

HI-REL DESIGN

- SURFACE MOUNT MAGNETICS
- WELDED HERMETIC PACKAGE
- LOW INTERNAL TEMPERATURE GRADIENTS
- ALL CERAMIC CAPACITORS
- WITHSTANDS 5000G

OTHER FEATURES—SINGLE OUTPUT

- NO DERATING — -55° C to +125° C
- OUTPUT VOLTAGE ADJUSTMENT STANDARD
- REMOTE SHUTDOWN

DESCRIPTION

The DB2800S series of DC-DC converters provides the ruggedness, reliability and features required to meet the advanced design challenges of today's hi-rel market. This has been accomplished using a new package pioneered by Apex having very low thermal gradients, excellent hermeticity and high voltage isolation. The use of advanced substrate and reflow soldering techniques during construction results in a rugged, cost-effective pin solderable package.

The DB2800S hybrid converter series utilizes all ceramic capacitors and surface mount magnetics to provide reliable operation at all operating temperatures while surviving very high G forces.

DB2800S series standard features include kelvin sense, indefinite short circuit protection, remote shutdown, output fault monitoring, turn on voltage point adjustment, switching frequency synchronization of up to 3 units using no external components and pi-network input filtering. An output voltage adjustment/load compensation pin is also standard, however a DB2800S series converter may be ordered without this feature (/F option)

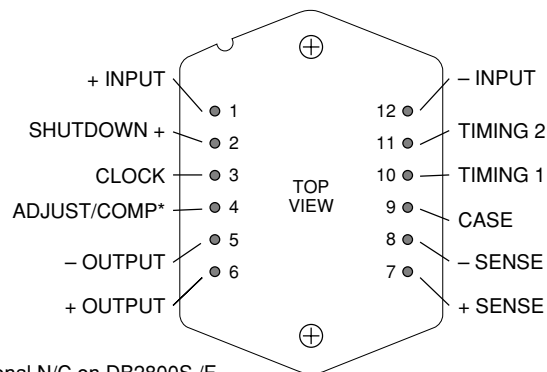
Fault tolerant design protects these converters from most external circuit faults. The output and output adjust pins will withstand +35V while the shutdown and all synchronization pins will withstand +50V protecting the converters from a variety of system or board faults, i.e. solder bridges, etc. Unique load fault protection circuitry allows this converter to pull up loads having difficult static load line characteristics and allows short term load excursions significantly beyond ratings in most applications.

The DB2800 series is a current mode push-pull topology converter which operates at a switching frequency of 500kHz. Internal filtering of both input and output eliminates the need for external capacitors in many applications.

The 12-pin MO-127 High Profile Power Dip™ package (see Package Outlines) allows connection to a heatsink and is hermetically sealed and isolated from the internal circuits. Please see the package outlines dimension section for dimensions and recommended mounting torque. The use of compressible isolation washers may void the warranty.

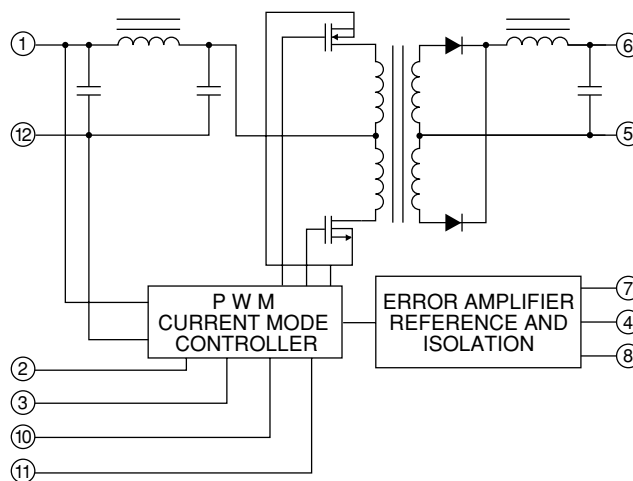


EXTERNAL CONNECTIONS



* Optional N/C on DB2800S /F

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

INPUT VOLTAGE RANGE (Pin 12 to 1, 2, 3, 10 or 11)	0 - 50 Vdc
INPUT TRANSIENT (Pin 12 to 1)	80 V @ 50 ms
OUTPUT WITHSTAND (Pin 5 and 8 to 7, 6 or 4)	35 Vdc
OUTPUT CURRENT (Continuous)	5.5 Adc DB2803S 4 Adc DB2805S 1.9 Adc DB2812S 1.5 Adc DB2815S
TEMPERATURE, Storage	-65°C, 150°C
TEMPERATURE, Pin Soldering 10s	300°C

SPECIFICATIONS

PARAMETER	TEST CONDITIONS ¹	DB2803S			UNITS
		MIN	TYP	MAX	
STEADY STATE CHARACTERISTICS					
INPUT VOLTAGE RANGE		16	28	40	Vdc
OUTPUT VOLTAGE	$V_{IN}; \text{min} \leftrightarrow \text{max Vdc} @ I_{MIN}$	3.2	3.3	3.4	Vdc
OUTPUT CURRENT	$V_{IN}; \text{min} \leftrightarrow \text{max Vdc}$	500		5500	mAdc
EFFICIENCY			66		%
OUTPUT RIPPLE VOLTAGE	Bandwidth 10 kHz \leftrightarrow 1MHz		20	50	mVrms
INPUT RIPPLE CURRENT	Bandwidth 10 kHz \leftrightarrow 1MHz		20	50	mA rms
OUTPUT POWER ²		1.6		18.0	W
LINE REGULATION ³	$V_{IN}; \text{min} \leftrightarrow \text{max}^3$		2	20	mVdc
LOAD REGULATION ³	$I_{OUT}; \text{min} \leftrightarrow \text{max}^3$		1	15	mVdc
TEMPERATURE COEFFICIENT			.01		%/°C
TEMPERATURE RANGE, case ²		-55		125	°C
QUIESCENT CURRENT	$I_{OUT} = 0 \text{ A}$		35	40	mAdc
INHIBITED	$V_{PINS}; < 8 \text{ Vdc}$.09	1.25	2.5	mAdc
ISOLATION CHARACTERISTICS (INPUT/OUTPUT/CASE)					
LEAKAGE RESISTANCE	$(V_{TEST} = 500\text{Vdc})$	100			MΩ
LEAKAGE CAPACITANCE	$(f = 10\text{kHz})$		50		pF
DYNAMIC CHARACTERISTICS					
LINE STEP RESPONSE	$V_{IN}; T_R, T_F = 10\mu\text{s}$				
VOLTAGE CHANGE	$V_{IN}; 16 \leftrightarrow 40 \text{ Vdc}$		300		mV
RECOVERY TIME (95%)			30		μs
WITH 100μF OUTPUT CAP					
VOLTAGE CHANGE	$V_{IN}; 16 \leftrightarrow 40 \text{ Vdc}$		100		mV
RECOVERY TIME (95%)			100		μs
LOAD STEP RESPONSE	$I_{OUT}; T_R, T_F = 10\mu\text{s}$				
VOLTAGE CHANGE	$I_{OUT}; 50\% \leftrightarrow \text{max Adc}$		1400		mV
RECOVERY TIME (95%)			40		μs
WITH 100μF OUTPUT CAP					
VOLTAGE CHANGE	$I_{OUT}; 50\% \leftrightarrow \text{max Adc}$		300		mV
RECOVERY TIME (95%)			60		μs
START-UP OVERSHOOT	$V_{IN}; 0 \rightarrow 40 \text{ Vdc}$		0		mV
SHUTDOWN DELAY	$V_{PINS}; > 10 \text{ Vdc} \rightarrow < 8 \text{ Vdc}$		220	500	μs
SHUTDOWN RECOVERY ⁴	$V_{PINS}; < 8 \text{ Vdc} \rightarrow > 10 \text{ Vdc}$		30	60	mS

- NOTES: 1. Unless otherwise stated: $T_C = 25^\circ$, $V_{IN} = 28\text{V}$, $I_{OUT} = I_{MAX \text{ AMPS}}$
 2. Derate power linearly to zero from 125°C to 135°C.
 3. Regulation measured between pin 8 and pin 7.
 4. Recovery spec assumes that converter has been OFF for at least 500ms.

CAUTION

The internal substrate contains beryllia (BeO). Do not break the seal. If accidentally broken, do not crush, machine, or subject to temperatures in excess of 850°C to avoid generating toxic fumes.



DB2805S			DB2812S			DB2815S			UNITS
MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
16	28	40	16	28	40	16	28	40	Vdc
5.00	5.05	5.1	12.00	12.05	12.1	15.0	15.1	15.2	Vdc
400		4000	190		1900	150		1500	mAdc
	70			72			73		%
	20	50		25	50		25	50	mVrms
	20	30		20	30		20	30	mArms
2		20	2.3		23	2.2		22	W
	5	50		5	50		10	50	mVdc
	2	25		5	50		20	50	mVdc
	.01			.01			.01		%/°C
-55		125	-55		125	-55		125	°C
	35	40		35	40		35	40	mAdc
.09	1.25	2.5	.09	1.25	2.5	.9	1.25	2.5	mAdc
100			100			100			MΩ
	50			80			85		pF
	400			300			300		mV
	30			40			40		μs
	200			150			150		mV
	250			250			250		μs
	1400			800			800		mV
	40			60			60		μs
	500			280			280		mV
	150			400			400		μs
	0			0			0		mV
	220	500		220	500		220	500	μs
	30	60		30	60		30	60	ms

PACKAGE THERMAL SPECIFICATIONS

	MIN	TYP	MAX	UNITS
RESISTANCE, case to air		12		°C/W
TEMPERATURE RISE, junction to case		10	15	°C

