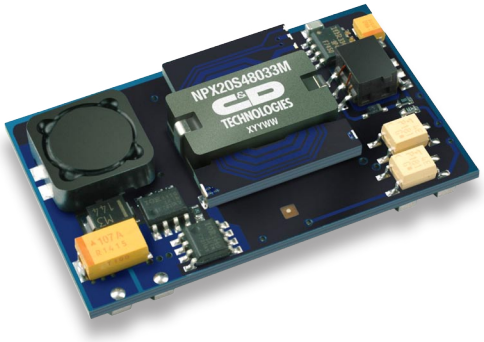
NPX20 SERIES

Isolated 20W Single Output DC/DC Converters



FEATURES

- Synchronous rectifier technology
- Full 6 Amp output current
- Remote on/off & output trim
- Minimum 76% efficiency at 1.8V
- Over voltage, current & temperature protection
- Operation to zero load
- UL 60950 recognition pending

DESCRIPTION

The NPX20 series of DC/DC Converters combines ease of application with versatility and is available in three pin patterns based on popular industry standards.

SELECTION GUIDE

Order Code	Input Voltage V (nom.)	Output Voltage V	Output Current A	Output Power W (max.)	Efficiency % (min.)
NPX20S24018M	24	1.8	6.0	10.8	76
NPX20S24025M	24	2.5	6.0	15.0	80
NPX20S24033M	24	3.3	6.0	19.8	84
NPX20S48018M	48	1.8	6.0	10.8	78
NPX20S48025M	48	2.5	6.0	15.0	81
NPX20S48033M	48	3.3	6.0	19.8	84

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	Continuous operation 24V I/P types	18	24	36	V
	Continuous operation 48V I/P types	36	48	75	
Under voltage lock out	Turn On Threshold NPX20S24XXX	15	17	18	V
	Turn Off Threshold NPX20S24XXX	11	16	16.5	
	Turn On Threshold NPX20S48XXX	30	32	35	
	Turn Off Threshold NPX20S48XXX	25	32	34.5	
Input standby current			1.4		mA
Power consumption	Zero load			1.0	W
Reflected ripple current	For measurement method see page 2		40		mA p-p

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage set point error		-2.0		+2.0	$\%V_{OUT}$
Overall voltage envelope	Substrate temperature -40°C to +85°C	-3.0		+3.0	$\%V_{OUT}$
Line regulation			2.0	5.0	mV
Load regulation				20.0	mV
Ripple & noise	BW = 0 to 20MHz with 1µF ceramic & 10µF tantalum capacitors			100	mV p-p
Voltage trim range		-10.0		+10.0	$\%V_{OUT}$
Transient response	Peak deviation (50-100% & 100-50% swing)		10		$\%V_{OUT}$
	Settling time (within 1% $V_{OUT\ NOM}$)		600		µs
Start delay	From remote on/off NPX20S24XXX		5.0		ms
	From remote on/off NPX20S48XXX		5.0		
	From application of VIN NPX20S24XXX		300		
	From application of VIN NPX20S48XXX		800		
Overcurrent protection			110		$\%I_{OUT}$
Overvoltage protection				140	$\%V_{OUT}$

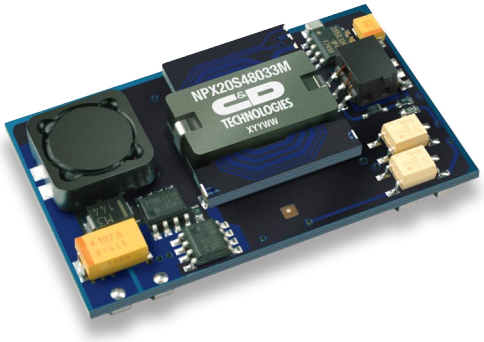
GENERAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency			350		kHz
Remote on/off	Module on (open collector input)				
	Module off			0.5	V
		-1.0			mA
MTTF	MIL HDBK 217F	487000			kHrs

ABSOLUTE MAXIMUM RATINGS

Input voltage, 24V input types[1]	40V
Input voltage, 48V input types[1]	80V
Output voltage	-0.5V / +5V
Output trim control	-0.5V / $+V_{OUT}$
Remote On/Off	0.5V

1. Absolute maximum value for 30 seconds. Prolonged operation may damage the product.
All specifications typical at T_A=25°C, nominal input voltage and rated output current unless otherwise specified.



ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Flash tested for 1 second	1500			VDC
Resistance	VISO = 500VDC	1			GΩ
Capacitance			65		pF

ENVIRONMENTAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Substrate temperature	Full load	-40		85	°C
Storage	Absolute max. internal temperature	-40		125	°C
Thermal protection	Operates at substrate temperature		100		°C

OUTPUT VOLTAGE ADJUSTMENT

The trim resistor equations are:

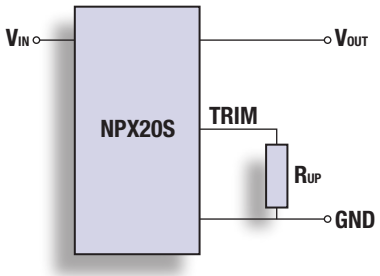
$$R_{DOWN} = \left[\frac{(V_{OUT} - L) \times G}{V_{NOM} - V_{OUT}}\right] - H$$

$$R_{UP} = \left[\frac{G \times L}{V_{OUT} - L - K}\right] - H$$

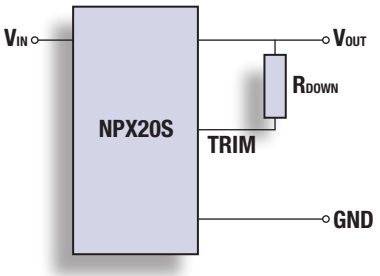
Where:

V_{NOM}	1.8	2.5	3.3
G	5100	5100	5100
H	2000	2000	2000
L	1.224	1.224	1.224
K	0.576	1.276	2.076

TRIM UP



TRIM DOWN

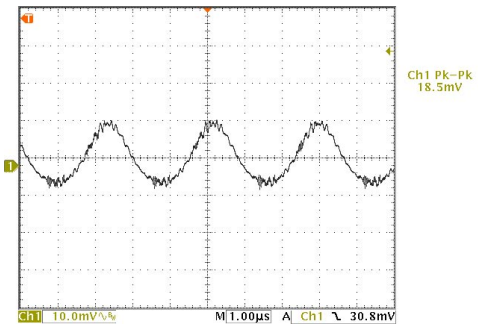


When the output voltage is trimmed up, output current must be derated so that the maximum output power (shown in the selection table) is not exceeded.

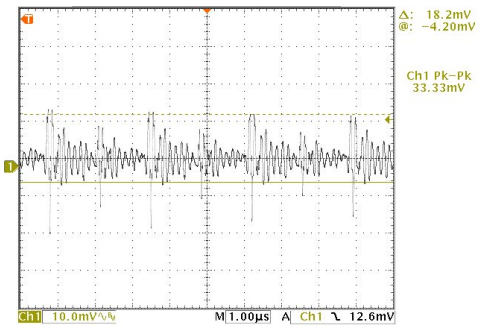
INPUT REFLECTED RIPPLE CURRENT

Input reflected ripple current is measured with a 33µF low ESR (<0.7Ω) capacitor across the input of the NPX DC/DC converter, a 12µH filter inductor, and a large bulk capacitor 220µF <100mΩ connected across the power supply.

TYPICAL INPUT REFLECTED RIPPLE CURRENT V_{IN} = 24V



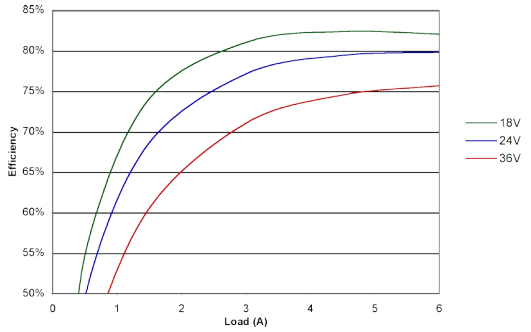
TYPICAL INPUT REFLECTED RIPPLE CURRENT V_{IN} = 48V



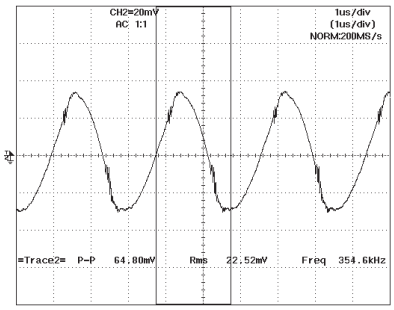
All specifications typical at T_A=25°C, nominal input voltage and rated output current unless otherwise specified.

CHARACTERISITCS CURVES – NPX20S24018M

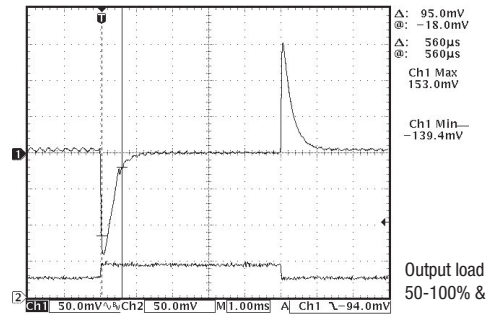
EFFICIENCY VS OUTPUT CURRENT



OUTPUT RIPPLE & NOISE

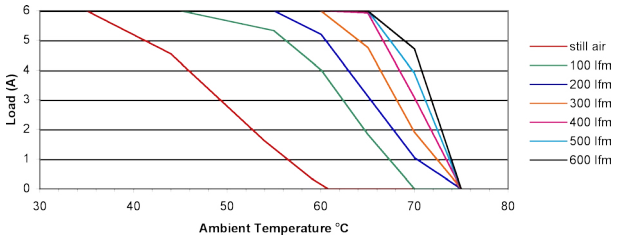


TYPICAL TRANSIENT RESPONSE



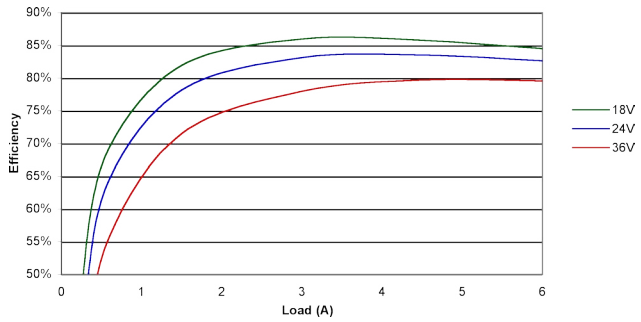
Output load change:
50-100% & 100-50%

THERMAL DERATING

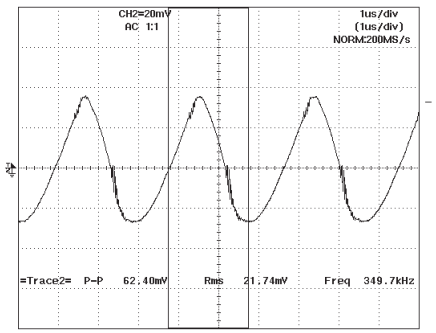


CHARACTERISITCS CURVES – NPX20S24025M

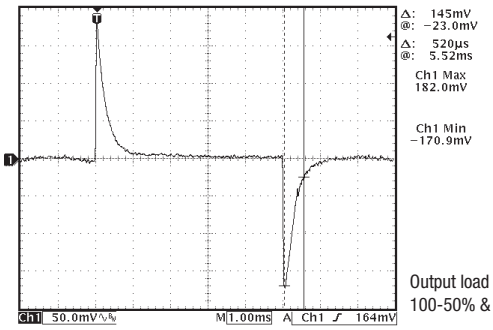
EFFICIENCY VS OUTPUT CURRENT



OUTPUT RIPPLE & NOISE

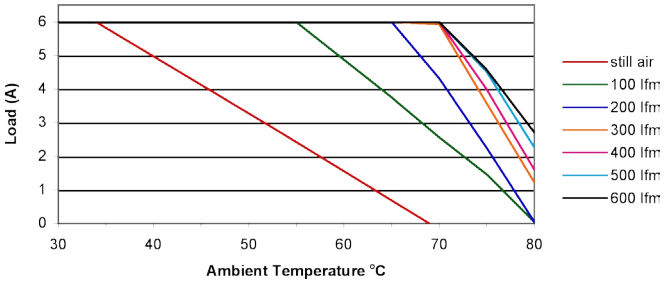


TYPICAL TRANSIENT RESPONSE



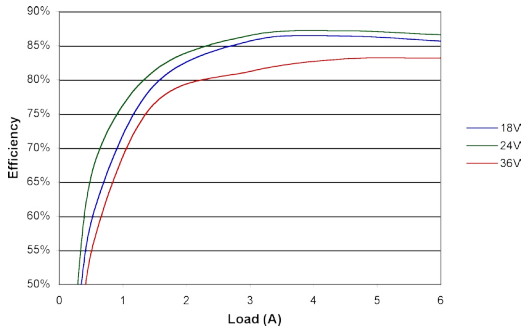
Output load change:
100-50% & 50-100%

THERMAL DERATING

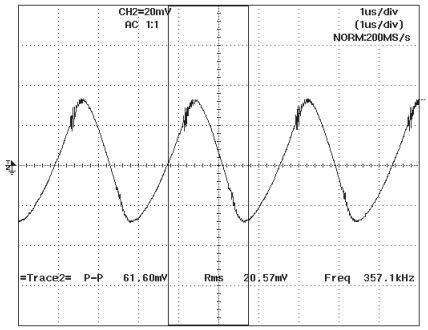


CHARACTERISITCS CURVES – NPX20S24033M

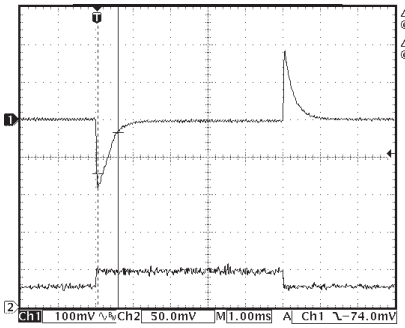
EFFICIENCY VS OUTPUT CURRENT



OUTPUT RIPPLE & NOISE

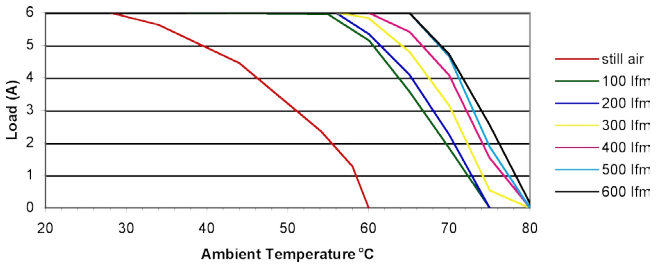


TYPICAL TRANSIENT RESPONSE



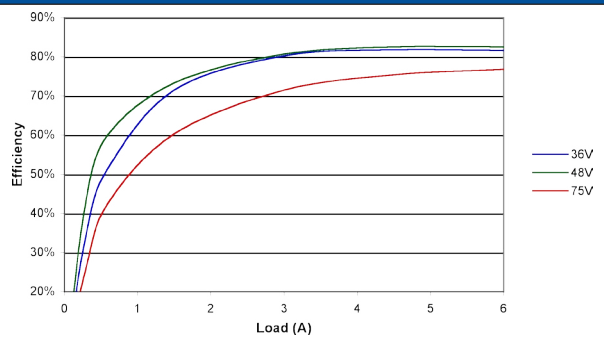
Output load change:
50-100% & 100-50%

THERMAL DERATING

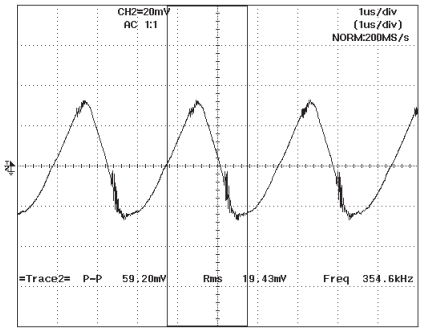


CHARACTERISITCS CURVES – NPX20S48018M

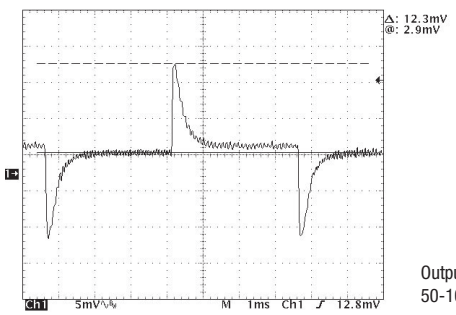
EFFICIENCY VS OUTPUT CURRENT



OUTPUT RIPPLE & NOISE

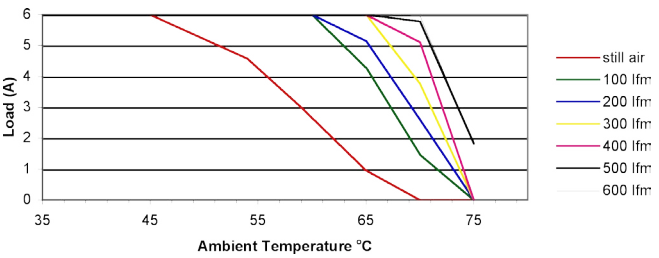


TYPICAL TRANSIENT RESPONSE



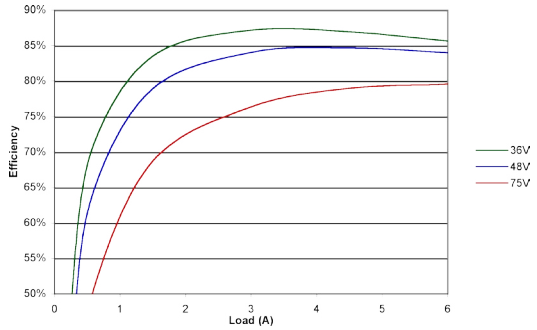
Output load change:
50-100% & 100-50%

THERMAL DERATING

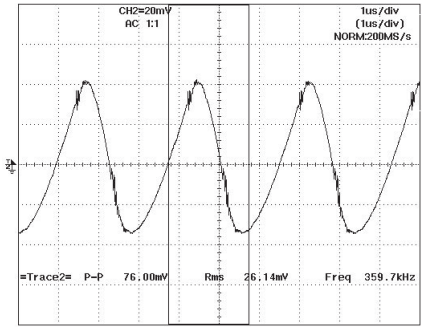


CHARACTERISITCS CURVES – NPX20S48025M

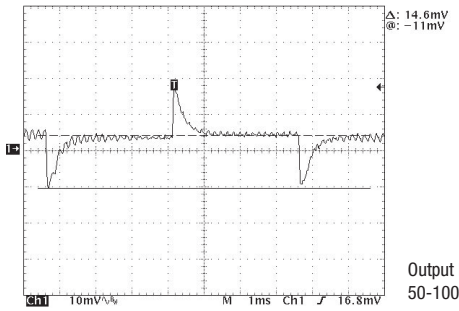
EFFICIENCY VS OUTPUT CURRENT



OUTPUT RIPPLE & NOISE



TYPICAL TRANSIENT RESPONSE



Output load change:
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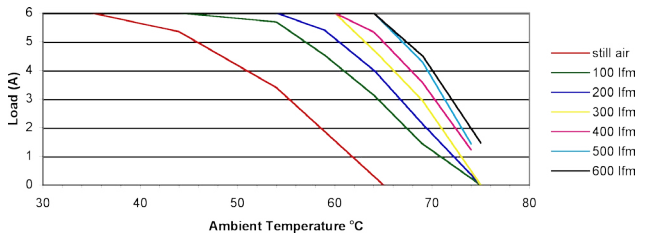
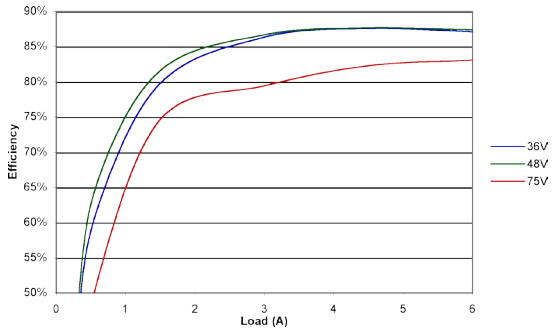
THERMAL DERATING

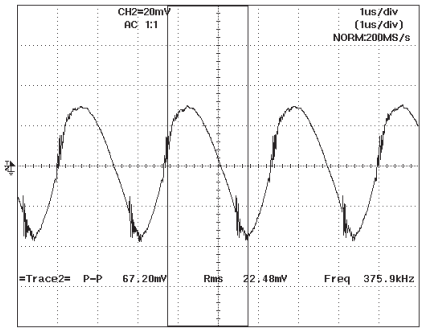


CHARACTERISITCS CURVES – NPX20S48033M

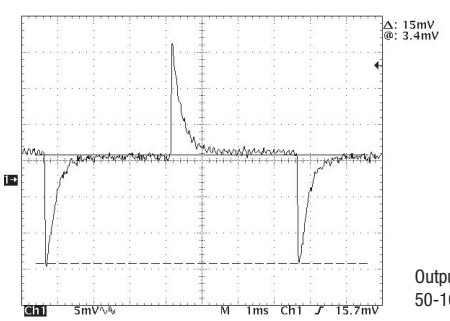
EFFICIENCY VS OUTPUT CURRENT



OUTPUT RIPPLE & NOISE

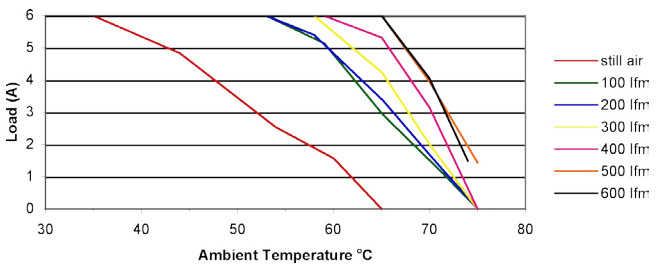


TYPICAL TRANSIENT RESPONSE



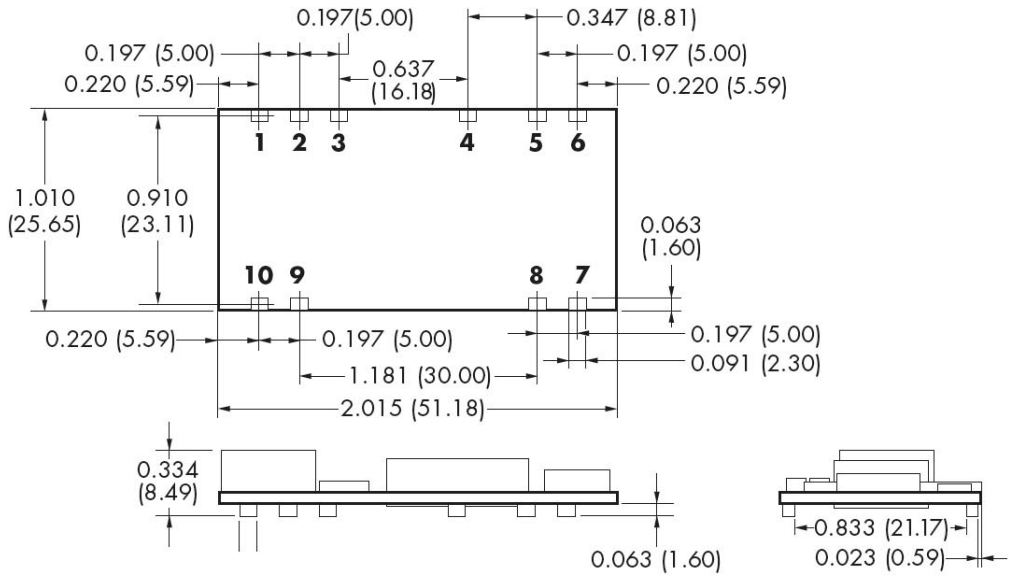
Output load change:
50-100% & 100-50%

THERMAL DERATING



MECHANICAL DIMENSIONS

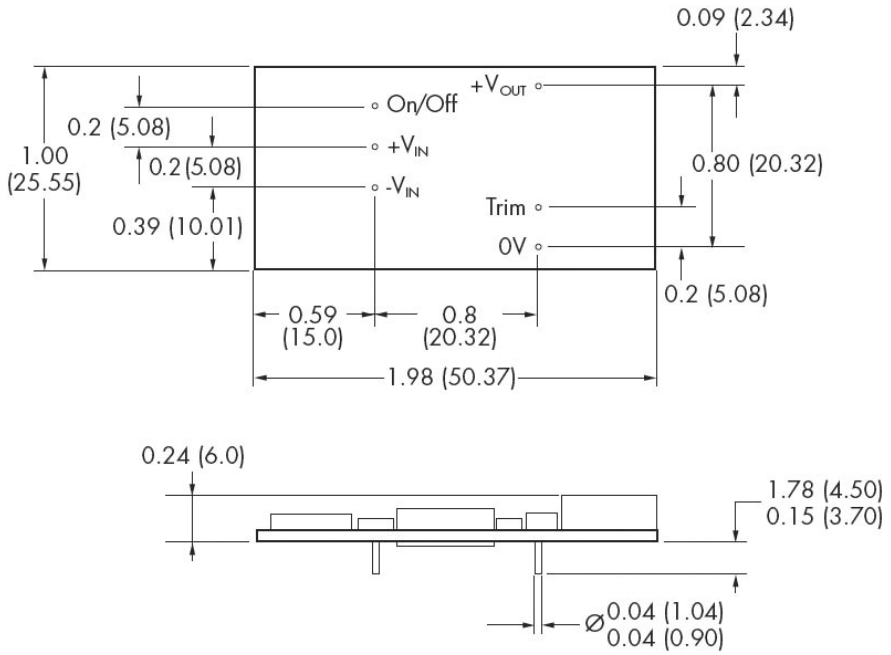
SURFACE MOUNT PACKAGE STYLE (BOTTOM VIEW)



PIN CONNECTIONS

Pin	Function
1	$+V_{OUT}$
2	$-V_{OUT}$
3	No Connection
4	Trim
5	No Connection
6	No Connection
7	No Connection
8	On/Off
9	$-V_{IN}$
10	$+V_{IN}$

THROUGH HOLE PACKAGE STYLE (BOTTOM VIEW)

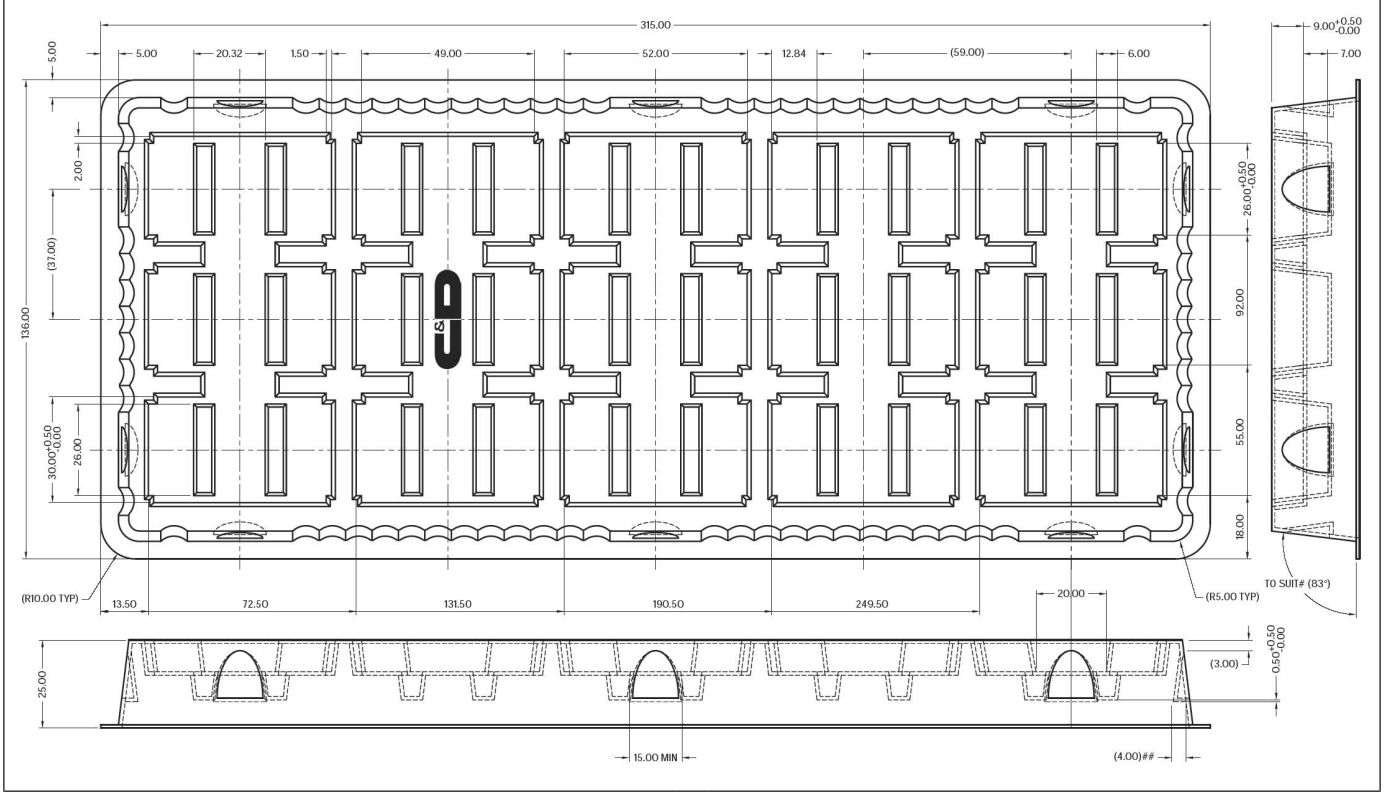


All pins on a 0.1(2.54) pitch and within ±0.01(0.25) of true position.

Unless otherwise stated all dimensions in inches(mm) ±0.01(0.25).

PACKAGING SPECIFICATIONS

TRAY DIMENSIONS



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