Series 1693

17 – 40 Watt Hybrid

For demanding industrial applications not requiring military specifications

Features

- Hermetic packaging protects against harsh environments
- Built-in EMI filter limits conducted emissions and reduces transient susceptibility
- Short circuit proof – inherent dual mode overcurrent protection
- Fixed frequency operation offers low ripple and fast load transient response
- User programmable soft start for Vout ramp
- Sync input
- Power on/off – ground INH to shut output: low quiescent current
- Precision RF feedback – no optical devices used
- Parallelable – for higher output prime or redundant power applications

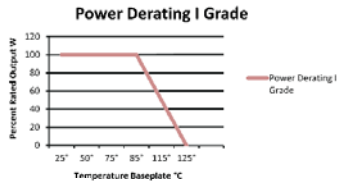
Specifications

INPUT: 24 VDC nominal
Range: 18 to 50 VDC
Operates through input transients of up to 80 V

ISOLATION:
Input to case: 100 MOhms at 500 VDC
Input to output: 100 MOhms at 500 VDC
Output to case: 10 MOhms at 100 VDC

ENVIRONMENT:
Storage temperature: -55°C to +150°C
Mechanical Shock: 50 G's, 11 mSec 1/2 sine pulse, 3X each axis
Random Vibration: 30 G's 50 – 2000Hz, 6dB/octave ramp, .6 PSD, 32g RMS overall

DERATING:
Full Power Output at T_{case} = +85°C
Linearly derates to 50% at T_{case} = +115°C



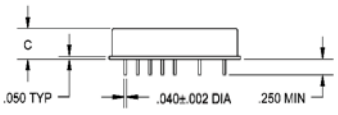
WEIGHT: 56 grams typical

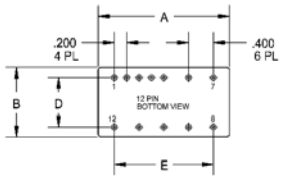
SINGLE OUTPUT DEVICES		1693-S03.3 (26.4W)			1693-S05 (40W)			1693-S05.2 (40W)			1693-S12 (40W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1	+5.1	+5.2	+5.3	+11.9	+12.0	+12.1
Output current	$V_{in\,min} - V_{in\,max}$	—	—	8A	—	—	8A	—	—	7.69A	—	—	3.33A
Efficiency	P_{out} = max rated load	66%	69%	—	69%	73%	—	71%	74%	—	78%	82%	—
Line regulation	P_{out} = max rated load $V_{in\,min} - V_{in\,max}$	—	10mV	30mV	—	10mV	50mV	—	10mV	50mV	—	20mV	100mV
Load regulation	P_{out} = 10% to F.L.	—	10mV	30mV	—	10mV	50mV	—	10mV	50mV	—	20mV	100mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	30	65	—	40	85	—	40	85	—	60	150

SINGLE OUTPUT DEVICES		1693-S15 (40W)			1693-S28 (40W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+14.9	+15.0	+15.1	+27.8	+28.0	+28.2
Output current	$V_{in\,min} - V_{in\,max}$	—	—	2.67A	—	—	1.43A
Efficiency	P_{out} = max rated load	79%	83%	—	78%	82%	—
Line regulation	P_{out} = max rated load $V_{in\,min} - V_{in\,max}$	—	25mV	125mV	—	50mV	250mV
Load regulation	P_{out} = 10% to F.L.	—	25mV	125mV	—	50mV	250mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	75	180	—	150	350

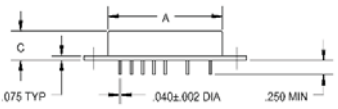
Model No.		Case Style	Pin Count	Mounting
1693		2	12	Solder Sealed Flangeless PCB Mount
1693	F	3	12	Solder Sealed PCB Mount with Flange
1693	XF	8	12	Seam Weld Chassis Mount with Flange
1693	PC	10	12	Solder Sealed Flangeless PCB Stud Mount

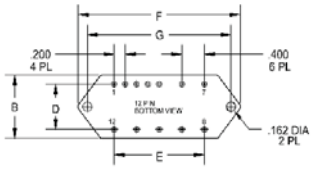
CASE STYLE 2
Solder Sealed
Flangeless PCB Mount



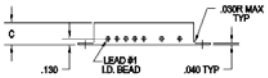


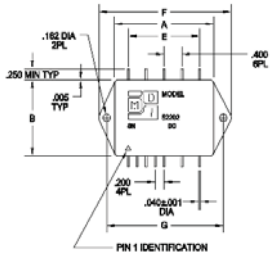
CASE STYLE 3
Solder Sealed
PCB Mount with Flange





CASE STYLE 8
Seam Weld
Chassis Mount with Flange





Case Dimensions

Units: inches | millimeters

TOLERANCES: ALL DIMENSIONS ±0.01 EXCEPT F= MAX. C = +0.01/-0.02; **DRAWINGS IN INCHES.**

Case Style		A	B	C	D	E	F	G
2		2.205 | 56.007	1.755 | 44.577	0.495 | 12.573	1.400 | 35.560	1.600 | 40.640	— | —	— | —
3	F	2.205 | 56.007	1.755 | 44.577	0.495 | 12.573	1.400 | 35.560	1.600 | 40.640	2.960 | 75.184	2.610 | 66.294
8	XF	2.220 | 56.388	2.110 | 53.594	0.495 | 12.573	— | —	1.600 | 40.640	2.960 | 75.184	2.610 | 66.294
10	PC	2.220 | 56.388	1.760 | 44.704	0.495 | 12.573	1.400 | 35.560	1.600 | 40.640	— | —	— | —

Modular Devices, Inc. • One Roned Road • Shirley, New York 11967
www.mdipower.com • Fax 631.345.3106 • **Tel 631.345.3100**

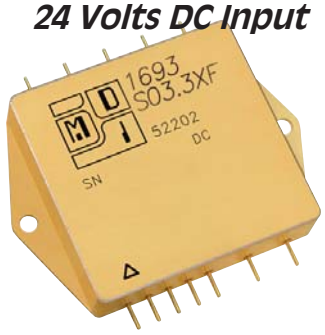
Released 2015-09-04

Series 1693

DC – DC Converters

INDUSTRIAL GRADE

24 Volts DC Input

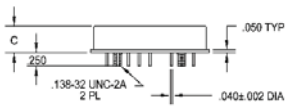


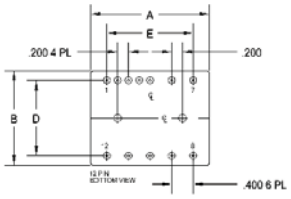
DUAL OUTPUT DEVICES		1693-D05 (40W)			1693-D12 (40W)			1693-D15 (40W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+4.9	+5.0	+5.1	+11.9	+12.0	+12.1	+14.9	+15.0	+15.1
		-4.9	-5.0	-5.1	-11.9	-12.0	-12.1	-14.9	-15.0	-15.1
Output current*	$V_{in\,min} - V_{in\,max}$	±150mA	—	±4A	±95mA	—	±1.67A	±76mA	—	±1.33A
Efficiency	P_{out} = max rated load	73%	76%	—	78%	82%	—	79%	83%	—
Line regulation	P_{out} = max rated load $V_{in\,min} - V_{in\,max}$	—	±10mV	±50mV	—	±20mV	±100mV	—	±25mV	±125mV
Load regulation†	P_{out} = 10% to F.L.	—	±10mV	±50mV	—	±20mV	±100mV	—	±25mV	±125mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	40	85	—	60	150	—	75	180

Notes: *Up to 90% full power available from either output if rated output power is not exceeded; †balanced load conditions.

TRIPLE OUTPUT DEVICES		1693-T3.3/5 (17.7W)			1693-T3.3/12 (24W)			1693-T3.3/15 (25.2W)			1693-T05 (19.5W)			1693-T12 (25.8W)			1693-T15 (27W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out} = -I_{out}$	+3.2	+3.3	+3.4	+3.2	+3.3	+3.4	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1	+4.9	+5.0	+5.1	+4.9	+5.0	+5.1
		+4.9	+5.0	+5.1	+11.9	+12.0	+12.1	+14.9	+15.0	+15.1	+4.9	+5.0	+5.1	+11.9	+12.0	+12.1	+14.9	+15.0	+15.1
		-4.9	-5.0	-5.1	-11.9	-12.0	-12.1	-14.9	-15.0	-15.1	-4.9	-5.0	-5.1	-11.9	-12.0	-12.1	-14.9	-15.0	-15.1
Output current	$V_{in\,min} - V_{in\,max}$	400mA	—	4A	400mA	—	4A	400mA	—	4A	90mA	—	3A	90mA	—	3A	90mA	—	3A
		±40mA	—	±450mA	±40mA	—	±450mA	±32mA	—	±400mA	±40mA	—	±450mA	±40mA	—	±450mA	±32mA	—	±400mA
Efficiency	P_{out} = max rated load	66%	69%	—	66%	69%	—	66%	69%	—	66%	69%	—	71%	74%	—	71%	74%	—
Line regulation	P_{out} = max rated load $V_{in\,min} - V_{in\,max}$	—	10mV	50mV	—	10mV	50mV	—	10mV	50mV	—	10mV	50mV	—	10mV	50mV	—	10mV	50mV
		—	25mV	50mV	—	25mV	50mV	—	25mV	50mV	—	25mV	50mV	—	25mV	50mV	—	25mV	50mV
Load regulation	P_{out} = 10% to F.L.	—	10mV	50mV	—	10mV	50mV	—	10mV	50mV	—	10mV	50mV	—	10mV	50mV	—	10mV	50mV
		—	25mV	50mV	—	25mV	50mV	—	25mV	50mV	—	25mV	50mV	—	25mV	50mV	—	25mV	50mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	30	65	—	30	65	—	30	65	—	40	85	—	40	85	—	40	85
		—	—	50	—	—	50	—	—	50	—	—	50	—	—	50	—	—	50

CASE STYLE 10
Solder Sealed
Flangeless PCB Stud Mount





1693-SXX output < 24 VDC				1693-SXX output ≥ 24 VDC				1693-DXX				1693-TXX			
Pin 1	N/C	Pin 7	+ Input	Pin 1	N/C	Pin 7	+ Input	Pin 1	N/C	Pin 7	+ Input	Pin 1	N/C	Pin 7	+ Input
Pin 2	Inhibit Not	Pin 8	Main Output	Pin 2	Inhibit Not	Pin 8	+ Remote Sense	Pin 2	Inhibit Not	Pin 8	+ Remote Sense	Pin 2	Inhibit Not	Pin 8	Main Output
Pin 3	Soft Start	Pin 9	Main Output Ret	Pin 3	Soft Start	Pin 9	- Remote Sense	Pin 3	Soft Start	Pin 9	- Remote Sense	Pin 3	Soft Start	Pin 9	Main Output Ret
Pin 4	Sync	Pin 10	+ Remote Sense	Pin 4	Sync	Pin 10	Main Output	Pin 4	Sync	Pin 10	+ Dual Output	Pin 4	Sync	Pin 10	+ Dual Output
Pin 5	N/C	Pin 11	Adjust	Pin 5	Adjust	Pin 11	N/C	Pin 5	Adjust	Pin 11	Dual Output Ret	Pin 5	N/C	Pin 11	Dual Output Ret
Pin 6	Input Ret	Pin 12	- Remote Sense	Pin 6	Input Ret	Pin 12	Main Output Ret	Pin 6	Input Ret	Pin 12	- Dual Output	Pin 6	Input Ret	Pin 12	- Dual Output