

# Series 1790

## 3.75 – 6.5 Watt Hybrid

### For demanding Industrial and Railroad (EN50155) applications

#### 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:** 110 VDC nominal  
Range: 77 to 135 VDC  
Operates through input transients of up to 160 V

#### ISOLATION:

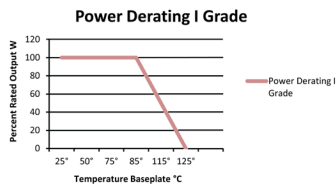
Input to case: 100 MOhms at 500 VDC  
Input to output: 100 MOhms at 500 VDC  
Output to case: 10 MOhms at 100 VDC

#### 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  $T_{case} = +85^{\circ}C$   
Linearly derates to 50% at  $T_{case} = +115^{\circ}C$



**WEIGHT:** 50 grams typical

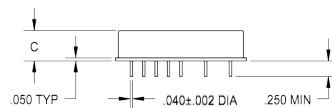
SINGLE OUTPUT DEVICES		1790-S03.3 (6.5W)			1790-S05 (6.5W)			1790-S05.2 (6.5W)			1790-S12 (6.5W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1	+5.1	+5.2	+5.3	+11.9	+12.0	+12.1
Output current	$V_{in min} - V_{in max}$	—	—	1.97A	—	—	1.3A	—	—	1.25A	—	—	541mA
Efficiency	$P_{out} = \text{max rated load}$	65%	68%	—	70%	73%	—	70%	73%	—	77%	81%	—
Line regulation	$P_{out} = \text{max rated load}$ $V_{in min} - V_{in max}$	—	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 <sub>pp</sub>	—	30	65	—	40	85	—	40	85	—	60	150

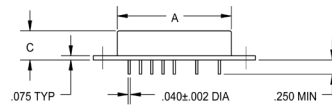
SINGLE OUTPUT DEVICES		1790-S15 (6.5W)			1790-S28 (6.5W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+14.9	+15.0	+15.1	+27.8	+28.0	+28.2
Output current	$V_{in min} - V_{in max}$	—	—	433mA	—	—	232mA
Efficiency	$P_{out} = \text{max rated load}$	73%	76%	—	77%	81%	—
Line regulation	$P_{out} = \text{max rated load}$ $V_{in min} - V_{in max}$	—	25mV	125mV	—	50mV	250mV
Load regulation	$P_{out} = 10\%$ to F.L.	—	25mV	125mV	—	50mV	250mV
Output ripple	F.L. BW 2 MHz mV <sub>pp</sub>	—	75	180	—	150	350

Model No.	Case Style	Pin Count	Mounting
1790	2	12	Solder Sealed Flangeless PCB Mount
1790	F	12	Solder Sealed PCB Mount with Flange
1790	UF	12	Seam Weld Chassis Mount with Flange

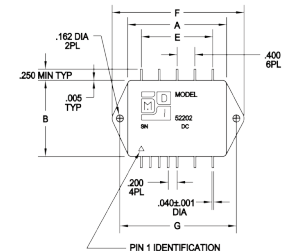
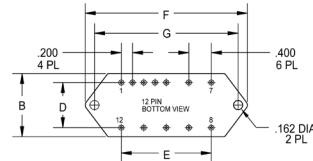
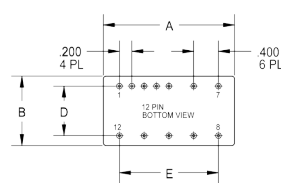
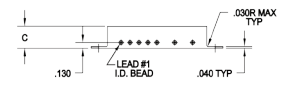
**CASE STYLE 2**  
Solder Sealed  
Flangeless PCB Mount



**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	2.130   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
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



**Modular Devices, Inc.**  
Power Conversion for Industrial/Railroad

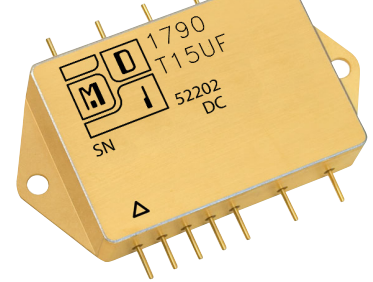
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# Series 1790

## DC – DC Converters INDUSTRIAL/RAILROAD GRADE

DUAL OUTPUT DEVICES		1790-D05 (6.5W)			1790-D12 (6.5W)			1790-D15 (6.5W)		
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*	$V_{in\ min} - V_{in\ max}$	±35mA	—	±625mA	±35mA	—	±270mA	±76mA	—	±1A
Efficiency	$P_{out} = \text{max rated load}$	72%	75%	—	77%	81%	—	79%	83%	—
Line regulation	$P_{out} = \text{max rated load}$ $V_{in\ min} - V_{in\ max}$	—	±10mV	±50mV	—	±20mV	±100mV	—	±25mV	±125mV
Load regulation <sup>1</sup>	$P_{out} = 10\% \text{ to F.L.}$	—	±10mV	±50mV	—	±20mV	±100mV	—	±25mV	±125mV
Output ripple	F.L. BW 2 MHz $mV_{pp}$	—	40	85	—	60	150	—	75	180

110 Volts DC Input



Notes: \*Up to 90% full power available from either output if rated output power is not exceeded; <sup>1</sup>balanced load conditions.

TRIPLE OUTPUT DEVICES		1790-T3.3/5 (3.75W)			1790-T3.3/12 (5W)			1790-T3.3/15 (5W)			1790-T05 (3.75W)			1790-T12 (5W)			1790-T15 (5W)		
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	$V_{in\ min} - V_{in\ max}$	75mA	—	750mA	75mA	—	750mA	75mA	—	750mA	60mA	—	500mA	60mA	—	500mA	60mA	—	500mA
		±20mA	—	±150mA	±20mA	—	±105mA	±20mA	—	±83mA	±20mA	—	±150mA	±20mA	—	±105mA	±20mA	—	±83mA
Efficiency	$P_{out} = \text{max rated load}$	65%	68%	—	65%	68%	—	65%	66%	—	62%	66%	—	66%	70%	—	70%	73%	—
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	$P_{out} = 10\% \text{ to F.L.}$	—	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

1790-SXX output < 24 VDC			1790-SXX output ≥ 24 VDC			1790-DXX			1790-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	N/C	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	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 4	Sync	Pin 10	+ Dual Output
Pin 5	N/C	Pin 11	Adjust	Pin 5	N/C	Pin 11	N/C	Pin 5	N/C	Pin 11	Dual Output Ret	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	Pin 6	Input Ret	Pin 12	- Dual Output



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