40V SURFACE-MOUNT SCHOTTKY BARRIER DIODE

Product Summary

V_R (V)	I_F (A)	V_F Max @ 400mA (V)	I_R Max @ 30V (µA)
40	0.52	0.5	10

Features and Benefits

- Low Equivalent On-Resistance
- Extremely Low Leakage (10µA @30V)
- High Current Capability (I_F = 0.52A)
- Low V_F, Fast Switching Schottky
- ZLLS400 Complements Low Temperature Equivalent ZHCS400
- Package Thermally Rated to +150°C
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The ZLLS400Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Description and Applications

This compact SOD323 packaged Schottky diode offers users an excellent performance combination comprising high current operation, extremely low leakage and low forward voltage, ensuring suitability for applications requiring efficient operation at higher temperatures (above +85°C). See *Operational Efficiency Chart* on page 3.

- DC-DC converters
- Mobile telecoms
- Charging circuits
- Motor controls

Mechanical Data

- Package: SOD323
- Package Material: UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: Cathode Band
- Terminals: Finish – Matte Tin Annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.004 grams (Approximate)

SOD323

Top View

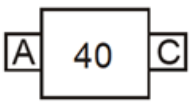
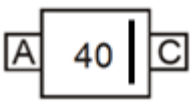
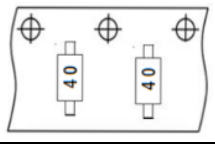
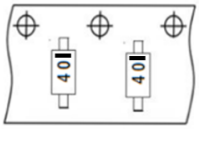
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZLLS400QTA	SOD323	3,000	Tape & Reel
ZLLS400QTC	SOD323	10,000	Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

40 = Product Type Marking Code

Before Date Code 2428 (YYWW)	From Date Code 2428 (YYWW) (including 2428)
	
	

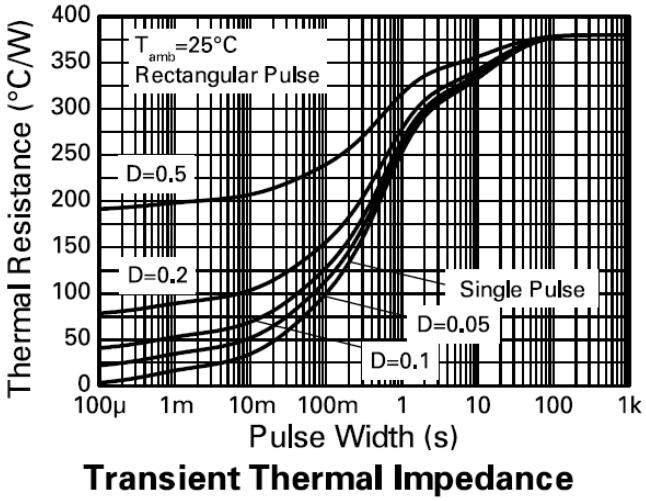
Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Continuous Reverse Voltage		V_R	40	V
Continuous Forward Current		I_F	0.52	A
Peak Repetitive Forward Current Rectangular Pulse Duty Cycle		I_{FPK}	0.85	A
Non-Repetitive Forward Current	t ≤ 100µs	I_{FSM}	12	A
	t ≤ 10ms		2.5	A

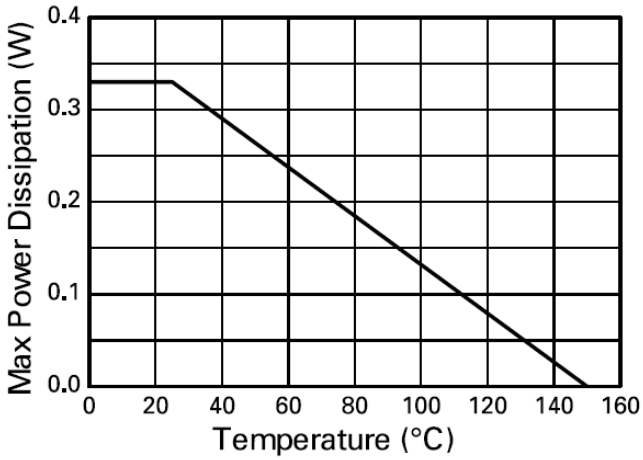
Thermal Characteristics

Characteristic			Symbol	Value	Unit
Power Dissipation, T_A = +25°C	Single Die Continuous		P_D	330	mW
	Single Die Measured at t < 5 secs			390	
Thermal Resistance, Junction to Ambient		(Note 5)	$R_{\theta JA}$	379	°C/W
		(Note 6)		317	
Junction Temperature			T_J	+150	°C
Storage Temperature Range			T_{STG}	-55 to +150	°C

Notes: 5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. For a device surface-mounted on FR4 PCB measured at t < 5 secs.



Transient Thermal Impedance



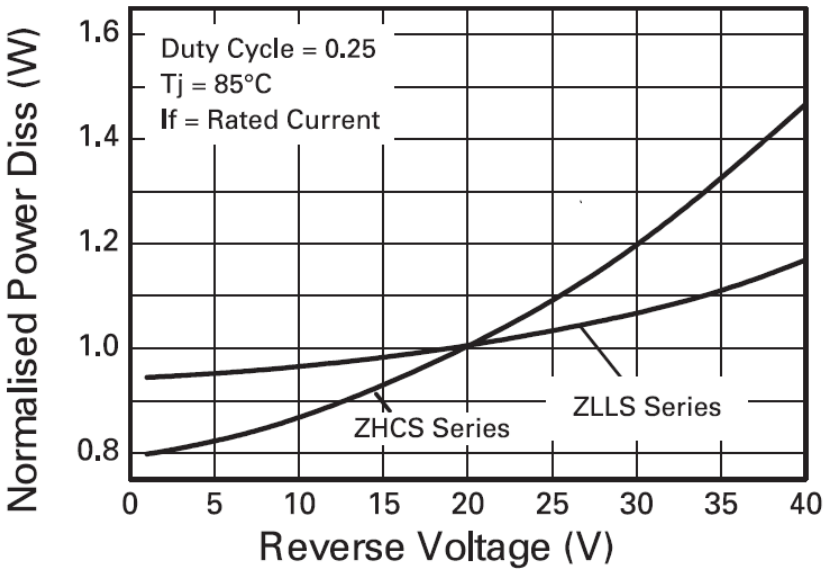
Derating Curve

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage	$V_{(BR)R}$	40	60	—	V	I_R = 200µA
Forward Voltage (Note 7)	V_F	—	305	360	mV	I_F = 50mA
		—	335	390		I_F = 100mA
		—	395	450		I_F = 250mA
		—	445	500		I_F = 400mA
		—	550	630		I_F = 750mA
		—	620	710		I_F = 1A
		—	710	800		I_F = 1.5A
		—	405	—		I_F = 400mA, T_A = +100°C
Reverse Current	I_R	—	6	10	µA	V_R = 30V
		—	370	—		V_R = 30V, T_A = +85°C
Diode Capacitance	C_D	—	15	—	pF	f = 1MHz, V_R = 30V
Reverse Recovery Time	t_{rr}	—	3	—	ns	Switched from I_F = 500mA to V_R = 5.5V Measured @ I_R = 50mA di/dt = 500mA/ns R_{source} = 6Ω, R_{load} = 10Ω
Reverse Recovery Charge	Q_{rr}	—	210	—	pC	

Note: 7. Measured under pulsed conditions. Pulse width = 300µs. Duty cycle ≤ 2%.

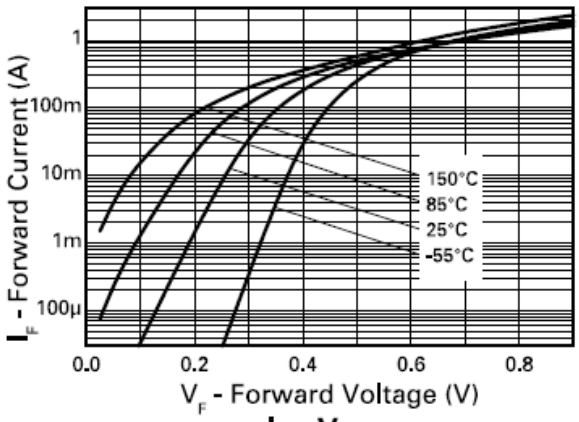
Operational Efficiency Chart



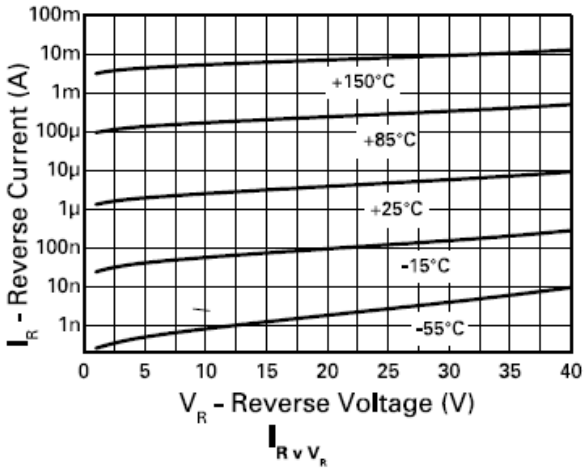
Operational Efficiency Example

The operational efficiency chart indicates the beneficial use of the ZLLS series diodes in applications requiring higher voltage and higher temperature operation. Circuits requiring low voltage, low temperature operation will benefit from using Diodes Incorporated's low V_F ZHCS series.

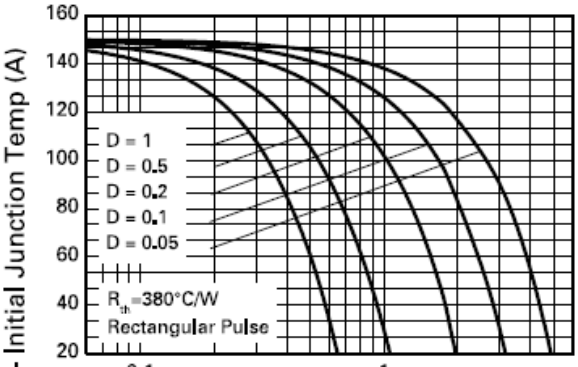
Operational Efficiency Chart (continued)



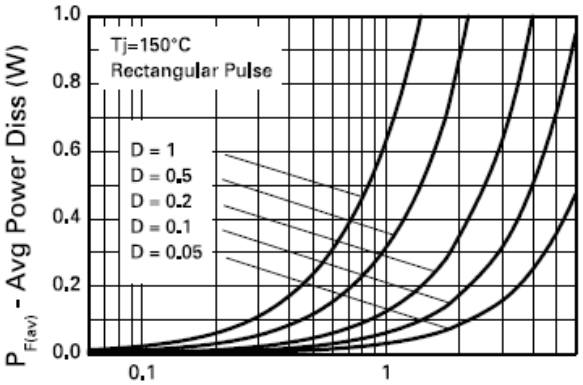
IF v VF



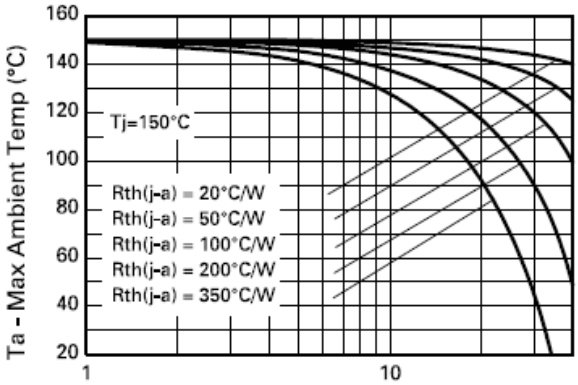
IR v VR



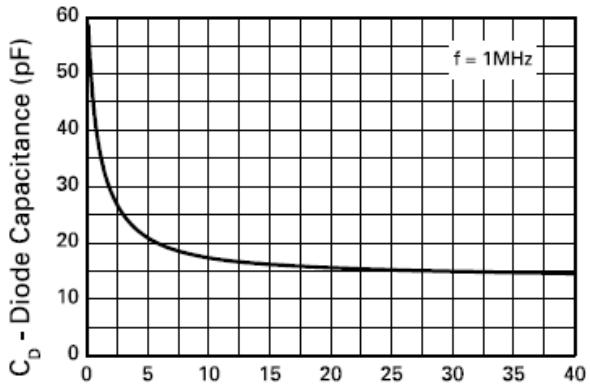
TC v IF(av)



PF(av) v IF(pk)



Ta v VR

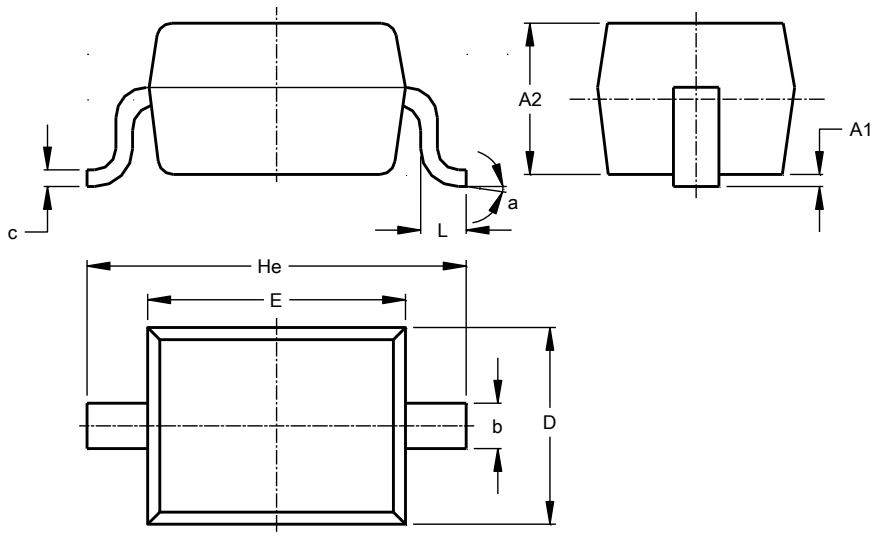


CD v VR

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOD323

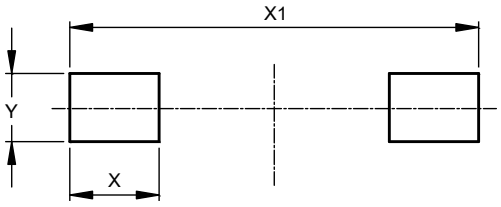


SOD323			
Dim	**Min**	**Max**	**Typ**
A1	--	0.10	0.05
A2	1.00	1.10	1.05
b	0.25	0.35	0.30
c	0.10	0.15	0.11
D	1.20	1.40	1.30
E	1.60	1.80	1.70
He	2.30	2.70	2.50
L	0.20	0.40	0.30
a	0º	8º	--
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOD323



Dimensions	Value (in mm)
X	0.590
X1	2.700
Y	0.450

IMPORTANT NOTICE

1. DIODES INCORPORATED (Diodes) AND ITS SUBSIDIARIES MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

2. The Information contained herein is for informational purpose only and is provided only to illustrate the operation of Diodes' products described herein and application examples. Diodes does not assume any liability arising out of the application or use of this document or any product described herein. This document is intended for skilled and technically trained engineering customers and users who design with Diodes' products. Diodes' products may be used to facilitate safety-related applications; however, in all instances customers and users are responsible for (a) selecting the appropriate Diodes products for their applications, (b) evaluating the suitability of Diodes' products for their intended applications, (c) ensuring their applications, which incorporate Diodes' products, comply the applicable legal and regulatory requirements as well as safety and functional-safety related standards, and (d) ensuring they design with appropriate safeguards (including testing, validation, quality control techniques, redundancy, malfunction prevention, and appropriate treatment for aging degradation) to minimize the risks associated with their applications.

3. Diodes assumes no liability for any application-related information, support, assistance or feedback that may be provided by Diodes from time to time. Any customer or user of this document or products described herein will assume all risks and liabilities associated with such use, and will hold Diodes and all companies whose products are represented herein or on Diodes' websites, harmless against all damages and liabilities.

4. Products described herein may be covered by one or more United States, international or foreign patents and pending patent applications. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks and trademark applications. Diodes does not convey any license under any of its intellectual property rights or the rights of any third parties (including third parties whose products and services may be described in this document or on Diodes' website) under this document.

5. Diodes' products are provided subject to Diodes' Standard Terms and Conditions of Sale (https://www.diodes.com/about/company/terms-and-conditions/terms-and-conditions-of-sales/) or other applicable terms. This document does not alter or expand the applicable warranties provided by Diodes. Diodes does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.

6. Diodes' products and technology may not be used for or incorporated into any products or systems whose manufacture, use or sale is prohibited under any applicable laws and regulations. Should customers or users use Diodes' products in contravention of any applicable laws or regulations, or for any unintended or unauthorized application, customers and users will (a) be solely responsible for any damages, losses or penalties arising in connection therewith or as a result thereof, and (b) indemnify and hold Diodes and its representatives and agents harmless against any and all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim relating to any noncompliance with the applicable laws and regulations, as well as any unintended or unauthorized application.

7. While efforts have been made to ensure the information contained in this document is accurate, complete and current, it may contain technical inaccuracies, omissions and typographical errors. Diodes does not warrant that information contained in this document is error-free and Diodes is under no obligation to update or otherwise correct this information. Notwithstanding the foregoing, Diodes reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes.

8. Any unauthorized copying, modification, distribution, transmission, display or other use of this document (or any portion hereof) is prohibited. Diodes assumes no responsibility for any losses incurred by the customers or users or any third parties arising from any such unauthorized use.

9. This Notice may be periodically updated with the most recent version available at https://www.diodes.com/about/company/terms-and-conditions/important-notice

www.diodes.com