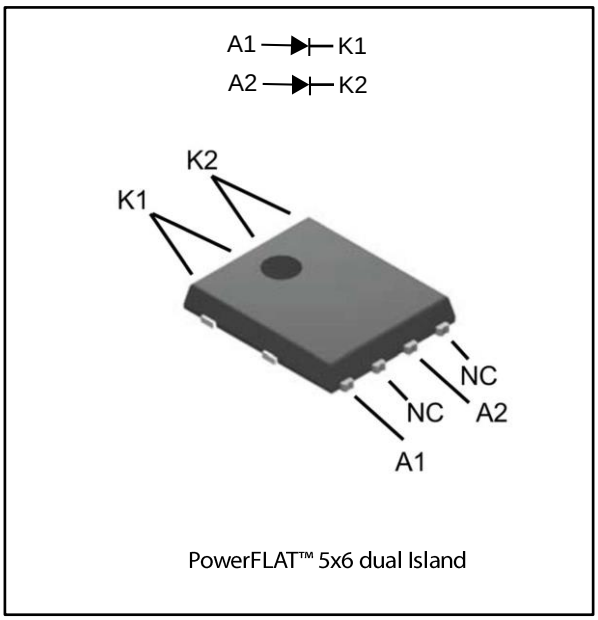
STPS660D-Y

Automotive power Schottky rectifier

Datasheet - production data



PowerFLAT™ 5x6 dual Island

Description

Dual chip Schottky rectifiers suited to automotive application, typically engine control units.

Packaged in PowerFLAT™ 5x6 wettable flanks, this device is especially intended for surface mounting and used in high frequency converters, free-wheeling and reverse polarity protection applications.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 3 A
V_{RRM}	60 V
T_j (max.)	175 °C
V_F (typ.)	0.49 V

Features

- AEC-Q101 qualified
- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Avalanche specification
- ECOPACK®2 compliant component
- PPAP capable
- Dual Island package
- Wettable flanks for automatic visual inspection

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage	T_j = -40 °C to +175 °C	60	V
$I_{F(RMS)}$	Forward rms current	PowerFLAT™ 5x6 dual Island	10	A
$I_{F(AV)}$	Average forward current	T_c = 160 °C, δ = 0.5 square pulse	3.5	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	65	A
		t_p = 8.3 ms sinusoidal	68	
P_{ARM}	Repetitive peak avalanche power	T_j = 125 °C, t_p = 10 µs	140	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature(1)		-40 to +175	°C

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 resistance parameters

Symbol	Parameter		Maximum	Unit
$R_{th(j-c)}$	Junction to case	Per diode	5	°C/W
		Total	3	
		Coupling	1	

Table 4: 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 = 60 V	-		150	µA
		T_j = 125 °C		-	20	30	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 3 A	-		0.61	V
		T_j = 125 °C		-	0.49	0.58	
		T_j = 25 °C	I_F = 6 A	-		0.80	
		T_j = 125 °C		-	0.62	0.72	

Notes:

(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:

$P = 0.44 \times I_{F(AV)} + 0.047 \times I_{F^2(RMS)}$

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 in a power diode

1.1 Characteristics (curves)

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

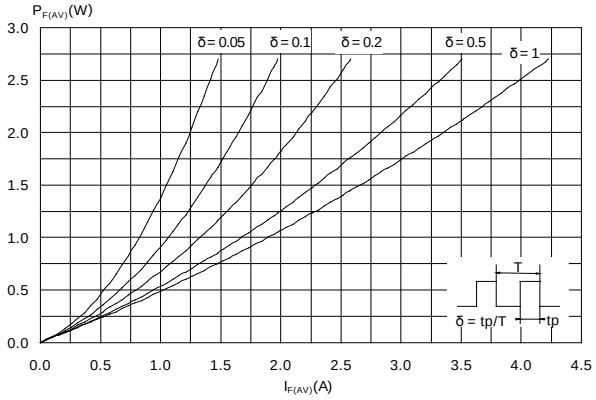


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

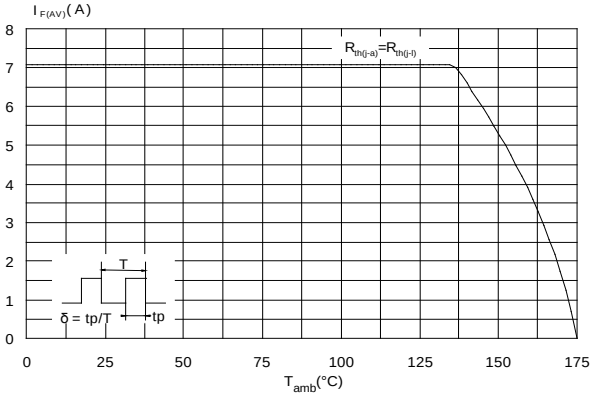


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

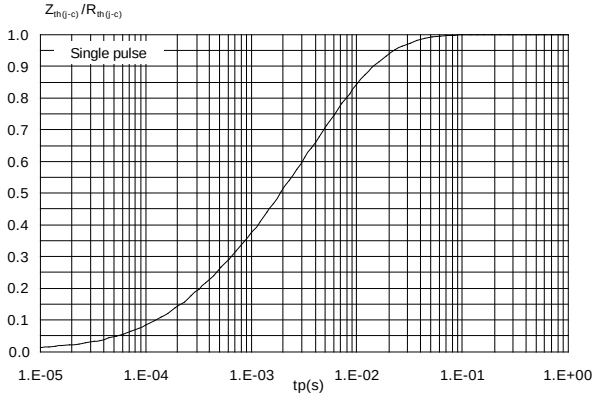


Figure 4: Junction capacitance versus reverse voltage applied (typical values, per diode)

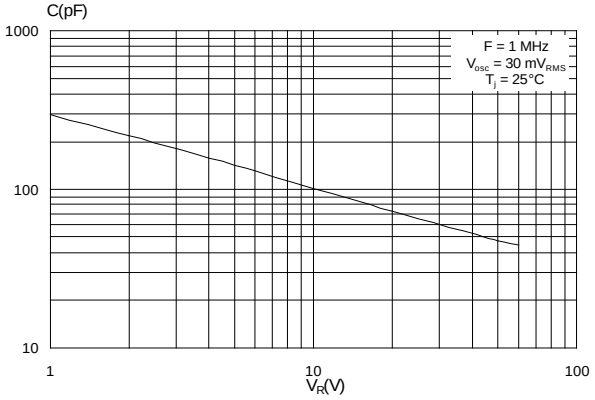


Figure 5: Forward voltage drop versus forward current (typical values, per diode)

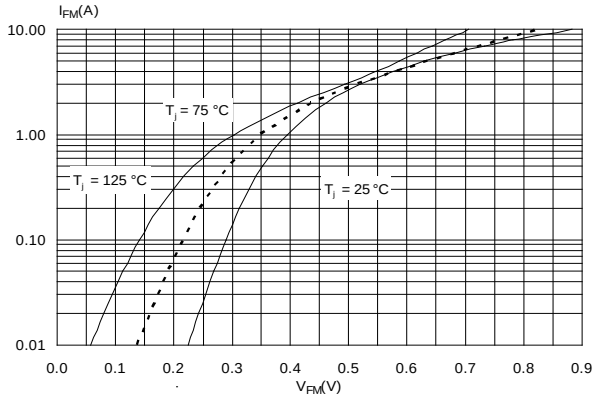
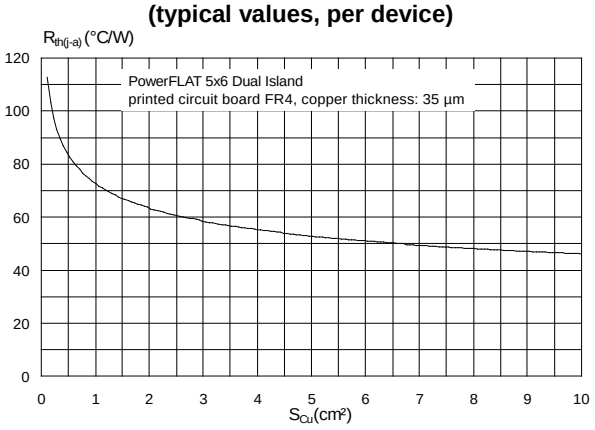


Figure 6: Thermal resistance junction to ambient total versus copper surface under each tab (typical values, per device)



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 PowerFLAT™ 5x6 dual island package information

Figure 7: PowerFLAT™ 5x6 dual island package outline

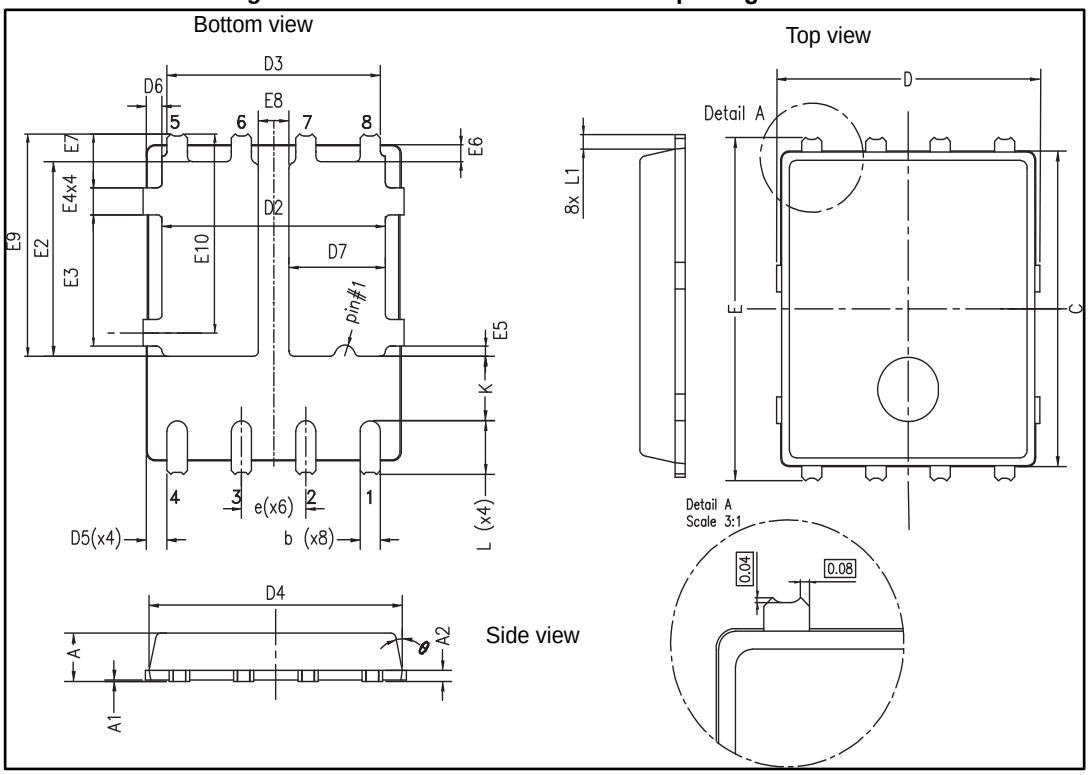
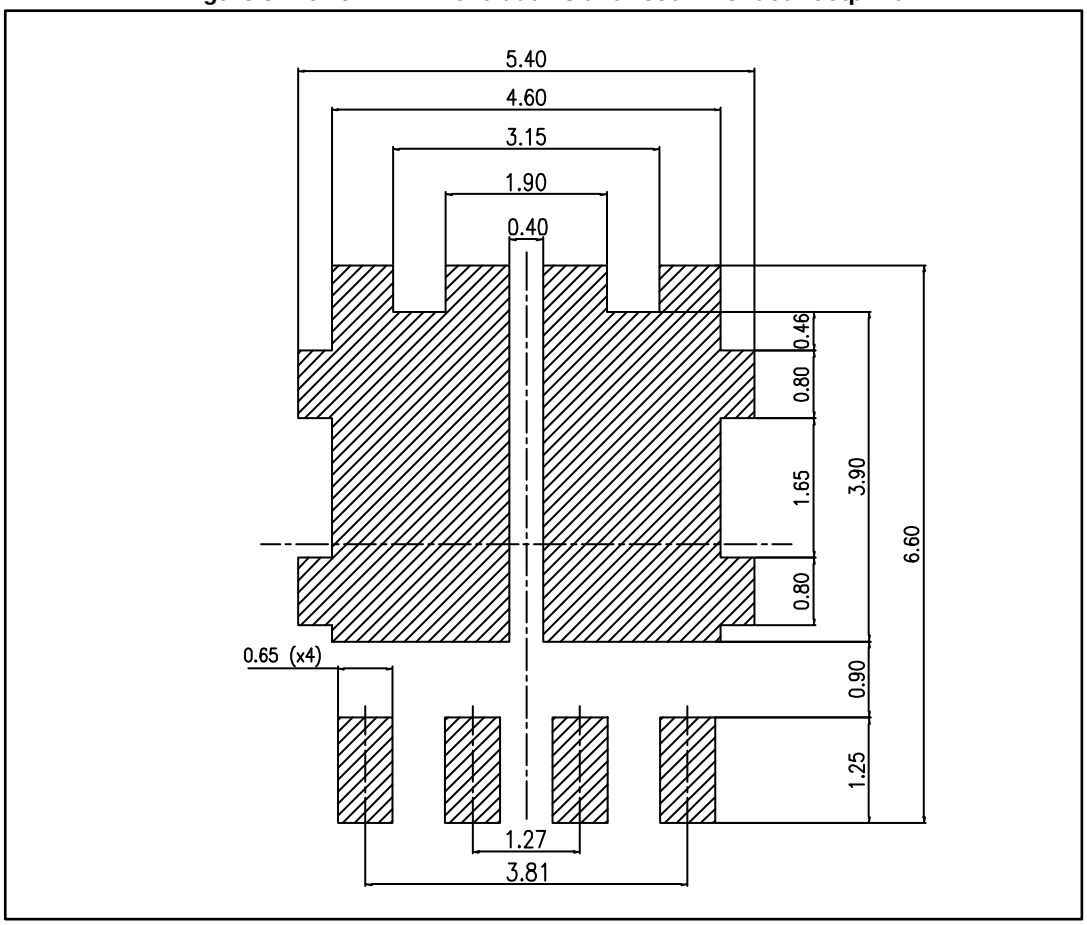


Table 5: PowerFLAT™ 5x6 dual island package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80		1.00	0.0315		0.0394
A1	0.02		0.05	0.0008		0.0020
A2		0.25			0.0098	
b	0.30		0.50	0.0118		0.0197
C	5.80	6.00	6.10	0.2283	0.2362	0.2402
D	5.00	5.20	5.40	0.1969	0.2047	0.2126
D2	4.15		4.45	0.1634		0.1752
D3	4.05	4.20	4.35	0.1594	0.1654	0.1713
D4	4.80	5.00	5.10	0.1890	0.1969	0.2008
D5	0.25	0.40	0.55	0.0098	0.0157	0.0217
D6	0.15	0.30	0.45	0.0059	0.0118	0.0177
D7	1.68		1.98	0.0661		0.0780
e		1.27			0.0500	
E	6.20	6.40	6.60	0.2441	0.2520	0.2598
E2	3.50		3.70	0.1378		0.1457
E3	2.35		2.55	0.0925		0.1004
E4	0.40		0.60	0.0157		0.0236
E5	0.08		0.28	0.031		0.0110
E6	0.20	0.325	0.45	0.0079	0.0128	0.0177
E7	0.85	1.00	1.15	0.0335	0.0394	0.0453
E8	0.55		0.75	0.0217		0.0295
E9	4.00	4.20	4.40	0.1575	0.1654	0.1732
E10	3.55	3.70	3.85	0.1398	0.1457	0.1516
K	1.05		1.35	0.0502		0.0620
L	0.90	1.00	1.10	0.0285	0.0325	0.0364
L1	0.175	0.275	0.375	0.0069	0.0108	0.0148
Θ	0°		12°	0°		12°

Figure 8: PowerFLAT™ 5x6 dual island recommended footprint



3 Ordering information

Table 6: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS660DDJFY-TR	S660 DY	PowerFLAT™ 5x6 dual Island	95 mg	3000	Tape and reel

4 Revision history

Table 7: Document revision history

Date	Revision	Changes
12-Oct-2016	1	First issue.

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