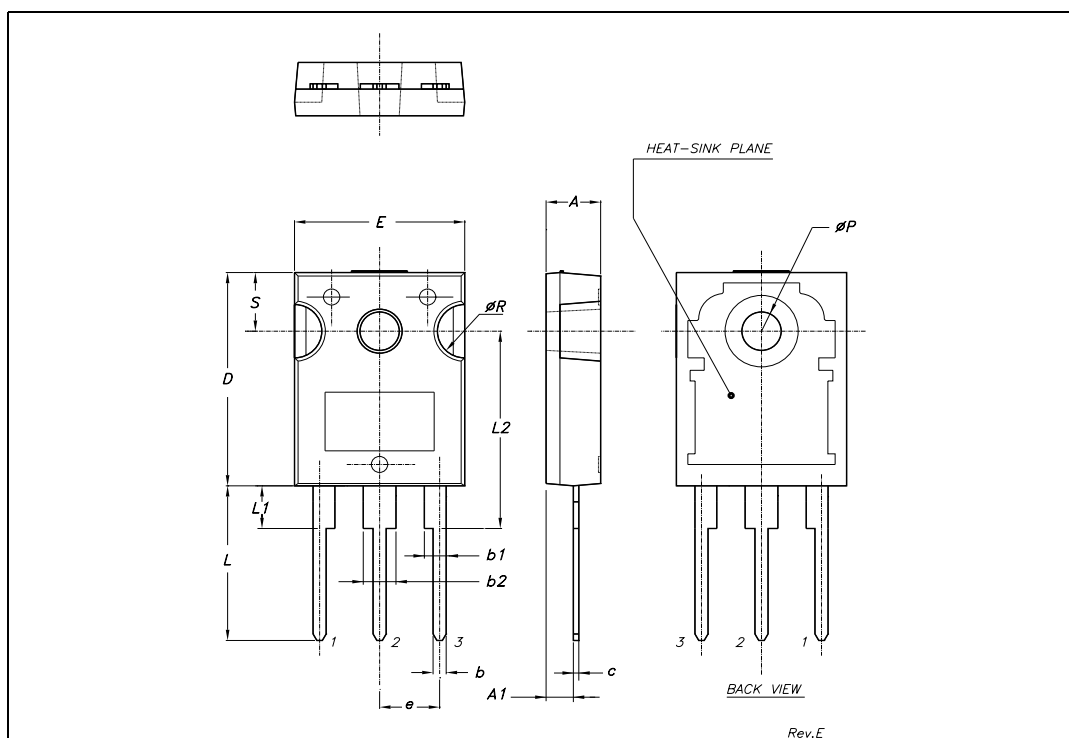


Fig. 2: Test Circuit For Inductive Load Switching



TO-247 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.85		5.15	0.19		0.20
A1	2.20		2.60	0.086		0.102
b	1.0		1.40	0.039		0.055
b1	2.0		2.40	0.086		0.094
b2	3.0		3.40	0.118		0.134
c	0.40		0.80	0.015		0.03
D	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e		5.45			0.214	
L	14.20		14.80	0.560		0.582
L1	3.70		4.30	0.14		0.17
L2		18.50			0.728	
øP	3.55		3.65	0.140		0.143
øR	4.50		5.50	0.177		0.216
S		5.50			0.216	



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 a registered trademark of STMicroelectronics

© 2003 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>