LAMBDA ADVANCED ANALOG INC.

ASA2800D Series

Hybrid - High Reliability
Dual Output DC/DC Converter

DESCRIPTION

The ASA2800D 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**

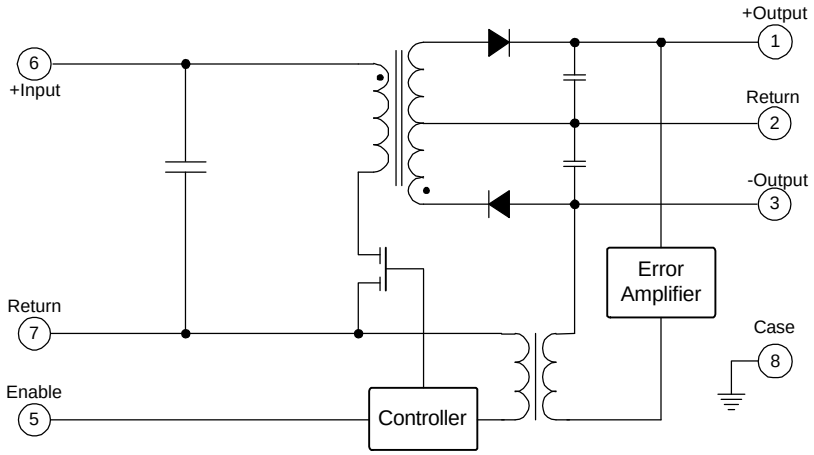
ABSOLUTE MAXIMUM RATINGS

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

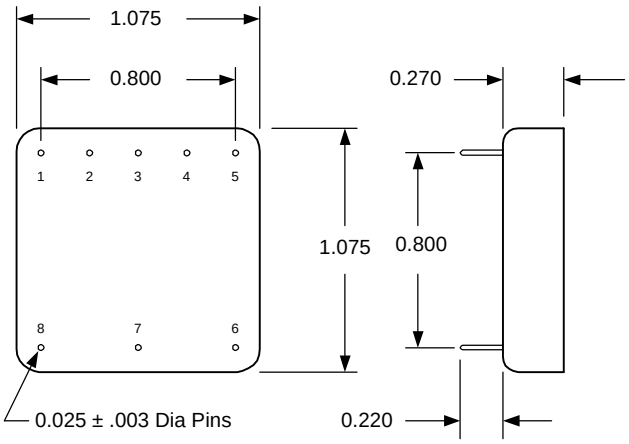
TEST	Conditions -55° ≤ T_C ≤+125°C V_{IN} = 28V dc ±5% C_L = 0 unless otherwise specified	Group A Subgroups	ASA2805D/XX Limits		ASA2812D/XX Limits		ASA2815D/XX Limits		Unit
			Min	Max	Min	Max	Min	Max	
Output voltage	I_{OUT} = 0	1	±4.95	±5.05	±11.88	±12.12	±14.85	±15.15	V
		2, 3	±4.90	±5.10	±11.76	±12.24	±14.70	±15.30	
Output current [1, 2]	V_{IN} = 16, 28, and 40 V dc either output	1, 2, 3	200	1000	84	333	67	267	mA
Output ripple voltage [3, 4]	V_{IN} = 16, 28 and 40 V dc	1, 2, 3		470		200		290	mV_{PP}
Line regulation [4]	V_{IN} = 16, 28, and 40 V dc I_{OUT} = 0, 50%, 100% I_{MAX}	1, 2, 3		50		50		50	mV
Load regulation [4]	V_{IN} = 16, 28, and 40 V dc I_{OUT} = 0, 50%, 100% I_{MAX}	1, 2, 3		50		50		50	mV
Cross regulation [5]	20% to 80% load change	1, 2, 3		15		8.0		8.0	%
Input current	I_{OUT} = 0 Pin 5 connected to pin7	1, 2, 3		12		12		12	mA
	I_{OUT} = 0 Pin5 open			60		60		60	
Input ripple current [3, 4]	$I_{OUT} = I_{MAX}$	1, 2, 3		100		100		100	mA_{PP}
Efficiency [4]	$I_{OUT} = I_{MAX}$	1, 3	70		71		71		%
		2	66		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 [6, 7]	No effect on dc performance, total for both outputs	4	200			200		200	µf
Power dissipation load fault	Overload [8]	1, 2, 3		4.0		4.0		4.0	W
	Short circuit			2.0		2.0		2.0	
Switching frequency [4]	$I_{OUT} = I_{MAX}$	4, 5, 6	500	600	500	600	500	600	KHz
Output response to step transient load changes [4, 9]	I_{OUT} = 50% ⇔ 100% I_{MAX}	4, 5, 6	-400	+400	-400	+400	-400	+400	mV pk
	I_{OUT} = 0 ⇔ 50% I_{MAX}		-800	+800	-800	+800	-800	+800	
Recovery time, step transient load changes [4, 9, 10]	I_{OUT} = 50% ⇔ 100% I_{MAX}	4, 5, 6		100		100		100	µS
	I_{OUT} = 0 ⇔ 50% I_{MAX}			2000		2000		2000	
Output response transient step line changes [4, 7, 11]	V_{IN} = 16 ⇔ 40 V dc, $I_{OUT} = I_{MAX}$	4, 5, 6	-750	+750	- 750	+750	-750	+750	mV pk
Recovery time transient step line changes [4, 7, 10, 11]	V_{IN} = 16 ⇔ 40 V dc, $I_{OUT} = I_{MAX}$	4, 5, 6		1200		1200		1200	µS
Turn on overshoot [4]	I_{OUT} = 0 and I_{MAX}	4, 5, 6		600		600		600	mV pk
Turn on delay [4, 12]	I_{OUT} = 0 and I_{MAX}	4, 5, 6		25		25		25	ms
Load fault recovery [7]		4, 5, 6		25		25		25	ms

Notes
1. Parameter guaranteed by line, load, and cross regulation tests.
2. Up to 80 percent of full power is available from either output provided the total output does not exceed 5 W.
3. Bandwidth of DC to 20 MHz is guaranteed by design. Tested for 20 KHz to 2 MHz.
4. Load current split equally between $+V_{OUT}$ and $-V_{OUT}$.
5. 1.0 watt load on output under test, 1.0 to 4.0 watt load change on other output.
6. 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.
7. Parameter shall be tested as part of design characterization and after design or process changes. Thereafter, parameters shall be guaranteed to the limits specified.
8. An overload is a condition with a load in excess of rated but less than that necessary to trigger the short circuit protection and is the condition of maximum power dissipation.
9. Load step transition time between 2 and 10 microseconds.
10. 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.
11. Input step transition time between 2 and 10 microseconds.
12. Turn-on delay time measurements is for either a step application of power at the input or the removal of ground connection from enable pin (pin 5) with power applied to the input.

ASA2800D Block Diagram



ASA2800D Case Outline



ASA2800D Pin Designation

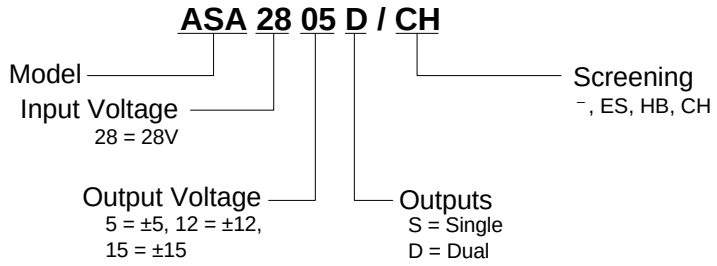
Pin No.	Designation
1	Positive Output
2	Output Return
3	Negative Output
4	N/C
5	Enable
6	Positive Input
7	Input Return
8	Case

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 Military Drawing (SMD) Cross Reference

Lambda Advanced Analog Part No.	Standard Military Drawing No.
ASA2812D/CH	5962-95648
ASA2815D/CH	5962-94649

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.

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LAMBDA ADVANCED ANALOG INC.

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