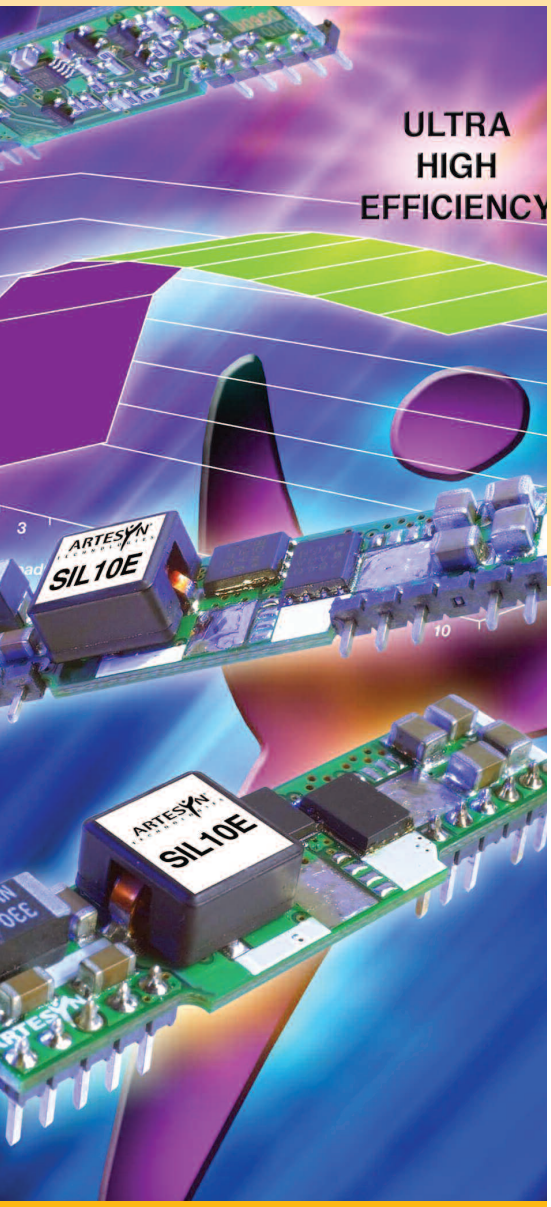
SIL10E SERIES

3.0 Vin to 5.5 Vin Single output



- 10 A Current rating
- Input voltage range: 3.0 Vdc to 5.5 Vdc
- Output voltage range: 0.8 Vdc to 3.63 Vdc
- Ultra high efficiency: 96% @ 5 Vin and 3.3 Vout
- Extremely low internal power dissipation
- Minimal thermal design concerns
- Designed in reliability: MTBF of >7 million hours per Telcordia SR-332
- Ideal solution where board space is at a premium or tighter card pitch is required
- Industry standard footprint and pin out
- Available RoHS compliant

The SIL10E series are non-isolated dc-dc converters packaged in a single-in-line footprint giving designers a cost effective solution for conversion from either a 5 V or 3.3 V input to output voltages of 3.3 Vdc to 0.8 Vdc. The SIL10E offers both fixed outputs and wide a output trim range, which allows maximum design flexibility and a pathway for future upgrades. Local voltage conversion by the SIL10E series from existing 5 V or 3.3 V system voltages eliminates the need for redesign of existing power architectures when voltage requirements change. The SIL10E is designed for applications that include distributed power, workstations, optical network and wireless applications. Implemented using state of the art surface mount technology and automated manufacturing techniques, the SIL10E offers compact size and efficiencies of up to 96%.

[2 YEAR WARRANTY]

ARTESYN TECHNOLOGIES

File Name :lf_sil10e_05.pdf Rev: 22 Dec 2005

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		5.5	V DC	$V_{in}(+) - V_{in}(-)$
Input voltage - peak/surge	V_{surge}	-0.3		6	V DC	2s max, non-repetitive
Operating temperature	T_{op}	-40		100	°C	Measured at thermal reference points, See Note 1 for thermal de-rating
Storage temperature	$T_{storage}$	-40		125	°C	
Output power (0V8S)	$P_{out\ (max)}$	0		8.8	W	
Output power (1V0S)	$P_{out\ (max)}$	0		11.0	W	
Output power (1V2S)	$P_{out\ (max)}$	0		13.2	W	
Output power (1V5S)	$P_{out\ (max)}$	0		16.5	W	
Output power (1V8S)	$P_{out\ (max)}$	0		19.8	W	
Output power (2V0S)	$P_{out\ (max)}$	0		22.0	W	
Output power (2V5S)	Pout (max)	0		27.5	W	
Output power (3V3S)	$P_{out\ (max)}$	0		36.3	W	
Output power (3V3W)	$P_{out\ (max)}$	0		36.3	W	

All specifications are typical at nominal input Vin = 5V, 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	$V_{in\ (oper)}$	3	5	5.5	V DC	Note 2
Input current - no load	I_{in}		70	150	mA DC	V_{in} (min) - V_{in} (max), enabled
Input current - Quiescent	$I_{in\ (off)}$		2		mA DC	Converter disabled
Inrush current (i^2t)	linrush		12		$A^2\mu s$	Complies with ETS300 132 Part 4.7, with recommended LISN
Input ripple current			65		mA rms	Measured with no external filter
Input fuse*				12.5	A	Slowblow/antisurge HRC recommended

* Fuse A - S(T) 1.25 x 0.25 inches
SIBA P/N 70-065-65/12.5ARS

Turn On/Off

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input voltage - turn on	$V_{in\ (on)}$	2.25	2.70	3	V DC	Will regulate @ V_{in} >3V if $V_{out} \leq$ 2V5
Turn on delay - enabled, then power applied	T_{delay} (power)		20		msec	With the enable signal asserted, this is the time from when the input voltage reaches the minimum specified operating voltage until the output voltage is within the total regulation band
Turn on delay - power applied, then enabled	T_{delay} (enable)		20		msec	$V_{in} = V_{in}$ (nom), then enabled. This is the time taken until the output voltage is within the total error band
Rise time	T_{rise}		15		msec	From 10% to 90%; full resistive load, no external capacitance

Signal Electrical Interface

Characteristic - Signal Name	Symbol	Min	Typ	Max	Units	Notes and Conditions
At remote/control ON/OFF pin Open collector or equivalent compatible						**See Notes 2 and 3** See Application Note 134 for Remote ON/OFF details
Control pin open circuit voltage	V_{ih}		0		V	I_{ih} = 0 µA; open circuit voltage
High level input current	I_{ih}			300	µA	Current flowing into control pin when pin is pulled high
High level input voltage	V_{ih}	1.2			Vin	Converter guaranteed OFF when control pin is greater than V_{ih} (min)
Acceptable high level leakage current	I_{ih} (leakage)			-10	µA	Acceptable leakage current from control pin into the open collector driver (neg = from converter)
Low level input voltage	V_{il}	0		0.5	V	Converter guaranteed ON when control pin is less than V_{il} (max)
Low level input current	I_{il}			20	µA	V_{il} = < 0.4 V

Reliability and Service Life

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Mean time between failure	MTBF	680,000			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	7,042,000			Hours	Telcordia SR-332
Mean time between failure	MTBF	TBA			Hours	Demonstrated. This entry will be periodically updated as the number of test hours increase

Other Specifications

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Switching frequency	F_{sw}		300		kHz	Fixed frequency
Weight			5		g	

EMC
Electromagnetic Compatibility

Phenomenon	Port	Standard	Test level	Criteria	Notes and conditions
Immunity:					
ESD	Enclosure	EN61000-4-2	6kV contact 8kV air	NP	As per ETS 300 386-1 table 5

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.

Referenced ETSI standards:

ETS 300 386-1 table 5 (1997): Public telecommunication network equipment, EMC requirements
ETS 300 132-2 (1996): Power supply interface at the input to telecommunication equipment: Part 2 operated by direct current (DC)
ETR 283 (1997): Transient voltages at interface A on telecommunication direct current (DC) power distributions

Safety Agency Approvals

Characteristic	
UL	E174104
TÜV	B02 12 38572 035

Material Ratings

Characteristic - Signal Name	Notes and Conditions
Flammability rating	UL94V-0

Model Numbers

Model Number	Input Voltage	Output Voltage	Output Current (Max.)	Typical Efficiency	Max. Load Regulation
SIL10E-05S0V8-VJ	3.0 - 5.5VDC	0.8V	10A	83%	1.5%
SIL10E-05S0V8-HJ	3.0 - 5.5VDC	0.8V	10A	83%	1.5%
SIL10E-05S1V0-VJ	3.0 - 5.5VDC	1.0V	10A	86%	1.5%
SIL10E-05S1V0-HJ	3.0 - 5.5VDC	1.0V	10A	86%	1.5%
SIL10E-05S1V2-VJ	3.0 - 5.5VDC	1.2V	10A	88%	1.0%
SIL10E-05S1V2-HJ	3.0 - 5.5VDC	1.2V	10A	88%	1.0%
SIL10E-05S1V5-VJ	3.0 - 5.5VDC	1.5V	10A	90%	1.0%
SIL10E-05S1V5-HJ	3.0 - 5.5VDC	1.5V	10A	90%	1.0%
SIL10E-05S1V8-VJ	3.0 - 5.5VDC	1.8V	10A	92%	1.0%
SIL10E-05S1V8-HJ	3.0 - 5.5VDC	1.8V	10A	92%	1.0%
SIL10E-05S2V0-VJ	3.0 - 5.5VDC	2.0V	10A	93%	1.0%
SIL10E-05S2V0-HJ	3.0 - 5.5VDC	2.0V	10A	93%	1.0%
SIL10E-05S2V5-VJ	3.0 - 5.5VDC	2.5V	10A	94%	1.0%
SIL10E-05S2V5-HJ	3.0 - 5.5VDC	2.5V	10A	94%	1.0%
SIL10E-05S3V3-VJ	4.5 - 5.5VDC	3.3V	10A	95%	1.0%
SIL10E-05S3V3-HJ	4.5 - 5.5VDC	3.3V	10A	95%	1.0%
SIL10E-05W3V3-VJ	4.5 - 5.5VDC	3.3V	10A	95%	1.0%
SIL10E-05W3V3-HJ	4.5 - 5.5VDC	3.3V	10A	95%	1.0%

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.

0V8S Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	I_{in}		1.9	3.5	A DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (max.); $V_o = V_o$ (nom)
Reflected ripple current	I_{in} (ripple)		65 230		mA rms mA pk-pk	$I_{out} = I_{out}$ (max.), measured with no external filter
Input capacitance - internal filter	C_{input}		18.8		µF	Internal to converter
Input capacitance - external bypass	C_{bypass}	100			µF	Recommended customer added capacitance

0V8S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vo (nom)	0.778	0.8	0.822	V DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (nom)
Total regulation band	V_o	0.76		0.834	V DC	For all line, static load and temperature until end of life
Line regulation				1	%	$I_{out} = I_{out}$ (nom); V_{in} (min) to V_{in} (max)
Load regulation				1.5	%	$V_{in} = V_{in}$ (nom); I_{out} (min) to I_{out} (max)
Output current continuous	I_{out}	0		10	A DC	
Output current - short circuit	I_{sc}			20	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 134 for measurement set-up details

0V8S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		50		mV	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec. Measurement taken with no external capacitors
Load transient response - recovery	$T_{recovery}$		50		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load. Measurement taken with no external capacitors
External load capacitance	C_{ext}	0		10,000	µF	

0V8S Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Allowable output voltage				10 10	% %	Trim up (% of V_o nom). Trim down (% of V_o nom) See Application Note 134 for details of trim equations and trim curves
Remote sense voltage				10	%	If Trim up is invoked de-rate power accordingly (remote sense + trim ≤ 10%)

0V8S Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	82	83		%	I_{out} = 100% I_{out} (max), V_{in} = V_{in} (nom)
Efficiency	η	83	84		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

1V0S Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	I_{in}		2.3	4	A DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (max.); $V_o = V_o$ (nom)
Reflected ripple current	I_{in} (ripple)		65 230		mA rms mA pk-pk	$I_{out} = I_{out}$ (max.), measured with no external filter
Input capacitance - internal filter	C_{input}		18.8		µF	Internal to converter
Input capacitance - external bypass	C_{bypass}	100			µF	Recommended customer added capacitance

1V0S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vo (nom)	0.97	1.0	1.03	V DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (nom)
Total regulation band	V_o	0.953		1.047	V DC	For all line, static load and temperature until end of life
Line regulation				1	%	$I_{out} = I_{out}$ (nom); V_{in} (min) to V_{in} (max)
Load regulation				1.5	%	$V_{in} = V_{in}$ (nom); I_{out} (min) to I_{out} (max)
Output current continuous	I_{out}	0		10	A DC	
Output current - short circuit	I_{sc}			20	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 134 for measurement set-up details

1V0S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		50		mV	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec. Measurement taken with no external capacitors
Load transient response - recovery	$T_{recovery}$		50		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load. Measurement taken with no external capacitors
External load capacitance	C_{ext}	0		10,000	µF	

1V0S Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Allowable output voltage				10	%	Trim up (% of V_o nom).
		10			%	Trim down (% of V_o nom) See Application Note 134 for details of trim equations and trim curves
Remote sense voltage				10	%	If Trim up is invoked de-rate power accordingly (remote sense + trim ≤ 10%)

1V0S Model

Efficiency

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

1V2S Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	I_{in}		2.7	4	A DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (max.); $V_o = V_o$ (nom)
Reflected ripple current	I_{in} (ripple)		65 230		mA rms mA pk-pk	$I_{out} = I_{out}$ (max.), measured with no external filter
Input capacitance - internal filter	C_{input}		18.8		µF	Internal to converter
Input capacitance - external bypass	C_{bypass}	100			µF	Recommended customer added capacitance

1V2S Model

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vo (nom)	1.17	1.2	1.34	V DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (nom)
Total regulation band	V_o	1.143		1.256	V DC	For all line, static load and temperature until end of life
Line regulation				1	%	$I_{out} = I_{out}$ (nom); V_{in} (min) to V_{in} (max)
Load regulation				1	%	$V_{in} = V_{in}$ (nom); I_{out} (min) to I_{out} (max)
Output current continuous	I_{out}	0		10	A DC	
Output current - short circuit	I_{sc}			20	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 134 for measurement set-up details

1V2S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		50		mV	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec. Measurement taken with no external capacitors
Load transient response - recovery	$T_{recovery}$		50		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load. Measurement taken with no external capacitors
External load capacitance	C_{ext}	0		10,000	µF	

1V2S Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Allowable output voltage				10	%	Trim up (% of V_o nom).
		10			%	Trim down (% of V_o nom) See Application Note 134 for details of trim equations and trim curves
Remote sense voltage				10	%	If Trim up is invoked de-rate power accordingly (remote sense + trim ≤ 10%)

1V2S Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	87	88		%	I_{out} = 100% I_{out} (max), V_{in} = V_{in} (nom)
Efficiency	η	88	89		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

1V5S Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	I_{in}		3.3	5	A DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (max.); $V_o = V_o$ (nom)
Reflected ripple current	I_{in} (ripple)		65 230		mA rms mA pk-pk	$I_{out} = I_{out}$ (max.), measured with no external filter
Input capacitance - internal filter	C_{input}		18.8		µF	Internal to converter
Input capacitance - external bypass	C_{bypass}	100			µF	Recommended customer added capacitance

1V5S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vo (nom)	1.46	1.5	1.54	V DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (nom)
Total regulation band	V_o	1.43		1.57	V DC	For all line, static load and temperature until end of life
Line regulation				1	%	$I_{out} = I_{out}$ (nom); V_{in} (min) to V_{in} (max)
Load regulation				1	%	$V_{in} = V_{in}$ (nom); I_{out} (min) to I_{out} (max)
Output current continuous	I_{out}	0		10	A DC	
Output current - short circuit	I_{sc}			20	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 134 for measurement set-up details

1V5S Model

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		50		mV	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec. Measurement taken with no external capacitors
Load transient response - recovery	$T_{recovery}$		50		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load. Measurement taken with no external capacitors
External load capacitance	C_{ext}	0		10,000	µF	

1V5S Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Allowable output voltage				10	%	Trim up (% of V_o nom).
		10			%	Trim down (% of V_o nom) See Application Note 134 for details of trim equations and trim curves
Remote sense voltage				10	%	If Trim up is invoked de-rate power accordingly (remote sense + trim ≤ 10%)

1V5S Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	89	90		%	I_{out} = 100% I_{out} (max), V_{in} = V_{in} (nom)
Efficiency	η	90	91		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

1V8S Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	I_{in}		3.9	5	A DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (max.); $V_o = V_o$ (nom)
Reflected ripple current	I_{in} (ripple)		65 230		mA rms mA pk-pk	$I_{out} = I_{out}$ (max.), measured with no external filter
Input capacitance - internal filter	C_{input}		18.8		µF	Internal to converter
Input capacitance - external bypass	C_{bypass}	100			µF	Recommended customer added capacitance

1V8S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vo (nom)	1.75	1.8	1.85	V DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (nom)
Total regulation band	V_o	1.71		1.89	V DC	For all line, static load and temperature until end of life
Line regulation				1	%	$I_{out} = I_{out}$ (nom); V_{in} (min) to V_{in} (max)
Load regulation				1	%	$V_{in} = V_{in}$ (nom); I_{out} (min) to I_{out} (max)
Output current continuous	I_{out}	0		10	A DC	
Output current - short circuit	I_{sc}			20	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 134 for measurement set-up details

1V8S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		50		mV	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec. Measurement taken with no external capacitors
Load transient response - recovery	$T_{recovery}$		50		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load. Measurement taken with no external capacitors
External load capacitance	C_{ext}	0		10,000	µF	

1V8S Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Allowable output voltage				10	%	Trim up (% of V_o nom).
		10			%	Trim down (% of V_o nom) See Application Note 134 for details of trim equations and trim curves
Remote sense voltage				10	%	If Trim up is invoked de-rate power accordingly (remote sense + trim ≤ 10%)

1V8S Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	91	92		%	I_{out} = 100% I_{out} (max), V_{in} = V_{in} (nom)
Efficiency	η	92	93		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

2V0S Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	I_{in}		4.3	5	A DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (max.); $V_o = V_o$ (nom)
Reflected ripple current	I_{in} (ripple)		65 230		mA rms mA pk-pk	$I_{out} = I_{out}$ (max.), measured with no external filter
Input capacitance - internal filter	C_{input}		18.8		µF	Internal to converter
Input capacitance - external bypass	C_{bypass}	100			µF	Recommended customer added capacitance

2V0S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vo (nom)	1.946	2.0	2.054	V DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (nom)
Total regulation band	V_o	1.906		2.094	V DC	For all line, static load and temperature until end of life
Line regulation				1	%	$I_{out} = I_{out}$ (nom); V_{in} (min) to V_{in} (max)
Load regulation				1	%	$V_{in} = V_{in}$ (nom); I_{out} (min) to I_{out} (max)
Output current continuous	I_{out}	0		10	A DC	
Output current - short circuit	I_{sc}			20	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 134 for measurement set-up details

2V0S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		50		mV	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec. Measurement taken with no external capacitors
Load transient response - recovery	$T_{recovery}$		50		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load. Measurement taken with no external capacitors
External load capacitance	C_{ext}	0		10,000	µF	

2V0S Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Allowable output voltage				10 10	% %	Trim up (% of V_o nom). Trim down (% of V_o nom) See Application Note 134 for details of trim equations and trim curves
Remote sense voltage				10	%	If Trim up is invoked de-rate power accordingly (remote sense + trim ≤ 10%)

2V0S Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	92	93		%	I_{out} = 100% I_{out} (max), V_{in} = V_{in} (nom)
Efficiency	η	93	94		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

2V5S Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	I_{in}		5.3	6	A DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (max.); $V_o = V_o$ (nom)
Reflected ripple current	I_{in} (ripple)		65 230		mA rms mA pk-pk	$I_{out} = I_{out}$ (max.), measured with no external filter
Input capacitance - internal filter	C_{input}		18.8		µF	Internal to converter
Input capacitance - external bypass	C_{bypass}	100			µF	Recommended customer added capacitance

2V5S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vo (nom)	2.43	2.5	2.57	V DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (nom)
Total regulation band	V_o	2.38		2.612	V DC	For all line, static load and temperature until end of life
Line regulation				1	%	$I_{out} = I_{out}$ (nom); V_{in} (min) to V_{in} (max)
Load regulation				1	%	$V_{in} = V_{in}$ (nom); I_{out} (min) to I_{out} (max)
Output current continuous	I_{out}	0		10	A DC	
Output current - short circuit	I_{sc}			20	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 134 for measurement set-up details

2V5S Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		50		mV	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec. Measurement taken with no external capacitors
Load transient response - recovery	$T_{recovery}$		50		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load. Measurement taken with no external capacitors
External load capacitance	C_{ext}	0		10,000	µF	

2V5S Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Allowable output voltage				10	%	Trim up (% of V_o nom).
		10			%	Trim down (% of V_o nom) See Application Note 134 for details of trim equations and trim curves
Remote sense voltage				10	%	If Trim up is invoked de-rate power accordingly (remote sense + trim ≤ 10%)

2V5S Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	93	94		%	I_{out} = 100% I_{out} (max), V_{in} = V_{in} (nom)
Efficiency	η	93	95		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

3V3S Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	I_{in}		7	8	ADC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (max.); $V_o = V_o$ (nom)
Reflected ripple current	I_{in} (ripple)		65 230		mA rms mA pk-pk	$I_{out} = I_{out}$ (max.), measured with no external filter
Input capacitance - internal filter	C_{input}		18.8		µF	Internal to converter
Input capacitance - External bypass	C_{bypass}	100			µF	Recommended customer added capacitance

3V3S Model

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	V_o (nom.)	3.21	3.3	3.39	VDC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (nom)
Total regulation band	V_o	3.15		3.45	VDC	For all line, static load and temperature until end of life
Line regulation				1	%	$I_{out} = I_{out}$ (nom); $V_{in\ (min)}$ to V_{in} (max)
Load regulation				1	%	$V_{in} = V_{in}$ (nom); I_{out} (min) to I_{out} (max)
Output current continuous	I_{out}	0		10	ADC	
Output current - short circuit	I_{sc}			20	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 134 for set-up details

3V3S Model

Electrical Characteristics – O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		50		mV	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec. Measurement taken with no external capacitors
Load transient response - recovery	$T_{recovery}$		50		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load. Measurement taken with no external capacitors
External load capacitance	C_{ext}	0		10,000	µF	

3V3S Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Allowable output voltage				10 10	% %	Trim up (% of V_o nom). Trim down (% of V_o nom) See Application Note 134 for details of trim equations and trim curves
Remote sense voltage				10	%	If Trim up is invoked de-rate power accordingly (remote sense + trim ≤ 10%)

3V3S Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	94	95		%	I_{out} = 100% I_{out} (max), V_{in} = V_{in} (nom)
Efficiency	η	94	96		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

3V3W Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	I_{in}		7	8	A DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (max.); $V_o = V_o$ (nom)
Reflected ripple current	I_{in} (ripple)		65 230		mA rms mA pk-pk	$I_{out} = I_{out}$ (max.), measured with no external filter
Input capacitance - internal filter	C_{input}		18.8		µF	
Input capacitance - external bypass	C_{bypass}	100			µF	Recommended customer added capacitance

3V3W Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	V_o (nom)	3.21	3.3	3.39	V DC	$V_{in} = V_{in}$ (nom); $I_{out} = I_{out}$ (nom)
Total regulation band	V_o	3.15		3.45	V DC	For all line, static load and temperature until end of life.
Line regulation				1	%	$I_{out} = I_{out}$ (nom); V_{in} (min) to V_{in} (max)
Load regulation				1	%	$V_{in} = V_{in}$ (nom); I_{out} (min) to I_{out} (max)
Output current continuous	I_{out}	0		10	A DC	
Output current - short circuit	I_{sc}			20	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 134 for measurement set-up details

3V3W Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	$V_{dynamic}$		50		mV	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec. Measurement taken with no external capacitors
Load transient response - recovery	$T_{recovery}$		50		µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load. Measurement taken with no external capacitors
External load capacitance	C_{ext}	0		10,000	µF	

3V3W Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Allowable output voltage				10 75	% %	Trim up (% of V_O nom). Trim down (% of V_O nom) See Application Note 134 for details of trim equations and trim curves
Remote sense voltage				10	%	If Trim up is invoked de-rate power accordingly (remote sense + trim ≤ 10%)

3V3W Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	94	95		%	I_{out} = 100% Iout (max), V_{in} = V_{in} (nom)
Efficiency	η	94	96		%	I_{out} = 50% I_{out} (max), V_{in} = V_{in} (nom)

0V8S Model

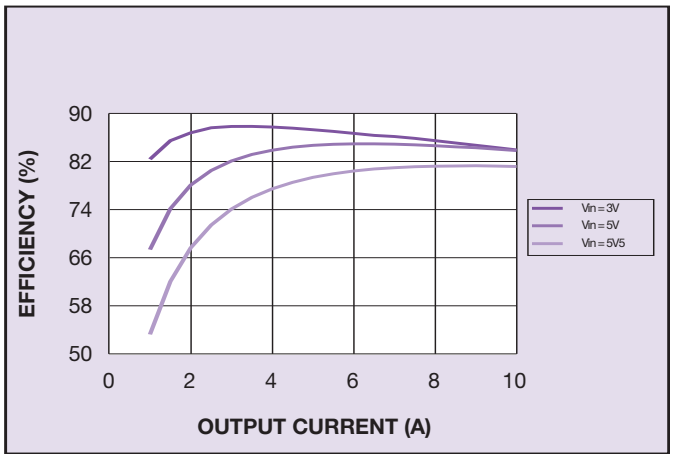


Figure 1: Efficiency vs Load

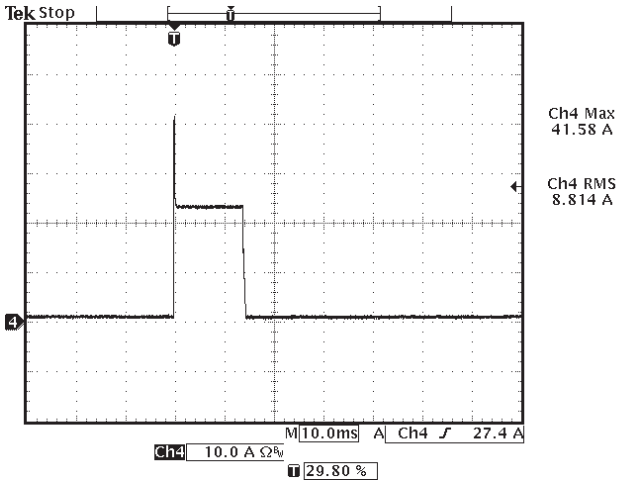


Figure 2: Short Circuit Characteristic

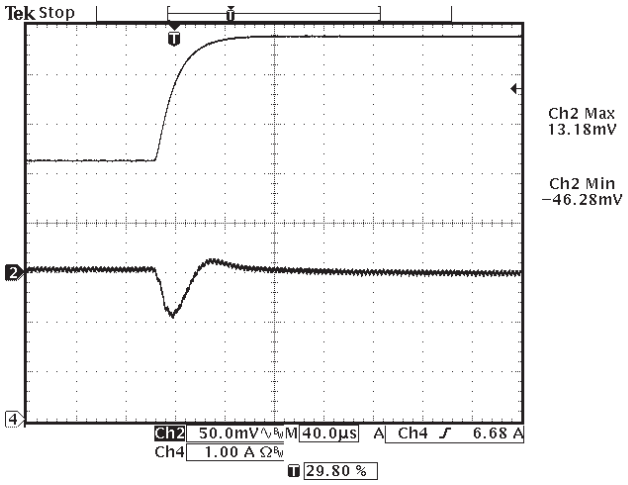


Figure 3: Typical Transient Response
(50% - 75% Step Load Change)

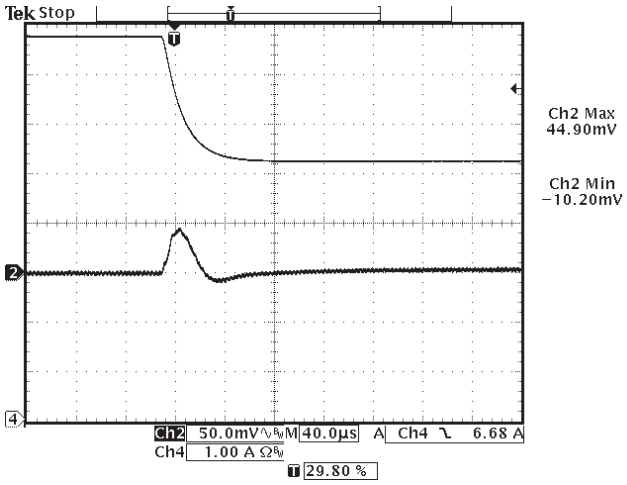


Figure 4: Typical Transient Response
(75% - 50% Step Load Change)

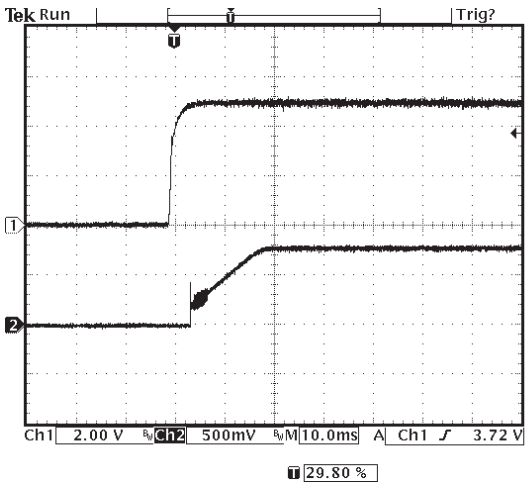


Figure 5: Typical Power-up Characteristic

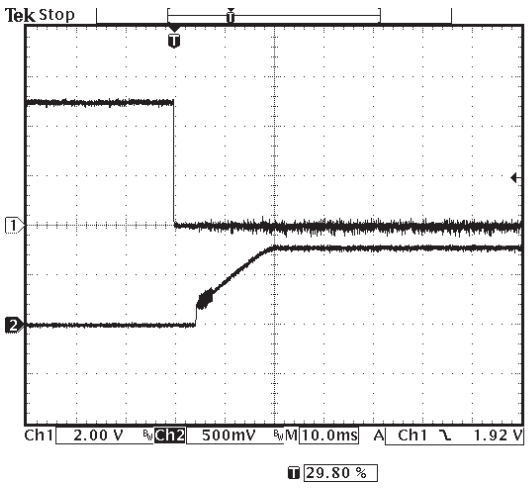


Figure 6: Control On/Off Characteristic

0V8S Model

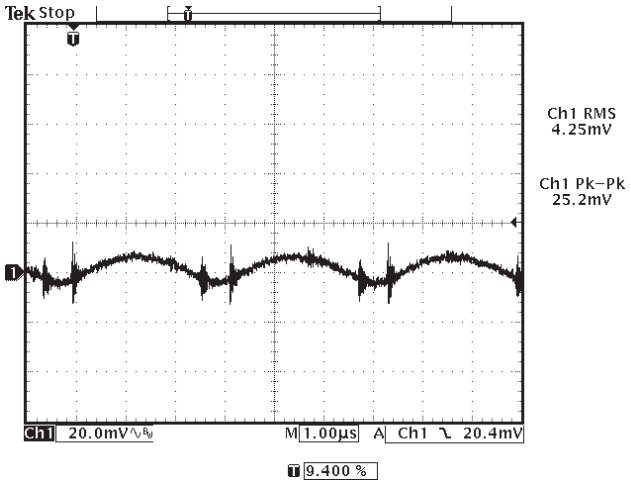


Figure 7: Typical Ripple and Noise

1V0S Model

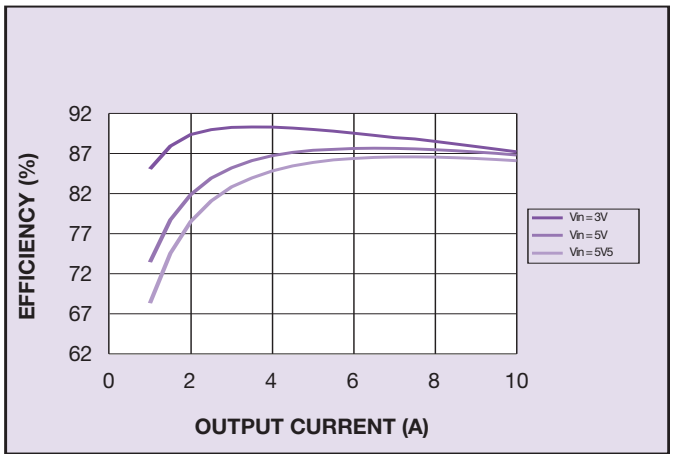


Figure 8: Efficiency vs Load

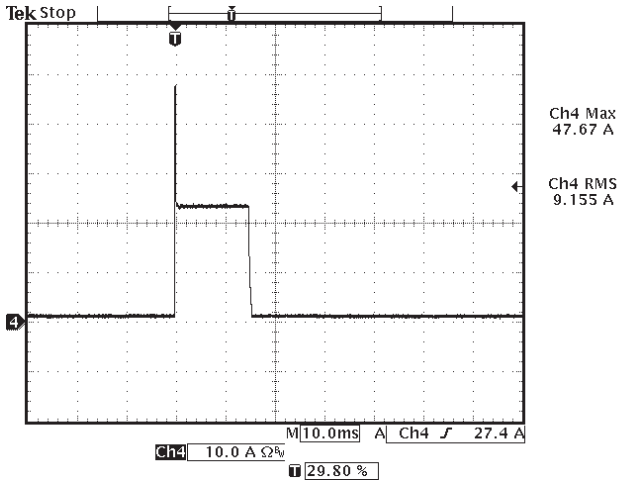


Figure 9: Short Circuit Characteristic

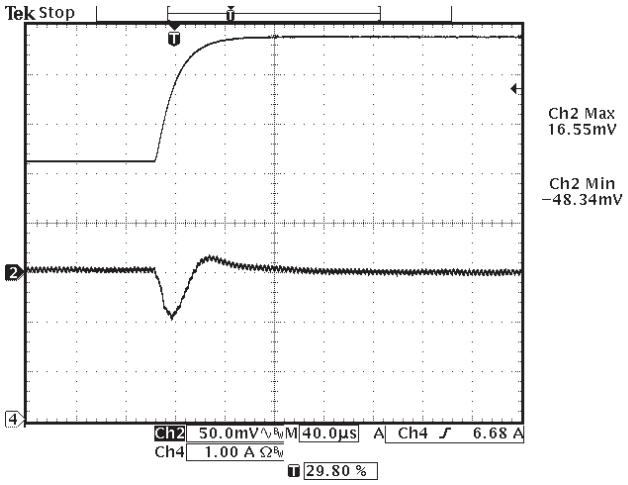


Figure 10: Typical Transient Response
(50% - 75% Step Load Change)

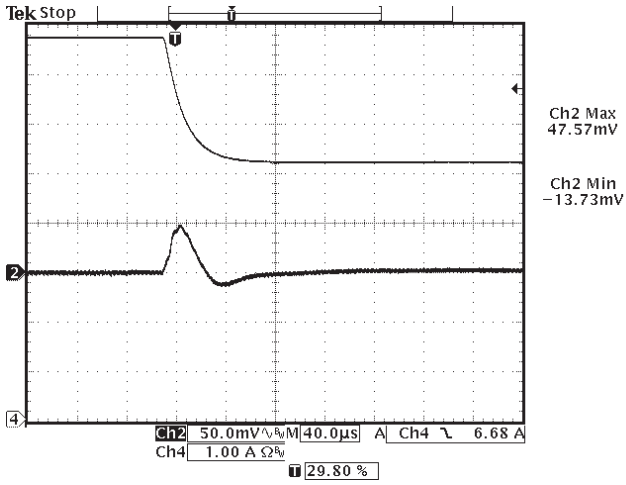


Figure 11: Typical Transient Response
(75% - 50% Step Load Change)

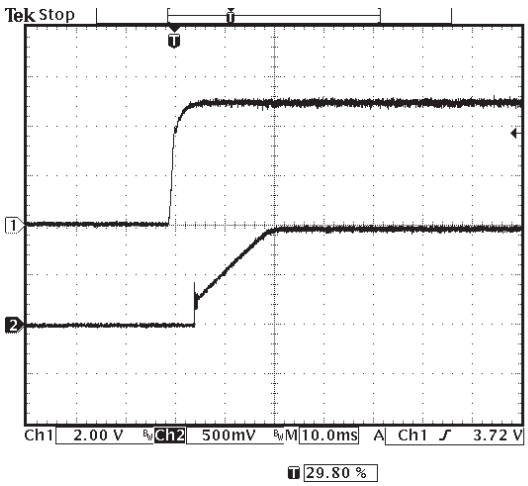


Figure 12: Typical Power-up Characteristic

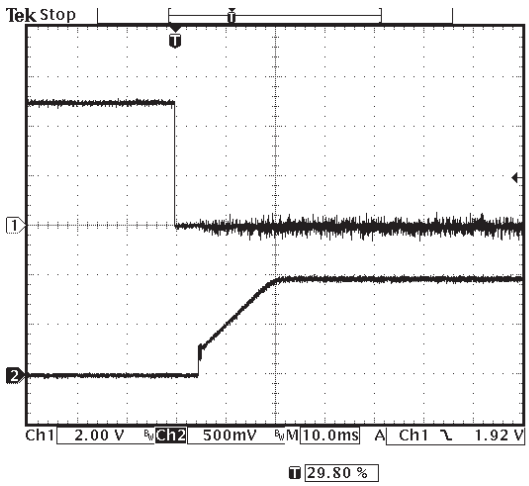


Figure 13: Control On/Off Characteristic

1V0S Model

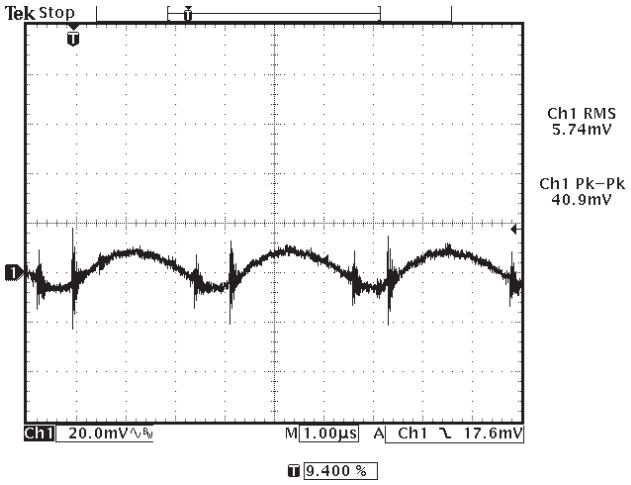


Figure 14: Typical Ripple and Noise

1V2S Model

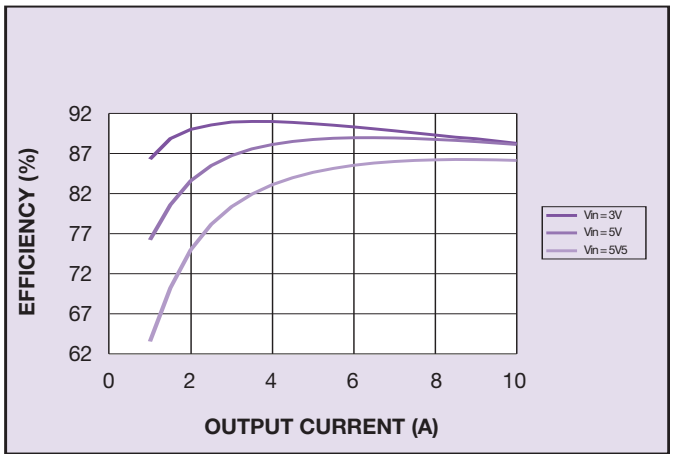


Figure 15: Efficiency vs Load

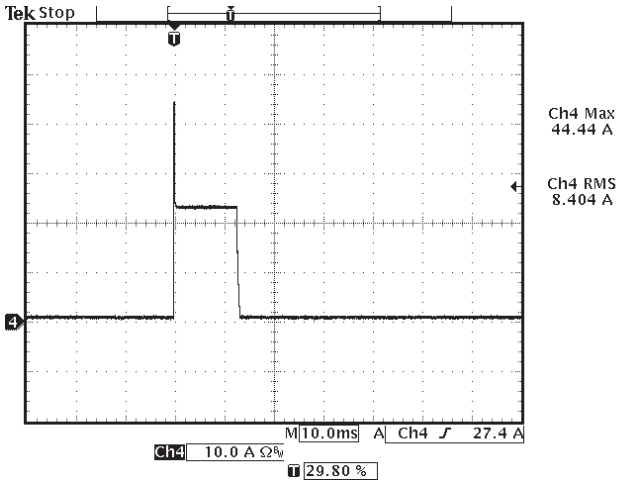


Figure 16: Short Circuit Characteristic

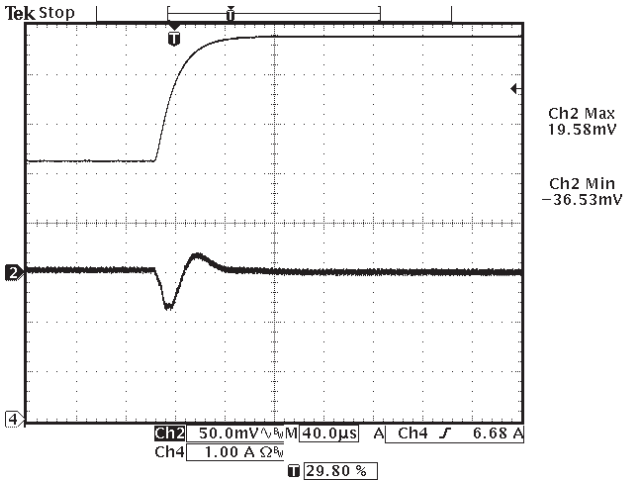


Figure 17: Typical Transient Response
(50% - 75% Step Load Change)

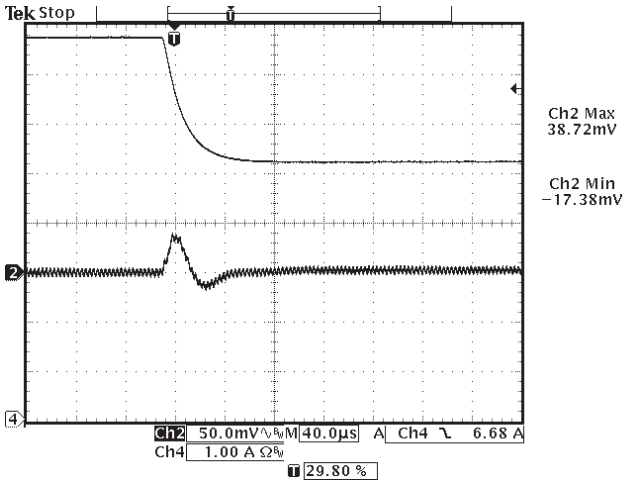


Figure 18: Typical Transient Response
(75% - 50% Step Load Change)

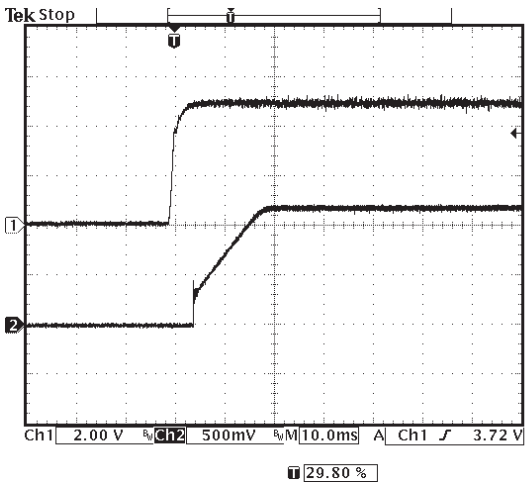


Figure 19: Typical Power-up Characteristic

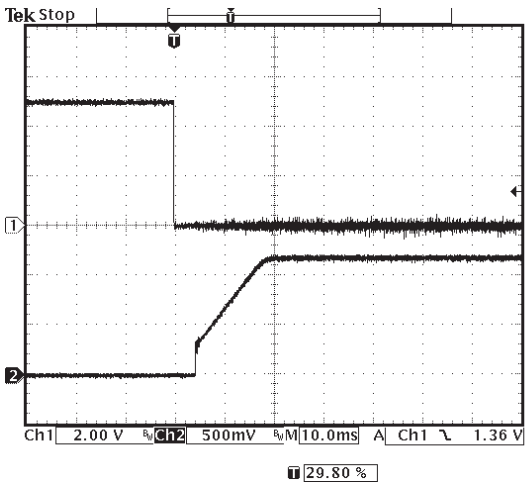


Figure 20: Control On/Off Characteristic

1V2S Model

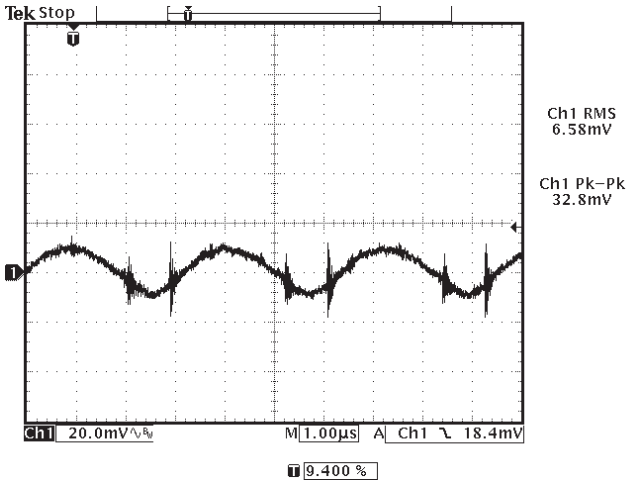


Figure 21: Typical Ripple and Noise

1V5S Model

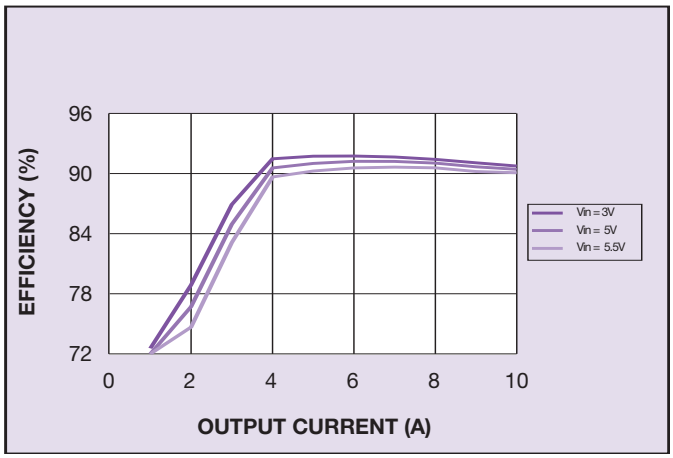


Figure 22: Efficiency vs Load

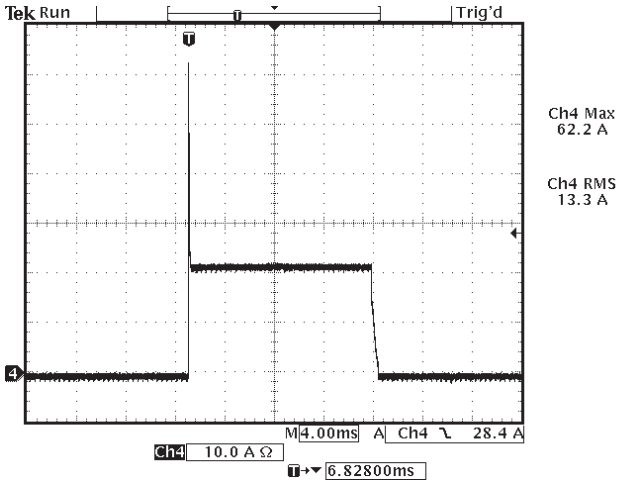


Figure 23: Short Circuit Characteristic

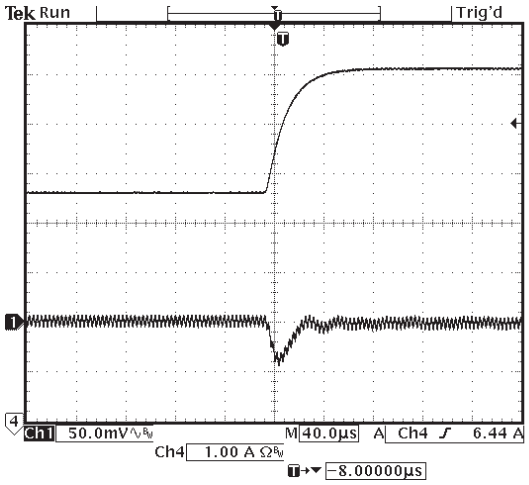


Figure 24: Typical Transient Response
(50% - 75% Step Load Change)

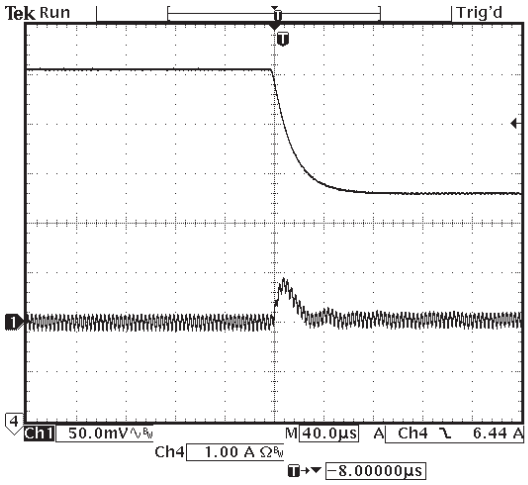


Figure 25: Typical Transient Response
(75% - 50% Step Load Change)

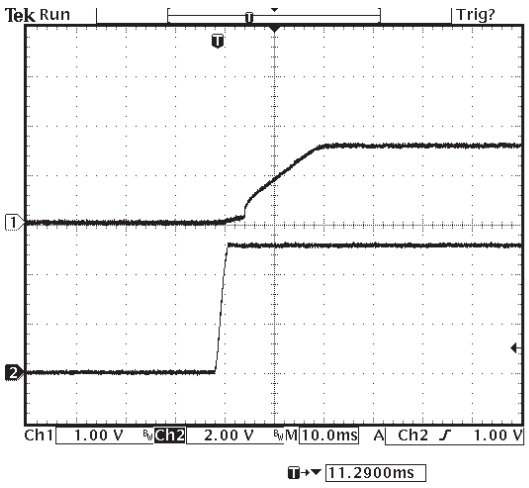


Figure 26: Typical Power-up Characteristic

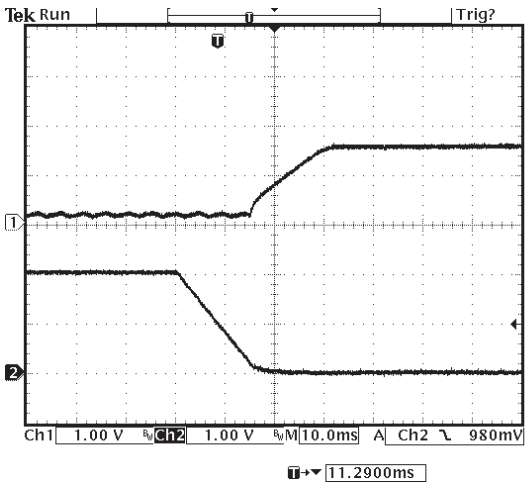


Figure 27: Control On/Off Characteristic

1V5S Model

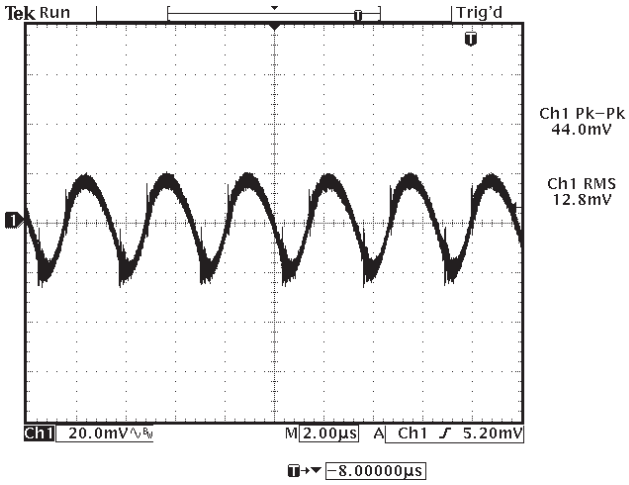


Figure 28: Typical Ripple and Noise

1V8S Model

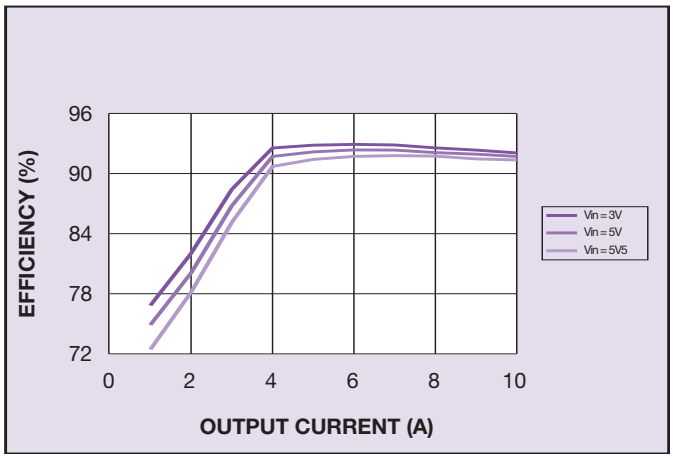


Figure 29: Efficiency vs Load

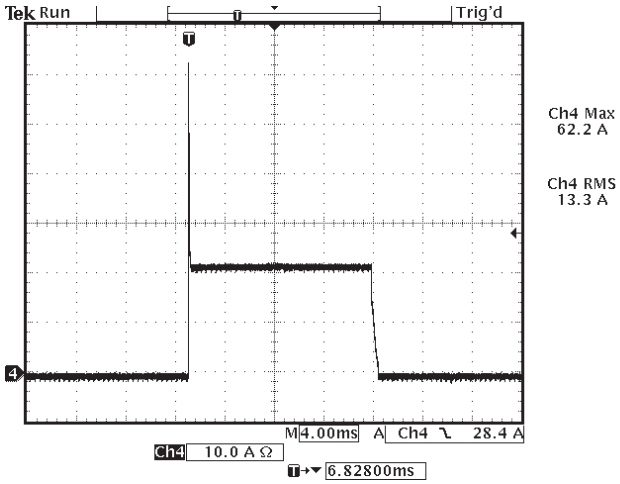


Figure 30: Short Circuit Characteristic

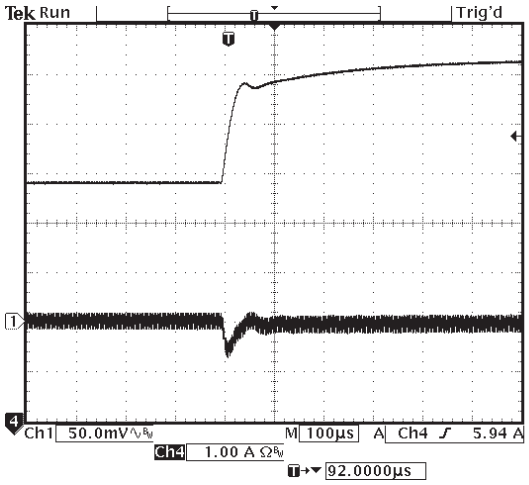


Figure 31: Typical Transient Response
(50% - 75% Step Load Change)

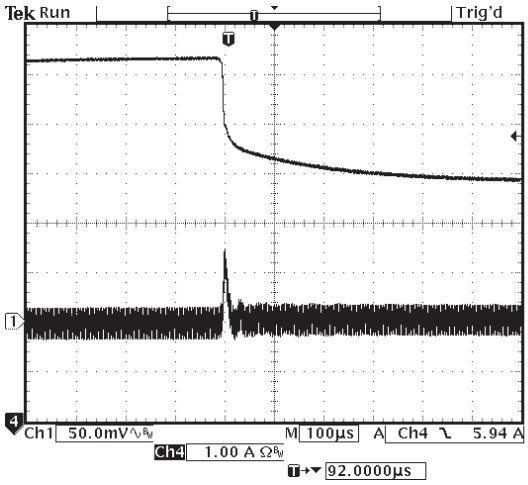


Figure 32: Typical Transient Response
(75% - 50% Step Load Change)

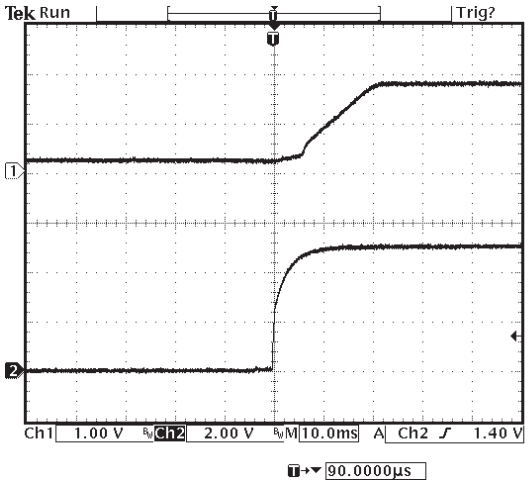


Figure 33: Typical Power-up Characteristic

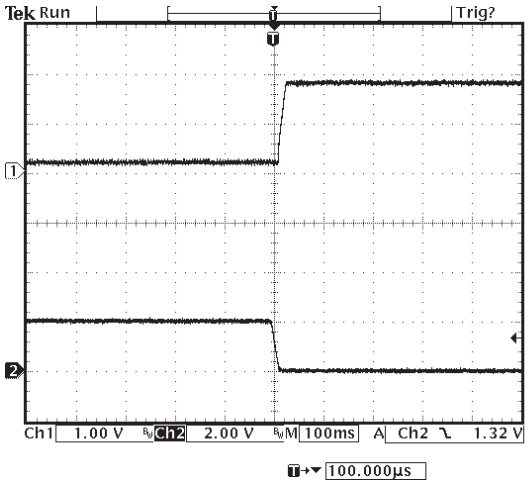


Figure 34: Control On/Off Characteristic

1V8S Model

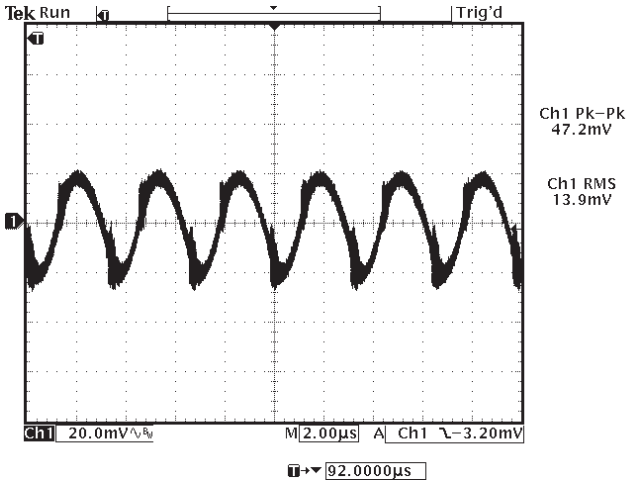


Figure 35: Typical Ripple and Noise

2V0S Model

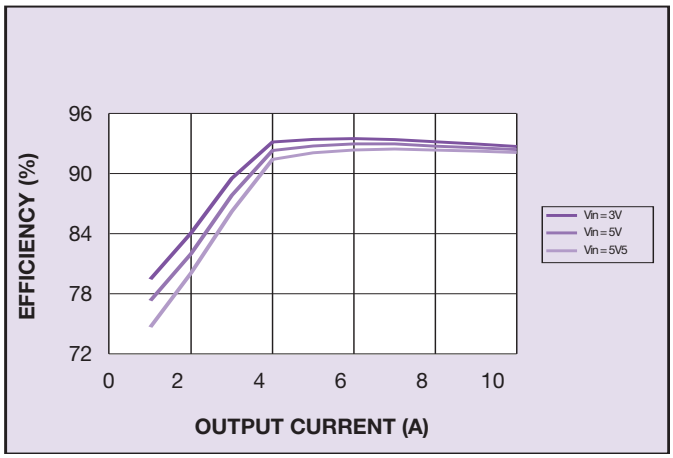


Figure 36: Efficiency vs Load

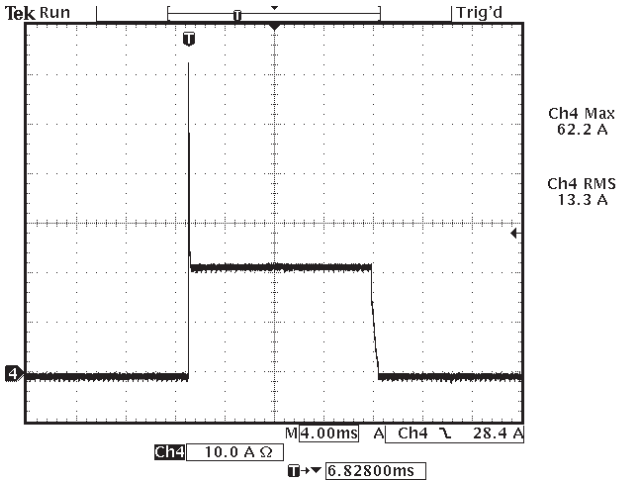


Figure 37: Short Circuit Characteristic

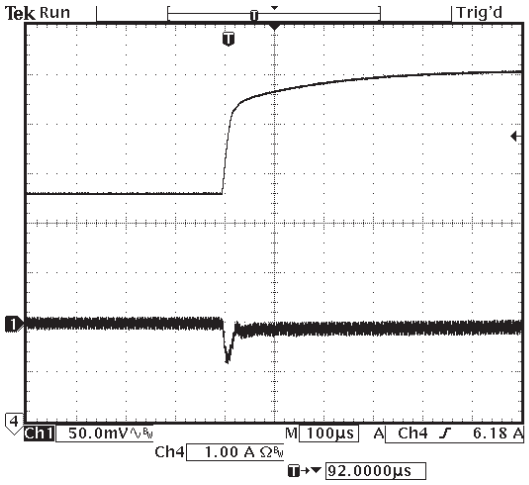


Figure 38: Typical Transient Response
(50% - 75% Step Load Change)

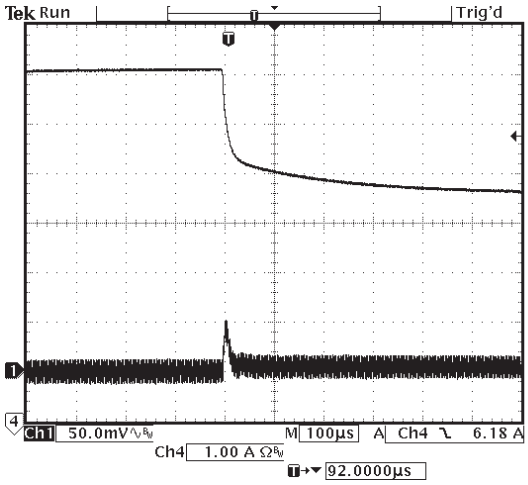


Figure 39: Typical Transient Response
(75% - 50% Step Load Change)

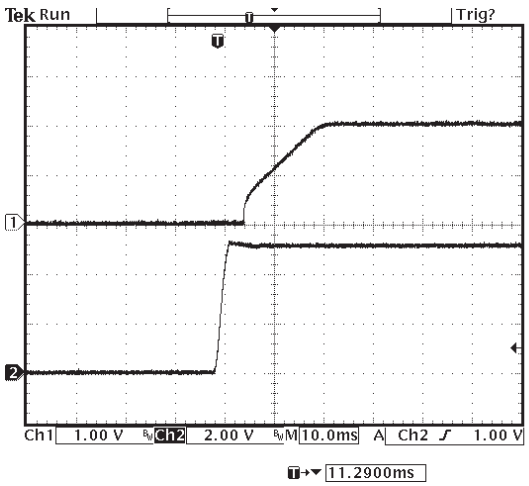


Figure 40: Typical Power-up Characteristic

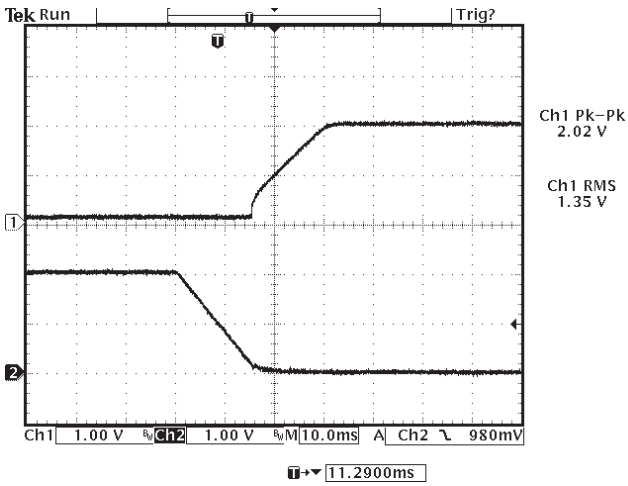


Figure 41: Control On/Off Characteristic

2V0S Model

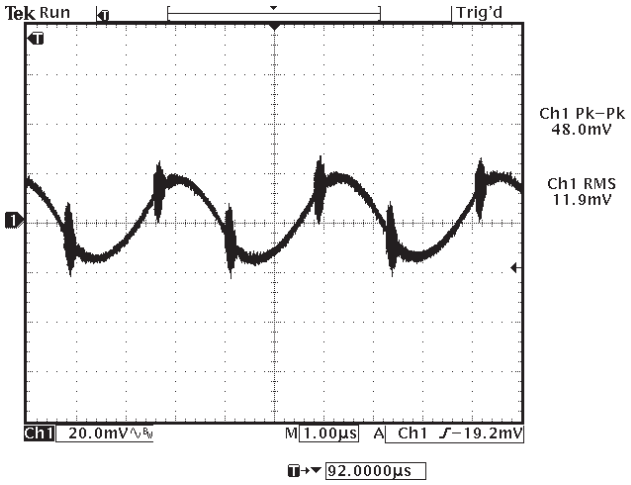


Figure 42: Typical Ripple and Noise

2V5S Model

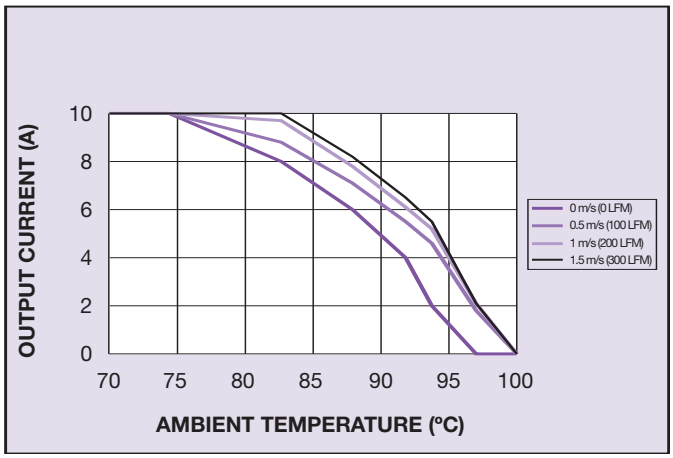


Figure 43: De-rating Curve with V_{in} = 3.3V and No Trim

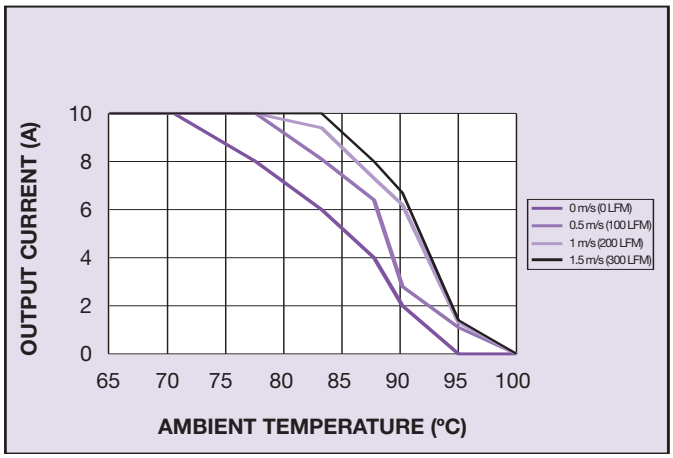


Figure 44: De-rating Curve with V_{in} = 5V and No Trim

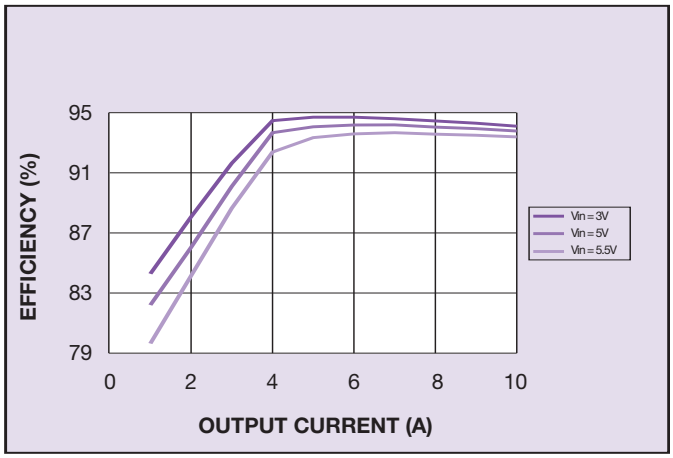


Figure 45: Efficiency vs Load

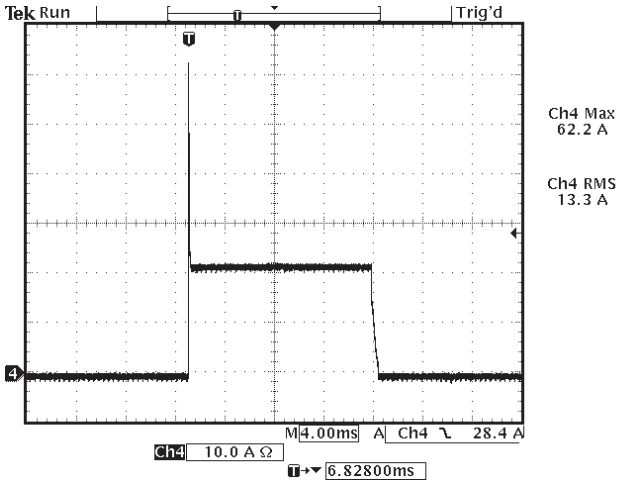


Figure 46: Short Circuit Characteristic

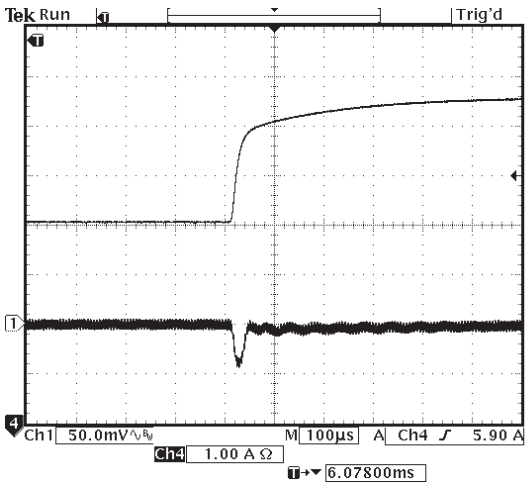


Figure 47: Typical Transient Response (50% - 75% Step Load Change)

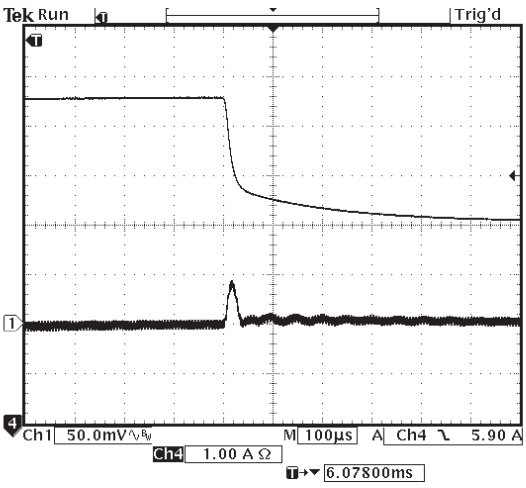


Figure 48: Typical Transient Response (75% - 50% Step Load Change)

2V5S Model

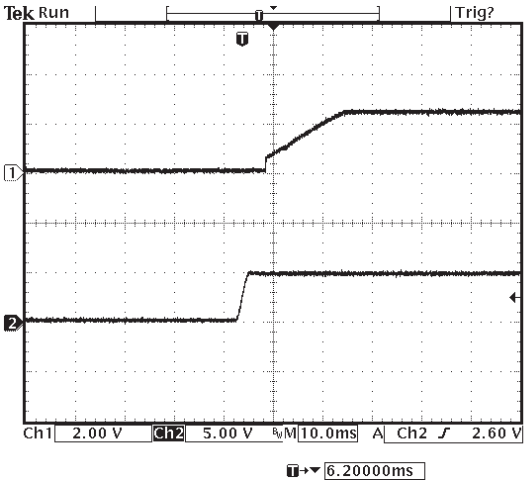


Figure 49: Typical Power-up Characteristic

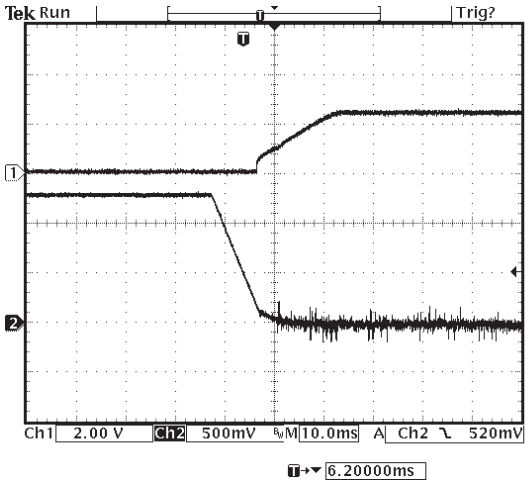


Figure 50: Control On/Off Characteristic

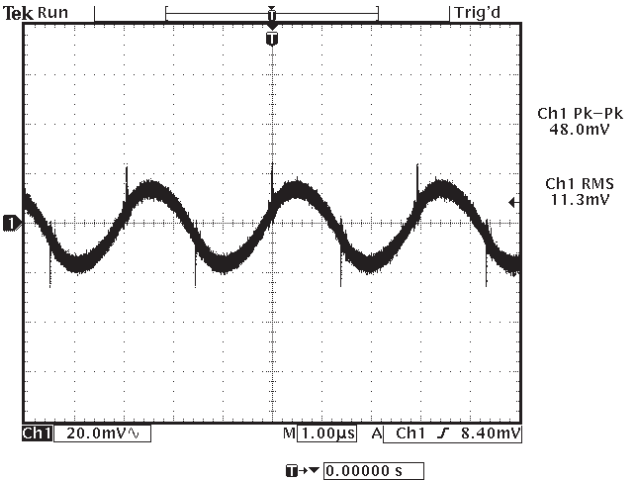


Figure 51: Typical Ripple and Noise

3V3S Model

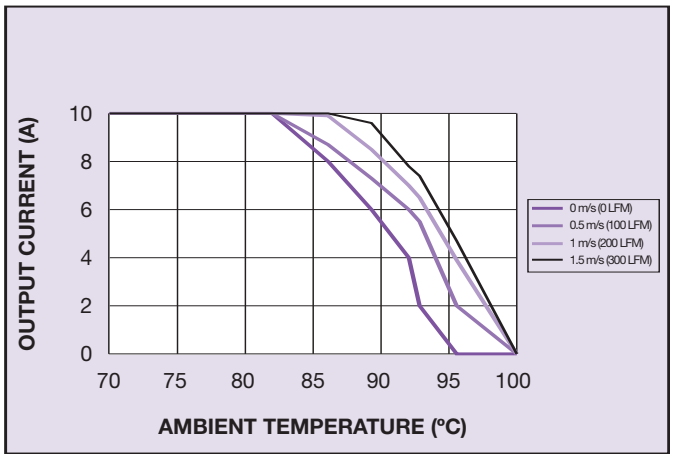


Figure 52: De-rating Curve with V_{in} = 5V and No Trim

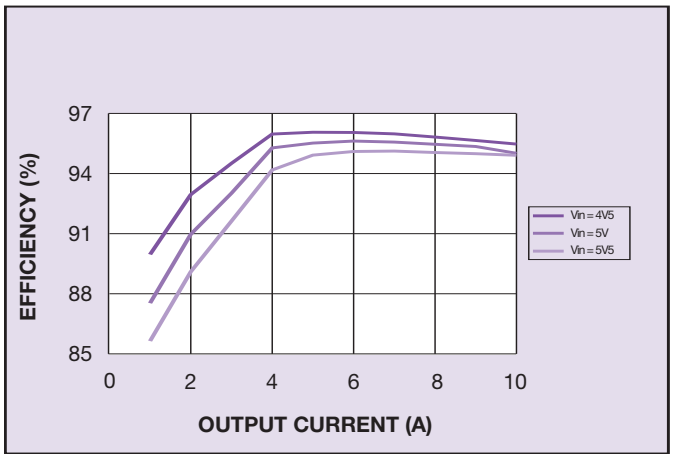


Figure 53: Efficiency vs Load

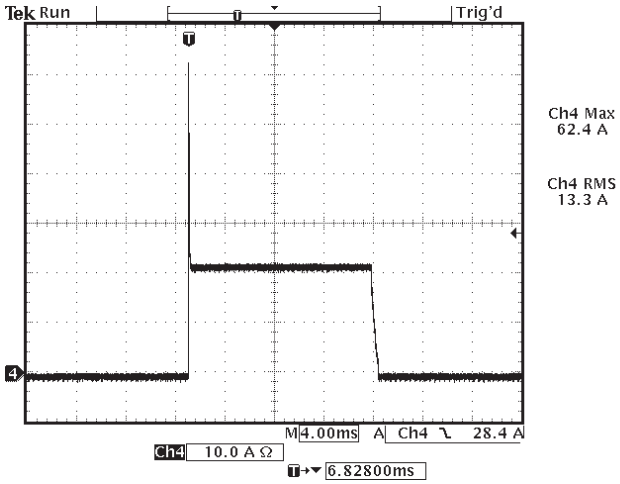


Figure 54: Short Circuit Characteristic

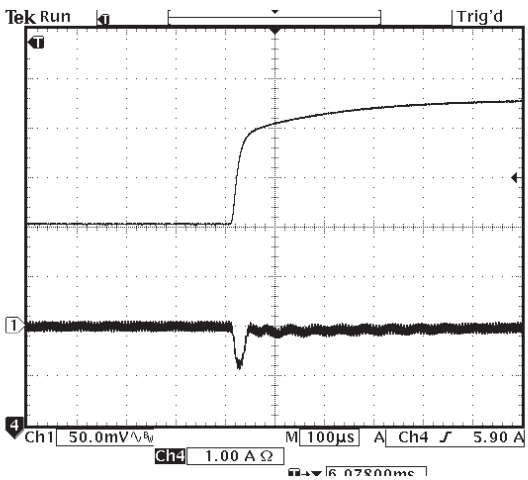


Figure 55: Typical Transient Response (50% - 75% Step Load Change)

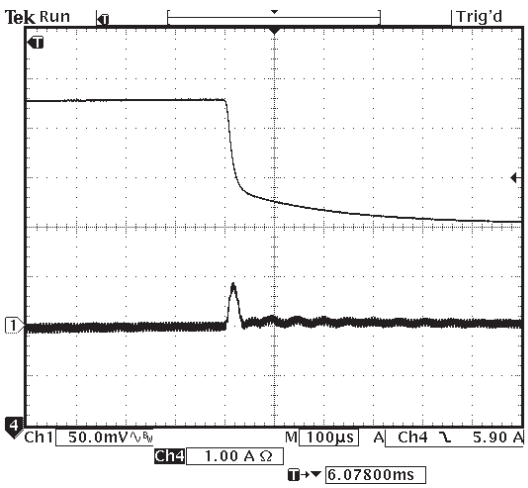


Figure 56: Typical Transient Response (75% - 50% Step Load Change)

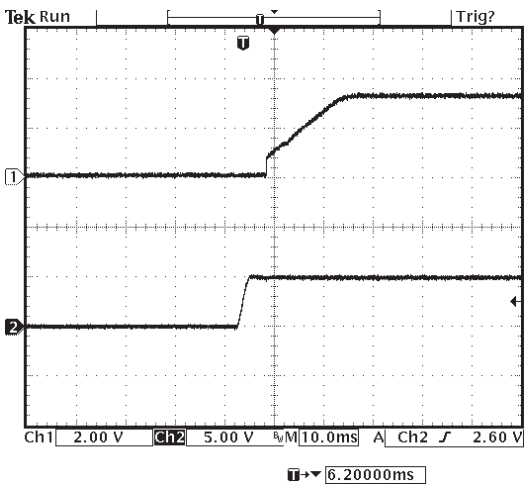


Figure 57: Typical Power-up Characteristic

3V3S Model

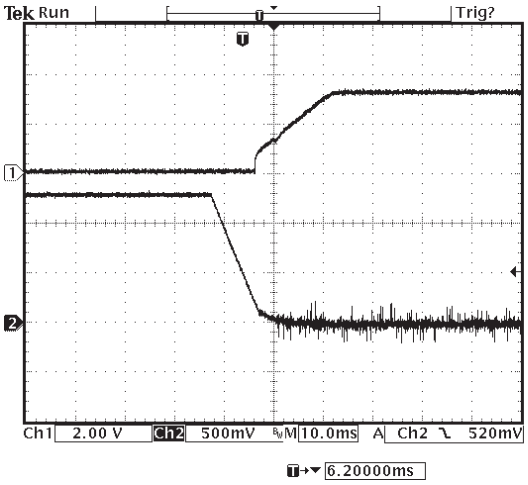


Figure 58: Control On/Off Characteristic

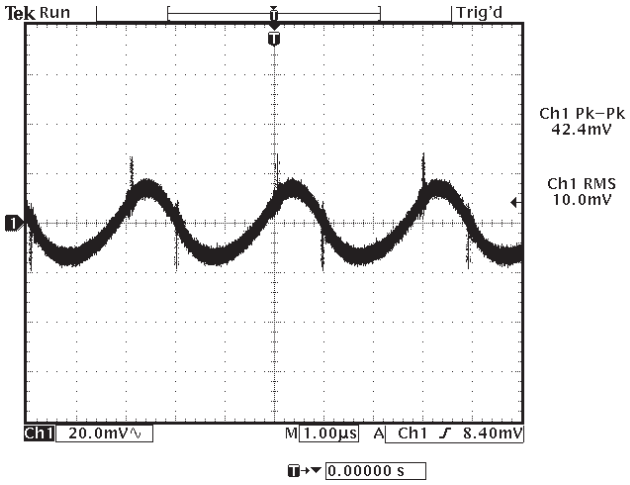


Figure 59: Typical Ripple and Noise

3V3W Model

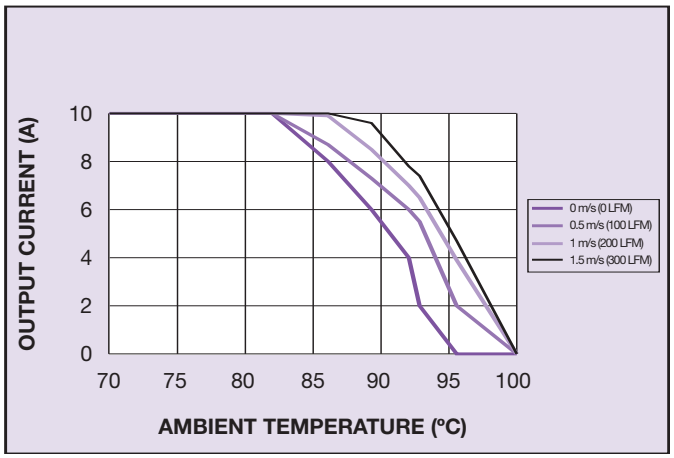


Figure 60: De-rating Curve with V_{in} = 5V and Vout = 3.3V

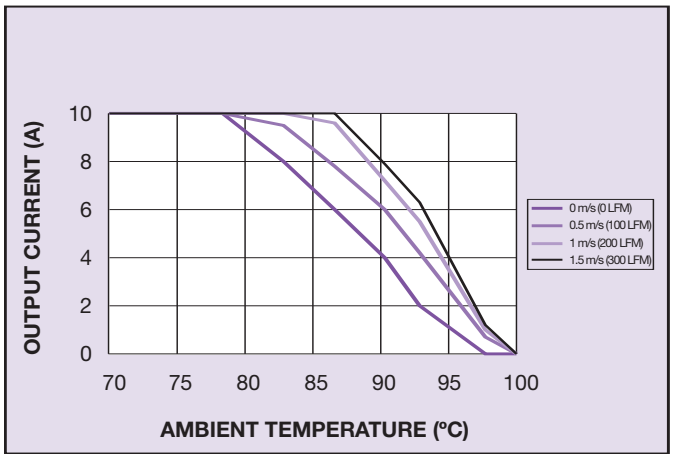


Figure 61: De-rating Curve with V_{in} = 5V and Vout = 0.8V

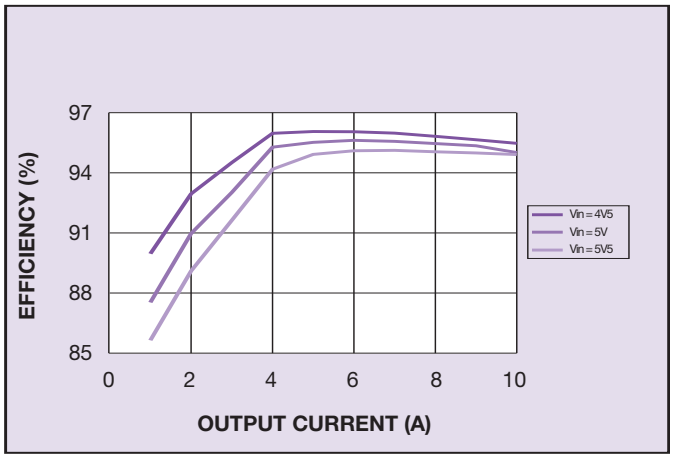


Figure 62: Efficiency vs Load

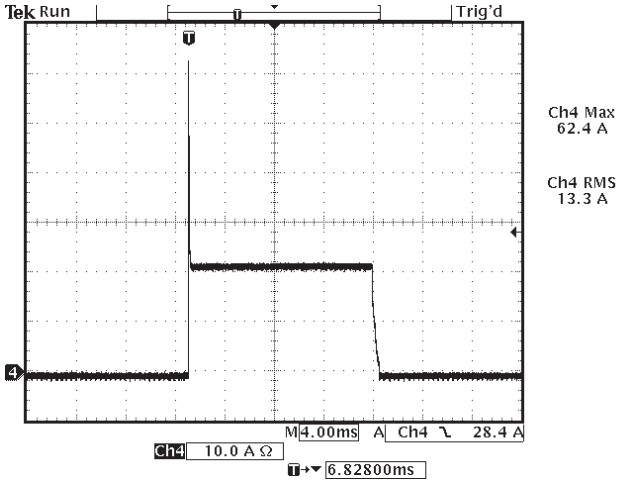


Figure 63: Short Circuit Characteristic

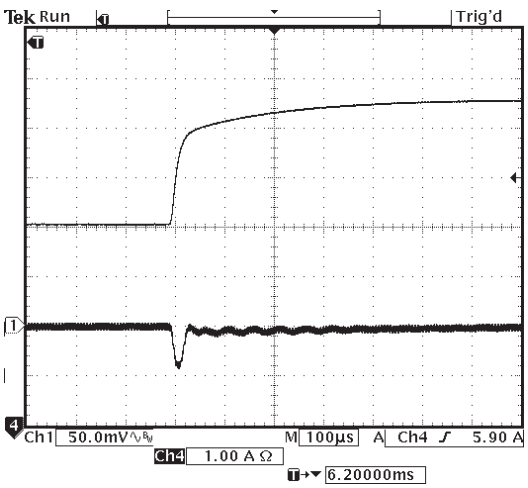


Figure 64: Typical Transient Response (50% - 75% Step Load Change)

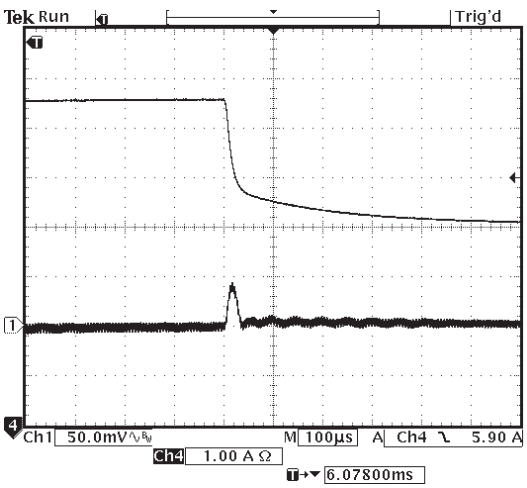


Figure 65: Typical Transient Response (75% - 50% Step Load Change)

3V3W Model

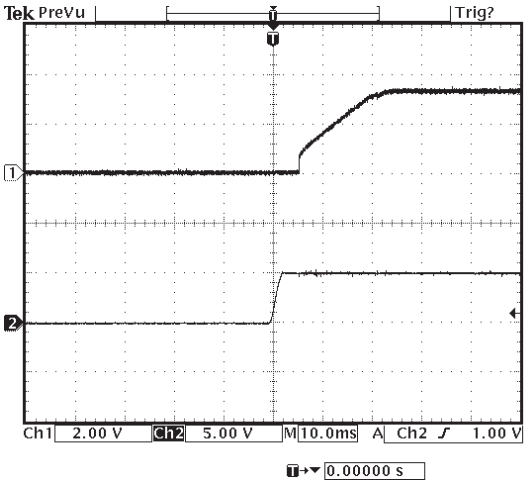


Figure 66: Typical Power-up Characteristic

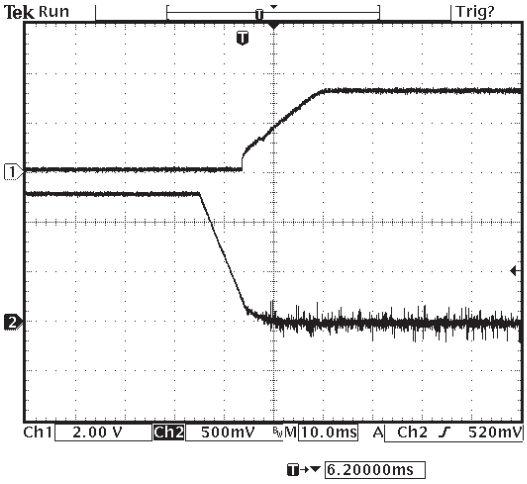


Figure 67: Control On/Off Characteristic

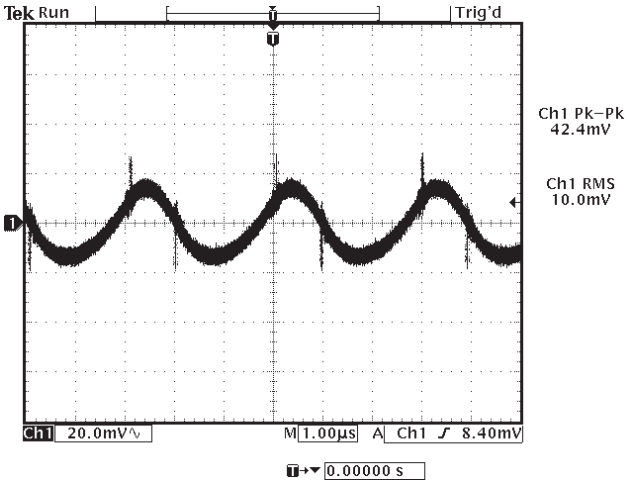


Figure 68: Typical Ripple and Noise

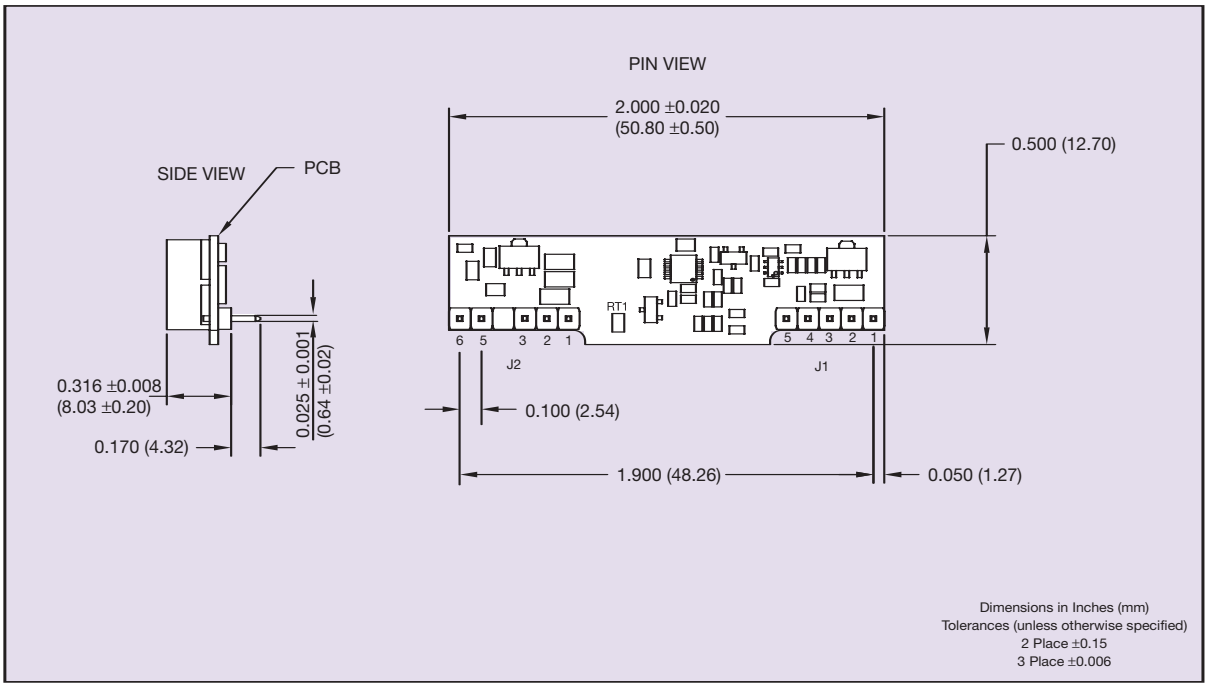


Figure 69: Mechanical Drawing - Horizontal

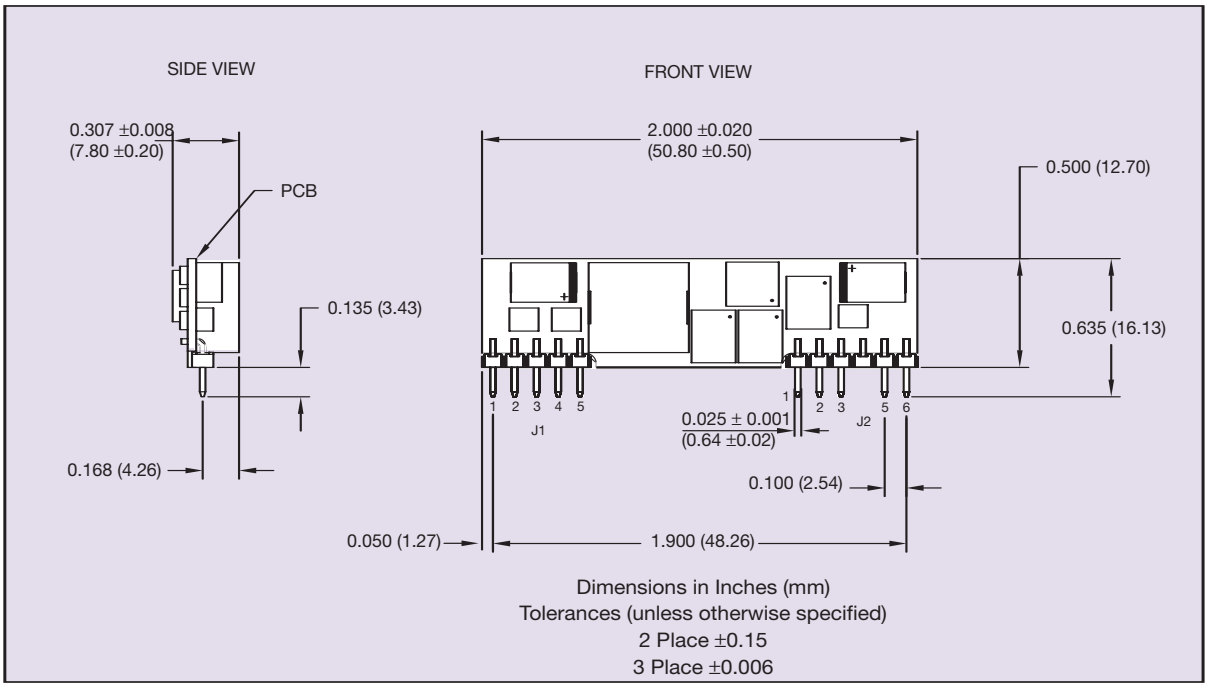


Figure 70: Mechanical Drawing - Vertical

Note 1

Thermal Reference Point is defined as the highest temperature measured at any one of the specified thermal reference points. See Figure 71: Thermal reference points.

Note 2

The Remote ON/OFF pin is referenced to ground.

Note 3

The SIL10E features a 'Negative Logic' Remote ON/OFF operation. If not using the Remote ON/OFF pin, leave the pin open (the converter will be on). The Remote ON/OFF pin is referenced to ground.

The following conditions apply for the SIL10E:

Configuration	Converter Operation
Remote pin open circuit	Unit is ON
Remote pin pulled low	Unit is ON
Remote pin pulled high [Von/off >1.2V]	Unit is OFF

A 'Positive Logic' Remote ON/OFF version is also possible with this converter. Please consult the factory for details.

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 134 .

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.

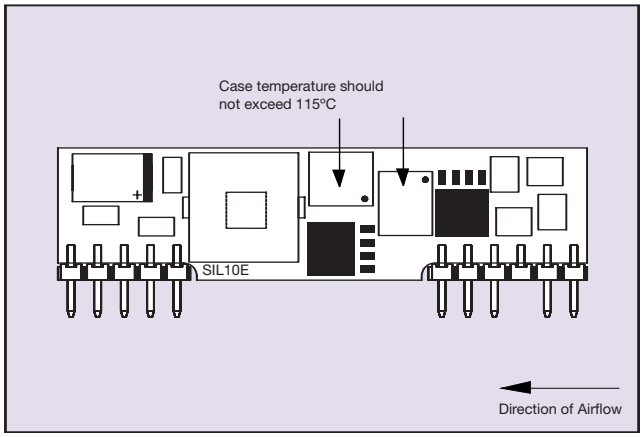


Figure 71: Thermal Reference Points

Pin Connections

Pin No.	Function
J1-1	+Vout
J1-2	+Vout
J1-3	Remote Sense (+)
J1-4	+Vout
J1-5	Ground
J2-1	Ground
J2-2	+Vin
J2-3	+Vin
J2-4	No Pin
J2-5	Trim
J2-6	Remote ON/OFF

Figure 72: Pinout

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File Name :lf_sil10e_05.pdf Rev: 22 Dec 2005