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HIGH EFFICIENCY 3500 W DC-DC POWER SUPPLY
TDM3K5 – 3500 W

DS-TDM3K5 REV. C SEPTEMBER 2008

DESCRIPTION

The TDM3K5 is a high efficiency, compact form factor and single output DC-DC power supply.

Offering 3500 W of regulated DC power from a 9.94 in x 5.12 in x 2.7 in, fully enclosed aluminum box, the TDM3K5 presents a power density of 32 W/in³, enabling designers to offer smaller systems.

The TDM3K5 step up function enables system designers to increase the allowed voltage drop along the distribution cables while reducing the system input capacitance, necessary to meet the hold up time requirements.

By converting energy at >96 % efficiency, the TDM3K5 generates less heat facilitating higher reliability and space saving designs.

The TDM3K5 presents two different output voltage settings, -58 V and -65 V respectively for ANSI and ETSI standards and it is equipped with an internal fan.

2 YEAR WARRANTY

KEY FEATURES

3500 W Non Isolated Power Supply
Very compact form factor of 9.94 in x 5.12 in x 2.7 in
Extremely high efficiency >96 % (typ)
-58 V and -65 V, standard output variants
-38.4 V to -72 V Input Voltage Range
OVP and Short Circuit Protection
Over Temperature Protection
RoHS Compliant

TARGET APPLICATIONS

Networking and Communications Equipment
Telecom Central Office
Optical Switching and Hubs
Routers
ETSI Standard
ANSI Standard
WiMax Base Stations

MODELS AND OUTPUT SPECIFICATIONS

Model	V ANSI setting [1]	I Current ANSI setting [1]	V ETSI setting [1]	I Current ETSI setting [1]	V Ripple Pk-Pk [2]
TDM3K5-48S58	-58 V	60 A	-	-	200 mV
TDM3K5-48S65	-	-	-65 V	54 A	200 mV

[1] Performed at the factory.
[2] Measured at 40 MHz Bandwidth.

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Input Specifications

Specification	Test Conditions / Notes	Minimum	Nominal	Maximum	Units
DC Input Voltage		-38.4	-48	-72	V
Input Current	At V_{in} = -38.4 V			97	A
Inrush Current	-72 V Cold start		30		A
Efficiency	Rated at Full Load and Nominal Input Voltage		96 %		

Output Specifications

Specification	Test Conditions / Notes	Minimum	Nominal	Maximum	Units
Output Voltage V ANSI	when -58V < V_{in} < -40V [3]	-56.26	-58	-59.74	V
Output Voltage V ETSI	when -65V < V_{in} < -38.4V [3]	-63.05	-65	-66.95	V
Output Power	ANSI/ETSI			3500	W
Voltage Set Point Accuracy	ANSI/ETSI			$\pm$0.5 %	
Voltage Adjustment Range	Digitally Adjustable at the factory	-45		-65	V
Line Regulation	ANSI/ETSI			$\pm$1 %	
Load Regulation	ANSI/ETSI			$\pm$1.5 %	
Transient Response (Voltage Deviation)	ANSI/ETSI 50 % Load changes at 1.5 A/µs and C_{out}= 20000 µF			$\pm$2 %	
Ripple & Noise	ANSI/ETSI Peak-Peak 40 MHz Bandwidth at 100 uF Maximum Load			200	mV
Rise Time	ANSI/ETSI -48 V at Maximum Load and C_{out}= 20000 uF	100		500	ms
Start-up Delay	ANSI/ETSI			1.9	s
Turn-on Overshoot	Percentage of V_{out}		3 %		
Hold-up Time	Internal auxiliary converter [4]	5			ms
Minimum Load	ANSI/ETSI	0			A
Temperature Drift	ANSI/ETSI	-65		+65	mV/°C

[3] For input voltage greater then the output voltage set point, the converter becomes a pass through.
[4] The hold up time is achieved on the output side and it is related to the output capacitance value.

Serial Communications

Specification	Signals
Electronic Label System	2 Kbit serial SPI E²PROM
Signals	Input Voltage Alarm Fan Off Alarm Output Under Voltage Alarm Internal Alarm
Control Switch	ON/OFF ANSI/ETSI No Load Sense
Led Signals	DC OK Fault Condition

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PROTECTION FEATURES & SAFETY APPROVALS

Specification	Test Conditions / Notes	Minimum	Nominal	Maximum	Units
Input Under Voltage start-up	ANSI ETSI	-42.5 -40	-43 -40.5	-43.5 -41	V
Input Under Voltage shut- down	ANSI ETSI	-37.5 -35	-38.5 -36	-39.5 -37	V
Input Fuse	Negative Pole		125		A
Over Current Protection	ANSI 1 s delayed shutdown [5] ETSI 1 s delayed shutdown [5]	62 56	67 60.5	72 65	A
Over Voltage Protection	ANSI/ETSI Under Fault conditions, the Maximum Voltage	80	81	82	V
Short Circuit Protection	Auto Recovery if less then 1 s		Yes		
Over Temperature Protection	Shutdown with Auto Recovery			Yes	
No Load Sense Threshold	Shut down Output Current (Stand-By [6]) Start Up Output Current (Staring from Stand-By)	10 1		25 2	mA mA
Stand By Voltage	ETSI/ANSI	- 15.2	- 16	- 16.8	V
Isolation Input/Output	No isolation				
Isolation Input/Ground		1500			V_{dc}
Isolation Output/Ground		1500			V_{dc}
Safety Approvals	Meet UL 60950-1				
Safety Standards	IEC, UL, EN60950-1; CSAC22.2 No.60950-1-03				
Agency File Numbers	$_{c}UR_{US}$: E134098-A16-UL-2 DEMKO Certificate: 143262-01 CB Certificate: DK-11311 CB Report: E134098-A16-CB-2				

[5] The unit will limit the output current for 1 s in order to allow the selective disconnection of the failed unit.
[6] The output voltage will pass from its regulated voltage to a stand by condition.

ELECTRO-MAGNETIC COMPATABILITY EMC

Specification	Test Conditions / Notes	Standard	Performance criteria
Conducted EMI	R3-11 Tab. 3-5 class A	GR1089-CORE	A
Radiated EMI	R3-2 Tab. 3-1 class A	GR1089-CORE	A
ESD	15 kV air discharge, 8 kV contact at any point of System Level 4	EN61000-4-2	A
Radiated Emissions	H Field R3-9 E Field R3-2 Tab 3.1	GR1089-CORE GR1089-CORE	A A
EFT	1KV on DC 5KHz repetition	EN61000-4-4	A
Conducted RF Immunity	3 Vrms, 0,15-80 MHz, 1 KHz/2 Hz 80 % AM modulation	EN61000-4-6	A

ENVIRONMENTAL SPECIFICATIONS

Specification	Test Conditions / Notes	Min	Nominal	Max	Units
Operating Temperature Range	Without de-rating	-25		50	°C
Storage Temperature Range		-40		85	°C
Humidity	RH, Non-condensing operating Non-operating			90 95	% %
Operating Altitude				3000	m
MTBF	83.3 % Full Load, Nominal V_{in} +30 °C, MIL-HDBK-217-E-1	700000			hour
Cooling	Internal fan Temperature Controlled		Yes		

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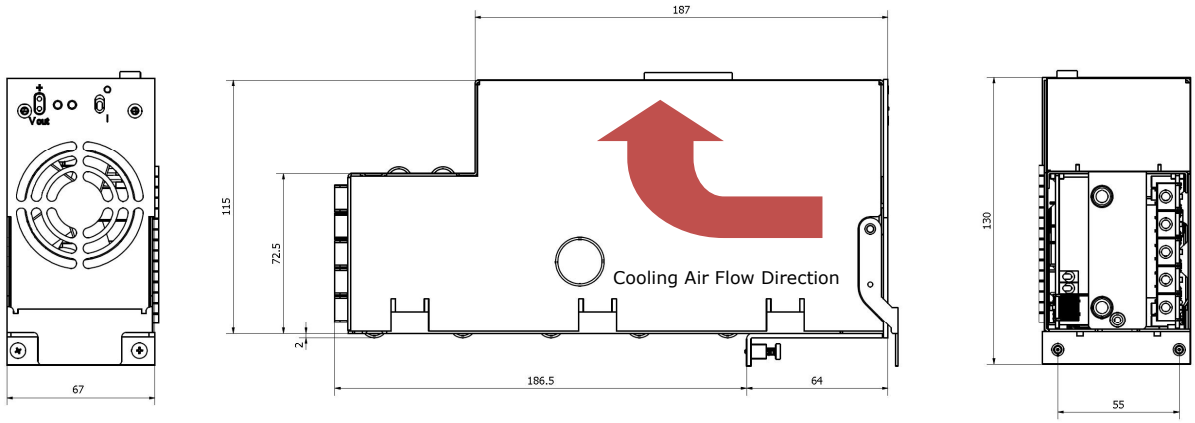
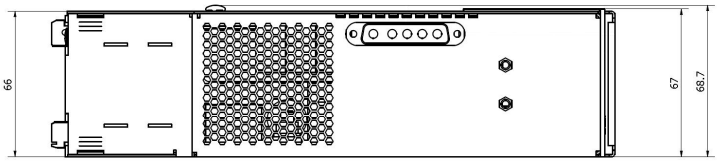
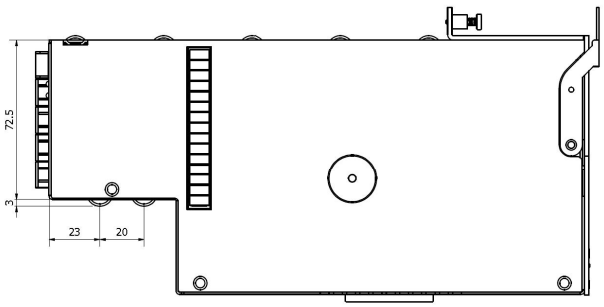
MECHANICAL SPECIFICATION

Case	Fully enclosed metal box IP20 conform
Outline Dimensions	252.5 mm x 130 mm x 69 mm = 9.94 in x 5.12 in x 2.7 in
Weight	< 2 Kg = < 4.4 lb



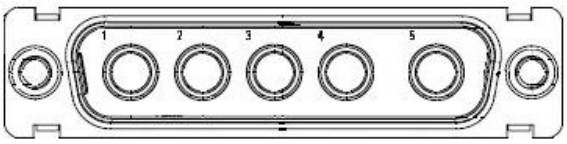


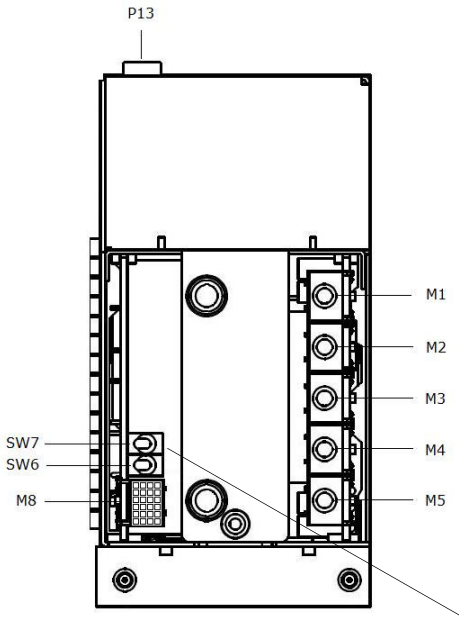


MODULE INPUT/OUTPUT CONNECTIONS

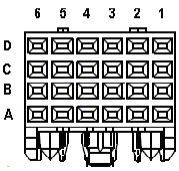
Connector	Manufacturer and Part Number
M1, M2, M3, M4, Input Connectors	COMPEL 350.136.996 (Right Angle Terminal + Housing)
M1, M2, M3, M4, Mating Connector	COMPEL 350.131.999 (Terminal + Housing)
M5 Ground Connector GND	COMPEL 350.136.995 (Right Angle Terminal + Housing)
M5 Ground Mating Connector	COMPEL 350.131.998 (Terminal + Housing)
M8 Signal Connector	FCI 88945-302LF (Right Angle 4 Raw)
M8 Mating Connector	FCI 70264-301LF
P13 Output Connector	ITT CANON DJT120070-229 (Right Angle Terminal + Housing)
P13 Mating Connector	ITT CANON DBM5WSA197 (Receptacle) ITT CANON DM53744-1 (Solder Terminal)
SW6 Switch	APEM TL36WW00050 (Manual Switch)
SW7 Switch	APEM TL36WW00050 (Manual Switch)

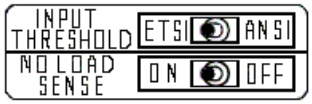
P13





M8





Output Connector P13	
Pin Number	**Pin Function**
1	DC Return
2	DC Return
3	GND
4	-58 V /-65 V
5	-58 V / -65 V
Input Connector M1, M2, M3, M4	
Pin Number	**Pin Function**
M1	+ Vin
M2	+Vin
M3	-Vin
M4	-Vin
M5	DC Ground
Output Connector M8	
Pin Number	**Pin Function**
1A	Signal Return
2A	-
3A	Input Voltage Alarm
4A	
5A	+3.3 Vcs
6A	-
1B	-
2B	Fan Off Alarm
3B	-
4B	-
5B	EECS
6B	EEDI
1C	Output Under Voltage Alarm
2C	-
3C	-
4C	-
5C	-
6C	EECK
1D	-
2D	Internal Alarm
3D	-
4D	-
5D	-
6D	Signal Return
Switch Settings SW6, SW7	
Switch Number	**Switch Function**
SW6	No Load Sense
SW7	ETSI/ANSI Range Setting

Europe, Middle East and Africa

ROAL Electronics S.p.A
Via Jesina 56/A
60022 – Castelfidardo (AN) - Italy
Tel:+39 071 721461
Fax:+ 39 071 72146 480

www.roallivingenergy.com

North America

ROAL Electronics USA, Inc.
701, Main St. Suite 405
Stroudsburg, PA18360
Phone: + 1 570 421 5750
Fax: +1 570 421 5687