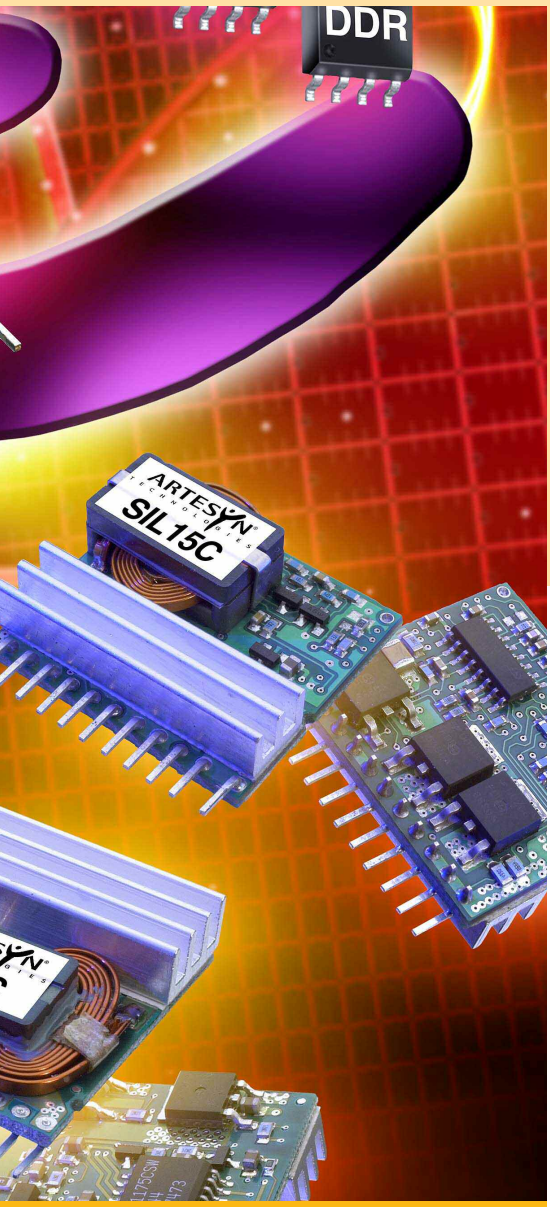
SIL15C SERIES

Single Output



- Wide output voltage trim (0.9 Vdc to 5.0 Vdc, 15 A max.)
- Power good output signal (open collector)
- Input undervoltage lockout
- Current sink capability for termination applications
- Operating ambient temperature up to 80 °C with suitable derating and forced air cooling
- Remote ON/OFF
- No minimum load requirements
- Non-latching over-current protection
- Compact footprint, vertical and horizontal options
- 5 V and 12 V input options
- Available RoHS compliant

The SIL15C is a new high density open frame non-isolated converter series for space-sensitive applications. Each model has a wide input range (4.5 Vdc to 5.5 Vdc or 10.2 Vdc to 13.8 Vdc) and offer a wide 0.9 Vdc to 3.3 V/5 V output voltage range with a 15 A load. An external resistor adjusts the output voltage from its pre-set value of 0.9 V to any value up to the maximum allowed value for that model. Typical efficiencies are 89% for the 5 V input version and 91% for the 12 V input version. The SIL15C series offers remote ON/OFF and over-current protection as standard. With full international safety approval including EN60950 and UL/cUL60950, the SIL15C reduces compliance costs and time to market.

[2 YEAR WARRANTY]

ARTESYN TECHNOLOGIES

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Stresses in excess of the maximum ratings can cause permanent damage to the device. Operation of the device is not implied at these or any other conditions in excess of those given in the specification. Exposure to absolute maximum ratings can adversely affect device reliability.

Absolute Maximum Ratings

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input voltage - continuous	$V_{in\ (cont)}$	-0.3		13.8	V DC	$V_{in(+)}$ - $V_{in(-)}$
Operating temperature	T_{op}	0		50	°C curves	Measured at thermal reference points, see Note 1. Higher ambient operation possible with forced air cooling. See derating
Storage temperature	$T_{storage}$	-40		125	°C	
Output current	Iout (max)			15	A	

All specifications are typical at nominal input Vin = 5V and 12V, full load under any resistive load combination at 25°C unless otherwise stated.

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input voltage - operating (5V) (12V)	$V_{in\ (oper)}$ $V_{in\ (oper)}$	4.5 10.2	5.0 12.0	5.5 13.8	V DC V DC	
Input current - no load (5V) (12V)	I_{in}		35 65		mADC	$V_{in\ (min)}$ - $V_{in\ (max)}$, enabled
Input current - Quiescent (5V) (12V)	$I_{in\ (off)}$		10 3.5	20 6.5	mADC	Converter disabled
Input voltage variation	dv/dt		1.2		V/ms	Product was tested at 1.2V/ms. Much higher dV/dt is possible (>10V/ms). Consult factory for details

Turn On/Off

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input voltage - turn on (5V) (12V)	$V_{in\ (on)}$ $V_{in\ (on)}$	4.4 8.7	4.5 9.0	4.6 9.3	V DC V DC	
Input voltage - turn off (5V) (12V)	$V_{in\ (off)}$ $V_{in\ (off)}$	4.2 7.2	4.3 7.5	4.4 7.8	V DC V DC	
Turn on delay - enabled, then power applied	T_{delay} (power)			20	msec	With the Remote ON/OFF signal asserted, this is the time from when the input voltage reaches the minimum specified operating voltage until the Power Good is asserted high
Turn on delay - power applied, then Remote ON/OFF asserted	T_{delay} (Remote ON/OFF)			20	msec	V_{in} = $V_{in\ (nom)}$, then Remote ON/OFF asserted. This is the time taken until the power good is asserted high.
Output to power good delay	T_{delay} (power good)			8	ms	Output voltage in full regulation to power good asserted high.
Rise time (5V)	T_{rise}			10	msec	From 10% to 90%; full resistive load, 680µF capacitance

Signal Electrical Interface

Characteristic - Signal Name	Symbol	Min	Typ	Max	Units	Notes and Conditions
At remote/control ON/OFF pin						**See Notes 2 and 3** See Application Note 131 for Remote ON/OFF details
Control pin open circuit voltage	V_{ih}		2.27	2.5	V	I_{ih} = 0 µA; open circuit voltage
High level input current	I_{ih}			1.0	µA	Current flowing into control pin when pin is pulled high (max. at V_{ih} = 13.8V)
High level input voltage	V_{ih}	2.4			V	Converter guaranteed on when control pin is greater than V_{ih} (min)
Low level input voltage	V_{il}			0.8	V	Converter guaranteed off when control pin is less than V_{il} (max)
Low level input current (5V) (12V)	I_{il} (max)			0.13 0.50	µA µA	V_{il} = 0.0 V;

Reliability and Service Life

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Mean time between failure	MTBF	468,803			Hours	MIL-HDBK-217F, V_{in} = $V_{in\ (nom)}$; I_{out} = $I_{out\ (max)}$; ambient 25°C; ground benign environment
Mean time between failure	MTBF	7,817,294			Hours	Telcordia SR-332 Issue 3, ground benign, temp. = 40°C, V_{in} = $V_{in\ (nom)}$, I_{out} = $I_{out\ (max)}$

Other Specifications

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Switching frequency	F_{sw}		200		kHz	Fixed frequency
Weight			14.2		g	

Environmental Specifications

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Thermal performance		0	50		°C	See Notes 1, 4 and individual derating curves

Type	Parameter	Reference	Test Level	Notes and Conditions
Air temperature operating Air temperature non-operating	10°C to 50°C -40°C to 120°C			Max. rate of change is 30 degrees per hour while operating and 20 degrees per hour while non-operating
Relative humidity - operating Relative humidity - non-operating	80% 100%			With non-condensing Excluding rain during parts shipment
Vibration - operating				Sinusoidal vibration, 0.5G (0 to peak) acceleration. See Note 5
Vibration - non-operating				Sinuisoidal vibration, 1.0G (0 to peak). See Note 5
Shock Non-operating square wave	Acceleration			40G, square wave at 200in/sec (508cm/sec); on all six sides
Non-operating half sine				Half sine pulse for 70in/sec (178cm/sec) for 2ms; on all sides except top)
Operating half sine				Half sine pulse for 40in/sec (102cm/sec) for 2ms; on all sides except top

Characteristic	Altitude	Percentage Derating		
Altitude Derating	3000m (9,843 ft) 10000m (32,808 ft)	20% 50%		Altitude is defined as height above sea level

Performance criteria:

NP: Normal Performance: EUT shall withstand applied test and operate within relevant limits as specified without damage.
RP: Reduced Performance: EUT shall withstand applied test. Reduced performance is permitted within specified limits, resumption to normal performance shall occur at the cessation of the test.
LFS: Loss of Function (self recovery): EUT shall withstand applied test without damage, temporary loss of function permitted during test. Unit will self recover to normal performance after test.

Safety Agency Approvals

Characteristic	
UL/cUL	UL/cUL 60950
TUV Product Service	IEC 60950

Material Ratings

Characteristic - Signal Name	*Notes and Conditions*
Flammability rating	UL94V-0
Material type	FR4 PCB

Model Numbers

Model Number	*Input Voltage*	*Output Voltage*	*Output Current (Max.)*	*Typical Efficiency*	*Max. Load Regulation*
SIL15C-05SADJ-VJ	5VDC	0.9V - 3.3V	15A	89%	±0.5%
SIL15C-05SADJ-HJ	5VDC	0.9V - 3.3V	15A	89%	±0.5%
SIL15C-12SADJ-VJ	12VDC	0.9V - 5V	15A	91%	±0.5%
SIL15C-12SADJ-HJ	12VDC	0.9V - 5V	15A	91%	±0.5%

RoHS Compliance Ordering Information

RoHS 2002/95/EC

The 'J' at the end of the part number indicates that the part is Pb-free (RoHS 6/6 compliant). TSE RoHS 5/6 (non Pb-free) compliant versions may be available on special request, please contact your local sales representative for details.

5V and 12V Model 0.9V Setpoint

Input Characteristics

Characteristic		Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating							
(Source)	(5V)	I_{in}		4.03		A DC	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$;
(Sink)	(5V)	I_{in}		-1.47		A DC	$V_o = V_{o\ (nom)}$
(Source)	(12V)	I_{in}		1.66		A DC	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$;
(Sink)	(12V)	I_{in}		-0.70		A DC	$V_o = V_{o\ (nom)}$
Reflected ripple current	(5V)	$I_{in\ (ripple)}$		40		mA RMS	$I_{out} = I_{out\ (max.)}$, measured
	(5V)			150		mA pk-pk	with external filter. See
	(12V)			33		mA RMS	Application Note 131 for details
	(12V)			190		mA pk-pk	
Input capacitance - internal filter		C_{input}		4.70		µF	
Input capacitance - external input		C_{bypass}		270		µF	Recommended customer added capacitance. Maximum ESR = 20mΩ See Application Note 131 for ripple current requirements

5V and 12V Model 0.9V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage with 1% trim resistors	Vo (nom)	0.878	0.9	0.923	V DC	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$ Worst case condition over line, load, temperature and life
Line regulation				±0.2	%	$I_{out} = I_{out\ (nom)}$; $V_{in\ (min)}$ to $V_{in\ (max)}$
Load regulation				±0.5	%	$V_{in} = V_{in\ (nom)}$; $I_{out\ (min)}$ to $I_{out\ (max)}$
Output current continuous	Iout	0		±15	A DC	Minus indicates Sink Mode
Output current - short circuit						
(5V)	I_{sc}		3.90			Continuous, unit auto recovers
(12V)			3.90			
Output voltage - noise						
(5V) 0.9V	V_{p-p}			30	mV pk-pk	Measurement bandwidth 20 MHz
	V_{rms}			15	mV rms	See Application Note 131 for
(12V) 0.9V	V_{p-p}			50	mV pk-pk	
	V_{rms}			25	mV rms	

5V and 12V Model 0.9V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		100		mV	Peak deviation for 50% to 75% step load, di/dt = 10A/µsec
Load transient response - recovery	$T_{recovery}$		200		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance (5V) (12V)	C_{ext}		680	17,600 11,000	µF	Max ESR = 12mΩ See Application Note 131 for output capacitance values vs. stability

5V and 12V Model 0.9V Setpoint

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overcurrent limit inception (5V) (12V)	I_{oc} I_{oc}		21 21		A DC A DC	V_o = 90% of V_o (nom)

5V and 12V Model 0.9V Setpoint

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency 5V (source mode) 5V (sink mode)	η	65.4 51.7	67.4 53.7		%	I_{out} = 100% Iout (max), V_{in} = V_{in} (nom)
Efficiency 12V (source mode) 12V (sink mode)	η	66.4 59.4	68.4 61.4		%	
Efficiency 5V (source mode) 5V (sink mode)	η	77.5 70.5	79.5 72.5		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)
Efficiency 12V (source mode) 12V (sink mode)	η	74.0 69.5	76.0 71.5		%	

5V Model 1.8V Setpoint

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating (source) (sink)	I_{in} I_{in}		6.85 -4.12		A DC A DC	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_O = V_{O\ (nom)}$
Reflected ripple current	$I_{in\ (ripple)}$		46 200		mA RMS mA pk-pk	$I_{out} = I_{out\ (max.)}$, measured with external filter. See Application Note 131 for details
Input capacitance - internal filter	C_{input}		4.70		µF	
Input capacitance - external bypass	C_{bypass}		270		µF	Recommended customer added capacitance. Max esr = 20mΩ See Application Note 131 for ripple current requirements

5V Model 1.8V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage Line regulation	Vo (nom)	1.755	1.80	1.845 ±0.2	V DC %	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$ $I_{out} = I_{out\ (nom)}$; $V_{in\ (min)}$ to $V_{in\ (max)}$
Load regulation				±0.5	%	$V_{in} = V_{in\ (nom)}$; $I_{out\ (min)}$ to $I_{out\ (max)}$
Output current continuous	Iout	0		±15	A DC	
Output current - short circuit	I_{sc}		3.90		A rms	Continuous, unit auto recovers from short, V_O < 100mV
Output voltage - noise	V_{p-p} V_{rms}			30 15	mV pk-pk mV rms	Measurement bandwidth 20 MHz See Application Note 131 for measurement set-up details

5V Model 1.8V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		100		mV	Peak deviation for 50% to 75% step load, di/dt = 10A/µsec
Load transient response - recovery	$T_{recovery}$		200		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance	C_{ext}		680	16,400	µF	Max ESR = 12mΩ See Application Note 131 for output capacitance values vs. stability

5V Model 1.8V Setpoint

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overcurrent limit inception	I_{oc}		21		A DC	V_o = 90% of V_o (nom)

5V Model 1.8V Setpoint

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency (source) (sink)	η	77.1 72.7	79.1 74.7		%	I_{out} = 100% Iout (max), V_{in} = V_{in} (nom)
Efficiency (source) (sink)	η	86.0 83.5	88.0 85.5		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

5V Model 3.3V Setpoint

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating (source)	I_{in}		11.43		A DC	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$
Reflected ripple current	$I_{in\ (ripple)}$		43 180		mA RMS mA pk-pk	$I_{out} = I_{out\ (max.)}$, measured with external filter. See Application Note 131 for details
Input capacitance - internal filter	C_{input}		4.7		µF	
Input capacitance - external bypass	C_{bypass}		270		µF	Recommended customer added capacitance. Max esr = 20mΩ See Application Note 131 for ripple current requirements

5V Model 3.3V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage Line regulation	Vo (nom)	3.22	3.30	3.38 ±0.2	V DC %	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$ $I_{out} = I_{out\ (nom)}$; $V_{in\ (min)}$ to $V_{in\ (max)}$
Load regulation				±0.5	%	$V_{in} = V_{in\ (nom)}$; $I_{out\ (min)}$ to $I_{out\ (max)}$
Output current continuous	Iout	0		±15	A DC	
Output current - short circuit	I_{sc}		3.90		A rms	Continuous, unit auto recovers from short, V_o < 100mV
Output voltage - noise	V_{p-p} V_{rms}			40 15	mV pk-pk mV rms	Measurement bandwidth 20 MHz See Application Note 131 for measurement set-up details

5V Model 3.3V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		100		mV	Peak deviation for 50% to 75% step load, di/dt = 10A/µsec
Load transient response - recovery	$T_{recovery}$		200		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance	C_{ext}		680	13,200	µF	Max ESR = 12mΩ See Application Note 131 for output capacitance values vs. stability

5V Model 3.3V Setpoint

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overcurrent limit inception	I_{oc}		22.20		A DC	V_o = 90% of V_o (nom)

5V Model 3.3V Setpoint

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency (source)	η	85	87		%	I_{out} = 100% Iout (max),
Efficiency (source)	η	90	92		%	I_{out} = 50% I_{out} (max),

12V Model 1.2V Setpoint

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating (source) (sink)	I_{in} I_{in}		2.02 -1.01	 -1.22	A DC A DC	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$
Input current - maximum	$I_{in\ (max.)}$		2.25		A DC	$V_{in} = V_{in\ (min)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$ (measured at converter)
Reflected ripple current	$I_{in\ (ripple)}$		35 175		mA RMS mA pk-pk	$I_{out} = I_{out\ (max.)}$, measured with external filter. See Application Note 131 for details
Input capacitance - internal filter	C_{input}		4.7		µF	
Input capacitance - external bypass	C_{bypass}		270		µF	Recommended customer added capacitance. Max esr = 20mΩ See Application Note 131 for ripple current requirements

12V Model 1.2V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage Line regulation	Vo (nom)	1.17	1.20	1.23 ±0.2	V DC %	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$ $I_{out} = I_{out\ (nom)}$; $V_{in\ (min)}$ to $V_{in\ (max)}$
Load regulation				±0.5	%	$V_{in} = V_{in\ (nom)}$; $I_{out\ (min)}$ to $I_{out\ (max)}$
Output current continuous	Iout	0		±15	A DC	
Output current - short circuit	I_{sc}		3.60		A rms	Continuous, unit auto recovers from short, V_o < 100mV
Output voltage - noise	V_{p-p} V_{rms}			50 25	mV pk-pk mV rms	Measurement bandwidth 20 MHz See Application Note 131 for measurement set-up details

12V Model 1.2V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		100		mV	Peak deviation for 50% to 75% step load, di/dt = 10A/µsec
Load transient response - recovery	$T_{recovery}$		200		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance	C_{ext}		680	9680	µF	Max ESR = 12mΩ See Application Note 131 for output capacitance values vs. stability

12V Model 1.2V Setpoint

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overcurrent limit inception	I_{oc}		24.0		A DC	V_o = 90% of V_o (nom)

12V Model 1.2V Setpoint

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency (source) (sink)	η	72 63	74 65		%	I_{out} = 100% Iout (max), V_{in} = V_{in} (nom)
Efficiency (source) (sink)	η	79 74	81 76		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

12V Model 2.5V Setpoint

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating (source) (sink)	I_{in} I_{in}		3.65 -2.57	 -3.04	A DC A DC	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$
Input current - maximum	$I_{in\ (max.)}$		4.30		A DC	$V_{in} = V_{in\ (min)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$ (measured at converter)
Reflected ripple current	$I_{in\ (ripple)}$		38.4 155		mA RMS mA pk-pk	$I_{out} = I_{out\ (max.)}$, measured with external filter. See Application Note 131 for details
Input capacitance - internal filter	C_{input}		4.70		µF	
Input capacitance - external bypass	C_{bypass}		270		µF	Recommended customer added capacitance. Max esr = 20mΩ See Application Note 131 for ripple current requirements

12V Model 2.5V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage Line regulation	Vo (nom)	2.43	2.50	2.56 ±0.2	V DC %	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$ $I_{out} = I_{out\ (nom)}$; $V_{in\ (min)}$ to $V_{in\ (max)}$
Load regulation				±0.5	%	$V_{in} = V_{in\ (nom)}$; $I_{out\ (min)}$ to $I_{out\ (max)}$
Output current continuous	Iout	0		±15	A DC	
Output current - short circuit	I_{sc}		3.60		A rms	Continuous, unit auto recovers from short, V_o < 100mV
Output voltage - noise	V_{p-p} V_{rms}			50 25	mV pk-pk mV rms	Measurement bandwidth 20 MHz See Application Note 131 for measurement set-up details

12V Model 2.5V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		100		mV	Peak deviation for 50% to 75% step load, di/dt = 10A/µsec
Load transient response - recovery	$T_{recovery}$		200		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance	C_{ext}		680	7840	µF	Max ESR = 12mΩ See Application Note 131 for output capacitance values vs. stability

12V Model 2.5V Setpoint

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overcurrent limit inception	I_{oc}		22.0		A DC	V_o = 90% of V_o (nom)

12V Model 2.5V Setpoint

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency (source) (sink)	η	80 80	82 82		%	I_{out} = 100% Iout (max), V_{in} = V_{in} (nom)
Efficiency (source) (sink)	η	84 85	86 87		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

12V Model 5V Setpoint

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	I_{in}		6.90		A DC	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$
Input current - maximum	$I_{in\ (max.)}$		8.10		A DC	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$ (measured at converter)
Reflected ripple current	$I_{in\ (ripple)}$		47.0 200		mA RMS mA pk-pk	$I_{out} = I_{out\ (max.)}$, measured with external filter. See Application Note 131 for details
Input capacitance - internal filter	C_{input}		4.70		µF	
Input capacitance - external bypass	C_{bypass}		270		µF	Recommended customer added capacitance. Max esr = 20mΩ See Application Note 131 for ripple current requirements

12V Model 5V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage Line regulation	Vo (nom)	4.88	5.00	5.13 ±0.2	V DC %	$V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$ $I_{out} = I_{out\ (nom)}$; $V_{in\ (min)}$ to $V_{in\ (max)}$
Load regulation				±0.5	%	$V_{in} = V_{in\ (nom)}$; $I_{out\ (min)}$ to $I_{out\ (max)}$
Output current continuous	Iout	0		15	A DC	
Output current - short circuit	I_{sc}		3.50		A rms	Continuous, unit auto recovers from short, V_o < 100mV
Output voltage - noise	V_{p-p} V_{rms}			50 25	mV pk-pk mV rms	Measurement bandwidth 20 MHz See Application Note 131 for measurement set-up details

12V Model 5V Setpoint

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		100		mV	Peak deviation for 50% to 75% step load, di/dt = 10A/µsec
Load transient response - recovery	$T_{recovery}$		200		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance	C_{ext}		680	5080	µF	Max ESR = 12mΩ See Application Note 131 for output capacitance values vs. stability

12V Model 5V Setpoint

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overcurrent limit inception	I_{oc}		19.0		A DC	V_o = 90% of V_o (nom)

12V Model 5V Setpoint

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency (source)	η	89	91		%	I_{out} = 100% Iout (max),
Efficiency (source)	η	91	93		%	I_{out} = 50% I_{out} (max),

5V Model 0.9V Setpoint

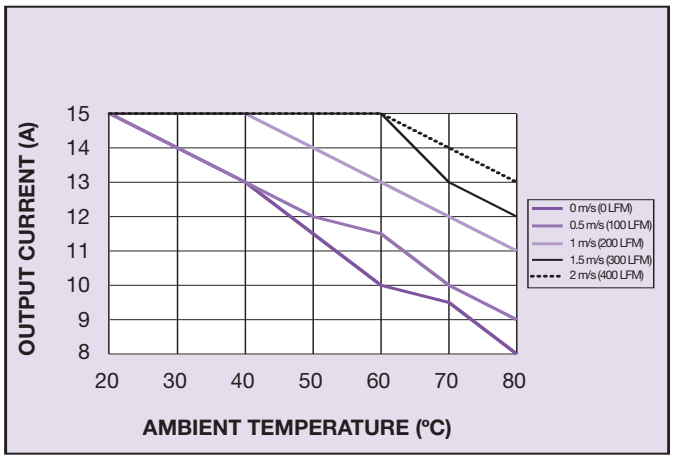

Figure 1: Thermal derating Curve

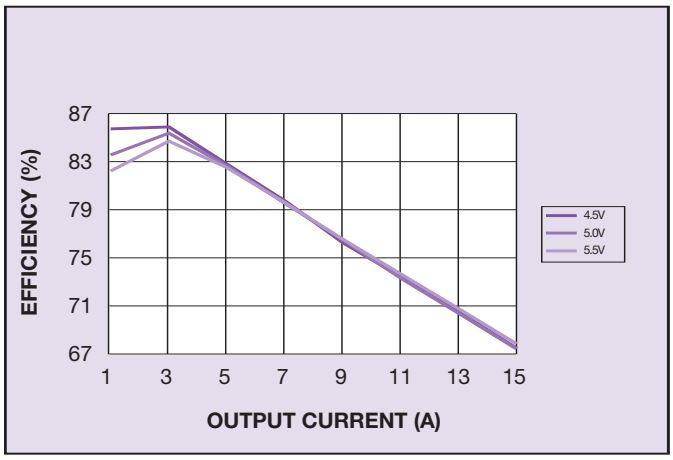

Figure 2: Efficiency when Sourcing

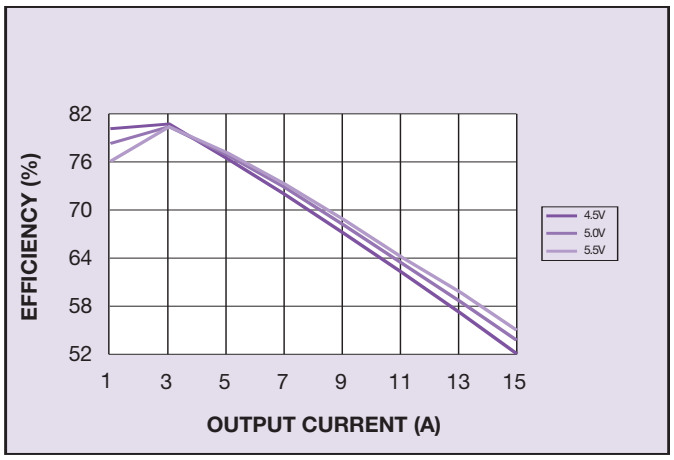

Figure 3: Efficiency when Sinking

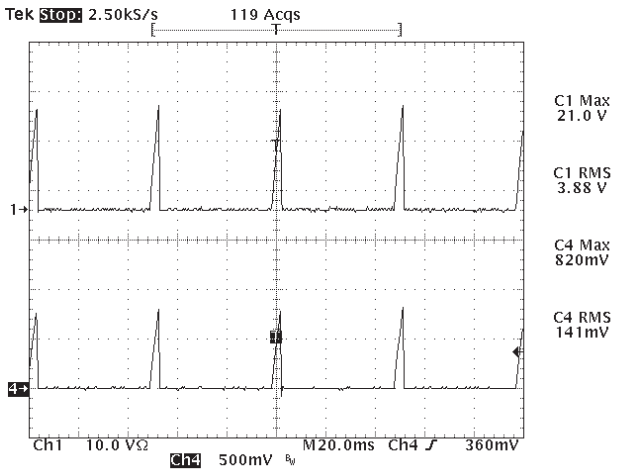

Figure 4: Short Circuit Characteristic (Channel 1: Output Current at 10A/div, Channel 4: Output Voltage)

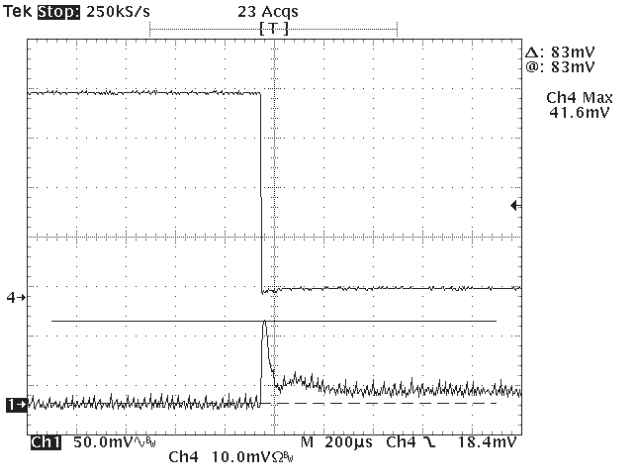

Figure 5: Transient Response 75-50% (Sinking) (Channel 1: Voltage, Channel 4: Current)

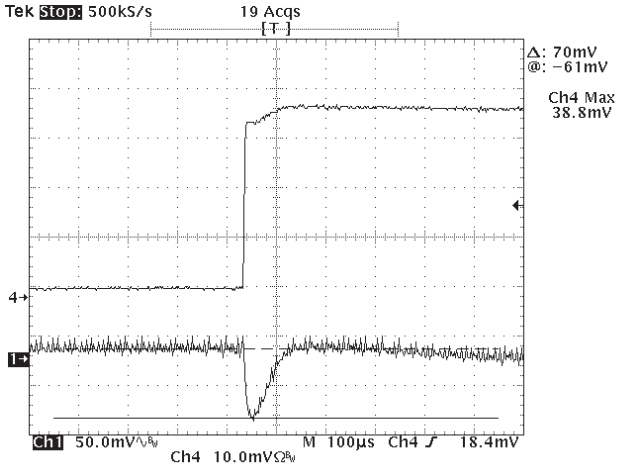

Figure 6: Transient Response 50-75% (Sourcing) (Channel 1: Voltage, Channel 4: Current)

5V Model 0.9V Setpoint

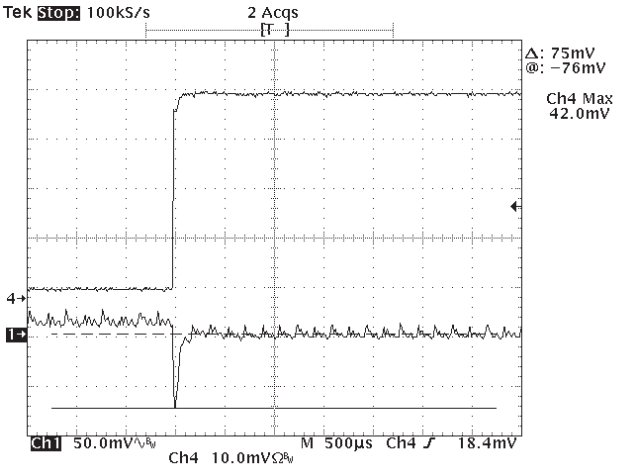

Figure 7: Transient Response 50-75% (Sinking) (Channel 1: Voltage, Channel 4: Current)

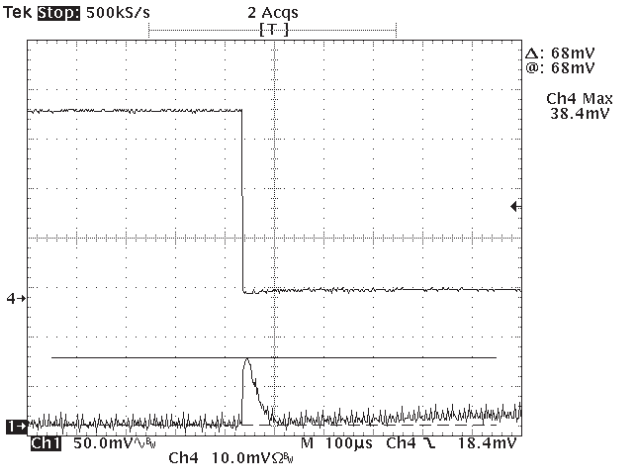

Figure 8: Transient Response 75-50% (Sourcing) (Channel 1: Voltage, Channel 4: Current)

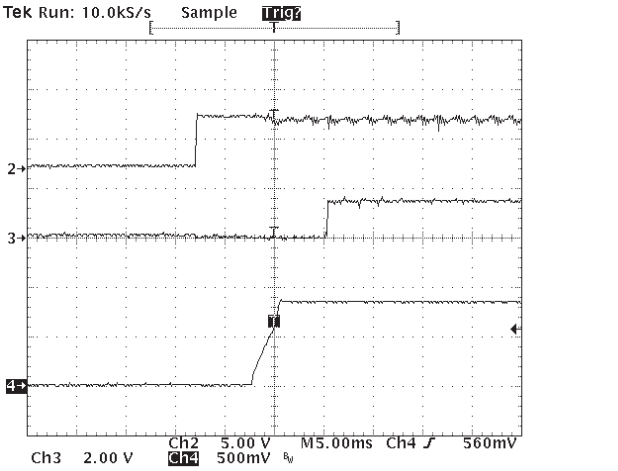

Figure 9: Typical Power Up (Channel 2: DC Input, Channel 3: Power Good Channel 4: Output Voltage)

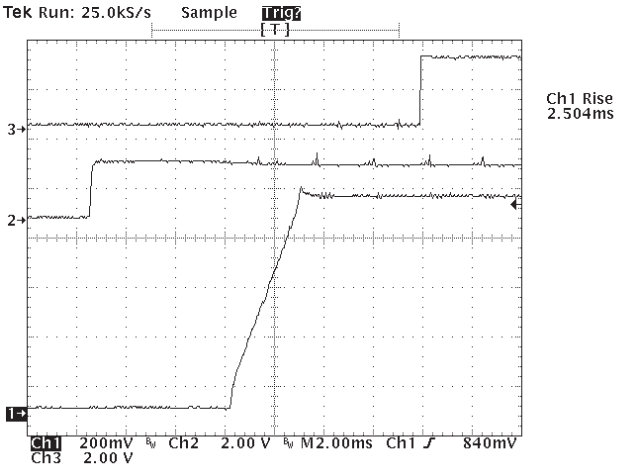

Figure 10: Control On/Off (Channel 1: Output Voltage, Channel 2: Remote ON/OFF, Channel 3: Power Good)

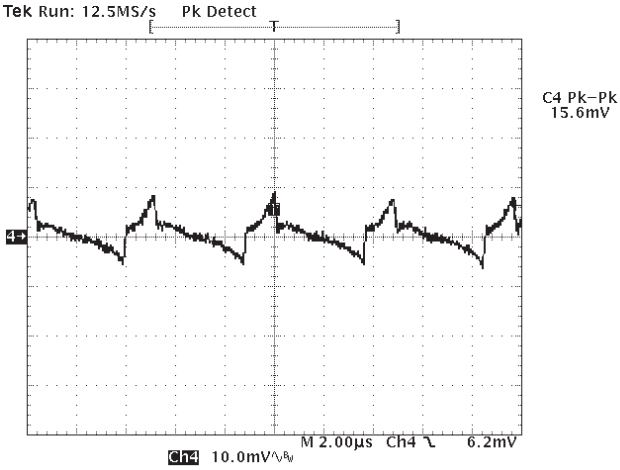

Figure 11: Typical Ripple and Noise

5V Model 1.8V Setpoint

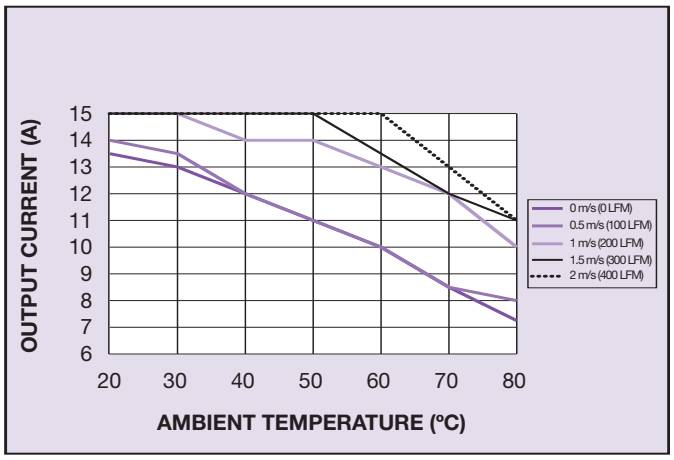

Figure 12: Thermal derating Curve

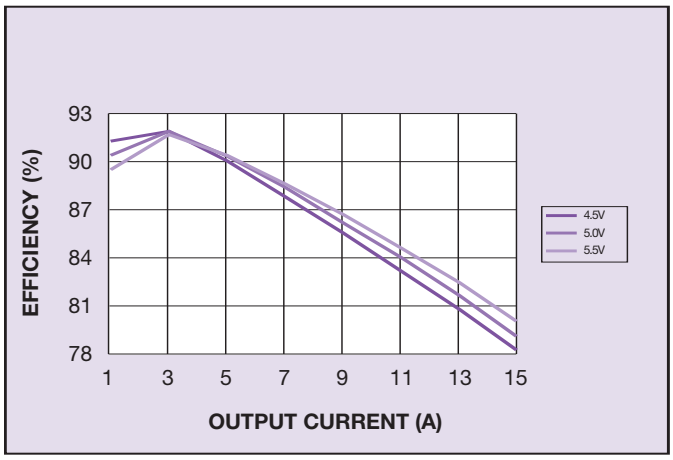

Figure 13: Efficiency when Sourcing

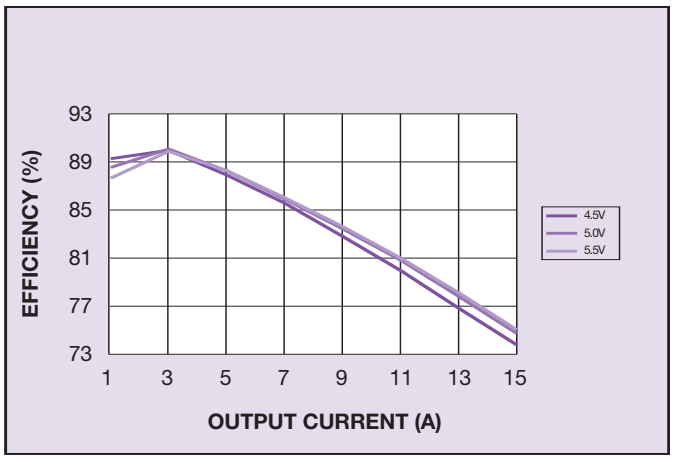

Figure 14: Efficiency when Sinking

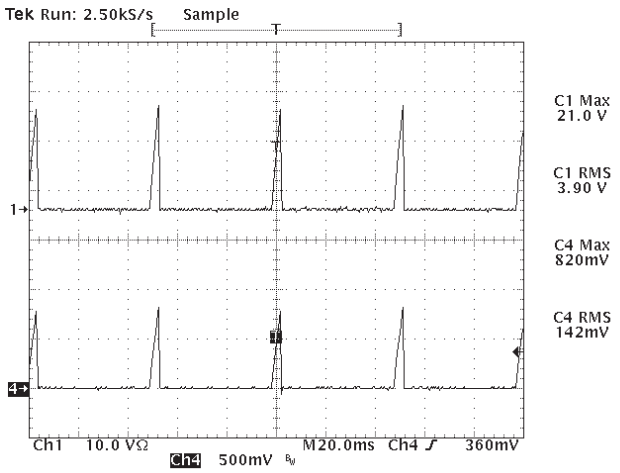

Figure 15: Short Circuit Characteristic (Channel 1: Output Current at 10A/div, Channel 4: Output Voltage)

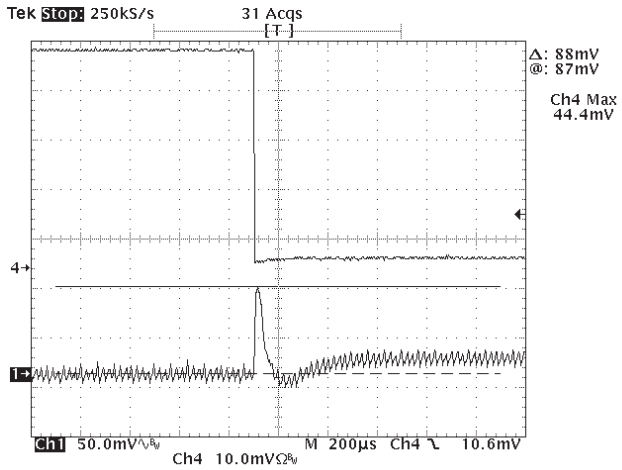

Figure 16: Transient Response 75-50% (Sinking) (Channel 1: Voltage, Channel 4: Current)

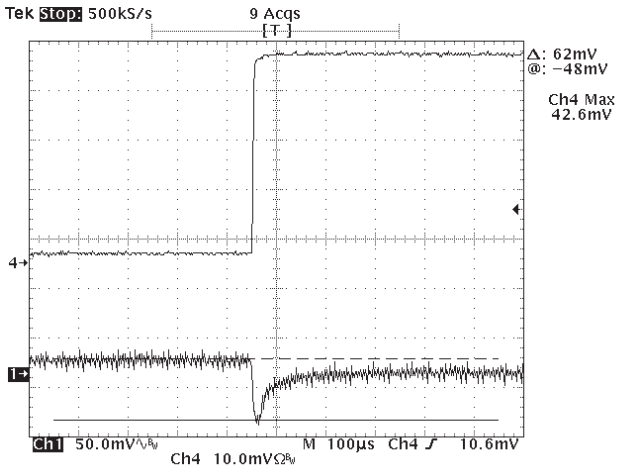

Figure 17: Transient Response 50-75% (Sourcing) (Channel 1: Voltage, Channel 4: Current)

5V Model 1.8V Setpoint

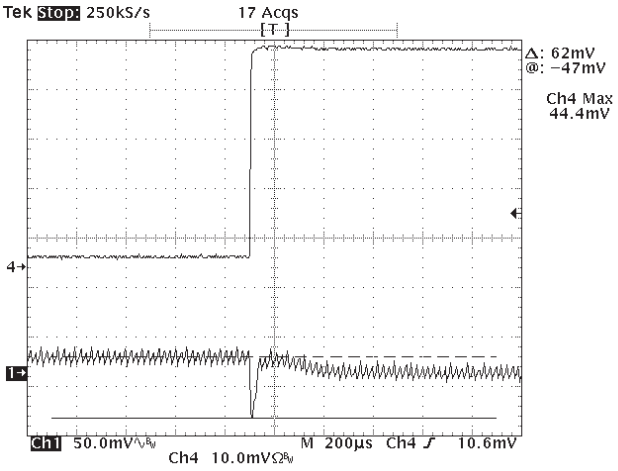

Figure 18: Transient Response 50-75% (Sinking) (Channel 1: Voltage, Channel 4: Current)

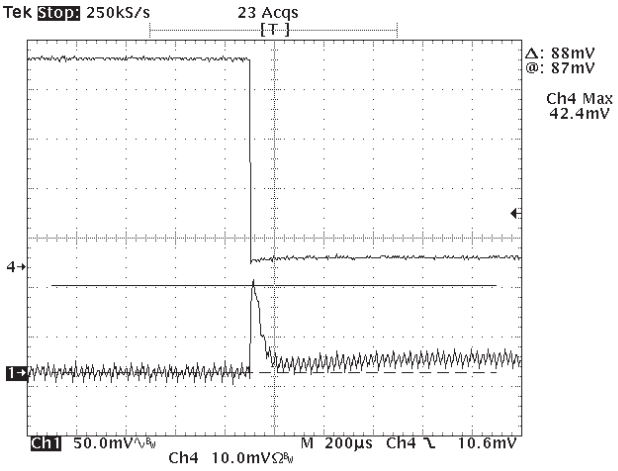

Figure 19: Transient Response 75-50% (Sourcing) (Channel 1: Voltage, Channel 4: Current)

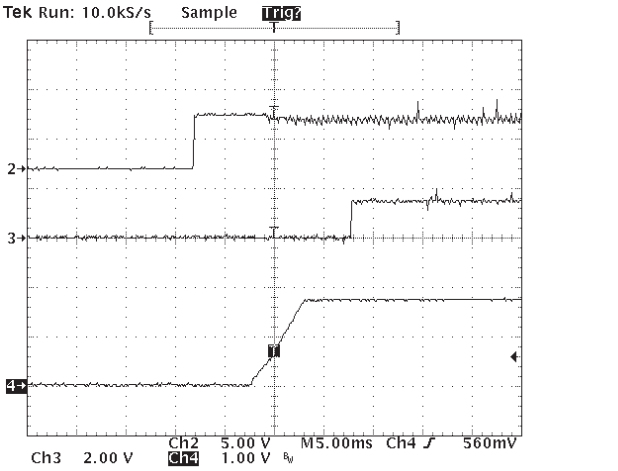

Figure 20: Typical Power Up (Channel 2: DC Input, Channel 3: Power Good Channel 4: Output Voltage)

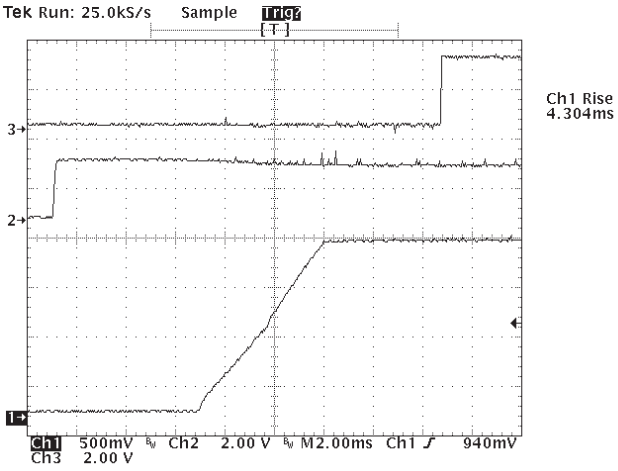

Figure 21: Control On/Off (Channel 1: Output Voltage, Channel 2: Remote ON/OFF, Channel 3: Power Good)

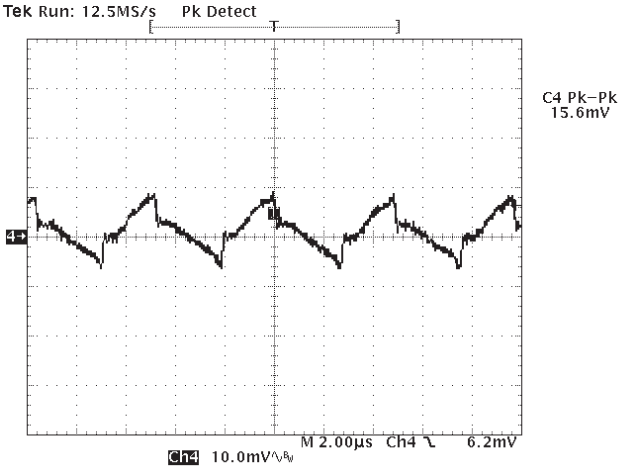

Figure 22: Typical Ripple and Noise

5V Model 3.3V Setpoint

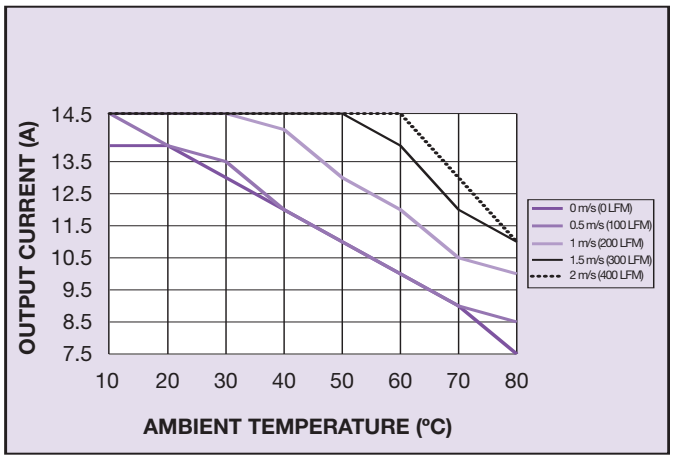

Figure 23: Thermal derating Curve

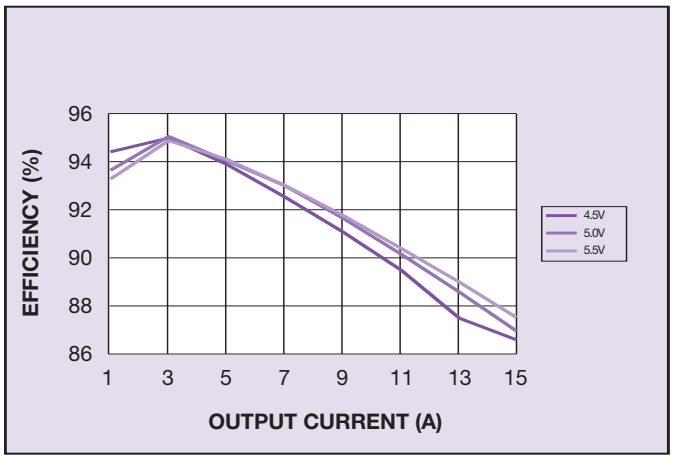

Figure 24: Efficiency when Sourcing

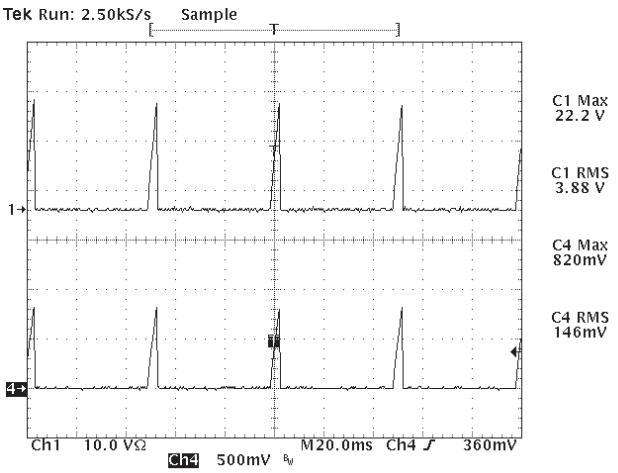

Figure 25: Short Circuit Characteristic (Channel 1: Output Current at 10A/div, Channel 4: Output Voltage)

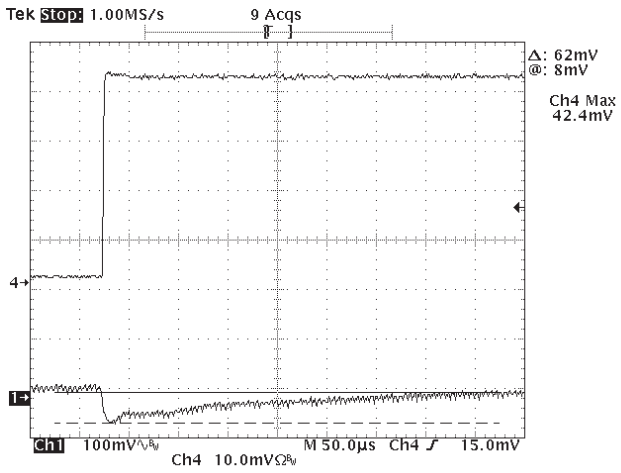

Figure 26: Transient Response 50-75% (Sourcing) (Channel 1: Output Voltage deviation, Channel 4: Current load step at 1A/div)

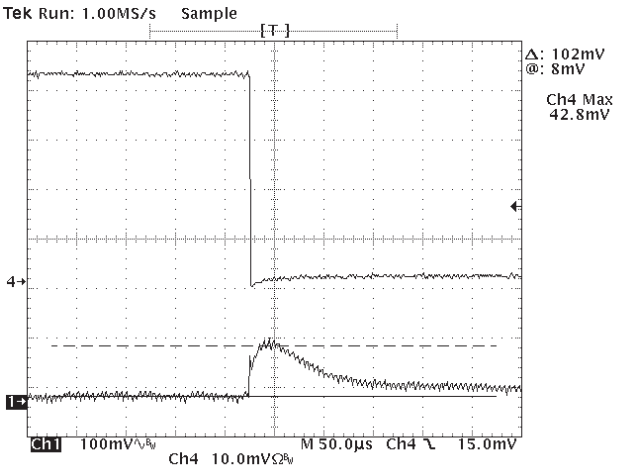

Figure 27: Transient Response 75 - 50% (Sourcing) (Channel 1: Voltage, Channel 4: Current)

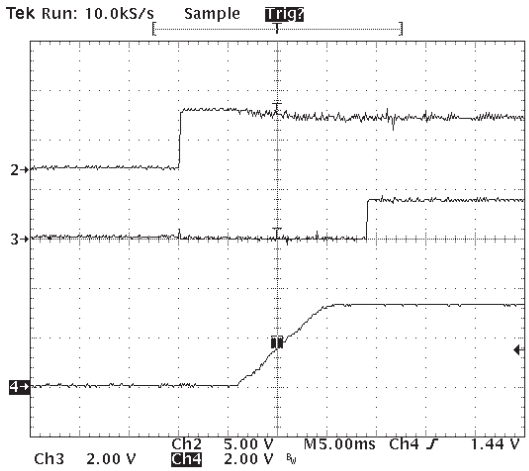

Figure 28: Typical Power Up (Channel 2: DC Input, Channel 3: Power Good Channel 4: Output Voltage)

5V Model 3.3V Setpoint

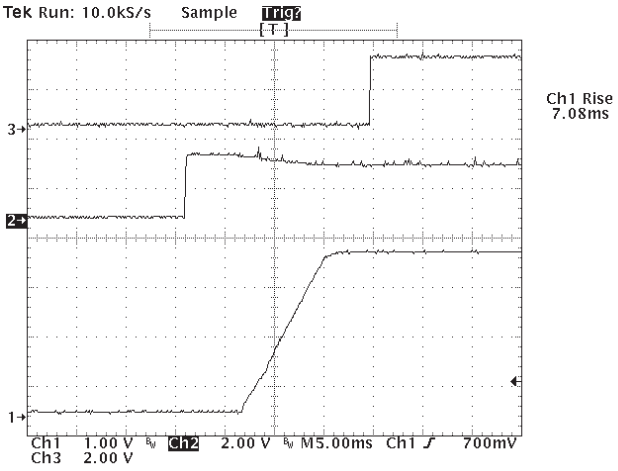

Figure 29: Control On/Off (Channel 1: Output Voltage, Channel 2: Remote ON/OFF, Channel 3: Power Good)

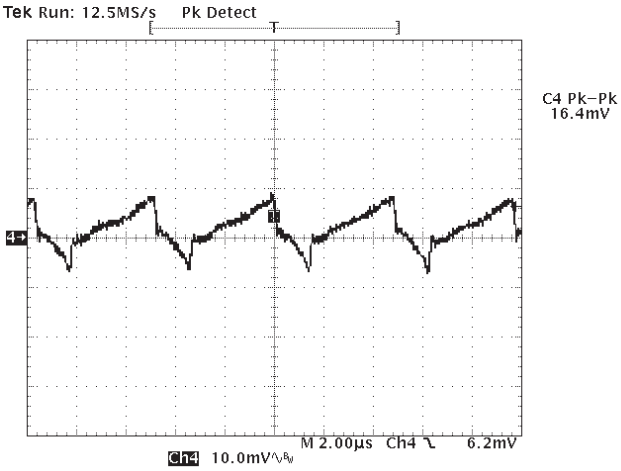

Figure 30: Typical Ripple and Noise

12V Model 0.9V Setpoint

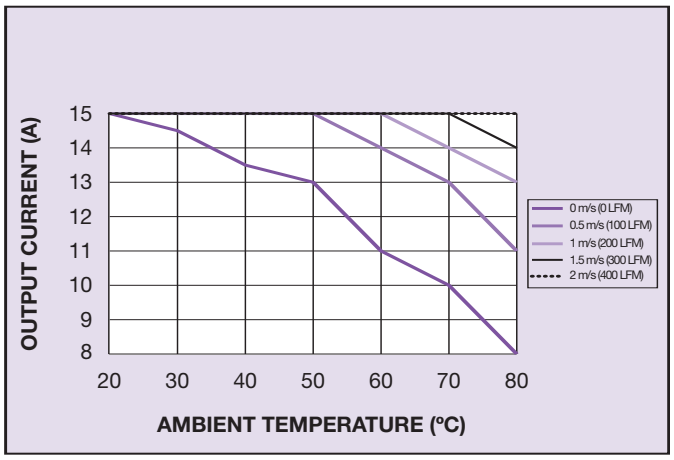

Figure 31: Thermal derating Curve

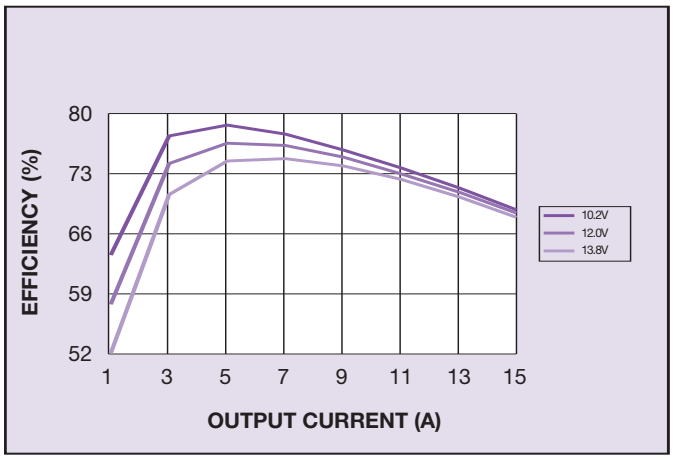

Figure 32: Efficiency when Sourcing

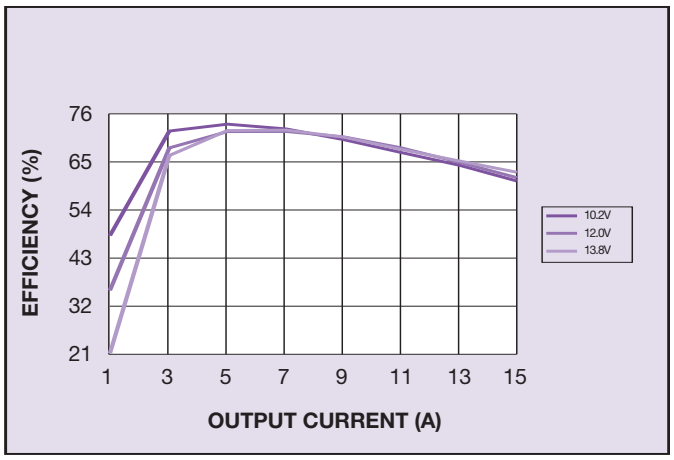

Figure 33: Efficiency when Sinking

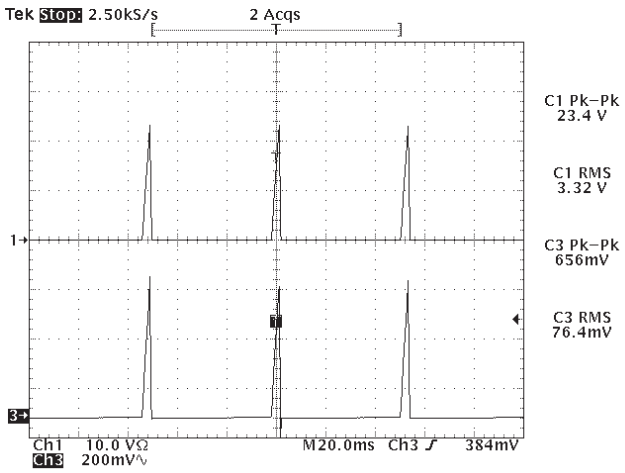

Figure 34: Short Circuit Characteristic (Channel 1: Output Current at 10A/div, Channel 3: Output Voltage)

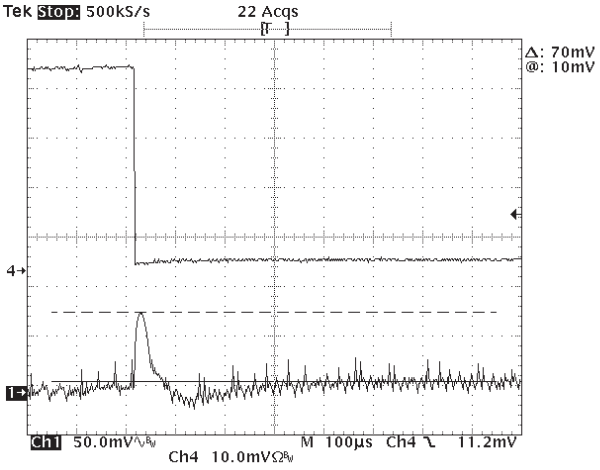

Figure 35: Transient Response 75-50% (Sinking) (Channel 1: Voltage, Channel 4: Current)

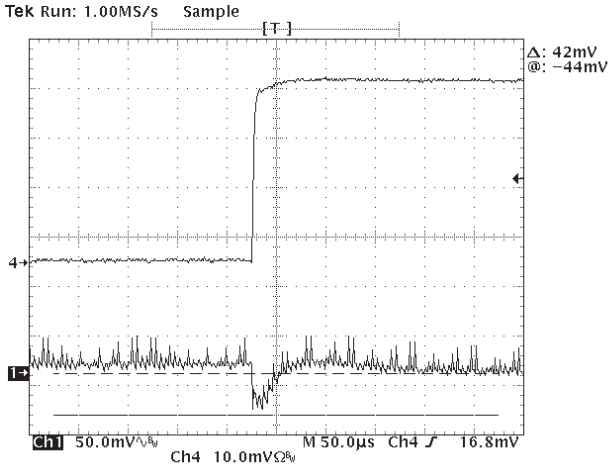

Figure 36: Transient Response 50-75% (Sourcing) (Channel 1: Voltage, Channel 4: Current)

12V Model 0.9V Setpoint

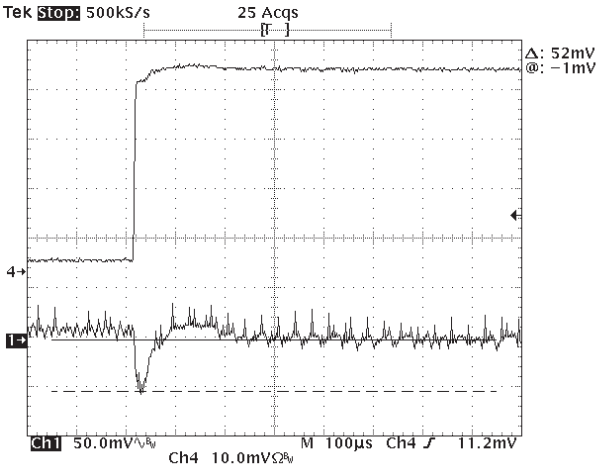

Figure 37: Transient Response 50-75% (Sinking) (Channel 1: Voltage, Channel 4: Current)

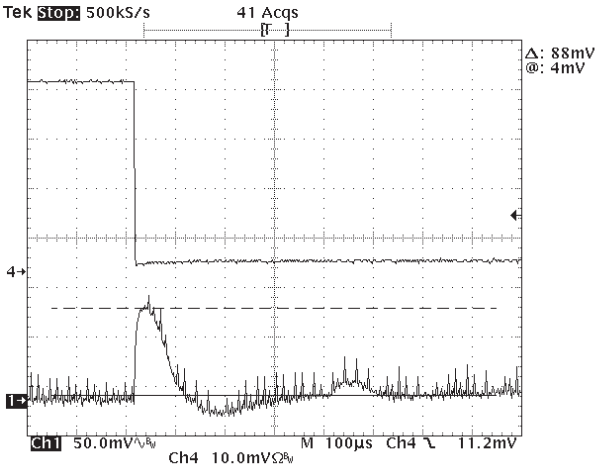

Figure 38: Transient Response 75-50% (Sourcing) (Channel 1: Voltage, Channel 4: Current)

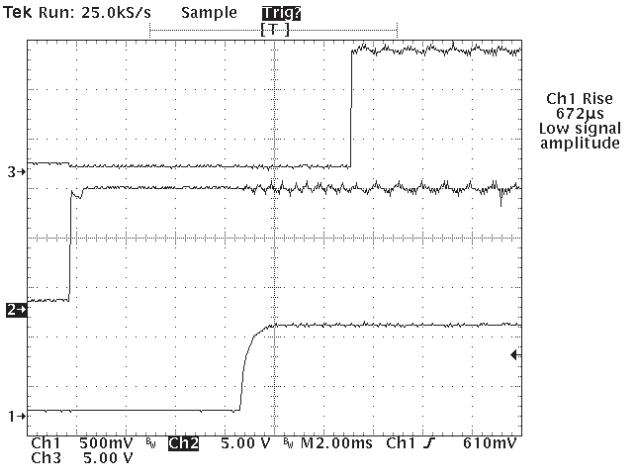

Figure 39: Typical Power Up (Channel 1: Output Voltage, Channel 2: DC Input, Channel 3: Power Good)

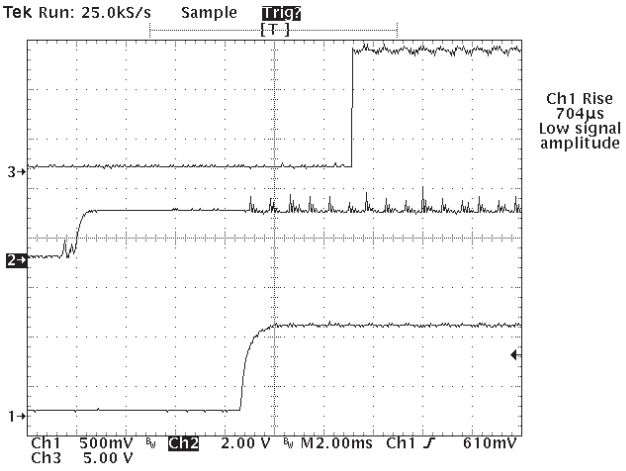

Figure 40: Control On/Off (Channel 1: Output Voltage, Channel 2: Remote ON/OFF, Channel 3: Power Good)

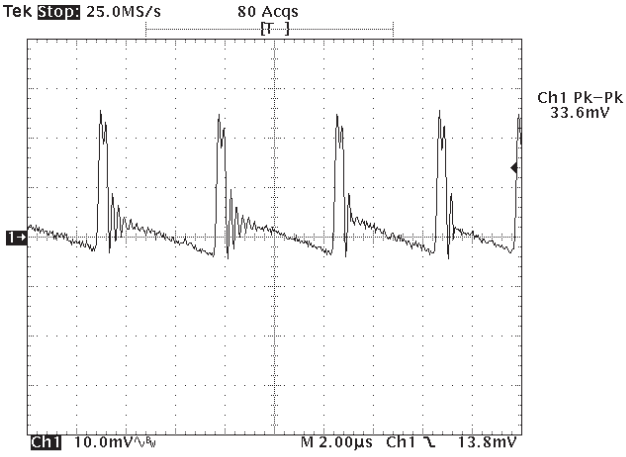

Figure 41: Typical Ripple and Noise

12V Model 1.2V Setpoint

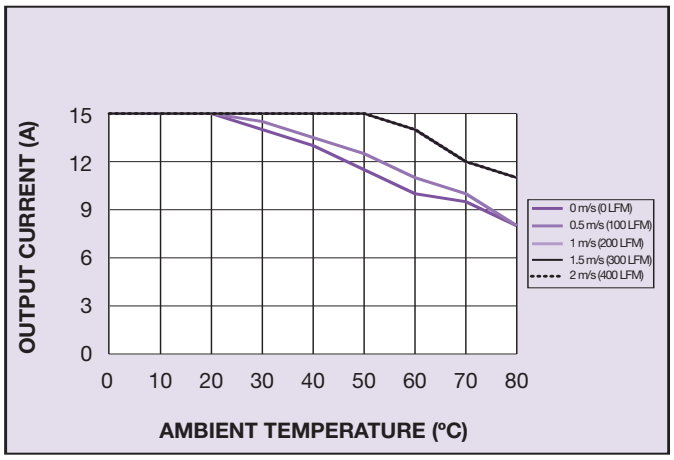

Figure 42: Thermal derating Curve

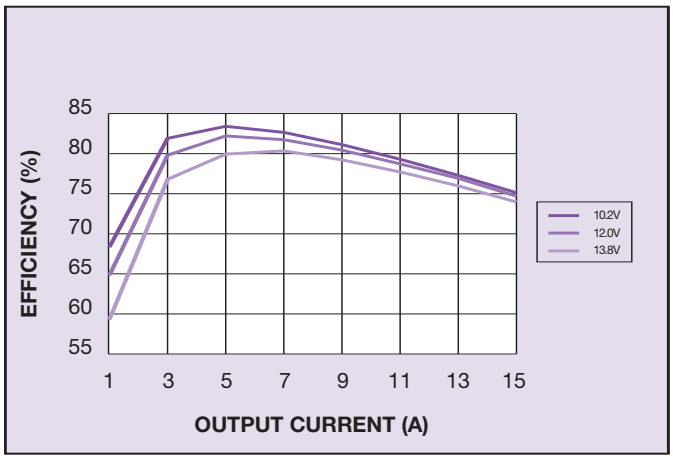

Figure 43: Efficiency when Sourcing

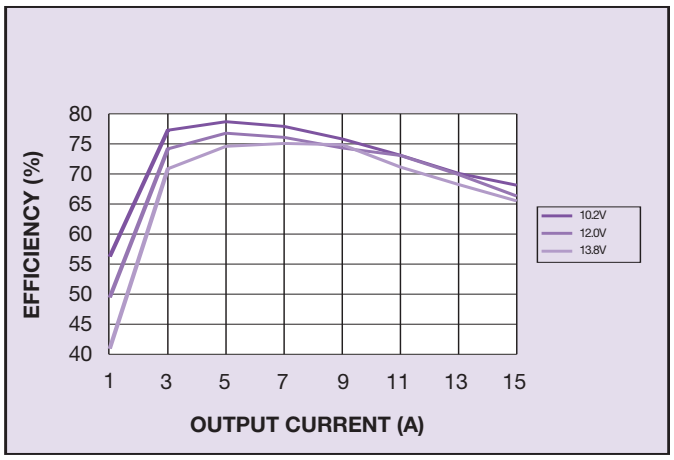

Figure 44: Efficiency when Sinking

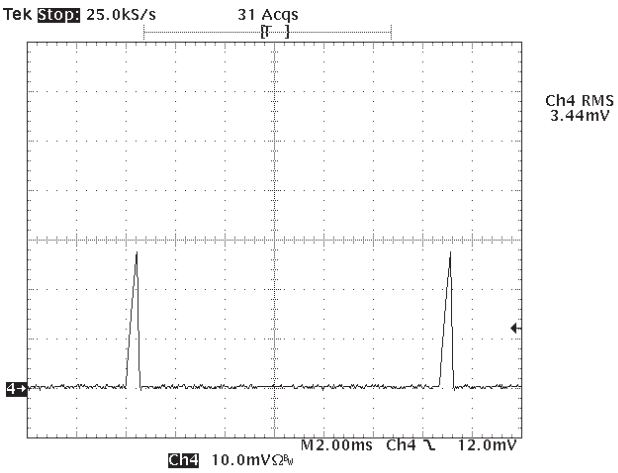

Figure 45: Short Circuit Characteristic (Channel 4: Output Current)

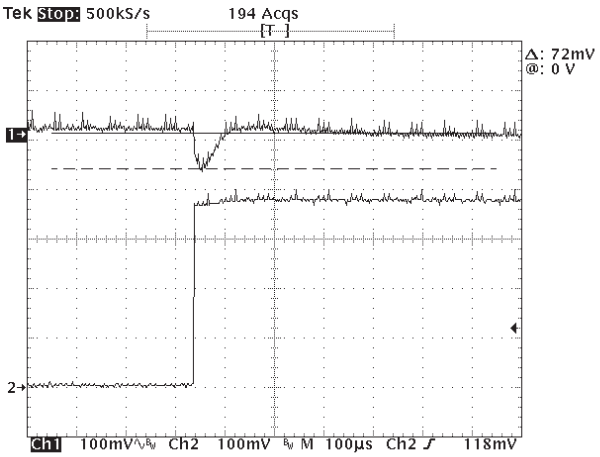

Figure 46: Transient Response 50-75% (Sinking) (Channel 1: Voltage, Channel 2: Current)

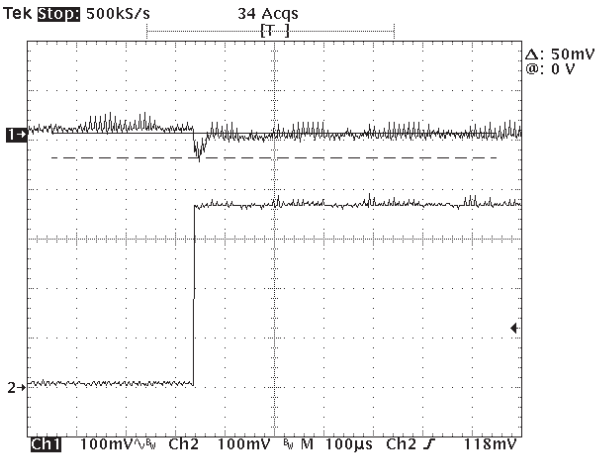

Figure 47: Transient Response 50-75% (Sourcing) (Channel 1: Voltage, Channel 2: Current)

12V Model 1.2V Setpoint

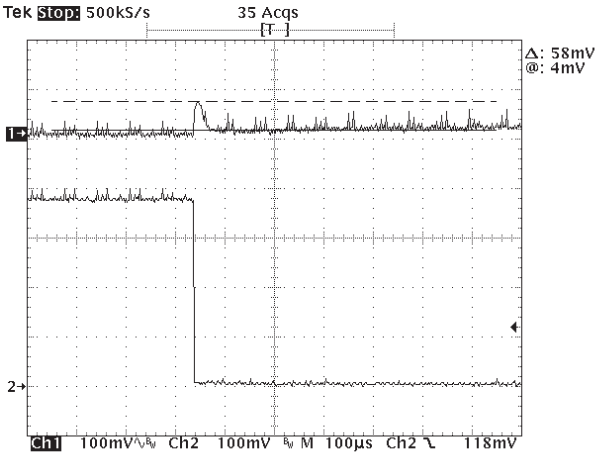

**Figure 48: Transient Response 75-50% (Sinking)
(Channel 1: Voltage, Channel 2: Current)**

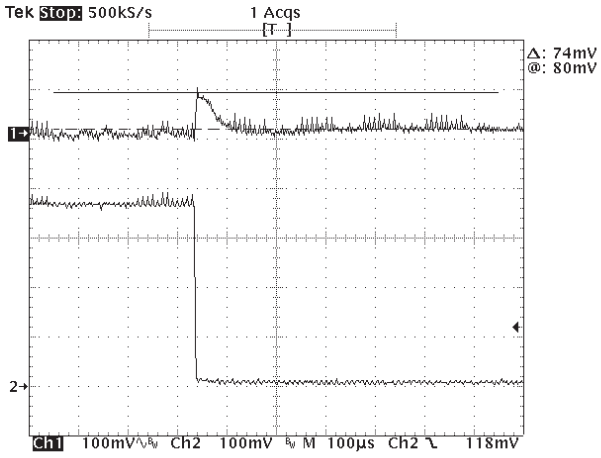

**Figure 49: Transient Response 75-50% (Sourcing)
(Channel 1: Voltage, Channel 2: Current)**

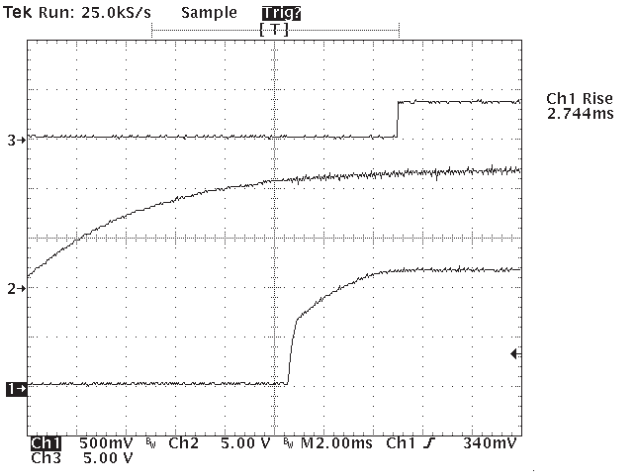

**Figure 50: Typical Power Up
(Channel 1: Output Voltage, Channel 2: DC Input,
Channel 3: Power Good)**

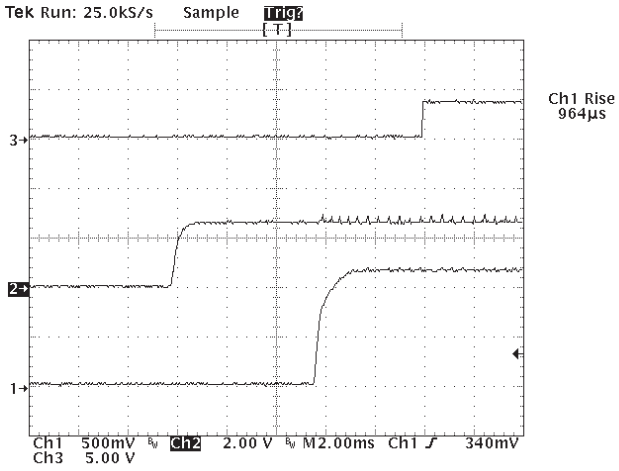

**Figure 51: Control On/Off
(Channel 1: Output Voltage, Channel 2: Remote ON/OFF,
Channel 3: Power Good)**

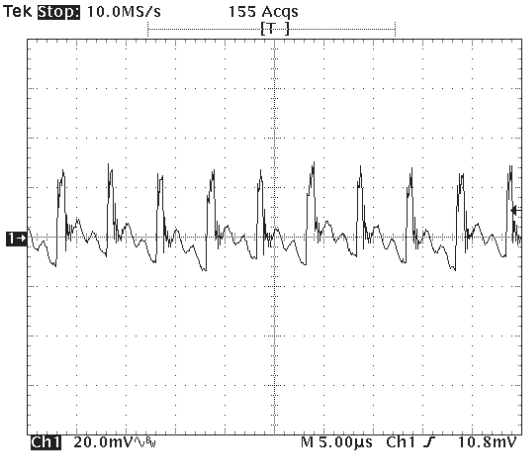

Figure 52: Typical Ripple and Noise

12V Model 2.5V Setpoint

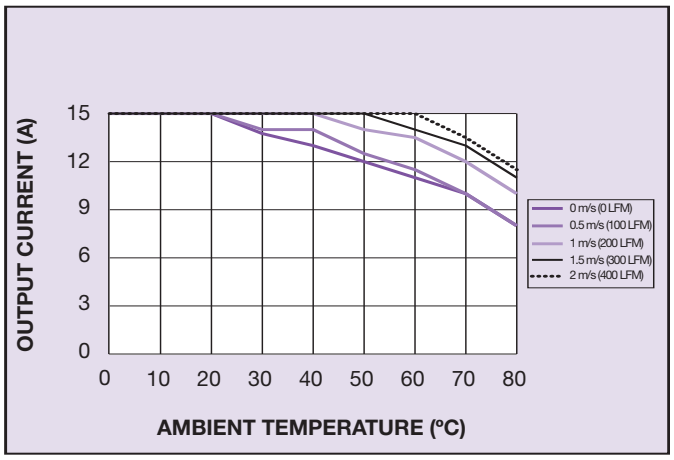

Figure 53: Thermal derating Curve

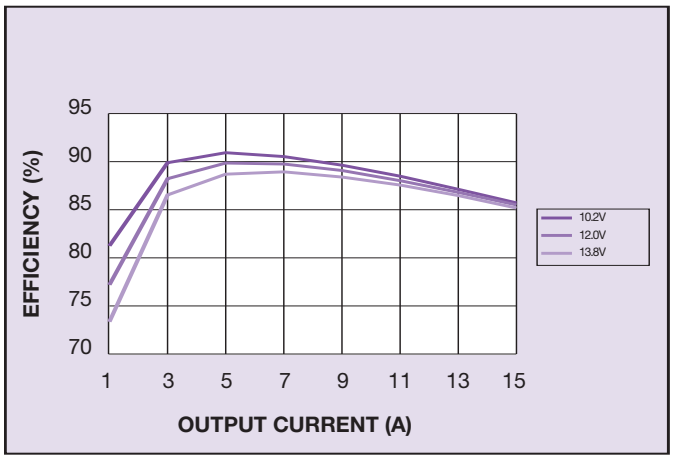

Figure 54: Efficiency when Sourcing

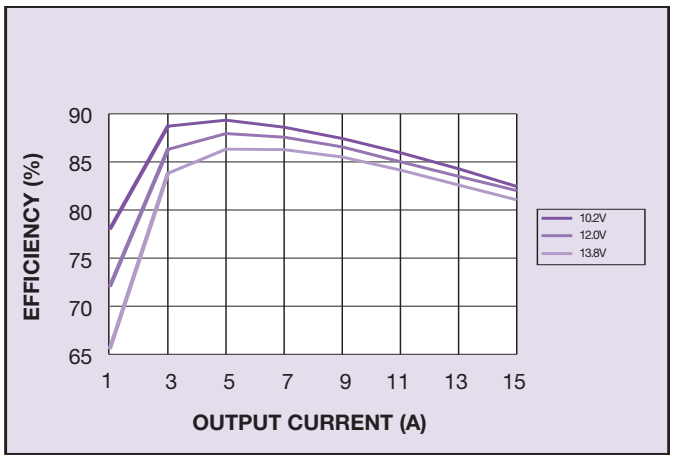

Figure 55: Efficiency when Sinking

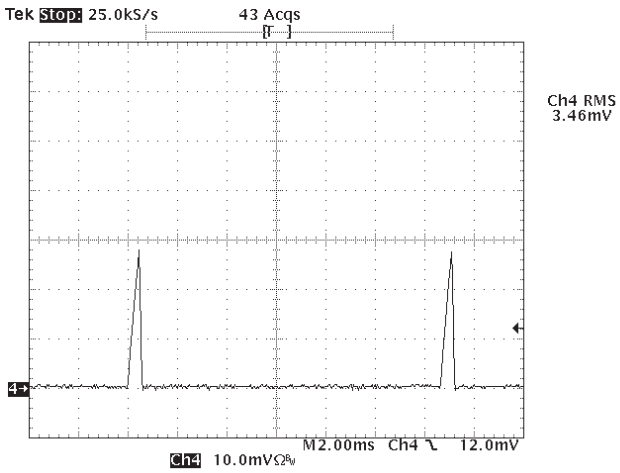

Figure 56: Short Circuit Characteristic (Channel 4: Output Current)

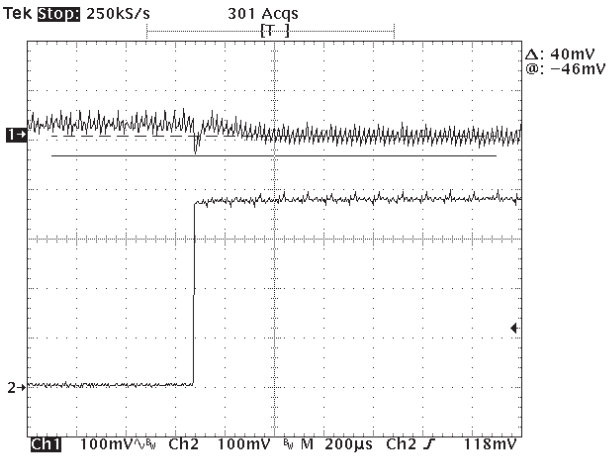

Figure 57: Transient Response 50-75% (Sinking) (Channel 1: Voltage, Channel 2: Current)

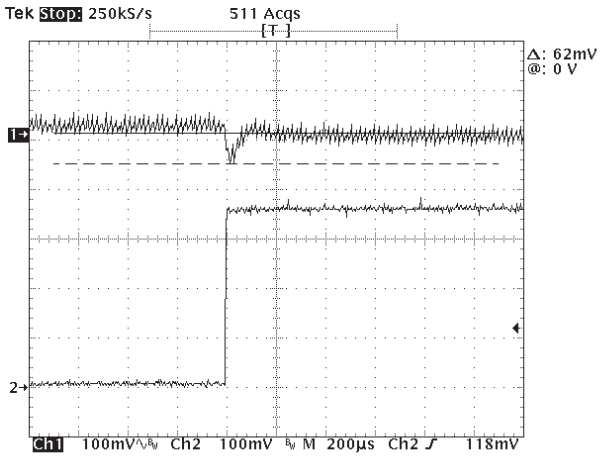

Figure 58: Transient Response 50-75% (Sourcing) (Channel 1: Voltage, Channel 2: Current)

12V Model 2.5V Setpoint

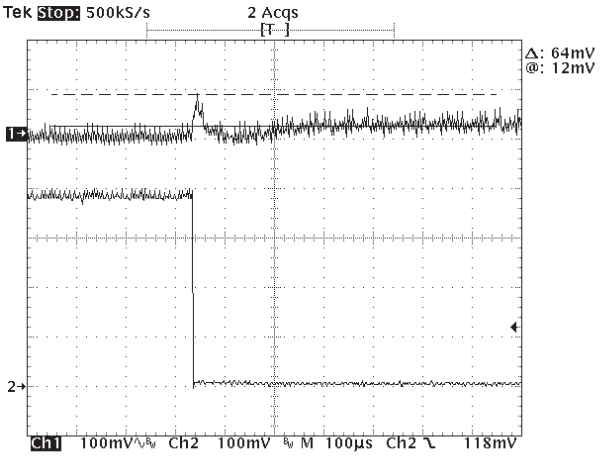

**Figure 59: Transient Response 75 - 50% (Sinking)
(Channel 1: Voltage, Channel 2: Current)**

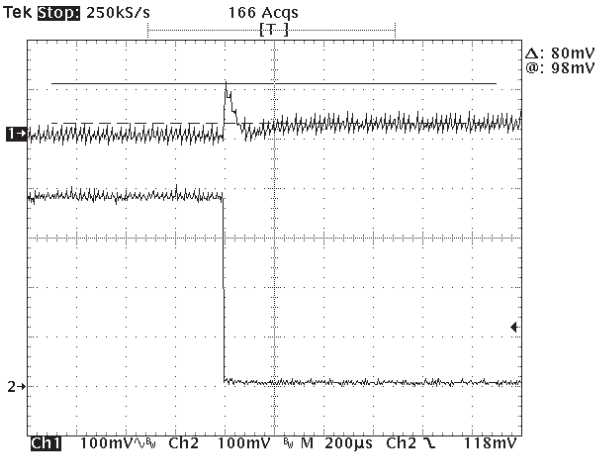

**Figure 60: Transient Response 75 - 50% (Sourcing)
(Channel 1: Voltage, Channel 2: Current)**

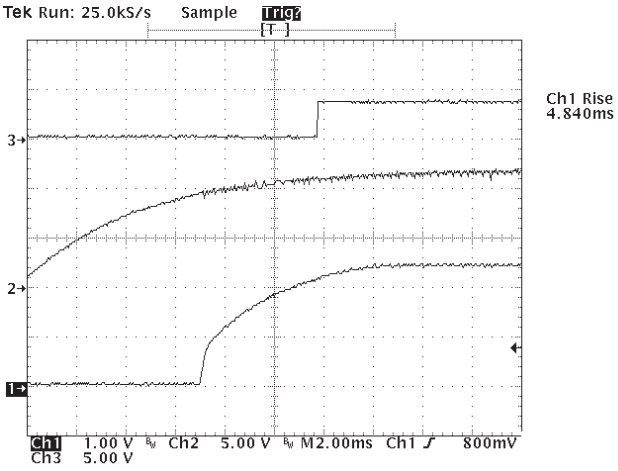

**Figure 61: Typical Power Up
(Channel 1: Output Voltage, Channel 2: DC Input,
Channel 3: Power Good)**

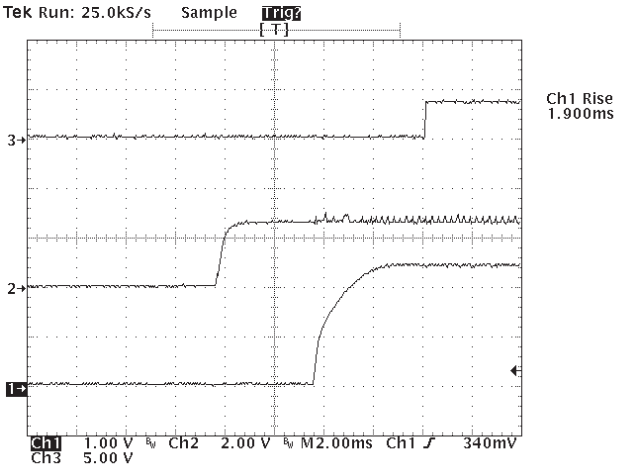

**Figure 62: Control On/Off
(Channel 1: Output Voltage, Channel 2: Remote ON/OFF,
Channel 3: Power Good)**

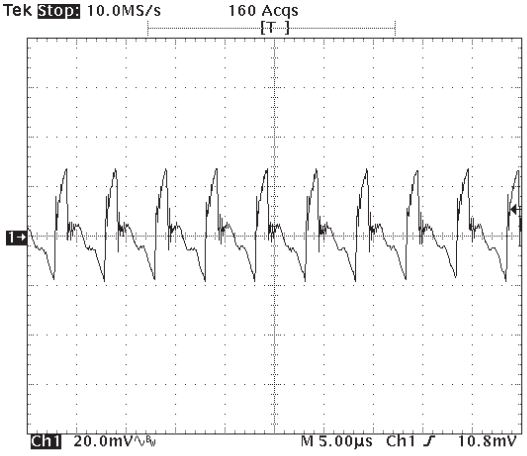

Figure 63: Typical Ripple and Noise

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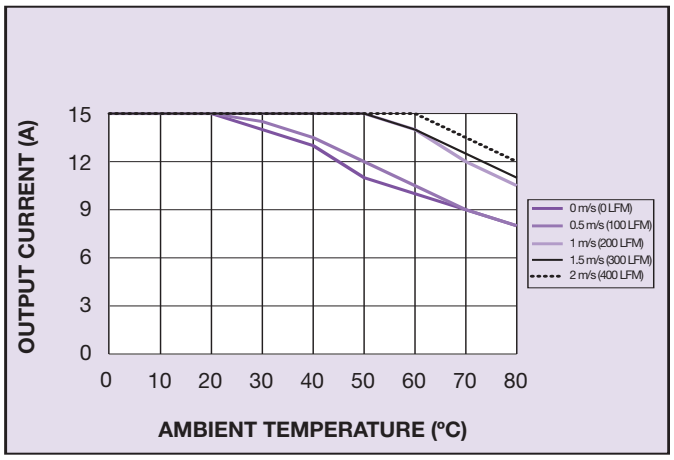

Figure 64: Thermal derating Curve

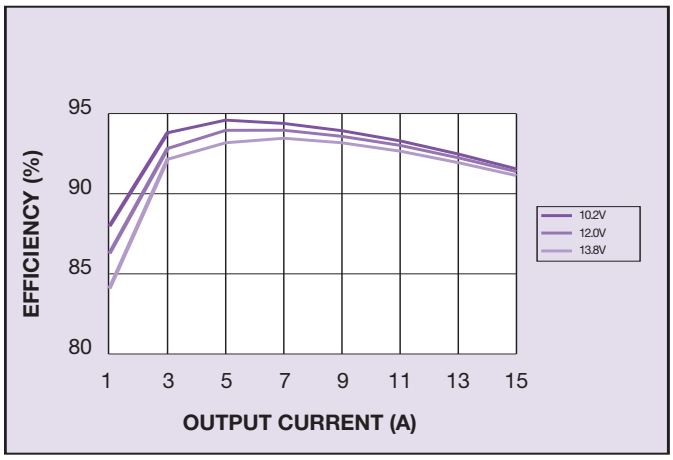

Figure 65: Efficiency when Sourcing

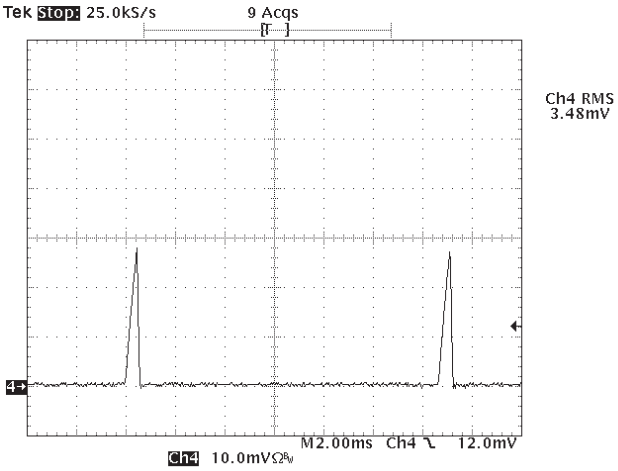

Figure 66: Short Circuit Characteristic (Channel 4: Output Current)

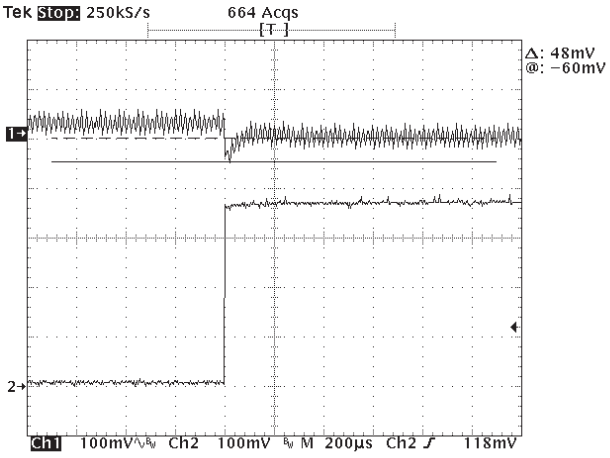

Figure 67: Transient Response 50-75% (Sourcing) (Channel 1: Voltage, Channel 2: Current)

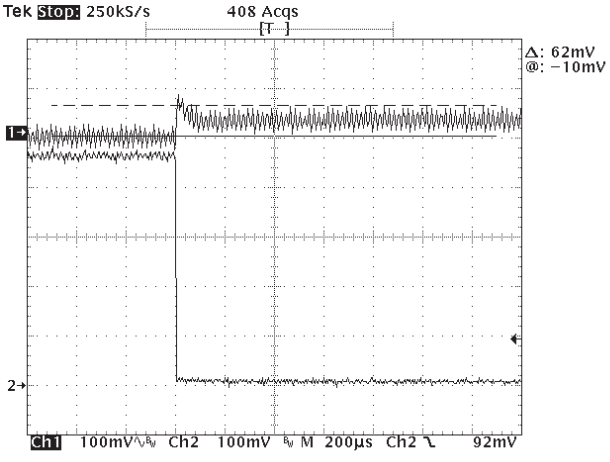

Figure 68: Transient Response 75 - 50% (Sourcing) (Channel 1: Voltage, Channel 2: Current)

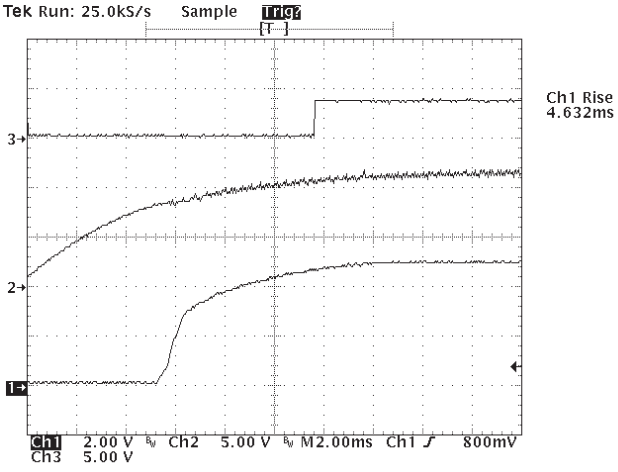

Figure 69: Typical Power Up (channel 1: Output Voltage, Channel 2: DC Input, Channel 3: Power Good)

12V Model 5V Setpoint

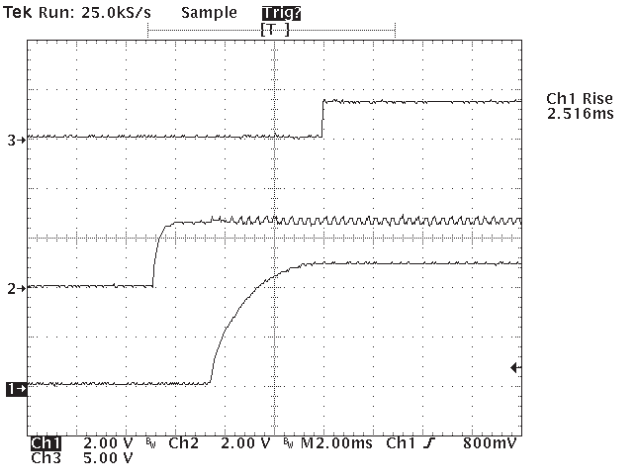

Figure 70: Control On/Off (Channel 1: Output Voltage, Channel 2: Remote ON/OFF, Channel 3: Power Good)

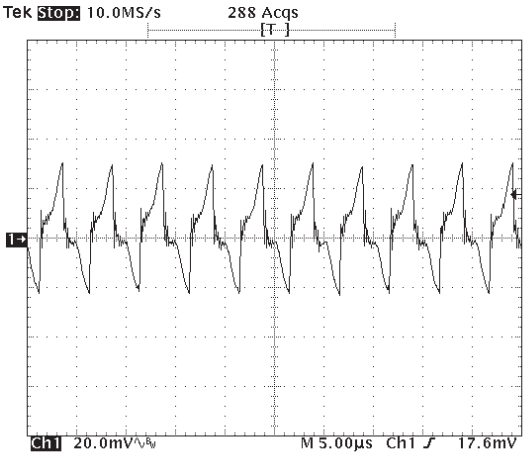

Figure 71: Typical Ripple and Noise

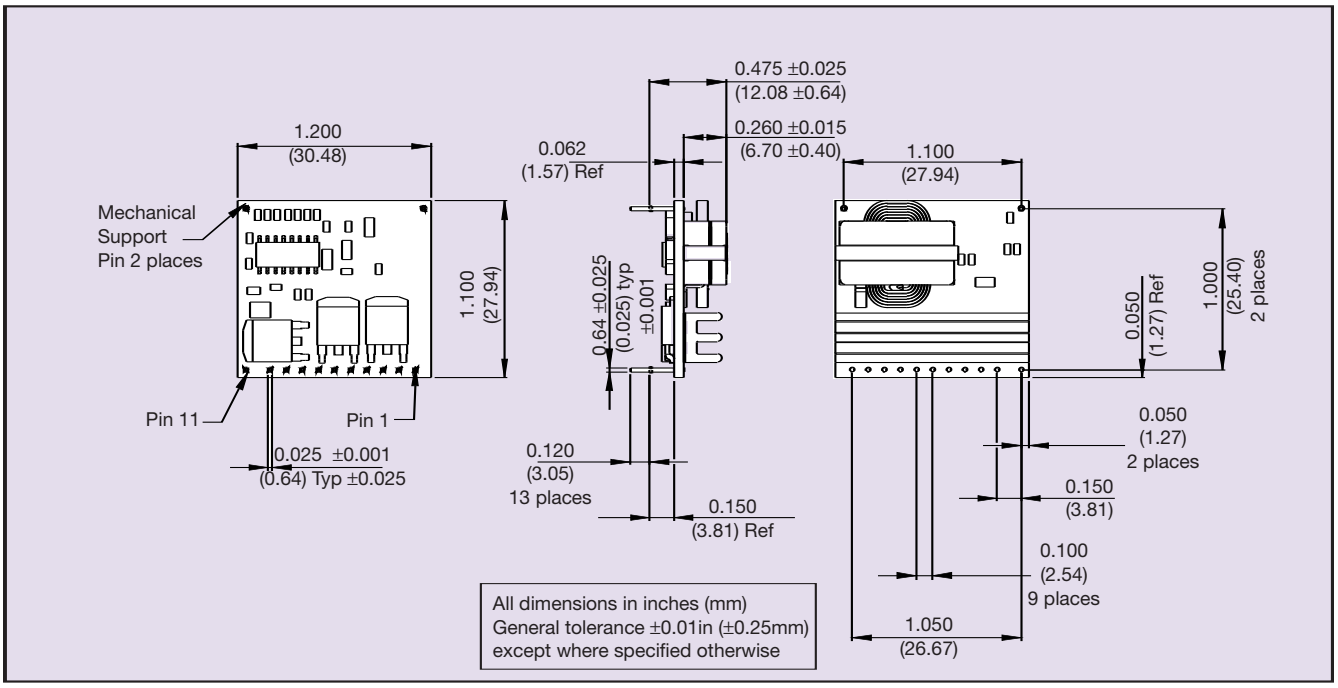

Figure 72: Mechanical Drawing - Horizontal

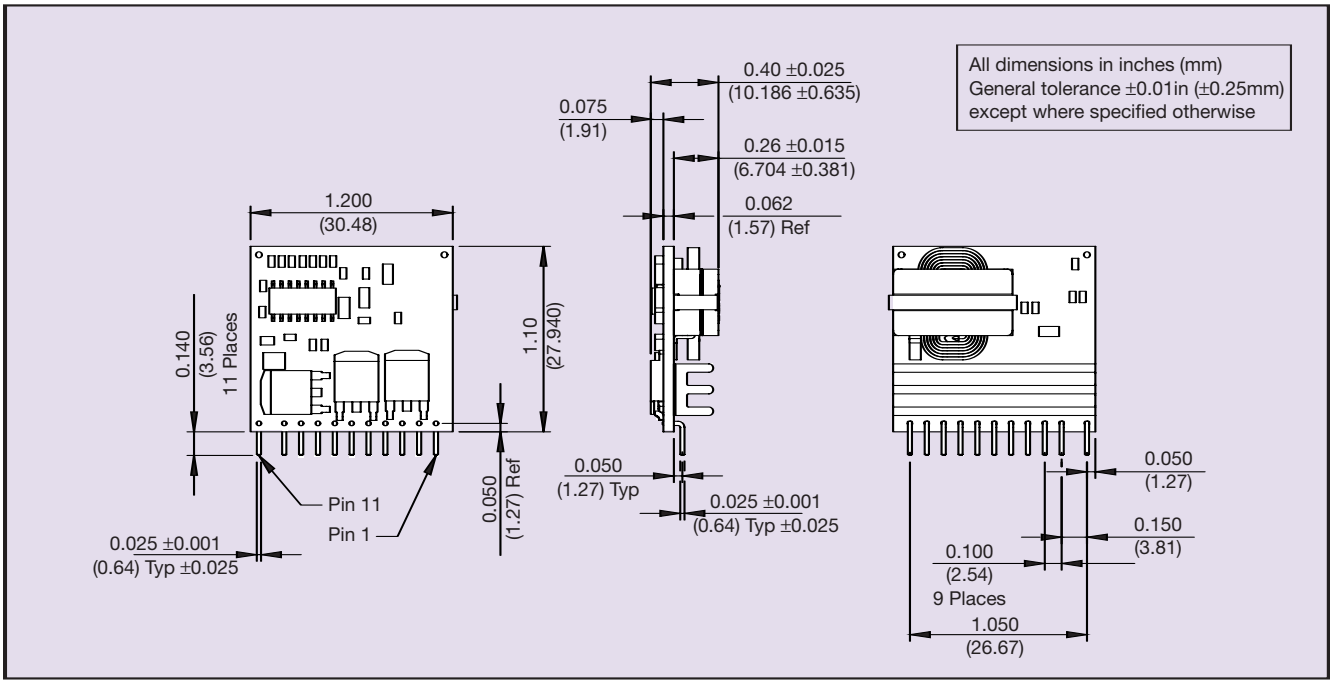

Figure 73: Mechanical Drawing - Vertical

Note 1

Thermal reference point is defined as the highest temperature measured at any one of the specified thermal reference points. See Figure 74: Thermal reference point.

Note 2

The control pin is referenced to Vin-

Note 3

The SIL15C is supplied as standard with active high logic.
Control input pulled low: Unit Disabled
Control input left open: Unit Enabled

Note 4

Thermal reference set up: Unit mounted on an edge card test board 215mm x 115mm. Test board mounted vertically. For test details and recommended set-up see Application Note 131.

Note 5

3-200Hz, sweep at 1/2 octave/min from low to high frequency, and then from high to low. Thirty minute dwell at all resonant points.

CAUTION: Hazardous internal voltages and high temperatures. Ensure that unit is accessible only to trained personnel. The user must provide the recommended fusing in order to comply with safety approvals.

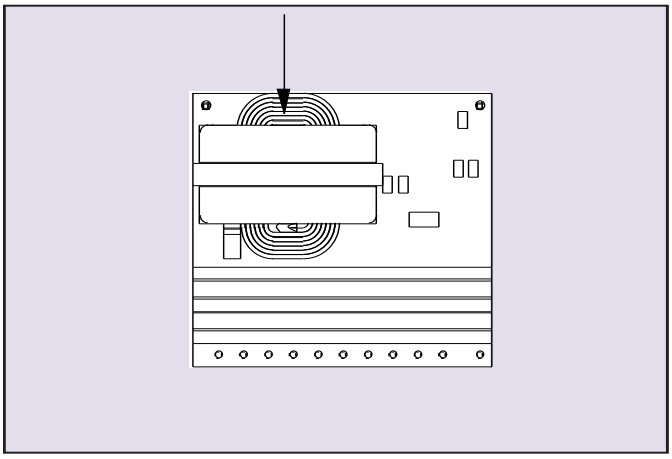

Figure 74: Thermal reference points

Pin Connections

Pin No.	Function
1	Vout
2	Vout
3	Vout
4	Trim
5	Output Enable
6	Power Good
7	Ground
8	Ground
9	Reserved
10	12V Input
11	12V Input

Figure 75: Pinout

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