LAMBDA ADVANCED ANALOG INC.

ASA2800S Series

Hybrid - High Reliability
Dual Output DC/DC Converter

DESCRIPTION

The ASA2800S Series of DC/DC converters are high reliability thick film hybrid converters that use flyback topology operating at a nominal frequency of 550KHz. High input to output isolation is achieved through the use of transformers in the flyback power and feedback circuits.

The advanced feedback design provides fast loop response for superior line and load transient characteristics and offers greater reliability than devices incorporating optical feedback circuits.

This device is designed to meet MIL-STD-704 input requirements offering full performance over a 16 to 40 volt input range. Output Power of up to 4 watts is available for either balanced or unbalanced loads.

Connecting the inhibit pin (pin 5) to the input common (pin 7) will cause the converter to shut down. It is recommended that the inhibit pin be driven by an open collector device capable of sinking at least 400ua. The open circuit voltage of the inhibit pin is 11.5 +/-0.5 volts.

These converters are manufactured in a facility fully qualified to MIL-PRF-38534. All processes used to manufacture these converters have been qualified to enable Lambda Advanced Analog to deliver compliant devices. Three standard temperature grades are offered with the screening options. Refer to Part Number section. The CH grade converters are fully compliant to MIL-PRF-38534 for class H. The HB grade converters are processed with the same screening as the CH grade, but do not have class H element evaluation as required by MIL-PRF-38534. These two grades are fully tested and operate over the full military temperature range without derating of output power. A commercial grade is also available. Variations in electrical, mechanical and screening can be accommodated. Extensive computer simulation using complex modeling enables rapid design modification to be provided. Contact Lambda Advanced Analog with specific requirements.

FEATURES

- **Up to 5 watt output power**
- **±5, ±12, ±15 volt outputs**
- **High reliability**
- **Wide input voltage range – 16 to 40 volts**
- **Indefinite short circuit and overload protection**
- **Popular industry standard pin-out**
- **Military screening**
- **Parallel seam welded package**
- **No external capacitors required**
- **Input voltage surge protected to MIL-STD-704**
- **Under Voltage Lockout**

ABSOLUTE MAXIMUM RATINGS

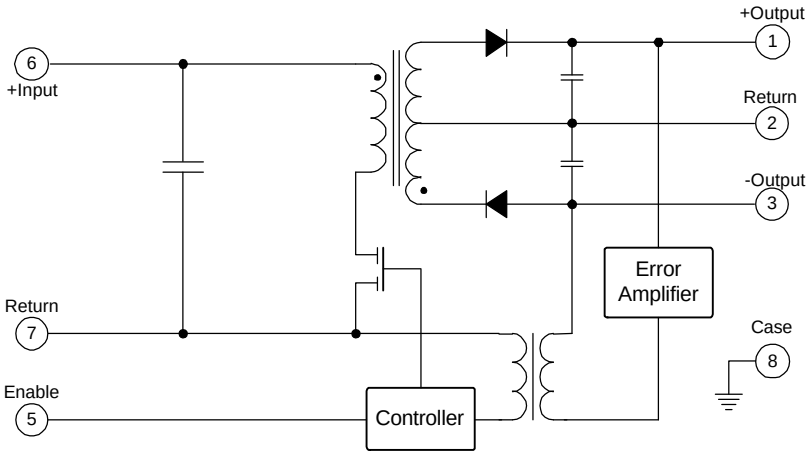
Input Voltage	-0.5 V to 50 V Continuous. 80 V, 100 mSec
Power Output	Internally limited (6.5 w typical)
Soldering	300°C for 10 Sec.
Temperature Range	Operating -55°C to +125°C Case
	Storage -65°C to +150°C

TEST	Conditions -55° ≤ T_C ≤+125°C V_{IN} = 28V dc ±5% C_L = 0 unless otherwise specified	Group A Subgroups	ASA2805S/XX Limits		ASA2812S/XX Limits		ASA2815S/XX Limits		Unit
			Min	Max	Min	Max	Min	Max	
Output voltage	I_{OUT} = 0	1	±4.95	±5.05	±11.88	±12.12	±14.85	±15.15	V
		2, 3	±4.90	±5.10	±11.76	±12.24	±14.70	±15.30	
Output current [1]	V_{IN} = 16, 28, and 40 V dc each output	1, 2, 3		1000		417		333	mA
Output ripple voltage [2]	V_{IN} = 16, 28 and 40 V dc	1		190		200		200	mV $_{PP}$
	B.W. = 20 Hz to 2 MHz	2, 3		475		290		290	
Line regulation	V_{IN} = 16, 28, and 40 V dc I_{OUT} = 0, 50%, 100% I_{MAX}	1		25		±25		±25	mV
		2, 3		50		±50		±50	
Load regulation	V_{IN} = 16, 28, and 40 V dc I_{OUT} = 0, 50%, 100% I_{MAX}	1		25		±25		±25	mV
		2, 3		50		±50		±50	
Input current	I_{OUT} = 0 inhibit (Pin 5) tied to input return (Pin 7)	1, 2, 3		18		18		18	mA
	I_{OUT} = 0 Pin5 open			50		50		50	
Input ripple current [2]	I_{OUT} = Full Load B.W. = 20 Hz to 2 MHz	1, 2, 3		100		100		100	mA $_{PP}$
Efficiency	I_{OUT} = Full Load	1, 2, 3	66		71		71		%
					68		68		
Isolation	Input to output or any pin to case (except pin 8) at 500 V dc, Tc = +25° C	1	100		100		100		MΩ
Capacitive load [3, 4]	No effect on dc performance, Tc = +25°C	4		250		100		100	µf
Power dissipation load fault	Overload [5]	1, 2, 3		4.0		4.0		4.0	W
	Short circuit			2.0		2.0		2.0	
Switching frequency [4]	I_{OUT} = Full Load	4, 5, 6	500	600	500	600	500	600	KHz
Output response to step transient load changes [6]	Half Load ⇔Full Load	4	-300	+300	-450	+450	-400	+450	mV pk
		5, 6	-450	+450					
	No Load ⇔ Half Load	4	-500	+500	-750	+750	-800	+750	
		5, 6	-750	+700					
Recovery time, step transient load changes	Hlaf Load ⇔ Full Load	4, 5, 6		200		100		100	µS
	No Load ⇔ Hlaf Load			1		1		1	ms
	Half Load ⇔ No Load			1		1		1	
Output response transient step line changes	Input step 16 to 40 V dc I_{OUT} = Full Load [4, 8]	4, 5, 6		500		1000		1000	mV pk
	Input step 40 to 16 V dc I_{OUT} = Full Load [4, 8]	4, 5, 6		-500		-1000		-1000	
Recovery time transient step line changes [4, 7, 10, 11]	Input step ⇔ 16 to 40 V dc I_{OUT} = Full Load [4, 7, 8]	4, 5, 6		800		800		800	µS
Turn on overshoot	I_{OUT} = No Load	4, 5, 6		600		600		600	mV pk
	I_{OUT} = Full Load	4, 5, 6		600		600		600	
Turn on delay	I_{OUT} = No Load and Full Load [9]	4, 5, 6		20		25		25	ms
Load fault recovery [4]		4, 5, 6		20		25		25	ms

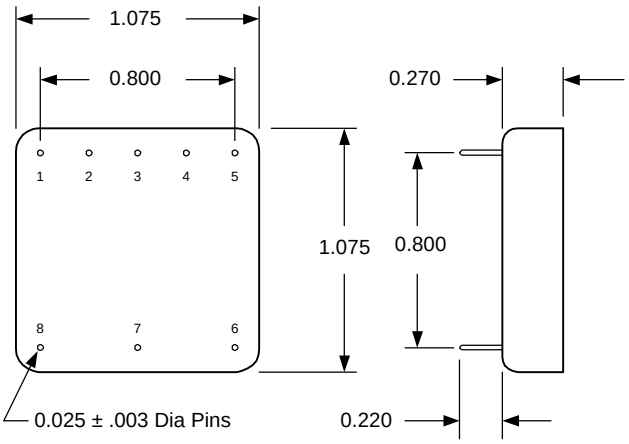
Notes

1. Parameter guaranteed by line and load regulation tests.
2. Bandwidth guaranteed by design. Tested for 20 KHz to 2 MHz.
3. 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.
4. Parameter shall be tested as part of design characterization and after design or process changes.
5. 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.
6. Load step transition time between 2 and 10 microseconds.
7. Recovery time is measured from the initiation of the transient to where V_{OUT} has returned to within ±1 percent of V_{OUT} at 50 percent load.
8. Input step transition time between 2 and 10 microseconds.
9. 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 2) while power is applied to the input.

ASA2800S Block Diagram



ASA2800S Case Outline



ASA2800S Pin Designation

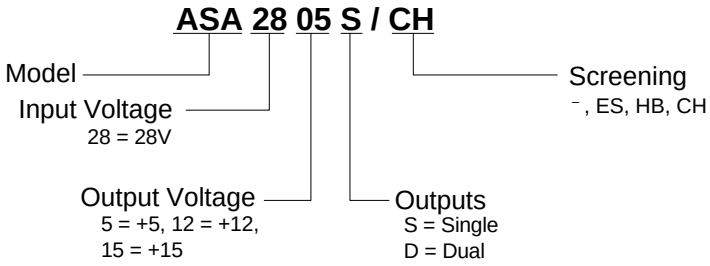
Pin No.	Designation
1	Positive Output
2	Output Return
3	Negative Output
4	N/C
5	Enable
6	Positive Input
7	Input Return
8	Case

Screening Levels and Performance Variations for ASA2800 Series Converters.

Requirement	MIL-STD-883 Method	No Suffix	ES Suffix	HB Suffix	CH Suffix
Temperature Range		-20°C to +85°C	-55°C to +125°C	-55°C to +125°C	-55°C to +125°C
Element Evaluation					MIL-PRF-38534
Internal Visual	2017	✶	✓	✓	✓
Temperature Cycle	1010		Cond B	Cond C	Cond C
Constant Acceleration	2001,		500g	Cond A	Cond A
Burn-in	1015		96hrs @ 125°C	160hrs @ 125°C	160hrs @ 125°C
Final Electrical (Group A)	MIL-PRF-38534	25°C	25°C	-55, +25, +125°C	-55, +25, +125°C
Seal, Fine & Gross	1014	Cond C	Cond A, C	Cond A, C	Cond A, C
External Visual	2009	✶	✓	✓	✓

✶ per Commercial Standards

Part Numbering/Ordering Information



Available Standard Millitary Drawing (SMD) Cross Reference

Lambda Advanced Analog Part No.	Standard Military Drawing No.
ASA2805S/CH	5962-94629
ASA2812S/CH	5962-94631
ASA2815S/CH	5962-94630

The information in this data sheet has been carefully checked and is believed to be accurate; however no responsibility is assumed for possible errors. These specifications are subject to change without notice.

9849

LAMBDA ADVANCED ANALOG INC. ⚠

MIL-PRF-38534 Certified
ISO 9001 Registered

2270 Martin Avenue
Santa Clara CA 95050-2781
(408) 988-4930 FAX (408) 988-2702