



# DVSA2800S Series

VPT Inc.  
2801 Commerce Street  
Blacksburg, VA 24060  
Sales Info: (425) 337-2482 FAX: (603) 297-1160  
WEB: <http://www.vptinc.com>  
E-mail: [mbosmann@worldnet.att.net](mailto:mbosmann@worldnet.att.net)

## Description

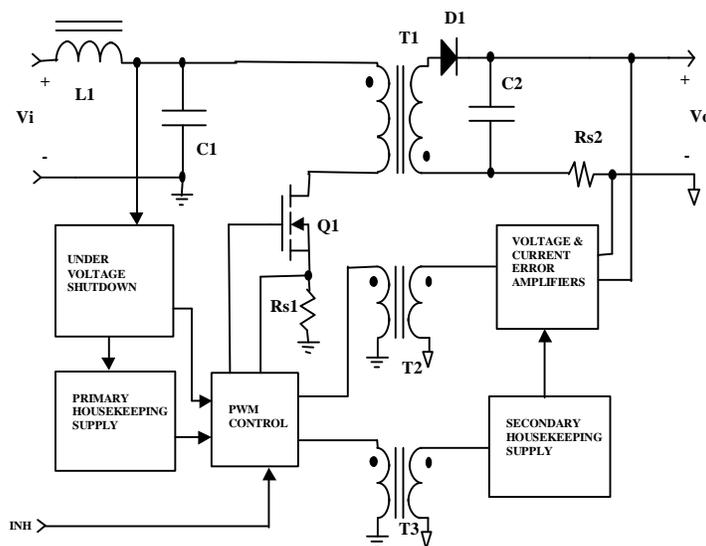
The DVSA series of hybrid DC to DC converters is able to operate at the full military (-55 °C to +125 °C) temperature range with no power derating. Unique to the DVSA series is a PATENTED magnetic feedback circuit that is fault tolerant and radiation immune. Operating at a nominal fixed frequency of 450kHz the regulated, isolated units utilize well controlled undervoltage lock out circuitry to eliminate slow startup problems.

## Features

- Very low output noise
- High Reliability
- Wide input voltage range : 15 to 50 Volts / MIL-STD-704
- Up to 6 Watts output power
- Patented, fault tolerant feedback circuit
- NO optoisolator
- Undervoltage Lockout
- Standard Pinout
- High input transient voltage : 80 Volts for 1 Sec MIL-STD-704A
- Radiation hardened version available
- Precision projection welded hermetic package
- High power density, >19 W/in<sup>3</sup>
- Custom Versions Available
- Environmental Screening Available
- Meets MIL-STD-461C and MIL-STD-461D EMC requirements when used with a DVMA28 EMI filter

## Block Diagram

DVSA2800S BLOCK DIAGRAM



**Specifications**

<b>Absolute Maximum Ratings</b>	
Input Voltage (Continuous)	50 Vdc
Input Voltage (Transient)	80 V (1sec)
Output Power <sup>1</sup>	6 Watts
Power Dissipation, Full Load, T <sub>CASE</sub> = +125°C	2.5 Watts
Junction Temperature rise to case	+10°C
Storage Temperature	-65°C to +150°C
Lead Solder Temperature for 10 seconds	270°C
Weight	15 grams

Tcase = -55°C to +125°C, Vin = +28V ±5%, Full Load unless otherwise specified

Parameter	Conditions -55°C ≤ TC ≤ 125°C, VIN = 28 VDC ±5%, Full Load Unless otherwise specified	DVSA283R3S			DVSA2805S			DVSA2812S			Units	
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
<b>Static</b>												
<b>INPUT</b>												
Voltage		15	28	50	15	28	50	15	28	50	V	
Current <sup>3</sup>	Inhibited No Load		3.5 40	5 60		3.5 40	5 60		3.5 40	5 60	mA mA	
Ripple Current	Full Load, 20Hz to 10MHz		15	30		15	30		15	30	mAp-p	
Inhibit Pin Input		0		1.5	0		1.5	0		1.5	V	
Inhibit Pin Open Circuit Voltage		9.0	11.0	13.0	9.0	11.0	13.0	9.0	11.0	13.0	V	
UVLO Turn On		11.5		15.0	11.5		15.0	11.5		15.0	V	
UVLO Turn Off		11.0		14.5	11.0		14.5	11.0		14.5	V	
<b>OUTPUT</b>												
Voltage	V <sub>OUT</sub>	Tcase = 25°C	3.27	3.30	3.33	4.95	5.00	5.05	11.88	12.0	12.12	V
	V <sub>OUT</sub>	-55°C ≤ Tcase ≤ +125°C	3.20	3.30	3.40	4.85	5.00	5.15	11.64	12.0	12.36	V
Power			0		4	0		5	0		6	W
Current	V <sub>OUT</sub>		0		1.21	0		1.0	0		0.50	A
Ripple Voltage	V <sub>OUT</sub>	Full Load, 20Hz to 10MHz		10	30		10	30		15	40	mV <sub>p-p</sub>
Line Regulation	V <sub>OUT</sub>	Vin = 15V to 50V		10	20		10	20		10	20	mV
Load Regulation	V <sub>OUT</sub>	No Load to Full Load		20	40		20	40		20	40	mV
EFFICIENCY			64	68		68	72		73	77		%
LOAD FAULT POWER DISSIPATION	Overload Short Circuit			3.0 2.5			3.0 2.5			3.0 2.5		W W
CAPACITIVE LOAD				1000			1000			500		μF
SWITCHING FREQUENCY			400	450	525	400	450	525	400	450	525	kHz
ISOLATION	500Vdc		100			100			100			MΩ
THERMAL RESISTANCE	Case to Ambient (θCA)			28			28			28		°C/W
MTBF	MIL-HDBK-217F, AIF @ Tc = 55°C			457			457			457		kHrs
<b>Dynamic</b>												
LOAD STEP		Half Load to Full Load										
Output Transient Recovery <sup>2</sup>	V <sub>OUT</sub>		200	400		200	400		300	500		mV <sub>PK</sub> μSec
LINE STEP		V <sub>IN</sub> = 15V to 50V										
Output Transient Recovery <sup>2</sup>	V <sub>OUT</sub>		200	400		200	400		300	500		mV <sub>PK</sub> μSec
TURN ON		V <sub>IN</sub> = 0V to 28V										
Delay	V <sub>OUT</sub>		10	15		10	15		10	15		mSec
Overshoot <sup>2</sup>	V <sub>OUT</sub>		0	33		0	50		0	120		mV <sub>PK</sub>

**NOTES:**

- Dependent on output voltage.
- Time for output voltage to settle within 1% of its nominal value
- Derate linearly to 0 at 135°C.

**Specifications**

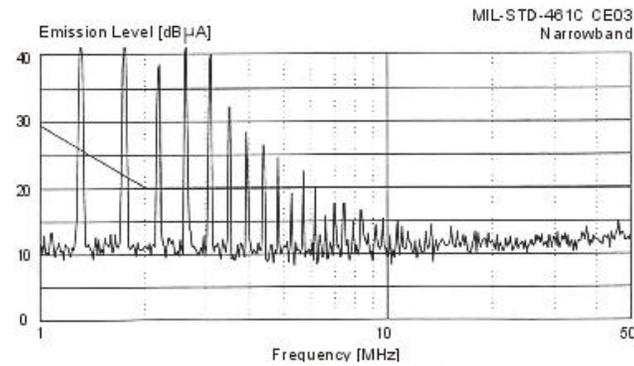
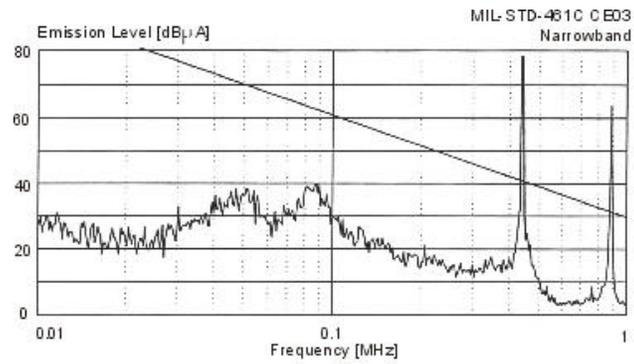
<b>Absolute Maximum Ratings</b>	
Input Voltage (Continuous)	50 Vdc
Input Voltage (Transient)	80 V (1sec)
Output Power <sup>1</sup>	6 Watts
Power Dissipation, Full, TCASE = +125°C	2.5 Watts
Junction Temperature rise to case	+10°C
Storage Temperature	-65°C to +150°C
Lead Solder Temperature for 10 seconds	270°C
Weight	15 grams

Tcase = -55°C to +125°C, Vin = +28V ±5%, Full Load unless otherwise specified

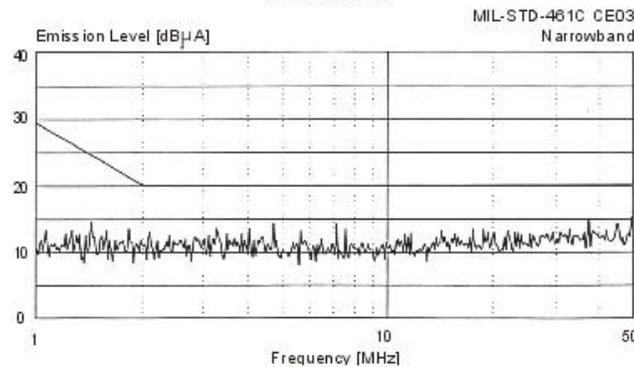
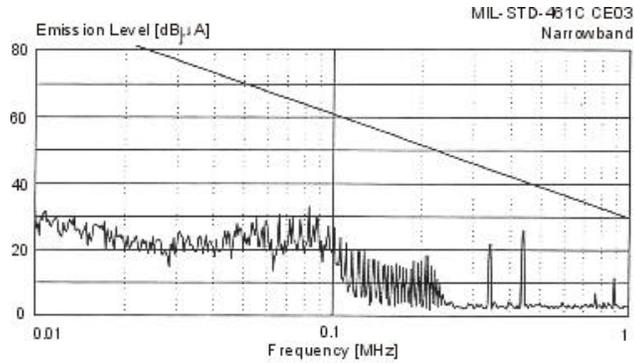
Parameter	Conditions -55°C ≤ TC ≤ 125°C, VIN = 28 VDC ±5%, Full Load Unless otherwise specified	DVSA2815S			Units	
		Min	Typ	Max		
<b>Static</b>						
<b>INPUT</b>						
Voltage		15	28	50	V	
Current <sup>3</sup>	Inhibited		3.5	5	mA	
	No Load		40	60	mA	
Ripple Current	Full Load, 20Hz to 10MHz		15	30	mA <sub>P-P</sub>	
Inhibit Pin Input		0		1.5	V	
Inhibit Pin Open Circuit Voltage		9.0	11.0	13.0	V	
UVLO Turn On		11.5		15.0	V	
UVLO Turn Off		11.0		14.5	V	
<b>OUTPUT</b>						
Voltage	V <sub>OUT</sub>	Tcase = 25°C	14.85	15.00	15.15	V
	V <sub>OUT</sub>	-55°C ≤ Tcase ≤ +125°C	14.55	15.00	15.45	V
Power			0		6	W
Current	V <sub>OUT</sub>		0		0.4	A
Ripple Voltage	V <sub>OUT</sub>	Full Load, 20Hz to 10MHz		15	40	mV <sub>P-P</sub>
Line Regulation	V <sub>OUT</sub>	Vin = 15V to 50V		10	20	mV
Load Regulation	V <sub>OUT</sub>	No Load to Full Load		20	40	mV
<b>EFFICIENCY</b>			74	78		%
<b>LOAD FAULT POWER DISSIPATION</b>	Overload				3.0	W
	Short Circuit				2.5	W
<b>CAPACITIVE LOAD</b>					500	μF
<b>SWITCHING FREQUENCY</b>			400	450	525	kHz
<b>ISOLATION</b>			100			MΩ
<b>THERMAL RESISTANCE</b>	Case to Ambient (θCA)			28		°C/W
<b>MTBF</b>	MIL-HDBK-217F, A1F @ Tc = 55°C			457		kHrs
<b>Dynamic</b>						
<b>LOAD STEP</b>		Half Load to Full Load				
Output Transient	V <sub>OUT</sub>			300	500	mV <sub>PK</sub>
Recovery <sup>2</sup>				200	400	μSec
<b>LINE STEP</b>		V <sub>IN</sub> = 15V to 50V				
Output Transient	V <sub>OUT</sub>			300	500	mV <sub>PK</sub>
Recovery <sup>2</sup>				200	400	μSec
<b>TURN ON</b>		V <sub>IN</sub> = 0V to 28V				
Delay	V <sub>OUT</sub>			10	15	mSec
Overshoot <sup>2</sup>				0	150	mV <sub>PK</sub>

**NOTES:**

1. Dependent on output voltage.
2. Time for output voltage to settle within 1% of its nominal value.
3. Derate linearly to 0 at 135°C.



DVSA2800S Without EMI filter  
Figure 1



DVSA2800S With EMI filter  
Figure 2

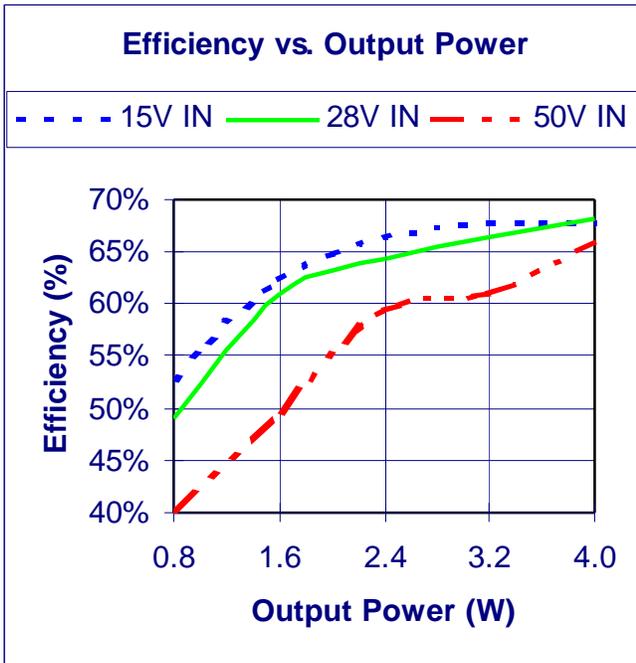


Figure 3  
EFFICIENCY vs. LOAD DVSA283R3S

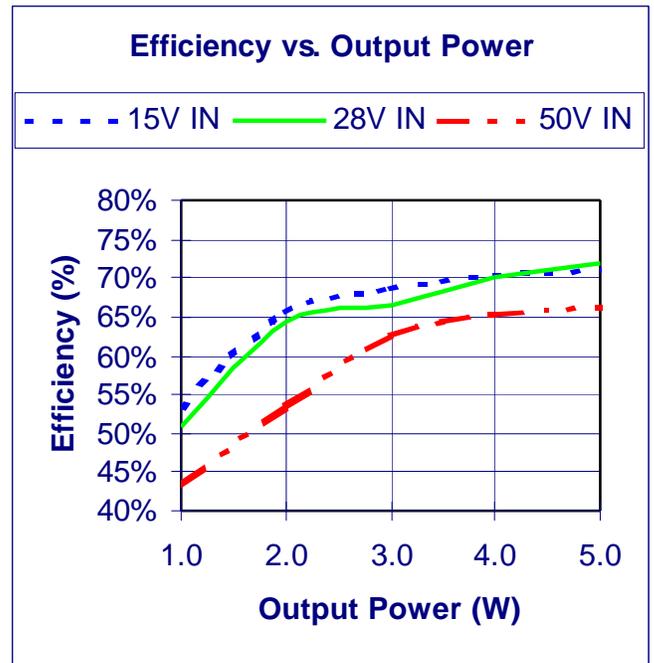
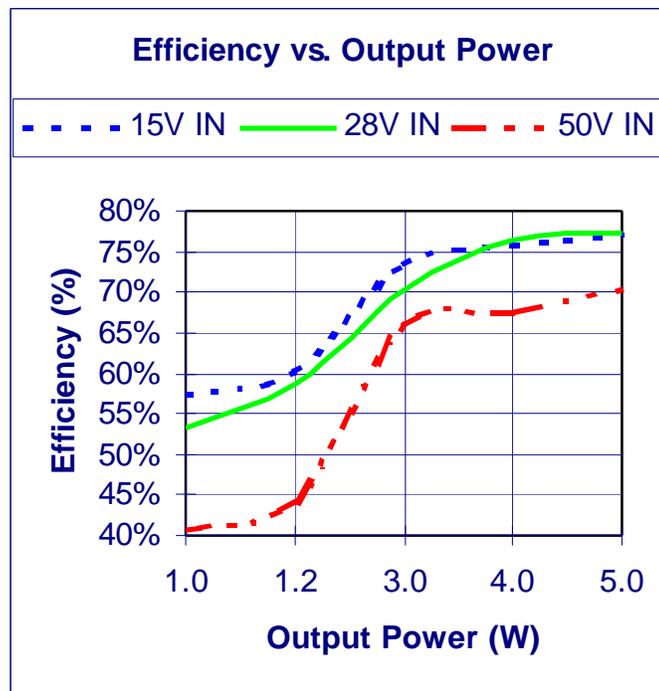
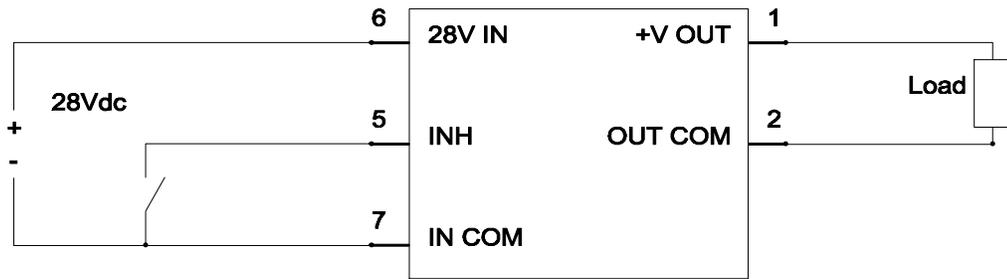


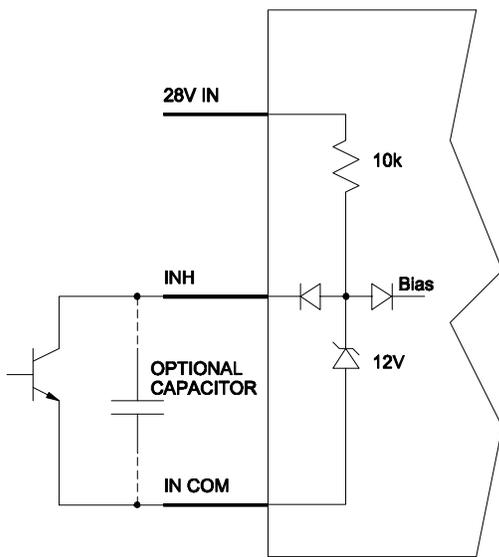
Figure 4  
EFFICIENCY vs. LOAD DVSA2805S



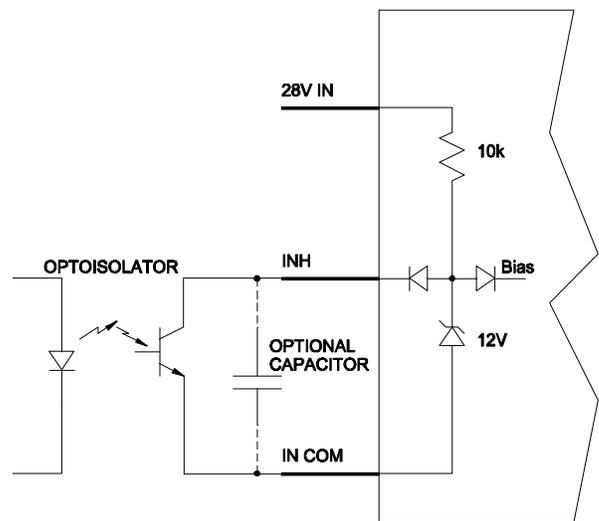
EFFICIENCY vs. LOAD DVSA2812S  
Figure 5



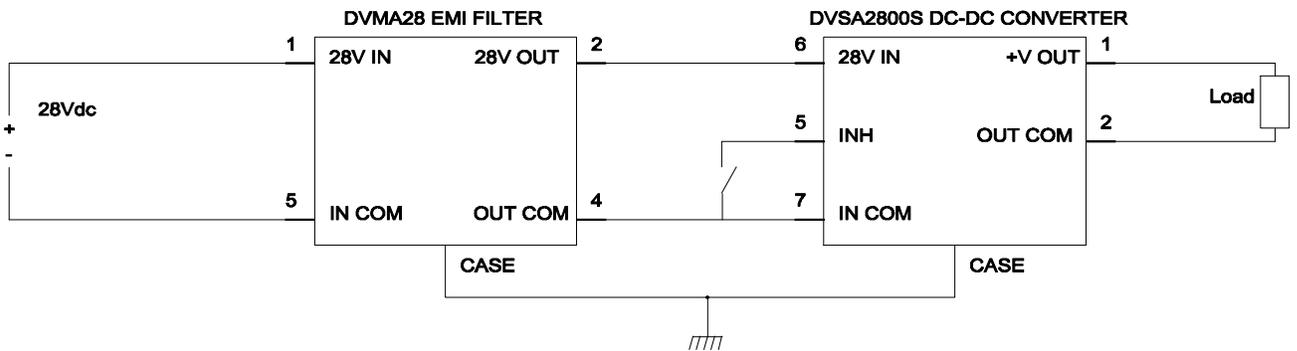
Connection Diagram  
Figure 6



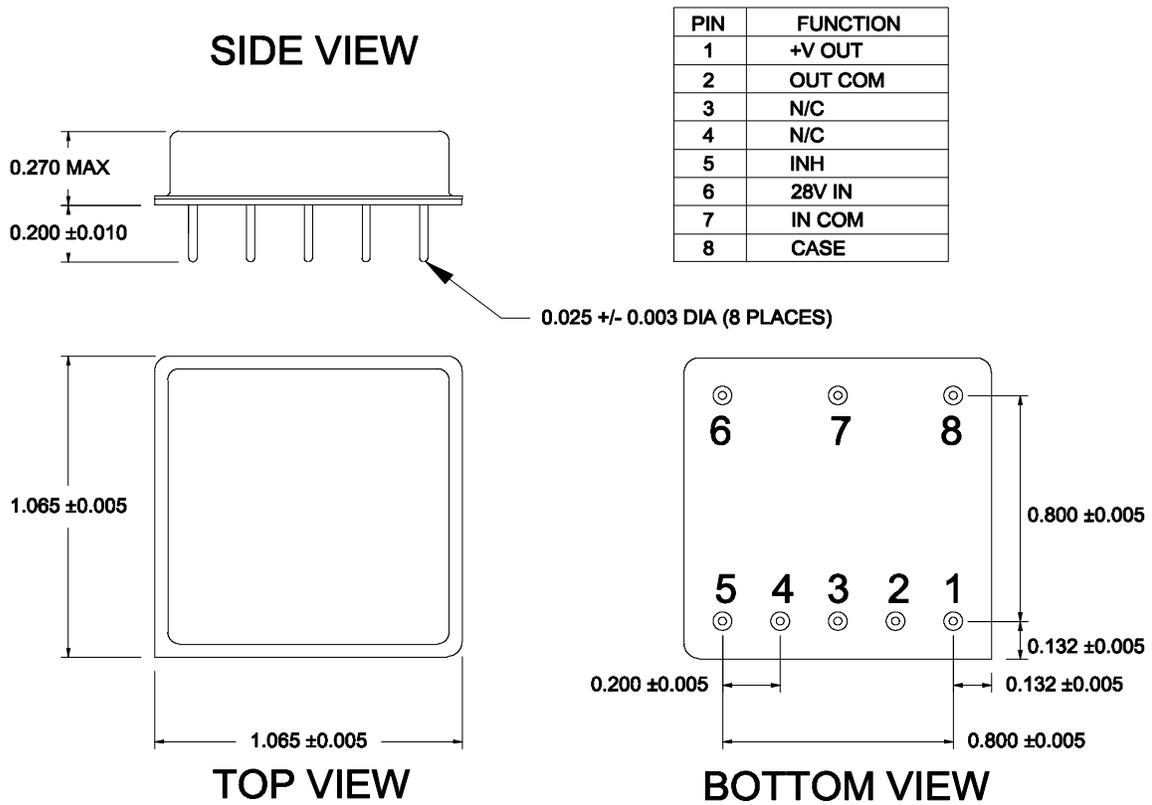
Internal Inhibit Circuit and Recommended Drive  
(Shown with optional capacitor for turn on delay)  
Figure 7



Isolated Inhibit Drive  
(Shown with optional capacitor for turn on delay)  
Figure 8



Converter with EMI Filter Hookup Diagram  
Figure 9



Package Drawing and Pinout  
Figure 10

Screening Action	MIL-STD-883	Standard (No Suffix)	Extended /ES Suffix	(H) /HB Suffix
Pre-cap Inspection	Method 2017, 203	•	•	•
Temperature Cycling	Method 1010, Condition C Method 1010, -55°C to +125°C		•	•
Constant Acceleration	Method 2001, 3000g Method 2001, 500g		•	•
Burn-In	Method 1015, 160 hours at 125°C 96 hours at 125°C 24 hours at 125°C	•	•	•
Hermeticity	Fine Leak, Method 1014, Condition A Gross Leak, Method 1014, Condition C	•	•	•
Final Electrical	MIL-PRF-38534, Group A 100% at 25°C	•	•	•
Final Inspection	Method 2009	•	•	•

Screening Information  
Table 1

### Ordering Information

Example Part Number: DVSA2805DR/ES					
DVSA	28	05	S	R	/ES
Product Series	Nominal Input Voltage	Output Voltage	No. Outputs	Rad Hard Opt.	Screening
DVSA	28 28 Volts	03R3 3.3 Volts 05 5 Volts 12 12 Volts 15 15 Volts	S Single	None Std. R 100kRad	None Standard /ES Extended /HB HB Screening