

ISOLATED DC/DC CONVERTERS

48V Input / 5V/2A or 12V/1A or 24V/0.5A Output

bel
POWER PRODUCTS

07LC-10T Series

- Isolated
- High Efficiency
- High Power Density
- Excellent Thermal Performance
- Output Over-voltage Protection
- Low Cost
- OCP/SCP



Description

The 07LC-10T Series converters are isolated DC/DC converters that operate from a nominal 48V source. These converters provide up to 12W of output power. These units are designed to be highly efficient and cost-effective. Features include remote on/off, short circuit protection, over-current protection, and output over-voltage protection. These converters are provided in a compact, industry standard package.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number
5V	36 – 72V	2A	10W	82%	07LC-10T050
12V	36 – 72V	1A	12W	83%	07LC-10T120
24V	36 – 72V	0.5A	12W	85%	07LC-10T240

Note: Add “G” suffix at the end of the model number to indicate Tray Packaging.

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	-0.3V	-	72V	
Input Voltage (peak/surge)	-	-	100V	100ms non-repetitive
Remote On/Off (Active Low)	-0.3V	-	18V	
Remote On/Off (Active High)	-0.3V	-	7V	
Output Power	-	-	12W	
Ambient Temperature	0°C	-	70°C	
Storage Temperature	-40°C	-	125°C	

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	36V	-	72V	
Input Current (no load)	-	25mA	40mA	
Input Current (full load)	-	-	0.45 A	
Remote Off Input Current (Active Low)	-	5mA	10mA	
Remote Off Input Current (Active High)	-	-	10mA	
Input Reflected Ripple Current (pk-pk)	-	15mA	30mA	Tested with simulated source impedance of 10uH, 5Hz to 20MHz; use a 47uF/100V electrolytic capacitor with ESR = 1 ohm max. at 200KHz at 25°C
Input Reflected Ripple Current (RMS)	-	5mA	10mA	
I ² t Inrush Current Transient	-	0.039A ² s	0.062A ² s	
Turn-on Voltage Threshold	-	30V	-	

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

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Output Specifications

Parameter		Min	Typ	Max	Notes	
Output Voltage Set Point	V _O =5V	4.850V	5.00V	5.150V	V _{in} =48V for all outputs	
	V _O =12V	11.64V	12.00V	12.36V		
	V _O =24V	23.28V	24.00V	24.72V		
Line Regulation	V _O =5V	-	10mV	15 mV		
	V _O =12V	-	20 mV	36 mV		
	V _O =24V	-	35 mV	48 mV		
Load Regulation	V _O =5V	-	15mV	25 mV		
	V _O =12V	-	36 mV	60 mV		
	V _O =24V	-	48 mV	80 mV		
Regulation Over Temperature (0°C to 70°C)		-	75mV	150mV		
Output Current	V _O =5V	0.2A	-	2A		
	V _O =12V	0.1A	-	1A		
	V _O =24V	0.05A	-	0.5A		
Current Limit Threshold (V _O = 90% V _{O, nom})	V _O =5V	-	3A	-		
	V _O =12V	-	1.5A	-		
	V _O =24V	-	0.75A	-		
Short Circuit Surge Transient		-	TBD	-	A ² s	
Ripple and Noise (RMS)	V _O =5V	-	18mV	30mV	0 - 20MHz Bandwidth with 1uF ceramic load capacitance	
	V _O =12V	-	21mV	40mV		
	V _O =24V	-	45mV	70mV		
Ripple and Noise (pk-pk)	V _O =5V	-	60mV	100mV	0 - 20MHz Bandwidth with 1uF ceramic load capacitance	
	V _O =12V	-	80mV	120mV		
	V _O =24V	-	120mV	180mV		
Turn on Time		-	2mS	-		
Overshoot at Turn on		-	0%	3%		
Output Capacitance	V _O =5V	0uF	-	800uF		
	V _O =12V	0uF	-	100uF		
	V _O =24V	0uF	-	20uF		
Transient Response						
50% ~ 100% Max Load	Overshoot	V _O =5V	-	100mV	150mV	di/dt = 0.1A/uS; V _{in} = 48V; T _a = 25°C and 1uF ceramic capacitance
	Settling Time		-	100uS	150uS	
100% ~ 50% Max Load	Overshoot	V _O =5V	-	100mV	150mV	
	Settling Time		-	100uS	150uS	
50% ~ 100% Max Load	Overshoot	V _O =12V	-	150mV	250mV	
	Settling Time		-	150uS	200uS	
100% ~ 50% Max Load	Overshoot	V _O =12V	-	150mV	250mV	
	Settling Time		-	150uS	200uS	
50% ~ 100% Max Load	Overshoot	V _O =24V	-	350mV	500mV	
	Settling Time		-	200uS	250uS	
100% ~ 50% Max Load	Overshoot	V _O =24V	-	350mV	500mV	
	Settling Time		-	200uS	250uS	

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

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General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency				
Vo=5V	78%	82%	-	Vin=48V, Io= Io, max
Vo=12V	79%	83%	-	
Vo=24V	81%	85%	-	
Switching Frequency	200KHz	250KHz	300KHz	
Output Trim Range	95%Vo	-	105%Vo	For all outputs
Protection Features				
Overvoltage Protection Setpoint				
Vo=5V	-	6.8V	-	
Vo=12V	-	15V	-	
Vo=24V	-	30V	-	
MTBF	2,000,000 hours			Calculated Per Bell Core TR-332 (Io = Nomal; Ta = 25°C)
Isolation	-	1500 V	-	
Dimensions				
Inches (L x W x H)	1.91 x 0.98 x 0.477			
Millimeters (L x W x H)	48.51 x 24.89 x 12.12			
Weight	-	10.3g	-	

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

Control Specifications

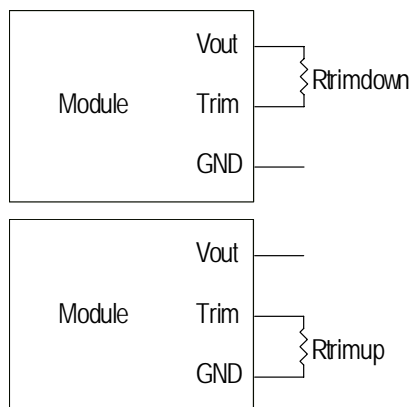
Parameter	Min	Typ	Max	Notes
Remote On/Off				
Signal Low (Unit On)	Active Low	-0.3V	-	The remote on/off pin open, Unit On.
Signal High (Unit Off)		2.4V	-	
Signal Low (Unit Off)	Active High	-0.3V	-	
Signal High (Unit On)		2.4V	-	

Output Trim Equations

Equations for calculating the trim resistor (in kΩ) given the desired adjusted voltage (Vadj) and the nominal output voltage of the converter (Vnom) are shown below. The Trim Down resistor should be connected between the Trim pin and Vout. The Trim Up resistor should be connected between the Trim pin and Ground. Only one of the resistors should be used for any given application.

$$R_{TrimDown} = \frac{A}{V_{nom} - V_{adj}} - B$$

$$R_{TrimUp} = \frac{C}{V_{adj} - V_{nom}} - D$$



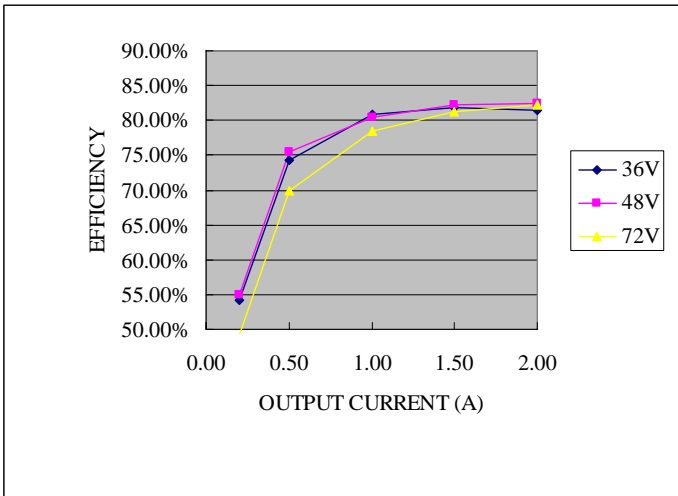
Vnom	A	B	C	D
24	489.490	28.310	26.660	6.810
12	113.550	16.990	13.020	6.490
5	56.410	51.200	18.228	36.500

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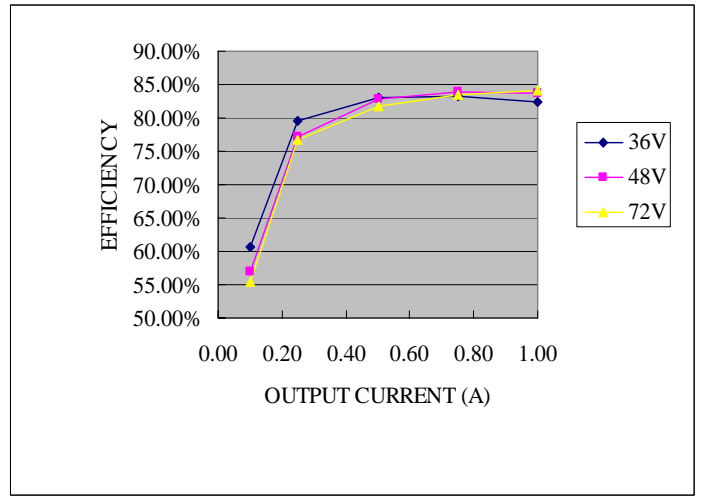
48V Input / 5V/2A or 12V/1A or 24V/0.5A Output



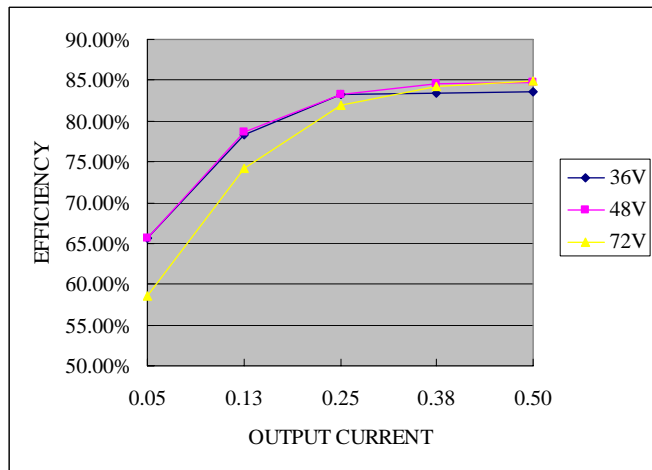
Efficiency Data



07LC-10T050



07LC-10T120



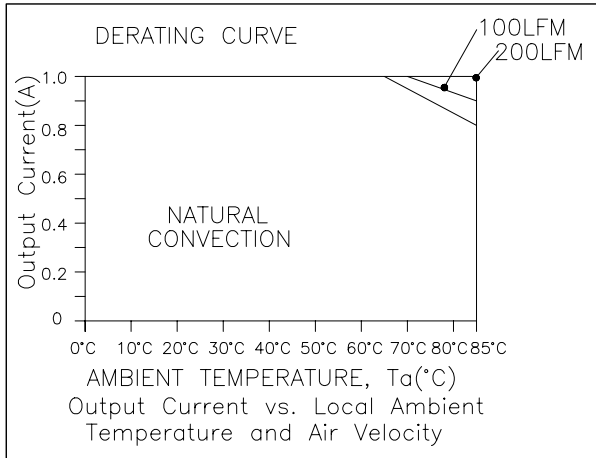
07LC-10T240

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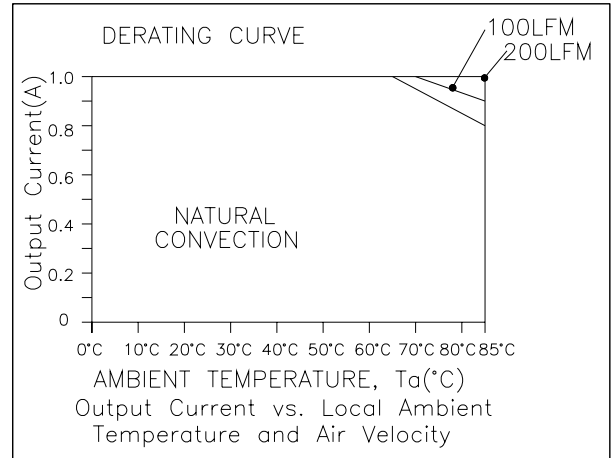
48V Input / 5V/2A or 12V/1A or 24V/0.5A Output



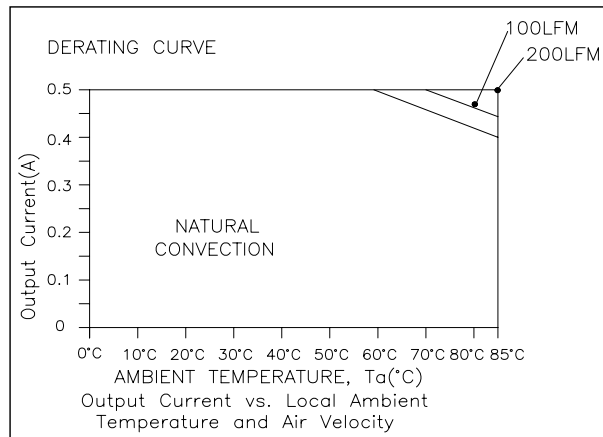
Thermal Derating Curves



$V_o=5\text{V}$, $I_o=2\text{A}$



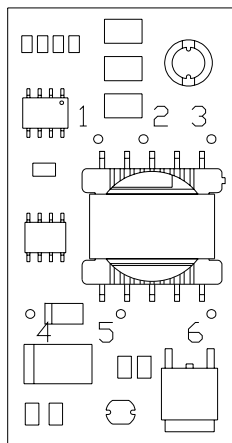
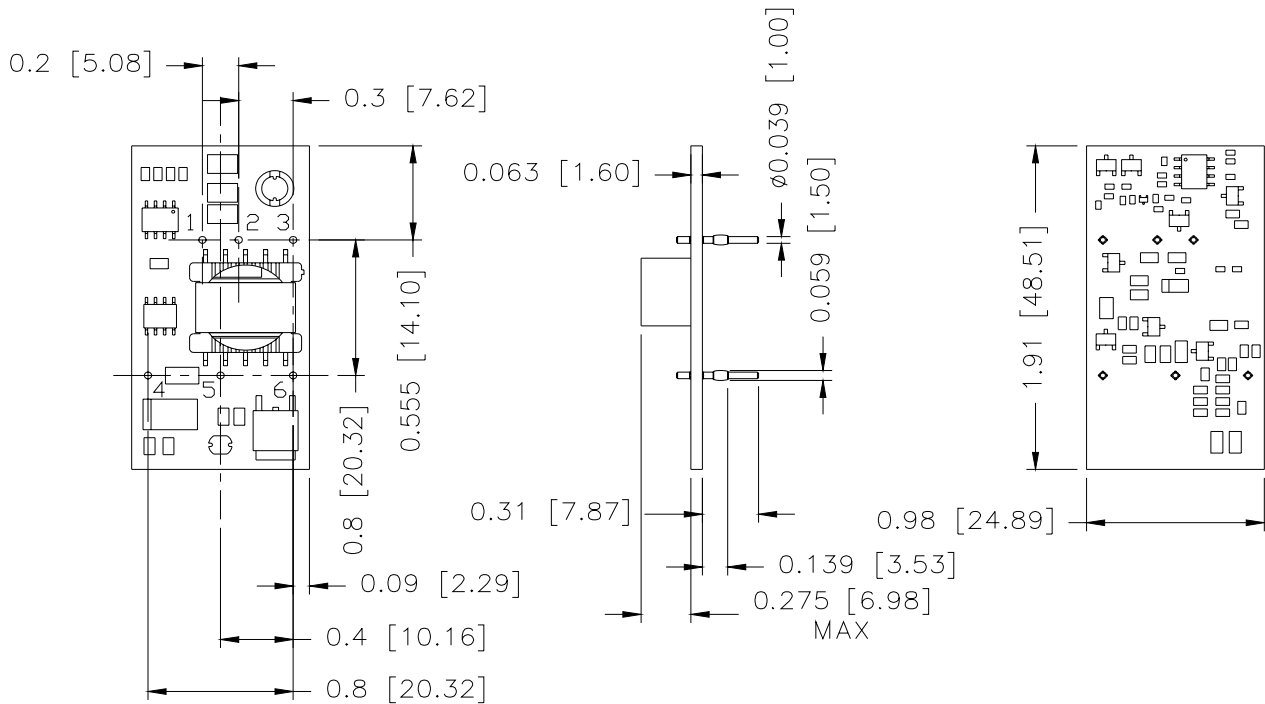
$V_o=12\text{V}$, $I_o=1\text{A}$



$V_o=24\text{V}$, $I_o=0.5\text{A}$

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Pin Connections

Pin	Function
1	V _{in} +
2	V _{in} -
3	Remote On/Off
4	V _o +
5	Trim
6	V _o -

Note: Remote On/Off pin open, unit on.

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