

## Integrated Power Solutions for DSPs & FPGAs

Lineage Power has raised the bar for cost-effective high power density for modular high density POL (point-of-load) power DC/DC converters. Lineage's DC/DC products are well suited to powering designs that include DSP Core and I/O requirements from 0.8V to 3.65V. Many silicon suppliers offer solutions for powering DSPs, using discrete components (Controller ICs, MOSFET's, Capacitors, Resistors, Inductors, etc.). These types of discrete solutions are attractive initially from pure BOM cost. However, modular solutions can be a lower total cost solution in many applications and offer the following significant advantages:

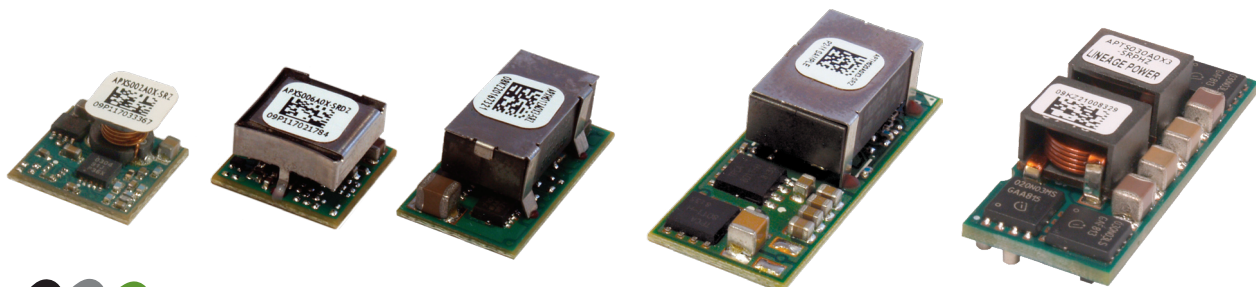
- Faster time to market
- Scalable offering from 0A to (5 x 30) = 150 Amps
- Pre-characterized electrical and thermal performance
- EZ-Sequence™ feature for sequencing Management
- Lower total cost solution
- Synchronization and Power Good features
- Wide input voltage range 2.4V to 16.0V
- High frequency switching and Tunable Loop™ feature reduces discrete components (external input and output capacitor requirements)
- Minimal risk of design errors
- Minimal engineering resources
- Reduced assembly time
- Highest power density
- International safety approvals
- Proven reliability >3 billion hours MTBF
- Reduced BOM - 1 part Vs. 10 to 20

### Leading Density at the Lowest Cost!

Lineage Power Tunable Loop™ products ensure low cost implementation of board mounted power in standards-based DOSA footprints.

Product Family	Model Number	Input Voltage	Output Voltage	Output Current	Peak Efficiency	Dimensions
PicoTlynx	APTH003	2.4-5.5	0.60-3.63	3A	95%	0.48 x 0.48 x 0.25"
	APTH006	2.4-5.5	0.59-3.63	6A	95%	0.48 x 0.48 x 0.29"
	APXS002	3.0-14.0	0.60-5.50	2A	96%	0.48 x 0.48 x 0.25"
	APTS003	4.5-14.0	0.60-5.50	3A	95%	0.48 x 0.48 x 0.25"
	APXK004	8.0-16.0	0.59-8.00	4A	96%	0.48 x 0.48 x 0.29"
	APTS006	4.5-14.0	0.59-5.50	6A	96%	0.48 x 0.48 x 0.29"
MicroTlynx	APTH012	2.4-5.5	0.60-3.63	12A	97%	0.80 x 0.45 x 0.33"
	APTS012	4.5-14.0	0.69-5.50	12A	97%	0.80 x 0.45 x 0.33"
	APXW005	9.0-36.0	3.00-18.00	5A	96%	0.80 x 0.45 x 0.33"
Tlynx	APTH020	2.4-5.5	0.60-3.63	20A	95%	1.30 x 0.53 x 0.33"
	APTS020	4.5-14.0	0.69-5.50	20A	97%	1.30 x 0.53 x 0.33"
MegaTlynx	APTS030	6.0-14.0	0.80-2.75	30A	95%	1.30 x 0.53 x 0.36"

1. Output currents above 30A are achieved by paralleling multiple AP(H/TS)030 devices that contain the -P (Current Share) option. See specification for details.  
2. All parts are non-isolated buck regulators. As such, Vin must exceed programmed Vout. See individual specifications for details.





## Altera Power Requirement by Part Number

Stratix®, Cyclone®, MAX®, Arrio™ are registered trademarks of the Altera® Corporation. Always refer to manufacturer's specification for correct and up-to-date power information.

### Stratix® IV GX / E / GT - Core Voltage: TLynx Output 0.9V to 2.5V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Stratix® IV GX / E / GT - I/O Voltage: TLynx Output 0.9V to 3.0V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Stratix® GX - II - IIGX - III Core Voltage: TLynx Output 1.0V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Stratix® GX - II - IIGX - III I/O Voltage: TLynx Output 1.14V to 3.45V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Hardcopy® III Core Voltage: TLynx Output 0.9V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Hardcopy® III I/O voltage : TLynx Output 1.0V to 3.0V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Hardcopy® IV E-1V GX Core Voltage: TLynx Output 0.9V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Hardcopy® IV E I/O Voltage: TLynx Output 1.0V to 3.0V

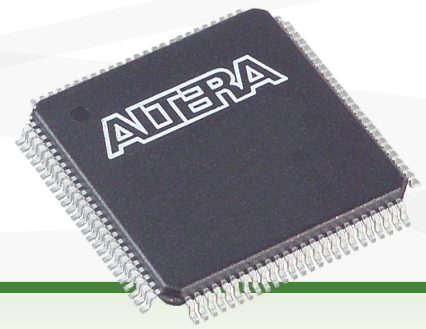
Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Hardcopy® IV GX I/O Voltage: TLynx Output 0.9V to 3.0V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

## Altera Power Requirement by Part Number

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### Arria™ GX Core Voltage: TLynx Output $V_{CCAUX}$ 2.5V / $MGTA_{VCC}$ 1.0V, $MGTA_{VCCPLL}$ 1.2V, $MGTA_{TTX}$ 1.2V, $MGTA_{ITRX}$ 1.2V, $MGTA_{ITRXC}$ 1.2V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Arria™ GX I/O voltage : TLynx Output 1.2V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Arria™ II GX Core Voltage: TLynx Output 0.9V to 3.3V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Arria™ II GX I/O Voltage: TLynx Output 1.2V to 2.5V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Cyclone® -II - III Core Voltage: TLynx Output 1.14V to 3.45V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Cyclone® -II - III I/O Voltage: TLynx Output $V_{CCAUX}$ 2.5V / $V_{CCAURX}$ 1.2V, $V_{TRX}$ 0.25V to 2.5V / $V_{CCAUTX}$ 1.2V, $V_{TTX}$ 1.14V to 1.575V

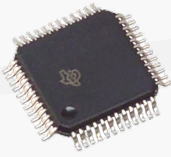
Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### MAX® II Series Core Voltage: TLynx Output 1.2V (All) | 2.5V / 2.5V, 3.3V / 3.3V / 2.5V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### MAX® II Series I/O Voltage: TLynx Output 1.14V to 3.65V / 1.1V to 3.6V / 1.1V to 3.6V / 1.1V to 3.45V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ



**TMS320Cxxxxx**

Core Voltage: TLynx Output 1.05~2.5V

I/O Voltage: TLynx Output 1.8 to 3.6V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

**TMS320Dxxxxx**

Core Voltage: TLynx Output 1.05~1.4V

I/O Voltage: TLynx Output 1.8V, 3.3V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

**TMS320Fxxxxx**

Core Voltage: TLynx Output 1.8V, 1.9V, 5V

I/O Voltage: TLynx Output 3.3V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

**TMS320Lxxxxx**

Core Voltage: TLynx Output 3.3V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

**TMS320Rxxxx**

Core Voltage: TLynx Output 1.9V

I/O Voltage: TLynx Output 3.3V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

**TMS320Uxxxx**

Core Voltage: TLynx Output 1.8V

I/O Voltage: TLynx Output 1.8~3.6V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

**TMS320Vxxxx**

Core Voltage: TLynx Output 1.2~2.5V

I/O Voltage: TLynx Output 2.7 to 3.6V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

## Xilinx Power Requirement by Part Number

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Always refer to manufacturer's specification for correct and up-to-date power information.



### Virtex 6™ Core Voltage: Tlynx Output 1.0 or 0.9V<sub>CCINT</sub> / 2.5V<sub>CCAUX</sub> / 1.2-2.5V<sub>CCO</sub> / 1V, 1.2V V<sub>MGTAX</sub>

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Virtex 5™ Core Voltage: Tlynx Output 1.0V V<sub>CCINT</sub>

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Virtex 5™ I/O Voltage: Tlynx Output 1.14V to 3.45V V<sub>CCO</sub>

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Virtex 5™ Tlynx Output: V<sub>CCAUX</sub> 2.5V / MGTA<sub>VCC</sub> 1.0V / MGTA<sub>VCCPLL</sub> 1.2V / MGTA<sub>TITX</sub> 1.2V / MGTA<sub>TRX</sub> 1.2V / MGTA<sub>TRXC</sub> 1.2V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Virtex 4™ Core Voltage: Tlynx Output 1.2V V<sub>CCINT</sub>

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Virtex 4™ I/O Voltage: Tlynx Output 1.14V to 3.45V V<sub>CCO</sub>

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Virtex 4™ Tlynx Output V<sub>CCAUX</sub> 2.5V / V<sub>CCAUXRX</sub> 1.2V / V<sub>TRX</sub> 0.25V to 2.5V / V<sub>CCAUXTX</sub> 1.2V / V<sub>TIX</sub> 1.14V to 1.575V

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Spartan 6™ Core Voltage: Tlynx Output 1.2V or 1.0V / 2.5V V<sub>CCINT</sub>

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Spartan 3/3A, 3A<sub>DSP</sub>/3AN/3E™ Core Voltage: Tlynx Output 1.2V (All) | 2.5V / 2.5V, 3.3V / 3.3V / 2.5V V<sub>CCINT</sub>

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ

### Spartan 3/3A, 3A<sub>DSP</sub>/3AN/3E™ I/O Voltage: Tlynx Output 1.14~3.65V / 1.1~3.6V / 1.1~3.6V / 1.1~3.45V V<sub>CCO</sub>

Input V	0 to 2 Amp	3 Amp	3 to 6 Amp	6 to 12 Amp	12 to 20 Amp	20 to 30 Amps	>30A
2.4 - 5.5V		APTH003A0X-SRZ	APTH006A0X-SRZ	APTH012A0X3-SRZ	APTH020A0X3-SRZ		
3.0 - 14V	APXS002A0X-SRZ						
4.5 - 14V		APTS003A0X-SRZ	APTS006A0X-SRZ	APTS012A0X3-SRZ	APTS020A0X3-SRZ	APTS030A0X3-SRZ	APTS030A0X3-SRPZ



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