



STGE200NB60S

N-CHANNEL 100A - 600V - ISOTOP

PowerMESH™ IGBT

TYPE	V _{CES}	V _{CE(sat)} (typ.)	I _C	T _C
STGE200NB60S	600 V	1.1 V 1.3 V	100 A 200 A	100°C 25°C

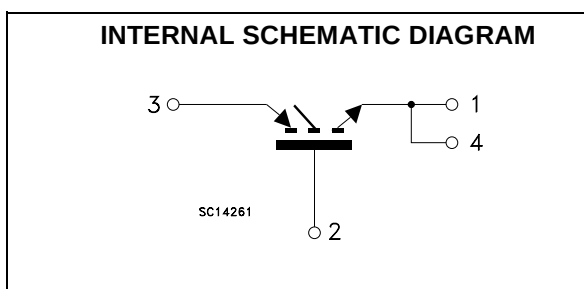
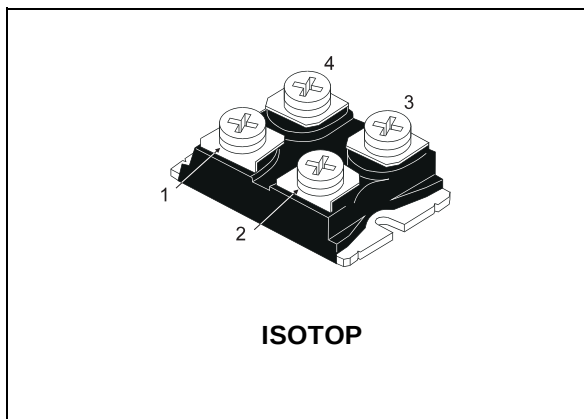
- HIGH INPUT IMPEDANCE (VOLTAGE DRIVEN)
- LOW ON-VOLTAGE DROP (V_{cesat})
- OFF LOSSES INCLUDE TAIL CURRENT
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY

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 "S" identifies a family optimized to achieve very low V_{CE(sat)} (@ max frequency of 1KHz).

APPLICATIONS

- LOW FREQUENCY MOTOR CONTROLS
- ALUMINUM WELDING EQUIPMENT



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CES}	Collector-Emitter Voltage (V _{GS} = 0)	600	V
V _{GE}	Gate-Emitter Voltage	±20	V
I _C	Collector Current (continuous) at T _C = 25°C	200	A
I _C	Collector Current (continuous) at T _C = 100°C	100	A
I _{CM} (■)	Collector Current (pulsed)	800	A
P _{TOT}	Total Dissipation at T _C = 25°C	600	W
	Derating Factor	4.8	W/°C
T _{stg}	Storage Temperature	– 65 to 150	°C
T _j	Max. Operating Junction Temperature	150	°C

(■) PULSE WIDTH LIMITED BY SAFE OPERATING AREA

STGE200NB60S

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case Max	0.20	°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)}	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			500 5	µA mA
I _{GES}	Gate-Emitter Leakage Current (V _{CE} = 0)	V _{GE} = ±20V, V _{CE} = 0			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GE(th)}	Gate Threshold Voltage	V _{CE} = V _{GE} , I _C = 250µA	3		5	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	V _{GE} = 15V, I _C = 100 A V _{GE} = 15V, I _C =100 A, T _J =125°C		1.2 1.0	1.6	V V

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs}	Forward Transconductance	V _{CE} = 15 V, I _C = 100 A		80		S
C _{ies} C _{oes} C _{res}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{CE} = 25V, f = 1 MHz, V _{GE} = 0		15600 1100 95		pF pF pF
Q _g Q _{ge} Q _{gc}	Total Gate Charge Gate-Emitter Charge Gate-Collector Charge	V _{CE} = 480V, I _C = 100 A, V _{GE} = 15V		560 70 170		nC nC nC
I _{CL}	Latching Current	V _{clamp} = 480 V T _J = 125°C, R _G = 10 Ω	300			A

SWITCHING ON

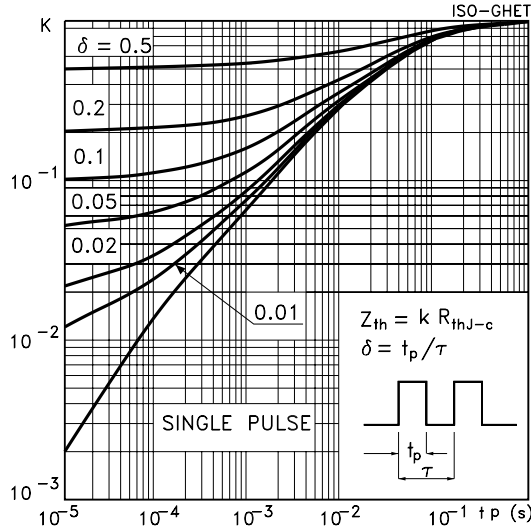
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t _{d(on)} t _r	Turn-on Delay Time Rise Time	V _{CC} = 480 V, I _C = 100 A R _G = 2Ω, V _{GE} = 15 V		64 112		µs µs
(di/dt) _{on} E _{on}	Turn-on Current Slope Turn-on Switching Losses	V _{CC} = 480 V, I _C = 100 A R _G =2Ω V _{GE} = 15 V, T _J = 125°C		1800 12		A/µs mJ

ELECTRICAL CHARACTERISTICS (CONTINUED)**SWITCHING OFF**

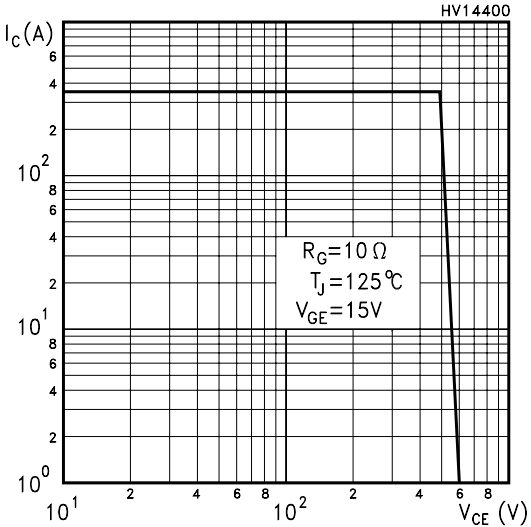
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_c	Cross-over Time	$V_{CC} = 480\text{ V}$, $I_C = 100\text{ A}$, $R_{GE} = 2\ \Omega$, $V_{GE} = 15\text{ V}$		2.98		μs
$t_r(V_{off})$	Off Voltage Rise Time			1.7		μs
$t_d(off)$	Delay Time			2.4		μs
t_f	Fall Time			1.23		μs
$E_{off}(**)$	Turn-off Switching Loss			59		mJ
E_{ts}	Total Switching Loss			71		mJ
t_c	Cross-over Time	$V_{CC} = 480\text{ V}$, $I_C = 100\text{ A}$, $R_{GE} = 2\ \Omega$, $V_{GE} = 15\text{ V}$, $T_j = 125\text{ }^\circ\text{C}$		4.52		μs
$t_r(V_{off})$	Off Voltage Rise Time			2.6		μs
$t_d(off)$	Delay Time			2.8		μs
t_f	Fall Time			1.8		μs
$E_{off}(**)$	Turn-off Switching Loss			92		mJ
E_{ts}	Total Switching Loss			105		mJ

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)

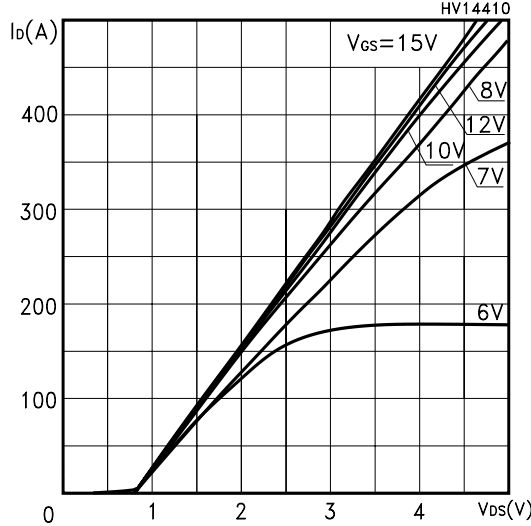
Thermal Impedance



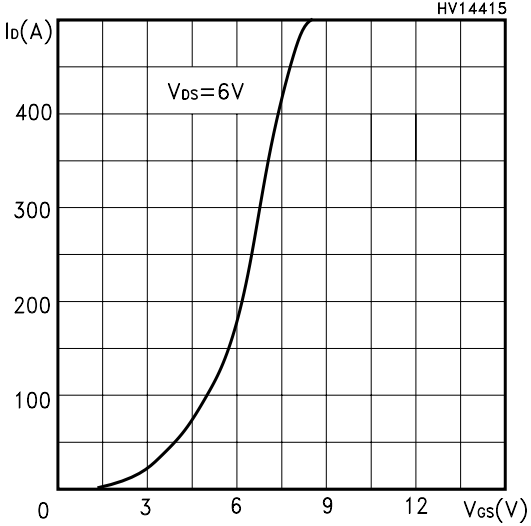
Switching Off Safe Operating Area



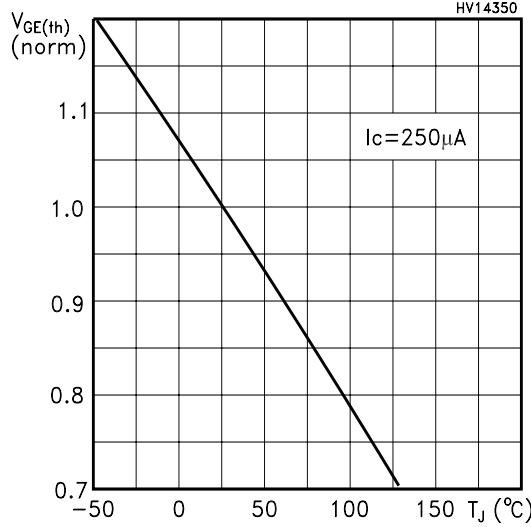
Output Characteristics



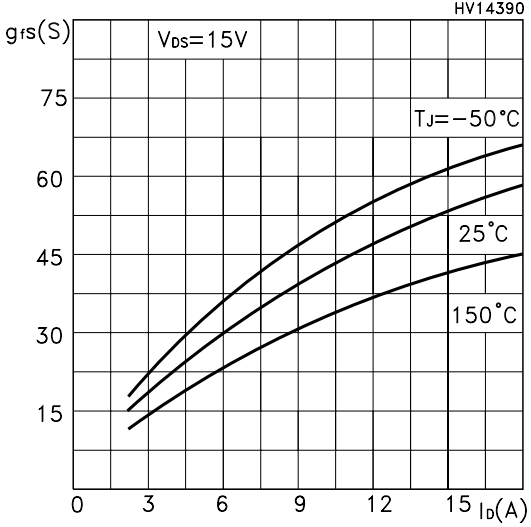
Transfer Characteristics

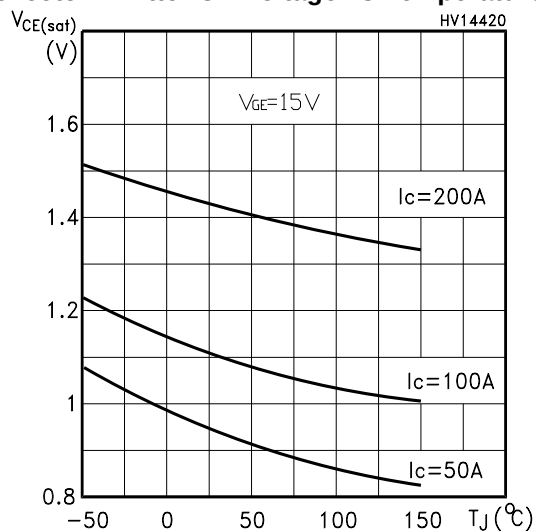
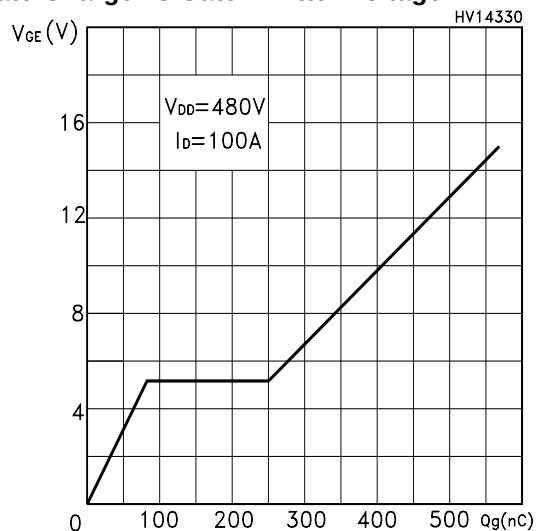
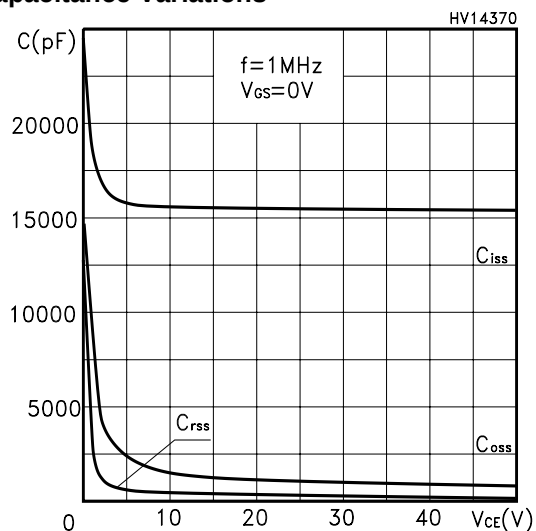
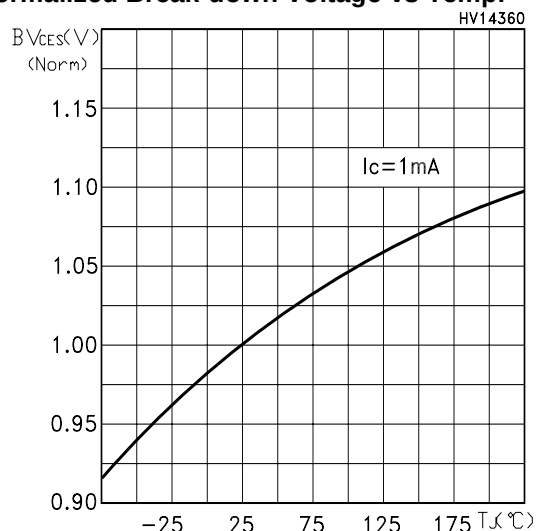
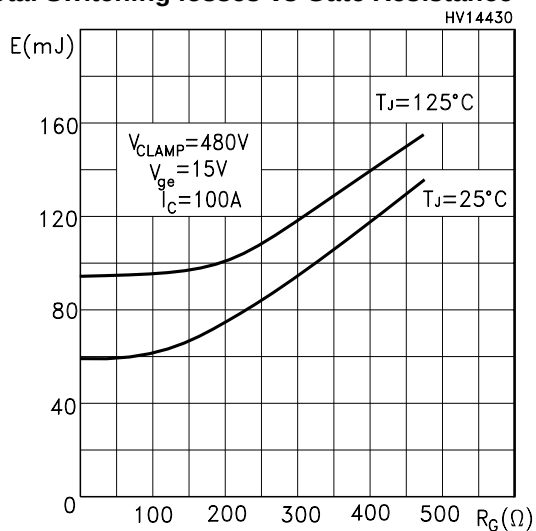
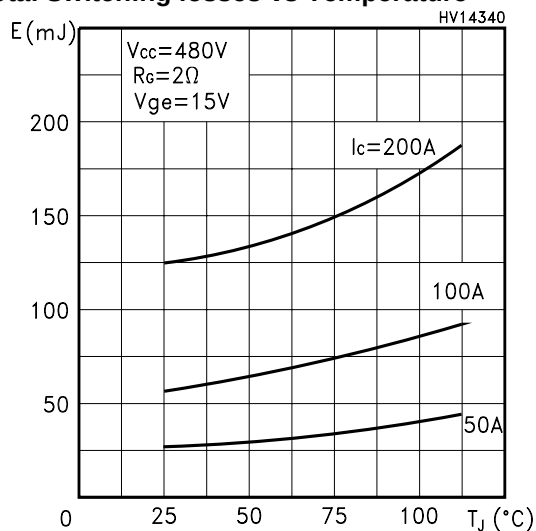


Normalized Gate Threshold Voltage vs Temp.

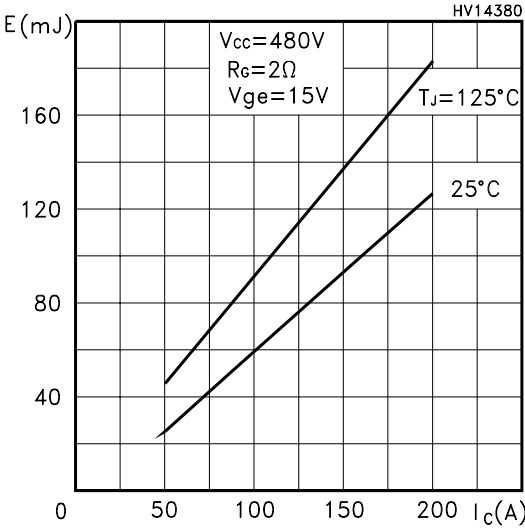


Transconductance



Collector-Emitter On Voltage vs Temperature**Gate-Charge vs Gate-Emitter Voltage****Capacitance Variations****Normalized Break-down Voltage vs Temp.****Total Switching losses vs Gate Resistance****Total Switching losses vs Temperature**

Total Switching losses vs I_c



Collector-Emitter on Voltage vs Current

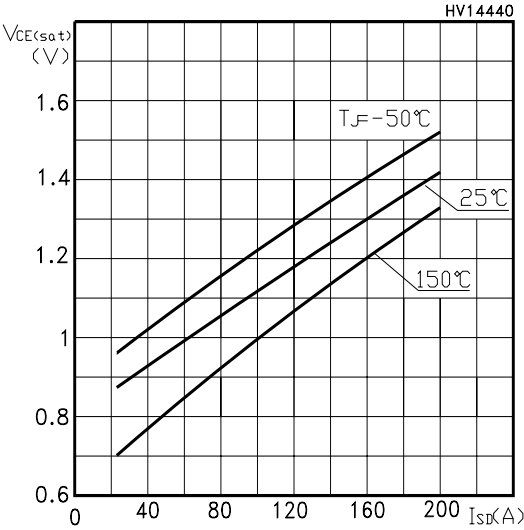


Fig. 1: Gate Charge test Circuit

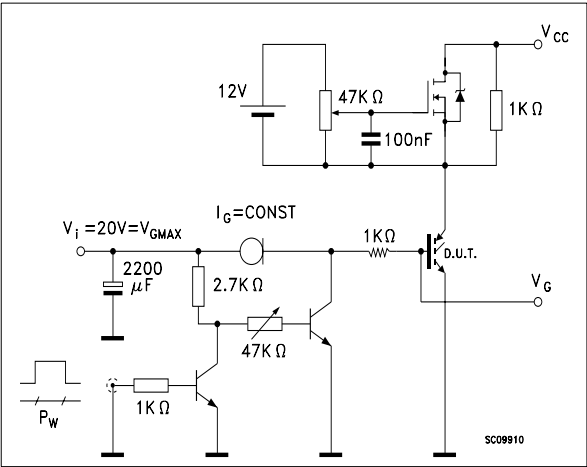
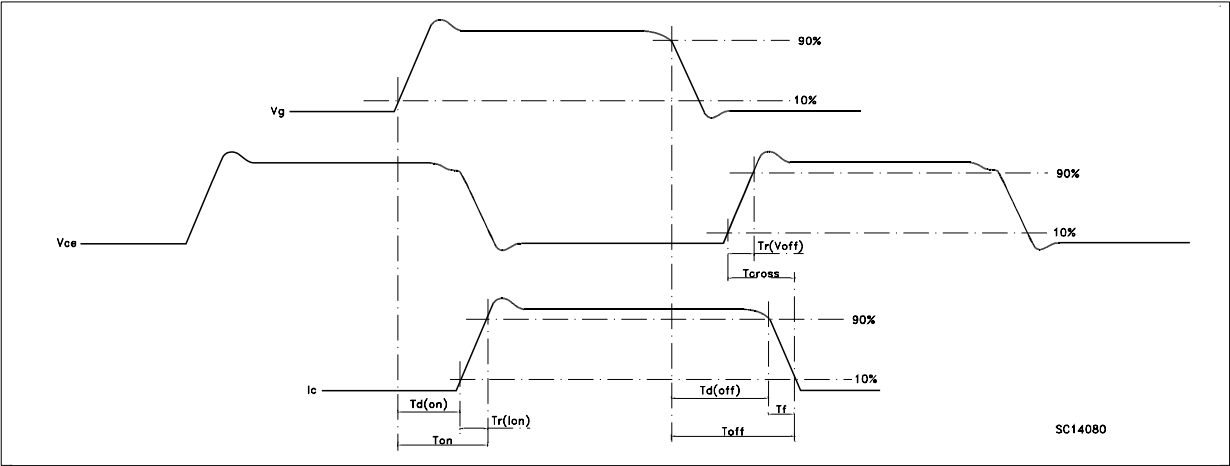
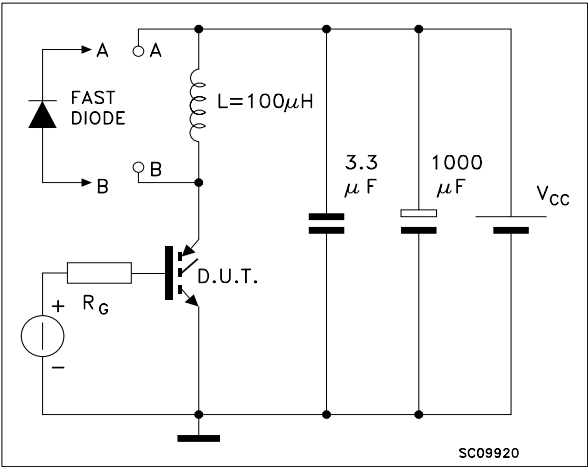
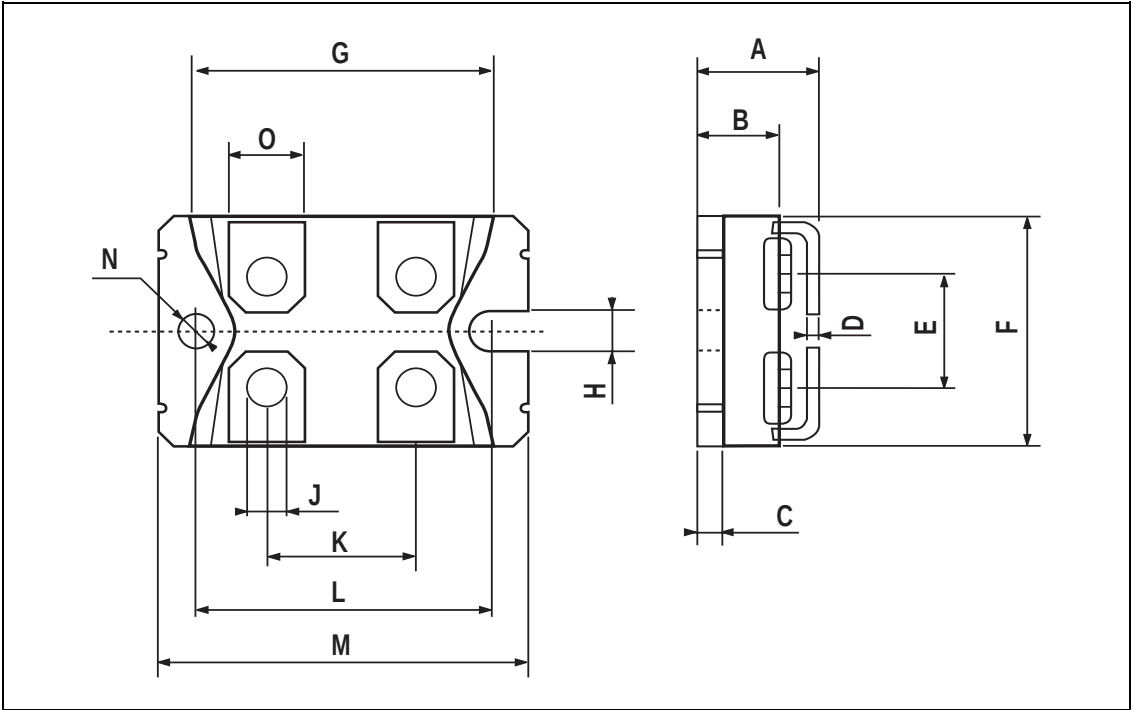


Fig. 2: Test Circuit For Inductive Load Switching



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



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