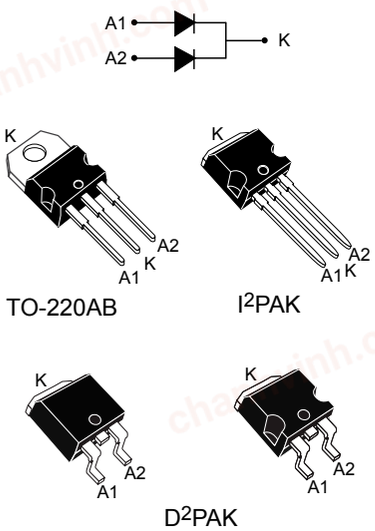
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STPS41H100C

Datasheet

100 V power Schottky rectifier



Features

- Negligible switching losses
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Low thermal resistance
- Avalanche specification
- ECOPACK®2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- Desktop power supply

Description

This dual center tab Schottky rectifier is suited for switch mode power supply and high frequency DC to DC converters.

Packaged in D²PAK, I²PAK and TO-220AB, the STPS41H100C is optimized for use in high frequency inverters.

Product status link	
STPS41H100C	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 x 20 A
V_{RRM}	100 V
T_j	175 °C
V_F (typ.)	0.62 V

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1 Characteristics

Table 1. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			100	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current, δ = 0.5 square wave	T_c = 150 °C	Per diode	20	A
			Per device	40	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		220	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C		1300	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature range(1)			175	°C

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

Table 2. Thermal resistance parameters

Symbol	Parameter		Max. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.5	°C/W
		Total	0.8	
$R_{th(c)}$	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously :

ΔT_j(diode 1) = P(diode1) x $R_{th(j-c)}$(per diode) + P(diode 2) x $R_{th(c)}$

For more information, please refer to the following application note:

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		10	µA
		T_j = 125 °C		-	3	10	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 20 A	-		0.80	V
		T_j = 125 °C		-	0.62	0.67	
		T_j = 25 °C	I_F = 40 A	-		0.90	
		T_j = 125 °C		-	0.70	0.76	

1. *Pulse test: t_p = 5 ms, δ < 2%*
2. *Pulse test: t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation: $P = 0.58 \times I_{F(AV)} + 0.0045 \times I_F^2{}_{(RMS)}$

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

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1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current (per diode)

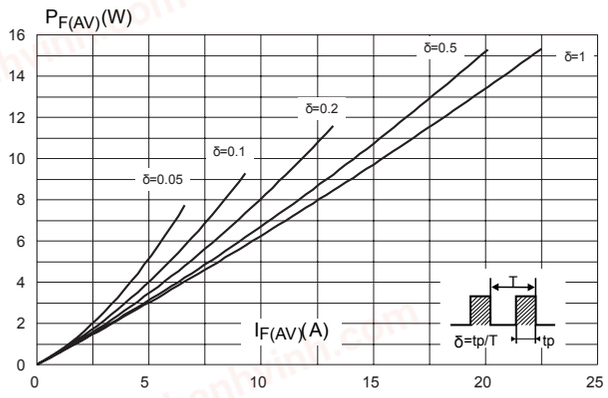


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

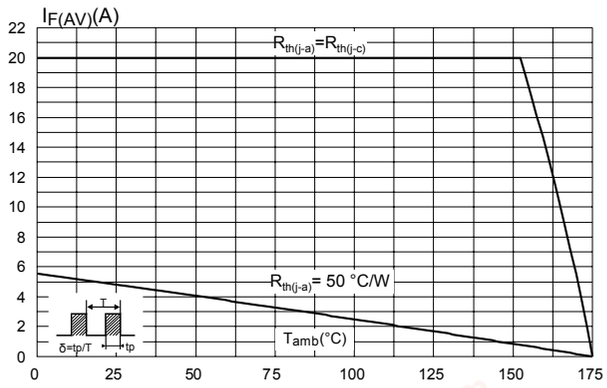


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

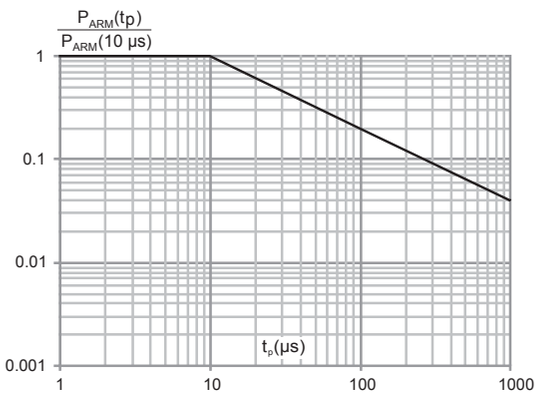
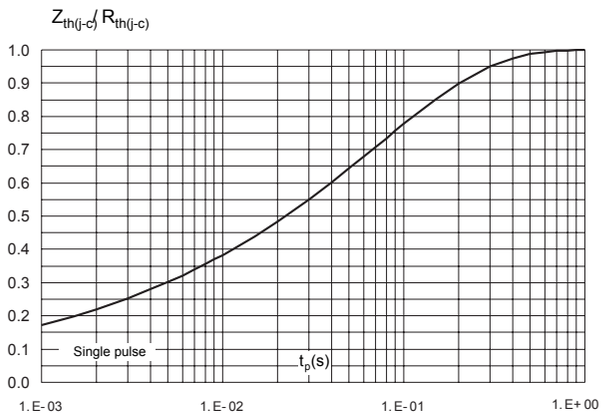


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration



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Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

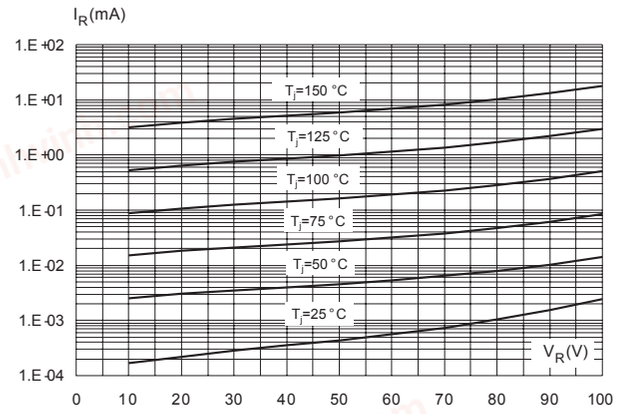


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

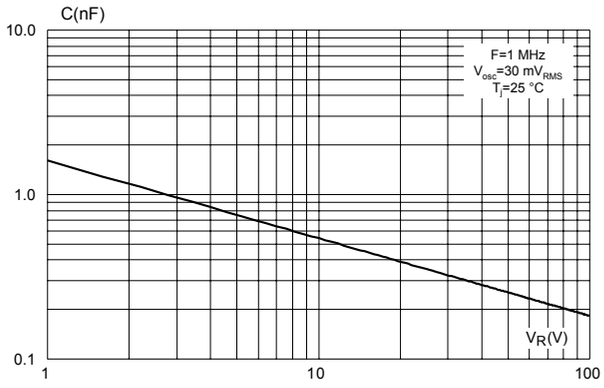


Figure 7. Forward voltage drop versus forward current (per diode)

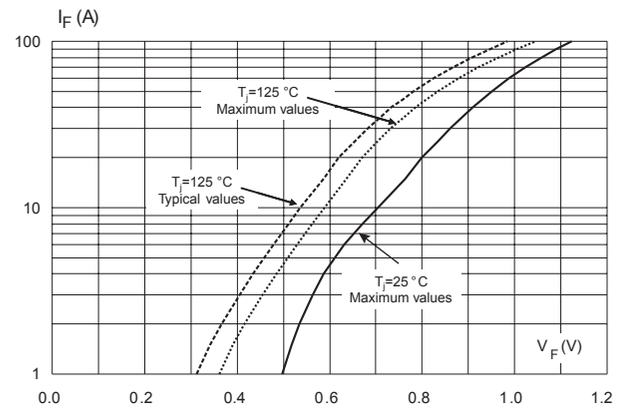
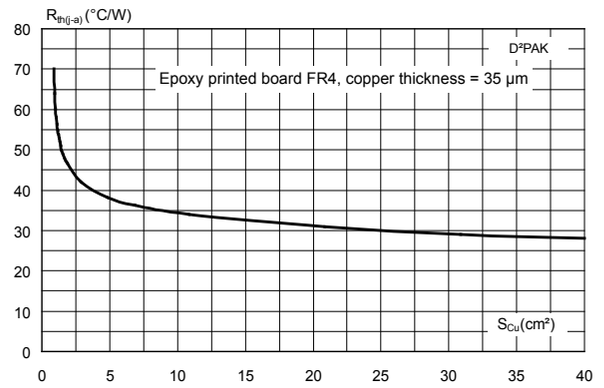


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



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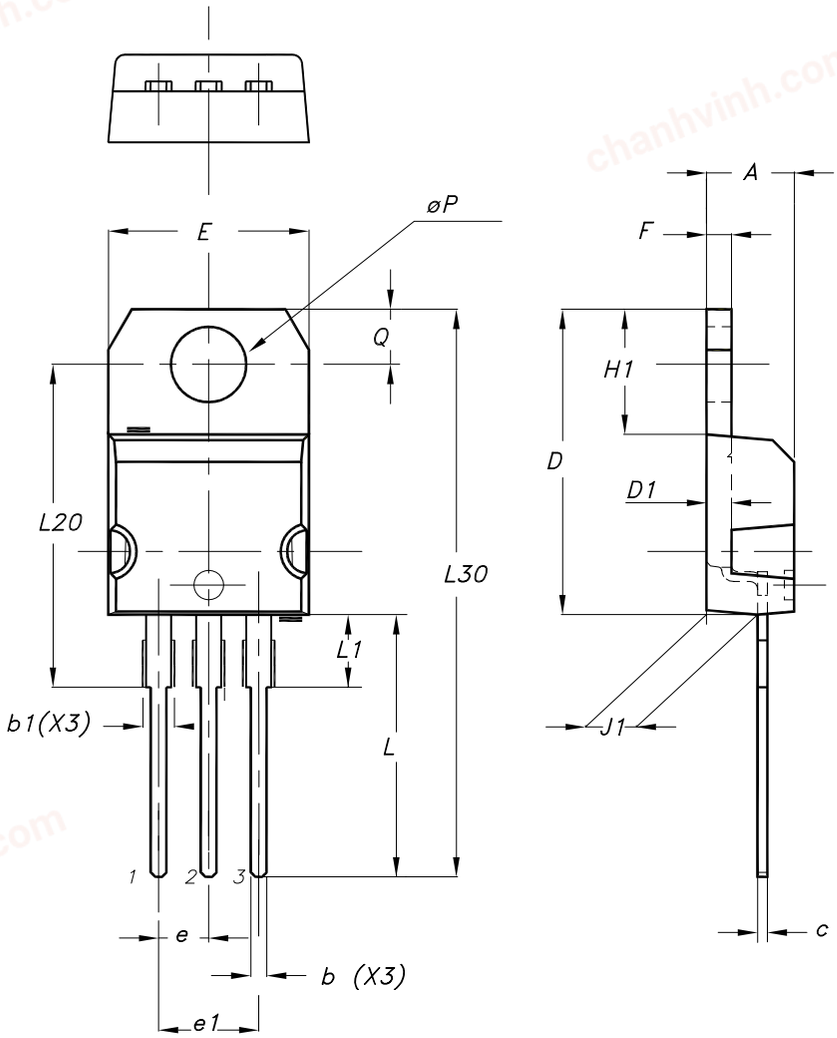
2 Package information

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.

2.1 TO-220AB package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.70 N·m

Figure 9. TO-220AB package outline



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Table 4. **TO-220AB package mechanical data**

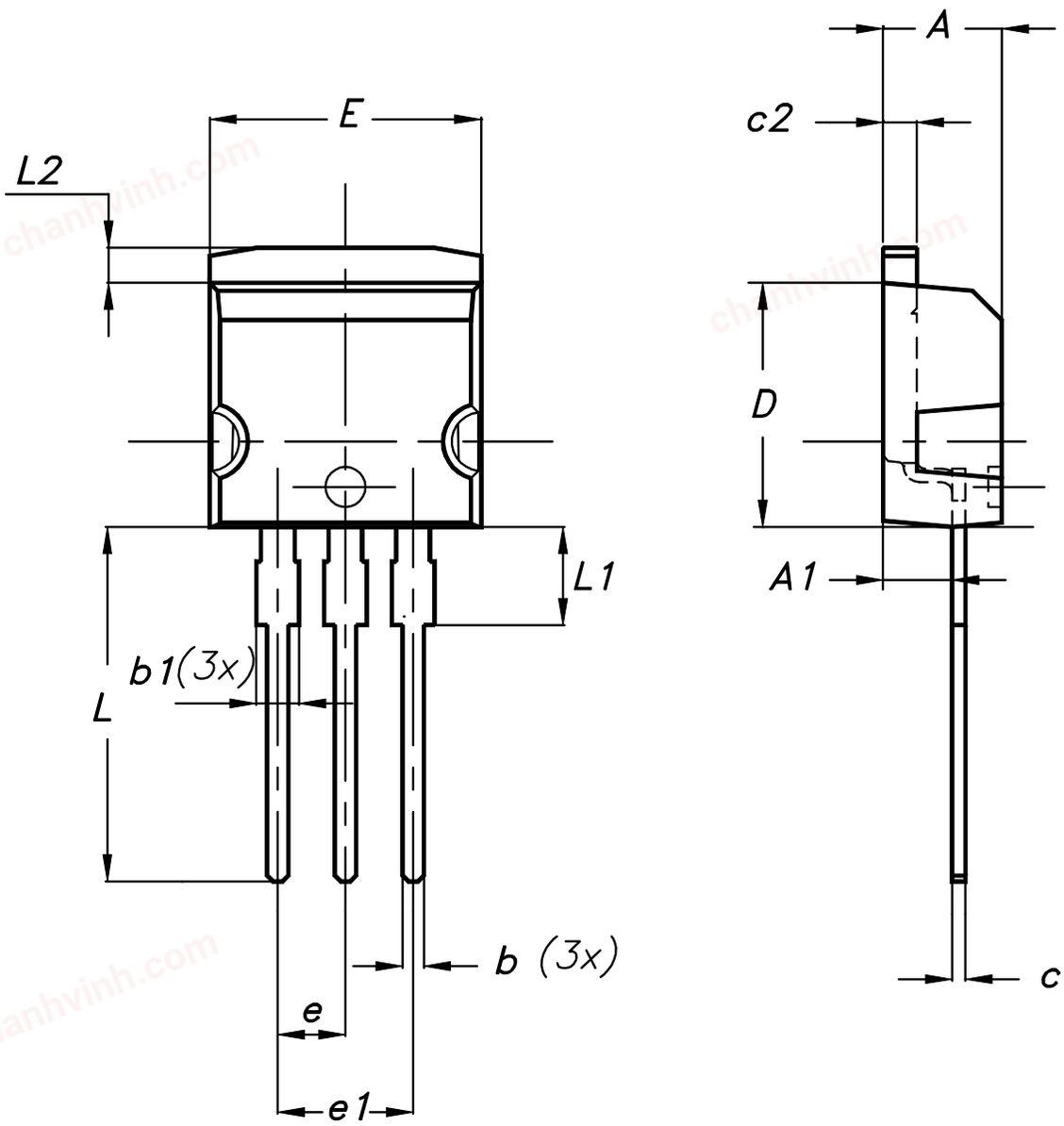
Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
b	0.61	0.88	0.240	0.035
b1	1.14	1.55	0.045	0.061
c	0.48	0.70	0.019	0.028
D	15.25	15.75	0.600	0.620
D1	1.27 typ.		0.050 typ.	
E	10.00	10.40	0.394	0.409
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.244	0.260
J1	2.40	2.72	0.094	0.107
L	13.00	14.00	0.512	0.551
L1	3.50	3.93	0.138	0.155
L20	16.40 typ.		0.646 typ.	
L30	28.90 typ.		1.138 typ.	
θP	3.75	3.85	0.148	0.152
Q	2.65	2.95	0.104	0.116

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2.2 I²PAK package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)

Figure 10. I²PAK package outline



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Table 5. **I²PAK package mechanical data**

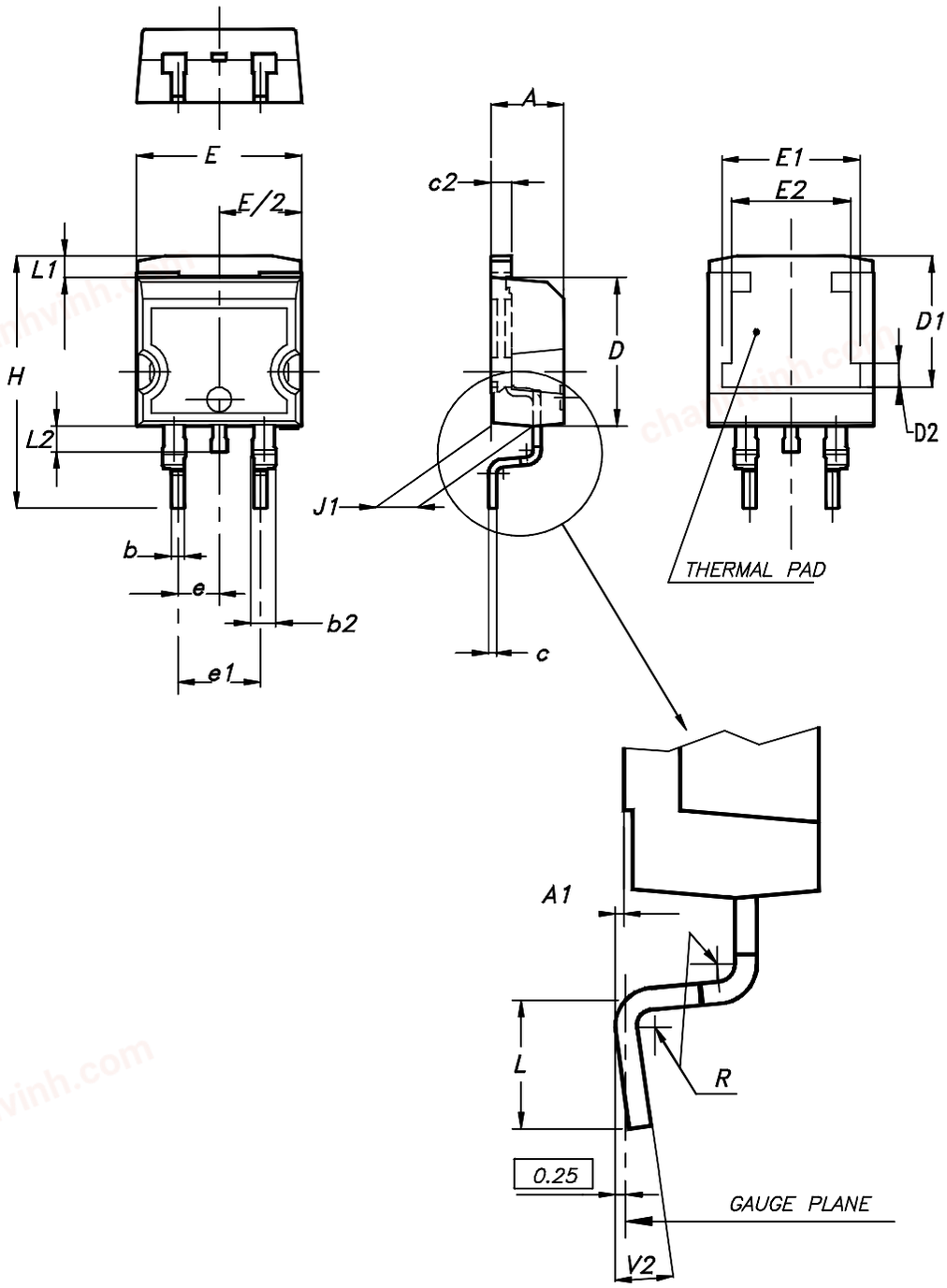
Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.40	2.72	0.094	0.107
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.044	0.067
c	0.49	0.70	0.019	0.028
c2	1.23	1.32	0.048	0.052
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
E	10.00	10.40	0.394	0.409
L	13.00	14.00	0.512	0.551
L1	3.50	3.93	0.138	0.155
L2	1.27	1.40	0.050	0.055

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2.3 D²PAK package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

Figure 11. **D²PAK package outline**



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

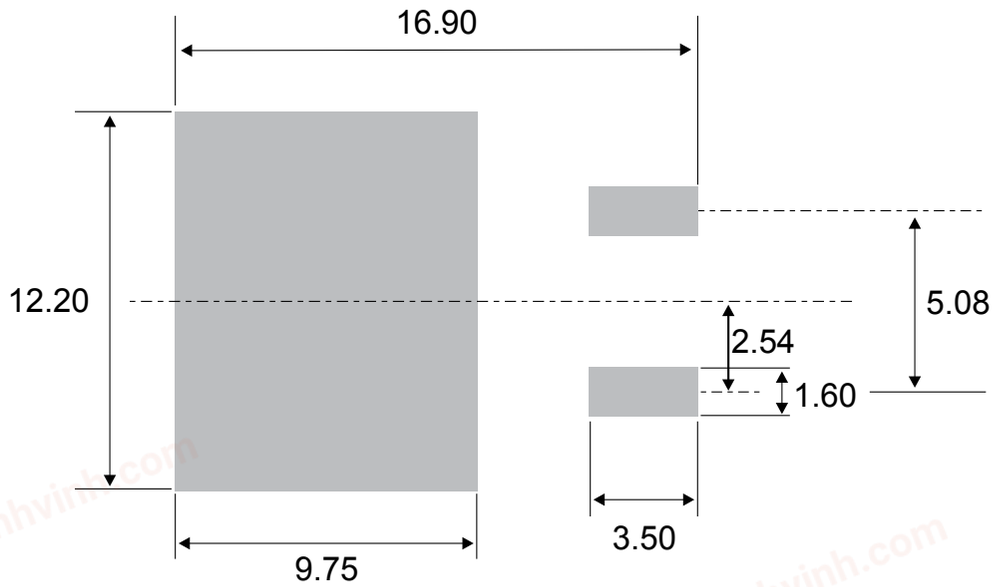
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Table 6. **D²PAK package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	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°

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Figure 12. D²PAK recommended footprint (dimensions in mm)



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3 Ordering information

Table 7. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS41H100CT	STPS41H100CT	TO-220AB	1.95 g	50	Tube
STPS41H100CG	STPS41H100CG	D^2PAK	1.38 g	50	Tube
STPS41H100CG-TR	STPS41H100CG	D^2PAK	1.38 g	10000	Tape and reel
STPS41H100CR	STPS41H100CR	I^2PAK	1.50 g	30	Tube

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Revision history

Table 8. **Document revision history**

Date	Version	Changes
Jul-2003	3A	Previous release.
15-Jul-2011	4	Updated Table 5.
11-Apr-2012	5	Removed order codes STPS41H100CR-H and STPS41H100CT-H. Replaced paragraph under Table 5.
27-Jun-2018	6	Updated Table 1. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified). Updated Section 1.1 Characteristics (curves).

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