STB180N55
STP180N55

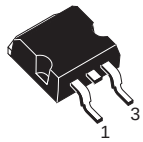
N-CHANNEL 55V - 2.9mΩ - 120A - D²PAK - TO-220
MDmesh™ Low Voltage Power MOSFET

TARGET SPECIFICATION

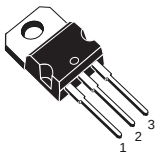
General features

Type	V_{DSS}	$R_{DS(on)}$	I_D
STB180N55	55V	3.5mΩ	120A (*Note* 1)
STP180N55	55V	3.8mΩ	120A (*Note* 1)

- ULTRA LOW ON-RESISTANCE
- 100% AVALANCHE TESTED



D²PAK



TO-220

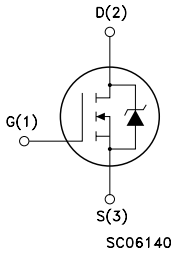
Description

This N-Channel enhancement mode MOSFET is the latest refinement of STMicroelectronic unique “Single Feature Size™“ strip-based process with less critical aligment steps and therefore a remarkable manufacturing reproducibility. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and low gate charge.

Applications

- HIGH CURRENT SWITCHING APPLICATION

Internal schematic diagram



Order codes

Sales Type	Marking	Package	Packaging
STB180N55	B180N55	D²PAK	TAPE & REEL
STP180N55	P180N55	TO-220	TUBE

This is a preliminary information on a new product foreseen to be developed. Details are subject to change without notice

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1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS}=0)	55	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D *Note* 1	Drain Current (continuous) at T_C = 25°C	120	A
I_D *Note* 1	Drain Current (continuous) at T_C = 100°C	120	A
I_{DM} *Note* 2	Drain Current (pulsed)	480	A
P_{TOT}	Total Dissipation at T_C = 25°C	315	W
	Derating Factor	2.1	W/°C
dv/dt	Peak Diode Recovery voltage slope	TBD	V/ns
E_{AS} *Note* 4	Single Pulse Avalanche Energy	TBD	mJ
T_j T_{stg}	Operating Junction Temperature Storage Temperature	-55 to 175	°C

Table 2. Thermal data

		TO-220	D²PAK	Unit
Rthj-case	Thermal Resistance Junction-case	0.48		°C/W
Rthj-a	Thermal Resistance Junction-ambient Max	62.5	--	°C/W
Rthj-pcb *Note* 5	Thermal Resistance Junction-ambient Max	--	35	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose	300	--	°C

2 Electrical characteristics

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

Table 3. On/off states

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250µA, V_{GS}= 0	55			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating, V_{DS} = Max Rating,Tc = 125°C			10 100	µA µA
I_{GSS}	Gate Body Leakage Current (V_{DS} = 0)	V_{GS} = ±20V			±200	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D = 250µA	2		4	V
$R_{DS(on)}$	Static Drain-Source On Resistance	V_{GS}= 10V, I_D= 60A **D²PAK** **TO-220**			3.5 3.8	mΩ mΩ

Table 4. Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} *Note* 3	Forward Transconductance	V_{DS} =15V, I_D = 60A		TBD		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} =25V, f=1 MHz, V_{GS}=0		6200 1800 100		pF pF pF
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}=44V, I_D = 120A V_{GS} =10V (see Figure 2)		110 TBD TBD	TBD	nC nC nC

Table 5. Switching times

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD}=27V, I_D= 60A, R_G=4.7Ω, V_{GS}=10V (see Figure 3)		TBD TBD		ns ns
$t_{d(off)}$ t_f	Off voltage Rise Time FallTime	V_{DD}=27V, I_D= 60A, R_G=4.7Ω, V_{GS}=10V (see Figure 3)		TBD TBD		ns ns

Table 6. Source drain diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} *Note* 2	Source-drain Current Source-drain Current (pulsed)				120 480	A A
V_{SD}*Note* 3	Forward on Voltage	I_{SD}=120A, V_{GS}=0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD}=120A, di/dt = 100A/µs, V_{DD}=30V, Tj=150°C		TBD TBD TBD		ns nC A

(1) Current limited by package

(2) Pulse width limited by safe operating area

(3) Pulsed: pulse duration = 300µs, duty cycle 1.5%

(4) Starting Tj=25°C, Id=60A, Vdd=40V

(5) When mounted o inch² FR4 2oz Cu

3 Test circuits

Figure 1. Switching Times Test Circuit For Resistive Load

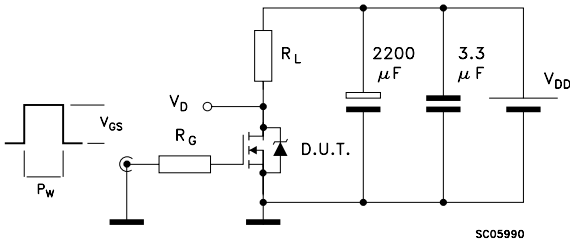


Figure 2. Gate Charge Test Circuit

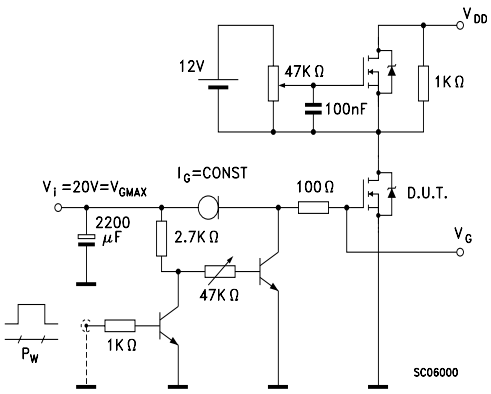


Figure 3. Test Circuit For Indictive Load Switching and Diode Recovery Times

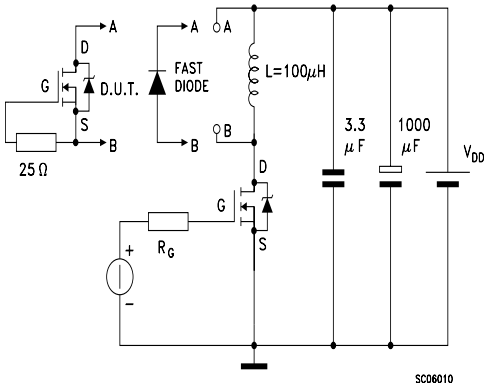


Figure 5. Unclamped Inductive Load Test Circuit

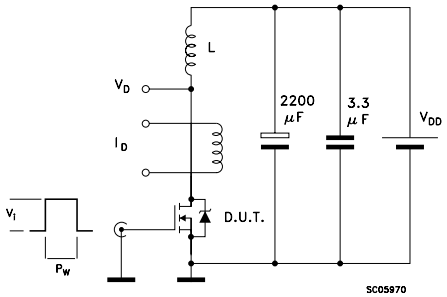


Figure 4. Unclamped Inductive Waveform

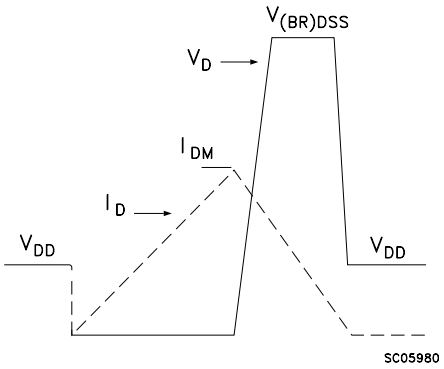
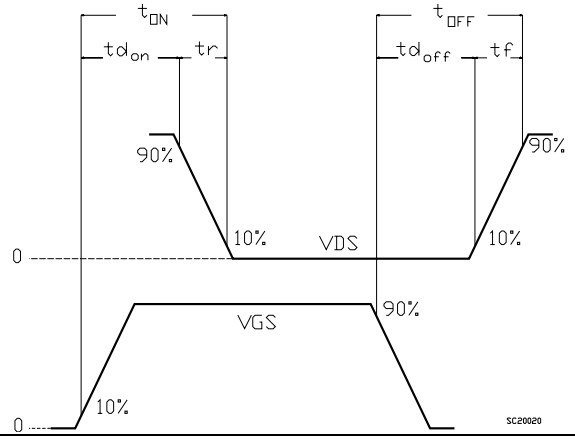


Figure 6. Switching Time Waveform

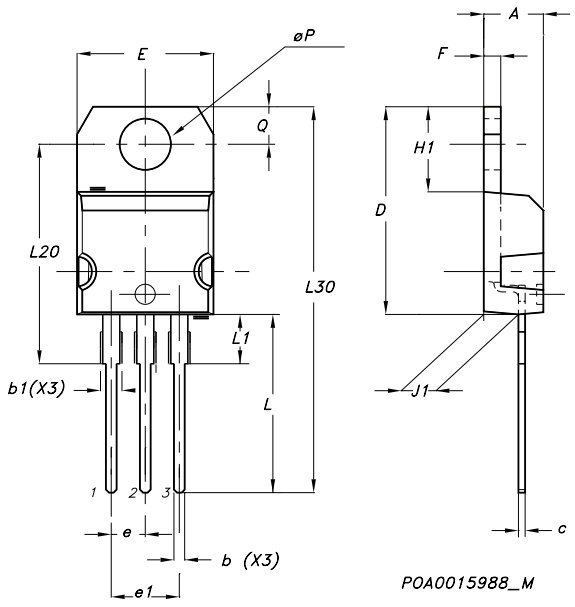


4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

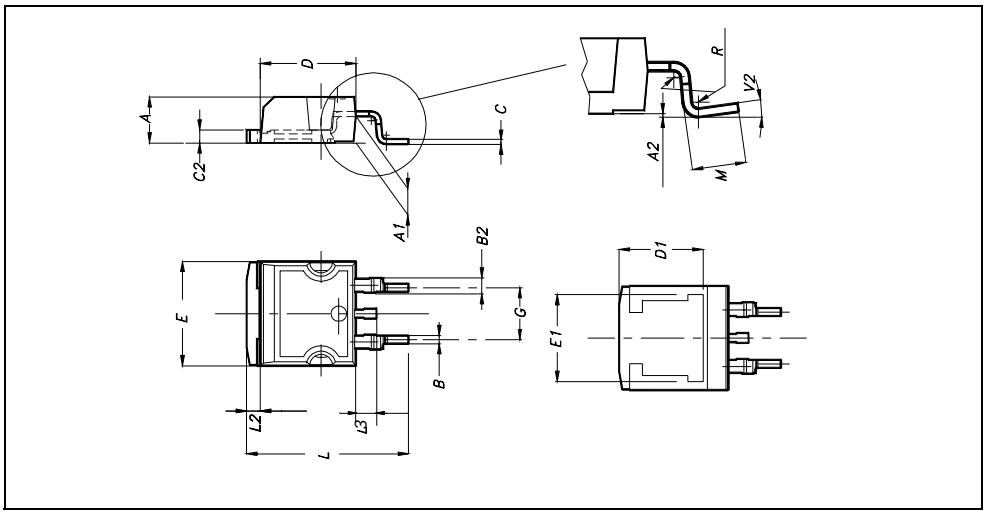
TO-220 MECHANICAL DATA

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



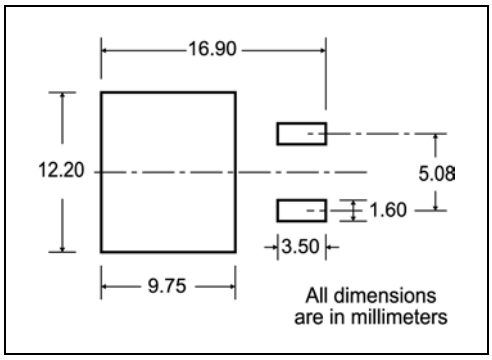
D^2PAK MECHANICAL DATA

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	0º		4º			

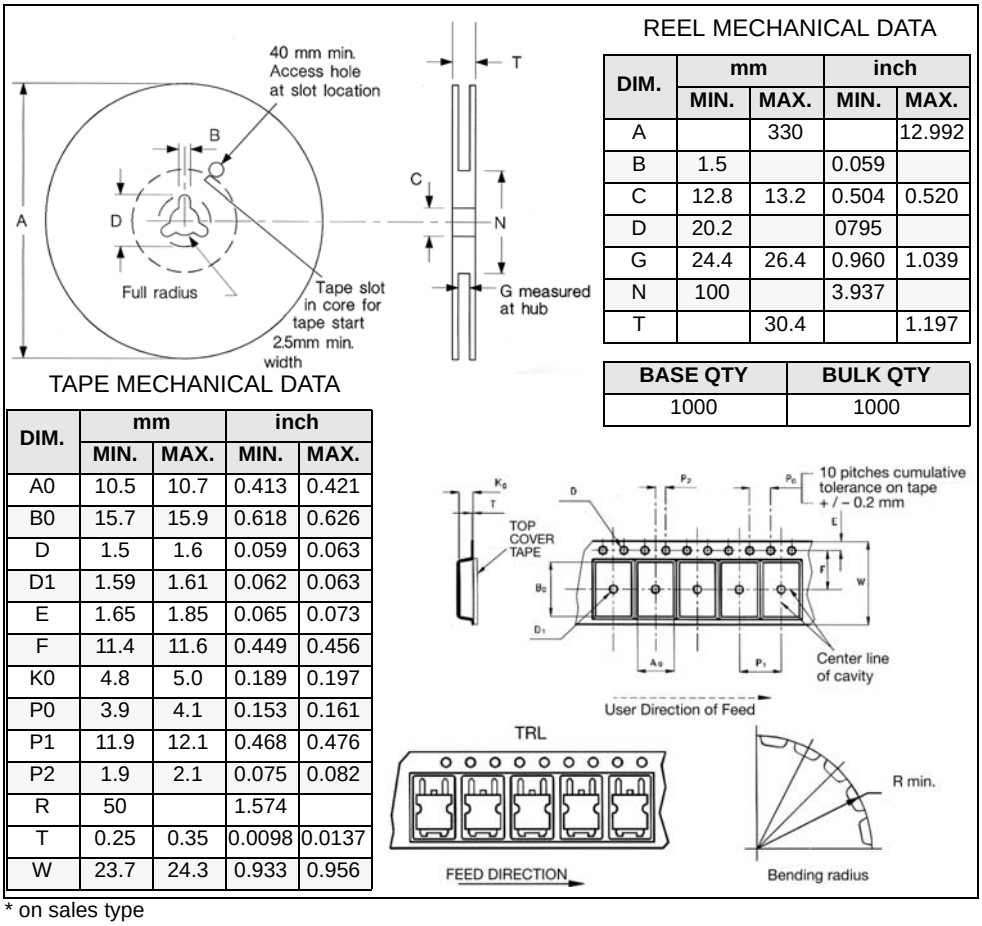


5 Packing mechanical data

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

Date	Revision	Changes
03-Jan-2006	1	First release

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