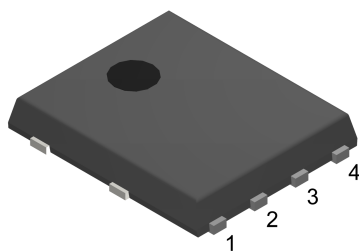
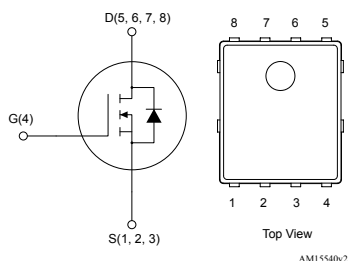


N-channel 40 V, 0.85 mΩ typ., 120 A STripFET F7 Power MOSFET in a PowerFLAT 5x6 package



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)

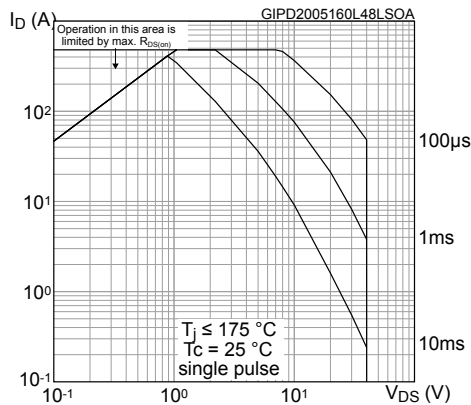
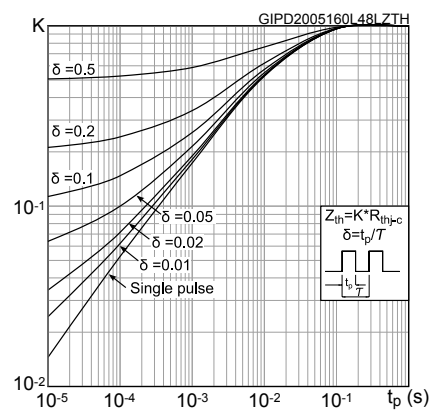
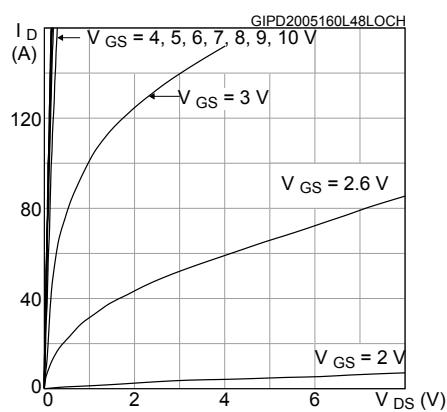
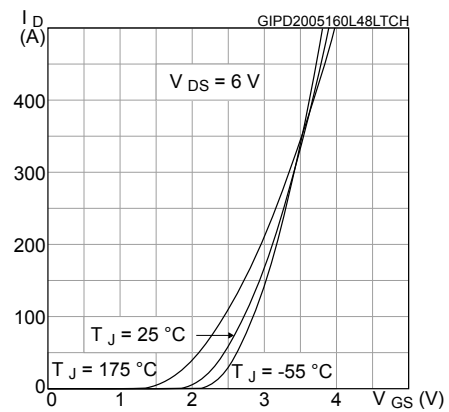
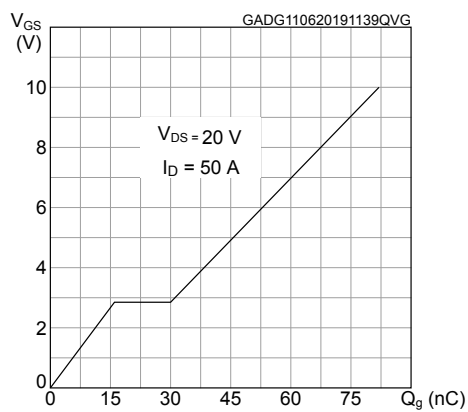
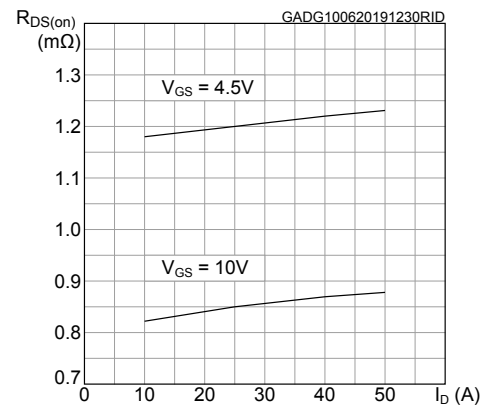
Figure 1. Safe operating area

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

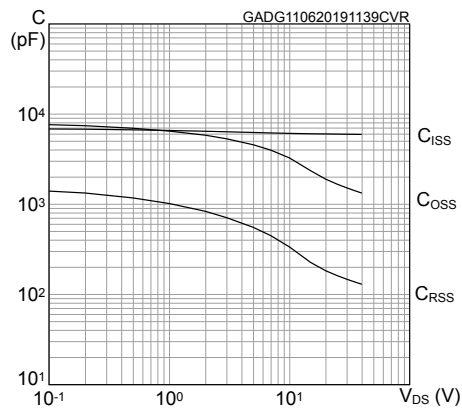


Figure 8. Normalized on-resistance vs temperature

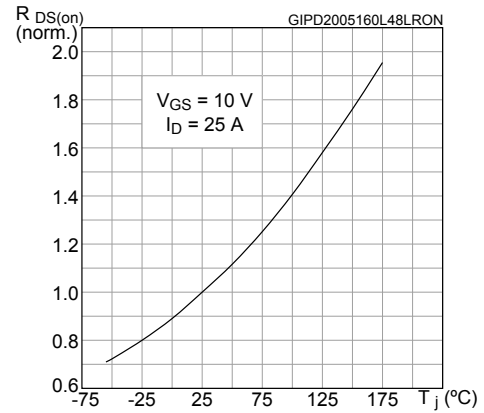


Figure 9. Normalized $V_{(BR)DSS}$ vs temperature

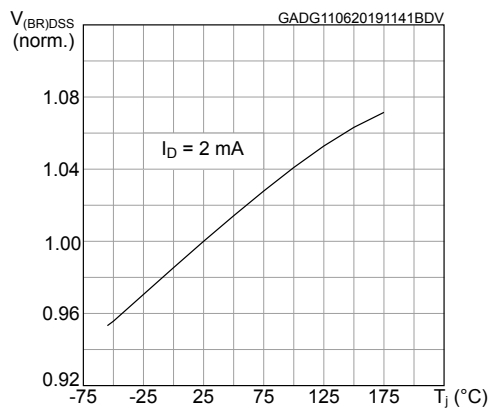


Figure 10. Normalized gate threshold voltage vs temperature

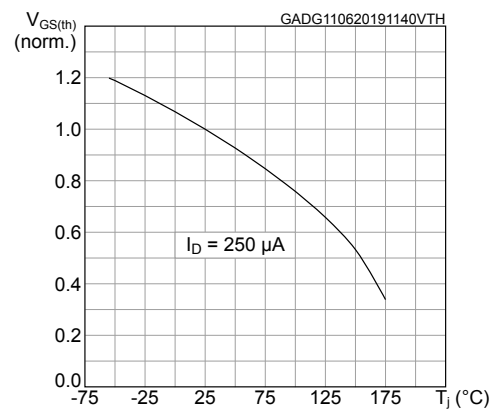
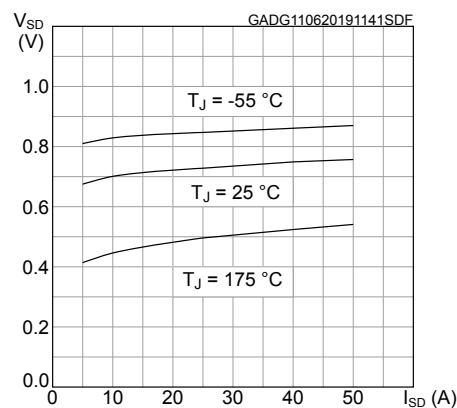
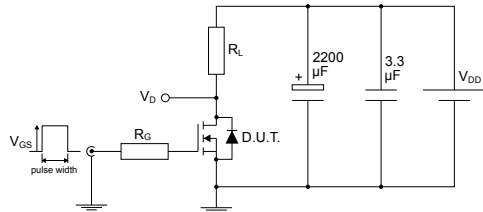


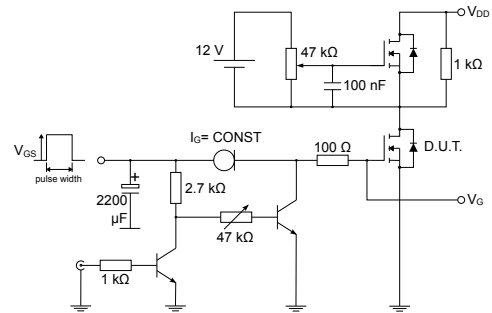
Figure 11. Source-drain diode forward characteristics



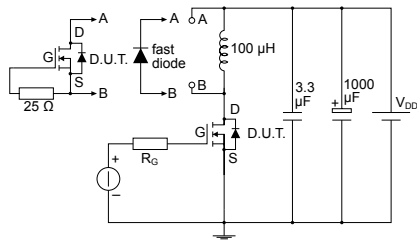
3 Test circuits

Figure 12. Test circuit for resistive load switching times


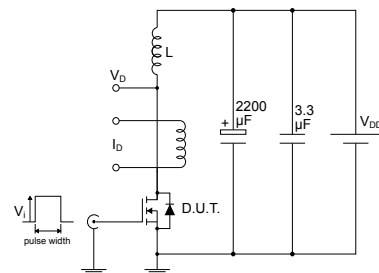
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Figure 13. Test circuit for gate charge behavior


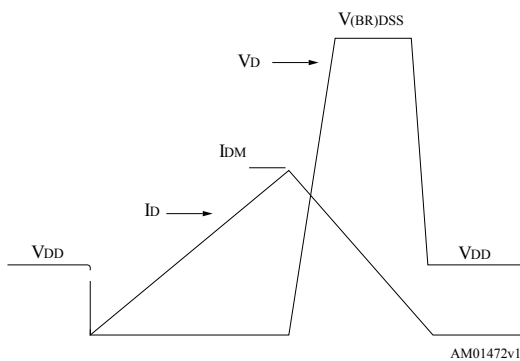
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Figure 14. Test circuit for inductive load switching and diode recovery times


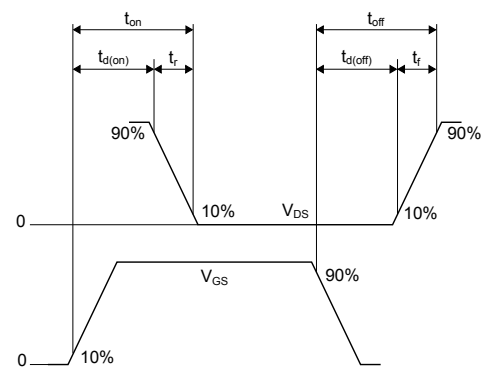
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Figure 15. Unclamped inductive load test circuit


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Figure 16. Unclamped inductive waveform


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Figure 17. Switching time waveform


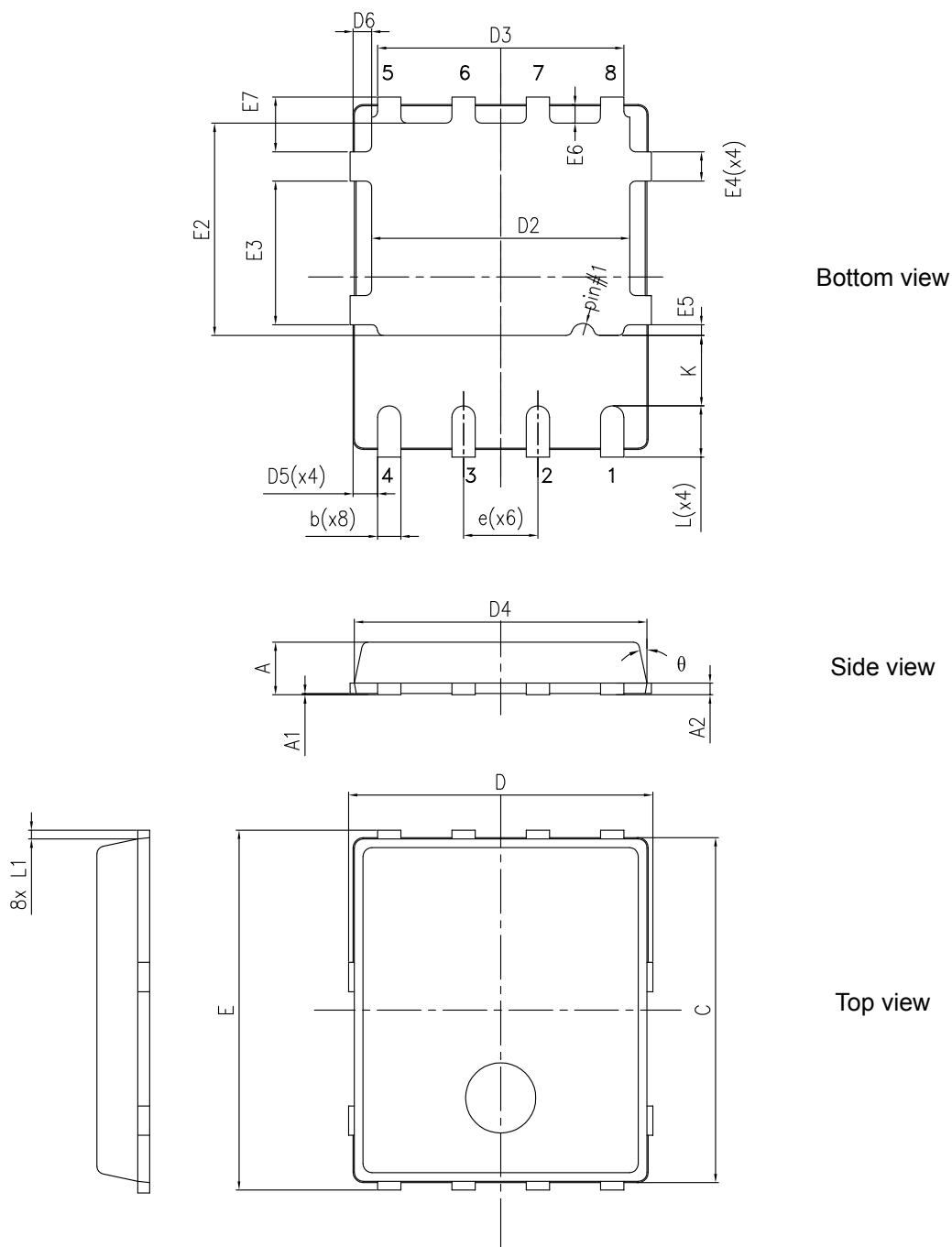
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4 Package information

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

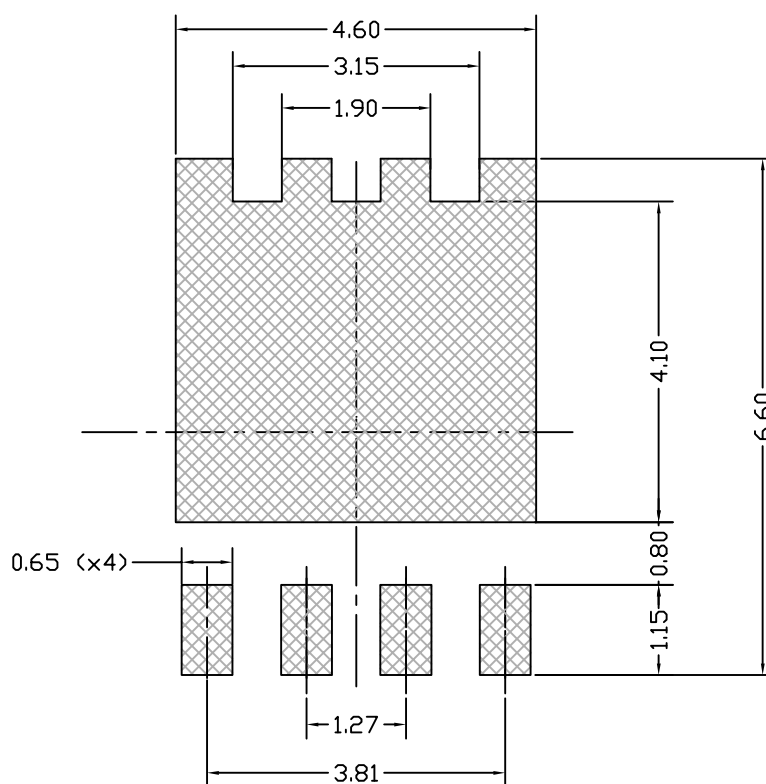


8231817_typeC_Rev18

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°

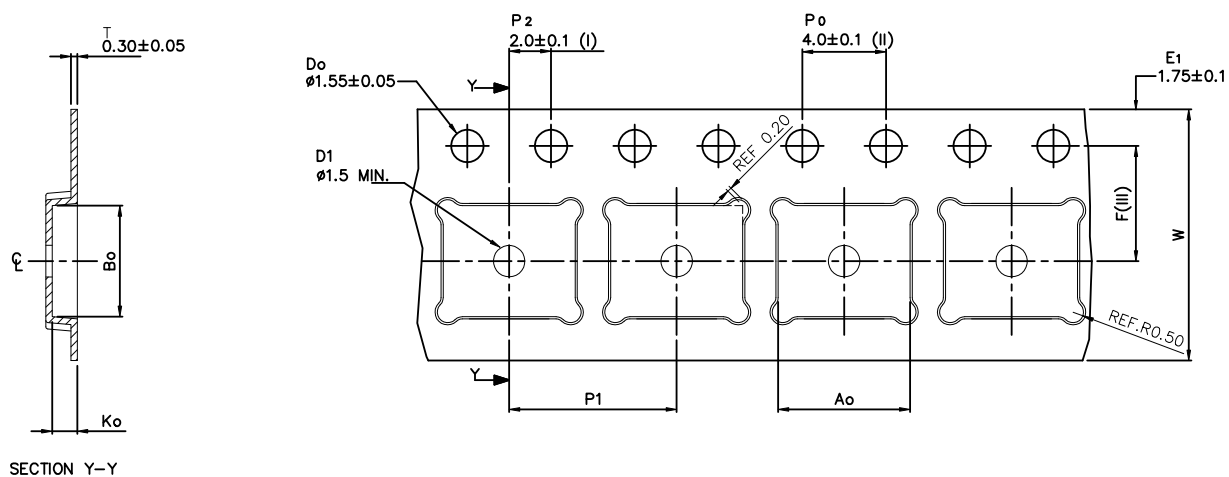
Figure 19. PowerFLAT™ 5x6 recommended footprint (dimensions are in mm)



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

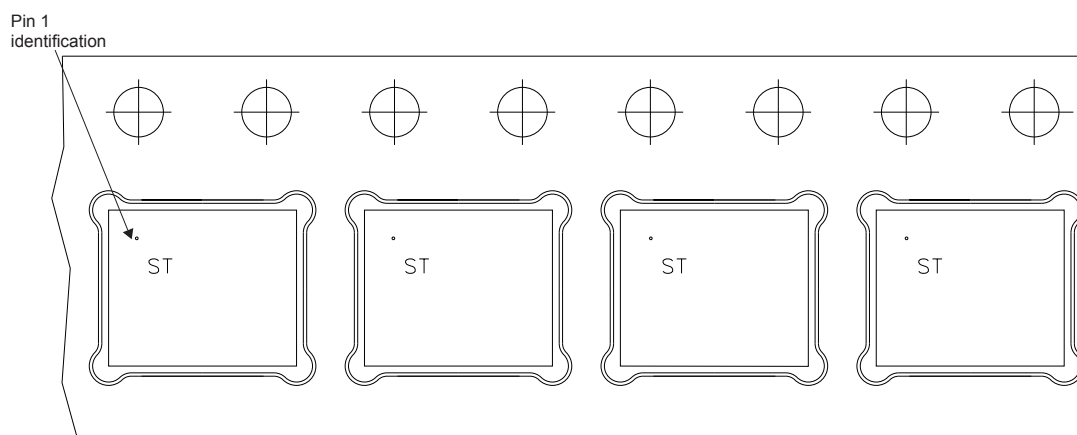
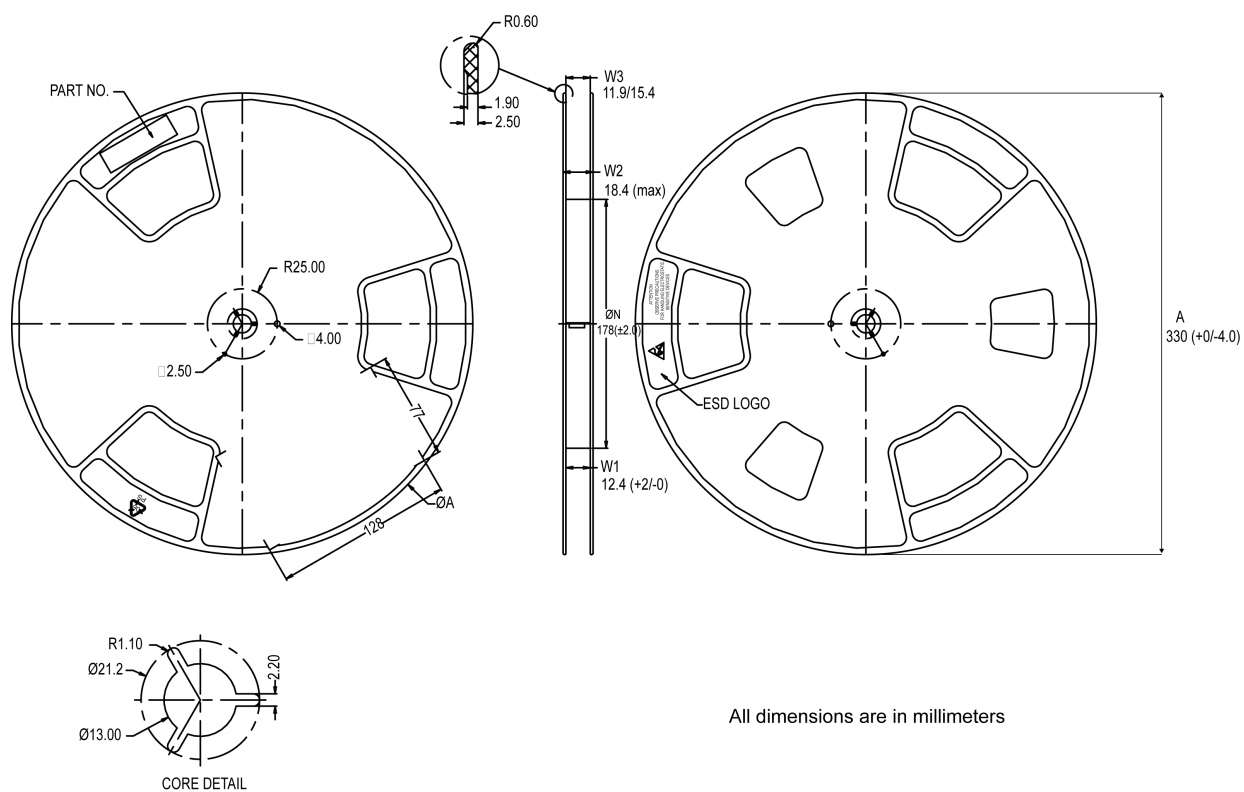


Figure 22. PowerFLAT 5x6 reel



All dimensions are in millimeters

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

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