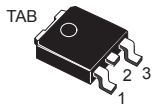
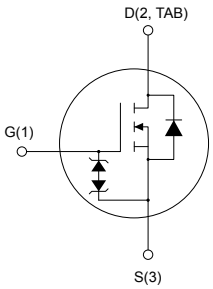
STD3N95K5AG

Datasheet

Automotive-grade N-channel 950 V, 4.3 Ω typ., 2 A MDmesh K5 Power MOSFET in a DPAK package



DPAK



AM01476v1_tab

Features

Order code	V_{DS}	$R_{DS(on)}$max.	I_D	P_{TOT}
STD3N95K5AG	950 V	5.0 Ω	2 A	45 W

- AEC-Q101 qualified
- Very low FoM (figure of merit)
- Ultra-low gate charge
- 100% avalanche tested
- Zener-protected

Applications

- Switching applications

Description

This very high voltage N-channel Power MOSFET is designed using MDmesh K5 technology based on an innovative proprietary vertical structure. The result is a dramatic reduction in on-resistance and ultra-low gate charge for applications requiring superior power density and high efficiency.

Product status link
STD3N95K5AG

Product summary[1]	
Order code	STD3N95K5AG
Marking	3N95K5
Package	DPAK
Packing	Tape and reel

1. *The HTRB test was performed at 80% $V_{(BR)DSS}$ in compliance with AEC-Q101 rev. C. All the other tests were performed according to rev. D.*

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{GS}	Gate-source voltage	±30	V
I_D	Drain current (continuous) at T_C = 25 °C	2	A
I_D	Drain current (continuous) at T_C = 100 °C	1.3	A
I_{DM} (1)	Drain current pulsed	3	A
P_{TOT}	Total power dissipation at T_C = 25 °C	45	W
dv/dt (2)	Peak diode recovery voltage slope	4.5	V/ns
dv/dt (3)	MOSFET dv/dt ruggedness	50	V/ns
T_J	Operating junction temperature range	-55 to 150	°C
T_{stg}	Storage temperature range		

1. *Pulse width limited by safe operating area.*
2. *I_{SD} ≤ 2 A, di/dt ≤ 100 A/µs, V_{DS} (peak) ≤ $V_{(BR)DSS}$*
3. *V_{DD} ≤ 760 V*

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance, junction-to-case	2.78	°C/W
R_{thJA} (1)	Thermal resistance, junction-to-ambient	50	°C/W

1. *When mounted on a standard 1 inch² area of FR-4 PCB with 2-oz copper.*

Table 3. Avalanche characteristics

Symbol	Parameter	Value	Unit
I_{AR}	Avalanche current, repetitive or not repetitive (pulse width limited by T_J max.)	1	A
E_{AS}	Single pulse avalanche energy (starting T_J = 25 °C, I_D = I_{AR}, V_{DD} = 50 V)	50	mJ

2 Electrical characteristics

T_C = 25 °C unless otherwise specified

Table 4. On/off-state

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	V_{GS} = 0 V, I_D = 1 mA	950			V
I_{DSS}	Zero gate voltage drain current	V_{DS} = 950 V, V_{GS} = 0 V			1	µA
		V_{DS} = 950 V, V_{GS} = 0 V T_C = 125 °C (1)			50	µA
I_{GSS}	Gate-body leakage current	V_{GS} = ±20 V, V_{DS} = 0 V			±10	µA
$V_{GS(th)}$	Gate threshold voltage	V_{DS} = V_{GS}, I_D = 100 µA	3	4	5	V
$R_{DS(on)}$	Static drain-source on-resistance	V_{GS} = 10 V, I_D = 1 A		4.3	5.0	Ω

1. *Specified by design, not tested in production.*

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	V_{DS} = 100 V, f = 1 MHz, V_{GS} = 0 V	-	105	-	pF
C_{oss}	Output capacitance		-	9	-	pF
C_{rss}	Reverse transfer capacitance		-	0.8	-	pF
$C_{o(tr)}$ (1)	Equivalent capacitance time related	V_{GS} = 0 V, V_{DS} = 0 to 760 V	-	16	-	pF
$C_{o(er)}$ (2)	Equivalent capacitance energy related			6	-	pF
R_g	Intrinsic gate resistance	f = 1 MHz open drain	-	16	-	Ω
Q_g	Total gate charge	V_{DD} = 760 V, I_D = 2 A V_{GS}= 0 to 10 V (see Figure 14. Test circuit for gate charge behavior)	-	3.4	-	nC
Q_{gs}	Gate-source charge		-	0.9	-	nC
Q_{gd}	Gate-drain charge		-	2.2	-	nC

1. *Time related is defined as a constant equivalent capacitance giving the same charging time as C_{oss} when V_{DS} increases from 0 to 80% V_{DSS}*
2. *Energy related is defined as a constant equivalent capacitance giving the same stored energy as C_{oss} when V_{DS} increases from 0 to 80% V_{DSS}*

Table 6. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	V_{DD}= 475 V, I_D = 1 A, R_G = 4.7 Ω	-	8.5	-	ns
t_r	Rise time	V_{GS} = 10 V	-	13.5	-	ns
$t_{d(off)}$	Turn-off delay time	(see Figure 13. Test circuit for resistive load switching times and Figure 18. Switching time waveform)	-	20.5	-	ns
t_f	Fall time		-	32.5	-	ns

Table 7. Source-drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain current		-		2	A
I_{SDM} (1)	Source-drain current (pulsed)		-		3	A
V_{SD} (2)	Forward on voltage	I_{SD} = 2 A, V_{GS} = 0 V	-		1.5	V
t_{rr}	Reverse recovery time	I_{SD} = 2 A, di/dt = 100 A/µs, V_{DD} = 60 V (see Figure 15. Test circuit for inductive load switching and diode recovery times)	-	300		ns
Q_{rr}	Reverse recovery charge		-	1.15		µC
I_{RRM}	Reverse recovery current		-	7.6		A
t_{rr}	Reverse recovery time	I_{SD} = 2 A, di/dt = 100 A/µs, V_{DD} = 60 V, T_J = 150 °C (see Figure 15. Test circuit for inductive load switching and diode recovery times)	-	525		ns
Q_{rr}	Reverse recovery charge		-	1.90		µC
I_{RRM}	Reverse recovery current		-	7.2		A

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

2.1 Electrical characteristics curves

Figure 1. Safe operating area

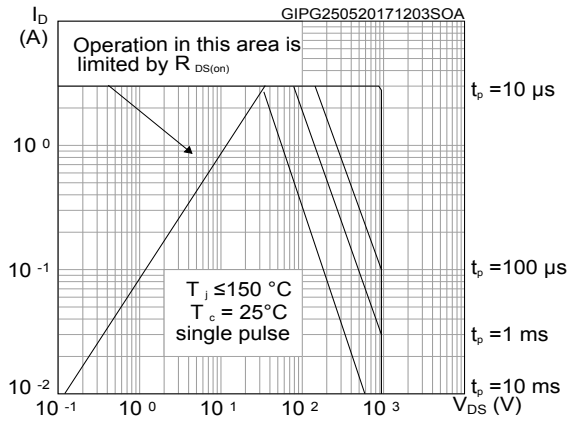


Figure 2. Thermal impedance

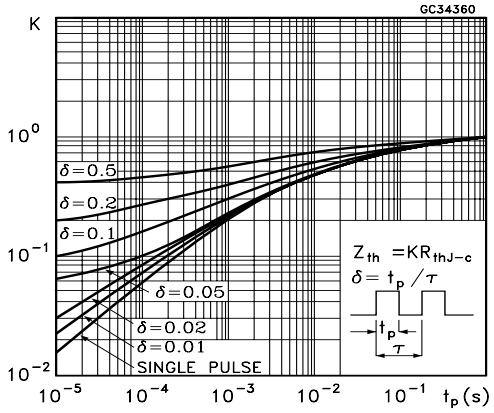


Figure 3. Output characteristics

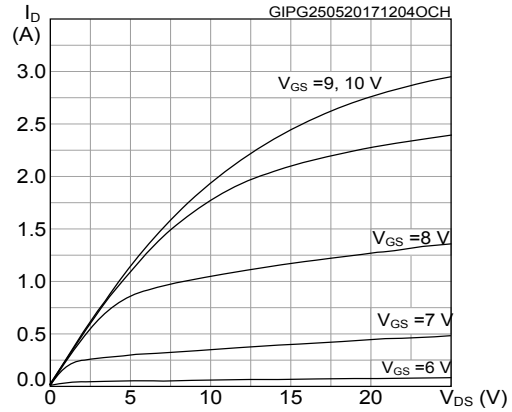


Figure 4. Transfer characteristics

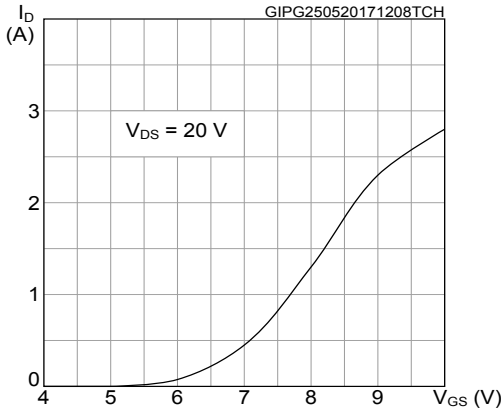


Figure 5. Gate charge vs gate-source voltage

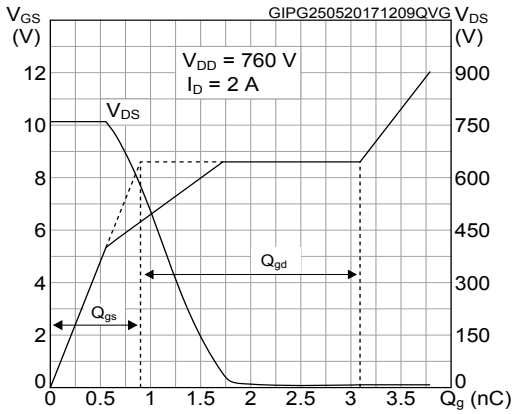


Figure 6. Static drain-source on-resistance

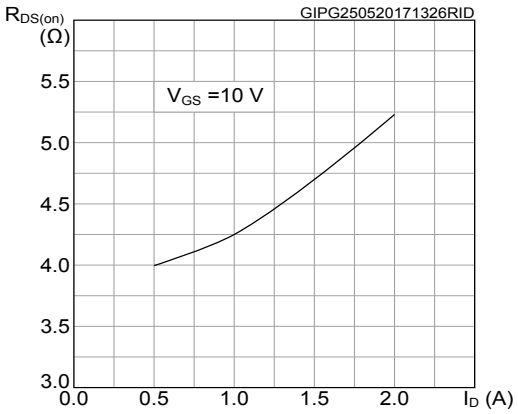


Figure 7. Capacitance variations

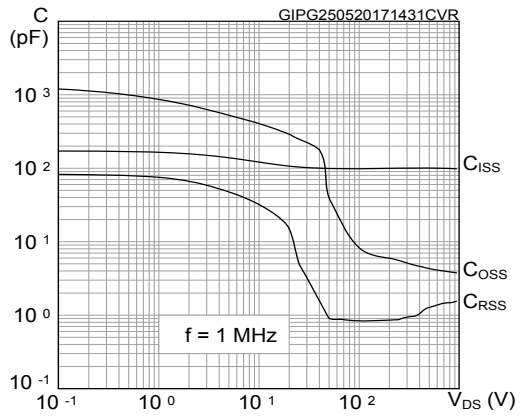


Figure 8. Output capacitance stored energy

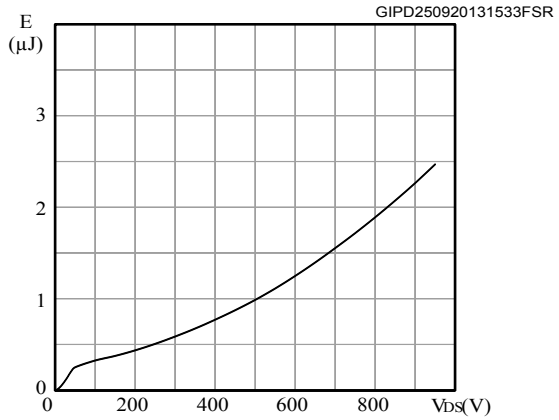


Figure 9. Normalized gate threshold voltage vs temperature

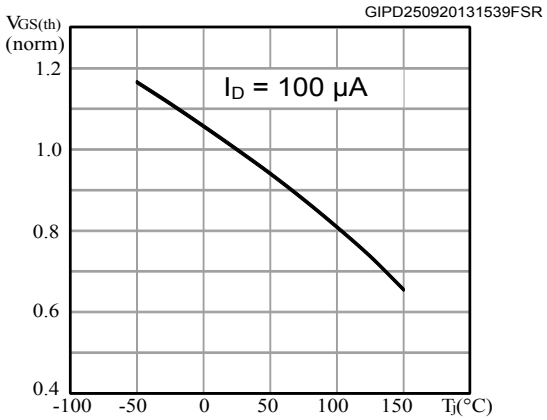


Figure 10. Normalized $V_{(BR)DSS}$ vs temperature

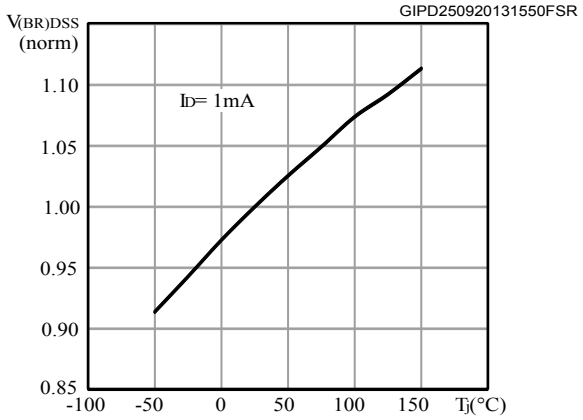


Figure 11. Normalized on-resistance vs temperature

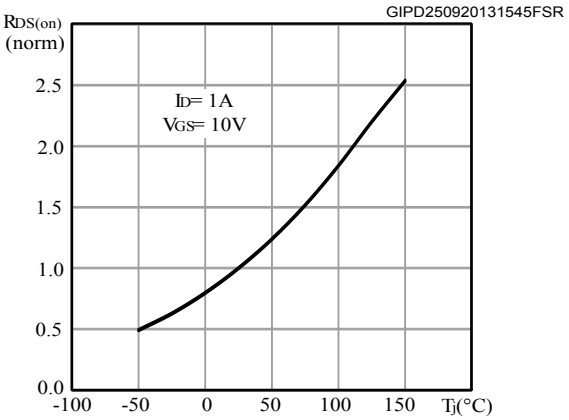
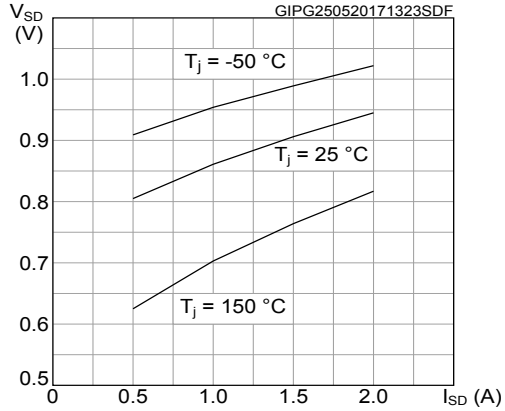
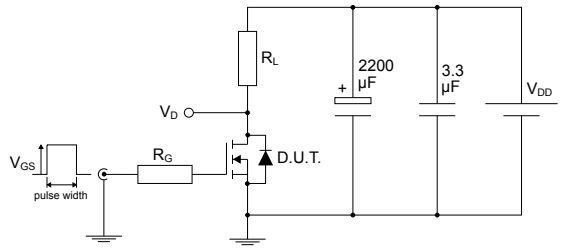


Figure 12. Source-drain diode forward characteristics



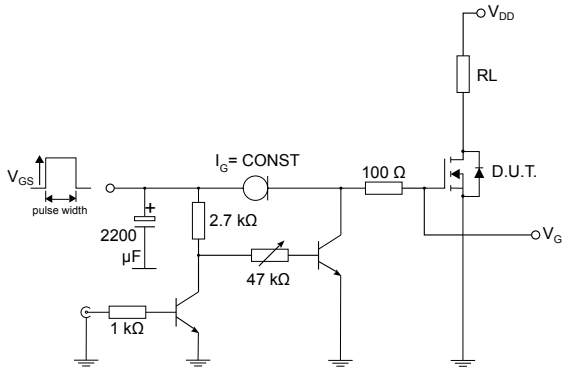
3 Test circuits

Figure 13. Test circuit for resistive load switching times



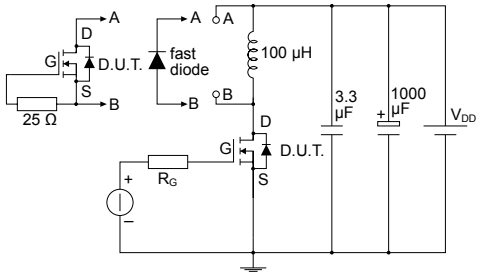
AM01468v1

Figure 14. Test circuit for gate charge behavior



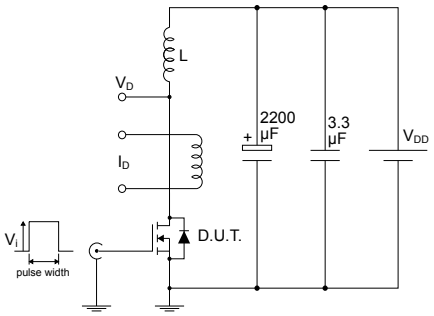
AM01469v10

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



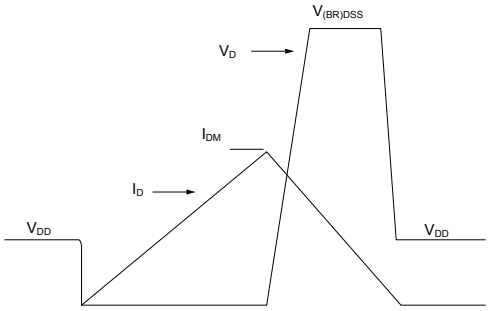
AM01470v1

Figure 16. Unclamped inductive load test circuit



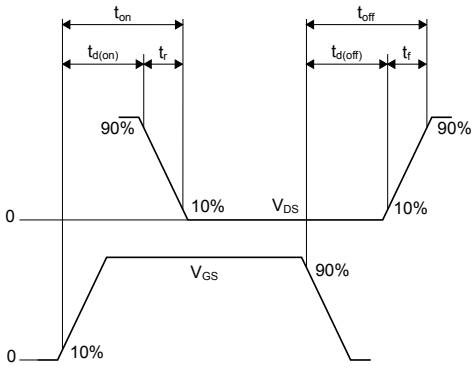
AM01471v1

Figure 17. Unclamped inductive waveform



AM01472v1

Figure 18. Switching time waveform



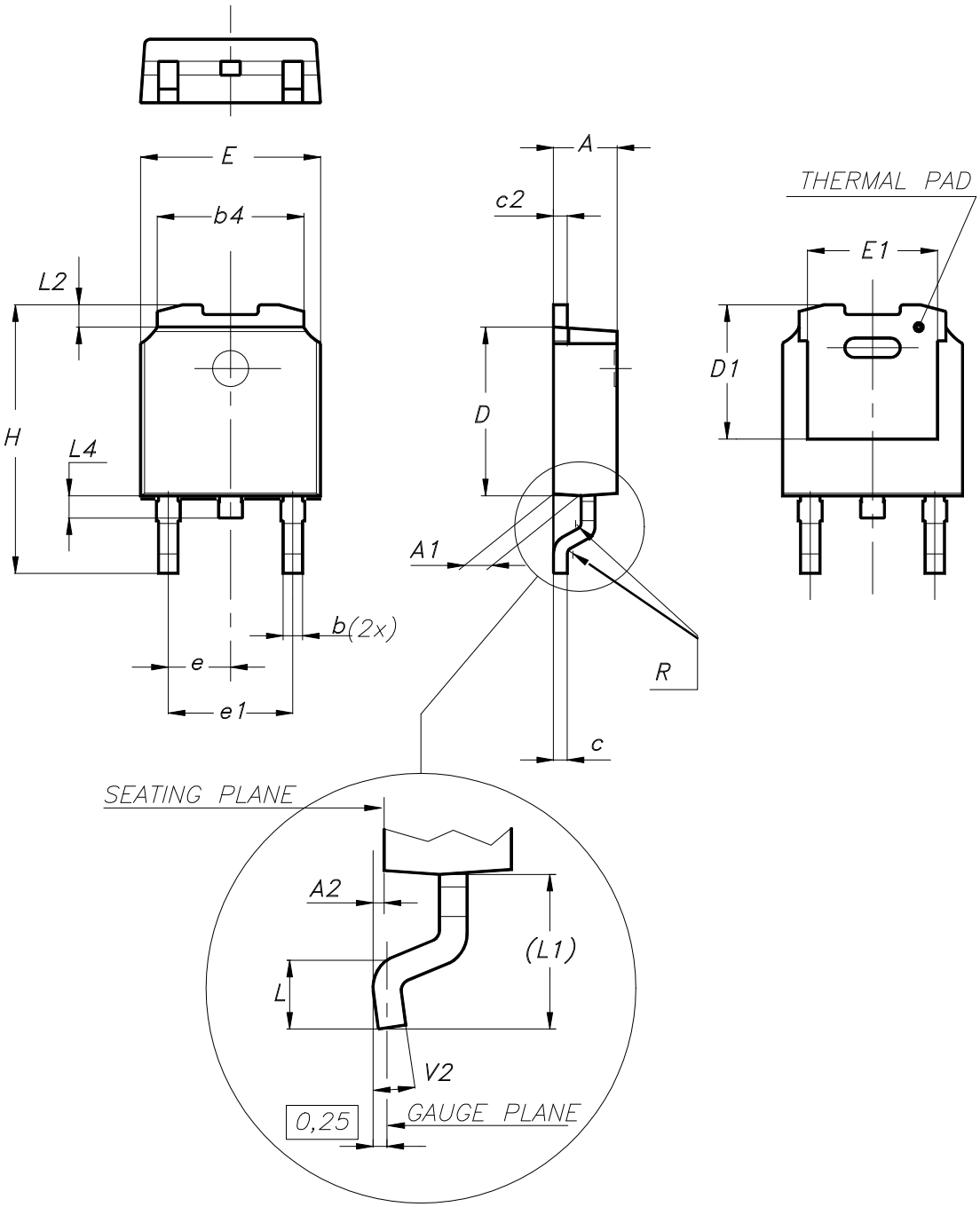
AM01473v1

4 Package information

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 A package information

Figure 19. DPAK (TO-252) type A package outline



0068772_A_36

Table 8. **DPAK (TO-252) type A 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	4.60	4.70	4.80
e	2.159	2.286	2.413
e1	4.445	4.572	4.699
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°

4.2 DPAK (TO-252) type A2 package information

Figure 20. **DPAK (TO-252) type A2 package outline**

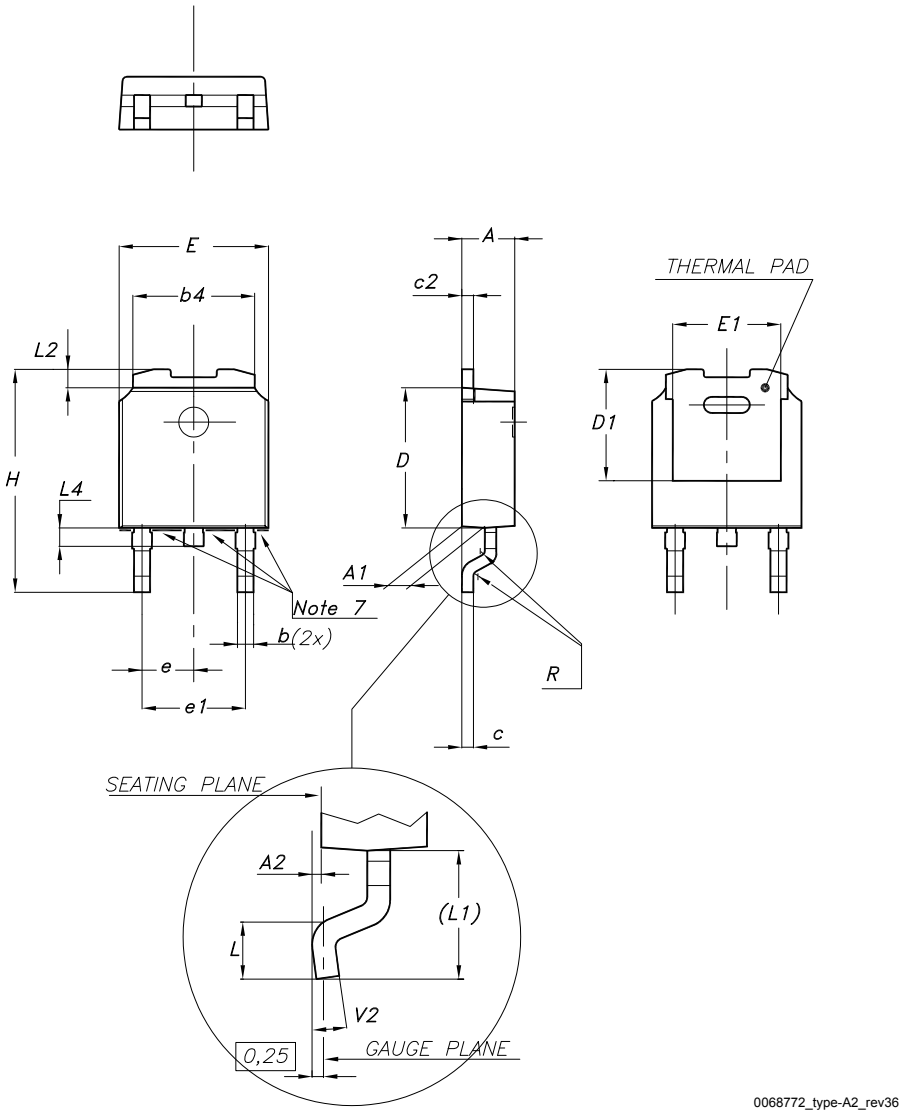
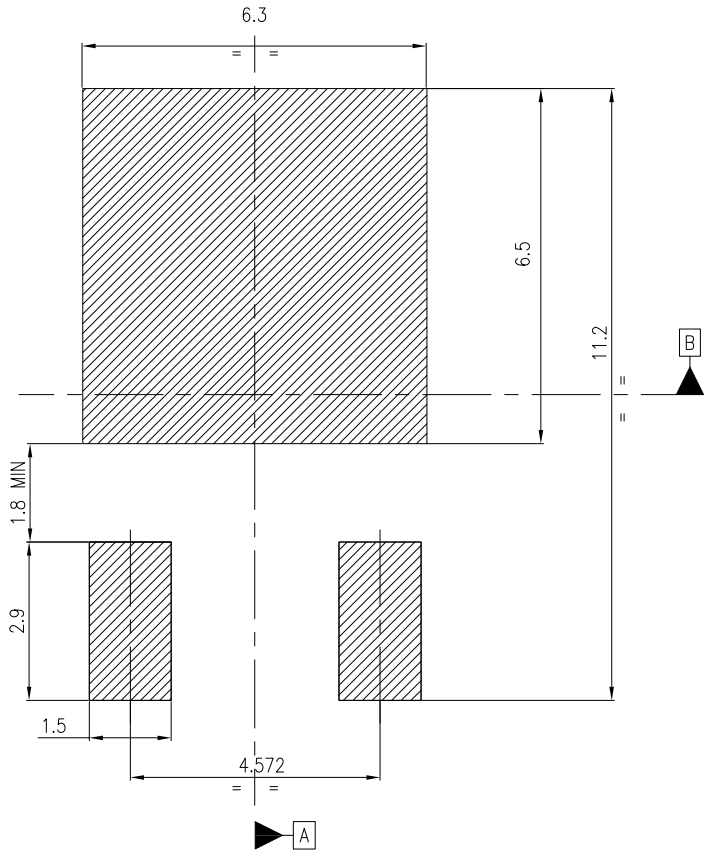


Table 9. **DPAK (TO-252) type A2 mechanical data**

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	2.159	2.286	2.413
e1	4.445	4.572	4.699
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 21. **DPAK (TO-252) recommended footprint (dimensions are in mm)**



Notes:

1) This footprint is able to ensure insulation up to 630 Vrms (according to CEI IEC 664−1)

2) The device must be positioned within ⌖ 0.05 A B

FP_0068772_36

4.3 DPAK (TO-252) packing information

Figure 22. **DPAK (TO-252) tape outline**

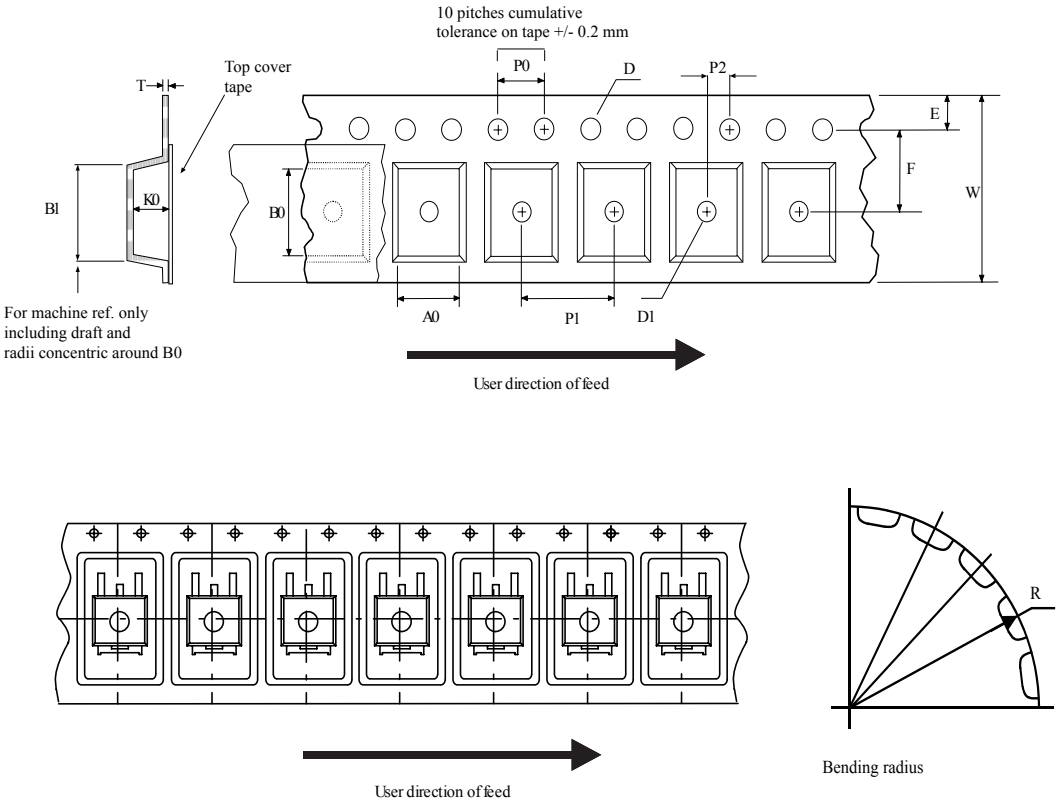
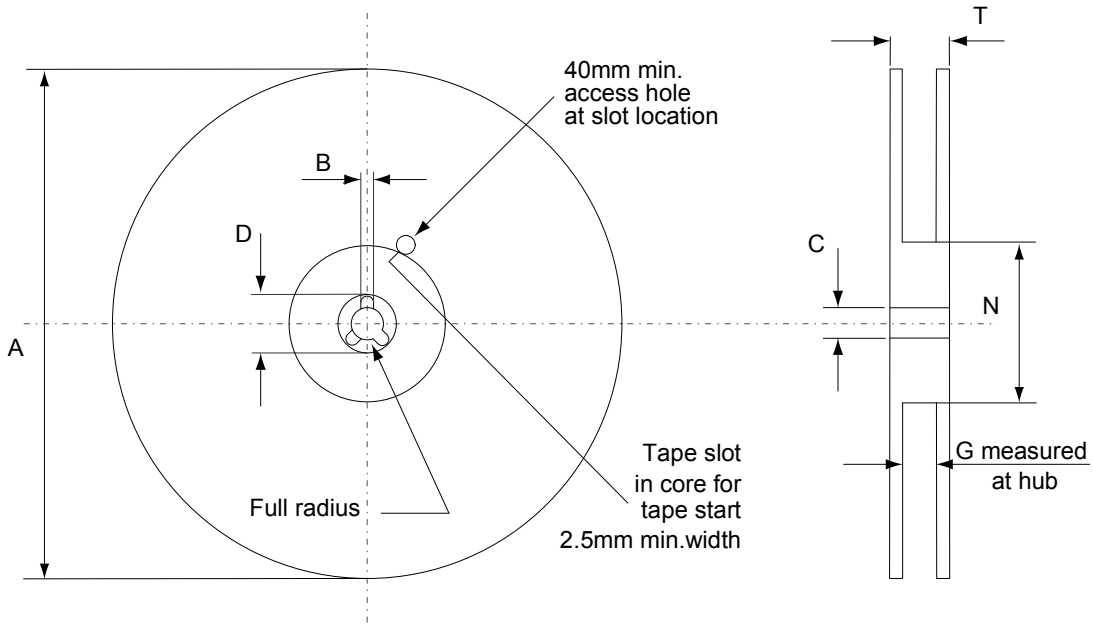


Figure 23. **DPAK (TO-252) reel outline**



AM06038v1

Table 10. **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			

Revision history

Table 11. **Document revision history**

Date	Revision	Changes
06-Jun-2017	1	First release.
24-Feb-2021	2	Updated *Section 4.1 DPAK (TO-252) package information.*
26-Mar-2026	3	Updated Section 4: Package information. Minor text changes.

Contents

1 **Electrical ratings** 2
2 **Electrical characteristics** 3
2.1 Electrical characteristics curves 5
3 **Test circuits** 7
4 **Package information** 8
4.1 DPAK (TO-252) type A package information 8
4.2 DPAK (TO-252) type A2 package information 10
4.3 DPAK (TO-252) packing information 13
Revision history 15

IMPORTANT NOTICE – 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.

In the event of any conflict between the provisions of this document and the provisions of any contractual arrangement in force between the purchasers and ST, the provisions of such contractual arrangement shall prevail.

The 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 acknowledgment.

The 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 the 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.

If the purchasers identify an ST product that meets their functional and performance requirements but that is not designated for the purchasers' market segment, the purchasers shall contact ST for more information.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. 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.

© 2026 STMicroelectronics – All rights reserved