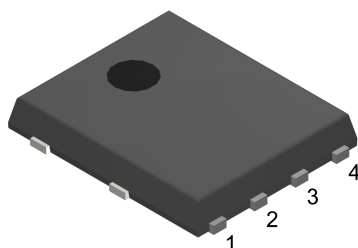
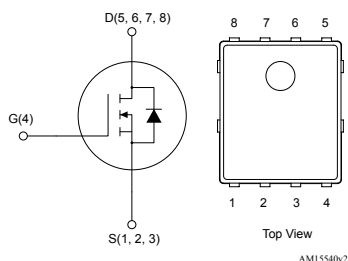


N-channel 40 V, 0.85 mΩ typ., 120 A STripFET F7 Power MOSFET in a PowerFLAT 5x6 package



PowerFLAT™ 5x6



Features

Order code	V _{DS}	R _{DS(on)} max.	I _D
STL260N4LF7	40 V	1.1 mΩ	120 A

- Among the lowest R_{DS(on)} on the market
- Excellent FoM (figure of merit)
- Low C_{rss}/C_{iss} ratio for EMI immunity
- High avalanche ruggedness

Applications

- Switching applications

Description

This N-channel Power MOSFET utilizes STripFET F7 technology with an enhanced trench gate structure that results in very low on-state resistance, while also reducing internal capacitance and gate charge for faster and more efficient switching.



Product status link

[STL260N4LF7](#)

Product summary

Order code	STL260N4LF7
Marking	260N4LF7
Package	PowerFLAT 5x6
Packing	Tape and reel

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	40	V
V_{GS}	Gate-source voltage	20	V
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25\text{ °C}$	120	A
$I_D^{(1)}$	Drain current (continuous) at $T_C = 100\text{ °C}$	120	A
$I_{DM}^{(2)(1)}$	Drain current (pulsed)	480	A
$I_D^{(3)}$	Drain current (continuous) at $T_{pcb} = 25\text{ °C}$	50	A
$I_D^{(3)}$	Drain current (continuous) at $T_{pcb} = 100\text{ °C}$	35	A
$I_{DM}^{(2)(3)}$	Drain current (pulsed)	200	A
$P_{TOT}^{(1)}$	Total power dissipation at $T_C = 25\text{ °C}$	188	W
$P_{TOT}^{(3)}$	Total power dissipation at $T_{pcb} = 25\text{ °C}$	4.8	W
T_{stg}	Storage temperature range	-55 to 175	°C
T_j	Operating junction temperature range		

1. This value is rated according to $R_{thj-case}$ and limited by package
2. Pulse width limited by safe operating area
3. This value is rated according to $R_{thj-pcb}$

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case	0.8	°C/W
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-pcb	31.3	°C/W

1. When mounted on FR-4 board of 1 inch², 2 oz Cu

2 Electrical characteristics

$T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

Table 3. On/off-state

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	40			V
I_{DSS}	Zero gate voltage drain current	$V_{GS} = 0\text{ V}$, $V_{DS} = 40\text{ V}$			1	μA
I_{GSS}	Gate body leakage current	$V_{DS} = 0\text{ V}$, $V_{GS} = 20\text{ V}$			100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1.2		2.5	V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 10\text{ V}$, $I_D = 25\text{ A}$		0.85	1.1	m Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 25\text{ A}$		1.2	1.4	m Ω

Table 4. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	$V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	-	6000	-	pF
C_{oss}	Output capacitance		-	1700	-	pF
C_{rss}	Reverse transfer capacitance		-	170	-	pF
Q_g	Total gate charge	$V_{DD} = 20\text{ V}$, $I_D = 50\text{ A}$, $V_{GS} = 0\text{ to }4.5\text{ V}$ (see Figure 14. Test circuit for gate charge behavior)	-	42	-	nC
Q_{gs}	Gate-source charge		-	16	-	nC
Q_{gd}	Gate-drain charge		-	14	-	nC

Table 5. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 20\text{ V}$, $I_D = 25\text{ A}$, $R_G = 4.7\text{ }\Omega$, $V_{GS} = 10\text{ V}$ (see Figure 13. Test circuit for resistive load switching times and Figure 18. Switching time waveform)	-	21	-	ns
t_r	Rise time		-	14	-	ns
$t_{d(off)}$	Turn-off delay time		-	74	-	ns
t_f	Fall time		-	23	-	ns

Table 6. Source-drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{SD}^{(1)}$	Forward on voltage	$I_{SD} = 50\text{ A}$, $V_{GS} = 0\text{ V}$	-		1	V
t_{rr}	Reverse recovery time	(see Figure 15. Test circuit for inductive load switching and diode recovery times) $I_D = 50\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $V_{DD} = 32\text{ V}$,	-	71		ns
Q_{rr}	Reverse recovery charge		-	100		nC
I_{RRM}	Reverse recovery current		-	2.8		A

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

2.1 Electrical characteristics (curves)

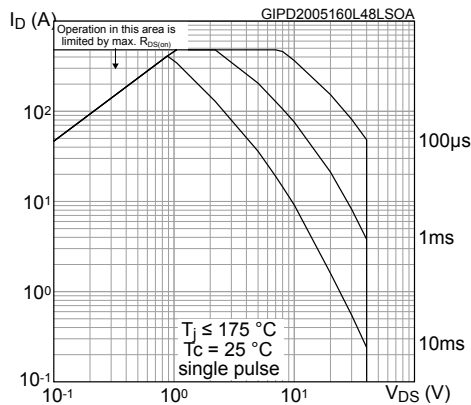
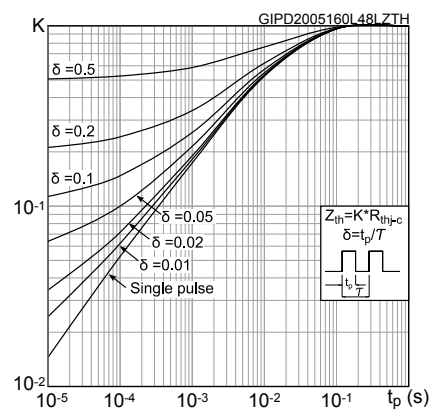
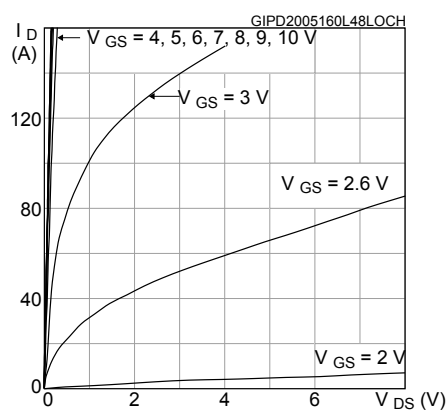
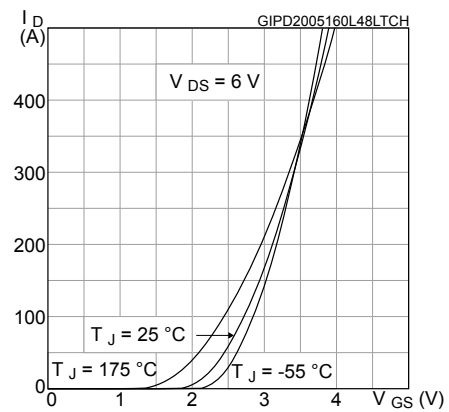
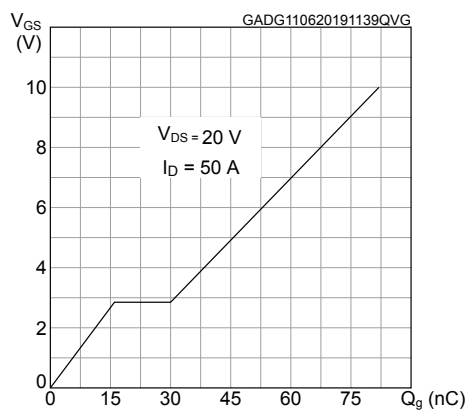
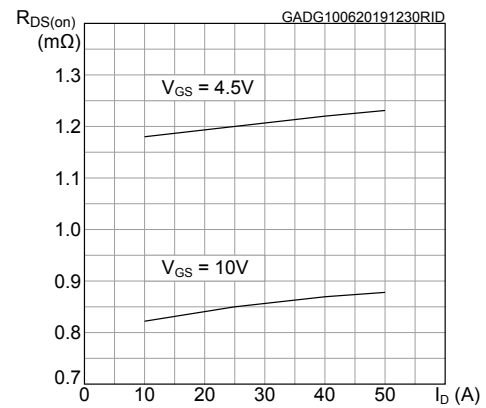
Figure 1. Safe operating area

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

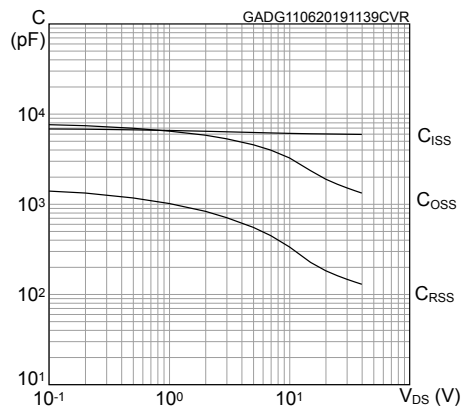


Figure 8. Normalized on-resistance vs temperature

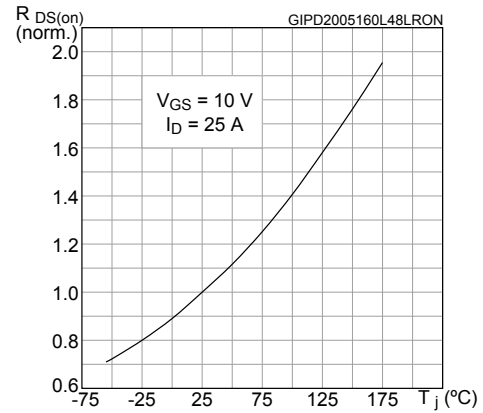


Figure 9. Normalized $V_{(BR)DSS}$ vs temperature

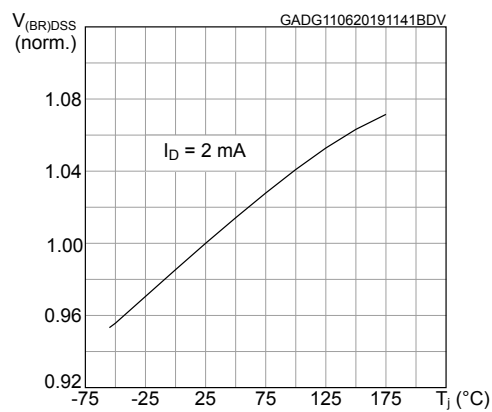


Figure 10. Normalized gate threshold voltage vs temperature

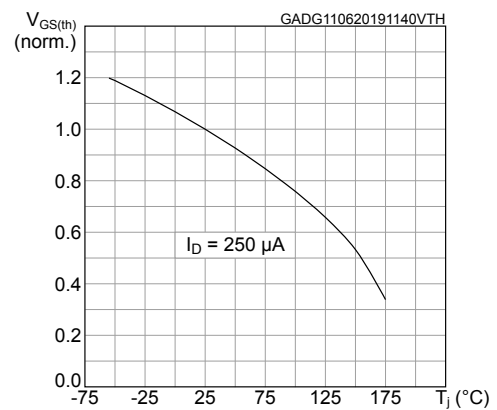
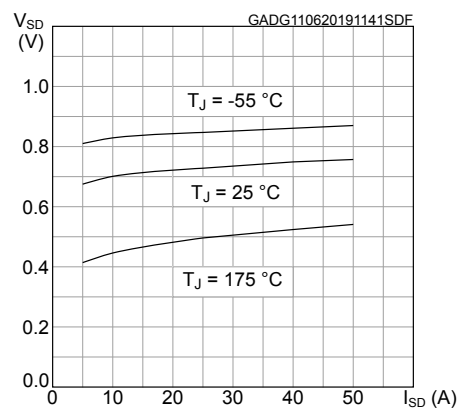


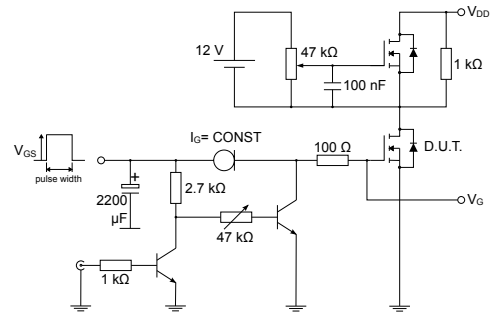
Figure 11. Source-drain diode forward characteristics



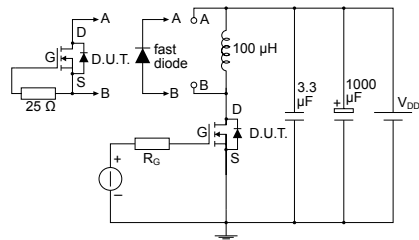
3 Test circuits

Figure 12. Test circuit for resistive load switching times


AM01468v1

Figure 13. Test circuit for gate charge behavior


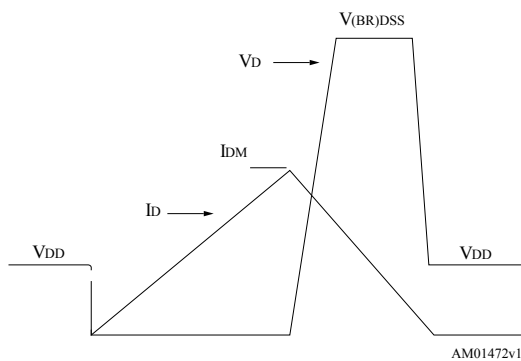
AM01469v1

Figure 14. Test circuit for inductive load switching and diode recovery times


AM01470v1

Figure 15. Unclamped inductive load test circuit


AM01471v1

Figure 16. Unclamped inductive waveform


AM01472v1

Figure 17. Switching time waveform

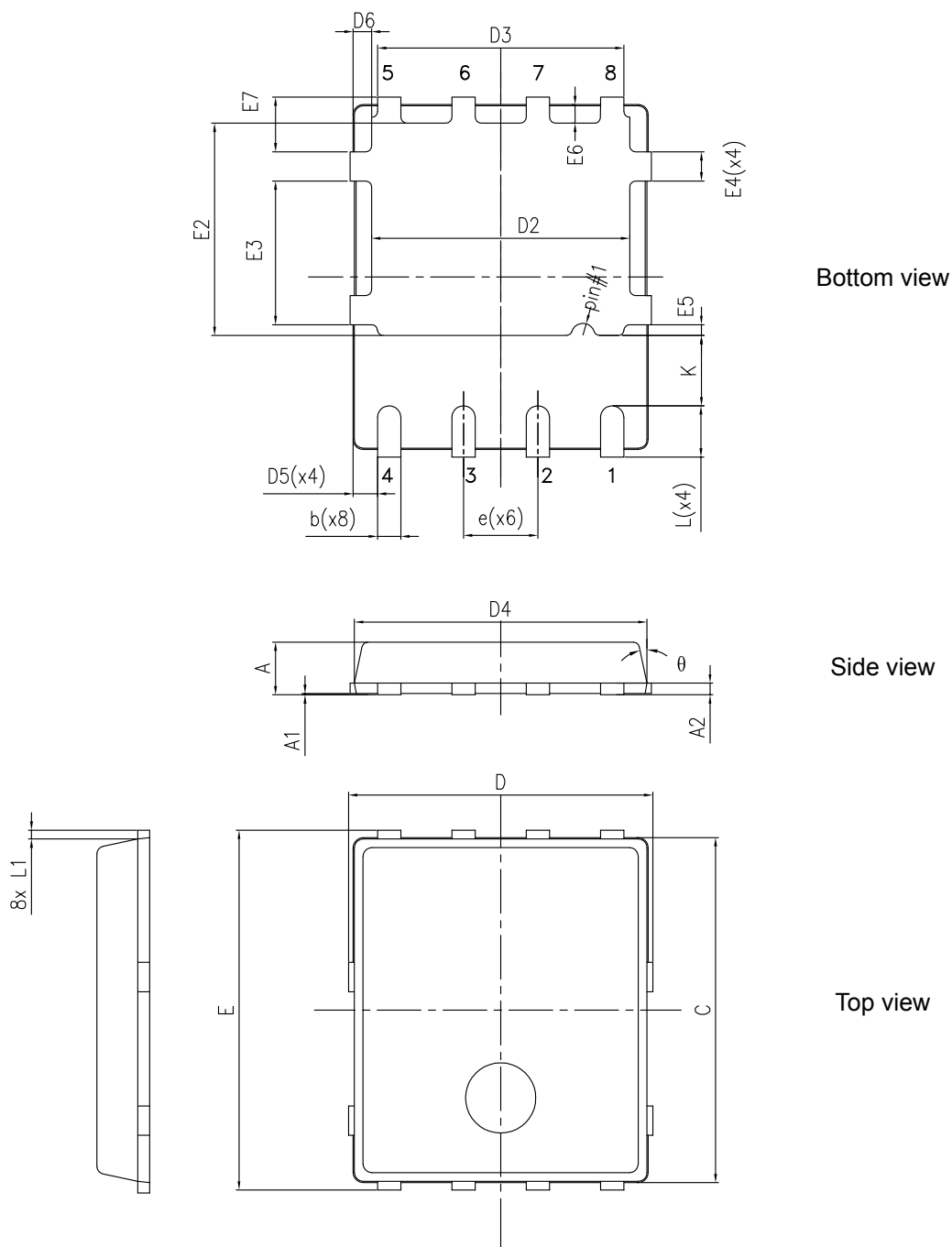

AM01473v1

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 PowerFLAT™ 5x6 type C package information

Figure 18. PowerFLAT™ 5x6 type C package outline

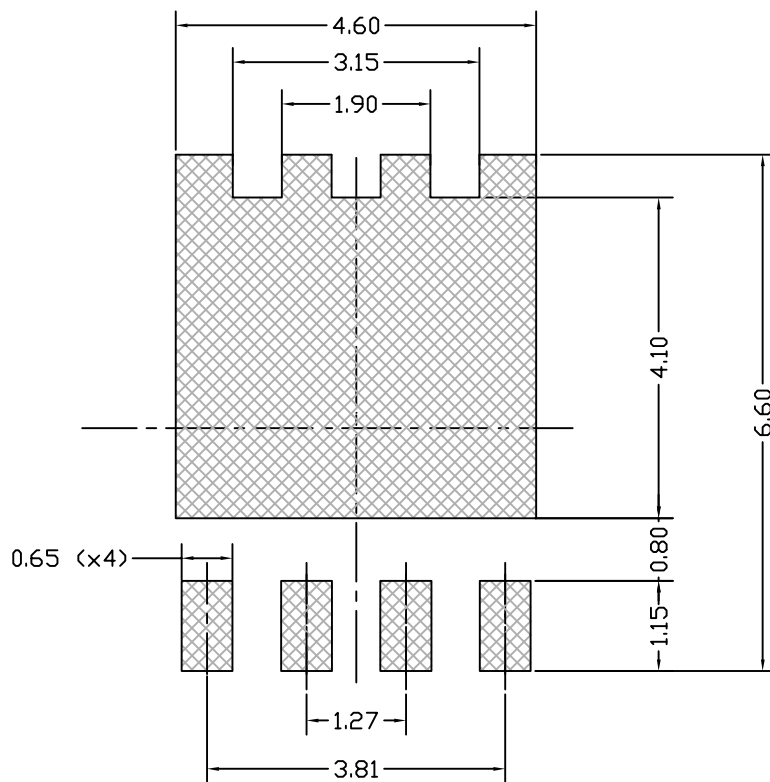


8231817_typeC_Rev18

Table 7. PowerFLAT™ 5x6 type C package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.80		1.00
A1	0.02		0.05
A2		0.25	
b	0.30		0.50
C	5.80	6.00	6.20
D	5.00	5.20	5.40
D2	4.15		4.45
D3	4.05	4.20	4.35
D4	4.80	5.00	5.20
D5	0.25	0.40	0.55
D6	0.15	0.30	0.45
e		1.27	
E	5.95	6.15	6.35
E2	3.50		3.70
E3	2.35		2.55
E4	0.40		0.60
E5	0.08		0.28
E6	0.20	0.325	0.45
E7	0.75	0.90	1.05
K	1.05		1.35
L	0.725		1.025
L1	0.05	0.15	0.25
θ	0°		12°

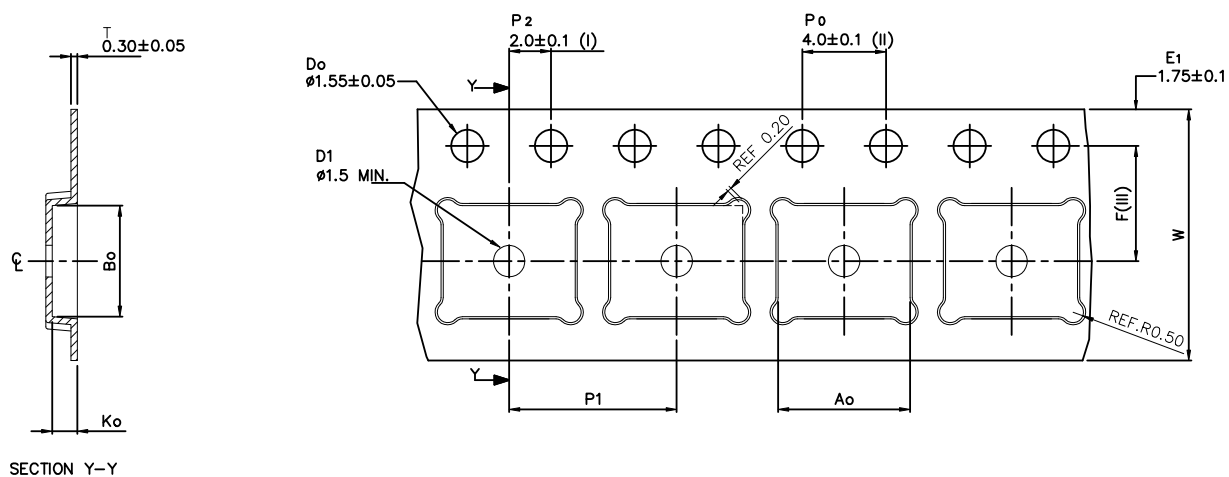
Figure 19. PowerFLAT™ 5x6 recommended footprint (dimensions are in mm)



8231817_FOOTPRINT_simp_Rev_18

4.2 PowerFLAT 5x6 packing information

Figure 20. PowerFLAT 5x6 tape (dimensions are in mm)



Ao	6.30 +/– 0.1
Bo	5.30 +/– 0.1
Ko	1.20 +/– 0.1
F	5.50 +/– 0.1
P1	8.00 +/– 0.1
W	12.00 +/– 0.3

(I) Measured from centreline of sprocket hole to centreline of pocket.

(II) Cumulative tolerance of 10 sprocket holes is ± 0.20 .

(III) Measured from centreline of sprocket hole to centreline of pocket

Base and bulk quantity 3000 pcs
 All dimensions are in millimeters

8234350_Tape_rev_C

Figure 21. PowerFLAT 5x6 package orientation in carrier tape

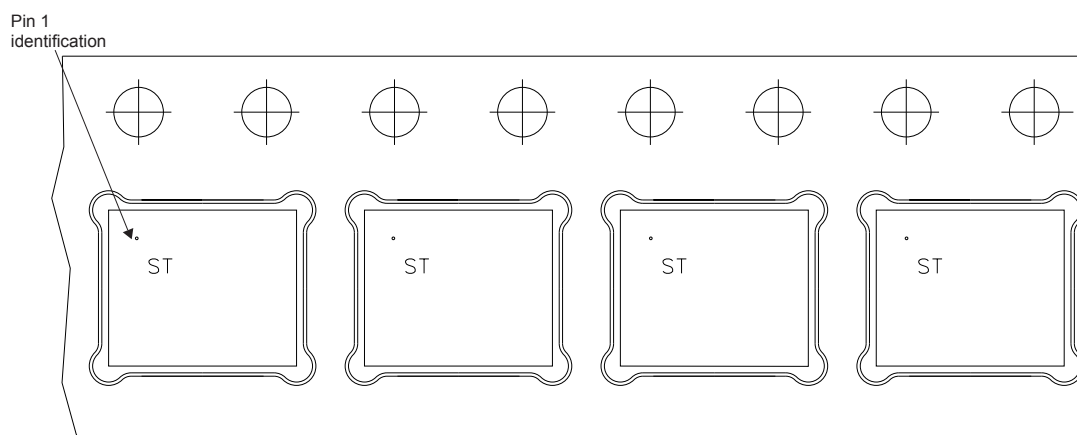
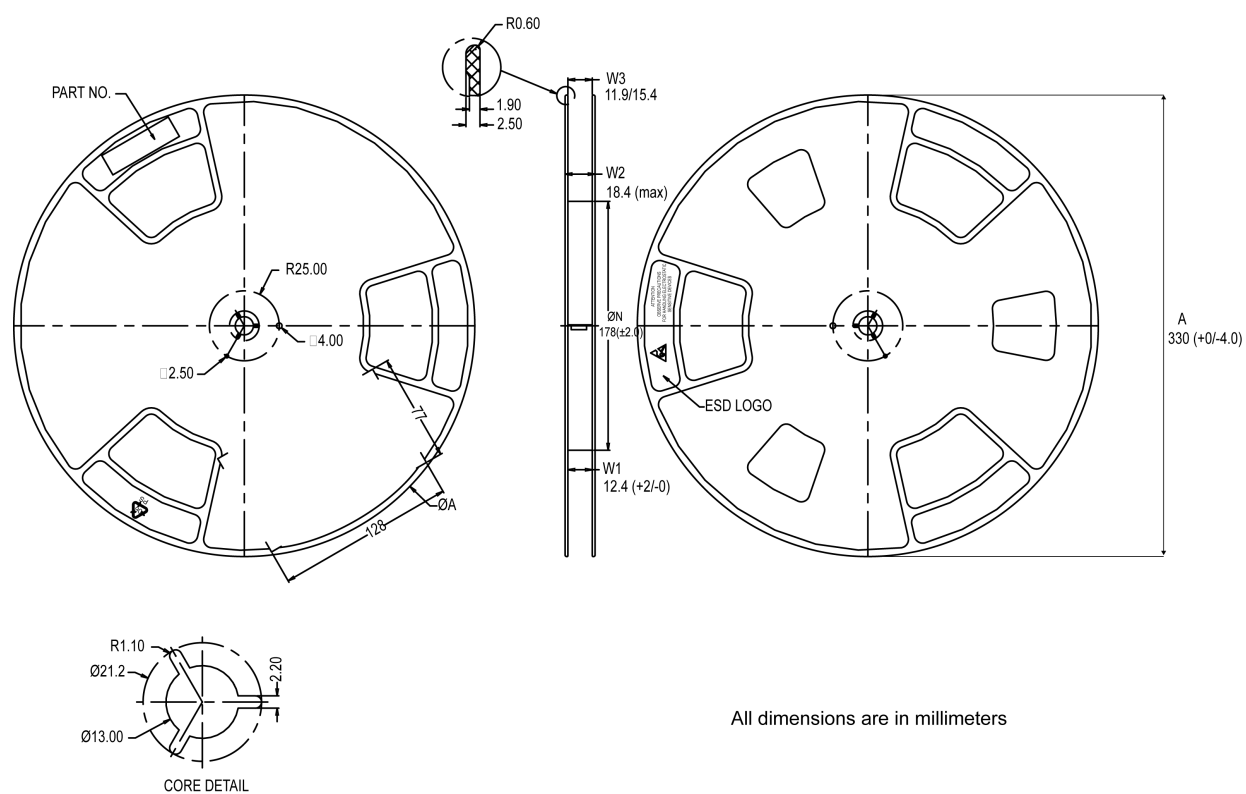


Figure 22. PowerFLAT 5x6 reel



8234350_Reel_rev_C

Revision history

Table 8. Document revision history

Date	Revision	Changes
25-Aug-2015	1	First release.
01-Oct-2015	2	Updated section electrical characteristics. Minor text changes.
08-Feb-2016	3	Updated title. Updated <i>Table 2: "Absolute maximum ratings"</i> , <i>Table 5: "Dynamic"</i> and <i>Table 6: "Switching times"</i> . Minor text changes.
13-May-2016	4	Modified: <i>Table 4: "On/off-state"</i> , <i>Table 5: "Dynamic"</i> , <i>Table 6: "Switching times"</i> and <i>Table 7: "Source-drain diode"</i> Updated <i>Section 4: "Package information"</i> Added: <i>Section 2.1: "Electrical characteristics (curves)"</i> Minor text changes
04-Jul-2019	5	Removed maturity status indication from cover page. The document status is production data. Updated Section 1 Electrical ratings , Section 2 Electrical characteristics and Section 2.1 Electrical characteristics (curves) . Minor text changes

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. For additional information about ST trademarks, please 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.

© 2019 STMicroelectronics – All rights reserved