Series 1780

12 – 30 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

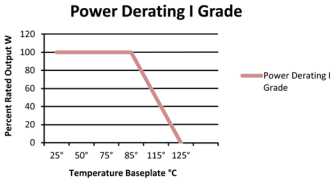
Specifications

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°C
Linearly derates to 50% at T_{case} = +115°C



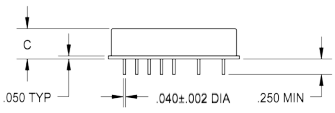
WEIGHT: 75 grams typical

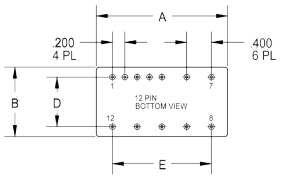
SINGLE OUTPUT DEVICES		1780-S02 (12W)			1780-S02.5 (15W)			1780-S03.3 (20W)			1780-S05 (30W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+1.9	+2.0	+2.1	+2.4	+2.5	+2.6	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1
Output current	$V_{in\ min}$ – $V_{in\ max}$	—	—	6.06A	—	—	6.06A	—	—	6.06A	—	—	6A
Efficiency	P_{out} = max rated load	56%	59%	—	61%	64%	—	66%	69%	—	71%	74%	—
Line regulation	P_{out} = 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.	—	10mV	30mV	—	10mV	30mV	—	10mV	30mV	—	10mV	50mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	25	50	—	30	60	—	30	65	—	40	85

SINGLE OUTPUT DEVICES		1780-S05.2 (30W)			1780-S12 (30W)			1780-S15 (30W)			1780-S28 (30W)		
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	$V_{in\ min}$ – $V_{in\ max}$	—	—	5.76A	—	—	2.5A	—	—	2A	—	—	1.07A
Efficiency	P_{out} = max rated load	71%	74%	—	78%	82%	—	75%	80%	—	78%	82%	—
Line regulation	P_{out} = 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.	—	10mV	50mV	—	20mV	100mV	—	25mV	125mV	—	50mV	250mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	40	85	—	60	150	—	75	180	—	150	350

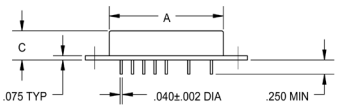
Model No.		Case Style	Pin Count	Mounting
1780		2	12	Solder Sealed Flangeless PCB Mount
1780	F	3	12	Solder Sealed PCB Mount with Flange
1780	WF	8	12	Seam Weld Chassis Mount with Flange
1780	PB	10	12	Solder Sealed Flangeless PCB Stud Mount

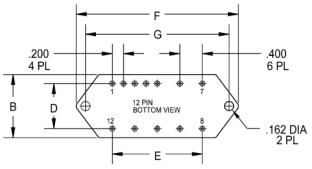
CASE STYLE 2
Solder Sealed
Flangeless PCB Mount



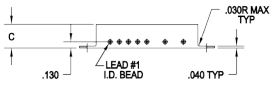


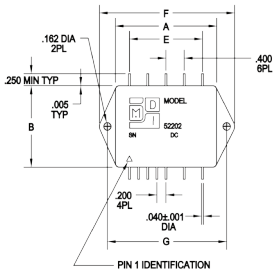
CASE STYLE 3
Solder Sealed
PCB Mount with Flange





CASE STYLE 8
Seam Welded
Chassis Mount with Flange





Case Dimensions

Units: inches | millimeters

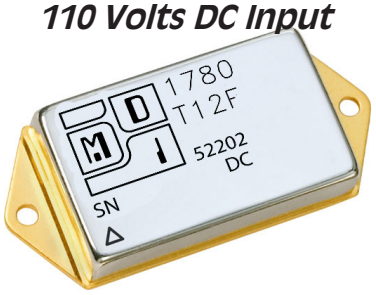
TOLERANCES: ALL DIMENSIONS ±0.01 EXCEPT F= MAX. C = +0.01/-0.02; **DRAWINGS IN INCHES.**

Case Style		A	B	C	D	E	F	G
2		2.200 | 55.880	1.350 | 34.290	0.495 | 12.573	1.000 | 25.400	1.600 | 40.640	— | —	— | —
3	F	2.200 | 55.880	1.350 | 34.290	0.495 | 12.573	1.000 | 25.400	1.600 | 40.640	2.960 | 75.184	2.610 | 66.294
8	WF	2.225 | 56.515	1.710 | 43.434	0.495 | 12.573	— | —	1.600 | 40.640	2.960 | 75.184	2.610 | 66.294
10	PB	2.225 | 56.515	1.350 | 34.290	0.495 | 12.573	1.000 | 25.400	1.600 | 40.640	— | —	— | —

Series 1780

DC – DC Converters INDUSTRIAL/RAILROAD GRADE

110 Volts DC Input

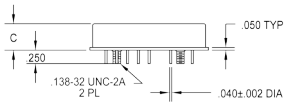


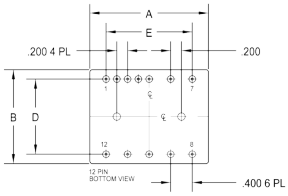
DUAL OUTPUT DEVICES		1780-D3.3/5 (14.9W)			1780-D05 (30W)			1780-D12 (30W)			1780-D15 (30W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+3.2 +4.9	+3.3 +5.0	+3.4 +5.1	+4.9 -4.9	+5.0 -5.0	+5.1 -5.1	+11.9 -11.9	+12.0 -12.0	+12.1 -12.1	+14.9 -14.9	+15.0 -15.0	+15.1 -15.1
Output current*	$V_{in\ min} - V_{in\ max}$	300mA 100mA	— —	3A 1A	±150mA	—	±3A	±95mA	—	±1.25A	±76mA	—	±1A
Efficiency	P_{out} = max rated load	63%	66%	—	72%	76%	—	78%	82%	—	79%	83%	—
Line regulation	P_{out} = max rated load $V_{in\ min} - V_{in\ max}$	— —	10mV 10mV	30mV 50mV	—	±10mV	±50mV	—	±20mV	±100mV	—	±25mV	±125mV
Load regulation†	P_{out} = 10% to F.L.	— —	10mV 10mV	30mV 50mV	—	±10mV	±50mV	—	±20mV	±100mV	—	±25mV	±125mV
Output ripple	F.L. BW 2 MHz mV_{pp}	— —	30 25	65 50	—	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		1780-T3.3/5 (12.5W)			1780-T3.3/12 (17.5W)			1780-T3.3/15 (17.5W)			1780-T05 (12.5W)			1780-T12 (17.5W)			1780-T15 (17.5W)		
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 +4.9 -4.9	+3.3 +5.0 -5.0	+3.4 +5.1 -5.1	+3.2 +11.9 -11.9	+3.3 +12.0 -12.0	+3.4 +12.1 -12.1	+3.2 +14.9 -14.9	+3.3 +15.0 -15.0	+3.4 +15.1 -15.1	+4.9 +4.9 -4.9	+5.0 +5.0 -5.0	+5.1 +5.1 -5.1	+4.9 +11.9 -11.9	+5.0 +12.0 -12.0	+5.1 +12.1 -12.1	+4.9 +14.9 -14.9	+5.0 +15.0 -15.0	+5.1 +15.1 -15.1
Output current	$V_{in\ min} - V_{in\ max}$	300mA ±40mA	— —	3A ±250mA	300mA ±40mA	— —	3A ±312mA	300mA ±32mA	— —	3A ±250mA	90mA ±40mA	— —	2A ±250mA	90mA ±40mA	— —	2A ±312mA	90mA ±32mA	— —	2A ±250mA
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 25mV	50mV 50mV	— —	10mV 25mV	50mV 50mV	— —	10mV 25mV	50mV 50mV	— —	10mV 25mV	50mV 50mV	— —	10mV 25mV	50mV 50mV	— —	10mV 25mV	50mV 50mV
Load regulation	P_{out} = 10% to F.L.	— —	10mV 25mV	50mV 50mV	— —	10mV 25mV	50mV 50mV	— —	10mV 25mV	50mV 50mV	— —	10mV 25mV	50mV 50mV	— —	10mV 25mV	50mV 50mV	— —	10mV 25mV	50mV 50mV
Output ripple	F.L. BW 2 MHz mV_{pp}	— —	30 —	65 50	— —	30 —	65 50	— —	30 —	65 50	— —	40 —	85 50	— —	40 —	85 50	— —	40 —	85 50

CASE STYLE 10
Solder Sealed
Flangeless PCB Stud Mount





1780-SXX output < 24 VDC				1780-SXX output ≥ 24 VDC				1780-DXX				1780-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