

MTR Single, Dual and Triple DC/DC Converters

28 VOLT INPUT – 30 WATT

FEATURES

- -55° to $+125^{\circ}\text{C}$ operation
- 16 to 40 VDC input
- Fully isolated
- Magnetic feedback
- Fixed frequency 600 kHz typical
- Topology – Single Ended Forward
- 50 V for up to 50 ms transient protection
- Inhibit and synchronization functions
- Indefinite short circuit protection
- Up to 30 watts output power
- Trim and remote sense on single output models
- Up to 84% efficiency



MODELS

VDC OUTPUT

SINGLE	DUAL	TRIPLE
3.3	± 5	$+5$ & ± 12
5	± 12	$+5$ & ± 15
12	± 15	
15		
18		

DESCRIPTION

The MTR Series™ of DC/DC converters offers up to 30 watts of output power from single, dual, or triple output configurations. They operate over the full military temperature range with up to 84% efficiency. MTR converters are packaged in hermetically sealed metal cases, making them ideal for use in military, aerospace and other high reliability applications.

CONVERTER DESIGN

The MTR converters are constant frequency, pulse-width modulated switching regulators which use a quasi-square wave, single ended, forward converter design. Tight load regulation is maintained via wide bandwidth magnetic feedback and, on single output models, through use of remote sense. On dual output models, the positive output is independently regulated and the negative output is cross regulated through the use of tightly coupled magnetics and shunt regulators. The MTR Series triple output DC/DC converter's design includes individual regulators on the auxiliary outputs which provide for no cross regulation error when a minimum 500 mA load is maintained on the main (+5) output.

Indefinite short circuit protection and overload protection are provided by a constant current-limit feature. This protective system senses current in the converter's secondary stage and limits it to approximately 115% of the maximum rated output current.

MTR converters are provided with internal filtering capacitors that help reduce the need for external components in normal operation. For systems that require compliance with MIL-STD-461C's CE03 standard, Interpoint offers filter/transient suppression modules (including the FMC-461, FMD-461 and FM-704A series filters) which will result in compliance. Contact your Interpoint representative for further details.

SYNCHRONIZATION

Synchronizing the converter with the system clock allows the designer to confine switching noise to clock transitions, minimizing interference and reducing the need for filtering. In sync mode, the converter will run at any frequency between 500 kHz and 675 kHz. The sync control operates with a quasi-TTL signal at any duty cycle between 40% and 60%. The sync pin must be connected to input common pin when not in use.

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OPERATING CONDITIONS AND CHARACTERISTICS

Input Voltage

- 16 to 40 VDC continuous
- 50 V for 50 msec transient

Output Power

- 25 to 30 watts depending on model

Lead Soldering Temperature (10 sec per pin)

- 300°C

Storage Temperature Range (Case)

- -65°C to +135°C

Case Operating Temperature (Tc)

- -55°C to +125°C full power
- -55°C to +135°C absolute

Derating Output Power/Current

- Linearly from 100% at 125°C to 0% at 135°C

Output Voltage Temperature Coefficient

- 100 ppm/°C typical single and dual outputs
- 200 ppm/°C main typical, 300 ppm/°C aux triple output typical

Input to Output Capacitance

- 50 pF typ (100 pF typical triple outputs)

Current Limit

- 115% of full load typical

Isolation

- 100 megohm minimum at 500 V

Audio Rejection

- 40 dB typ (50 dB typical triple output)

Conversion Frequency

- Free run 550 min, 600 typical, 650 max kHz duals and singles
Free run 525 min, 600 typical, 650 max kHz triples
- External sync 500 to 675 kHz singles and duals
External sync 500 to 700 kHz triples

SYNC AND INHIBIT

Sync (500 to 675 kHz)

- Duty cycle 40% min, 60% max
- Logic low 0.8 V max
- Logic high 4.5 V min, 5 V max
- Referenced to input common
- If not used, connect to input common

Inhibit TTL Open Collector (referenced to input common)

- Logic low (output disabled), ≤ 0.8 V
Inhibit pin current
8.0 mA max for singles & duals,
6.0 mA for triples
- Logic high (output enabled)
Input pin voltage, unit enabled, 9 to 11 V

MECHANICAL AND ENVIRONMENTAL

Size (maximum)

Non-flanged

Single and dual output 2.125 x 1.125 x 0.400 inches (53.98 x 28.58 x 10.16 mm) See case H2 for dimensions.
MTR Dual with standard or ES screening, ht 0.417", (10.59 mm) See Case H4 for dimensions.

Triple output 1.950 x 1.350 x 0.405 inches (49.53 x 34.29 x 10.29 mm) See case F1 for dimensions.

Flanged

Single and dual output 2.910 x 1.125 x 0.400 inches (73.91 x 28.58 x 10.16 mm) See case K3 for dimensions.
MTR Dual with standard or ES screening, ht. 0.417", (10.59 mm) See case K5 for dimensions.

Triple output 2.720 x 1.350 x 0.405 inches (69.09 x 34.29 x 10.29 mm) See case J1 for dimensions.

Weight (maximum)

Single and dual non-flanged 50 grams, flanged 52 grams
Triple non-flanged 58 grams, flanged 62 grams

Screening

Standard, ES, or /883 (Class H, QML). See "883, Class H, QML Products – Element Evaluation" and "883, Class H, QML Products – Environmental Screening" for more information.

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PIN OUT

Pin	Single Output	Dual Output	Triple Output
1	Positive Input	Positive Input	Positive Input
2	Inhibit	Inhibit	Main (+5) Output
3	Sense Return	Positive Output	Output Common
4	Output Common	Output Common	Neg. Aux. Output
5	Positive Output	Negative Output	Pos. Aux. Output
6	Positive Sense	Case Ground	Case Ground
7	Case Ground	Case Ground	Case Ground
8	Case Ground	Case Ground	Inhibit
9	Sync	Sync	Sync
10	Input Common	Input Common	Input Common

PINS NOT IN USE

Inhibit	Leave unconnected
Sync In	Connect to input common
Sense Lines	Must be connected to appropriate outputs

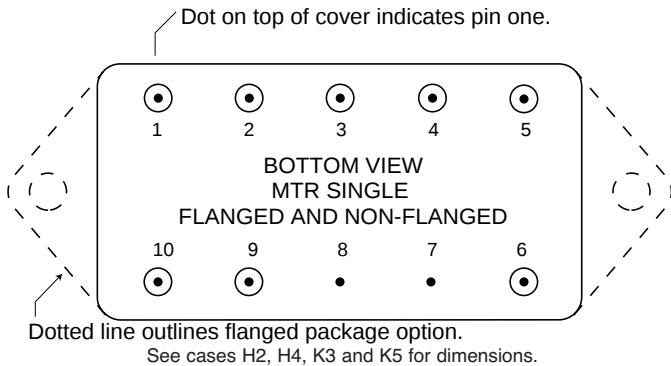
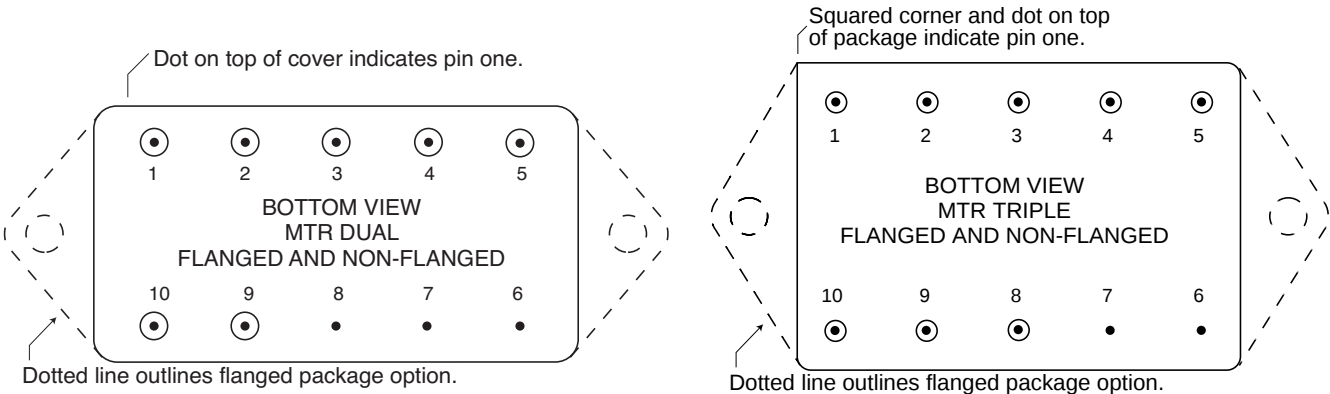


FIGURE 1: PIN OUT SINGLE OUTPUT MODELS



See cases H2, H4, K3 and K5 for dimensions.

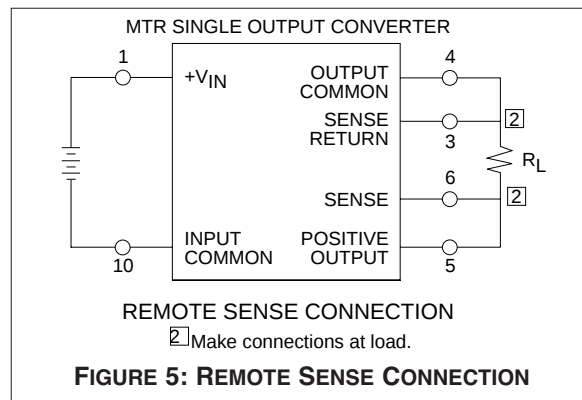
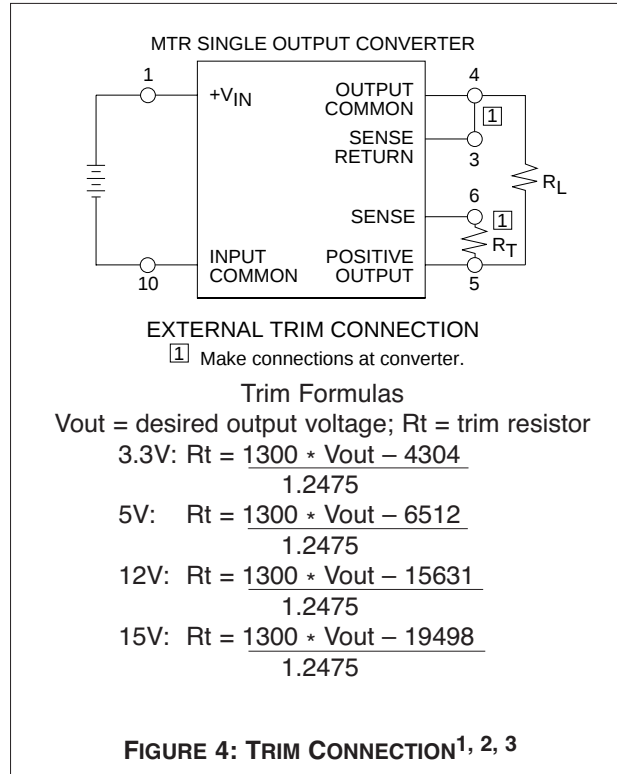
FIGURE 2: PIN OUT DUAL OUTPUT MODELS

See cases F1 and J1 for dimensions.

FIGURE 3: PIN OUT TRIPLE OUTPUT MODELS

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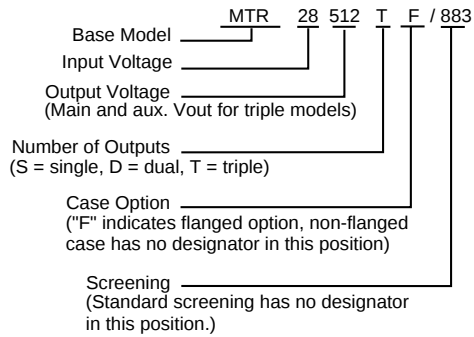
Notes for Remote Sense and Trim

1. When trimming output voltage and/or remote sensing, the total output voltage increase must be less than 0.6 volts at the converters pins to maintain specified performance.
2. If neither voltage trim nor remote sense will be used, connect pin 3 to pin 4 and pin 5 to pin 6 or the output voltage will increase by 1.2 volts.
3. CAUTION: The converter will be permanently damaged if the positive remote sense (pin 6) is shorted to ground. Damage may also result if the output common or positive output is disconnected from the load with the remote sense leads connected to the load.

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MODEL NUMBERING KEY



SMD NUMBERS

STANDARD MICROCIRCUIT DRAWING (SMD)	MTR SERIES SIMILAR PART
5962-0150101HXC	MTR283R3S/883
5962-9306801HXC	MTR2805S/883
5962-9306901HXC	MTR2812S/883
5962-9307001HXC	MTR2815S/883
5962-9320201HXC	MTR2818S/883
5962-9320501HXC	MTR2805D/883
5962-9307101HXC	MTR2812D/883
5962-9307201HXC	MTR2815D/883
5962-9307301HXC	MTR28512T/883
5962-9307401HXC	MTR28515T/883

To indicate the flanged case option change the "X" to "Z" in the SMD number. The SMD number shown is for Class H screening, non-flanged. For exact specifications for an SMD product, refer to the SMD drawing. SMDs can be downloaded from:
<http://www.dscc.dla.mil/programs/smcr>

Model Selection

MTR28

Base model *Vout value* *number of outputs* *case option* *screening*

Choose one from each of the following rows

Vout value	for singles or duals: 5, 12, or 15		for triples*: 512 or 515	
Number of outputs	S (single)	D (dual)	or T (triple)	
Case option	non-flanged case option, leave blank		F (flanged case option)	
Screening	standard screening, leave blank		/ES (ES screening), /883 (Class H, QML)	

* for triple output models "5" indicates the main voltage, "12" or "15" indicate the $\pm$ auxiliary voltages.

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Electrical Characteristics: 25°C Tc, 28 VDC Vin, 100% load, free run, unless otherwise specified.

SINGLE OUTPUT MODELS		MTR283R3S			MTR2805S			MTR2812S			MTR2815S			MTR2818S			UNITS
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE		3.27	3.30	3.34	4.95	5.00	5.05	11.88	12.00	12.12	14.85	15.00	15.15	17.82	18.00	18.18	VDC
OUTPUT CURRENT ²	V _{IN} = 16 to 40 VDC	0	—	6.06	0	—	5.0	0	—	2.5	0	—	2.0	0	—	1.67	A
OUTPUT POWER ²	V _{IN} = 16 to 40 VDC	0	—	20	0	—	25	0	—	30	0	—	30	0	—	30	W
OUTPUT RIPPLE VOLTAGE	10 kHz – 2 MHz Tc = –55°C TO +125°C	—	15	40	—	35	50	—	25	40	—	25	40	—	—	40	mV p-p
LINE REGULATION ³	V _{in} = 16 to 40 VDC	—	5	10	—	10	50	—	10	50	—	10	50	—	—	50	mV
	Tc = –55°C TO +125°C	—	—	10	—	15	50	—	15	50	—	15	50	—	—	50	
LOAD REGULATION	NO LOAD TO FULL	—	2	10	—	5	50	—	5	50	—	5	50	—	—	50	mV
	Tc = –55°C TO +125°C	—	—	10	—	15	50	—	15	50	—	15	50	—	—	50	
INPUT VOLTAGE ²	CONTINUOUS	16	28	40	16	28	40	16	28	40	16	28	40	16	28	40	VDC
NO LOAD TO FULL	TRANSIENT 50 ms	—	—	50	—	—	50	—	—	50	—	—	50	—	—	50	V
INPUT CURRENT ²	NO LOAD	—	30	75	—	35	75	—	35	75	—	35	75	—	—	75	mA
	INHIBITED	—	7	8	—	3	8	—	3	8	—	3	8	—	—	8	mA
INPUT RIPPLE CURRENT	10 kHz – 10 MHz Tc = –55°C TO +125°C	—	25	50	—	20	50	—	20	50	—	20	50	—	—	50	mA p-p
EFFICIENCY		74	76	—	76	78	—	80	83	—	81	84	—	81	84	—	%
LOAD FAULT ⁴	SHORT CIRCUIT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	W
	POWER DISSIPATION	—	10	—	—	10	—	—	10	—	—	10	—	—	10	—	
	RECOVERY ^{1, 2, 5}	—	1.4	6	—	1.4	5	—	1.4	5	—	1.4	5	—	1.4	5	ms
STEP LOAD RESP.	50% – 100% – 50% TRANSIENT	—	±125	±250	—	±200	±300	—	±250	±400	—	±350	±500	—	—	±600	mV pk
	RECOVERY ^{1, 4}	—	—	200	—	60	200	—	60	200	—	60	200	—	60	—	μs
STEP LINE RESP. ¹	16 – 40 – 16 VDC TRANSIENT ⁶	—	—	±300	—	±200	±300	—	±400	±500	—	±500	±600	—	±500	—	mV pk
	RECOVERY ⁵	—	—	300	—	—	300	—	—	300	—	—	300	—	300	—	μs
START-UP ^{2, 7}	DELAY	—	1.4	5	—	1.4	5	—	1.4	5	—	1.4	5	—	—	5	ms
	OVERSHOOT	—	0	50	—	0	50	—	0	120	—	0	150	—	0	—	mV pk
	FULL LOAD ¹	—	33	150	—	50	250	—	120	600	—	150	750	—	—	—	
	NO LOAD ¹	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	μF
CAPACITIVE LOAD ¹	NO EFFECT ON DC PERFORMANCE	—	—	300	—	—	300	—	—	3000	—	—	3000	—	—	2000	

Notes

1. **Guaranteed, not tested.**

2. Tc = –55°C to +125°C

3. Operation is limited below 16V (see Figure 22).

4. Indefinite short circuit protection not guaranteed above 125°C case.

5. Recovery time is measured from application of the transient to point at which V_{out} is within 1% of final value.

6. Transition time ≥10 μs.

7. Tested on release from inhibit.

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Electrical Characteristics: 25°C Tc, 28 VDC Vin, 100% load, free run, unless otherwise specified.

DUAL OUTPUT MODELS		MTR2805D			MTR2812D			MTR2815D			UNITS
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE	+V _{OUT}	4.95	5.00	5.05	11.88	12.00	12.12	14.85	15.00	15.15	VDC
	-V _{OUT}	4.92	5.00	5.08	11.82	12.00	12.18	14.77	15.00	15.23	
OUTPUT CURRENT ^{2, 3}	V _{IN} = 16 TO 40 VDC	0	2.5	4.5	0	1.25	2.25	0	1.0	1.8	A
OUTPUT POWER ^{2, 3}	V _{IN} = 16 TO 40 VDC	0	—	25	0	—	30	0	—	30	W
OUTPUT RIPPLE	10 kHz - 2 MHz	—	20	40	—	30	80	—	25	80	mV p-p
VOLTAGE +/– V _{OUT}	Tc = –55°C TO +125°C	—	40	90	—	40	120	—	40	120	
LINE REGULATION ⁴ V _{IN} = 16 TO 40 VDC	+V _{OUT}	—	10	50	—	10	50	—	10	50	mV
	-V _{OUT}	—	50	100	—	50	150	—	50	180	
	Tc = –55°C +V _{OUT}	—	10	50	—	10	50	—	10	50	
	TO +125°C -V _{OUT}	—	50	100	—	50	150	—	50	180	
LOAD REGULATION NO LOAD TO FULL	+V _{OUT}	—	5	50	—	15	50	—	15	50	mV
	-V _{OUT}	—	25	100	—	30	150	—	30	180	
	Tc = –55°C +V _{OUT}	—	5	50	—	15	50	—	15	50	
	TO +125°C -V _{OUT}	—	25	100	—	30	150	—	30	180	
CROSS REGULATION ¹	SEE NOTE 5	—	7	12	—	4	8.3	—	3	8	%
EFFECT ON -V _{OUT}	SEE NOTE 6	—	4	6	—	4	6	—	4	6	
INPUT VOLTAGE ²	CONTINUOUS	16	28	40	16	28	40	16	28	40	VDC
NO LOAD TO FULL	TRANSIENT 50 ms	0	—	50	0	—	50	0	—	50	V
INPUT CURRENT	NO LOAD	—	35	75	—	50	75	—	50	75	mA
	INHIBITED	—	3	8	—	3	8	—	3	8	mA
INPUT RIPPLE CURRENT ²	10 kHz - 10 MHz	—	15	50	—	20	50	—	20	50	mA p-p
EFFICIENCY		76	78	—	78	81	—	80	83	—	%
LOAD FAULT ⁷	POWER DISSIPATION	—	10	—	—	10	—	—	10	—	W
	SHORT CIRCUIT ²	—	1.4	5.0	—	1.4	5.0	—	1.4	5.0	ms
STEP LOAD RESPONSE ± V _{OUT}	50 – 100 – 50% BALANCED TRANSIENT	—	±200	±300	—	±150	±300	—	±200	±400	mV pk
	RECOVERY ^{1, 8}	—	100	200	—	100	200	—	100	200	μs
	RECOVERY ⁸	—	—	300	—	—	300	—	—	300	μs
STEP LINE ¹ RESPONSE ± V _{OUT}	16 – 40 – 16 V _{IN} TRANSIENT ⁹	—	±200	±400	—	±200	±400	—	±400	±500	mV pk
	RECOVERY ⁸	—	—	300	—	—	300	—	—	300	μs
START-UP ^{2, 10}	DELAY	—	1.4	5	—	1.4	5	—	1.4	5	ms
	OVERSHOOT FULL LOAD ¹	—	0	50	—	0	120	—	0	150	mV pk
CAPACITIVE LOAD ¹	NO LOAD ¹	—	50	250	—	120	600	—	150	750	
	NO EFFECT ON DC PERFORMANCE	—	—	500	—	—	500	—	—	500	μF

Notes

1. Guaranteed, not tested.

2. Tc = –55°C to +125°C.

3. Up to 90% of the total output current/power is available from either output providing the positive output is carrying at least 10% of the total output power.

4. Operation is limited below 16 V (see Figure 22).

5. Effect on negative Vout from 50%/50% loads to 80%/20% or 20%/80% loads.

6. Effect on negative Vout from 50%/50% loads to 90%/10% or 10%/90% loads.

7. Indefinite short circuit protection not guaranteed above 125°C case.

8. Recovery time is measured from application of the transient to point at which Vout is within 1% of final value.

9. Transition time ≥ 10 μs.

10. Tested on release from inhibit.

MTR Single, Dual and Triple DC/DC Converters

28 VOLT INPUT – 30 WATT

Electrical Characteristics: 25°C Tc, 28 VDC Vin, 100% load, free run, unless otherwise specified.

TRIPLE OUTPUT MODELS		MTR28512T			MTR28515T			UNITS	
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX		
OUTPUT VOLTAGE	MAIN	4.95	5.0	5.05	4.95	5.0	5.05	VDC	
	+ AUXILIARY	11.82	12.0	12.18	14.77	15.0	15.23		
	– AUXILIARY	11.82	12.0	12.18	14.77	15.0	15.23		
OUTPUT CURRENT ² V _{IN} = 16 TO 40	MAIN	0.3	—	4.0	0.3	—	4.0	A	
	+ AUXILIARY	—	0.416	0.750	—	0.333	0.600		
	– AUXILIARY	—	0.416	0.750	—	0.333	0.600		
OUTPUT POWER ² V _{IN} = 16 TO 40	MAIN	—	20	20	—	20	20	W	
	+ AUXILIARY	—	5	9	—	5	9		
	– AUXILIARY	—	5	9	—	5	9		
	TOTAL	—	—	30	—	—	30		
OUTPUT RIPPLE VOLTAGE	10 kHz to 2 MHz MAIN	—	50	125	—	50	125	mV p-p	
	± AUXILIARY	—	20	60	—	20	60		
LINE REGULATION V _{IN} = 16 TO 40	MAIN	—	10	20	—	10	20	mV	
	±AUXILIARY	—	25	75	—	30	75		
LOAD REGULATION ^{3, 4}	MAIN	—	10	50	—	10	50	mV	
	± AUXILIARY	—	30	75	—	30	75		
INPUT VOLTAGE	CONTINUOUS	16	28	40	16	28	40	VDC	
	TRANSIENT 50 ms	—	—	50	—	—	50		
INPUT CURRENT	NO LOAD	—	70	100	—	70	120	mA	
	INHIBITED	—	3.0	6	—	3.0	6	mA	
INPUT RIPPLE CURRENT	10 kHz TO 10 MHz	—	20	45	—	20	45	mA p-p	
EFFICIENCY		72	75	—	73	75	—	%	
LOAD FAULT ⁵	POWER DISSIPATION SHORT CIRCUIT							W	
	ALL OUTPUTS SHORTED TOTAL	—	14	—	—	14	—		
	RECOVERY EACH OUTPUT ¹	—	4	6.0	—	4	6.0		ms
STEP LOAD RESPONSE	TRANSIENT ⁶	MAIN	—	150	250	—	150	250	mV pk
		± AUXILIARY	—	500	800	—	500	800	
	RECOVERY ⁷	MAIN	—	0.05	0.10	—	0.05	0.10	ms
		± AUXILIARY	—	3	4	—	2	4	
STEP LINE RESPONSE ¹ V _{IN} = 16 TO 40	TRANSIENT	MAIN	—	150	250	—	150	250	mV pk
		± AUXILIARY	—	100	250	—	100	250	
START-UP ⁸	DELAY		—	4	6.0	—	4	6.0	ms
	OVERSHOOT	MAIN ¹	—	0	500	—	0	500	mV
		± AUXILIARY ¹	—	0	1500	—	0	1500	

Notes

1. **Guaranteed, not tested.**

2. The sum of the two aux outputs is not to exceed 10 watts. The maximum load per aux output is 9 watts.

3. To maintain regulation when operating the ±Aux at full load, a minimum load of 300 mA is required on the main.

4. Measured on each output one at a time with the other outputs at full load.

5. Indefinite short circuit protection not guaranteed above 125°C (case).

6. Response of each output as all outputs are simultaneously transitioned.
Main: 50% - 100% - 50% of main full load

Auxiliaries: 25% - 50% - 25% each, of total auxiliary full load

7. Recovery time is measured from application of the transient to point at which Vout is within 1% of regulation.

8. Tested on release from inhibit.

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Typical Performance Curves: 25°C T_c, 28 VDC V_{in}, 100% load, free run, unless otherwise specified.

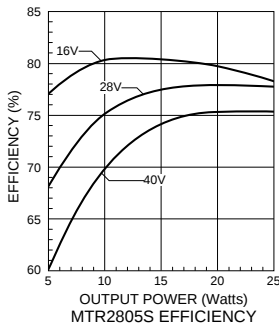


FIGURE 6

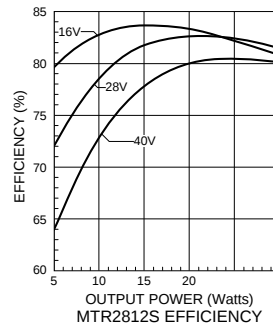


FIGURE 7

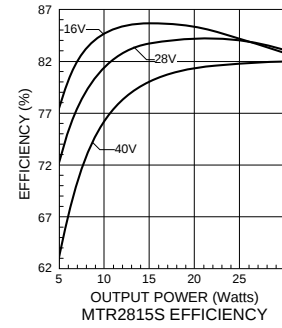


FIGURE 8

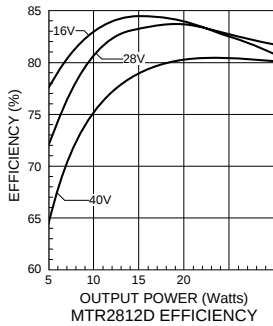


FIGURE 9

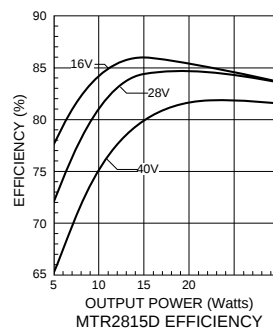


FIGURE 10

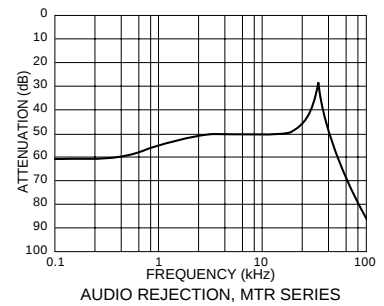


FIGURE 11

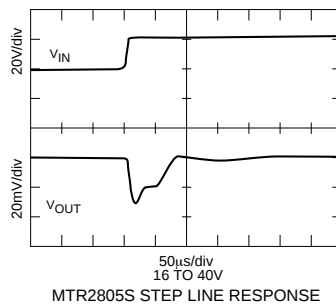


FIGURE 12

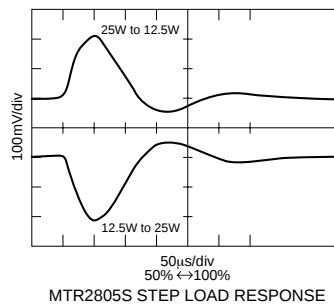


FIGURE 13

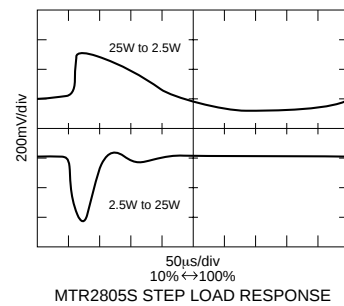


FIGURE 14

MTR Single, Dual and Triple DC/DC Converters

28 VOLT INPUT – 30 WATT

Typical Performance Curves: 25°C T_c, 28 VDC V_{in}, 100% load, free run, unless otherwise specified.

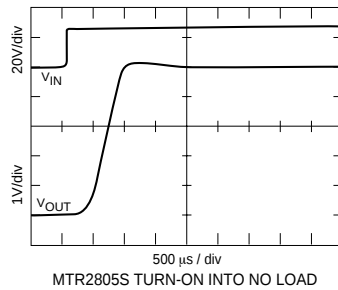


FIGURE 15

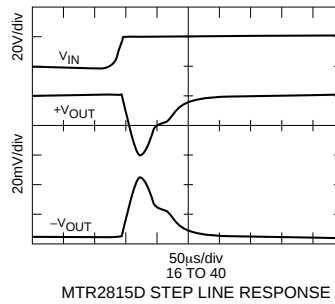


FIGURE 16

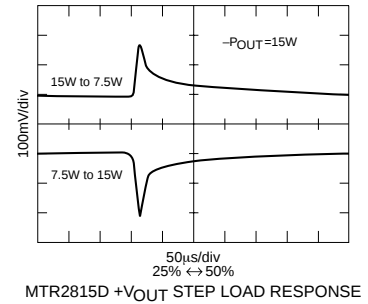


FIGURE 17

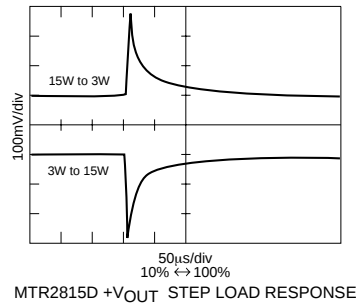


FIGURE 18

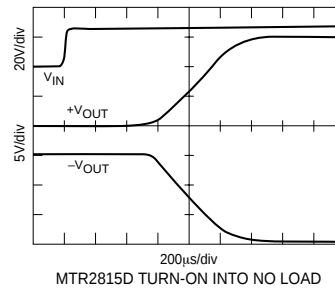


FIGURE 19

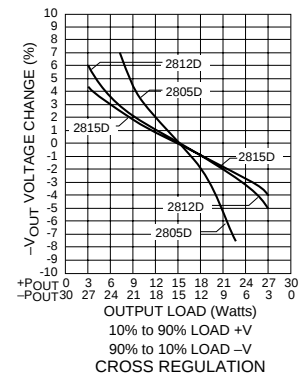


FIGURE 20

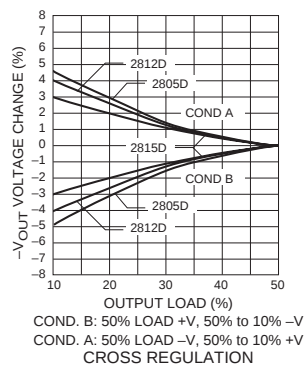


FIGURE 21

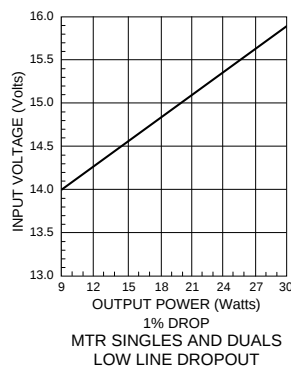


FIGURE 22

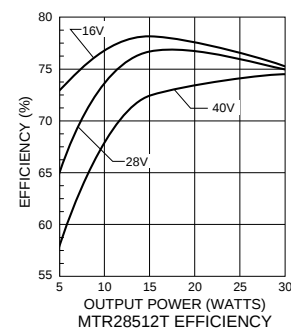


FIGURE 23

MTR Single, Dual and Triple DC/DC Converters

28 VOLT INPUT – 30 WATT

Typical Performance Curves: 25°C T_c, 28 VDC V_{in}, 100% load, free run, unless otherwise specified.

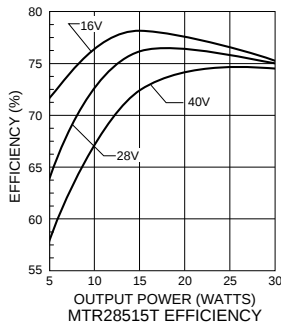


FIGURE 24

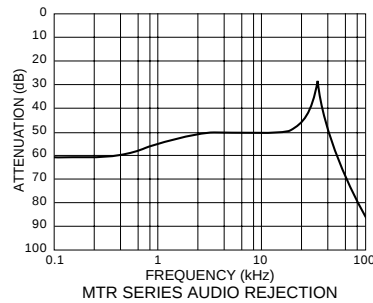


FIGURE 25

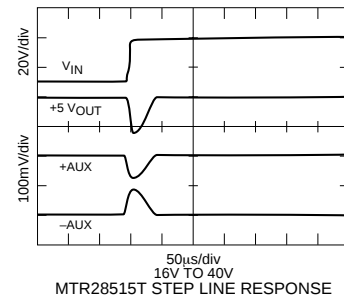


FIGURE 26

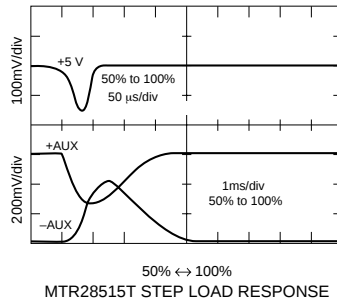


FIGURE 27

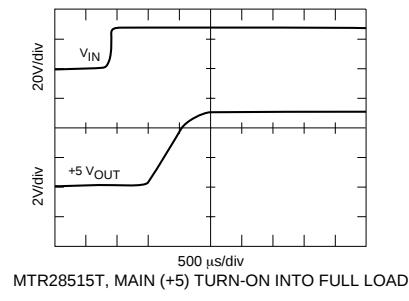


FIGURE 28

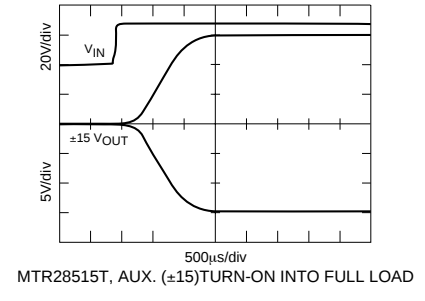


FIGURE 29

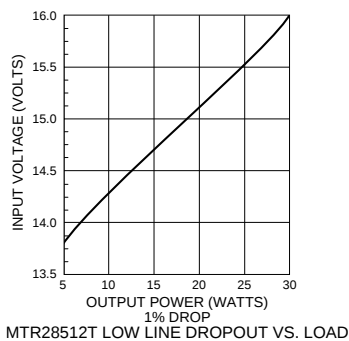


FIGURE 30

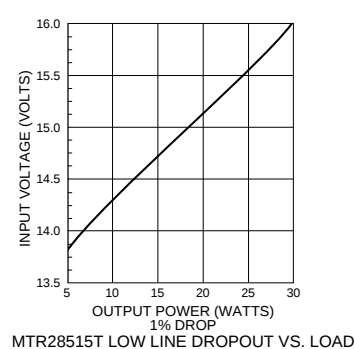
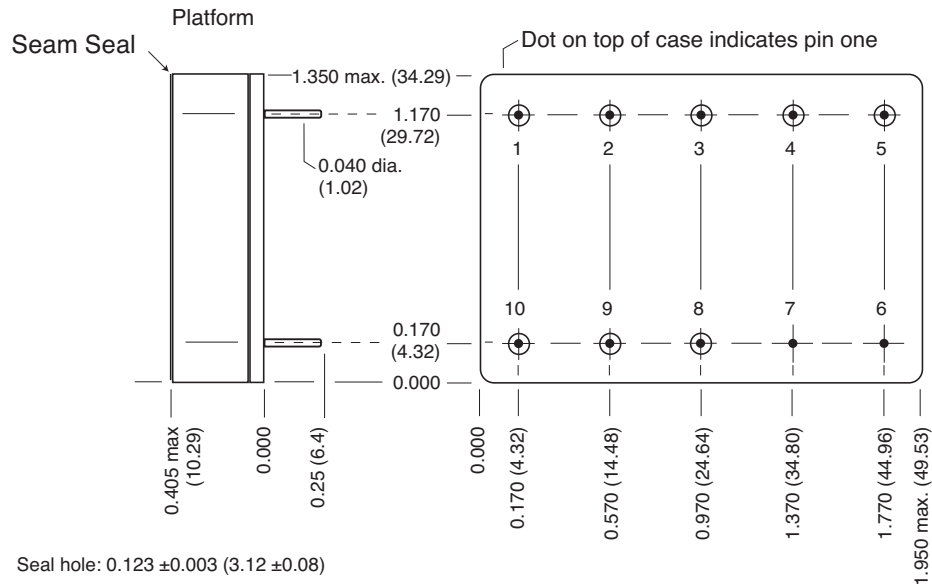


FIGURE 31

MTR Single, Dual and Triple DC/DC Converter Cases

28 VOLT INPUT – 30 WATT

BOTTOM VIEW CASE F1



Case dimensions in inches (mm)

Tolerance ± 0.005 (0.13) for three decimal places
 ± 0.01 (0.3) for two decimal places
 unless otherwise specified

CAUTION

Heat from reflow or wave soldering may damage the device.
 Solder pins individually with heat application not exceeding 300°C for 10 seconds per pin.

Materials

Header Cold Rolled Steel/Nickel/Gold
 Cover Kovar/Nickel
 Pins #52 alloy/Gold ceramic seal

Case F1, Rev C, 20051216

Please refer to the numerical dimensions for accuracy. All information is believed to be accurate, but no responsibility is assumed for errors or omissions. Interpoint reserves the right to make changes in products or specifications without notice.

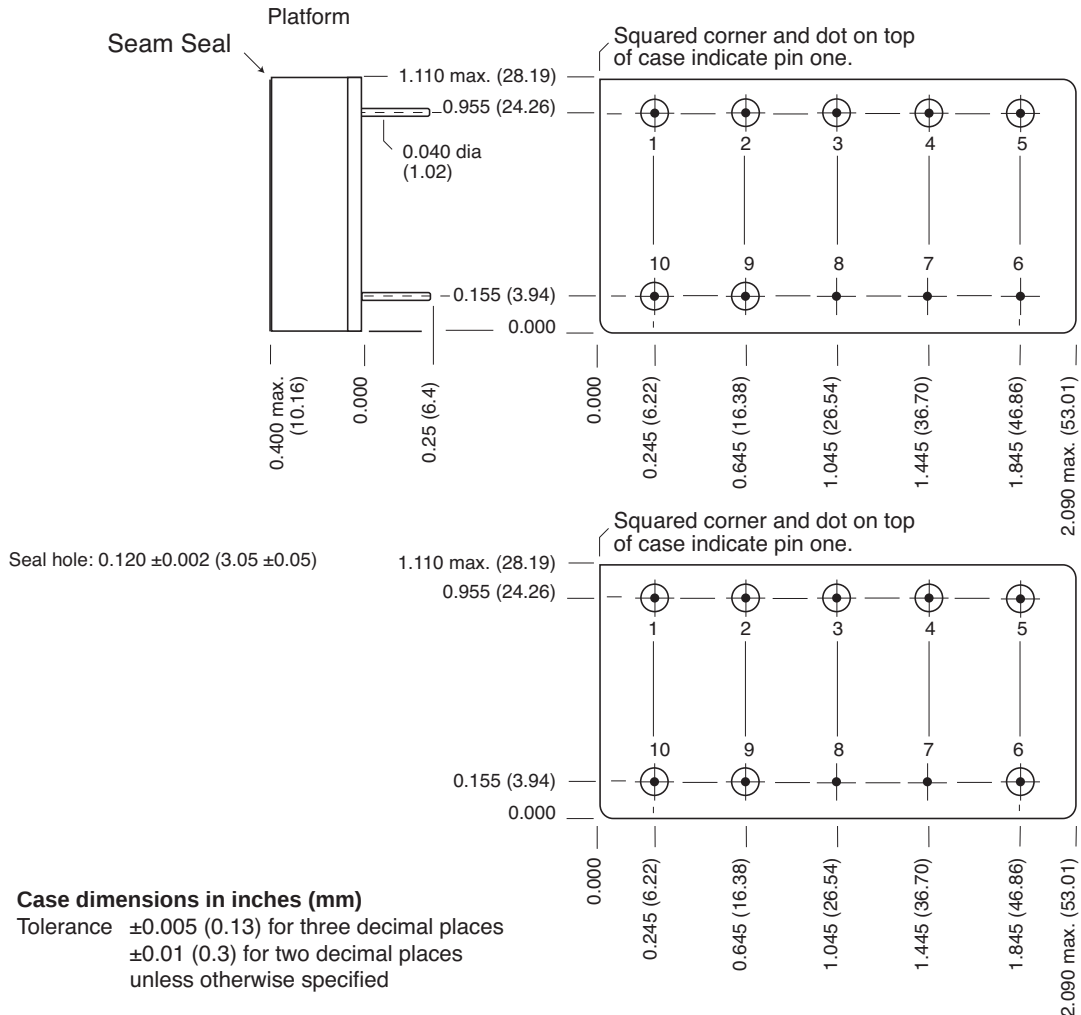
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FIGURE 32: CASE F1 – TRIPLE MODELS

MTR Single, Dual and Triple DC/DC Converter Cases

28 VOLT INPUT – 30 WATT

BOTTOM VIEW CASE H2



CAUTION

Heat from reflow or wave soldering may damage the device.

Solder pins individually with heat application not exceeding 300°C for 10 seconds per pin.

Materials

Header Cold Rolled Steel/Nickel/Gold

Cover Kovar/Nickel

Pins #52 alloy/Gold ceramic seal

Case H2, Rev C - 20060109

Please refer to the numerical dimensions for accuracy. All information is believed to be accurate, but no responsibility is assumed for errors or omissions. Interpoint reserves the right to make changes in products or specifications without notice.

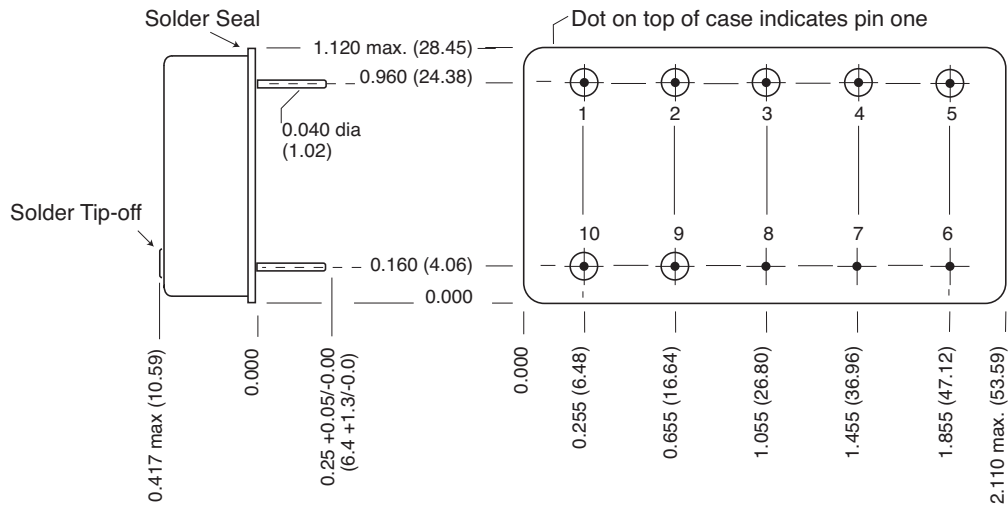
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FIGURE 33: CASE H2 – DUAL MODELS

MTR Single, Dual and Triple DC/DC Converter Cases

28 VOLT INPUT – 30 WATT

BOTTOM VIEW CASE H4



Seal hole: 0.091 ±0.005 (2.31 ±0.13)

Case dimensions in inches (mm)

Tolerance ±0.005 (0.13) for three decimal places
 ±0.01 (0.3) for two decimal places
 unless otherwise specified

CAUTION

Heat from reflow or wave soldering may damage the device.
 Solder pins individually with heat application not exceeding 300°C for 10 seconds per pin.

Materials

Header Cold Rolled Steel/Nickel/Tin
 Cover Cold Rolled Steel/Nickel/Tin
 Pins #52 alloy compression glass seal

Case H4, Rev C - 20060110

Please refer to the numerical dimensions for accuracy. All information is believed to be accurate, but no responsibility is assumed for errors or omissions. Interpoint reserves the right to make changes in products or specifications without notice.

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FIGURE 34: CASE H4 – DUAL MODELS

BOTTOM VIEW CASE J1

Platform
Seam Seal

Squared corner and dot on top of case indicate pin one.

0.405 max (10.29)
0.000
0.25 (6.4)
1.350 max. (34.29)
1.170 (29.72)
0.040 dia. (1.02)
0.670 (17.02)
0.170 (4.32)
0.000

1
2
3
4
5
10
9
8
7
6

0.162 dia (4.11)

0.210 (5.33)
0.000
0.170 (4.32)
0.570 (14.48)
0.970 (24.64)
1.370 (34.80)
2.150 (54.61)
2.150 (54.61)
2.720 max. (69.09)

Flange thickness: 0.060 (1.52)

Seal hole: 0.12 ± 0.0021

2.720 max (69.09)

Tolerance ± 0.005 (0.13) for three decimal places
 ± 0.01 (0.3) for two decimal places
 unless otherwise specified

Heat from reflow or wave soldering may damage the device.
Solder pins individually with heat application not exceeding 300°C for 10 seconds per pin.

Header	Cold Rolled Steel/Nickel/Gold
Cover	Kovar/Nickel
Pins	#52 alloy/Gold ceramic seal

Please refer to the numerical dimensions for accuracy. All information is believed to be accurate, but no responsibility is assumed for errors or omissions. Interpoint reserves the right to make changes in products or specifications without notice.
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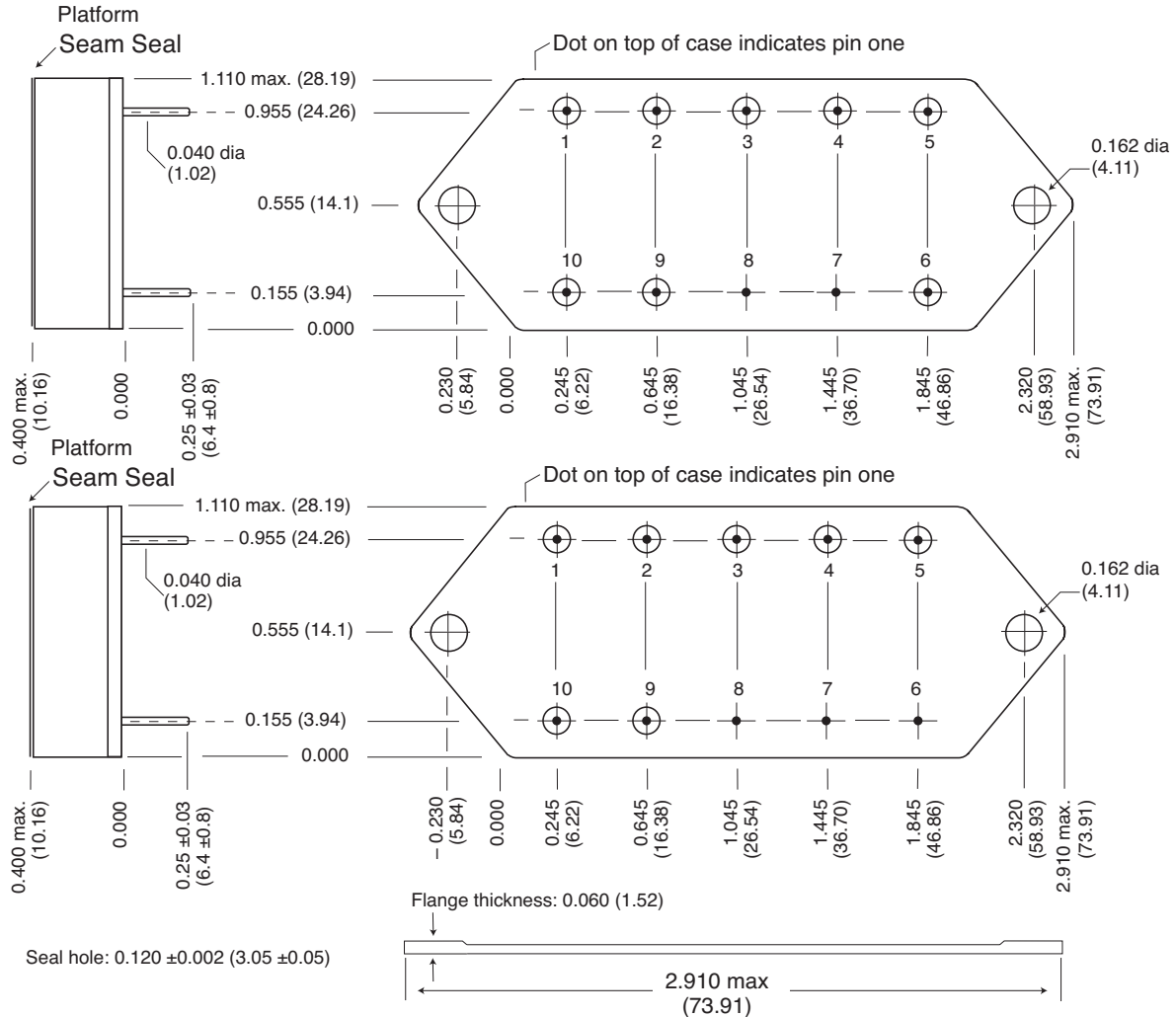
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MTR Single, Dual and Triple DC/DC Converter Cases

28 VOLT INPUT – 30 WATT

BOTTOM VIEW CASE K3

Flanged cases: Designator "F" required in Case Option position of model number.



Case dimensions in inches (mm)

Tolerance ±0.005 (0.13) for three decimal places
±0.01 (0.3) for two decimal places
unless otherwise specified

Materials

Header Cold Rolled Steel/Nickel/Gold
Cover Kovar/Nickel
Pins #52 alloy/Gold ceramic seal

CAUTION

Heat from reflow or wave soldering may damage the device.
Solder pins individually with heat application not exceeding 300°C for 10 seconds per pin.

Case K3, Rev C, 20060110

Please refer to the numerical dimensions for accuracy.

All information is believed to be accurate, but no responsibility is assumed for errors or omissions.

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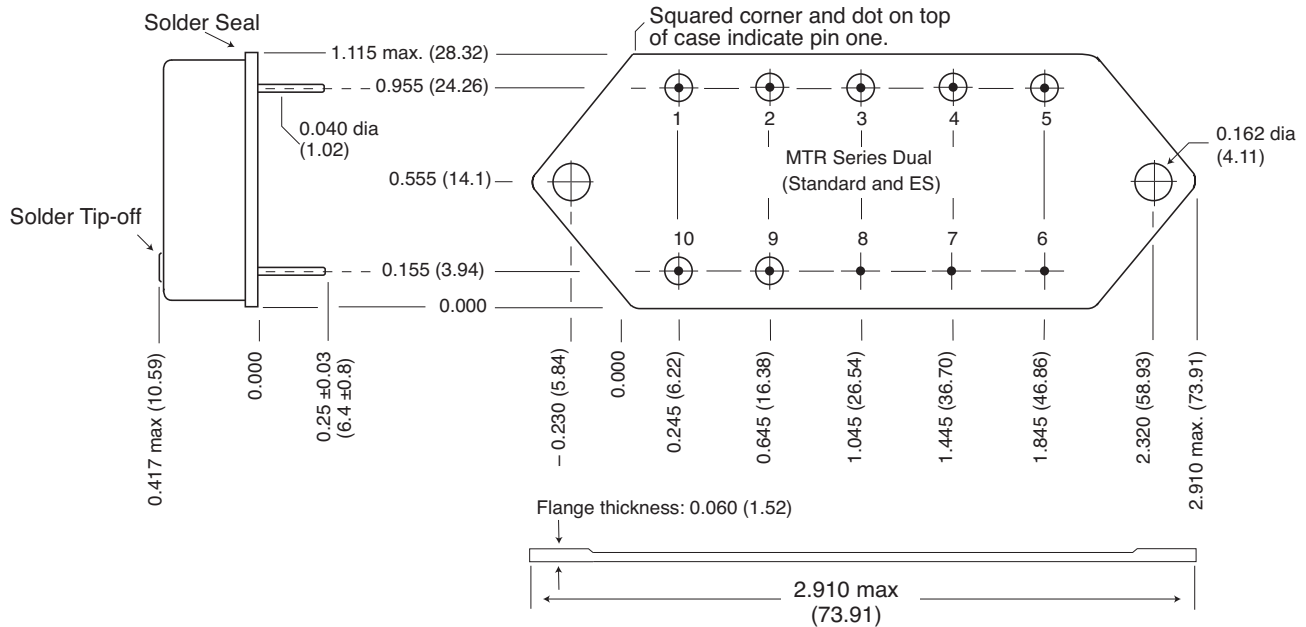
FIGURE 36: CASE K3 – SINGLE MODELS

MTR Single, Dual and Triple DC/DC Converter Cases

28 VOLT INPUT – 30 WATT

BOTTOM VIEW CASE K5

Flanged cases: Designator "F" required in Case Option position of model number.



Seal hole: 0.091 ±0.001 (2.31 ±0.03)

Case dimensions in inches (mm)

Tolerance ±0.005 (0.13) for three decimal places
 ±0.01 (0.3) for two decimal places
 unless otherwise specified

CAUTION

Heat from reflow or wave soldering may damage the device.

Solder pins individually with heat application not exceeding 300°C for 10 seconds per pin.

Materials

Header Cold Rolled Steel/Nickel/Tin

Cover Cold Rolled Steel/Nickel/Tin

Pins #52 alloy compression glass seal

Case K3, Rev C, 20060109

Please refer to the numerical dimensions for accuracy. All information is believed to be accurate, but no responsibility is assumed for errors or omissions. Interpoint reserves the right to make changes in products or specifications without notice.

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FIGURE 37: CASE K5 – SINGLE MODELS

MTR Single, Dual and Triple DC/DC Converters

28 VOLT INPUT – 30 WATT

883, CLASS H, QML PRODUCTS – ELEMENT EVALUATION

ELEMENT EVALUATION TEST PERFORMED (COMPONENT LEVEL)	STANDARD (NON-QML) ¹		CLASS H, QML	
	M/S ²	P ³	M/S ²	P ³
Element Electrical (probe)	yes	no	yes	yes
Element Visual	no	no	yes	yes
Internal Visual	no	no	yes	no
Final Electrical	no	no	yes	yes
Wire Bond Evaluation ⁴	no	no	yes	yes
SLAM™/C-SAM: Input Capacitors only (Add'l test, not req. by H or K)	no	no	no	yes

Definitions:

Element Evaluation: Component testing/screening per MIL-STD-883 as determined by MIL-PRF-38534

SLAM™: Scanning Laser Acoustic Microscopy

C-SAM: C - Mode Scanning Acoustic Microscopy

Notes:

1. Non-QML products do not meet all of the requirements of MIL-PRF-38534
2. M/S = Active components (Microcircuit and Semiconductor Die)
3. P = Passive components
4. Not applicable to EMI filters that have no wire bonds

MTR Single, Dual and Triple DC/DC Converters

28 VOLT INPUT – 30 WATT

883, CLASS H, QML PRODUCTS – ENVIRONMENTAL SCREENING

TEST	125°C STANDARD non-QML	125°C /ES non-QML	Class H /883 QML
Pre-cap Inspection Method 2017, 2032	yes	yes	yes
Temperature Cycle (10 times) Method 1010, Cond. C, -65°C to 150°C, ambient Method 1010, Cond. B, -55°C to 125°C, ambient	no no	no yes	yes no
Constant Acceleration Method 2001, 3000 g Method 2001, 500g	no no	no yes	yes no
Burn-In Method 1015, 160 hours at 125°C case, typical 96 hours at 125°C case, typical	no no	no yes	yes no
Final Electrical Test MIL-PRF-38534, Group A Subgroups 1 through 6: -55°C, +25°C, +125°C case Subgroups 1 and 4: +25°C case	no yes	no yes	yes no
Hermeticity Test Fine Leak, Method 1014, Cond. A Gross Leak, Method 1014, Cond. C Gross Leak, Dip (1 x 10 ⁻³)	no no yes	yes yes no	yes yes no
Final Visual Inspection Method 2009	yes	yes	yes

Test methods are referenced to MIL-STD-883 as determined by MIL-PRF-38534.