



# DVST2800T Series

## HIGH RELIABILITY DC-DC CONVERTERS

### DESCRIPTION

The DVST series of high reliability DC-DC converters contains internal EMI filtering and meets MIL-STD-461C and MIL-STD-461D for conducted emissions, providing a one piece COTS solution for power conversion applications. The DVST series is operable over a wide (-40°C to +85°C) temperature range with no power derating. The three low noise outputs are fully isolated from each other, allowing for maximum flexibility in system design.

### FEATURES

- Up to 30 Watts Output Power
- Three Fully Isolated Outputs
- Wide Input Voltage Range: 15 to 50 Volts per MIL-STD-704 with 80 Volt Transient for 1 sec
- Internal Filter Meets MIL-STD-461C and MIL-STD-461D Conducted Emissions Requirements
- NO Use of Optoisolators
- Undervoltage Lockout
- Low Output Noise
- Custom Versions Available
- Low Profile (0.380 inches) Package
- Military Environmental Screening Available



**Figure 1** – DVST2800T DC-DC Converter  
(Not To Scale)



# DVST2800T Series

**SPECIFICATIONS** ( $T_{CASE} = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ,  $V_{IN} = +28\text{V} \pm 5\%$ , Full Load, Unless Otherwise Specified)

## ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	50 V <sub>DC</sub>	Operating Case Temperature	-40°C to +85°C
Input Voltage (Transient, 1 second)	80 Volts	Storage Temperature	-55°C to +125°C
Output Power <sup>1</sup>	30 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, $T_{CASE} = +85^{\circ}\text{C}$ )	13 Watts	Weight	100 grams

## INPUT

Parameter	Conditions	DVST2800T			Units
		Min	Typ	Max	
<b>STATIC</b>					
INPUT Voltage	Continuous	15	28	50	V
	Transient, 1 sec			80	V
Current	Inhibited		1.6	5.0	mA
	No Load		65	100	mA
Inhibit Pin Input		0		1.5	V
Inhibit Pin Open Circuit Voltage			11.0	14.0	V
UVLO Turn On				14.9	V
UVLO Turn Off		11.8			V
SWITCHING FREQUENCY		250		350	kHz
ISOLATION Input / Output / Case	500 V <sub>DC</sub>	100			MO
THERMAL RESISTANCE	Case to Ambient ( $\theta_{CA}$ )		6		°C/W

## MAIN OUTPUT

Parameter	Conditions	DVST283R3xxyyT			DVST2805xxyyT			Units	
		Min	Typ	Max	Min	Typ	Max		
<b>STATIC</b>									
OUTPUT Voltage	$V_{OUT}$	$T_{CASE} = 25^{\circ}\text{C}$	3.26	3.30	3.34	4.95	5.00	5.05	V
	$V_{OUT}$	$T_{CASE} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	3.23	3.30	3.37	4.90	5.00	5.10	V
Power <sup>2</sup>			0		15	0		20	W
Current <sup>2</sup>	$V_{OUT}$		0		4.5	0		4.0	A
Ripple Voltage	$V_{OUT}$	Full Load, 20Hz to 10MHz		10	50		10	50	mV <sub>p-p</sub>
Line Regulation	$V_{OUT}$	$V_{IN} = 15\text{V}$ to 50V		5	20		5	20	mV
Load Regulation	$V_{OUT}$	No Load to Full Load		10	30		10	30	mV
EFFICIENCY				73			76		%
CAPACITIVE LOAD					1000			1000	μF
<b>DYNAMIC</b>									
Load Step Output Transient	$V_{OUT}$	Half Load to Full Load		200	400		200	400	mV <sub>PK</sub>
Load Step Recovery <sup>3</sup>				200	400		200	400	μSec
Line Step Output Transient	$V_{OUT}$	$V_{IN} = 15\text{V}$ to 50V		400	600		400	600	mV <sub>PK</sub>
Line Step Recovery <sup>3</sup>				400	600		400	600	μSec
Turn On Delay	$V_{OUT}$	$V_{IN} = 0\text{V}$ to 28V		15	20		15	20	mSec
Turn On Overshoot				0	50		0	50	mV <sub>PK</sub>



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## ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	50 V <sub>DC</sub>	Operating Case Temperature	-40°C to +85°C
Input Voltage (Transient, 1 second)	80 Volts	Storage Temperature	-55°C to +125°C
Output Power <sup>1</sup>	30 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, $T_{CASE} = +85^{\circ}\text{C}$ )	13 Watts	Weight	100 grams

## AUXILIARY OUTPUT

Parameter	Conditions	DVST28x12yyT			DVST28x15yyT			Units	
		Min	Typ	Max	Min	Typ	Max		
<b>STATIC</b>									
OUTPUT Voltage	V <sub>OUT</sub>	T <sub>CASE</sub> = 25°C	11.76	12.00	12.24	14.70	15.00	15.30	V
	V <sub>OUT</sub>	T <sub>CASE</sub> = -55°C to +125°C	11.64	12.00	12.36	14.55	15.00	15.45	V
Power <sup>2</sup>			0		5	0		5	W
Current <sup>2</sup>	V <sub>OUT</sub>		0		0.42	0		0.33	A
Ripple Voltage	V <sub>OUT</sub>	Full Load, 20Hz to 10MHz		25	50		25	50	mV <sub>P-P</sub>
Line Regulation	V <sub>OUT</sub>	V <sub>IN</sub> = 15V to 50V		5	20		5	20	mV
Load Regulation	V <sub>OUT</sub>	No Load to Full Load		10	50		10	50	mV
CAPACITIVE LOAD					500			500	μF
<b>DYNAMIC</b>									
Load Step Output Transient	V <sub>OUT</sub>	Half Load to Full Load		200	400		200	400	mV <sub>PK</sub>
Load Step Recovery <sup>3</sup>				100	200		100	200	μSec
Line Step Output Transient	V <sub>OUT</sub>	V <sub>IN</sub> = 15V to 50V		50	400		50	400	mV <sub>PK</sub>
Line Step Recovery <sup>3</sup>				100	200		100	200	μSec
Turn On Delay	V <sub>OUT</sub>	V <sub>IN</sub> = 0V to 28V		2	20		2	20	mSec
Turn On Overshoot					100	250		100	250

- Notes: 1. Dependant on output voltage.  
 2. Derate linearly from full rating at 85°C to 0 at 100°C.  
 3. Time for output voltage to settle to within 1% of its nominal value.

## CONNECTION DIAGRAM

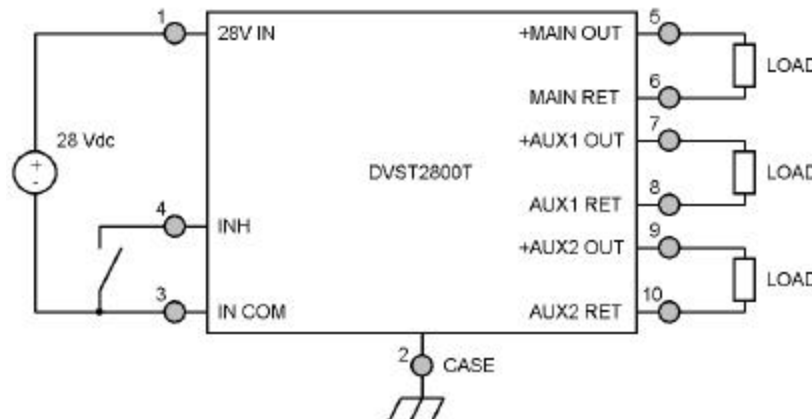


Figure 2

## BLOCK DIAGRAM

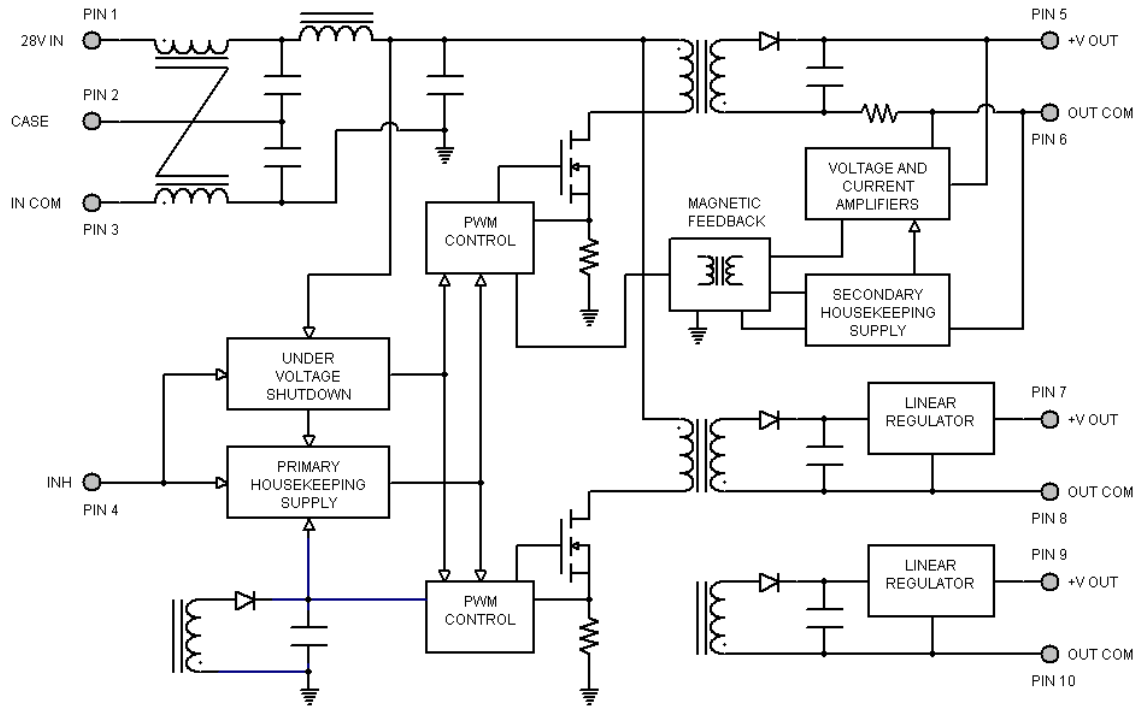


Figure 3

## INHIBIT DRIVE CONNECTION DIAGRAMS

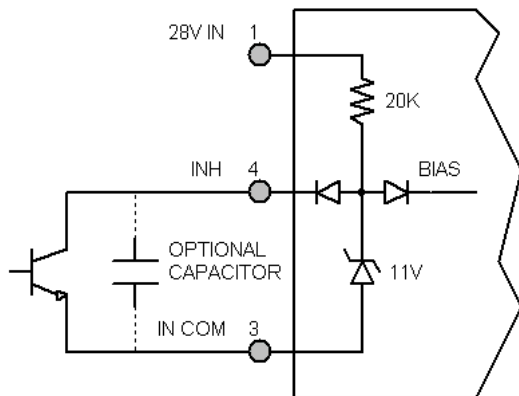


Figure 4 – Internal Inhibit Circuit and Recommended Drive  
(Shown with optional capacitor for turn-on delay)

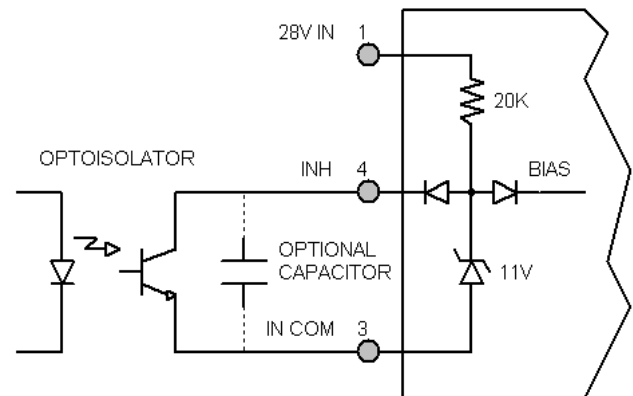
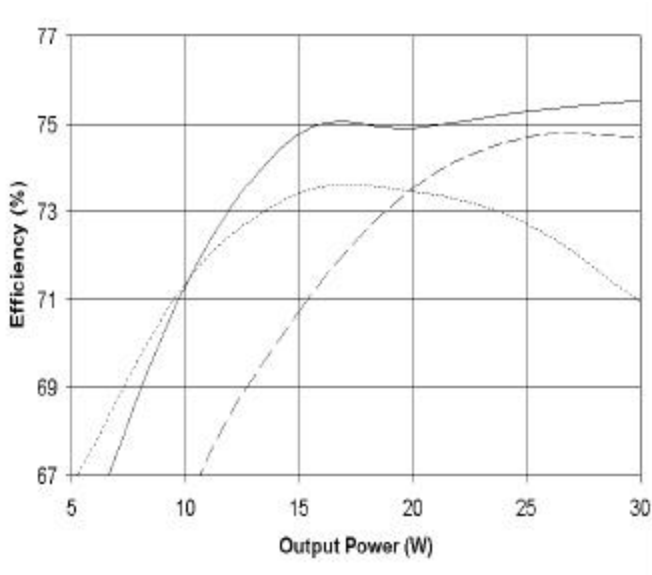
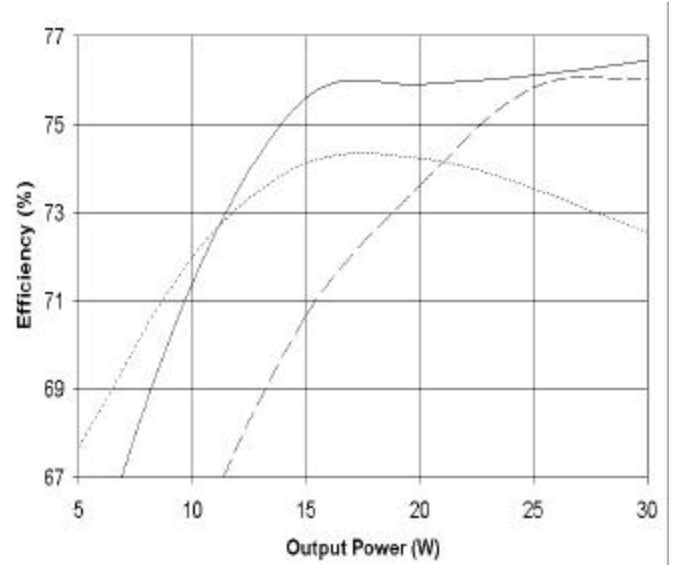


Figure 5 – Isolated Inhibit Drive  
(Shown with optional capacitor for turn-on delay)

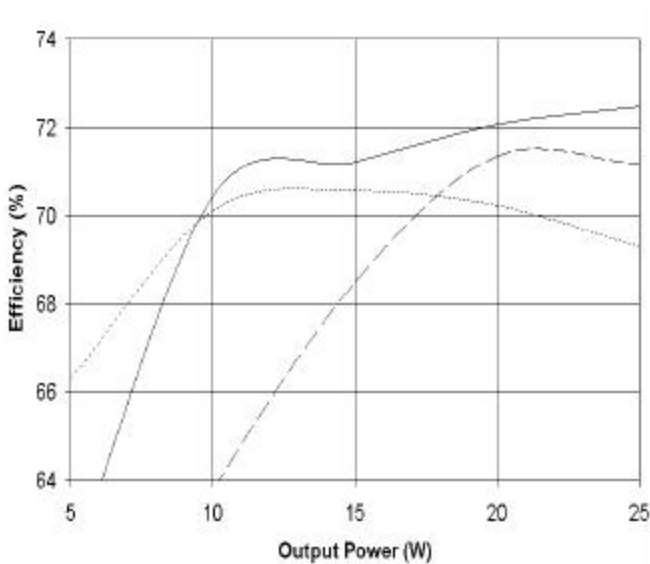
## EFFICIENCY PERFORMANCE CURVES ( $T_{CASE} = 25^{\circ}C$ , Full Load, Unless Otherwise Specified)



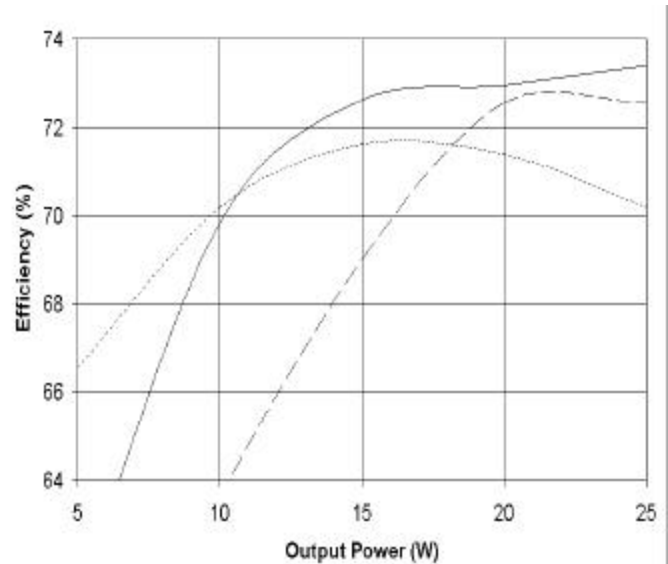
**Figure 6 – DVST2851212T**  
Efficiency (%) vs. Output Power (W)



**Figure 7 – DVST2851515T**  
Efficiency (%) vs. Output Power (W)



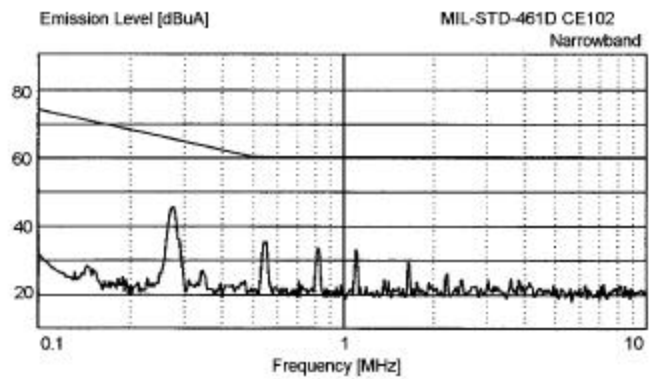
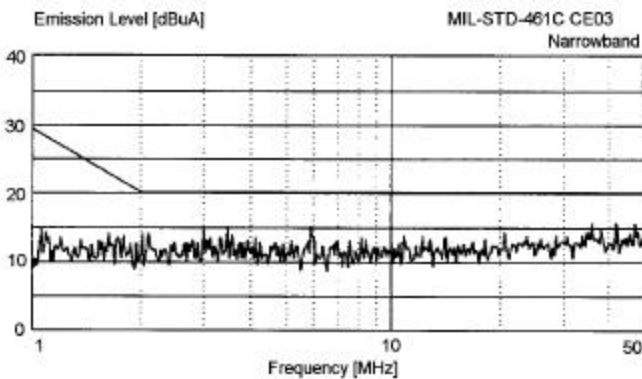
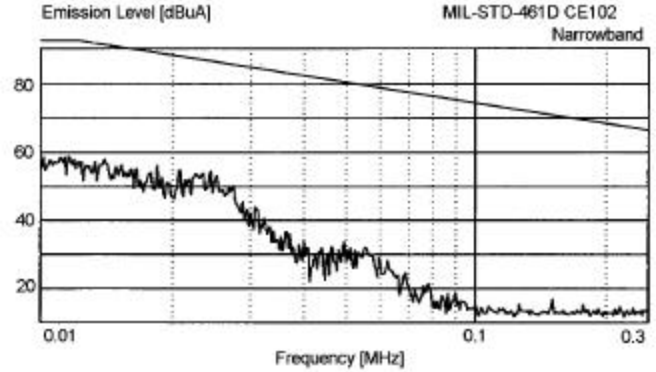
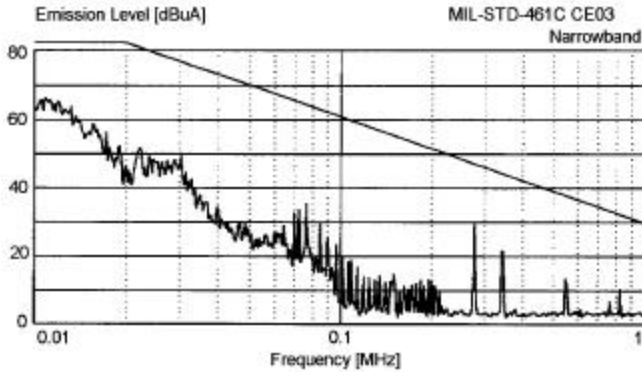
**Figure 8 – DVST283R31212T**  
Efficiency (%) vs. Output Power (W)



**Figure 9 – DVST283R31515T**  
Efficiency (%) vs. Output Power (W)

## EMI PERFORMANCE CURVES

( $T_{CASE} = -40^{\circ}C$  to  $+85^{\circ}C$ ,  $V_{IN} = +28V \pm 5\%$ , Full Load, Unless Otherwise Specified)



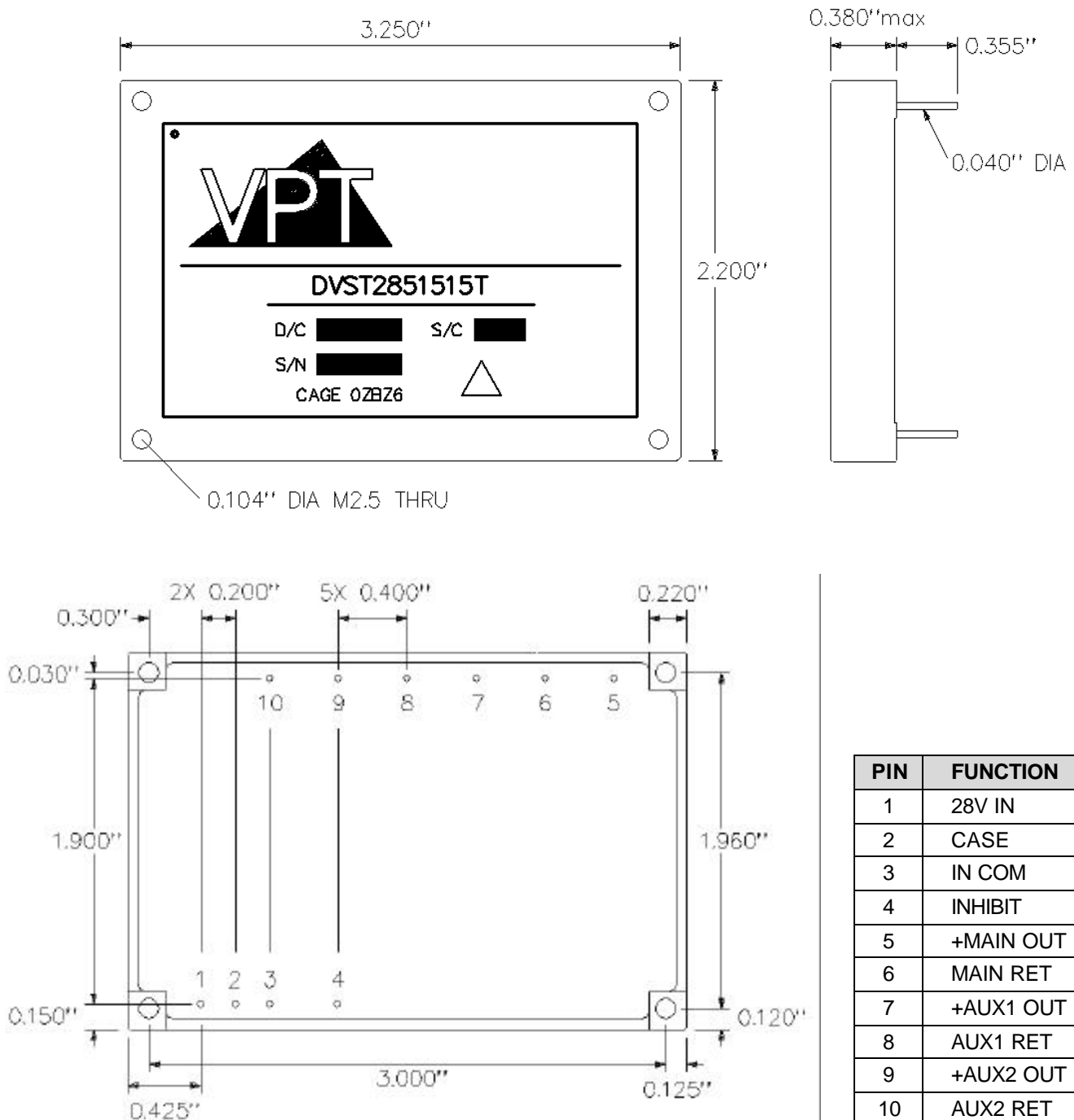
**Figure 10 –**  
MIL-STD-461C CE03 Conducted Emissions

**Figure 11 –**  
MIL-STD-461D CE102 Conducted Emissions

## ENVIRONMENTAL QUALIFICATION

Description	MIL-STD-883	MIL-STD-202	Test Condition
Temperature Cycling	1010	102A	-40°C to +100°C, 100 cycles
Constant Acceleration	2001	212A	500g, 1min.
Mechanical Shock	2002 Cond. A	213B Cond. D	500g, 1ms
Random Vibration	2026 Cond. D	214A Cond. D	11.6G RMS, operating
Moisture Resistance	1004	106F	10 days
Barometric Pressure	1001 Cond. D	105C Cond. C	70,000 ft, operating
Salt Atmosphere	1009 Cond. B	101D Cond. B	48 hrs.
Resistance to Solvents	2015	215J	
Solderability	2003	208H	

## PACKAGE SPECIFICATIONS



Notes: Additional mounting options are available. Consult the factory for details.

**Figure 12 – Package and Pinout**



## PACKAGE PIN DESCRIPTION

Pin	Function	Description
1	28V IN	Positive Input voltage Connection
2	CASE	Case Connection
3	IN COM	Input Common Connection
4	INHIBIT	Logic Low = Disabled Output. Connecting the inhibit pin to input common (PIN 7) causes converter shutdown. Logic High = Enabled Output. Unconnected or open collector TTL.
5	+MAIN OUT	Main Positive Output Voltage Connection
6	MAIN RET	Main Output Return Connection
7	+AUX1 OUT	Auxiliary Positive Output Voltage Connection
8	AUX1 RET	Auxiliary Output Return Connection
9	+AUX2 OUT	Auxiliary Positive Output Voltage Connection
10	AUX2 RET	Auxiliary Output Return Connection

## ENVIRONMENTAL SCREENING

Screening	MIL-STD-883	Standard (No Suffix)	Extended /MIL
Temperature Cycling	Method 1010, -40°C to 100°C, 10 Cycles		•
Burn-In	96 hours at +85°C 24 hours at +85°C	•	•
Final Electrical	100% at 25°C	•	•
Final Inspection	Method 2009	•	•





## ORDERING INFORMATION

DVST	28	5	15	15	T		/MIL	-	XXX
1	2	3	4	5	6	7	8		9

(1)

(2)

(3)

(4)

(5)

Product Series	Nominal Input Voltage		Main Output		Auxiliary Output 1		Auxiliary Output 2	
DVST	28	28 Volts	3R3 5	3.3 Volts 5 Volts	12 15	12 Volts 15 Volts	12 15	12 Volts 15 Volts

(6)

(7)

(8)

(9)

Number of Outputs		Package Option		Screening Code		Additional Screening Code
T	Triple	None	Standard	None /MIL	Standard Military	Contact Sales

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, or packaging requirements.

## CONTACT INFORMATION

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

**Phone:** (425) 337-2482  
**Fax:** (603) 297-1160  
**E-mail:** mbosmann@worldnet.att.net

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