

Electrical Specifications (continued)

Parameter	Device	Symbol	Min	Typ	Max	Unit
Output Voltage Set-point (with 0.5% tolerance for external resistor used to set output voltage)	All	$V_{O, set}$	-1.5		+1.5	% $V_{O, set}$
Output Voltage (Over all operating input voltage, resistive load, and temperature conditions until end of life)	All	$V_{O, set}$	-3.0	—	+3.0	% $V_{O, set}$
Adjustment Range (selected by an external resistor) (Some output voltages may not be possible depending on the input voltage – see Feature Descriptions Section)	All	$V_O$	0.59		5.5	Vdc
Remote Sense Range	All				0.5	Vdc
Output Regulation (for $V_O \geq 2.5Vdc$ )						
Line ( $V_{IN}=V_{IN, min}$ to $V_{IN, max}$ )	All			—	+0.4	% $V_{O, set}$
Load ( $I_O=I_{O, min}$ to $I_{O, max}$ )	All			—	10	mV
Temperature ( $T_{ref}=T_{A, min}$ to $T_{A, max}$ )	All			—	+0.4	% $V_{O, set}$
Output Regulation (for $V_O < 2.5Vdc$ )						
Line ( $V_{IN}=V_{IN, min}$ to $V_{IN, max}$ )	All			—	10	mV
Load ( $I_O=I_{O, min}$ to $I_{O, max}$ )	All			—	5	mV
Temperature ( $T_{ref}=T_{A, min}$ to $T_{A, max}$ )	All			—	5	mV
Remote Sense Range	All				0.5	V
Output Ripple and Noise on nominal output ( $V_{IN}=V_{IN, nom}$ and $I_O=I_{O, min}$ to $I_{O, max}$ $C_o = 0.1\mu F // 10 \mu F$ ceramic capacitors)						
$V_O > 3.3V$ Peak-to-Peak (5Hz to 20MHz bandwidth)	All		—	110	135	mV <sub>pk-pk</sub>
RMS (5Hz to 20MHz bandwidth)	All			35	45	mV <sub>rms</sub>
$V_O \leq 3.3V$ Peak-to-Peak (5Hz to 20MHz bandwidth)	All		—	50	110	mV <sub>pk-pk</sub>
RMS (5Hz to 20MHz bandwidth)	All			20	40	mV <sub>rms</sub>
External Capacitance <sup>1</sup> Without the Tunable Loop™ ESR $\geq 1 m\Omega$	All	$C_{O, max}$	0	—	47	$\mu F$
With the Tunable Loop™ ESR $\geq 0.15 m\Omega$	All	$C_{O, max}$	0	—	1000	$\mu F$
ESR $\geq 10 m\Omega$	All	$C_{O, max}$	0	—	3000	$\mu F$
Output Current	All	$I_o$	0		3	A <sub>dc</sub>
Output Current Limit Inception (Hiccup Mode )	All	$I_{O, lim}$		200		% $I_{O, max}$
Output Short-Circuit Current ( $V_O \leq 250mV$ ) ( Hiccup Mode )	All	$I_{O, s/c}$		300		mA
Efficiency $V_{IN} = 12Vdc$ , $T_A = 25^\circ C$ $I_O = I_{O, max}$ , $V_O = V_{O, set}$						
$V_{O, set} = 0.59Vdc$		$\eta$		73.3		%
$V_{O, set} = 1.2Vdc$		$\eta$		82.9		%
$V_{O, set} = 1.8Vdc$		$\eta$		86.5		%
$V_{O, set} = 2.5Vdc$		$\eta$		88.9		%
$V_{O, set} = 3.3Vdc$		$\eta$		90.6		%
$V_{O, set} = 5.0Vdc$		$\eta$		92.6		%
Switching Frequency	All	$f_{sw}$	—	600	—	kHz
Dynamic Load Response ( $dI_o/dt = 10A/\mu s$ ; $V_{IN} = V_{IN, nom}$ ; $V_{out} = 1.8V$ , $T_A = 25^\circ C$ ) Load Change from $I_o = 50\%$ to $100\%$ of $I_{O, max}$ ; $C_o = 0$						
Peak Deviation	All	$V_{pk}$		220		mV
Settling Time ( $V_o < 10\%$ peak deviation)	All	$t_s$		60		$\mu s$
Load Change from $I_o = 100\%$ to $50\%$ of $I_{O, max}$ ; $C_o = 0$						
Peak Deviation	All	$V_{pk}$		240		mV
Settling Time ( $V_o < 10\%$ peak deviation)	All	$t_s$		60		$\mu s$

<sup>1</sup> External capacitors may require using the new Tunable Loop™ feature to ensure that the module is stable as well as getting the best transient response. See the Tunable Loop™ section for details.

## General Specifications

Parameter	Device	Min	Typ	Max	Unit
Calculated MTBF ( $I_o=0.8I_{o,max}$ , $T_A=40^\circ\text{C}$ ) Telcordia Issue 2 Method 1 Case 3	APTS		15,694,689		Hours
	APXS		25,017,068		Hours
Weight		—	1.55 (0.0546)	—	g (oz.)

## Feature Specifications

Unless otherwise indicated, specifications apply over all operating input voltage, resistive load, and temperature conditions. See Feature Descriptions for additional information.

Parameter	Device	Symbol	Min	Typ	Max	Unit
On/Off Signal Interface ( $V_{IN}=V_{IN,min}$ to $V_{IN,max}$ ; open collector or equivalent, Signal referenced to GND) Device is with suffix "4" – Positive Logic (See Ordering Information) Logic High (Module ON) Input High Current Input High Voltage Logic Low (Module OFF) Input Low Current Input Low Voltage	All	$I_{IH}$		—	10	$\mu\text{A}$
	All	$V_{IH}$	3.5	—	$V_{IN,max}$	V
	All	$I_{IL}$	—	—	1	mA
	All	$V_{IL}$	-0.3	—	0.8	V
Device Code with no suffix – Negative Logic (See Ordering Information) (On/OFF pin is open collector/drain logic input with external pull-up resistor; signal referenced to GND) Logic High (Module OFF) Input High Current Input High Voltage Logic Low (Module ON) Input low Current Input Low Voltage	All	$I_{IH}$	—	—	1	mA
	All	$V_{IH}$	3.5	—	$V_{IN,max}$	Vdc
	All	$I_{IL}$	—	—	10	$\mu\text{A}$
	All	$V_{IL}$	-0.2	—	0.6	Vdc
Turn-On Delay and Rise Times ( $V_{IN}=V_{IN,nom}$ , $I_o=I_{o,max}$ , $V_o$ to within $\pm 1\%$ of steady state) Case 1: On/Off input is enabled and then input power is applied (delay from instant at which $V_{IN} = V_{IN,min}$ until $V_o = 10\%$ of $V_{o,set}$ ) Case 2: Input power is applied for at least one second and then the On/Off input is enabled (delay from instant at which Von/Off is enabled until $V_o = 10\%$ of $V_{o,set}$ ) Output voltage Rise time (time for $V_o$ to rise from 10% of $V_{o,set}$ to 90% of $V_{o,set}$ )	All	Tdelay	—	2	—	msec
	All	Tdelay	—	2	—	msec
	All	Trise	—	4	—	msec
Output voltage overshoot ( $T_A = 25^\circ\text{C}$ ) $V_{IN}=V_{IN,min}$ to $V_{IN,max}$ ; $I_o=I_{o,min}$ to $I_{o,max}$ With or without maximum external capacitance					3.0	% $V_{o,set}$
Over Temperature Protection (See Thermal Considerations section)	All	$T_{ref}$		140		$^\circ\text{C}$
Tracking Accuracy (Power-Up: 2V/ms) (Power-Down: 2V/ms) ( $V_{IN,min}$ to $V_{IN,max}$ ; $I_{o,min}$ to $I_{o,max}$ $V_{SEQ} < V_o$ )	APTS	$V_{SEQ} - V_o$			100	mV
	APTS	$V_{SEQ} - V_o$			100	mV