

## ISOLATED DC/DC CONVERTERS

48V Input 3.3V/7A or 5V/5A or 12V/2.5A Output



### 07LC-25T Series

- Compact Through-hole Package
- Excellent Thermal Performance
- 1500V Isolation
- High Efficiency
- High Power Density
- Wide Input Voltage
- Remote On/Off
- Output Voltage Trim
- Input Under Voltage Lockout
- Over Voltage Protection
- SCP/OCP
- Over Temperature Protection



### Description

The 07LC-25Txx0 series converters are isolated DC/DC converters that operate from a nominal 48V source. These converters provide up to 25W of output power. These units are designed to be high efficient and very low cost. Features include remote on/off, output adjust, short circuit protection, over current protection, over-temperature protection, and input under voltage lockout. These converters are provided in a compact, through-hole package that is easy to use and provides good thermal performance, and are pin-to-pin compatible with the Emerson AG25 Series.

### Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number
12.0V	36 – 75V	2.5A	30.0W	90%	07LC-25T120
5.0V	36 – 75V	5A	25.0W	90%	07LC-25T050
3.3V	36 – 75V	7A	23.0W	88%	07LC-25T033

**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	-	80V	
Remote On/Off	-0.3V	-	12V	
Ambient Temperature	-40°C	-	85°C	
Storage Temperature	-55°C	-	125°C	

### Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	36V	-	75V	
Input Current (no load)	-	25mA	40mA	
Input Current (full load)	-	-	1.1A	
Remote Off Input Current	-	3mA	10mA	
Input Reflected Ripple Current (RMS)	-	10mA	20mA	Tested with simulated source impedance of 10uH, 5Hz to 20MHz and a 100uF/100V electrolytic capacitor with ESR=1 ohm max, at 200KHz
Input Reflected Ripple Current (pk-pk)	-	40mA	60mA	
I <sup>2</sup> t Inrush Current Transient	-	0.0012A <sup>2</sup> s	0.0024A <sup>2</sup> s	
Turn-on Input Voltage	31V	34V	36V	
Turn-off Input Voltage	30V	33V	35V	

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

# ISOLATED DC/DC CONVERTERS

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## Output Specifications

Parameter		Min	Typ	Max	Notes	
Output Voltage Set Point	V <sub>O</sub> =3.3V	3.234 V	3.3 V	3.366 V	Test condition: V <sub>in</sub> =48V, I <sub>O</sub> =50% full load	
	V <sub>O</sub> =5.0V	4.900V	5.0 V	5.100V		
	V <sub>O</sub> =12.0V	11.760V	12.0V	12.240V		
Line Regulation	V <sub>O</sub> =3.3V	-	1mV	3mV		
	V <sub>O</sub> =5.0V	-	2mV	5mV		
	V <sub>O</sub> =12.0V	-	5mV	10mV		
Load Regulation	V <sub>O</sub> =3.3V	-	2mV	5mV		
	V <sub>O</sub> =5.0V	-	4mV	8mV		
	V <sub>O</sub> =12.0V	-	9mV	18mV		
Temperature Regulation (-40°C to +85°C)	V <sub>O</sub> =3.3V	-	30mV	50mV		
	V <sub>O</sub> =5.0V	-	40mV	70mV		
	V <sub>O</sub> =12.0V	-	100mV	170mV		
Ripple and Noise (RMS)		-	10mV	20mV	Tested with 0-20MHz BW, with a 0.47uF ceramic capacitor at the output	
Ripple and Noise (pk-pk)		-	40mV	75mV		
Output Current	V <sub>O</sub> =3.3V	0A	-	7A		
	V <sub>O</sub> =5.0V	0A	-	5A		
	V <sub>O</sub> =12.0V	0A	-	2.5A		
Current Limit Threshold	V <sub>O</sub> =3.3V	7.7A	-	12A		
	V <sub>O</sub> =5.0V	5.5A	-	8A		
	V <sub>O</sub> =12.0V	3A	-	4.2A		
Short Circuit Surge Transient		-	0.5A <sup>2</sup> s	1A <sup>2</sup> s		
Turn on Time		-	10mS	25mS		
Overshoot at Turn On		-	0%	5%		
Output Capacitance	V <sub>O</sub> =3.3V	0uF	-	3300uF		
	V <sub>O</sub> =5.0V	0uF	-	2200uF		
	V <sub>O</sub> =12.0V	0uF	-	330uF		
<b>Transient Response</b>						
50% ~ 75% Max Load	Overshoot	V <sub>O</sub> =3.3V	-	75mV	100mV	Tested conditions: di/dt=0.1A/uS, V <sub>in</sub> =48V, T <sub>a</sub> =25°C, with a 220uF/10V electrolytic capacitor at the output.
	Settling Time		-	150uS	200uS	
50% ~ 25% Max Load	Overshoot	V <sub>O</sub> =3.3V	-	75mV	100mV	
	Settling Time		-	150uS	200uS	
50% ~ 75% Max Load	Overshoot	V <sub>O</sub> =5.0V	-	100mV	150mV	
	Settling Time		-	150uS	200uS	
50% ~ 25% Max Load	Overshoot	V <sub>O</sub> =5.0V	-	100mV	150mV	
	Settling Time		-	150uS	200uS	
50% ~ 75% Max Load	Overshoot	V <sub>O</sub> =12.0V	-	150mV	200mV	
	Settling Time		-	150mV	200mV	
50% ~ 25% Max Load	Overshoot	V <sub>O</sub> =12.0V	-	150mV	200mV	
	Settling Time		-	150mV	200mV	

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

# ISOLATED DC/DC CONVERTERS

48V Input 3.3V/7A or 5V/5A or 12V/2.5A Output



## General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency Vo=3.3V Vo=5.0V Vo=12.0V	85% 87% 87%	88% 90% 90%	- - -	Measured at Vin=48V, Io=Io, max
Switching Frequency	200kHz	230kHz	260kHz	
Output Trim Range	90% Vo	-	110% Vo	
I/O Isolation Voltage	1500V	-	-	
Isolation Capacitance	-	1500pF	-	
Output Voltage Trim Range	90%	-	110%	
Over Temperature Protection	-	110°C	-	
Over Voltage Protection Vo=3.3V Vo=5.0V Vo=12.0V	3.9V 5.7V 13.6V	- - -	5V 7V 14.2V	
MTBF	2,602,427 hours			Calculated Per Bell Core TR-332 (Io = Io max; Ta = 25°C)
Dimensions Inches (L x W x H) Millimeters (L x W x H)	2.0 x 1.0 x 0.438 50.8 x 25.4 x 11.14			
Weight	-	20g	-	

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

## Control Specifications

Parameter	Min	Typ	Max	Notes	
<b>Remote On/Off</b>					
Signal Low (Unit On)	Active Low	-0.3V	-	The remote On/Off pin open, Unit On.	
Signal High (Unit Off)		3.5V	-		12V
Signal Low (Unit Off)	Active High	-0.3V	-		0.8V
Signal High (Unit On)		3.5V	-		12V
Current Sink	0.3mA	-	0.75mA		

# ISOLATED DC/DC CONVERTERS

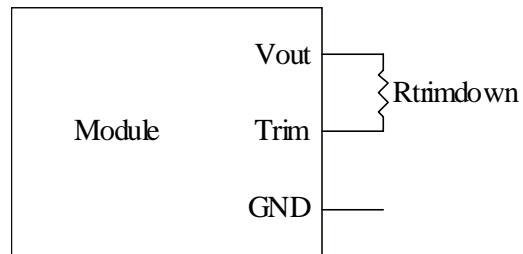
48V Input 3.3V/7A or 5V/5A or 12V/2.5A Output



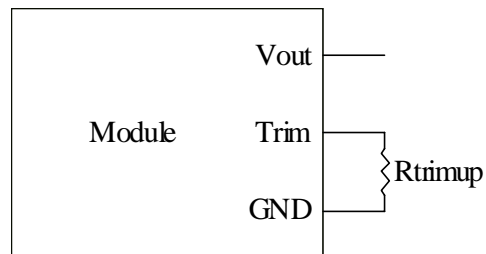
## Output Trim Equations

Equations for calculating the trim resistor (in kΩ) given the desired adjusted voltage ( $V_{adj}$ ) and the nominal output voltage of the converter ( $V_{nom}$ ) are shown below. The Trim Down resistor should be connected between the Trim pin and  $V_{out}$ . 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.

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



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



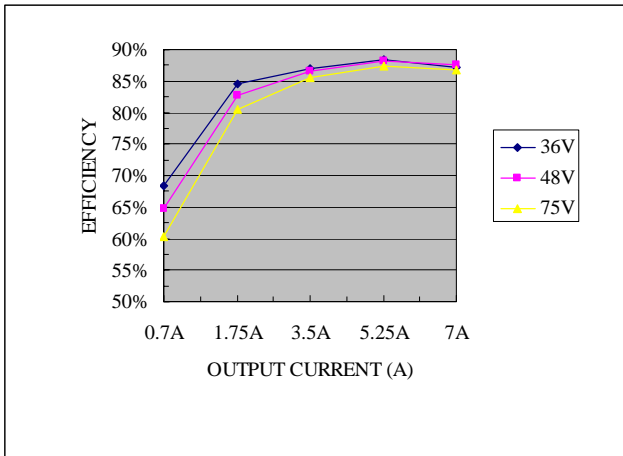
Vnom	A	B	C	D
12	53.320	9.260	14.025	3.650
5	19.300	15.120	6.350	10.000
3.3	21.711	40.610	13.032	30.100

# ISOLATED DC/DC CONVERTERS

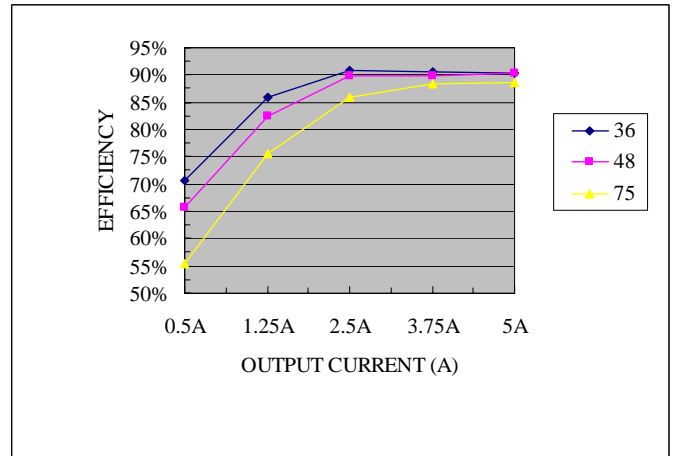
48V Input 3.3V/7A or 5V/5A or 12V/2.5A Output



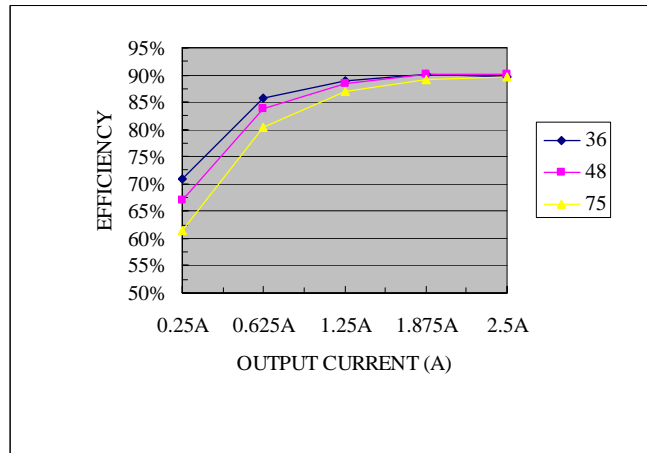
## Efficiency Data



07LC-25T033



07LC-25T050



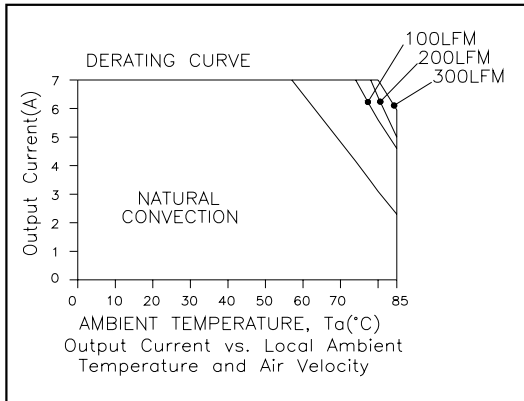
07LC-25T120

# ISOLATED DC/DC CONVERTERS

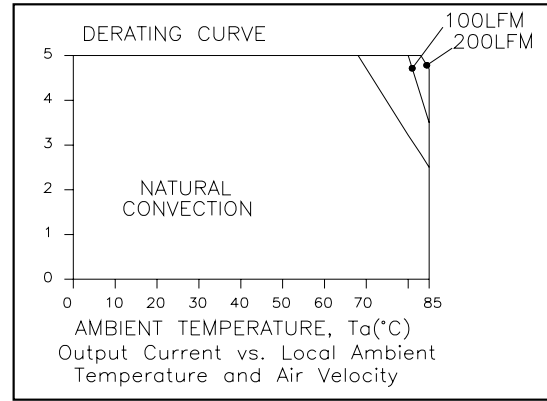
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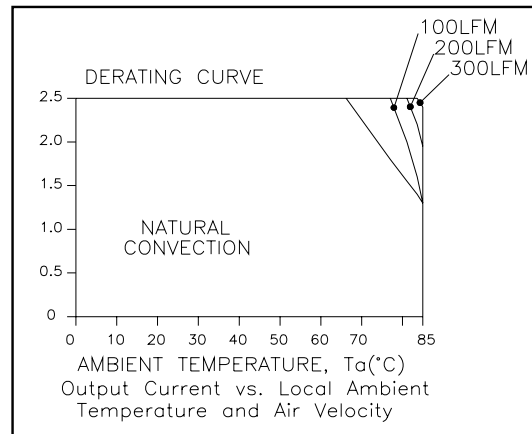
## Thermal Derating Curves



07LC-25T033



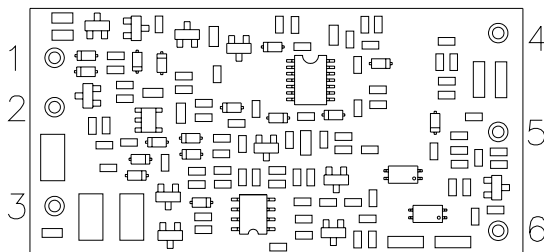
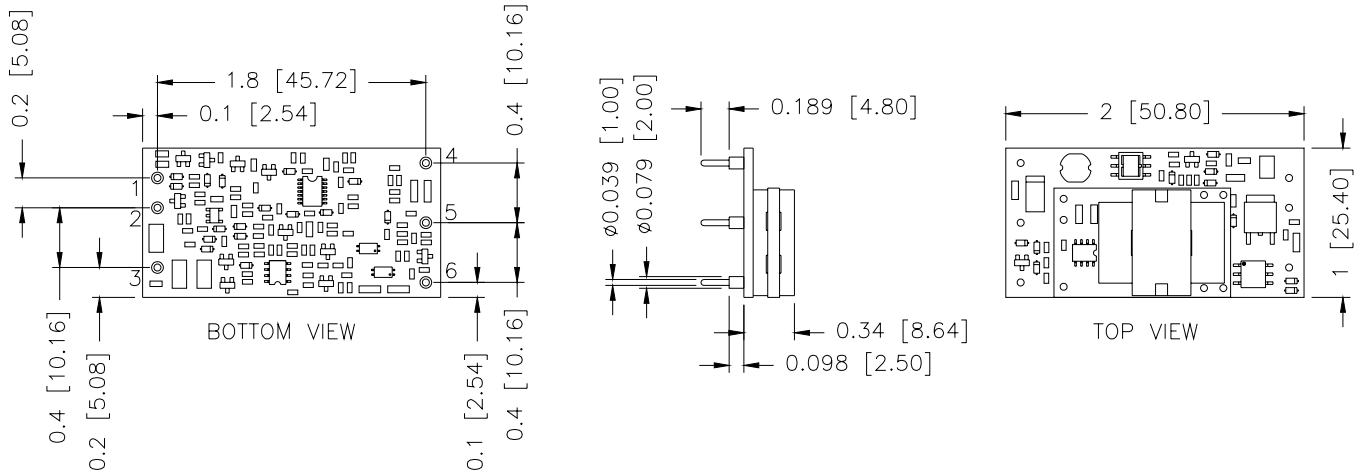
07LC-25T050



07LC-25T120

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## Pin Connections

Pin	Function
1	Vin+
2	Vin-
3	Remote On/Off
4	Vo+
5	Vo-
6	Trim

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