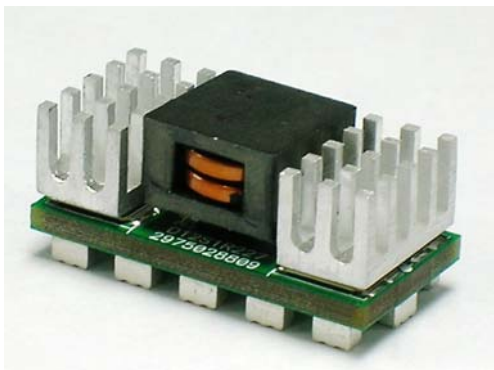


DELPHI SERIES



FEATURES

- High efficiency :
89.5% @ 11Vin, 1.8V/25A out
85.0% @ 11Vin, 1.0V/25A out
- Small size and low profile: (SMD)
(1.0" x 0.5" x 0.45")
- Surface mount
- No minimum load required
- Parallellable
- ISO 9000, TL 9000, ISO 14001
certified manufacturing facility
- UL/cUL 60950-1 (US & Canada)
Recognized, and TUV (EN60950-1)
Certified
- CE mark meets 73/23/EEC and
93/68/EEC directives

D12S1R227-2D, Non-Isolated, Power Block DC/DC Power Modules: 7.0~13.2Vin, 0.8V~1.8V/25Aout

The Delphi D12S1R227-2D, surface mounted, power block is the latest offering from a world leader in power systems technology and manufacturing — Delta Electronics, Inc. The D12S1R227-2D is the latest offering in the DXP30 family which was developed to address the ever-growing demands of increased current and power densities in networking applications while providing maximum flexibility for system configuration, its benefits can easily be applied to other applications transcending various market segments. The DXP30 family, containing all necessary power components and boasting of a USABLE (55°C, 200LFM) current density of 60A/in² and a power density of up to 216W/in³, is a building block for a new open Digital Power Architecture developed to work with either digital or analog controllers. Measured at 0.5"Wx1.0"Lx0.5"H and rated at 25A of output current, the D12S1R227-2D is designed to operate with an input voltage from 7V to 13.2V and provide an output voltage adjustable from 0.8V to 1.8V in digitally defined step resolution of 1.62mV. Multiple D12S1R227-2D can be used in parallel to serve applications where output currents are in excess of 25A with limitation imposed only by the control circuit, analog or digital. Designed for superior price/performance, The D12S1R227-2D can provide 1.8V and 25A full load in ambient temperature up to 55°C with 200LFM airflow.

APPLICATIONS

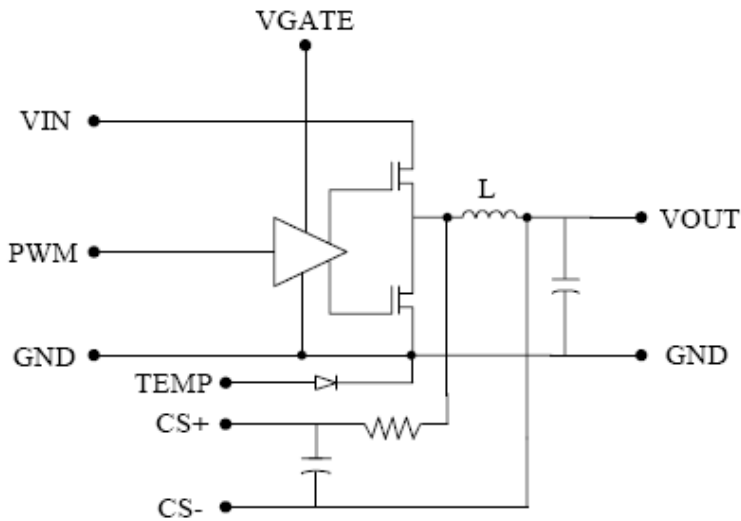
- Telecom / DataCom
- Distributed power architectures
- Servers and workstations
- LAN / WAN applications
- Data processing applications

DATASHEET
DS_D12S1R227-2D_01232009

TECHNICAL SPECIFICATIONS

$T_A = 25^\circ\text{C}$, airflow rate = 300 LFM, $V_{in} = 7\sim 13.2\text{Vdc}$, nominal V_{out} unless otherwise noted.

PARAMETER	NOTES and CONDITIONS	D12S1R227-2D			
		Min.	Typ.	Max.	Units
ABSOLUTE MAXIMUM RATINGS					
Input Voltage (Continuous)		0		15	Vdc
Operating Temperature	Refer to Figure 15 for the measuring point	0		85	°C
Storage Temperature		-40		125	°C
INPUT CHARACTERISTICS					
Operating Input Voltage		7.0	9.6	13.2	V
Maximum Input Current	Vin=11V, Vout=1.8V, Iout=30A		4.68		A
PWM	Pin 3	4.5	5.0	5.5	V
Gate Voltage	Pin 5 (reference to ground)	6.7	7.0	7.5	Vdc
OUTPUT CHARACTERISTICS					
Output Voltage Adjustable Range	Vin=9.6V	0.8		1.8	V
Total Output Voltage Regulation	Total Regulation over load, line and temperature	-1		+1	%V
Output Voltage Ripple and Noise	3x 560µF OSCON and 320µF ceramic capacitor, BW=20MHz		15		mVpp
Output Voltage Overshoot	@ turn on		0	0.5	%V
Output Current Range		0		25	A
Transient Response			TBD		mVpp
Inductor Value			380		nH
Inductor DCR			0.7		mΩ
Inductor Peak Current	Inductor temperature of 125°C			35	A
Temperature sense	25°C, 495µA bias current	1.345	1.35	1.355	V
EFFICIENCY					
	Vin=11V, Vo=1.8V, Io=25A		89.5		%
	Vin=11V, Vo=1.0V, Io=25A		85		%
FEATURE CHARACTERISTICS					
Operating Frequency			400		kHz
GENERAL SPECIFICATIONS					
MTBF	Io=Io,max, Ta=25°C		TBD		M hours
Weight			8		grams



Block diagram of D12S1R227-2D



ELECTRICAL CHARACTERISTICS CURVES

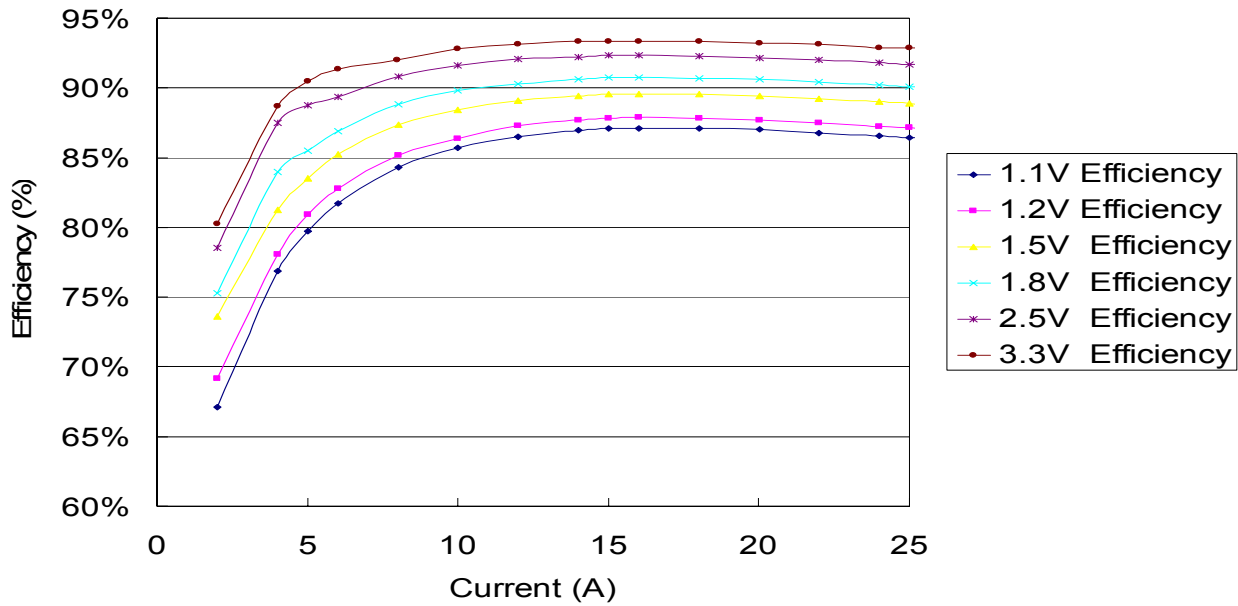


Figure 1: Efficiency vs. load current for minimum, nominal, and maximum input voltage at 25°C.

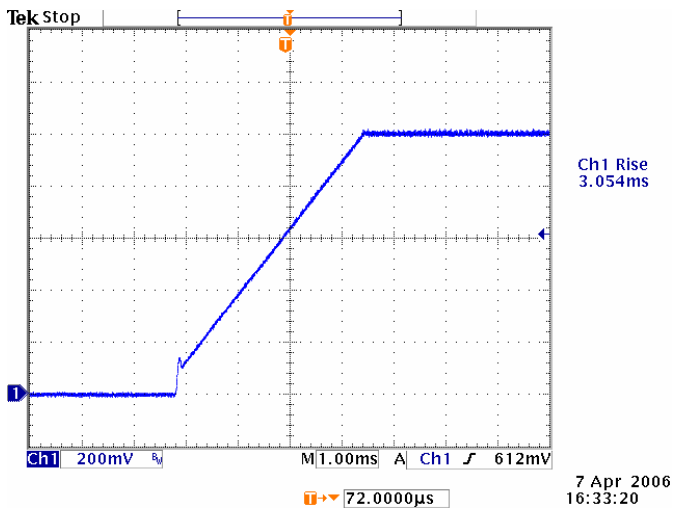


Figure 2: Output Rise Time: 1 pcs Converter on test board.
($V_{in}=9.6V$; 1V Output Voltage; $I_{out}=25A$)

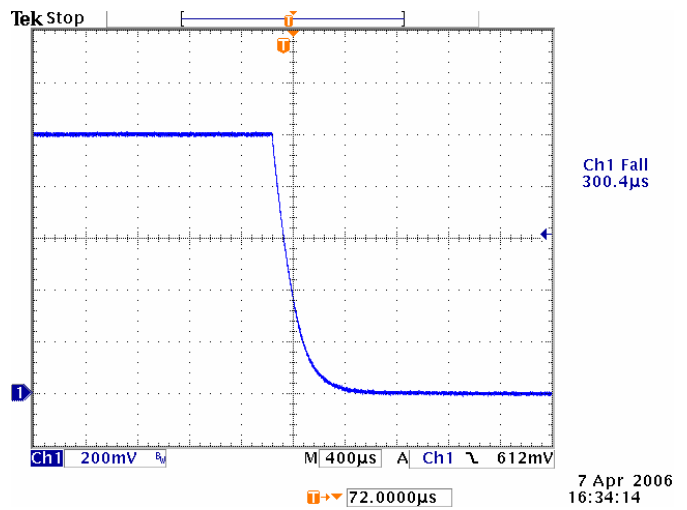


Figure 3: Output Fall Time: 1 pcs Converter on test board.
($V_{in}=9.6V$; 1V Output Voltage; $I_{out}=25A$)



ELECTRICAL CHARACTERISTICS CURVES

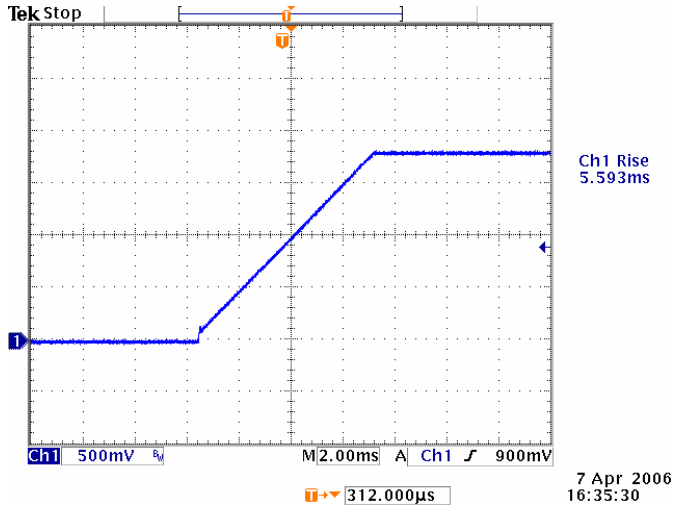


Figure 4: Output Rise Time: 1 pcs Converter on test board.
($V_{in} = 9.6V$; 1.8V Output Voltage; $I_{out} = 25A$)

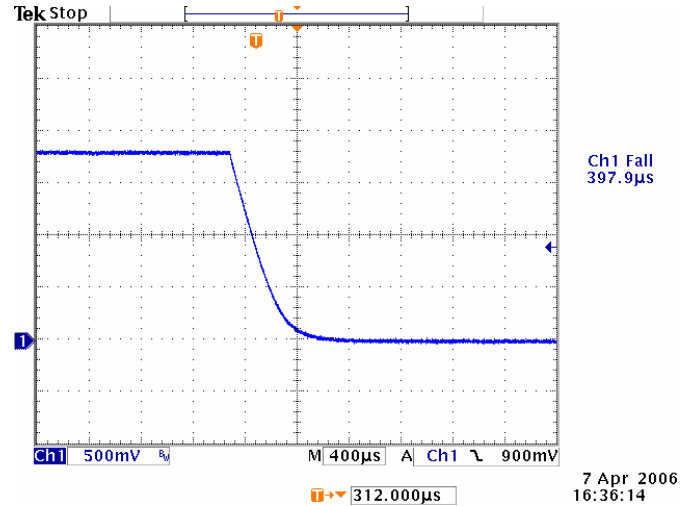


Figure 5: Output Fall Time: 1 pcs Converter on test board.
($V_{in} = 9.6V$; 1.8V Output Voltage; $I_{out} = 25A$)

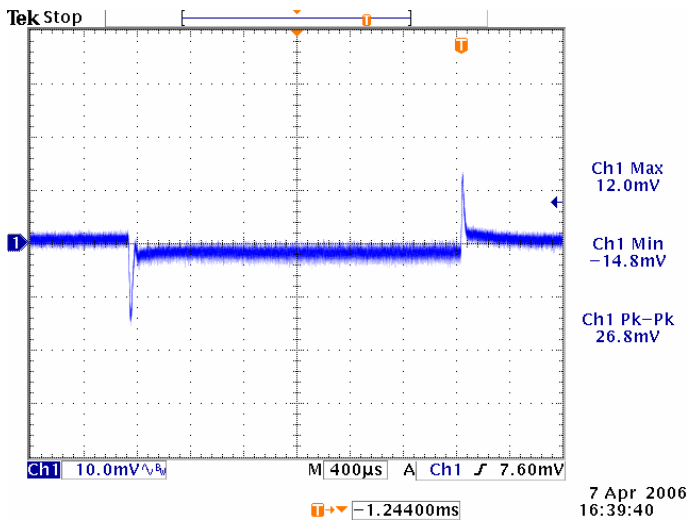


Figure 6: Output Dynamic Response : 1 pcs converter on test board ($V_{in} = 9.6V$; 1V Output Voltage; I_{out} Step: 0~10A; Slew/Rate: 2.5A/μs $C_{out} = 2,000μF$)

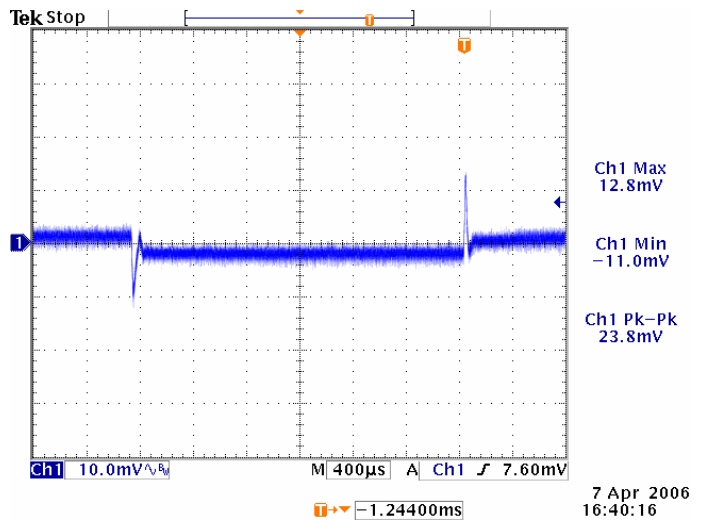


Figure 7: Output Dynamic Response : 1 pcs converter on test board ($V_{in} = 9.6V$; 1V Output Voltage; I_{out} Step: 10~25A; Slew/Rate: 2.5A/μs $C_{out} = 2,000μF$)

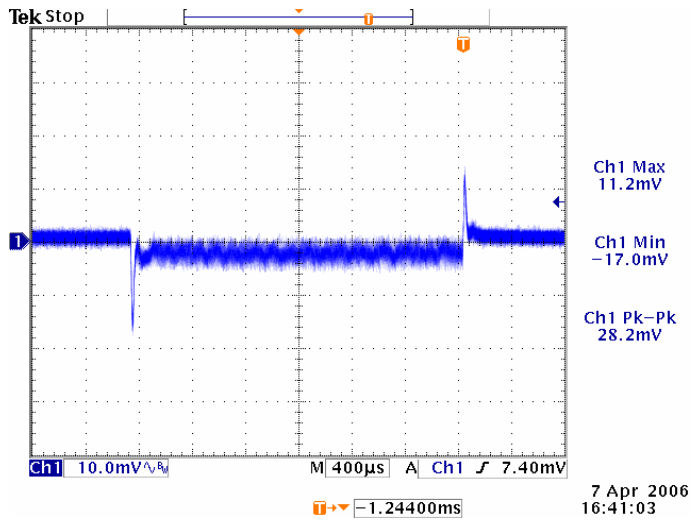


Figure 8: Output Dynamic Response : 1 pcs converter on test board ($V_{in} = 9.6V$; 1.8V Output Voltage; I_{out} Step:0~10A; Slew/Rate: 2.5A/ μ S $C_{out} = 2,000\mu F$)

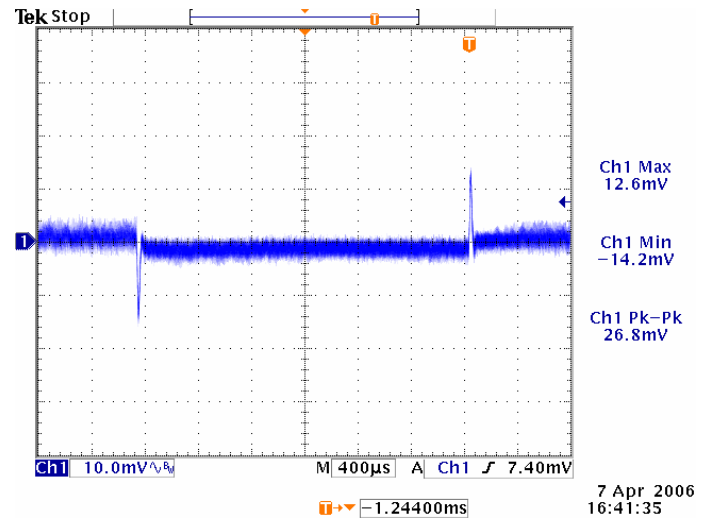


Figure 9: Output Dynamic Response : 1 pcs converter on test board ($V_{in} = 9.6V$; 1.8V Output Voltage; I_{out} Step:10~25A; Slew/Rate: 2.5A/ μ S $C_{out} = 2,000\mu F$)



TEST CONFIGURATIONS

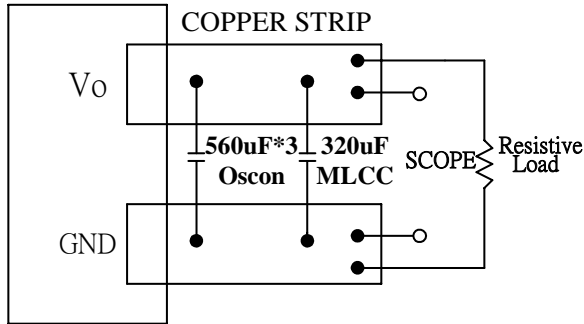


Figure 10: Peak-peak output ripple & noise and startup transient measurement test setup

Note: 3pcs 560μF OSCON and 320μF MLCC capacitor in the module output. Scope measurement should be made by using a BNC connector.

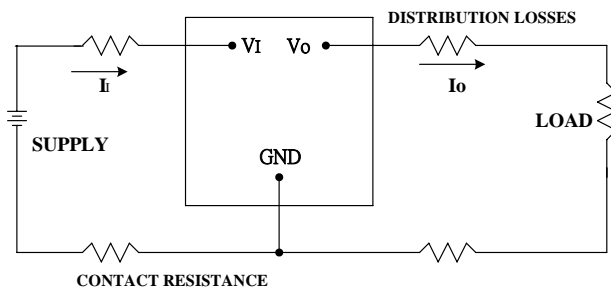


Figure 11: Output voltage and efficiency measurement test setup

Note: All measurements are taken at the module terminals. When the module is not soldered (via socket), place Kelvin connections at module terminals to avoid measurement errors due to contact resistance.

$$\eta = \left(\frac{V_o \times I_o}{V_i \times I_i} \right) \times 100 \quad \%$$

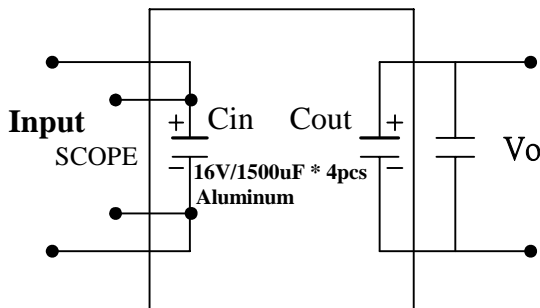


Figure 12: Peak-peak Input ripple & noise measurement test setup

Note: 4pcs 1,500μF Aluminum in the module input. Scope measurement should be made by using a BNC connector.

DESIGN CONSIDERATIONS

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the module. An input capacitance must be placed close to the modules input pins to filter ripple current and ensure module stability in the presence of inductive traces that supply the input voltage to the module.

Safety Considerations

For safety-agency approval the power module must be installed in compliance with the spacing and separation requirements of the end-use safety agency standards.

For the converter output to be considered meeting the requirements of safety extra-low voltage (SELV), the input must meet SELV requirements. The power module has extra-low voltage (ELV) outputs when all inputs are ELV.

The input to these units is to be provided with a maximum 15A time-delay fuse in the ungrounded lead.

FEATURES DESCRIPTIONS

Over-Current Protection

To provide protection in an output over load fault condition, the unit is equipped with internal over-current protection. When the over-current protection is triggered, the unit will be shutdown and restart by input or OUTEN on/off. The units operate normally once the fault condition is removed.

Over-Temperature Protection

To provide additional over-temperature protection in a fault condition, the unit is equipped with a latching thermal shutdown circuit. The shutdown circuit engages when the temperature of monitored component exceeds approximately 135°C. The shutdown unit will restart by input or OUTEN on/off while the temperature lower than 125°C.



THERMAL CONSIDERATIONS

Thermal management is an important part of the system design. To ensure proper, reliable operation, sufficient cooling of the power module is needed over the entire temperature range of the module. Convection cooling is usually the dominant mode of heat transfer.

Hence, the choice of equipment to characterize the thermal performance of the power module is a wind tunnel.

Thermal Testing Setup

Delta's DC/DC power modules are characterized in heated wind tunnels that simulate the thermal environments encountered in most electronics equipment.

The following figures show the wind tunnel characterization setup. The power module is mounted on Primarion test board and is horizontally positioned within the wind tunnel.

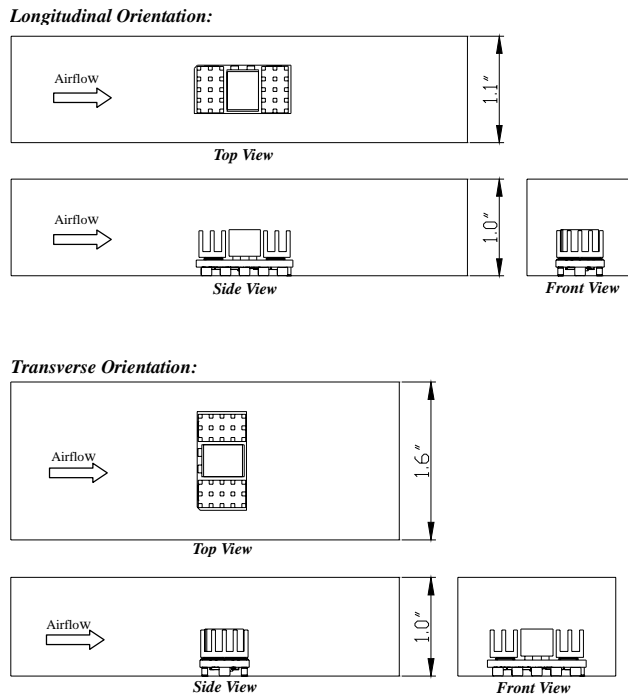


Figure 13: Wind Tunnel Test Setup (Single Module)

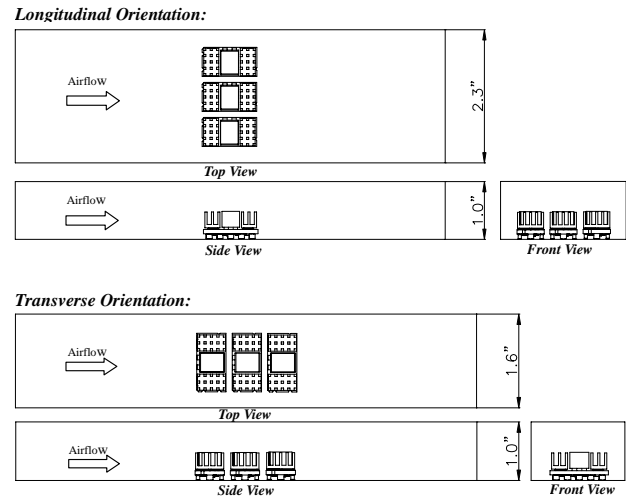


Figure 14: Wind Tunnel Test Setup (Parallel Module)

Thermal De-rating

The module's maximum hot spot temperature is $+110^{\circ}\text{C}$. To enhance system reliability, the power module should always be operated below the maximum operating temperature. If the temperature exceeds the maximum module temperature, reliability of the unit may be affected.

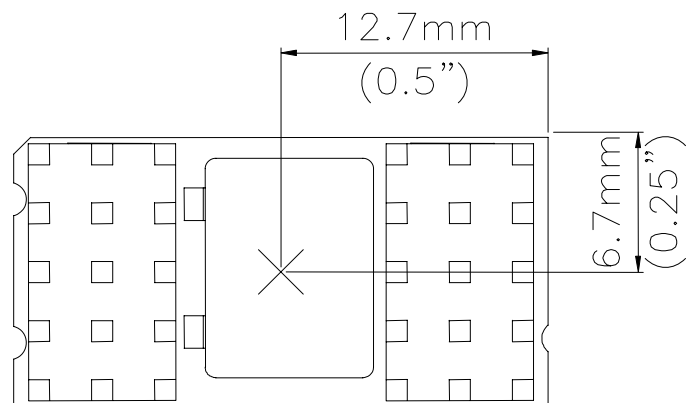
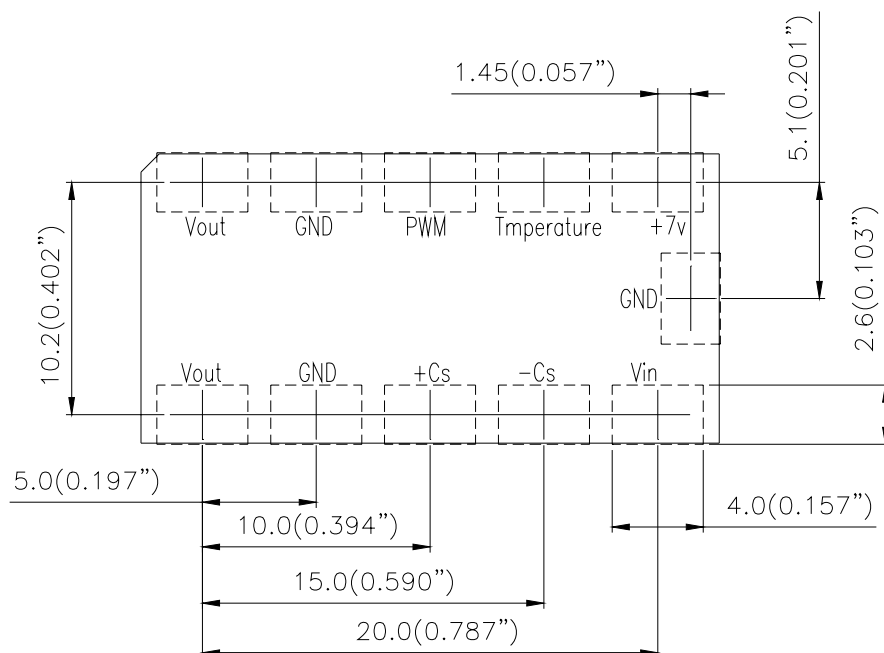


Figure 15: Temperature measurement location
The allowed maximum hot spot temperature is defined at 110°C

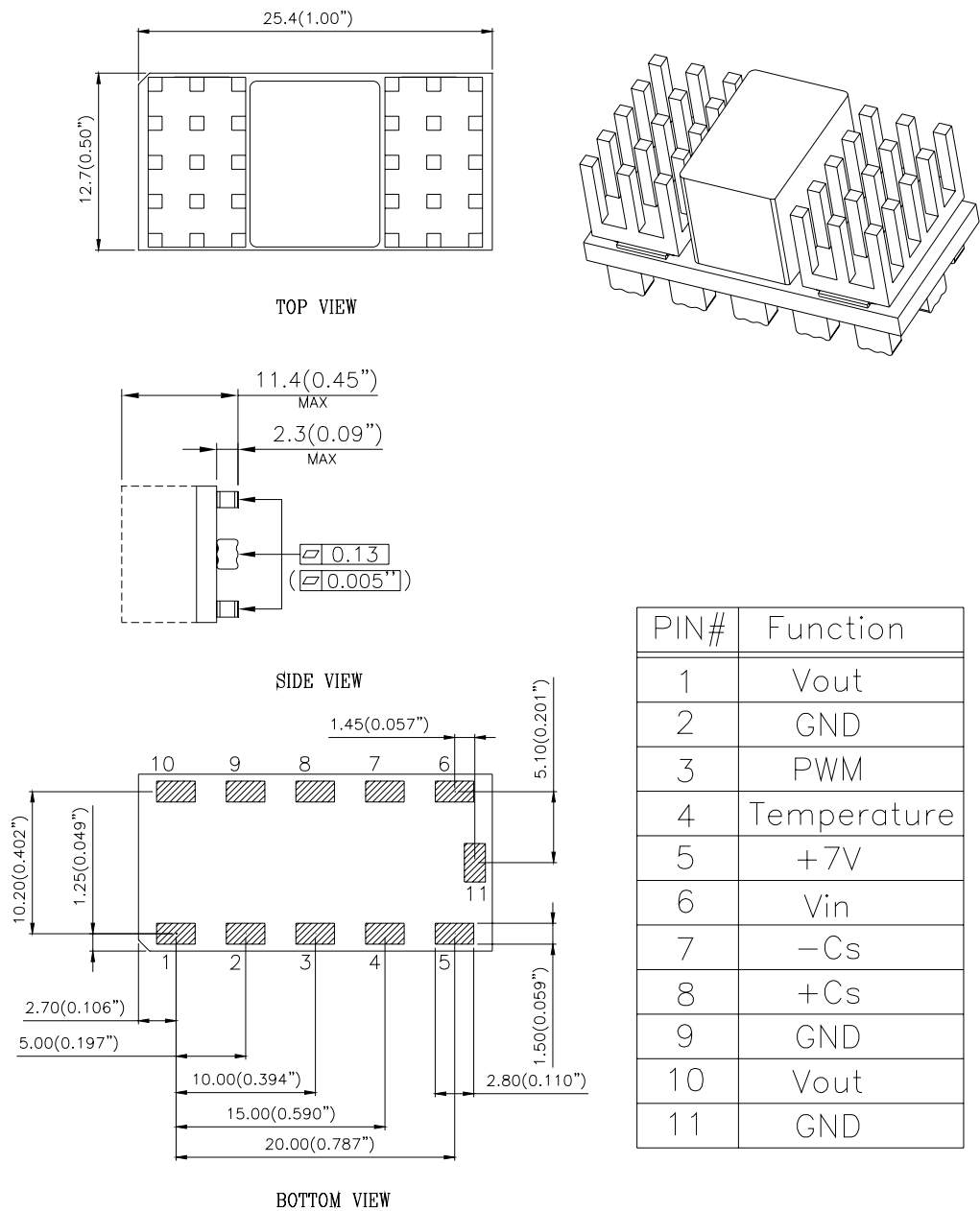
SURFACE-MOUNT TAPE & REEL



RECOMMENDED P.W.B PAD LAYOUT



MECHANICAL DRAWING



ALL DIMENSIONS ARE IN MILLIMETERS (INCHES)
TOLERANCE: X.X mm ± 0.5mm (X.XX in. ± 0.02 in.)
X.XX mm ±0.25 mm (X.XXX in. ± 0.010 in.)



PART NUMBERING SYSTEM

D	12	S	1R2	27	2D
Type of Product	Input Voltage	Number of Outputs	Output Voltage	Output Current	Option Code
D - DC/DC modules	12 - 7 ~ 13.2V	S - Single	1R2 - 0.8~1.8V	27 - 25~30A, refer to option code	D - 30A standard model, 0.48" total height 2D - 25A under the same thermal condition, 0.45" total height

MODEL LIST

Model Name	Input Voltage	Output Voltage	Output Current	RoHS 5/6 complaint	Total Height	Efficiency 12Vin, 5Vout @ 100% load
D12S1R227D	7.0 ~ 13.2Vdc	0.8V ~ 1.8V	30A	Yes	0.48"	89.5%
D12S1R227-2D	7.0 ~ 13.2Vdc	0.8V ~ 1.8V	25A	Yes	0.45"	89.5%

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WARRANTY

Delta offers a two (2) year limited warranty. Complete warranty information is listed on our web site or is available upon request from Delta.

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