

75 Watt LT Triple Series DC/DC Converters



Description

The LT Triple Series DC/DC family provides three independent and precisely regulated low output voltage converters in one package reducing cost and saving board space. The LT Series meets rigorous requirements in an industry standard ½ brick package, and is well suited for telecom and industrial applications.

All three outputs are rated for a maximum of 10 Amps, thus providing many possible output load combinations with a total output power of 75 Watts. The remote trim function on each output can be used to compensate for voltage drops between the converter and the load at higher currents.

The LT Series includes a primary remote on/off for power conservation. The LT package features threaded-through holes to allow for easy mounting or the addition of a heat sink for extended temperature operation.

Features

- Small size 2.4" x 2.28" x 0.55"
- Excellent thermal performance with metal baseplate
- Non-latching over voltage shutdown
- Pulse-by-pulse current limiting, short circuit foldback
- Over-temperature protection
- Auto-softstart
- Low noise
- Constant frequency for normal operation.
- 2:1 input voltage range
- Positive logic primary remote ON/OFF
- Negative logic primary shutdown as an option
- Very low temperature coefficient
- Water Washable
- Trimmable output voltages
- Low cost
- 5 Year Warranty

Selection Chart

Model *	Input Range VDC		V out VDC	I out ADC (all ** outputs)
	Min	Max		
24T5.3.2LT	18	36	5, 3.3, 2.5	10
24T5.2.1R8LT	18	36	5, 2.5, 1.8	10
24T5.2.1R5LT	18	36	5, 2.5, 1.5	10
24T3.2.1R8LT	18	36	3.3, 2.5, 1.8	10
24T3.2.1R5LT	18	36	3.3, 2.5, 1.5	10
24T3.1R8.1R5LT	18	36	3.3, 1.8, 1.5	10
48T5.3.2LT	36	75	5, 3.3, 2.5	10
48T5.2.1R8LT	36	75	5, 2.5, 1.8	10
48T5.2.1R5LT	36	75	5, 2.5, 1.5	10
48T3.2.1R8LT	36	75	3.3, 2.5, 1.8	10
48T3.2.1R5LT	36	75	3.3, 2.5, 1.5	10
48T3.1R8.1R5LT	36	75	3.3, 1.8, 1.5	10

*Add (-N) to the end of the part number for negative logic on the primary shutdown. Default ON/OFF logic is positive.

** The output currents are the maximum ratings of each of the outputs. It is up to the user to keep the total power output at or below the 75 Watt rating of the package.

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Unless otherwise stated, these specifications apply for ambient temperature $T_A=23 \pm 2^\circ\text{C}$, nominal input voltage, and full load. (1) (2)

Input Parameters								
Model		24T5.3.2LT	24T5.2.1R8LT	24T5.2.1R5LT	24T3.2.1R8LT	24T3.2.1R5LT	24T3.1R8.1R5LT	Units
Voltage Range	MIN						18	VDC
	TYP						24	
	MAX						36	
Input Overvoltage 100 mSec	MAX						50	VDC
Input Ripple Rejection (120Hz)	TYP						50	dB
Undervoltage Lockout							Yes	
Input Reverse Voltage Protection							Yes	
Input Current No Load 100% Load	TYP						12	mA A
	TYP						3.6	
Inrush Current	MAX						0.5	A ² S
Reflected Ripple, 12 μ H Source Impedance (4)	TYP						20	mA P-P
Efficiency	TYP	81			77			%
Switching Frequency	TYP						360	kHz
Recommended Fuse							(3)	AMPS

Input Parameters								
Model		48T5.3.2LT	48T5.2.1R8LT	48T5.2.1R5LT	48T3.2.1R8LT	48T3.2.1R5LT	48T3.1R8.1R5LT	Units
Voltage Range	MIN						36	VDC
	TYP						48	
	MAX						75	
Input Overvoltage 100 mSec	MAX						85	VDC
Input Ripple Rejection (120Hz)	TYP						50	dB
Undervoltage Lockout							Yes	
Input Reverse Voltage Protection							Yes	
Input Current No Load 100% Load	TYP						12	mA A
	TYP						1.8	
Inrush Current	MAX						0.5	A ² S
Reflected Ripple, 12 μ H Source Impedance (4)	TYP						20	mA P-P
Efficiency	TYP	82			78			%
Switching Frequency	TYP						360	kHz
Recommended Fuse							(3)	AMPS

NOTES:

- Refer to the CALEX Application Notes for the definition of terms, measurement circuits, and other information.
- Full Load is defined as the main output operating at 10 Amps. The auxiliary outputs are equally loaded to bring output power to 75 Watts, or loaded to 10 Amps maximum on each.
- This unit is not fused and needs to be fused by the user. Refer to the CALEX Application Notes for information on fusing. For inrush current, refer to the specifications above.
- Place a 33 μ F capacitor between the two "Input" pins. Then place the current sensor in series with a 12 μ H inductor between the capacitor and the source. The reflected ripple current is measured over a 5 Hz to 20 MHz bandwidth. Noise should be minimized in the measurement.
- Noise is measured per the CALEX Application Notes. Output noise is measured with a 10 μ F tantalum capacitor in parallel with a 0.1 μ F ceramic capacitor connected across the output to CMN. Measurement bandwidth is 0-20 MHz.
- Optimum performance is obtained when this power supply is operated within the minimum to maximum load specifications. No damage to the module will occur when the output is operated at less than minimum load, but the output voltage may contain a low frequency component that may exceed output noise specifications. At no load the converter's Vo1 output voltage may fall out of regulation, typically rising to the OVP limit. A load current of between 0.5% to 1% of maximum rated load on any of the outputs will usually suffice to bring Vo1 within regulation.
- Load Transient Recovery Time is defined as the time for the output to settle from a 50 to 75% or 25% step load change to a 1% error band of output voltage (rise time of step = 2 μ Sec).
- Load Transient Overshoot is defined as the peak overshoot during a transient as defined in the Note 7 above.
- Load regulation is defined as the output voltage change when changing load current from maximum to minimum. The voltage is measured at the output pin.
- Most switches would be suitable for logic On/Off control, in case there is a problem, you can make following estimations and then leave some margin.
When open collector is used for logic high, "Open Circuit Voltage at On/Off Pin", "Output Resistance" and "External Leakage Current Allowed for Logic High" are used to estimate the high impedance requirement of open collector.
When switch is used for logic low, "Open Circuit Voltage at On/Off Pin", "Output Resistance" and "LOW Logic Level" are used to estimate the low impedance requirement of switch.

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Unless otherwise stated, these specifications apply for ambient temperature $T_A=23 \pm 2^\circ\text{C}$, nominal input voltage, and full load. (1) (2)

Output Parameters (VO1)						
Model		24T5.3.2LT 24T5.2.1R8LT 24T5.2.1R5LT	48T5.3.2LT 48T5.2.1R8LT 48T5.2.1R5LT	24T3.2.1R8LT 24T3.2.1R5LT 24T3.1R8.1R5LT	48T3.2.1R8LT 48T3.2.1R5LT 48T3.1R8.1R5LT	Units
Output Voltage		5		3.3		VDC
Output Voltage Setpoint Accuracy	MAX	±1				%
Turn On Overshoot	TYP	0				%
Temperature Coefficient	TYP MAX	0.003 0.01				%/°C
Noise & Ripple (5)	TYP MAX	50 100		33 66		mV P-P
Load Current (6) (12)	MIN MAX	1.0 10.0				A
Load Transient Overshoot (8)	TYP	4				%
Load Transient Recovery Time (7)	TYP	100				µSec
Load Regulation (9)	TYP	0.5				%
Min-Max Load	MAX	1				%
Line Regulation	TYP	0.1				%
Vin = Min-Max	MAX	0.5				%
Overvoltage Protection (OVP) Threshold	TYP	130				%
OVP Type - Non-latching						
Open Loop Overvoltage Clamp						
Output Current Limit	TYP	120				%
V out=90% of V out-nom						
Output Short Circuit Current	TYP	175				%
V out = 0.25 V						

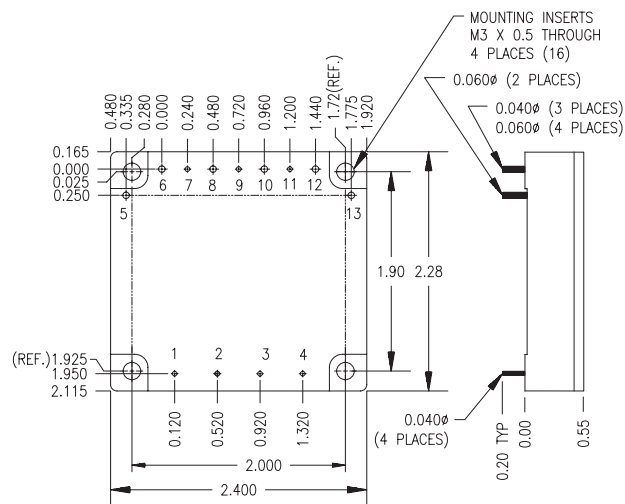
Output Parameters (VO2, OV3)								
Model		VO2			VO3			Units
		24T5.3.2LT 48T5.3.2LT	24T5.2.1R8LT 24T5.2.1R5LT 24T3.2.1R8LT 24T3.2.1R5LT 48T5.2.1R8LT 48T5.2.1R5LT 48T3.2.1R8LT 48T3.2.1R5LT	24T3.1R8.1R5LT 48T3.1R8.1R5LT	24T5.3.2LT 48T5.3.2LT	24T5.2.1R8LT 24T3.2.1R8LT 48T5.2.1R8LT 48T3.2.1R8LT	24T5.2.1R5LT 24T3.2.1R5LT 48T5.2.1R5LT 48T3.2.1R5LT 24T3.1R8.1R5LT 48T3.1R8.1R5LT	
Output Voltage		3.3	2.5	1.8	2.5	1.8	1.5	VDC
Output Voltage Setpoint Accuracy	MAX	±1.5						%
Turn On Overshoot	TYP	0						%
Temperature Coefficient	TYP MAX	0.02 0.05						%/°C
Noise & Ripple (5)	TYP MAX	33 66	25 50	18 36	25 50	18 36	15 30	mV P-P
Load Current (6)	MIN MAX	0.2 10.0						A
Load Transient Overshoot (8)	TYP	4						%
Load Regulation (9)	TYP	0.5						%
Min-Max Load	MAX	1						%
Line Regulation	TYP	0.5						%
Vin = Min-Max	MAX	1						%

- (11) Thermal impedance is tested with the converter mounted vertically and facing another printed circuit board 1/2 inch away. If converter is mounted horizontally with no obstructions, thermal impedance is approximately 7 °C/W.
- (12) Minimum load is defined as 10% of maximum load. Calex Mfg. Co. Inc. does not guarantee performance for loads less than the minimum. Loads less than the minimum shall not damage the unit.
- (13) The unit can be configured with negative logic for Remote ON/OFF.

- (14) When an external On/Off switch is used, such as open collector switch, logic high requires the switch to be high-impedance. Switch leakage currents greater than 10 uA may be sufficient to trigger the ON/Off to the logic-low state.
- (15) Water Washability - Calex DC/DC converters are designed to withstand most solder/wash processes. Careful attention should be used when assessing the applicability in your specific manufacturing process. Converters are not hermetically sealed.
- (16) Torque fasteners into threaded mounting inserts at 12 in. oz. or less. Greater torque may result in damage to unit and void the warranty.

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General Specifications			
All Models			Units
Primary Remote ON/OFF Function			
HIGH Logic Level for ON	Min	3.0	VDC
External Leakage Current Allowed for Logic High (14)	MAX	10	μA
Input Diode Protection Voltage	MAX	50	VDC
LOW Logic Level or Tie ON/OFF Pin to -Input	MAX	1.0	VDC
Sinking Current for Primary Logic Level	MAX	500	μA
Open Circuit Voltage at Primary On/Off Pin (10)			
Positive Logic	TYP	2.3	VDC
Negative Logic	TYP	1.5	VDC
Output Resistance (10)	TYP	3	k Ohm
Idle Current (Module is OFF)	TYP	2	mADC
Turn-on Time to 1% error	TYP	20	mSec
Remote ON/OFF Logic (13)	HIGH - Module ON LOW - Module OFF		
Output Voltage Trim			
Trim Range	MIN MAX	±5	% of Vout
Input Resistance	TYP	10	k Ohm
Open Circuit Voltage	TYP	2.5	V
Trim Limit			
Maximum Output Voltage	MAX	105	% of Vout
Isolation			
Input to Output Isolation 10μA Leakage	MAX	1544	VDC
Input to Output Resistance	MIN	10	Mohm
Input to Output Capacitance	TYP	1800	pF
Environmental			
Calculated MTBF, Bellcore Method 1, Case 1		>1,000,000	Hr
Baseplate Operating Temperature Range	MIN MAX	-40 100	°C
Storage Temperature	MIN MAX	-40 120	°C
Thermal Impedance (11)	TYP	7	°C/W
General			
Unit Weight	TYP	4/114	oz/g
Chassis Mounting Kit	MS25		
Case Dimension	2.4" x 2.28" x 0.55"		
Agency Approvals	UL60950 pending		



Mechanical tolerances unless otherwise noted:

X.XX dimensions: ±0.020 inches

X.XXX dimensions: ±0.005 inches

Pin	Function	Pin	Function
1	CASE	8	- V1
2	- INPUT	9	V1 TRIM
3	+ INPUT	10	+ V1
4	ON/OFF	11	+ V2 TRIM
5	- V3	12	+ V2
6	+ V3	13	- V2
7	V3 TRIM		