

## Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

[STMicroelectronics](#)

[STPS640CBY-TR](#)

For any questions, you can email us directly:

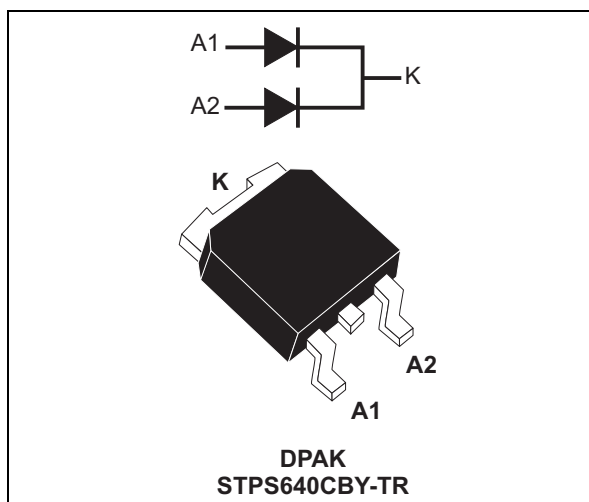
[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)



# STPS640C-Y

## Automotive power Schottky rectifier

Datasheet — production data



### Features

- Low forward voltage drop
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- AEC-Q101 qualified.

### Description

This dual Schottky rectifier is designed for switch mode power supplies and other power converters.

This device is intended for use in low and medium voltage operation, and in particular high frequency circuits where low switching losses are required (free wheeling and polarity protection) in automotive applications.

**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	2 x 3 A
$V_{RRM}$	40 V
$T_j$	150 °C
$V_F (Typ)$	0.50 V

## Characteristics

## STPS640C-Y

# 1 Characteristics

**Table 2. Absolute ratings (limiting values, per diode)**

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		40	V
$I_{F(RMS)}$	Forward rms current		6	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$ , $T_c = 135\text{ }^{\circ}\text{C}$	per diode	3	A
		per device	6	
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal, $T_c = 25\text{ }^{\circ}\text{C}$	75	A
$I_{RRM}$	Peak repetitive reverse current	$t_p = 2\text{ }\mu\text{s}$ , $F = 1\text{ kHz}$	1	A
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 1\text{ }\mu\text{s}$ , $T_c = 25\text{ }^{\circ}\text{C}$	1300	W
$T_{stg}$	Storage temperature range		-65 to +150	$^{\circ}\text{C}$
$T_j$	Operating junction temperature		-40 to +150	$^{\circ}\text{C}$

**Table 3. Thermal parameters**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	per diode	5.5	$^{\circ}\text{C/W}$
		per device	3	
$R_{th(c)}$	coupling		0.5	

When the diodes 1 and 2 are used simultaneously :  
 $\Delta T_j(\text{diode } 1) = P(\text{diode } 1) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode } 2) \times R_{th(c)}$

**Table 4. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ }^{\circ}\text{C}$	$V_R = V_{RRM}$	-	-	100	$\mu\text{A}$
		$T_j = 125\text{ }^{\circ}\text{C}$		-	2	10	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 3\text{ A}$	-	-	0.63	V
		$T_j = 125\text{ }^{\circ}\text{C}$		-	0.50	0.57	
		$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 6\text{ A}$	-	-	0.84	
		$T_j = 125\text{ }^{\circ}\text{C}$		-	0.67	0.72	

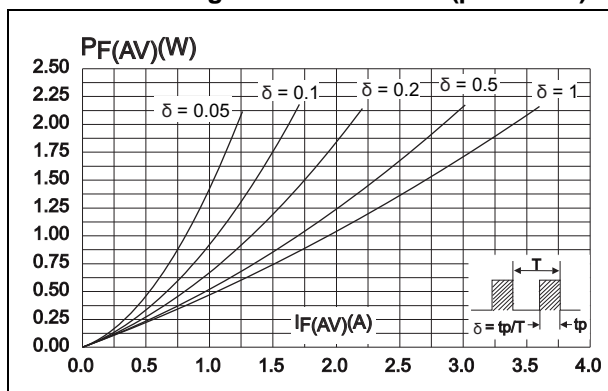
1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$
2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:  
 $P = 0.42 \times I_{F(AV)} + 0.050 \times I_{F(RMS)}^2$

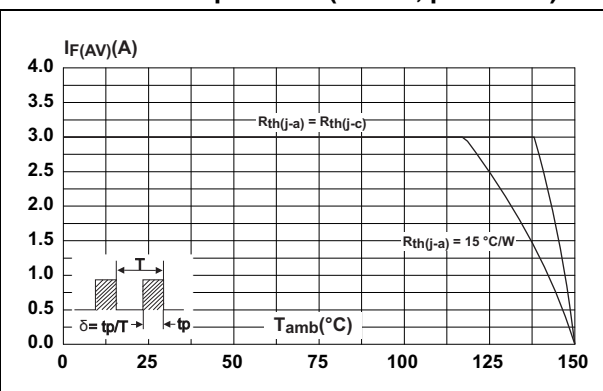
**STPS640C-Y**

**Characteristics**

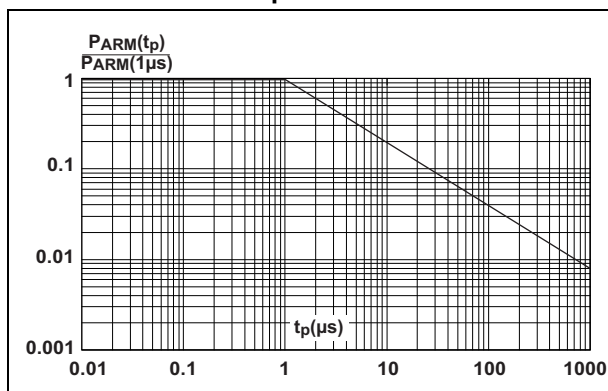
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



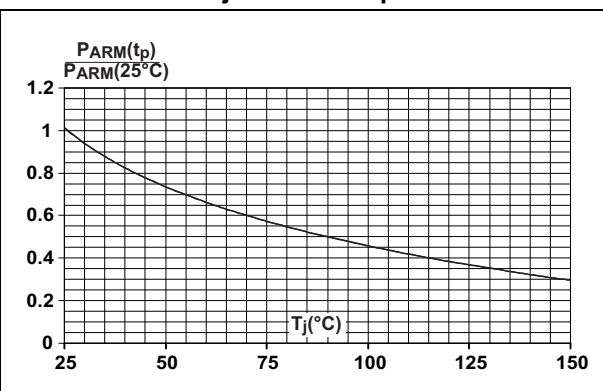
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



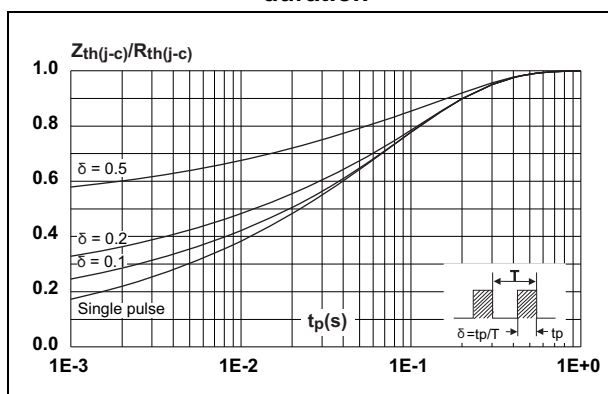
**Figure 3. Normalized avalanche power derating versus pulse duration**



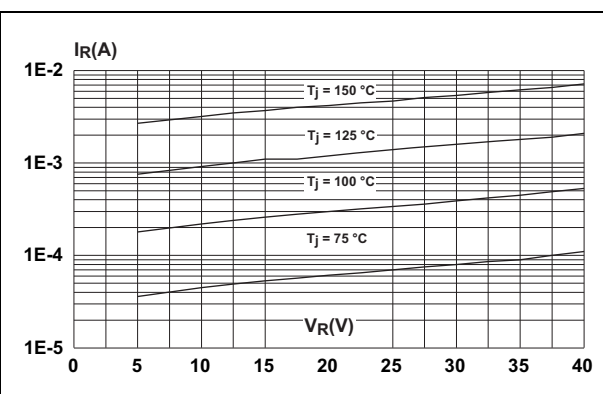
**Figure 4. Normalized avalanche power derating versus junction temperature**



**Figure 5. Relative variation of thermal impedance junction to case versus pulse duration**



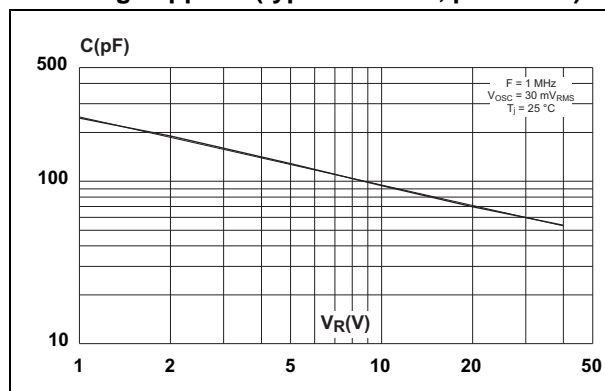
**Figure 6. Reverse leakage current vs. reverse voltage applied (typical values, per diode)**



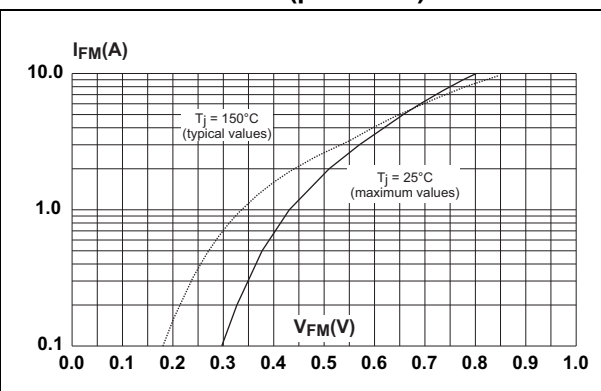
## Characteristics

## STPS640C-Y

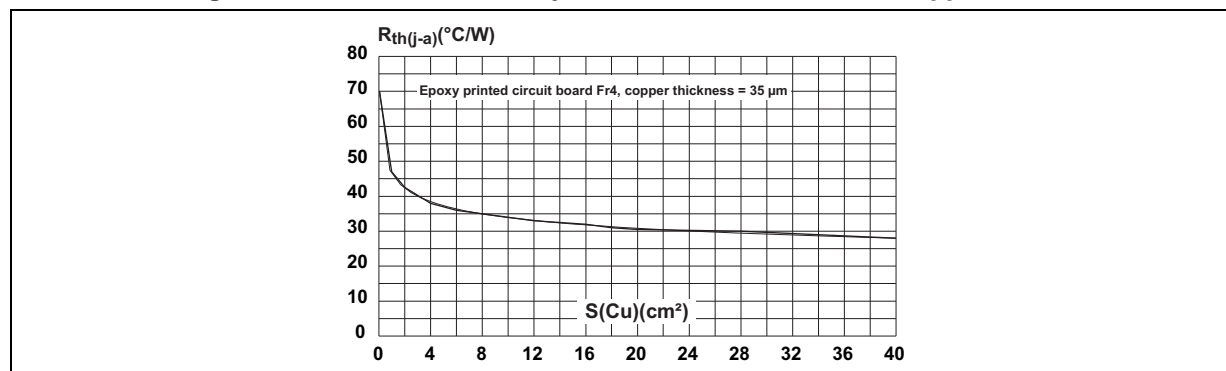
**Figure 7. Junction capacitance vs. reverse voltage applied (typical values, per diode)**



**Figure 8. Forward voltage drop vs. forward current (per diode)**



**Figure 9. Thermal resistance junction to ambient versus copper surface under tab**



STPS640C-Y

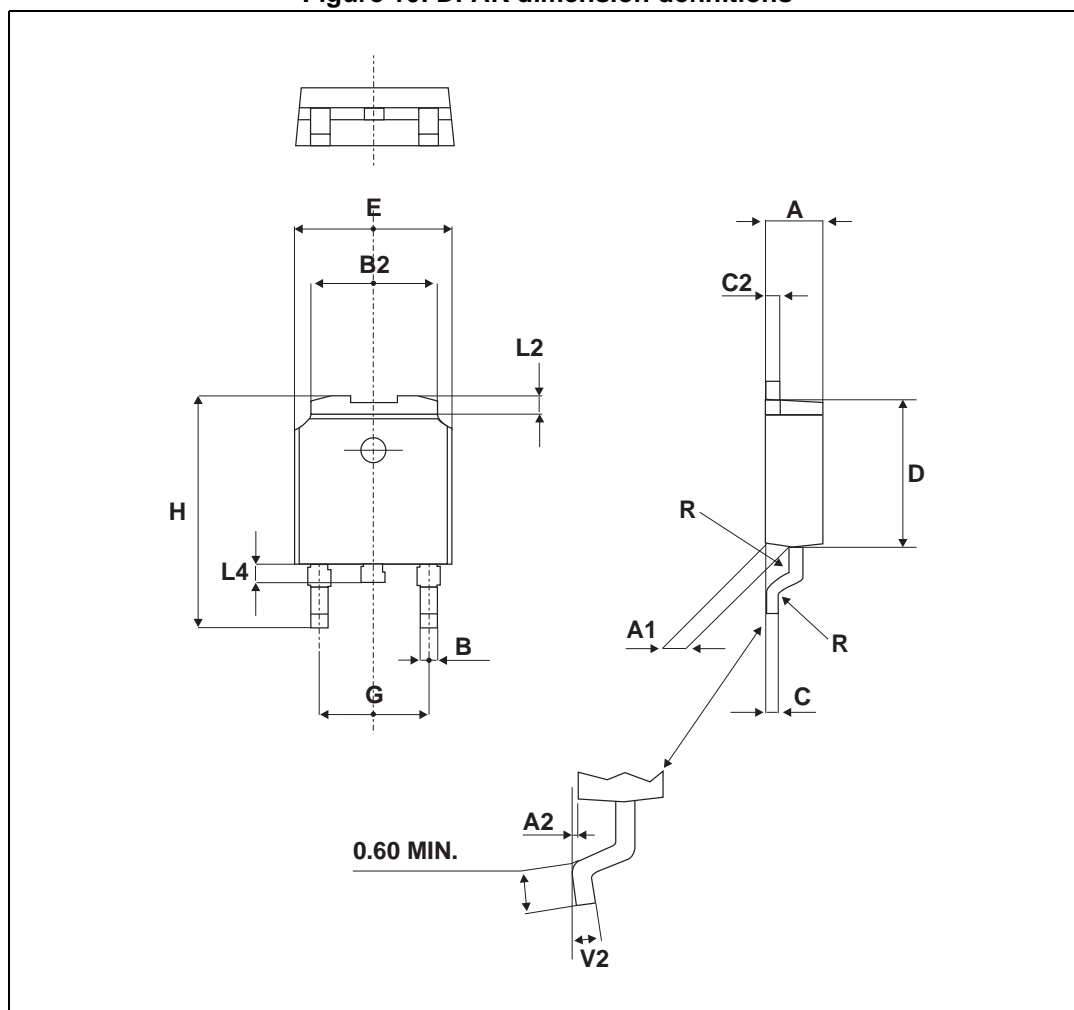
Package information

## 2 Package information

- Epoxy meets UL94,V0
- Lead-free packages

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

Figure 10. DPAK dimension definitions



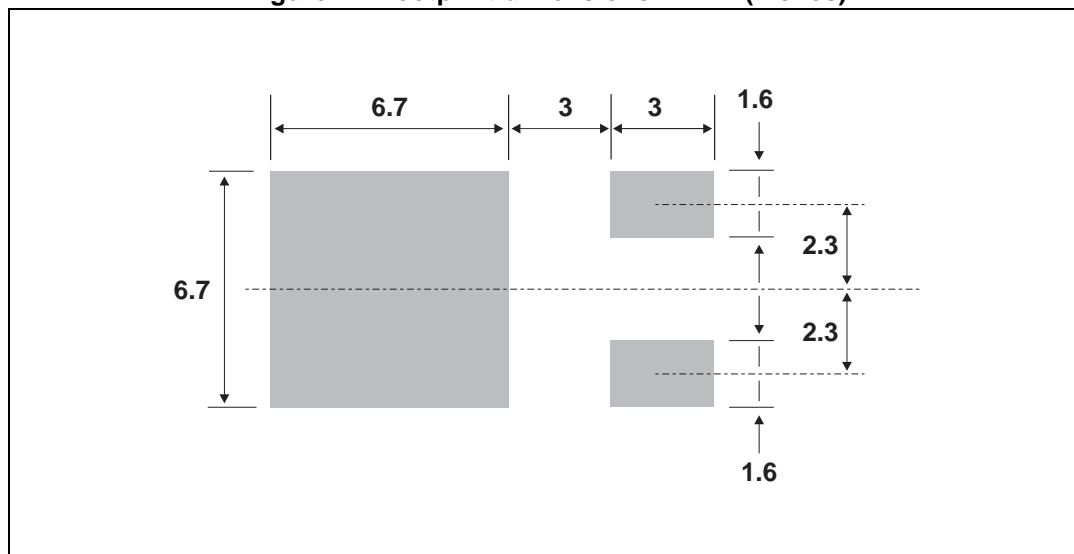
**Package information**

**STPS640C-Y**

**Table 5. DPAK dimension values**

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.212
C	0.45		0.60	0.017		0.023
C2	0.48		0.60	0.018		0.023
D	6.00		6.20	0.236		0.244
E	6.40		6.60	0.251		0.259
G	4.40		4.60	0.173		0.181
H	9.35		10.10	0.368		0.397
L2		0.80 typ.			0.031 typ.	
L4	0.60		1.00	0.023		0.039
V2	0°		8°	0°		8°

**Figure 11. Footprint dimensions in mm (inches)**



STPS640C-Y

Ordering information

### 3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS640CBY-TR	STPS640CY	DPAK	0.3 g	2500	Tape and reel

### 4 Revision history

Table 7. Revision history

Date	Revision	Changes
6-Nov-2013	1	First issue
04-Dec-2013	2	Properties changed from preliminary data to production data.



---

**STPS640C-Y**

---

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2013 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)