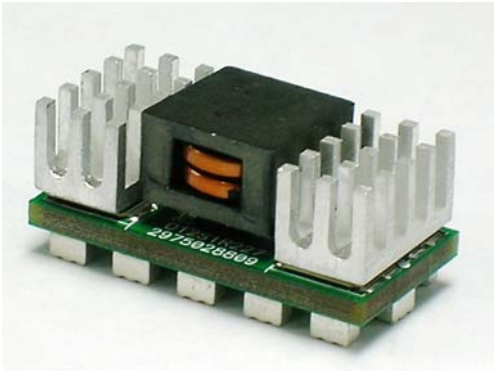
DELPHI SERIES



FEATURES

- High efficiency:
  90.0% @ 11Vin, 1.8V/30A out
  86.5% @ 11Vin, 1.0V/30A out
- Small size and low profile:
  (1.0” x 0.5” x 0.480”) (SMD)
- Surface mount
- No minimum load required
- Input: UVLO, Output OCP/SCP, OVP, OTP
- Parallel Units
- 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

D12S1R830B, Non-Isolated, Power Block
DC/DC Power Modules: 7.0~13.2Vin, 0.8V~1.8V/30Aout

The Delphi D12S1R830B, surface mounted, power block is the latest offering from a world leader in power systems technology and manufacturing — Delta Electronics, Inc. The D12S1R830B 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/in^2 and a power density of up to 216W/in^3, 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”Lx0.48”H and rated at 30A of output current, the D12S1R830B 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 D12S1R830B can be used in parallel to serve applications where output currents are in excess of 30A with limitation imposed only by the control circuit, analog or digital. Designed for superior price/performance, the D12S1R830B can provide 1.8V and 30A 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

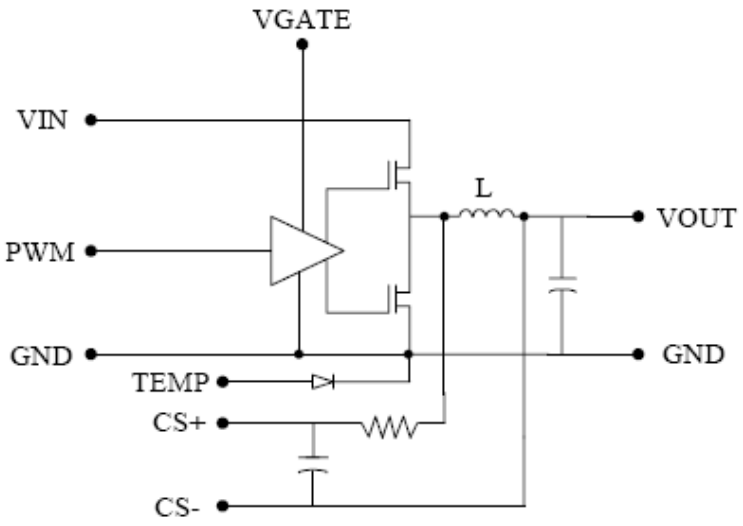
DATASHEET
DS_D12S1R830B_01232009

Delta Electronics, Inc.

TECHNICAL SPECIFICATIONS

T_A = 25°C, airflow rate = 300 LFM, V_{in} = 10Vdc and 14Vdc, nominal Vout unless otherwise noted.

PARAMETER	NOTES and CONDITIONS	D12S1R830B			
		Min.	Typ.	Max.	Units
ABSOLUTE MAXIMUM RATINGS					
Input Voltage (Continuous)		0		15	Vdc
Operating Temperature	Refer to Figure 25 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=9.6V, Vout=1.8V, Iout=30A		6.3		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		30	A
Transient Response			TBD		mVpp
Inductor Value			380		nH
Inductor DCR			0.55		mΩ
Inductor Peak Current	Inductor temperature of 125°C			39	A
Temperature sense	25°C, 495μA bias current	1.345	1.35	1.355	V
EFFICIENCY					
	Vin=7V, Vo=1.8V, Io=30A		90.5		%
	Vin=9.6V, Vo=1.8V, Io=30A		90.2		%
	Vin=11V, Vo=1.8V, Io=30A		90.0		%
FEATURE CHARACTERISTICS					
Operating Frequency			400		kHz
GENERAL SPECIFICATIONS					
MTBF	Io=Io,max, Ta=25℃		4.9		M hours
Weight			8		grams



Block diagram of D12S1R830B

ELECTRICAL CHARACTERISTICS CURVES

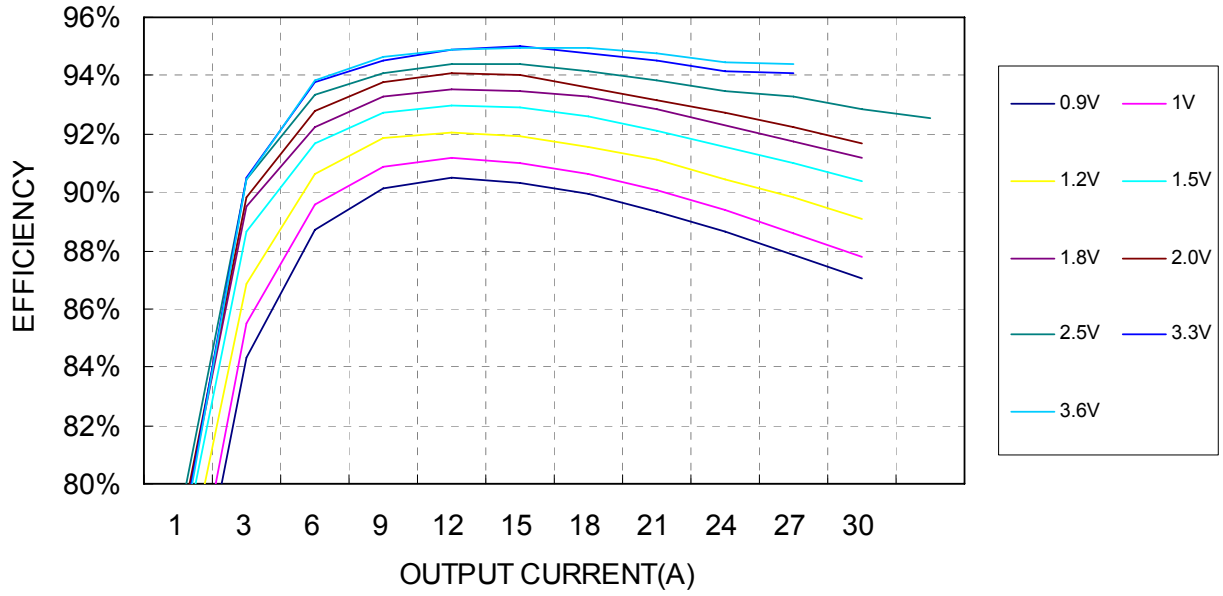


Figure 1: *Efficiency vs. load current for minimum, nominal, and maximum input voltage at 25°C.*

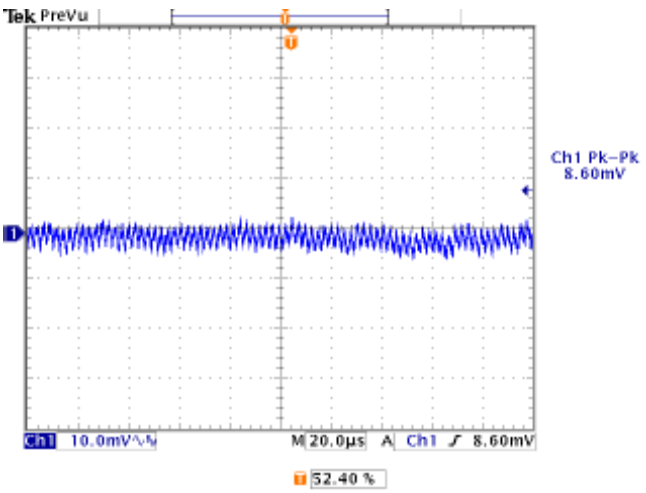


Figure 2: *Output Ripple & Noise*
Input Voltage=7V, Iout=30 A, Reading=8.60mV

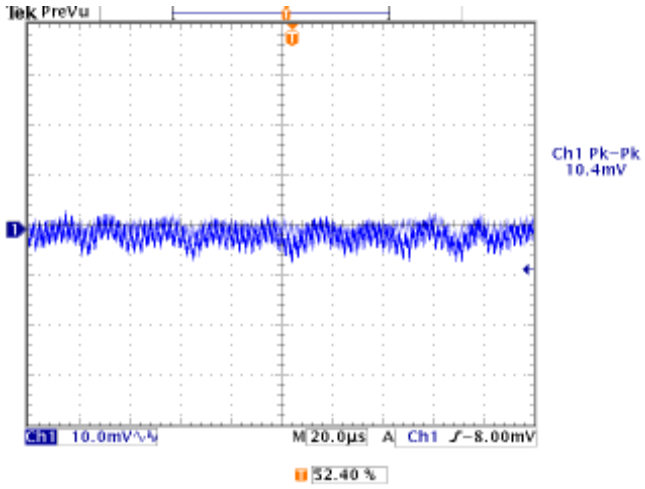


Figure 3: *Output Ripple & Noise*
Input Voltage=7V, Iout=60A, Reading=10.4mV

ELECTRICAL CHARACTERISTICS CURVES

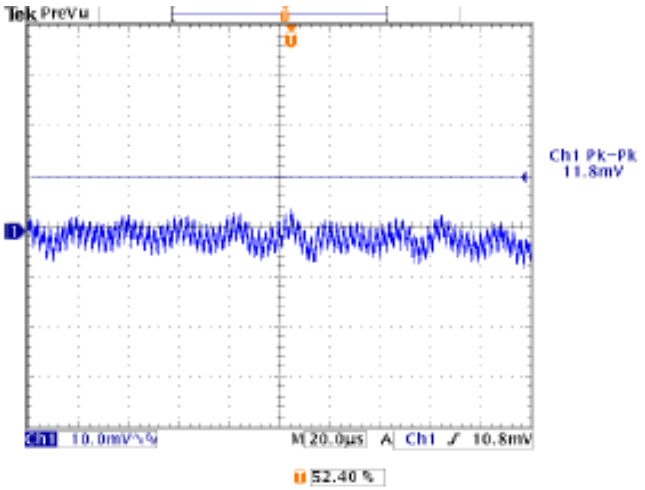


Figure 4: *Output Ripple & Noise*
Input Voltage=7V, Iout=90 A, Reading=11.8mV

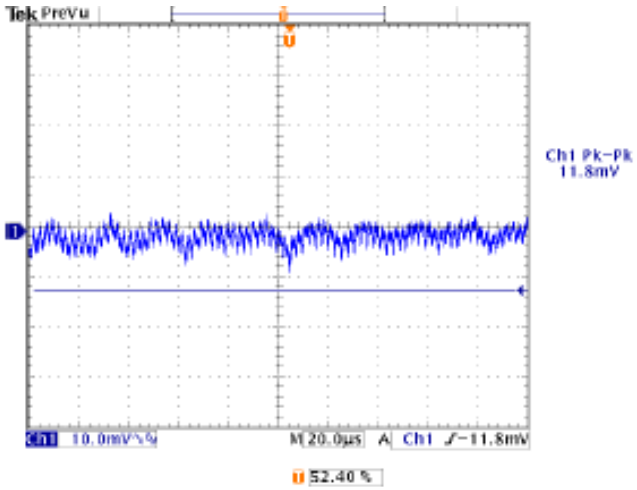


Figure 5: *Output Ripple & Noise*
Input Voltage=12V, Iout=30 A, Reading=11.8mV

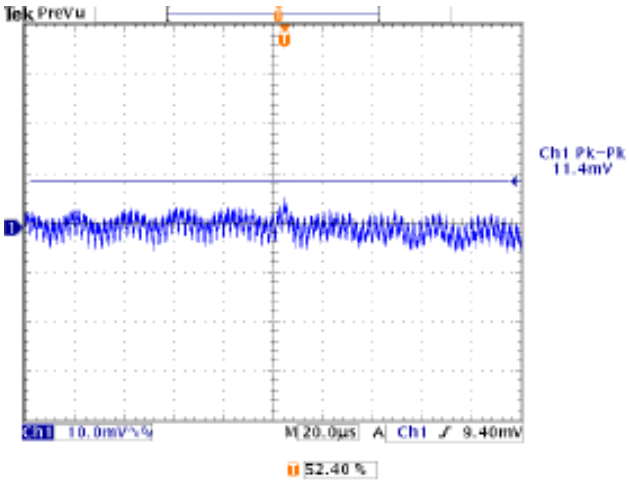


Figure 6: *Output Ripple & Noise*
Input Voltage=12V, Iout=60 A, Reading=11.4mV

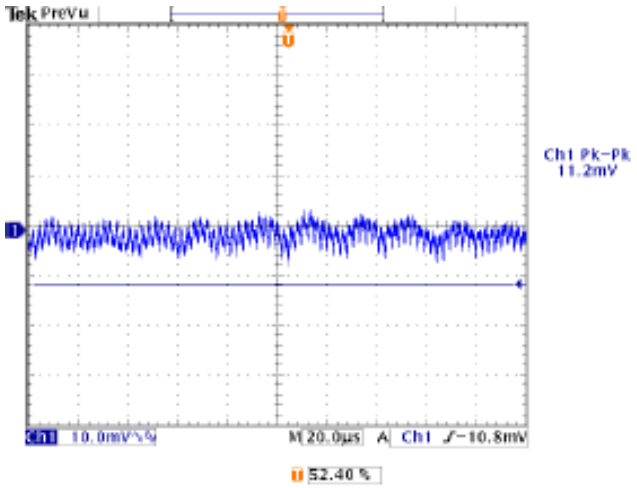


Figure 7: *Output Ripple & Noise*
Input Voltage=12V, Iout=90 A, Reading=11.2mV

ELECTRICAL CHARACTERISTICS CURVES

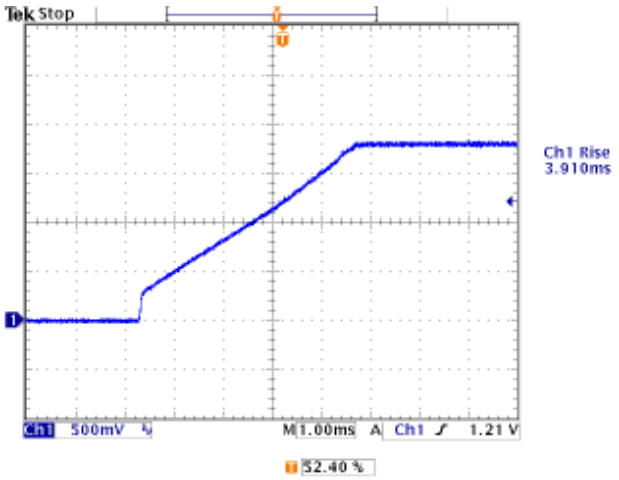


Figure 8: *Output Voltage Rise Time & Fall Tim*
Input Voltage=7V, Iout=20A, Reading=3.91mS

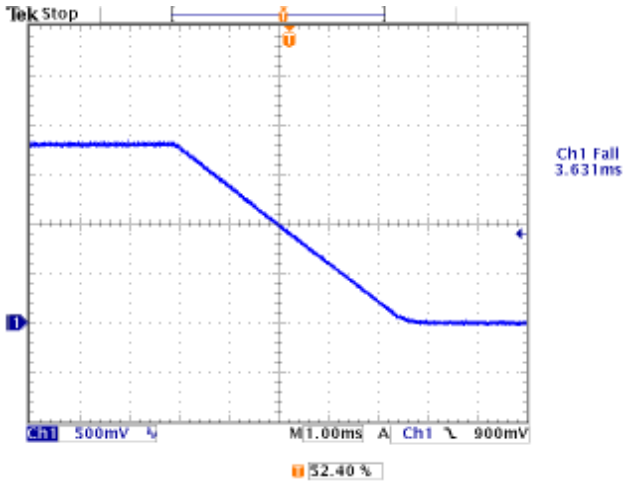


Figure 9: *Output Voltage Rise Time & Fall Tim*
Input Voltage=7V, Iout=20A, Reading=3.631mS

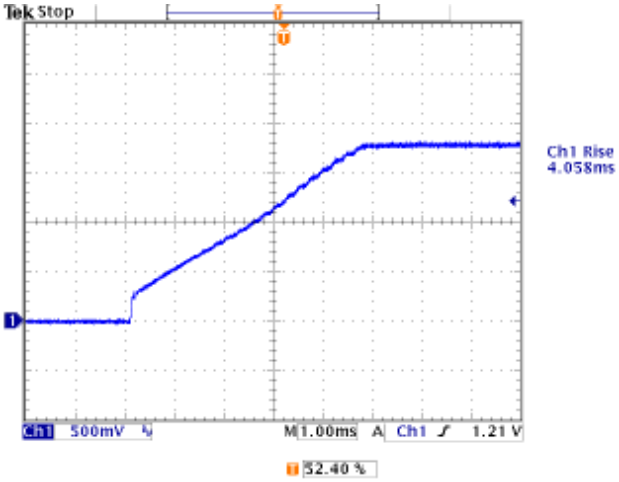


Figure 10: *Output Voltage Rise Time & Fall Tim*
Input Voltage=7V, Iout=40A, Reading=4.058mS

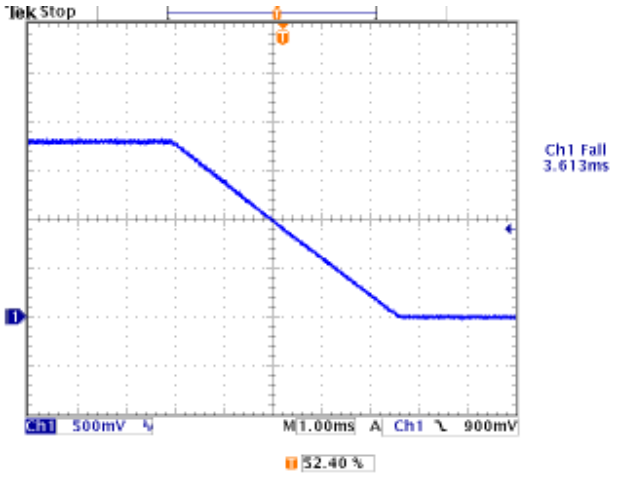


Figure 11: *Output Voltage Rise Time & Fall Tim*
Input Voltage=7V, Iout=40A, Reading=3.613mS

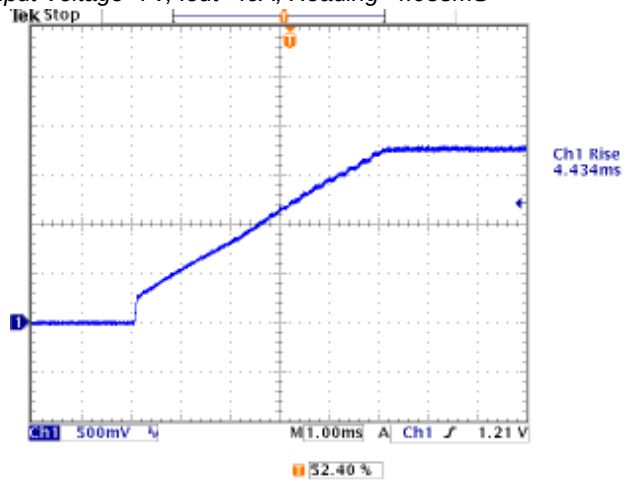


Figure 12: *Output Voltage Rise Time & Fall Tim*
Input Voltage=7V, Iout=60A, Reading=4.434mS

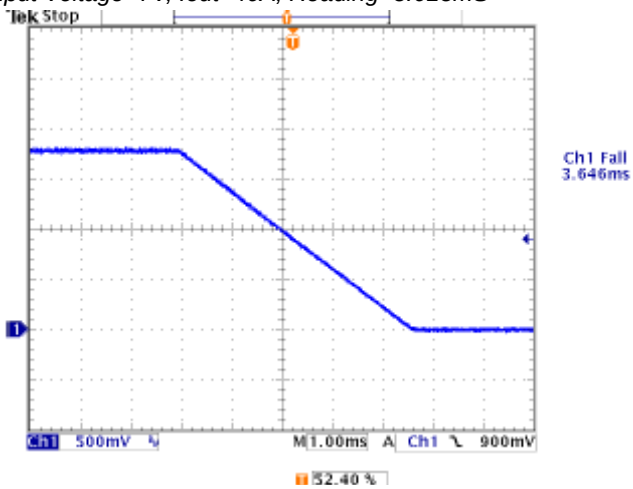


Figure 13: *Output Voltage Rise Time & Fall Tim*
Input Voltage=7V, Iout=60A, Reading=3.646mS

ELECTRICAL CHARACTERISTICS CURVES

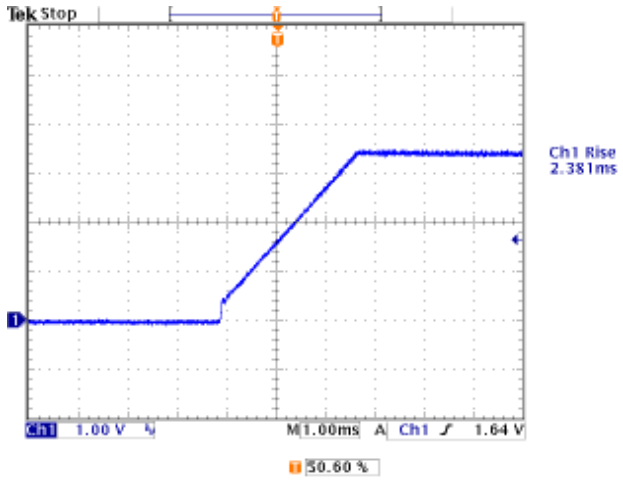


Figure 14: *Output Voltage Rise Time & Fall Tim*
Input Voltage=12V, Iout=30A, Reading=2.381mS

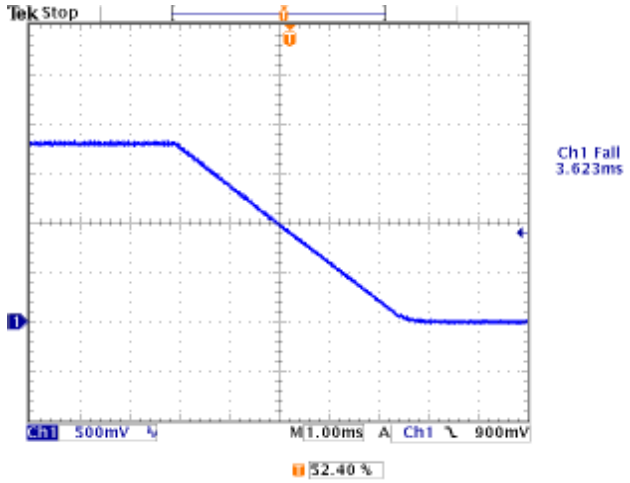


Figure 15: *Output Voltage Rise Time & Fall Tim*
Input Voltage=12V, Iout=30A, Reading=3.623mS

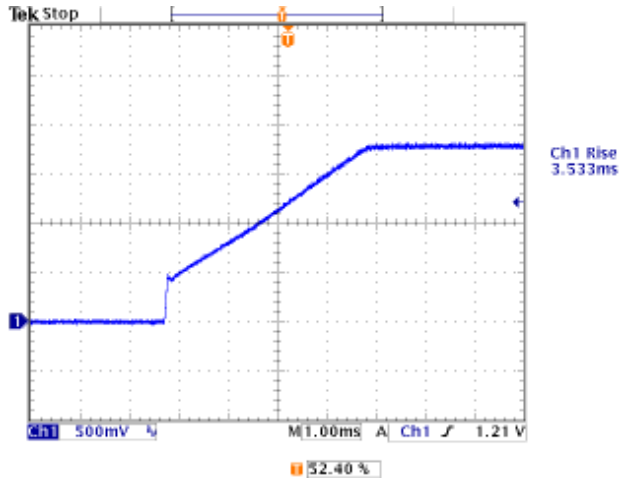


Figure 16: *Output Voltage Rise Time & Fall Tim*
Input Voltage=12V, Iout=60A, Reading=3.533mS

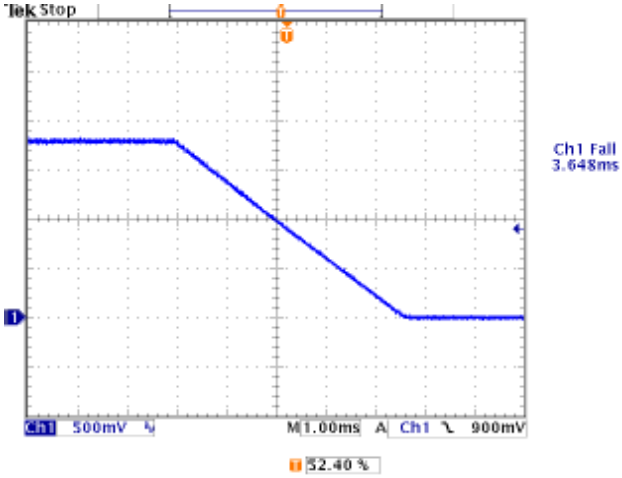


Figure 17: *Output Voltage Rise Time & Fall Tim*
Input Voltage=12V, Iout=60A, Reading=3.648mS

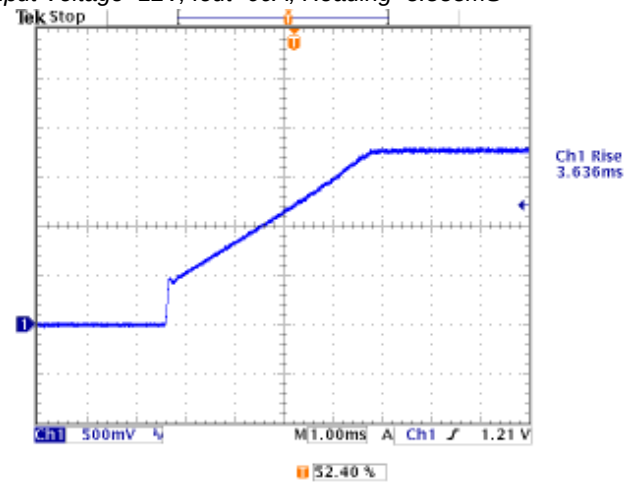


Figure 18: *Output Voltage Rise Time & Fall Tim*
Input Voltage=12V, Iout=90A, Reading=3.636mS

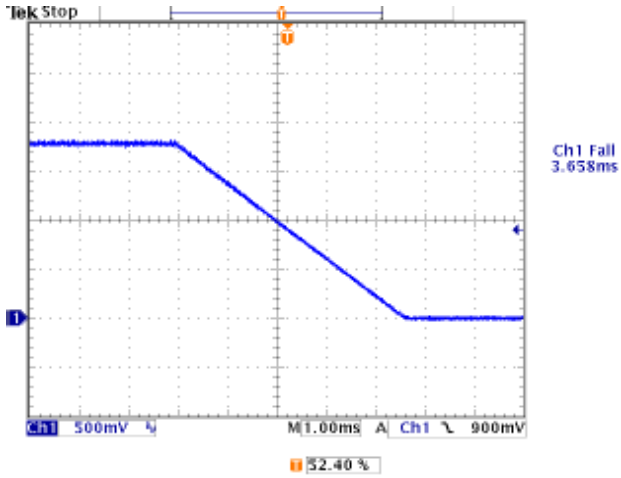


Figure 19: *Output Voltage Rise Time & Fall Tim*
Input Voltage=12V, Iout=90A, Reading=3.658mS

TEST CONFIGURATIONS

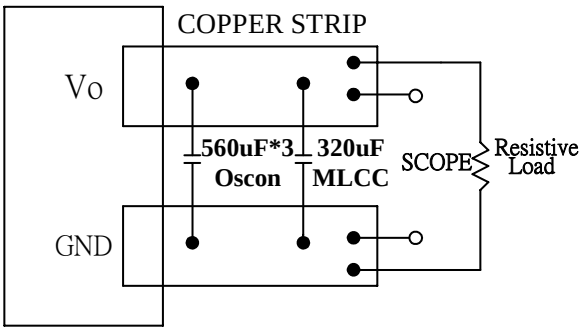


Figure 20: *Peak-peak output ripple & noise and startup transient measurement test setup*

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

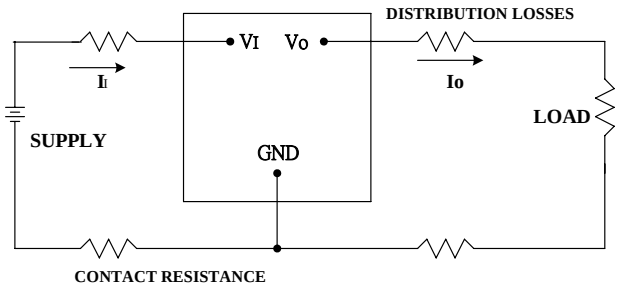


Figure 21: *Output voltage and efficiency measurement test setup*

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.

$$\eta = (\frac{Vo \times Io}{Vi \times Ii}) \times 100 \quad \%$$

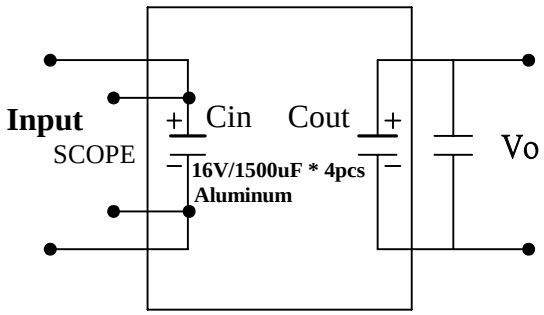


Figure 22: *Peak-peak Input ripple & noise measurement test setup*

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℃. The shutdown unit will restart by input or OUTEN on/off while the temperature lower than 125C.

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.

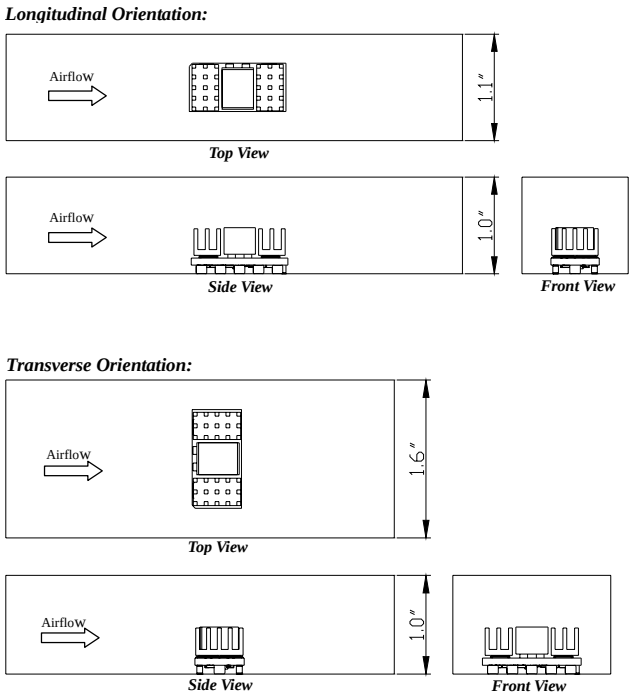


Figure 23: *Wind Tunnel Test Setup (Single Module)*

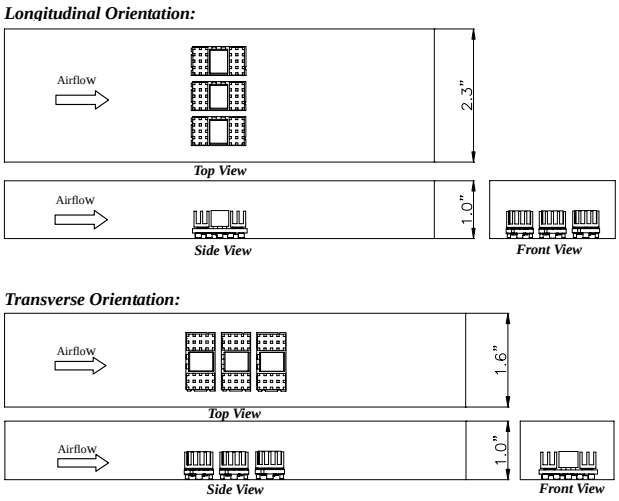


Figure 24: *Wind Tunnel Test Setup (Parallel Module)*

Thermal De-rating

The module's maximum hot spot temperature is +110°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.

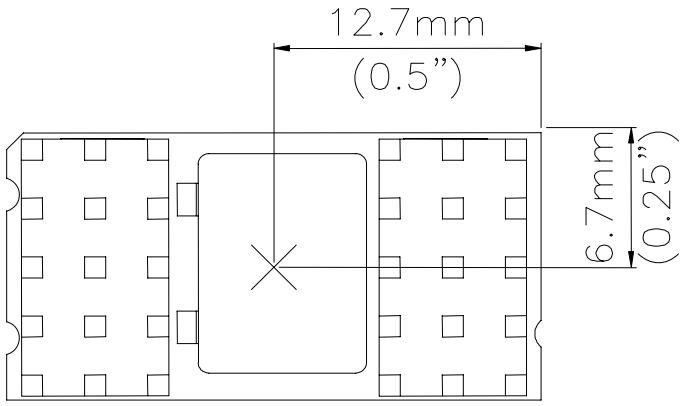


Figure 25: *Temperature measurement location*
The allowed maximum hot spot temperature is defined at 110℃

THERMAL CURVES

Single Module (Longitudinal Orientation)

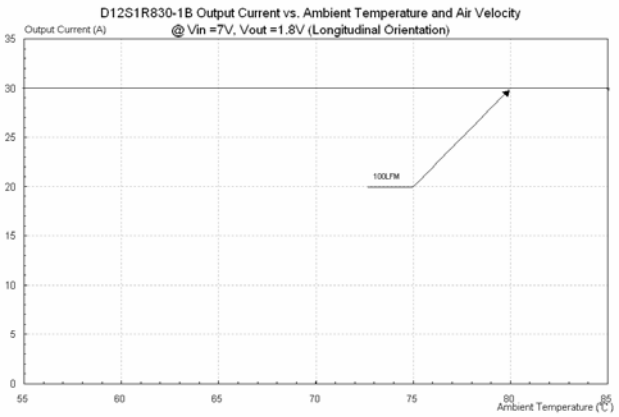


Figure 26: *Output current vs. ambient temperature and air velocity@ V_{in}=7V, V_{out}=1.8V (Longitudinal Orientation)*

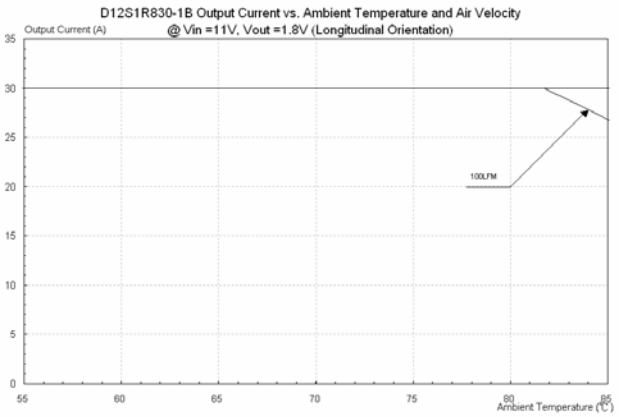


Figure 27: *Output current vs. ambient temperature and air velocity@ V_{in}=11V, V_{out}=1.8V (Longitudinal Orientation)*

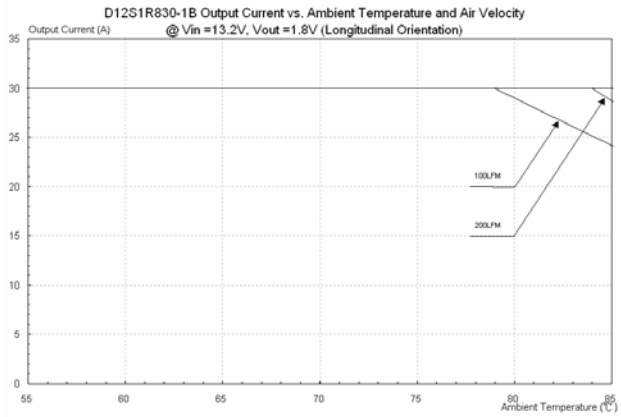


Figure 28: *Output current vs. ambient temperature and air velocity@ V_{in}=13.2V, V_{out}=1.8V (Longitudinal Orientation)*

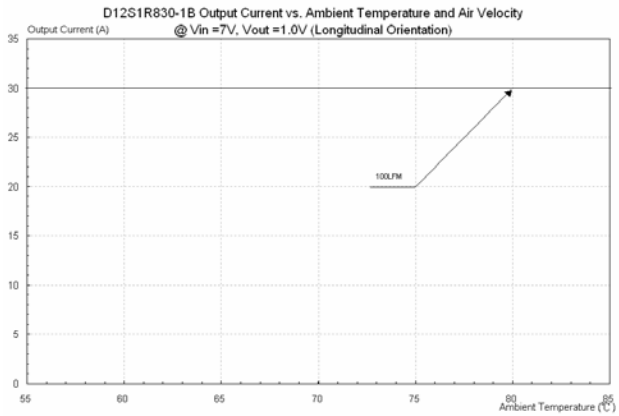


Figure 29: *Output current vs. ambient temperature and air velocity@ V_{in}=7V, V_{out}=1.0V (Longitudinal Orientation)*

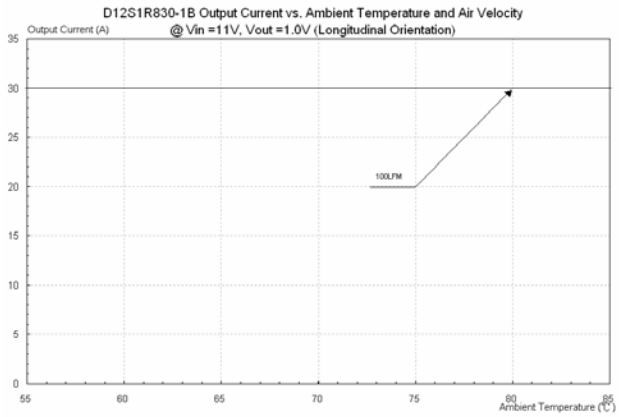


Figure 30: *Output current vs. ambient temperature and air velocity@ V_{in}=11V, V_{out}=1.0V (Longitudinal Orientation)*

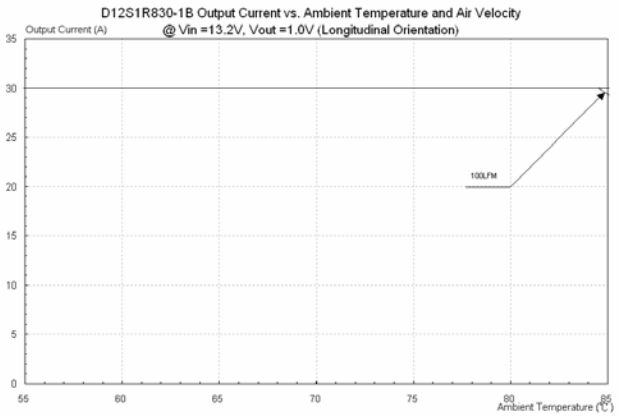


Figure 31: *Output current vs. ambient temperature and air velocity@ V_{in}=13.2V, V_{out}=1.0V (Longitudinal Orientation)*

Single Module (Transverse Orientation)

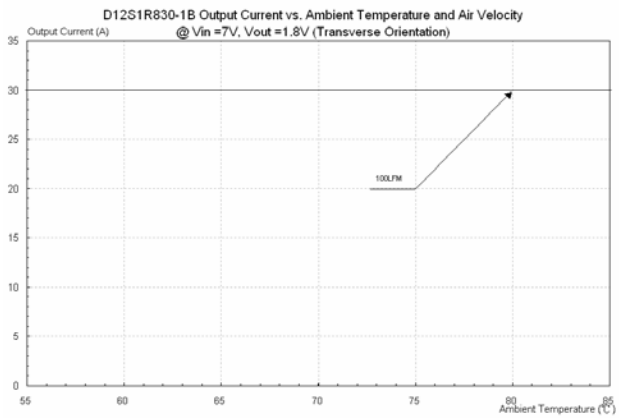


Figure 32: *Output current vs. ambient temperature and air velocity@ V_{in}=7V, V_{out}=1.8V (Transverse Orientation)*

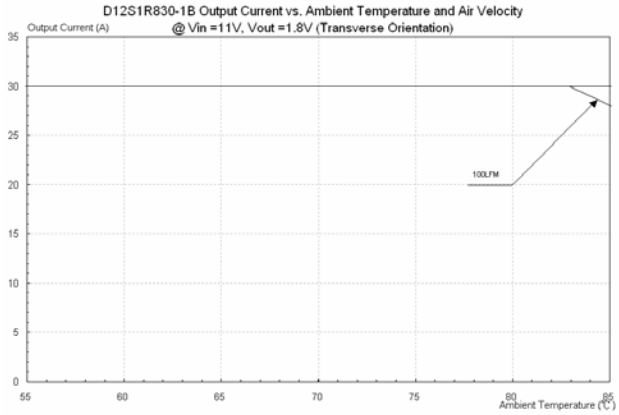


Figure 33: *Output current vs. ambient temperature and air velocity@ V_{in}=11V, V_{out}=1.8V (Transverse Orientation)*

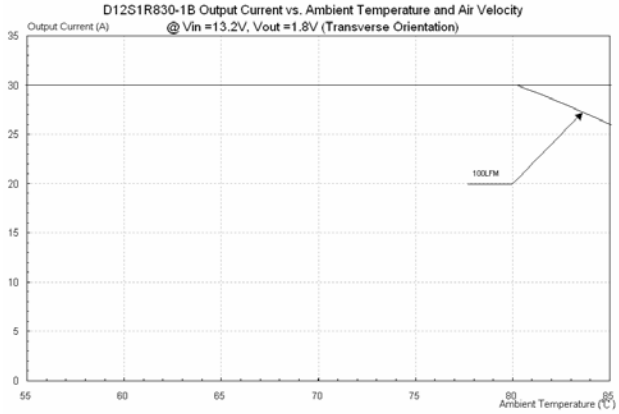


Figure 34: *Output current vs. ambient temperature and air velocity@ V_{in}=13.2V, V_{out}=1.8V (Transverse Orientation)*

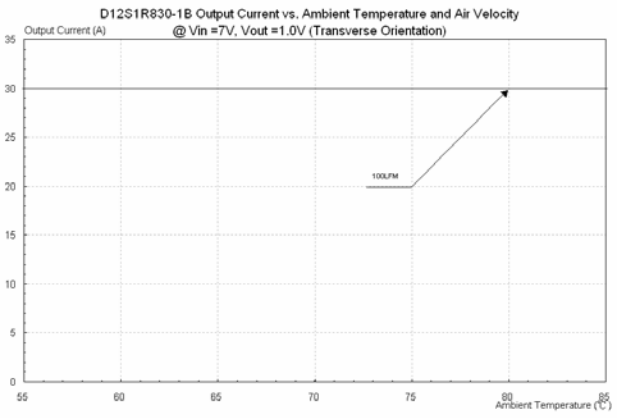


Figure 35: *Output current vs. ambient temperature and air velocity@ V_{in}=7V, V_{out}=1.0V (Transverse Orientation)*

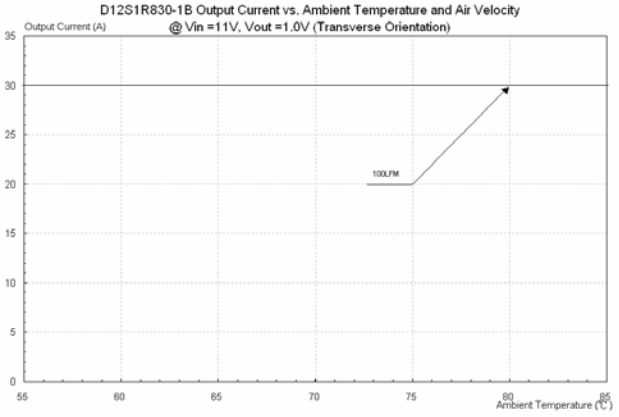


Figure 36: *Output current vs. ambient temperature and air velocity@ V_{in}=11V, V_{out}=1.0V (Transverse Orientation)*

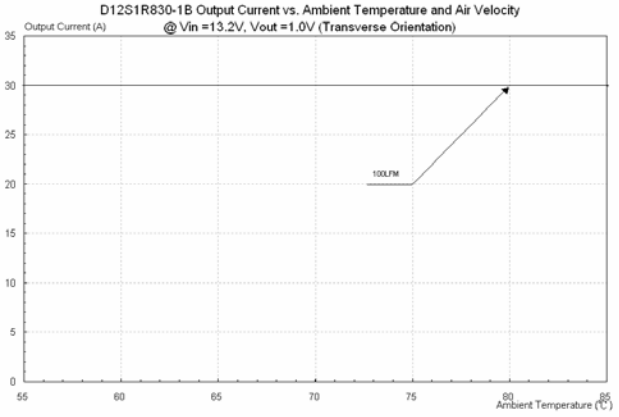


Figure 37: *Output current vs. ambient temperature and air velocity@ V_{in}=13.2V, V_{out}=1.0V (Transverse Orientation)*

Parallel Module (Longitudinal Orientation)

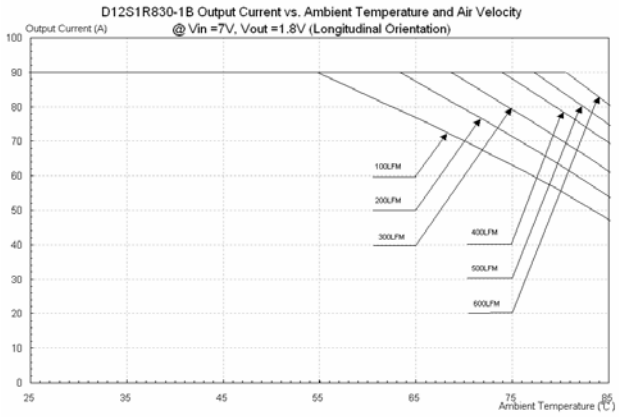


Figure 38: *Output current vs. ambient temperature and air velocity@ V_{in}=7V, V_{out}=1.8V (Longitudinal Orientation)*

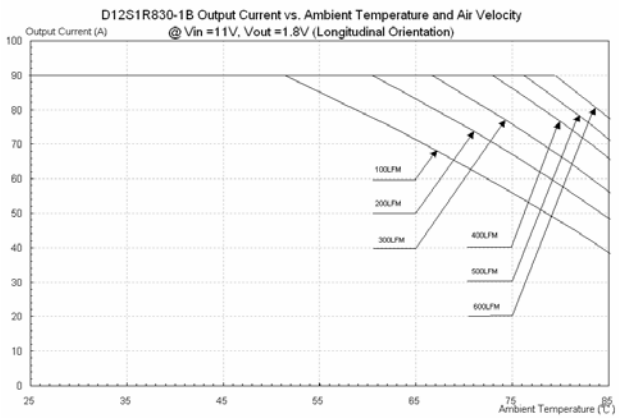


Figure 39: *Output current vs. ambient temperature and air velocity@ V_{in}=11V, V_{out}=1.8V (Longitudinal Orientation)*

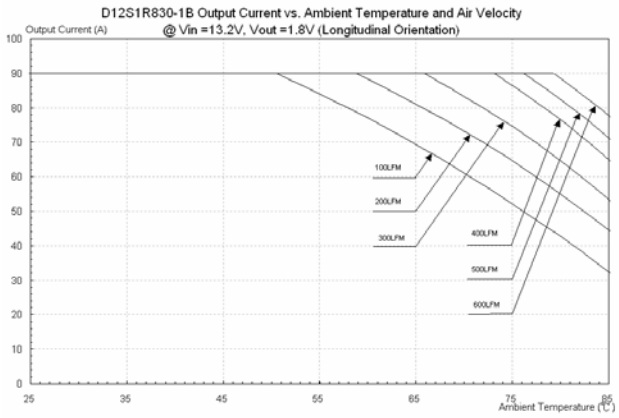


Figure 40: *Output current vs. ambient temperature and air velocity@ V_{in}=13.2V, V_{out}=1.8V (Longitudinal Orientation)*

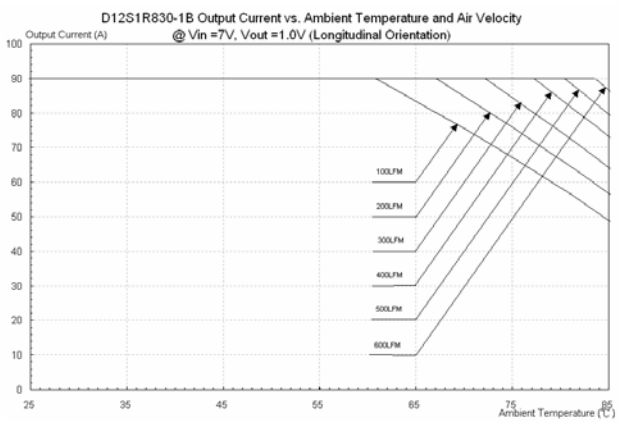


Figure 41: *Output current vs. ambient temperature and air velocity@ V_{in}=7V, V_{out}=1.0V (Longitudinal Orientation)*

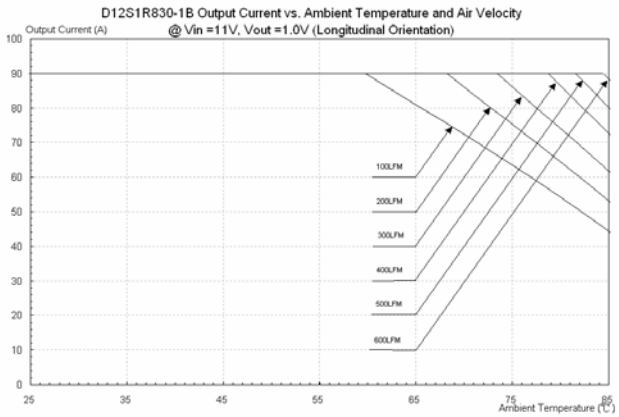


Figure 42: *Output current vs. ambient temperature and air velocity@ V_{in}=11V, V_{out}=1.0V (Longitudinal Orientation)*

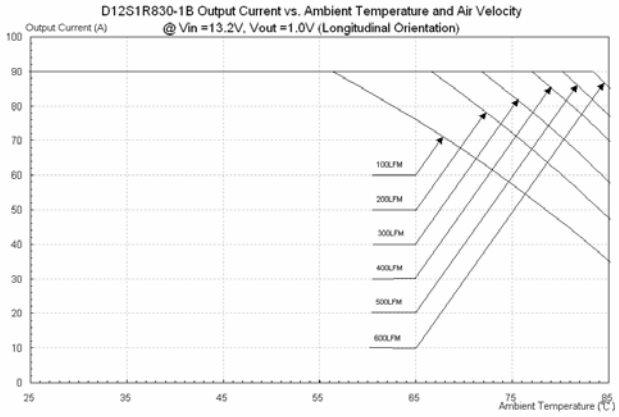


Figure 43: *Output current vs. ambient temperature and air velocity@ V_{in}=13.2V, V_{out}=1.0V (Longitudinal Orientation)*

Parallel Module (Transverse Orientation)

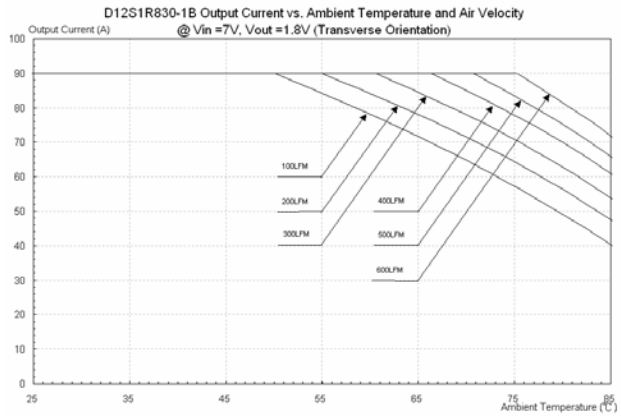


Figure 44: *Output current vs. ambient temperature and air velocity@ V_{in}=7V, V_{out}=1.8V (Transverse Orientation)*

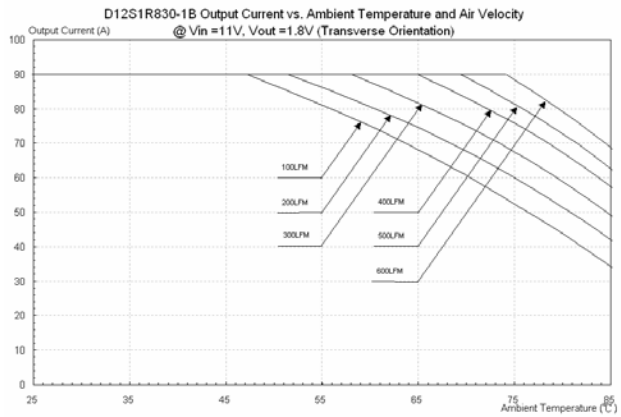


Figure 45: *Output current vs. ambient temperature and air velocity@ V_{in}=11V, V_{out}=1.8V (Transverse Orientation)*

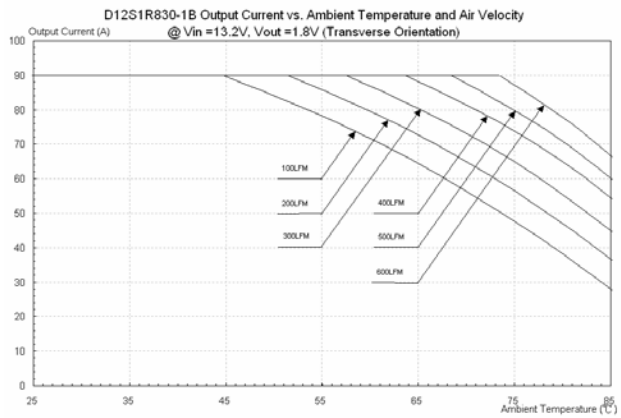


Figure 46: *Output current vs. ambient temperature and air velocity@ V_{in}=13.2V, V_{out}=1.8V (Transverse Orientation)*

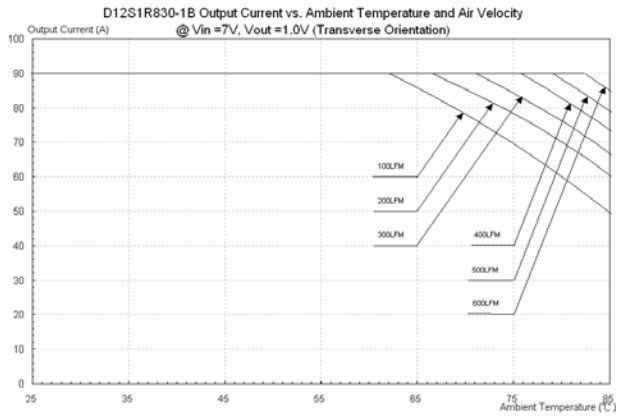


Figure 47: *Output current vs. ambient temperature and air velocity@ V_{in}=7V, V_{out}=1.0V (Transverse Orientation)*

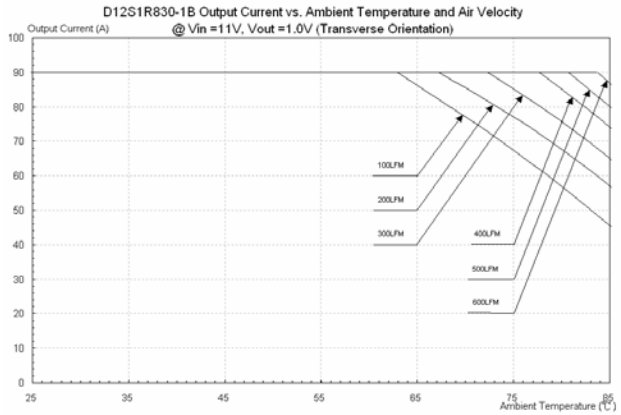


Figure 48: *Output current vs. ambient temperature and air velocity@ V_{in}=11V, V_{out}=1.0V (Transverse Orientation)*

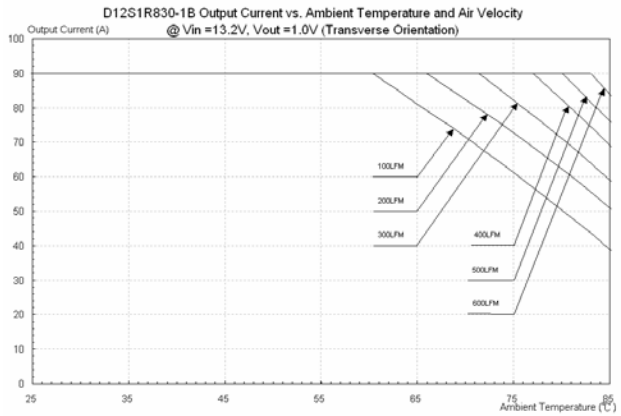
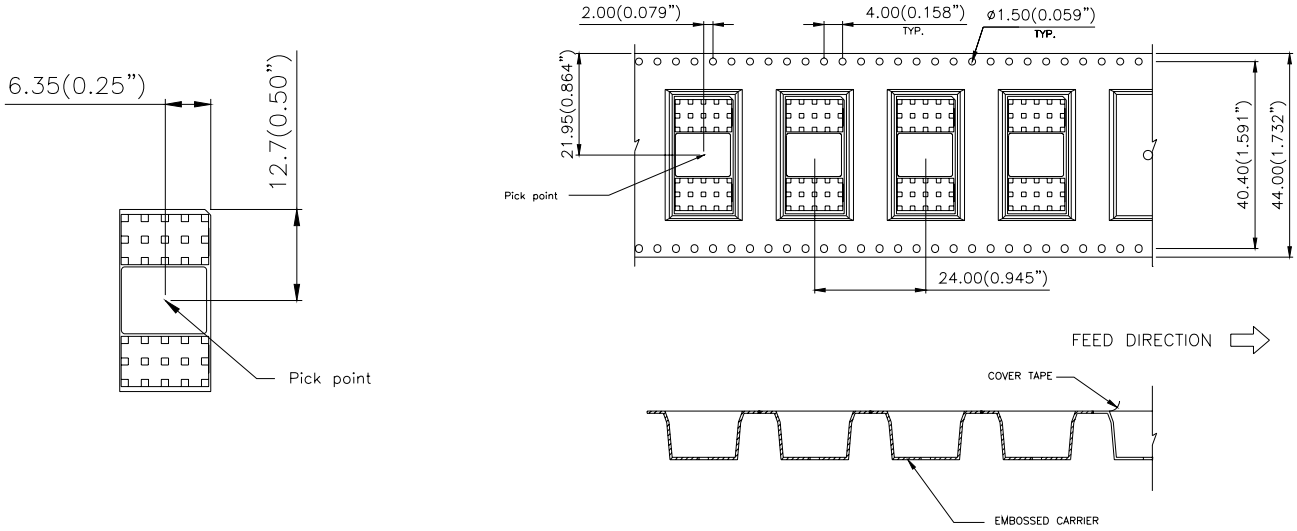
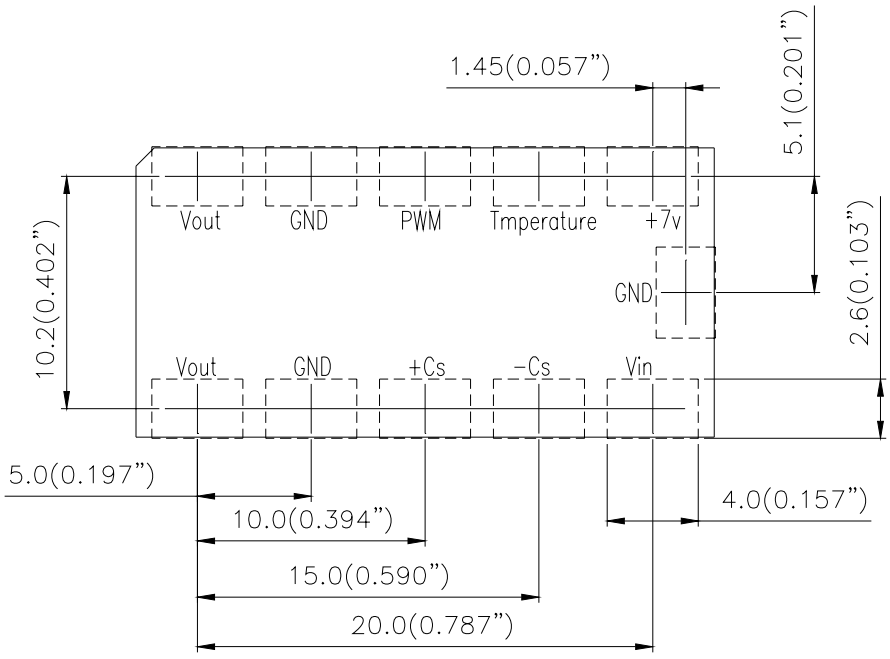


Figure 49: *Output current vs. ambient temperature and air velocity@ V_{in}=13.2V, V_{out}=1.0V (Transverse Orientation)*

MECHANICAL CONSIDERATIONS

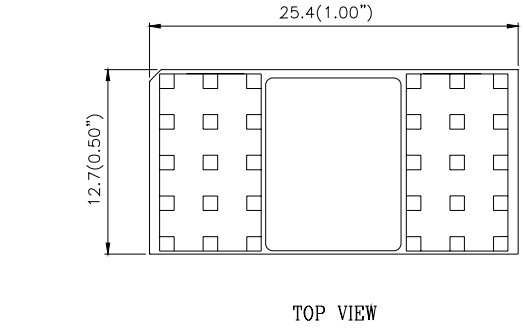
SURFACE-MOUNT TAPE & REEL



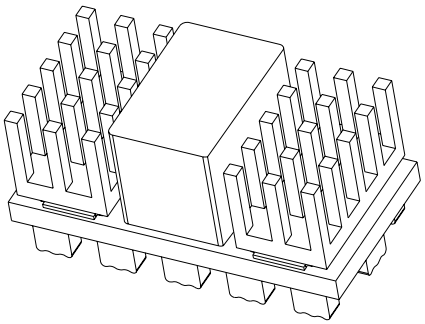


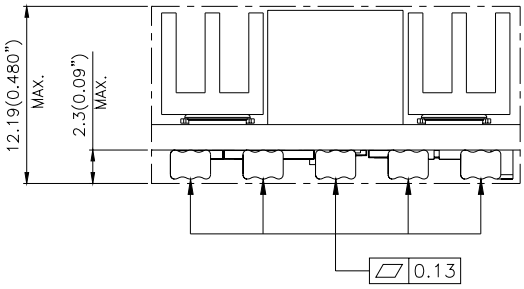
RECOMMENDED P.W.B PAD LAYOUT

MECHANICAL DRAWING

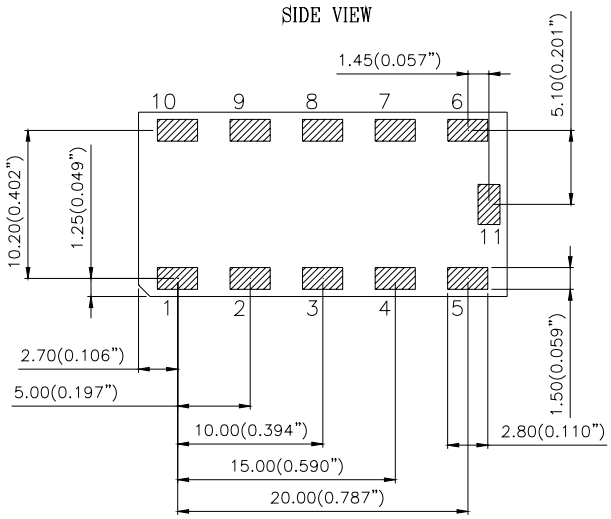


TOP VIEW





SIDE VIEW



BOTTOM VIEW

PIN#	Function
1	Vout
2	GND
3	PWM
4	Temperature
5	+7V
6	Vin
7	−Cs
8	+Cs
9	GND
10	Vout
11	GND

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	1R8	30	B
Type of Product	**Input Voltage**	**Number of Outputs**	**Output Voltage**	**Output Current**	**Option Code**
D - DC/DC modules	12 - 7 ~13.2V	S - Single	1R8 - 0.8~1.8V	30 - 30A max	B- Standard

MODEL LIST

Model Name	Input Voltage	Output Voltage	Output Current	RoHS 5/6 complaint	Total Height	Efficiency 9.6Vin, 1.8Vout @ 100% load
D12S1R830B	7.0 ~ 13.2Vdc	0.8V ~ 1.8V	30A	Yes	0.48"	90.2%

CONTACT: www.delta.com.tw/dcdc

USA:
Telephone:
East Coast: (888) 335 8201
West Coast: (888) 335 8208
Fax: (978) 656 3964
Email: DCDC@delta-corp.com

Europe:
Phone: +41 31 998 53 11
Fax: +41 31 998 53 53
Email: DCDC@delta-es.com

Asia & the rest of world:
Telephone: +886 3 4526107
ext 6220~6224
Fax: +886 3 4513485
Email: DCDC@delta.com.tw

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.