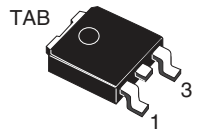
STD127DT4

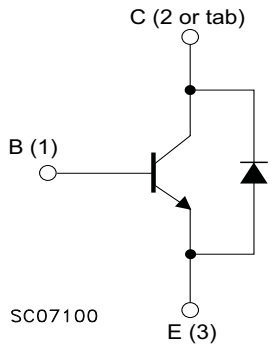
High voltage fast-switching NPN power transistor

Datasheet - production data



DPAK

Figure 1. Internal schematic diagram



Features

- NPN transistor
- High voltage capability
- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed
- Integrated anti-parallel collector - emitter diode

Applications

- Electronic ballast for fluorescent lighting
- Fly back and forward single transistor low power converters

Description

This device is manufactured using high voltage multi epitaxial planar technology for high switching speeds and medium voltage capability. It uses a cellular emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA. The device is designed for use in lighting applications and low cost switch-mode power supplies.

Table 1. Device summary

Part number	Marking	Package	Packaging
STD127DT4	D127D	DPAK	Tape and reel

Contents

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V_{BE} = 0)	700	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	400	V
V_{EBO}	Emitter-base voltage (I_C = 0; I_B = 2 A, t_p < 10 μs, T_J = 150 °C)	$V_{(BR)EBO}$	V
I_C	Collector current	4	A
I_{CM}	Collector peak current (t_P < 5 ms)	8	A
I_B	Base current	2	A
I_{BM}	Base peak current (t_P < 5 ms)	4	A
P_{tot}	Total dissipation at $T_c \leq$ 25 °C	35	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case max	3.57	°C/W
R_{thJA}	Thermal resistance junction-ambient max	100	°C/W

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current (V_{BE} =0)	V_{CE} = 700 V			100	µA
I_{CEO}	Collector cut-off current (I_B =0)	V_{CE} = 400 V			250	µA
$V_{(BR)EBO}$	Emitter - base breakdown voltage (I_C = 0)	I_E =10 mA	9		18	V
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C =100 mA	400			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 1 A I_B = 0.2 A I_C = 4 A I_B = 1 A			0.3 1.3	V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 1 A I_B = 0.2 A			1.2	V
h_{FE} (1)	DC current gain	I_C = 10 mA V_{CE} = 5 V I_C = 1 A V_{CE} = 5 V I_C = 4 A V_{CE} = 5 V	7 10 5	25	40	
V_F	Diode forward voltage	I_F = 2 A			2.5	V
 t_s t_f	Inductive load Storage time Fall time	I_C = 2 A $I_{B(on)}$= 0.4 A $V_{BE(off)}$ = -5 V; $R_{BB(off)}$ =0 V_{CC} = 200 V L = 200 µH		 0.6 0.1		 µs ns

1. Pulsed duration = 300 µs, duty cycle ≤ 1.5%.

2.1 Electrical characteristics (curves)

Figure 2. Reverse biased safe operating area

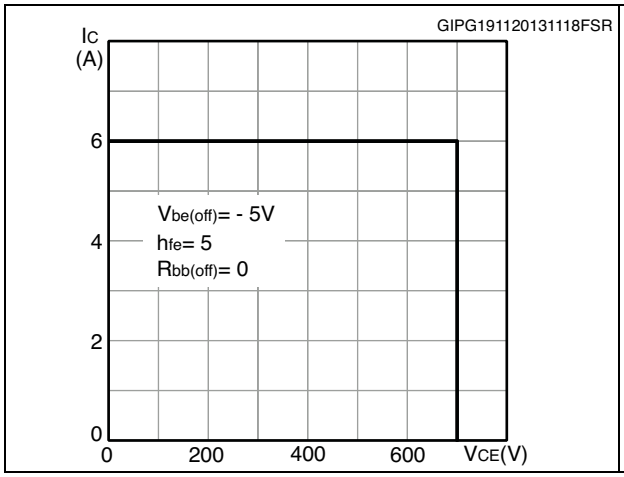


Figure 3. DC current gain

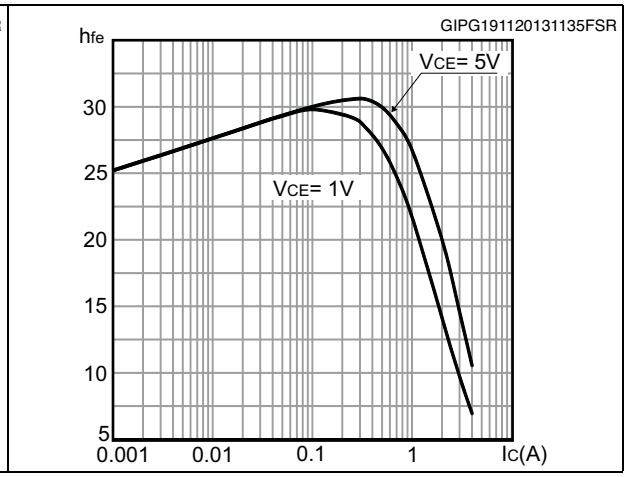


Figure 4. Collector-emitter saturation voltage

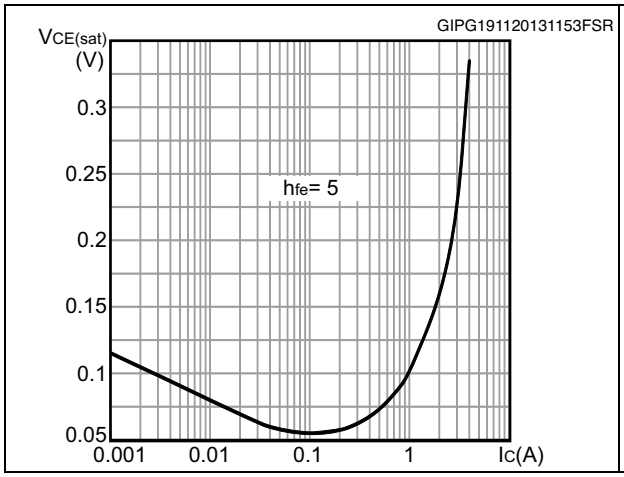


Figure 5. Base-emitter saturation voltage

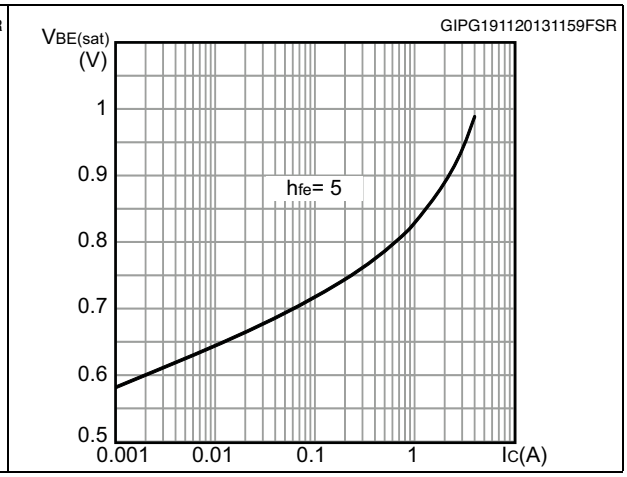


Figure 6. Base-emitter on-voltage

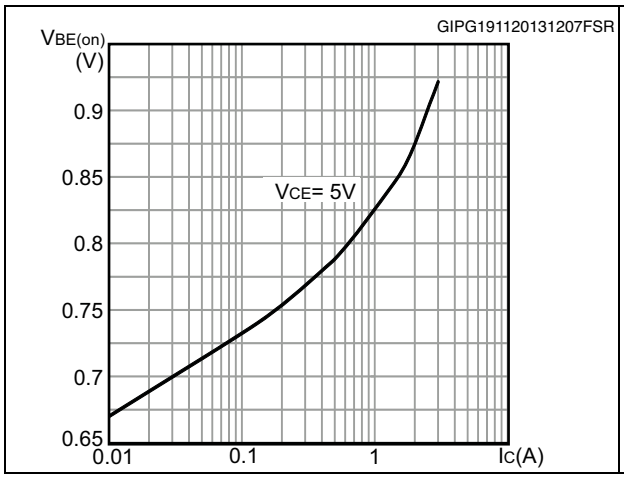


Figure 7. Diode forward voltage vs collector current

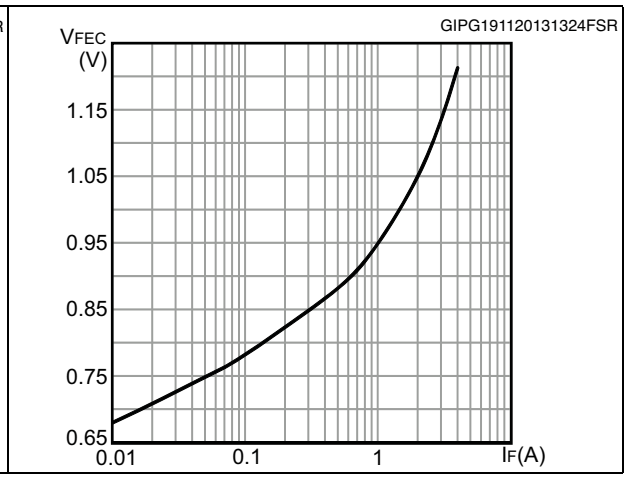


Figure 8. Resistive load switching time

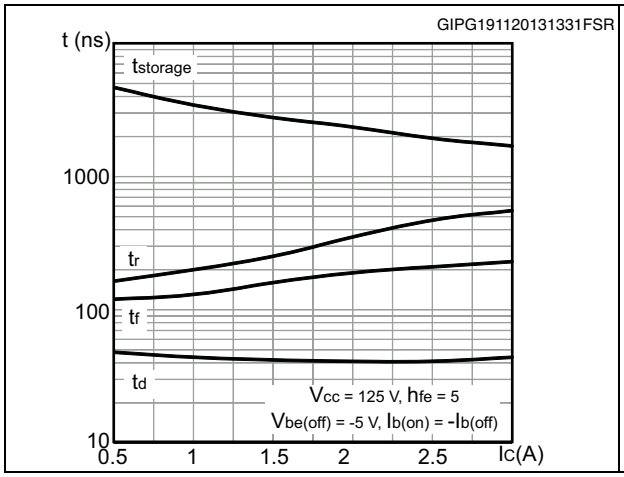
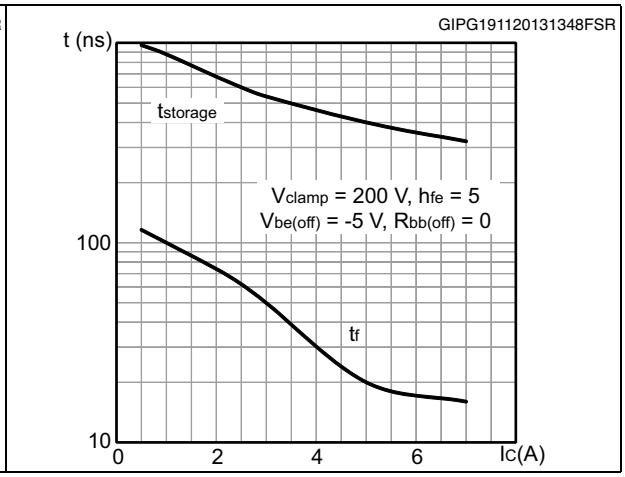
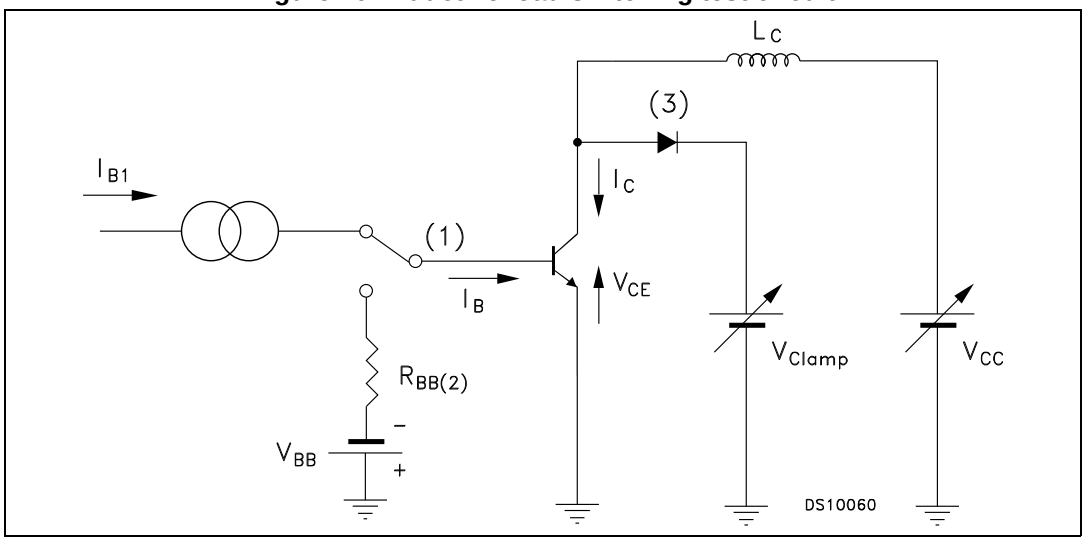


Figure 9. Inductive load switching time



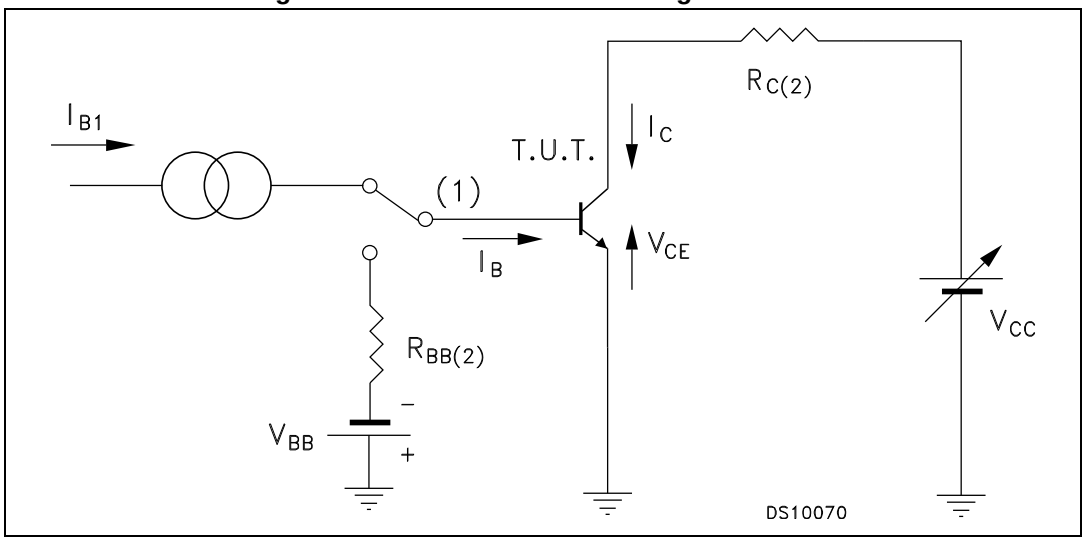
3 Test circuits

Figure 10. Inductive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor
3. Fast recovery rectifier

Figure 11. Resistive load switching test circuit



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 5. DPAK (TO-252) type C mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	2.20	2.30	2.38
A1	0.90	1.01	1.10
A2	0.00		0.10
b	0.72		0.85
b4	5.13	5.33	5.46
c	0.47		0.60
c2	0.47		0.60
D	6.00	6.10	6.20
D1	5.25		
E	6.50	6.60	6.70
E1	4.70		
e	2.186	2.286	2.386
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L2	0.90		1.25
L4	0.60	0.80	1.00
Θ1	5°	7°	9°
Θ2	5°	7°	9°
V2	0°		8°

Figure 12. DPAK (TO-252) type C drawing

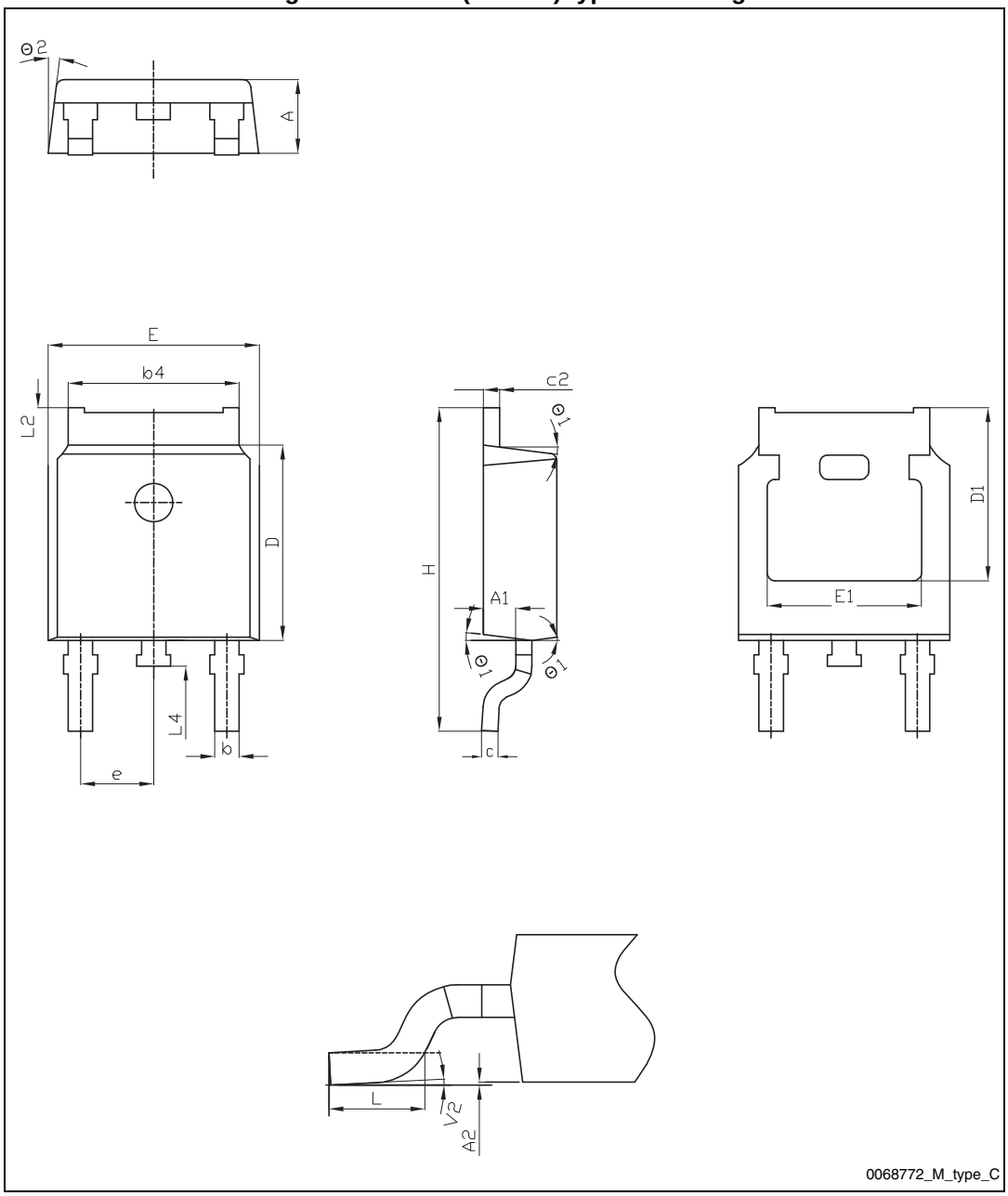
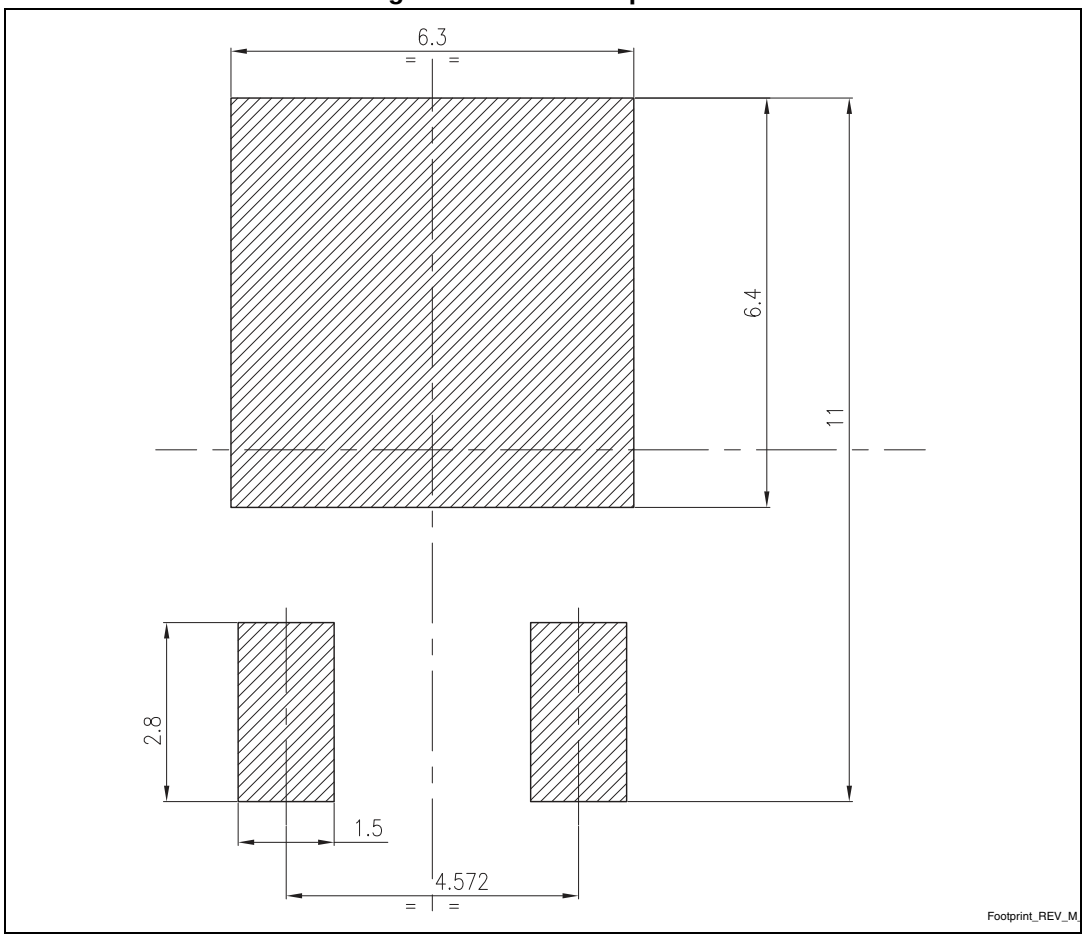


Figure 13. DPAK footprint [(a)]



a. All dimensions are in millimeters

5 Packing mechanical data

Table 6. 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			

Figure 14. Tape for DPAK (TO-252)

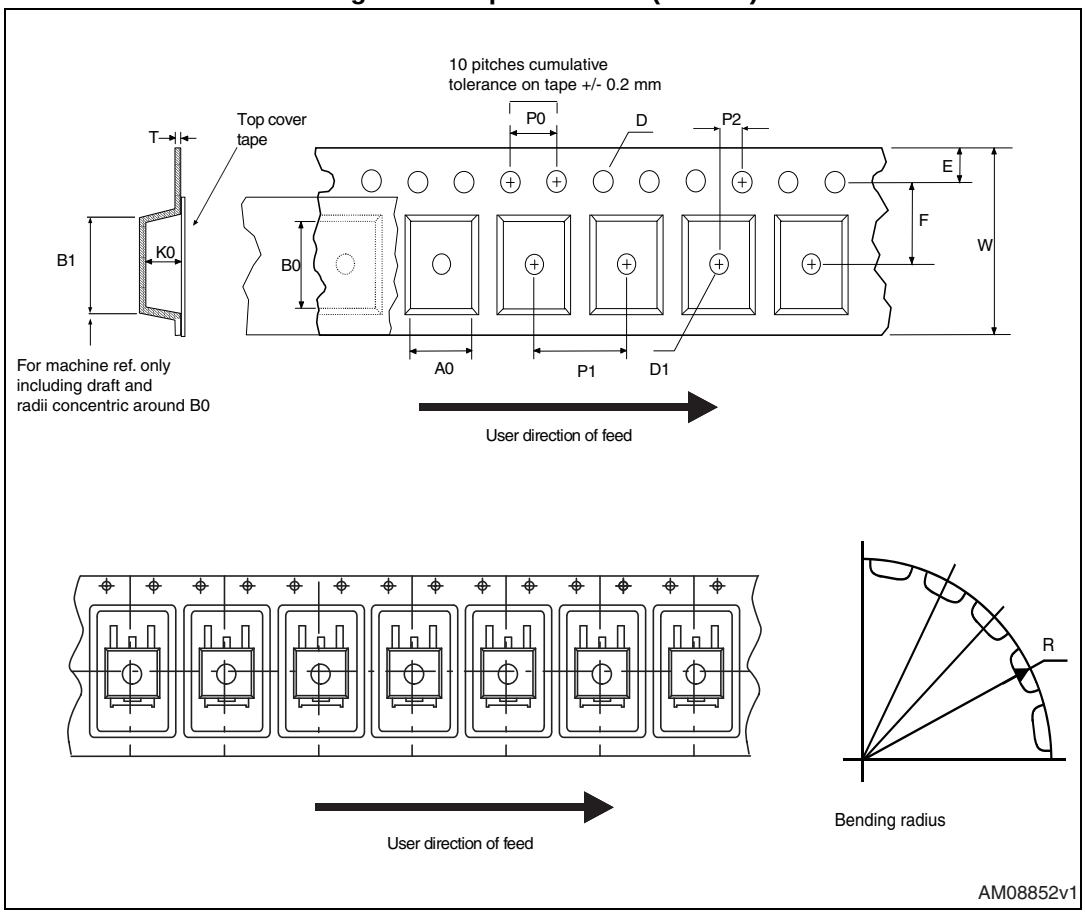
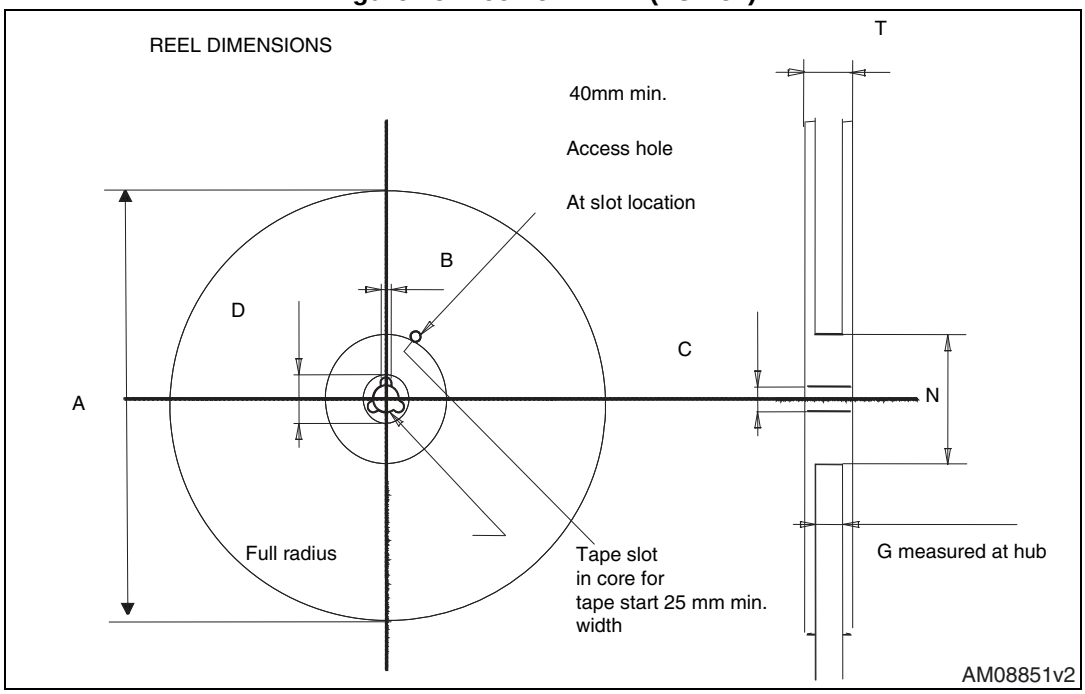


Figure 15. Reel for DPAK (TO-252)



6 Revision history

Table 7. Document revision history

Date	Revision	Changes
19-Nov-2013	1	Initial release.

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