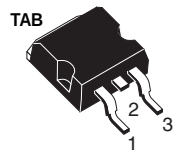
STH110N8F7-2

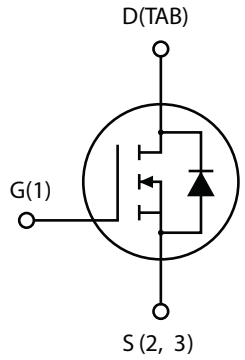
N-channel 80 V, 5.6 mΩ typ., 110 A STripFET™ F7 Power MOSFET in a H²PAK-2 package

Datasheet - target specification



H²PAK-2

Figure 1. Internal schematic diagram



Features

Order code	V_{DS}	$R_{DS(on)}$ max.	I_D	P_{TOT}
STH110N8F7-2	80 V	6.6 mΩ	110 A	170 W

- Among the lowest $R_{DS(on)}$ on the market
- Excellent figure of merit (FoM)
- Low C_{rss}/C_{iss} ratio for EMI immunity
- High avalanche ruggedness

Applications

- Switching applications

Description

This N-channel Power MOSFET utilizes STripFET™ F7 technology with an enhanced trench gate structure that results in very low on-state resistance, while also reducing internal capacitance and gate charge for faster and more efficient switching.

Table 1. Device summary

Order code	Marking	Package	Packaging
STH110N8F7-2	110N8F7	H²PAK-2	Tape and reel

Contents

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	80	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current (continuous) at T_C = 25 °C	110	A
I_D	Drain current (continuous) at T_C = 100 °C	80	A
I_{DM}(1)	Drain current (pulsed)	440	A
P_{TOT}	Total dissipation at T_C = 25 °C	170	W
E_{AS}(2)	Single pulse avalanche energy	TBD	mJ
T_j	Operating junction temperature	- 55 to 175	°C
T_{stg}	Storage temperature		

1. Pulse width is limited by safe operating area
2. Starting Tj =25 °C, Id = 18.5 A, Vdd = 50 V

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}pcb}$(1)	Thermal resistance junction-pcb	35	°C/W
$R_{thj\text{-}case}$	Thermal resistance junction-case	0.88	°C/W

1. When mounted on a 1 inch² FR-4 board, 2 oz 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	V_{GS} = 0, I_D = 250 µA	80			V
I_{DSS}	Zero gate voltage Drain current	V_{GS} = 0, V_{DS} = 80 V			1	µA
		V_{GS} = 0, V_{DS} = 80 V, T_J=125 °C			10	µA
I_{GSS}	Gate-source leakage current	V_{DS} = 0, V_{GS} = ±20 V			±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS} = V_{GS}, I_D = 250 µA	2.5		4.5	V
$R_{DS(on)}$	Static drain-source on-resistance	V_{GS}=10 V, I_D = 55 A		5.6	6.6	mΩ

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	-	3200	-	pF
C_{oss}	Output capacitance		-	800	-	pF
C_{rss}	Reverse transfer capacitance		-	55	-	pF
Q_g	Total gate charge	V_{DD} = 40 V, I_D = 110 A, V_{GS} = 10 V	-	45	-	nC
Q_{gs}	Gate-source charge		-	TBD	-	nC
Q_{gd}	Gate-drain charge		-	TBD	-	nC

Table 6. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	V_{DD} = 40 V, I_D = 55 A R_G=4.7 Ω, V_{GS} = 10 V	-	TBD	-	ns
t_r	Rise time		-	TBD	-	ns
$t_{d(off)}$	Turn-off-delay time		-	TBD	-	ns
t_f	Fall time		-	TBD	-	ns

Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{SD} (1)	Forward on voltage	V_{GS} = 0, I_{SD} = 110 A	-		TBD	V
t_{rr}	Reverse recovery time	I_{SD} = 110 A, di/dt = 100 A/µs, V_{DD} = 60 V T_j = 25 °C	-	TBD		ns
Q_{rr}	Reverse recovery charge		-	TBD		nC
I_{RRM}	Reverse recovery current		-	TBD		A

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

3 Test circuits

Figure 2. Switching times test circuit for resistive load

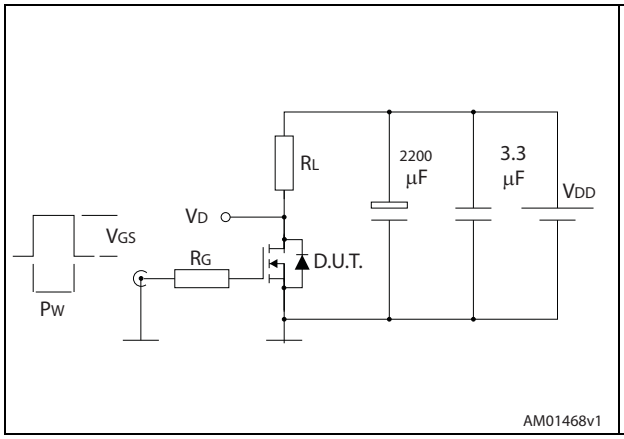


Figure 3. Gate charge test circuit

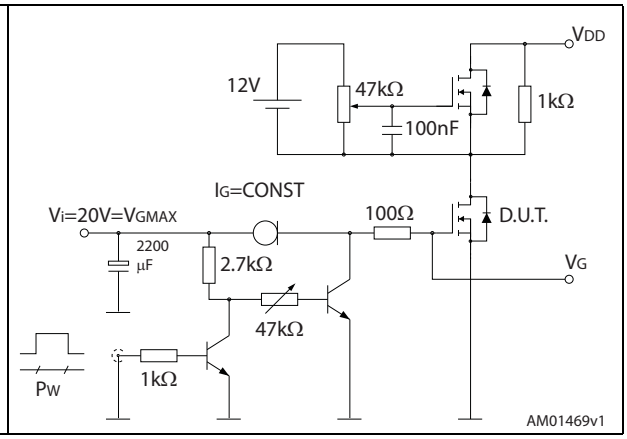


Figure 4. Test circuit for inductive load switching and diode recovery times

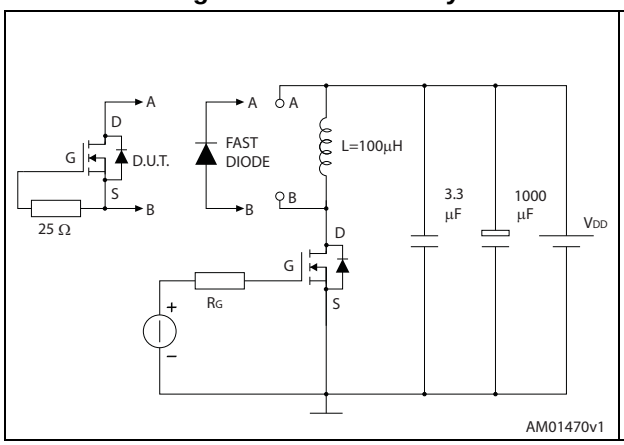


Figure 5. Unclamped inductive load test circuit

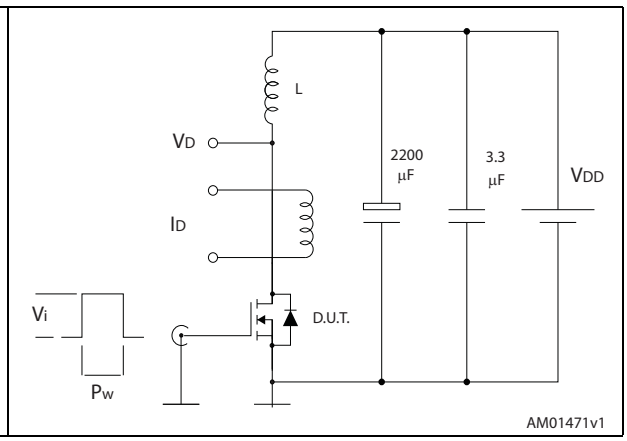


Figure 6. Unclamped inductive waveform

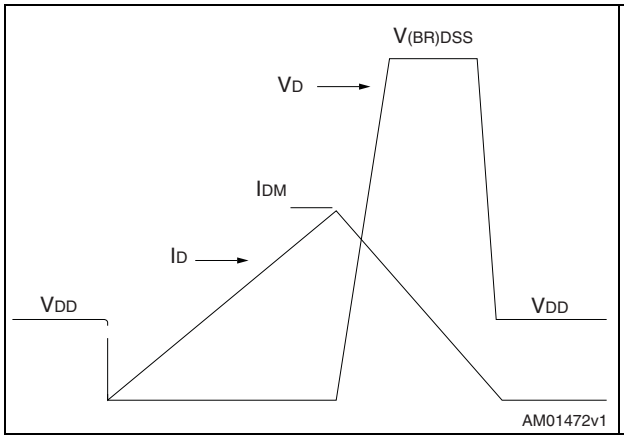
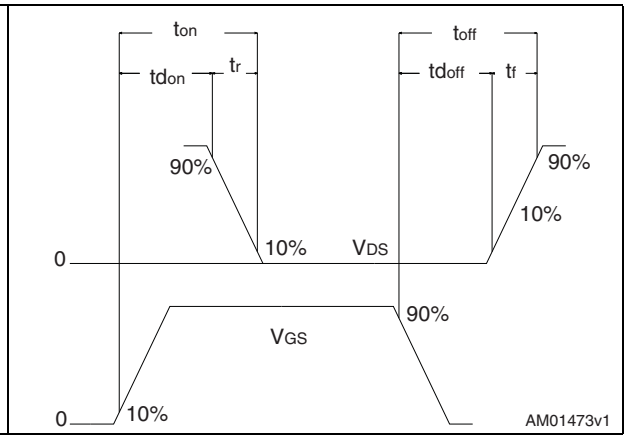


Figure 7. Switching time waveform



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*.
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Figure 8. H²PAK-2 drawing

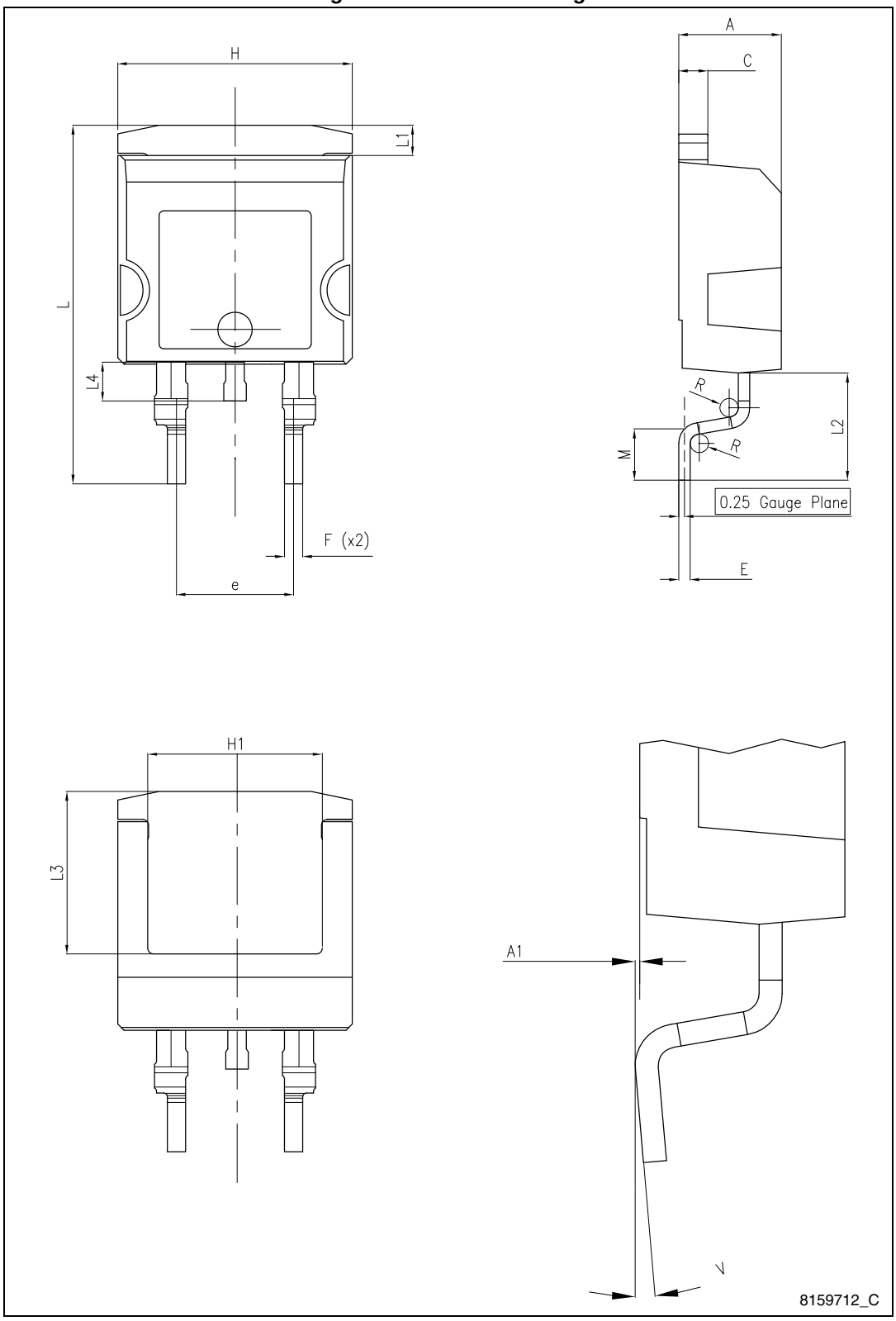
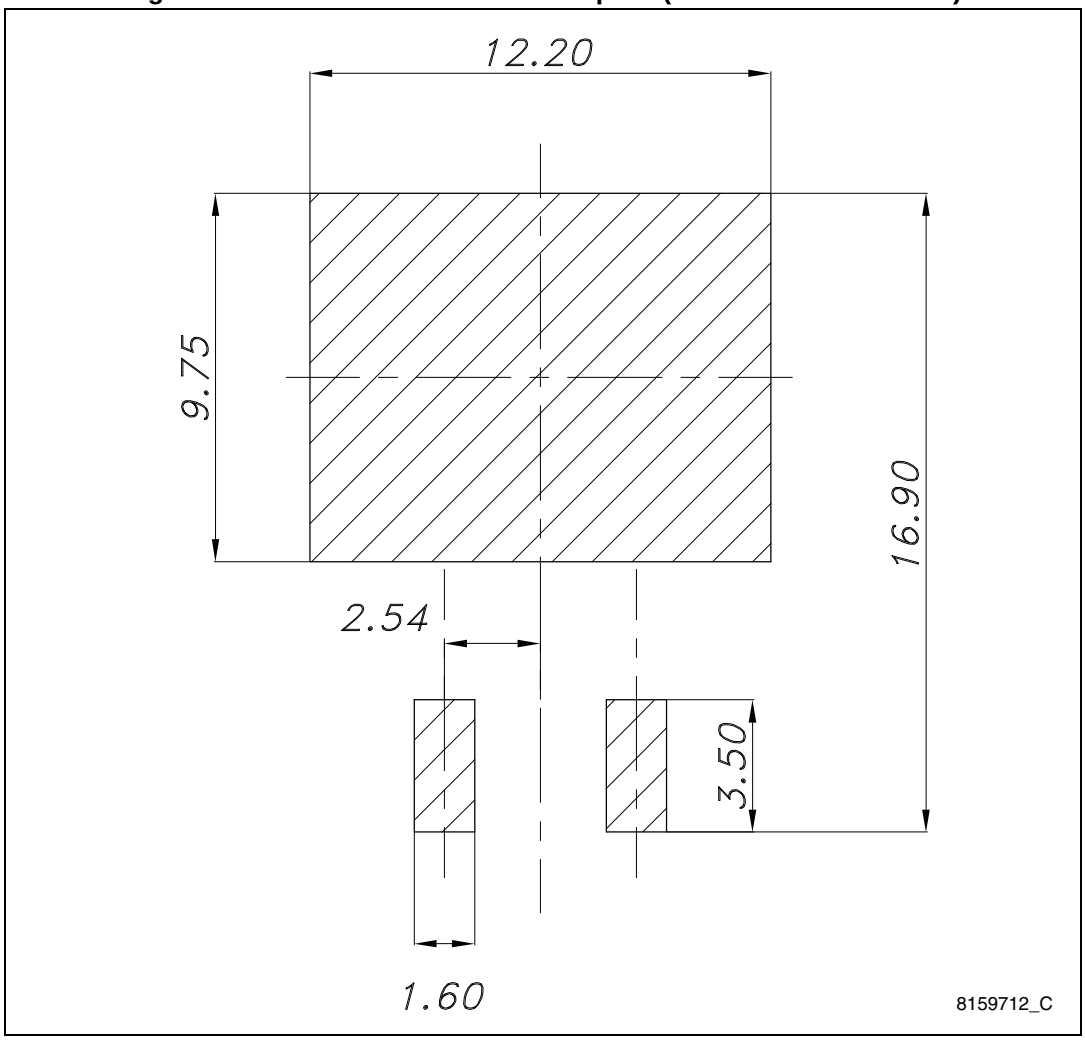


Table 8. H²PAK-2 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.30	-	4.80
A1	0.03		0.20
C	1.17		1.37
e	4.98		5.18
E	0.50		0.90
F	0.78		0.85
H	10.00		10.40
H1	7.40		7.80
L	15.30		15.80
L1	1.27		1.40
L2	4.93		5.23
L3	6.85		7.25
L4	1.5		1.7
M	2.6		2.9
R	0.20		0.60
V	0°		8°

Figure 9. H²PAK-2 recommended footprint (dimensions are in mm)



5 Packaging mechanical data

Figure 10. Tape dimension

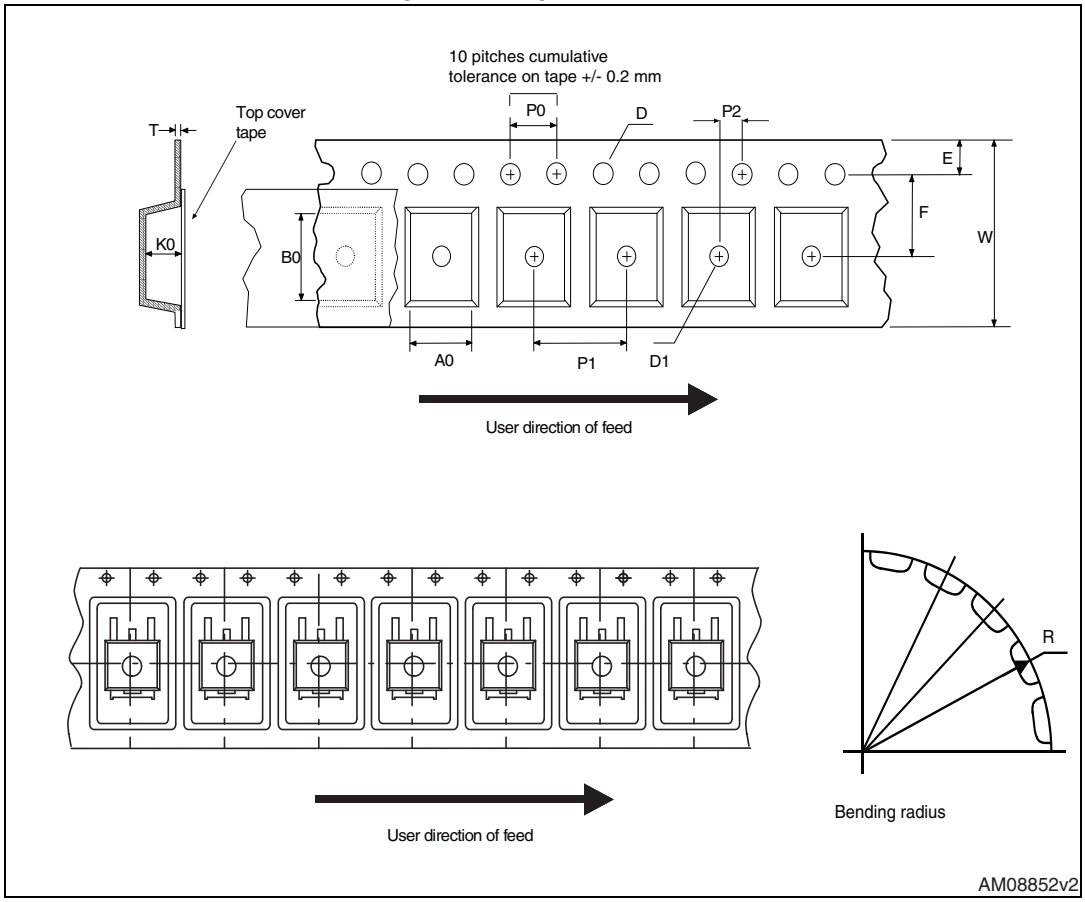
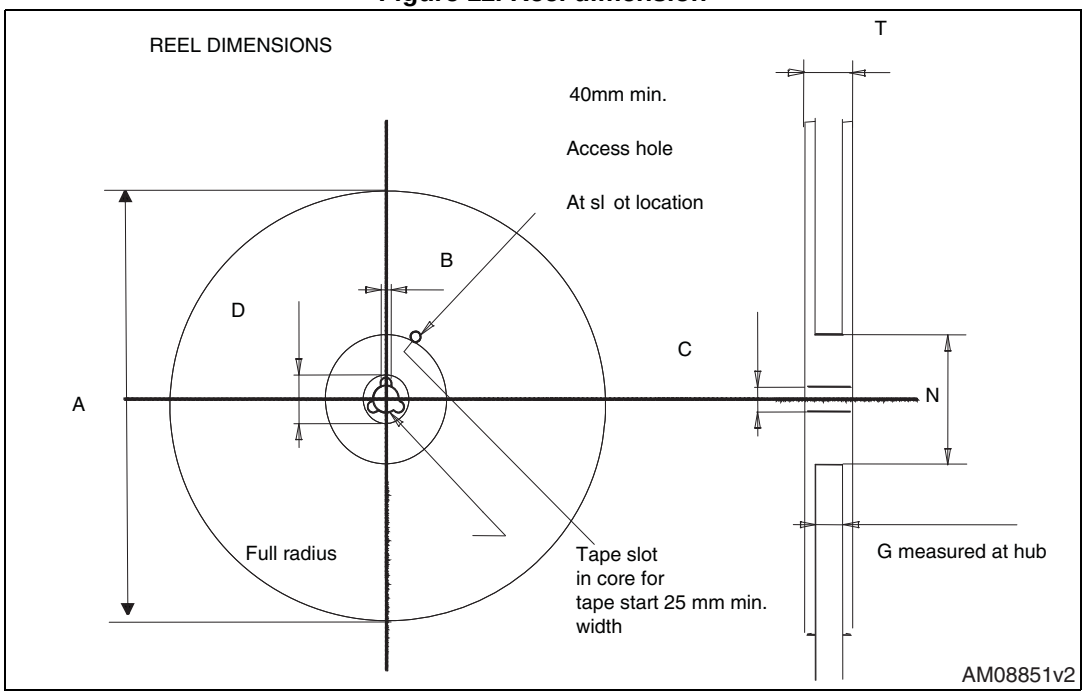


Table 9. H²PAK-2 tape and reel mechanical data

Tape			Reel		
Dim.	mm		Dim.	mm	
	Min.	Max.		Min.	Max.
A0	10.5	10.7	A		330
B0	15.7	15.9	B	1.5	
D	1.5	1.6	C	12.8	13.2
D1	1.59	1.61	D	20.2	
E	1.65	1.85	G	24.4	26.4
F	11.4	11.6	N	100	
K0	4.8	5.0	T		30.4
P0	3.9	4.1			
P1	11.9	12.1	Base qty		1000
P2	1.9	2.1	Bulk qty		1000
R	50				
T	0.25	0.35			
W	23.7	24.3			

Figure 11. Reel dimension



6 Revision history

Table 10. Document revision history

Date	Revision	Changes
05-Nov-2014	1	First release.