

**Specifications**

**AHF2803R3S**

Absolute Maximum Ratings	
Input Voltage	-0.5Vdc to +50V <sub>DC</sub>
Soldering temperature	+300°C for 10 seconds
Operating case temperature	-55°C to +125°C
Storage case temperature	-65°C to +135°C

**Table I. Electrical Performance Characteristics**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 Unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output voltage	V <sub>OUT</sub>	I <sub>OUT</sub> = 5% of rated load	1	01	3.26	3.34	V
			2,3		3.23	3.36	
Output current <sup>1</sup>	I <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		3030	mA
Output power	P <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		10	W
Output ripple voltage <sup>2</sup>	V <sub>RIP</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, B.W. = 20 Hz to 2MHz	1,2,3	01		60	mVp-p
Line regulation	VR <sub>LINE</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 5%, 50% and 100% rated load	1,2,3	01		25	mV
Load regulation	VR <sub>LOAD</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 5%, 50% and 100% rated load	1,2,3	01		50	mV
Input current	I <sub>IN</sub>	I <sub>OUT</sub> = 0, Inhibit (Pin 1) tied to Input Return (Pin 7)	1,2,3	01		12	mA
		I <sub>OUT</sub> = 0, Inhibit (Pin 1) = open			30		
Input ripple current <sup>2</sup>	I <sub>RIP</sub>	I <sub>OUT</sub> = 100% rated load B.W. = 20 Hz to 2 MHz	1,2,3	01		50	mA <sub>p-p</sub>
Efficiency	E <sub>EFF</sub>	I <sub>OUT</sub> = 100% rated load	1	01	70		%
			2,3		68		
Isolation	ISO	Input to output or any pin to case (except Pin 6) at 500Vdc T <sub>C</sub> = +25°C	1	01	100		MΩ
Capacitive load <sup>3,4</sup>	C <sub>L</sub>	No effect on dc performance, T <sub>C</sub> = +25°C	4	01		500	μF
Power dissipation load fault	P <sub>D</sub>	Overload <sup>5</sup>	1	01		6.0	W
		Short circuit	1,2,3	01		2.0	
Switching frequency	F <sub>S</sub>	I <sub>OUT</sub> = 100% rated load	4,5,6	01	500	600	kHz

For Notes to Electrical Performance Characteristics, refer to page 3

**Table I. Electrical Performance Characteristics (continued)**

**AHF2803R3S**

Parameter	Symbol	Conditions -55°C ≤ T <sub>c</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output response to step transient load changes <sup>6</sup>	V <sub>O</sub> T <sub>LOAD</sub>	50% to/from 100% rated load	4,5,6	01	-300	+300	mVpk
		5% to/from 50% rated load	4,5,6		-500	+500	
Recovery time step transient load changes <sup>6,7</sup>	T <sub>T</sub> LOAD	50% to/from 100% rated load	4,5,6	01		70	μs
		5% to 50% rated load	4,5,6			1200	μs
		50% to 5% rated load	4,5,6			8.0	ms
Output response to transient step line changes	V <sub>O</sub> T <sub>LINE</sub>	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load <sup>4, 8</sup>	4,5,6	01		500	mVpk
Recovery time transient step line changes	T <sub>T</sub> LINE	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load <sup>4, 7, 8</sup>	4,5,6	01		800	μs
Turn on overshoot	V <sub>T</sub> on <sub>OS</sub>	I <sub>OUT</sub> = 5 and 100% rated load	4,5,6	01		600	mVpk
Turn on delay	T <sub>on</sub> D	I <sub>OUT</sub> = 5 and 100% rated load <sup>9</sup>	4,5,6	01		20	ms
Load fault recovery <sup>4,9</sup>	T <sub>r</sub> LF		4,5,6	01		20	ms
Weight						38	g

**Notes to Table I:**

- Parameter guaranteed by line and load regulation tests.
- Bandwidth guaranteed by design. Tested for 20kHz to 2MHz.
- Capacitive load may be any value from 0 to the maximum limit without compromising dc performance.  
A capacitive in excess of the maximum limit will not disturb loop stability but may interfere with the operation of the load fault detection circuitry, appearing as a short circuit during turn-on.
- Parameter shall be tested as part of design characterization and after design or process changes.  
Thereafter, parameters shall be guaranteed to the limits specified in Table I.
- An overload is that condition with a load in excess of the rated load but less than that necessary to trigger the short circuit protection and is the condition of maximum power dissipation.
- Load step transition time between 2 and 10 microseconds.
- Recovery time is measured from the initiation of the transient to where V<sub>OUT</sub> has returned to within ±1 percent of V<sub>OUT</sub> at 50 percent load.
- Input step transition time between 2 and 10 microseconds.
- Turn-on delay time measurement is for either a step application of power at the input or the removal of ground signal from the Inhibit Pin (Pin 1) while power is applied to the input is unlimited.

**Specifications**

**AHF2805S**

Absolute Maximum Ratings	
Input Voltage	-0.5Vdc to +50V <sub>DC</sub>
Soldering temperature	+300°C for 10 seconds
Operating case temperature	-55°C to +125°C
Storage case temperature	-65°C to +135°C

**Table II. Electrical Performance Characteristics**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 Unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output voltage	V <sub>OUT</sub>	I <sub>OUT</sub> = 0	1	01	4.95	5.05	V
			2,3		4.90	5.10	
Output current <sup>1</sup>	I <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		2400	mA
Output power	P <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		12	W
Output ripple voltage <sup>2</sup>	V <sub>RIP</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, B.W. = 20 Hz to 2MHz	1,2,3	01		60	mVp-p
Line regulation	V <sub>RLINE</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01		25	mV
Load regulation	V <sub>RLOAD</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01		50	mV
Input current	I <sub>IN</sub>	I <sub>OUT</sub> = 0, Inhibit (Pin 1) tied to Input Return (Pin 7)	1,2,3	01		12	mA
		I <sub>OUT</sub> = 0, Inhibit (Pin 1) = open			30		
Input ripple current <sup>2</sup>	I <sub>RIP</sub>	I <sub>OUT</sub> = 100% rated load B.W. = 20 Hz to 2 MHz	1,2,3	01		50	mA <sub>p-p</sub>
Efficiency	E <sub>FF</sub>	I <sub>OUT</sub> = 100% rated load	1	01	76		%
			2,3		74		
Isolation	ISO	Input to output or any pin to case (except Pin 6) at 500Vdc T <sub>C</sub> = +25°C	1	01	100		MΩ
Capacitive load <sup>3,4</sup>	C <sub>L</sub>	No effect on dc performance, T <sub>C</sub> = +25°C	4	01		500	μF
Power dissipation load fault	P <sub>D</sub>	Overload <sup>5</sup>	1	01		6.0	W
		Short circuit	1,2,3	01		2.0	
Switching frequency	F <sub>S</sub>	I <sub>OUT</sub> = 100% rated load	4,5,6	01	500	600	kHz

For Notes to Electrical Performance Characteristics, refer to page 5

**Table II. Electrical Performance Characteristics (continued)**

**AHF2805S**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output response to step transient load changes <sup>6</sup>	V <sub>O</sub> T <sub>LOAD</sub>	50% to/from 100% rated load	4,5,6	01	-300	+300	mVpk
		0% to/from 50% rated load	4,5,6		-500	+500	
Recovery time step transient load changes <sup>6,7</sup>	T <sub>T</sub> LOAD	50% to/from 100% rated load	4,5,6	01		70	μs
		0% to 50% rated load	4,5,6			1200	μs
		50% to 0% rated load	4,5,6			8.0	ms
Output response to transient step line changes	V <sub>O</sub> T <sub>LINE</sub>	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load <sup>4, 8</sup>	4,5,6	01		500	mVpk
Recovery time transient step line changes	T <sub>T</sub> LINE	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load <sup>4, 7, 8</sup>	4,5,6	01		800	μs
Turn on overshoot	V <sub>T</sub> onOS	I <sub>OUT</sub> = 0 and 100% rated load	4,5,6	01		600	mVpk
Turn on delay	T <sub>on</sub> D	I <sub>OUT</sub> = 0 and 100% rated load <sup>9</sup>	4,5,6	01		20	ms
Load fault recovery <sup>4,9</sup>	T <sub>r</sub> LF		4,5,6	01		20	ms
Weight						38	g

**Notes to Table II:**

- Parameter guaranteed by line and load regulation tests.
- Bandwidth guaranteed by design. Tested for 20kHz to 2MHz.
- Capacitive load may be any value from 0 to the maximum limit without compromising dc performance.  
A capacitive in excess of the maximum limit will not disturb loop stability but may interfere with the operation of the load fault detection circuitry, appearing as a short circuit during turn-on.
- Parameter shall be tested as part of design characterization and after design or process changes.  
Thereafter, parameters shall be guaranteed to the limits specified in Table II.
- An overload is that condition with a load in excess of the rated load but less than that necessary to trigger the short circuit protection and is the condition of maximum power dissipation.
- Load step transition time between 2 and 10 microseconds.
- Recovery time is measured from the initiation of the transient to where V<sub>OUT</sub> has returned to within ±1 percent of V<sub>OUT</sub> at 50 percent load.
- Input step transition time between 2 and 10 microseconds.
- Turn-on delay time measurement is for either a step application of power at the input or the removal of ground signal from the Inhibit Pin (Pin 1) while power is applied to the input is unlimited.

**Specifications**

**AHF2812S**

Absolute Maximum Ratings	
Input Voltage	-0.5Vdc to +50V <sub>DC</sub>
Soldering temperature	+300°C for 10 seconds
Operating case temperature	-55°C to +125°C
Storage case temperature	-65°C to +135°C

**Table III. Electrical Performance Characteristics**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 Unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output voltage	V <sub>OUT</sub>	I <sub>OUT</sub> = 0	1	01	11.88	12.12	V
			2,3		11.76	12.24	
Output current <sup>1</sup>	I <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		1000	mA
Output power	P <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		12	W
Output ripple voltage <sup>2</sup>	V <sub>RIP</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, B.W. = 20 Hz to 2MHz	1,2,3	01		60	mVp-p
Line regulation	VR <sub>LINE</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01		50	mV
Load regulation	VR <sub>LOAD</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01		50	mV
Input current	I <sub>IN</sub>	I <sub>OUT</sub> = 0, Inhibit (Pin 1) tied to Input Return (Pin 7)	1,2,3	01		12	mA
		I <sub>OUT</sub> = 0, Inhibit (Pin 1) = open				50	
Input ripple current <sup>2</sup>	I <sub>RIP</sub>	I <sub>OUT</sub> = 100% rated load B.W. = 20 Hz to 2 MHz	1,2,3	01		50	mA <sub>p-p</sub>
Efficiency	E <sub>EFF</sub>	I <sub>OUT</sub> = 100% rated load	1	01	78		%
			2,3		75		
Isolation	ISO	Input to output or any pin to case (except Pin 6) at 500Vdc T <sub>C</sub> = +25°C	1	01	100		MΩ
Capacitive load <sup>3,4</sup>	C <sub>L</sub>	No effect on dc performance, T <sub>C</sub> = +25°C	4	01		200	μF
Power dissipation load fault	P <sub>D</sub>	Overload <sup>5</sup>	1	01		6.0	W
		Short circuit	1,2,3	01		2.0	
Switching frequency	F <sub>S</sub>	I <sub>OUT</sub> = 100% rated load	4,5,6	01	500	600	kHz

For Notes to Electrical Performance Characteristics, refer to page 7

**Table III. Electrical Performance Characteristics (continued)**

**AHF2812S**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output response to step transient load changes <sup>6</sup>	V <sub>O</sub> T <sub>LOAD</sub>	50% to/from 100% rated load	4	01	-300	+300	mVpk
			5,6		-450	+450	
		0% to/from 50% rated load	4		-500	+500	
			5,6		-750	+750	
Recovery time step transient load changes <sup>6,7</sup>	T <sub>T</sub> LOAD	50% to/from 100% rated load	4,5,6	01		100	μs
		0% to 50% rated load	4,5,6			1500	μs
		50% to 0% rated load	4,5,6			10	ms
Output response to transient step line changes	V <sub>O</sub> T <sub>LINE</sub>	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load <sup>4, 8</sup>	4,5,6	01		1500	mVpk
Recovery time transient step line changes	T <sub>T</sub> LINE	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load <sup>4, 7, 8</sup>	4,5,6	01		800	μs
Turn on overshoot	V <sub>T</sub> OnOS	I <sub>OUT</sub> = 0 and 100% rated load	4,5,6	01		600	mVpk
Turn on delay	T <sub>onD</sub>	I <sub>OUT</sub> = 0 and 100% rated load <sup>9</sup>	4,5,6	01		20	ms
Load fault recovery <sup>4,9</sup>	T <sub>rLF</sub>		4,5,6	01		20	ms
Weight						38	g

**Notes to Table III:**

- Parameter guaranteed by line and load regulation tests.
- Bandwidth guaranteed by design. Tested for 20kHz to 2MHz.
- Capacitive load may be any value from 0 to the maximum limit without compromising dc performance.  
A capacitive in excess of the maximum limit will not disturb loop stability but may interfere with the operation of the load fault detection circuitry, appearing as a short circuit during turn-on.
- Parameter shall be tested as part of design characterization and after design or process changes.  
Thereafter, parameters shall be guaranteed to the limits specified in Table III.
- An overload is that condition with a load in excess of the rated load but less than that necessary to trigger the short circuit protection and is the condition of maximum power dissipation.
- Load step transition time between 2 and 10 microseconds.
- Recovery time is measured from the initiation of the transient to where V<sub>OUT</sub> has returned to within ±1 percent of V<sub>OUT</sub> at 50 percent load.
- Input step transition time between 2 and 10 microseconds.
- Turn-on delay time measurement is for either a step application of power at the input or the removal of ground signal from the Inhibit Pin (Pin 1) while power is applied to the input is unlimited.

**Specifications**

**AHF2815S**

Absolute Maximum Ratings	
Input Voltage	-0.5Vdc to +50V <sub>DC</sub>
Soldering temperature	+300°C for 10 seconds
Operating case temperature	-55°C to +125°C
Storage case temperature	-65°C to +135°C

**Table IV. Electrical Performance Characteristics**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 Unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output voltage	V <sub>OUT</sub>	I <sub>OUT</sub> = 0	1	01	14.85	15.15	V
			2,3		14.70	15.30	
Output current <sup>1</sup>	I <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		800	mA
Output power	P <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		12	W
Output ripple voltage <sup>2</sup>	V <sub>RIP</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, B.W. = 20 Hz to 2MHz	1,2,3	01		60	mVp-p
Line regulation	VR <sub>LINE</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01		50	mV
Load regulation	VR <sub>LOAD</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01		50	mV
Input current	I <sub>IN</sub>	I <sub>OUT</sub> = 0, Inhibit (Pin 1) tied to Input Return (Pin 7)	1,2,3	01		12	mA
		I <sub>OUT</sub> = 0, Inhibit (Pin 1) = open			40		
Input ripple current <sup>2</sup>	I <sub>RIP</sub>	I <sub>OUT</sub> = 100% rated load B.W. = 20 Hz to 2 MHz	1,2,3	01		50	mA <sub>p-p</sub>
Efficiency	E <sub>EFF</sub>	I <sub>OUT</sub> = 100% rated load	1	01	78		%
			2,3		75		
Isolation	ISO	Input to output or any pin to case (except Pin 6) at 500Vdc T <sub>C</sub> = +25°C	1	01	100		MΩ
Capacitive load <sup>3,4</sup>	C <sub>L</sub>	No effect on dc performance, T <sub>C</sub> = +25°C	4	01		200	μF
Power dissipation load fault	P <sub>D</sub>	Overload <sup>5</sup>	1	01		6.0	W
		Short circuit	1,2,3	01		2.0	
Switching frequency	F <sub>S</sub>	I <sub>OUT</sub> = 100% rated load	4,5,6	01	500	600	kHz

For Notes to Electrical Performance Characteristics, refer to page 9

**Table IV. Electrical Performance Characteristics (continued)**

**AHF2815S**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output response to step transient load changes <sup>6</sup>	V <sub>O</sub> T <sub>LOAD</sub>	50% to/from 100% rated load	4,5,6	01	-300	+300	mVpk
		0% to/from 50% rated load	4,5,6		-750	+750	
Recovery time step transient load changes <sup>6,7</sup>	T <sub>T</sub> LOAD	50% to/from 100% rated load	4,5,6	01		100	μs
		0% to 50% rated load	4,5,6			1500	μs
		50% to 0% rated load	4,5,6			10	ms
Output response to transient step line changes	V <sub>O</sub> T <sub>LINE</sub>	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load <sup>4, 8</sup>	4,5,6	01	-1500	+1500	mVpk
Recovery time transient step line changes	T <sub>T</sub> LINE	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load <sup>4, 7, 8</sup>	4,5,6	01		800	μs
Turn on overshoot	V <sub>TonOS</sub>	I <sub>OUT</sub> = 0 and 100% rated load	4,5,6	01		750	mVpk
Turn on delay	T <sub>onD</sub>	I <sub>OUT</sub> = 0 and 100% rated load <sup>9</sup>	4,5,6	01		20	ms
Load fault recovery <sup>4,9</sup>	T <sub>rLF</sub>		4,5,6	01		20	ms
Weight						38	g

**Notes to Table IV:**

- Parameter guaranteed by line and load regulation tests.
- Bandwidth guaranteed by design. Tested for 20kHz to 2MHz.
- Capacitive load may be any value from 0 to the maximum limit without compromising dc performance.  
A capacitive in excess of the maximum limit will not disturb loop stability but may interfere with the operation of the load fault detection circuitry, appearing as a short circuit during turn-on.
- Parameter shall be tested as part of design characterization and after design or process changes.  
Thereafter, parameters shall be guaranteed to the limits specified in Table IV.
- An overload is that condition with a load in excess of the rated load but less than that necessary to trigger the short circuit protection and is the condition of maximum power dissipation.
- Load step transition time between 2 and 10 microseconds.
- Recovery time is measured from the initiation of the transient to where V<sub>OUT</sub> has returned to within ±1 percent of V<sub>OUT</sub> at 50 percent load.
- Input step transition time between 2 and 10 microseconds.
- Turn-on delay time measurement is for either a step application of power at the input or the removal of ground signal from the Inhibit Pin (Pin 1) while power is applied to the input is unlimited.



**Specifications**

**AHF2805D**

Absolute Maximum Ratings	
Input Voltage	-0.5Vdc to +50V <sub>DC</sub>
Soldering temperature	+300°C for 10 seconds
Operating case temperature	-55°C to +125°C
Storage case temperature	-65°C to +135°C

**Table V. Electrical Performance Characteristics**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 Unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output voltage	V <sub>OUT</sub>	I <sub>OUT</sub> = 0	1	01	±4.95	±5.05	V
			2,3		±4.90	±5.10	
Output current <sup>1,2</sup>	I <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, each output	1,2,3	01	240	2160	mA
Output power	P <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		12	W
Output ripple voltage <sup>3</sup>	V <sub>RIP</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, B.W. = 20 Hz to 2MHz	1,2,3	01		60	mVp-p
Line regulation <sup>4</sup>	VR <sub>LINE</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01	-30	30	mV
Load regulation <sup>4</sup>	VR <sub>LOAD</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01	-50	50	mV
Cross regulation <sup>5</sup>	VR <sub>CROSS</sub>	10% to 90% load changes	1,2,3	01	-10	10	%
Input current	I <sub>IN</sub>	I <sub>OUT</sub> = 0, Inhibit (Pin 1) tied to Input Return (Pin 7)	1,2,3	01		12	mA
		I <sub>OUT</sub> = 0, Inhibit (Pin 1) = open			60		
Input ripple current <sup>3,4</sup>	I <sub>RIP</sub>	I <sub>OUT</sub> = 100% rated load B.W. = 20 Hz to 2 MHz	1,2,3	01		50	mAp-p
Efficiency <sup>4</sup>	E <sub>FF</sub>	I <sub>OUT</sub> = 100% rated load	1,3	01	75		%
			2		72		
Isolation	ISO	Input to output or any pin to case (except Pin 6) at 500Vdc T <sub>C</sub> = +25°C	1	01	100		MΩ
Capacitive load <sup>6,7</sup>	C <sub>L</sub>	No effect on dc performance, T <sub>C</sub> = +25°C	4	01		200	μF
Power dissipation load fault	P <sub>D</sub>	Overload	1,2,3	01		6.0	W
		Short circuit			2.0		
Switching frequency	F <sub>S</sub>	I <sub>OUT</sub> = 100% rated load	4,5,6	01	500	600	kHz

For Notes to Electrical Performance Characteristics, refer to page 11

**Table V. Electrical Performance Characteristics (continued)**

**AHF2805D**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output response to step transient load changes <sup>4,9</sup>	V <sub>O_TLOAD</sub>	50% to/from 100% rated load	4,5,6	01	-400	+400	mVpk
		0% to/from 50% rated load	4,5,6		-800	+800	
Recovery time step transient load changes <sup>4,9,10</sup>	T <sub>TLOAD</sub>	50% to/from 100% rated load	4,5,6	01		100	μs
		0% to 50% rated load	4,5,6			5000	μs
Output response to transient step line changes <sup>4,7,11</sup>	V <sub>O_TLINE</sub>	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load	4,5,6	01	-400	+400	mVpk
Recovery time transient step line changes <sup>4,7,10,11</sup>	T <sub>TLINE</sub>	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load	4,5,6	01		1200	μs
Turn on overshoot <sup>4</sup>	V <sub>TonOS</sub>	I <sub>OUT</sub> = 0 and 100% rated load	4,5,6	01		600	mVpk
Turn on delay	T <sub>onD</sub>	I <sub>OUT</sub> = 0 and 100% rated load <sup>9</sup>	4,5,6	01		25	ms
Load fault recovery <sup>4,9</sup>	T <sub>rLF</sub>		4,5,6	01		25	ms
Weight						38	g

**Notes to Table V:**

- Parameter guaranteed by line load and cross regulation tests.
- Up to 90 percent of full power is available from either output provided the total output does not exceed 12W.
- Bandwidth guaranteed by design. Tested for 20kHz to 2MHz.
- Load current split equally between +V<sub>OUT</sub> and -V<sub>OUT</sub>.
- 1.2 watt load on output under test, 1.2 watt to 10.8 watt load change on other output.
- Capacitive load may be any value from 0 to the maximum limit without compromising dc performance.  
A capacitive load in excess of the maximum limit will not disturb loop stability but may interfere with the operation of the load fault detection circuitry, appearing as a short circuit during turn-on.
- Parameter shall be tested as part of design characterization and after design or process changes.  
Thereafter, parameters shall be guaranteed to the limits specified in Table V.
- An overload is that condition with a load in excess of the rated load but less than that necessary to trigger the short circuit protection and is the condition of maximum power dissipation.
- Load step transition time between 2 and 10 microseconds.
- Recovery time is measured from the initiation of the transient to where V<sub>OUT</sub> has returned to within ±1 percent of V<sub>OUT</sub> at 50 percent load.
- Input step transition time between 2 and 10 microseconds.
- Turn-on delay time measurement is for either a step application of power at the input or the removal of a ground signal from the Inhibit Pin (Pin 1) while power is applied to the input.

**Specifications**

**AHF2812D**

Absolute Maximum Ratings	
Input Voltage	-0.5Vdc to +50V <sub>DC</sub>
Soldering temperature	+300°C for 10 seconds
Operating case temperature	-55°C to +125°C
Storage case temperature	-65°C to +135°C

**Table VI. Electrical Performance Characteristics**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 Unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output voltage	V <sub>OUT</sub>	I <sub>OUT</sub> = 0	1	01	±11.88	±12.12	V
			2,3		±11.76	±12.24	
Output current <sup>1,2</sup>	I <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, each output	1,2,3	01	100	900	mA
Output power	P <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		12	W
Output ripple voltage <sup>3</sup>	V <sub>RIP</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, B.W. = 20 Hz to 2MHz	1,2,3	01		60	mVp-p
Line regulation <sup>4</sup>	VR <sub>LINE</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01	-30	30	mV
Load regulation <sup>4</sup>	VR <sub>LOAD</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01	-50	50	mV
Cross regulation <sup>5</sup>	VR <sub>CROSS</sub>	10% to 90% load changes	1,2,3	01	-3.0	3.0	%
Input current	I <sub>IN</sub>	I <sub>OUT</sub> = 0, Inhibit (Pin 1) tied to Input Return (Pin 7)	1,2,3	01		12	mA
		I <sub>OUT</sub> = 0, Inhibit (Pin 1) = open				60	
Input ripple current <sup>3,4</sup>	I <sub>RIP</sub>	I <sub>OUT</sub> = 100% rated load B.W. = 20 Hz to 2 MHz	1,2,3	01		50	mAp-p
Efficiency <sup>4</sup>	E <sub>FF</sub>	I <sub>OUT</sub> = 100% rated load	1,3	01	77		%
			2		74		
Isolation	ISO	Input to output or any pin to case (except Pin 6) at 500Vdc T <sub>C</sub> = +25°C	1	01	100		MΩ
Capacitive load <sup>6,7</sup>	C <sub>L</sub>	No effect on dc performance, T <sub>C</sub> = +25°C	4	01		200	μF
Power dissipation load fault	P <sub>D</sub>	Overload	1,2,3	01		6.0	W
		Short circuit				3.0	
Switching frequency	F <sub>S</sub>	I <sub>OUT</sub> = 100% rated load	4,5,6	01	500	600	kHz

For Notes to Electrical Performance Characteristics, refer to page 13

**Table VI. Electrical Performance Characteristics (continued)**

**AHF2812D**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output response to step transient load changes <sup>4,9</sup>	V <sub>O</sub> T <sub>LOAD</sub>	50% to/from 100% rated load	4,5,6	01	-200	+200	mVpk
		0% to/from 50% rated load	4,5,6		-800	+800	
Recovery time step transient load changes <sup>4,9,10</sup>	T <sub>T</sub> LOAD	50% to/from 100% rated load	4,5,6	01		70	μs
		0% to 50% rated load	4,5,6			2000	μs
Output response to transient step line changes <sup>4,7,11</sup>	V <sub>O</sub> T <sub>LINE</sub>	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load	4,5,6	01	-750	+750	mVpk
Recovery time transient step line changes <sup>4,7,10,11</sup>	T <sub>T</sub> LINE	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load	4,5,6	01		1200	μs
Turn on overshoot <sup>4</sup>	V <sub>T</sub> onOS	I <sub>OUT</sub> = 0 and 100% rated load	4,5,6	01		600	mVpk
Turn on delay	T <sub>on</sub> D	I <sub>OUT</sub> = 0 and 100% rated load <sup>9</sup>	4,5,6	01		25	ms
Load fault recovery <sup>4,9</sup>	T <sub>r</sub> LF		4,5,6	01		25	ms
Weight						38	g

**Notes to Table VI:**

- Parameter guaranteed by line load and cross regulation tests.
- Up to 90 percent of full power is available from either output provided the total output does not exceed 12W.
- Bandwidth guaranteed by design. Tested for 20kHz to 2MHz.
- Load current split equally between +V<sub>OUT</sub> and -V<sub>OUT</sub>.
- 1.2 watt load on output under test, 1.2 watt to 10.8 watt load change on other output.
- Capacitive load may be any value from 0 to the maximum limit without compromising dc performance.  
A capacitive load in excess of the maximum limit will not disturb loop stability but may interfere with the operation of the load fault detection circuitry, appearing as a short circuit during turn-on.
- Parameter shall be tested as part of design characterization and after design or process changes.  
Thereafter, parameters shall be guaranteed to the limits specified in Table VI.
- An overload is that condition with a load in excess of the rated load but less than that necessary to trigger the short circuit protection and is the condition of maximum power dissipation.
- Load step transition time between 2 and 10 microseconds.
- Recovery time is measured from the initiation of the transient to where V<sub>OUT</sub> has returned to within ±1 percent of V<sub>OUT</sub> at 50 percent load.
- Input step transition time between 2 and 10 microseconds.
- Turn-on delay time measurement is for either a step application of power at the input or the removal of a ground signal from the Inhibit Pin (Pin 1) while power is applied to the input.

**Specifications**

**AHF2815D**

Absolute Maximum Ratings	
Input Voltage	-0.5Vdc to +50V <sub>DC</sub>
Soldering temperature	+300°C for 10 seconds
Operating case temperature	-55°C to +125°C
Storage case temperature	-65°C to +135°C

**Table VII. Electrical Performance Characteristics**

Parameter	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 Unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output voltage	V <sub>OUT</sub>	I <sub>OUT</sub> = 0	1	01	±14.85	±15.15	V
			2,3		±14.70	±15.30	
Output current <sup>1,2</sup>	I <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, each output	1,2,3	01	80	720	mA
Output power	P <sub>OUT</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc	1,2,3	01		12	W
Output ripple voltage <sup>3</sup>	V <sub>RIP</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, B.W. = 20 Hz to 2MHz	1,2,3	01		60	mVp-p
Line regulation <sup>4</sup>	VR <sub>LINE</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01	-35	35	mV
Load regulation <sup>4</sup>	VR <sub>LOAD</sub>	V <sub>IN</sub> = 16, 28, and 40Vdc, I <sub>OUT</sub> = 0, 50% and 100% rated load	1,2,3	01	-50	50	mV
Cross regulation <sup>5</sup>	VR <sub>CROSS</sub>	10% to 90% load changes	1,2,3	01	-3.0	3.0	%
Input current	I <sub>IN</sub>	I <sub>OUT</sub> = 0, Inhibit (Pin 1) tied to Input Return (Pin 7)	1,2,3	01		12	mA
		I <sub>OUT</sub> = 0, Inhibit (Pin 1) = open				60	
Input ripple current <sup>3,4</sup>	I <sub>RIP</sub>	I <sub>OUT</sub> = 100% rated load B.W. = 20 Hz to 2 MHz	1,2,3	01		50	mAp-p
Efficiency <sup>4</sup>	E <sub>FF</sub>	I <sub>OUT</sub> = 100% rated load	1,3	01	78		%
			2		74		
Isolation	ISO	Input to output or any pin to case (except Pin 6) at 500Vdc T <sub>C</sub> = +25°C	1	01	100		MΩ
Capacitive load <sup>6,7</sup>	C <sub>L</sub>	No effect on dc perfor- mance, T <sub>C</sub> = +25°C	4	01		200	μF
Power dissipation load fault	P <sub>D</sub>	Overload	1,2,3	01		6.0	W
		Short circuit				2.5	
Switching frequency	F <sub>S</sub>	I <sub>OUT</sub> = 100% rated load	4,5,6	01	500	600	kHz

For Notes to Electrical Performance Characteristics, refer to page 15

**Table VII. Electrical Performance Characteristics (continued)**

**AHF2815D**

Parameter	Symbol	Conditions -55°C ≤ T <sub>c</sub> ≤ +125°C V <sub>IN</sub> = 28 V <sub>DC</sub> ± 5%, C <sub>L</sub> = 0 unless otherwise specified	Group A Subgroups	Device Types	Limits		Unit
					Min	Max	
Output response to step transient load changes <sup>4,9</sup>	V <sub>OLOAD</sub>	50% to/from 100% rated load	4,5,6	01	-200	+200	mVpk
		0% to/from 50% rated load	4,5,6		-800	+800	
Recovery time step transient load changes <sup>4,9,10</sup>	T <sub>TLOAD</sub>	50% to/from 100% rated load	4,5,6	01		70	μs
		0% to 50% rated load	4,5,6			2000	μs
Output response to transient step line changes <sup>4,7,11</sup>	V <sub>OTLINE</sub>	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load	4,5,6	01	-750	+750	mVpk
Recovery time transient step line changes <sup>4,7,10,11</sup>	T <sub>TLINE</sub>	Input step 16V to/from 40Vdc, I <sub>OUT</sub> = 100% rated load	4,5,6	01		1200	μs
Turn on overshoot <sup>4</sup>	V <sub>TonOS</sub>	I <sub>OUT</sub> = 0 and 100% rated load	4,5,6	01		750	mVpk
Turn on delay	T <sub>onD</sub>	I <sub>OUT</sub> = 0 and 100% rated load <sup>9</sup>	4,5,6	01		25	ms
Load fault recovery <sup>4,9</sup>	T <sub>rLF</sub>		4,5,6	01		25	ms
Weight						38	g

**Notes to Table VII:**

- Parameter guaranteed by line load and cross regulation tests.
- Up to 90 percent of full power is available from either output provided the total output does not exceed 12W.
- Bandwidth guaranteed by design. Tested for 20kHz to 2MHz.
- Load current split equally between +V<sub>OUT</sub> and -V<sub>OUT</sub>.
- 1.2 watt load on output under test, 1.2 watt to 10.8 watt load change on other output.
- Capacitive load may be any value from 0 to the maximum limit without compromising dc performance.  
A capacitive load in excess of the maximum limit will not disturb loop stability but may interfere with the operation of the load fault detection circuitry, appearing as a short circuit during turn-on.
- Parameter shall be tested as part of design characterization and after design or process changes.  
Thereafter, parameters shall be guaranteed to the limits specified in Table VII.
- An overload is that condition with a load in excess of the rated load but less than that necessary to trigger the short circuit protection and is the condition of maximum power dissipation.
- Load step transition time between 2 and 10 microseconds.
- Recovery time is measured from the initiation of the transient to where V<sub>OUT</sub> has returned to within ±1 percent of V<sub>OUT</sub> at 50 percent load.
- Input step transition time between 2 and 10 microseconds.
- Turn-on delay time measurement is for either a step application of power at the input or the removal of a ground signal from the Inhibit Pin (Pin 1) while power is applied to the input.

## Application Information

### Inhibit Function (Enable)

Connecting the Enable Input (Pin 1) to Input Common (Pin 7) will cause the converter to shut down. It is recommended that the Enable Pin be driven by an open collector device capable of sinking at least 400µA of current. The open circuit voltage of the Enable Input is 15±1.0V<sub>DC</sub>. If the Inhibit function is not used, this Input can be left unconnected because it is internally pulled-up.

### Thermal Management

Assuming that there is no forced air flow, the package temperature rise above ambient (ΔT) may be calculated using the following expression:

$$\Delta T \approx 80 A^{-0.7} P^{0.85} (\text{°C})$$

where A = Effective surface area in square inches (including heat sink if used), P = Power dissipation in watts.

The total surface area of the AHF package is 4.9 square inches. If a worst case full load efficiency of 78% is assumed, then the case temperature rise can be calculated as follows:

$$P = P_{OUT} \left[ \frac{1}{Eff} - 1 \right] = 12 \left[ \frac{1}{0.78} - 1 \right] = 3.4W$$

$$\Delta T = 80 (4.9)^{-0.7} (3.4)^{0.85} = 74\text{°C}$$

Hence if T<sub>AMBIENT</sub> = +25°C, the DC-DC converter case temperature will be approximately 100°C if no heat sink or air flow is provided.

To calculate the heat sink area required to maintain a specific case temperature rise, the above equation may be manipulated as follows:

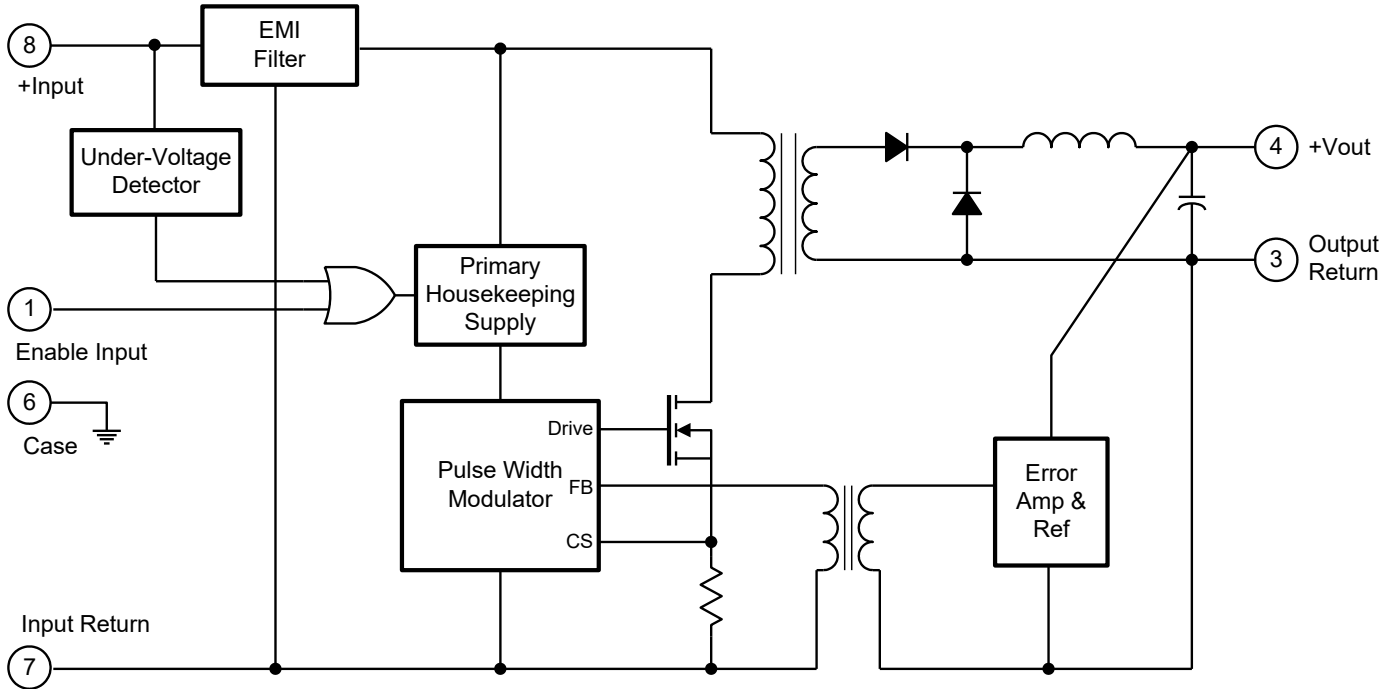
$$A_{HEAT\ SINK} = \left[ \frac{\Delta T}{80 P^{0.85}} \right]^{-1.43} - A_{PKG}$$

As an example, if a maximum case temperature rise of 50°C above ambient is desired, then the required effective heat sink area is:

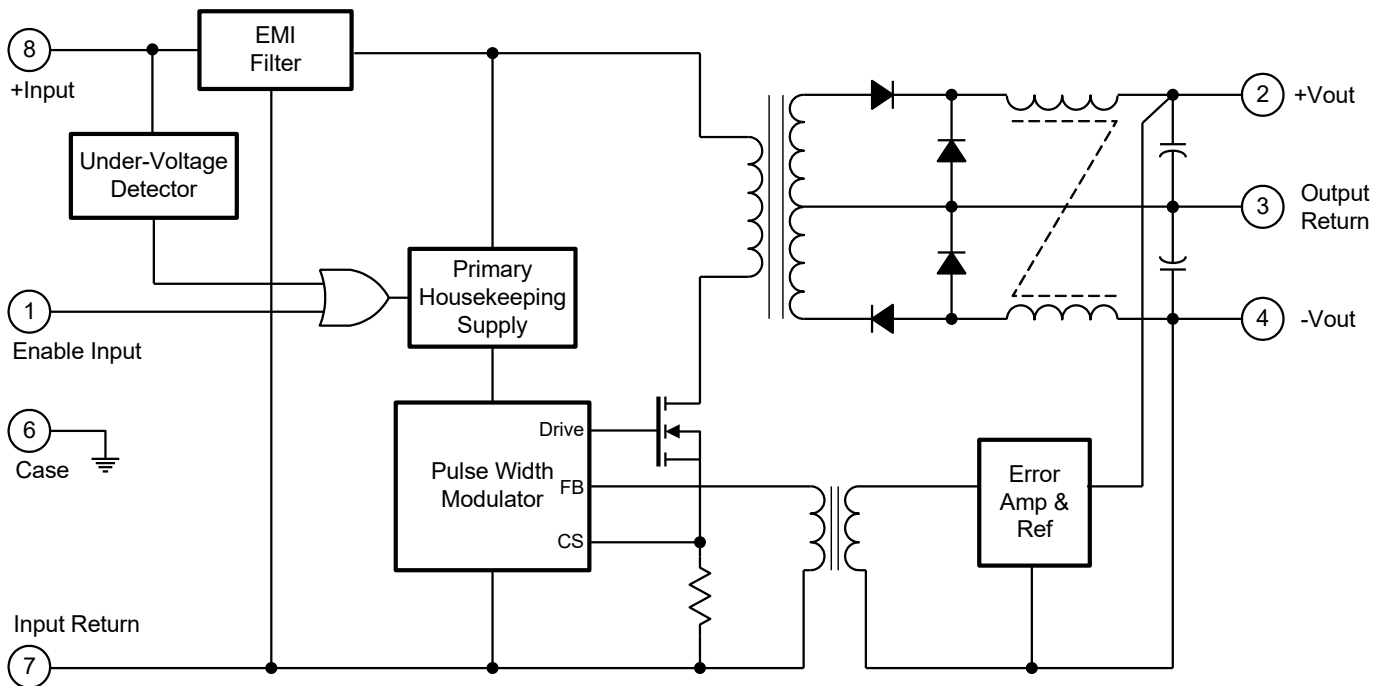
$$A_{HEATSINK} = \left[ \frac{50}{80(3.4)^{0.85}} \right]^{-1.43} - 4.9 = 3.75in.^2$$

**Block Diagrams**

**Single Output**

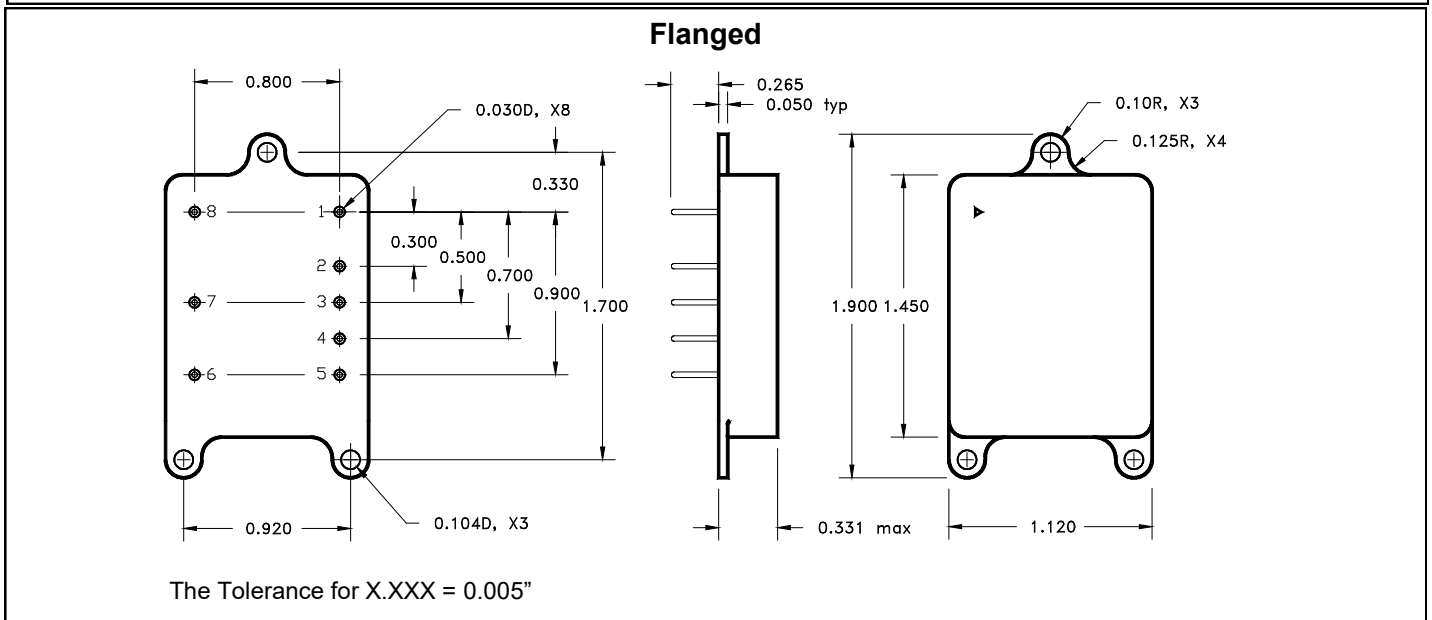
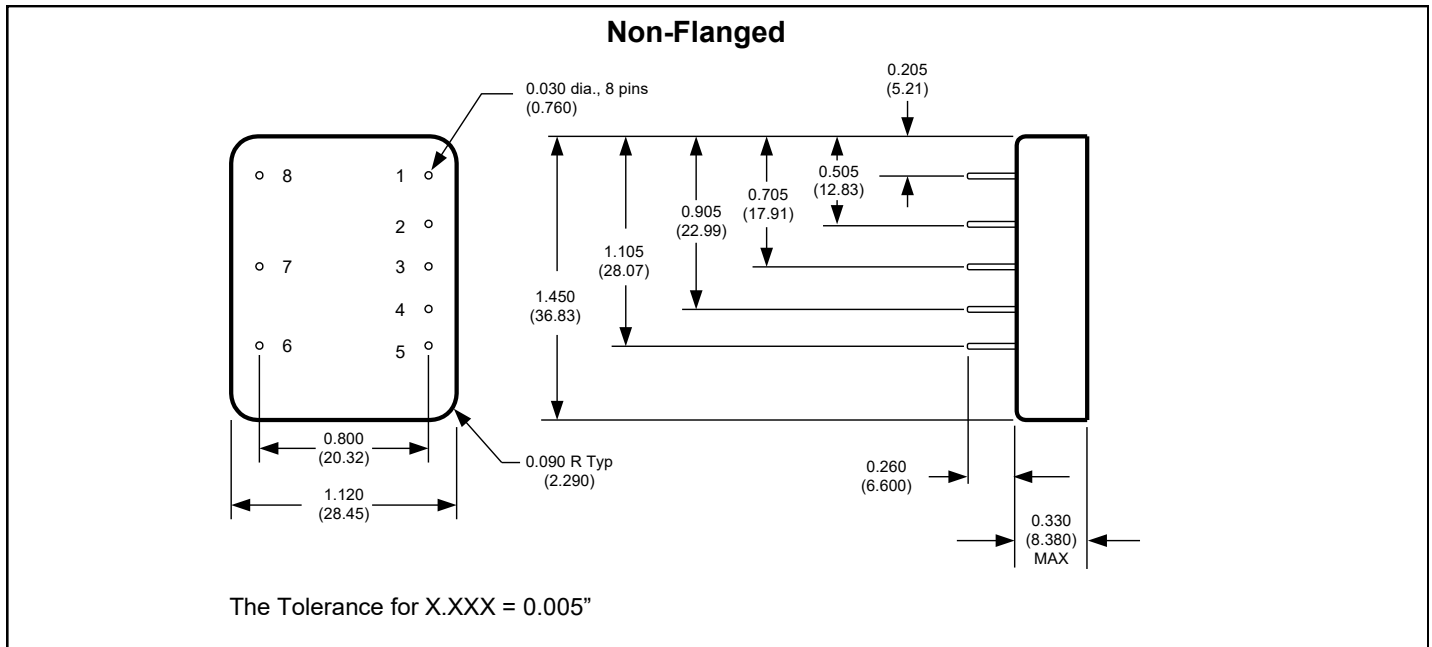


**Dual Output**





**Mechanical Outlines**



**Pin Designation Tables**

**Standard Microcircuit Drawing Equivalence Table**

**Single Output**

**Dual Output**

Pin #	Designation
1	Enable Input
2	NC
3	Output Return
4	+Output
5	NC
6	Case Ground
7	Input Return
8	+Input

Pin #	Designation
1	Enable Input
2	+Output
3	Output Return
4	-Output
5	NC
6	Case Ground
7	Input Return
8	+Input

Standard Microcircuit Drawing Number	Vendor Cage Code	IR Hirel Standard Part Number
5962-91600	52467	AHF2805S
5962-94568	52467	AHF2812S
5962-94563	52467	AHF2815S
5962-05205	52467	AHF2805D
5962-92111	52467	AHF2812D
5962-92351	52467	AHF2815D

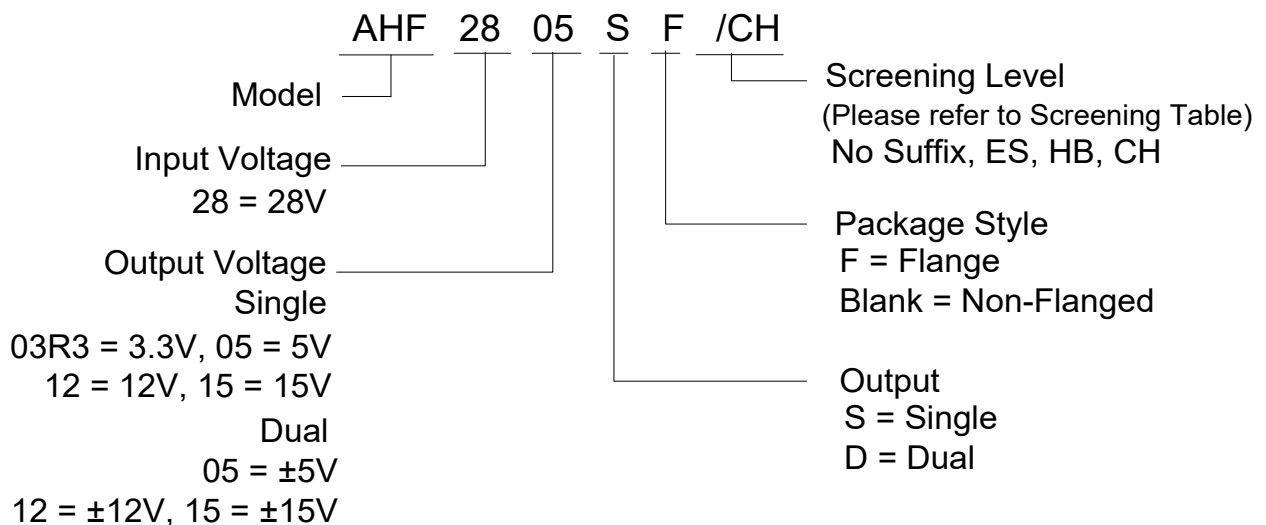
**Device Screening**

Requirement	MIL-STD-883 Method	No Suffix	ES ②	HB	CH
Temperature Range	—	-20°C to +85°C	-55°C to +125°C③	-55°C to +125°C	-55°C to +125°C
Element Evaluation	MIL-PRF-38534	N/A	N/A	N/A	Class H
Non-Destructive Bond Pull	2023	N/A	N/A	N/A	N/A
Internal Visual	2017	①	Yes	Yes	Yes
Temperature Cycle	1010	N/A	Cond B	Cond C	Cond C
Constant Acceleration	2001, Y1 Axis	N/A	500 Gs	3000 Gs	3000 Gs
PIND	2020	N/A	N/A	N/A	N/A
Burn-In	1015	N/A	48 hrs @ hi temp	160hrs @ 125°C	160 hrs @ 125°C
Final Electrical (Group A)	MIL-PRF-38534 & Specification	25°C	25°C	-55°C, +25°C, +125°C	-55°C, +25°C, +125°C
PDA	MIL-PRF-38534	N/A	N/A	N/A	10%
Seal, Fine and Gross	1014	Cond A	Cond A, C	Cond A, C	Cond A, C
Radiographic	2012	N/A	N/A	N/A	N/A
External Visual	2009	①	Yes	Yes	Yes

**Notes:**

- ① Best commercial practice.
- ② Sample tests at low and high temperatures.
- ③ -55°C to +105°C for AHE, ATO, ATW.

**Part Numbering**



### **IMPORTANT NOTICE**

The information given in this document shall be in no event regarded as guarantee of conditions or characteristic. The data contained herein is a characterization of the component based on internal standards and is intended to demonstrate and provide guidance for typical part performance. It will require further evaluation, qualification and analysis to determine suitability in the application environment to confirm compliance to your system requirements.

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