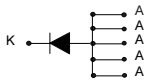
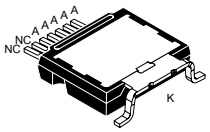
STPS60170L2Y

Datasheet

Automotive 170 V, 60 A power Shottky rectifier





HU3PAK

Features

- AEC-Q101 qualified and PPAP capable
- None or negligible reverse recovery
- V_{RRM} guaranteed from -40 °C up to 175 °C
- High junction temperature capability
- Low reverse current
- Reduce conduction, reverse and switching losses
- 100 % Avalanche tested in production
- ECOPACK2 compliant

Applications

- DC/DC converters for EV/HEV
- LLC resonant converter

Product status link
STPS60170L2Y

Product summary	
$I_{F(AV)}$	60 A
V_{RRM}	170 V
V_F (typ.)	0.690 V
T_j	-40 °C to +175 °C

Description

Housed in a HU3PAK package, this 60 A, 170 V planar Schottky diode provides high performance in a flat, topside-cooling package.

STPS60170L2Y has been developed for applications requiring a high-voltage secondary rectification diode, and in particular, for high frequency switched-mode power supply DC-DC converters used in electrical cars.

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage	T_j = -40 °C to +175 °C	170	V
$I_{F(RMS)}$	Forward rms current		90	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_C = 160 °C	60	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	800	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	3100	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range(1)		-40 to +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	Typ. value	Unit
$R_{th(j-c)}$	Junction to case	0.20	°C/W

For more information, refer to the following technical note:

- TN1378:HU3PAK package mounting and thermal behaviour
- AN5088: Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		75	µA
		T_j = 125 °C		-	13	40	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 30 A	-		0.82	V
		T_j = 125 °C			0.60	0.67	
		T_j = 25 °C	I_F = 60 A			0.91	
		T_j = 125 °C		-	0.69	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:

- $P = 0.58 \times I_{F(AV)} + 0.003 \times I_F{}^2{}_{(RMS)}$

For more information, 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

1.1 Characteristics (curves)

Figure 1. Average forward current versus case temperature (δ = 0.5)

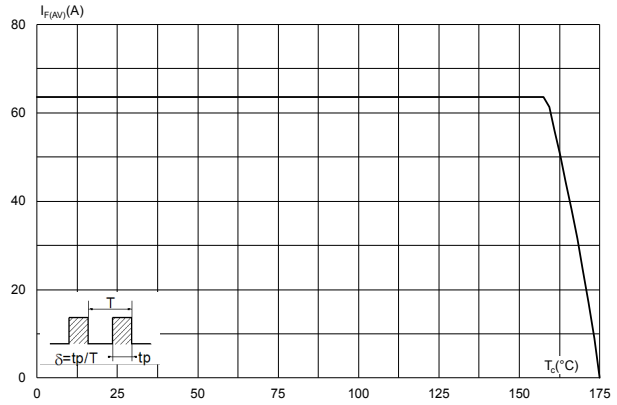


Figure 2. Relative variation of thermal impedance junction to case versus pulse duration

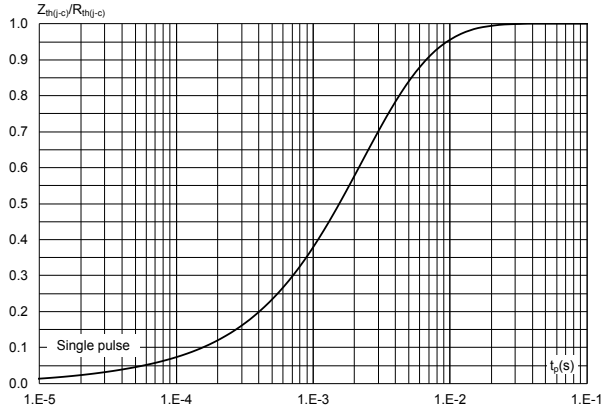


Figure 3. Normalized avalanche power derating versus pulse duration (T_j= 125 °C)

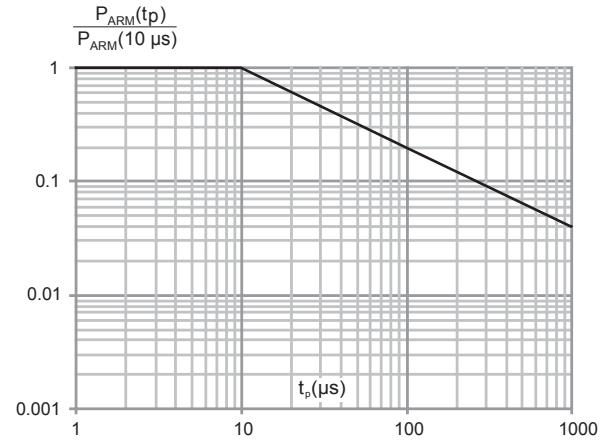


Figure 4. Reverse leakage current versus reverse voltage applied (typical values)

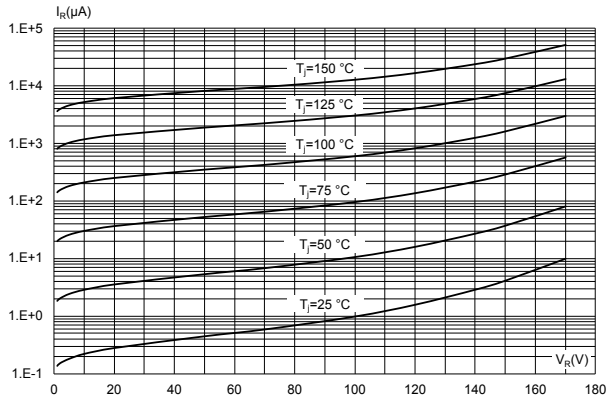


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

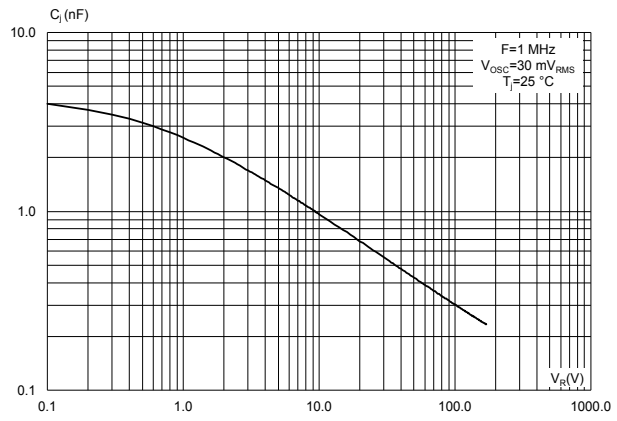
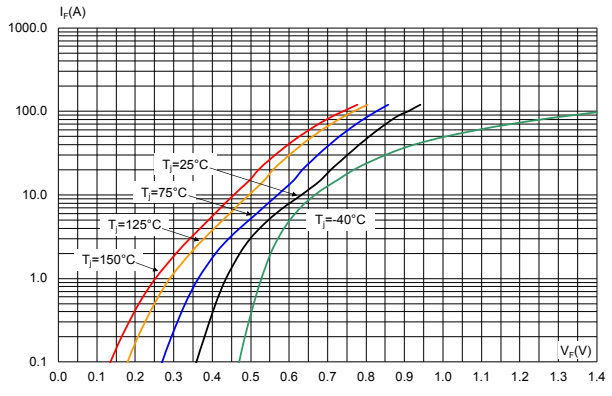


Figure 6. Forward voltage drop versus forward current (typical values)



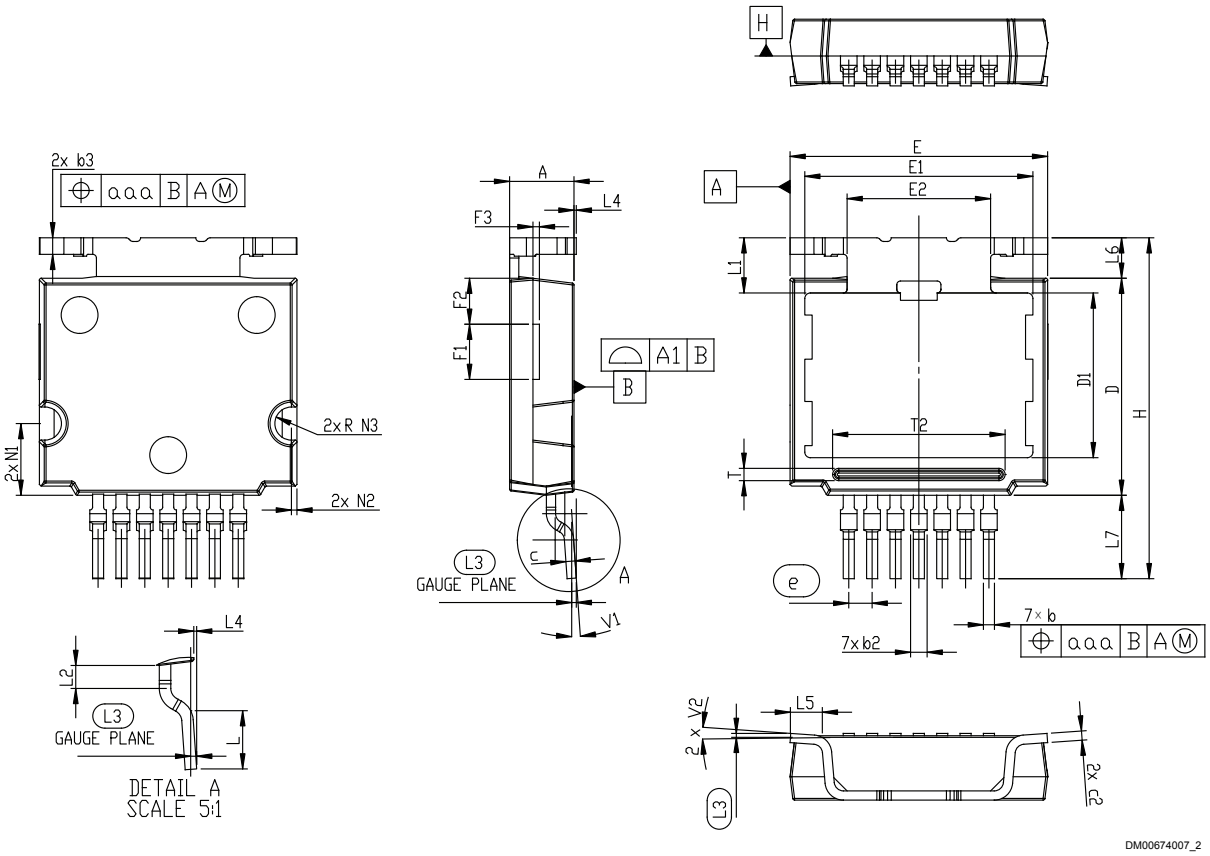
2 Package information

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 HU3PAK package information

- Epoxy meets UL94, V0

Figure 7. HU3PAK package outline



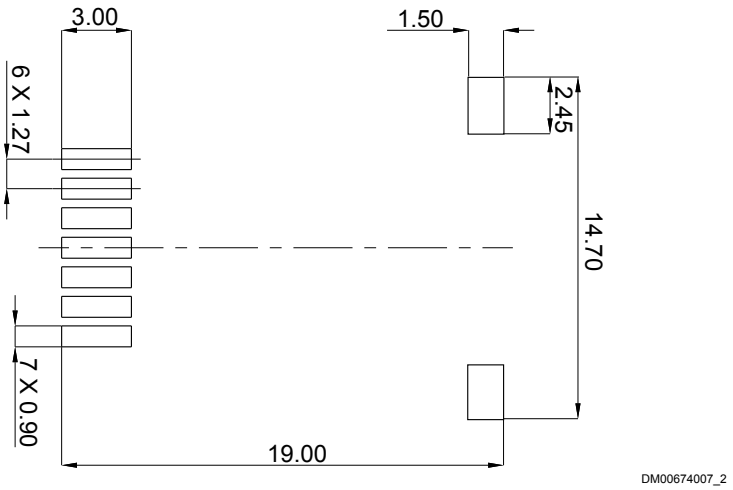
Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 4. **HU3PAK package mechanical data**

Ref.	Dimensions		
	mm		
	Min.	Typ.	Max.
A	3.40	3.50	3.60
A1		0.05	
b	0.50	0.60	0.70
b2	0.50	0.70	1.00
b3	0.80	0.90	1.00
c	0.40	0.50	0.60
c2	0.40	0.50	0.60
D	11.70	11.80	11.90
D1	8.80	8.955	9.10
E	13.90	14.00	14.10
E1	12.30	12.40	12.50
E2	7.75	7.80	7.85
e		BSC 1.27	
H	18.00	18.58	19.00
L	2.40	2.52	2.60
L1		3.05	
L2	0.90	1.00	1.10
L3		BSC 0.26	
L4	0.075	0.125	0.175
L5	1.83	1.93	2.03
L6	2.14	2.24	2.34
L7	4.44	4.54	4.64
aaa		0.10	
F1	2.90	3.00	3.10
F2	2.40	2.50	2.60
F3	0.25	0.35	0.45
N1	3.80	3.90	4.00
N2	0.25	0.30	0.45
N3	0.80	0.90	1.00
T	0.50	0.67	0.70
T2	9.18	9.38	9.43
θ1		0°	8°
θ2		0°	8°

1. Package outline exclusive of any mold flashes dimensions.
2. Package outline exclusive of burr dimensions.
3. Max resin gate protrusion: 0.25 mm.
4. The planarity of the package backside 50 micron max.
5. BSC: basic spacing between centers

Figure 8. **HU3PAK recommended footprint (dimensions are in mm)**



Note: For packing details you can see technical note TN1173: Packing information for IPAD, protection, rectifiers, thyristors and AC Switches.

2.2 HU3PAK packing information

Figure 9. **HU3PAK carrier tape outline**

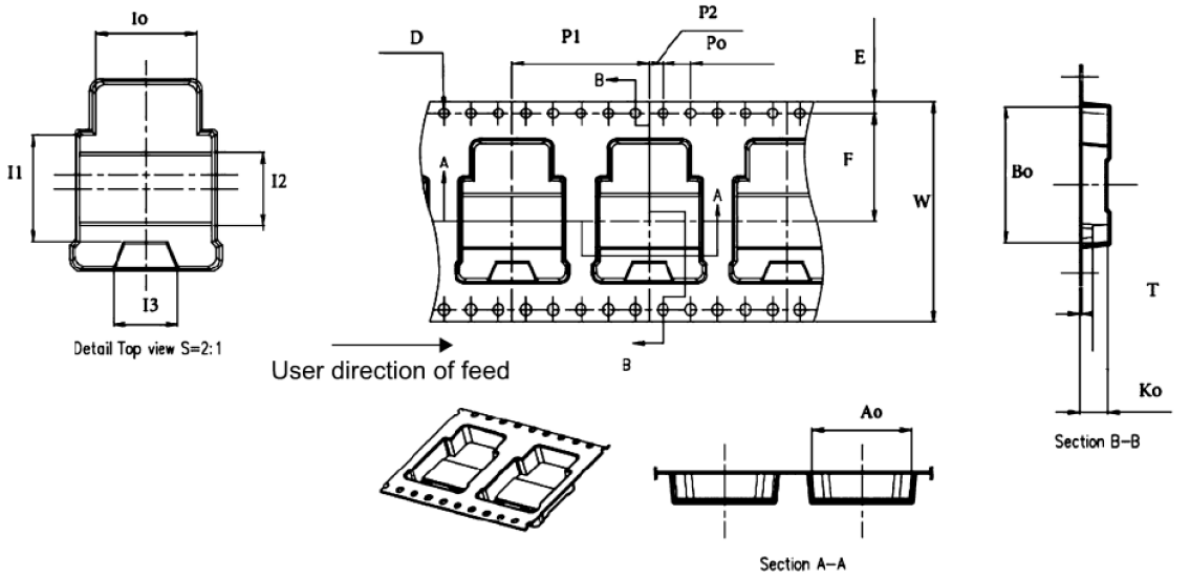


Table 5. **HU3PAK carrier tape mechanical data**

Ref.	Dimensions		
	mm		
	Min.	Typ.	Max.
A0	14.30	14.40	14.50
B0		19.70	
D	1.40	1.50	1.60
E	1.65	1.75	1.85
F	15.55	15.65	15.75
I0		11.00	
I1	11.50	11.60	11.70
I2		8.00	
I3		7.00	
K0		4.20	
P0	3.90	4.00	4.10
P1	19.90	20.00	20.10
P2	1.90	2.00	2.10
T	0.00	0.40	0.90
W	31.70	32.00	32.30

3 Ordering information

Table 6. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS60170L2Y	STPS60170L2Y	HU3PAK	2.32 g	600	Tape and reel

Revision history

Table 7. **Document revision history**

Date	Revision	Changes
17-Mar-2026	1	Initial release.

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