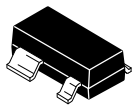
CAT811, CAT812

4-Pin Microprocessor Power Supply Supervisors with Manual Reset

ON Semiconductor®

http://onsemi.com



SOT−143
BI SUFFIX
CASE 527AF

Description

The CAT811 and CAT812 are microprocessor supervisory circuits that monitor power supplies. The CAT811 and CAT812 are direct replacements for the MAX811 and MAX812 in applications operating over the industrial temperature range; both have a manual reset input.

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. The underlying floating gate technology, Analog EEPROM used by ON Semiconductor, makes it possible to offer any custom reset threshold value. Seven industry standard threshold levels are offered to support +5.0 V, +3.3 V, +3.0 V and +2.5 V systems.

The CAT811 features a RESET push−pull output (active LOW) and the CAT812 features a RESET push−pull output (active HIGH).

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

The CAT811/812 are fully specified over the industrial temperature range (−40°C to 85°C) and are available in a compact 4−pin SOT−143 package.

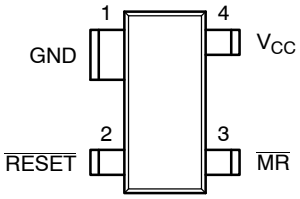
Features

- Precision Monitoring of
  +5.0 V (± 5%, ± 10%, ± 20%),
  +3.3 V (± 5%, ± 10%),
  +3.0 V (± 10%) and
  +2.5 V (± 5%) Power Supplies
- Manual Reset Input
- Offered in Two Output Configurations: CAT811: Active LOW Reset
  CAT812: Active HIGH Reset
- Direct Replacements for the MAX811 and MAX812 in Applications Operating over the Industrial Temperature Range
- Reset Valid down to V_{CC} = 1.0 V
- 6 μA Power Supply Current
- Power Supply Transient Immunity
- Available in SOT−143 Packages with Sn or NiPdAu Green Lead Finishes
- Industrial Temperature Range: −40°C to +85°C
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

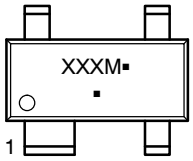
- Computers, Servers, Laptops and Cable Modems
- Wireless Communications
- Embedded Control Systems
- White Goods, Power Meters
- Intelligent Instruments
- PDAs and Handheld Equipment

PIN CONFIGURATION



(Top View)

MARKING DIAGRAM



XXX = Specific Device Code
M = Month 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 9 of this data sheet.

© Semiconductor Components Industries, LLC, 2012

Table 1. THRESHOLD SUFFIX SELECTOR DESCRIPTION

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

Table 2. PIN DESCRIPTION

Pin Number		Pin Name	Description
CAT811	CAT812		
1	1	GND	Ground.
2	–	$\overline{\text{RESET}}$	Active LOW reset. $\overline{\text{RESET}}$ is asserted if V_{CC} falls below the reset threshold and remains low for at least 140 ms after V_{CC} rises above the reset threshold.
–	2	RESET	Active HIGH reset. RESET is asserted if V_{CC} falls below the reset threshold and remains high for at least 140 ms after V_{CC} rises above the reset threshold.
3	3	$\overline{\text{MR}}$	Manual Reset Input. A logic LOW on $\overline{\text{MR}}$ asserts RESET. RESET remains active as long as $\overline{\text{MR}}$ is LOW and for 140 ms after $\overline{\text{MR}}$ returns HIGH. The active low input has an internal 20 kΩ pull−up resistor. The input should be left open if not used.
4	4	V_{CC}	Power supply voltage that is monitored.

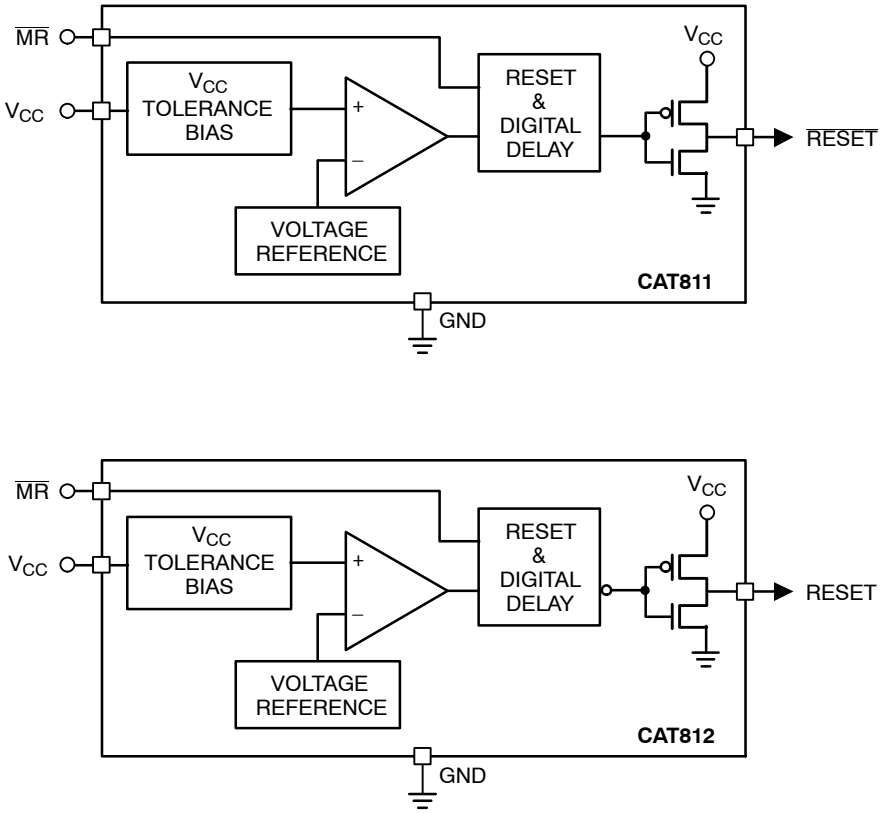


Figure 1. Block Diagrams

Table 3. ABSOLUTE MAXIMUM RATINGS

Parameters	Ratings	Units
Any pin with respect to ground	−0.3 to +6.0	V
Input Current, V_{CC}	20	mA
Output Current RESET, $\overline{RESET}$	20	mA
Rate of Raise, V_{CC}	100	V/μs
Continuous Power Dissipations Derate 4 mW/°C above +70°C (SOT−143)	320	mW
Storage Temperature Range	−65 to +105	°C
Operating Ambient Temperature Range	−40 to +85	°C
Lead Soldering Temperature (10 seconds)	+300	°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.

Table 4. ELECTRICAL OPERATING CHARACTERISTICS
(V_{CC} = Full range, T_A = −40°C to +85°C unless otherwise noted. Typical values at T_A = +25°C and V_{CC} = 5 V for the L/M/J versions, V_{CC} = 3.3 V for the T/S versions, V_{CC} = 3 V for the R version and V_{CC} = 2.5 V for the Z version.)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
V_{CC} Range		T_A = 0°C to +70°C		1.0		5.5	V
		T_A = −40°C to +85°C		1.2		5.5	
Supply Current	I_{CC}	T_A = −40°C to +85°C	V_{CC} < 5.5 V, J/L/M		8	20	μA
			V_{CC} < 3.6 V, R/S/T/Z		6	15	
Reset Threshold Voltage	V_{TH}	L Threshold	T_A = +25°C	4.56	4.63	4.70	V
			T_A = −40°C to +85°C	4.50		4.75	
		M Threshold	T_A = +25°C	4.31	4.38	4.45	
			T_A = −40°C to +85°C	4.25		4.50	
		J Threshold	T_A = +25°C	3.93	4.00	4.06	
			T_A = −40°C to +85°C	3.89		4.10	
		T Threshold	T_A = +25°C	3.04	3.08	3.11	
			T_A = −40°C to +85°C	3.00		3.15	
		S Threshold	T_A = +25°C	2.89	2.93	2.96	
			T_A = −40°C to +85°C	2.85		3.00	
		R Threshold	T_A = +25°C	2.59	2.63	2.66	
			T_A = −40°C to +85°C	2.55		2.70	
		Z Threshold	T_A = +25°C	2.28	2.32	2.35	
			T_A = −40°C to +85°C	2.25		2.38	
Reset Threshold Tempco					30		ppm/°C
V_{CC} to Reset Delay (Note 3)		V_{CC} = V_{TH} to (V_{TH} − 100 mV)			20		μs
Reset Active Timeout Period		T_A = −40°C to +85°C		140	240	400	ms

1. Production testing done at T_A = +25°C; limits over temperature guaranteed by design only.
2. Glitches of 100 ns or less typically will not generate a reset pulse.
3. $\overline{RESET}$ output for the CAT811; RESET output for the CAT812.

Table 4. ELECTRICAL OPERATING CHARACTERISTICS
(V_{CC} = Full range, T_A = −40°C to +85°C unless otherwise noted. Typical values at T_A = +25°C and V_{CC} = 5 V for the L/M/J versions, V_{CC} = 3.3 V for the T/S versions, V_{CC} = 3 V for the R version and V_{CC} = 2.5 V for the Z version.)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
$\overline{\text{RESET}}$ Output Voltage Low (Push−pull, active LOW, CAT811)	V_{OL}	$V_{CC} = V_{TH\ min}$, I_{SINK} = 1.2 mA CAT811R/S/T/Z			0.3	V
		$V_{CC} = V_{TH\ min}$, I_{SINK} = 3.2 mA CAT811J/L/M			0.4	
		V_{CC} > 1.0 V, I_{SINK} = 50 μA			0.3	
$\overline{\text{RESET}}$ Output Voltage High (Push−pull, active LOW, CAT811)	V_{OH}	$V_{CC} = V_{TH\ max}$, I_{SOURCE} = 500 μA CAT811R/S/T/Z	$0.8V_{CC}$			V
		$V_{CC} = V_{TH\ max}$, I_{SOURCE} = 800 μA CAT811J/L/M	V_{CC} − 1.5			V
RESET Output Voltage Low (Push−pull, active HIGH, CAT812)	V_{OL}	$V_{CC} > V_{TH\ max}$, I_{SINK} = 1.2 mA CAT812R/S/T/Z			0.3	V
		$V_{CC} > V_{TH\ max}$, I_{SINK} = 3.2 mA CAT812J/L/M			0.4	
RESET Output Voltage High (Push−pull active HIGH, CAT812)	V_{OH}	1.8 V < $V_{CC} \le V_{TH\ min}$, I_{SOURCE} = 150 μA	$0.8V_{CC}$			V
$\overline{\text{MR}}$ Minimum Pulse Width	t_{MR}		10			μs
$\overline{\text{MR}}$ Glitch Immunity		(Note 2)		100		ns
$\overline{\text{MR}}$ to RESET Propagation Delay	t_{MD}	(Note 3)		0.5		μs
$\overline{\text{MR}}$ Input Threshold	V_{IH}	$V_{CC} > V_{TH\ (MAX)}$, CAT811/812L/M/J	2.3V			V
	V_{IL}				0.8	
	V_{IH}	$V_{CC} > V_{IH\ (MAX)}$, CAT811/812R/S/T/Z	$0.7V_{CC}$			
	V_{IL}				$0.25V_{CC}$	
$\overline{\text{MR}}$ Pull−up Resistance			10	20	75	kΩ

1. Production testing done at T_A = +25°C; limits over temperature guaranteed by design only.
2. Glitches of 100 ns or less typically will not generate a reset pulse.
3. $\overline{\text{RESET}}$ output for the CAT811; RESET output for the CAT812.

TYPICAL OPERATING CHARACTERISTICS

(V_{CC} = Full range, T_A = −40°C to +85°C unless otherwise noted. Typical values at T_A = +25°C and V_{CC} = 5 V for the L/M/J versions, V_{CC} = 3.3 V for the T/S versions, V_{CC} = 3 V for the R version and V_{CC} = 2.5 V for the Z version.)

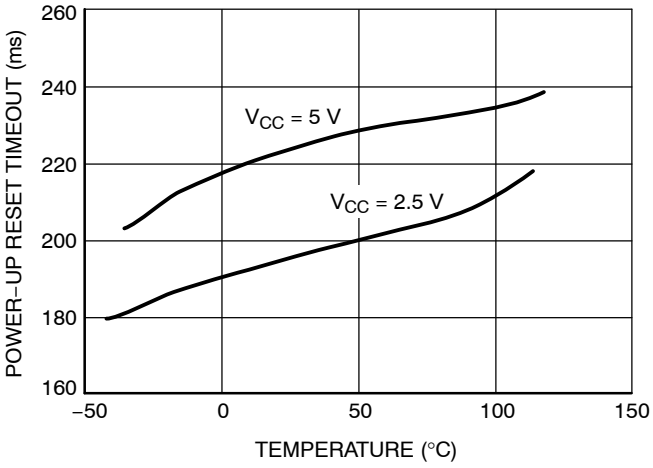


Figure 2. Power−Up Reset Timeout vs. Temperature

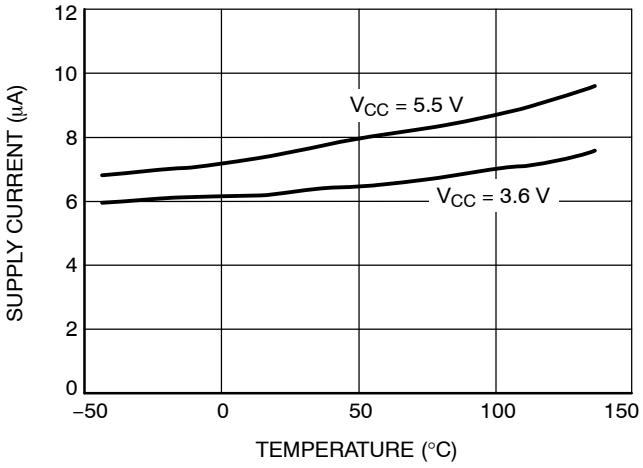


Figure 3. Supply Current vs. Temperature (No Load, CAT8xxR/S/T/Z)

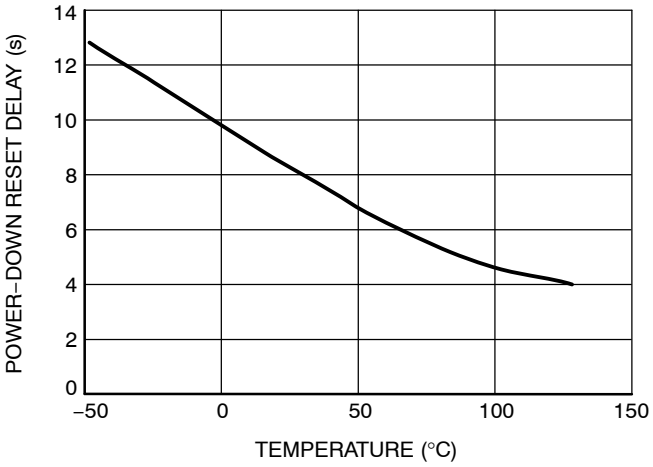


Figure 4. Power−Down Reset Delay vs. Temperature (CAT8xxR/S/T/Z)

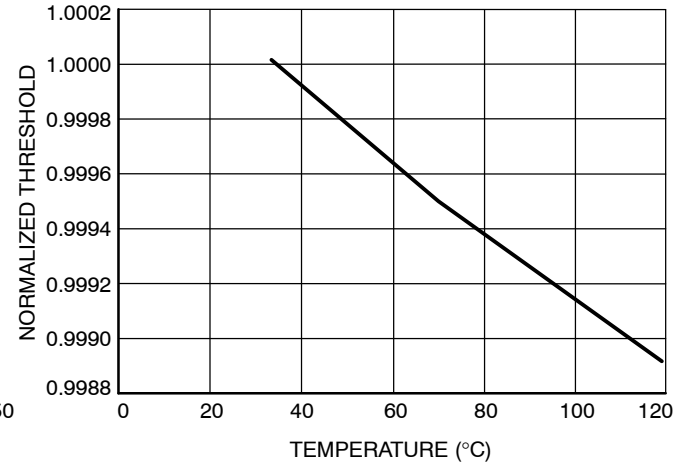


Figure 5. Normalized Reset Threshold vs. Temperature

DETAILED DESCRIPTION

Reset Timing

The reset signal is asserted LOW for the CAT811 and HIGH for the CAT812 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.

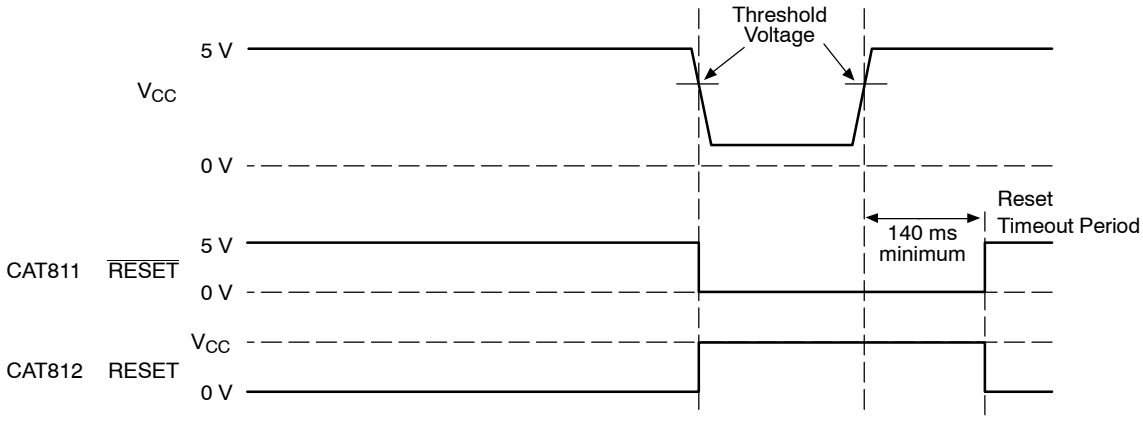


Figure 6. Reset Timing Diagram

V_{CC} Transient Response

The CAT811/812 protect μPs against brownout failure. Short duration transients of 4 μs 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 ($V_{TH} - V_{CC}$).

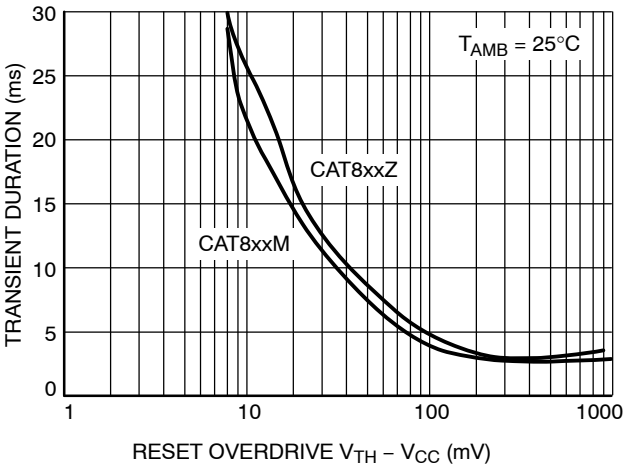


Figure 7. Maximum Transient Duration without Causing a Reset Pulse vs. Reset Comparator Overdrive

Valid Reset with V_{CC} under 1.0 V

To ensure that the CAT811 $\overline{RESET}$ pin is in a known state when V_{CC} is under 1.0 V, a 100 kΩ pull−down resistor between $\overline{RESET}$ pin and GND is recommended; the value is not critical. For the CAT812, a pull−up resistor from RESET pin to V_{CC} is needed.

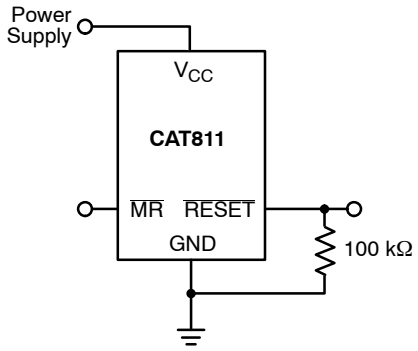


Figure 8. $\overline{RESET}$ Valid with V_{CC} Under 1.0 V

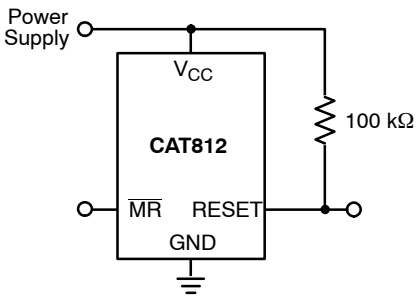


Figure 9. RESET Valid with V_{CC} Under 1.1 V

Bi−directional Reset Pin Interfacing

The CAT811/812 can interface with μP/μC bi−directional reset pins by connecting a 4.7 kΩ resistor in series with the CAT811/812 reset output and the μP/μC bi−directional reset pin.

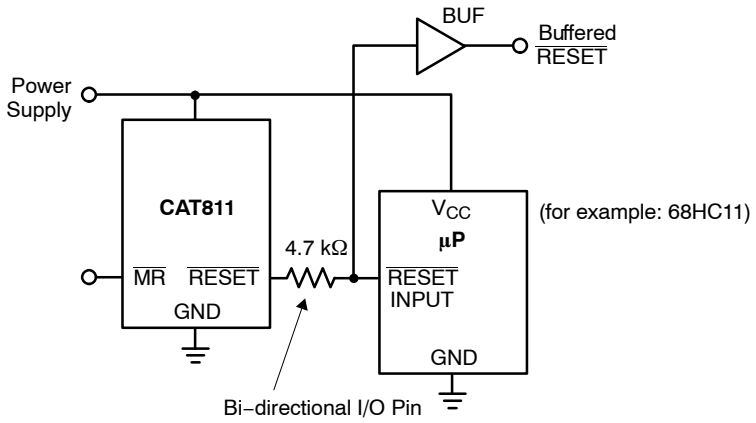


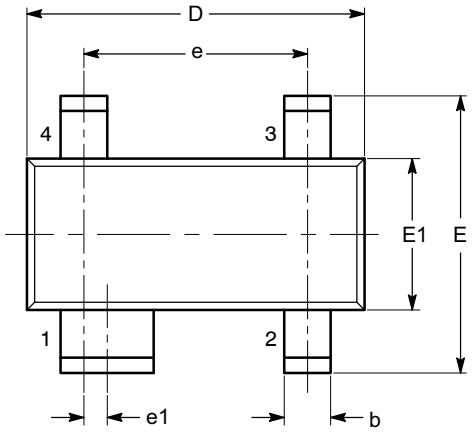
Figure 10. Bi−directional Reset Pin Interfacing

Table 5. OTHER SUPERVISORY PRODUCTS

Function	CAT1161/3	CAT1162	CAT809	CAT810	CAT811	CAT812
With 16k Bit Serial EEPROM Memory	✔	✔				
Watchdog Timer	✔					
Manual Reset Input	✔	✔			✔	✔
Active Low Reset			✔		✔	
Active High Reset				✔		✔
Dual Polarity Reset Outputs	✔	✔				
Package	8−pin DIP and SOIC	8−pin DIP and SOIC	3−pin SOT−23 and SC70	3−pin SOT−23 and SC70	4−pin SOT−143	4−pin SOT−143

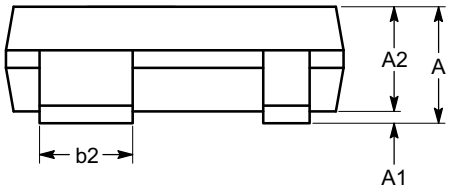
PACKAGE DIMENSIONS

SOT−143, 4 Lead
CASE 527AF−01
ISSUE A

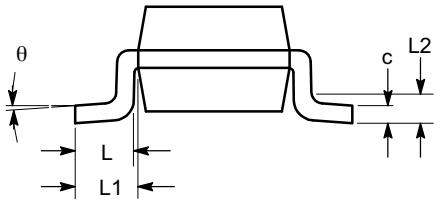


TOP VIEW

SYMBOL	MIN	NOM	MAX
A	0.80		1.22
A1	0.05		0.15
A2	0.75	0.90	1.07
b	0.30		0.50
b2	0.76		0.89
c	0.08		0.20
D	2.80	2.90	3.04
E	2.10		2.64
E1	1.20	1.30	1.40
e	1.92 BSC		
e1	0.20 BSC		
L	0.40	0.50	0.60
L1	0.54 REF		
L2		0.25	
θ	0°		8°



SIDE VIEW



END VIEW

Notes:
(1) All dimensions are in millimeters. Angles in degrees.
(2) Complies with JEDEC TO-253.

ORDERING INFORMATION

Order Number		Voltage	Top Mark (Note 4)		Output	Reset	Package	Quantity per Reel (Note 5)
NiPdAu	Matte−Tin		NiPdAu	Matte−Tin				
CAT811LTBI−GT3	CAT811LTBI−T3	4.63 V	VEA	VES	Manual Reset	LOW	SOT−143−4	3,000
CAT811MTBI−GT3	CAT811MTBI−T3	4.38 V	VEA	VES				
CAT811JTBI−GT3	CAT811JTBI−T3	4.00 V	VEA	VES				
CAT811TTBI−GT3	CAT811TTBI−T3	3.08 V	VEA	VES				
CAT811STBI−GT3	CAT811STBI−T3	2.93 V	VEA	VES				
CAT811RTBI−GT3	CAT811RTBI−T3	2.63 V	VEA	VES				
CAT811ZTBI−GT3	CAT811ZTBI−T3	2.32 V	VEA	VES				
CAT812LTBI−GT3	CAT812LTBI−T3	4.63 V	VTA	VTS	Manual Reset	HIGH	SOT−143−4	3,000
CAT812MTBI−GT3	CAT812MTBI−T3	4.38 V	VTA	VTS				
CAT812JTBI−GT3	CAT812JTBI−T3	4.00 V	VTA	VTS				
CAT812TTBI−GT3	CAT812TTBI−T3	3.08 V	VTA	VTS				
CAT812STBI−GT3	CAT812STBI−T3	2.93 V	VTA	VTS				
CAT812RTBI−GT3	CAT812RTBI−T3	2.63 V	VTA	VTS				
CAT812ZTBI−GT3	CAT812ZTBI−T3	2.32 V	VTA	VTS				

4. Threshold and full part numbers will be provided on box and reel labels as well as all Shipping documents.
5. 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.
6. 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

ON Semiconductor and ON are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC 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:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

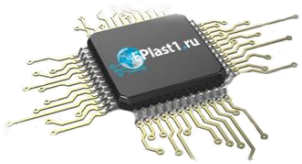
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.