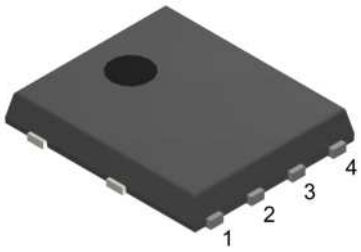
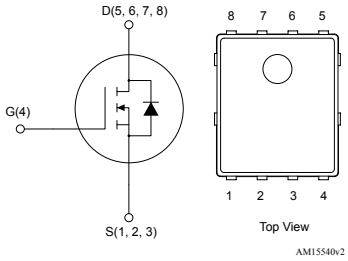
STL260N4LF7

Datasheet

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 °C	120	A
I_D (1)	Drain current (continuous) at T_C = 100 °C	120	A
I_{DM} (2) (1)	Drain current (pulsed)	480	A
I_D (3)	Drain current (continuous) at T_{pcb} = 25 °C	50	A
I_D (3)	Drain current (continuous) at T_{pcb} = 100 °C	35	A
I_{DM} (2) (3)	Drain current (pulsed)	200	A
P_{TOT} (1)	Total power dissipation at T_C = 25 °C	188	W
P_{TOT} (3)	Total power dissipation at T_{pcb} = 25 °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 $R_{thj\text{-}case}$ and limited by package*
2. *Pulse width limited by safe operating area*
3. *This value is rated according to $R_{thj\text{-}pcb}$*

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case	0.8	°C/W
$R_{thj\text{-}pcb}$ (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 °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 V, I_D = 250 µA	40			V
I_{DSS}	Zero gate voltage drain current	V_{GS} = 0 V, V_{DS} = 40 V			1	µA
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	1.2		2.5	V
$R_{DS(on)}$	Static drain-source on-resistance	V_{GS} = 10 V, I_D = 25 A		0.85	1.1	mΩ
		V_{GS} = 4.5 V, I_D = 25 A		1.2	1.4	mΩ

Table 4. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0 V	-	6000	-	pF
C_{oss}	Output capacitance		-	1700	-	pF
C_{rss}	Reverse transfer capacitance		-	170	-	pF
Q_g	Total gate charge	V_{DD} = 20 V, I_D = 50 A, V_{GS}= 0 to 4.5 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 V, I_D = 25 A, R_G = 4.7 Ω, V_{GS} = 10 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 A, V_{GS} = 0 V	-		1	V
t_{rr}	Reverse recovery time	(see Figure 15. Test circuit for inductive load switching and diode recovery times) I_D = 50 A, di/dt = 100 A/µs, V_{DD} = 32 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

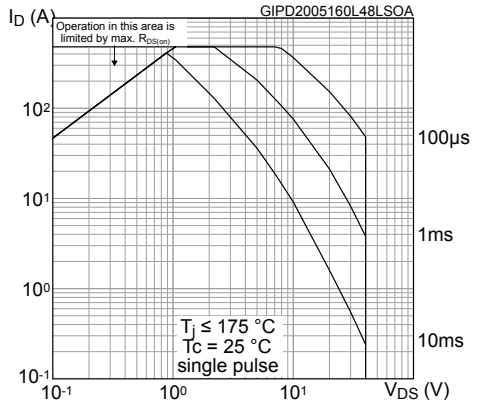


Figure 2. Thermal impedance

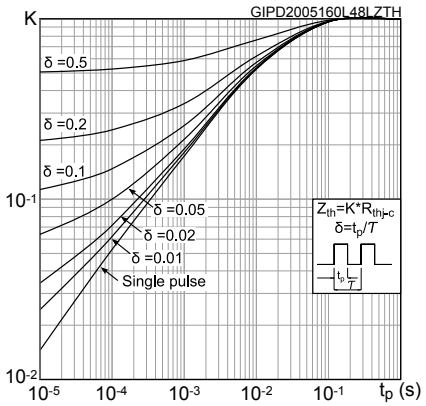


Figure 3. Output characteristics

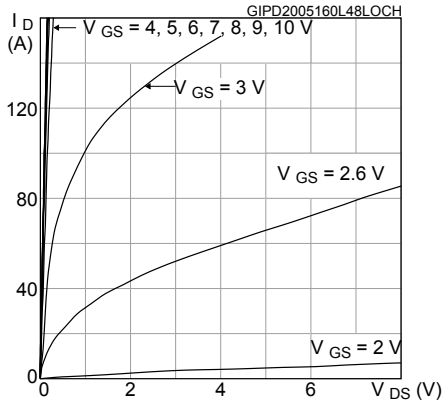


Figure 4. Transfer characteristics

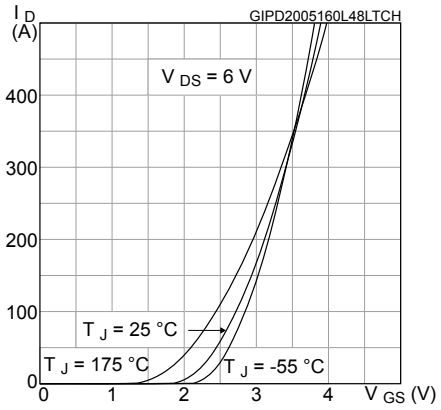


Figure 5. Gate charge vs gate-source voltage

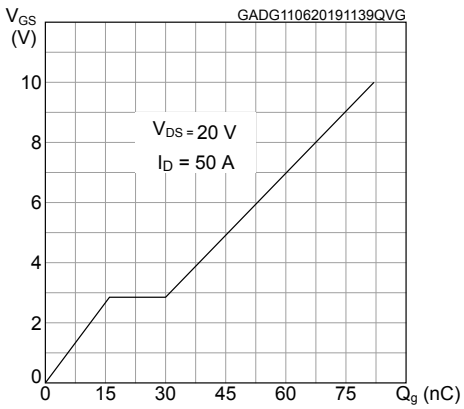


Figure 6. Static drain-source on-resistance

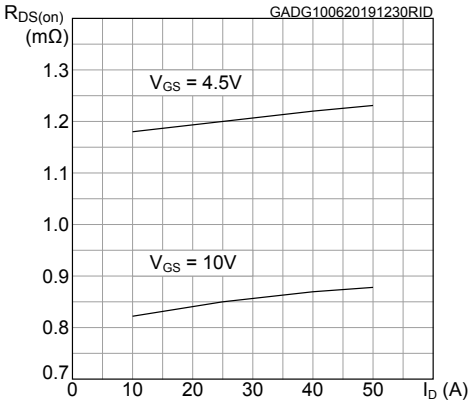


Figure 7. Capacitance variations

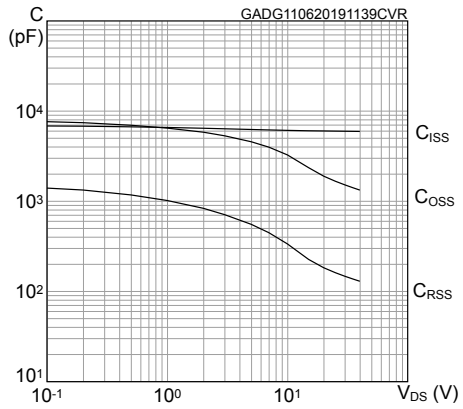


Figure 8. Normalized on-resistance vs temperature

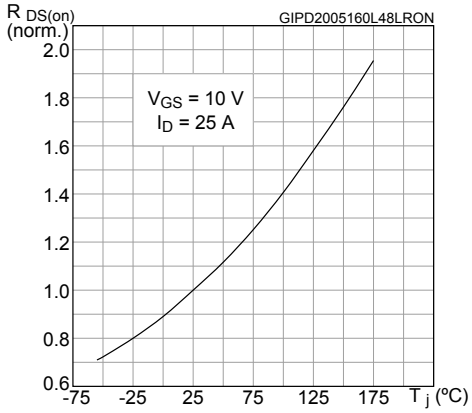


Figure 9. Normalized $V_{(BR)DSS}$ vs temperature

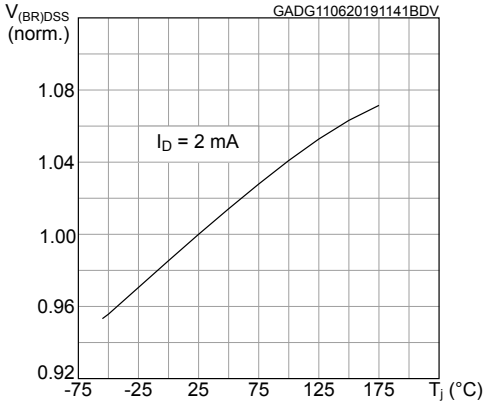


Figure 10. Normalized gate threshold voltage vs temperature

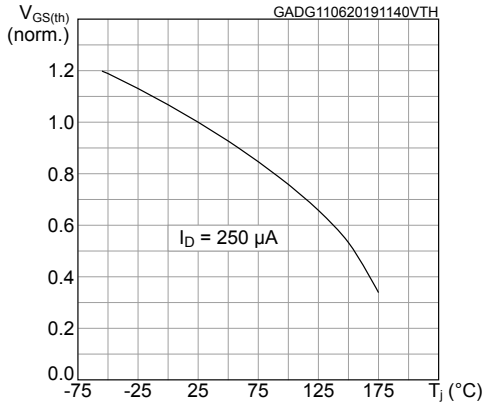
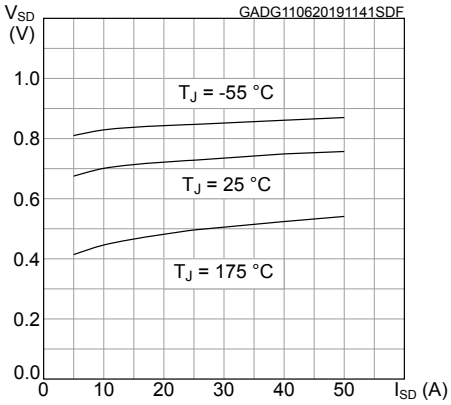


Figure 11. Source-drain diode forward characteristics



3 Test circuits

Figure 12. Test circuit for resistive load switching times

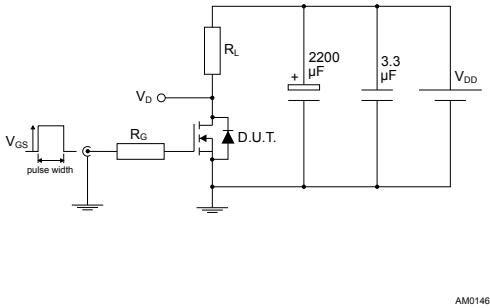


Figure 13. Test circuit for gate charge behavior

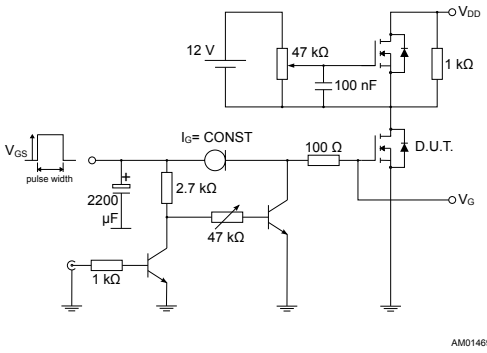


Figure 14. Test circuit for inductive load switching and diode recovery times

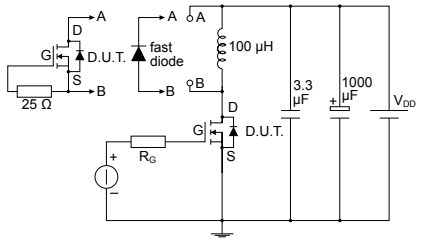


Figure 15. Unclamped inductive load test circuit

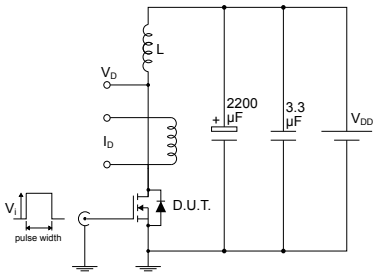


Figure 16. Unclamped inductive waveform

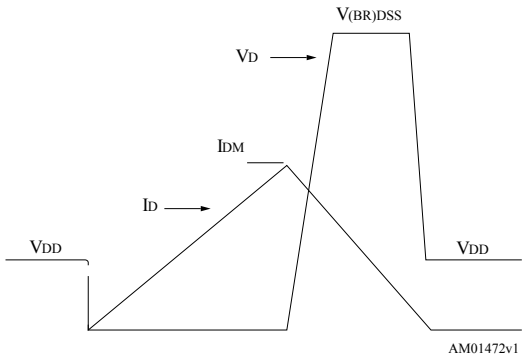
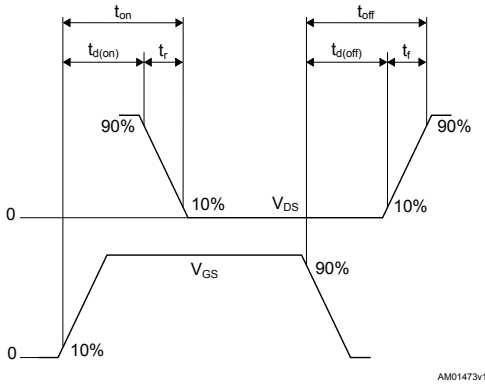


Figure 17. Switching time waveform



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**

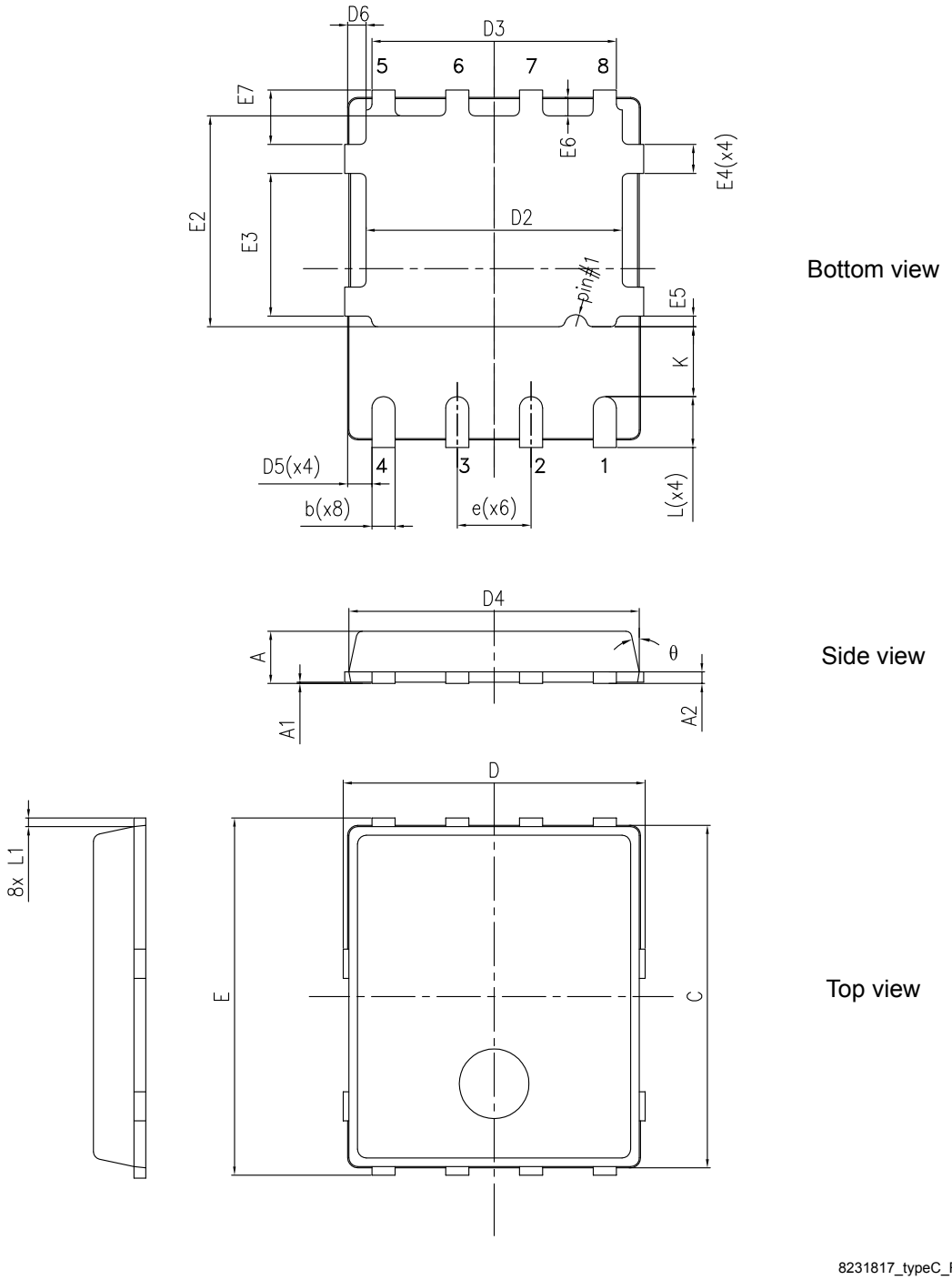
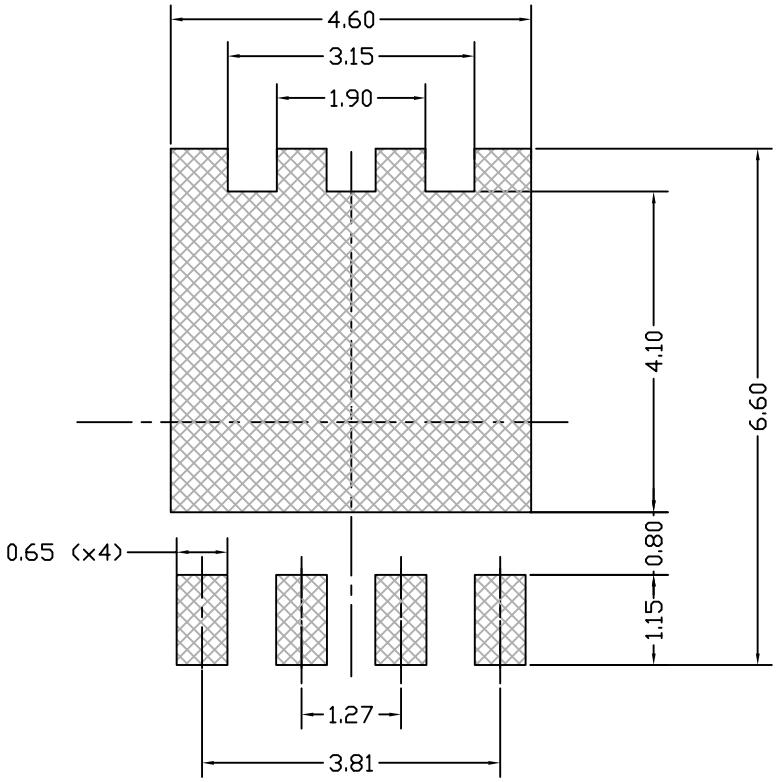


Table 7. **PowerFLAT™ 5x6 type C package mechanical data**

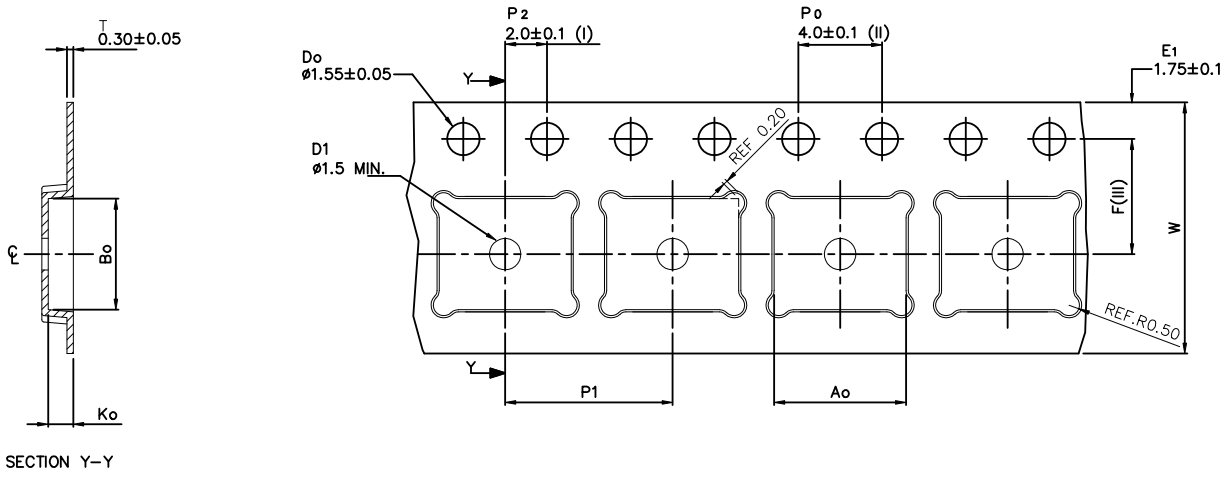
Dim.	mm		
	Min.	Typ.	Max.
A	0.80		1.00
A1	0.02		0.05
A2		0.25	
b	0.30		0.50
C	5.80	6.00	6.20
D	5.00	5.20	5.40
D2	4.15		4.45
D3	4.05	4.20	4.35
D4	4.80	5.00	5.20
D5	0.25	0.40	0.55
D6	0.15	0.30	0.45
e		1.27	
E	5.95	6.15	6.35
E2	3.50		3.70
E3	2.35		2.55
E4	0.40		0.60
E5	0.08		0.28
E6	0.20	0.325	0.45
E7	0.75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



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

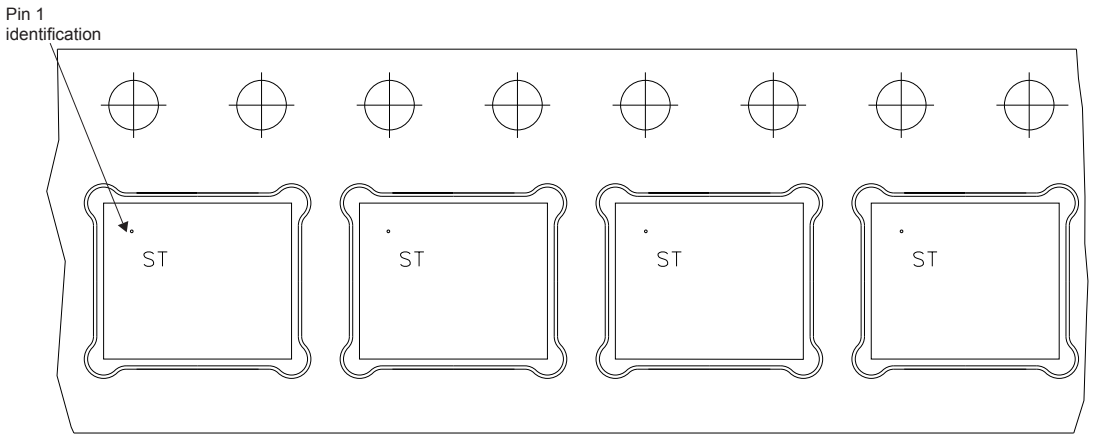
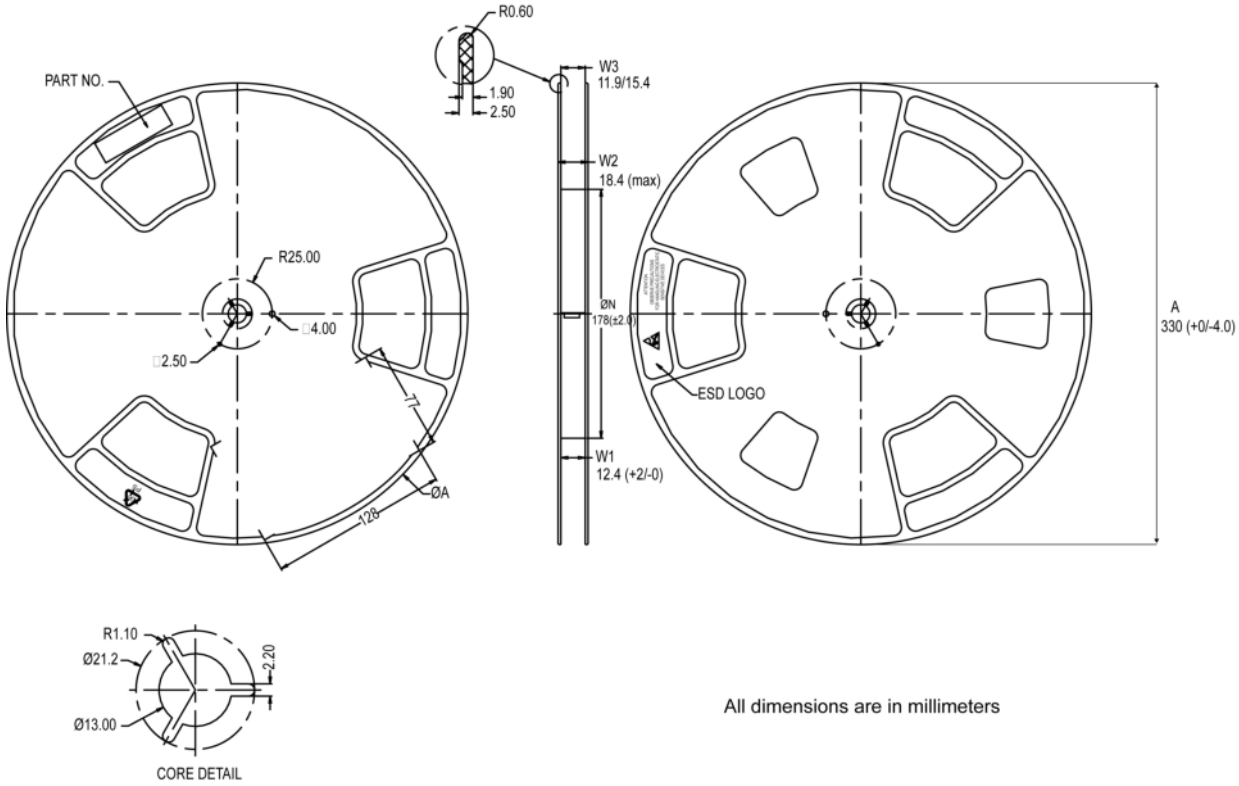


Figure 22. **PowerFLAT 5x6 reel**



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 *Table 2: "Absolute maximum ratings"*, *Table 5: "Dynamic"* and *Table 6: "Switching times"*. Minor text changes.
13-May-2016	4	Modified: *Table 4: "On/off-state"*, *Table 5: "Dynamic"*, *Table 6: "Switching times"* and *Table 7: "Source-drain diode"* Updated *Section 4: "Package information"* Added: *Section 2.1: "Electrical characteristics (curves)"* 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

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