



STGW40NC60V

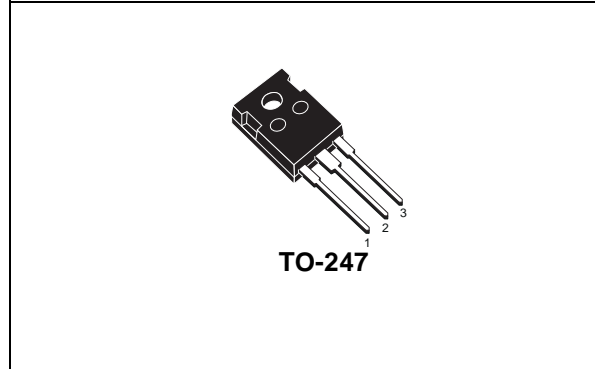
N-CHANNEL 40A - 600V TO-247

PowerMESH™ IGBT

TARGET DATA

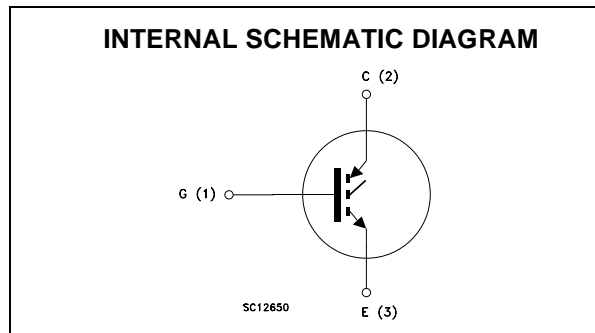
TYPE	V _{CES}	V _{CE(sat)}	I _C
STGW40NC60V	600 V	< 2.5 V	40 A

- HIGH INPUT IMPEDANCE
- LOW ON-VOLTAGE DROP (V_{cesat})
- OFF LOSSES INCLUDE TAIL CURRENT
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY
- VERY HIGH FREQUENCY OPERATION



APPLICATIONS

- HIGH FREQUENCY INVERTERS
- SMPS and PFC IN BOTH HARD SWITCH AND RESONANT TOPOLOGIES
- UPS
- WELDING



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	80	A
I _C	Collector Current (continuous) at T _C = 100°C	40	A
I _{CM} (●)	Collector Current (pulsed)	300	A
P _{TOT}	Total Dissipation at T _C = 25°C	TBD	W
	Derating Factor	TBD	W/°C
T _{stg}	Storage Temperature	- 55 to 150	°C
T _j	Max. Operating Junction Temperature	150	°C

(●)Pulse width limited by safe operating area

STGW40NC60V

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case Max	1.04	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	30	°C/W
Rthc-sink	Thermal Resistance Case-sink 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)}	Collector-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			250 TBD	μA μA
I _{GES}	Gate-Emitter Leakage Current (V _{CE} = 0)	V _{GE} = ±20 V, V _{CE} = 0			±250	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GE(th)}	Gate Threshold Voltage	V _{CE} = V _{GE} , I _C = 250 μA	3	4	5	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	V _{GE} = 15 V, I _C = 40 A, T _j = 25°C V _{GE} = 15 V, I _C = 40 A, T _j = 125°C		1.92 1.7	2.5	V V

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs}	Forward Transconductance	V _{CE} = 25 V, I _C = 40 A		TBD		S
C _{ies}	Input Capacitance	V _{CE} = 25 V, f = 1 MHz, V _{GE} = 0		4500		pF
C _{oes}	Output Capacitance			350		pF
C _{res}	Reverse Transfer Capacitance			100		pF
Q _g Q _{ge} Q _{gc}	Total Gate Charge Gate-Emitter Charge Gate-Collector Charge	V _{CE} = 480 V, I _C = 40 A, V _{GE} = 15 V		TBD TBD TBD		nC nC nC
I _{CL}	Latching Current	V _{clamp} = 480 V, T _j = 150°C R _G = 10 Ω	TBD			A

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t _{d(on)} t _r	Turn-on Delay Time Rise Time	V _{CC} = 480 V, I _C = 40 A R _G = 10 Ω, V _{GE} = 15 V		TBD TBD		ns ns
(di/dt) _{on} E _{on}	Turn-on Current Slope Turn-on Switching Losses	V _{CC} = 480 V, I _C = 40 A R _G = 5 Ω, V _{GE} = 15 V, T _j = 125°C		2100 810		A/μs μJ

ELECTRICAL CHARACTERISTICS (CONTINUED)**SWITCHING OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_r(V_{off})$	Off Voltage Rise Time	$V_{CC} = 480\text{ V}$, $I_C = 40\text{ A}$, $R_{GE} = 5\ \Omega$, $V_{GE} = 15\text{ V}$ $T_J = 25\text{ }^\circ\text{C}$		28		ns
$t_d(off)$	Delay Time			170		ns
t_f	Fall Time			65		ns
$E_{off(**)}$	Turn-off Switching Loss			940		μJ
E_{ts}	Total Switching Loss			1750		μJ
$t_r(V_{off})$	Off Voltage Rise Time	$V_{CC} = 480\text{ V}$, $I_C = 40\text{ A}$, $R_{GE} = 5\ \Omega$, $V_{GE} = 15\text{ V}$ $T_J = 125\text{ }^\circ\text{C}$		54		ns
$t_d(off)$	Delay Time			210		ns
t_f	Fall Time			90		ns
$E_{off(**)}$	Turn-off Switching Loss			1400		μJ
E_{ts}	Total Switching Loss			2200		μJ

Note: 1. Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.
 2. Pulse width limited by max. junction temperature.
 (**). Losses include Also the Tail (Jedec Standardization)

Fig. 1: Gate Charge test Circuit

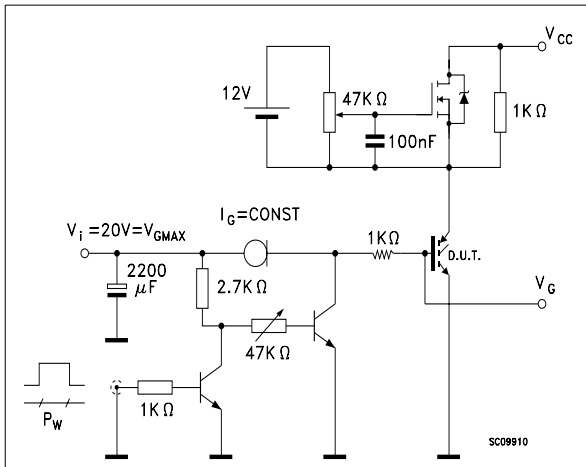
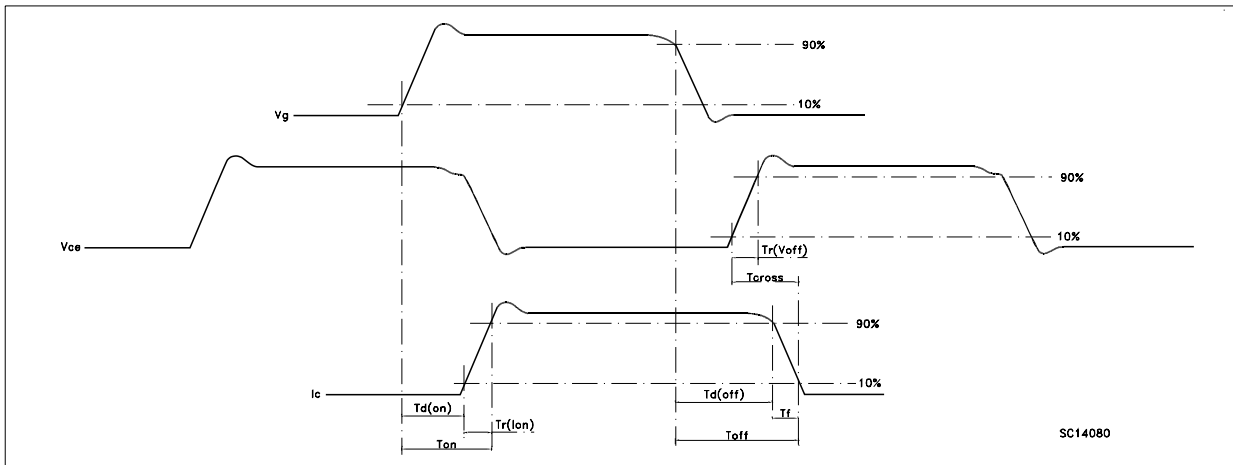
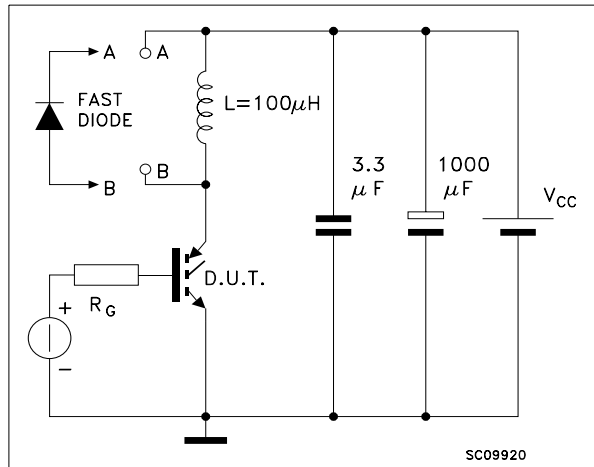
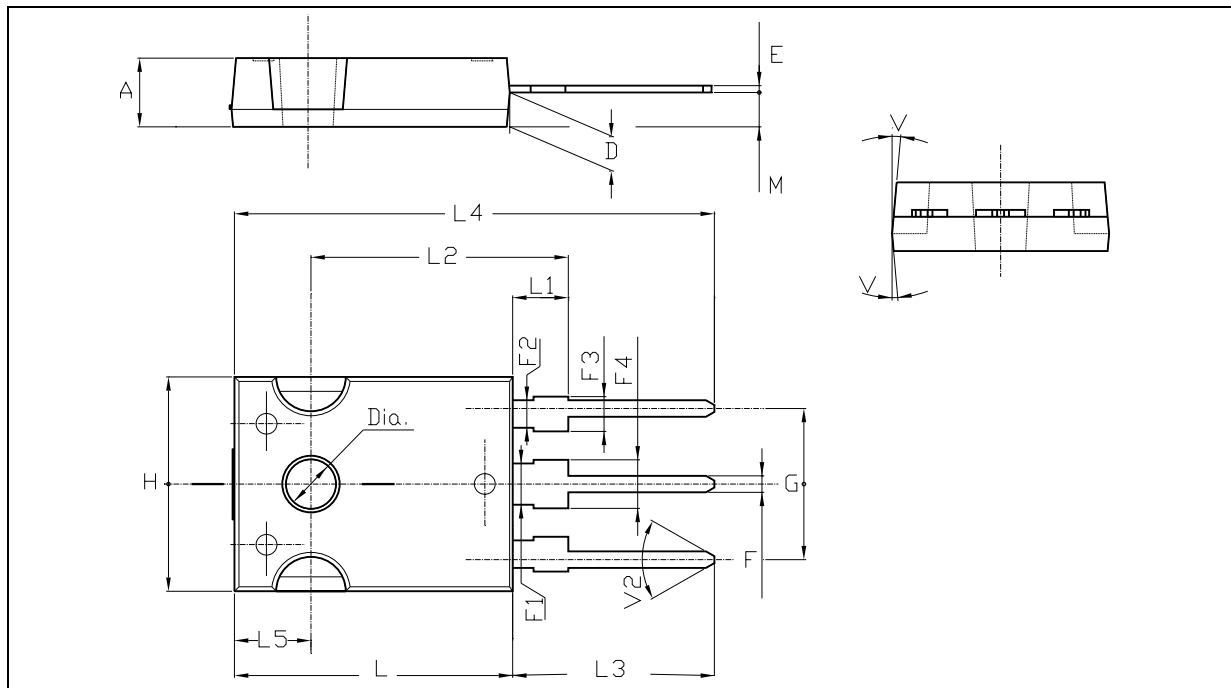


Fig. 2: Test Circuit For Inductive Load Switching



TO-247 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.85		5.15	0.19		0.20
D	2.20		2.60	0.08		0.10
E	0.40		0.80	0.015		0.03
F	1		1.40	0.04		0.05
F1		3			0.11	
F2		2			0.07	
F3	2		2.40	0.07		0.09
F4	3		3.40	0.11		0.13
G		10.90			0.43	
H	15.45		15.75	0.60		0.62
L	19.85		20.15	0.78		0.79
L1	3.70		4.30	0.14		0.17
L2		18.50			0.72	
L3	14.20		14.80	0.56		0.58
L4		34.60			1.36	
L5		5.50			0.21	
M	2		3	0.07		0.11
V		5°			5°	
V2		60°			60°	
Dia	3.55		3.65	0.14		0.143



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

© 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>