



STB200N6F3, STI200N6F3 STP200N6F3

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

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Preliminary data

Features

Type	V _{DSS}	R _{DS(on)}	I _D	P _w
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

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.

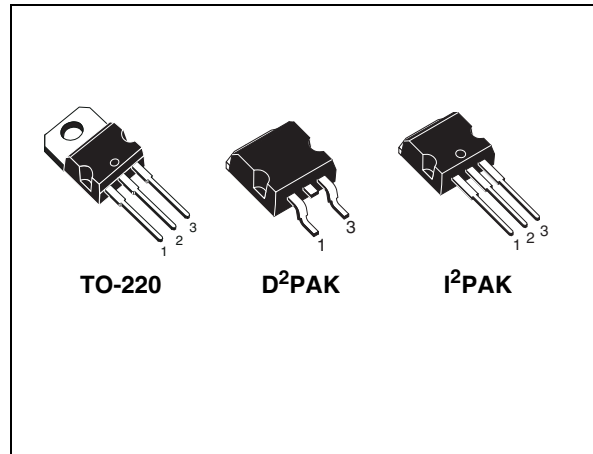


Figure 1. Internal schematic diagram

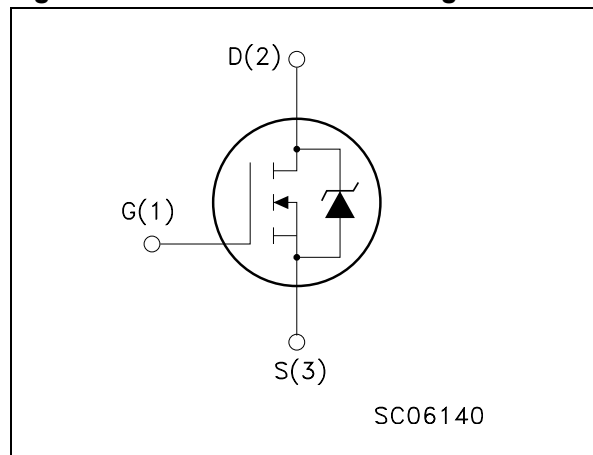


Table 1. Device summary

Order codes	Marking	Package	Packaging
STB200N6F3	200N6F3	D ² PAK	Tape & reel
STI200N6F3	200N6F3	I ² PAK	Tube
STP200N6F3	200N6F3	TO-220	Tube

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1 Electrical ratings

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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 $T_C = 25^\circ\text{C}$	120	A
$I_D^{(1)}$	Drain current (continuous) at $T_C=100^\circ\text{C}$	120	A
$I_{DM}^{(2)}$	Drain current (pulsed)	480	A
P_{TOT}	Total dissipation at $T_C = 25^\circ\text{C}$	330	W
	Derating factor	2.2	W/ $^\circ\text{C}$
$dv/dt^{(3)}$	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	$^\circ\text{C}$

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

Table 3. Thermal data

Symbol	Parameter	TO-220/l ² PAK	D ² PAK	Unit
$R_{thj-case}$	Thermal resistance junction-case	0.45		$^\circ\text{C}/\text{W}$
R_{thj-a}	Thermal resistance junction-ambient max	62.5		$^\circ\text{C}/\text{W}$
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-ambient max		50	$^\circ\text{C}/\text{W}$
T_l	Maximum lead temperature for soldering purpose	300		$^\circ\text{C}$

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

2 Electrical characteristics

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(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}	Input capacitance	V _{DS} = 25 V, f = 1MHz, V _{GS} = 0	-	6800	-	pF
C _{OSS}	Output capacitance			1450		pF
C _{rss}	Reverse transfer capacitance			15		pF
t _{d(on)}	Turn-on delay time	V _{DD} = 27.5 V, I _D = 60 A R _G = 4.7 Ω V _{GS} = 10 V <i>(see Figure 2, Figure 7)</i>	-	TBD	-	ns
t _r	Rise time			TBD		ns
t _{d(off)}	Turn-off delay time			TBD		ns
t _f	Fall time			TBD		ns
Q _g	Total gate charge	V _{DD} = 30 V, I _D = 120 A,	-	100	-	nC
Q _{gs}	Gate-source charge	V _{GS} = 10 V,		30		nC
Q _{gd}	Gate-drain charge	<i>(see Figure 3)</i>		26		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	$I_{SD}=120\text{ A}$, $V_{GS}=0$	-		1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	$I_{SD}=120\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $V_{DD}=35\text{ V}$, $T_j=150\text{ }^\circ\text{C}$ (see Figure 4)	-	TBD TBD TBD		ns μC A

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

3 Test circuits

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Figure 2. Switching times test circuit for resistive load

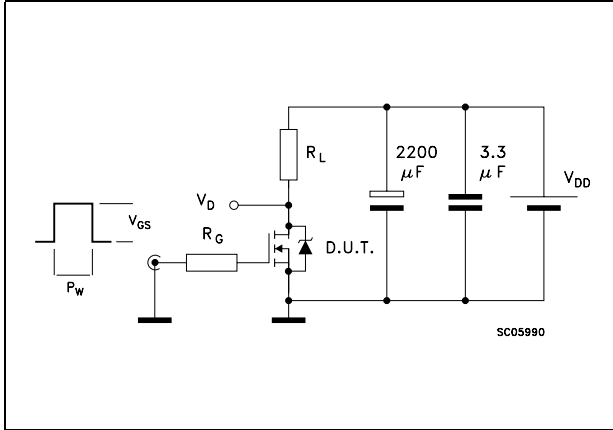


Figure 3. Gate charge test circuit

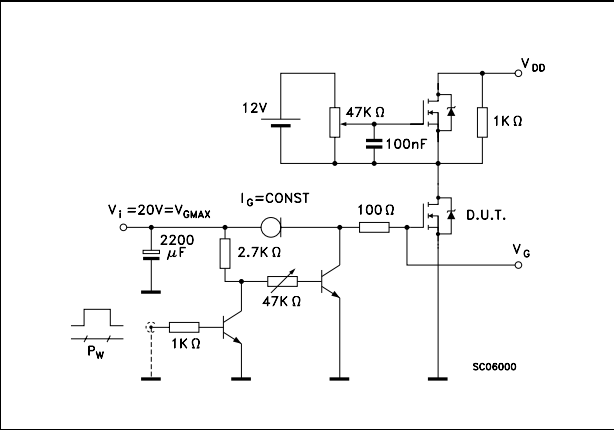


Figure 4. Test circuit for inductive load switching and diode recovery times

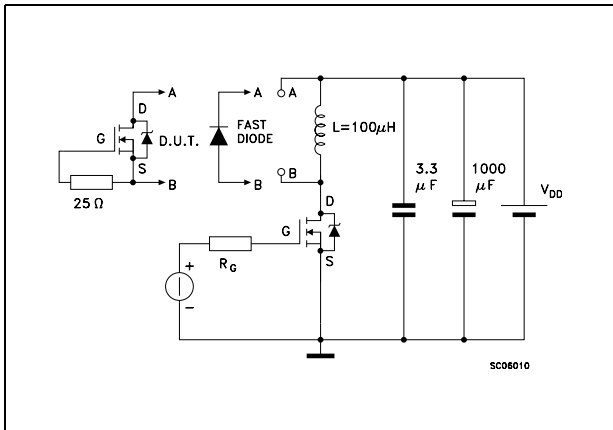


Figure 5. Unclamped inductive load test circuit

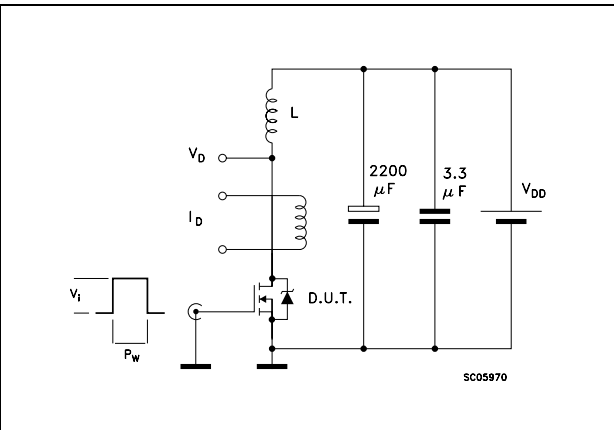


Figure 6. Unclamped inductive waveform

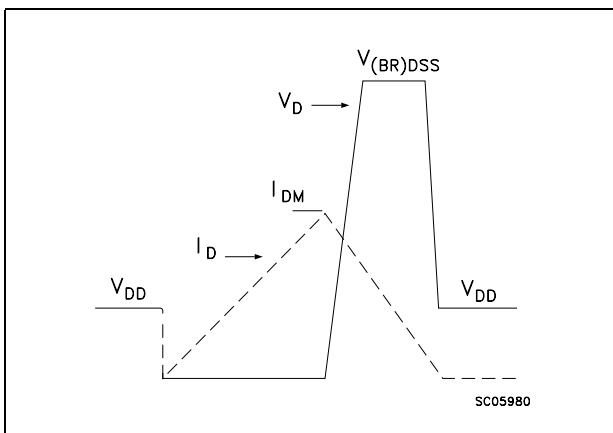
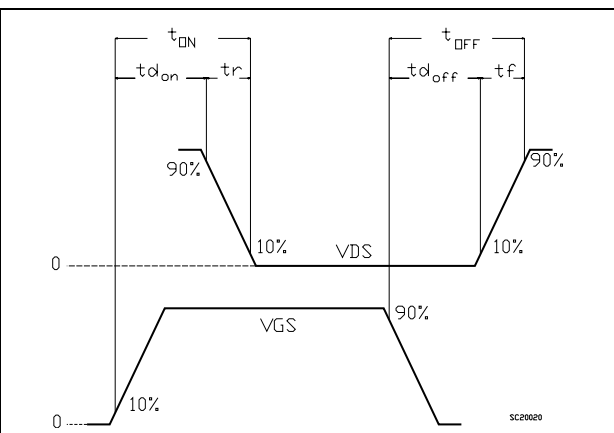


Figure 7. Switching time waveform



4 Package mechanical data

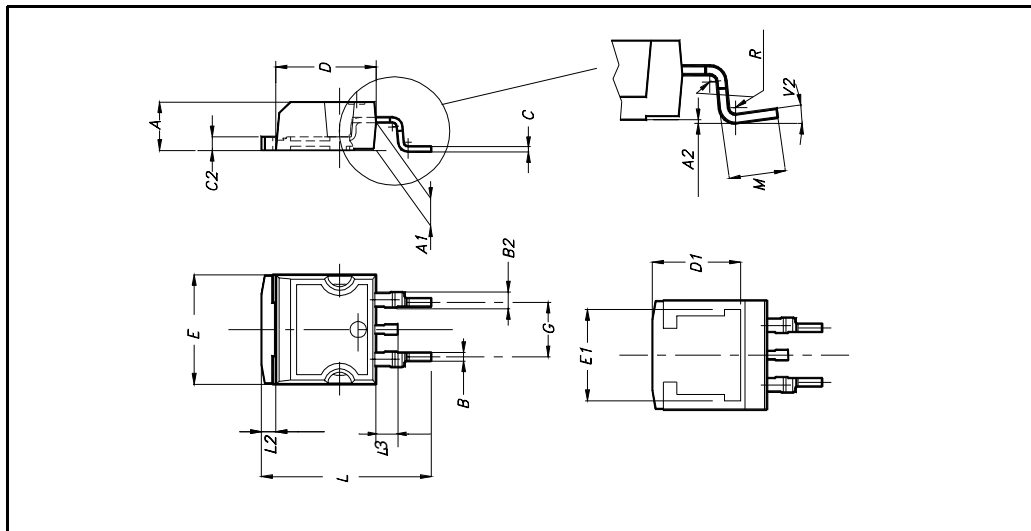
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D²PAK mechanical data

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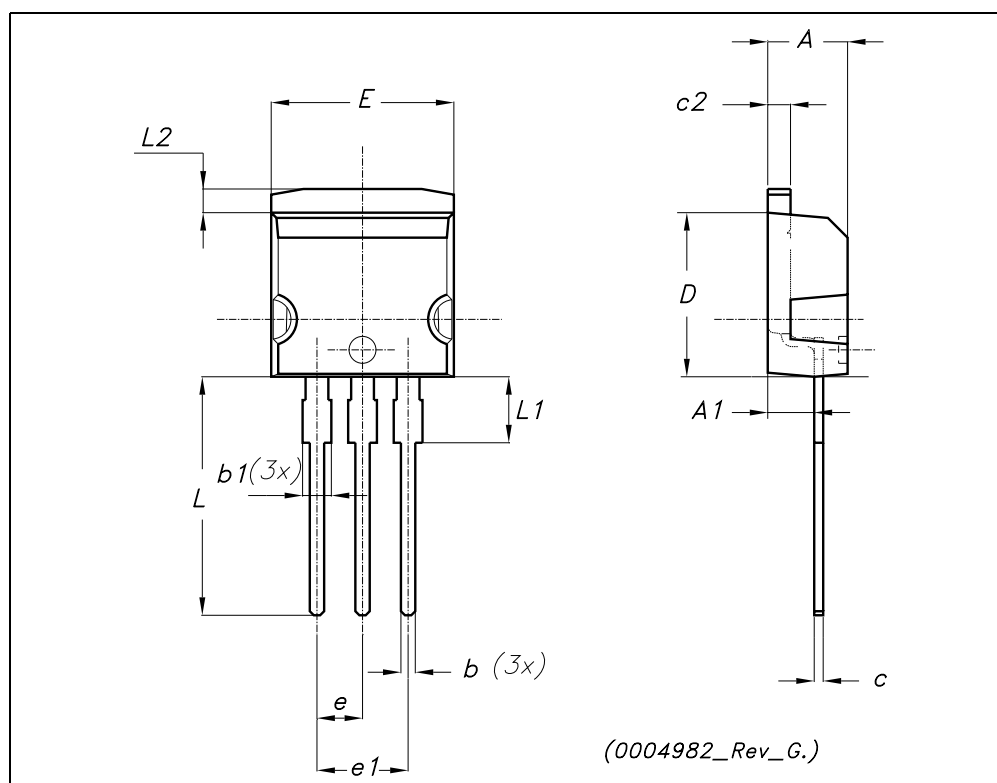
DIM.	mm.			inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
C	0.45		0.6	0.017		0.023
C2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.393		
E1		8.5			0.334	
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 (I²PAK) mechanical data

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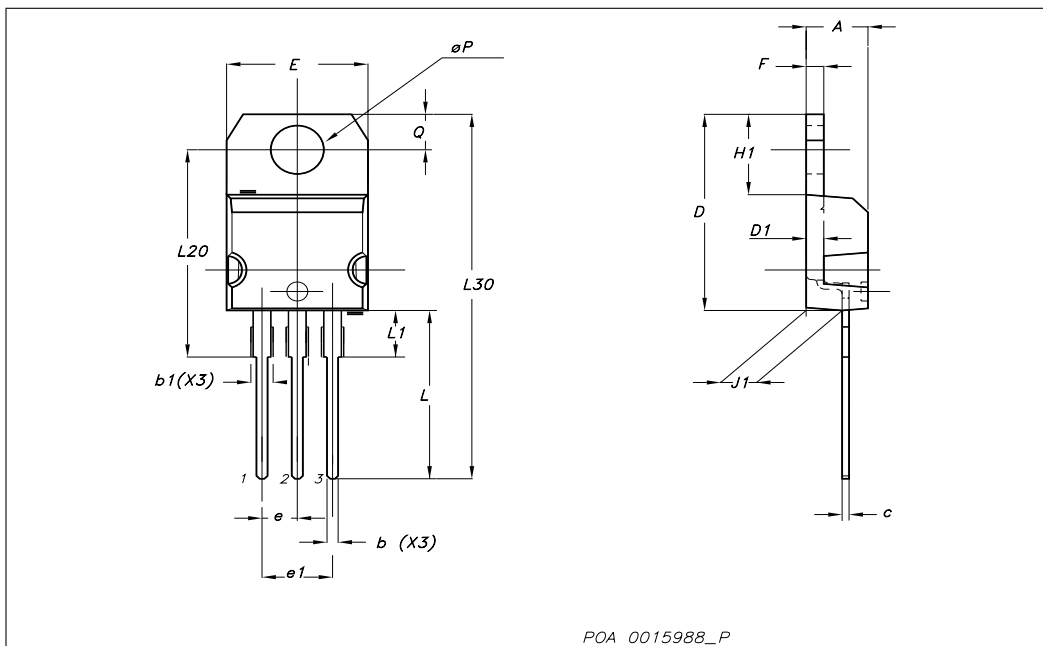
DIM.	mm.			inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
A1	2.40		2.72	0.094		0.107
b	0.61		0.88	0.024		0.034
b1	1.14		1.70	0.044		0.066
c	0.49		0.70	0.019		0.027
c2	1.23		1.32	0.048		0.052
D	8.95		9.35	0.352		0.368
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
E	10		10.40	0.393		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



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TO-220 mechanical data

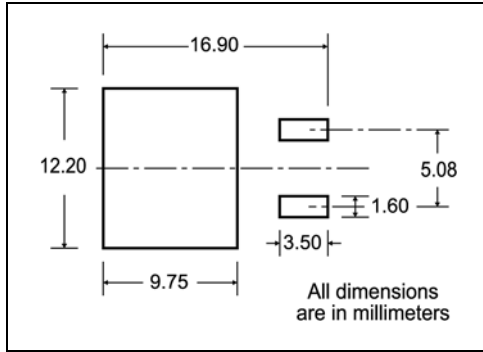
Dim	mm			inch		
	Min	Typ	Max	Min	Typ	Max
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.14		1.70	0.044		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.6		0.62
D1		1.27			0.050	
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.051
H1	6.20		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

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D²PAK FOOTPRINT



TAPE AND REEL SHIPMENT

40 mm min. Access hole at slot location

Full radius

Tape slot in core for tape start 25mm min. width

TR

C

N

G measured at hub

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

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		0.795	
G	24.4	26.4	0.960	1.039
N	100		3.937	
T		30.4		1.197

BASE QTY	BULK QTY
1000	1000

TOP COVER TAPE

10 pitches cumulative tolerance on tape +/- 0.2 mm

Center line of cavity

User Direction of Feed

TRL

FEED DIRECTION

Bending radius R min.

* on sales type

6 Revision history

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Table 7. Document revision history

Date	Revision	Changes
20-Apr-2009	1	First version

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