



STGD7NB120S-1

N-CHANNEL 7A - 1200V IPAK Power MESH™ IGBT

PRELIMINARY DATA

TYPE	V _{CES}	V _{CE(sat)}	I _C
STGD7NB120S-1	1200 V	< 2.1 V	7 A

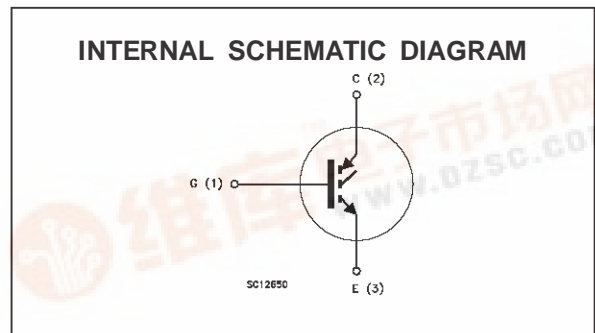
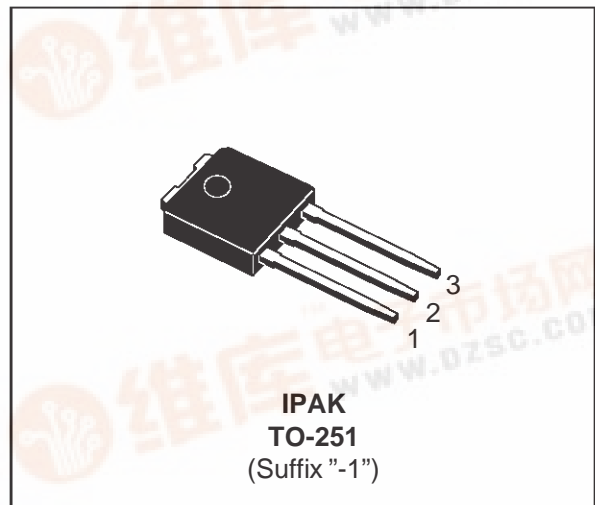
- HIGH INPUT IMPEDANCE (VOLTAGE DRIVEN)
- VERY LOW ON-VOLTAGE DROP (V_{cesat})
- HIGH CURRENT CAPABILITY
- OFF LOSSES INCLUDE TAIL CURRENT

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

APPLICATIONS

- LIGHT DIMMER
- INRUSH CURRENT LIMITATION
- MOTOR CONTROL



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 (continuous) at T _c = 25 °C	10	A
I _C	Collector Current (continuous) 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



STGD7NB120S-1

THERMAL DATA

R _{thj-case}	Thermal Resistance Junction-case	Max	2.27	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max	100	°C/W
R _{thc-sink}	Thermal Resistance Case-sink	Typ	1.5	°C/W

ELECTRICAL CHARACTERISTICS (T_j = 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	1200			V
V _{BR(ECR)}	Emitter-Collector Breakdown Voltage	I _C = 10 mA V _{GE} = 0	20			V
I _{CES}	Collector cut-off (V _{GE} = 0)	V _{CE} = Max Rating T _j = 25 °C V _{CE} = 0.8 Max Rating T _j = 125 °C			250 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 _{GE}	Gate Emitter Voltage	V _{CE} = 2.5V I _C = 2A T _j = 25 ÷ 125 °C			6.5	V
V _{CE(SAT)}	Collector-Emitter Saturation Voltage	V _{GE} = 15 V I _C = 3.5 A V _{GE} = 15 V I _C = 7 A V _{GE} = 15 V I _C = 10 A		1.7	1.6 2.1	V 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} C _{oes} C _{res}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{CE} = 25 V f = 1 MHz V _{GE} = 0		430 40 7		pF pF pF
Q _G	Gate Charge	V _{CE} = 960 V I _C = 7 A V _{GE} = 15 V		29		nC
I _{CL}	Latching Current	V _{clamp} = 960 V R _G = 1kΩ T _j = 150 °C	10			A

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t _{d(on)} t _r	Delay Time Rise Time	V _{CC} = 960 V I _C = 7 A V _{GE} = 15 V R _G = 1 KΩ		570 270		ns ns
(di/dt) _{on}	Turn-on Current Slope	V _{CC} = 960 V I _C = 7 A R _G = 1 KΩ V _{GE} = 15 V		800		A/μs
E _{on}	Turn-on Switching Losses	T _j = 125 °C		3.2		mJ

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_c	Cross-Over Time	$V_{CC} = 960 \text{ V}$		4.9		μs
$t_r(V_{off})$	Off Voltage Rise Time	$I_C = 7 \text{ A}$ $R_{GE} = 1000 \Omega$		2.9		μs
t_f	Fall Time	$V_{GE} = 15 \text{ V}$		3.3		μs
$E_{off(**)}$	Turn-off Switching Loss			15		mJ
t_c	Cross-Over Time	$V_{CC} = 960 \text{ V}$		7.5		μs
$t_r(V_{off})$	Off Voltage Rise Time	$I_C = 7 \text{ A}$ $R_{GE} = 1000 \Omega$		5.5		μs
t_f	Fall Time	$V_{GE} = 15 \text{ V}$ $T_j = 125 \text{ }^\circ\text{C}$		6.2		μs
$E_{off(**)}$	Turn-off Switching Loss			22		mJ

(●) Pulse width limited by safe operating area

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

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

Fig. 1: Gate Charge test Circuit

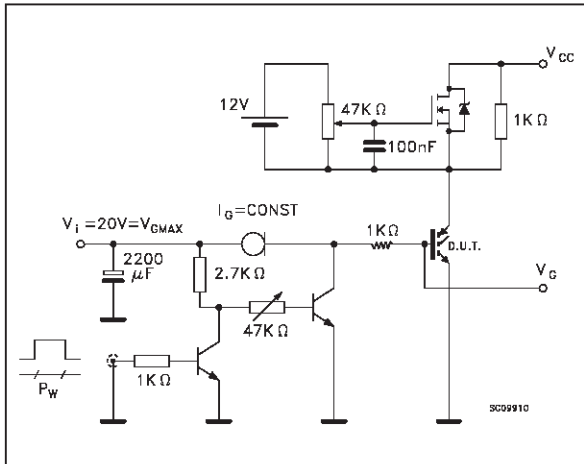


Fig. 2: Test Circuit For Inductive Load Switching

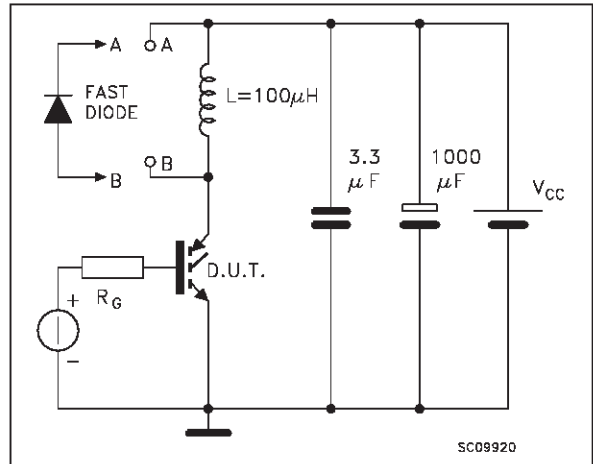
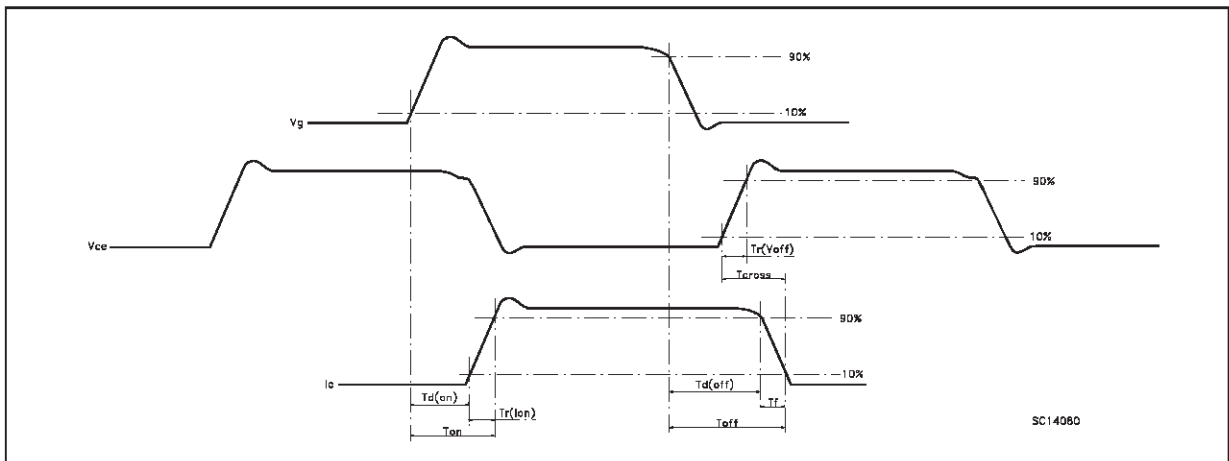
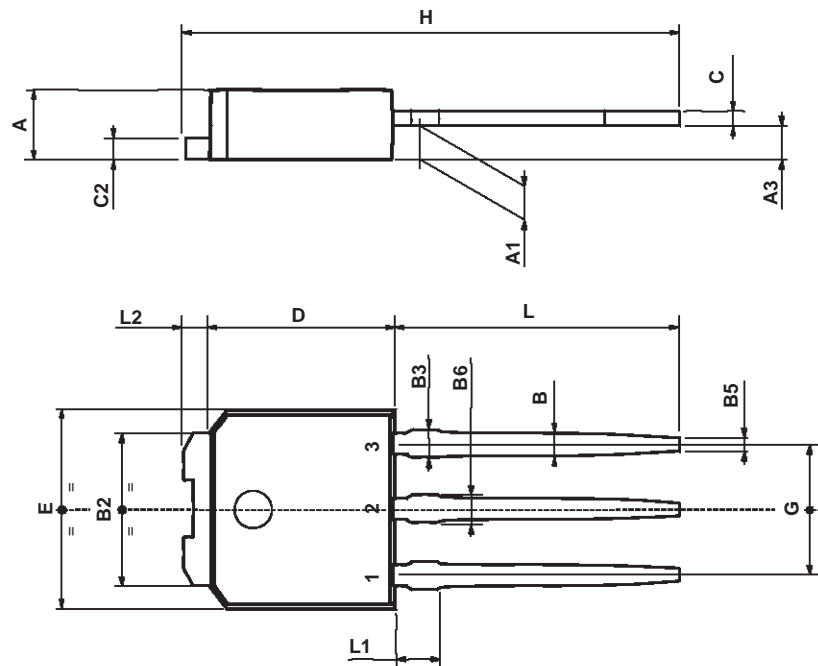


Fig. 3: Switching Waveforms



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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