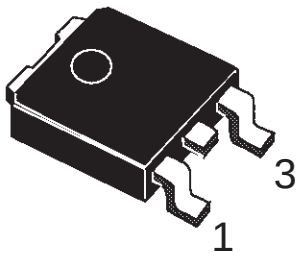
STGD7NB60K

N-CHANNEL 7A - 600V - DPAK
SHORT CIRCUIT PROOF PowerMESH™ IGBT

PRELIMINARY DATA

TYPE	V_{CES}	$V_{CE(sat)}$	I_C
STD7NB60K	600 V	< 2.8 V	7 A

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

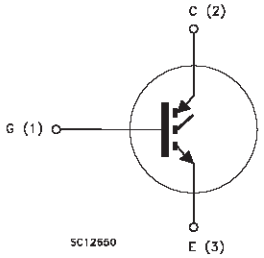


DPAK

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 “K” identifies a family optimized for high frequency motor control applications with short circuit withstand capability.

INTERNAL SCHEMATIC DIAGRAM



APPLICATIONS

- HIGH FREQUENCY MOTOR CONTROLS
- SMPS and PFC

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 (continuos) at T_C = 25°C	14	A
I_C	Collector Current (continuos) at T_C = 100°C	7	A
I_{CM} (■)	Collector Current (pulsed)	56	A
Tsc	Short Circuit Withstand	10	µs
P_{TOT}	Total Dissipation at T_C = 25°C	55	W
	Derating Factor	0.44	W/°C
T_{stg}	Storage Temperature	–65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

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	600			V
I_{CES}	Collector cut-off (V_{GE} = 0)	V_{CE} = Max Rating, T_C = 25 °C			10	µA
		V_{CE} = Max Rating, T_C = 125 °C			100	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	5		7	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE} = 15V, I_C = 7 A		2.3	2.8	V
		V_{GE} = 15V, I_C = 7 A, Tj =125°C		1.9		V

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs}	Forward Transconductance	V_{CE} = 25 V , I_C =7 A	3.5	5		S
C_{ies}	Input Capacitance	V_{CE} = 25V, f = 1 MHz, V_{GE} = 0		560		pF
C_{oes}	Output Capacitance			68		pF
C_{res}	Reverse Transfer Capacitance			15		pF
Q_g	Total Gate Charge	V_{CE} = 480V, I_C = 7 A, V_{GE} = 15V		42	55	nC
Q_{ge}	Gate-Emitter Charge			T.B.D.		nC
Q_{gc}	Gate-Collector Charge			T.B.D.		nC
tscw	Short Circuit Withstand Time	V_{ce} = 0.5 BVces , V_{GE} = 15 V, Tj = 125°C , R_G = 10 Ω	10			µs

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 480 V, I_C = 7 A		15		ns
t_r	Rise Time	R_G = 10Ω , V_{GE} = 15 V		48		ns
$(di/dt)_{on}$	Turn-on Current Slope	V_{CC}= 480 V, I_C = 7 A R_G=10Ω V_{GE} = 15 V,Tj = 125°C		160		A/µs
Eon	Turn-on Switching Losses			70		µJ

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_c	Cross-over Time	V_{cc} = 480 V, I_C = 7 A, R_{GE} = 10 Ω , V_{GE} = 15 V		85		ns
$t_r(V_{off})$	Off Voltage Rise Time			20		ns
$t_{d(off)}$	Delay Time			75		ns
t_f	Fall Time			70		ns
E_{off}(**)	Turn-off Switching Loss			85		µJ
E_{ts}	Total Switching Loss			130		µJ
t_c	Cross-over Time	V_{cc} = 480 V, I_C = 7 A, R_{GE} = 10 Ω , V_{GE} = 15 V Tj = 125 °C		150		ns
$t_r(V_{off})$	Off Voltage Rise Time			50		ns
$t_{d(off)}$	Delay Time			110		ns
t_f	Fall Time			110		ns
E_{off}(**)	Turn-off Switching Loss			220		µJ
E_{ts}	Total Switching Loss			290		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

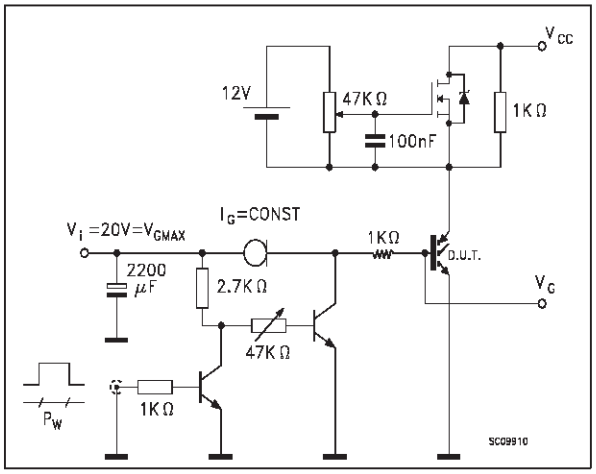
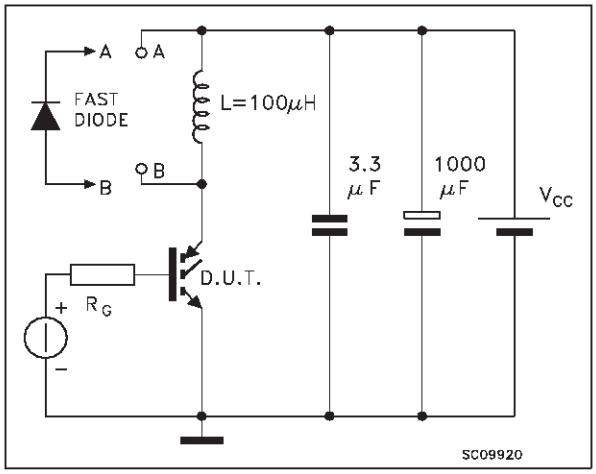
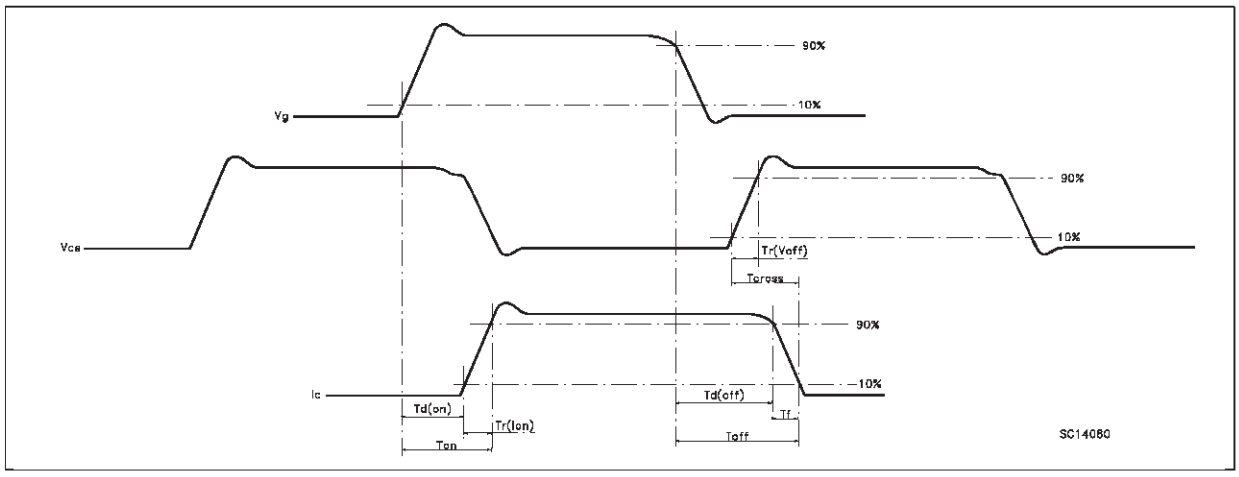


Fig. 2: Test Circuit For Inductive Load Switching





TO-252 (DPAK) 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
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
B2	5.2		5.4	0.204		0.212
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	9.35		10.1	0.368		0.397
L2		0.8			0.031	
L4	0.6		1	0.023		0.039