

# NON-ISOLATED DC/DC CONVERTER

12V Input 1.60V-2.80V/20A Output



## V7XE-20AS20

- Non-Isolated
- High Efficiency
- High Power Density
- 2 Phase Architecture
- Power Good Signal
- Remote On/Off
- OCP/SCP
- VID Controlled Output Voltage

### Description

The Bel V7XE-20AS20 is a part of the non-isolated dc to dc converter Power Module series. The module uses a SIP package for ease of layout and space savings. The efficiency is typically 86% at full load. This module makes use of inherent output resistance to facilitate improved transient response. This means the output voltage will decrease with increasing output current. For this reason, the total DC Regulation window at any given operating temperature consists of a no-load setpoint and a load dependent voltage drop due to module output resistance.

### Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number
1.60V – 2.80V	12V	20A	56W	86%	V7XE-20AS20

### Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	-0.3V	-	16V	
Output Enable Terminal Voltage	-0.3V	-	16V	
Input Signal Voltage	-0.3V	-	7.3V	
Ambient Temperature	0°C	-	55°C	
Storage Temperature	-40°C	-	125°C	

### Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	10.8V	-	13.2V	
Input Current (full load)	-	-	6A	
Input Current (no load)	-	-	100mA	
Remote Off Input Current	-	3mA	30mA	
Input Reflected Ripple Current (pk-pk)	-	-	150mA	Tested with a 47uF Aluminum capacitor.
Input Reflected Ripple Current (RMS)	-	-	25mA	
Turn-on Voltage Threshold	-	5.3V	-	
Turn-off Voltage Threshold	-	5.5V	-	

**Note:** All specifications are typical at 12V input, full load at 25°C unless otherwise stated.

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## Output Specifications

Parameter	Min	Typ	Max	Notes
Output Voltage Range	1.60V	-	2.80V	Per attached VID code
DC load-line slope	-	-2.5mV/A	-	50mV of droop @I <sub>fl</sub>
Output Current	0A	-	20A	
Current Limit Threshold	25A	-	35A	
Ripple and Noise (RMS)	-	15mV	-	Tested with 0-20MHz BW, 7 × 4.7uF ceramic capacitors and 10 X 560uF Oscon.
Ripple and Noise (pk-pk)	-	40mV	-	
Turn on Time	-	-	200mS	
Overshoot at Turn on	-	0%	5%	
Output Capacitance	0uF	-	1000uF	
<b>Transient Response</b>				
50% ~ 100% Max Load	All	-	60mV	Test conditions: di/dt=1A/us, Vin=12V, and with 7× 4.7uFuF ceramic capacitors and 10 X 560uF Oscon at the output.
Settling Time		-	70uS	
100% ~ 50% Max Load		-	60mV	
Settling Time		-	30uS	

**Note:** All specifications are typical at 12V input, full load at 25°C unless otherwise stated.

## General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency Vo=2.80V Vo=1.60V	84% 81%	86% 83%	- - -	Measured at Vin=12V, full load
Switching Frequency	450KHz	500KHz	550KHz	
MTBF	TBD			Calculated Per Bell Core TR-332 (I <sub>o</sub> = Nominal; T <sub>a</sub> = 25°C)
Dimensions Inches (L × W × H) Millimeters (L × W × H)	2.5 x 1.0 x 0.41 63.50 x 25.4 x 10.4			
Weight	-	18g	-	

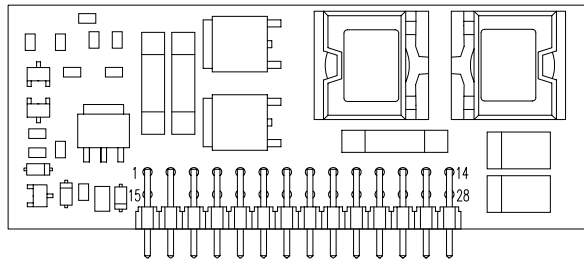
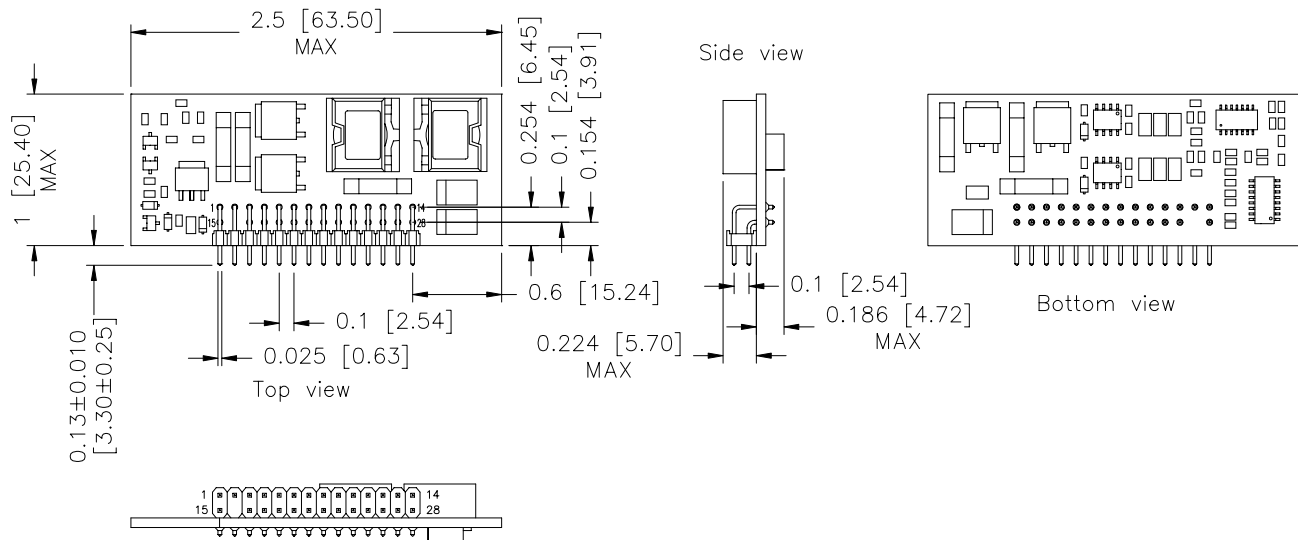
**Note:** All specifications are typical at 25°C unless otherwise stated.

## Control Specifications

Parameter	Min	Typ	Max	Notes
Signal Low (Unit Off)	-0.3V	-	0.3V	Remote on/off pin open, unit on.
Signal High (Unit On)	1.5V	-	13.2V	
Signal Low	-	-	0.5V	
Current Sink	-	-	6mA	
Signal High	-	-	5.5V	

# NON-ISOLATED DC/DC CONVERTERS

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## Pin Connections

Function	Pin	Pin	Function
Vin 1	1	15	Vin 2
Reserved	2		No Pin
Reserved	3	17	Reserved
VID0	4	18	VID1
VID2	5	19	VID3
Vid25mV	6	20	Power Good
OUTEN	7	21	ISHARE
Reserved	8	22	Reserved
Vsense-	9	23	Vsense+
Ground	10	24	Ground
Ground	11	25	Ground
Ground	12	26	Ground
Vout	13	27	Vout
Vout	14	28	Vout

Module leads, header, and any portion of the component that is exposed directly to molten solder will withstand a temperature of 260 degrees C for a minimum of 10 seconds. Component sections not exposed directly to the solder will withstand 150 degrees C. Lead solderability meets ANSI/J-STD-002.

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## Voltage Identification (VID) Code

VID25mV	VID3	VID2	VID1	VID0	Vo (VDC)
0	0	1	0	0	1.608
1	0	1	0	0	1.646
0	0	0	1	1	1.685
1	0	0	1	1	1.723
0	0	0	1	0	1.761
1	0	0	1	0	1.800
0	0	0	0	1	1.838
1	0	0	0	1	1.876
0	0	0	0	0	1.915
1	0	0	0	0	1.953
0	1	1	1	1	1.991
1	1	1	1	1	2.029
0	1	1	1	0	2.068
1	1	1	1	0	2.106
0	1	1	0	1	2.144
1	1	1	0	1	2.183
0	1	1	0	0	2.221
1	1	1	0	0	2.259
0	1	0	1	1	2.297
1	1	0	1	1	2.336
0	1	0	1	0	2.374
1	1	0	1	0	2.412
0	1	0	0	1	2.451
1	1	0	0	1	2.489
0	1	0	0	0	2.527
1	1	0	0	0	2.565
0	0	1	1	1	2.604
1	0	1	1	1	2.642
0	0	1	1	0	2.680
1	0	1	1	0	2.719
0	0	1	0	1	2.757
1	0	1	0	1	2.795