

## HIGH RELIABILITY HYBRID DC-DC CONVERTERS

### DESCRIPTION

The DVFL series of high reliability DC-DC converters is operable over the full military (-55 °C to +125 °C) temperature range with no power derating. Unique to the DVFL series is a magnetic feedback circuit that is radiation immune. Operating at a nominal fixed frequency of 500 kHz, these regulated, isolated units utilize well-controlled undervoltage lockout circuitry to eliminate slow start-up problems. The current sharing function allows a maximum of five units to be connected in parallel to boost the total output power to 5 times. The output voltage is trimmable up to +10% or down -20%.

These converters are designed and manufactured in a facility qualified to ISO9001 and certified to MIL-PRF-38534 and MIL-STD-883.

This product may incorporate one or more of the following U.S. patents:

5,784,266  
5,790,389  
5,963,438  
5,999,433  
6,005,780  
6,084,792  
6,118,673

### FEATURES

- High Reliability
- Parallel Up to 5 Units With Current Sharing
- Output Voltage Trim Up +10% or Down -20%
- Wide Input Voltage Range: 16 to 40 Volts per MIL-STD-704
- Up to 120 Watts Output Power
- Radiation Immune Magnetic Feedback Circuit
- NO Use of Optoisolators
- Undervoltage Lockout
- Indefinite Short Circuit Protection
- Current Limit Protection
- Industry Standard Pinout
- Input Transient Voltage: 50 Volts for 1 second
- Radiation Hardened Version Available
- Precision Seam Welded Hermetic Package
- High Power Density: > 80 W/in<sup>3</sup>
- Custom Versions Available
- Additional Environmental Screening Available
- Meets MIL-STD-461C and MIL-STD-461D EMC Requirements When Used With a DVME28 EMI Filter
- MIL-PRF-38534 Element Evaluated Components

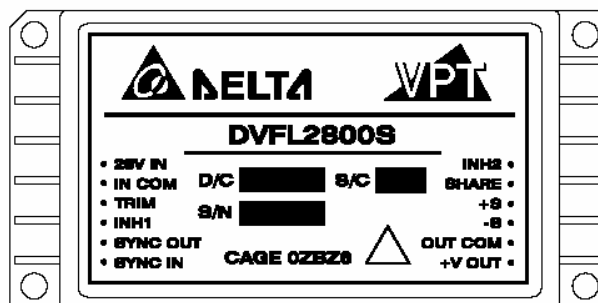


Figure 1 – DVFL2800S DC-DC Converter  
(Not To Scale)

SPECIFICATIONS ( $T_{CASE} = -55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $V_{IN} = +28\text{V} \pm 5\%$ , Full Load, Unless Otherwise Specified)

## ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	40 $V_{DC}$	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	50 Volts	Storage Temperature	-65°C to +150°C
Output Power <sup>1</sup>	120 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, $T_{CASE} = +125^{\circ}\text{C}$ )	41 Watts	Weight (Maximum) (No Pin Extensions)	86 Grams

Parameter	Conditions	DVFL283R3S			DVFL2805S			Units
		Min	Typ	Max	Min	Typ	Max	
<b>STATIC</b>								
INPUT Voltage <sup>4</sup>	Continuous	16	28	40	16	28	40	V
	Transient, 1 sec	-	-	50	-	-	50	V
Current	Inhibited 1	-	-	6	-	-	6	mA
	Inhibited 2	-	-	70	-	-	70	mA
	No Load	-	-	120	-	-	120	mA
Ripple Current	Full Load, 20Hz to 10MHz	-	-	80	-	-	80	mA <sub>p-p</sub>
INH1 Pin Input <sup>4</sup>		0	-	1.5	0	-	1.5	V
INH2 Pin Input <sup>4</sup>		0	-	1.0	0	-	1.0	V
INH1 Pin Open Circuit Voltage <sup>4</sup>		10.5	-	13.5	10.5	-	13.5	V
INH2 Pin Open Circuit Voltage <sup>4</sup>		5.0	-	8.0	5.0	-	8.0	V
UVLO Turn On		14.5	-	16.0	14.5	-	16.0	V
UVLO Turn Off <sup>4</sup>		14.0	-	15.5	14.0	-	15.5	V
OUTPUT Voltage	$V_{OUT}$ $T_{CASE} = 25^{\circ}\text{C}$	3.267	3.30	3.333	4.95	5.00	5.05	V
	$V_{OUT}$ $T_{CASE} = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	3.25	3.30	3.35	4.925	5.00	5.075	V
Power		0	-	66	0	-	100	W
Current	$V_{OUT}$	-	-	20	-	-	20	A
Ripple Voltage	$V_{OUT}$ Full Load, 20Hz to 10MHz	-	-	80	-	-	80	mV <sub>p-p</sub>
Line Regulation	$V_{OUT}$ $V_{IN} = 16\text{V}$ to $40\text{V}$	-	-	20	-	-	20	mV
Load Regulation	$V_{OUT}$ No Load to Full Load	-	-	80	-	-	100	mV
Voltage Trim <sup>4</sup>	$V_{OUT}$ Full Load	-10	-	10	-20	-	10	%
Share Pin Voltage <sup>4</sup>		2.0	-	3.0	2.0	-	3.0	V
EFFICIENCY		68	-	-	72	-	-	%
LOAD FAULT POWER DISSIPATION	Overload <sup>4</sup>	-	-	80	-	-	80	W
	Short Circuit	-	-	80	-	-	80	W
CAPACITIVE LOAD <sup>4</sup>		-	-	1000	-	-	1000	$\mu\text{F}$
SWITCHING FREQUENCY		425	500	600	425	500	600	kHz
SYNC FREQUENCY RANGE	$V_H - V_L = 5\text{V}$ Duty Cycle = 20% - 80%	500	-	600	500	-	600	kHz
ISOLATION	500 $V_{DC}$	100	-	-	100	-	-	M $\Omega$
MTBF (MIL-HDBK-217F)	AIF @ $T_C = 55^{\circ}\text{C}$	-	400	-	-	400	-	kHrs

- Notes: 1. Dependant on output voltage. 2. Time for output voltage to settle within 1% of its nominal value.  
3. Derate linearly to 0 at 135°C. 4. Verified by qualification testing.

SPECIFICATIONS ( $T_{CASE} = -55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $V_{IN} = +28\text{V} \pm 5\%$ , Full Load, Unless Otherwise Specified)

### ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	40 $V_{DC}$	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	50 Volts	Storage Temperature	-65°C to +150°C
Output Power <sup>1</sup>	120 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, $T_{CASE} = +125^{\circ}\text{C}$ )	41 Watts	Weight (Maximum) (No Pin Extensions)	86 Grams

Parameter	Conditions	DVFL283R3S			DVFL2805S			Units	
		Min	Typ	Max	Min	Typ	Max		
<b>DYNAMIC</b>									
Load Step Output Transient	$V_{OUT}$	Half Load to Full Load	-	-	400	-	-	400	mV <sub>PK</sub>
Load Step Recovery <sup>2</sup>			-	-	500	-	-	500	μSec
Line Step Output Transient <sup>4</sup>	$V_{OUT}$	$V_{IN} = 16\text{V}$ to $40\text{V}$	-	300	600	-	300	600	mV <sub>PK</sub>
Line Step Recovery <sup>2,4</sup>			-	300	500	-	300	500	μSec
Turn On Delay	$V_{OUT}$	$V_{IN} = 0\text{V}$ to $28\text{V}$	-	-	20	-	-	20	mSec
Turn On Overshoot			-	-	15	-	-	25	mV <sub>PK</sub>

- Notes:
1. Dependant on output voltage.
  2. Time for output voltage to settle within 1% of its nominal value.
  3. Derate linearly to 0 at 135°C.
  4. Verified by qualification testing.

SPECIFICATIONS ( $T_{CASE} = -55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $V_{IN} = +28\text{V} \pm 5\%$ , Full Load, Unless Otherwise Specified)

## ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	40 $V_{DC}$	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	50 Volts	Storage Temperature	-65°C to +150°C
Output Power <sup>1</sup>	120 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, $T_{CASE} = +125^{\circ}\text{C}$ )	41 Watts	Weight (Maximum) (No Pin Extensions)	86 Grams

Parameter	Conditions	DVFL2812S			DVFL2815S			Units
		Min	Typ	Max	Min	Typ	Max	
<b>STATIC</b>								
INPUT Voltage <sup>4</sup>	Continuous	16	28	40	16	28	40	V
	Transient, 1 sec	-	-	50	-	-	50	V
Current	Inhibited 1	-	-	6	-	-	6	mA
	Inhibited 2	-	-	70	-	-	70	mA
	No Load	-	-	120	-	-	120	mA
Ripple Current	Full Load, 20Hz to 10MHz	-	-	80	-	-	80	mA <sub>p-p</sub>
INH1 Pin Input <sup>4</sup>		0	-	1.5	0	-	1.5	V
INH2 Pin Input <sup>4</sup>		0	-	1.0	0	-	1.0	V
INH1 Pin Open Circuit Voltage <sup>4</sup>		10.5	-	13.5	10.5	-	13.5	V
INH2 Pin Open Circuit Voltage <sup>4</sup>		5.0	-	8.0	5.0	-	8.0	V
UVLO Turn On		14.5	-	16.0	14.5	-	16.0	V
UVLO Turn Off <sup>4</sup>		14.0	-	15.5	14.0	-	15.5	V
OUTPUT Voltage	$V_{OUT}$ $T_{CASE} = 25^{\circ}\text{C}$	11.88	12.00	12.12	14.85	15.00	15.15	V
	$V_{OUT}$ $T_{CASE} = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	11.82	12.00	12.18	14.775	15.00	15.225	V
Power		-	-	110	-	-	120	W
Current	$V_{OUT}$	-	-	9.2	-	-	8.0	A
Ripple Voltage	$V_{OUT}$ Full Load, 20Hz to 10MHz	-	-	80	-	-	80	mV <sub>p-p</sub>
Line Regulation	$V_{OUT}$ $V_{IN} = 16\text{V}$ to $40\text{V}$	-	-	20	-	-	20	mV
Load Regulation	$V_{OUT}$ No Load to Full Load	-	-	120	-	-	120	mV
Voltage Trim <sup>4</sup>	$V_{OUT}$ Full Load	-20	-	10	-20	-	10	%
Share Pin Voltage <sup>4</sup>		2.0	-	3.0	2.0	-	3.0	V
EFFICIENCY		79	-	-	80	-	-	%
LOAD FAULT POWER DISSIPATION	Overload <sup>4</sup>	-	-	80	-	-	80	W
	Short Circuit	-	-	80	-	-	80	W
CAPACITIVE LOAD <sup>4</sup>		-	-	500	-	-	500	$\mu\text{F}$
SWITCHING FREQUENCY		425	500	600	425	500	600	kHz
SYNC FREQUENCY RANGE	$V_H - V_L = 5\text{V}$ Duty Cycle = 20% - 80%	500	-	600	500	-	600	kHz
ISOLATION	500 $V_{DC}$	100	-	-	100	-	-	M $\Omega$
MTBF (MIL-HDBK-217F)	AIF @ $T_C = 55^{\circ}\text{C}$	-	400	-	-	400	-	kHrs

- Notes: 1. Dependant on output voltage. 2. Time for output voltage to settle within 1% of its nominal value.  
3. Derate linearly to 0 at 135°C. 4. Verified by qualification testing.

SPECIFICATIONS ( $T_{CASE} = -55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $V_{IN} = +28\text{V} \pm 5\%$ , Full Load, Unless Otherwise Specified)

### ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	40 $V_{DC}$	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	50 Volts	Storage Temperature	-65°C to +150°C
Output Power <sup>1</sup>	120 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, $T_{CASE} = +125^{\circ}\text{C}$ )	41 Watts	Weight (Maximum) (No Pin Extensions)	86 Grams

Parameter	Conditions	DVFL2812S			DVFL2815S			Units	
		Min	Typ	Max	Min	Typ	Max		
<b>DYNAMIC</b>									
Load Step Output Transient	$V_{OUT}$	Half Load to Full Load	-	-	800	-	-	800	mV <sub>PK</sub>
Load Step Recovery <sup>2</sup>			-	-	500	-	-	500	μSec
Line Step Output Transient <sup>4</sup>	$V_{OUT}$	$V_{IN} = 16\text{V}$ to $40\text{V}$	-	600	1200	-	600	1200	mV <sub>PK</sub>
Line Step Recovery <sup>2,4</sup>			-	300	500	-	300	500	μSec
Turn On Delay	$V_{OUT}$	$V_{IN} = 0\text{V}$ to $28\text{V}$	-	-	20	-	-	20	mSec
Turn On Overshoot			-	-	50	-	-	50	mV <sub>PK</sub>

- Notes:
1. Dependant on output voltage.
  2. Time for output voltage to settle within 1% of its nominal value.
  3. Derate linearly to 0 at 135°C.
  4. Verified by qualification testing.

SPECIFICATIONS ( $T_{CASE} = -55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $V_{IN} = +28\text{V} \pm 5\%$ , Full Load, Unless Otherwise Specified)

## ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	40 $V_{DC}$	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	50 Volts	Storage Temperature	-65°C to +150°C
Output Power <sup>1</sup>	120 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, $T_{CASE} = +125^{\circ}\text{C}$ )	41 Watts	Weight (Maximum) (No Pin Extensions)	86 Grams

Parameter	Conditions	DVFL285R2S			Units
		Min	Typ	Max	
<b>STATIC</b>					
INPUT Voltage <sup>4</sup>	Continuous	16	28	40	V
	Transient, 1 sec	-	-	50	V
Current	Inhibited 1	-	-	6	mA
	Inhibited 2	-	-	70	mA
	No Load	-	-	120	mA
Ripple Current	Full Load, 20Hz to 10MHz	-	-	80	$\text{mA}_{p-p}$
INH1 Pin Input <sup>4</sup>		0	-	1.5	V
INH2 Pin Input <sup>4</sup>		0	-	1.0	V
INH1 Pin Open Circuit Voltage <sup>4</sup>		10.5	-	13.5	V
INH2 Pin Open Circuit Voltage <sup>4</sup>		5.0	-	8.0	V
UVLO Turn On		14.5	-	16.0	V
UVLO Turn Off <sup>4</sup>		14.0	-	15.5	V
OUTPUT Voltage	$V_{OUT}$ $T_{CASE} = 25^{\circ}\text{C}$	5.148	5.20	5.252	V
	$V_{OUT}$ $T_{CASE} = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	5.122	5.20	5.278	V
Power		-	-	100	W
Current	$V_{OUT}$	-	-	19.2	A
Ripple Voltage	$V_{OUT}$ Full Load, 20Hz to 10MHz	-	-	80	$\text{mV}_{p-p}$
Line Regulation	$V_{OUT}$ $V_{IN} = 16\text{V}$ to $40\text{V}$	-	-	20	mV
Load Regulation	$V_{OUT}$ No Load to Full Load	-	-	100	mV
Voltage Trim <sup>4</sup>	$V_{OUT}$ Full Load	-20	-	10	%
Share Pin Voltage <sup>4</sup>		2.0	-	3.0	V
EFFICIENCY		72	-	-	%
LOAD FAULT POWER DISSIPATION	Overload <sup>4</sup>	-	-	80	W
	Short Circuit	-	-	80	W
CAPACITIVE LOAD <sup>4</sup>		-	-	1000	$\mu\text{F}$
SWITCHING FREQUENCY		425	500	600	kHz
SYNC FREQUENCY RANGE	$V_H - V_L = 5\text{V}$ Duty Cycle = 20% - 80%	500	-	600	kHz
ISOLATION	500 $V_{DC}$	100	-	-	$\text{M}\Omega$
MTBF (MIL-HDBK-217F)	AIF @ $T_C = 55^{\circ}\text{C}$	-	400	-	kHrs

- Notes: 1. Dependant on output voltage. 2. Time for output voltage to settle within 1% of its nominal value.  
3. Derate linearly to 0 at 135°C. 4. Verified by qualification testing.

SPECIFICATIONS ( $T_{CASE} = -55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $V_{IN} = +28\text{V} \pm 5\%$ , Full Load, Unless Otherwise Specified)

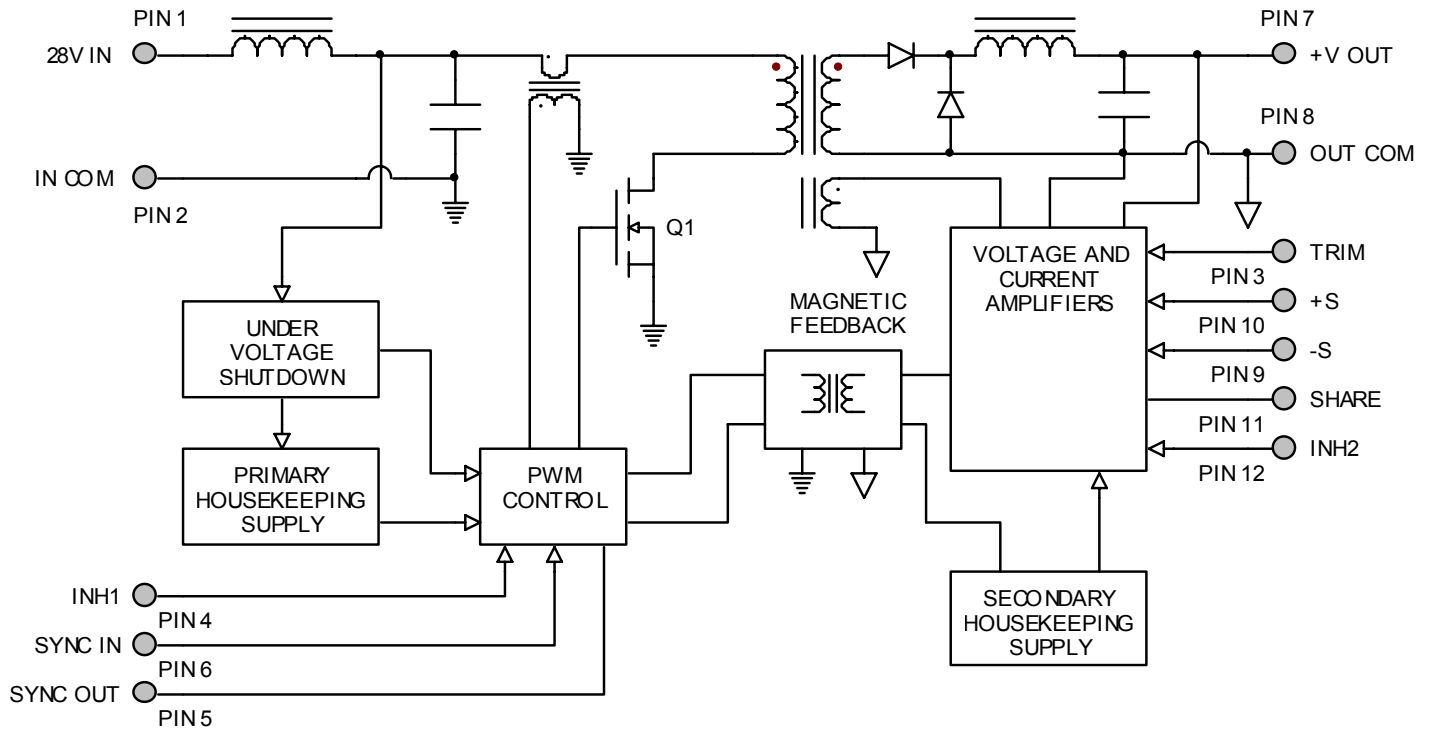
### ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	40 $V_{DC}$	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	50 Volts	Storage Temperature	-65°C to +150°C
Output Power <sup>1</sup>	120 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, $T_{CASE} = +125^{\circ}\text{C}$ )	41 Watts	Weight (Maximum) (No Pin Extensions)	86 Grams

Parameter	Conditions	DVFL285R2S			Units	
		Min	Typ	Max		
<b>DYNAMIC</b>						
Load Step Output Transient	$V_{OUT}$	Half Load to Full Load	-	-	400	$\text{mV}_{PK}$
Load Step Recovery <sup>2</sup>			-	-	500	$\mu\text{Sec}$
Line Step Output Transient <sup>4</sup>	$V_{OUT}$	$V_{IN} = 16\text{V}$ to $40\text{V}$	-	300	600	$\text{mV}_{PK}$
Line Step Recovery <sup>2,4</sup>			-	300	500	$\mu\text{Sec}$
Turn On Delay	$V_{OUT}$	$V_{IN} = 0\text{V}$ to $28\text{V}$	-	-	20	$\text{mSec}$
Turn On Overshoot			-	-	25	$\text{mV}_{PK}$

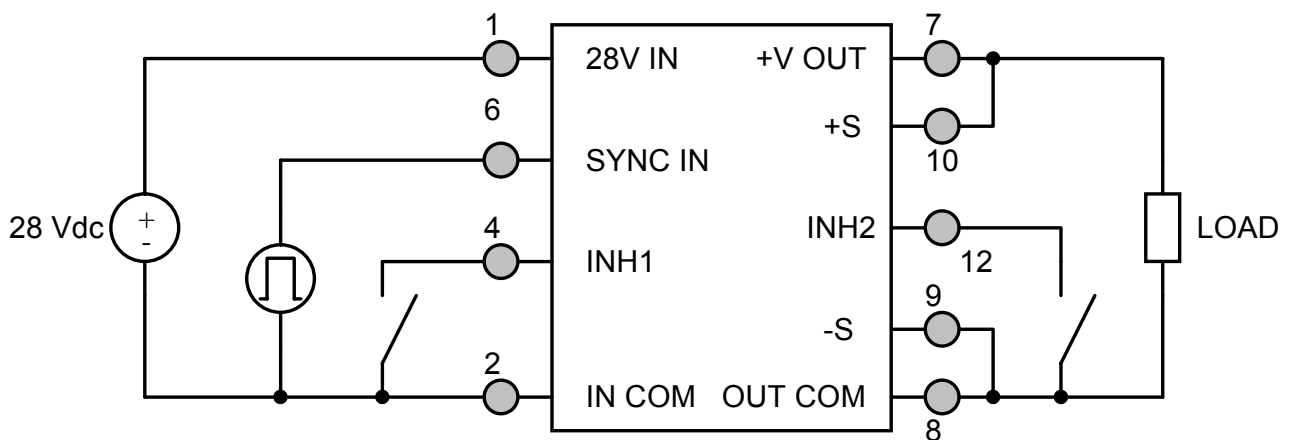
- Notes:
1. Dependant on output voltage.
  2. Time for output voltage to settle within 1% of its nominal value.
  3. Derate linearly to 0 at  $135^{\circ}\text{C}$ .
  4. Verified by qualification testing.

**BLOCK DIAGRAM**



**Figure 2**

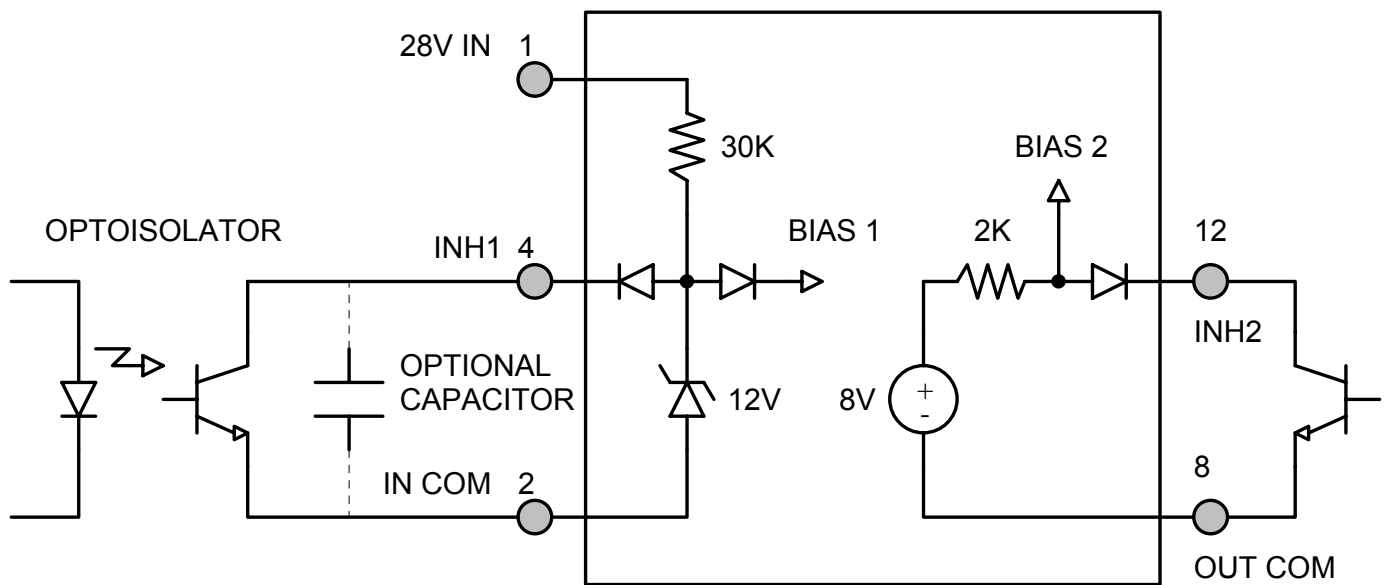
**CONNECTION DIAGRAM**



**Figure 3**

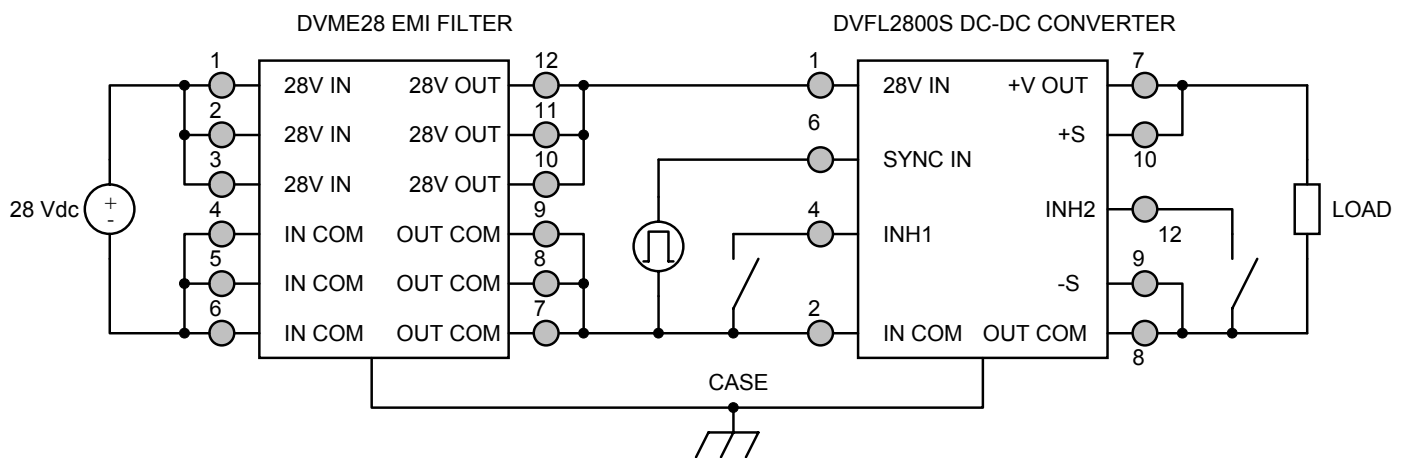


**INHIBIT DRIVE CONNECTION DIAGRAM**



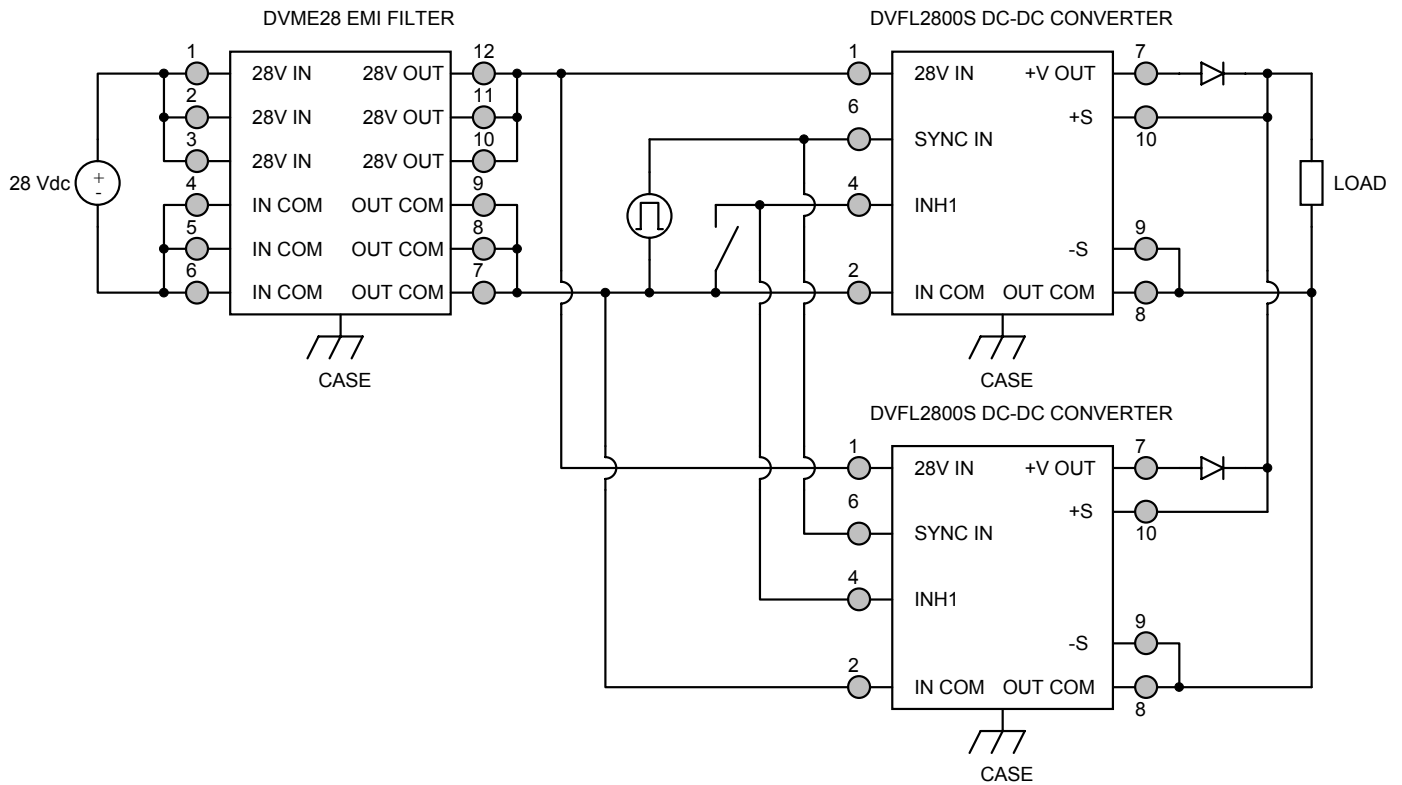
**Figure 4 – Isolated Inhibit Drive and Internal Equivalent Circuit**  
(Shown with optional capacitor for turn-on delay)

**EMI FILTER HOOKUP DIAGRAM**



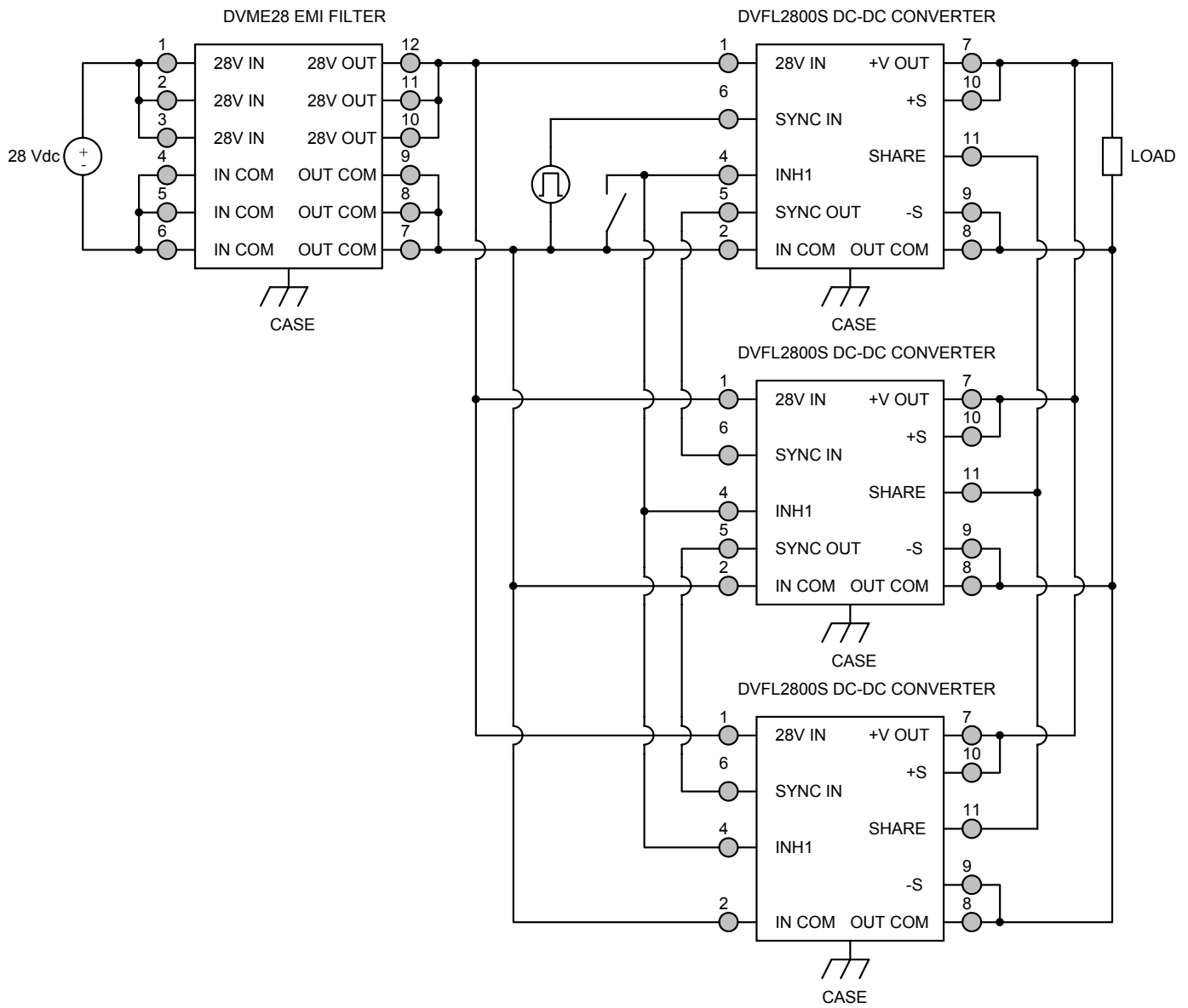
**Figure 5 – Converter with EMI Filter**

## PARALLEL CONNECTION DIAGRAMS



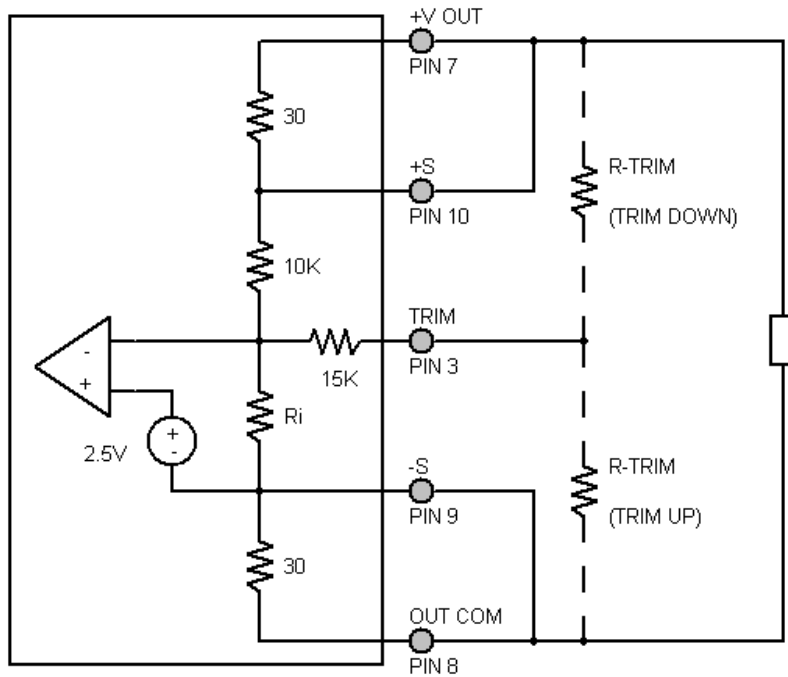
**Figure 6** – Parallel Connection without Current Sharing

## PARALLEL CONNECTION DIAGRAMS



**Figure 7** – Current Sharing Parallel Connection for Multiple Converters

## OUTPUT VOLTAGE TRIM



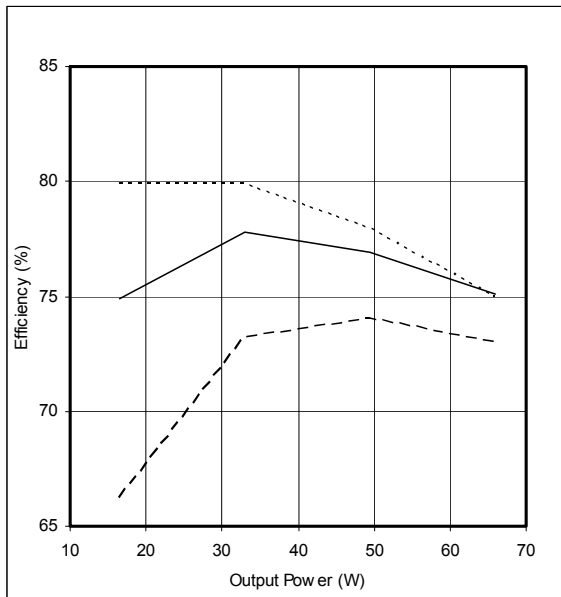
The output voltage can be trimmed down by connecting a resistor between the TRIM pin (PIN 3) and the +V OUT pin (PIN 7), or can be trimmed up by connecting a resistor between the TRIM pin (PIN 3) and the OUT COM pin (PIN 8). The maximum trim range is +10% up and -20% down. The appropriate resistor values versus the output voltage are given in the trim table below.

Figure 8 – Output Voltage Trim

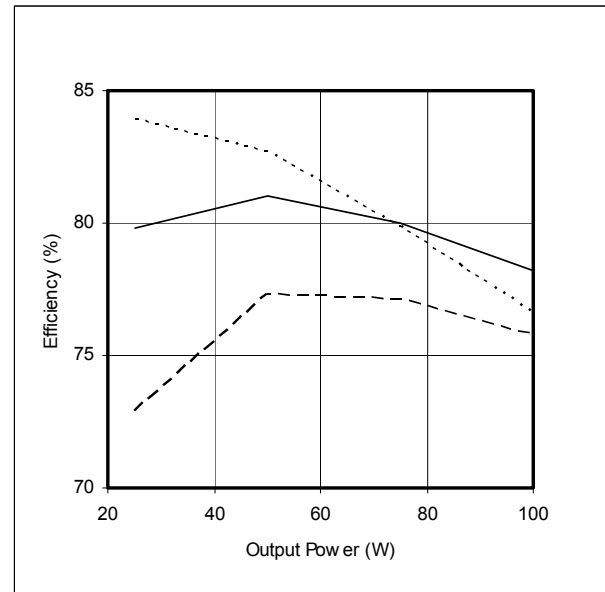
DVFL283R3S		DVFL2805S		DVFL285R2S		DVFL2812S		DVFL2815S	
+V <sub>OUT</sub> (V)	R <sub>TRIM</sub> (Ω)	+V <sub>OUT</sub> (V)	R <sub>TRIM</sub> (Ω)	+V <sub>OUT</sub> (V)	R <sub>TRIM</sub> (Ω)	+V <sub>OUT</sub> (V)	R <sub>TRIM</sub> (Ω)	+V <sub>OUT</sub> (V)	R <sub>TRIM</sub> (Ω)
3.60	68.3k	5.5	35k	5.7	35k	13.2	5.8k	16.50	1.7k
3.55	85k	5.4	47.5k	5.6	47.5k	13.0	10k	16.25	5k
3.50	110k	5.3	68.3k	5.5	68.3k	12.8	16.2k	16.00	10k
3.45	151.7k	5.2	110k	5.4	110k	12.6	26.6k	15.75	18.3k
3.40	235k	5.1	235k	5.3	235k	12.4	47.3k	15.50	35k
3.35	485k	5.0	-	5.2	-	12.2	109k	15.25	85k
3.30	-	4.9	225k	5.1	245k	12.0	-	15.00	-
3.25	135k	4.8	100k	5.0	110k	11.8	454k	14.75	475k
3.20	55k	4.7	58.3k	4.9	65k	11.6	213k	14.50	225k
3.15	28.3k	4.6	37.5k	4.8	42.5k	11.4	134k	14.25	142k
3.10	15k	4.5	25k	4.7	29k	11.2	94k	14.00	100k
3.05	7k	4.4	16.7k	4.6	20k	11.0	70.1k	13.75	75k
3.00	1.7k	4.3	10.7k	4.5	13.6k	10.8	54.3k	13.50	58.3k
		4.2	6.3k	4.4	8.8k	10.6	42.9k	13.25	46.4k
		4.1	2.8k	4.3	5k	10.4	34.4k	13.00	37.5k
		4.0	0	4.2	2k	10.2	27.8k	12.75	30.6k
						10.0	22.5k	12.50	25k
						9.8	18.2k	12.25	20.5k
						9.6	14.6k	12.00	16.7k

EFFICIENCY PERFORMANCE CURVES ( $T_{CASE} = 25^{\circ}C$ , Full Load, Unless Otherwise Specified)

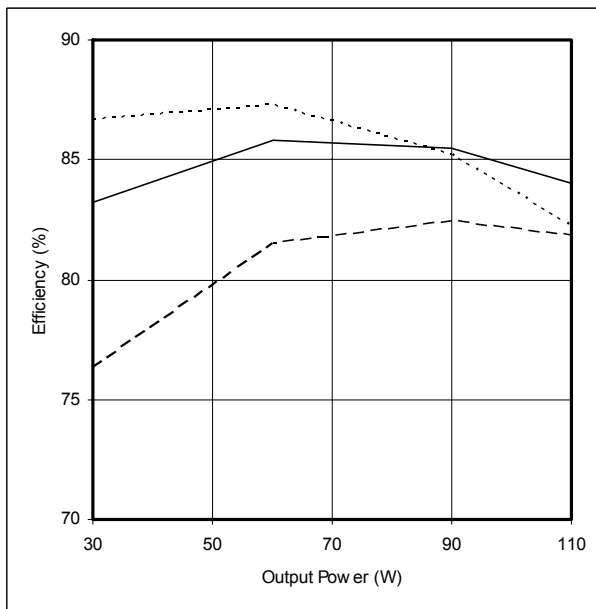
-----  $V_{IN} = 16V$       ———  $V_{IN} = 28V$       - - - - -  $V_{IN} = 40V$



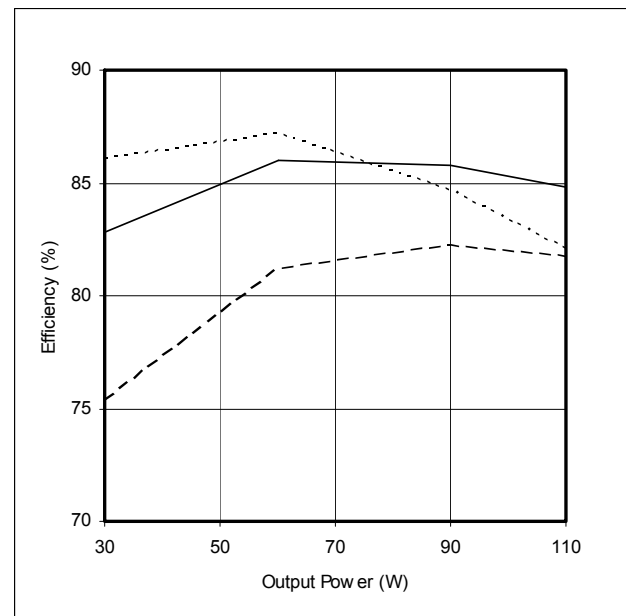
**Figure 9 – DVFL283R3S**  
Efficiency (%) vs. Output Power (W)



**Figure 10 – DVFL2805S / DVFL285R2S**  
Efficiency (%) vs. Output Power (W)



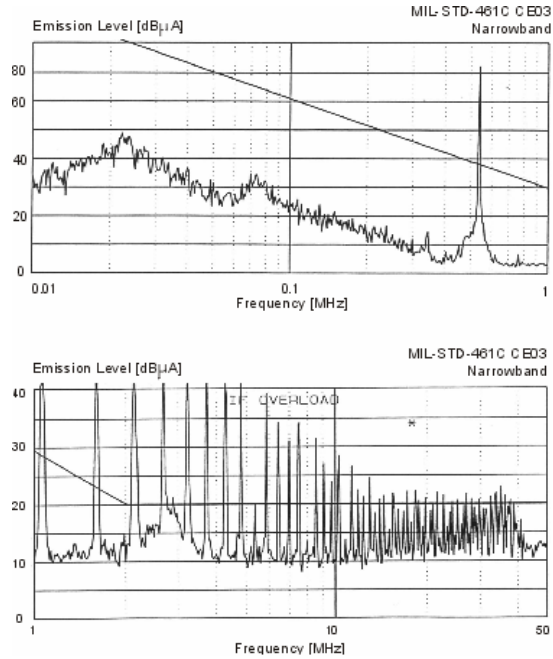
**Figure 11 – DVFL2812S**  
Efficiency (%) vs. Output Power (W)



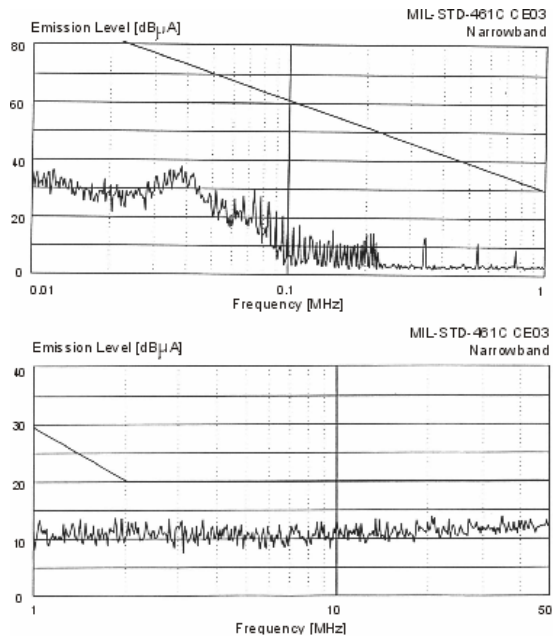
**Figure 12 – DVFL2815S**  
Efficiency (%) vs. Output Power (W)

**EMI PERFORMANCE CURVES**

( $T_{CASE} = 25^{\circ}C$ ,  $V_{IN} = +28V \pm 5\%$ , Full Load, Unless Otherwise Specified)

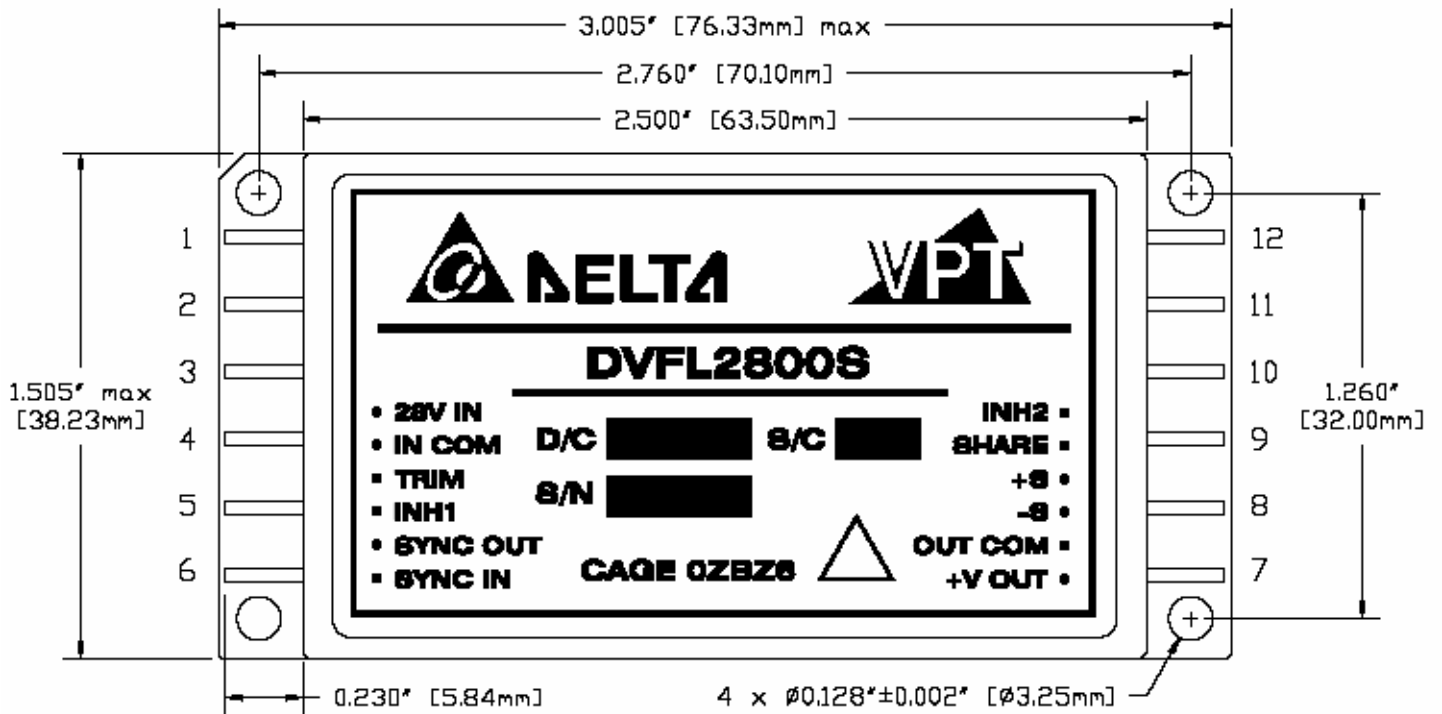


**Figure 13 – DVFL2800S without EMI Filter**

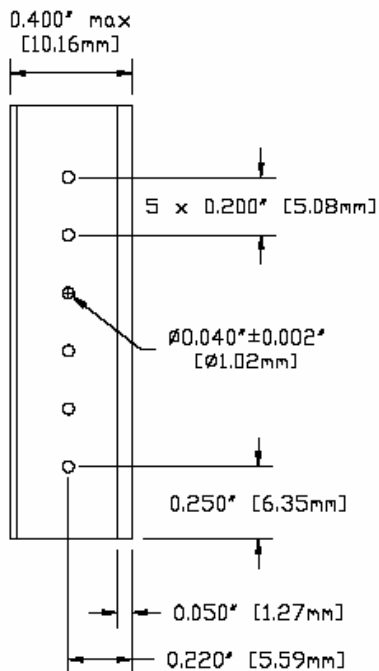


**Figure 14 – DVFL2800S with EMI Filter**

## PACKAGE SPECIFICATIONS



TOP VIEW

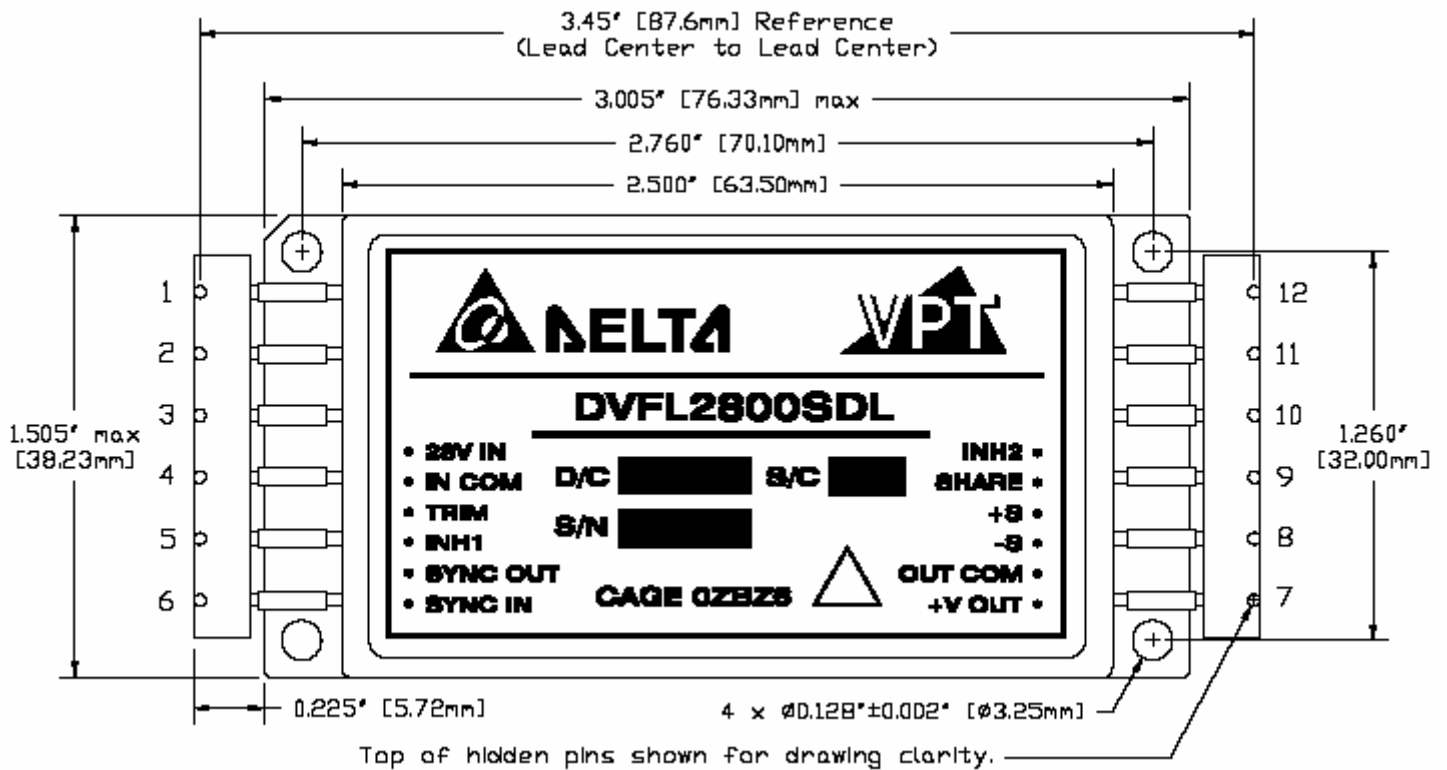


SIDE VIEW

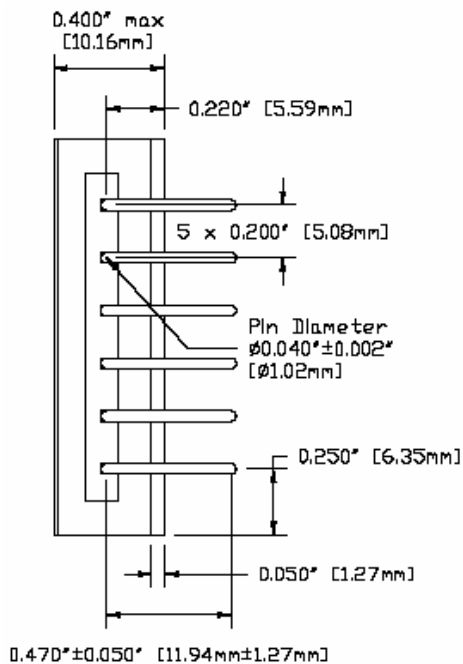
PIN	FUNCTION
1	28V IN
2	IN COM
3	TRIM
4	INH1
5	SYNC OUT
6	SYNC IN
7	+V OUT
8	OUT COM
9	-S
10	+S
11	SHARE
12	INH2

**Figure 15 – Package and Pinout**  
 (Pin Length is  $\pm 0.01$ ", Other Dimensional Limits are  $\pm 0.005$ " Unless Otherwise Stated)

## PACKAGE SPECIFICATIONS (DOWN-LEADED)



### TOP VIEW



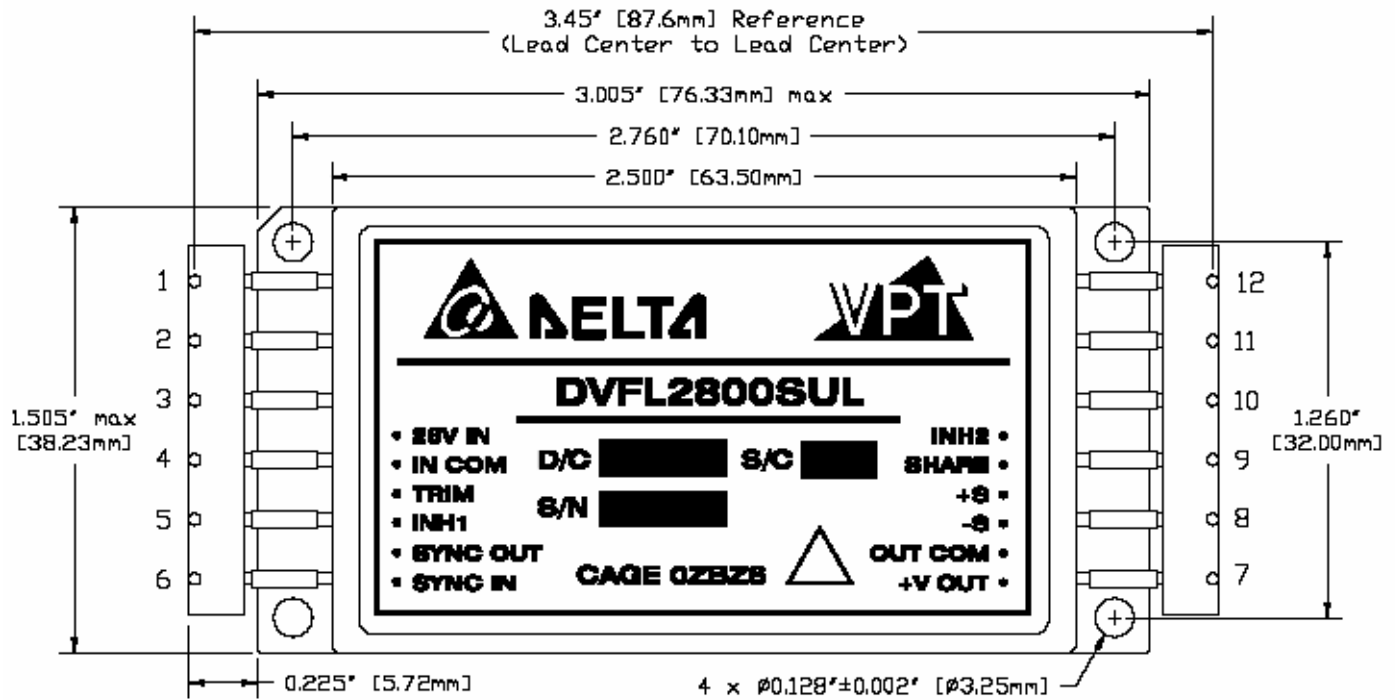
### SIDE VIEW

PIN	FUNCTION
1	28V IN
2	IN COM
3	TRIM
4	INH1
5	SYNC OUT
6	SYNC IN
7	+V OUT
8	OUT COM
9	-S
10	+S
11	SHARE
12	INH2

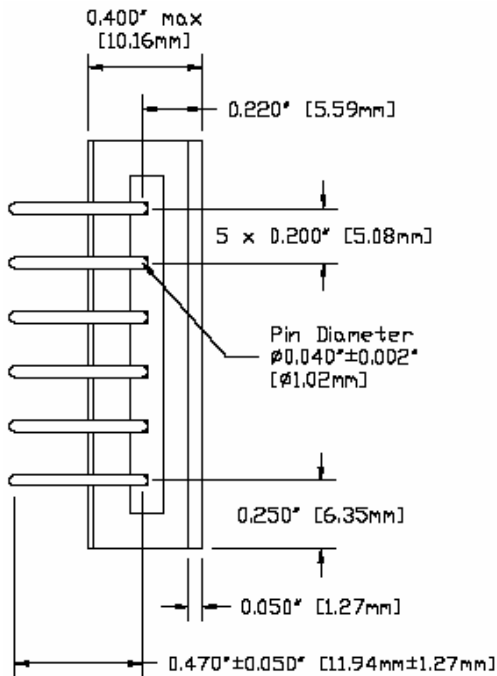
**Figure 16** – Package and Pinout (With Down-Leaded Pin Extensions Added)  
(Pin Length is  $\pm 0.01$ ", Other Dimensional Limits are  $\pm 0.005$ " Unless Otherwise Stated)



## PACKAGE SPECIFICATIONS (UP-LEADED)



TOP VIEW



SIDE VIEW

PIN	FUNCTION
1	28V IN
2	IN COM
3	TRIM
4	INH1
5	SYNC OUT
6	SYNC IN
7	+V OUT
8	OUT COM
9	-S
10	+S
11	SHARE
12	INH2

**Figure 17** – Package and Pinout (With Up-Leaded Pin Extensions Added)  
(Pin Length is  $\pm 0.01$ ", Other Dimensional Limits are  $\pm 0.005$ " Unless Otherwise Stated)

## PACKAGE PIN DESCRIPTION

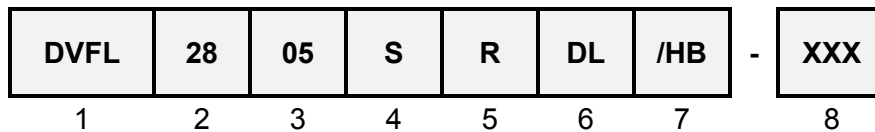
Pin	Function	Description
1	28V IN	Positive Input Voltage Connection
2	IN COM	Input Common Connection
3	TRIM	Trim Output Voltage to +10%, -20% of Nominal Value
4	INH1	Logic Low = Disabled Output. Connecting the inhibit(1) pin to input common causes converter shutdown. Logic High = Enabled Output. Unconnected or open collector TTL.
5	SYNC OUT	Output Synchronization Signal
6	SYNC IN	Input Synchronization Signal
7	+V OUT	Positive Output Voltage Connection
8	OUT COM	Output Common Connection
9	-S	Return Sense
10	+S	Positive Sense
11	SHARE	Current Share
12	INH2	Logic Low = Disabled Output. Connecting the inhibit(2) pin to output common causes converter shutdown. Logic High = Enabled Output. Unconnected or open collector TTL.

## ENVIRONMENTAL SCREENING (100% Tested Per MIL-STD-883 as referenced to MIL-PRF-38534)

Screening	MIL-STD-883	Standard (No Suffix)	Extended /ES	HB /HB	Class H /H	Class K /K
Non-Destructive Bond Pull	Method 2023	•	•	•	•	•
Internal Visual	Method 2017, 2032 Internal Procedure	•	•	•	•	•
Temperature Cycling	Method 1010, Condition C Method 1010, -55°C to 125°C		•	•	•	•
Constant Acceleration	Method 2001, 3000g, Y1 Direction Method 2001, 500g, Y1 Direction		•	•	•	•
PIND	Method 2020, Condition A <sup>2</sup>					•
Pre Burn-In Electrical	100% at 25°C					•
Burn-In	Method 1015, 320 hours at +125°C Method 1015, 160 hours at +125°C 96 hours at +125°C 24 hours at +125°C	•	•	•	•	•
Final Electrical	MIL-PRF-38534, Group A <sup>1</sup> 100% at 25°C	•	•	•	•	•
Hermeticity	Method 1014, Fine Leak, Condition A Method 1014, Gross Leak, Condition C Dip (1 x 10 <sup>-3</sup> )	•	•	•	•	•
Radiography	Method 2012 <sup>3</sup>					•
External Visual	Method 2009	•	•	•	•	•

- Notes:
1. 100% R&R testing at -55°C, +25°C, and +125°C with all test data included in product shipment.
  2. PIND test Certificate of Compliance included in product shipment.
  3. Radiographic test Certificate of Compliance and film(s) included in product shipment.

## ORDERING INFORMATION



(1)	(2)		(3)		(4)	
Product Series	Nominal Input Voltage		Output Voltage		Number of Outputs	
<b>DVFL</b>	<b>28</b>	28 Volts	<b>3R3</b> <b>05</b> <b>5R2</b> <b>12</b> <b>15</b>	3.3 Volts 5 Volts 5.2 Volts 12 Volts 15 Volts	<b>S</b>	Single

(5)		(6)		(7)		(8)
Rad-Hard Option <sup>2</sup>		Package Option		Screening Code <sup>1,3</sup>		Additional Screening Code
<b>None</b> <b>R</b>	Standard 100 kRad	<b>None</b> <b>DL</b> <b>UL</b>	Standard Down-Lead Up-Lead	<b>None</b> <b>/ES</b> <b>/HB</b> <b>/H</b> <b>/K</b>	Standard Extended HB Class H Class K	Contact Sales

- Notes:
1. Contact the VPT Inc. Sales Department for availability of Class H (/H) or Class K (/K) qualified products.
  2. VPT Inc. is not currently qualified to a DSCC certified radiation hardness assurance program.
  3. VPT Inc. reserves the right to ship higher screened or SMD products to meet lower screened orders at our sole discretion unless specifically forbidden by customer contract.

Please contact your sales representative or the VPT Inc. Sales Department for more information concerning additional environmental screening and testing, different input voltage, output voltage, power requirement, source inspection, and/or special element evaluation for space or other higher quality applications.

## SMD (STANDARD MICROCIRCUIT DRAWING) NUMBERS

Standard Microcircuit Drawing (SMD)	DVFL2800S Series Similar Part Number
*T.B.D.	DVFL283R3S/H
*T.B.D.	DVFL2805S/H
*T.B.D.	DVFL285R2S/H
*T.B.D.	DVFL2812S/H
*T.B.D.	DVFL2815S/H

Do not use the DVFL2800S Series similar part number for SMD product acquisition. It is listed for reference only. For exact specifications for the SMD product, refer to the SMD drawing. SMD's can be downloaded from the DSCC website at <http://www.dscclia.mil/programs/smcr/>. The SMD number listed above is for MIL-PRF-38534 Class H screening, standard gold plated lead finish, and no RHA (Radiation Hardness Assurance) level. Please reference the SMD for other screening levels, lead finishes, and radiation levels.

## CONTACT INFORMATION

To request a quotation or place orders please contact your sales representative or the VPT Inc. Sales Department at:

**Phone:** (425) 353-3010  
**Fax:** (425) 353-4030  
**E-mail:** [vptsales@vpt-inc.com](mailto:vptsales@vpt-inc.com)

All information contained in this datasheet is believed to be accurate, however, no responsibility is assumed for possible errors or omissions. The products or specifications contained herein are subject to change without notice.