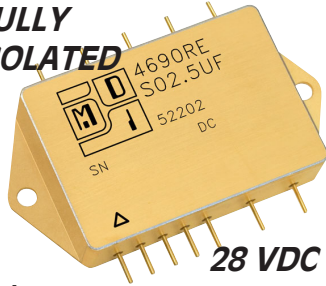


Series 4690

Proton Rad Hard 100K + [®] DC – DC Converters

FULLY ISOLATED



Features

- Rad Hard: TID > 100 kRad (Si)
- 2:1 margin: Operates beyond 200 kRad TID
- No SEE: LET > 82MeV*cm²/mg
- Proton Resistant: No optocouplers used
- Efficiency optimized for low power applications
- Typical no load quiescent current <15 mA at 28 VDC
- Typical INH (OFF) quiescent current <275µA
- Completely self contained Thick Film Hybrid DC-DC Converter
- No external filter caps required
- Fully isolated design
- "Inhibit-not" function
- Power on soft start
- 100 kHz operation for low ripple and fast response time
- Built-in EMI input filter meets MIL-STD-461C requirements CE01, CE03, CS01, CS02 and CS06
- Short circuit and overvoltage protection
- Capability of external sync for switching frequencies
- Built-in test capability

Specifications

INPUT: 28 VDC nominal
Range: 16 to 50 VDC continuous
 Survives 80 V transients/MIL-STD-704A

ISOLATION:
 Input to case: 500 VDC
 Input to output: 500 VDC
 Output to case: 100 VDC

ENVIRONMENT:
 Storage temperature: -55°C to +150°C
 Shock: 50 G's
 Acceleration: 500 G's
 Vibration: 30 G's

Grades EU, L, R & S:
 Full Power Output at Tcase = +85°C
 Linearly derates to zero at Tcase = +115°C
 Grades LE, RE & SE:
 Full Power Output at Tcase = +125°C
 Linearly derates to zero at Tcase = +135°C
 Grades L & LE:

TID up to 45 kRad (Si)
 No SEE up to 60MeV*cm²/mg
WEIGHT: 50 grams typical

Note:
 All units operate to no load. Minimum load is the measurement point for load regulation.

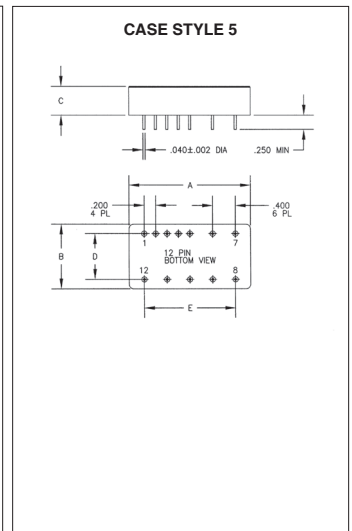
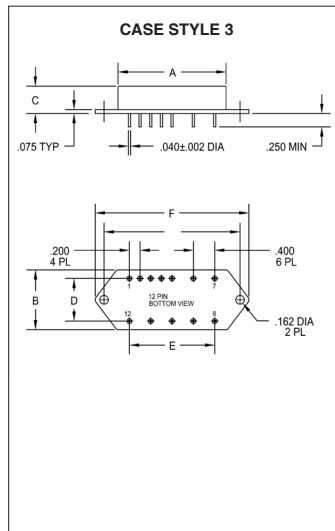
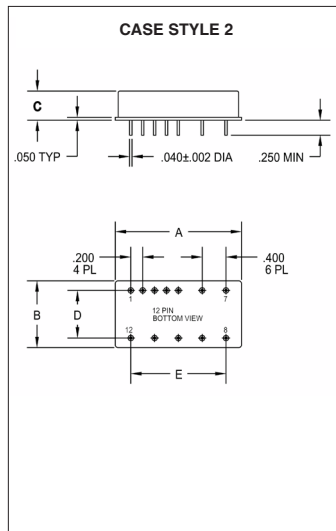
SINGLE OUTPUT DEVICES		4690-S02 (2.5W)			4690-S02.5 (2.5W)			4690-S03.3 (2.5W)			4690-S05 (2.5W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+1.9	+2.0	+2.1	+2.4	+2.5	+2.6	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1
Output current	$V_{in\ min} - V_{in\ max}$	125mA	—	1.25A	0.1A	—	1A	75mA	—	0.75A	0.50mA	—	0.50A
Efficiency	P _{out} = max rated load	70%	74%	—	72%	77%	—	67%	69%	—	73%	77%	—

Line regulation	$P_{out} = \text{max rated load}$ $V_{in\ min} - V_{in\ max}$	—	10mV	30mV	—	10mV	30mV	—	10mV	30mV	—	10mV	50mV
Load regulation	P _{out} = 10% to F.L.	—	50mV	100mV	—	62mV	125mV	—	75mV	250mV	—	0.1V	0.3V
Output Ripple	F.L BW 2 MHz mV _{pp}	—	30	65	—	30	65	—	3	100	—	40	125

SINGLE OUTPUT DEVICES		4690-S05.2 (2.5W)			4690-S12 (2.5W)			4690-S15 (2.5W)			4690-S28 (2.5W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+5.1	+5.2	+5.3	+11.9	+12.0	+12.1	+14.9	+15.0	+15.1	+27.8	+28.0	+28.2
Output current	$V_{in\ min} - V_{in\ max}$	48mA	—	480mA	20.8mA	—	0.208A	16.7mA	—	0.167A	9mA	—	90mA
Efficiency	P _{out} = max rated load	77%	82%	—	81%	85%	—	81%	86%	—	81%	86%	—

Line regulation	$P_{out} = \text{max rated load}$ $V_{in\ min} - V_{in\ max}$	—	10mV	50mV	—	20mV	100mV	—	25mV	125mV	—	50mV	250mV
Load regulation	P _{out} = 10% to F.L.	—	0.1V	0.2V	—	0.25V	0.5V	—	0.3V	0.6V	—	600mV	1.2V
Output Ripple	F.L BW 2 MHz mV _{pp}	—	40	85	—	60	150	—	75	180	—	150	350

Model No.	Case Style	Pin Count	Mounting
4690	2	12	Solder Sealed Flangeless PCB Mount
4690 F	3	12	Solder Sealed PCB Mount with Flange
4690 G	5	12	Seam Weld Flangeless PCB Mount
4690 GF	6	12	Seam Weld PCB Mount with Flange
4690 UF	8	12	Seam Weld Chassis Mount with Flange



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

Case Dimensions

Units: inches | millimeters

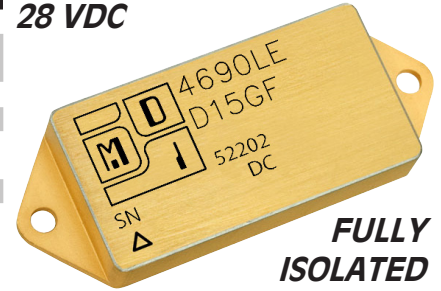
Case Style	A	B	C	D	E	F	G
2	2.130 54.102	1.120 28.448	0.375 9.525	0.800 20.320	1.600 40.640	— —	— —
3 F	2.130 54.102	1.120 28.448	0.375 9.525	0.800 20.320	1.600 40.640	2.890 73.406	2.550 64.770
5 G	2.130 54.102	1.120 28.448	0.375 9.525	0.800 20.320	1.600 40.640	— —	— —
6 GF	2.130 54.102	1.120 28.448	0.375 9.525	0.900 20.320	1.600 40.640	2.890 73.406	2.550 64.770
8 UF	2.160 54.864	1.510 38.354	0.495 12.573	— —	1.600 40.640	2.890 73.406	2.550 64.770

Series 4690

2.5 Watt Hybrid

DUAL OUTPUT DEVICES		4690-D05 (2.5W)			4690-D12 (2.5W)			4690-D15 (2.5W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$V_{out} = -I_{out}$	+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*	$V_{in, min} - V_{in, max}$	±25mA	—	±250mA	±10.4mA	—	±104mA	±8.3mA	—	±83mA
Efficiency	$P_{out} = \text{max rated load}$	71%	82%	—	81%	85%	—	81%	86%	—
Line regulation	$P_{out} = \text{max rated load}$ $V_{in, min} - V_{in, max}$	—	±10mV	±250mV	—	±20mV	±100mV	—	±25mV	±250mV
Load regulation†	$P_{out} = 10\% \text{ to F.L.}$	—	±50mV	±300mV	—	±250mV	±0.5V	—	±0.3V	±0.6V
Output ripple	F.L. BW 2 MHz mV _{pp}	—	40	85	—	60	150	—	75	180

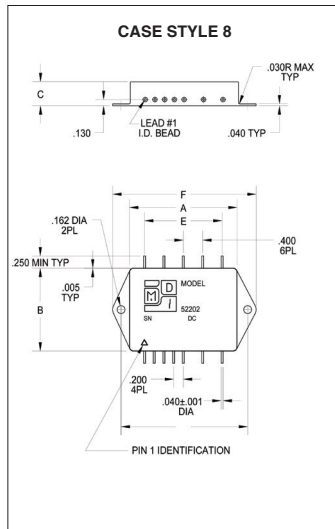
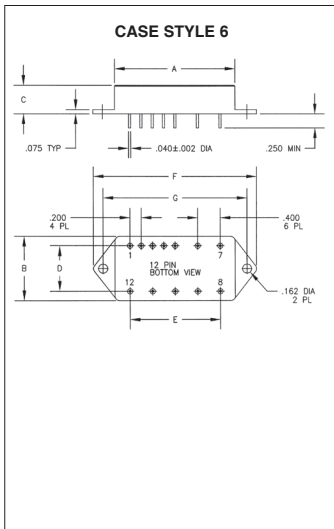
28 VDC



FULLY ISOLATED

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

TRIPPLE OUTPUT DEVICES		4690-T05 (2.5W)			4690-T12 (2.5W)			4690-T15 (2.5W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$V_{out} = -I_{out}$	+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
Output current	$V_{in, min} - V_{in, max}$	30mA	—	250mA	30mA	—	250mA	30mA	—	250mA
Efficiency	$P_{out} = \text{max rated load}$	65%	70%	—	72%	77%	—	73%	78%	—
Line regulation	$P_{out} = \text{max rated load}$ $V_{in, min} - V_{in, max}$	—	10mV	50mV	—	10mV	50mV	—	10mV	50mV
Load regulation	$P_{out} = 10\% \text{ to F.L.}$	—	10mV	50mV	—	10mV	50mV	—	10mV	50mV
		—	100mV	200mV	—	100mV	200mV	—	100mV	200mV
Output ripple	F.L. BW 2 MHz mV _{pp}	—	40	85	—	40	85	—	40	85



4690-SXX output < 24 VDC			4690-SXX output ≥ 24 VDC			4690-DXX			4690-TXX		
Pin 1	bit	Pin 7	+input	Pin 1	bit	Pin 7	+input	Pin 1	bit	Pin 7	+input
Pin 2	inhibit not	Pin 8	main output	Pin 2	inhibit not	Pin 8	N/C	Pin 2	inhibit not	Pin 8	main output
Pin 3	soft start	Pin 9	main output ret	Pin 3	soft start	Pin 9	N/C	Pin 3	soft start	Pin 9	main output ret
Pin 4	sync	Pin 10	N/C	Pin 4	sync	Pin 10	main output	Pin 4	sync	Pin 10	+dual output
Pin 5	N/C	Pin 11	N/C	Pin 5	N/C	Pin 11	N/C	Pin 5	N/C	Pin 11	dual output ret
Pin 6	input ret	Pin 12	N/C	Pin 6	input ret	Pin 12	main output ret	Pin 6	input ret	Pin 12	-dual output

Please specify **GRADE LEVEL** for your application. EU grade units will be shipped if no option is specified.

EU Engineering Units **L** 45 KRAD, +85°C military/aerospace **LE** 45 KRAD, +125°C Military/aerospace **R** 100 KRAD, +85°C military/aerospace
RE 100 KRAD, +125°C military/aerospace **S** 100 KRAD, +85°C space **SE** 100 KRAD, +125°C space