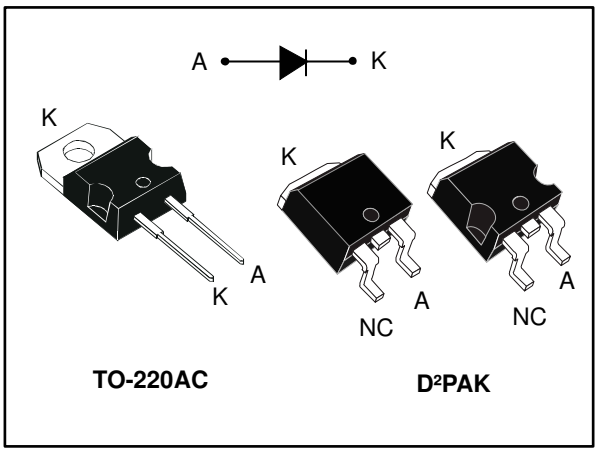
STPS20L15

Low drop OR-ing power Schottky diode

Datasheet - production data



Description

Packaged in TO-220AC or D²PAK, this device is especially intended for use as an OR-ing diode in fault tolerant power supply equipments.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	20 A
V_{RRM}	15 V
V_F (typ.)	0.28 V
T_j (max.)	125 °C

Features

- Very low forward voltage drop for less power dissipation and reduced heatsink size
- Reverse voltage suited to OR-ing of 3 V, 5 V and 12 V rails
- Avalanche capability specified
- ECOPACK®2 compliant component for D²PAK on demand

This is information on a product in full production.

www.st.com

1 Characteristics

Table 2: Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		15	V
$I_{F(RMS)}$	Forward rms current		30	A
$I_{F(AV)}$	Average forward current	T_C = 115 °C, DC	20	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	310	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	970	W
T_{stg}	Storage temperature range		-65 to +150	°C
T_j	Maximum operating junction temperature (1)		125	

Notes:

(1)$(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.

Table 3: Thermal parameters

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	1.6	°C/W

Table 4: Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	V_R = 15 V	-		6	mA
		T_j = 100 °C		-	200	500	
V_F(1)	Forward voltage drop	T_j = 25 °C	I_F = 19 A	-		0.41	V
			I_F = 40 A	-		0.52	
		T_j = 125 °C	I_F = 19 A	-	0.28	0.33	
			I_F = 40 A		0.42	0.50	

Notes:

(1)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the maximum conduction losses, use the following equation:

$P = 0.18 \times I_{F(AV)} + 8.10^{-3} \times I_{F}{}^{2}{}_{(RMS)}$

1.1 Characteristics (curves)

Figure 1: Average forward power dissipation versus average forward current

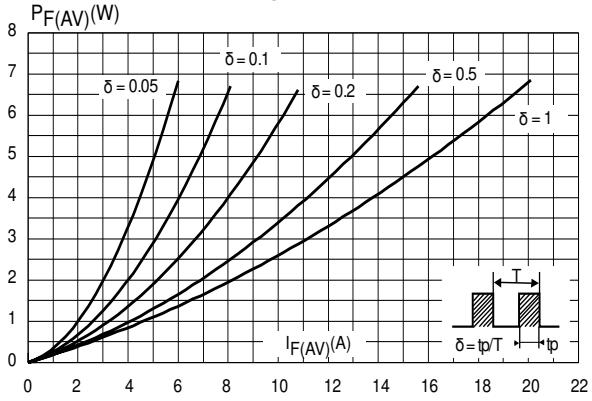


Figure 2: Average forward current versus ambient temperature (δ = 1)

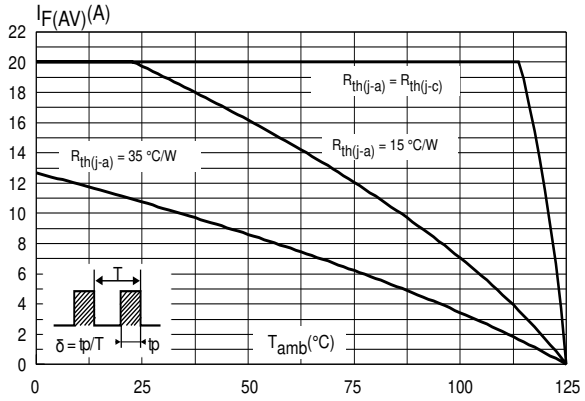


Figure 3: Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

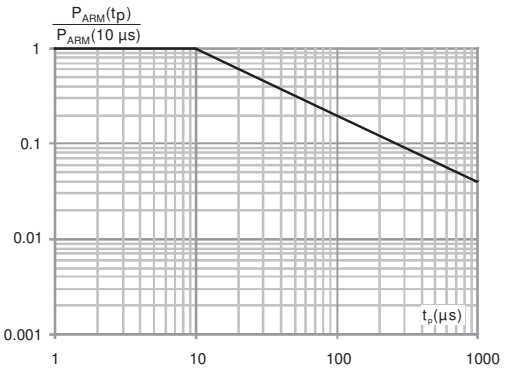


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

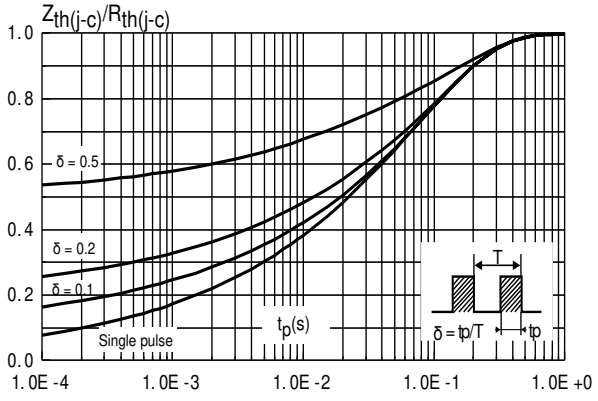


Figure 5: Reverse leakage current versus reverse voltage applied (typical values)

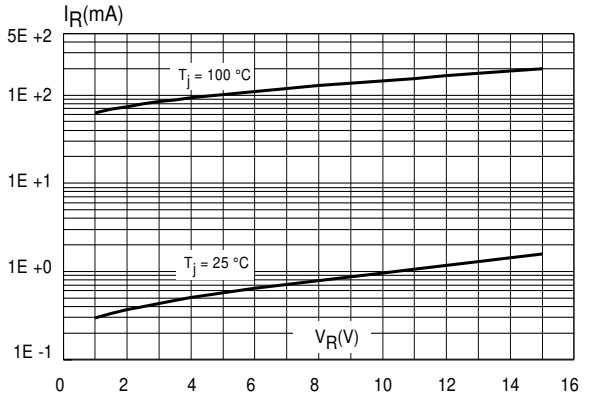


Figure 6: Junction capacitance versus reverse voltage applied (typical values)

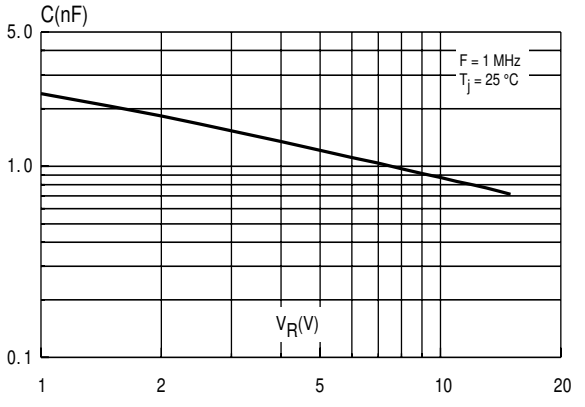


Figure 7: Forward voltage drop versus forward current (typical values)

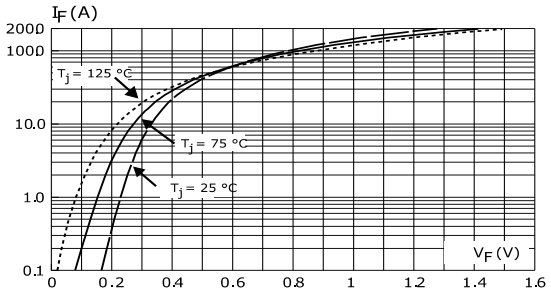


Figure 8: Forward voltage drop versus forward current (maximum values)

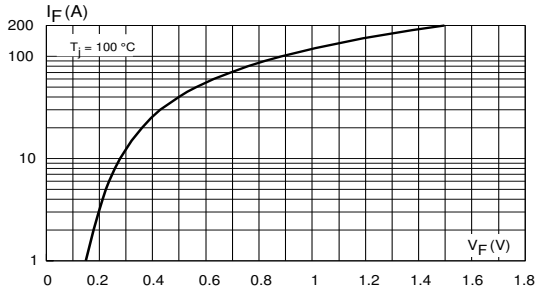
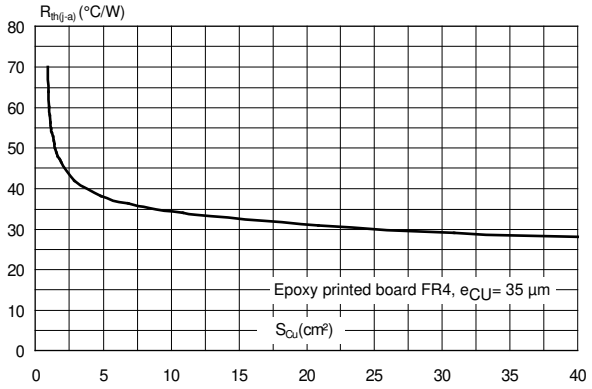


Figure 9: Thermal resistance junction to ambient versus copper surface under tab for D²PAK



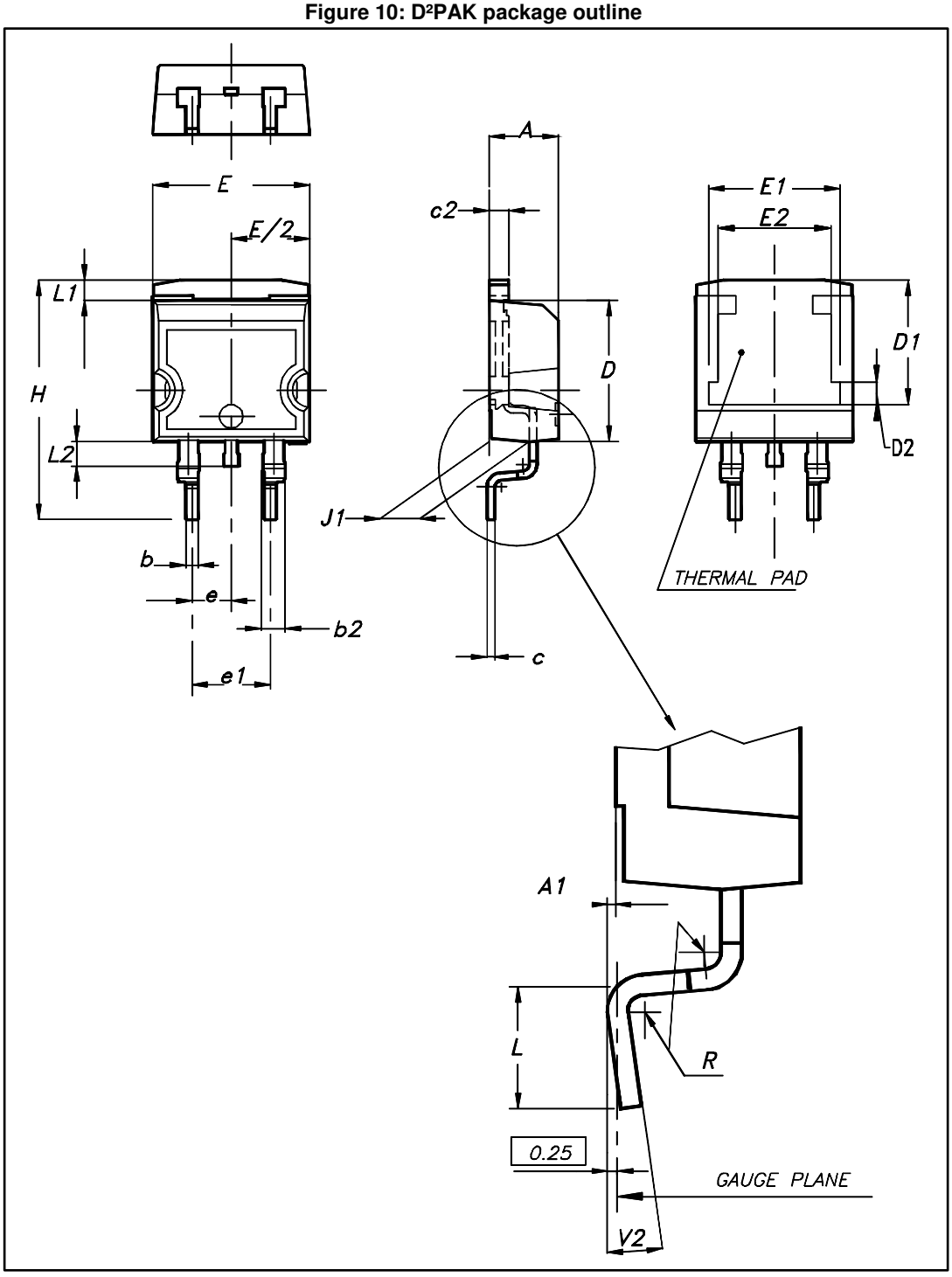
2 Package information

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.

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0
- Recommended torque value: 0.55 N·m (for TO-220AC)
- Maximum torque value: 0.7 N·m (for TO-220AC)

2.1 D²PAK package information

Figure 10: D²PAK package outline

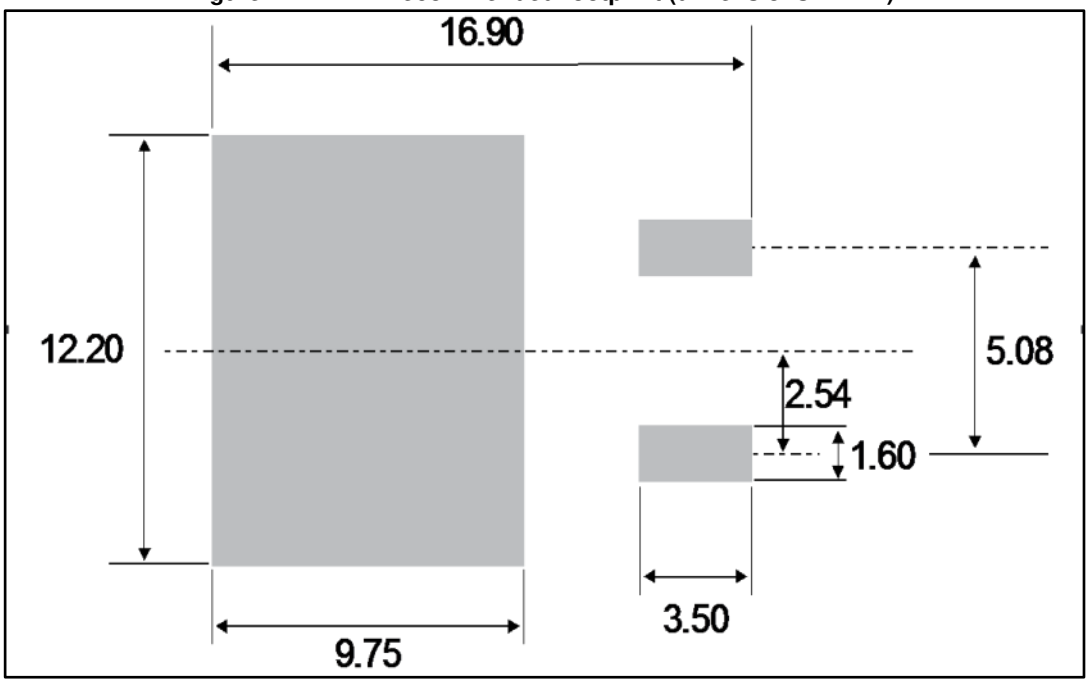


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5: D²PAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.36	4.60	0.172	0.181
A1	0.00	0.25	0.000	0.010
b	0.70	0.93	0.028	0.037
b2	1.14	1.70	0.045	0.067
c	0.38	0.69	0.015	0.027
c2	1.19	1.36	0.047	0.053
D	8.60	9.35	0.339	0.368
D1	6.90	8.00	0.272	0.311
D2	1.10	1.50	0.043	0.060
E	10.00	10.55	0.394	0.415
E1	8.10	8.90	0.319	0.346
E2	6.85	7.25	0.266	0.282
e	2.54 typ.		0.100	
e1	4.88	5.28	0.190	0.205
H	15.00	15.85	0.591	0.624
J1	2.49	2.90	0.097	0.112
L	1.90	2.79	0.075	0.110
L1	1.27	1.65	0.049	0.065
L2	1.30	1.78	0.050	0.070
R	0.4 typ.		0.015	
V2	0°	8°	0°	8°

Figure 11: D²PAK recommended footprint (dimensions in mm)



2.2 TO-220AC package information

Figure 12: TO-220AC package outline

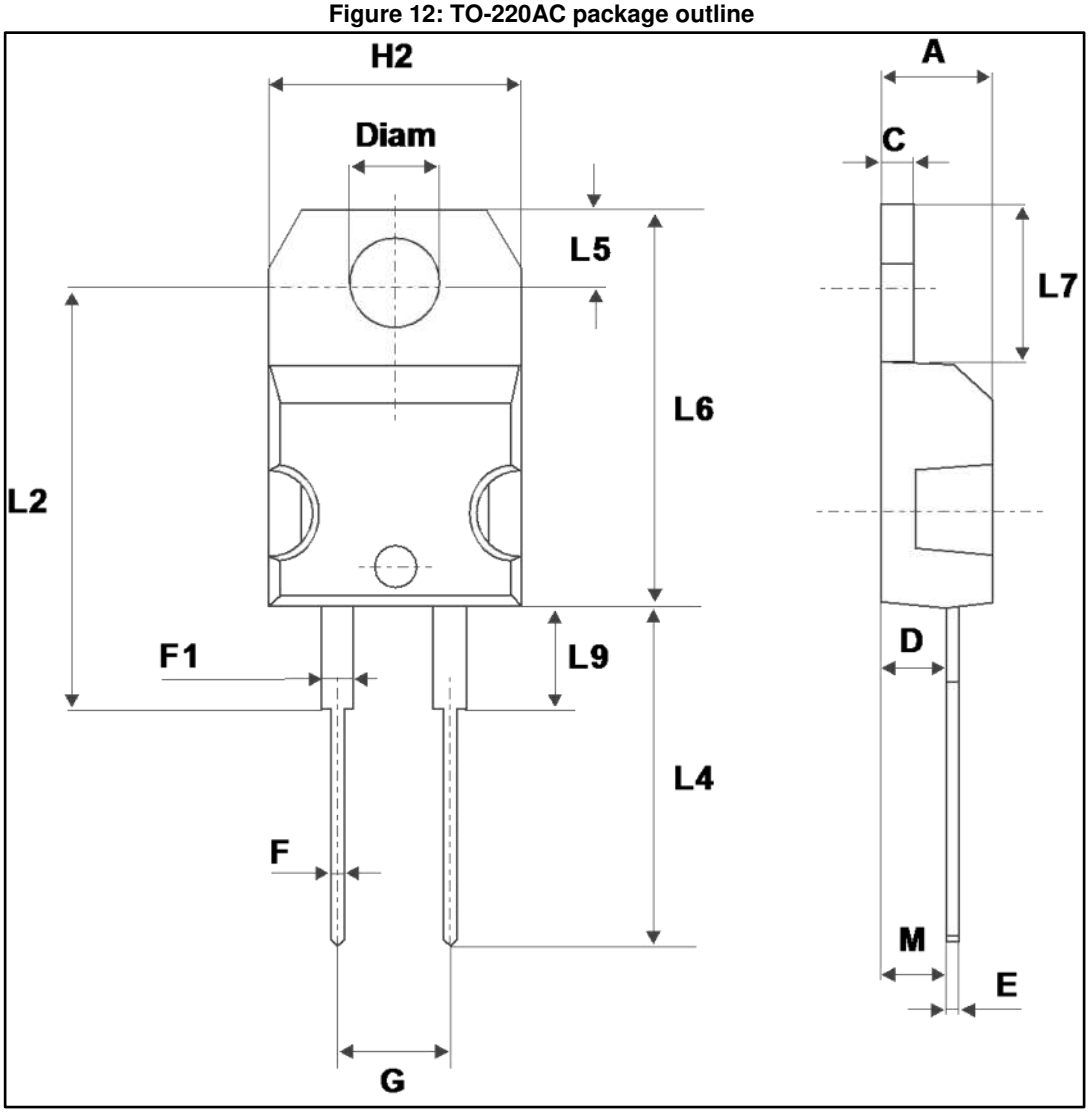


Table 6: TO-220AC package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
H2	10.00	10.40	0.393	0.409
L2	16.40 typ.		0.645 typ.	
L4	13.00	14.00	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam	3.75	3.85	0.147	0.151

3 Ordering information

Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS20L15D	STPS20L15D	TO-220AC	1.86 g	50	Tube
STPS20L15G-TR	STPS20L15G	D²PAK	1.38 g	1000	Tape and reel

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
24-Jul-2012	3	
13-Oct-2016	4	Updated cover page, *Section 3.1: "Characteristics (curves)"*, *Section 3: "Characteristics"*, *Section 4.2: "D²PAK package information"* and *Table 7: "Ordering information"*.

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