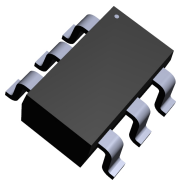
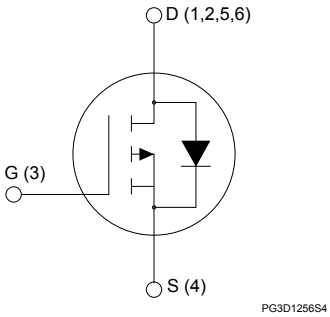
STT4P3LLH6

Datasheet

P-channel 30 V, 48 mΩ typ., 4 A, STripFET H6 Power MOSFET in an SOT23-6L package



SOT23-6L



Features

Order code	V_{DS}	$R_{DS(on)}$ max.	I_D
STT4P3LLH6	30 V	56 mΩ at 10 V	4 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 H6 technology with a new trench gate structure. The resulting Power MOSFET exhibits very low $R_{DS(on)}$ in all packages.

Product status link
STT4P3LLH6

Product summary	
Order code	STT4P3LLH6
Marking	4K3L
Package	SOT23-6L
Packing	Tape and reel

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	30	V
V_{GS}	Gate-source voltage	±20	V
I_D	Drain current (continuous) at T_{amb} = 25 °C	4	A
	Drain current (continuous) at T_{amb} = 100 °C	2.5	
I_{DM} (1)	Drain current (pulsed)	16	A
P_{TOT}	Total power dissipation at T_{amb} = 25 °C	1.6	W
T_{stg}	Storage temperature range	-55 to 150	°C
T_J	Operating junction temperature		

1. *Pulse width limited by safe operating area.*

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJA} (1)	Thermal resistance, junction-to-ambient	78	°C/W

1. *When mounted on 1 inch² FR-4 board, 2 oz. Cu., t ≤ 10 s.*

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

2 Electrical characteristics

(T_C = 25 °C unless otherwise specified)

Table 3. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	V_{GS} = 0 V, I_D = 250 µA	30			V
I_{DSS}	Zero gate voltage drain current	V_{GS} = 0 V, V_{DS} = 30 V			1	µA
		V_{GS} = 0 V, V_{DS} = 30 V, T_C = 125 °C(1)			10	
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	1.0		2.5	V
$R_{DS(on)}$	Static drain-source on-resistance	V_{GS} = 10 V, I_D = 2 A		48	56	mΩ
		V_{GS} = 4.5 V, I_D = 2 A		75	90	

1. *Defined by design, not subject to production test.*

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	-	639	-	pF
C_{oss}	Output capacitance		-	79	-	pF
C_{rss}	Reverse transfer capacitance		-	52	-	pF
Q_g	Total gate charge	V_{DD} = 15 V, I_D = 4 A, V_{GS} = 4.5 V (see Figure 13. Gate charge test circuit)	-	6	-	nC
Q_{gs}	Gate-source charge		-	1.9	-	nC
Q_{gd}	Gate-drain charge		-	2.1	-	nC

Table 5. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	V_{DD} = 15 V, I_D = 2 A, R_G = 4.7 Ω, V_{GS} = 10 V (see Figure 12. Switching times test circuit for resistive load)	-	5.4	-	ns
t_r	Rise time		-	5	-	ns
$t_{d(off)}$	Turn-off delay time		-	19.2	-	ns
t_f	Fall time		-	3.4	-	ns

Table 6. Source-drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{SD} (1)	Forward on voltage	I_{SD} = 4 A, V_{GS} = 0 V	-		1.1	V
t_{rr}	Reverse recovery time	I_{SD} = 4 A, di/dt = 100 A/µs, V_{DD} = 16 V, T_J = 150 °C (see Figure 14. Test circuit for inductive load switching and diode recovery times)	-	11.2		ns
Q_{rr}	Reverse recovery charge		-	3.5		nC
I_{RRM}	Reverse recovery current		-	0.6		A

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

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

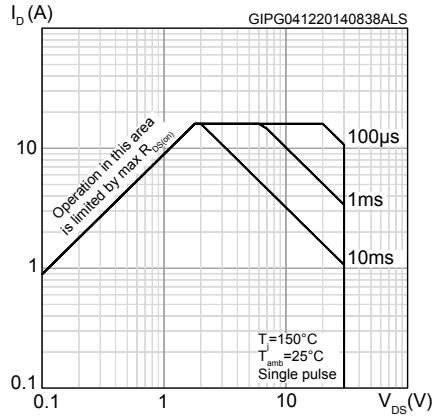


Figure 2. Normalized transient thermal impedance

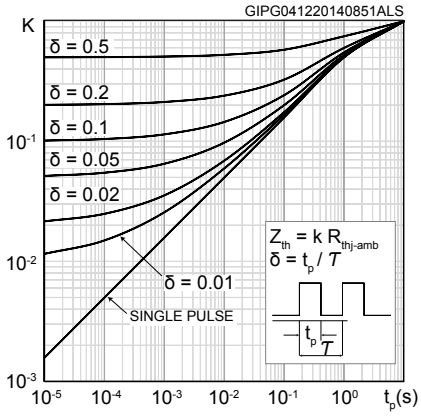


Figure 3. Typical output characteristics

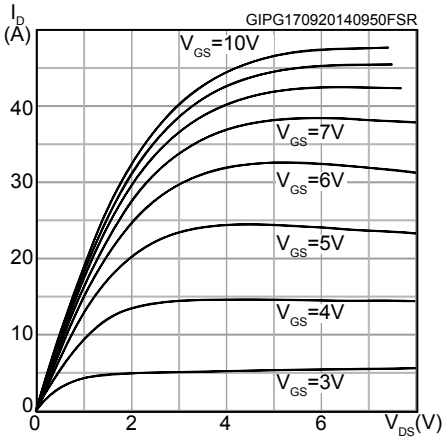


Figure 4. Typical transfer characteristics

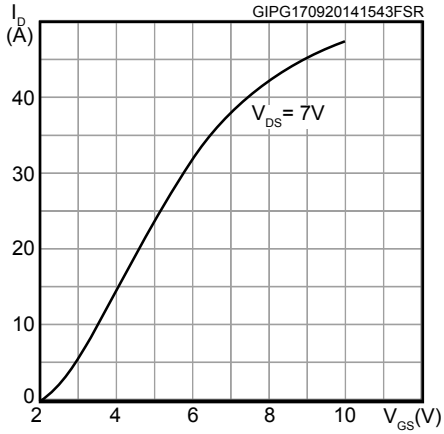


Figure 5. Typical gate charge vs gate-source voltage

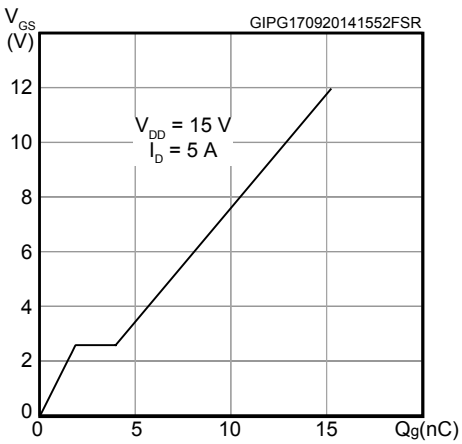


Figure 6. Typical static drain-source on-resistance

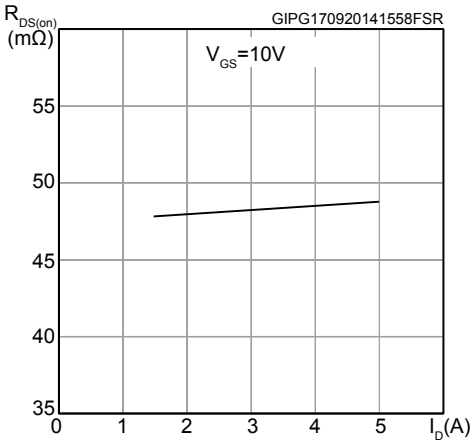


Figure 7. Normalized breakdown voltage vs temperature

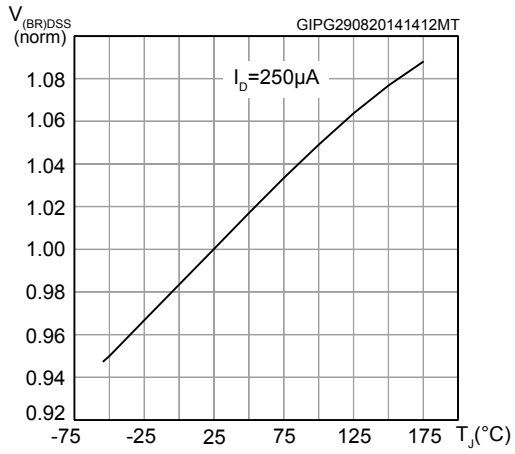


Figure 8. Typical capacitance characteristics

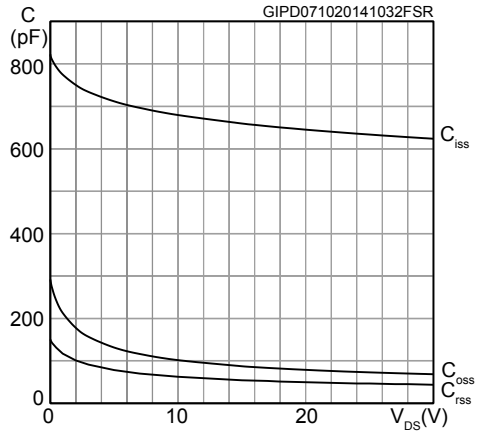


Figure 9. Normalized gate threshold voltage vs temperature

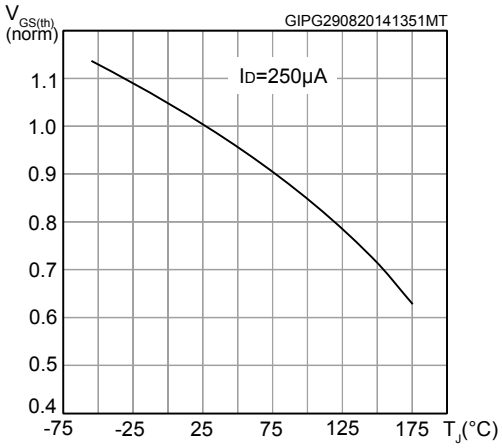


Figure 10. Normalized on-resistance vs temperature

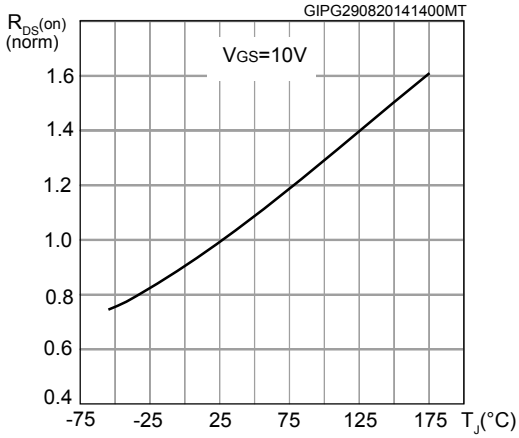
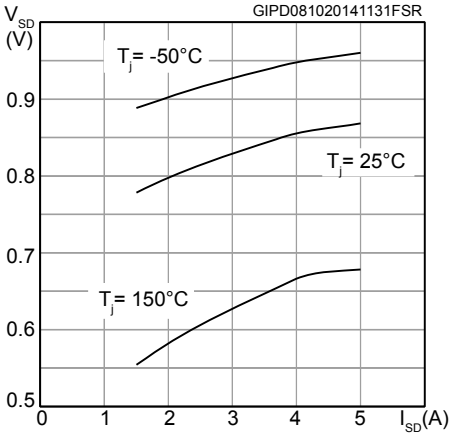


Figure 11. Typical reverse diode forward characteristics



Note: For the P-channel Power MOSFET, current and voltage polarities are reversed.

3 Test circuits

Figure 12. Switching times test circuit for resistive load

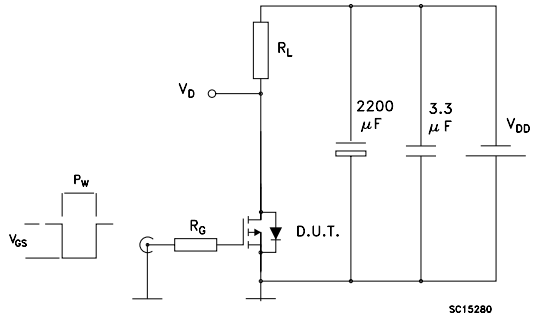


Figure 13. Gate charge test circuit

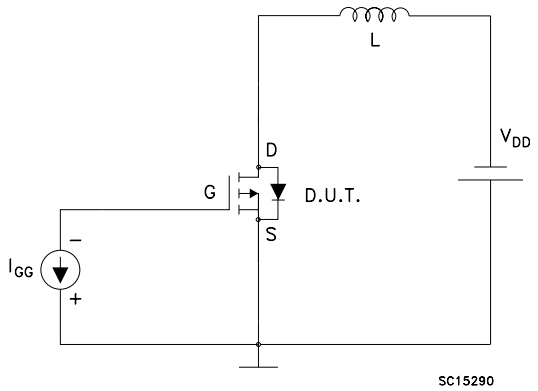
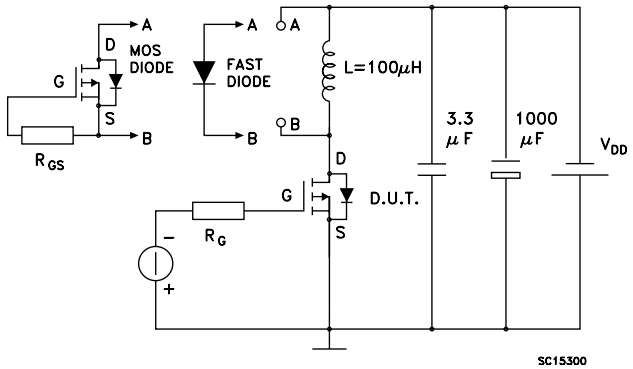


Figure 14. Test circuit for inductive load switching and diode recovery times



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 SOT23-6L package information

Figure 15. SOT23-6L package outline

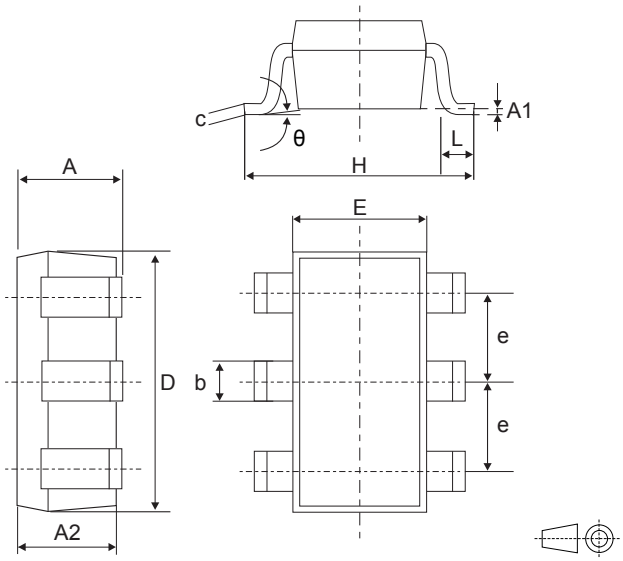


Table 7. SOT23-6L package mechanical data

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
A			1.25
A1	0		0.15
A2	1.0	1.10	1.20
b	0.36		0.50
C	0.14		0.20
D	2.826	2.926	3.026
E	1.526	1.626	1.726
e	0.90	0.95	1.00
H	2.60	2.80	3.00
L	0.35	0.45	0.60
θ	0		8

Figure 16. Footprint recommendations, dimensions in mm (inches)

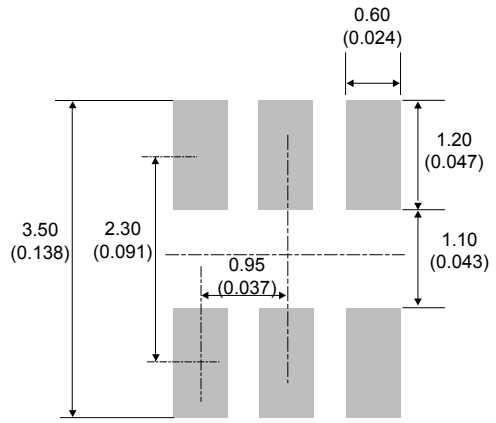


Figure 17. Marking layout (refer to ordering information table for marking)

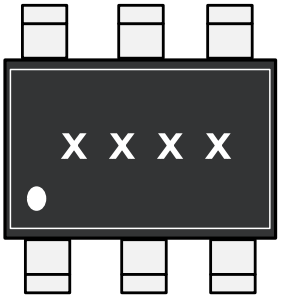
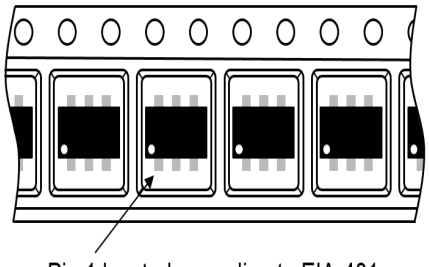


Figure 18. Package orientation in reel



Note: Pocket dimensions are not on scale
Pocket shape may vary depending on package

Figure 19. Tape and reel orientation

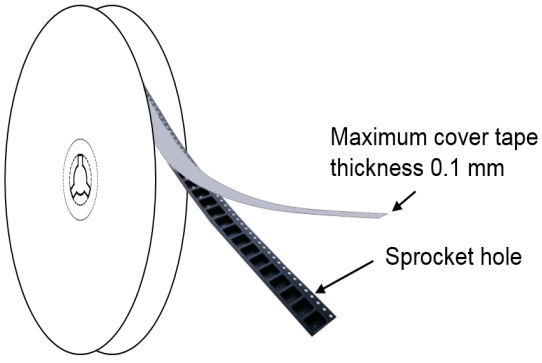


Figure 20. Reel dimensions (mm)

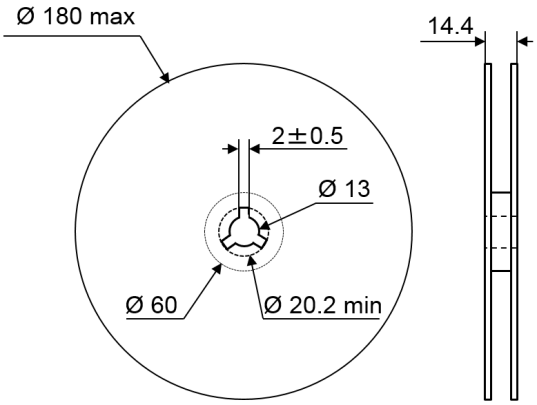


Figure 21. Inner box dimensions (mm)

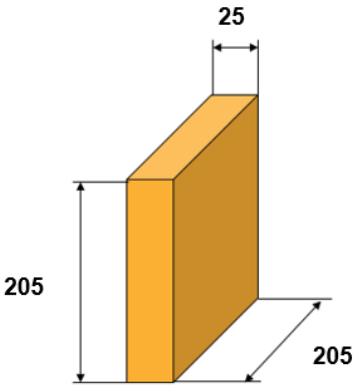


Figure 22. **Tape outline**

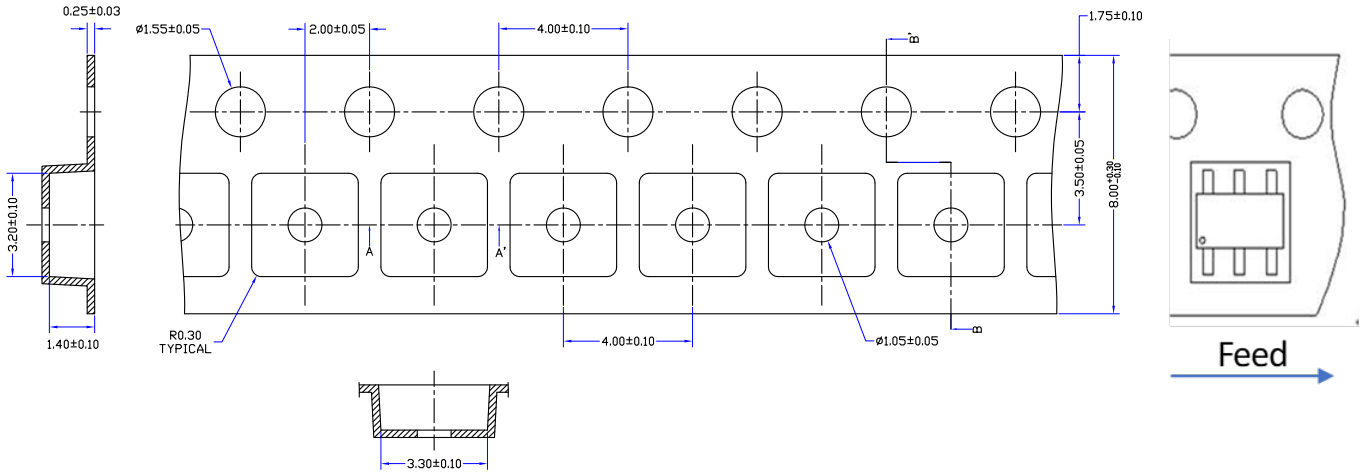


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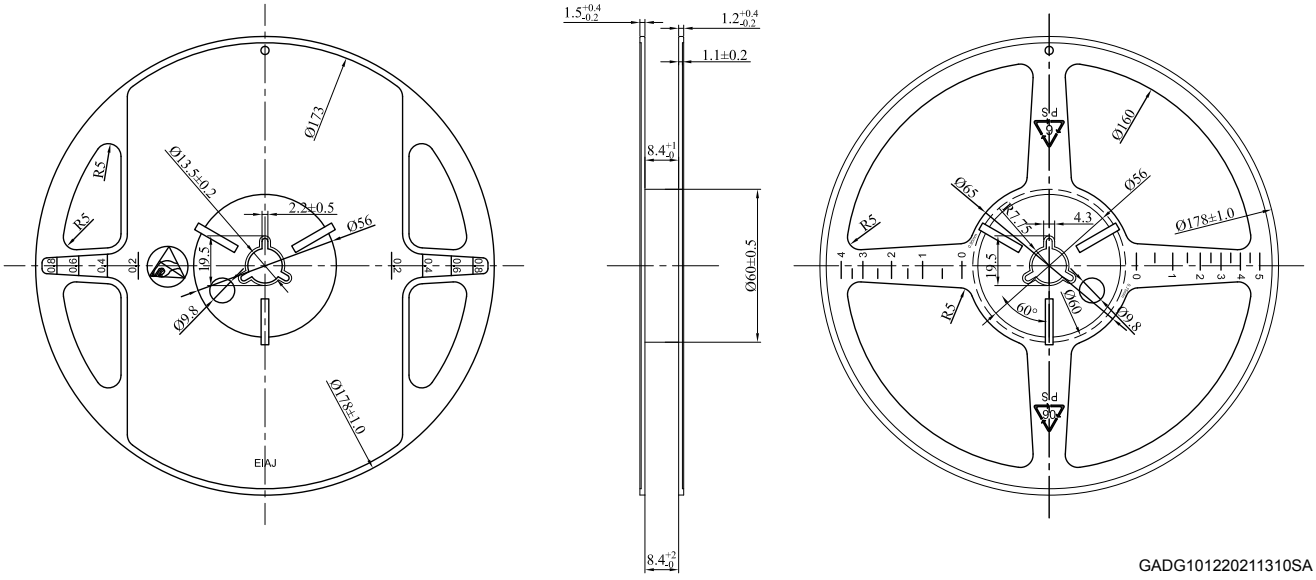
Figure 23. **Reel outline**



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Revision history

Table 8. **Document revision history**

Date	Version	Changes
09-May-2013	1	First revision.
09-Dec-2014	2	Text edits throughout document On cover page: – changed title description – updated Features – updated Description Updated *Table 4* In *Table 5*, changed values and test conditions In *Table 6*, changed values and test conditions In *Table 7*, changed values and test conditions Added *Section 2.1: Electrical characteristics (curves)* Updated *Section 3: Test circuits* Updated *Section 4: Package mechanical data*
10-Dec-2021	3	Updated Section 4 Package information. Minor text changes.

Contents

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