

FEATURES



- 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
- 500V_{DC} 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

DESCRIPTION

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 V_{out}.

The peak deviation will not exceed 10% of V_{out} 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.

AGENCY APPROVALS



PRODUCT SELECTION CHART

| MODEL | INPUT VOLTAGE (V _{DC}) | V _{out} | | | I _{out} | | |
|-------------|----------------------------------|----------------------------|--------------|--------------|----------------------------------|----------|----------|
| | | RATED OUTPUT VOLTAGE (VDC) | | | RATED MAXIMUM OUTPUT CURRENT (A) | | |
| | | Output 1 (±) | Output 2 (±) | Output 3 (±) | Output 1 | Output 2 | Output 3 |
| VKP100MT312 | 48 (33-75) | 3.3 | 12 | 12 | 30 | 4.2 | 4.2 |
| VKP100MT315 | | 3.3 | 15 | 15 | 30 | 3.4 | 3.4 |
| VKP100MT512 | | 5.1 | 12 | 12 | 20 | 4.2 | 4.2 |
| VKP100MT515 | | 5 | 15 | 15 | 20 | 3.4 | 3.4 |



For full details go to www.murata-ps.com/rohs

INPUT SPECIFICATIONS, ALL MODELS

Specifications are at $T_{CASE} = +40^{\circ}C$ nominal input voltage unless other-

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|-----------------------------|---|-----|-----|-------|-----------------|
| Input Fusing | | | | 10 | A |
| Voltage Range | | | | | |
| VKP100MT Series | | 33 | 48 | 75 | V _{DC} |
| Reflected Ripple Current | Peak - Peak | | | 370 | mA |
| Input Ripple Rejection | DC to 1KHz | 50 | 60 | | dB |
| Maximum Input Current | Output Power = 100W | | | | |
| VKP100MT Series | $V_{IN} = 30V$ | | | 5 | A |
| No Load Power Dissipation | $P_{OUT} = 0, V_{IN, Min} < V_{IN} < V_{IN, Max}$ | | | 6 | W |
| Inrush Charge | | | | 0.247 | mC |
| VKP100MT Series | | | | | |
| Quiescent Operating Current | | | 7.5 | 10 | mA |
| Primary On/Off Disabled | | | 15 | 20 | mA |
| Secondary On/Off Disabled | | | | | |

COMMON SPECIFICATIONS, ALL MODELS

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

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|--------------------------------|--|------|------|----------------|-----------------|
| ISOLATION | | | | | |
| Input to Each Output | Peak Test | 1500 | | | V _{DC} |
| Input to Baseplate | | 1500 | | | V _{DC} |
| Channel to Channel | Any Channel to Any Channel | 500 | | | V _{DC} |
| Resistance, Input - Output | | 10 | | | MΩ |
| Capacitance, Input - Output | | | 2000 | | pF |
| Leakage Current | $V_{ISO} = 240V_{AC}, 60Hz$ | | 180 | | μA, rms |
| GENERAL | | | | | |
| 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 |
| 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) |
| TEMPERATURE | | | | | |
| Operation/Specification | Case Temperature | -40 | | +100 | °C |
| Storage | | -55 | | +125 | °C |
| Shutdown | | +100 | | +115 | °C |
| Thermal Impedance | Case to Ambient | | 8.2 | | °C/W |

VKP100MT312 OUTPUT SPECIFICATIONS

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

| 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 | $I_{O, Nom}$ | | 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 | $V_{IN, Min} \leq V_{IN} \leq V_{IN, Max}$ | | 0.05 | 0.10 | | 1.0 | 2.0 | | 1.0 | 2.0 | % |
| Load Regulation | $I_O = I_{O, Nom}$ 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 | | | | | | | | % |

VKP100MT315 OUTPUT SPECIFICATIONS

Specifications are at $T_{CASE} = +40^{\circ}C$ 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 | $I_{O,Nom}$ | | 3.3 | | | 15.85 | | | 15.85 | | 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* | | 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 | $V_{IN,Min} \leq V_{IN} \leq V_{IN,Max}$ $I_O = I_{O,Nom}$ | | 0.05 | 0.10 | | 1.0 | 2.0 | | 1.0 | 2.0 | % |
| Load Regulation | Min Load to Rated Load | | 0.50 | 1.0 | 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 | $V_{OUT} 1\%$ of $V_{OUT,Nom}$ | | 35 | 50 | | | | | | | 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 | | | | | | | % |

VKP100MT512 OUTPUT SPECIFICATIONS

Specifications are at $T_{CASE} = +40^{\circ}C$ 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 | $I_{O,Nom}$ | | 5.1 | | | 12 | | | 12 | | 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* | | 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 | $V_{IN,Min} \leq V_{IN} \leq V_{IN,Max}$ $I_O = I_{O,Nom}$ | | 0.05 | 0.10 | | 1.0 | 2.0 | | 1.0 | 2.0 | % |
| Load Regulation | Min Load to Rated Load | | 0.50 | 1.0 | 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 | $V_{OUT} 1\%$ of $V_{OUT,Nom}$ | | 35 | 50 | | | | | | | 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 | | | | | | | % |

VKP100MT515 OUTPUT SPECIFICATIONS

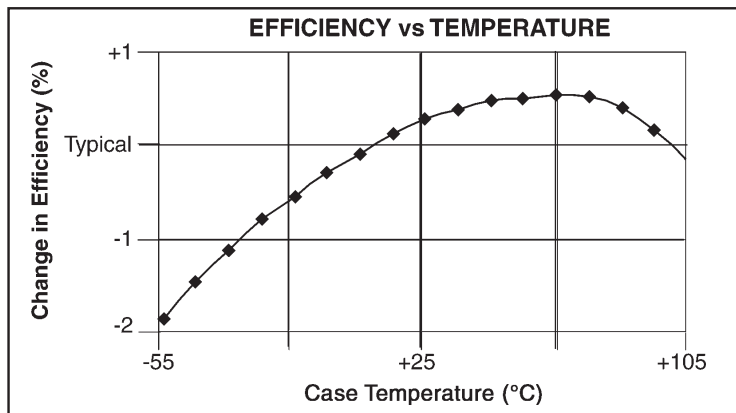
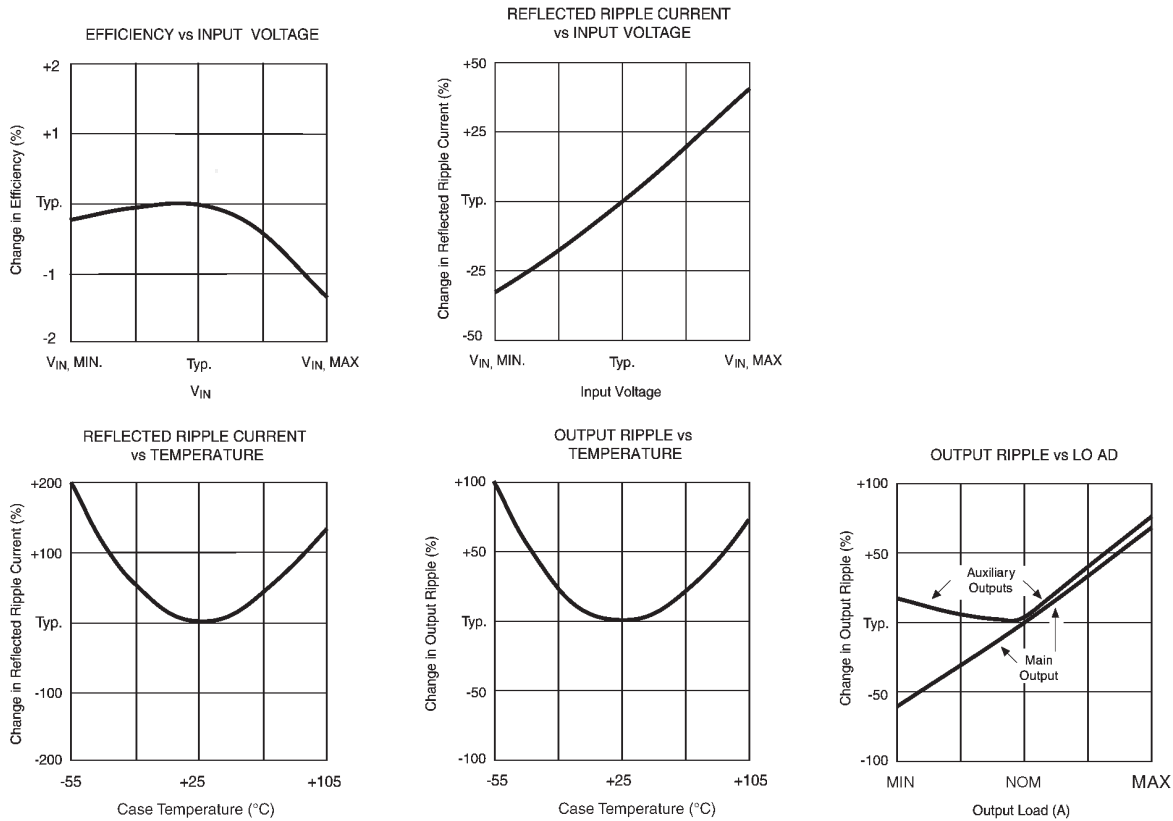
Specifications are at $T_{CASE} = +40^{\circ}C$ nominal input voltage unless otherwise specified.

| 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 | $I_{O,Nom}$ | | 5.0 | | | 15.3 | | | 15.3 | | 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* | | 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 | $V_{IN,Min} \leq V_{IN} \leq V_{IN,Max}$ $I_O = I_{O,Nom}$ | | 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 | $V_{OUT} 1\%$ of $V_{OUT,Nom}$ | | 35 | 50 | | | | | | | 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

TYPICAL PERFORMANCE CURVE

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



ABSOLUTE MAXIMUM RATINGS

| | |
|--|------------------|
| Output Short-Circuit Duration | Continuous |
| Baseplate Temperature | +100 $^{\circ}C$ |
| Lead Temperature (soldering, 10 seconds max) | +300 $^{\circ}C$ |
| Storage Temperature | +125 $^{\circ}C$ |
| Input to Output Isolation | 1500 Vdc |

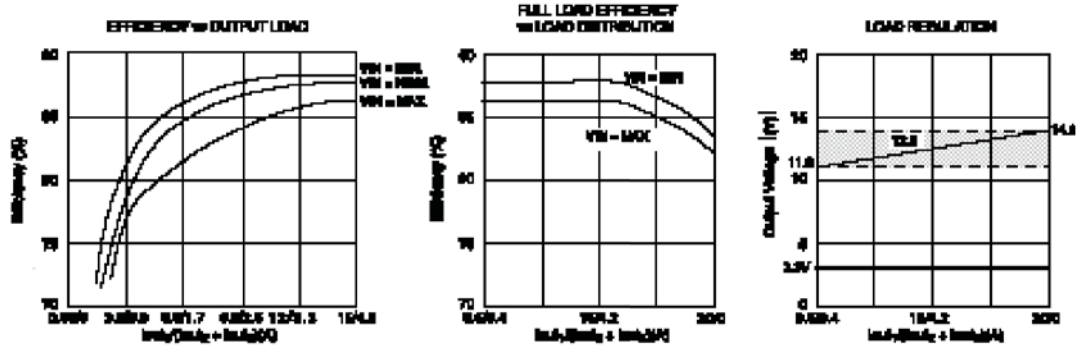
ORDERING INFORMATION

| | |
|---|-------|
| VKP100 MTYZ - L | |
| Device Family | _____ |
| 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 | |
| Z = 12 for 12V, 15 for 15V | |
| Lead Length | _____ |
| 0.250" - No Number | |
| 0.145" - (6) | |
| 0.110" - (8) | |

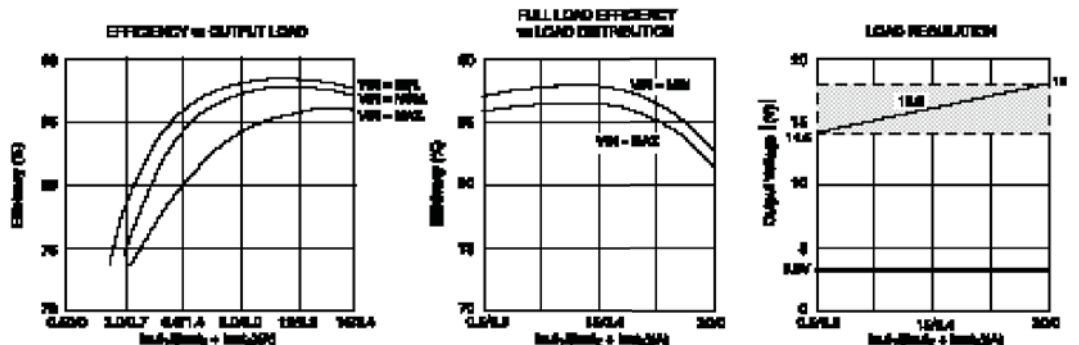
TYPICAL PERFORMANCE CURVE

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

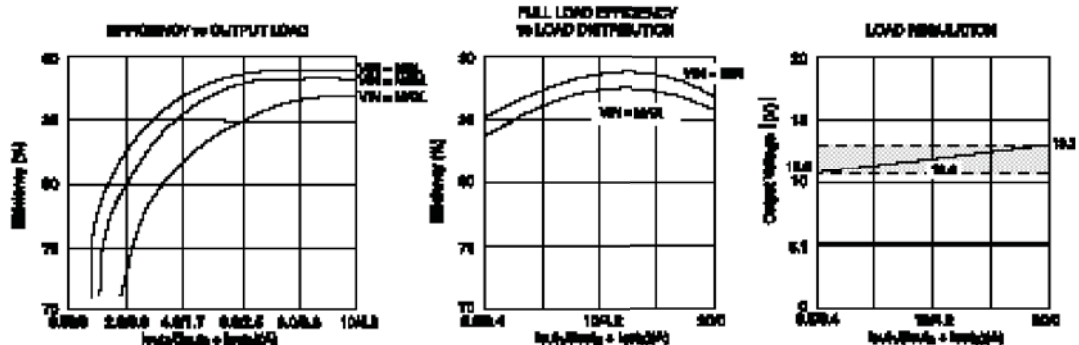
VKP100xT312



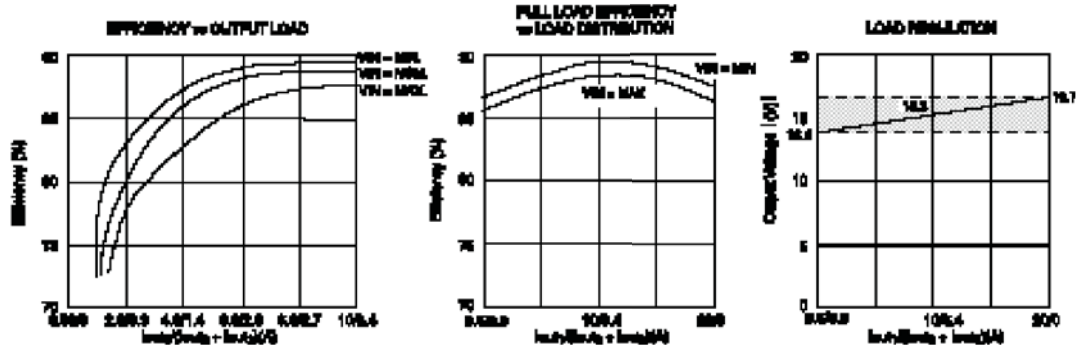
VKP100xT315



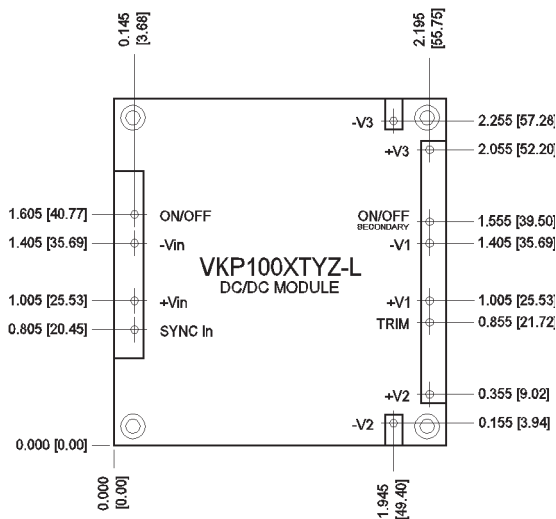
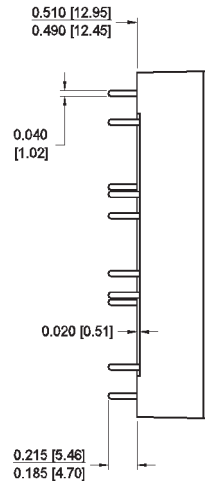
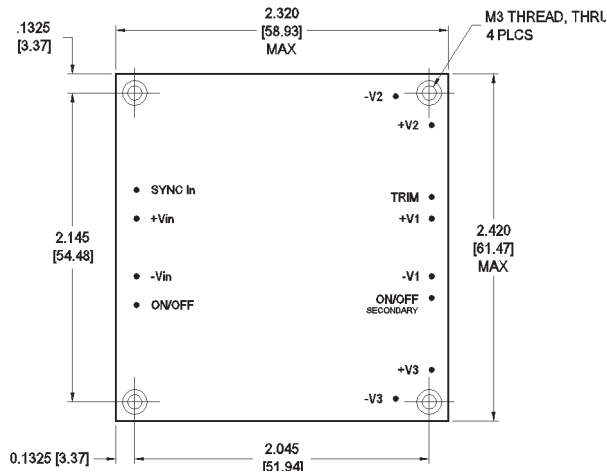
VKP100xT512



VKP100xT515



MECHANICAL



NOTES:
 All dimensions are in inches (millimeters).
 PIN PLACEMENT TOLERANCE: ± 0.005"
 MECHANICAL TOLERANCE: ± 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.

| 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 |