



# ACE523C

## 250mA Low consumption Linear Regulator

### Description

ACE523C series is a group of positive voltage output, low power consumption, low dropout voltage, three terminal regulator. It can provide 200mA output current when input / output voltage differential drops to 418mV ( $V_{out}=3.3V$ ), And it also provides foldback short-circuit protection and output current limit function. The very low power consumption of ACE523C ( $I_q=3\mu A$ ) can greatly improve natural life of batteries.

ACE523C can provide output value in the range of 1.2V~5.0V in 0.1V steps. It also can customized on command.

ACE523C includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

ACE523C has well load transient response and good temperature characteristic, And it uses trimming technique to guarantee output voltage accuracy within  $\pm 2\%$ .

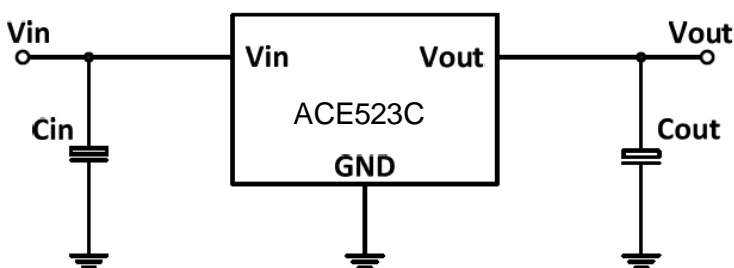
### Features

- Low Power Consumption: 3 $\mu A$  (Typ.)
- Maximum Output Current: 250mA
- Small Dropout Voltage  
211mV@100mA ( $V_{out}=3.3V$ )  
418mV@200mA ( $V_{out}=3.3V$ )
- Input Voltage Range: 2.5V~16V
- Output Voltage Range: 1.2V~5.0V (customized on command in 0.1V steps)
- Highly Accurate:  $\pm 2\%$  ( $\pm 1\%$  customized)
- Output Current Limit : 500mA
- Foldback Short-circuit Current : 85mA

### Application

- Battery Powered equipment
- Power Management of MP3. PDA. DSC. Mouse. PS2 Games
- Reference Voltage Source Regulation after Switching Power

### Typical Application



Note: Input capacitor ( $C_{in}=1\mu F$ ) and Output capacitor ( $C_{out}=1\mu F$ ) are recommended in all application circuit. Ceramic capacitor is recommended.

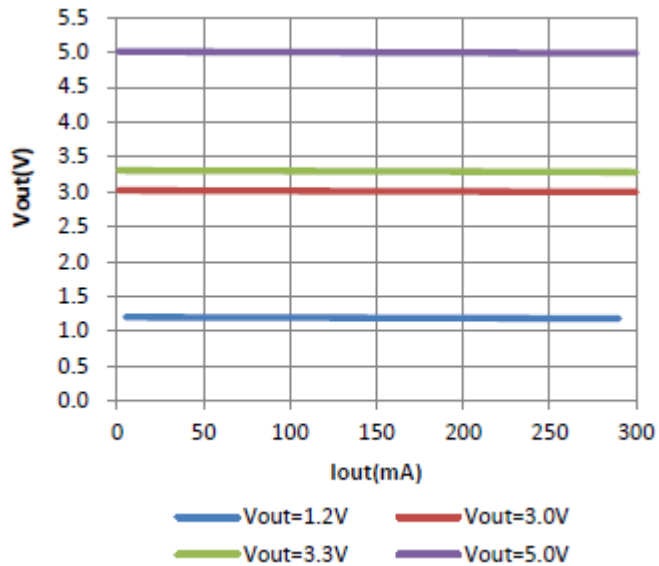


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### Electrical Characteristics

#### Load Regulation



### Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Max Input Voltage		20	V
Power Dissipation	SOT-23-3	250	mW
	SOT-89-3(A、B)	500	
Operating Junction temperature	T <sub>J</sub>	125	°C
Storage temperature	T <sub>S</sub>	- 45 ~ 150	°C
Ambient Temperature	T <sub>A</sub>	-40 ~ 85	°C
Lead Temperature & Time		260°C , 10s	

Note: Exceed these limits to damage to the device.

Exposure to absolute maximum rating conditions may affect device reliability.



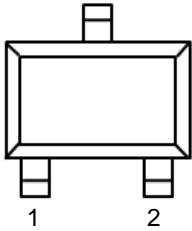
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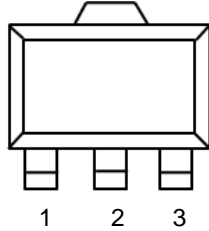
### Packaging Type

SOT-23-3

3



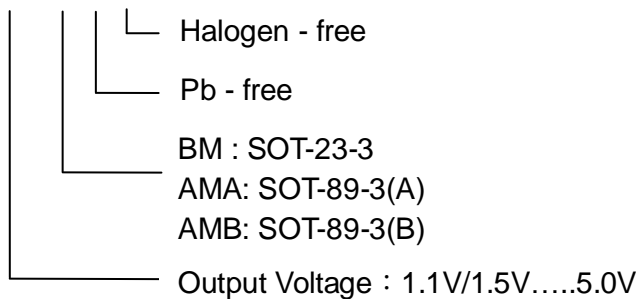
SOT-89-3



SOT-23-3	SOT-89-3(A)	SOT-89-3(B)	Description
1	1	2	GND
2	3	1	Vout
3	2	3	Vin

### Ordering information

ACE523C XX XX + H



### Recommended Work Conditions

Item	Min	Max	Unit
Input Voltage Range		16	V
Ambient Temperature	-40	+85	°C

### Electrical Characteristics

(Test Conditions:  $C_{in}=1\mu F$ ,  $C_{out}=1\mu F$ ,  $T_A=25^\circ C$ , unless otherwise specified.)

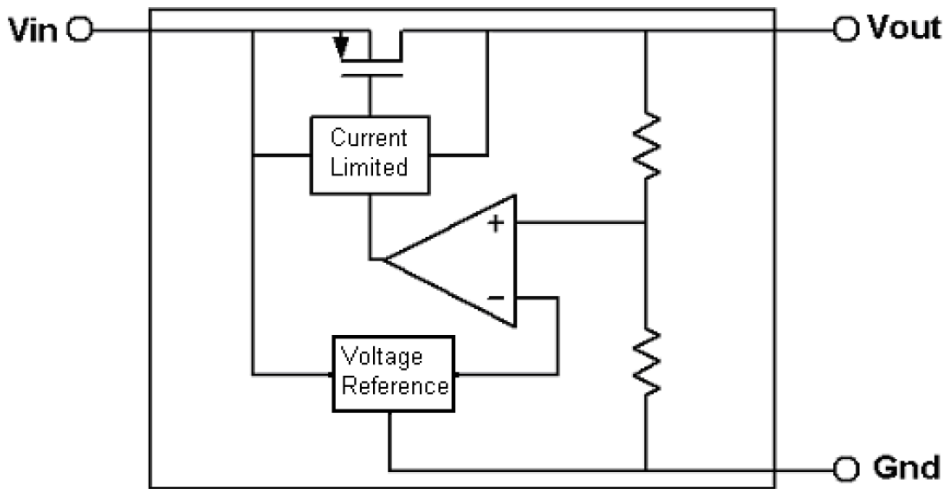
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage	$V_{IN}$				16	V
Output Voltage	$V_{OUT}$		$V_{out} \times 0.98$		$V_{out} \times 1.02$	V
Maximum Output Current	$I_{OUT}(\text{Max.})$	$V_{IN}-V_{OUT}=1V$	250			mA
Input-Output Voltage Differential	Dropout Voltage	$I_{OUT}=100mA$ $V_{out}=3.3V$		210	400	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=10mA$ $2V \leq V_{IN} \leq 16V$		0.2	0.3	%/V
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=\text{Set } V_{out}+1V$ $1mA \leq I_{OUT} \leq 100mA$		20	40	mV
Quiescent Current	$I_q$	$V_{IN}=\text{Set } V_{out}+1V$		3		uA
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T \cdot V_{OUT}}$	$I_{OUT}=10mA$		100		ppm/°C



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### Block Diagram



### Explanation

ACE523C is a series of low dropout voltage and low power consumption three pins regulator. Its application circuit is very simple, which only needs two outside capacitors. It is composed of these modules: high accuracy voltage reference, current limit circuit, error amplifier, output driver and power transistor.

Current Limit module can keep chip and power system away from danger when load current is more than 500mA.

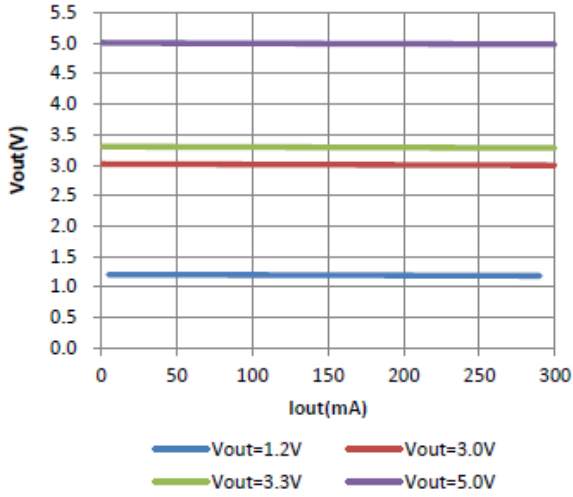
ACE523C uses trimming technique to assure the accuracy of output value within  $\pm 2\%$ , at the same time, temperature compensation is elaborately considered in this chip, which makes ACE523C's temperature coefficient within  $100\text{ppm}/^\circ\text{C}$ .



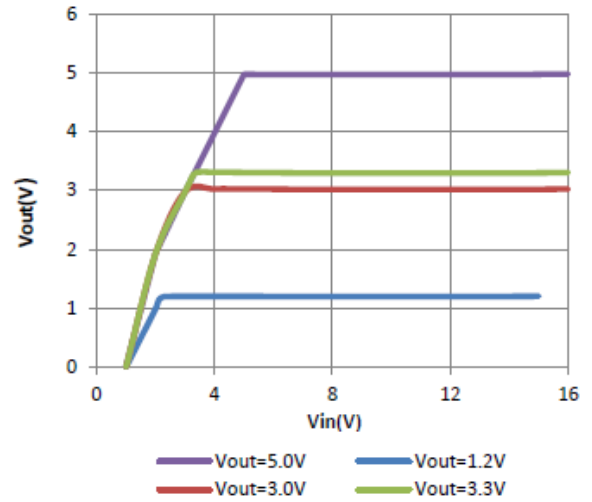
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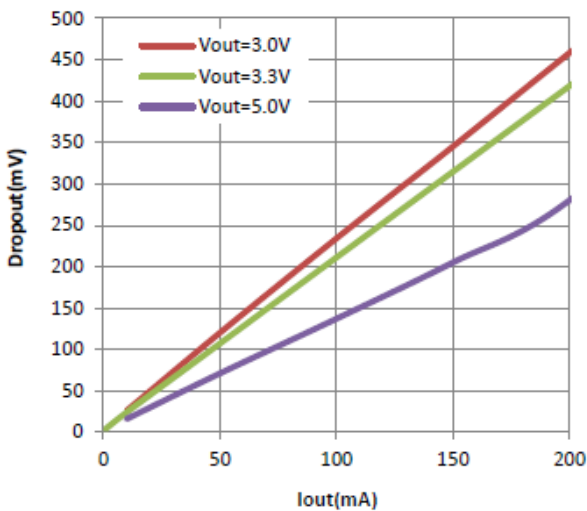
### Typical Performance Characteristics Load Regulation



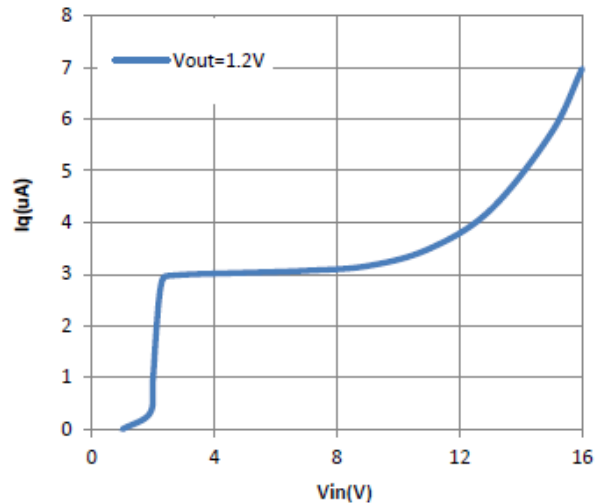
### Line Regulation



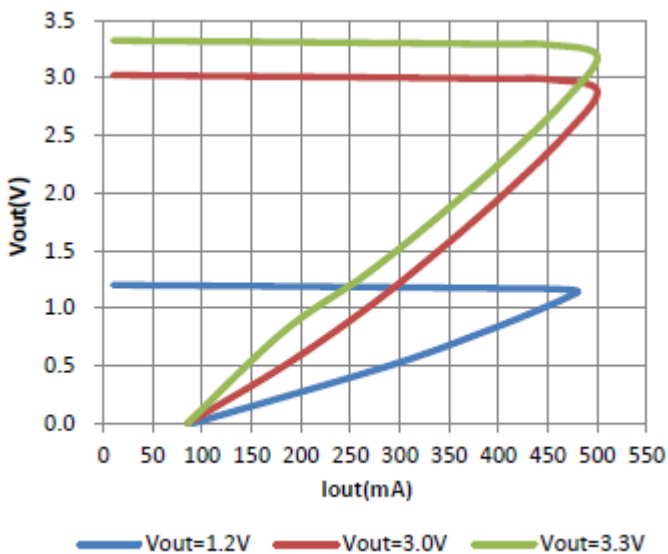
### Dropout



### Iq



### Current Limit



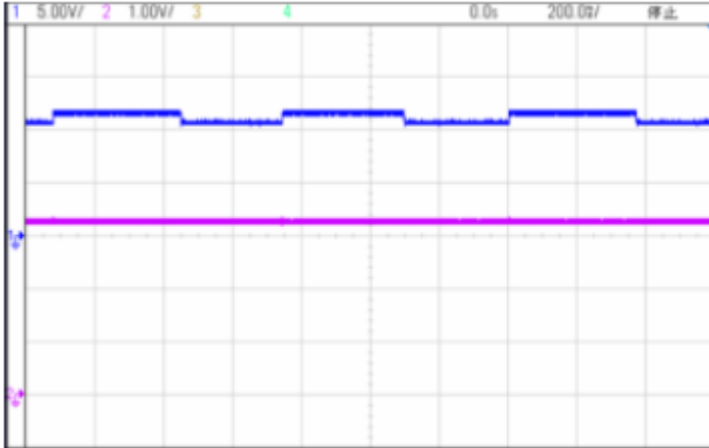


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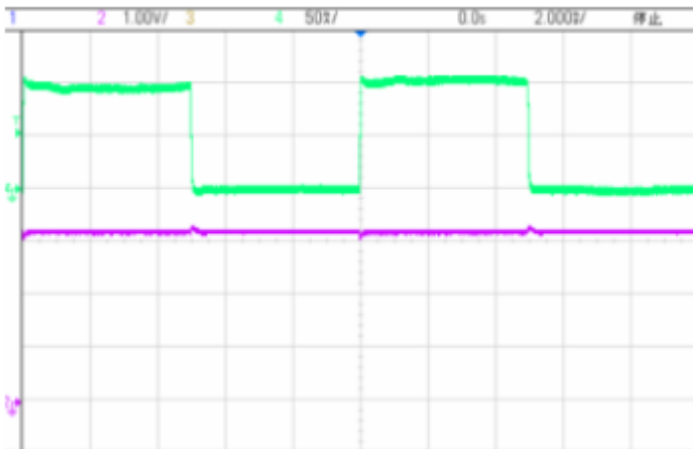
## Line transient response

$V_{in}=11V\sim 12V$ , Ch1— $V_{in}$ , Ch2— $V_{out}$



## Load transient response

$I_{out}=1mA\sim 100mA$ , Ch2— $V_{out}$ , Ch4— $I_{out}$



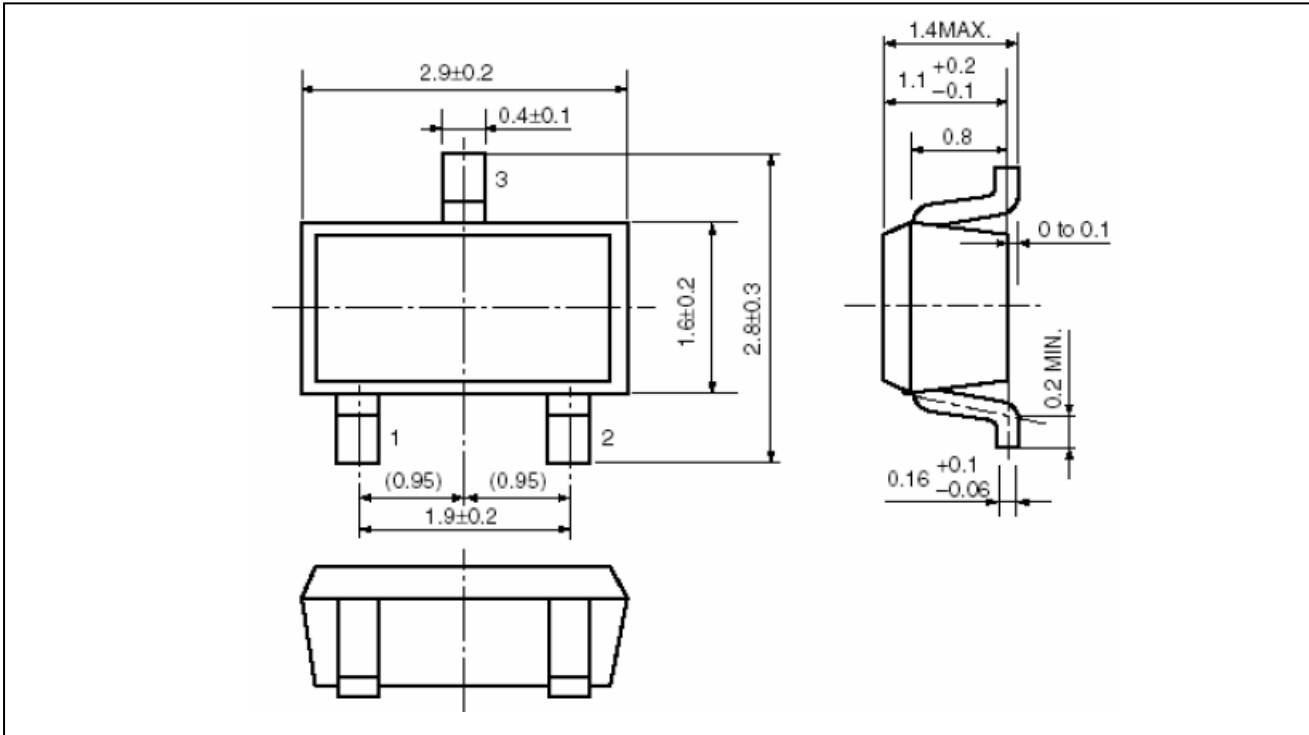


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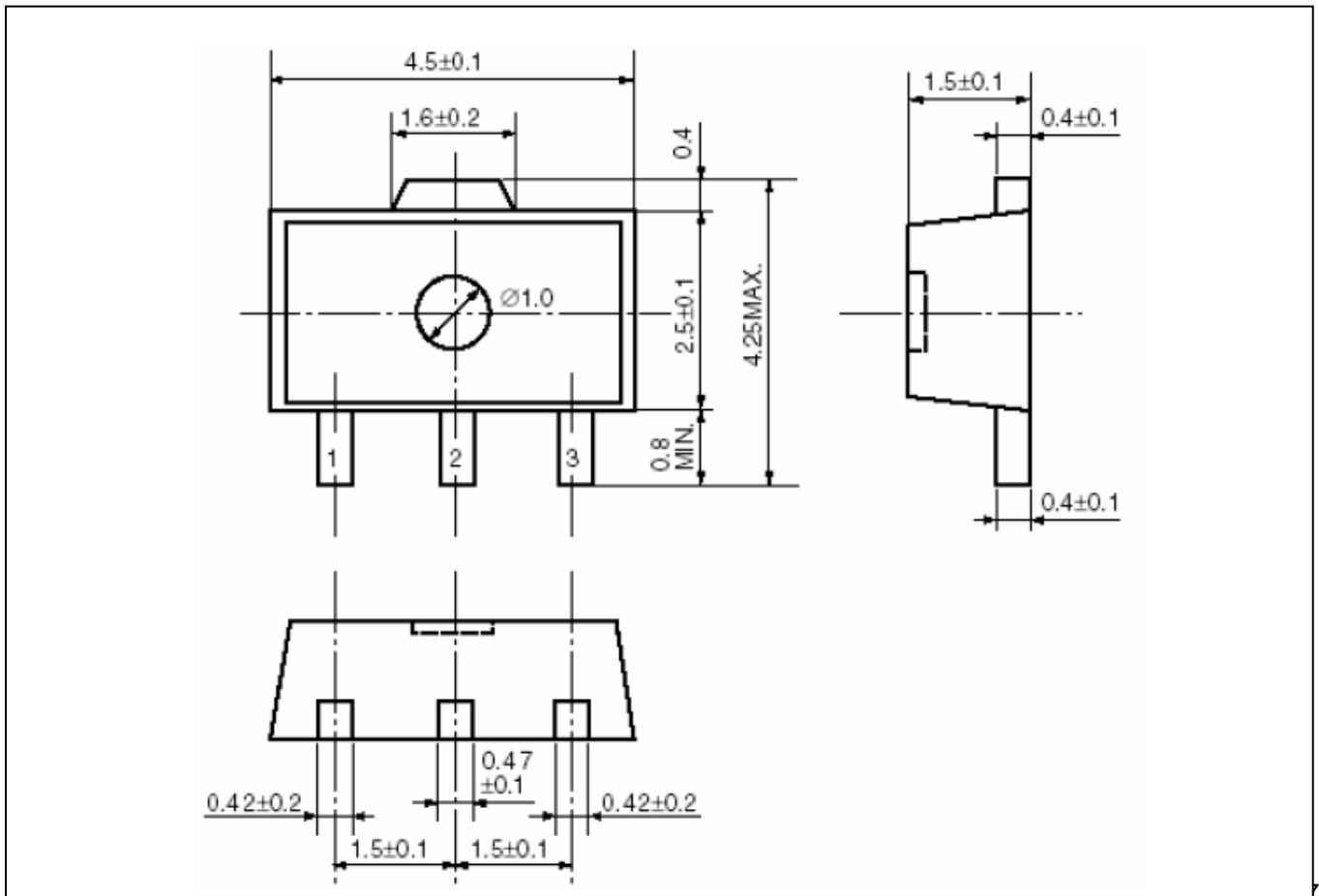
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## Packing Information

### SOT-23-3



### SOT-89-3





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### Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Electronics Co., LTD.

As sued herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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