STB200N6F3, STI200N6F3 STP200N6F3

N-channel 60 V, 3 mΩ, 120 A D²PAK, TO-220, I²PAK STripFET™ Power MOSFET

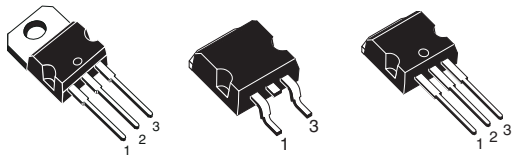
Preliminary data

Features

Type	V_{DSS}	$R_{DS(on)}$	I_D	Pw
STB200N6F3	60 V	< 3.6 mΩ	120 A(1)	330 W
STI200N6F3	60 V	< 3.9 mΩ	120 A(1)	330 W
STP200N6F3	60 V	< 3.9 mΩ	120 A(1)	330 W

1. Value limited by wire bonding

- Ultra low on-resistance
- 100% avalanche tested



TO-220 D²PAK I²PAK

Application

- Switching applications

Description

This STripFET™ III Power MOSFET technology is among the latest improvements, which have been especially tailored to minimize on-state resistance providing superior switching performance.

Figure 1. Internal schematic diagram

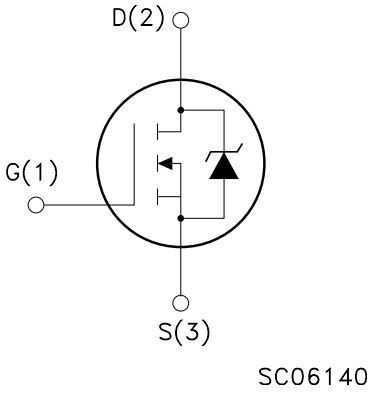


Table 1. Device summary

Order codes	Marking	Package	Packaging
STB200N6F3	200N6F3	D²PAK	Tape & reel
STI200N6F3	200N6F3	I²PAK	Tube
STP200N6F3	200N6F3	TO-220	Tube

Contents

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage (V_{GS}=0)	60	V
V_{GS}	Gate-source voltage	± 20	V
I_D (1)	Drain current (continuous) at T_C = 25°C	120	A
I_D (1)	Drain current (continuous) at T_C=100°C	120	A
I_{DM} (2)	Drain current (pulsed)	480	A
P_{TOT}	Total dissipation at T_C = 25°C	330	W
	Derating factor	2.2	W/°C
dv/dt (3)	Peak diode recovery voltage slope	TBD	V/ns
E_{AS} (4)	Single pulse avalanche energy	TBD	mJ
T_j T_{stg}	Operating junction temperature storage temperature	-55 To 175	°C

1. Current limited by package.
2. Pulse width limited by safe operating area.
3. $I_{SD} \leq$ 120 A, di/dt $\leq$ TBD, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq T_{JMAX}$
4. Starting Tj = 25 °C, I_D = TBD, V_{DD} = TBD *(see Figure 5 and Figure 6)*

Table 3. Thermal data

Symbol	Parameter	TO-220/I²PAK	D²PAK	Unit
Rthj-case	Thermal resistance junction-case	0.45		°C/W
Rthj-a	Thermal resistance junction-ambient max	62.5		°C/W
Rthj-pcb(1)	Thermal resistance junction-ambient max		50	°C/W
T_l	Maximum lead temperature for soldering purpose	300		°C

1. When mounted on 1 inch² FR4 2oz Cu.

2 Electrical characteristics

(T_{CASE}=25 °C unless otherwise specified)

Table 4. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	I_D = 250 µA, V_{GS}= 0	60			V
I_{DSS}	Zero gate voltage drain current (V_{GS} = 0)	V_{DS}= max rating, V_{DS}= max rating, @125°C			10 100	µA µA
I_{GSS}	Gate body leakage current (V_{DS} = 0)	V_{GS} = ±20 V			±200	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS}= V_{GS}, I_D = 250 µA	2		4	V
$R_{DS(on)}$	Static drain-source on resistance	V_{GS}= 10 V, I_D= 60 A **D²PAK** **TO-220, I²PAK**		 3 3.3	 3.6 3.9	 mΩ mΩ

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} = 25 V, f = 1MHz, V_{GS} = 0	-	6800 1450 15	-	pF pF pF
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on delay time Rise time Turn-off delay time Fall time	V_{DD} = 27.5 V, I_D = 60 A R_G = 4.7 Ω V_{GS} = 10 V *(see Figure 2, Figure 7)*	-	TBD TBD TBD TBD	-	ns ns ns ns
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	V_{DD} = 30 V, I_D = 120 A, V_{GS} = 10 V, (see *Figure 3*)	-	100 30 26	-	nC nC nC

Table 6. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}(1)	Source-drain current Source-drain current (pulsed)		-		120 480	A A
V_{SD}(2)	Forward on voltage	I_{SD}=120 A, V_{GS}=0	-		1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	I_{SD}=120 A, di/dt = 100 A/µs, V_{DD}=35 V, Tj=150 °C (see *Figure 4*)	-	TBD TBD TBD		ns µC A

1. Pulse width limited by safe operating area
2. Pulsed: pulse duration = 300µs, duty cycle 1.5%

3 Test circuits

Figure 2. Switching times test circuit for resistive load

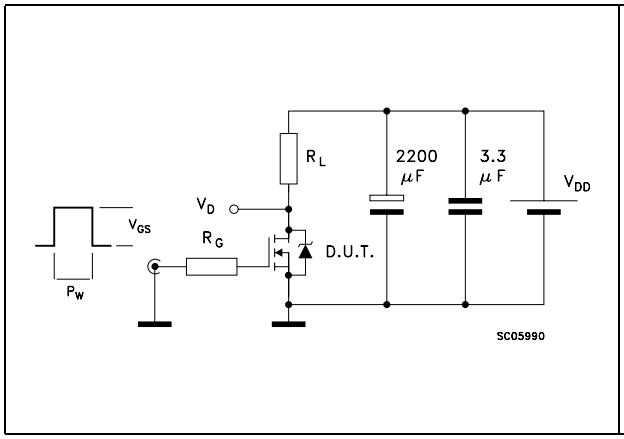


Figure 3. Gate charge test circuit

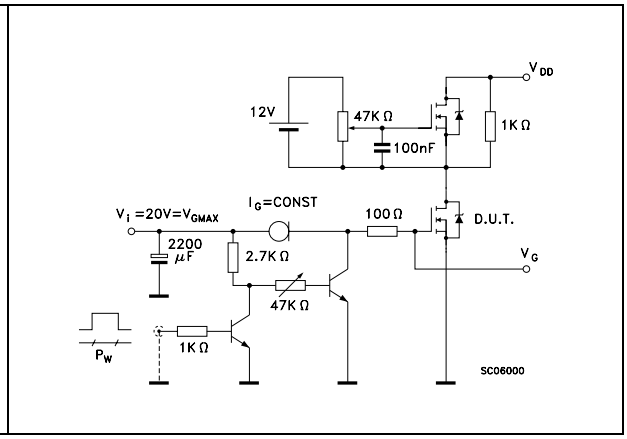


Figure 4. Test circuit for inductive load switching and diode recovery times

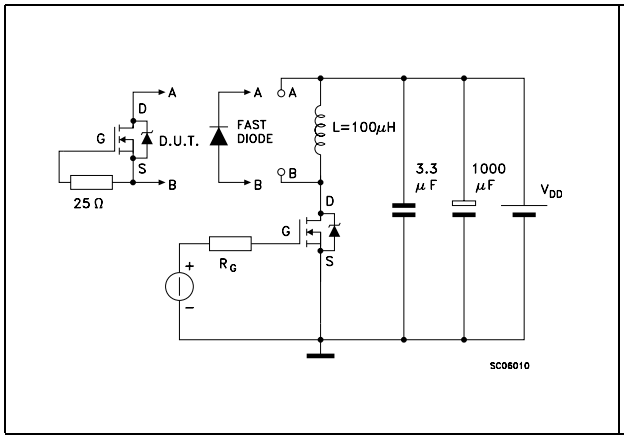


Figure 5. Unclamped inductive load test circuit

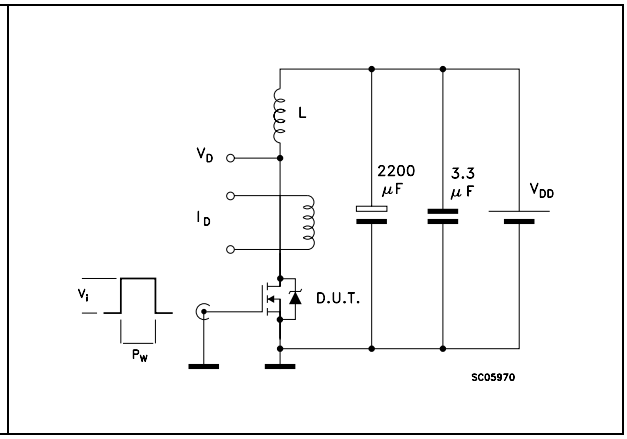


Figure 6. Unclamped inductive waveform

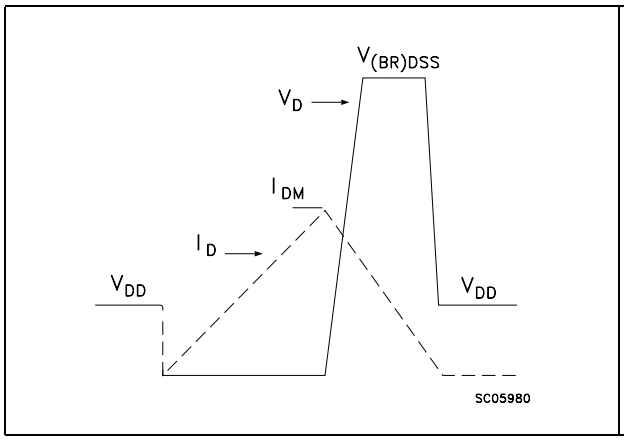
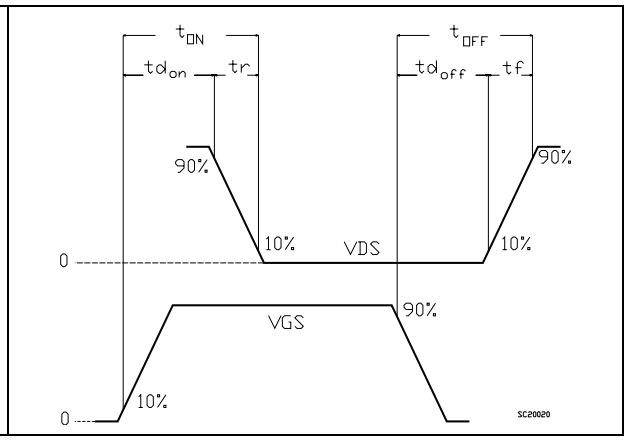


Figure 7. Switching time waveform

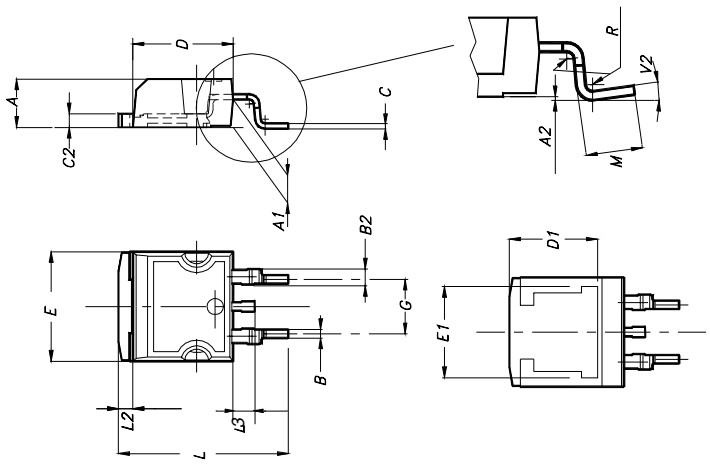


4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

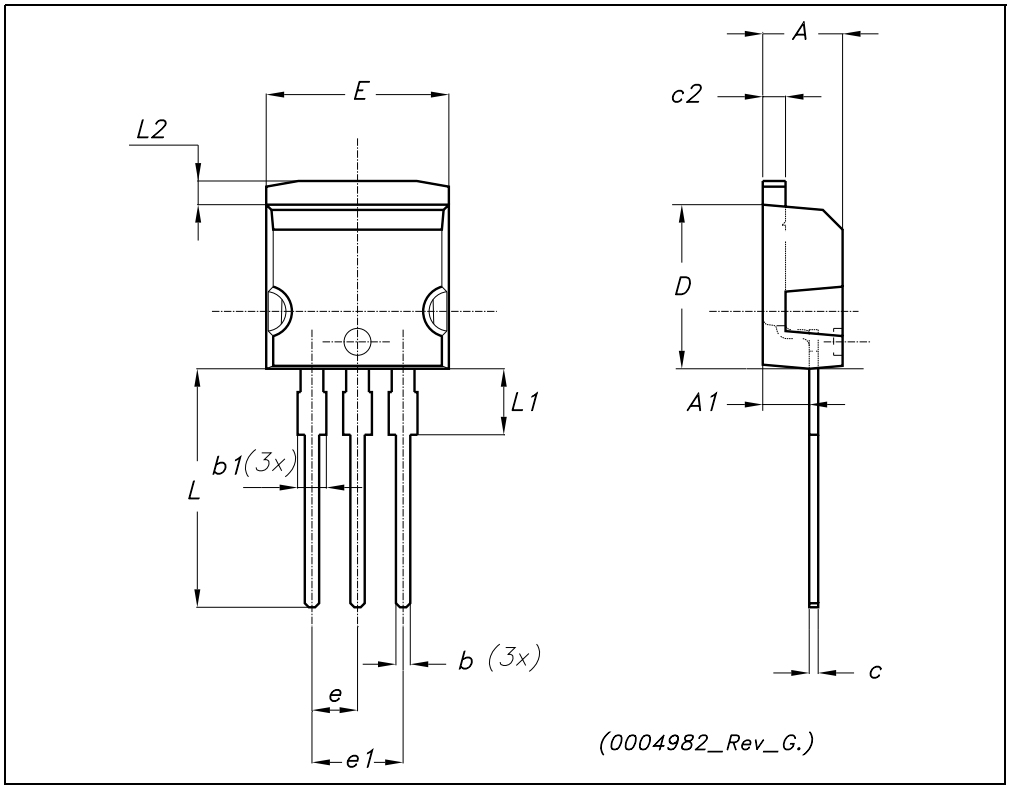
D²PAK mechanical data

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
R	0	.4			0.015	
V2	0°		4°			



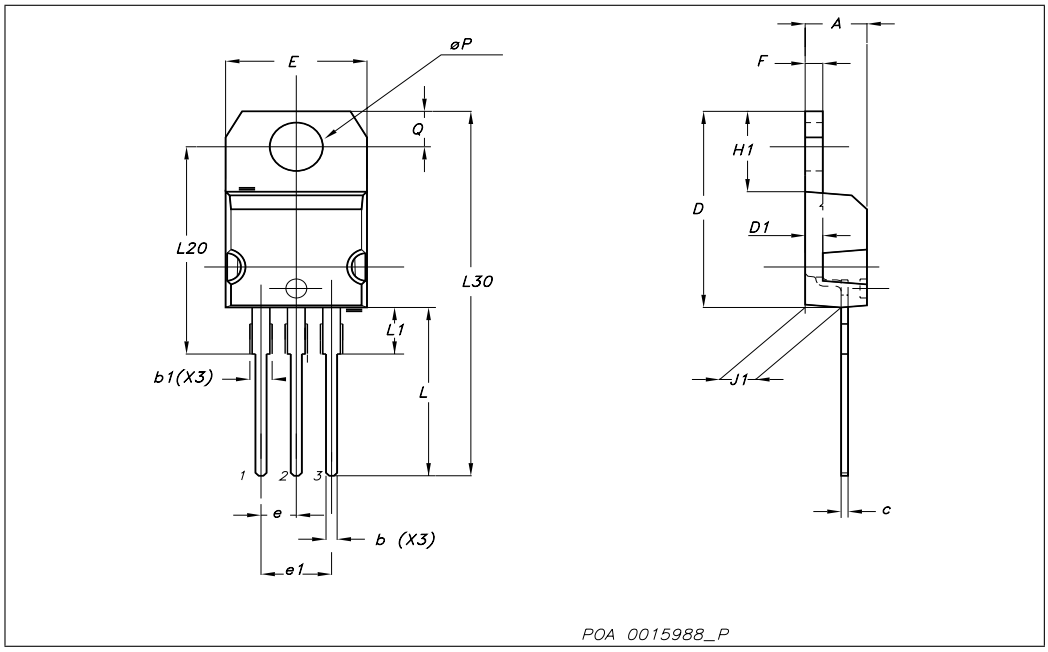
TO-262 (I^2PAK) mechanical data

DIM.	mm.			inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
A1	2.40		2.72	0.094		0.107
b	0.61		0.88	0.024		0.034
b1	1.14		1.70	0.044		0.066
c	0.49		0.70	0.019		0.027
c2	1.23		1.32	0.048		0.052
D	8.95		9.35	0.352		0.368
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
E	10		10.40	0.393		0.410
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L2	1.27		1.40	0.050		0.055



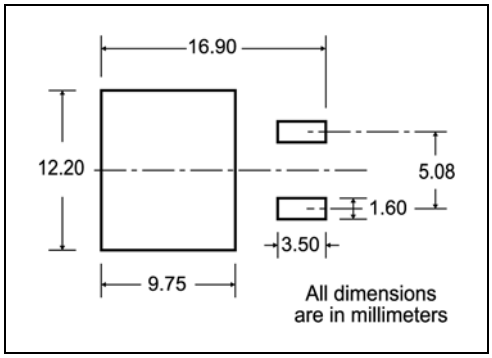
TO-220 mechanical data

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	1.14		1.70	0.044		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.6		0.62
D1		1.27			0.050	
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		0.051
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	
∅P	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116

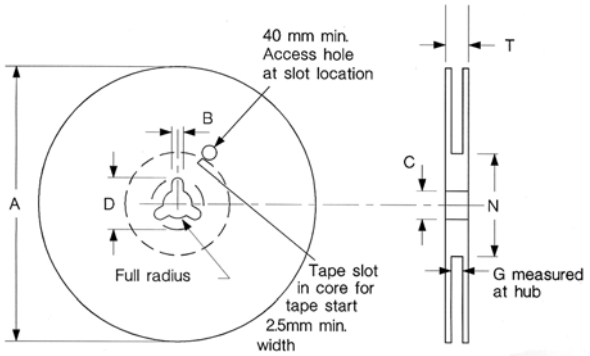


5 Packaging mechanical data

D²PAK FOOTPRINT



TAPE AND REEL SHIPMENT



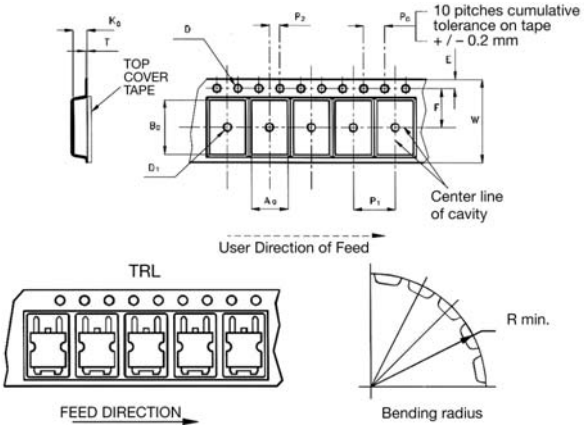
REEL MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A		330		12.992
B	1.5		0.059	
C	12.8	13.2	0.504	0.520
D	20.2		0795	
G	24.4	26.4	0.960	1.039
N	100		3.937	
T		30.4		1.197

BASE QTY	BULK QTY
1000	1000

TAPE MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A0	10.5	10.7	0.413	0.421
B0	15.7	15.9	0.618	0.626
D	1.5	1.6	0.059	0.063
D1	1.59	1.61	0.062	0.063
E	1.65	1.85	0.065	0.073
F	11.4	11.6	0.449	0.456
K0	4.8	5.0	0.189	0.197
P0	3.9	4.1	0.153	0.161
P1	11.9	12.1	0.468	0.476
P2	1.9	2.1	0.075	0.082
R	50		1.574	
T	0.25	0.35	0.0098	0.0137
W	23.7	24.3	0.933	0.956



* on sales type

6 Revision history

Table 7. Document revision history

Date	Revision	Changes
20-Apr-2009	1	First version

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