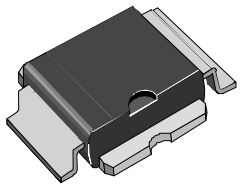
PD85025-E

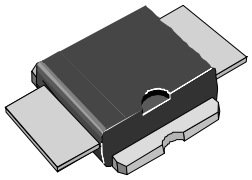
RF power transistor, LdmoST plastic family N-channel enhancement-mode lateral MOSFETs

Features

- Excellent thermal stability
- Common source configuration
- P_{OUT} = 25 W with 15.7 dB gain @ 870 MHz / 13.6 V
- Plastic package
- ESD protection
- In compliance with the 2002/95/EC European directive



PowerSO-10RF (formed lead)



PowerSO-10RF (straight lead)

Description

The PD85025-E is a common source N-channel, enhancement-mode lateral field-effect RF power transistor. It is designed for high gain, broadband commercial and industrial applications. It operates at 13.6 V in common source mode at frequencies of up to 1 GHz. PD85025-E boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology mounted in the first true SMD plastic RF power package, PowerSO-10RF. PD85025-E's superior linearity performance makes it an ideal solution for car mobile radio.

The PowerSO-10 plastic package, designed to offer high reliability, is the first ST JEDEC approved, high power SMD package. It has been specially optimized for RF needs and offers excellent RF performances and ease of assembly.

Figure 1. Pin connection

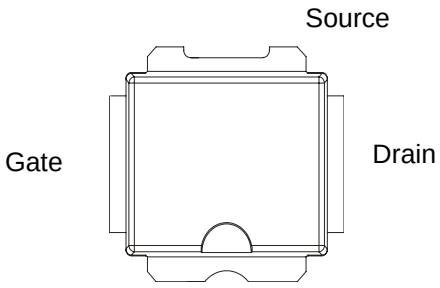


Table 1. Device summary

Order codes	Package	Packing
PD85025-E	PowerSO-10RF (formed lead)	Tube
PD85025S-E	PowerSO-10RF (straight lead)	
PD85025TR-E	PowerSO-10RF (formed lead)	Tape and reel
PD85025STR-E	PowerSO-10RF (straight lead)	

Contents

1 Electrical data

1.1 Maximum ratings

Table 2. Absolute maximum ratings (T_{CASE} = 25 °C)

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-source voltage	40	V
V_{GS}	Gate-source voltage	-0.5 to +15	V
I_D	Drain current	7	A
P_{DISS}	Power dissipation (@ T_C = 70 °C)	79	W
T_J	Max. operating junction temperature	165	°C
T_{STG}	Storage temperature	-65 to +150	°C

1.2 Thermal data

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Junction - case thermal resistance	1.2	°C/W

2 Electrical characteristics

T_{CASE} = +25 °C

2.1 Static

Table 4. Static

Symbol	Test conditions			Min	Typ	Max	Unit
I_{DSS}	V_{GS} = 0 V	V_{DS} = 25 V				1	µA
I_{GSS}	V_{GS} = 5 V	V_{DS} = 0 V				1	µA
$V_{GS(Q)}$	V_{DS} = 10 V	I_D = 300 mA		3.2		4.8	V
$V_{DS(ON)}$	V_{GS} = 10 V	I_D = 1 A			0.27	0.31	V
C_{ISS}	V_{GS} = 0 V	V_{DS} = 12.5 V	f = 1 MHz		55		pF
C_{OSS}	V_{GS} = 0 V	V_{DS} = 12.5 V	f = 1 MHz		40		pF
C_{RSS}	V_{GS} = 0 V	V_{DS} = 12.5 V	f = 1 MHz		1.5		pF

2.2 Dynamic

Table 5. Dynamic

Symbol	Test conditions		Min	Typ	Max	Unit
P3dB	V_{DD} = 13.6 V, I_{DQ} = 300 mA	f = 870 MHz	25	30	-	W
G_P	V_{DD} = 13.6 V, I_{DQ} = 300 mA, P_{OUT} = 10 W, f = 870 MHz		15	17.3	-	dB
h_D	V_{DD} = 13.6 V, I_{DQ} = 300 mA, P_{OUT} = P3dB, f = 870 MHz		60	66	-	%
Load mismatch	V_{DD} = 17 V, I_{DQ} = 300 mA, P_{OUT} = 45 W, f = 870 MHz All phase angles		20:1		-	VSWR

2.3 ESD protection characteristics

Table 6. ESD protection characteristics

Test conditions	Class
Human body model	2
Machine model	M3

2.4 Moisture sensitivity level

Table 7. Moisture sensitivity level

Test conditions	Rating
J-STD-020B	MSL 3

3 Impedance

Figure 2. Current conventions

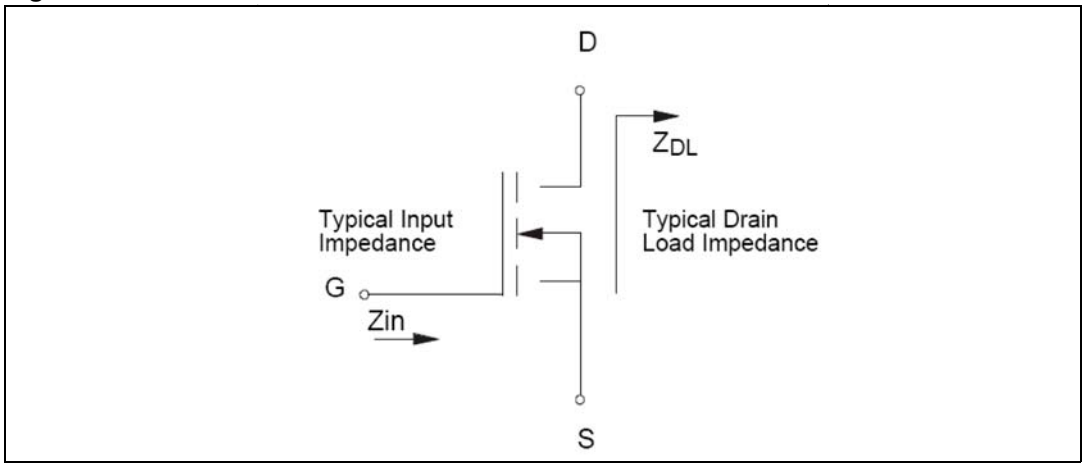


Table 8. Impedance data

Frequency (MHz)	Z_{IN} (Ω)	Z_{DL}(Ω)
870 MHz	0.21 +j 1.82	1.23 -j 0.98

4 Typical performance

Figure 3. Capacitances vs drain voltage

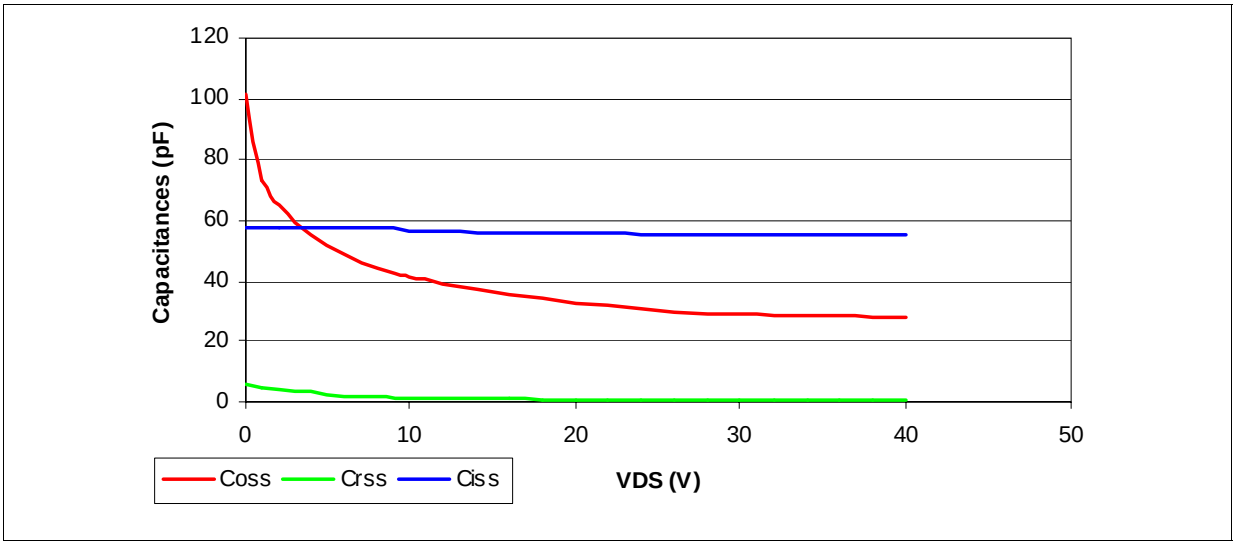


Figure 4. DC output characteristics

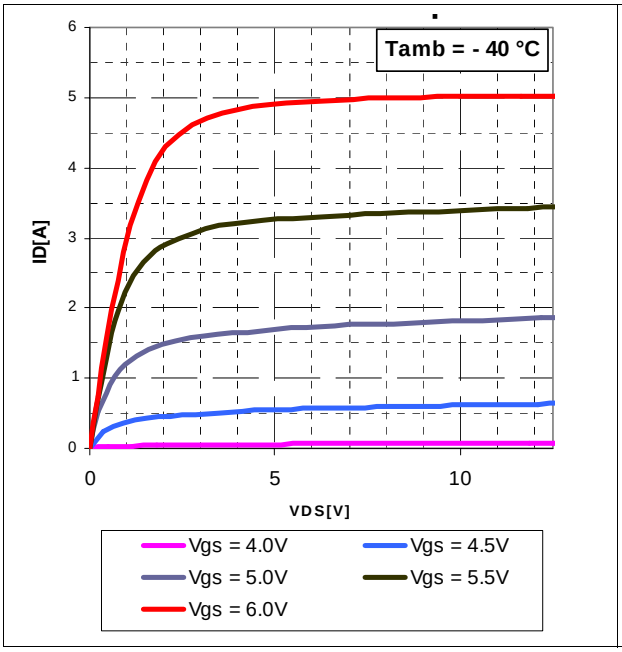


Figure 5. DC output characteristics

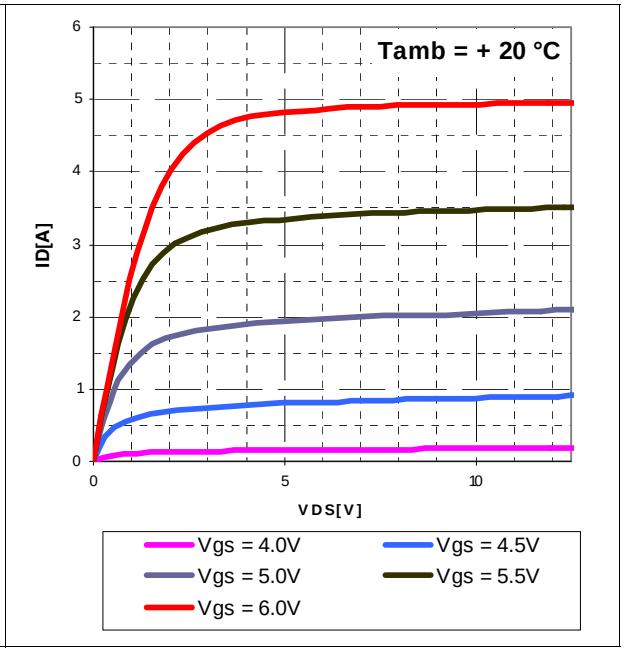


Figure 6. DC output characteristics

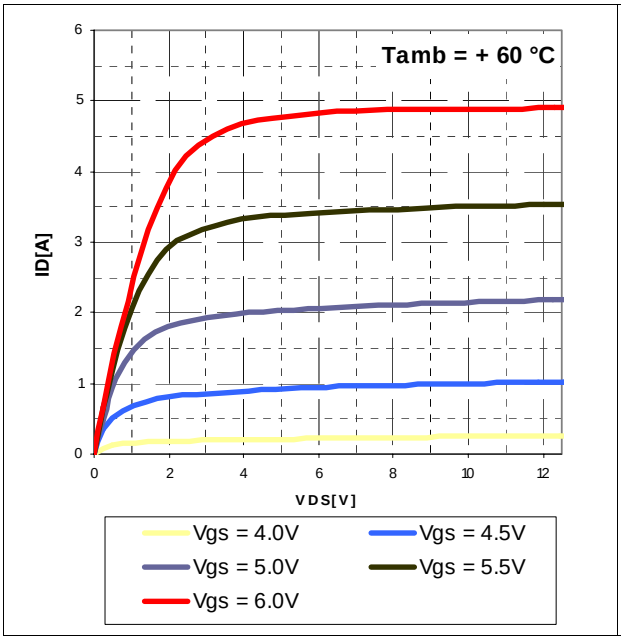


Figure 7. Gain vs output power and Bias current

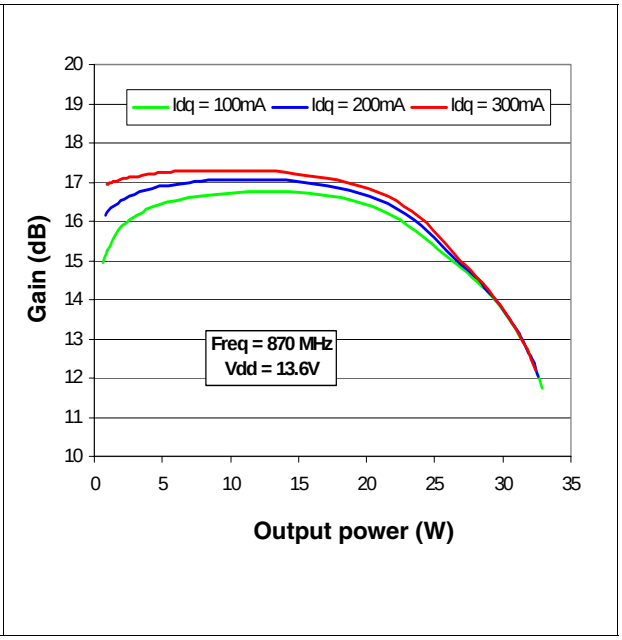


Figure 8. Ouptut power and efficiency vs Input power

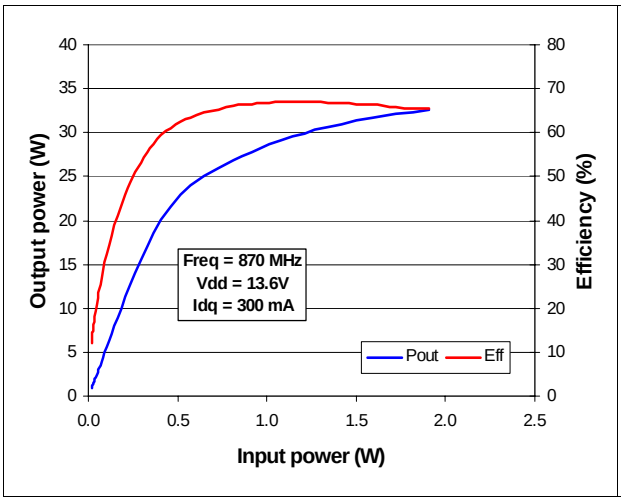


Figure 9. Output power and drain current vs Gate voltage

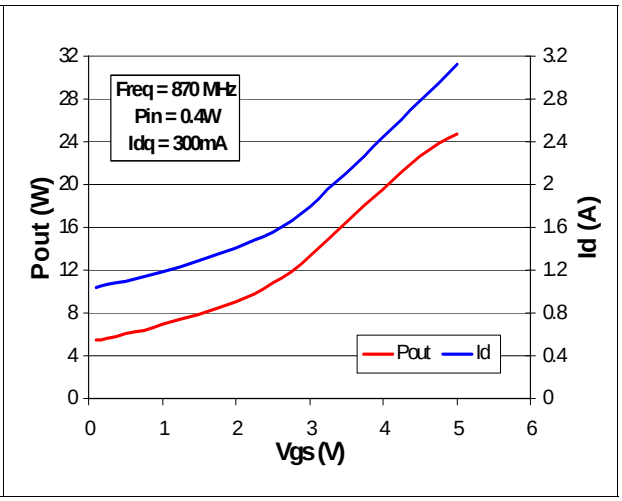


Figure 10. Pout and drain current vs supply voltage

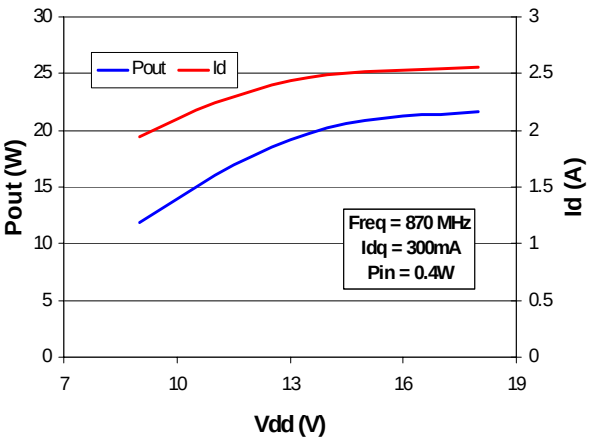
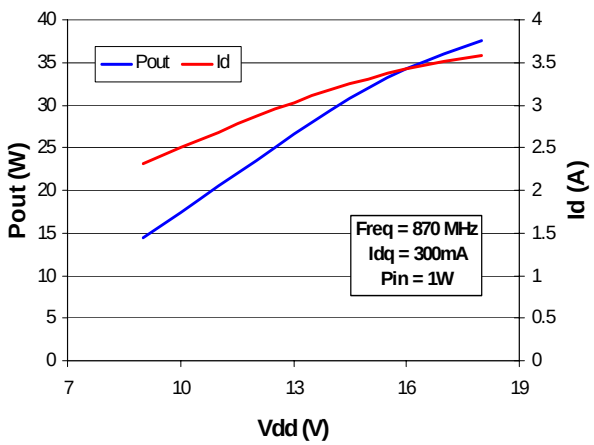


Figure 11. Pout and drain current vs supply voltage



5 Package mechanical data

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.

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Table 9. PowerSO-10RF formed lead (gull wing) mechanical data

Dim.	mm.			Inch		
	Min	Typ	Max	Min	Typ	Max
A1	0	0.05	0.1	0.	0.0019	0.0038
A2	3.4	3.5	3.6	0.134	0.137	0.142
A3	1.2	1.3	1.4	0.046	0.05	0.054
A4	0.15	0.2	0.25	0.005	0.007	0.009
a		0.2			0.007	
b	5.4	5.53	5.65	0.212	0.217	0.221
c	0.23	0.27	0.32	0.008	0.01	0.012
D	9.4	9.5	9.6	0.370	0.374	0.377
D1	7.4	7.5	7.6	0.290	0.295	0.298
E	13.85	14.1	14.35	0.544	0.555	0.565
E1	9.3	9.4	9.5	0.365	0.37	0.375
E2	7.3	7.4	7.5	0.286	0.292	0.294
E3	5.9	6.1	6.3	0.231	0.24	0.247
F		0.5			0.019	
G		1.2			0.047	
L	0.8	1	1.1	0.030	0.039	0.042
R1			0.25			0.01
R2		0.8			0.031	
T	2 deg	5 deg	8 deg	2 deg	5 deg	8 deg
T1		6 deg			6 deg	
T2		10 deg			10 deg	

Note: Resin protrusions not included (max value: 0.15 mm per side)

Figure 12. Package dimensions

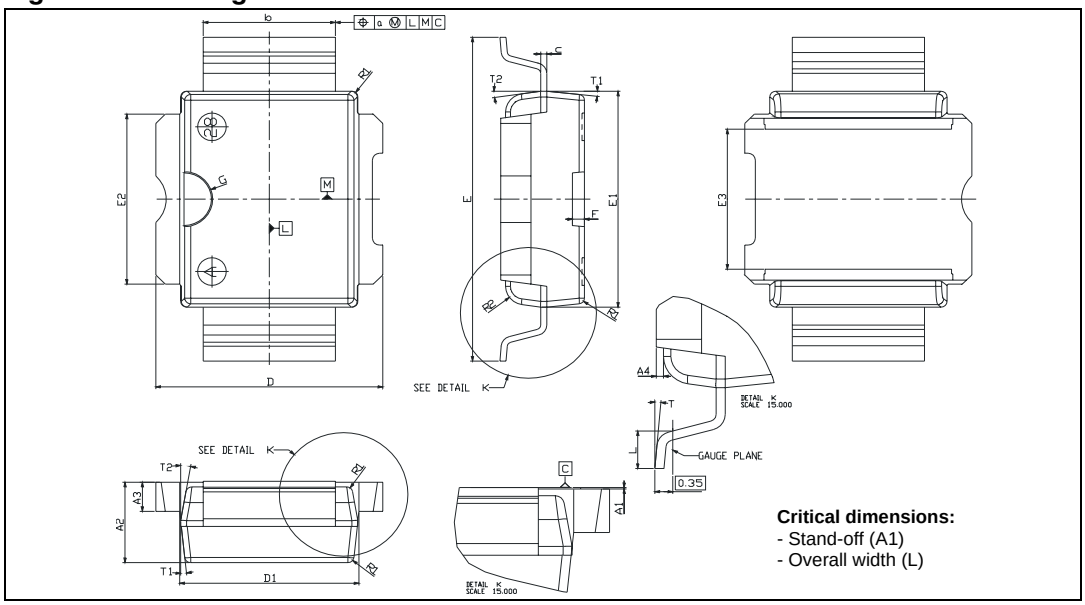


Table 10. PowerSO-10RF straight lead mechanical data

Dim.	mm.			Inch		
	Min	Typ	Max	Min	Typ	Max
A1	1.62	1.67	1.72	0.064	0.065	0.068
A2	3.4	3.5	3.6	0.134	0.137	0.142
A3	1.2	1.3	1.4	0.046	0.05	0.054
A4	0.15	0.2	0.25	0.005	0.007	0.009
a		0.2			0.007	
b	5.4	5.53	5.65	0.212	0.217	0.221
c	0.23	0.27	0.32	0.008	0.01	0.012
D	9.4	9.5	9.6	0.370	0.374	0.377
D1	7.4	7.5	7.6	0.290	0.295	0.298
E	15.15	15.4	15.65	0.595	0.606	0.615
E1	9.3	9.4	9.5	0.365	0.37	0.375
E2	7.3	7.4	7.5	0.286	0.292	0.294
E3	5.9	6.1	6.3	0.231	0.24	0.247
F		0.5			0.019	
G		1.2			0.047	
R1			0.25			0.01
R2		0.8			0.031	
T1		6 deg			6 deg	
T2		10 deg			10 deg	

Note: Resin protrusions not included (max value: 0.15 mm per side)

Figure 13. Package dimensions

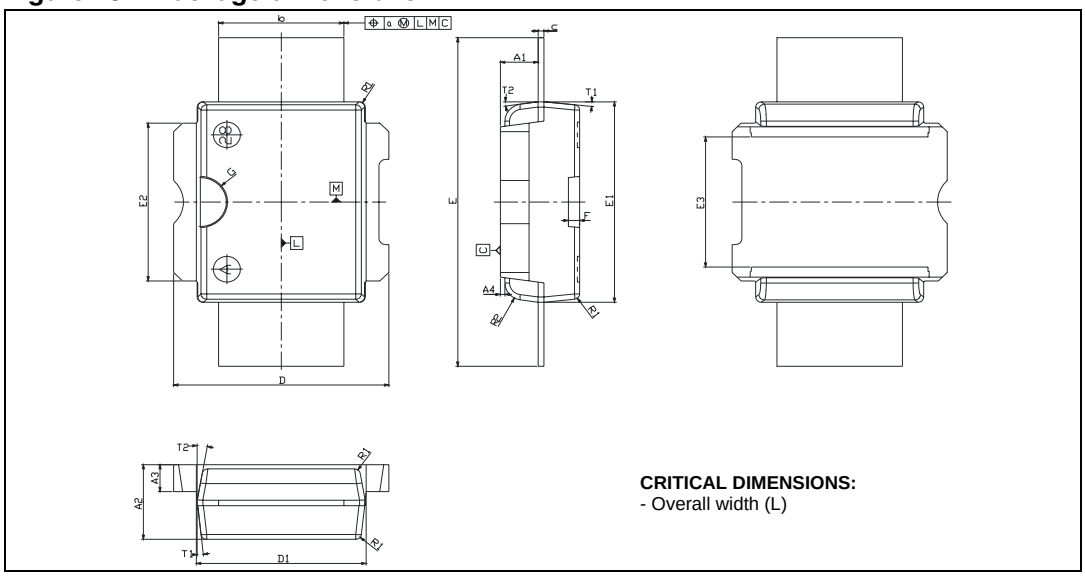


Figure 14. Tube information

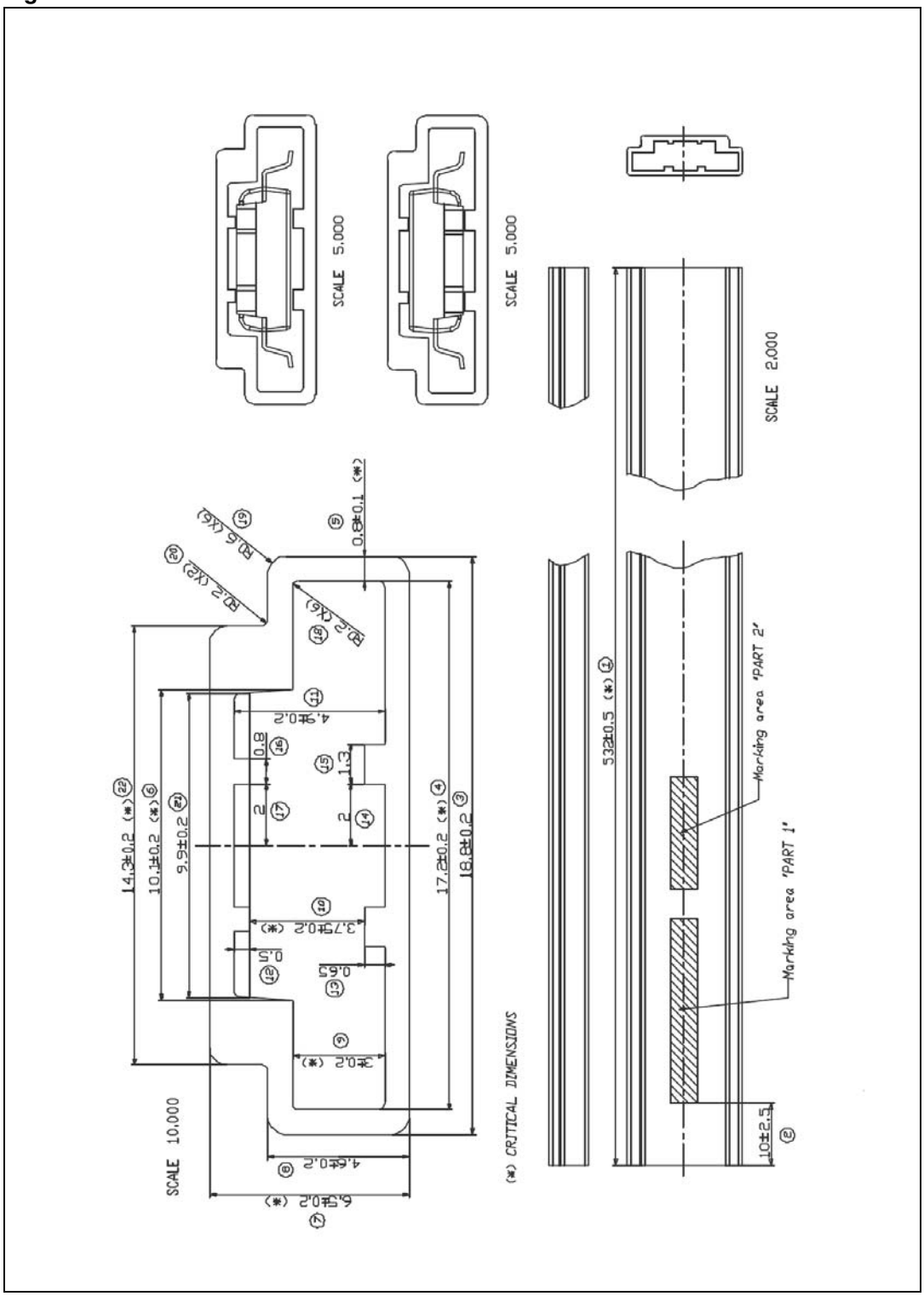
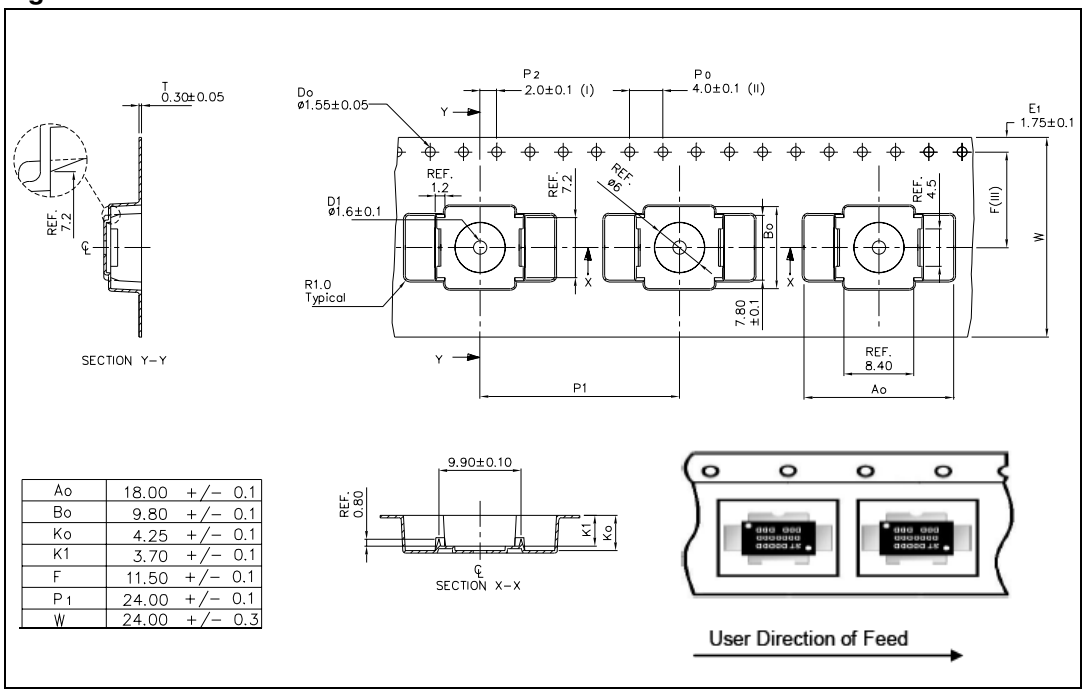


Figure 15. Reel information



Ao	18.00	+/−	0.1
Bo	9.80	+/−	0.1
Ko	4.25	+/−	0.1
K1	3.70	+/−	0.1
F	11.50	+/−	0.1
P1	24.00	+/−	0.1
W	24.00	+/−	0.3

6 Revision history

Table 11. Document revision history

Date	Revision	Changes
21-May-2007	1	Initial release.
26-Aug-2008	2	Updated *Table 4 on page 4*
28-Jun-2011	3	Updated *Table 4 on page 4*

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