

P-channel -30 V, 0.01 Ω typ., -12.5 A, STripFET™ H6 Power MOSFET in an SO-8 package

Datasheet - production data

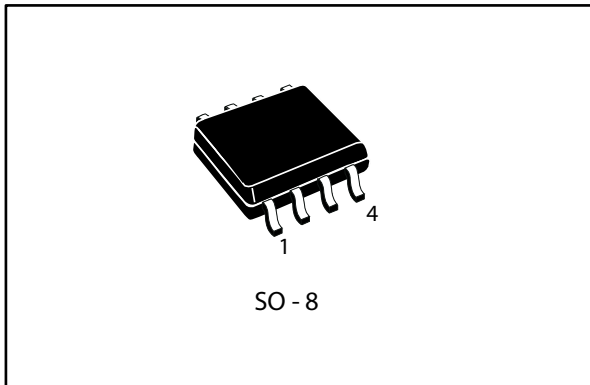


Figure 1: Internal schematic diagram

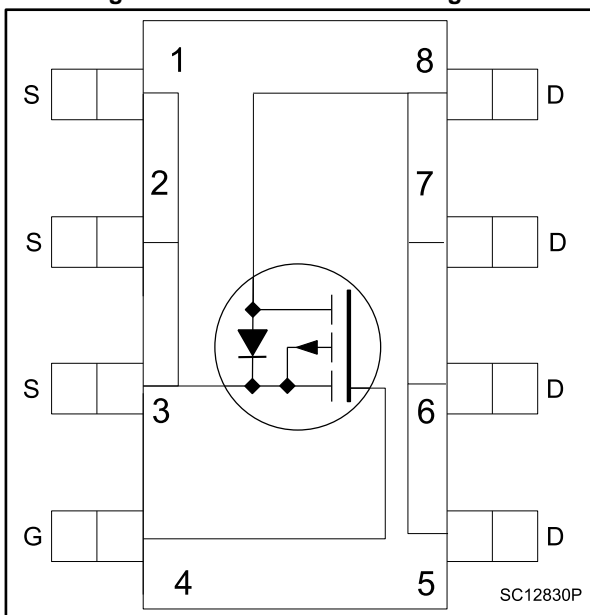


Table 1: Device summary

Order code	Marking	Packages	Packing
STS10P3LLH6	10K3L	SO-8	Tape and reel

Features

Order code	V _{DS}	R _{DS(on)} max	I _D
STS10P3LLH6	-30 V	0.012 Ω	-12.5 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.

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1 Electrical ratings

Table 2: 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 $T_{amb} = 25^\circ\text{C}$	-12.5	A
	Drain current (continuous) at $T_{amb} = 100^\circ\text{C}$	-7.8	
$I_{DM}^{(1)}$	Drain current (pulsed)	-50	A
P_{TOT}	Total dissipation at $T_{amb} = 25^\circ\text{C}$	2.7	W
T_{stg}	Storage temperature	-55 to 150	$^\circ\text{C}$
T_j	Operating junction temperature		

Notes:

⁽¹⁾Pulse width limited by safe operating area

Table 3: Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-amb}^{(1)}$	Thermal resistance junction-amb	47	$^\circ\text{C/W}$

Notes:

⁽¹⁾When mounted on 1 inch² FR-4 board, 2 oz. Cu., $t \leq 10$ s

2 Electrical characteristics

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

Table 4: On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source breakdown voltage	I _D = -250 μA	-30			V
I _{DSS}	Zero gate voltage drain current (V _{GS} = 0)	V _{DS} = -30 V			-1	μA
		V _{DS} = -30 V, T _C = 125 °C			-10	μA
I _{GSS}	Gate-body leakage current (V _{DS} = 0)	V _{GS} = ±20 V			-100	nA
V _{GS(th)}	Gate threshold voltage	V _{DS} = V _{GS} , I _D = -250 μA	1			V
R _{DS(on)}	Static drain-source on-resistance	V _{GS} = -10 V, I _D = -5 A		0.01	0.012	Ω
		V _{GS} = -4.5 V, I _D = -5 A		0.014	0.017	

Table 5: Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C _{iss}	Input capacitance	V _{DS} = -25 V, f = 1 MHz, V _{GS} = 0 V	-	3350	-	pF
C _{OSS}	Output capacitance		-	414	-	
C _{rss}	Reverse transfer capacitance		-	287	-	
Q _g	Total gate charge	V _{DD} = -15 V, I _D = -10 A V _{GS} = -4.5 V (see Figure 14: "Gate charge test circuit")	-	33	-	nC
Q _{gs}	Gate-source charge		-	14	-	
Q _{gd}	Gate-drain charge		-	11	-	

Table 6: Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t _{d(on)}	Turn-on delay time	V _{DD} = -15 V, I _D = -5 A R _G = 4.7 Ω, V _{GS} = -10 V (see Figure 13: "Switching times test circuit for resistive load")	-	12.8	-	ns
t _r	Rise time		-	112	-	
t _{d(off)}	Turn-off delay time		-	61	-	
t _f	Fall time		-	45	-	

Table 7: Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V _{SD} ⁽¹⁾	Forward on voltage	I _{SD} = -5 A, V _{GS} = 0	-		-1.1	V
t _{rr}	Reverse recovery time	I _{SD} = -5 A, di/dt = 100 A/μs V _{DD} = -24 V, T _j = 150 °C (see Figure 15: "Source-drain diode forward characteristics")	-	25.2		ns
Q _{rr}	Reverse recovery charge		-	17.4		nC
I _{RRM}	Reverse recovery current		-	-1.4		A

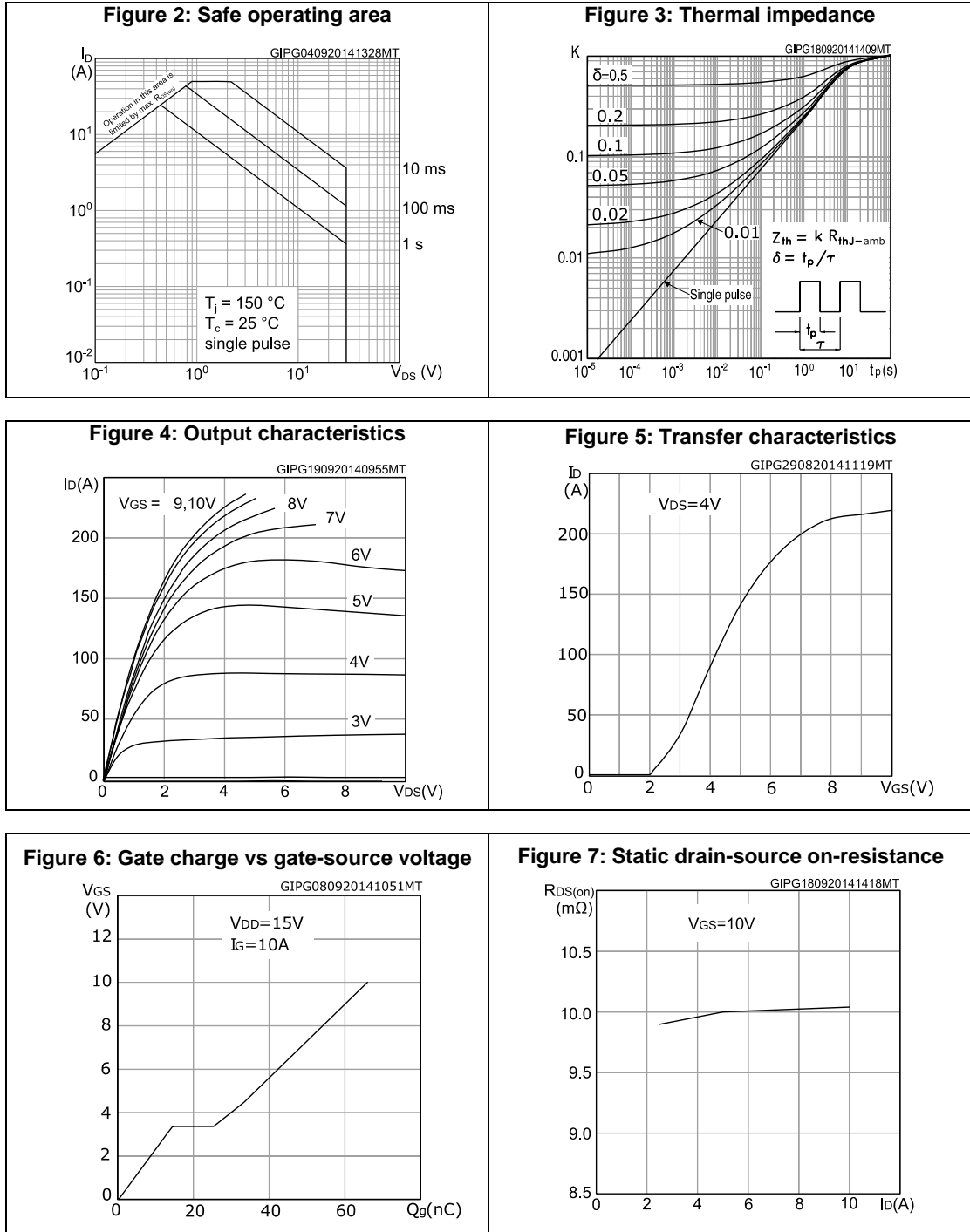
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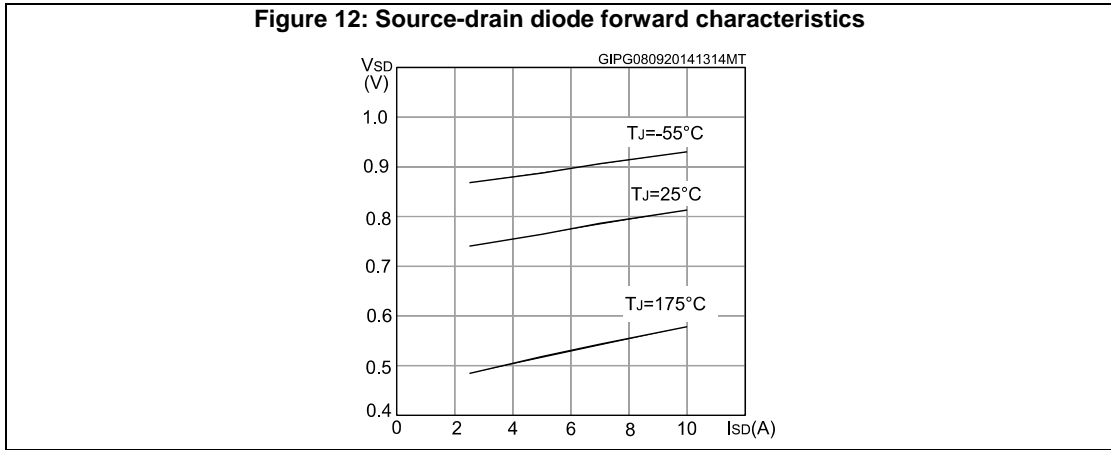
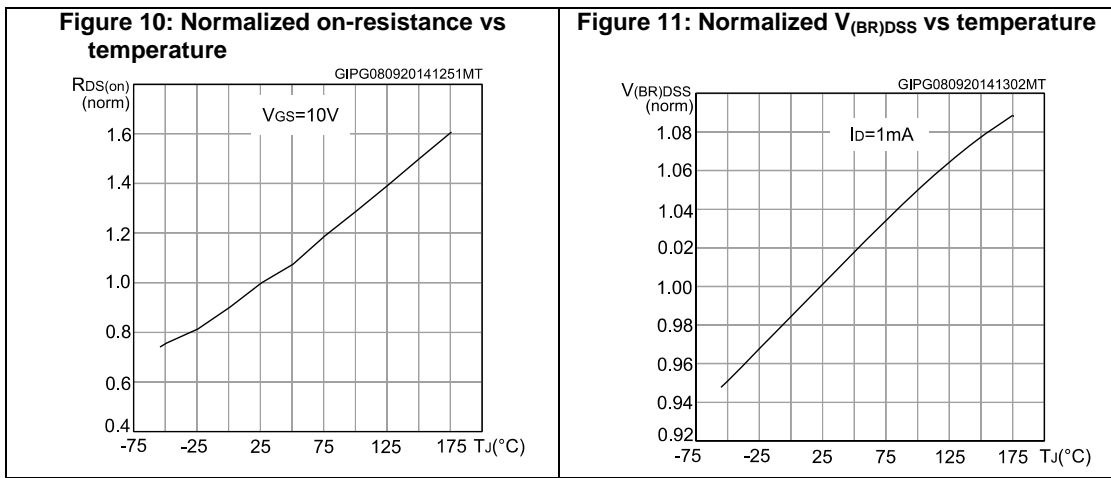
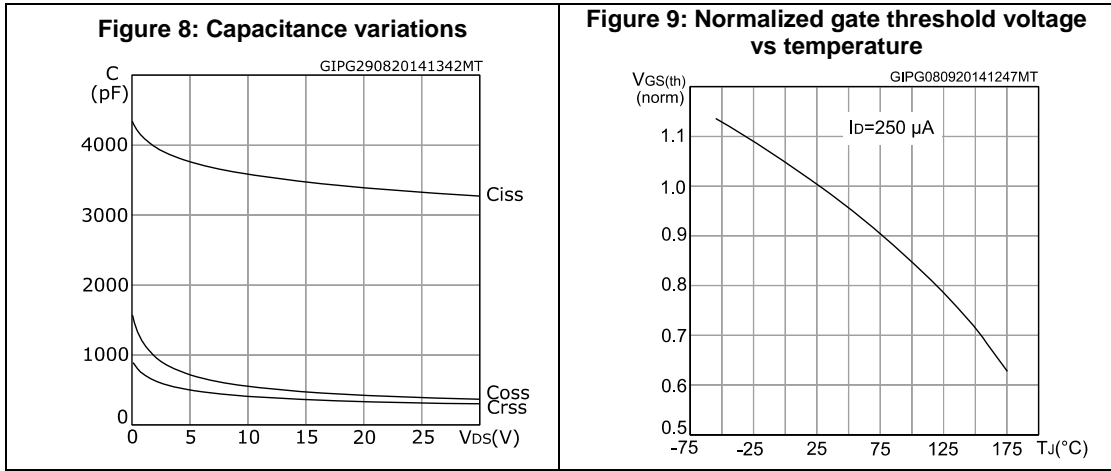
⁽¹⁾Pulsed: Pulse duration = 300 μs, duty cycle 1.5%

2.1 Electrical characteristics (curves)



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





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3 Test circuits

Figure 13: Switching times test circuit for resistive load

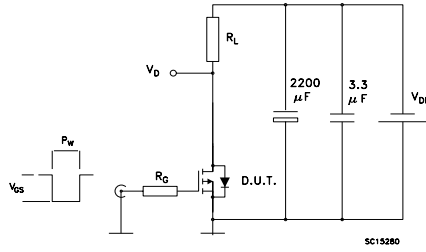


Figure 14: Gate charge test circuit

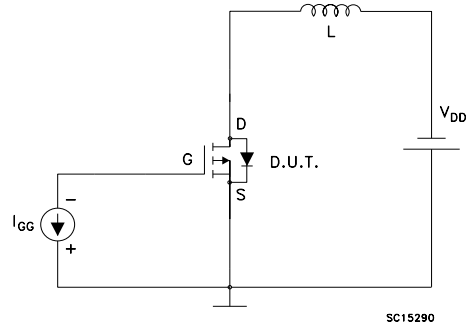
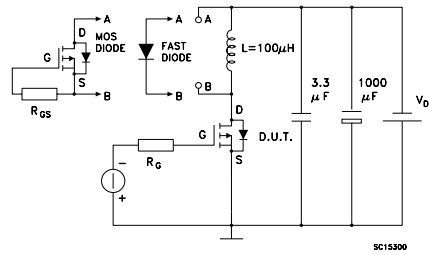


Figure 15: Source-drain diode forward characteristics



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 SO-8 package information

Figure 16: SO-8 package outline

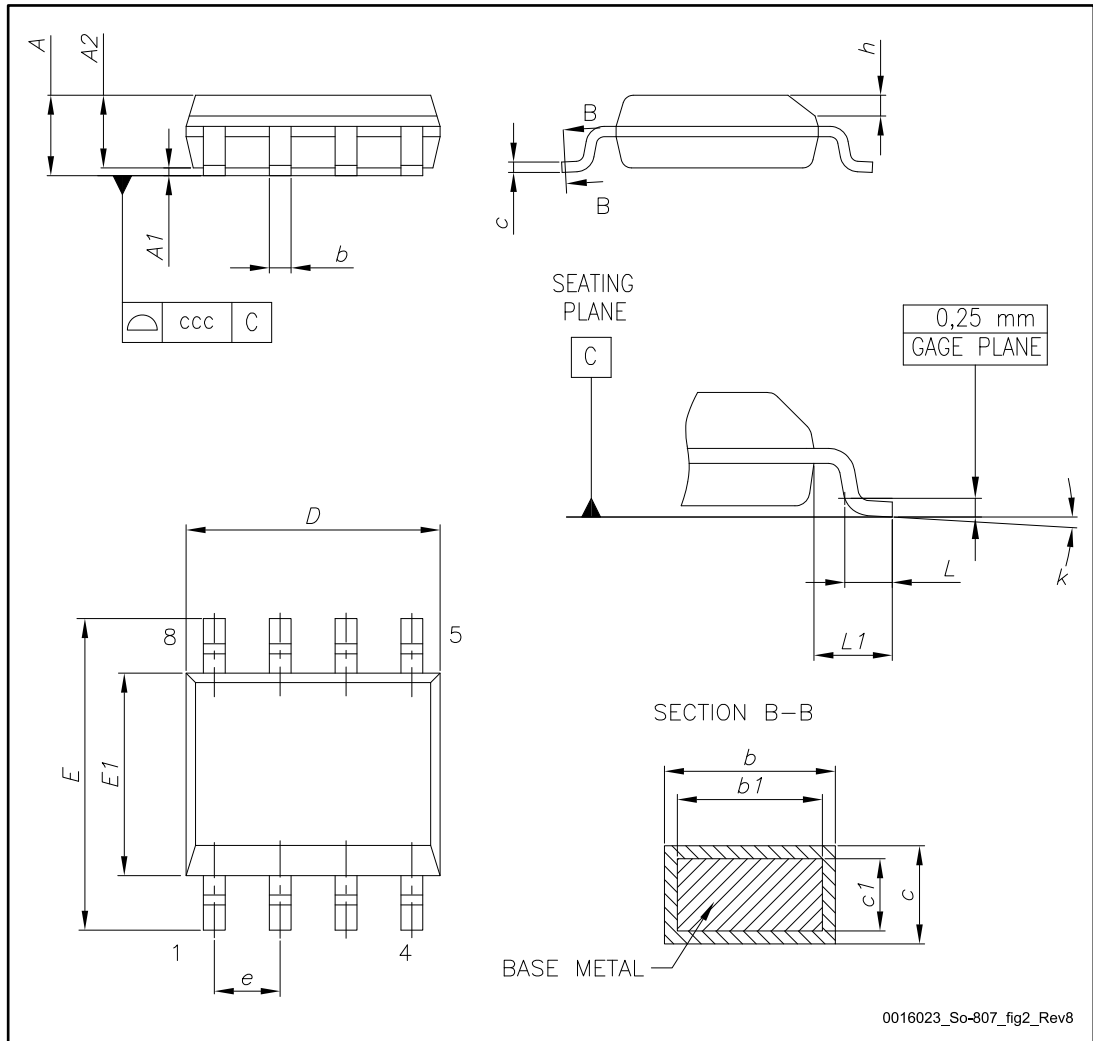
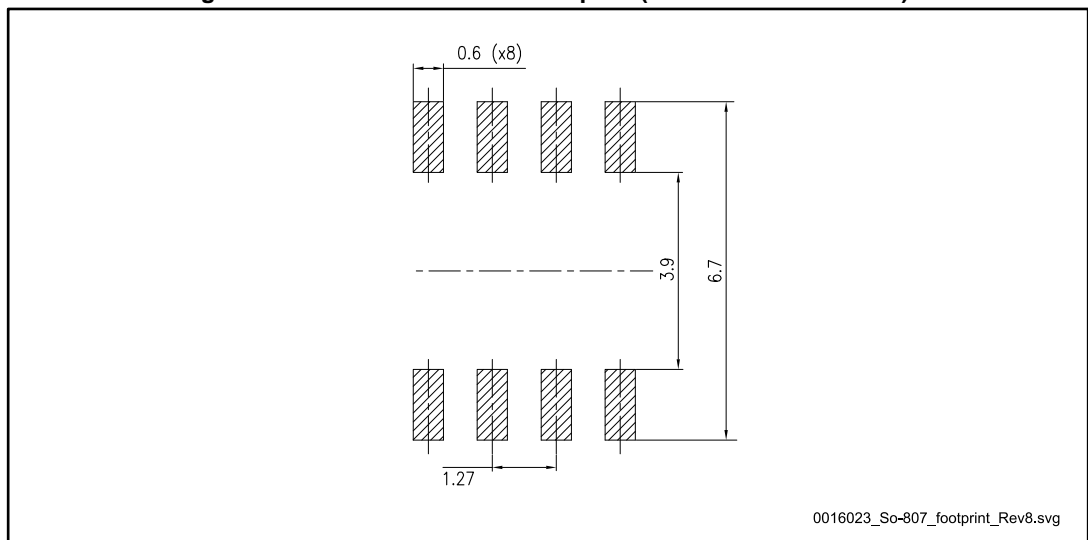


Table 8: SO-8 mechanical data

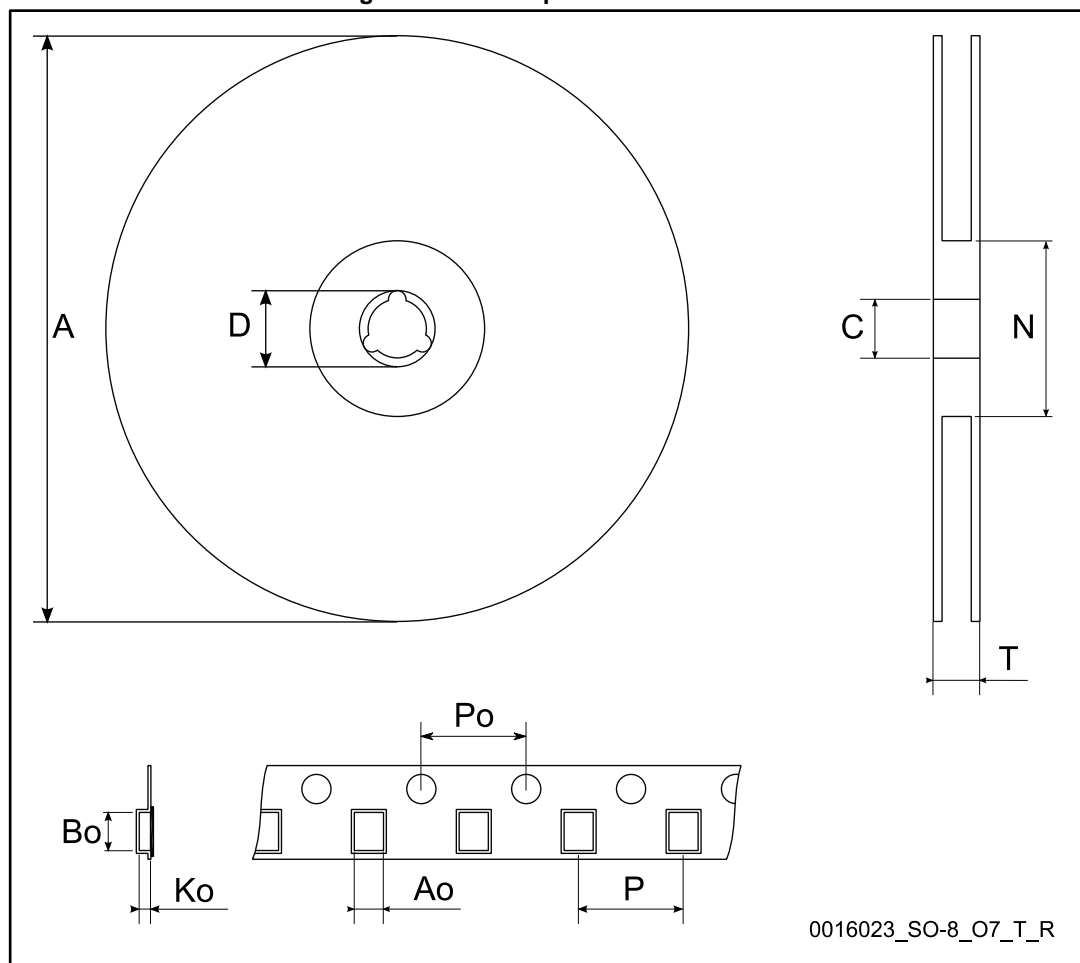
Dim.	mm		
	Min.	Typ.	Max.
A			1.75
A1	0.10		0.25
A2	1.25		
b	0.31		0.51
b1	0.28		0.48
c	0.10		0.25
c1	0.10		0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27	
h	0.25		0.50
L	0.40		1.27
L1		1.04	
L2		0.25	
k	0°		8°
ccc			0.10

Figure 17: SO-8 recommended footprint (dimensions are in mm)



4.2 SO-8 packing information

Figure 18: SO-8 tape and reel outline



0016023_SO-8_07_T_R

Table 9: SO-8 tape and reel mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A			330
C	12.8		13.2
D	20.2		
N	60		
T			22.4
Ao	8.1		8.5
Bo	5.5		5.9
Ko	2.1		2.3
Po	3.9		4.1
P	7.9		8.1

5 Revision history

Table 10: Document revision history

Date	Revision	Changes
06-May-2014	1	Initial release.
24-Sep-2014	2	Updated the title, the features and the description in cover page. Updated <i>Section 1: "Electrical ratings"</i> , <i>Section 2: "Electrical characteristics"</i> . Added <i>Section 2.1: "Electrical characteristics (curves)"</i> Minor text changes.
11-Jun-2015	3	Text and formatting changes throughout document. On cover page: - updated title description and Features table In Section 1 Electrical ratings: - updated Table Absolute maximum ratings In section 2.1 Electrical characteristics (curves) - updated Figure Safe operating area Updated and renamed Section 4.1 SO-8 package information (was SO-8 mechanical data)

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