



STGB10N60L

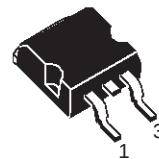
N-CHANNEL 10A - 600V D²PAK LOGIC LEVEL IGBT

TYPE	V _{CES}	V _{CE(sat)}	I _C
STGB10N60L	600 V	< 1.95 V	10 A

- HIGH INPUT IMPEDANCE (VOLTAGE DRIVEN)
- VERY LOW ON-VOLTAGE DROP (V_{cesat})
- LOW THRESHOLD VOLTAGE (LOGIC LEVEL INPUT)
- HIGH CURRENT CAPABILITY
- OFF LOSSES INCLUDE TAIL CURRENT
- SURFACE-MOUNTING D2PAK (TO-263) POWER PACKAGE IN TUBE (NO SUFFIX) OR IN TAPE & REEL (SUFFIX "T4")

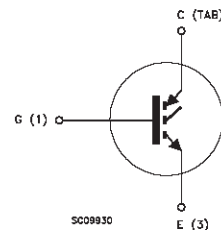
APPLICATIONS

- ELECTRONIC IGNITION
- LIGHT DIMMER
- STATIC RELAYS



**D²PAK
TO-263**

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CES}	Collector-Emitter Voltage (V _{GS} = 0)	600	V
V _{ECR}	Reverse Battery Protection	25	V
V _{GE}	Gate-Emitter Voltage	± 15	V
I _C	Collector Current (continuous) at T _c = 25 °C	25	A
I _C	Collector Current (continuous) at T _c = 100 °C	20	A
I _{CM} (•)	Collector Current (pulsed)	100	A
P _{tot}	Total Dissipation at T _c = 25 °C	125	W
	Derating Factor	0.83	W/°C
T _{stg}	Storage Temperature	-65 to 175	°C
T _j	Max. Operating Junction Temperature	175	°C

(•) Pulse width limited by safe operating area

STGB10N60L

THERMAL DATA

R _{thj-case}	Thermal Resistance Junction-case	Max	1.2	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max	62.5	°C/W
R _{thc-sink}	Thermal Resistance Case-sink	Typ	0.1	°C/W

ELECTRICAL CHARACTERISTICS (T_j = - 40 to 150 °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 _j = 25 °C V _{CE} = Max Rating T _j = 125 °C			25 100	μA μA
I _{GES}	Gate-Emitter Leakage Current (V _{CE} = 0)	V _{GE} = ± 15 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 V _{CE} = V _{GE} I _C = 250 μA T _j = 25 °C	0.6 1.0		2.4 2.0	V V
V _{CE(SAT)}	Collector-Emitter Saturation Voltage	V _{GE} = 4.5 V I _C = 8 A T _j = - 40 °C V _{GE} = 4.5 V I _C = 9.5 A T _j = 25 °C V _{GE} = 4.5 V I _C = 8 A T _j = 150 °C		1.5 1.4 1.25	2.0	V V V
I _C	Collector Current	V _{GE} = 4.5 V V _{CE} = 7 V	15	45		A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs}	Forward Transconductance	V _{CE} = 25 V I _C = 8 A T _j = 25 °C	7	12		S
C _{ies} C _{oes} C _{res}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{CE} = 25 V f = 1 MHz V _{GE} = 0		1800 120 19	2600 165 26	pF pF pF
Q _G	Gate Charge	V _{CE} = 400 V I _C = 8 A V _{GE} = 5 V		30		nC

FUNCTIONAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CL}	Latching Current	V _{clamp} = 480 V dV/dt = 200 V/μs T _j = 125 °C	20			A
E _{CF}	Forward Clamping Energy	T _{start} = 55 °C V _{clamp} = 480 V I _C = 10 A L = 4.2 mH - Single Pulse	210			mJ
E _{AR}	Reverse Avalanche Energy		10			mJ

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Delay Time	$V_{CC} = 480\text{ V}$		0.7		μs
t_r	Rise Time	$I_C = 8\text{ A}$ $V_{GE} = 5\text{ V}$ $R_G = 1\text{ K}\Omega$		1.9		μs
$(di/dt)_{on}$	Turn-on Current Slope	$V_{CC} = 480\text{ V}$ $R_G = 1\text{ K}\Omega$ $T_j = 125\text{ }^\circ\text{C}$		5		A/ μs
E_{on}	Turn-on Switching Losses			2.5		mJ

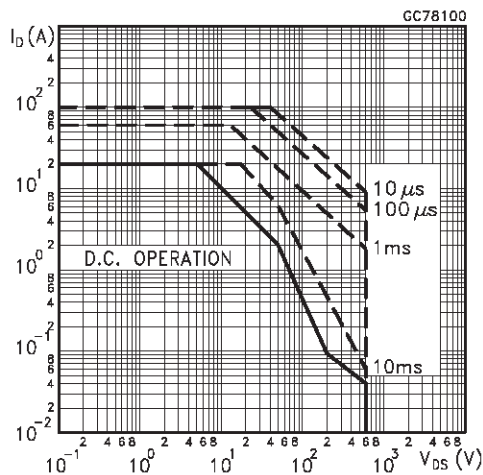
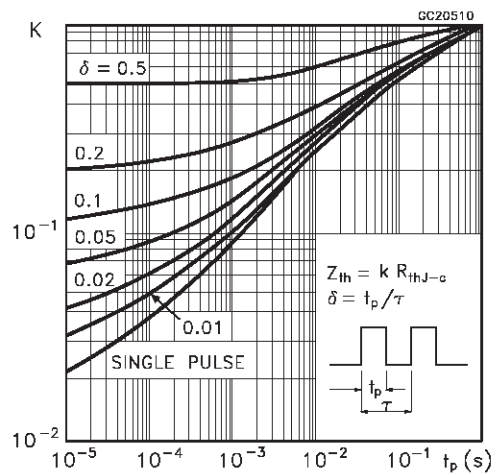
SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_c	Cross-Over Time	$V_{CC} = 480\text{ V}$		4		μs
$t_r(V_{off})$	Off Voltage Rise Time	$R_{GE} = 1\text{ K}\Omega$ $V_{GE} = 5\text{ V}$		2.5		μs
t_f	Fall Time	$T_j = 25\text{ }^\circ\text{C}$		1.5		μs
$E_{off}(^{**})$	Turn-off Switching Loss			9.0		mJ
t_c	Cross-Over Time	$V_{CC} = 480\text{ V}$		6		μs
$t_r(V_{off})$	Off Voltage Rise Time	$R_{GE} = 1\text{ K}\Omega$ $V_{GE} = 5\text{ V}$		3.3		μs
t_f	Fall Time	$T_j = 125\text{ }^\circ\text{C}$		2.5		μs
$E_{off}(^{**})$	Turn-off Switching Loss			10.8		mJ

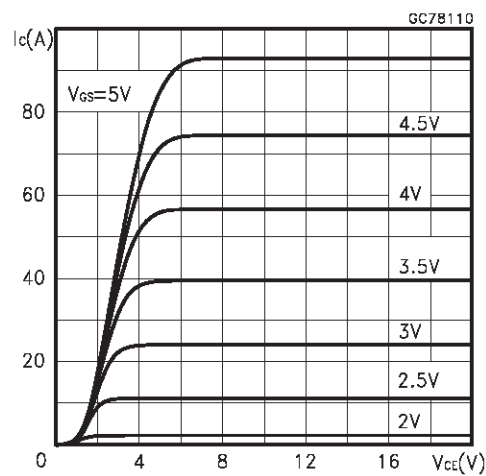
(•) Pulse width limited by safe operating area

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

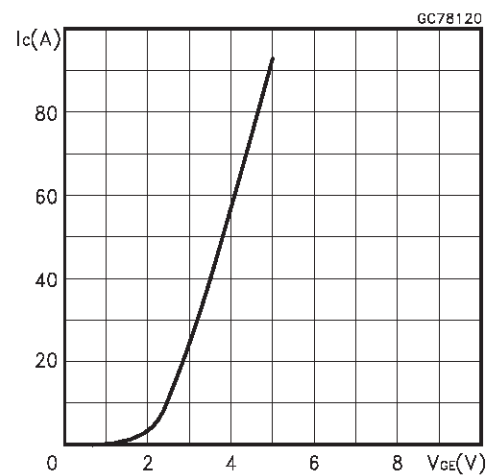
(**) Losses Include Also The Tail (Jedec Standardization)

Safe Operating Area**Thermal Impedance**

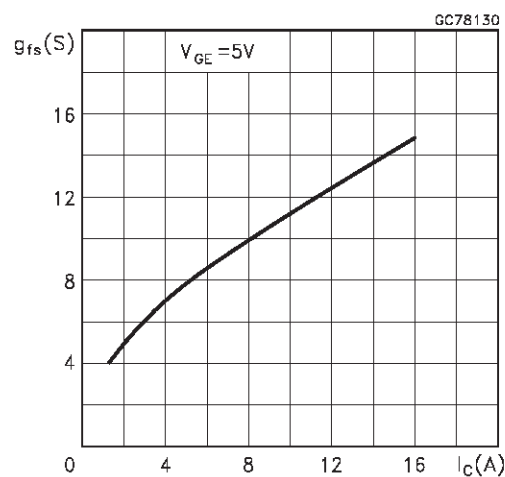
Output Characteristics



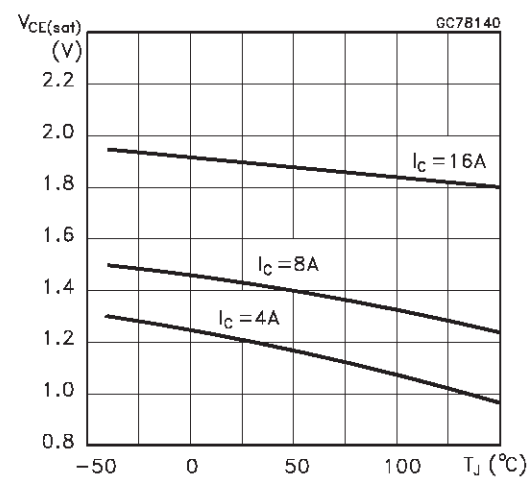
Transfer Characteristics



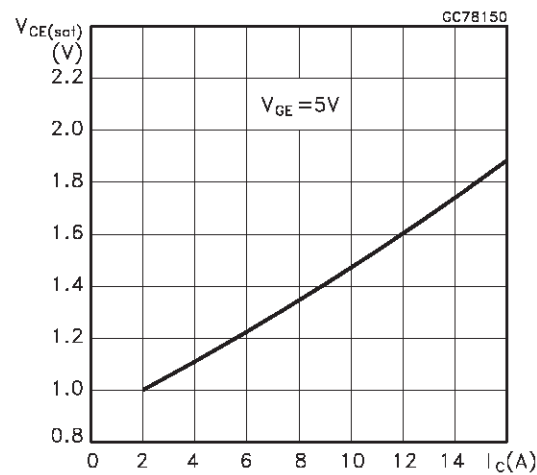
Transconductance



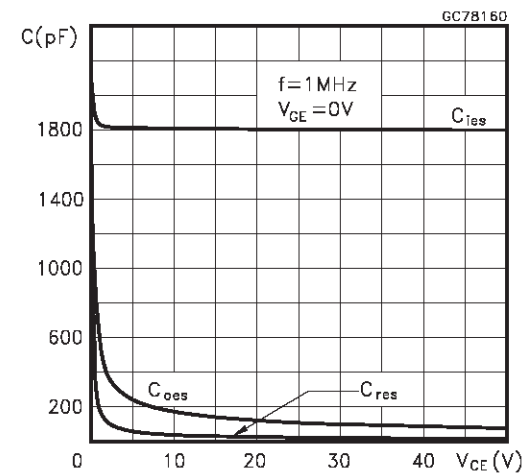
Collector-Emitter On Voltage vs Temperature



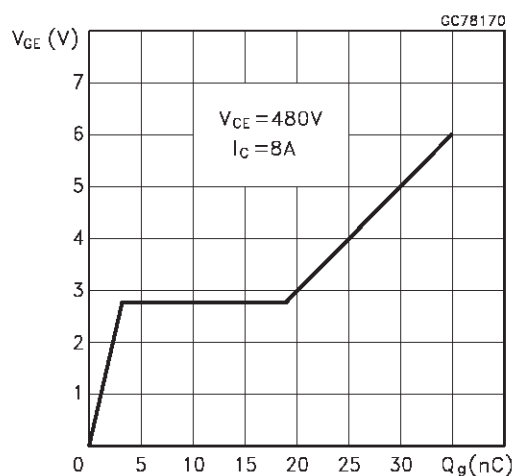
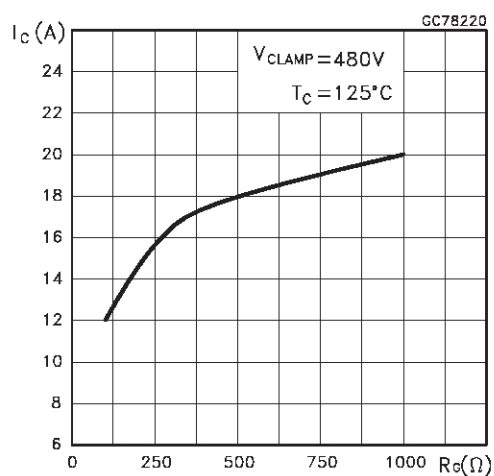
Collector-Emitter On Voltage vs Collector Current



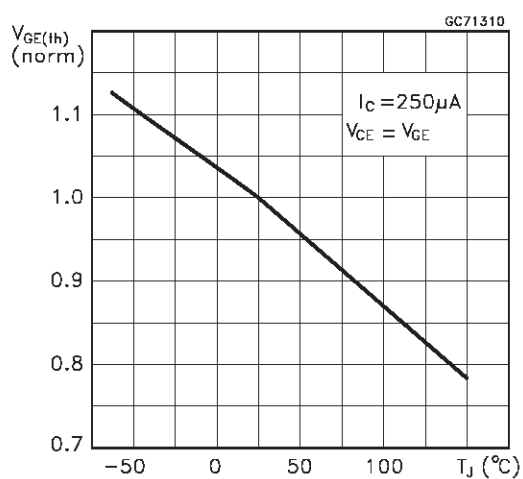
Capacitance Variations



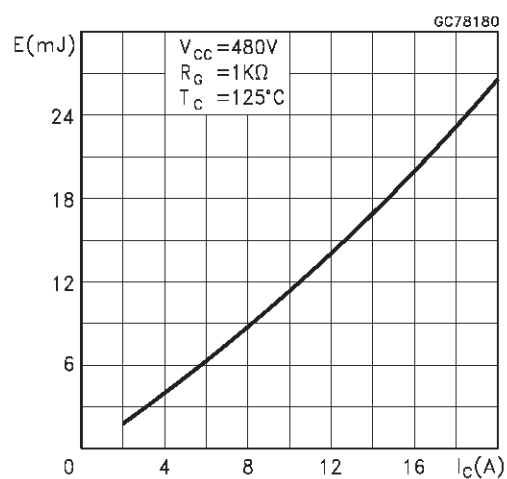
Gate Charge vs Gate-Emitter Voltage

Latching Current vs R_g 

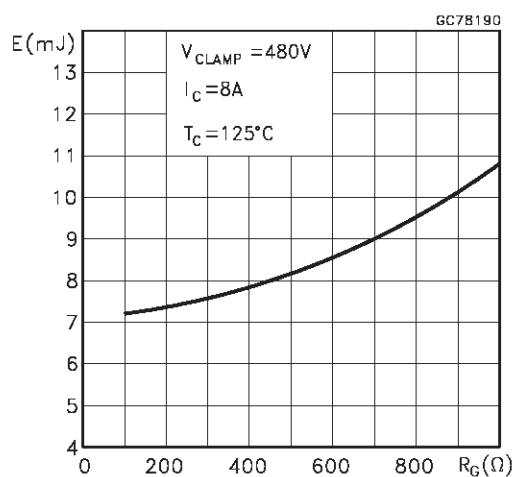
Gate Threshold vs Temperature



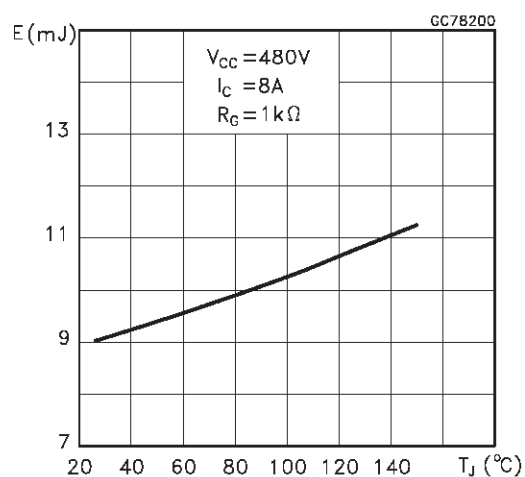
Off Losses vs Collector Current



Off Losses vs Gate Resistance



Off Losses vs Temperature



Switching Off Safe Operatin Area

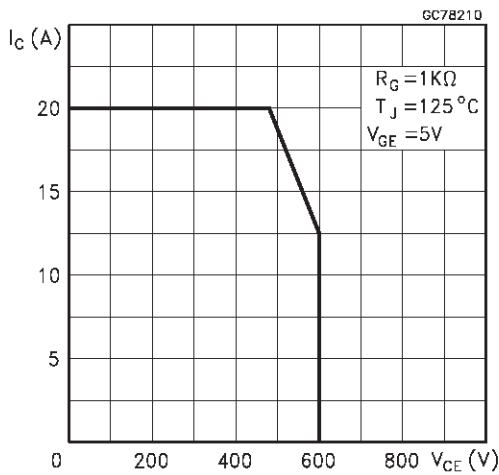


Fig. 1: Gate Charge test Circuit

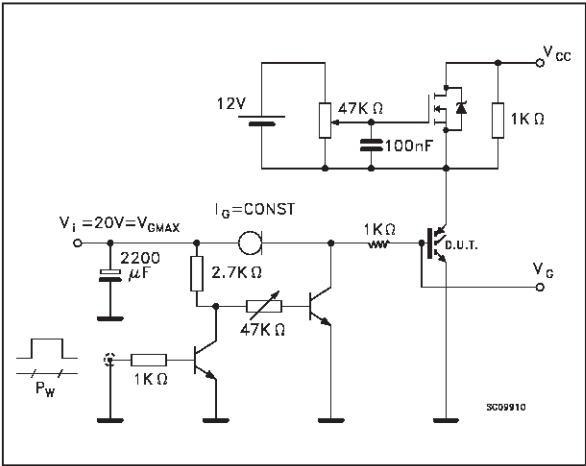


Fig. 2: Switching Times Test Circuit For Resistive Load

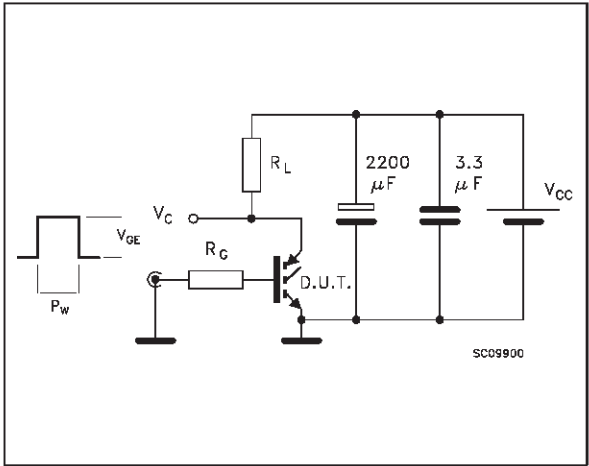
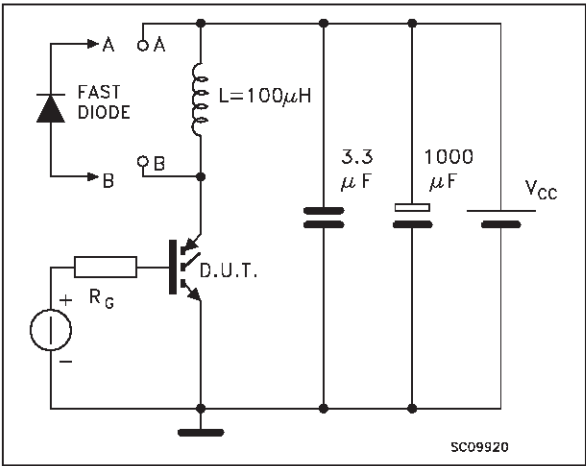
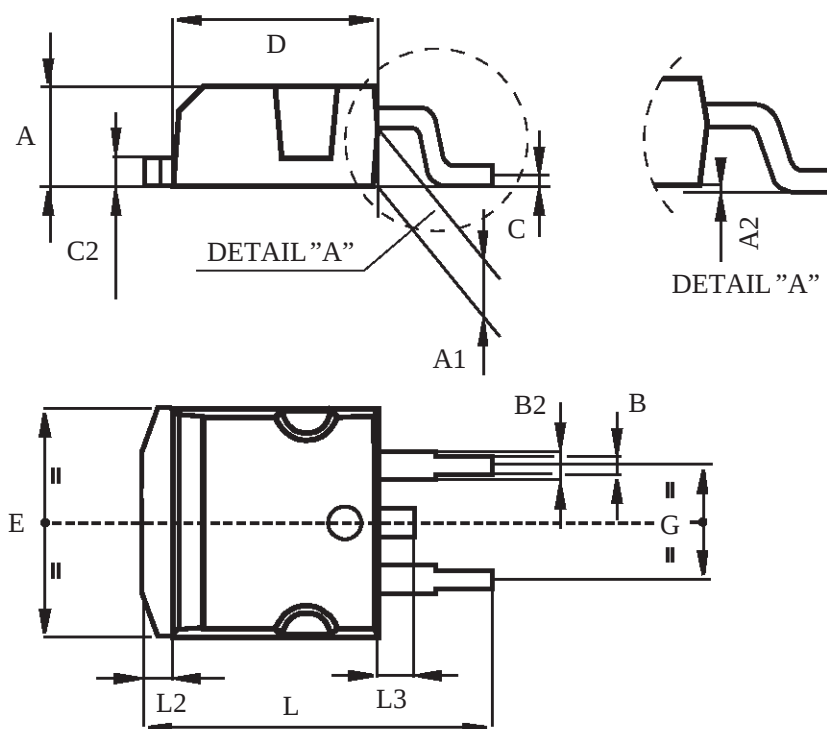


Fig. 3: Test Circuit For Inductive Load Switching



TO-263 (D²PAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
B	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
C	0.45		0.6	0.017		0.023
C2	1.21		1.36	0.047		0.053
D	8.95		9.35	0.352		0.368
E	10		10.4	0.393		0.409
G	4.88		5.28	0.192		0.208
L	15		15.85	0.590		0.624
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.068



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