

# CAT853, CAT859, CAT863, CAT869

## 3-Pin Microprocessor Power Supply Supervisors

### Description

The CAT853, CAT863, CAT859, and CAT869 are supervisory circuits that monitor power supplies in digital systems.

These devices generate a reset signal, which is asserted while the power supply voltage is below a preset threshold level and for at least 140 ms after the power supply level has risen above that level. Industry standard threshold levels are offered to support +3.3 V or 5.0 V systems.

The CAT859 and CAT869 feature a  $\overline{\text{RESET}}$  push-pull output (active low) for the two pinout options.

The CAT853 and CAT863 feature an open drain  $\overline{\text{RESET}}$  output (active low). Both require a pull-up resistor on the RESET output.

Fast transients on the power supply are ignored and the output is guaranteed to be in the correct state at  $V_{CC}$  levels as low as 1.0 V.

### Features

- Precision Monitoring of +3.3 V (-5%, -10%), 5 V (-10% Power Supplies)
- Active Low Reset Output
- Reset Valid down to  $V_{CC} = 1.0$  V
- 6  $\mu\text{A}$  Power Supply Current
- Power Supply Transient Immunity
- Industrial Temperature Range: -40°C to +85°C
- SOT-23 Package
- These Devices are Pb-Free and are RoHS Compliant

### Applications

- Computers, Servers, Laptops and Cable Modems
- Wireless Communications
- Embedded Control Systems
- White Goods
- Power Meters
- Intelligent Instruments
- PDAs and Handheld Equipment

**Table 1. THRESHOLD SUFFIX SELECTOR**

Nominal Threshold Voltage	Threshold Suffix Designation
4.63 V	L
4.38 V	M
4.20 V	F
4.00 V	J
3.08 V	T
2.93 V	S
2.63 V	R
2.40 V	C
2.32 V	Z



ON Semiconductor®

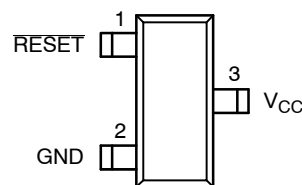
<http://onsemi.com>



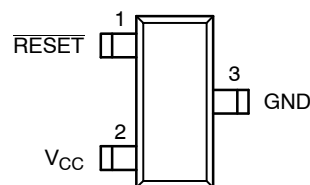
SOT-23  
TB SUFFIX  
CASE 527AG

### PIN CONFIGURATION

#### CAT853, CAT859

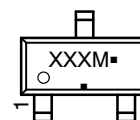


#### CAT863, CAT869



(Top Views)

### MARKING DIAGRAM



XXX = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

(\*Note: Microdot may be in either location)

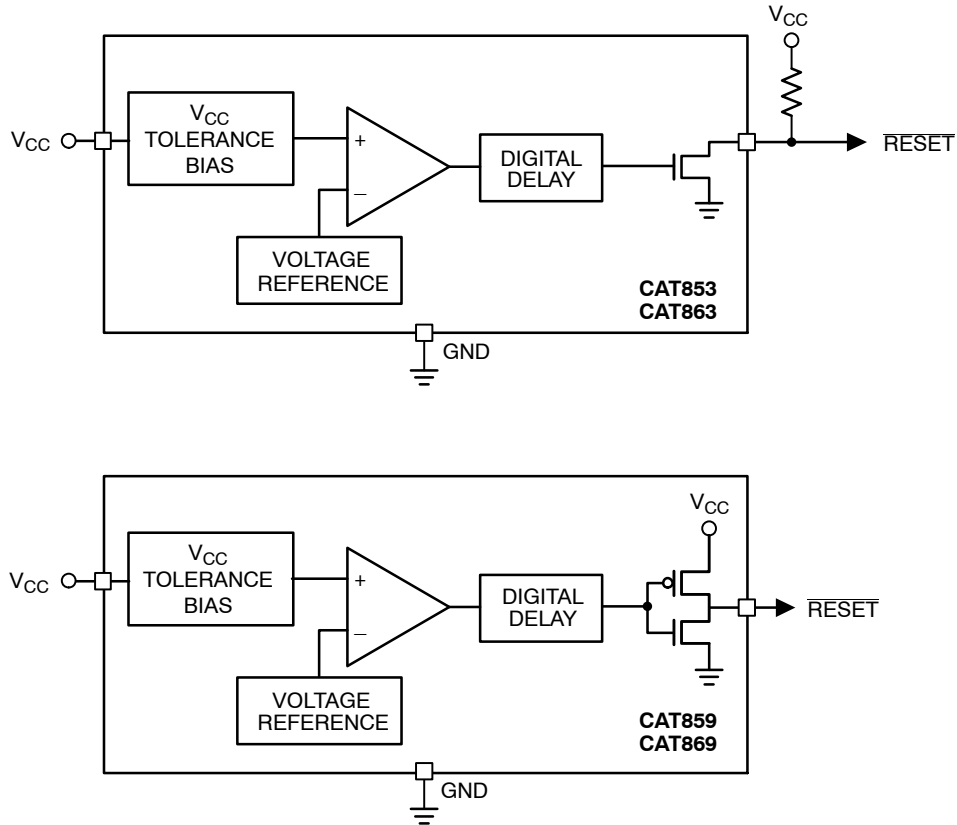
### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 8 of this data sheet.

# CAT853, CAT859, CAT863, CAT869

**Table 2. PIN DESCRIPTION**

Pin Name	Function
$\overline{\text{RESET}}$	Active low reset. $\overline{\text{RESET}}$ is asserted if $V_{\text{CC}}$ falls below the reset threshold and remains low for at least 140 ms after $V_{\text{CC}}$ rises above the reset threshold
GND	Ground
$V_{\text{CC}}$	Power supply voltage that is monitored



**Figure 1. Block Diagrams**

**Table 3. ABSOLUTE MAXIMUM RATINGS**

Parameters	Ratings	Units
Any pin with respect to ground	-0.3 to +6.0	V
Input Current, $V_{\text{CC}}$	20	mA
Output Current, $\overline{\text{RESET}}$	20	mA
Rate of Rise, $V_{\text{CC}}$	100	V/ $\mu$ s
Continuous Power Dissipation Derate 4 mW/ $^{\circ}$ C above 70 $^{\circ}$ C (SOT23)	320	mW
Operating Temperature Range	-40 to +85	$^{\circ}$ C
Storage Temperature Range	-65 to +105	$^{\circ}$ C
Lead Soldering Temperature (10 sec)	300	$^{\circ}$ C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

# CAT853, CAT859, CAT863, CAT869

**Table 4. ELECTRICAL CHARACTERISTICS** ( $V_{CC}$  = Full range,  $T_A$  =  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  unless otherwise noted. Typical values at  $T_A$  =  $+25^{\circ}\text{C}$  and  $V_{CC}$  = 3.3 V for the C, S, T versions,  $V_{CC}$  = 5 V for the M version.)

Symbol	Parameter	Conditions		Min	Typ (Note 1)	Max	Units			
	$V_{CC}$ Range	$T_A = 0^{\circ}\text{C}$ to $+70^{\circ}\text{C}$		1.0		5.5	V			
		$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$		1.2		5.5				
$I_{CC}$	Supply Current	$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	$V_{CC} < 3.6\text{ V}$ , C, S, T		6	15	$\mu\text{A}$			
$V_{TH}$	Reset Threshold Voltage	L Threshold	$T_A = +25^{\circ}\text{C}$	4.56	4.63	4.70	V			
			$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	4.50		4.75				
		M Threshold	$T_A = +25^{\circ}\text{C}$	4.31	4.38	4.45				
			$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	4.25		4.50				
		F Threshold	$T_A = +25^{\circ}\text{C}$	4.14	4.20	4.26				
			$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	4.08		4.31				
		J Threshold	$T_A = +25^{\circ}\text{C}$	3.93	4.00	4.06				
			$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	3.89		4.10				
		T Threshold	$T_A = +25^{\circ}\text{C}$	3.04	3.08	3.11				
			$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	3.00		3.15				
		S Threshold	$T_A = +25^{\circ}\text{C}$	2.89	2.93	2.96				
			$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	2.85		3.00				
		R Threshold	$T_A = +25^{\circ}\text{C}$	2.59	2.63	2.66				
			$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	2.55		2.70				
		C Threshold	$T_A = +25^{\circ}\text{C}$	2.35	2.40	2.45				
			$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	2.30		2.50				
		Z Threshold	$T_A = +25^{\circ}\text{C}$	2.28	2.32	2.35				
			$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	2.25		2.38				
			Reset Threshold Tempco					30		ppm/ $^{\circ}\text{C}$
			$V_{CC}$ to Reset Delay	$V_{CC} = V_{TH}$ to $(V_{TH} - 100\text{ mV})$				20		$\mu\text{s}$
	Reset Active Timeout Period	$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$		140	240	460	ms			
$V_{OL}$	RESET Output Voltage Low	$V_{CC} = V_{TH}$ min, $I_{SINK} = 1.2\text{ mA}$				0.4	V			
		$V_{CC} > 1.0\text{ V}$ , $I_{SINK} = 50\ \mu\text{A}$				0.3				
$V_{OH}$	RESET Output Voltage High	$V_{CC} = V_{TH}$ max, $I_{SOURCE} = -500\ \mu\text{A}$ (for CAT859/869 only)		$0.8 V_{CC}$			V			

1. Production testing done at  $T_A = +25^{\circ}\text{C}$ ; limits over temperature guaranteed by design only.

# CAT853, CAT859, CAT863, CAT869

## TYPICAL ELECTRICAL OPERATING CHARACTERISTICS

( $V_{CC}$  = Full range,  $T_A$  =  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  unless otherwise noted. Typical values at  $T_A$  =  $+25^{\circ}\text{C}$  and  $V_{CC}$  = 3.3 V for the C, S, T versions,  $V_{CC}$  = 5 V for the M version.)

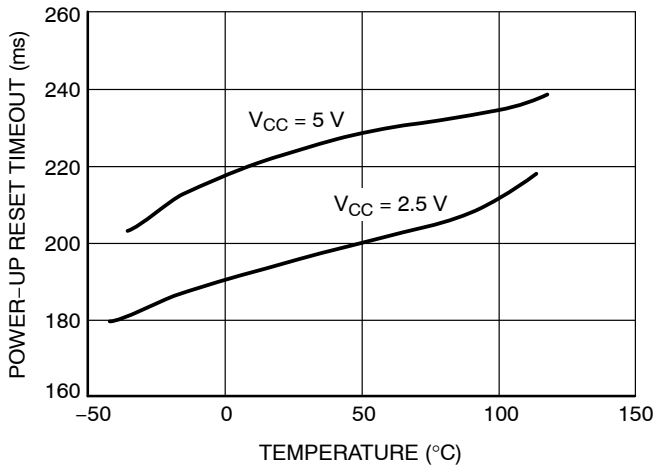


Figure 2. Power-Up Reset Timeout vs. Temperature

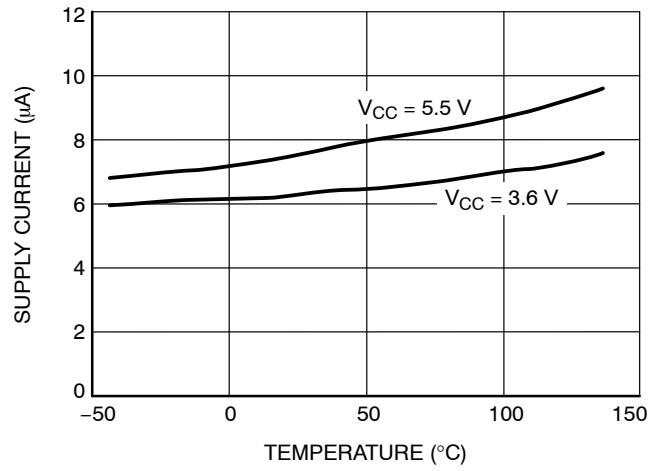


Figure 3. Supply Current vs. Temperature (No Load)

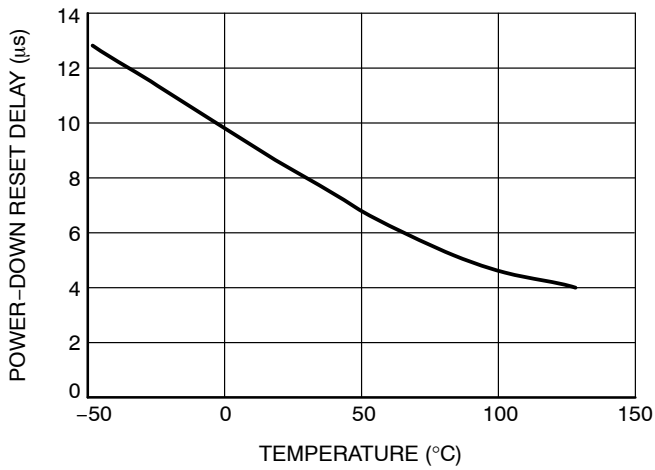


Figure 4. Power-Down Reset Delay vs. Temperature

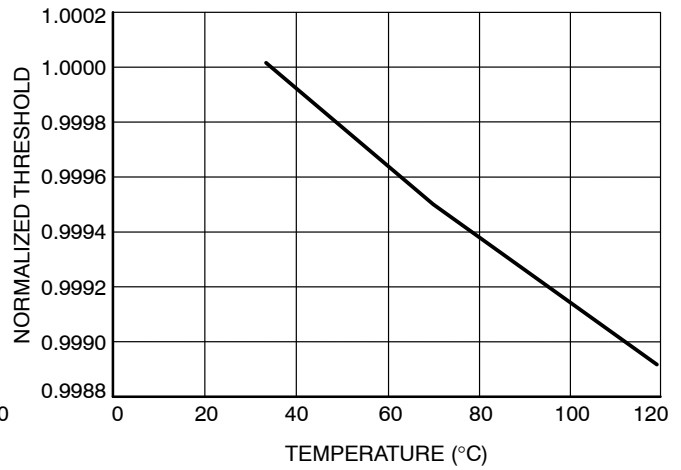


Figure 5. Normalized Reset Threshold vs. Temperature

# CAT853, CAT859, CAT863, CAT869

## DETAILED DESCRIPTION

### Reset Timing

The reset signal is asserted low for the CAT853, CAT863, CAT859, and CAT869 when the power supply voltage falls below the threshold trip voltage and remains asserted for at least 140 ms after the power supply voltage has risen above the threshold.

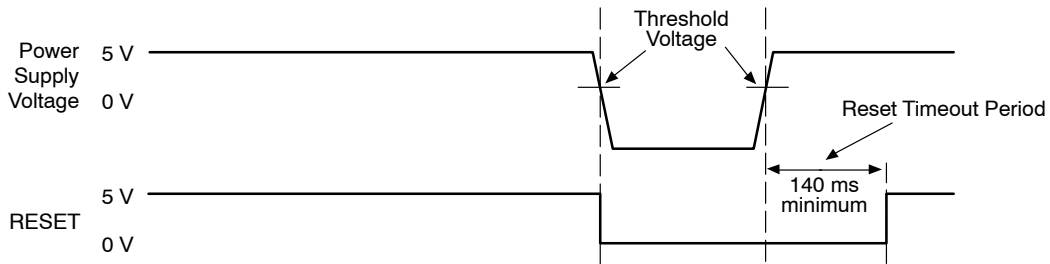


Figure 6. Reset Timing Diagram

### V<sub>CC</sub> Transient Response

The CAT853, CAT863, CAT859, and CAT869 protect  $\mu$ Ps against brownout failure. Short duration transients of 4  $\mu$ s or less and 100 mV amplitude typically do not cause a false RESET.

Figure 7 shows the maximum pulse duration of negative-going  $V_{CC}$  transients that do not cause a reset condition. As the amplitude of the transient goes further below the threshold (increasing  $V_{TH} - V_{CC}$ ), the maximum pulse duration decreases. In this test, the  $V_{CC}$  starts from an initial voltage of 0.5 V above the threshold and drops below it by the amplitude of the overdrive voltage ( $V_{TH} - V_{CC}$ ).

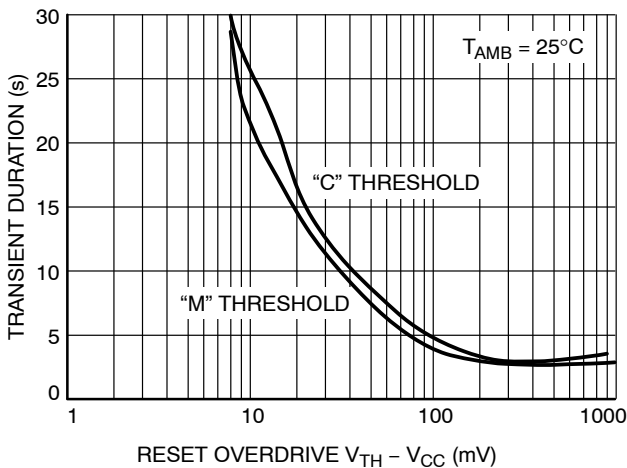


Figure 7. Maximum Transient Duration Without Causing a Reset Pulse vs. Reset Comparator Overdrive

### Valid Reset with $V_{CC}$ under 1.0 V

To ensure that the CAT859 and CAT869  $\overline{\text{RESET}}$  pin is in a known state when  $V_{CC}$  is under 1.0 V, a  $> 10 \text{ k}\Omega$  pull-down resistor between  $\overline{\text{RESET}}$  pin and GND is recommended.

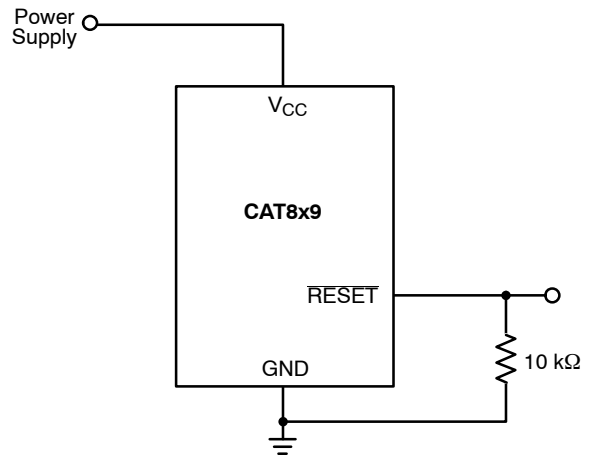


Figure 8.  $\overline{\text{RESET}}$  Valid with  $V_{CC}$  Under 1.0 V

# CAT853, CAT859, CAT863, CAT869

## Bi-directional Reset Pin Interfacing

The CAT859 and CAT869 can interface with  $\mu\text{P}/\mu\text{C}$  bi-directional reset pins by connecting a  $4.7\text{ k}\Omega$  resistor in series with the CAT859 and CAT869 reset output and the  $\mu\text{P}/\mu\text{C}$  bi-directional reset pin.

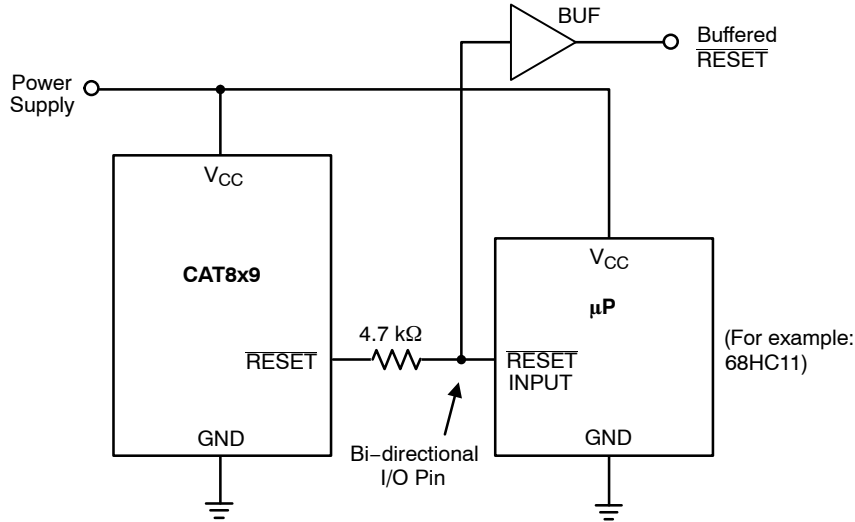


Figure 9. Bi-directional Reset Pin Interfacing

## CAT853 and CAT863 Open-Drain RESET Application

The CAT853 and CAT863 features an open-drain RESET output and therefore need a pull-up resistor on the output for proper operation, as shown on Figure 10. An advantage of the open-drain output includes the ability to “wire AND”

several outputs together to form an inexpensive logic circuit. It is also possible to have the pull-up resistor connected to a different supply which can be higher than the CAT8x3  $V_{CC}$  pin. The value of the pull-up resistor is not critical in most applications, typical values being between  $5\text{ k}\Omega$  and  $10\text{ k}\Omega$ .

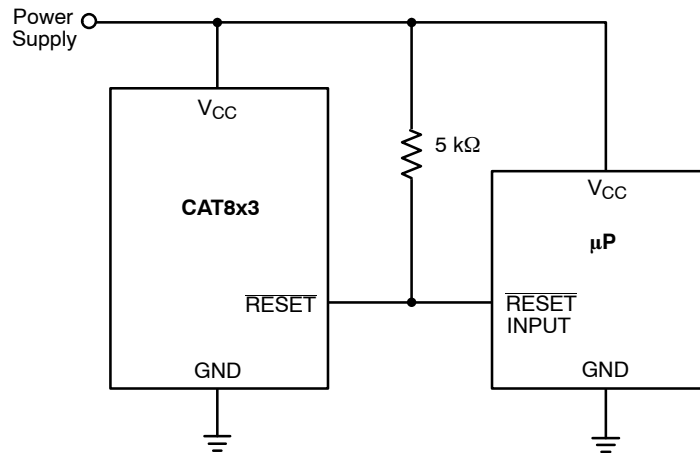
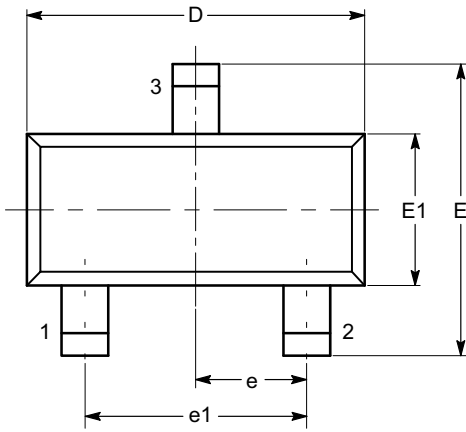


Figure 10. Typical CAT8x3 Open-Drain Circuit Configuration

# CAT853, CAT859, CAT863, CAT869

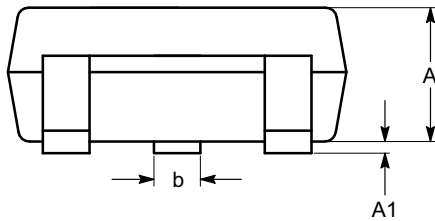
## PACKAGE DIMENSIONS

SOT-23, 3 Lead  
CASE 527AG-01  
ISSUE O

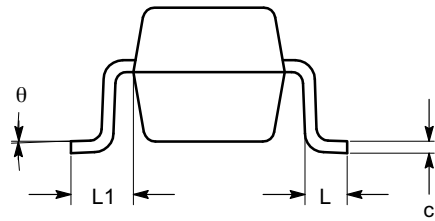


TOP VIEW

SYMBOL	MIN	NOM	MAX
A	0.89		1.12
A1	0.013		0.10
b	0.37		0.50
c	0.085		0.18
D	2.80		3.04
E	2.10		2.64
E1	1.20		1.40
e	0.95 BSC		
e1	1.90 BSC		
L	0.40 REF		
L1	0.54 REF		
$\theta$	0°		8°



SIDE VIEW



END VIEW

**Notes:**

- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC TO-236.

# CAT853, CAT859, CAT863, CAT869

## ORDERING INFORMATION

Order Number		Voltage	Top Mark (Note 2)		Reset	Package	Quantity per Reel (Note 3)
NiPdAu	Matte-Tin		NiPdAu	Matte-Tin			
CAT853LTBI-GT3	CAT853LTBI-T3	4.63 V	VPA	VPR	LOW	SOT-23-3	3,000
CAT853MTBI-GT3	CAT853MTBI-T3	4.38 V	VPA	VPR			
CAT853FTBI-GT3	CAT853FTBI-T3	4.20 V	VPA	VPR			
CAT853JTBI-GT3	CAT853JTBI-T3	4.00 V	VPA	VPR			
CAT853TTBI-GT3	CAT853TTBI-T3	3.08 V	VPA	VPR			
CAT853STBI-GT3	CAT853STBI-T3	2.93 V	VPA	VPR			
CAT853RTBI-GT3	CAT853RTBI-T3	2.63 V	VPA	VPR			
CAT853CTBI-GT3	CAT853CTBI-T3	2.40 V	VPA	VPR			
CAT853ZTBI-GT3	CAT853ZTBI-T3	2.32 V	VPA	VPR			
CAT859LTBI-GT3	CAT859LTBI-T3	4.63 V	VNA	VNR	LOW	SOT-23-3	3,000
CAT859MTBI-GT3	CAT859MTBI-T3	4.38 V	VNA	VNR			
CAT859FTBI-GT3	CAT859FTBI-T3	4.20 V	VNA	VNR			
CAT859JTBI-GT3	CAT859JTBI-T3	4.00 V	VNA	VNR			
CAT859TTBI-GT3	CAT859TTBI-T3	3.08 V	VNA	VNR			
CAT859STBI-GT3	CAT859STBI-T3	2.93 V	VNA	VNR			
CAT859RTBI-GT3	CAT859RTBI-T3	2.63 V	VNA	VNR			
CAT859CTBI-GT3	CAT859CTBI-T3	2.40 V	VNA	VNR			
CAT859ZTBI-GT3	CAT859ZTBI-T3	2.32 V	VNA	VNR			
CAT863LTBI-GT3	CAT863LTBI-T3	4.63 V	VNB	VNK	LOW	SOT-23-3	3,000
CAT863MTBI-GT3	CAT863MTBI-T3	4.38 V	VNB	VNK			
CAT863FTBI-GT3	CAT863FTBI-T3	4.20 V	VNB	VNK			
CAT863JTBI-GT3	CAT863JTBI-T3	4.00 V	VNB	VNK			
CAT863TTBI-GT3	CAT863TTBI-T3	3.08 V	VNB	VNK			
CAT863STBI-GT3	CAT863STBI-T3	2.93 V	VNB	VNK			
CAT863RTBI-GT3	CAT863RTBI-T3	2.63 V	VNB	VNK			
CAT863CTBI-GT3	CAT863CTBI-T3	2.40 V	VNB	VNK			
CAT863ZTBI-GT3	CAT863ZTBI-T3	2.32 V	VNB	VNK			
CAT869LTBI-GT3	CAT869LTBI-T3	4.63 V	VNC	VNJ	LOW	SOT-23-3	3,000
CAT869MTBI-GT3	CAT869MTBI-T3	4.38 V	VNC	VNJ			
CAT869FTBI-GT3	CAT869FTBI-T3	4.20 V	VNC	VNJ			
CAT869JTBI-GT3	CAT869JTBI-T3	4.00 V	VNC	VNJ			
CAT869TTBI-GT3	CAT869TTBI-T3	3.08 V	VNC	VNJ			
CAT869STBI-GT3	CAT869STBI-T3	2.93 V	VNC	VNJ			
CAT869RTBI-GT3	CAT869RTBI-T3	2.63 V	VNC	VNJ			
CAT869CTBI-GT3	CAT869CTBI-T3	2.40 V	VNC	VNJ			
CAT869ZTBI-GT3	CAT869ZTBI-T3	2.32 V	VNC	VNJ			

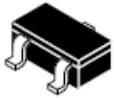
2. Threshold and full part numbers will be provided on box and reel labels as well as all Shipping documents.
3. For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.
4. For detailed information and a breakdown of device nomenclature and numbering systems, please see the ON Semiconductor Device Nomenclature document, TND310/D, available at [www.onsemi.com](http://www.onsemi.com)



# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®

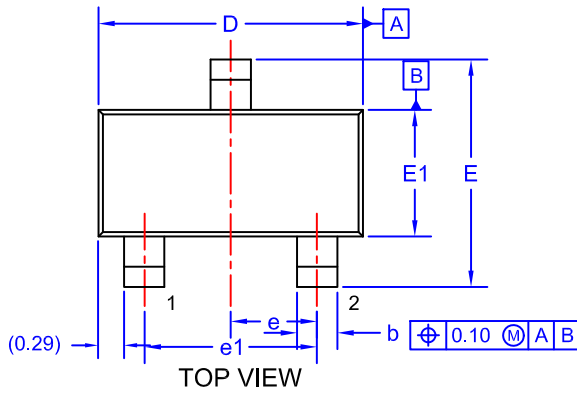


### SOT-23/SUPERSOT™ -23, 3 LEAD, 1.4x2.9

#### CASE 527AG

#### ISSUE A

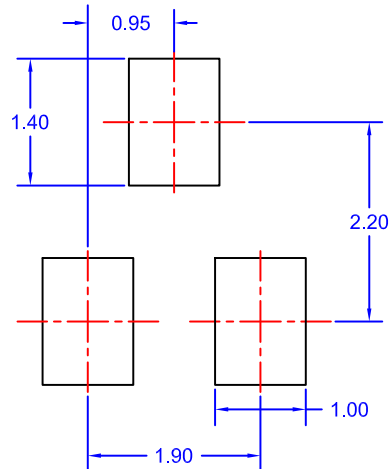
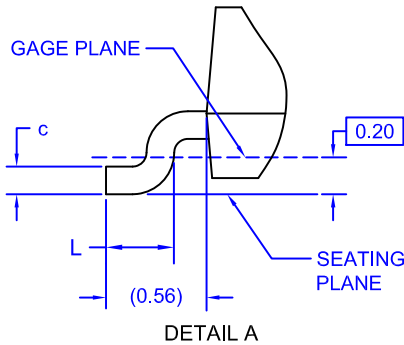
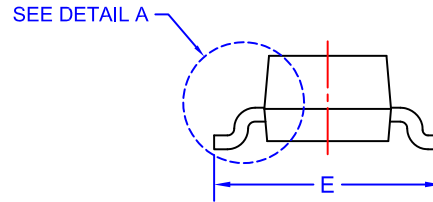
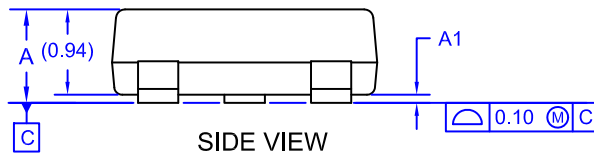
DATE 09 DEC 2019



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.

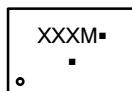
DIM	MIN.	NOM.	MAX.
A	0.85	0.95	1.12
A1	0.00	0.05	0.10
b	0.370	0.435	0.508
c	0.085	0.150	0.180
D	2.80	2.92	3.04
E	2.31	2.51	2.71
E1	1.20	1.40	1.52
e	0.95 BSC		
e1	1.90 BSC		
L	0.33	0.38	0.43



#### LAND PATTERN RECOMMENDATION\*

\*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

#### GENERIC MARKING DIAGRAM\*



- XXX = Specific Device Code
- M = Month Code
- = Pb-Free Package

(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

<b>DOCUMENT NUMBER:</b>	<b>98AON34319E</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>SOT-23/SUPERSOT-23, 3 LEAD, 1.4X2.9</b>	<b>PAGE 1 OF 1</b>

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Email Requests to: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**onsemi Website:** [www.onsemi.com](http://www.onsemi.com)

### TECHNICAL SUPPORT

**North American Technical Support:**

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

**Europe, Middle East and Africa Technical Support:**

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Supervisory Circuits](#) category:*

*Click to view products by [ON Semiconductor](#) manufacturer:*

Other Similar products are found below :

[CAT1161LI-25-G](#) [CAT853STBI-T3](#) [CAT1026LI-30-G](#) [CAT1320LI-25-G](#) [TC54VN2402EMB713](#) [MCP1316T-44NE/OT](#) [MCP1316MT-45GE/OT](#) [MCP1316MT-23LI/OT](#) [MAX8997EWW+](#) [MAX6725AKASYD3-LF-T](#) [DS1232L](#) [NCV302HSN45T1G](#) [PT7M6130NLTA3EX](#) [PT7M7811STBEX-2017](#) [S-1000N28-I4T1U](#) [CAT1161LI-28-G](#) [MCP1321T-29AE/OT](#) [MCP1319MT-47QE/OT](#) [S-1000N23-I4T1U](#) [S-1000N19-I4T1U](#) [CAT824UTDI-GT3](#) [TC54VC2502ECB713](#) [PT7M6133NLTA3EX](#) [PT7M6127NLTA3EX](#) [VDA2510NTA](#) [AP0809ES3-r](#) [HG811RM4/TR](#) [MD7030C](#) [MD7033C](#) [MD7019](#) [MD7020](#) [MD7021](#) [MD7023](#) [MD7024](#) [MD7027](#) [MD7030](#) [MD7033](#) [MD7035](#) [MD7036](#) [MD7039](#) [MD7040](#) [MD7044](#) [MD7050](#) [MD7015](#) [MD7022](#) [MD7028](#) [MD7031](#) [MD7042](#) [MD7043](#) [MD7047](#)