STD37P3H6AG

Automotive-grade P-channel -30 V, 11 mΩ typ., -49 A STripFET™ H6 Power MOSFET in a DPAK package

Datasheet - production data

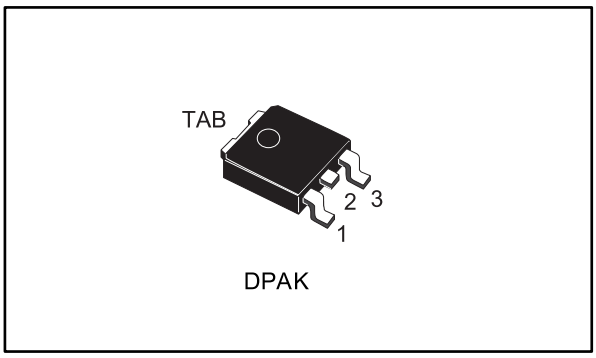
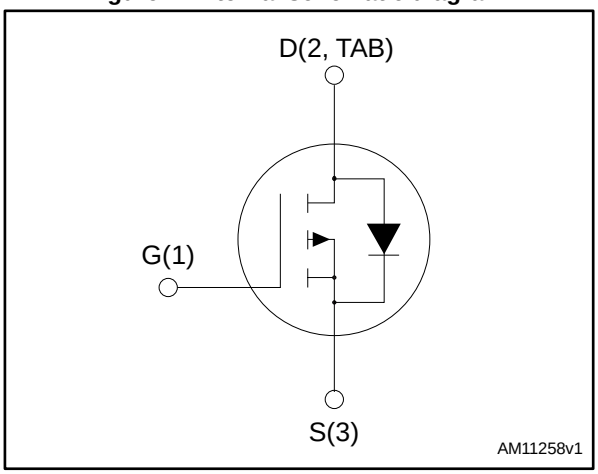


Figure 1: Internal schematic diagram



Features

Order code	V_{DS}	$R_{DS(on)}$ max.	I_D	P_{TOT}
STD37P3H6AG	-30 V	15 mΩ	-49 A	60 W

- Designed for automotive applications and AEC-Q101 qualified
- Very low on-resistance
- Very low gate charge
- High avalanche ruggedness
- Low gate drive power loss

Applications

- Switching applications

Description

This device is a P-channel Power MOSFET developed using the STripFET™ H6 technology with a new trench gate structure. The resulting Power MOSFET exhibits very low $R_{DS(on)}$ in all packages.

Table 1: Device summary

Order code	Marking	Package	Packing
STD37P3H6AG	37P3H6	DPAK	Tape and Reel

Contents

1 Electrical ratings

Table 2: Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	-30	V
V_{GS}	Gate-source voltage	±20	V
I_D	Drain current (continuous) at T_{CASE} = 25 °C	-49	A
	Drain current (continuous) at T_{CASE} = 100 °C	-34.5	
I_{DM} (1)	Drain current (pulsed)	-196	A
P_{TOT}	Total dissipation at $T_{\${casePCB}}$ = 25 °C	60	W
E_{AS} (2)	Single pulse avalanche energy	750	mJ
T_{stg}	Storage temperature	-55 to 175	°C
T_j	Operating junction temperature		

Notes:

(1) Pulse width is limited by safe operating area.

(2) starting T_j = 25 °C, I_D = -40 A, V_{DD} = 25 V.

Table 3: Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case	2.5	°C/W
$R_{thj\text{-}pcb}$ (1)	Thermal resistance junction-pcb	50	

Notes:

(1) When mounted on a 1-inch² FR-4, 2 Oz copper board, t < 10 s.

2 Electrical characteristics

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

Table 4: Static

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	V_{GS} = 0 V, I_D = -250 mA	-30			V
I_{DSS}	Zero gate voltage drain current	V_{GS} = 0 V, V_{DS} = -30 V			-1	µA
		V_{GS} = 0 V, V_{DS} = -30 V, T_{CASE} = 125 °C			-10	
I_{GSS}	Gate-body leakage current	V_{DS} = 0 V, 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 = -25 A		11	15	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 V	-	1630	-	pF
C_{oss}	Output capacitance		-	376	-	
C_{rss}	Reverse transfer capacitance		-	230	-	
Q_g	Total gate charge	V_{DD} = -15 V, I_D = -40 A, V_{GS} = -10 V (see *Figure 14: "Gate charge test circuit"*)	-	30.6	-	nC
Q_{gs}	Gate-source charge		-	9.7	-	
Q_{gd}	Gate-drain charge		-	10	-	

Table 6: Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	V_{DD} = -15 V, I_D = -20 A R_G = 4.7 Ω, V_{GS} = -10 V (see *Figure 13: "Switching times test circuit for resistive load"*)	-	13.4	-	ns
t_r	Rise time		-	15.8	-	
$t_{d(off)}$	Turn-off delay time		-	23.6	-	
t_f	Fall time		-	9.4	-	

Table 7: Source-drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain current		-		-49	A
I_{SDM} (1)	Source-drain current (pulsed)		-		-196	A
V_{SD} (2)	Forward on voltage	V_{GS} = 0 V, I_{SD} = -40 A	-		-1.3	V
t_{rr}	Reverse recovery time	I_{SD} = -40 A, di/dt = 100 A/µs, V_{DD} = -24 V (see *Figure 15: "Test circuit for inductive load switching and diode recovery times"*)	-	25.3		ns
Q_{rr}	Reverse recovery charge		-	19.2		nC
I_{RRM}	Reverse recovery current		-	-1.5		A

Notes:

(1) Pulse width is limited by safe operating area.

(2) Pulse test: pulse duration = 300 µs, duty cycle 1.5%.

2.1 Electrical characteristics (curves)

For the P-channel Power MOSFET, current and voltage polarities are reversed

Figure 2: Safe operating area

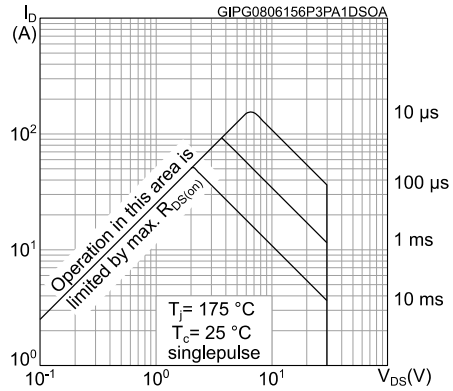


Figure 3: Thermal impedance

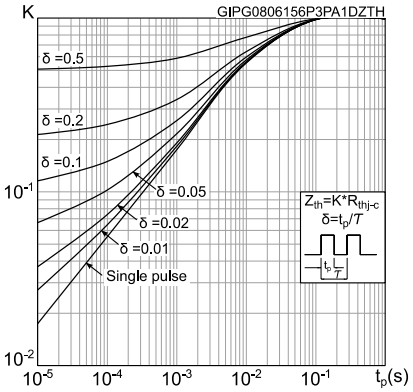


Figure 4: Output characteristics

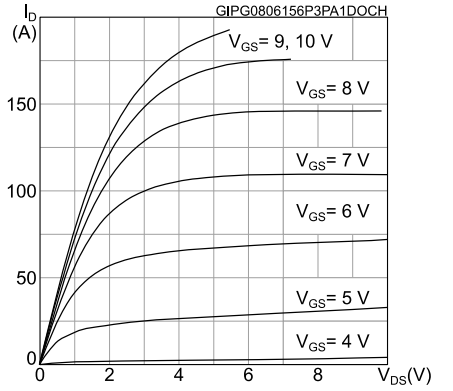


Figure 5: Transfer characteristics

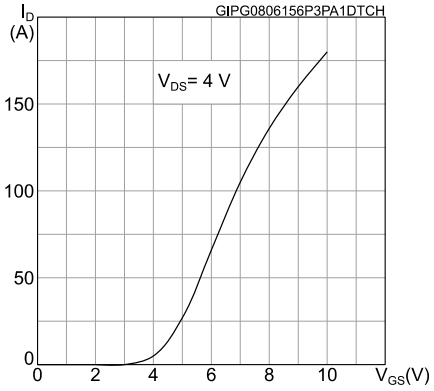


Figure 6: Gate charge vs gate-source voltage

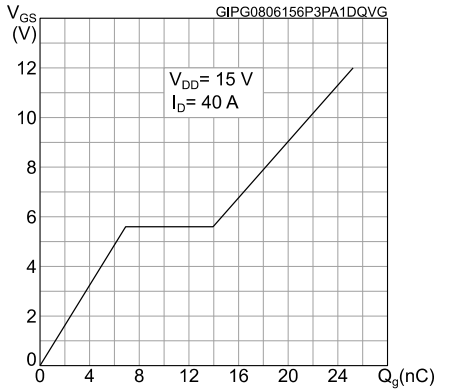


Figure 7: Static drain-source on-resistance

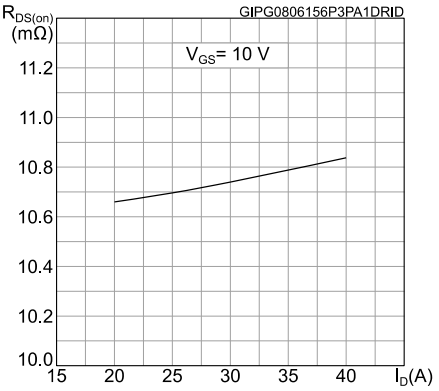


Figure 8: Capacitance variations

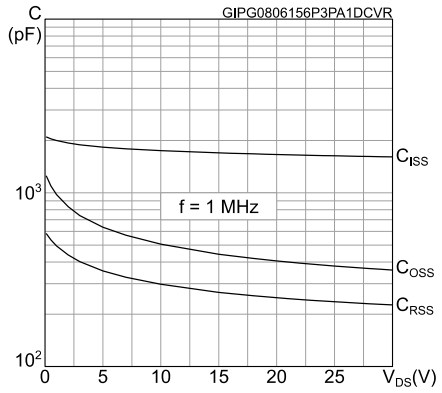


Figure 9: Normalized gate threshold voltage vs temperature

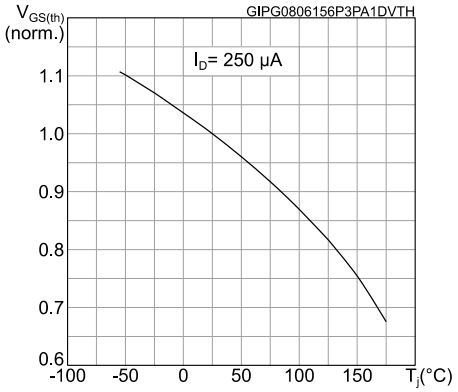


Figure 10: Normalized on-resistance vs temperature

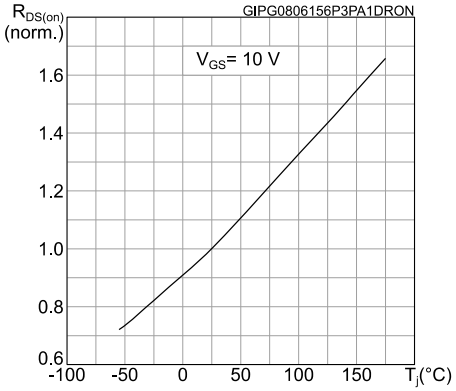


Figure 11: Normalized V(BR)DSS vs temperature

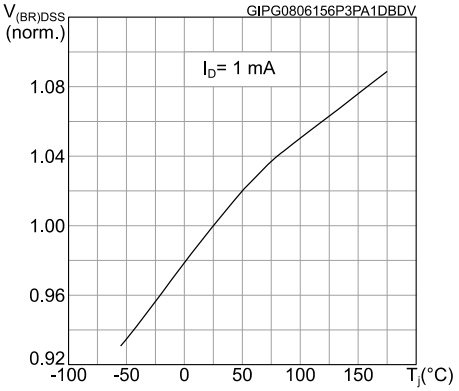
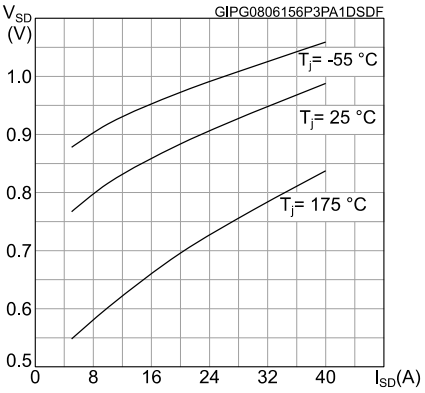


Figure 12: Source-drain diode forward characteristics



For the P-channel Power MOSFET, current and voltage polarities are reversed

3 Test circuits

Figure 13: Switching times test circuit for resistive load

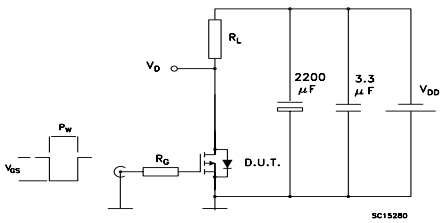


Figure 14: Gate charge test circuit

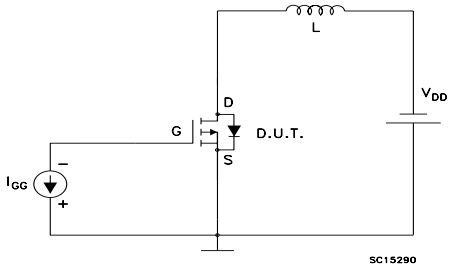
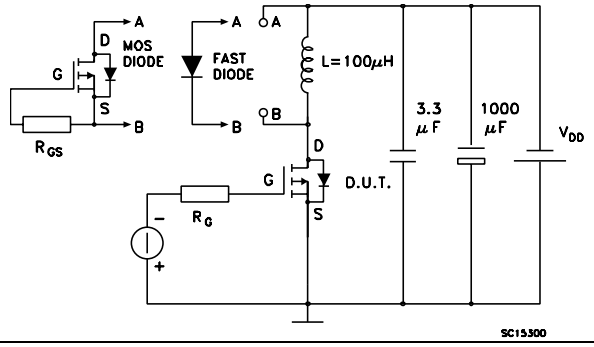


Figure 15: Test circuit for inductive load switching and diode recovery times



4 Package information

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.

4.1 DPAK (TO-252) type A2 package information

Figure 16: DPAK (TO-252) type A2 package outline

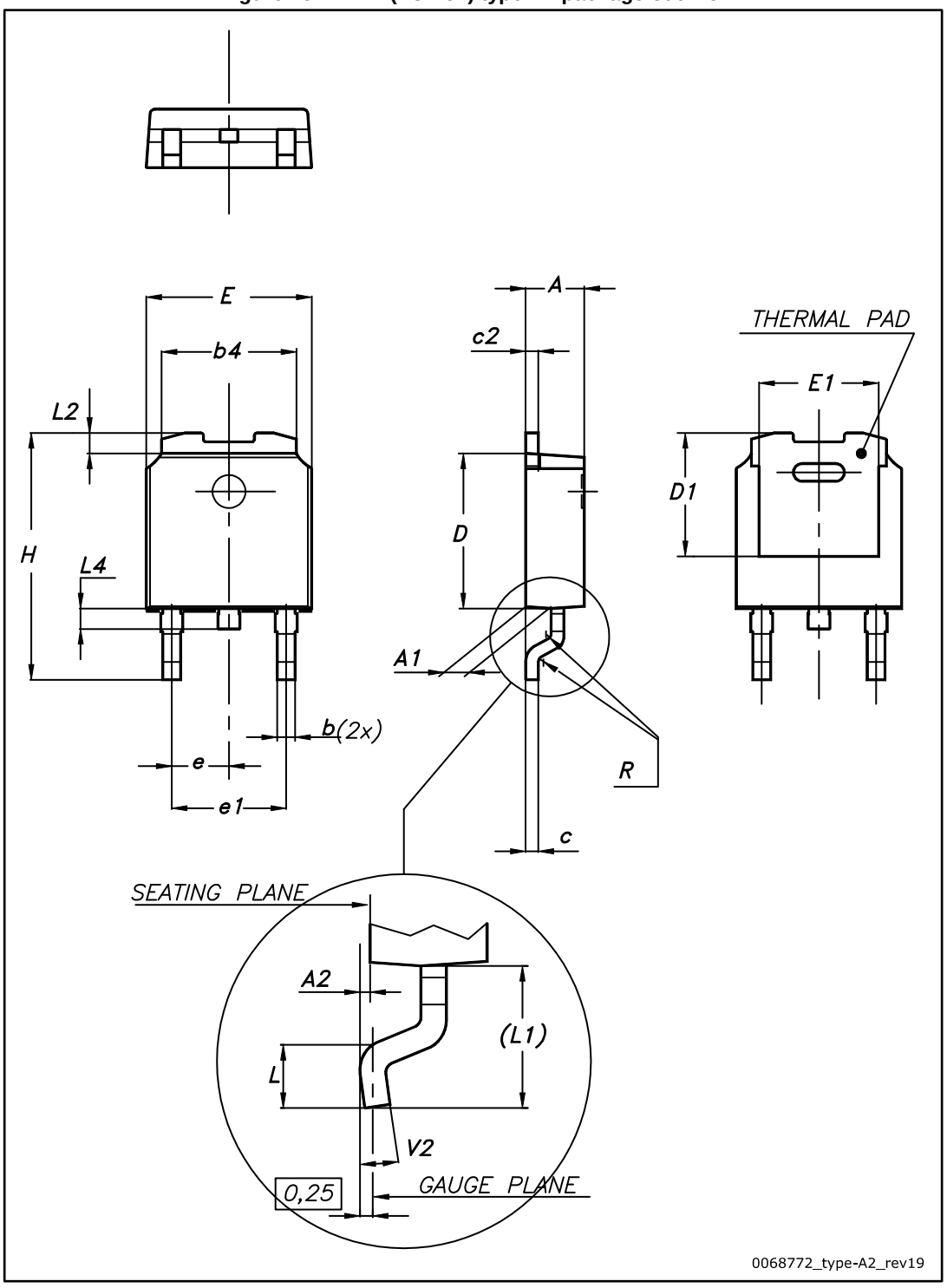
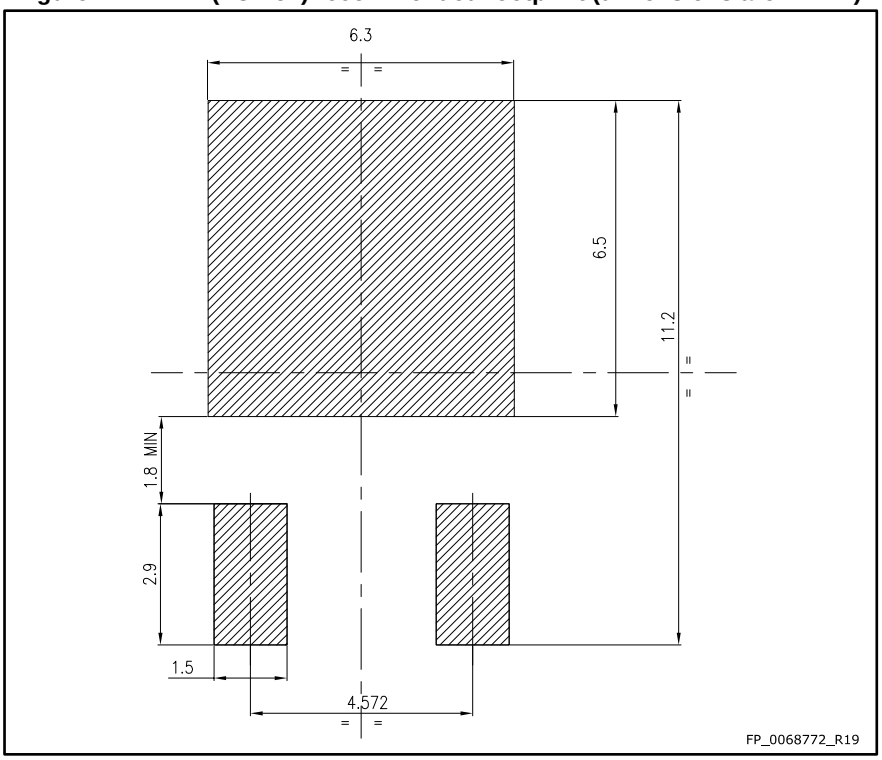


Table 8: DPAK (TO-252) type A2 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
c	0.45		0.60
c2	0.48		0.60
D	6.00		6.20
D1	4.95	5.10	5.25
E	6.40		6.60
E1	5.10	5.20	5.30
e	2.16	2.28	2.40
e1	4.40		4.60
H	9.35		10.10
L	1.00		1.50
L1	2.60	2.80	3.00
L2	0.65	0.80	0.95
L4	0.60		1.00
R		0.20	
V2	0°		8°

Figure 17: DPAK (TO-252) recommended footprint (dimensions are in mm)



4.2 DPAK (TO-252) packing information

Figure 18: DPAK (TO-252) tape outline

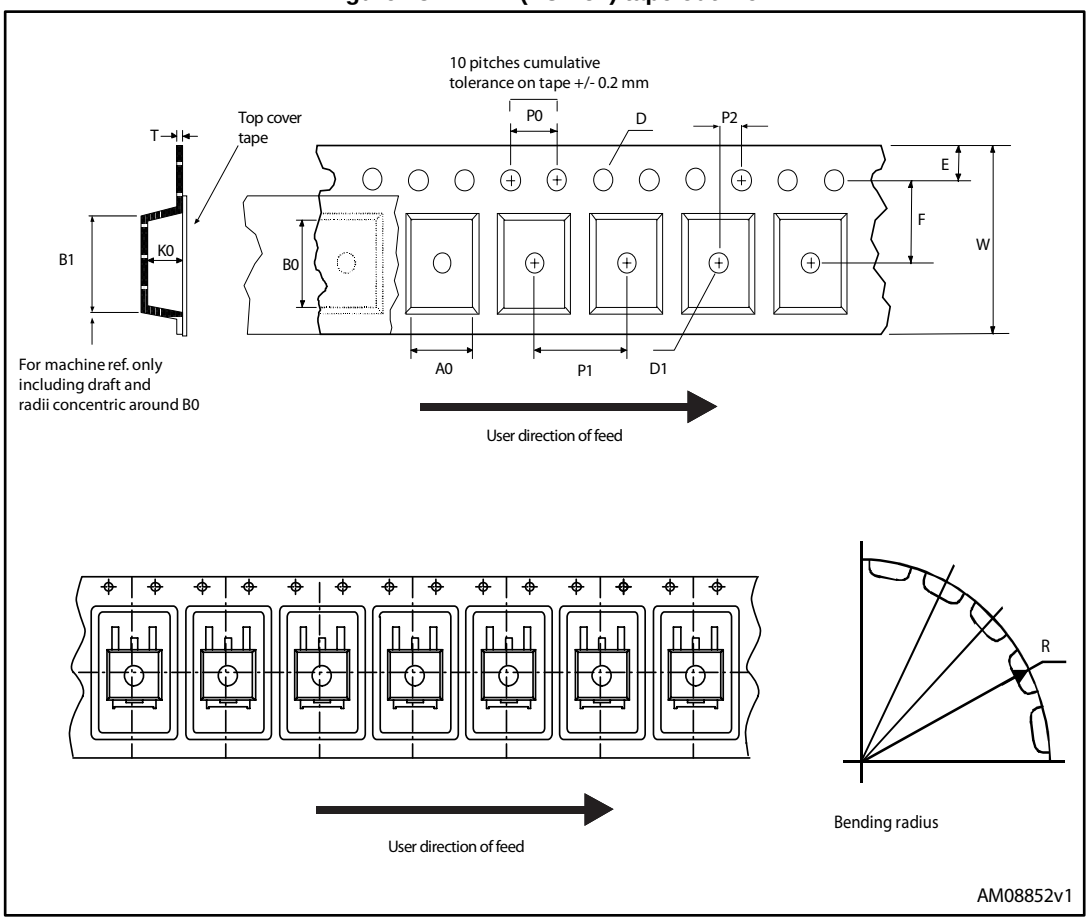


Figure 19: DPAK (TO-252) reel outline

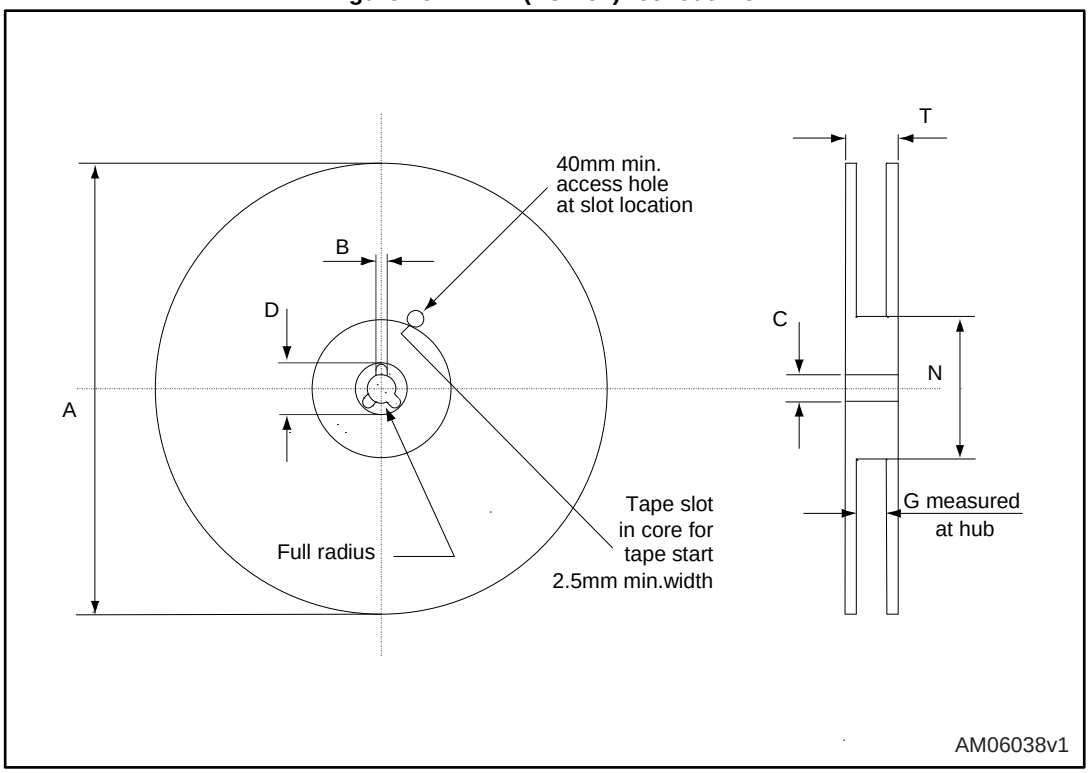


Table 9: DPAK (TO-252) tape and reel mechanical data

Tape			Reel		
Dim.	mm		Dim.	mm	
	Min.	Max.		Min.	Max.
A0	6.8	7	A		330
B0	10.4	10.6	B	1.5	
B1		12.1	C	12.8	13.2
D	1.5	1.6	D	20.2	
D1	1.5		G	16.4	18.4
E	1.65	1.85	N	50	
F	7.4	7.6	T		22.4
K0	2.55	2.75			
P0	3.9	4.1	Base qty.		2500
P1	7.9	8.1	Bulk qty.		2500
P2	1.9	2.1			
R	40				
T	0.25	0.35			
W	15.7	16.3			

5 Revision history

Table 10: Document revision history

Date	Revision	Changes
05-Aug-2015	1	Initial release

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for MOSFET ***category:***

Click to view products by STMicroelectronics ***manufacturer:***

Other Similar products are found below :

614233C 648584F IRFD120 JANTX2N5237 FCA20N60_F109 FDZ595PZ 2SK2545(Q,T) 405094E 423220D TPCC8103,L1Q(CM MIC4420CM-TR VN1206L SBVS138LT1G 614234A 715780A NTNS3166NZT5G SSM6J414TU,LF(T 751625C BUK954R8-60E NTE6400 SQJ402EP-T1-GE3 2SK2614(TE16L1,Q) 2N7002KW-FAI DMN1017UCP3-7 EFC2J004NUZTDG ECH8691-TL-W FCAB21350L1 P85W28HP2F-7071 DMN1053UCP4-7 NTE221 NTE2384 NTE2903 NTE2941 NTE2945 NTE2946 NTE2960 NTE2967 NTE2969 NTE2976 NTE455 NTE6400A NTE2910 NTE2916 NTE2956 NTE2911 DMN2080UCB4-7 TK10A80W,S4X(S SSM6P69NU,LF DMP22D4UFO-7B DMN1006UCA6-7