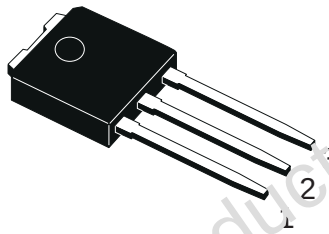
STGD7NB120S-1

N-CHANNEL 7A - 1200V - IPAK
PowerMESH™ IGBT

PRELIMINARY DATA

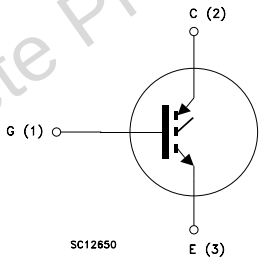
TYPE	V_{CES}	$V_{CE(sat)}$	I_C
STGD7NB120S-1	1200 V	< 2.1 V	7 A

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



IPAK

INTERNAL SCHEMATIC DIAGRAM



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 achieve minimum on-voltage drop for low frequency applications (<1kHz).

APPLICATIONS

- MOTOR CONTROL
- LIGHT DIMMER
- INTRUSH CURRENT LIMITATION

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage (V_{GS} = 0)	1200	V
V_{ECR}	Reverse Battery Protection	20	V
V_{GE}	Gate-Emitter Voltage	±20	V
I_C	Collector Current (continuos) at T_C = 25°C	10	A
I_C	Collector Current (continuos) at T_C = 100°C	7	A
I_{CM} (●)	Collector Current (pulsed)	20	A
P_{TOT}	Total Dissipation at T_C = 25°C	55	W
	Derating Factor	0.4	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

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case Max	2.27	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	100	°C/W
Rthc-h	Thermal Resistance Case-heatsink Typ	0.5	°C/W

ELECTRICAL CHARACTERISTICS (TCASE = 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	1200			V
$V_{BR(ECR)}$	Emitter-Collectro Breakdown Voltage	I_C = 10mA, V_{GE} = 0	20			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			50 250	µA µA
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_{GE}	Gate Emitter Voltage	V_{CE} =2.5V, I_C = 2A Tj = 25÷125°C			6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE} = 15 V, I_C = 3.5 A V_{GE} = 15V, I_C = 7 A V_{GE} = 15V, I_C = 10 A		 1.7	1.6 2.1	V V

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs}	Forward Transconductance	V_{CE} = 25 V , I_C =7 A	2.5	4.5		S
C_{ies}	Input Capacitance	V_{CE} = 25V, f = 1 MHz, V_{GE} = 0		430		pF
C_{oes}	Output Capacitance			40		pF
C_{res}	Reverse Transfer Capacitance			7		pF
Q_g	Gate Charge	V_{CE} = 960V, I_C = 7 A, V_{GE} = 15V		29		nC
I_{CL}	Latching Current	V_{clamp} = 960V , Tj = 150°C R_G = 1KΩ	10			A

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 960 V, I_C = 7 A R_G = 1KΩ , V_{GE} = 15 V		570		ns
t_r	Rise Time			270		ns
$(di/dt)_{on}$	Turn-on Current Slope	V_{CC}= 960 V, I_C = 7 A, R_G=1KΩ V_{GE} = 15 V, Tj = 125°C		800		A/µs
Eon	Turn-on Switching Losses			3.2		µJ

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_c	Cross-over Time	V_{cc} = 960 V, I_C = 7 A, R_{GE} = 1KΩ , V_{GE} = 15 V		4.9		µs
$t_r(V_{off})$	Off Voltage Rise Time			2.9		µs
t_f	Fall Time			3.3		µs
E_{off}(**)	Turn-off Switching Loss			15		mJ
t_c	Cross-over Time	V_{cc} = 960 V, I_C = 7 A, R_{GE} = 1KΩ , V_{GE} = 15 V Tj = 125 °C		7.5		µs
$t_r(V_{off})$	Off Voltage Rise Time			5.5		µs
t_f	Fall Time			6.2		µs
E_{off}(**)	Turn-off Switching Loss			22		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)

Fig. 1: Gate Charge test Circuit

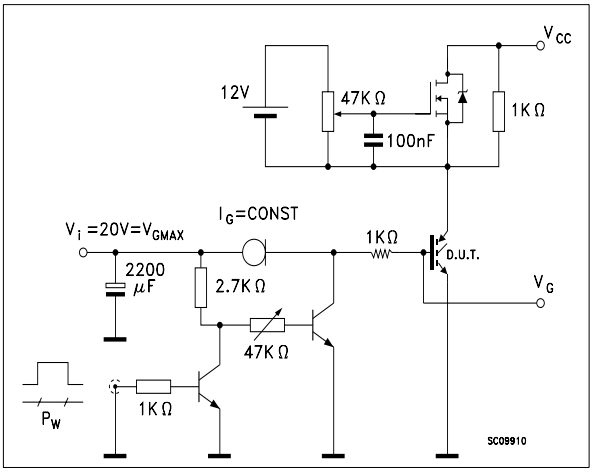
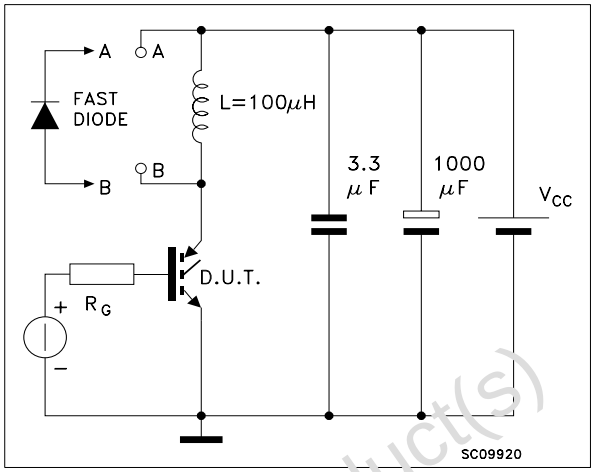
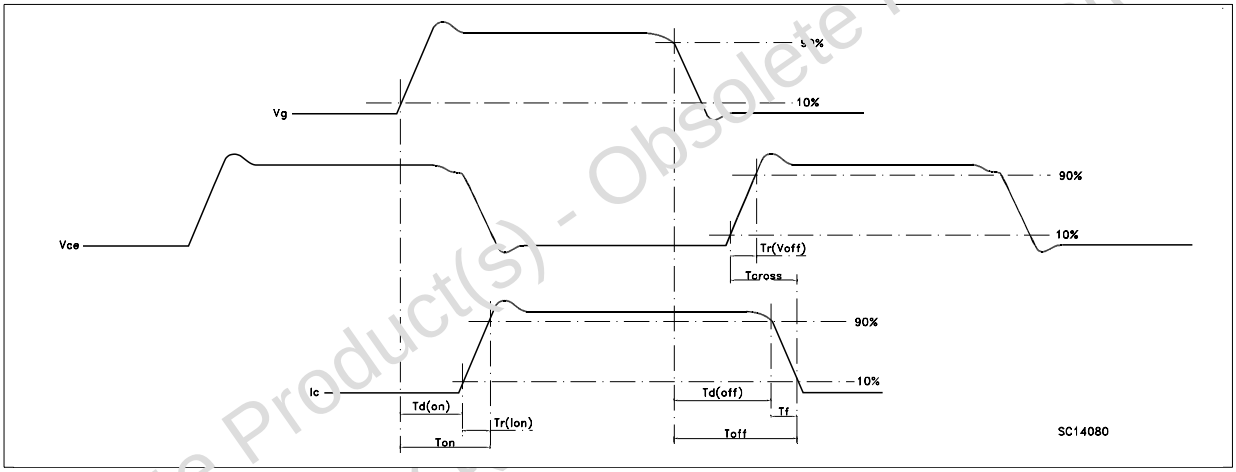


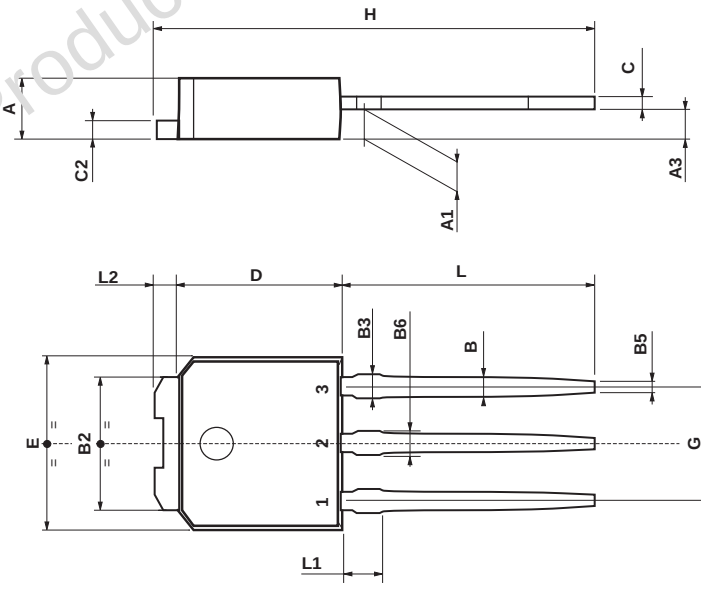
Fig. 2: Test Circuit For Inductive Load Switching





TO-251 (IPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A3	0.7		1.3	0.027		0.051
B	0.64		0.9	0.025		0.031
B2	5.2		5.4	0.204		0.212
B3			0.85			0.033
B5		0.3			0.012	
B6			0.95			0.037
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
E	6.4		6.6	0.252		0.260
G	4.4		4.6	0.173		0.181
H	15.9		16.3	0.626		0.641
L	9		9.4	0.354		0.370
L1	0.8		1.2	0.031		0.047
L2		0.8	1		0.031	0.039



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