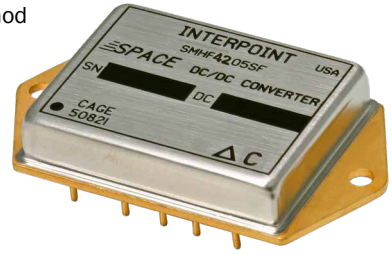
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

FEATURES

- Radiation tolerant space DC-DC converter
  - Single event effects (SEE) LET performance to 86 MeV cm^2/mg
  - Total ionizing dose (TID) guaranteed per MIL-STD-883 method 1019, radiation hardness assurance (RHA)
    L = 50 krad(Si), R = 100 krad(Si)
  - 50 - 300 rad(Si)/sec dose rate (Condition A)
  - 10 mrad(Si)/sec dose rate (Condition D)
- Operating temperature -55°C to +125°C
- Screened to MIL-PRF-38534 Class H and K
- Input voltage range 35 to 55 volts
- Transient protection 80 volts for 50 ms
- Fully isolated
- Fixed high frequency switching
- Inhibit function
- Synchronization input
- Indefinite short circuit protection
- Undervoltage lockout



MODELS OUTPUT VOLTAGE (V)	
SINGLE	DUAL
3.3	±5
5	±7
5.2	±12
12	±15
15	

DESCRIPTION

The Interpoint® SMHF42 Series™ of 42 volt DC-DC converters offers up to 15 watts of power in a radiation tolerant design. The low profile SMHF42 converters are manufactured in our fully certified and qualified MIL-PRF-38534 Class K production facility and packaged in hermetically sealed steel cases. They are ideal for use in programs requiring high reliability, small size, and high levels of radiation hardness assurance. They are targeted for operation on a 42 volt power bus. The units are capable of withstanding transients up to 80 volts for up to 50 ms.

SCREENING

SMHF42 converters offer screening to Class H or K and radiation hardness assurance (RHA) levels L - 50 krad(Si) or R - 100 krad(Si). Single event effects (SEE) LET performance to 86 MeV cm^2/mg. See Table 11 on page 35 for more information.

CONVERTER DESIGN

The SMHF42 converters are switching regulators that use a quasi-square wave, single-ended forward converter design with a constant switching frequency of 500 kHz typical. Isolation between input and output circuits is provided with a transformer in the forward path.

Dual output models maintain cross regulation with tightly coupled output magnetics. Up to 70% of the total output power is available from either output, providing the opposite output is simultaneously carrying 30% of the total output power. Predictable current limit is accomplished by directly monitoring the output load current and limiting the current output above the overload point.

Feed-forward compensation system provides excellent dynamic response and audio rejection. Audio rejection is typically 50 dB. Typical output voltage response for a 50% to 100% step load transient is as low as 2% with a 100 µs recovery time.

INHIBIT FUNCTION

An inhibit terminal that can be used to disable internal switching, resulting in no output and very low quiescent input current. The converter is inhibited when the inhibit pin is pulled low. The unit is enabled when the pin, which is internally connected to a pull-up resistor, is left unconnected or is connected to an open-collector gate.

SYNCHRONIZATION

Synchronization allows the user to synchronize the switching frequency of the converter to the frequency of the system clock. This allows the user to adjust the nominal 500 kHz operating frequency to any frequency within the range of 500 kHz to 600 kHz by applying a compatible input of the desired frequency to pin 5.

SHORT CIRCUIT PROTECTION

Short circuit protection is provided by restricting the output current to approximately 140% of the full load output current. The output current is sensed in the secondary stage to provide highly predictable and accurate current limiting, and to eliminate foldback characteristics.

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Undervoltage Lockout

Undervoltage lockout prevents the converters from operating below approximately 30 volts input to keep system current levels smooth, especially during initialization or re-start operations.

External EMI Filter

The Interpoint SFMC28-461™ EMI filter reduces the input line reflected ripple current of the SMHF42 converters to meet MIL-STD-461C levels of conducted emission (CE03). The maximum input voltage of the SFMC28-461 is 50 volts.

Example EMI plots are Figure 9, Figure 21, Figure 33, Figure 44, Figure 57 and Figure 70.

Span Voltage on Duals

Dual outputs may be spanned to increase the output voltage. Our duals can also be configured as a single output where the positive output is used as one rail and the negative output is used as the other rail. As an example the positive and negative 15 volt dual can be configured as a single 30 volt output. This can be used as a positive 30 volt output or a negative 30 volt output. In all cases Output Common of the converter is not connected.

If the dual is configured as a positive 30 volt output the negative output would be used as system ground and the positive output would be used as the positive 30 volt output.

The maximum capacitance when using a span voltage on a dual is half the value specified for each output.

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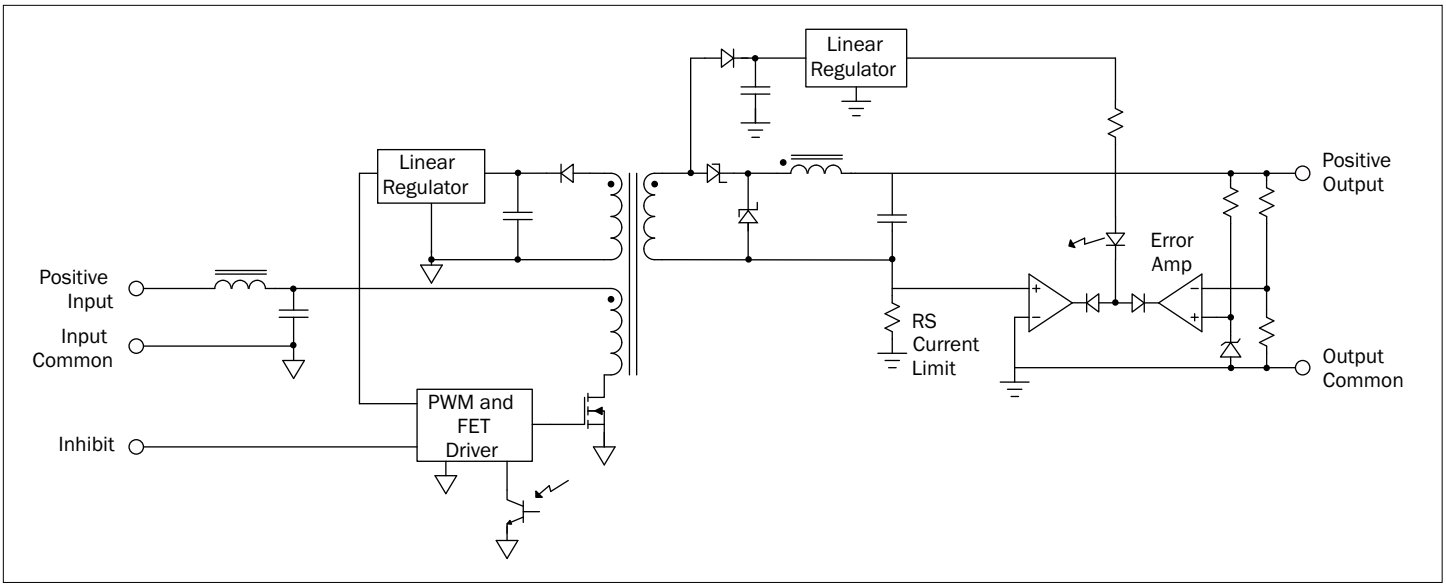

FIGURE 1: SMHF42 SINGLE OUTPUT, BLOCK DIAGRAM

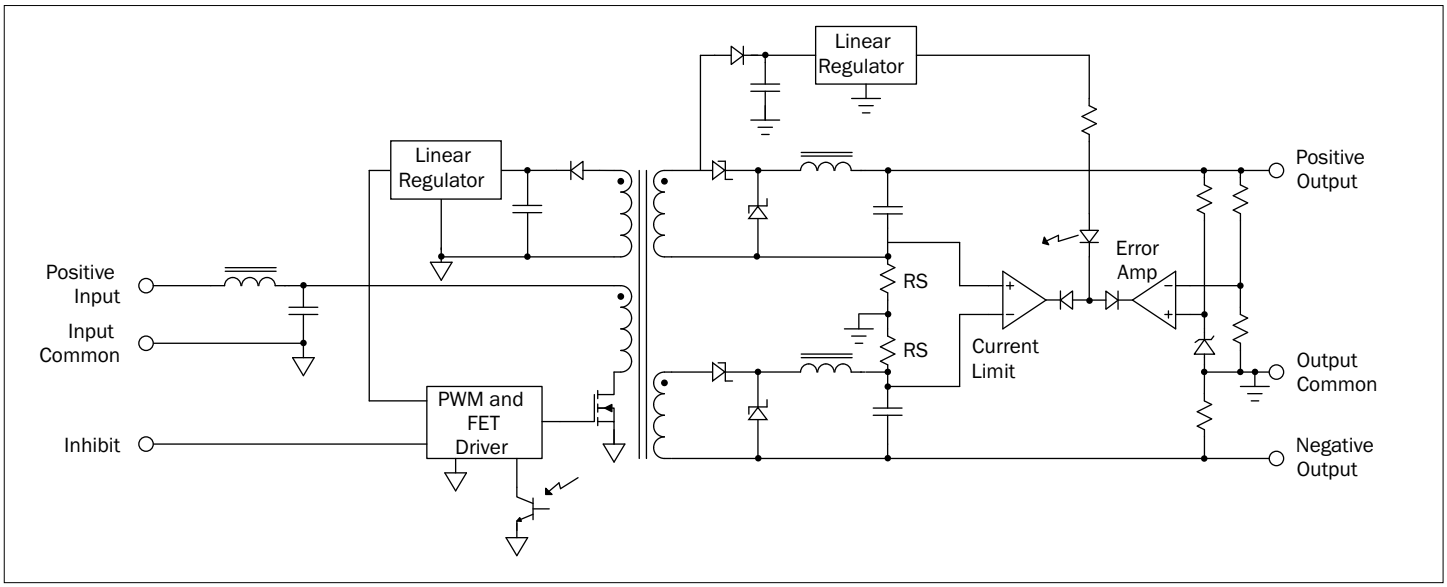

FIGURE 2: SMHF42 DUAL OUTPUT, BLOCK DIAGRAM

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PIN OUT		
Pin	**Single Output**	**Dual Output**
1	Inhibit	Inhibit
2	No connection	Positive Output
3	Output Common	Output Common
4	Positive Output	Negative Output
5	Sync	Sync
6	Case Ground	Case Ground
7	Input Common	Input Common
8	Positive Input	Positive Input

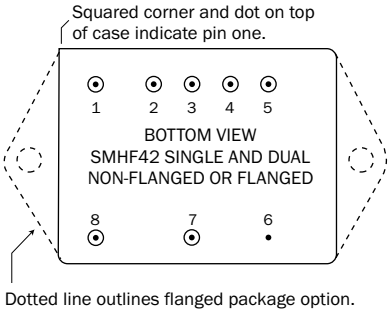
TABLE 1: PIN OUT

SMD NUMBERS	
STANDARD MICROCIRCUIT DRAWING (SMD)	**SMHF42 SIMILAR PART**
5962R1722701KXC	SMHF423R3S/KR
5962R1722702KXC	SMHF4205S/KR
5962R1722703KXC	SMHF425R2S/KR
5962R1722704KXC	SMHF4212S/KR
5962R1722705KXC	SMHF4215S/KR
5962R1722801KXC	SMHF4205D/KR
5962R1722802KXC	SMHF4207D/KR
5962R1722803KXC	SMHF4212D/KR
5962R1722804KXC	SMHF4215D/KR
The SMD numbers shown are for RHA level R, screening level Class K, standard case (X), standard pin seal and non-solder dipped pins (C). For other options please refer to the SMD for the SMD number and the vendor similar number. All SMD numbers are listed on the SMD in the "Bulletin" which is the last page of the SMD. For exact specifications for an SMD product, refer to the SMD. SMDs can be downloaded from https://landandmaritimeapps.dla.mil/programs/smcr	

TABLE 2: SMD NUMBER CROSS REFERENCE

PINS NOT IN USE	
Inhibit (pin 1)	Leave unconnected
Sync (pin 5)	Connect to Input Common (pin 7)

TABLE 3: PINS NOT IN USE



See Figure 80 on page 32 and Figure 81 on page 33 for dimensions.

FIGURE 4: PIN OUT

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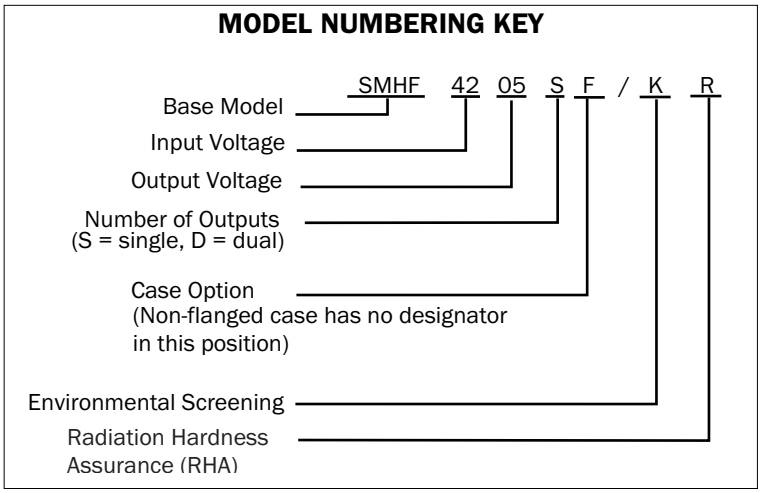

FIGURE 5: MODEL NUMBERING KEY

MODEL NUMBER OPTIONS [1]

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

CATEGORY	Base Model and Input Voltage	Output Voltage [2]	Number of Outputs [3]	Case Option [4]	Screening [5]	RHA [6]
OPTIONS	SMHF42	3R3, 05, 5R2, 12, 15	S	(non-flanged, leave blank)	O	O
		05, 07, 12, 15	D	F (flanged)	H	L
					K	R
FILL IN FOR MODEL # [7]	SMHF42	_____	_____	_____ /	_____	_____

Notes
1. See Figure 5 above for an example of a model number.
2. Output Voltage: An R indicates a decimal point. 3R3 is 3.3 volts out. The values of 3.3 and 5.2 are only available in single output models.
3. Number of Outputs: S is a single output and D is a dual output
4. Case Options: For the standard case (Figure 80 on page 32) leave the Case Option blank. For the flanged case option (Figure 81 on page 33), insert the letter F in the Case Option position.
5. Screening: A screening level of O is a space prototype and is only available with RHA "-" (O). See Table 10 on page 34 and Table 11 on page 35 for more information.
6. RHA: Interpoint model numbers use an "O" in the RHA designator position to indicate the "-" (dash) radiation hardness assurance level of MIL-PRF-38534, which is defined as "no RHA." RHA O is only available with screening level O. See Table 11 on page 35 for more information.
7. If ordering by model number add a "-Q" to request solder dipped leads (SMHF4205S/KR-Q).

TABLE 4: MODEL NUMBER OPTIONS

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TABLE 5: OPERATING CONDITIONS - ALL MODELS, 42 VIN UNLESS OTHERWISE SPECIFIED

SMHF42 SERIES		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 TEMPERATURE	FULL POWER	-55	—	+125	°C
	ABSOLUTE [1]	-55	—	+135	
DERATING OUTPUT POWER/CURRENT [1]	LINEARLY	From 100% at 125°C to 0% at 135°C			
ESD RATING [1, 2] MIL-PRF-38534, 3.9.5.8.2	MIL-STD-883 METHOD 3015 CLASS 1C, T_C = 25°C	1000-1999			V
ISOLATION: INPUT TO OUTPUT, INPUT TO CASE, OUTPUT TO CASE [3]	@ 500 VDC, T_C = 25°C	100	—	—	Megohms
UNDERVOLTAGE LOCKOUT [1]	V_{IN}, T_C = -55°C TO +125°C	—	30	—	V
INPUT TO OUTPUT CAPACITANCE [1]	T_C = 25°C	—	60	—	pF
CURRENT LIMIT [3] T_C = -55°C TO +125°C	% OF FULL LOAD	—	140	—	%
AUDIO REJECTION [1]	T_C = 25°C	—	50	—	dB
SWITCHING FREQUENCY	T_C = -55°C TO +125°C	480	500	620	kHz
SYNCHRONIZATION T_C = -55°C TO +125°C	INPUT FREQUENCY	500	—	600	kHz
	DUTY CYCLE [1]	40	—	50	%
	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) T_C = -55°C TO +125°C Do not apply a voltage to the inhibit pin	INHIBIT PIN PULLED LOW	—	—	0.8	V
	INHIBIT PIN SOURCE CURRENT [1, 4]	—	—	1.5	mA
	REFERENCED TO	INPUT COMMON			
INHIBIT ACTIVE HIGH (OUTPUT ENABLED T_C = -55°C TO +125°C Do not apply a voltage to the inhibit pin	INHIBIT PIN CONDITION	OPEN COLLECTOR OR UNCONNECTED			
	OPEN INHIBIT PIN VOLTAGE [1]	7.5	—	12	V

Notes
1. Guaranteed by characterization test and/or analysis. Not a production test.
2. Passes 1000 volts.
3. When testing isolation, input pins are tied together and output pins are tied together. They are tested against each other and against case. Discharge the pins before and after testing.
4. Current limit is defined as the point at which the output voltage decreases by 1%. 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.
5. Inhibit current = Vin/35 k ohms.

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TABLE 6: ELECTRICAL CHARACTERISTICS: -55°C TO +125°C CASE, 42 VIN, 100% LOAD, UNLESS OTHERWISE SPECIFIED.

SINGLE OUTPUT MODELS		SMHF423R3S			SMHF4205S			SMHF425R2S			UNITS
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE		3.20	3.30	3.40	4.85	5.00	5.15	5.05	5.20	5.35	V
OUTPUT CURRENT	V_{IN} = 35 TO 55 V	–	–	2.4	–	–	2.4	–	–	2.4	A
OUTPUT POWER	V_{IN} = 35 TO 55 V	0	–	8	0	–	12	0	–	12.5	W
OUTPUT RIPPLE	T_C = 25°C	–	5	50	–	5	50	–	5	50	mV p-p
10 KHZ - 2 MHZ	T_C = -55°C TO +125°C	–	5	50	–	5	50	–	5	50	
OUTPUT RIPPLE	T_C = 25°C	–	15	80	–	15	80	–	5	80	mV p-p
10 KHZ - 10 MHZ	T_C = -55°C TO +125°C	–	15	80	–	15	80	–	5	80	
LINE REGULATION	V_{IN} = 35 TO 55 V	–	1	10	–	1	10	–	1	10	mV
LOAD REGULATION	NO LOAD TO FULL	–	20	50	–	20	50	–	20	50	mV
INPUT VOLTAGE	CONTINUOUS	35	42	55	35	42	55	35	42	55	V
NO LOAD TO FULL	TRANSIENT 50 MS [1]	0	–	80	0	–	80	0	–	80	
INPUT CURRENT	NO LOAD	–	25	50	–	25	40	–	25	40	mA
	INHIBITED	–	6	10	–	6	10	–	6	10	
INPUT RIPPLE CURRENT	10 kHz - 10 MHz	–	–	120	–	–	120	–	–	120	mA p-p
EFFICIENCY	T_C = 25°C	68	72	–	73	79	–	73	80	–	%
	T_C = -55°C TO +125°C	65	–	–	70	–	–	70	–	–	
LOAD FAULT [2, 3]	POWER DISSIPATION	–	5	8	–	3.5	8	–	3.5	8	W
SHORT CIRCUIT	RECOVERY [1]	–	7.5	30	–	7.5	30	–	7.5	30	ms
STEP LOAD RESPONSE [3, 4]	TRANSIENT	–	±150	±400	–	±150	±400	–	±150	±400	mV pk
50% - 100% - 50%	RECOVERY	–	150	300	–	150	300	–	150	300	µs
STEP LINE RESPONSE [1, 3, 5]	TRANSIENT	–	±0.5	±5	–	±0.5	±5	–	±0.5	±5	%
± 2 V STEP TRANSIENT [6]	RECOVERY	–	150	–	–	100	–	–	100	–	µs
STARTUP [7, 3]	DELAY	–	10	25	–	10	25	–	10	25	ms
	OVERSHOOT	–	15	50	–	15	50	–	15	50	mV pk
CAPACITIVE LOAD [1]	T_C = 25°C	–	–	300	–	–	300	–	–	300	µF

Notes
1. Guaranteed by characterization test and/or analysis. Not a production test.
2. Indefinite short circuit protection not guaranteed above 125°C (case)
3. Recovery and start-up times are measured from application of the transient or change in condition, to the point at which V_{OUT} is within 1% of final value.
4. Step load transition test is performed at 10 microseconds typical.
5. Step line characterization test is performed at 100 microseconds ± 20 microseconds..
6. ± 2 V step transients from Vin 35 to 37 up to 55 and the reverse for 55 to 35.
7. Tested on release from inhibit.

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TABLE 7: ELECTRICAL CHARACTERISTICS: -55°C TO +125°C CASE, 42 VIN, 100% LOAD, UNLESS OTHERWISE SPECIFIED.

SINGLE OUTPUT MODELS		SMHF4212S			SMHF4215S			UNITS
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE		11.76	12.00	12.24	14.70	15.00	15.30	V
OUTPUT CURRENT	V_{IN} = 35 TO 55 V	–	–	1.25	–	–	1.00	A
OUTPUT POWER	V_{IN} = 35 TO 55 V	0	–	15	0	–	15	W
OUTPUT RIPPLE	T_C = 25°C	–	15	40	–	10	40	mV p-p
10 KHZ - 2 MHZ	T_C = -55°C TO +125°C	–	15	40	–	10	40	
OUTPUT RIPPLE	T_C = 25°C	–	15	70	–	40	70	mV p-p
10 KHZ - 10 MHZ	T_C = -55°C TO +125°C	–	15	70	–	40	70	
LINE REGULATION	V_{IN} = 35 TO 55 V	–	5	20	–	8	30	mV
LOAD REGULATION	NO LOAD TO FULL	–	20	50	–	20	50	mV
INPUT VOLTAGE	CONTINUOUS	35	42	55	35	42	55	V
NO LOAD TO FULL	TRANSIENT 50 MS [1]	0	–	80	0	–	80	
INPUT CURRENT	NO LOAD	–	25	55	–	25	62	mA
	INHIBITED	–	5	10	–	5	10	
INPUT RIPPLE CURRENT	10 kHz - 10 MHz	–	–	120	–	–	120	mA p-p
EFFICIENCY	T_C = 25°C	76	80	–	78	81	–	%
	T_C = -55°C TO +125°C	72	–	–	74	–	–	
LOAD FAULT [2, 3]	POWER DISSIPATION	–	3.5	8	–	3.5	8	W
SHORT CIRCUIT	RECOVERY [1]	–	7.5	30	–	7.5	30	ms
STEP LOAD RESPONSE [3, 4]	TRANSIENT	–	±150	±500	–	±200	±500	mV pk
50% - 100% - 50%	RECOVERY	–	50	300	–	50	300	µs
STEP LINE RESPONSE [1, 3, 5]	TRANSIENT	–	±0.5	±5	–	±0.5	±5	%
± 2 V STEP TRANSIENT [6]	RECOVERY	–	150	–	–	150	–	µs
STARTUP [7, 3]	DELAY	–	10	25	–	10	25	ms
	OVERSHOOT	–	25	50	–	25	50	mV pk
CAPACITIVE LOAD [1]	T_C = 25°C	–	–	100	–	–	100	µF

Notes
1. Guaranteed by characterization test and/or analysis. Not a production test.
2. Indefinite short circuit protection not guaranteed above 125°C (case)
3. Recovery and start-up times are measured from application of the transient or change in condition, to the point at which V_{OUT} is within 1% of final value.
4. Step load transition test is performed at 10 microseconds typical.
5. Step line characterization test is performed at 100 microseconds ± 20 microseconds.
6. ± 2 V step transients from Vin 35 to 37 up to 55 and the reverse for 55 to 35.
7. Tested on release from inhibit.

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TABLE 8: ELECTRICAL CHARACTERISTICS: -55°C TO +125°C CASE, 42 VIN, 100% LOAD, UNLESS OTHERWISE SPECIFIED.

DUAL OUTPUT MODELS		SMHF4205D			SMHF4207D			UNITS
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE	$+V_{OUT}$	4.85	5.00	5.15	6.86	7.00	7.14	V
	$-V_{OUT}$	4.82	5.00	5.18	6.83	7.00	7.18	
OUTPUT CURRENT [2]	EITHER OUTPUT	–	±1.2	1.68	–	±0.850	1.190	A
V_{IN} = 35 TO 55 V	TOTAL	–	–	2.4	–	–	1.7	
OUTPUT POWER [2]	EITHER OUTPUT	–	±6	8.4	–	±5.95	8.33	W
V_{IN} = 35 TO 55 V	TOTAL	–	–	12	–	–	11.9	
OUTPUT RIPPLE ± V_{OUT}	T_C = 25°C	–	30	95	–	20	95	mV p-p
10 kHz - 2 MHz	T_C = -55°C TO +125°C	–	30	95	–	20	95	
OUTPUT RIPPLE ± V_{OUT}	T_C = 25°C	–	30	110	–	40	110	mV p-p
10 kHz - 10 MHz	T_C = -55°C TO +125°C	–	30	110	–	40	110	
LINE REGULATION [3]	$+V_{OUT}$	–	2	10	–	2	10	mV
V_{IN} = 35 TO 55 V	$-V_{OUT}$	–	10	100	–	10	100	
LOAD REGULATION [3]	$+V_{OUT}$	–	5	25	–	5	20	mV
NO LOAD TO FULL	$-V_{OUT}$	–	80	150	–	100	200	
CROSS REGULATION [4]	EFFECT ON $-V_{OUT}$	–	–	375	–	–	700	mV
INPUT VOLTAGE	CONTINUOUS	35	42	55	35	42	55	V
NO LOAD TO FULL	TRANSIENT 50 MS [1]	–	–	80	–	–	80	
INPUT CURRENT	NO LOAD	–	25	50	–	25	60	mA
	INHIBITED	–	6	10	–	6	10	
INPUT RIPPLE CURRENT	10 KHZ - 10 MHZ	–	60	120	–	60	120	mA p-p
EFFICIENCY	T_C = 25°C	75	79	–	78	80	–	%
	T_C = -55°C TO +125°C	72	–	–	75	–	–	
LOAD FAULT [5, 6]	POWER DISSIPATION	–	3	6	–	3	6	W
SHORT CIRCUIT	RECOVERY [1]	–	6	30	–	6	30	ms
STEP LOAD RESPONSE [6, 7, 8]	TRANSIENT	–	±200	±500	–	±200	±300	mV pk
50% - 100% - 50%	RECOVERY	–	90	400	–	90	120	µs
STEP LINE RESPONSE [1, 6, 9]	TRANSIENT	–	±0.5	±5	–	±0.5	±5	%
± 2 V STEP TRANSIENT [10]	RECOVERY	–	100	–	–	120	–	µs
STARTUP [6, 11]	DELAY	–	12	25	–	10	25	ms
	OVERSHOOT	0	100	500	–	100	500	mV pk
CAPACITIVE LOAD [1, 12]	T_C = 25°C	–	–	47	–	–	10	µF

Notes
1. Guaranteed by characterization test and/or analysis. Not a production test.
2. Up to 70% of the total output power is available from either output providing the opposite output is simultaneously carrying 30% of the total output power. Each output must carry a minimum of 30% of the total output power in order to maintain regulation on the negative output.
3. Balanced loads.
4. Effect on $-V_{OUT}$ for the following conditions:
   $+P_O$ = 50%, $-P_O$ = 10%; $+P_O$ = 10%, $-P_O$ = 50%
   $+P_O$ = 70%, $-P_O$ = 30%; $+P_O$ = 30%, $-P_O$ = 70%
   All conditions are referenced to balanced loads
5. Indefinite short circuit protection not guaranteed above 125°C (case)
6. Recovery and start-up times are measured from application of the transient or change in condition, to the point at which V_{OUT} is within 1% of final value.
7. Response of either output with balanced loads simultaneously transitioned from 50% to 100% to 50%.
8. Step load transition test is performed at 10 microseconds typical.
9. Step line characterization test is performed at 100 microseconds ± 20 microseconds.
10. ± 2 V step transients from Vin 35 to 37 up to 55 and the reverse for 55 to 35.
11. Tested on release from inhibit.
12. Applies to each output.

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TABLE 9: ELECTRICAL CHARACTERISTICS: -55°C TO +125°C CASE, 42 VIN, 100% LOAD, UNLESS OTHERWISE SPECIFIED.

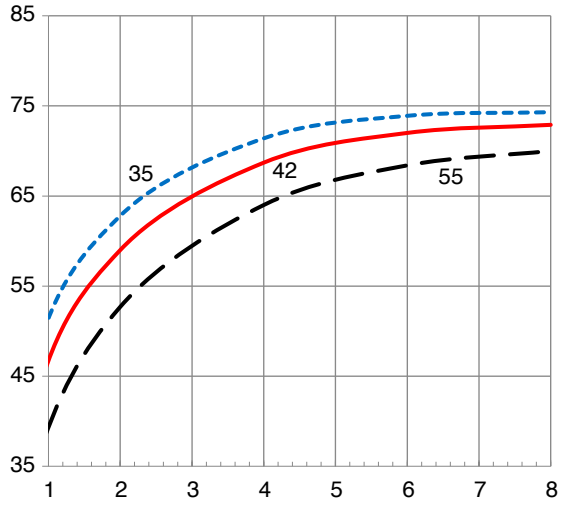
DUAL OUTPUT MODELS		SMHF4212D			SMHF4215D			UNITS
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE	$+V_{OUT}$	11.76	12.00	12.24	14.70	15.00	15.30	V
	$-V_{OUT}$	11.70	12.00	12.30	14.63	15.00	15.38	
OUTPUT CURRENT [2]	EITHER OUTPUT	–	±0.625	0.875	–	±0.5	0.7	A
V_{IN} = 35 TO 55 V	TOTAL	–	–	1.25	–	–	1.0	
OUTPUT POWER [2]	EITHER OUTPUT	–	–	10.5	–	–	10.5	W
V_{IN} = 35 TO 55 V	TOTAL	–	–	15	–	–	15	
OUTPUT RIPPLE ± V_{OUT}	T_C = 25°C	–	30	95	–	30	95	mV p-p
10 kHz - 2 MHz	T_C = -55°C TO +125°C	–	30	95	–	30	95	
OUTPUT RIPPLE ± V_{OUT}	T_C = 25°C	–	30	110	–	30	110	mV p-p
10 kHz - 10 MHz	T_C = -55°C TO +125°C	–	30	110	–	30	110	
LINE REGULATION [3]	$+V_{OUT}$	–	2	30	–	2	30	mV
V_{IN} = 35 TO 55 V	$-V_{OUT}$	–	10	100	–	10	100	
LOAD REGULATION [3]	$+V_{OUT}$	–	5	35	–	5	35	mV
NO LOAD TO FULL	$-V_{OUT}$	–	60	150	–	40	150	
CROSS REGULATION [4]	EFFECT ON $-V_{OUT}$	–	–	720	–	–	900	mV
INPUT VOLTAGE	CONTINUOUS	35	42	55	35	42	55	V
NO LOAD TO FULL	TRANSIENT 50 MS [1]	–	–	80	–	–	80	
INPUT CURRENT	NO LOAD	–	30	50	–	30	50	mA
	INHIBITED	–	6	10	–	6	10	
INPUT RIPPLE CURRENT	10 KHZ - 10 MHZ	–	55	120	–	55	120	mA p-p
EFFICIENCY	T_C = 25°C	76	80	–	76	82	–	%
	T_C = -55°C TO +125°C	74	–	–	74	–	–	
LOAD FAULT [5, 6]	POWER DISSIPATION	–	3	6	–	3	6	W
SHORT CIRCUIT	RECOVERY [1]	–	6	50	–	6	50	ms
STEP LOAD RESPONSE [6, 7, 8]	TRANSIENT	–	±300	±600	–	±300	±600	mV pk
50% - 100% - 50%	RECOVERY	–	90	400	–	90	400	µs
STEP LINE RESPONSE [1, 6, 9]	TRANSIENT	–	±1	±5	–	±1	±5	%
± 2 V STEP TRANSIENT [10]	RECOVERY	–	150	–	–	150	–	µs
STARTUP [6, 11]	DELAY	–	10	20	–	10	20	ms
	OVERSHOOT	0	100	500	0	100	500	mV pk
CAPACITIVE LOAD [1, 12]	T_C = 25°C	–	–	10	–	–	10	µF

Notes
1. Guaranteed by characterization test and/or analysis. Not a production test.
2. Up to 70% of the total output power is available from either output providing the opposite output is simultaneously carrying 30% of the total output power. Each output must carry a minimum of 30% of the total output power in order to maintain regulation on the negative output.
3. Balanced loads.
4. Effect on $-V_{OUT}$ for the following conditions:
   $+P_O$ = 50%, $-P_O$ = 10%; $+P_O$ = 10%, $-P_O$ = 50%
   $+P_O$ = 70%, $-P_O$ = 30%; $+P_O$ = 30%, $-P_O$ = 70%
   All conditions are referenced to balanced loads.
5. Indefinite short circuit protection not guaranteed above 125°C (case)
6. Recovery and start-up times are measured from application of the transient or change in condition, to the point at which V_{OUT} is within 1% of final value.
7. Response of either output with balanced loads simultaneously transitioned from 50% to 100% to 50%.
8. Step load transition test is performed at 10 microseconds typical.
9. Step line characterization test is performed at 100 microseconds ± 20 microseconds.
10. ± 2 V step transients from Vin 35 to 37 up to 55 and the reverse for 55 to 35.
11. Tested on release from inhibit.
12. Applies to each output.

SMHF42 Single and Dual DC-DC Converters

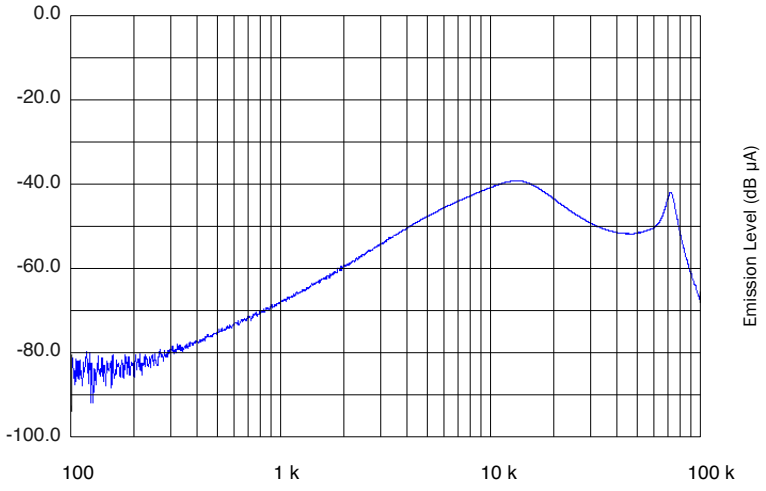
35 TO 55 VOLT INPUT – 8 TO 15 WATT

TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



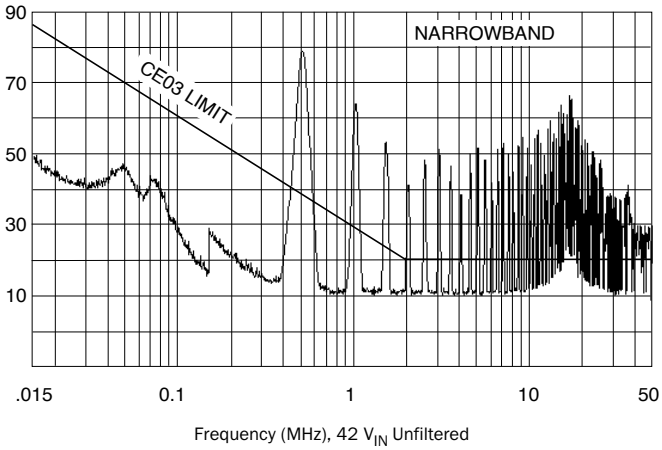
SMHF423R3S EFFICIENCY

FIGURE 6



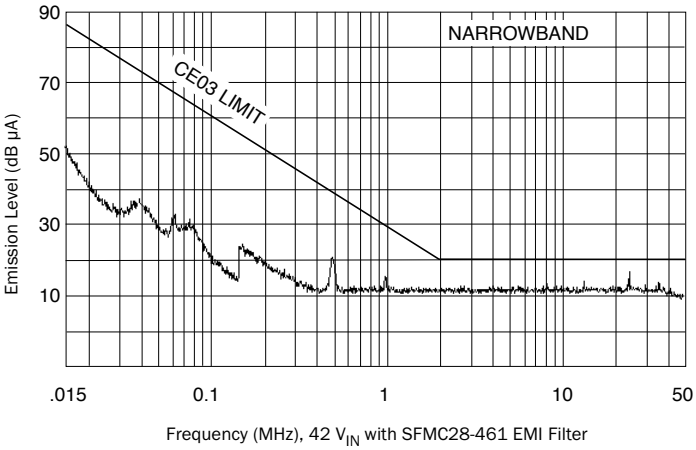
SMHF423R3S AUDIO REJECTION

FIGURE 7



SMHF423R3S MIL-STD-461C, CE03

FIGURE 8



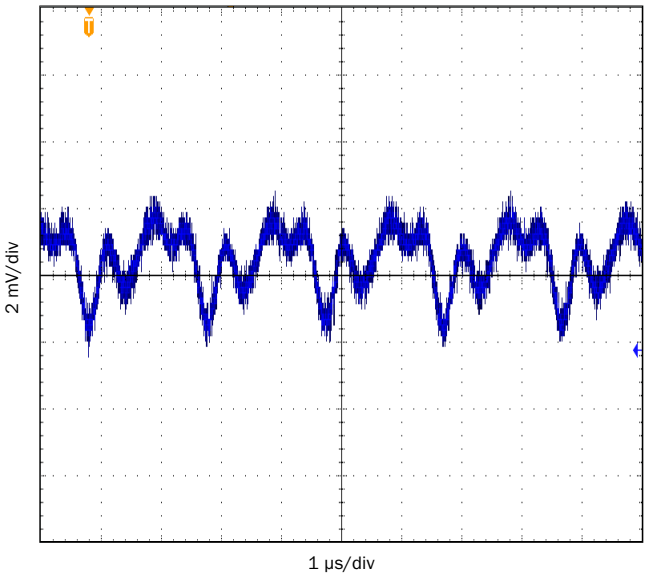
SMHF423R3S MIL-STD-461C, CE03

FIGURE 9

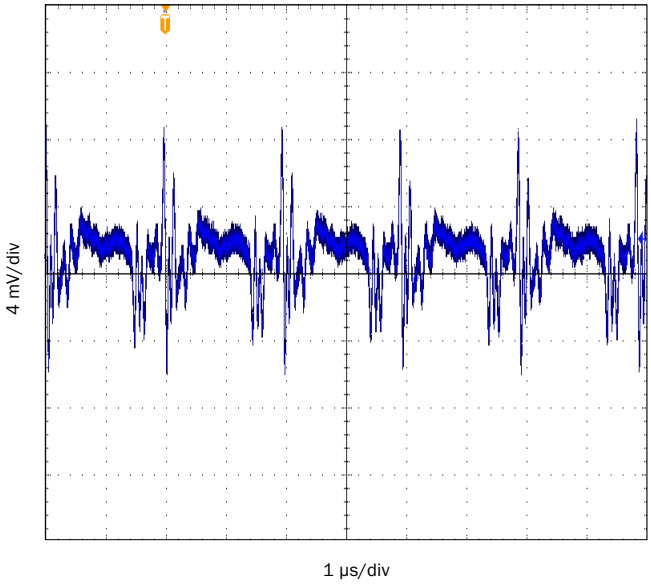
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

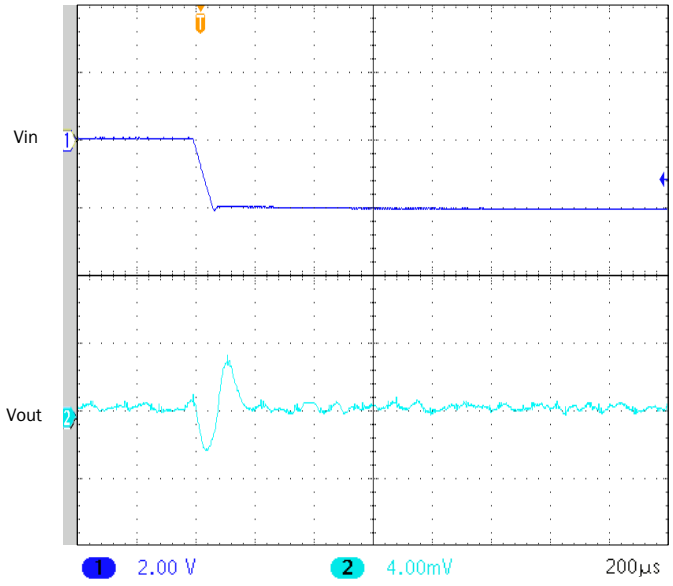
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



SMHF423R3S OUTPUT RIPPLE 2 MHZ
FIGURE 10

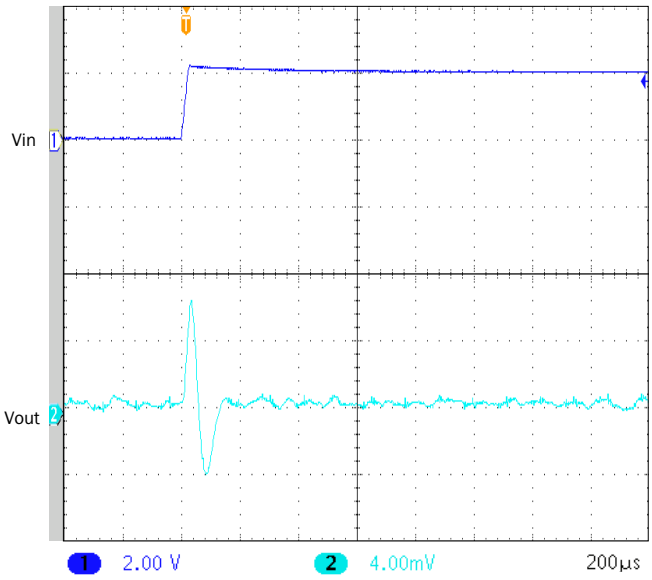


SMHF423R3S OUTPUT RIPPLE 10 MHZ
FIGURE 11



UNITS ARE PER DIVISION

SMHF423R3S STEP LINE 43 - 41 VOLTS IN
FIGURE 12



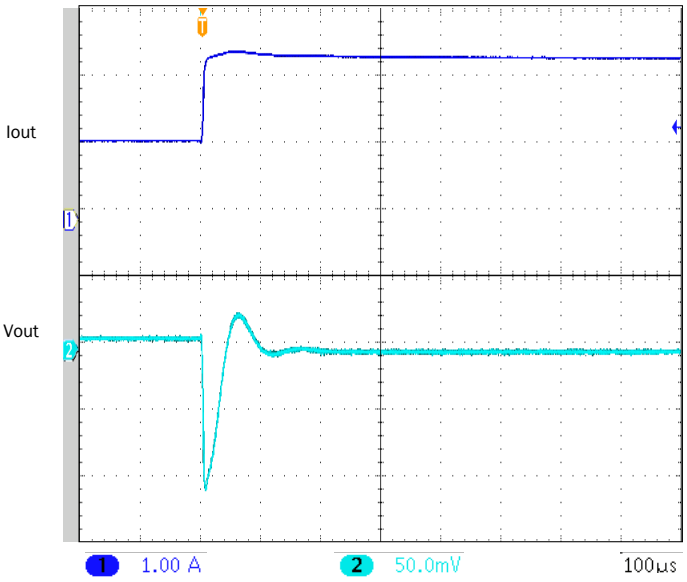
UNITS ARE PER DIVISION

SMHF423R3S STEP LINE 41 - 43 VOLTS IN
FIGURE 13

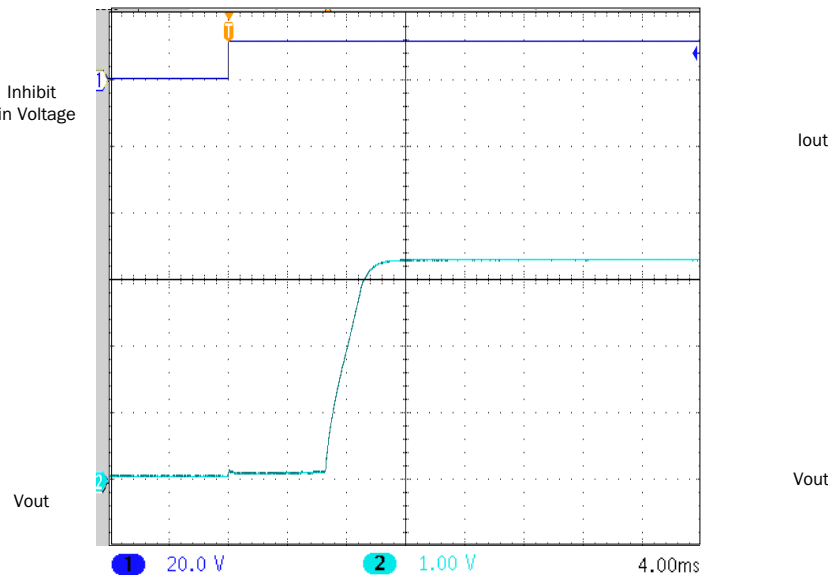
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

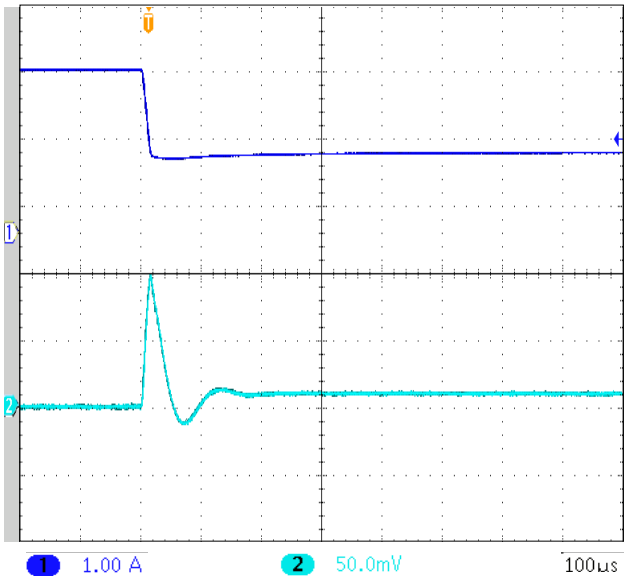
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



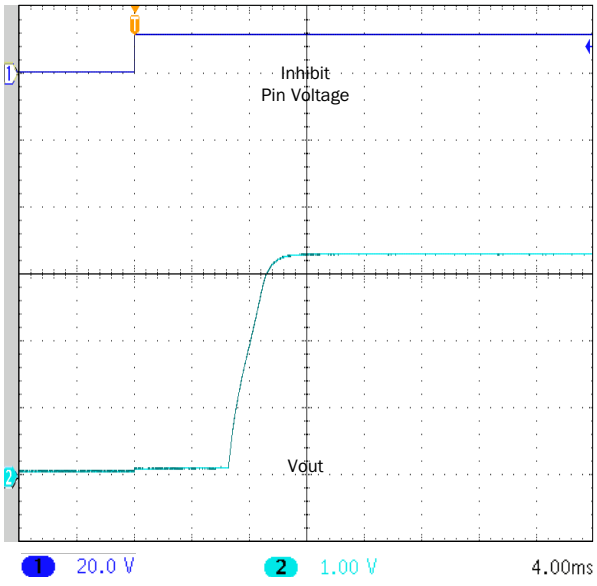
UNITS ARE PER DIVISION
SMHF423R3S STEP LOAD 50% - 100%
FIGURE 14



UNITS ARE PER DIVISION
SMHF423R3S STEP LOAD 100% - 50%
FIGURE 15



UNITS ARE PER DIVISION
SMHF423R3S START-UP DELAY NO CAP
FIGURE 16

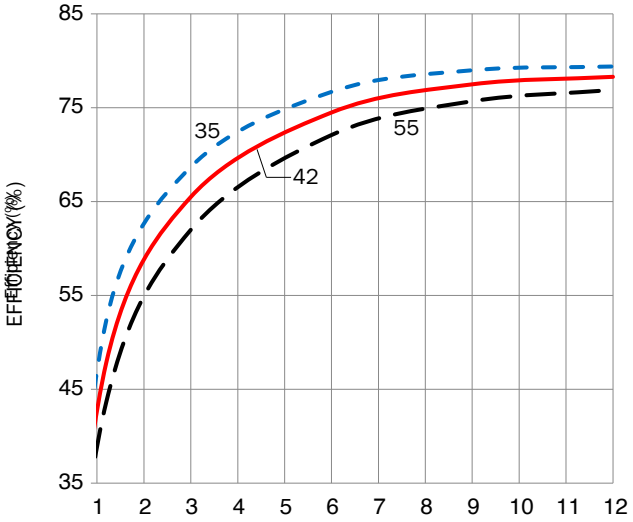


UNITS ARE PER DIVISION
SMHF423R3S START-UP DELAY WITH 300 µF CAP
FIGURE 17

SMHF42 Single and Dual DC-DC Converters

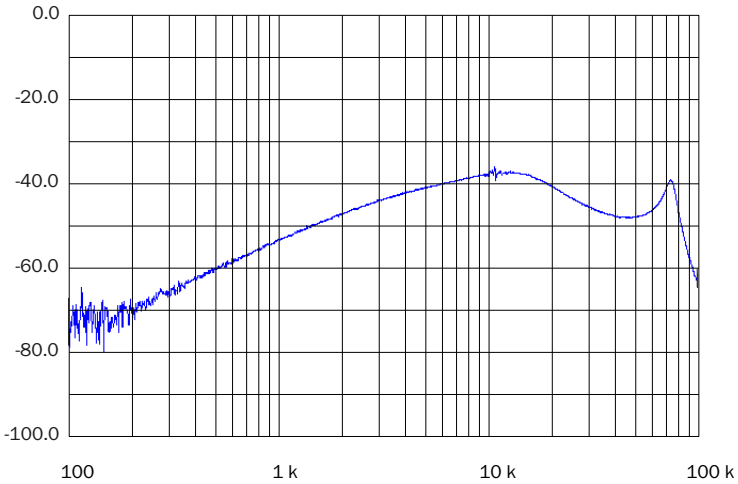
35 TO 55 VOLT INPUT – 8 TO 15 WATT

TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



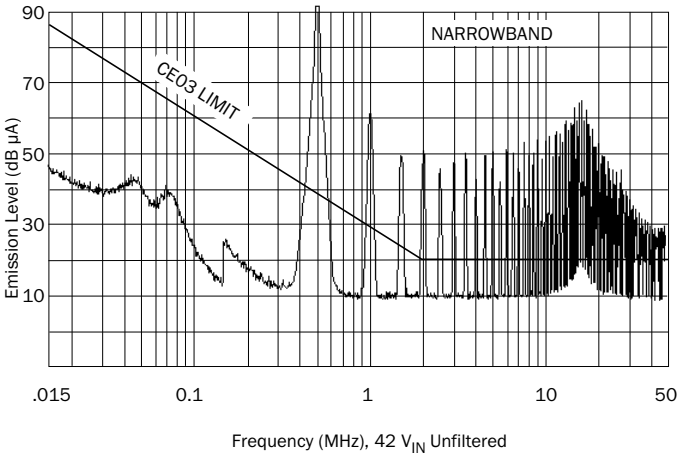
SMHF4205S EFFICIENCY

FIGURE 18



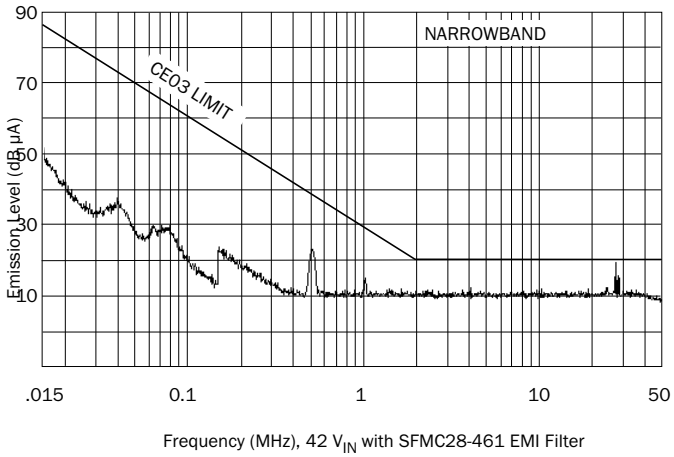
SMHF4205S AUDIO REJECTION

FIGURE 19



SMHF4205S MIL-STD-461C, CE03

FIGURE 20



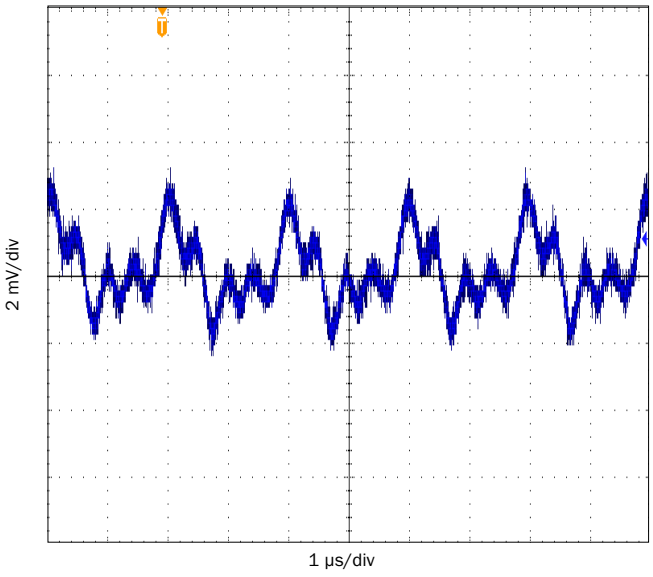
SMHF4205S MIL-STD-461C, CE03

FIGURE 21

SMHF42 Single and Dual DC-DC Converters

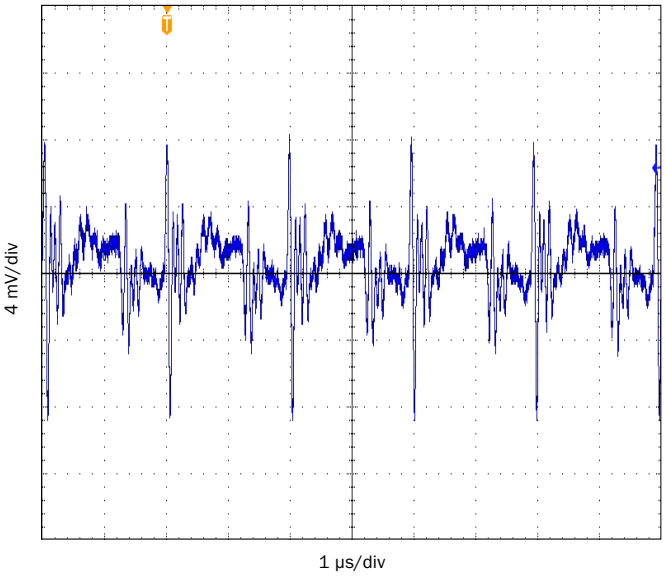
35 TO 55 VOLT INPUT – 8 TO 15 WATT

TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



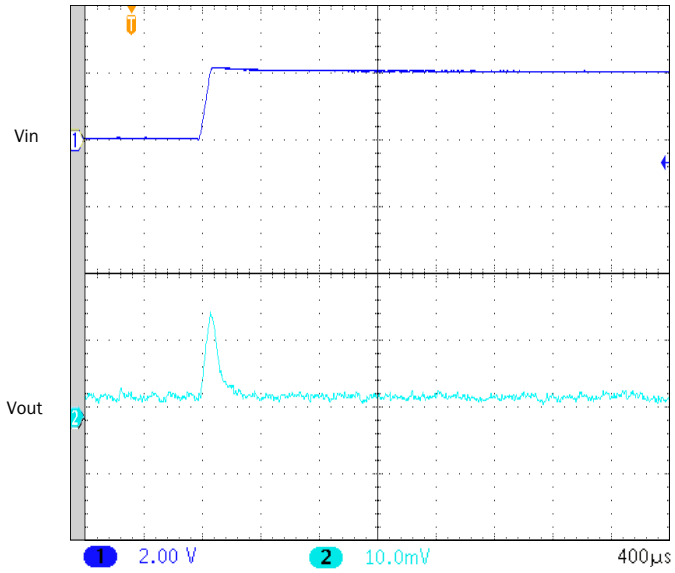
SMHF4205S OUTPUT RIPPLE 2 MHZ

FIGURE 22



SMHF4205S OUTPUT RIPPLE 10 MHZ

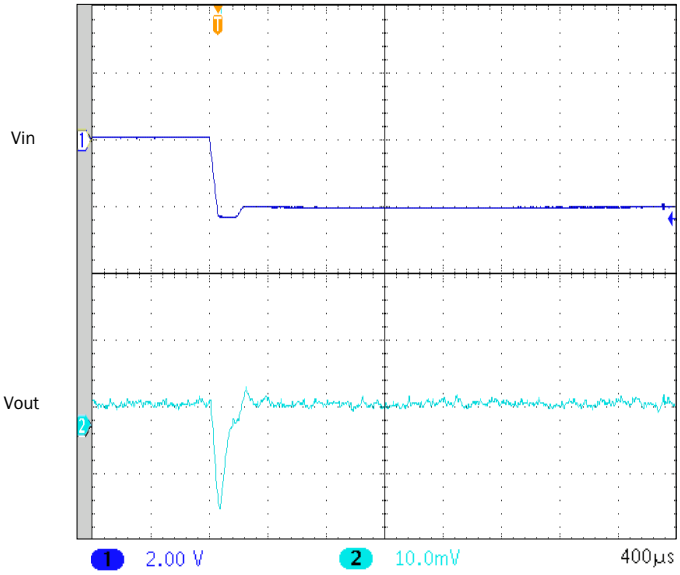
FIGURE 23



UNITS ARE PER DIVISION

SMHF4205S STEP LINE 41 - 43 VOLTS IN

FIGURE 24



UNITS ARE PER DIVISION

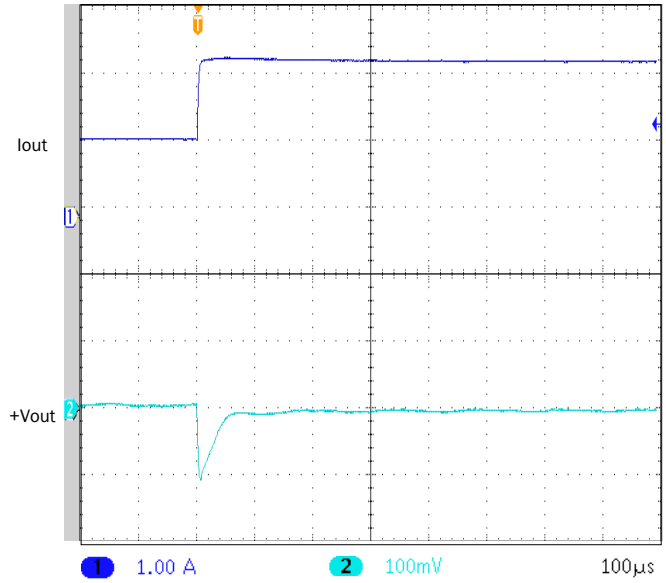
SMHF4205S STEP LINE 43 - 41 VOLTS IN

FIGURE 25

SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

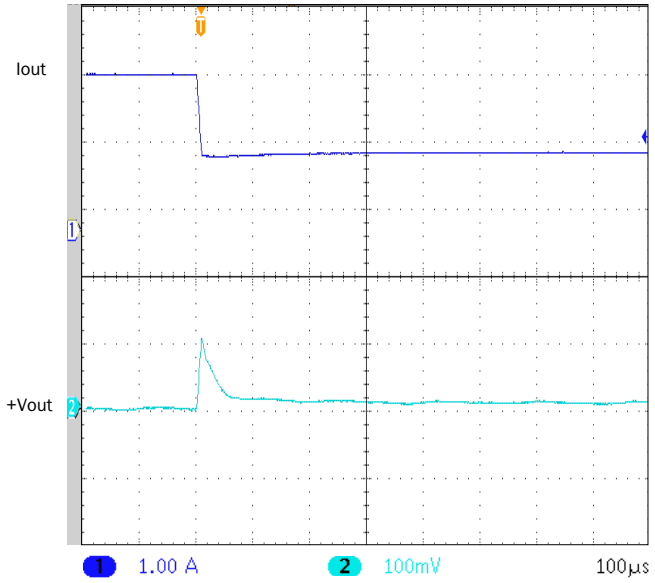
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



UNITS ARE PER DIVISION

SMHF4205S STEP LOAD 50% - 100%

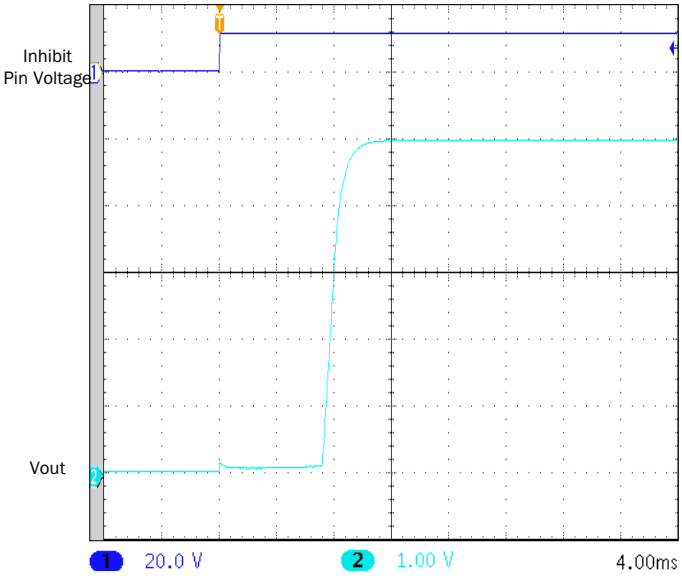
FIGURE 26



UNITS ARE PER DIVISION

SMHF4205S STEP LOAD 100% - 50%

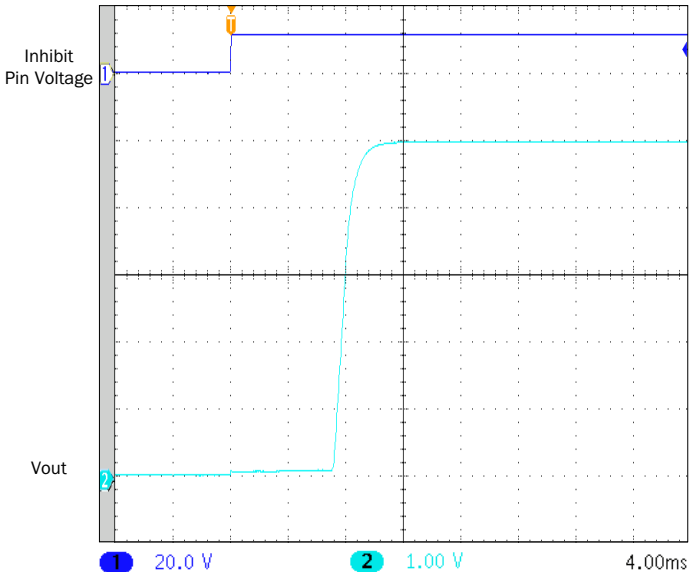
FIGURE 27



UNITS ARE PER DIVISION

SMHF4205S START-UP DELAY NO CAP

FIGURE 28



UNITS ARE PER DIVISION

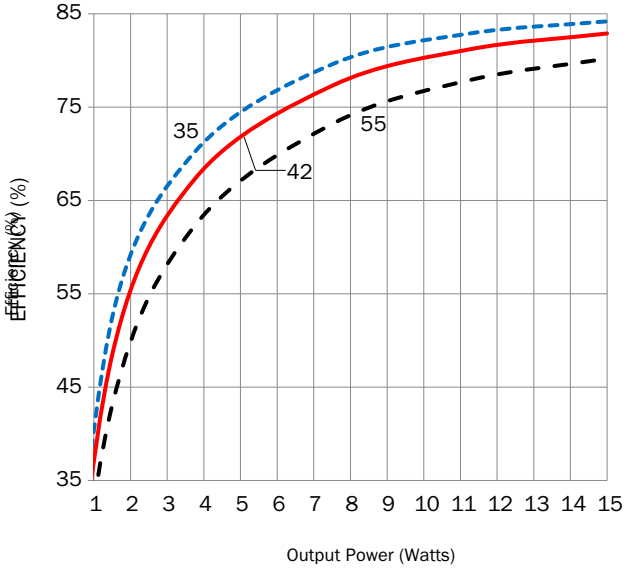
SMHF4205S START-UP DELAY WITH 300 µF CAP

FIGURE 29

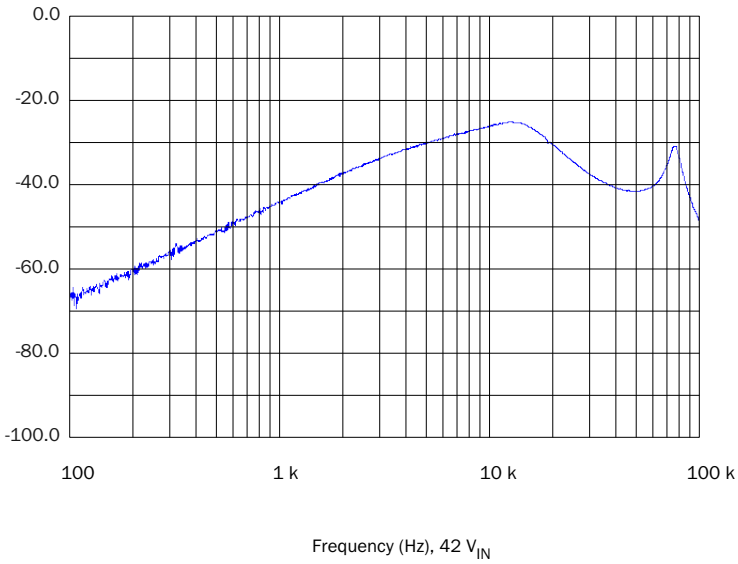
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

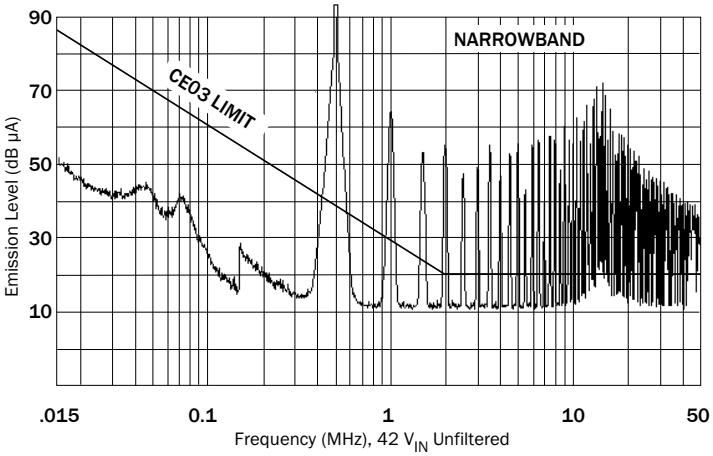
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



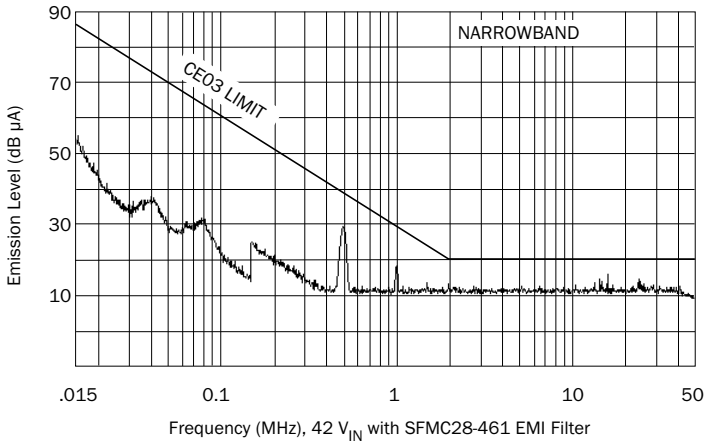
SMHF4215S EFFICIENCY
FIGURE 30



SMHF4215S AUDIO REJECTION
FIGURE 31



SMHF4215S MIL-STD-461C, CE03
FIGURE 32

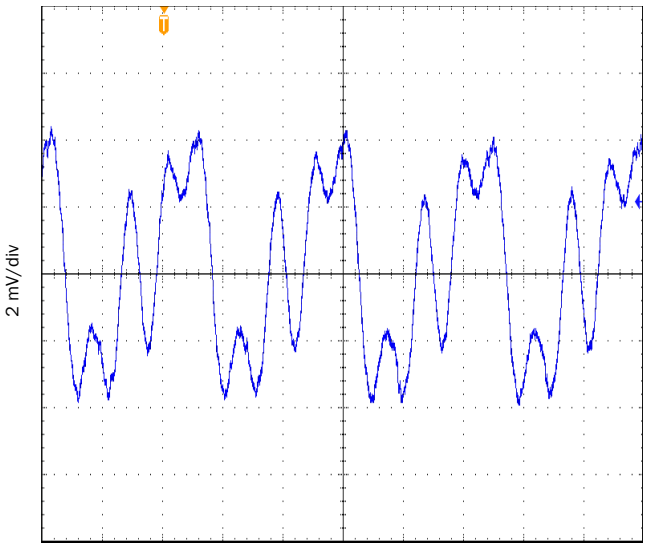


SMHF4215S MIL-STD-461C, CE03
FIGURE 33

SMHF42 Single and Dual DC-DC Converters

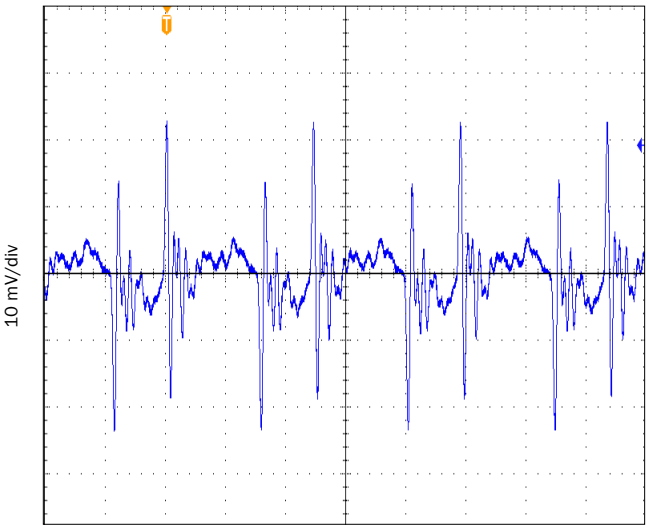
35 TO 55 VOLT INPUT – 8 TO 15 WATT

TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



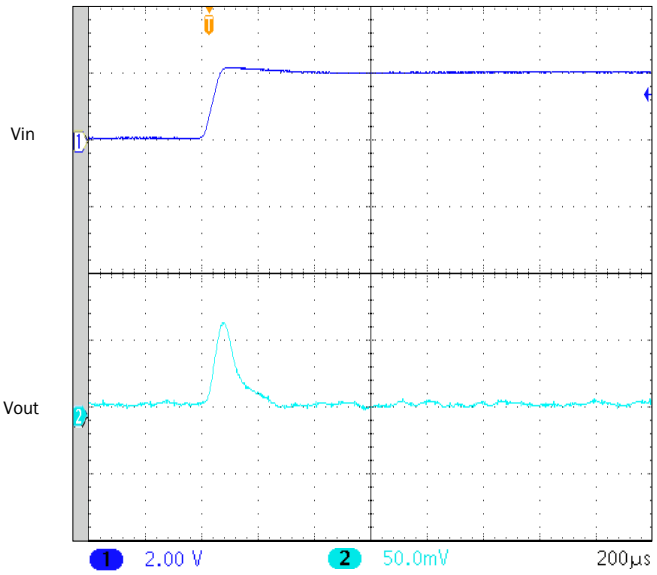
SMHF4215S OUTPUT RIPPLE 2 MHZ

FIGURE 34



SMHF4215S OUTPUT RIPPLE 10 MHZ

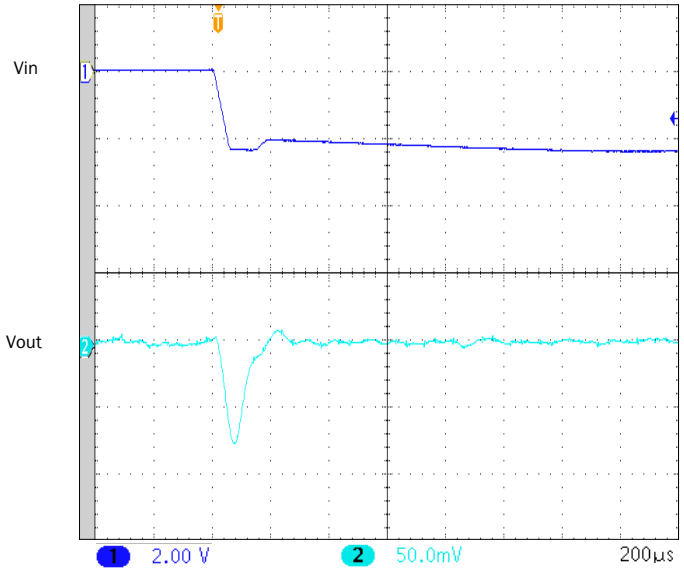
FIGURE 35



UNITS ARE PER DIVISION

SMHF4215S STEP LINE 41 - 43 VOLTS IN

FIGURE 36



UNITS ARE PER DIVISION

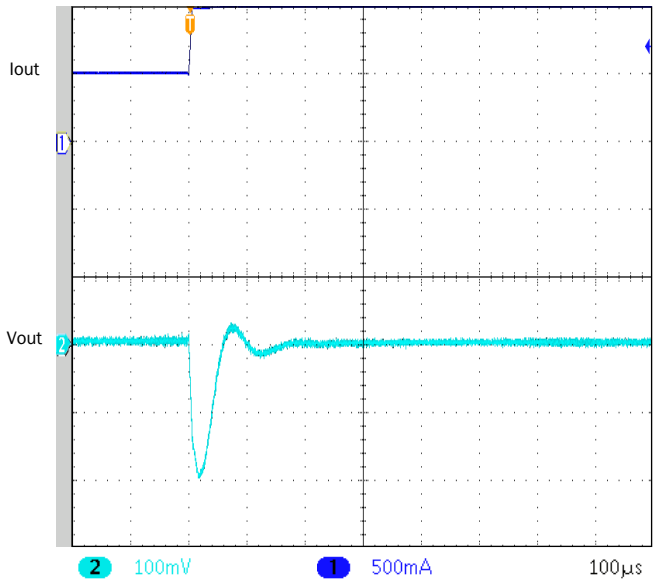
SMHF4215S STEP LINE 43 - 41 VOLTS IN

FIGURE 37

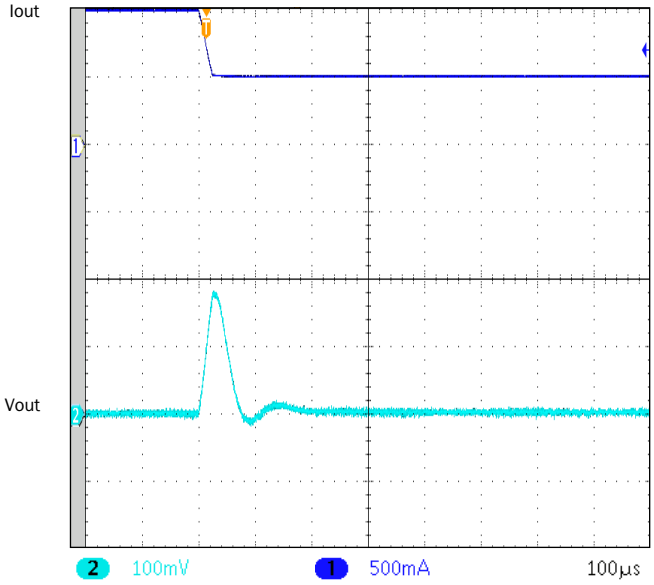
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

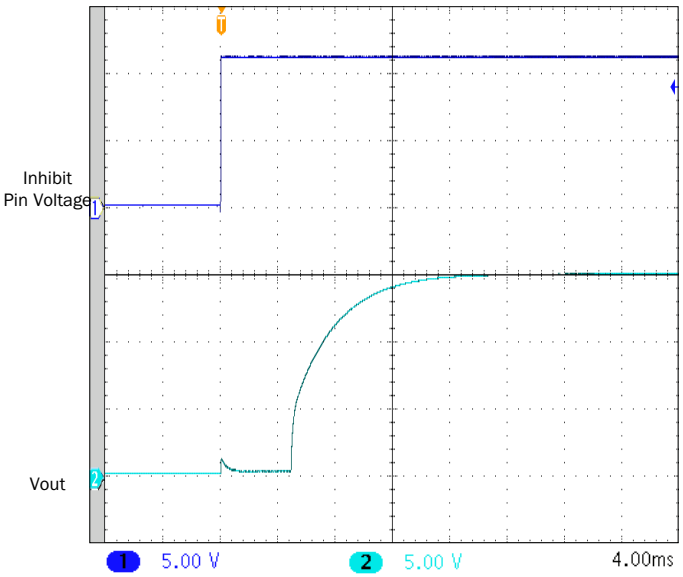
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



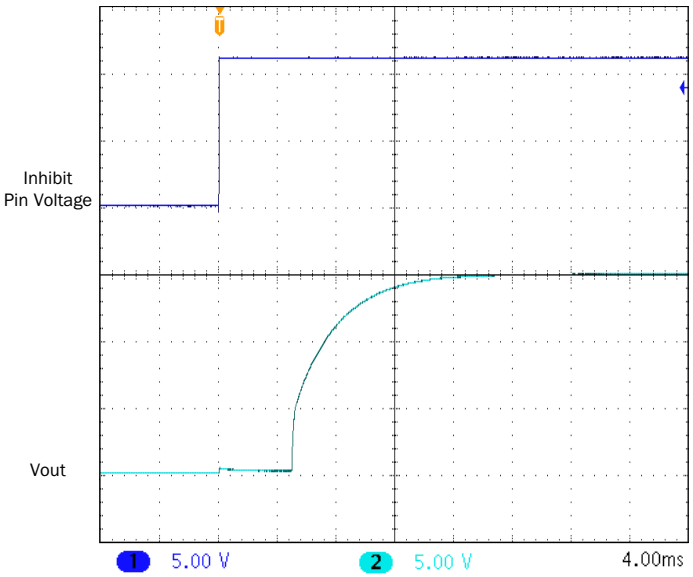
UNITS ARE PER DIVISION
SMHF4215S STEP LOAD 50% - 100%
FIGURE 38



UNITS ARE PER DIVISION
SMHF4215S STEP LOAD 100% - 50%
FIGURE 39



UNITS ARE PER DIVISION
SMHF4215S START-UP DELAY NO CAP
FIGURE 40

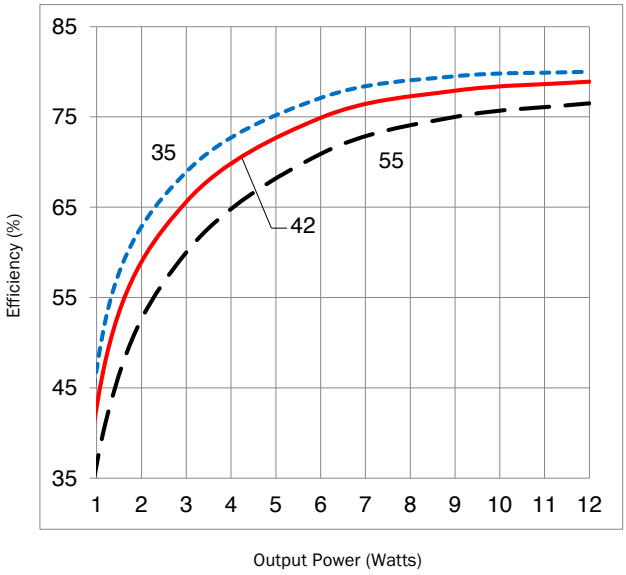


UNITS ARE PER DIVISION
SMHF4215S START-UP DELAY WITH 100 µF CAP
FIGURE 41

SMHF42 Single and Dual DC-DC Converters

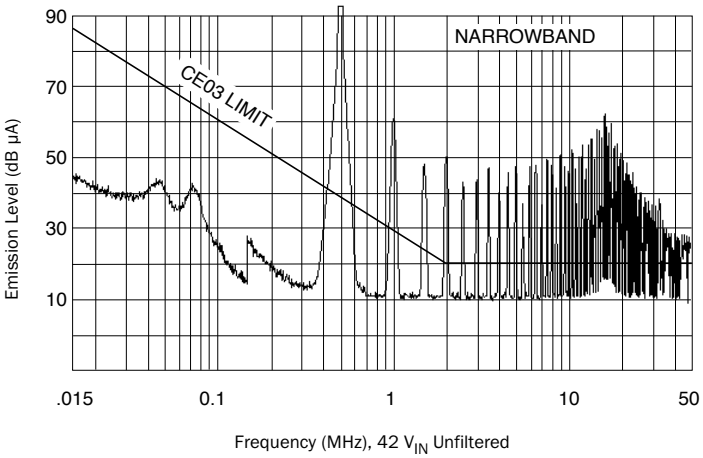
35 TO 55 VOLT INPUT – 8 TO 15 WATT

TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



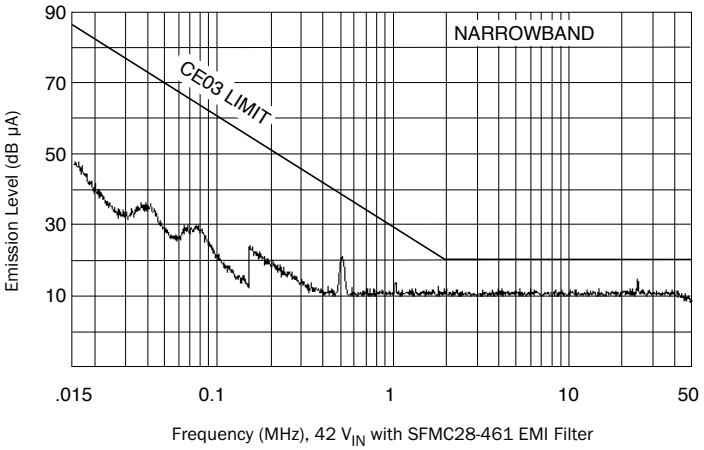
SMHF4205D EFFICIENCY

FIGURE 42



SMHF4205D MIL-STD-461C, CE03

FIGURE 43



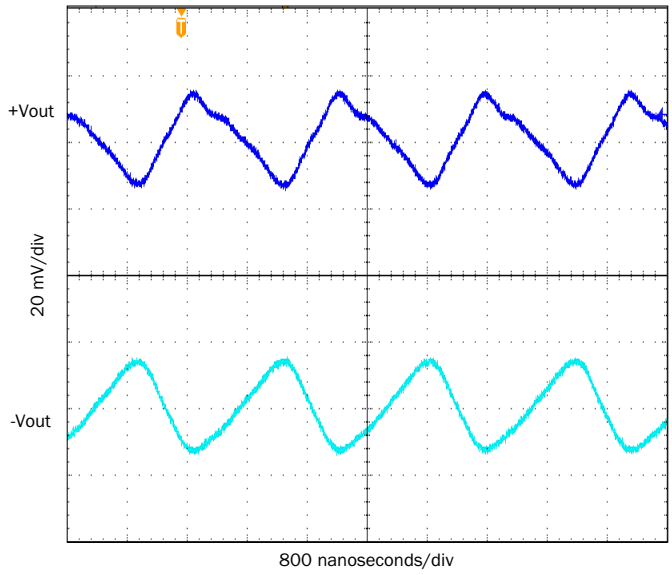
SMHF4205D MIL-STD-461C, CE03

FIGURE 44

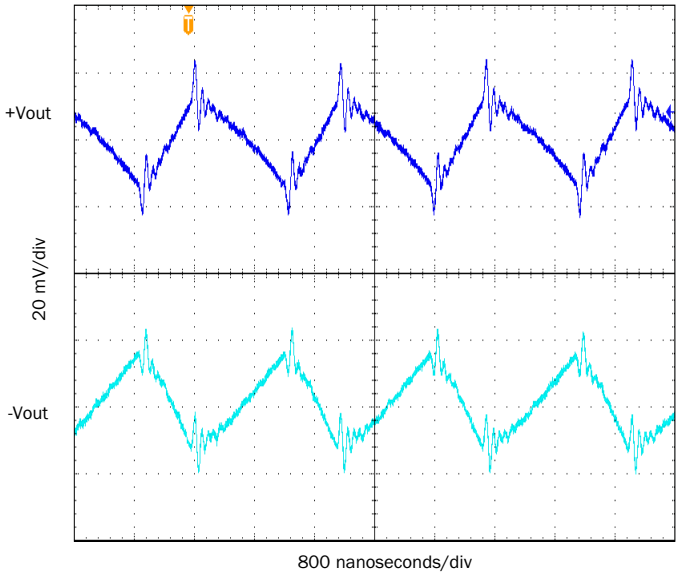
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

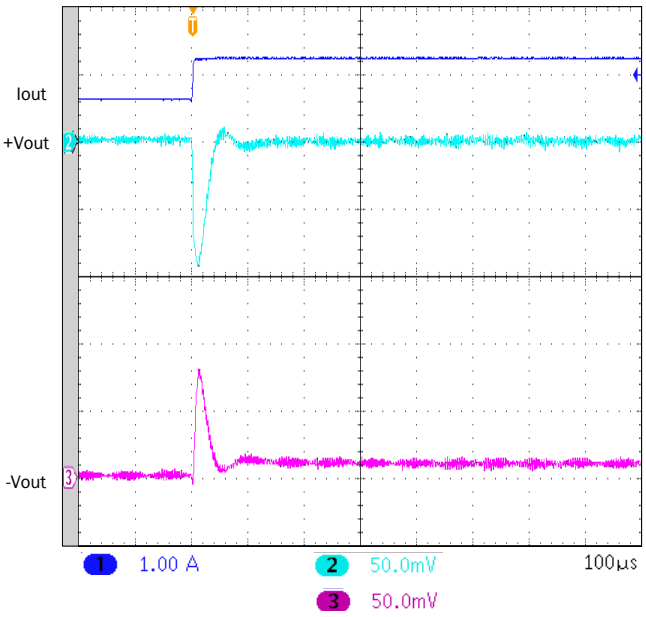
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



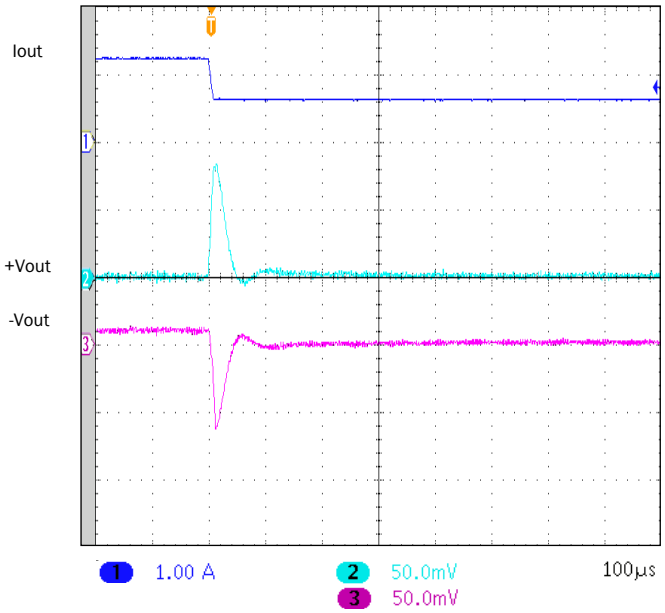
SMHF4205D OUTPUT RIPPLE 2 MHZ
FIGURE 45



SMHF4205D OUTPUT RIPPLE 10 MHZ
FIGURE 46



UNITS ARE PER DIVISION
SMHF4205D STEP LOAD 50% - 100%
FIGURE 47

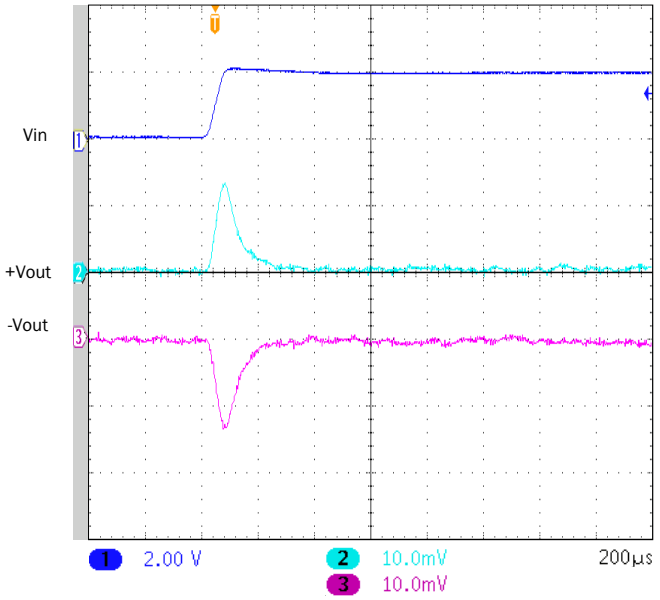


UNITS ARE PER DIVISION
SMHF4205D STEP LOAD 100% - 50%
FIGURE 48

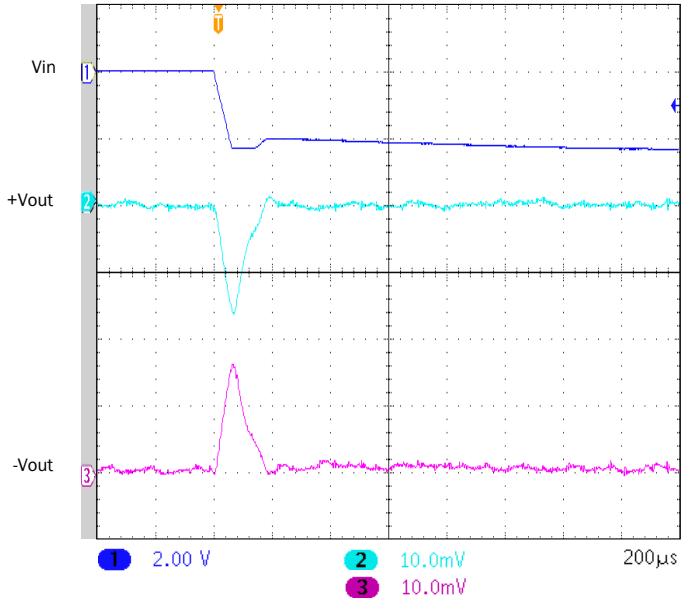
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

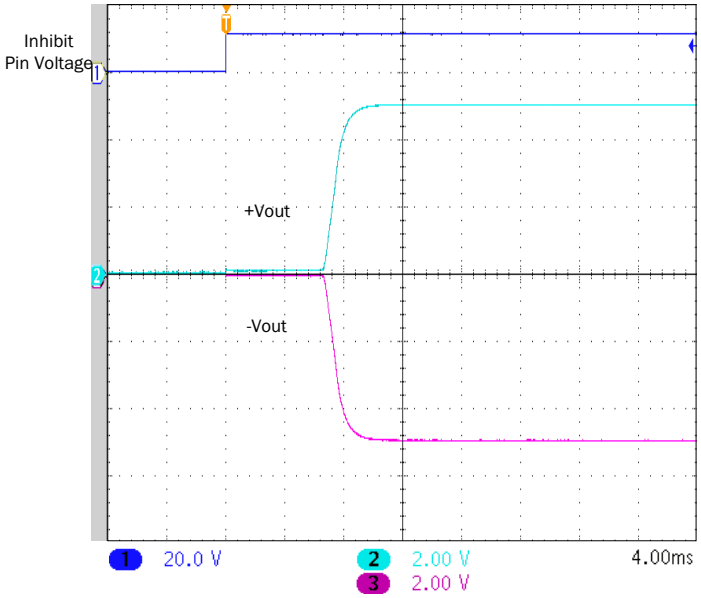
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



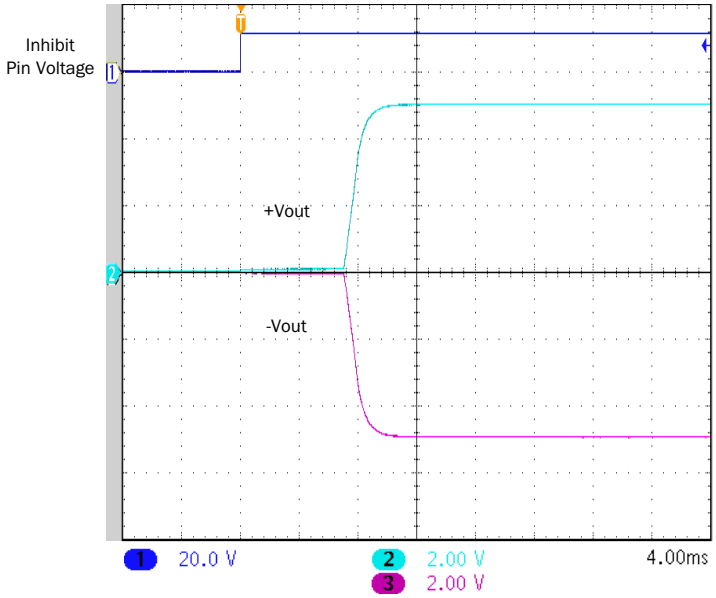
UNITS ARE PER DIVISION
SMHF4205D STEP LINE 41 - 43 VOLTS IN
FIGURE 49



UNITS ARE PER DIVISION
SMHF4205D STEP LINE 43 - 41 VOLTS IN
FIGURE 50



UNITS ARE PER DIVISION
SMHF4205D START-UP DELAY NO CAP
FIGURE 51

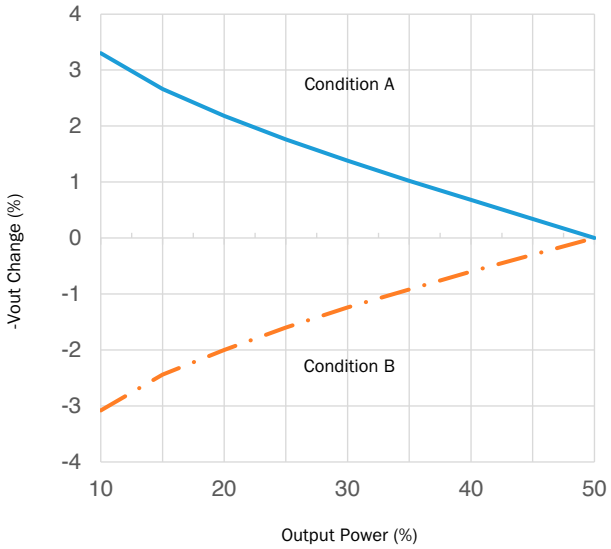


UNITS ARE PER DIVISION
SMHF4205D START-UP DELAY WITH 100 µF CAP
FIGURE 52

SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



SMHF4205D CROSS REGULATION

FIGURE 53

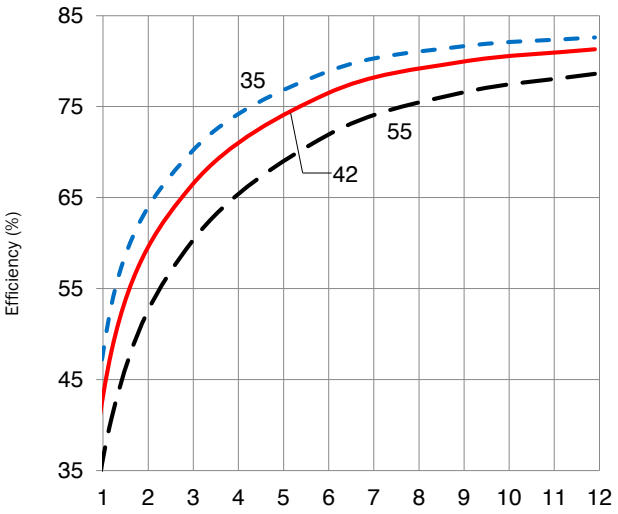
Condition A:
+Vout held at 50% load.
-Vout 10 - 50% load sweep

Condition B:
-Vout held at 50% load.
+Vout 10-50% load sweep

SMHF42 Single and Dual DC-DC Converters

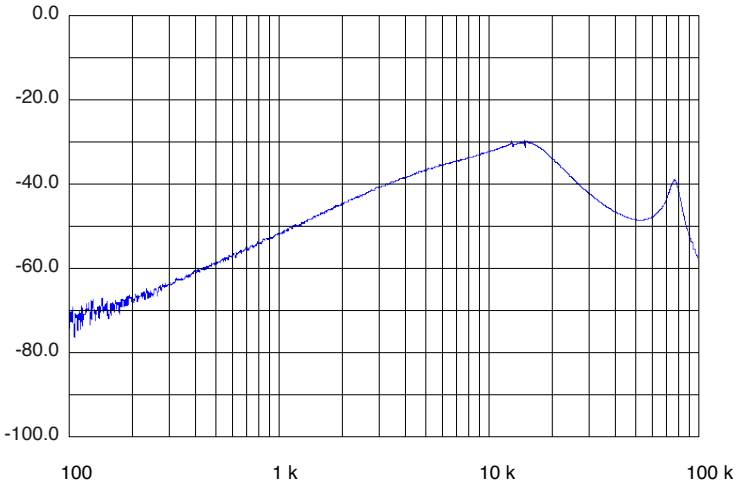
35 TO 55 VOLT INPUT – 8 TO 15 WATT

TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



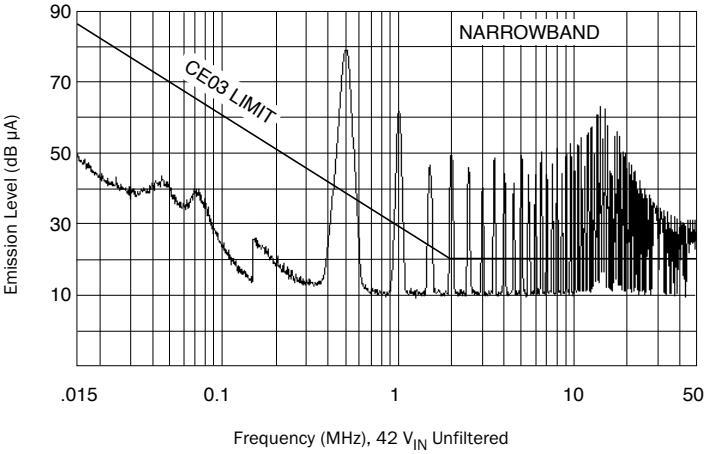
SMHF4207D EFFICIENCY

FIGURE 54



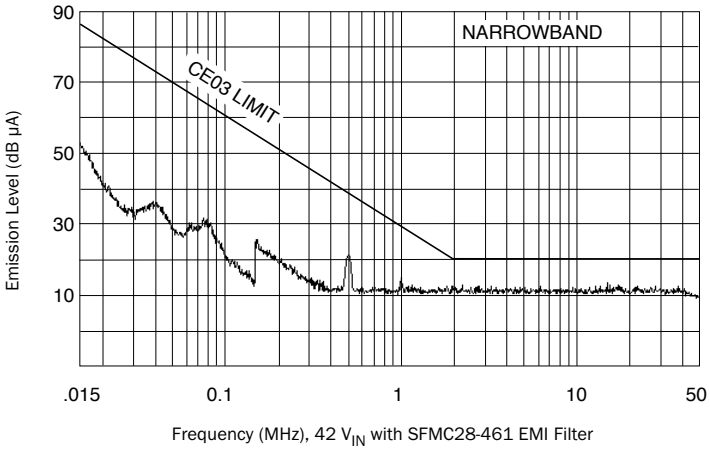
SMHF4207D AUDIO REJECTION

FIGURE 55



SMHF4207D MIL-STD-461C, CE03

FIGURE 56



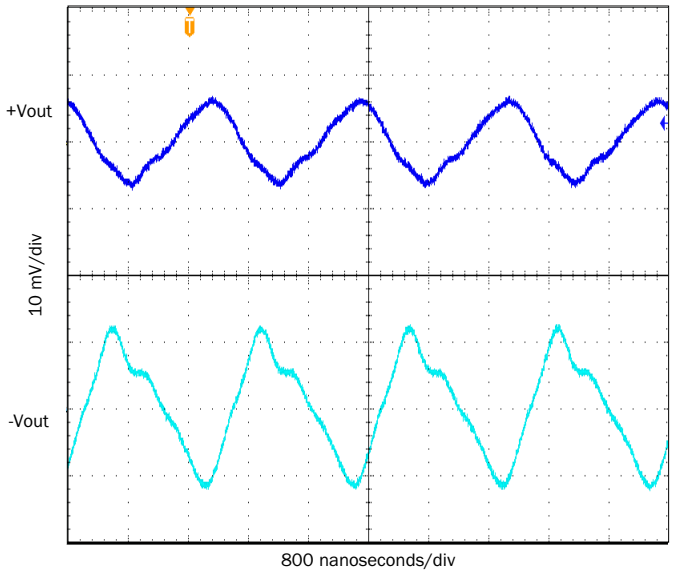
SMHF4207D MIL-STD-461C, CE03

FIGURE 57

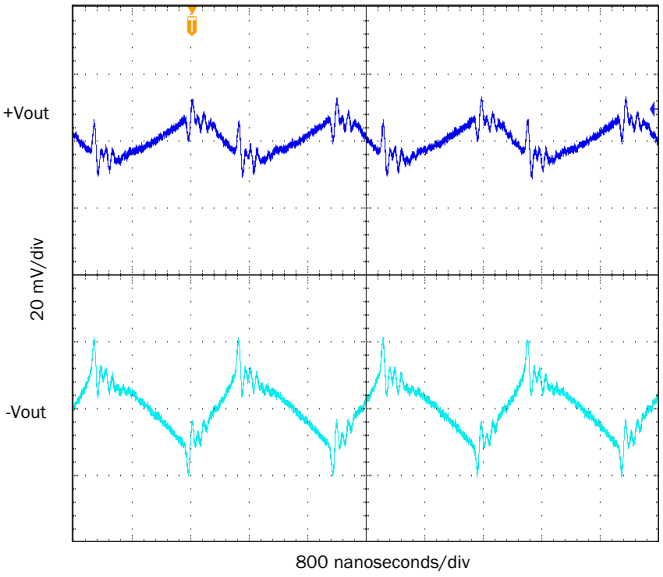
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

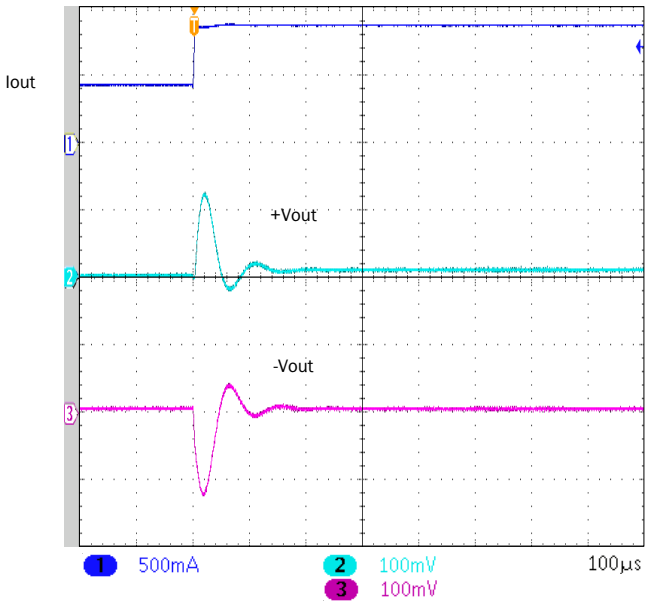
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



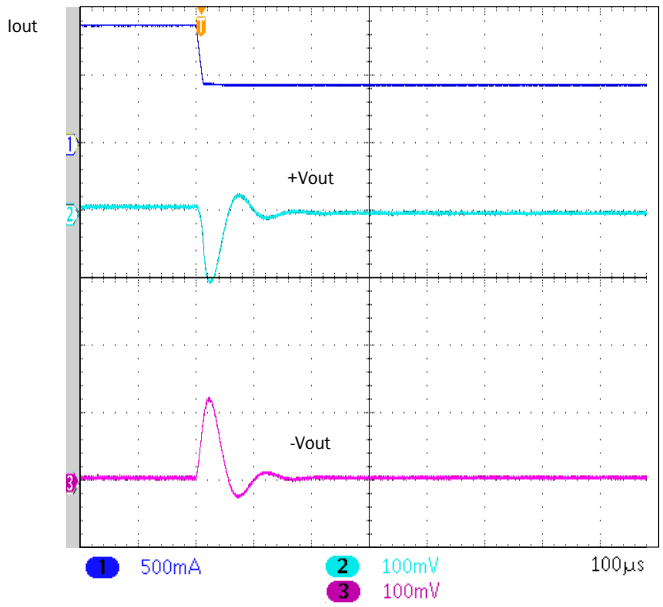
SMHF4207D OUTPUT RIPPLE 2 MHZ
FIGURE 58



SMHF4207D OUTPUT RIPPLE 10 MHZ
FIGURE 59



UNITS ARE PER DIVISION
SMHF4207D STEP LOAD 50% - 100%
FIGURE 60

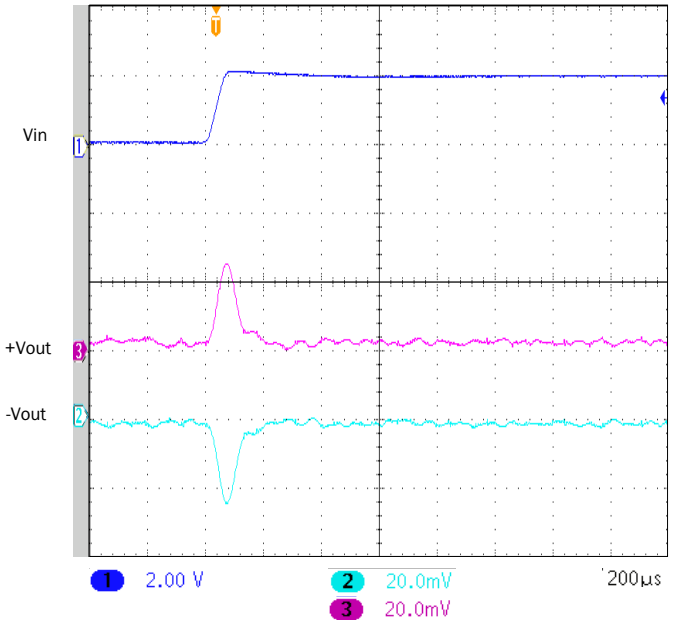


UNITS ARE PER DIVISION
SMHF4207D STEP LOAD 100% - 50%
FIGURE 61

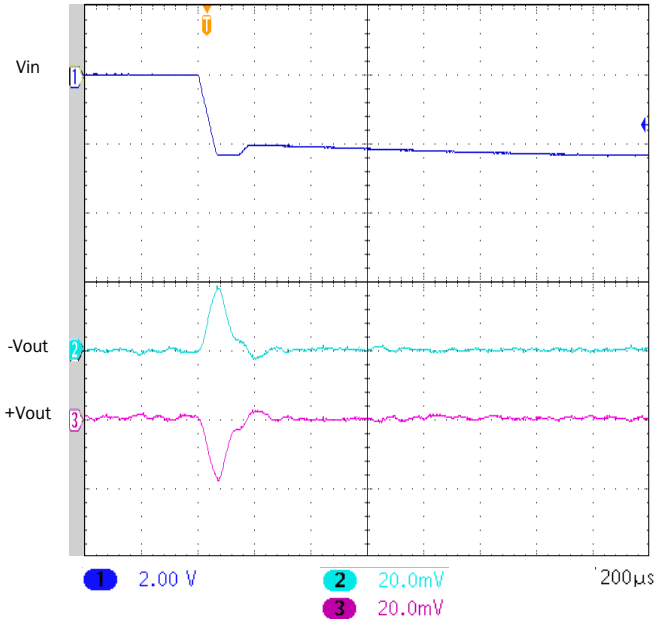
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

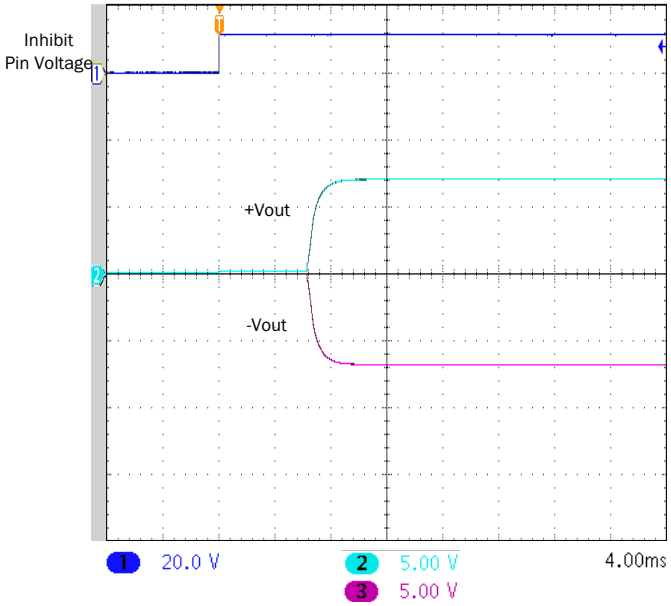
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



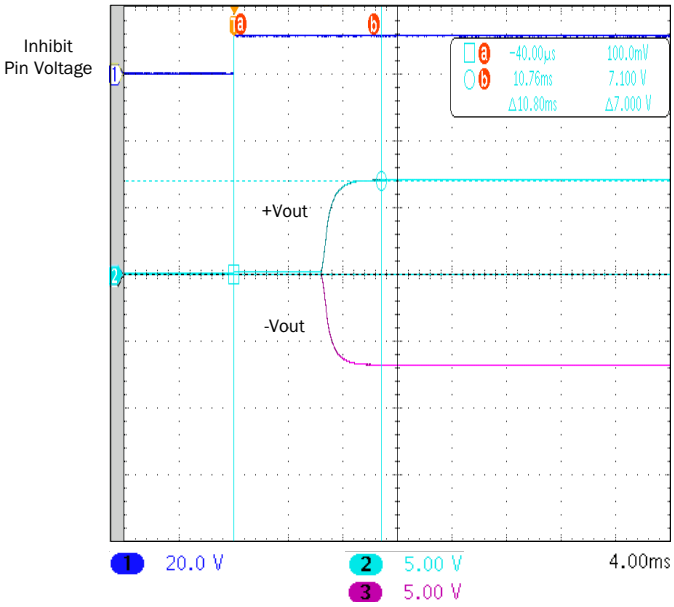
UNITS ARE PER DIVISION
SMHF4207D STEP LINE 41 - 43 VOLTS IN
FIGURE 62



UNITS ARE PER DIVISION
SMHF4207D STEP LINE 43 - 41 VOLTS IN
FIGURE 63



UNITS ARE PER DIVISION
SMHF4207D START-UP DELAY NO CAP
FIGURE 64

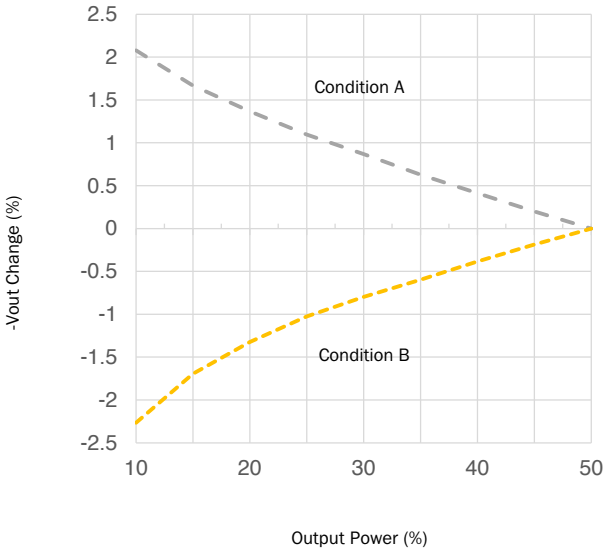


UNITS ARE PER DIVISION
SMHF4207D START-UP DELAY WITH 10 µF CAP
FIGURE 65

SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



SMHF4207D CROSS REGULATION

FIGURE 66

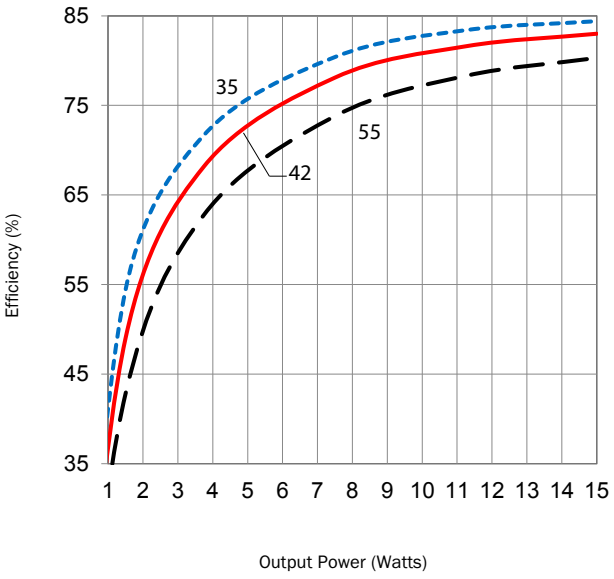
Condition A:
+Vout held at 50% load.
-Vout 10 - 50% load sweep

Condition B:
-Vout held at 50% load.
+Vout 10-50% load sweep

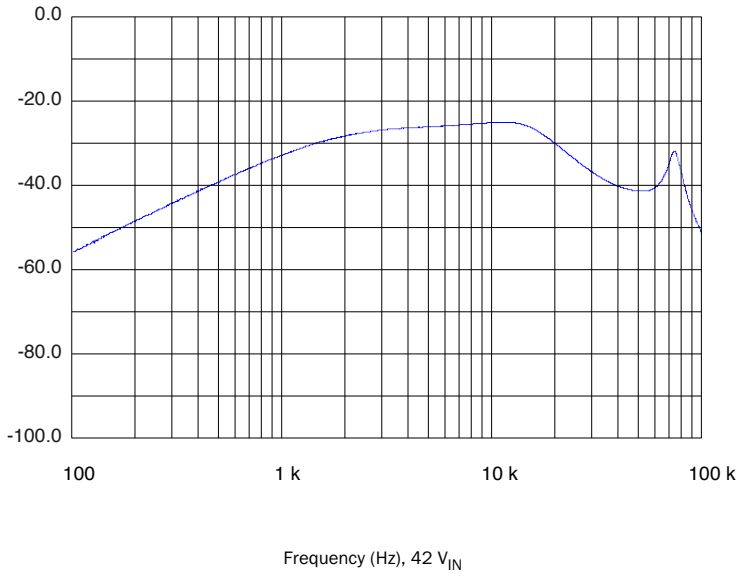
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

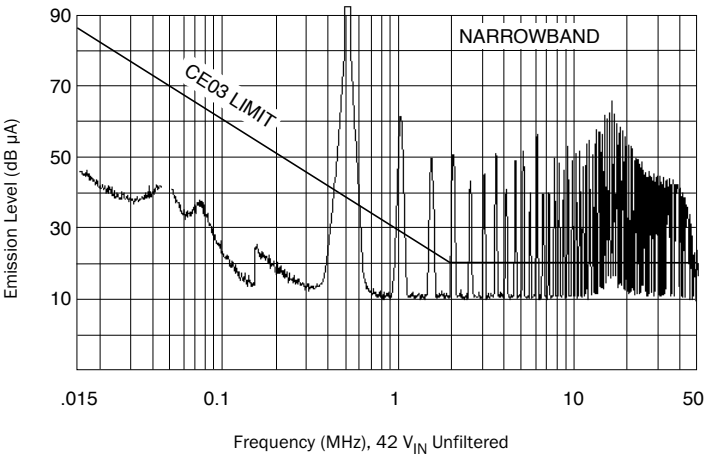
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



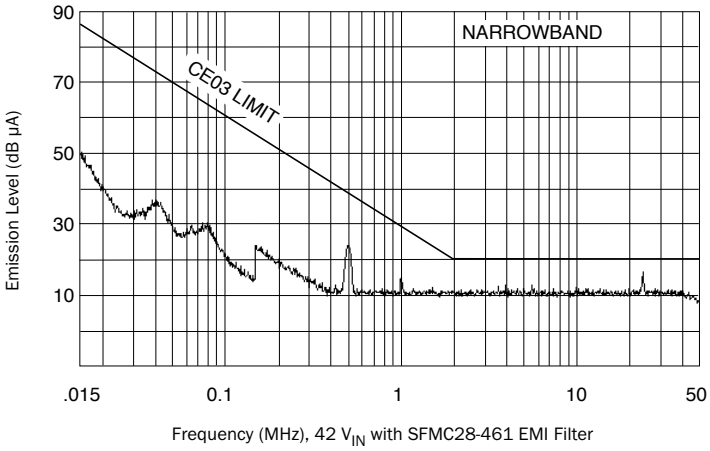
SMHF4215D EFFICIENCY
FIGURE 67



SMHF4215D AUDIO REJECTION
FIGURE 68



SMHF4215D MIL-STD-461C, CE03
FIGURE 69

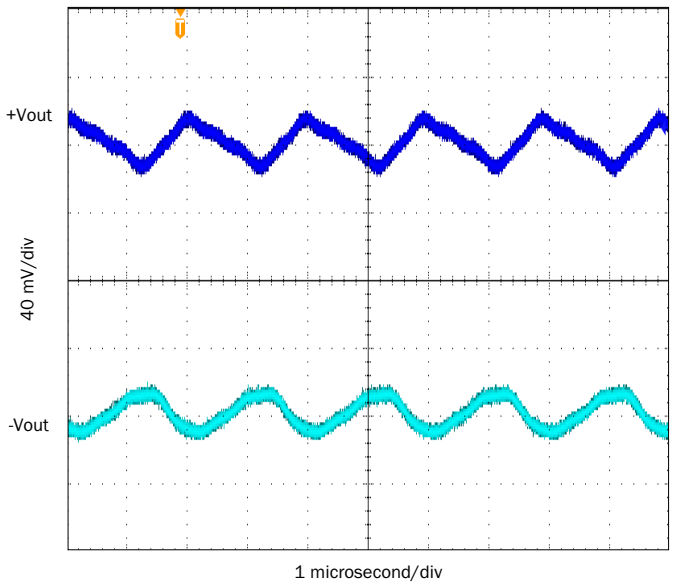


SMHF4215D MIL-STD-461C, CE03
FIGURE 70

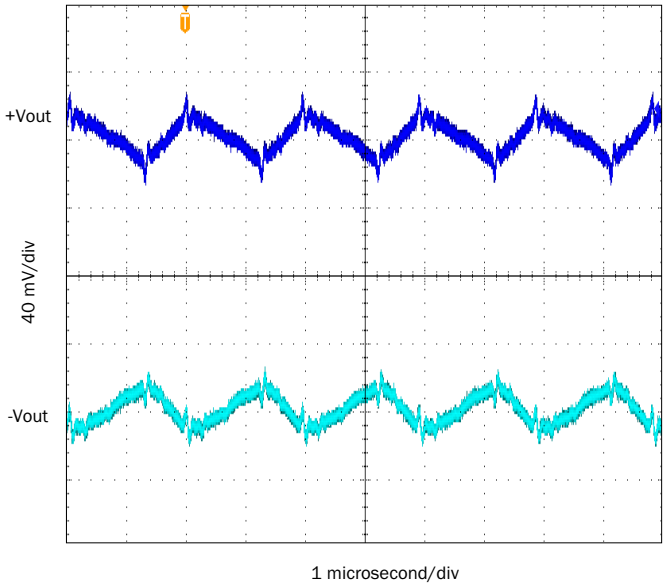
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

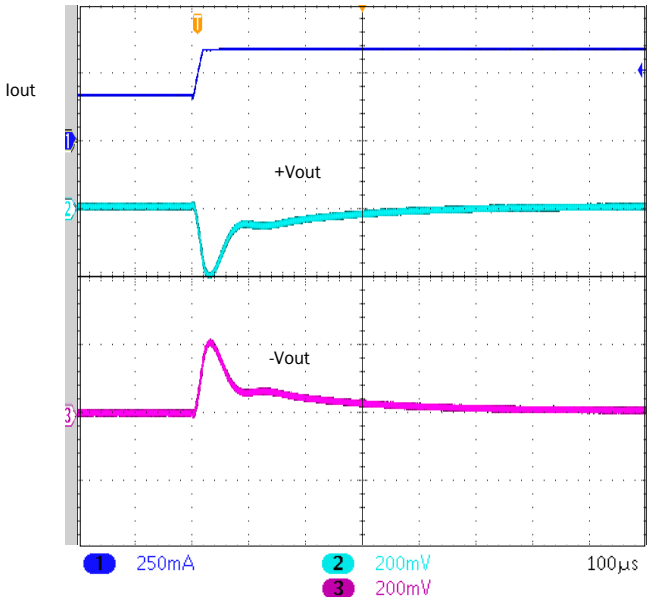
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



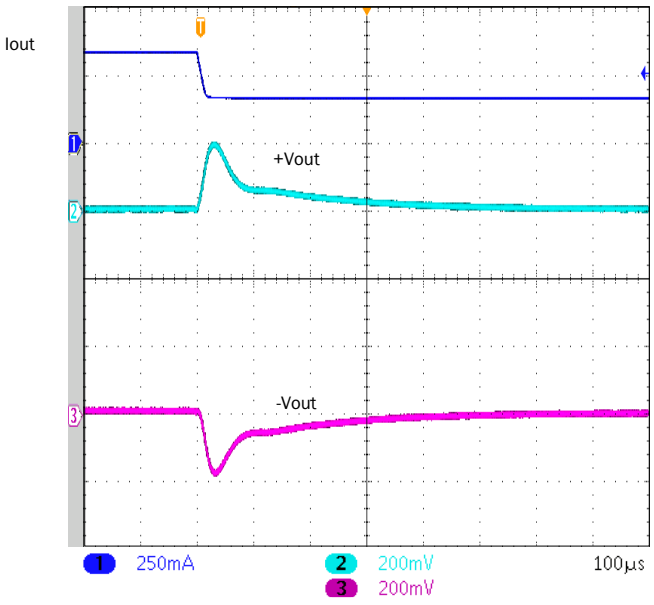
SMHF4215D OUTPUT RIPPLE 2 MHZ
FIGURE 71



SMHF4215D OUTPUT RIPPLE 10 MHZ
FIGURE 72



UNITS ARE PER DIVISION
SMHF4215D STEP LOAD 50% - 100%
FIGURE 73

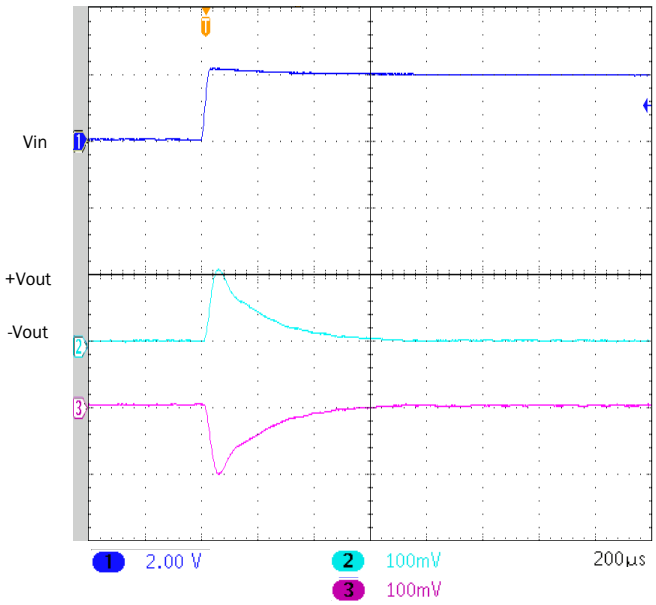


UNITS ARE PER DIVISION
SMHF4207D STEP LOAD 100% - 50%
FIGURE 74

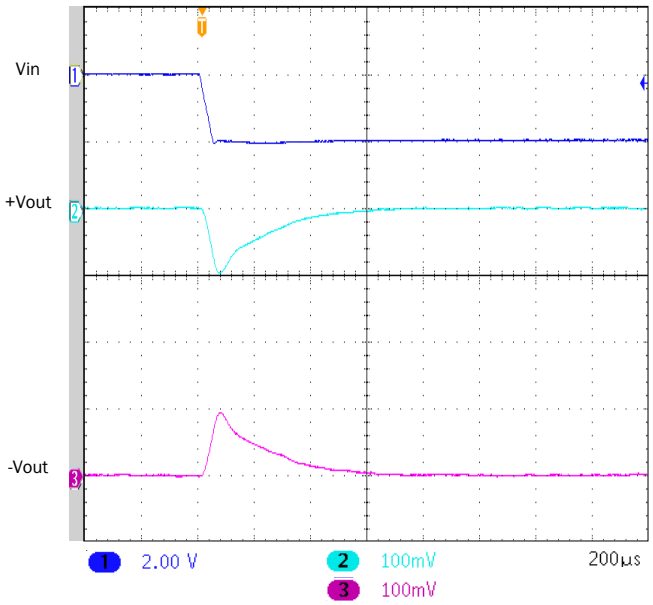
SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

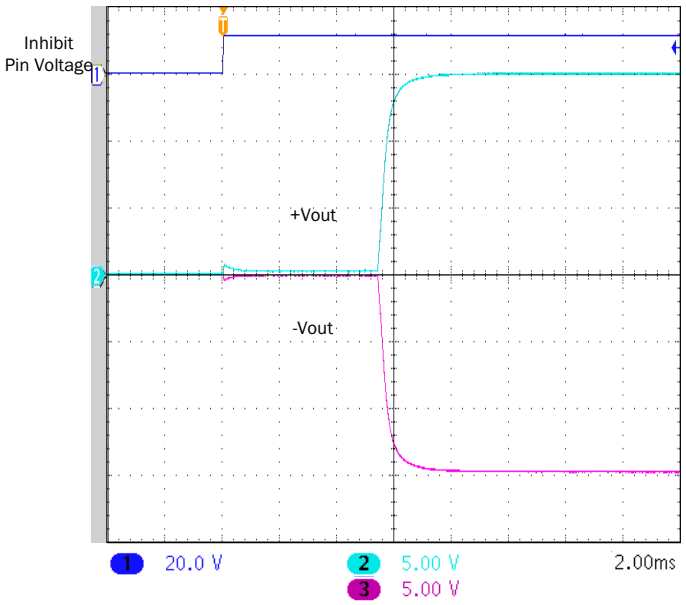
TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



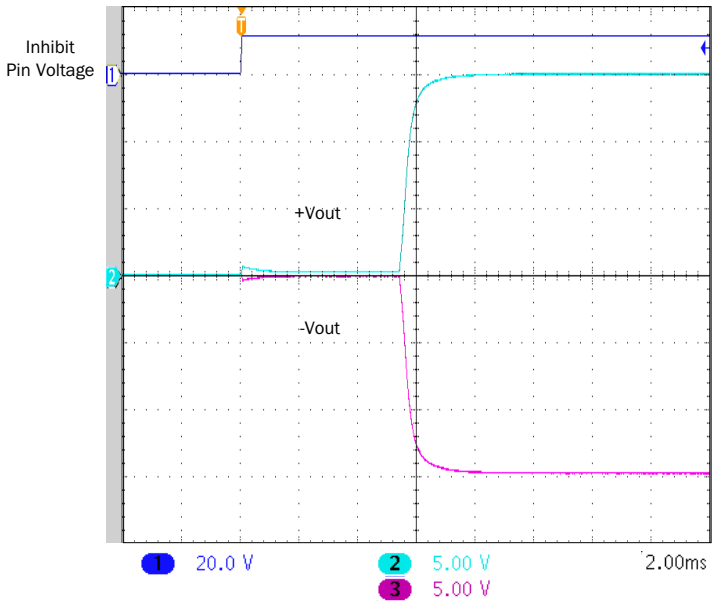
UNITS ARE PER DIVISION
SMHF4215D STEP LINE 41 - 43 VOLTS IN
FIGURE 75



UNITS ARE PER DIVISION
SMHF4215D STEP LINE 43 - 41 VOLTS IN
FIGURE 76



UNITS ARE PER DIVISION
SMHF4215D START-UP DELAY NO CAP
FIGURE 77

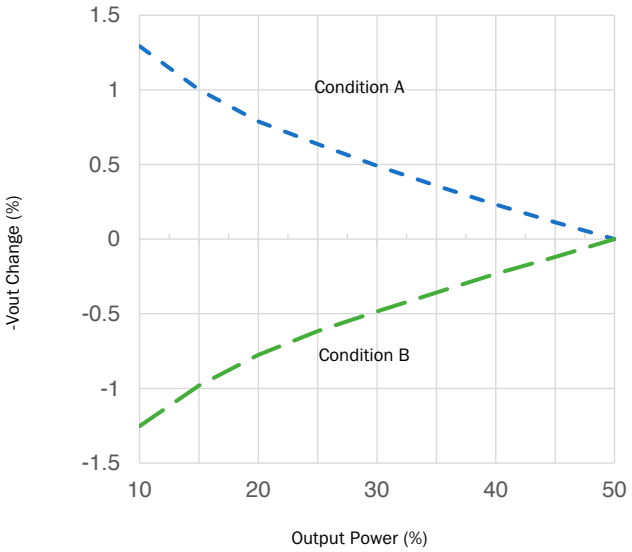


UNITS ARE PER DIVISION
SMHF4215D START-UP DELAY WITH 100 µF CAP
FIGURE 78

SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

TYPICAL PERFORMANCE PLOTS: 25°C CASE, 42 V_{IN}, 100% LOAD, UNLESS OTHERWISE SPECIFIED.
FOR REFERENCE ONLY. NOT GUARANTEED SPECIFICATIONS.



SMHF4215D CROSS REGULATION

FIGURE 79

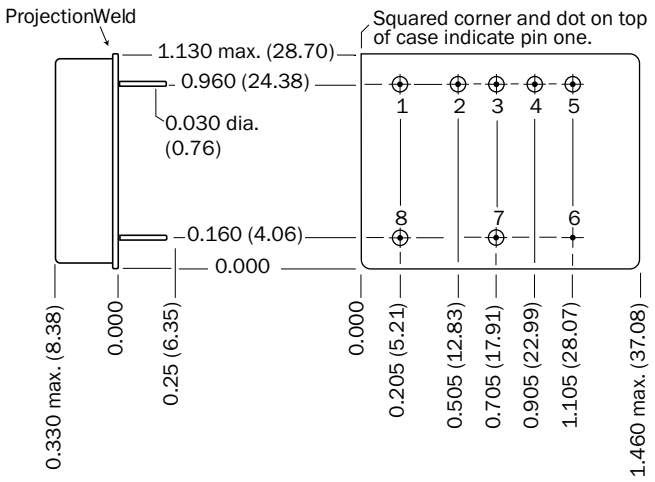
Condition A:
+Vout held at 50% load.
-Vout 10 - 50% load sweep

Condition B:
-Vout held at 50% load.
+Vout 10-50% load sweep

SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

BOTTOM VIEW CASE E1



Weight: 30 grams maximum

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.

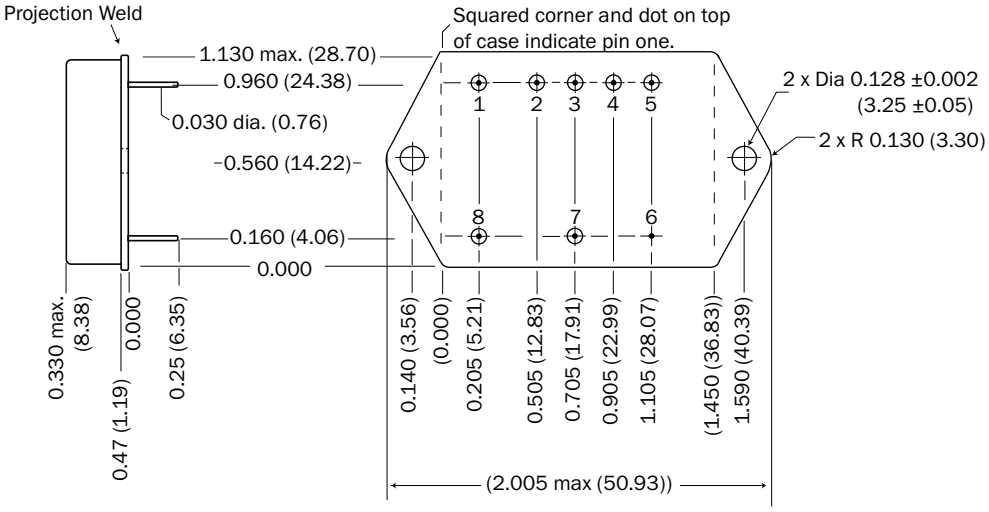
Materials

Header	Cold Rolled Steel/Nickel/Gold
Cover	Kovar/Nickel
Pins	#52 alloy/Gold compression glass seal. Gold plating of 50 - 150 microinches included in pin diameter Seal Hole: 0.080 ±0.002 (2.03 ±0.05)

Please refer to the numerical dimensions for accuracy.

FIGURE 80: CASE E1

BOTTOM VIEW CASE G1
Flanged cases: Designator "F" required in Case Option position of model number



Weight: 30 grams maximum

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 compression glass seal Gold plating of 50 - 150 microinches included in pin diameter Seal Hole: 0.080 ±0.002 (2.03 ±0.05)

Please refer to the numerical dimensions for accuracy.

FIGURE 81: CASE G1

SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

ELEMENT EVALUATION TABLES FOR QML PRODUCTS ARE IN "APP-009 QUALITY AND CERTIFICATION", APPENDIX A, IN COMPLIANCE WITH MIL-PRF-38534 REVISION L. (LINK HTTPS://WWW.CRANEAE.COM/QUALITY-ASSURANCE-MODULAR-POWER)

ENVIRONMENTAL SCREENING SPACE DC-DC CONVERTERS PROTOTYPE, CLASS H AND K

	NON-QML [1]	QML [2, 3]	
TEST PERFORMED	**PROTOTYPE (/O) [4]**	**CLASS H (/H)**	**CLASS K (/K)**
Non-destruct wire bond pull, Method 2023		■ [5]	■
Pre-cap Inspection, Method 2017, 2032	■	■	■
Temperature Cycle (10 times)			
Method 1010, Cond. C, -65°C to +150°C, ambient	■	■	■
Constant Acceleration			
Method 2001, 3000 g	■	■	■
PIND, Test Method 2020, Cond. A		■ [5]	■
Pre burn-in test, Group A, Subgroups 1 and 4	■	■ [5]	■
Burn-in Method 1015, +125°C case, typical [6]			
96 hours	■		
160 hours		■	
2 x 160 hours (includes mid-BI test)			■
Final Electrical Test, MIL-PRF-38534, Group A,			
Subgroups 1 and 4: +25°C case	■		
Subgroups 1 through 6, -55°C, +25°C, +125°C case		■	■
Hermeticity Test, Method 1014			
Gross Leak, Cond. B_2, Kr85			■
Gross Leak, Cond. C_1, fluorocarbon	■	■	
Fine Leak, Cond. B_1, Kr85			■
Fine Leak, Cond. A_2, helium	■	■	
Radiography, Method 2012			■
Post Radiography Electrical Test, +25°C case			■ [5]
Final visual inspection			
Method 2009 of MIL-STD-883		■	■
Magnification 1X [7]	■		

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

Notes
1. Non-QML prototype products may not meet all of the requirements of MIL-PRF-38534.
2. All processes are QML qualified and performed by certified operators.
3. Class H or K QML products that have no SMD number are marked "CHP, CHL, CHR, CKP, CKL or CKR" per MIL-PRF-38534, Table III instead of "QML".
4. "O" in the RHA designator position in Interpoint model numbers indicates DLA RHA "-" defined as no RHA.
5. Not required by DLA but performed to assure product quality.
6. Burn-in temperature designed to bring the case temperature to +125°C minimum. Burn-in is a powered test.
7. Visual inspection is performed per an internal document. Product may contain cosmetic irregularities such as dents, dings, scratches, etc. that do not affect form, fit or function.

TABLE 10: ENVIRONMENTAL SCREENING SPACE DC-DC CONVERTERS PROTOTYPE, CLASS H AND K

SMHF42 Single and Dual DC-DC Converters

35 TO 55 VOLT INPUT – 8 TO 15 WATT

SPACE RADIATION HARDNESS ASSURANCE DC-DC CONVERTERS CLASS H AND K, RHA [1] L AND R

	QML			
	CLASS H		CLASS K	
QUALIFICATION PER MIL-STD	/HL	/HR	/KL	/KR
RHA L: 50 krad(Si) total dose [2, 3, 4]	■		■	
RHA R: 100 krad(Si) total dose [2, 3, 4]		■		■
SEE, LET 86 MeV cm^2/mg [5]	■	■	■	■

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

Notes
1. DLA has approved the RHA plan for Interpoint power products. Our SMD products with RHA "L" or "R" code meet DLA requirements.
2. Radiation sensitive components internal to the devices are procured with radiation guarantees or undergo radiation lot acceptance testing (RLAT) performed per condition A, method 1019 of MIL-STD-883.
3. Representative converters were high dose rate (HDR) tested using condition A of method 1019 of MIL-STD-883 to 150 krad(Si) to ensure RHA designator level "R" (100 krad(Si)).
4. Representative converters were low dose rate (LDR) tested using condition D of method 1019 of MIL-STD-883 to 100 krad(Si) to ensure RHA designator level "R" (100 krad(Si)).
5. Single event testing was performed on a converter to 86 MeV-cm^2/mg using 15 MeV/nucleon gold ions with no latch-up, burn-out, functional interrupts, or gate ruptures exhibited. Single event upsets (output voltage transients) may be present up to 86 MeV-cm^2/mg.

TABLE 11: SPACE RADIATION HARDNESS ASSURANCE DC-DC CONVERTERS CLASS H AND K, RHA L AND R

