

12V PicoTLynx™ 6A: Non-Isolated DC-DC Power Modules

4.5Vdc –14Vdc input; 0.59Vdc to 5.5Vdc output; 6A Output Current

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	$V_{O, set}$	-2.5	—	+2.5	% $V_{O, set}$
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 $V_O \geq 2.5$ Vdc)						
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			—	10mV	% $V_{O, set}$
Temperature ($T_{ref}=T_{A, min}$ to $T_{A, max}$)	All			—	+0.4	% $V_{O, set}$
Output Regulation (for $V_O < 2.5$ Vdc)						
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
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)						
Peak-to-Peak (5Hz to 20MHz bandwidth)	All		—	50	100	mV _{pk-pk}
RMS (5Hz to 20MHz bandwidth)	All			20	38	mV _{rms}
External Capacitance ¹						
Without the Tunable Loop™						
ESR ≥ 1 m Ω	All	$C_{O, max}$	0	—	47	μF
With the Tunable Loop™						
ESR ≥ 0.15 m Ω	All	$C_{O, max}$	0	—	1000	μF
ESR ≥ 10 m Ω	All	$C_{O, max}$	0	—	3000	μF
Output Current (in either sink or source mode)	All	I_O	0		6	Adc
Output Current Limit Inception (Hiccup Mode) (current limit does not operate in sink mode)	All	$I_{O, lim}$			200	% $I_{O, max}$
Output Short-Circuit Current ($V_O \leq 250$ mV) (Hiccup Mode)	All	$I_{O, s/c}$		170		mA
Efficiency						
$V_{IN} = 12$ Vdc, $T_A = 25^\circ C$	$V_{O, set} = 0.6$ Vdc	η		69.3		%
	$V_{O, set} = 1.2$ Vdc	η		80.7		%
	$V_{O, set} = 1.8$ Vdc	η		85.3		%
	$V_{O, set} = 2.5$ Vdc	η		88.1		%
	$V_{O, set} = 3.3$ Vdc	η		90.8		%
	$V_{O, set} = 5.0$ Vdc	η		93.6		%
Switching Frequency	All	f_{sw}	—	600	—	kHz

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.

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General Specifications

Parameter	Device	Min	Typ	Max	Unit
Calculated MTBF ($I_O=0.8I_{O,max}$, $T_A=40^\circ\text{C}$) Telecordia Issue 2 Method 1 Case 3	APTS		14,353,850		Hours
	APXS		22,280,045		Hours
Weight		—	1.95 (0.0687)	—	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	All	I_{IH}	—	—	10	μA
Input High Voltage	All	V_{IH}	3.5	—	$V_{IN,max}$	V
Logic Low (Module OFF)						
Input Low Current	All	I_{IL}	—	—	1	mA
Input Low Voltage	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	All	I_{IH}	—	—	1	mA
Input High Voltage	All	V_{IH}	3.5	—	$V_{IN,max}$	Vdc
Logic Low (Module ON)						
Input low Current	All	I_{IL}	—	—	10	μA
Input Low Voltage	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 $V_{O,set}$)	All	Tdelay	—	2	—	msec
Case 2: Input power is applied for at least one second and then the On/Off input is enabled (delay from instant at which On/Off is enabled until $V_O =$ 10% of $V_{O,set}$)	All	Tdelay	—	2	—	msec
Output voltage Rise time (time for V_O to rise from 10% of $V_{O,set}$ to 90% of $V_{O,set}$)	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 APTS	$V_{SEQ} - V_O$ $V_{SEQ} - V_O$			100 100	mV mV