



STGP7NC60HD - STGF7NC60HD STGB7NC60HD

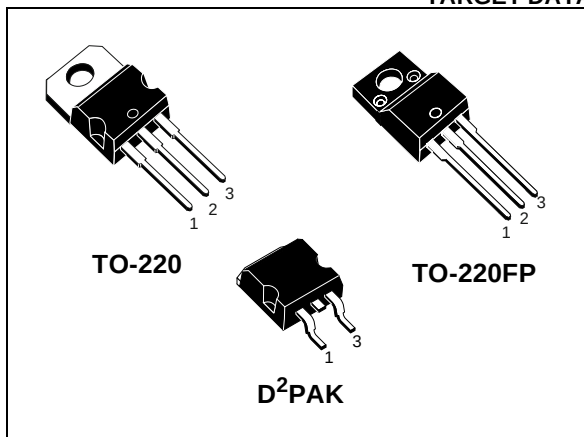
N-CHANNEL 7A - 600V - TO-220/TO-220FP/D²PAK

PowerMESH™ IGBT

TARGET DATA

TYPE	V _{CES}	V _{CE(sat)} (Max) @ 25°C	I _C (#) @100°C
STGB7NC60HD	600 V	< 2.2 V	15 A
STGF7NC60HD	600 V	< 2.2 V	15 A
STGP7NC60HD	600 V	< 2.2 V	15 A

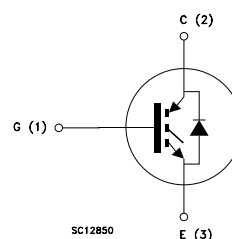
- HIGH INPUT IMPEDANCE (VOLTAGE DRIVEN)
- LOW ON-VOLTAGE DROP (V_{cesat})
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY
- OFF LOSSES INCLUDE TAIL CURRENT
- LOSSES INCLUDE DIODE RECOVERY ENERGY



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 "H" identifies a family optimized for high frequency applications (up to 50kHz) in order to achieve very high switching performances (reduced fall) maintaining a low voltage drop.

INTERNAL SCHEMATIC DIAGRAM



APPLICATIONS

- HIGH FREQUENCY MOTOR CONTROLS
- SMPS AND PFC IN BOTH HARD SWITCH AND RESONANT TOPOLOGIES

ORDERING INFORMATION

SALES TYPE	MARKING	PACKAGE	PACKAGING
STGB7NC60HDT4	GB7NC60HD	D ² PAK	TAPE & REEL
STGF7NC60HD	GF7NC60HD	TO-220FP	TUBE
STGP7NC60HD	GP7NC60HD	TO-220	TUBE

STGP7NC60HD - STGF7NC60HD - STGB7NC60HD

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STGB7NC60HD STGP7NC60HD	STGF7NC60HD	
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 (continuous) at T _C = 25°C (#)	30		A
I _C	Collector Current (continuous) at T _C = 100°C (#)	15		A
I _{CM} (■)	Collector Current (pulsed)	60		A
P _{TOT}	Total Dissipation at T _C = 25°C	80	25	W
	Derating Factor	0.64	0.20	W/°C
V _{ISO}	Insulation Withstand Voltage A.C.(t = 1 sec; T _c = 25°C)	--	2500	V
T _{stg}	Storage Temperature	– 55 to 150		°C
T _j	Operating Junction Temperature			

(■) Pulse width limited by Max Junction Temperature.

THERMAL DATA

			Min.	Typ.	Max.	
R _{thj-case}	Thermal Resistance Junction-case	TO-220 D2PAK			1.56	°C/W
		TO-220FP			5.0	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient				62.5	°C/W
T _L	Maximum Lead Temperature for Soldering Purpose (1.6 mm from case, for 10 sec.)			300		°C

ELECTRICAL CHARACTERISTICS (T_{CASE} = 25 °C UNLESS OTHERWISE SPECIFIED)

MAIN PARAMETERS

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 Current (V _{GE} = 0)	V _{CE} = Max Rating, T _C = 25 °C V _{CE} = Max Rating, T _C = 125 °C			50 500	μA μA
I _{GES}	Gate-Emitter Leakage Current (V _{CE} = 0)	V _{GE} = ±20V, V _{CE} = 0			±100	nA
V _{GE(th)}	Gate Threshold Voltage	V _{CE} = V _{GE} , I _C = 250μA	3.75		5.75	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	V _{GE} = 15V, I _C = 7 A V _{GE} = 15V, I _C = 7 A, T _C = 125°C		1.7 1.5	2.2	V V

(#) Calculated according to the iterative formula:

$$I_C(T_C) = \frac{T_{JMAX} - T_C}{R_{THJ-C} \times V_{CESAT(MAX)}(T_C, I_C)}$$

SWITCHING PARAMETERS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs(1)}$	Forward Transconductance	$V_{CE} = 15V, I_C = 7 A$		5		S
C_{ies} C_{oes} C_{res}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{CE} = 25V, f = 1 MHz, V_{GE} = 0$		750 65 17		pF pF pF
Q_g Q_{ge} Q_{gc}	Total Gate Charge Gate-Emitter Charge Gate-Collector Charge	$V_{CE} = 480V, I_C = 7 A,$ $V_{GE} = 15V$		35 TBD TBD		nC nC nC
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	$V_{CC} = 480 V, I_C = 7 A$ $R_G = 10\Omega, V_{GE} = 15 V$		TBD TBD		ns ns
$(di/dt)_{on}$ E_{on}	Turn-on Current Slope Turn-on Switching Losses	$V_{CC} = 480 V, I_C = 8 A, R_G = 10\Omega$ $V_{GE} = 15 V, T_c = 125^\circ C$		TBD TBD		A/ μs μJ
t_c $t_r(V_{off})$ $t_{d(off)}$ t_f $E_{off(**)}$ E_{ts}	Cross-over Time Off Voltage Rise Time Delay Time Fall Time Turn-off Switching Loss Total Switching Loss	$V_{CC} = 480 V, I_C = 7 A,$ $R_{GE} = 10 \Omega, V_{GE} = 15 V$ $T_c = 25^\circ C$		TBD TBD TBD 100 TBD TBD		ns ns ns ns μJ μJ
t_c $t_r(V_{off})$ $t_{d(off)}$ t_f $E_{off(**)}$ E_{ts}	Cross-over Time Off Voltage Rise Time Delay Time Fall Time Turn-off Switching Loss Total Switching Loss	$V_{CC} = 480 V, I_C = 7 A,$ $R_{GE} = 10 \Omega, V_{GE} = 15 V$ $T_c = 125^\circ C$		TBD TBD TBD 200 TBD TBD		ns ns ns ns μJ μJ

COLLECTOR-EMITTER DIODE

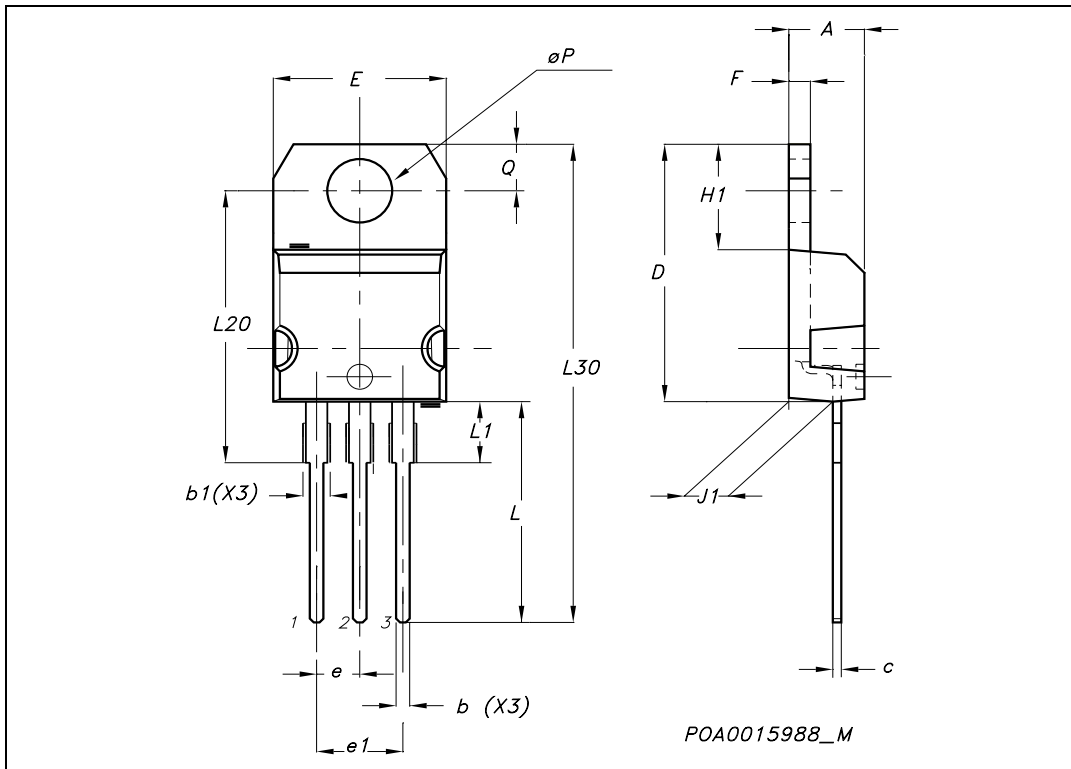
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_f I_{fm}	Forward Current Forward Current pulsed				7 60	A A
V_f	Forward On-Voltage	$I_f = 3.5 A$ $I_f = 3.5 A, T_j = 125^\circ C$		1.4 1.15	1.9	V V
t_{rr} Q_{rr} I_{rrm}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_f = 7 A, V_R = 200 V,$ $T_j = 125^\circ C, di/dt = 100A/\mu s$		TBD TBD TBD		ns nC A

1. Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.

(**) Losses include Also the Tail (Jedec Standardization)

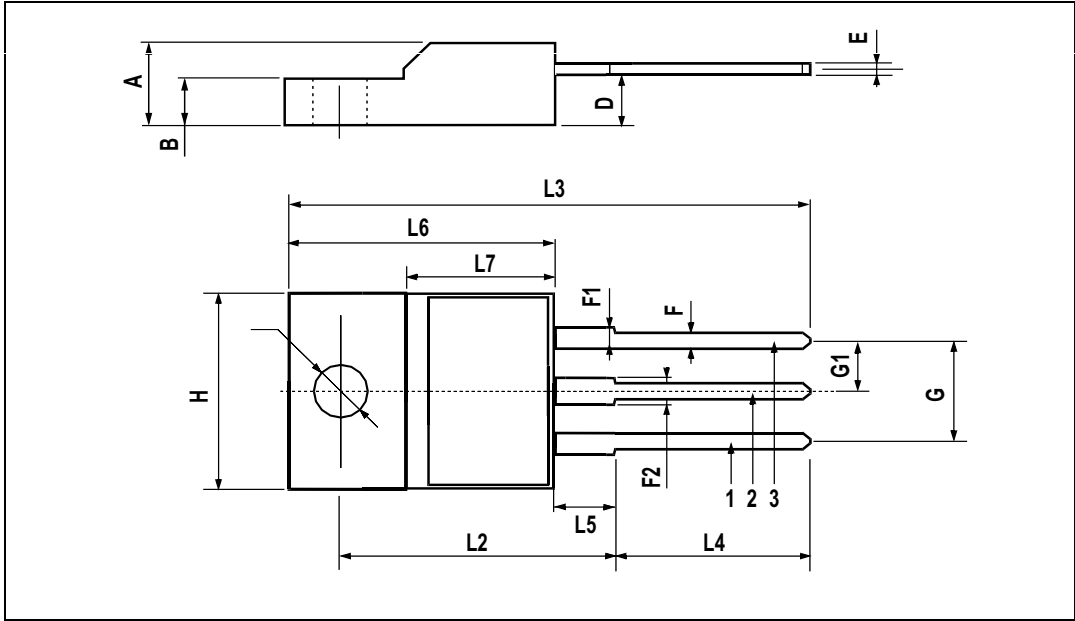
TO-220 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.15		1.70	0.045		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.60		0.620
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.052
H1	6.20		6.60	0.244		0.256
J1	2.40		2.72	0.094		0.107
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L20		16.40			0.645	
L30		28.90			1.137	
øP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116



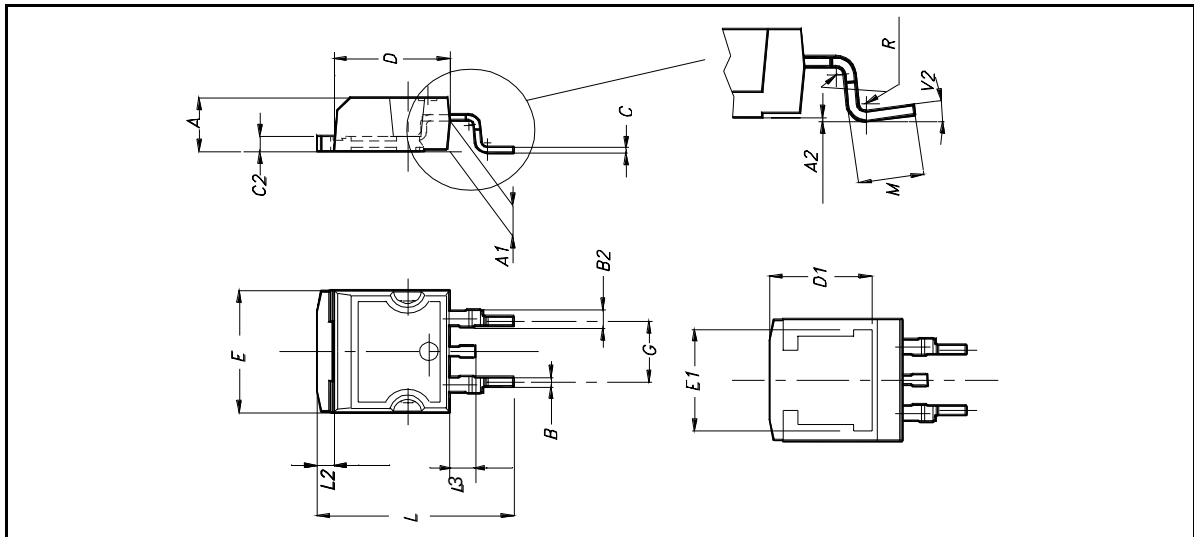
TO-220FP MECHANICAL DATA

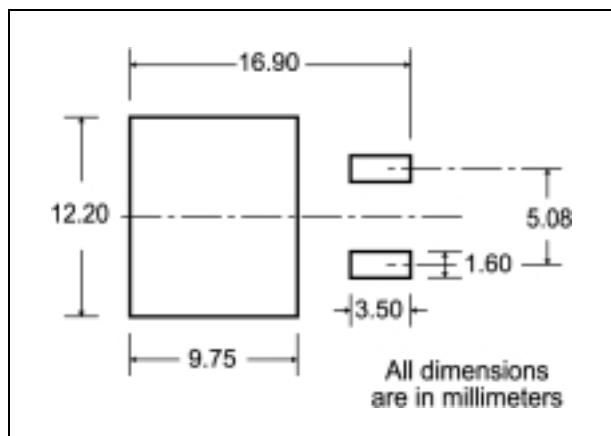
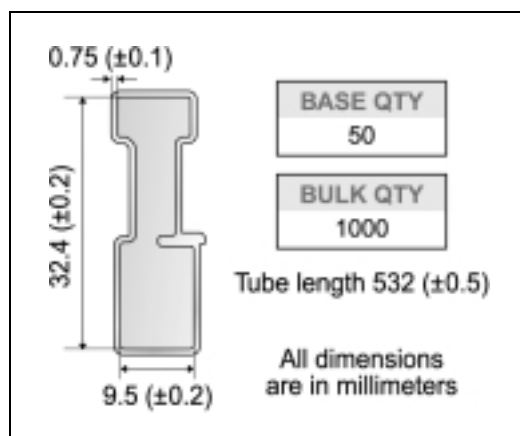
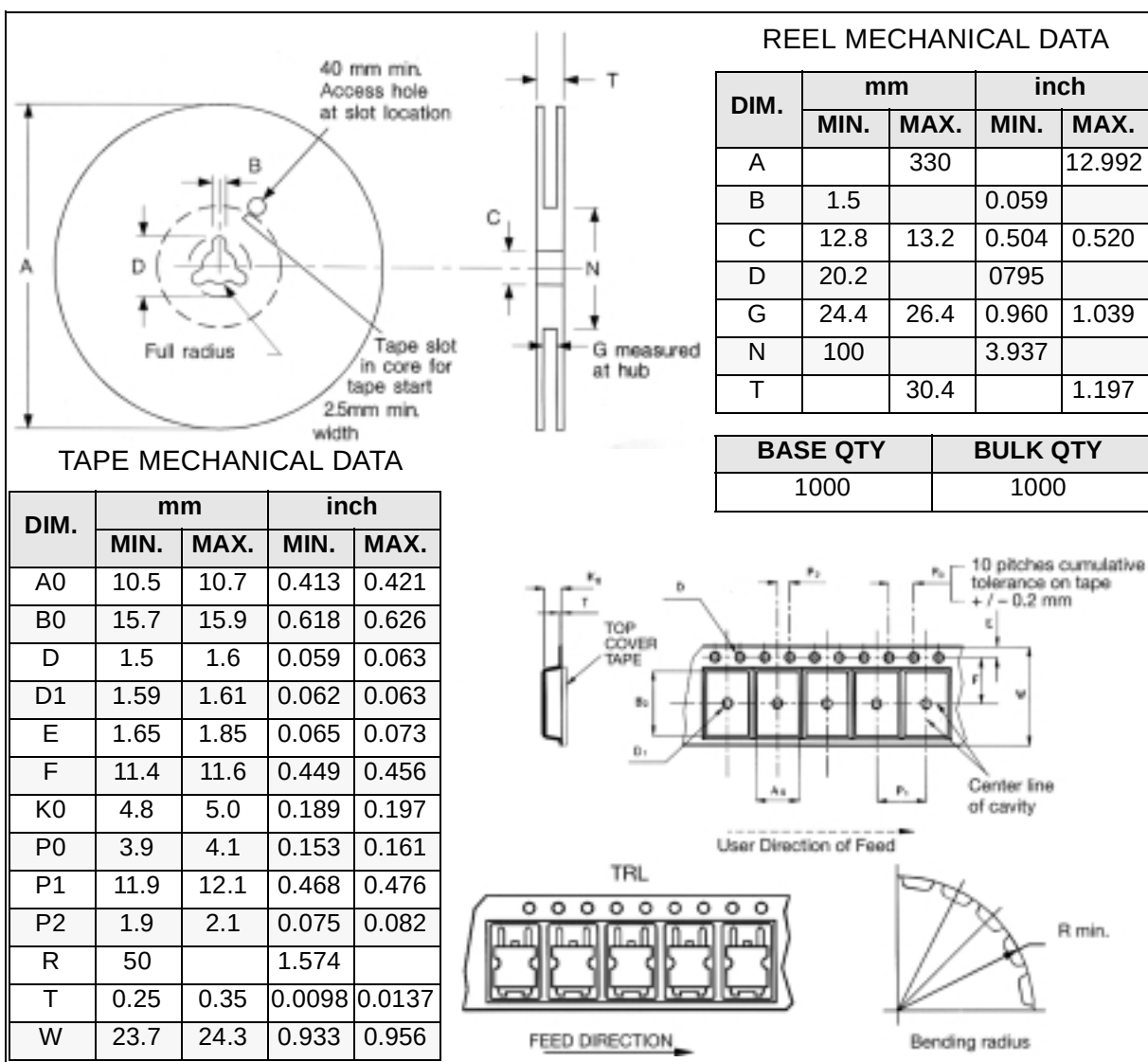
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.7	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.7	0.045		0.067
F2	1.15		1.7	0.045		0.067
G	4.95		5.2	0.195		0.204
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	.0385		0.417
L5	2.9		3.6	0.114		0.141
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
Ø	3		3.2	0.118		0.126



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
A2	0.03		0.23	0.001		0.009
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	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.393		
E1		8.5			0.334	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.590		0.625
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.068
M	2.4		3.2	0.094		0.126



D²PAK FOOTPRINT**TUBE SHIPMENT (no suffix)*****TAPE AND REEL SHIPMENT (suffix "T4")***

* on sales type

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