

## P-channel 100 V, 0.136 $\Omega$ typ., 10 A STripFET™ F6 Power MOSFET in a DPAK package

Datasheet - production data

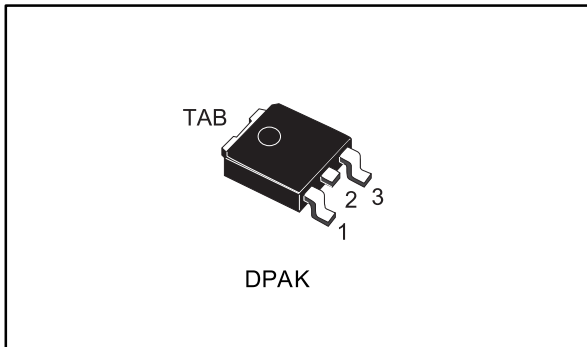
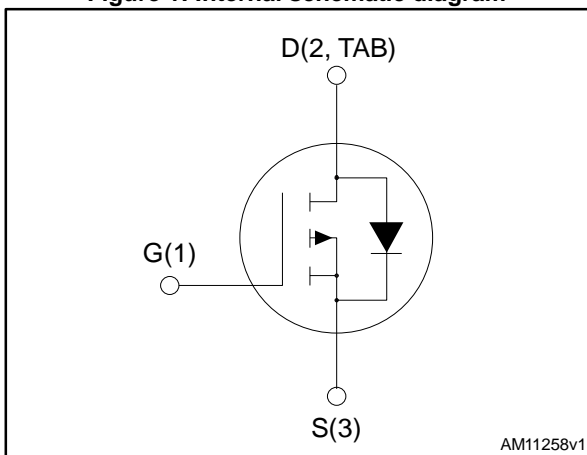


Figure 1: Internal schematic diagram



### Features

Order code	V <sub>DSS</sub>	R <sub>DS(on)</sub> max	I <sub>D</sub>
STD10P10F6	100 V	0.18 $\Omega$	10 A

- 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™ F6 technology with a new trench gate structure. The resulting Power MOSFET exhibits very low R<sub>DS(on)</sub> in all packages.

Table 1: Device summary

Order code	Marking	Package	Packaging
STD10P10F6	10P10F6	DPAK	Tape and reel

-  For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

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**Contents**

<b>1</b>	<b>Electrical ratings .....</b>	<b>3</b>
<b>2</b>	<b>Electrical characteristics .....</b>	<b>4</b>
	2.1 Electrical characteristics (curves).....	6
<b>3</b>	<b>Package mechanical data .....</b>	<b>8</b>
	3.1 DPAK (TO-252) type A mechanical data.....	9
<b>4</b>	<b>DPAK (TO-252) tape and reel mechanical data .....</b>	<b>12</b>
<b>5</b>	<b>Revision history .....</b>	<b>14</b>

# 1 Electrical ratings

**Table 2: Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-source voltage	100	V
$V_{GS}$	Gate-source voltage	$\pm 20$	V
$I_D$	Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	10	A
$I_D$	Drain current (continuous) at $T_C = 100\text{ }^\circ\text{C}$	7.5	A
$I_{DM}^{(1)}$	Drain current (pulsed)	40	A
$P_{TOT}$	Total dissipation at $T_C = 25\text{ }^\circ\text{C}$	40	W
$T_{stg}$	Storage temperature	-55 to 175	$^\circ\text{C}$
$T_j$	Max. operating junction temperature	175	$^\circ\text{C}$

**Notes:**

<sup>(1)</sup>Pulse width limited by safe operating area

**Table 3: Thermal data**

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	3.75	$^\circ\text{C/W}$
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-pcb max	50	$^\circ\text{C/W}$

**Notes:**

<sup>(1)</sup>When mounted on 1 inch<sup>2</sup> FR-4, 2 Oz copper board



For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

## 2 Electrical characteristics

(T<sub>CASE</sub> = 25 °C unless otherwise specified).

**Table 4: Static**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V <sub>(BR)DSS</sub>	Drain-source breakdown Voltage	V <sub>GS</sub> = 0, I <sub>D</sub> = 250 μA	100			V
I <sub>DSS</sub>	Zero gate voltage drain current	V <sub>GS</sub> = 0, V <sub>DS</sub> = 100 V			1	μA
		V <sub>GS</sub> = 0, V <sub>DS</sub> = 100 V, T <sub>C</sub> = 125 °C			10	μA
I <sub>GSS</sub>	Gate body leakage current	V <sub>DS</sub> = 0, V <sub>GS</sub> = ± 20 V			±100	nA
V <sub>GS(th)</sub>	Gate threshold voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2		4	V
R <sub>DS(on)</sub>	Static drain-source on-resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5 A		0.136	0.18	Ω

**Table 5: Dynamic**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C <sub>iss</sub>	Input capacitance	V <sub>DS</sub> = 80 V, f = 1 MHz, V <sub>GS</sub> = 0	-	864	-	pF
C <sub>oss</sub>	Output capacitance		-	45	-	pF
C <sub>rss</sub>	Reverse transfer capacitance		-	25	-	pF
Q <sub>g</sub>	Total gate charge	V <sub>DD</sub> = 80 V, I <sub>D</sub> = 10 A V <sub>GS</sub> = 10 V	-	16.5	-	nC
Q <sub>gs</sub>	Gate-source charge		-	3.5	-	nC
Q <sub>gd</sub>	Gate-drain charge		-	3.8	-	nC

**Table 6: Switching on/off (inductive load)**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t <sub>d(on)</sub>	Turn-on delay time	V <sub>DD</sub> = 80 V, I <sub>D</sub> = 5 A, R <sub>G</sub> = 4.7 Ω, V <sub>GS</sub> = 10 V	-	10.5	-	ns
t <sub>r</sub>	Rise time		-	4.8	-	ns
t <sub>d(off)</sub>	Turn-off delay time		-	24	-	ns
t <sub>f</sub>	Fall time		-	4.5	-	ns



For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

Table 7: Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{SD}^{(1)}$	Forward on voltage	$I_{SD} = 5 \text{ A}$ , $V_{GS} = 0$	-		1.1	V
$t_{rr}$	Reverse recovery time	$I_{SD} = 10 \text{ A}$ , $di/dt = 100 \text{ A}/\mu\text{s}$ , $V_{DD} = 80 \text{ V}$	-	26.5		ns
$Q_{rr}$	Reverse recovery charge		-	36.5		nC
$I_{RRM}$	Reverse recovery current		-	2.7		A

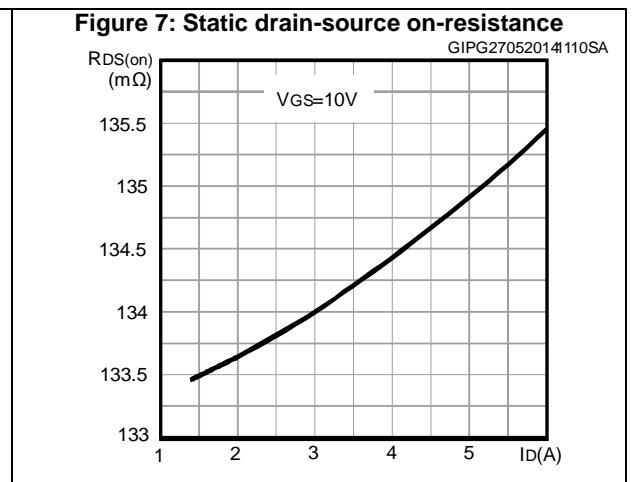
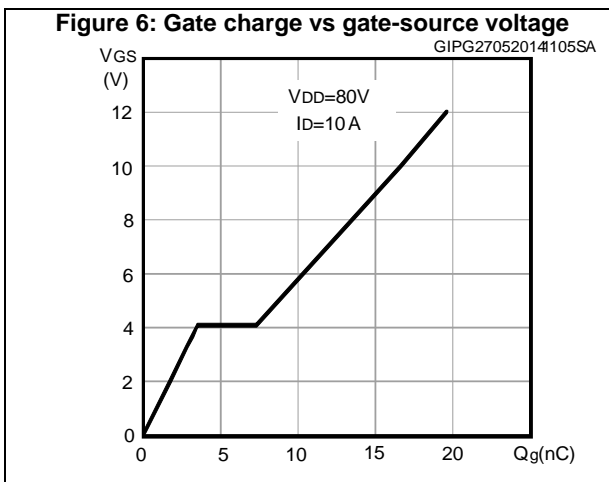
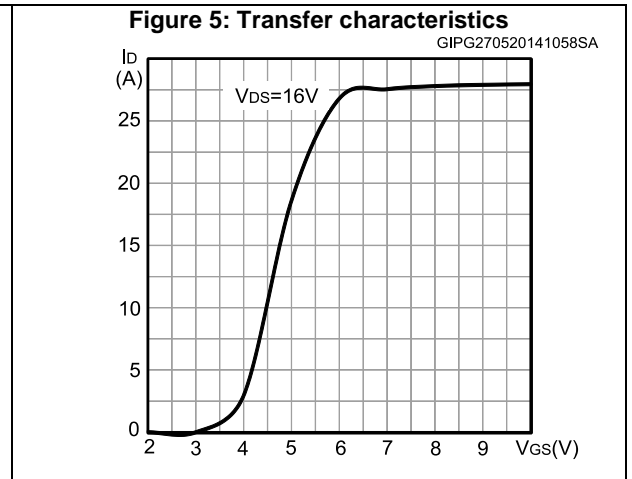
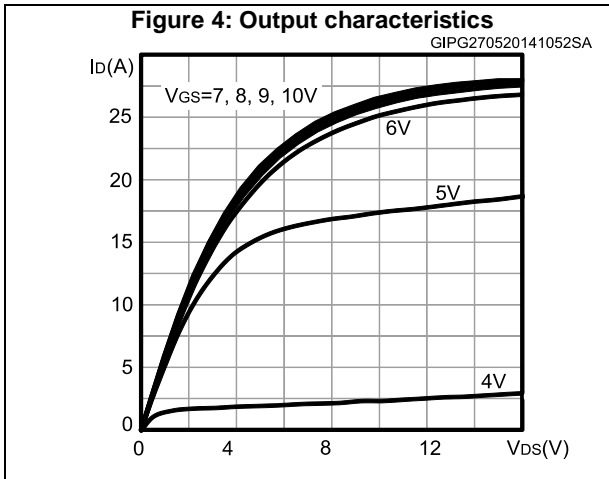
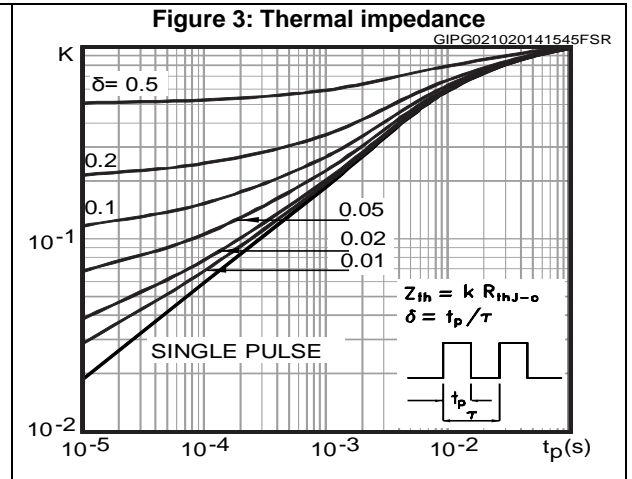
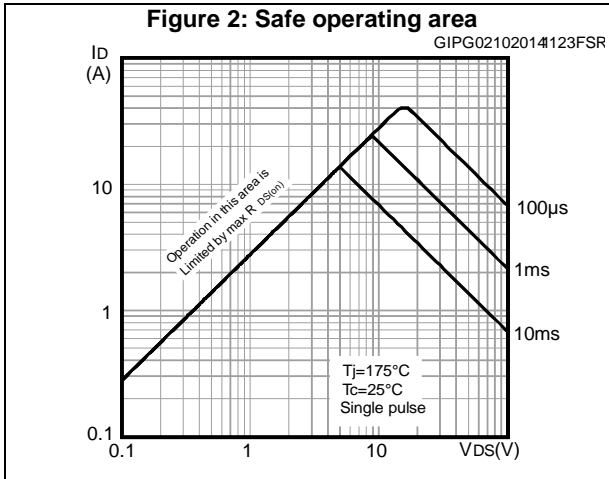
**Notes:**

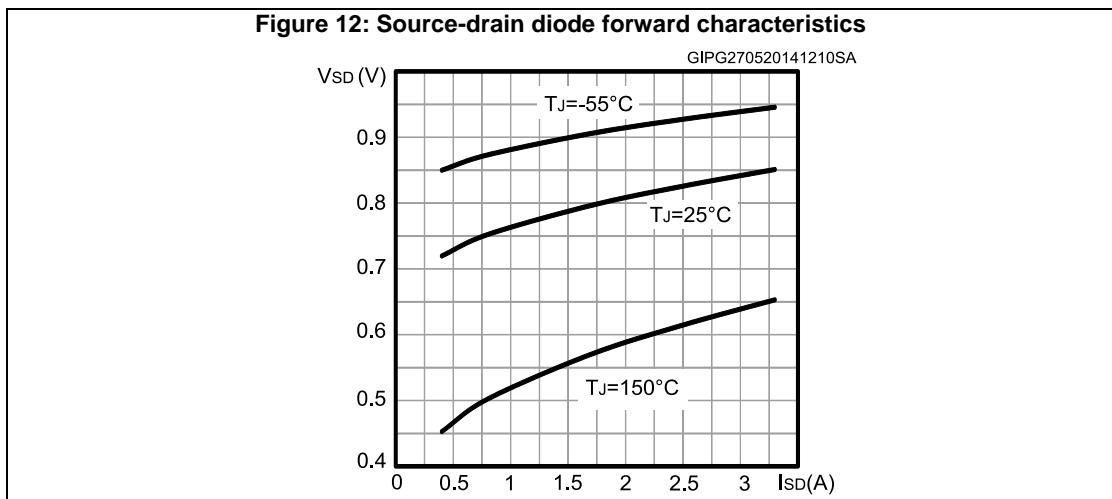
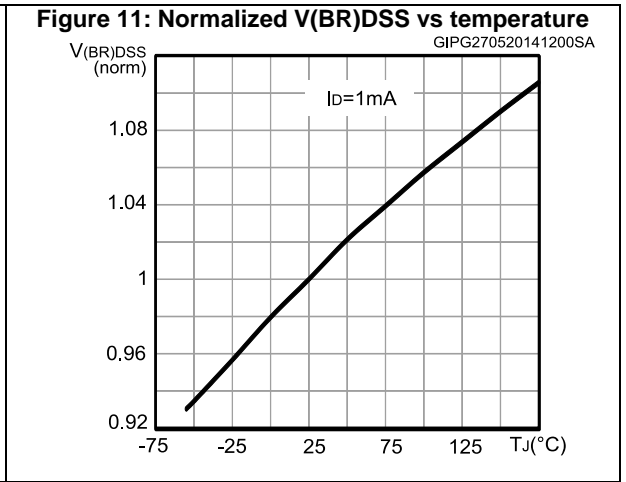
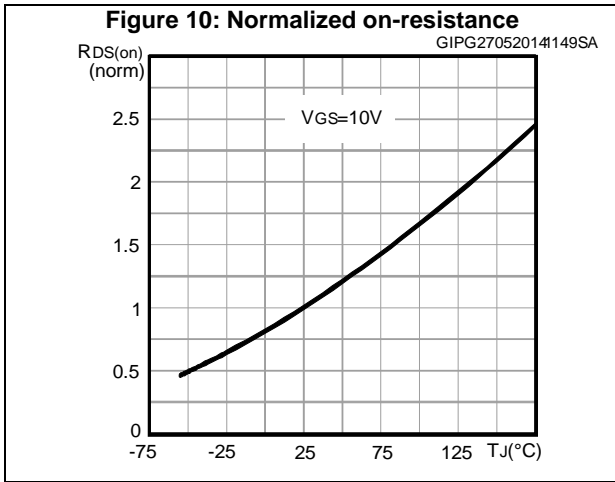
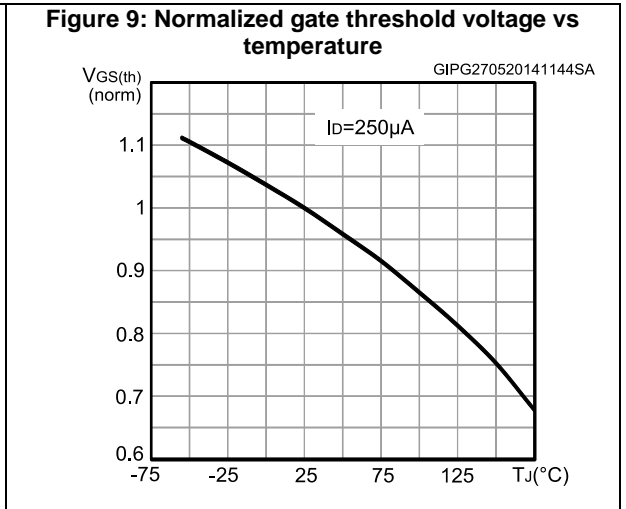
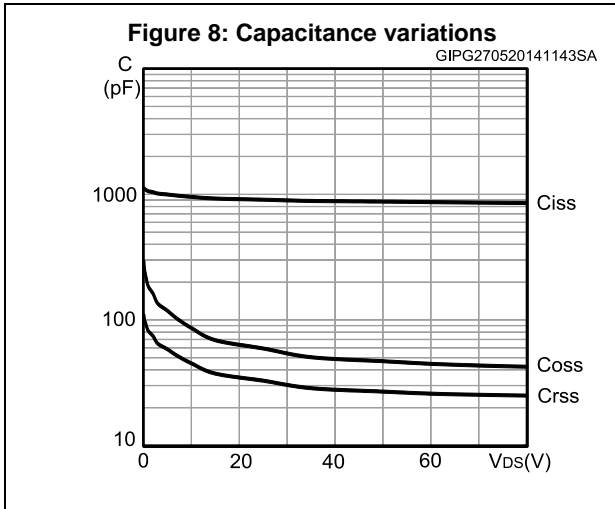
<sup>(1)</sup>Pulsed: pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5%



For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

2.1 Electrical characteristics (curves)





### 3 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](http://www.st.com). ECOPACK® is an ST trademark.



### 3.1 DPAK (TO-252) type A mechanical data

Figure 13: DPAK (TO-252) type A drawings

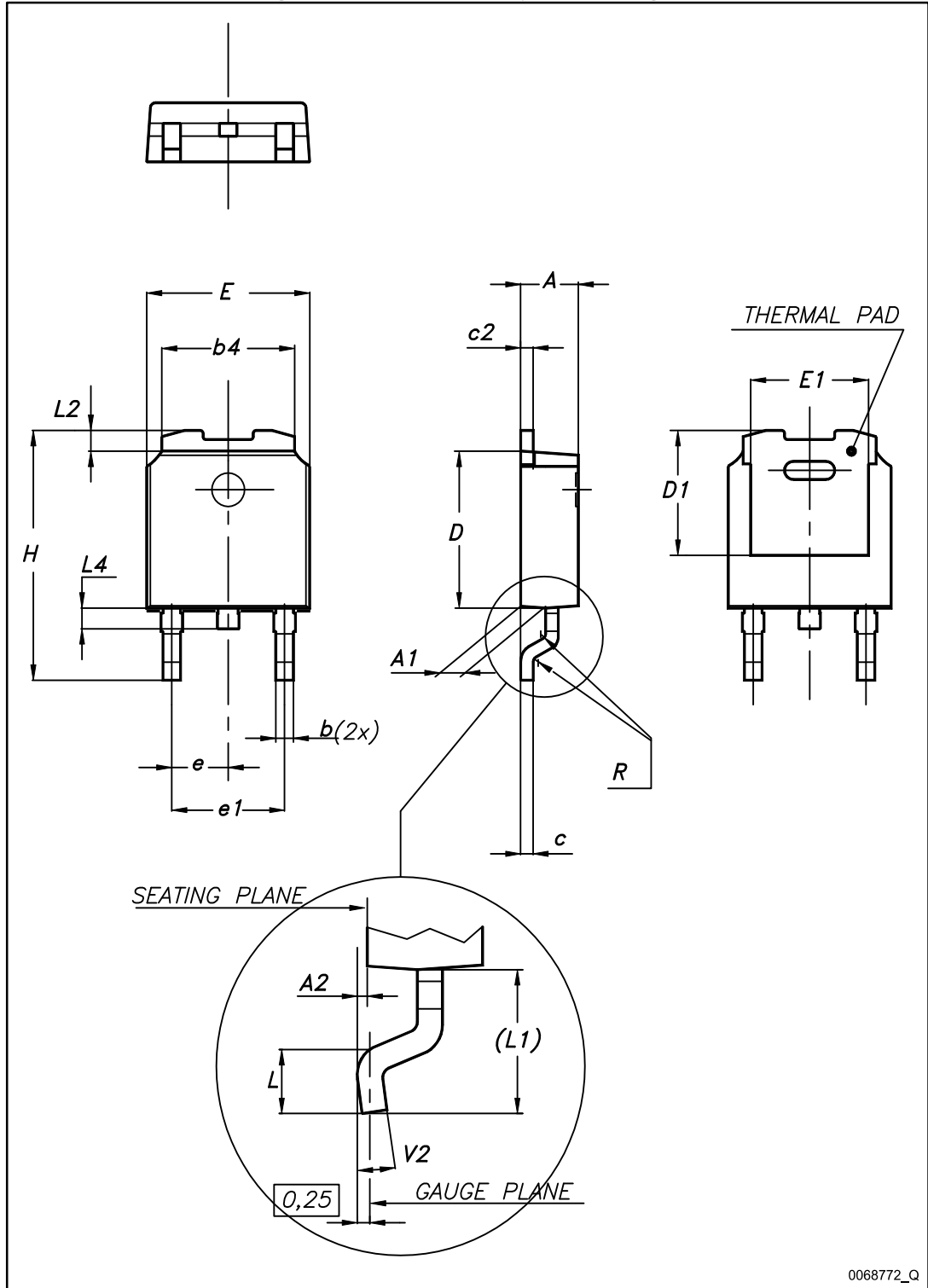
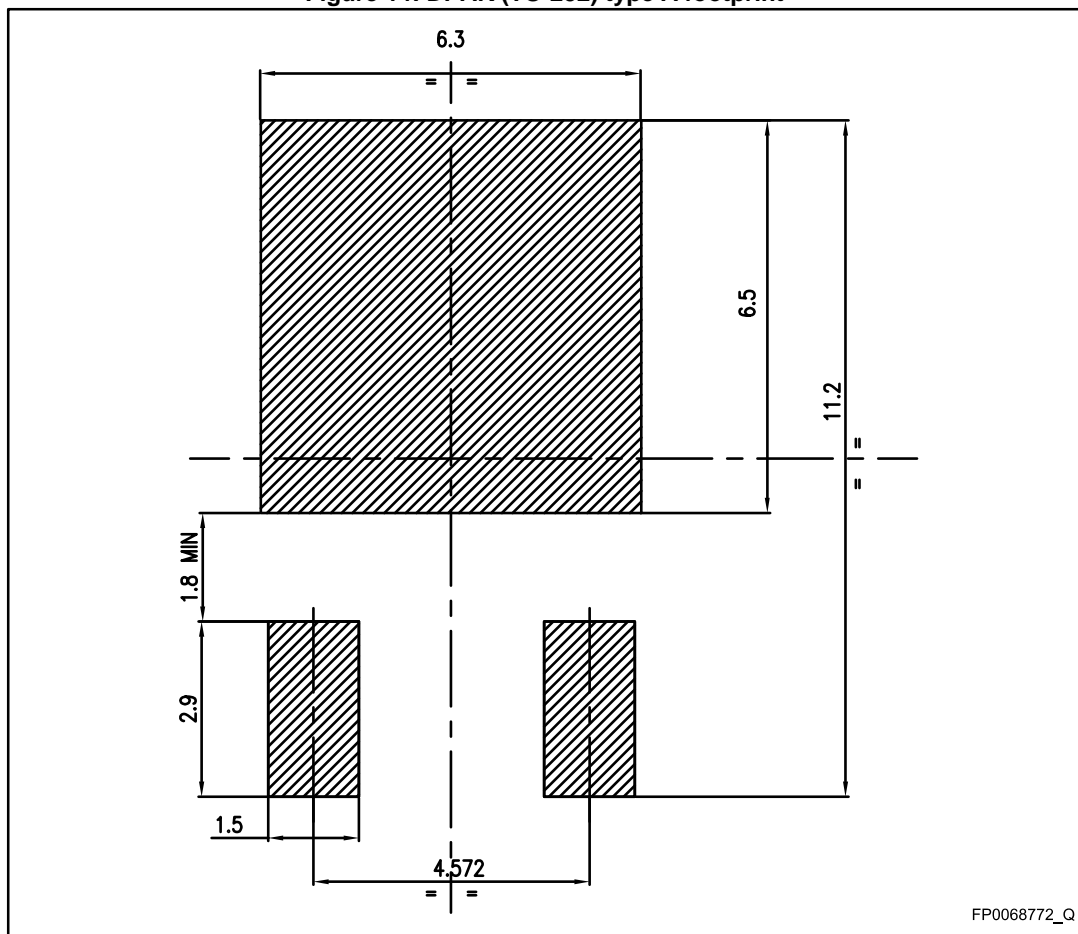


Table 8: DPAK (TO-252) type A mechanical data

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		5.10	
E	6.40		6.60
E1		4.70	
e		2.28	
e1	4.40		4.60
H	9.35		10.10
L	1.00		1.50
(L1)		2.80	
L2		0.80	
L4	0.60		1.00
R		0.20	
V2	0°		8°

Figure 14: DPAK (TO-252) type A footprint



All dimensions are in mm

# 4 DPAK (TO-252) tape and reel mechanical data

Figure 15: Tape for DPAK (TO-252)

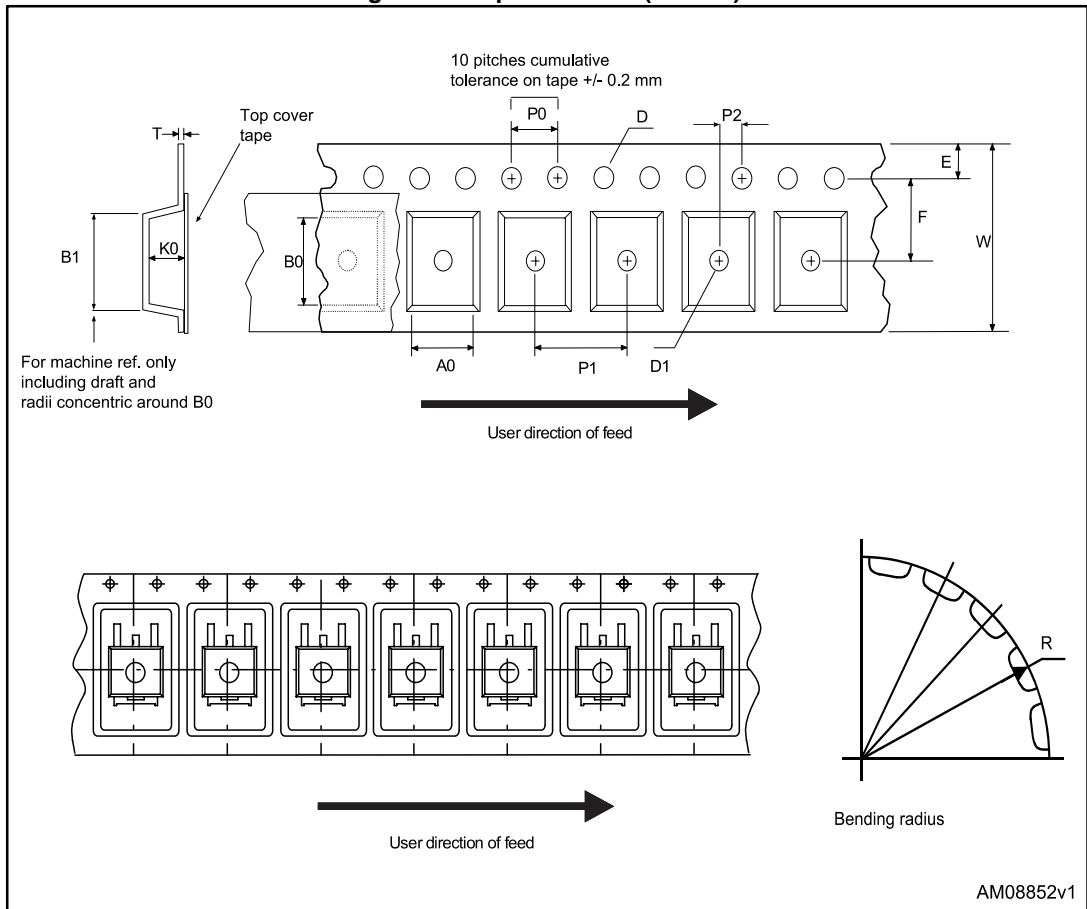


Figure 16: Reel for DPAK (TO-252)

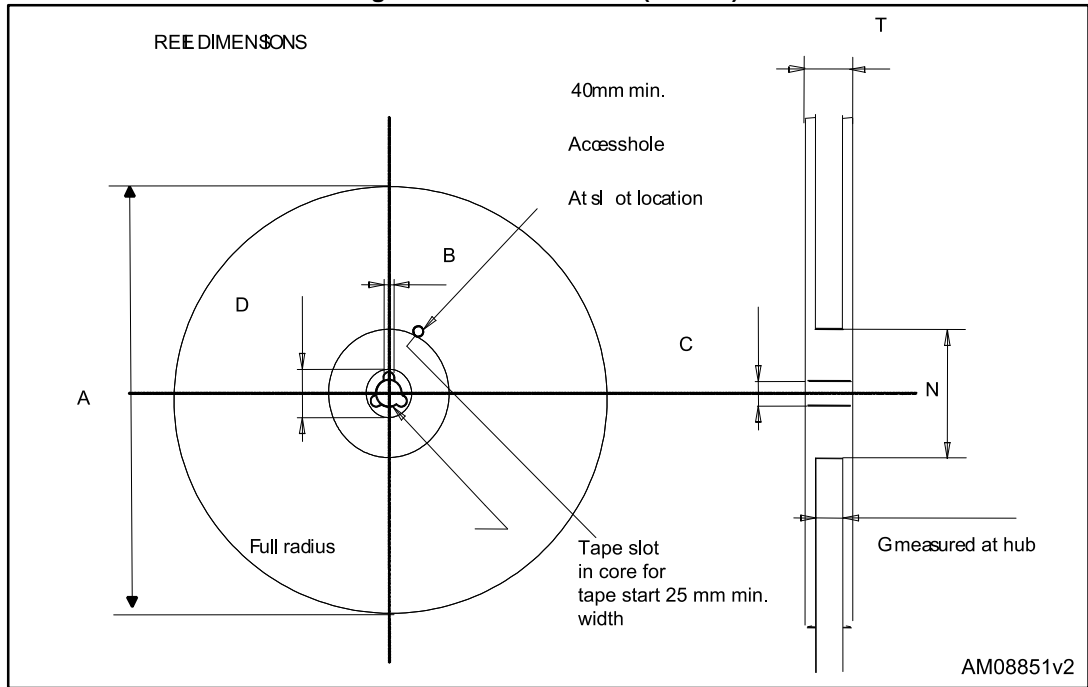


Table 9: DPAK (TO-252) tape and reel mechanical data

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
20-May-2014	1	First release.
02-Oct-2014	2	Document status promoted from preliminary to production data Added <a href="#">Section 2.1: "Electrical characteristics (curves)"</a> .

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