

# 19.5-40 Watt Hybrid

## Features

- Rad Hard: TID > 25kRad(Si)
- No SEE: LET > 37MeV\*cm<sup>2</sup>/mg
- Specifically designed for redundant or individual space applications
- Completely self contained Thick Film Hybrid DC-DC Converter
- No external filter caps required
- Fully isolated design
- "Inhibit-not" function
- Power on soft start
- 200 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:** 120 VDC nominal  
Range: 86 to 158 VDC continuous

**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

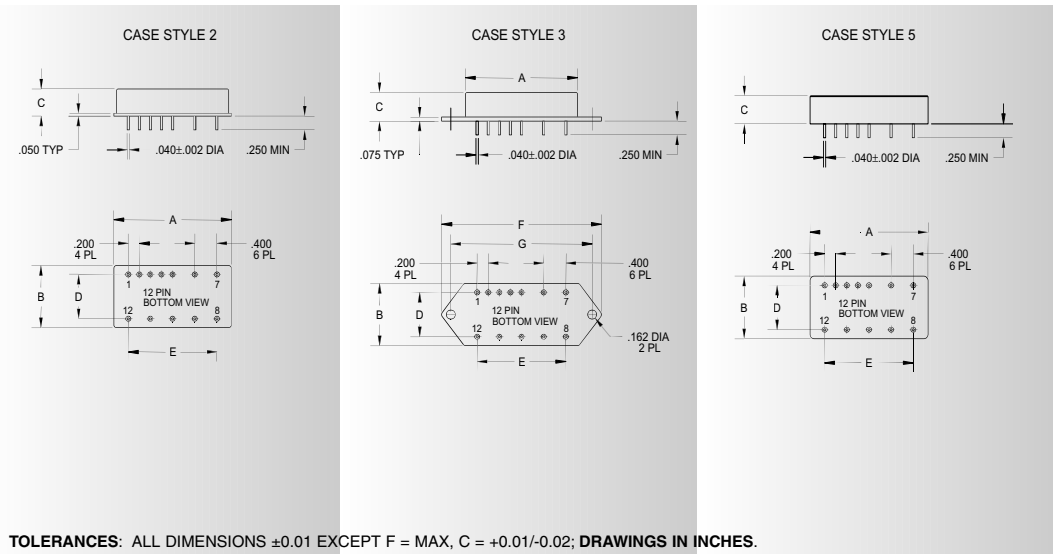
Grades EU, R & S:  
Full Power Output at T<sub>case</sub> = +85°C  
Linearly derates to zero at T<sub>case</sub> = +115°C  
Grades RE & SE:  
Full Power Output at T<sub>case</sub> = +125°C  
Linearly derates to zero at T<sub>case</sub> = +135°C

**WEIGHT:** 90 grams typical

SINGLE OUTPUT DEVICES		3326-S03.3 (26.4W)			3326-S05 (40W)			3326-S05.2 (40W)			3326-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 <sub>in min</sub> — V <sub>in max</sub>	—	—	8A	—	—	8A	—	—	7.69A	—	—	3.33A
Efficiency	P <sub>out</sub> = max rated load	65%	68%	—	71%	74%	—	71%	74%	—	78%	82%	—
Line regulation	P <sub>out</sub> = max rated load V <sub>in min</sub> — V <sub>in max</sub>	—	10mV	30mV	—	10mV	50mV	—	10mV	50mV	—	20mV	100mV
Load regulation	P <sub>out</sub> = 10% to F.L.	—	10mV	30mV	—	10mV	50mV	—	10mV	50mV	—	20mV	100mV
Output ripple	F.L. BW 2 MHz mV <sub>pp</sub>	—	30	65	—	40	85	—	40	85	—	60	150

SINGLE OUTPUT DEVICES		3326-S15 (40W)			3326-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 <sub>in min</sub> — V <sub>in max</sub>	—	—	2.67A	—	—	1.43A						
Efficiency	P <sub>out</sub> = max rated load	79%	83%	—	78%	82%	—						
Line regulation	P <sub>out</sub> = max rated load V <sub>in min</sub> — V <sub>in max</sub>	—	25mV	125mV	—	50mV	250mV						
Load regulation	P <sub>out</sub> = 10% to F.L.	—	25mV	125mV	—	50mV	250mV						
Output ripple	F.L. BW 2 MHz mV <sub>pp</sub>	—	75	180	—	150	350						

Model No.	Case Style	Pin Count	Mounting
3326	2	12	Solder Sealed Flangeless PCB Mount
3326	F	3	Solder Sealed PCB Mount with Flange
3326	J	5	Seam Weld Flangeless PCB Mount
3326	JF	6	Seam Weld PCB Mount with Flange
3326	XF	8	Seam Weld Chassis Mount with Flange
3326	PC	10	Solder Sealed Flangeless PCB Stud Mount



## Case Dimensions

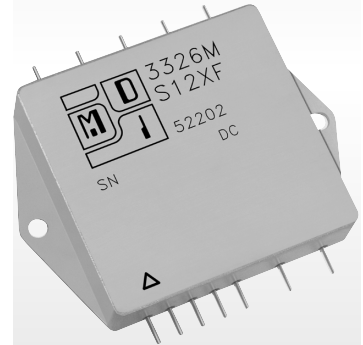
Units: inches | millimeters

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
5 J	2.190   55.626	1.755   44.577	0.495   12.573	1.400   35.560	1.600   40.640	—   —	—   —
6 JF	2.190   55.626	1.760   44.704	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	2.190   55.626	1.760   44.704	0.495   12.573	1.400   35.560	1.600   40.640	—   —	—   —

# RAD HARD DC-DC CONVERTERS

## FULL FEATURE SERIES

# 3326



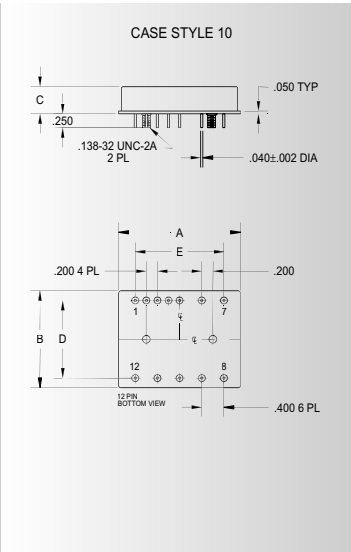
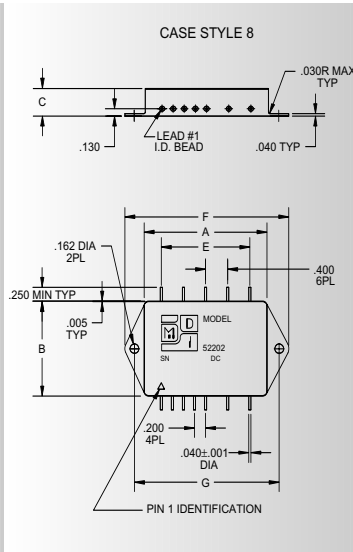
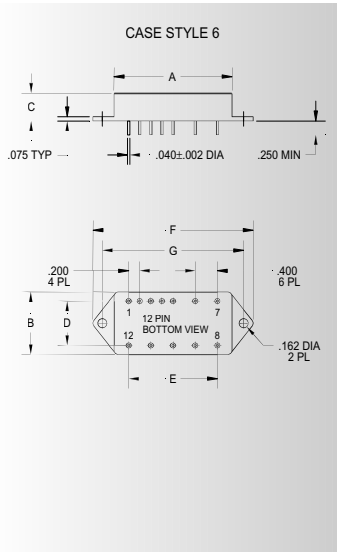
## 120 VDC

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DUAL OUTPUT DEVICES		3326-D05 (40W)			3326-D12 (40W)			3326-D15 (40W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out} = -I_{out}$	+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*	$V_{in\ min} - V_{in\ max}$	±150mA	—	±4A	±95mA	—	±1.67A	±76mA	—	±1.33A
Efficiency	$P_{out} = \text{max rated load}$	72%	76%	—	78%	82%	—	79%	83%	—
Line regulation	$P_{out} = \text{max rated load}$ $V_{in\ min} - V_{in\ max}$	—	±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 <sub>pp</sub>	—	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		3326-T3.3/5 (17.5W)			3326-T3.3/12 (24W)			3326-T3.3/15 (25.2W)			3326-T05 (19.5W)			3326-T12 (25.8W)			3326-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
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	$P_{out} = \text{max rated load}$	67%	70%	—	67%	70%	—	67%	70%	—	66%	69%	—	71%	74%	—	71%	74%	—
Line regulation	$P_{out} = \text{max rated load}$ $V_{in\ min} - V_{in\ max}$	—	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 <sub>pp</sub>	—	30	65	—	30	65	—	30	65	—	40	85	—	40	85	—	40	85
		—	—	50	—	—	50	—	—	50	—	—	50	—	—	50	—	—	50



3326-SXX output <24 VDC			3326-SXX output ≥24 VDC			3326-DXX			3326-TXX		
Pin	Function	Pin	Pin	Function	Pin	Pin	Function	Pin	Pin	Function	
Pin 1	bit	Pin 7	Pin 1	bit	Pin 7	Pin 1	bit	Pin 1	bit	Pin 7	
Pin 2	inhibit not	Pin 8	Pin 2	inhibit not	Pin 8	Pin 2	inhibit not	Pin 2	inhibit not	Pin 8	
Pin 3	soft start	Pin 9	Pin 3	soft start	Pin 9	Pin 3	soft start	Pin 3	soft start	Pin 9	
Pin 4	sync	Pin 10	Pin 4	sync	Pin 10	Pin 4	sync	Pin 4	sync	Pin 10	
Pin 5	N/C	Pin 11	Pin 5	N/C	Pin 11	Pin 5	N/C	Pin 5	N/C	Pin 11	
Pin 6	input ret	Pin 12	Pin 6	input ret	Pin 12	Pin 6	input ret	Pin 6	input ret	Pin 12	

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

**EU** Engineering Units

**R** 25 KRAD, +85°C military/aerospace  
**RE** 25 KRAD, +125°C military/aerospace

**S** 25 KRAD, +85°C space  
**SE** 25 KRAD, +125°C space