MTR (50) Single and Dual DC-DC Converters

28 (16-50) VOLT INPUT – 30 WATT

FEATURES

Input voltage range 16 to 50 VDC

Transient protection up to 80 V

- Operating temperature -55° to +125°C
- Fully isolated, magnetic feedback
- Fixed high frequency switching
- Inhibit and synchronization function
- Indefinite short circuit and overload protection

MODELS VDC OUTPUT	
SINGLE	DUAL
3.3	±5
5	±12
8.5	±15
12	
15	

FOR OUR LEGACY MTR (40)
16 - 40 Vin, 50 V transient / 50 ms.
Datasheet at www.interpoint.com/mtr40

DESCRIPTION

The Interpoint™ MTR Series™ of dc-dc converters offers up to 30 watts of output power from single or dual output configurations. MTR (50) models have an input voltage range of 16 to 50 V. Transient protection up to 80 Vin for up to 50 milliseconds meets the overvoltage transient requirements of MIL-STD-704A. 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. The converters are offered with standard screening, “ES” screening, or fully compliant to “883” MIL-PRF-38534 Class H screening. See “Table 9: Element Evaluation” on page 15 and “Table 10: Environmental Screening” on page 16. Standard microcircuit drawings (SMD) are available see “Table 3: SMD Number Cross Reference” on page 6.

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.

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 140% 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. Use our FMCE-0328™, FMCE-0528™ or FMCE-0828™ EMI filter to meet the requirements of MIL-STD-461C CE03 and CS01 and/or MIL-STD-461D, E and F CE102 and CS101 levels of conducted emissions. Or use the FM-704A for transient suppression and to meet MIL-STD-461C CE03.

COVER MARKING

The cover marking for the MTR 50 has “MTR (50) DC-DC CONVERTER” below the model number. See “Figure 8: Cover Marking for MTR (50) - 50 Vin” on page 6.

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 duty cycle between 40% and 60%. The sync pin must be connected to input common pin when not in use.

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Wide Input Voltage Range

MTR converters are designed to provide full power over a full 16 to 50 VDC input voltage range. Operation below 16 volts, including MIL-STD-704A emergency power conditions is possible with derated power. For details, refer to the low line dropout graph “Figure 24” on page 12.

Dynamic Response

The MTR Series feed-forward compensation system provides excellent dynamic response and noise rejection. Audio rejection is typically 40 dB. The minimum to maximum step line transition response is typically less than 4%.

Inhibit Function

MTR converters provide an inhibit terminal that can be used to disable internal switching, resulting in no output voltage and very low quiescent input current. The converter is inhibited when the inhibit pin is pulled below 0.8 V and enabled when its inhibit pin is left floating. An external inhibit interface should be capable of pulling the converter’s inhibit pin below 0.8 V while sinking the maximum inhibit current and also allowing the inhibit pin to float high to enable the converter. A voltage should not be applied to the inhibit pin. The open circuit voltage present on the inhibit pin is 9 to 11 V.

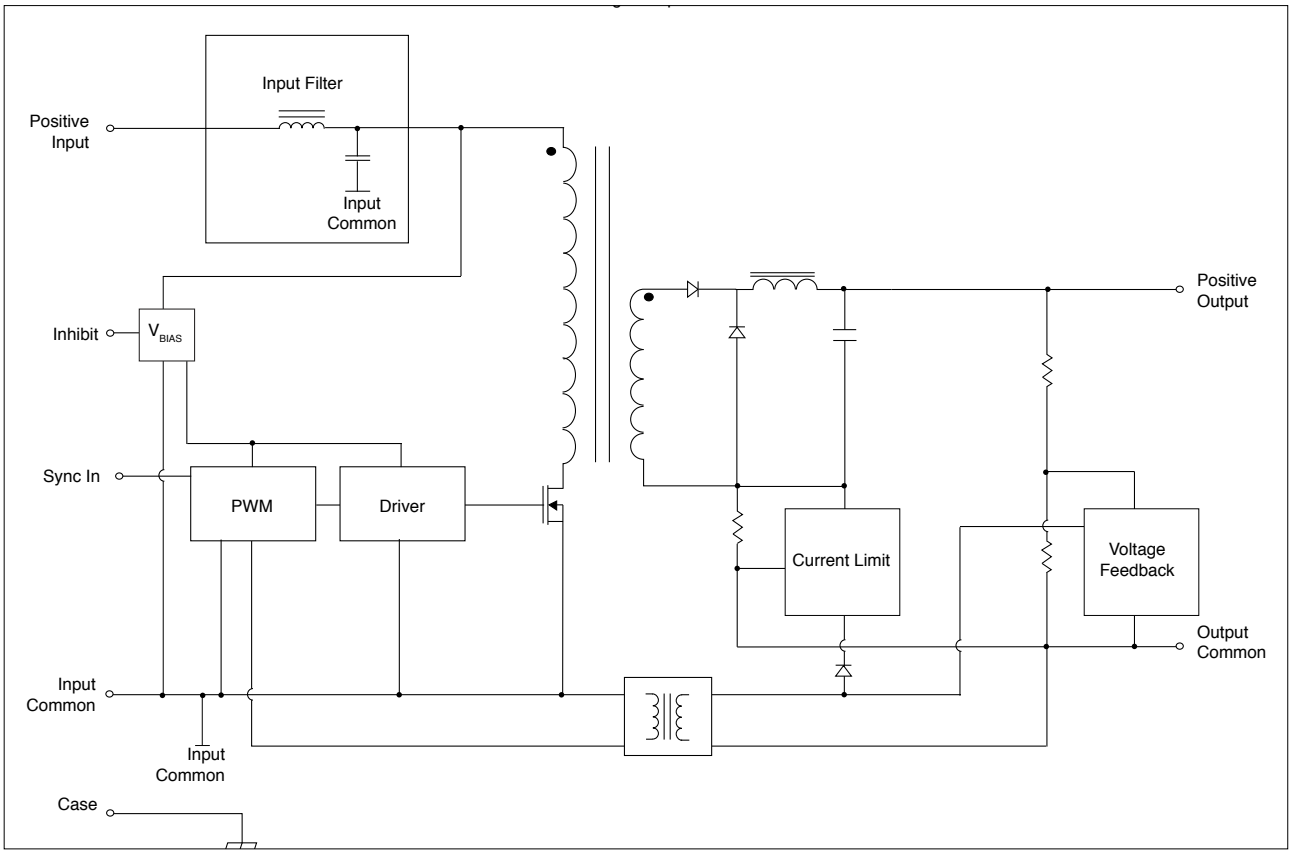


Figure 1: MTR Single Block Diagram

MTR (50) Single and Dual DC-DC Converters

28 (16-50) VOLT INPUT – 30 WATT

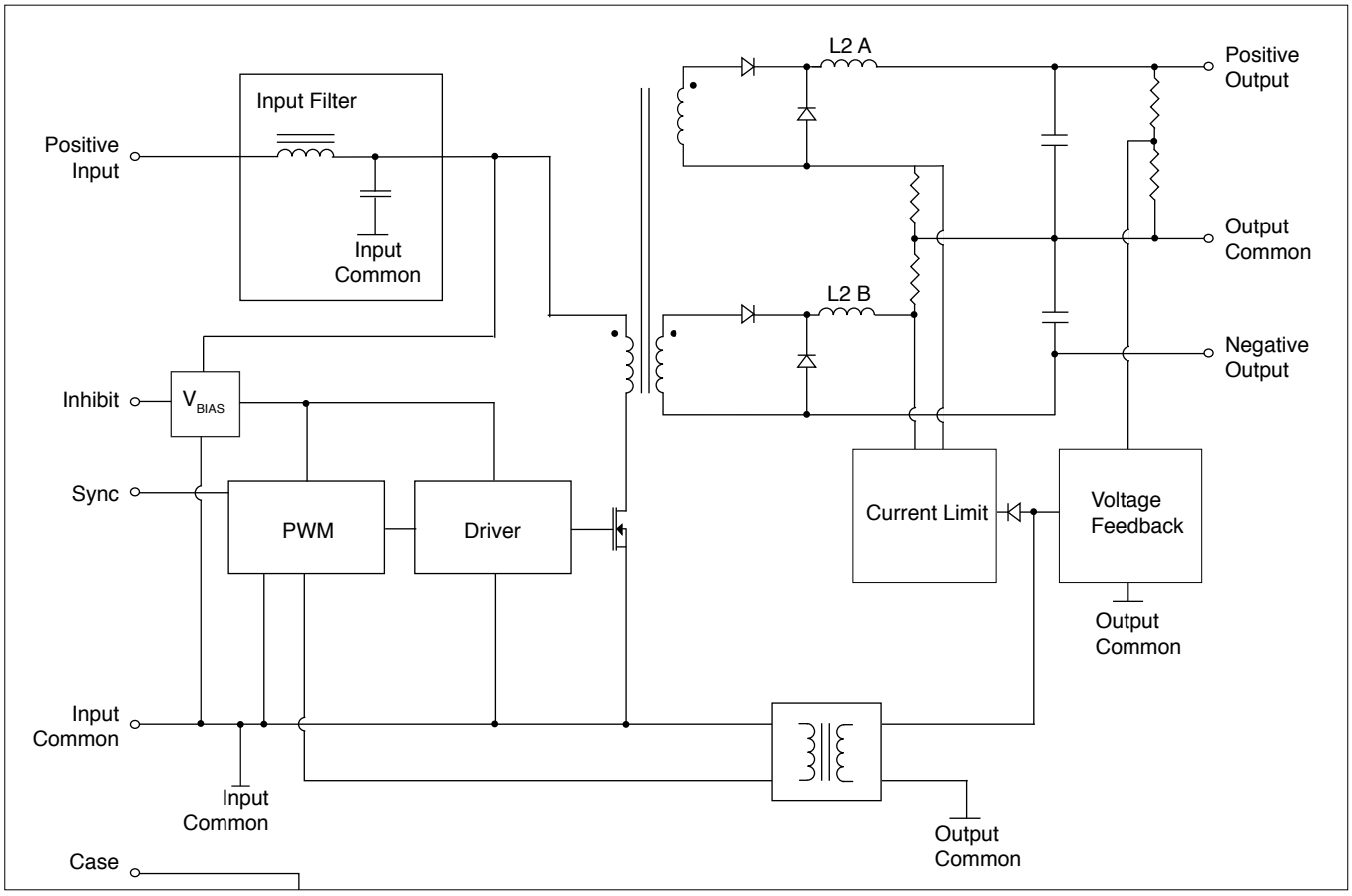
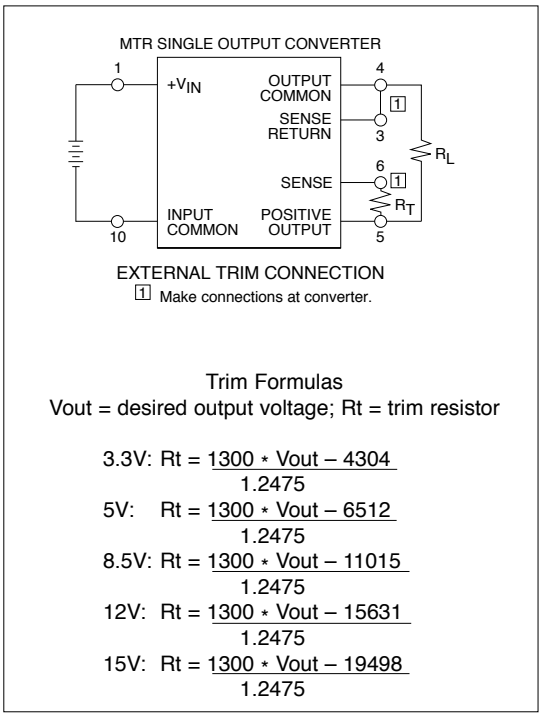


FIGURE 2: MTR DUAL BLOCK DIAGRAM

MTR (50) Single and Dual DC-DC Converters

28 (16-50) VOLT INPUT – 30 WATT

TRIM AND REMOTE SENSE (AVAILABLE ON SINGLE OUTPUT MODELS ONLY)



Trim Formulas

Vout = desired output voltage; Rt = trim resistor

$$3.3V: \quad Rt = \frac{1300 * Vout - 4304}{1.2475}$$

$$5V: \quad Rt = \frac{1300 * Vout - 6512}{1.2475}$$

$$8.5V: \quad Rt = \frac{1300 * Vout - 11015}{1.2475}$$

$$12V: \quad Rt = \frac{1300 * Vout - 15631}{1.2475}$$

$$15V: \quad Rt = \frac{1300 * Vout - 19498}{1.2475}$$

FIGURE 3: TRIM CONNECTION [1, 2, 3]

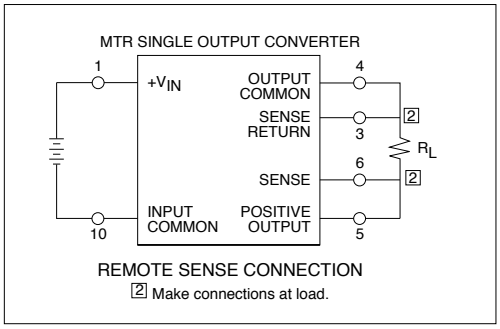


FIGURE 4: REMOTE SENSE CONNECTION [4]

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. Do not exceed the maximum power.
2. If neither voltage trim nor remote sense will be used, connect pin 3 to pin 4 and pin 5 to pin 6.
3. CAUTION: The converter will be permanently damaged if the remote sense (pin 6) is shorted to ground. Damage may also result if the output common or positive output is disconnected from the load when the remote sense leads are connected to the load.
4. When using remote sense for voltage compensation or when using remote sense for trim, the output will drift over temperature. Contact Applications Engineering for more information at powerapps@crane-eg.com

MTR (50) Single and Dual DC-DC Converters

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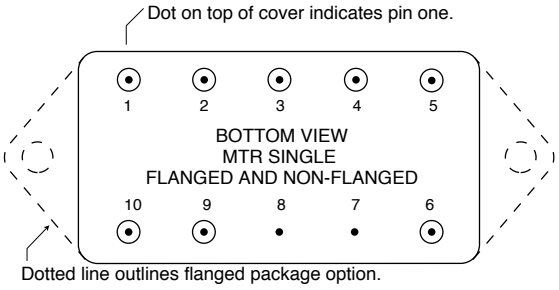
PIN OUT		
Pin	**Single Output**	**Dual Output**
1	Positive Input	Positive Input
2	Inhibit	Inhibit
3	Sense Return	Positive Output
4	Output Common	Output Common
5	Positive Output	Negative Output
6	Positive Sense	Case Ground
7	Case Ground	Case Ground
8	Case Ground	Case Ground
9	Sync	Sync
10	Input Common	Input Common

TABLE 1: PIN OUT

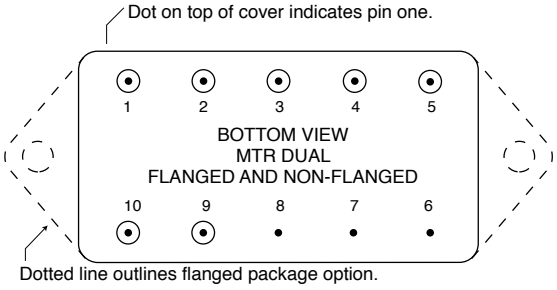
PINS NOT IN USE	
Inhibit	Leave unconnected
Sync In	Connect to input common
Sense Lines	Must be connected to appropriate outputs

TABLE 2: PINS NOT IN USE



For dimensions see “Figure 25: Cases H2” on page 13 and “Figure 26: Cases K3” on page 14.

FIGURE 5: PIN OUT SINGLE OUTPUT MODELS



For dimensions see cases “Figure 25: Cases H2” on page 13, and “Figure 26: Cases K3” on page 14.

FIGURE 6: PIN OUT DUAL OUTPUT MODELS

MTR (50) Single and Dual DC-DC Converters

28 (16-50) VOLT INPUT – 30 WATT

MODEL NUMBERING KEY

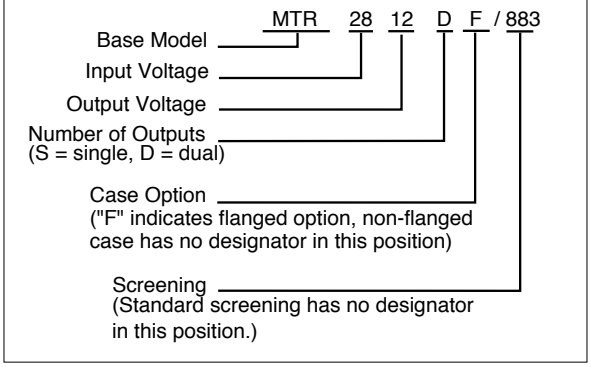


FIGURE 7: MODEL NUMBERING KEY

SMD NUMBERS	
STANDARD MICROCIRCUIT DRAWING (SMD)	**MTR SIMILAR PART**
5962-0150101HXC	MTR283R3S/883
5962-9306801HXC	MTR2805S/883
5962-9306901HXC	MTR2812S/883
5962-9307001HXC	MTR2815S/883
5962-9320501HXC	MTR2805D/883
5962-9307101HXC	MTR2812D/883
5962-9307201HXC	MTR2815D/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. The MTR (50) meets the most current SMD revision revision. See the SMD for the numbers for other screening and radiation levels. For exact specifications for an SMD product, refer to the SMD drawing. SMDs can be downloaded from: http://www.dscc.dla.mil/programs/smcr	

TABLE 3: SMD NUMBER CROSS REFERENCE

FIGURE 8: COVER MARKING FOR MTR (50) - 50 VIN

MODEL NUMBER OPTIONS

TO DETERMINE THE MODEL NUMBER ENTER ONE OPTION FROM EACH CATEGORY IN THE FORM BELOW.

CATEGORY	Base Model and Input Voltage	Output Voltage [1]	Number of Outputs [2]	Case Options [3]	Screening [4]
OPTIONS	MTR28	3R3, 05, 8R5, 12, 15	S	(non-flanged, leave blank)	(standard, leave blank)
		05, 12, 15	D	F (flanged)	ES
					883
FILL IN FOR MODEL #	MTR28	_____	_____	_____	/ _____

Notes:
1. Output Voltage: An R indicates a decimal point. 3R3 is 3.3 volts out. The value of 3R3 and 8R5 are only available in single output models.
2. Number of Outputs: S is a single output and D is a dual output.
3. Case Options: For the standard case, "Figure 25: Cases H2" on page 13, leave the case option blank. For the flanged case option, "Figure 26: Cases K3" on page 14, insert the letter F in the Case Option position.
4. Screening: For standard screening leave the screening option blank. For other screening options, insert the desired screening level. For more information see "Table 9: Element Evaluation" on page 15 and "Table 10: Environmental Screening" on page 16.

TABLE 4: MODEL NUMBER OPTIONS

MTR (50) Single and Dual DC-DC Converters

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TABLE 5: OPERATING CONDITIONS, ALL MODELS : 25°C T_C, 28 VDC V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.

		ALL MODELS			
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
LEAD SOLDERING TEMPERATURE [1]	10 seconds max.	—	—	300	°C
STORAGE TEMPERATURE [1]		-65	—	+150	°C
CASE OPERATING	FULL POWER	-55	—	+125	°C
TEMPERATURE	ABSOLUTE [1]	-55	—	+135	
DERATING OUTPUT POWER/CURRENT [1]	LINEARLY	From 100% at 125°C to 0% at 135°C			
ESD RATING [1] CLASS 2 MIL-PRF-38534, 3.9.5.8.2	MIL-STD-883 METHOD 3015	2000	—	3999	V
ISOLATION, ANY PIN TO CASE EXCEPT CASE PIN	@ 500 VDC	100	—	—	Megohms
INPUT TO OUTPUT CAPACITANCE [1]		—	50	—	pF
CURRENT LIMIT [2]	% OF FULL LOAD	—	140	—	%
AUDIO REJECTION [1]		—	40	—	dB
CONVERSION FREQUENCY, FREE RUN	-55° TO +125°C	550	—	650	kHz
SYNCHRONIZATION	INPUT FREQUENCY	500	—	675	kHz
-55° TO +125°C	DUTY CYCLE [1]	40	—	60	%
	ACTIVE LOW	—	—	0.8	V
	ACTIVE HIGH [1]	4.5	—	5.0	
	REFERENCED TO	INPUT COMMON			
	IF NOT USED	CONNECT TO INPUT COMMON			
INHIBIT ACTIVE LOW (OUTPUT DISABLED)	INHIBIT PIN PULLED LOW	—	—	0.8	V
Do not apply a voltage to the inhibit pin. [3]	INHIBIT PIN SOURCE CURRENT [1]	—	—	8	mA
	REFERENCED TO	INPUT COMMON			
INHIBIT ACTIVE HIGH (OUTPUT ENABLED)	INHIBIT PIN CONDITION	OPEN COLLECTOR OR UNCONNECTED			
Do not apply a voltage to the inhibit pin. [3]	OPEN INHIBIT PIN VOLTAGE [1]	9	—	11	V

Notes:
1. Guaranteed by qualification test and/or analysis. Not an in-line test.
2. Dual outputs: The over-current limit will trigger when the sum of the currents from both outputs reaches 140% (typical value) of the maximum rated “total” current of both outputs.
3. An external inhibit interface should be used to pull the inhibit low or leave it floating. The inhibit pin can be left unconnected if not used.

MTR (50) Single and Dual DC-DC Converters

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TABLE 6: ELECTRICAL CHARACTERISTICS: -55°C TO +125°C T_C, 28 VDC VIN, 100% LOAD, FREE RUN, UNLESS OTHERWISE SPECIFIED.

SINGLE OUTPUT MODELS		MTR283R3S			MTR2805S			MTR288R5S			UNITS
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE		3.201	3.30	3.399	4.85	5.00	5.15	8.77	8.5	8.23	VDC
OUTPUT CURRENT	V_{IN} = 16 TO 50 VDC	0	—	6.06	0	—	5.0	0	—	2.95	A
OUTPUT POWER	V_{IN} = 16 TO 50 VDC	0	—	20	0	—	25	0	—	25	W
OUTPUT RIPPLE	T_C = 25°C	—	15	40	—	35	50	—	25	60	mV p-p
10 kHz - 2 MHz	T_C = -55°C TO +125°C	—	—	50	—	50	90	—	40	60	
LINE REGULATION [2]	V_{IN} = 16 TO 50 VDC	—	—	10	—	15	50	—	15	50	mV
LOAD REGULATION	NO LOAD TO FULL	—	—	10	—	15	50	—	15	50	mV
INPUT VOLTAGE	CONTINUOUS	16	28	50	16	28	50	16	28	50	VDC
NO LOAD TO FULL	TRANSIENT 50 ms [1]	—	—	80	—	—	80	—	—	80	V
INPUT CURRENT	NO LOAD	—	30	75	—	35	75	—	35	75	mA
	INHIBITED	—	7	8	—	3	8	—	3	8	
INPUT RIPPLE CURRENT [3]	10 kHz - 10 MHz	—	25	50	—	20	50	—	20	50	mA p-p
EFFICIENCY	T_C = 25°C	74	76	—	76	78	—	78	83	—	%
	T_C = -55°C TO +125°C	71	—	—	73	—	—	78	—	—	
LOAD FAULT [4]	POWER DISSIPATION	—	—	12	—	—	12	—	—	12	W
SHORT CIRCUIT	RECOVERY [1]	—	1.4	6	—	1.4	5	—	1.4	5	ms
STEP LOAD RESPONSE	TRANSIENT	—	±125	±250	—	±200	±300	—	±250	±400	mV pk
50% - 100% - 50%	RECOVERY [5]	—	—	200	—	60	200	—	60	200	µs
STEP LINE RESPONSE [1]	TRANSIENT	—	—	±300	—	±200	±300	—	±400	±500	mV pk
16 - 40 -16 VDC	RECOVERY [5]	—	—	300	—	—	300	—	—	300	µs
START-UP [6]	DELAY	—	1.4	5	—	1.4	5	—	1.4	5	m sec
FULL LOAD	OVERSHOOT	—	0	50	—	0	50	—	0	50	mV pk
CAPACITIVE LOAD [1] T_C = 25°C	NO EFFECT ON DC PERFORMANCE	—	—	300	—	—	300	—	—	300	µF

Notes
1. Guaranteed by qualification test and/or analysis. Not an in-line test.
2. Operation is limited below 16V (see “Figure 24” on page 12).
3. Tested with 6800 pF ceramic bypass capacitor connected externally from input common to case.
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. Tested on release from inhibit.

MTR (50) Single and Dual DC-DC Converters

28 (16-50) VOLT INPUT – 30 WATT

TABLE 7: ELECTRICAL CHARACTERISTICS: -55°C TO +125°C T_C, 28 VDC VIN, 100% LOAD, FREE RUN, UNLESS OTHERWISE SPECIFIED.

SINGLE OUTPUT MODELS		MTR2812S			MTR2815S			UNITS
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE		11.64	12.00	12.36	14.70	15.00	15.30	VDC
OUTPUT CURRENT	V_{IN} = 16 TO 50 VDC	0	—	2.5	0	—	2.0	A
OUTPUT POWER	V_{IN} = 16 TO 50 VDC	0	—	30	0	—	30	W
OUTPUT RIPPLE	T_C = 25°C	—	25	40	—	25	40	mV p-p
10 kHz - 2 MHz	T_C = -55°C TO +125°C	—	40	90	—	40	90	
LINE REGULATION [2]	V_{IN} = 16 TO 50 VDC	—	15	50	—	15	50	mV
LOAD REGULATION	NO LOAD TO FULL	—	15	50	—	15	50	mV
INPUT VOLTAGE	CONTINUOUS	16	28	50	16	28	50	VDC
NO LOAD TO FULL	TRANSIENT 50 ms [1]	—	—	80	—	—	80	V
INPUT CURRENT	NO LOAD	—	35	75	—	35	75	mA
	INHIBITED	—	3	8	—	3	8	
INPUT RIPPLE CURRENT [3]	10 kHz - 10 MHz	—	20	50	—	20	50	mA p-p
EFFICIENCY	T_C = 25°C	80	83	—	81	84	—	%
	T_C = -55°C TO +125°C	77	—	—	78	—	—	
LOAD FAULT [4]	POWER DISSIPATION	—	—	12	—	—	12	W
SHORT CIRCUIT	RECOVERY [1]	—	1.4	5	—	1.4	5	ms
STEP LOAD RESPONSE	TRANSIENT	—	±250	±400	—	±350	±500	mV pk
50% - 100% - 50%	RECOVERY [5]	—	60	200	—	60	200	µs
STEP LINE RESPONSE [1]	TRANSIENT	—	±400	±500	—	±500	±600	mV pk
16 - 40 -16 VDC	RECOVERY [5]	—	—	300	—	—	300	µs
START-UP [6]	DELAY	—	1.4	5	—	1.4	5	m sec
FULL LOAD	OVERSHOOT	—	0	120	—	0	150	mV pk
CAPACITIVE LOAD [1] T_C = 25°C	NO EFFECT ON DC PERFORMANCE	—	—	300	—	—	300	µF

Notes
1. Guaranteed by qualification test and/or analysis. Not an in-line test.
2. Operation is limited below 16V (see “Figure 24” on page 12).
3. Tested with 6800 pF ceramic bypass capacitor connected externally from input common to case.
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. Tested on release from inhibit.

MTR (50) Single and Dual DC-DC Converters

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TABLE 8: ELECTRICAL CHARACTERISTICS: -55°C TO +125°C T_C, 28 VDC VIN, 100% LOAD, FREE RUN, UNLESS OTHERWISE SPECIFIED.

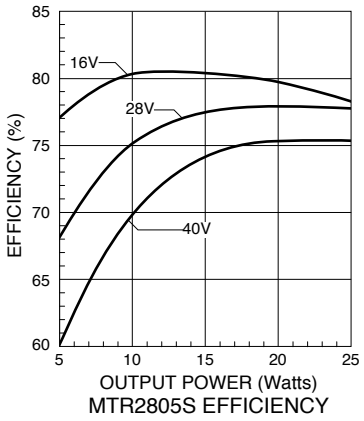
DUAL OUTPUT MODELS		MTR2805D			MTR2812D			MTR2815D			UNITS
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE	+ V_{OUT}	4.850	5.00	5.150	11.64	12.00	12.36	14.55	15.00	15.45	VDC
	- V_{OUT}	4.825	5.00	5.172	11.58	12.00	12.42	14.47	15.00	15.53	
OUTPUT CURRENT [2]	EITHER OUTPUT	0	2.5	4.5 [1]	0	1.25	2.25 [1]	0	1.00	1.80 [1]	A
V_{IN} = 16 TO 50 VDC	TOTAL OUTPUT	—	—	5	—	—	2.5	—	—	2.00	
OUTPUT POWER [2]	EITHER OUTPUT	0	12.5	22.5 [1]	0	15	27 [1]	0	15	27 [1]	W
V_{IN} = 16 to 50 VDC	TOTAL OUTPUT	—	—	25	—	—	30	—	—	30	
OUTPUT RIPPLE	T_C = 25°C	—	20	40	—	30	80	—	25	80	mV p-p
10 KHZ - 2 MHZ ± V_{OUT}	T_C = -55°C TO +125°C	—	40	90	—	40	120	—	40	120	
LINE REGULATION [3]	+ V_{OUT}	—	10	50	—	10	50	—	10	50	mV
V_{IN} = 16 TO 50 VDC	- V_{OUT}	—	50	100	—	50	150	—	50	180	
LOAD REGULATION	+ V_{OUT}	—	5	50	—	15	50	—	15	50	mV
NO LOAD TO FULL	- V_{OUT}	—	25	100	—	30	150	—	30	180	
CROSS REGULATION [1]	SEE NOTE 4	—	4	6	—	4	6	—	4	6	%
EFFECT ON -V_{OUT}, 25°C	SEE NOTE 5	—	7	12	—	4	8.3	—	3	8	
INPUT VOLTAGE	CONTINUOUS	16	28	50	16	28	50	16	28	50	VDC
NO LOAD TO FULL	TRANSIENT 50 ms. [1]	—	—	80	—	—	80	—	—	80	V
INPUT CURRENT	NO LOAD	—	35	75	–	50	75	—	50	75	mA
	INHIBITED	—	3	8	—	3	8	—	3	8	
INPUT RIPPLE CURRENT [6]	10 kHz - 10 MHz	—	15	50	—	20	50	—	20	50	mA p-p
EFFICIENCY	T_C = 25°C	76	78	—	79	81	—	80	83	—	%
BALANCED LOAD	T_C = -55°C TO +125°C	73	—	—	76	—	—	77	—	—	
LOAD FAULT [7]	POWER DISSIPATION	—	10	12	—	10	12	—	10	12	W
SHORT CIRCUIT	RECOVERY [1]	—	1.4	5.0	—	1.4	5.0	—	1.4	5.0	ms
STEP LOAD RESPONSE	TRANSIENT	—	±200	±300	—	±150	±300	—	±200	±400	mV pk
50% - 100% - 50% ± V_{OUT}	RECOVERY [8]	—	100	200	—	100	200	—	100	200	µs
STEP LINE RESPONSE [1]	TRANSIENT	—	±200	±400	—	±200	±400	—	±400	±500	mV pk
16 - 40 -16 VDC ± V_{OUT}	RECOVERY [8]	—	—	300	—	—	300	—	—	300	µs
START-UP [9]	DELAY	—	1.4	5	—	1.4	5	—	1.4	5	ms
FULL LOAD	OVERSHOOT [1]	—	0	180	—	0	120	—	0	150	mV pk
CAPACITIVE LOAD [1] T_C = 25°C	NO EFFECT ON DC PERFORMANCE	—	—	500	—	—	500	—	—	500	µF

Notes
1. Guaranteed by qualification test and/or analysis. Not an in-line test.
2. 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.
3. Operation is limited below 16 V (see “Figure 24” on page 12).
4. Effect on negative V_{OUT} from 50%/50% loads to 80%/20% or 20%/80% loads.
5. Effect on negative V_{OUT} from 50%/50% loads to 90%/10% or 10%/90% loads. See “Figure 22” and “Figure 23” on page 12.
6. Tested with 6800 pF ceramic bypass capacitor connected externally from input common to case.
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 V_{OUT} is within 1% of final value.
9. Tested on release from inhibit.

MTR (50) Single and Dual DC-DC Converters

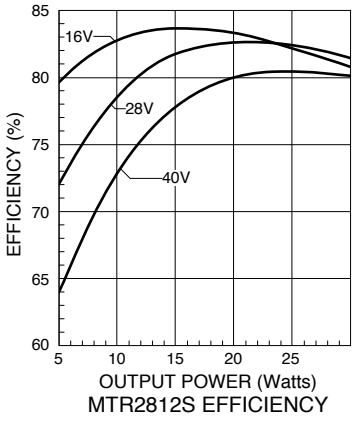
28 (16-50) VOLT INPUT – 30 WATT

Typical Performance Curves: 25°C Tc, 28 VDC Vin, 100% load, free run, unless otherwise specified.



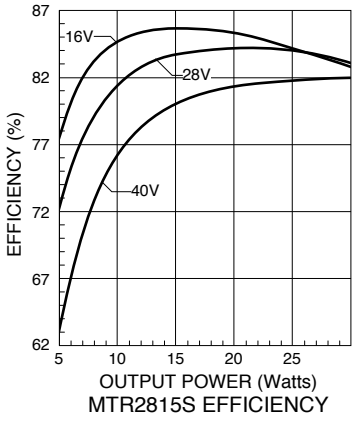
MTR2805S EFFICIENCY

FIGURE 9



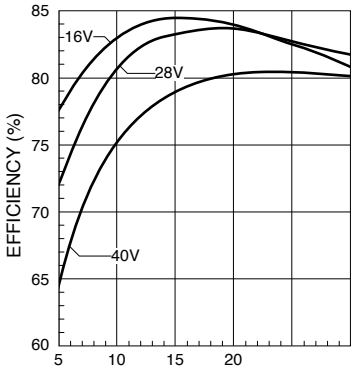
MTR2812S EFFICIENCY

FIGURE 10



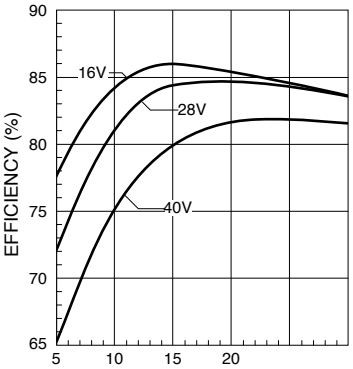
MTR2815S EFFICIENCY

FIGURE 11



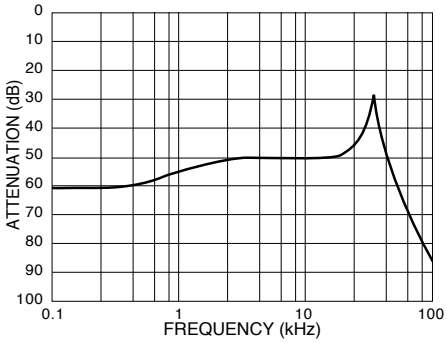
MTR2812D EFFICIENCY

FIGURE 12



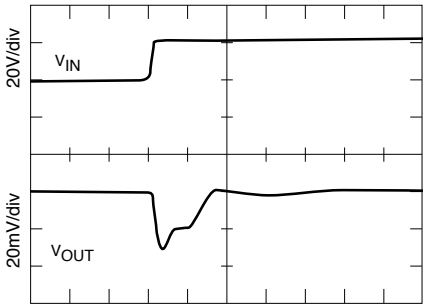
MTR2815D EFFICIENCY

FIGURE 13



AUDIO REJECTION, MTR SERIES

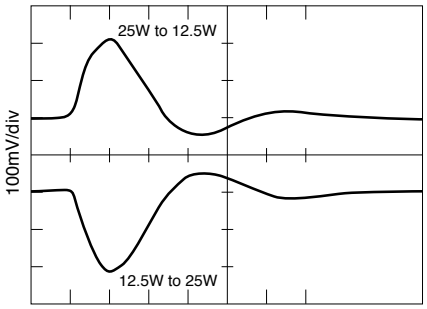
FIGURE 14



50 µs/div
16 TO 40V

MTR2805S STEP LINE RESPONSE

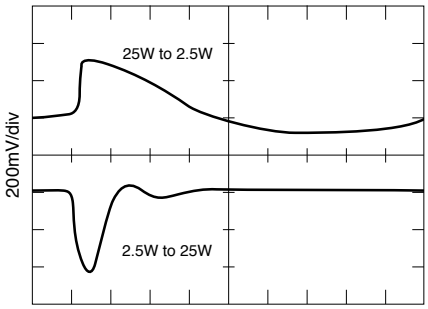
FIGURE 14



50 µs/div
50% ↔100%

MTR2805S STEP LOAD RESPONSE

FIGURE 15



50 µs/div
10% ↔100%

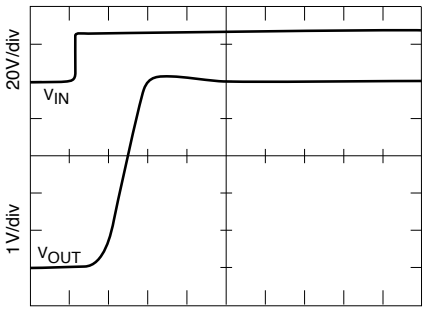
MTR2805S STEP LOAD RESPONSE

FIGURE 16

MTR (50) Single and Dual DC-DC Converters

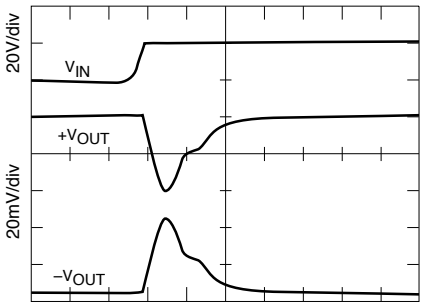
28 (16-50) VOLT INPUT – 30 WATT

Typical Performance Curves: 25°C Tc, 28 VDC Vin, 100% load, free run, unless otherwise specified.



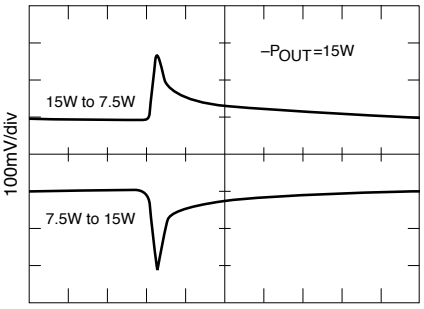
MTR2805S TURN-ON INTO NO LOAD

FIGURE 17



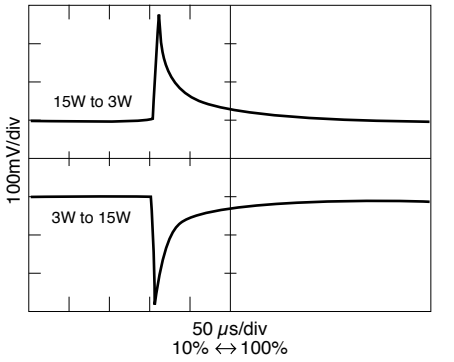
MTR2815D STEP LINE RESPONSE

FIGURE 18



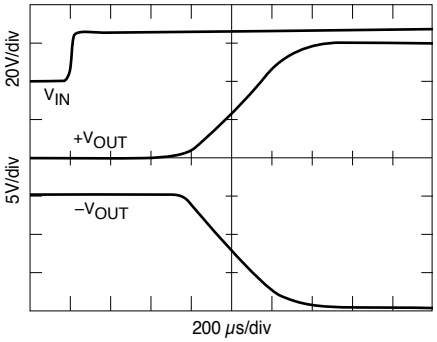
MTR2815D +V_{OUT} STEP LOAD RESPONSE

FIGURE 19



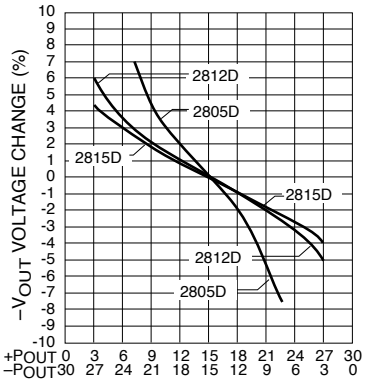
MTR2815D +V_{OUT} STEP LOAD RESPONSE

FIGURE 20



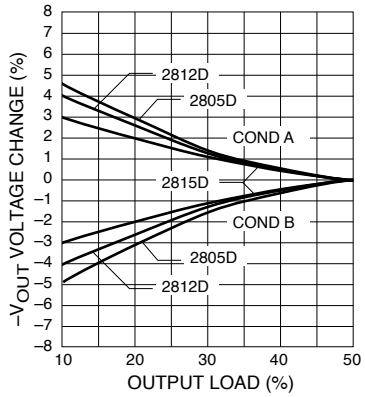
MTR2815D TURN-ON INTO NO LOAD

FIGURE 21



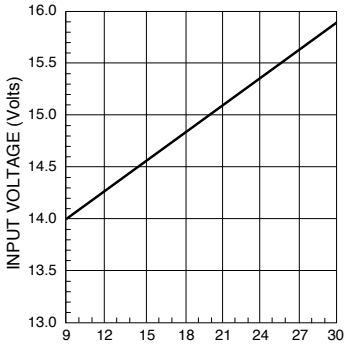
10% to 90% LOAD +V, 90% to 10% LOAD –V
CROSS REGULATION

FIGURE 22



COND. B: 50% LOAD +V, 50% to 10% –V
COND. A: 50% LOAD –V, 50% to 10% +V
CROSS REGULATION

FIGURE 23



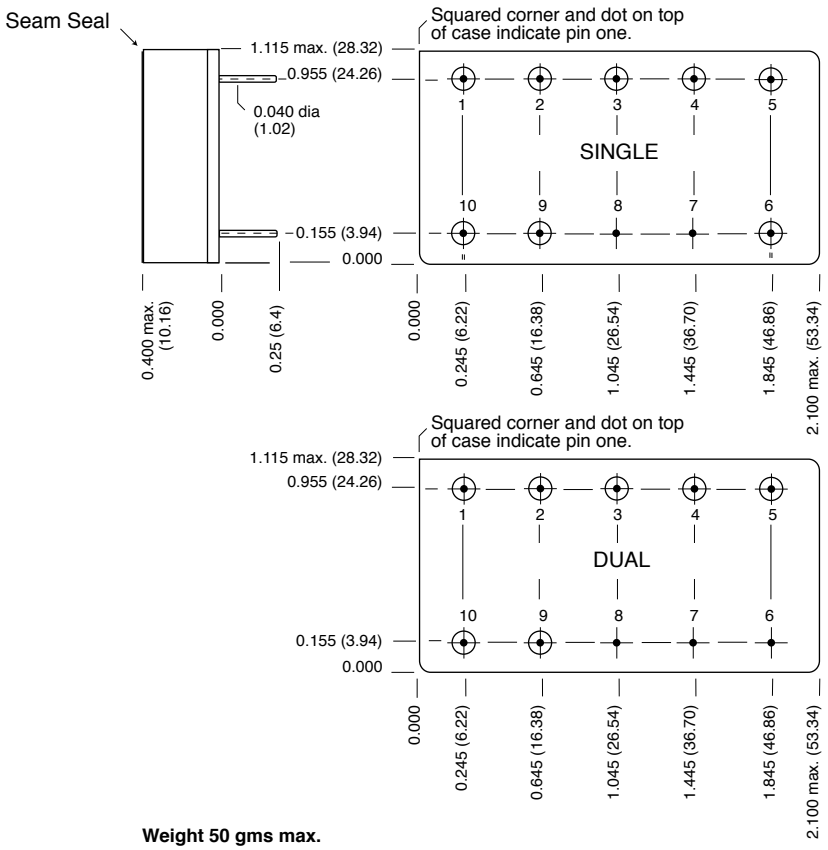
1% DROP
MTR SINGLES AND DUALS
LOW LINE DROPOUT

FIGURE 24

MTR (50) Single and Dual DC-DC Converters

28 (16-50) VOLT INPUT – 30 WATT

BOTTOM VIEW CASE H2



Weight 50 gms max.

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
	Gold plating of 50 - 150 microinches included in pin diameter
	Seal hole 0.120 ±0.002 (3.05 ± 0.05)

Case H2 MTR SD, Rev J, 2013.07.01
Please refer to the numerical dimensions for accuracy..

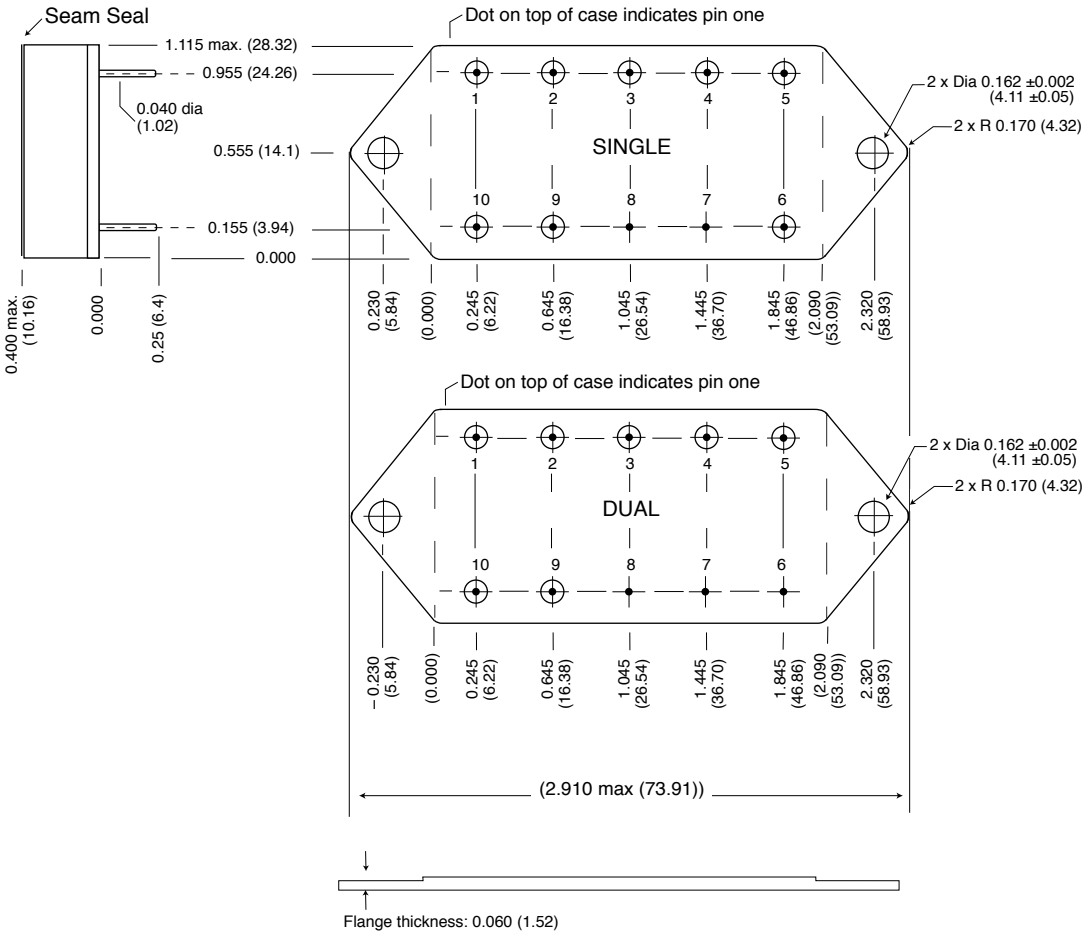
FIGURE 25: CASES H2
SINGLE AND DUAL MODELS

MTR (50) Single and Dual DC-DC Converters

28 (16-50) VOLT INPUT – 30 WATT

BOTTOM VIEW CASE K3

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



Weight 52 grams max.

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
	Gold plating of 50 - 150 microinches included in pin diameter
	Seal hole 0.120 ±0.002 (3.04 ±0.05)

Case K3 MTR SD F, Rev J, 2013.07.01
Please refer to the numerical dimensions for accuracy.

FIGURE 26: CASES K3
SINGLE AND DUAL MODELS

STANDARD AND /ES (NON-QML) AND /883 (CLASS H, QML) MIL-PRF-38534 ELEMENT EVALUATION

COMPONENT-LEVEL TEST PERFORMED	NON-QML [1]	QML	
	STANDARD AND /ES	CLASS H /883	
	M/S [2]	M/S [2]	P [3]
Element Electrical	■	■	■
Visual		■	■
Internal Visual		■	
Final Electrical		■	■
Wire Bond Evaluation		■	■

Notes:
1. Standard and /ES non-QML products may not meet all of the requirements of MIL-PRF-38534.
2. M/S = Active components (Microcircuit and Semiconductor Die)
3. P = Passive components, Class H element evaluation. Not applicable to Standard and /ES element evaluation.

TABLE 9: ELEMENT EVALUATION

MTR (50) Single and Dual DC-DC Converters

28 (16-50) VOLT INPUT – 30 WATT

STANDARD AND /ES (NON-QML) AND /883 (CLASS H, QML) MIL-PRF-38534 ENVIRONMENTAL SCREENING

TEST PERFORMED	NON-QML [1]		QML
	STANDARD	/ES	CLASS H /883
Pre-cap Inspection, Method 2017, 2032	■	■	■
Temperature Cycle (10 times)			
Method 1010, Cond. C, -65°C to +150°C, ambient			■
Method 1010, Cond. B, -55°C to +125°C, ambient		■	
Constant Acceleration			
Method 2001, 3000 g			■
Method 2001, 500 g		■	
Burn-in Method 1015, +125°C case, typical [2]			
96 hours		■	
160 hours			■
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	■	■	■
Hermeticity Test			
Gross Leak, Method 1014, Cond. C		■	■
Fine Leak, Method 1014, Cond. A		■	■
Gross Leak, Dip	■		
Final visual inspection, Method 2009	■	■	■

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

Notes:
1. Standard and /ES, non-QML products, may not meet all of the requirements of MIL-PRF-38534.
2. Burn-in temperature designed to bring the case temperature to +125°C minimum. Burn-in is a powered test.

TABLE 10: ENVIRONMENTAL SCREENING

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