

# **murata** **OBSOLETE PRODUCT** VKP100MTC Series

100 Watt, Dual/Triple Output, Half Brick DC/DC Converter

Murata Power Solutions Contact Factory for Replacement Model

## FEATURES



- ROHS COMPLIANT
- 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
- APPROVED TO UL/CUL1950, EN 60950

## DESCRIPTION

The VKP100MTC 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 VKP100MTC'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 VKP100xTC'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 VKP100MTC 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.

## AGENCY APPROVALS



## PRODUCT SELECTION CHART

MODEL	INPUT VOLTAGE (Vdc)	Vout			Iout		
		RATED OUTPUT VOLTAGE (VDC)			RATED MAXIMUM OUTPUT CURRENT (A)		
		Output 1 (±)	Output 2 (±)	Output 3 (±)	Output 1	Output 2	Output 3
VKP100MT312C	48 (33-75)	3.3	12	12	30	4.2	4.2
VKP100MT315C		3.3	15	15	30	3.4	3.4
VKP100MT512C		5.1	12	12	20	4.2	4.2
VKP100MT515C		5	15	15	20	3.4	3.4



### INPUT SPECIFICATIONS, ALL MODELS Specifications are at T<sub>CASE</sub> = +40°C nominal input voltage unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input Fusing				10	A
Voltage Range					
VKP100MTC Series		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				
VKP100MTC Series	V <sub>IN</sub> = 30V			5	A
No Load Power Dissipation	P <sub>OUT</sub> = 0, V <sub>IN, Min</sub> < V <sub>IN</sub> < V <sub>IN, Max</sub>			6	W
Inrush Charge					
VKP100MTC Series				0.247	mC
Quiescent Operating Current					
Primary On/Off Disabled			7.5	10	mA
Secondary On/Off Disabled			15	20	mA

### COMMON SPECIFICATIONS, ALL MODELS Specifications are at T<sub>CASE</sub> = +40°C nominal input voltage unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
<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 <sub>ISO</sub> = 240V <sub>AC</sub> , 60Hz		180		μA, rms
<b>GENERAL</b>					
Set Point Accuracy	V <sub>IN</sub> = Nominal, 50% Load			1	%
Turn-on Time	Within 1% of Nominal V <sub>OUT</sub>		3.5	5	mSec
Remote On/Off Control Inputs					
Primary	Open Collector/Drain				
Sink Current-Logic Low	V <sub>IN</sub> = V <sub>MAX</sub>			7	mA
Vlow				0.8	V
Vhigh				Open Collector	
Secondary	Open Collector/Drain				
Sink Current-Logic Low				100	μA
Vlow				0.4	V
Vhigh				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	-40		+100	°C
Storage		-55		+125	°C
Shutdown		+100		+115	°C
Thermal Impedance	Case to Ambient		8.2		°C/W

### VKP100MT312C OUTPUT SPECIFICATIONS Specifications are at T<sub>CASE</sub> = +40°C nominal input voltage unless otherwise specified.

PARAMETER	CONDITIONS	OUTPUT 1			OUTPUT 2			OUTPUT 3			UNITS
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	
Output Power	Total Combined O/P Power = 100 Watts Max		50	100		25	50		25	50	W
Set Point Voltage	I <sub>O, Nom</sub>		3.3			12.2			12.2		V
Output Current, I <sub>OUT</sub>		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 <sub>IN, Min</sub> ≤ V <sub>IN</sub> ≤ V <sub>IN, Max</sub>		0.05	0.10		1.0	2.0		1.0	2.0	%
Load Regulation	I <sub>O</sub> = I <sub>O, Nom</sub> 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 <sub>OUT</sub> * 1% of V <sub>OUT, Nom</sub>		35	50							μSec
Overvoltage Limit		4.2		5.0							V
Efficiency	I <sub>OUT1</sub> =15A, (I <sub>OUT2</sub> +I <sub>OUT3</sub> )= 4.2A F.L. V <sub>IN</sub> =Nominal	85	86								%

### VKP100MT315C OUTPUT SPECIFICATIONS Specifications are at T<sub>CASE</sub> = +40°C nominal input voltage unless otherwise specified.

PARAMETER	CONDITIONS	OUTPUT 1			OUTPUT 2			OUTPUT 3			UNITS
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	
Output Power	Total Combined O/P Power = 100 Watts Maximum		50	100		25	50		25	50	W
Set Point Voltage	I <sub>O,Nom</sub>		3.3			15.85			15.85		V
Output Current, I <sub>OUT</sub>		0.5	15	30.0	0	1.66	3.33	0	1.66	3.33	A
Output Ripple, p-p	DC to 20MHz*		100	200		125	500		125	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 <sub>IN,Min</sub> ≤ V <sub>IN</sub> ≤ V <sub>IN,Max</sub> I <sub>O</sub> = I <sub>O,Nom</sub>		0.05	0.10		1.0	2.0		1.0	2.0	%
Load Regulation	Min Load to Rated Load		0.50	1.0	See Regulation Curves			See Regulation Curves			%
Current Limit Inception	Other Outputs Min Load		38			5.0			5.0		A
Short-Circuit Current			30	38		4.0	5.0		4.0	5.0	A
Transient Response	50 to 100% Load Step										
Peak Deviation			150	250							mV
Settling Time	V <sub>OUT</sub> * 1% of V <sub>OUT,Nom</sub>		35	50							µSec
Overvoltage Limit		4.2		5.0							V
Efficiency	I <sub>OUT1</sub> =15A, (I <sub>OUT2</sub> +I <sub>OUT3</sub> ) = 3.4A F.L. V <sub>IN</sub> =Nominal	85	86								%

### VKP100MT512C OUTPUT SPECIFICATIONS Specifications are at T<sub>CASE</sub> = +40°C nominal input voltage unless otherwise specified.

PARAMETER	CONDITIONS	OUTPUT 1			OUTPUT 2			OUTPUT 3			UNITS
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	
Output Power	Total Combined O/P Power = 100 Watts Combined		50	100		25	50		25	50	W
Set Point Voltage	I <sub>O,Nom</sub>		5.1			12			12		V
Output Current, I <sub>OUT</sub>		0.5	10	20	0	2.1	4.2	0	2.1	4.2	A
Output Ripple, p-p	DC to 20MHz*		100	150		150	500		150	500	mV
Output Adjust Range	*	4.75		5.50	Dependent on V1						V
Output Temperature Drift			.02	.05		.02	.05		.02	.05	%/°C
Line Regulation	V <sub>IN,Min</sub> ≤ V <sub>IN</sub> ≤ V <sub>IN,Max</sub> I <sub>O</sub> = I <sub>O,Nom</sub>		0.05	0.10		1.0	2.0		1.0	2.0	%
Load Regulation	Min Load to Rated Load		0.50	1.0	See Regulation Curves			See Regulation Curves			%
Current Limit Inception	Other Outputs Min Load		26.0			6.0			6.0		A
Short-Circuit Current			20.0	26.0		5.0	6.0		5.0	6.0	A
Transient Response	50 to 100% Load Step										
Peak Deviation			200	300							mV
Settling Time	V <sub>OUT</sub> * 1% of V <sub>OUT,Nom</sub>		35	50							µSec
Overvoltage Limit		6.0		7.0							V
Efficiency	I <sub>OUT1</sub> =10A, (I <sub>OUT2</sub> +I <sub>OUT3</sub> ) = 4.2A F.L. V <sub>IN</sub> =Nominal	86	87								%

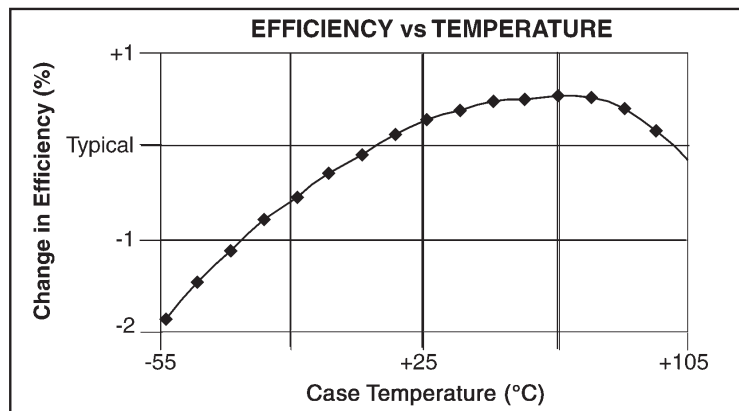
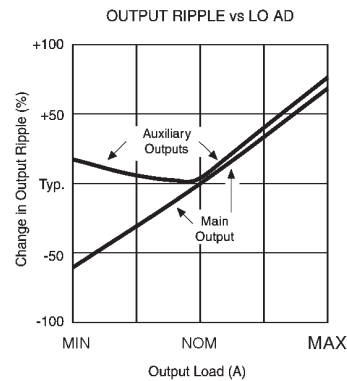
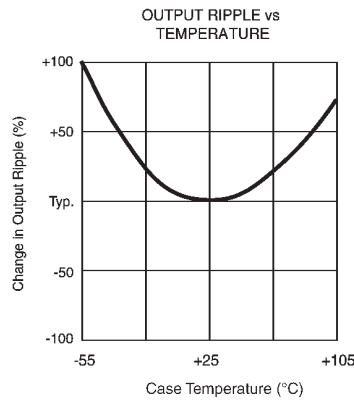
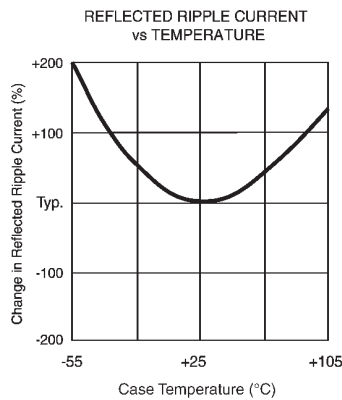
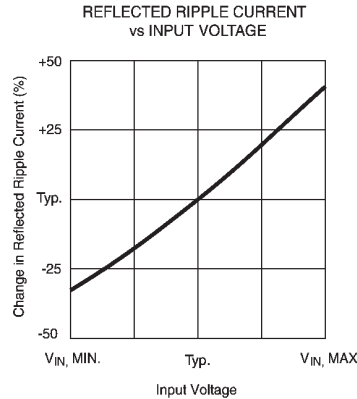
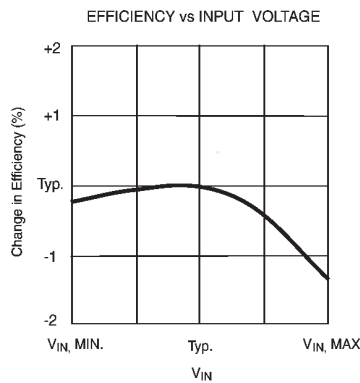
### VKP100MT515C OUTPUT SPECIFICATIONS Specifications are at T<sub>CASE</sub> = +40°C nominal input voltage unless otherwise specified.

PARAMETER	CONDITIONS	OUTPUT 1			OUTPUT 2			OUTPUT 3			UNITS
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	
Output Power	Total Combined O/P Power = 100 Watts Max		50	100		25	50		25	50	W
Set Point Voltage	I <sub>O,Nom</sub>		5.0			15.3			15.3		V
Output Current, I <sub>OUT</sub>		0.5	10	20	0	1.66	3.33	0	1.66	3.33	A
Output Ripple, p-p	DC to 20MHz*		100	150		125	500		125	500	mV
Output Adjust Range	*	4.60		5.50	Dependent on V1						V
Output Temperature Drift			.02	.05		.02	.05		.02	.05	%/°C
Line Regulation	V <sub>IN,Min</sub> ≤ V <sub>IN</sub> ≤ V <sub>IN,Max</sub> I <sub>O</sub> = I <sub>O,Nom</sub>		0.05	1.0		1.0	2.0		1.0	2.0	%
Load Regulation	Min Load to Rated Load		0.05	1.0	See Regulation Curves			See Regulation Curves			%
Current Limit Inception	Other Outputs Min Load		26.0			5.0			5.0		A
Short-Circuit Current			20.0	26.0		4.0	5.0		4.0	5.0	A
Transient Response	50 to 100% Load Step										
Peak Deviation			200	300							mV
Settling Time	V <sub>OUT</sub> * 1% of V <sub>OUT,Nom</sub>		35	50							µSec
Overvoltage Limit		6.0		7.0							V
Efficiency	I <sub>OUT1</sub> =10A, (I <sub>OUT2</sub> +I <sub>OUT3</sub> ) = 4.2A F.L. V <sub>IN</sub> =Nominal	86	87								%

\*See Application Notes available on the web at [www.cd4power.com](http://www.cd4power.com)

**TYPICAL PERFORMANCE CURVE**

$T_{CASE} = +40^{\circ}C$ , nominal input voltage, nominal load, recommended external components applied, unless otherwise specified. (Refer to Application Note DCAN-9 at www.cd4power.com)



**ABSOLUTE MAXIMUM 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

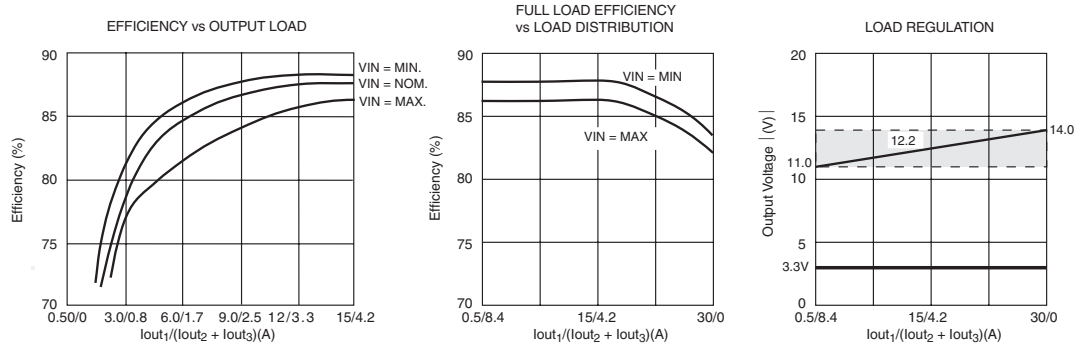
**ORDERING INFORMATION**

Device Family	VKP100	MTYZ	-	L	C
Indicates 100 Watt Regulated Unit					
Model Number	Selected from Table of Electrical Characteristics				
Where:	<ul style="list-style-type: none"> <li>X = Input Voltage (M = 48VDC)</li> <li>T = Number of Outputs (Triple "T")</li> <li>Y = 3 for 3.3V, 5 for 5V</li> <li>Z = 12 for 12V, 15 for 15V</li> </ul>				
Lead Length	<ul style="list-style-type: none"> <li>0.250" - No Number</li> <li>0.145" - (6)</li> <li>0.110" - (8)</li> </ul>				
RoHS Compliant					

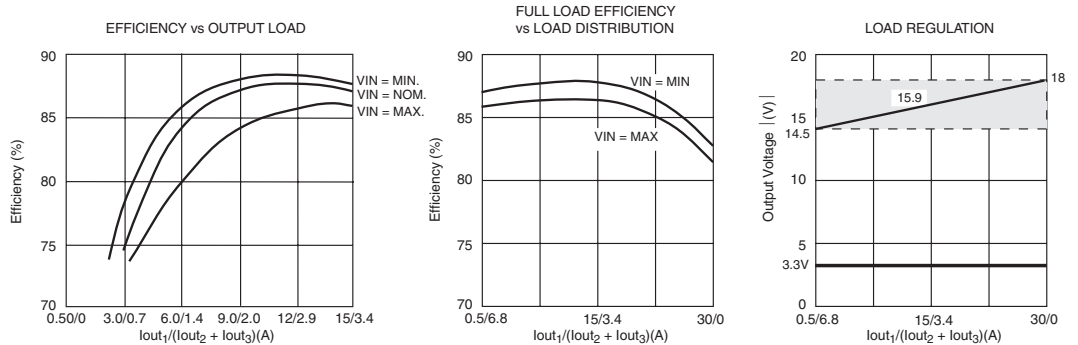
**TYPICAL PERFORMANCE CURVE**

$T_{CASE} = +40^{\circ}C$ , nominal input voltage, nominal load, recommended external components applied, unless otherwise specified. (Refer to Application Note DCAN-9 at [www.cd4power.com](http://www.cd4power.com))

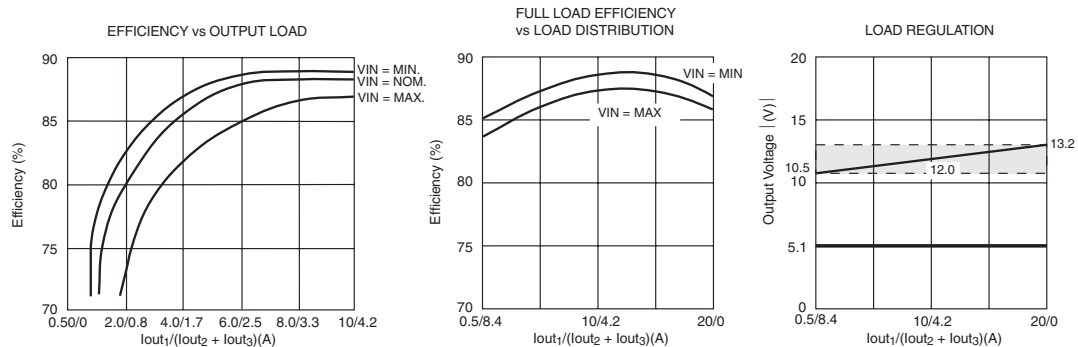
**VKP100xT312C**



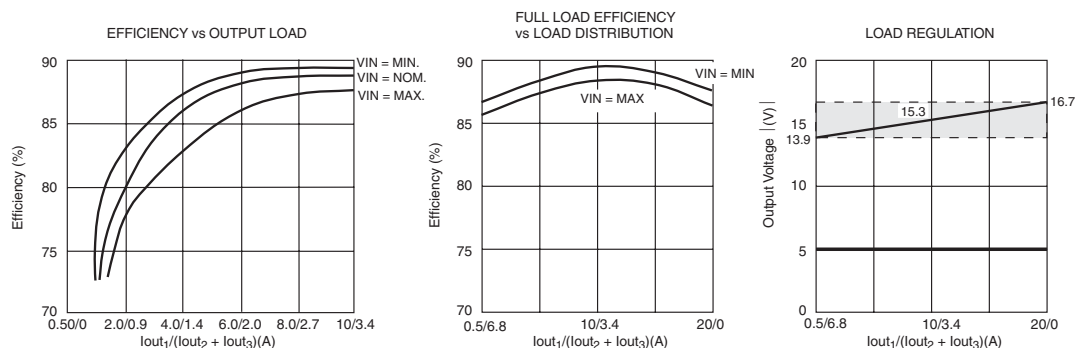
**VKP100xT315C**



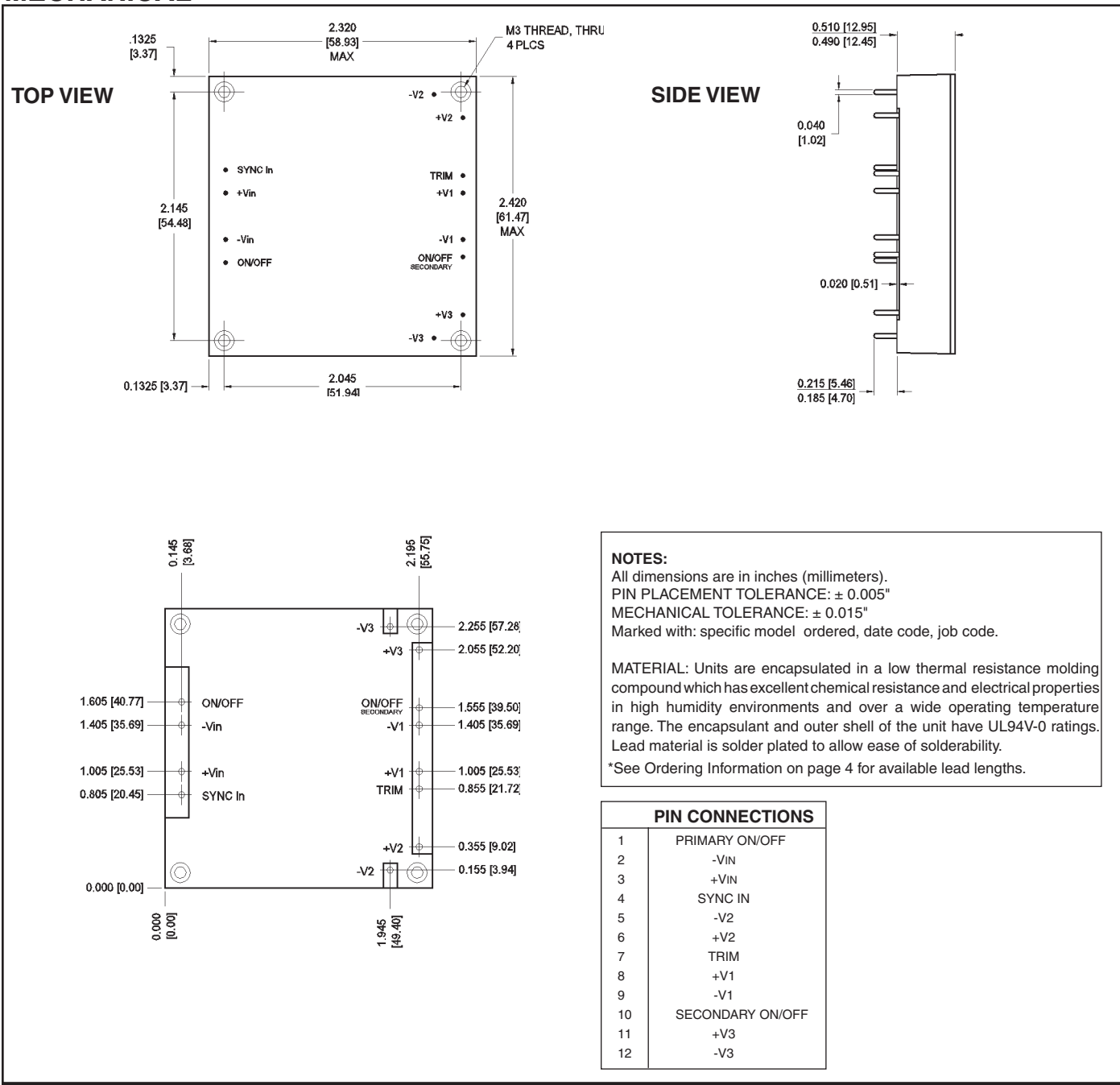
**VKP100xT512C**



**VKP100xT515C**



**MECHANICAL**



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