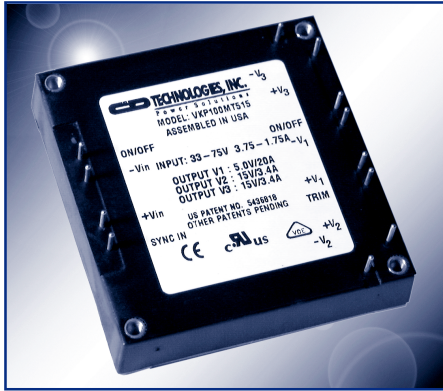


# VKP100xT

## 100 Watt Triple Output Half Brick DC/DC Converter



- 18 - 40 & 33 - 75V Input Range
- 2.3" X 2.4" X 0.5"
- User Configurable as a Single, Dual or Triple Output
- Each Channel Independently Current Limited
- Excellent Cross Regulation
- 500VDC Channel to Channel Isolation
- High Efficiency: 88% Typical
- Fixed-Frequency Operation
- Operation to +100°C Baseplate Temperature
- 50μS Transient Recovery, 0-90% Load Step
- Primary & Secondary Remote On/Off
- Adjustable Output Voltage
- External Synchronization
- VKP100MT Series are Approved to UL/CUL1950, EN 60950

The VKP100xT Series are members of the VK high density DC/DC converter family. They are multiple output DC/DC converters offered in a 33-75 input voltage range. Their versatile architecture featuring fully isolated channels enables the system designer to utilize the converter in either a single, dual or triple output scheme without excessive minimum load requirements or cross regulation

degradation.

The VKP100xT's architecture results in an economical and practical solution for use in distributed power schemes for today's demanding telecommunication and electronic data processing applications requiring ground separation between noise sensitive digital logic and bipolar analog components. The VKP100xT's proprietary control circuitry responds

to 50-100% load steps in 35μSeconds to within 1% of nominal Vout. The peak deviation will not exceed 10% of Vout for pulsed load slew rates in excess of 75 Amps per microsecond. The VKP100xT is ideal for electronic data processing applications utilizing modern disk drives and low voltage microprocessors that require dynamic load current response while maintaining tight output voltage tolerances.

### PRODUCT SELECTION CHART

MODEL	INPUT VOLTAGE (VDC)	RATED VOUT (VDC)			RATED MAXIMUM IOUT (A)		
		V1 (±)	V2 (±)	V3 (±)	V1(±)	V2(±)	V3(±)
VKP100MT312	48 (33-75)	3.3	12	12	30	4.2	4.2
VKP100MT315	48 (33-75)	3.3	15	15	30	3.4	3.4
VKP100MT512	48 (33-75)	5.1	12	12	20	4.2	4.2
VKP100MT515	48 (33-75)	5.0	15	15	20	2.0	2.0

# SPECIFICATIONS, ALL MODELS

Specifications are at  $T_{CASE} = +40^{\circ}C$  nominal input voltage unless otherwise specified.

PARAMETER	CONDITIONS	MIN			TYP			MAX			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
INPUT	Input Fusing									10	A
	Voltage Range			33		48				75	V <sub>DC</sub>
	Reflected Ripple Current	Peak - Peak								370	mA
	Input Ripple Rejection	DC to 1KHz		50		60					dB
	Maximum Input Current	Output Power = 100W $V_{IN} = 30V$								5	A
	No Load Power Dissipation	$P_{OUT} = 0, V_{IN, Min} < V_{IN} < V_{IN, Max}$								6	W
	Inrush Charge									0.247	mC
	Quiescent Operating Current										
	Primary On/Off Disabled					7.5				10	mA
	Secondary On/Off Disabled					15				20	mA

PARAMETER	CONDITIONS	MIN			TYP			MAX			UNITS	
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
GENERAL	<b>ISOLATION</b>											
	Input to Each Output	Peak Test	1500									V <sub>DC</sub>
	Input to Baseplate		1500									V <sub>DC</sub>
	Channel to Channel	Any Channel to Any Channel	500									V <sub>DC</sub>
	Resistance, Input - Output		10									MΩ
	Capacitance, Input - Output					2000						pF
	Leakage Current	$V_{ISO} = 240V_{AC}, 60Hz$				180						μA, rms
	<b>GENERAL</b>											
	Set Point Accuracy	$V_{IN} = \text{Nominal}, 50\% \text{ Load}$								1		%
	Turn-on Time	Within 1% of Nominal $V_{OUT}$				3.5				5		mSec
	Remote On/Off Control Inputs											
	Primary	Open Collector/Drain										
	Sink Current-Logic Low	$V_{IN} = V_{MAX}$								7		mA
	V <sub>low</sub>									0.8		V
	V <sub>high</sub>									Open Collector		
	Secondary	Open Collector/Drain										
	Sink Current-Logic Low									100		μA
	V <sub>low</sub>									0.4		V
	V <sub>high</sub>									Open Collector		
	External Synchronization Input											
	Frequency		440							520		KHz
	Pulse Width		150							320		nSec
	Source Impedance									47		Ω
	Input High Voltage		4							5		V
	Input Low Voltage		0							1		V
	Input Impedance					470						Ω
	Switching Frequency		470			480				490		KHz
	Weight									3 (85)		oz (g)
	<b>TEMPERATURE</b>											
	Operation/Specification	Case Temperature										°C
Storage					-40						+100	
Shutdown					-55						+125	
Thermal Impedance	Case to Ambient				+100						+115	
									8.2		°C/W	

PARAMETER	CONDITIONS	V1			V2			V3			UNITS		
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max			
VKP100MT312 OUTPUT	Output Power	Total Combined O/P Power = 100 Watts Max		50	100	25	50	25	50		W		
	Set Point Voltage		$I_{ONom}$	3.3		12.2		12.2			V		
	Output Current, $I_{OUT}$			0.5	15	30.0	0	2.1	4.2	0	2.1	4.2	A
	Output Ripple, p-p	DC to 20MHz*			100	200	150	500	150	500		mV	
	Output Adjust Range	*	3.15		3.80		Dependent on V1					V	
	Output Temperature Drift				.02	.05	.02	.05	.02	.05		%/°C	
	Line Regulation	$V_{IN, Min} \leq V_{IN} \leq V_{IN, Max}$ $I_O = I_{O, Nom}$			0.05	0.10	1.0	2.0	1.0	2.0		%	
	Load Regulation	Min Load to Rated Load			0.50	1.00	See Regulation Curves			See Regulation Curves			%
	Current Limit Inception	Other Outputs Min Load			38		6.0		6.0			A	
	Short-Circuit Current				30	38	5.0	6.0	5.0	6.0		A	
	Transient Response	50 to 100% Load Step											
	Peak Deviation				150	250						mV	
	Settling Time	$V_{OUT}, 1\% \text{ of } V_{OUT, Nom}$			35	50						μSec	
	Overvoltage Limit		4.2		5.0							V	
	Efficiency	$I_{OUT1} = 15A, (I_{OUT2} + I_{OUT3}) = 4.2A$ F.L. $V_{IN} = \text{Nominal}$	85	86								%	

\* See Application Notes available on the web at [www.cdpowerelectronics.com](http://www.cdpowerelectronics.com)

# SPECIFICATIONS, ALL MODELS

Specifications are at  $T_{CASE} = +40^{\circ}C$  nominal input voltage unless otherwise specified.

PARAMETER	CONDITIONS	V1			V2			V3			UNITS
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	
VKP100MT315 OUTPUT	Output Power	Total Combined O/P Power = 100 Watts Maximum									W
	Set Point Voltage	$I_{O,Nom}$									V
	Output Current, $I_{OUT}$	0.5	15	30.0	0	1.66	3.33	0	1.66	3.33	A
	Output Ripple, p-p	DC to 20MHz*									mV
	Output Adjust Range	*									V
	Output Temperature Drift										Dependent on V1
	Line Regulation	$V_{IN,Min} \leq V_{IN} \leq V_{IN,Max}$ $I_O = I_{O,Nom}$	.02	.05		.02	.05		.02	.05	%/°C
	Load Regulation	Min Load to Rated Load	0.05	0.10		1.0	2.0		1.0	2.0	%
	Current Limit Inception	Other Outputs Min Load	0.50	1.0		See Regulation Curves		See Regulation Curves			%
	Short-Circuit Current		38			5.0			5.0		A
	Transient Response	50 to 100% Load Step	30	38		4.0	5.0		4.0	5.0	A
	Peak Deviation										mV
	Settling Time	$V_{OUT}$ , 1% of $V_{OUT,Nom}$									µSec
	Overvoltage Limit		4.2		5.0						V
	Efficiency	$I_{OUT1}=15A, (I_{OUT2}+I_{OUT3}) = 3.4A$ F.L. $V_{IN}$ =Nominal	85	86							%

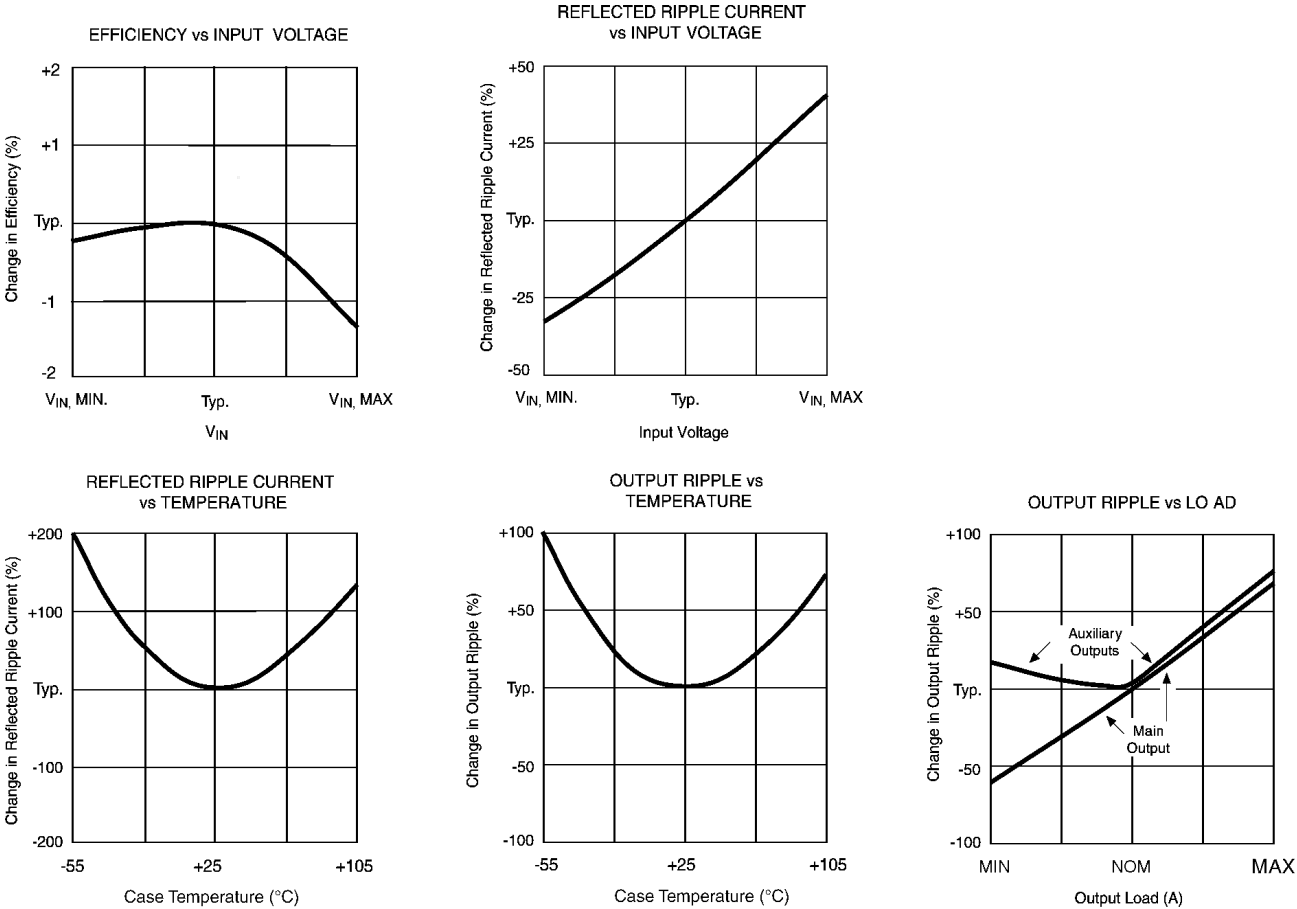
PARAMETER	CONDITIONS	V1			V2			V3			UNITS
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	
VKP100MT512 OUTPUT	Output Power	Total Combined O/P Power = 100 Watts Combined									W
	Set Point Voltage	$I_{O,Nom}$									V
	Output Current, $I_{OUT}$	0.5	10	20	0	2.1	4.2	0	2.1	4.2	A
	Output Ripple, p-p	DC to 20MHz*									mV
	Output Adjust Range	*									V
	Output Temperature Drift										Dependent on V1
	Line Regulation	$V_{IN,Min} \leq V_{IN} \leq V_{IN,Max}$ $I_O = I_{O,Nom}$	.02	.05		.02	.05		.02	.05	%/°C
	Load Regulation	Min Load to Rated Load	0.05	0.10		1.0	2.0		1.0	2.0	%
	Current Limit Inception	Other Outputs Min Load	0.50	1.0		See Regulation Curves		See Regulation Curves			%
	Short-Circuit Current		26.0			6.0			6.0		A
	Transient Response	50 to 100% Load Step	20.0	26.0		5.0	6.0		5.0	6.0	A
	Peak Deviation										mV
	Settling Time	$V_{OUT}$ , 1% of $V_{OUT,Nom}$									µSec
	Overvoltage Limit		6.0		7.0						V
	Efficiency	$I_{OUT1}=10A, (I_{OUT2}+I_{OUT3}) = 4.2A$ F.L. $V_{IN}$ =Nominal	86	87							%

PARAMETER	CONDITIONS	V1			V2			V3			UNITS
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	
VKP100MT515 OUTPUT	Output Power	Total Combined O/P Power = 100 Watts Max									W
	Set Point Voltage	$I_{O,Nom}$									V
	Output Current, $I_{OUT}$	0.5	10	20	0	1.66	3.33	0	1.66	3.33	A
	Output Ripple, p-p	DC to 20MHz*									mV
	Output Adjust Range	*									V
	Output Temperature Drift										Dependent on V1
	Line Regulation	$V_{IN,Min} \leq V_{IN} \leq V_{IN,Max}$ $I_O = I_{O,Nom}$	.02	.05		.02	.05		.02	.05	%/°C
	Load Regulation	Min Load to Rated Load	0.05	1.0		1.0	2.0		1.0	2.0	%
	Current Limit Inception	Other Outputs Min Load	0.05	1.0		See Regulation Curves		See Regulation Curves			%
	Short-Circuit Current		26.0			5.0			5.0		A
	Transient Response	50 to 100% Load Step	20.0	26.0		4.0	5.0		4.0	5.0	A
	Peak Deviation										mV
	Settling Time	$V_{OUT}$ , 1% of $V_{OUT,Nom}$									µSec
	Overvoltage Limit		6.0		7.0						V
	Efficiency	$I_{OUT1}=10A, (I_{OUT2}+I_{OUT3}) = 4.2A$ F.L. $V_{IN}$ =Nominal	86	87							%

\* See Application Notes available on the web at [www.cdpowerelectronics.com](http://www.cdpowerelectronics.com)

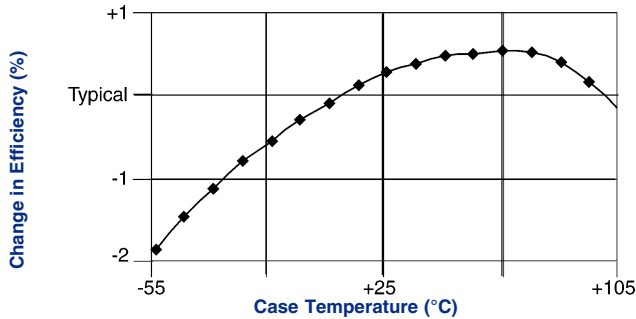
# TYPICAL PERFORMANCE CURVES

Specifications are at  $T_{CASE} = +40^{\circ}C$  nominal input voltage, nominal load, recommended external components applied, unless otherwise specified. (Refer to Application Note DCAN-9 at [www.cdpowerelectronics.com](http://www.cdpowerelectronics.com))



## EFFICIENCY vs TEMPERATURE

$T_{CASE} = +40^{\circ}C$ , nominal input voltage, nominal load, recommended external components applied, unless otherwise specified.\*



## ABSOLUTE MAX. RATINGS

Output Short-Circuit Duration	Continuous
Baseplate Temperature	+100°C
Lead Temperature (soldering, 10 seconds max)	+300°C
Storage Temperature	+125°C
Input to Output Isolation	1500 VDC

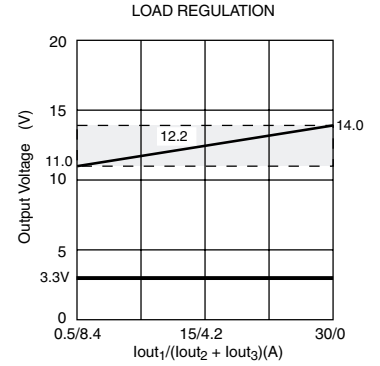
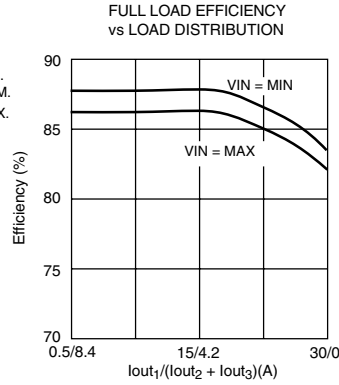
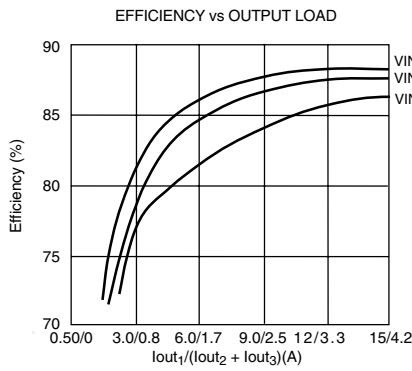
## ORDERING INFORMATION

Device Family VKP100 MTyz - L  
 Indicates 100 Watt Regulated Unit  
 Model Number \_\_\_\_\_  
 Selected from Table of Electrical Characteristics  
 Where:  
 X = Input Voltage (M = 48VDC)  
 T = Number of Outputs (Triple 'T')  
 y = 3 for 3.3V, 5 for 5V  
 yz = 12 for 12V, 15 for 15V  
 Lead Length \_\_\_\_\_  
 0.250" - No Number  
 0.145" - (6)  
 0.110" - (8)

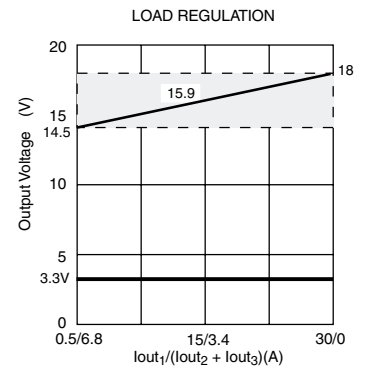
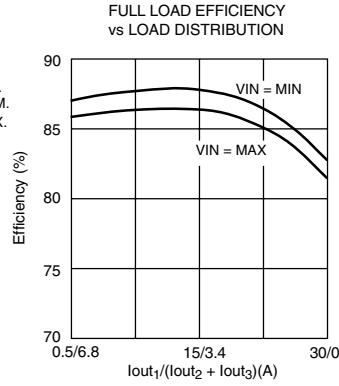
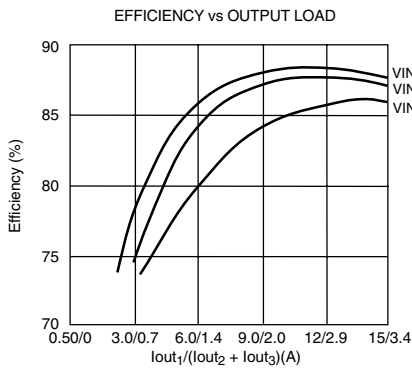
# TYPICAL PERFORMANCE CURVES

Specifications are at  $T_{CASE} = +40^{\circ}C$  nominal input voltage, nominal load, recommended external components applied, unless otherwise specified. (Refer to Application Note DCAN-9 at [www.cdpowerelectronics.com](http://www.cdpowerelectronics.com))

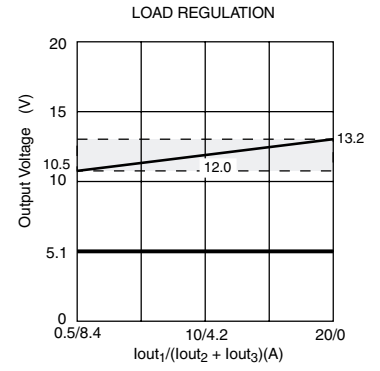
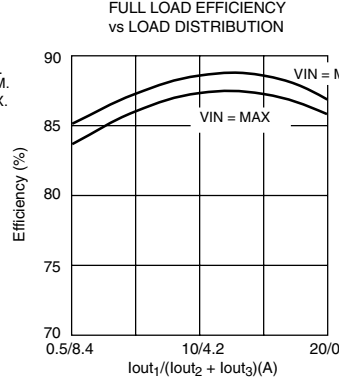
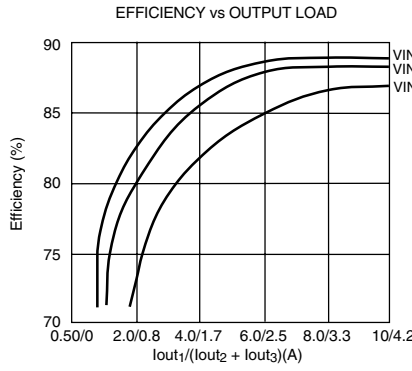
## VKP100xT312



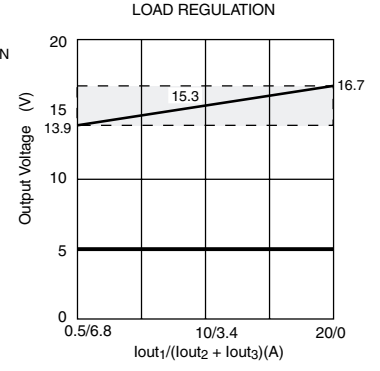
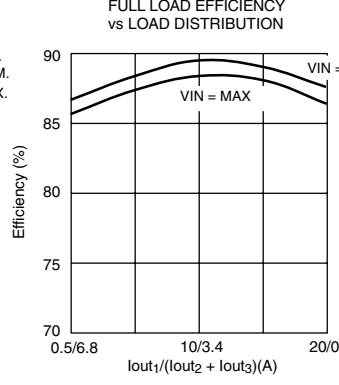
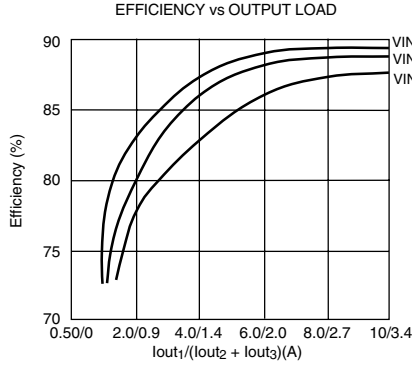
## VKP100xT315



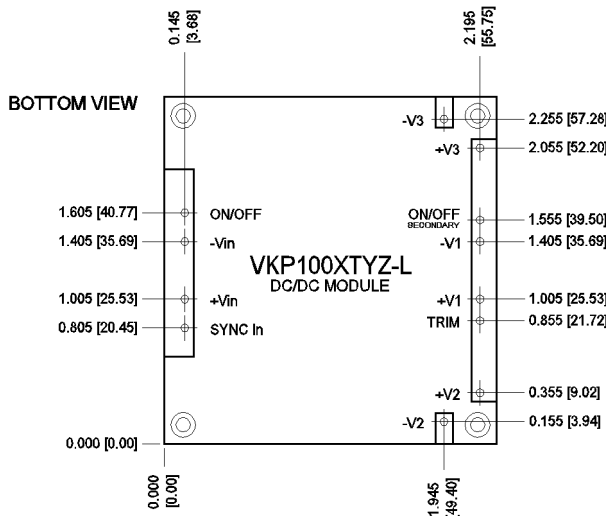
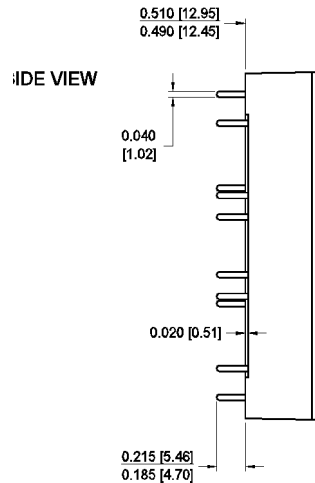
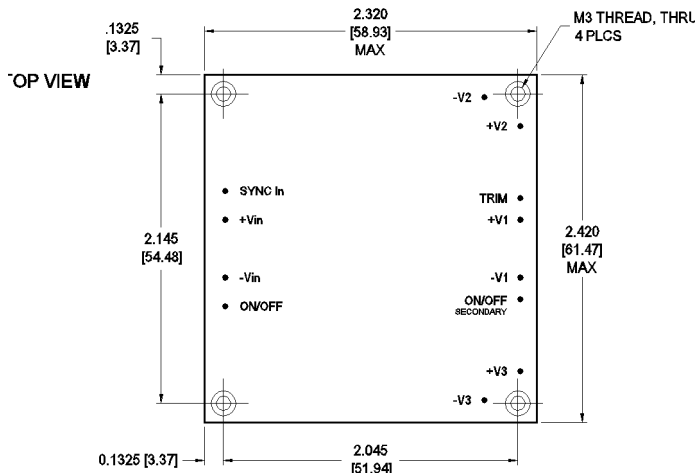
## VKP100xT512



## VKP100xT515



# MECHANICAL



PIN CONNECTIONS	
1	PRIMARY ON/OFF
2	-VIN
3	+VIN
4	SYNC IN
5	-V2
6	+V2
7	TRIM
8	+V1
9	-V1
10	SECONDARY ON/OFF
11	+V3
12	-V3

## NOTES:

All dimensions are in inches (millimeters).

PIN PLACEMENT TOLERANCE:  $\pm 0.005$ "

MECHANICAL TOLERANCE:  $\pm 0.015$ "

Marked with: specific model ordered, date code, job code.

MATERIAL: Units are encapsulated in a low thermal resistance molding compound which has excellent chemical resistance and electrical properties in high humidity environments and over a wide operating temperature range. The encapsulant and outer shell of the unit have UL94V-0 ratings. Lead material is solder plated to allow ease of solderability.

\*See Ordering Information on page 4 for available lead lengths.

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