Contents

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	75	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current (continuous) at T_C = 25 °C	180	A
I_D	Drain current (continuous) at T_C = 100 °C	150	A
I_{DM} (1)	Drain current (pulsed)	720	A
P_{TOT}	Total dissipation at T_C = 25 °C	300	W
E_{AS} (2)	Single pulse avalanche energy	540	mJ
	Derating factor	2	W/°C
T_{stg}	Storage temperature	- 55 to 175	°C
T_j	Operating junction temperature		

1. Current limited by package.
2. Starting T_J= 25 °C, I_D= 60 A, V_{DD}= 50 V.

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case max	0.5	°C/W
$R_{thj\text{-}pcb}$ (1)	Thermal resistance junction-pcb max	35	°C/W

1. When mounted on FR-4 board of 1 inch², 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	75			V
I_{DSS}	Zero gate voltage drain current (V_{GS} = 0)	V_{DS} = 75 V V_{DS} = 75 V,T_C=125 °C			1 100	µA µA
I_{GSS}	Gate-body 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		4	V
$R_{DS(on)}$	Static drain-source on-resistance	V_{GS} = 10 V, I_D = 90 A		2.7	3.4	mΩ

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0	-	11800	-	pF
C_{oss}	Output capacitance			1060		pF
C_{rss}	Reverse transfer capacitance			394		pF
Q_g	Total gate charge	V_{DD} = 37.5 V, I_D = 120 A, V_{GS} = 10 V *(see Figure 14)*	-	171	-	nC
Q_{gs}	Gate-source charge			50		nC
Q_{gd}	Gate-drain charge			36		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 = 60 A R_G = 4.7 Ω V_{GS} = 10 V *(see Figure 13)*	-	34	-	ns
t_r	Rise time			70		ns
$t_{d(off)}$	Turn-off-delay time		-	154	-	ns
t_f	Fall time			71		ns

Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max	Unit
I_{SD}	Source-drain current		-		180	A
I_{SDM} (1)	Source-drain current (pulsed)		-		720	A
V_{SD} (2)	Forward on voltage	I_{SD} = 180 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, V_{DD} = 60 V di/dt = 100 A/µs, T_j = 150 °C *(see Figure 15)*	-	60 144 4.8		ns nC A

1. Current limited by package.
2. Pulsed: pulse duration = 300 µs, duty cycle 1.5%

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

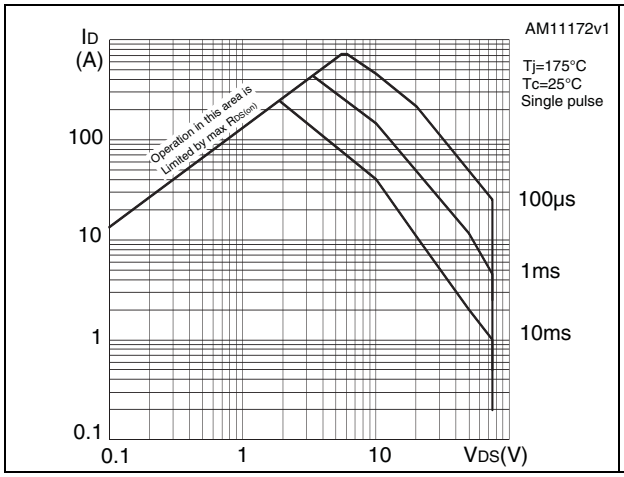


Figure 3. Thermal impedance

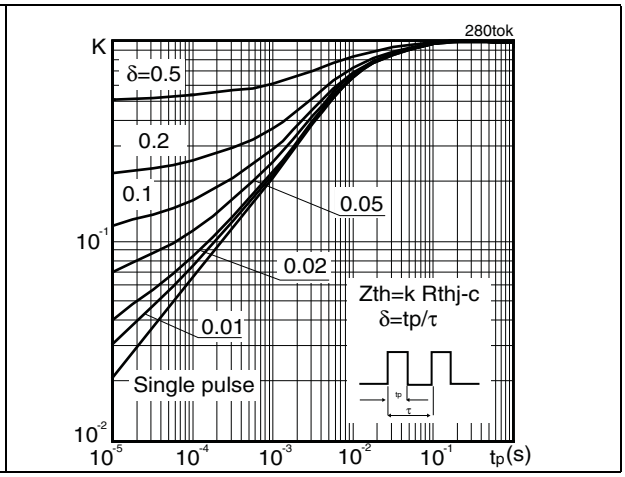


Figure 4. Output characteristics

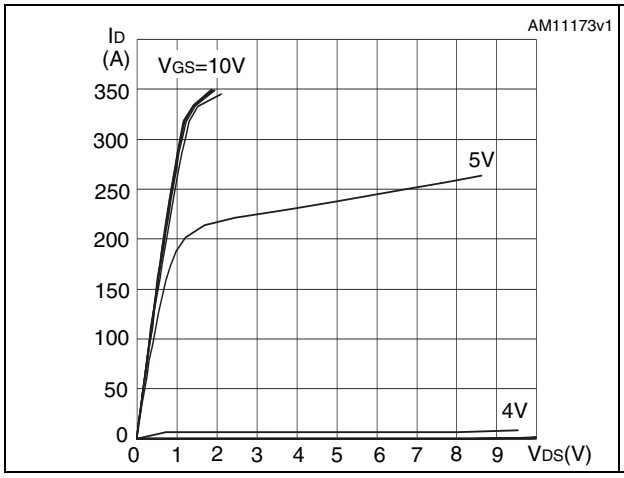


Figure 5. Transfer characteristics

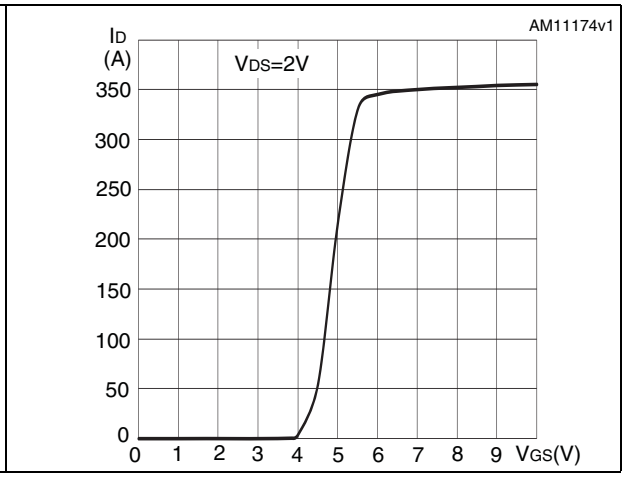


Figure 6. Normalized V_{DS} vs temperature

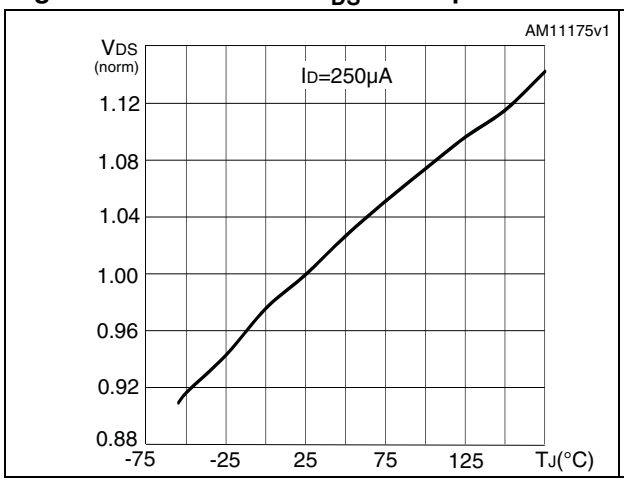


Figure 7. Static drain-source on-resistance

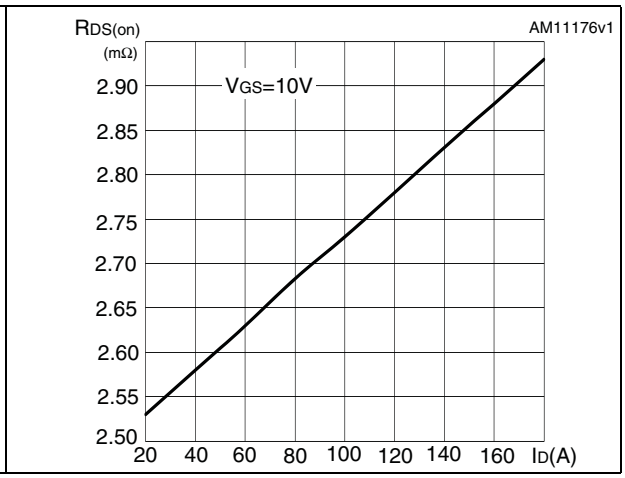


Figure 8. Gate charge vs gate-source voltage

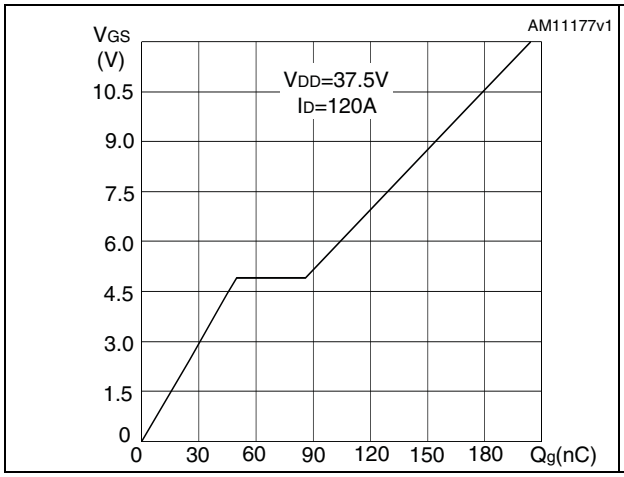


Figure 9. Capacitance variations

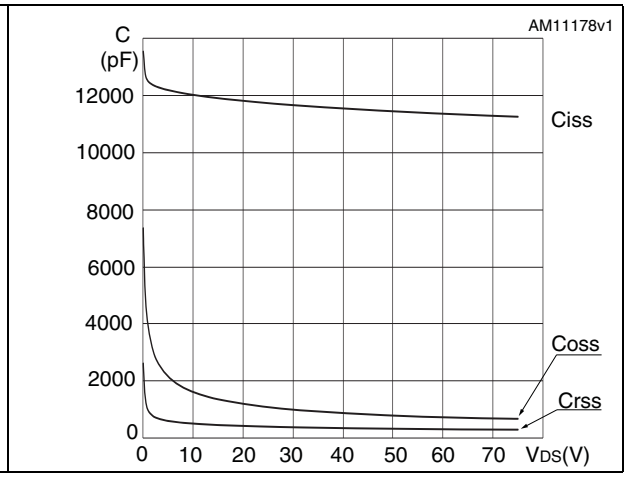


Figure 10. Normalized gate threshold voltage vs temperature

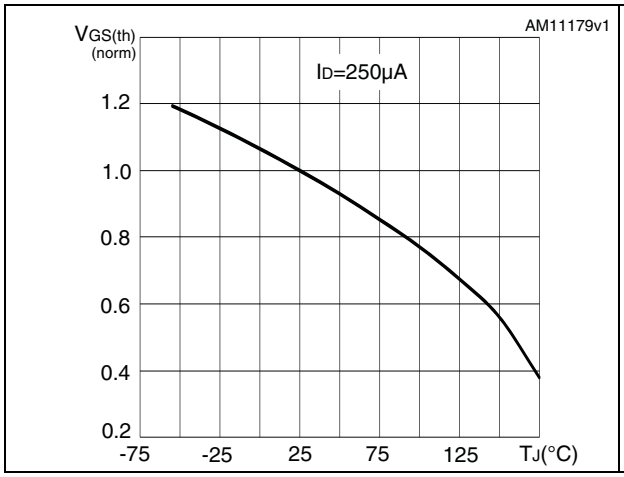


Figure 11. Normalized on-resistance vs temperature

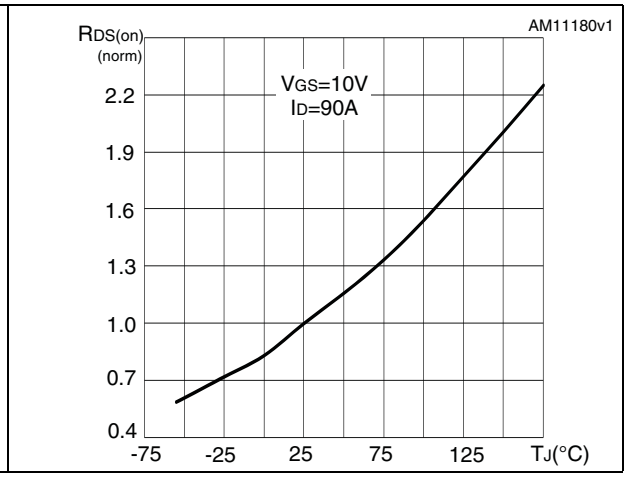
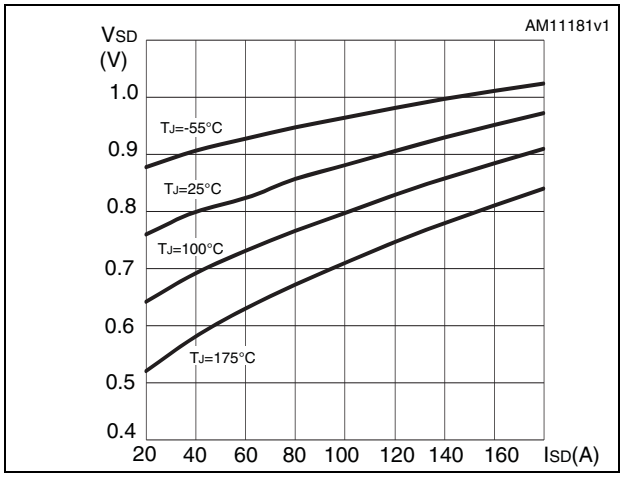


Figure 12. Source-drain diode forward characteristics



3 Test circuits

Figure 13. Switching times test circuit for resistive load

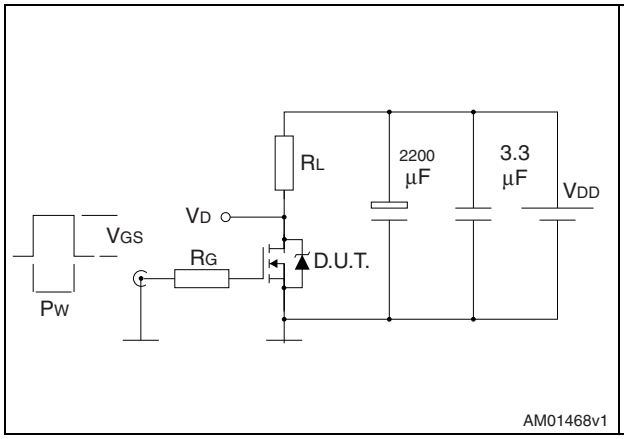


Figure 14. Gate charge test circuit

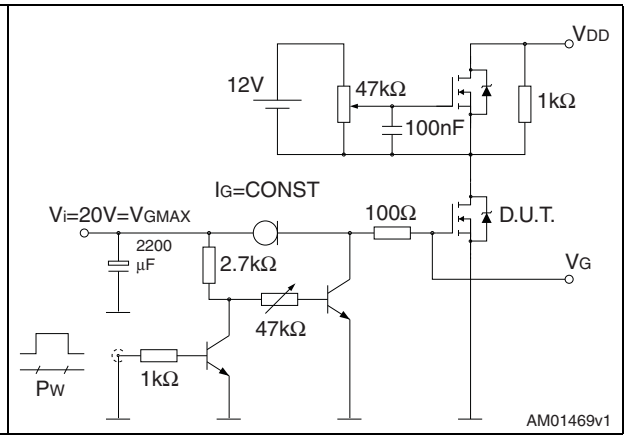


Figure 15. Test circuit for inductive load switching and diode recovery times

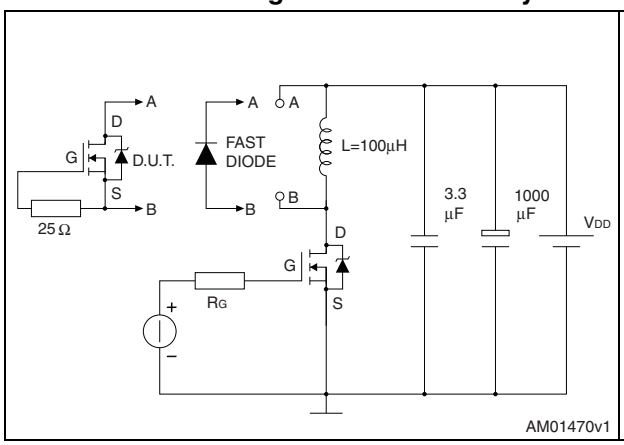


Figure 16. Unclamped inductive load test circuit

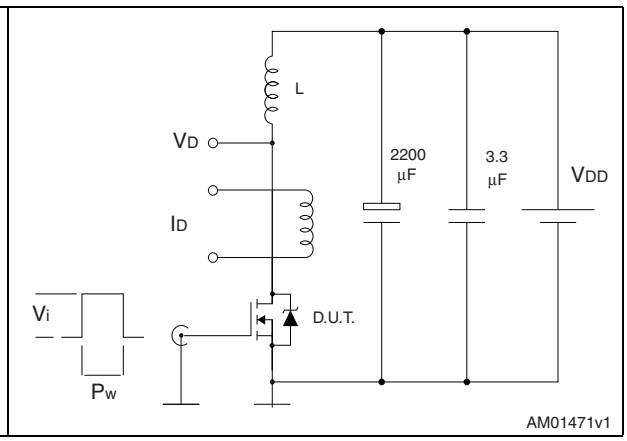


Figure 17. Unclamped inductive waveform

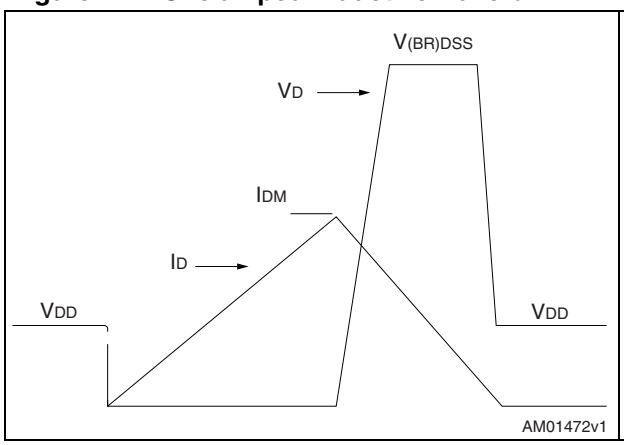
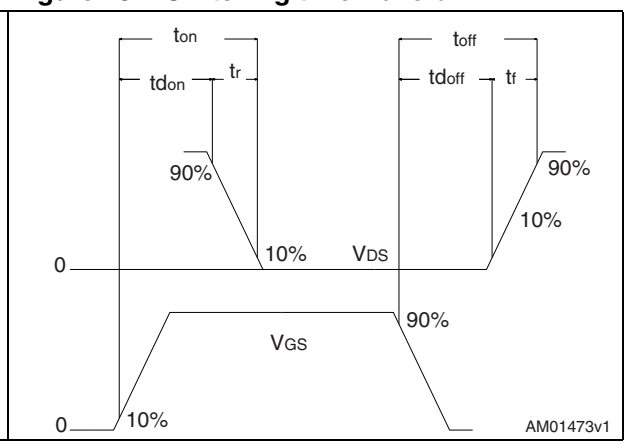


Figure 18. Switching time waveform



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.

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 19. H²PAK-2 drawing

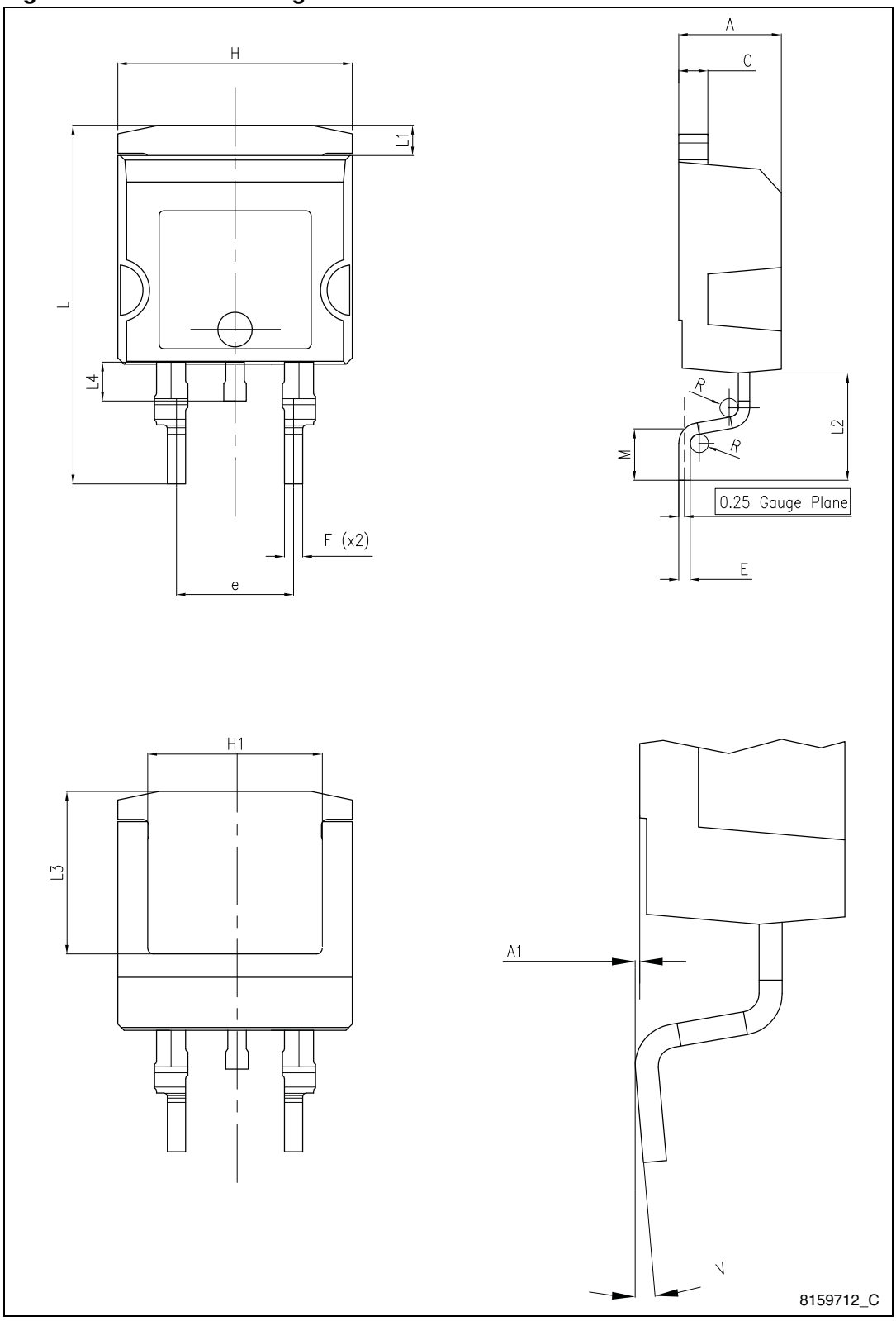
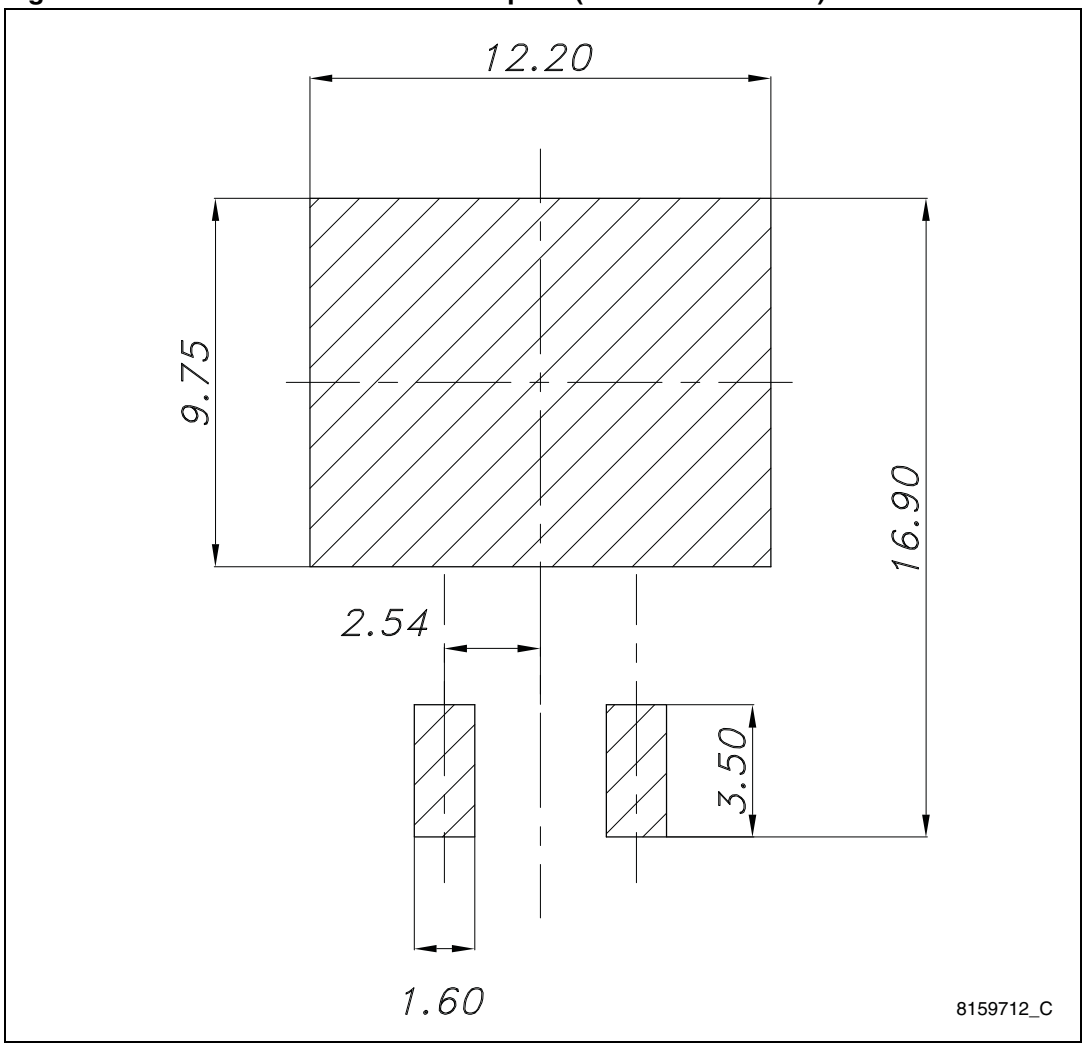


Figure 20. H²PAK-2 recommended footprint (dimensions in mm)



5 Packaging mechanical data

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 21. Tape

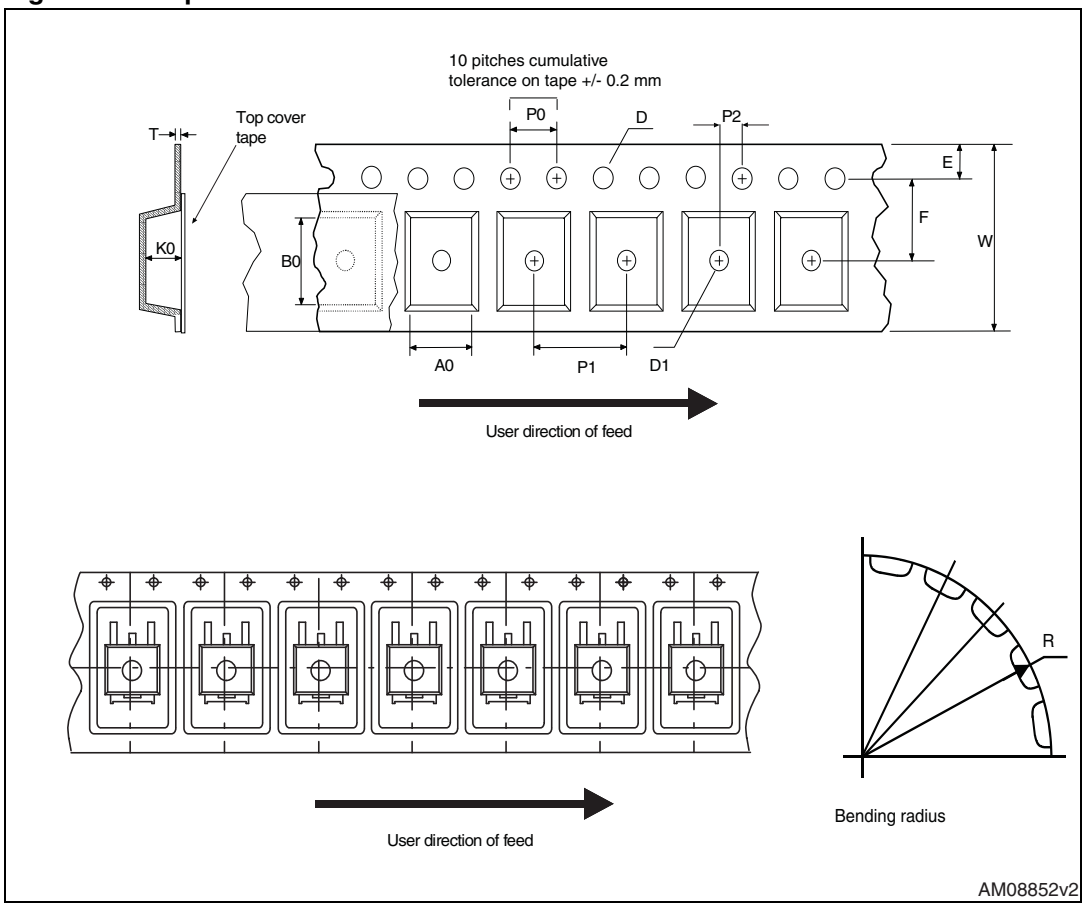
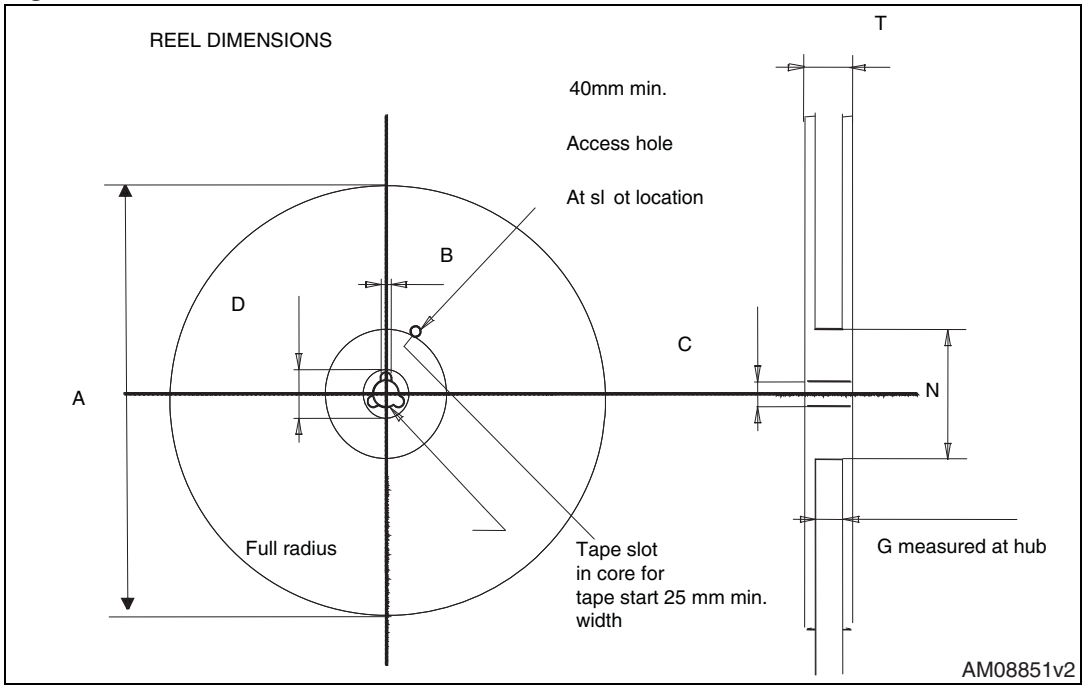


Figure 22. Reel



6 Revision history

Table 10. Document revision history

Date	Revision	Changes
23-May-2011	1	First release.
20-Jul-2012	2	Document status promoted from preliminary data to datasheet. Updated mechanical data. Inserted *Section 2.1: Electrical characteristics (curves)*. Inserted *Section 5: Packaging mechanical data*.

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