

EP 10 Watt Series – Wide Input Range DC-DC Converter

Features

10W DIL PACKAGE
 INDUSTRY STANDARD PACKAGE
 9-18V,18-36V,36-72V,9-27V,18-54V,
 9-36V,18V-72V WIDE INPUT RANGE
 SHORT CIRCUIT PROTECTION
 REGULATED OUTPUT
 100% BURN IN
 UL 94V-0 PACKAGE MATERIAL
 CUSTOM SOLUTIONS AVAILABLE
 RoHS COMPLIANT



Specification

Output Specification

Voltage Setpoint Accuracy	+/-2% max.
Temperature Coefficient	+/-0.05%/°C
Ripple & Noise(20MHz BW) ¹	100mVp-p max.
Line Regulation ²	+/-0.5% max.
Load Regulation ³	+/-0.5% max.
Minimum Load	10% of Full Load
Short Circuit Protection	Continuous
Short Circuit Restart	Automatic
Over Load Protection	180% typ.
Transient Response ⁴	200uS max.

Input Specification

Input Voltage Range	2:1 3:1 4:1 Input Range
Input Filter	Pi Network
Protection	Fuse Recommended
Start up time (Nominal input) Vin:	
12V & 24V	25ms max.
Start up time (Nominal input) Vin:	
48V	1s max.

Environmental Specifications

Operating Temperature	
Standard Models	-25°C to +71°C
Suffix "G", "T" Models	-40°C to +71°C
Storage Temperature	-55°C to +125°C
Humidity	95% max.
Cooling	Free-Air Convection

General Specifications

Efficiency	70% min.
Isolation Voltage ⁵	1500 VDC min. Standard Models
	3000 VDC min. Suffix "3K" Models
Isolation Resistance	109 ohms min.
Isolation Capacitance	500pF max.
Switching Frequency	200 KHz min.
MTBF ⁶	>342,000 Hours
Weight	31.2g typ.
Case Material	Six-Side Shielded Case
Case Size	50.8mm*25.4mm*11.2mm
Potting Material	Epoxy(UL94V-0)
Radiated Emissions	EN55022 Class A

Remote Control

ON	2.5 to 5.5VDC or open circuit
OFF	0 to 0.8VDC

ALL SPECIFICATIONS TYPICAL AT NOMINAL LINE, FULL LOAD , AND 25°C UNLESS OTHERWISE NOTED.

¹ Measured with 1uF ceramic capacitor connect to the output pins

² High Line to Low Line

³ Load Regulation is for output load current change from 10% to 100%.

⁴ 25% Step Load Change.

⁵ 1500VDC for 10 seconds,3000VDC for 3 seconds.

⁶ MIL-HDBK-217F @25°C , Ground Benign

Selection Guide (1) 2:1 7W-10W Output 1500VDC or 3000VDC

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT ⁷		EFF (%) ⁸	CAPACITOR LOAD MAX.
				CURRENT(mA)			
				FULL LOAD	NO LOAD		
EP9-18-03,3S2400(A)(-3K)	9-18	3.3	2400	891	30	74	2700uF
EP9-18-05S2000(A)(-3K)	9-18	5	2000	1068	30	78	2700uF
EP9-18-09S1111(A)(-3K)	9-18	9	1111	1046	30	80	2200uF
EP9-18-12S830(A)(-3K)	9-18	12	830	1040	28	80	1800uF
EP9-18-15S670(A)(-3K)	9-18	15	670	1020	28	81	1500uF
EP9-18-24S416(A)(-3K)	9-18	24	416	1020	28	82	1000uF
EP9-18-05D1000(A)(-3K)	9-18	+/-5	+/-1000	1068	30	78	+/-1200uF
EP9-18-09D556(A)(-3K)	9-18	+/-9	+/-556	1046	30	80	+/-1000uF
EP9-18-12D416(A)(-3K)	9-18	+/-12	+/-416	1029	40	81	+/-820uF
EP9-18-15D333(A)(-3K)	9-18	+/-15	+/-333	1020	45	82	+/-680uF
EP9-18-24D208(A)(-3K)	9-18	+/-24	+/-208	1052	45	79	+/-560uF
EP18-36-03,3S2400(A)(-3K)	18-36	3.3	2400	434	16	76	2700uF
EP18-36-05S2000(A)(-3K)	18-36	5	2000	527	25	79	2700uF
EP18-36-09S1111(A)(-3K)	18-36	9	1111	523	20	80	2200uF
EP18-36-12S830(A)(-3K)	18-36	12	830	508	22	82	1800uF
EP18-36-15S670(A)(-3K)	18-36	15	670	502	30	83	1500uF
EP18-36-24S416(A)(-3K)	18-36	24	416	515	28	81	1000uF
EP18-36-05D1000(A)(-3K)	18-36	+/-5	+/-1000	527	23	79	+/-1200uF
EP18-36-09D556(A)(-3K)	18-36	+/-9	+/-556	523	18	80	+/-1000uF
EP18-36-12D416(A)(-3K)	18-36	+/-12	+/-416	508	30	82	+/-820uF
EP18-36-15D333(A)(-3K)	18-36	+/-15	+/-333	510	25	82	+/-680uF
EP18-36-24D208(A)(-3K)	18-36	+/-24	+/-208	520	20	80	+/-560uF

Note: Other input to output voltages may be available. Please contact factory.

ORDERING INFORMATION:

FOR EXAMPLE: EP**-**-*****A(PACKAGE "A" For REMOTE CONTROL)

EP**-**-*****3K(Isolation Voltage For 3000VDC)

⁷ NOMINAL INPUT VOLTAGE.

⁸ NOMINAL INPUT VOLTAGE, FULL LOAD.

Selection Guide (2) 2:1 8-10 W Output 1500VDC or 3000VDC

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT ⁹ CURRENT(mA)		EFF (%) ¹⁰	CAPACITOR LOAD MAX.
				FULL LOAD	NO		
					LOAD		
EP36-72-03,3S2400(A)(-3K)	36-72	3.3	2400	217	20	76	1000uF
EP36-72-05S2000(A)(-3K)	36-72	5	2000	264	20	79	1000uF
EP36-72-09S1111(A)(-3K)	36-72	9	1111	254	20	80	470uF
EP36-72-12S830(A)(-3K)	36-72	12	830	254	20	82	330uF
EP36-72-15S670(A)(-3K)	36-72	15	670	254	20	82	330uF
EP36-72-24S416(A)(-3K)	36-72	24	416	264	20	82	330uF
EP36-72-05D1000(A)(-3K)	36-72	+/-5	+/-1000	262	20	79	+/-470uF
EP36-72-09D556(A)(-3K)	36-72	+/-9	+/-556	254	20	80	+/-220uF
EP36-72-12D416(A)(-3K)	36-72	+/-12	+/-416	254	20	82	+/-100uF
EP36-72-15D333(A)(-3K)	36-72	+/-15	+/-333	257	20	81	+/-100uF
EP36-72-24D208(A)(-3K)	36-72	+/-24	+/-208	254	20	82	+/-100uF

Note: Other input to output voltages may be available. Please contact factory.

ORDERING INFORMATION:

FOR EXAMPLE:

EP**-**-*****A(PACKAGE "A" For REMOTE CONTROL)

EP**-**-*****3K(Isolation Voltage For 3000VDC)

⁹ NOMINAL INPUT VOLTAGE.

¹⁰ NOMINAL INPUT VOLTAGE, FULL LOAD.

Selection Guide (3) 3:1 8-10 W Output 1500 VDC or 3000 VDC

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT ¹¹		EFF (%) ¹²	CAPACITOR LOAD MAX.
				CURRENT(mA) FULL LOAD	NO LOAD		
EP9-27-03,3S2400(A)(-3K)	9-27	3.3	2400	880	40	76	2700uF
EP9-27-05S2000(A)(-3K)	9-27	5	2000	1082	40	77	2700uF
EP9-27-09S1111(A)(-3K)	9-27	9	1111	1065	40	78	2200uF
EP9-27-12S830(A)(-3K)	9-27	12	830	1054	40	79	1800uF
EP9-27-15S670(A)(-3K)	9-27	15	670	1041	40	80	1500uF
EP9-27-24S417(A)(-3K)	9-27	24	417	1057	40	79	1000uF
EP9-27-05D1000(A)(-3K)	9-27	+/-5	+/-1000	1082	40	77	+/-1200uF
EP9-27-09D556(A)(-3K)	9-27	+/-9	+/-556	1068	40	78	+/-1000uF
EP9-27-12D416(A)(-3K)	9-27	+/-12	+/-416	1041	40	80	+/-820uF
EP9-27-15D333(A)(-3K)	9-27	+/-15	+/-333	1028	40	81	+/-680uF
EP18-54-03,3S2400(A)(-3K)	18-54	3.3	2400	434	20	76	2700uF
EP18-54-05S2000(A)(-3K)	18-54	5	2000	527	20	79	2700uF
EP18-54-09S1111(A)(-3K)	18-54	9	1111	515	20	81	2200uF
EP18-54-12S830(A)(-3K)	18-54	12	830	520	20	80	1800uF
EP18-54-15S670(A)(-3K)	18-54	15	670	514	20	81	1500uF
EP18-54-24S416(A)(-3K)	18-54	24	416	510	20	81	1000uF
EP18-54-05D1000(A)(-3K)	18-54	+/-5	+/-1000	527	20	79	+/-1200uF
EP18-54-09D556(A)(-3K)	18-54	+/-9	+/-556	526	20	79	+/-1000uF
EP18-54-12D416(A)(-3K)	18-54	+/-12	+/-416	520	20	80	+/-820uF
EP18-54-15D333(A)(-3K)	18-54	+/-15	+/-333	514	20	81	+/-560uF

Note: Other input to output voltages may be available. Please contact factory.

ORDERING INFORMATION:

FOR EXAMPLE: EP**-**-*****A(PACKAGE "A" For REMOTE CONTROL)

EP**-**-*****-3K(Isolation Voltage For 3000VDC)

¹¹ NOMINAL INPUT VOLTAGE.

¹² NOMINAL INPUT VOLTAGE, FULL LOAD.

Selection Guide (4) 4:1 8-10 W Output 1500 VDC or 3000VDC

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT ¹³ CURRENT(mA)		EFF (%) ¹⁴	CAPACITOR LOAD MAX.
				FULL LOAD	NO		
					LOAD		
EP9-36-03,3S2400(A)(-3K)	9-36	3.3	2400	880	40	76	2700uF
EP9-36-05S2000(A)(-3K)	9-36	5	2000	1082	40	77	2700uF
EP9-36-09S1111(A)(-3K)	9-36	9	1111	1065	40	78	2200uF
EP9-36-12S830(A)(-3K)	9-36	12	830	1054	40	79	1800uF
EP9-36-15S670(A)(-3K)	9-36	15	670	1041	40	80	1500uF
EP9-36-24S417(A)(-3K)	9-36	24	417	1057	40	79	1000uF
EP9-36-05D1000(A)(-3K)	9-36	+/-5	+/-1000	1082	40	77	+/-1200uF
EP9-36-09D556(A)(-3K)	9-36	+/-9	+/-556	1063	40	78	+/-1000uF
EP9-36-12D416(A)(-3K)	9-36	+/-12	+/-416	1041	40	80	+/-820uF
EP9-36-15D333(A)(-3K)	9-36	+/-15	+/-333	1028	40	81	+/-680uF
EP18-72-03,3S2400(A)(-3K)	18-72	3.3	2400	434	20	76	2700uF
EP18-72-05S2000(A)(-3K)	18-72	5	2000	527	20	79	2700uF
EP18-72-09S1111(A)(-3K)	18-72	9	1111	515	20	81	2200uF
EP18-72-12S830(A)(-3K)	18-72	12	830	520	20	80	1800uF
EP18-72-15S670(A)(-3K)	18-72	15	670	514	20	81	1500uF
EP18-72-24S417(A)(-3K)	18-72	24	417	510	20	81	1000uF
EP18-72-05D1000(A)(-3K)	18-72	+/-5	+/-1000	527	20	79	+/-1200uF
EP18-72-09D556(A)(-3K)	18-72	+/-9	+/-556	525	20	79	+/-1000uF
EP18-72-12D416(A)(-3K)	18-72	+/-12	+/-416	520	20	80	+/-820uF
EP18-72-15D333(A)(-3K)	18-72	+/-15	+/-333	514	20	81	+/-680uF

Note: Other input to output voltages may be available. Please contact factory.

ORDERING INFORMATION:

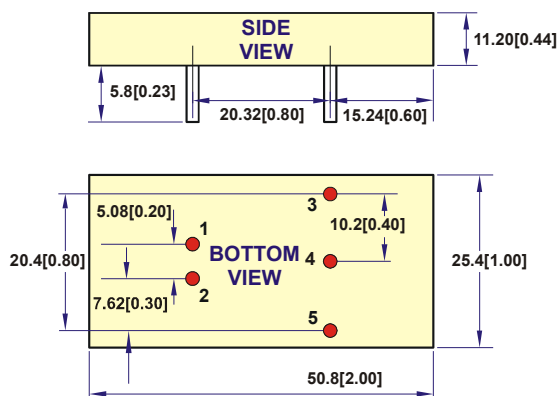
FOR EXAMPLE: EP**_**_*****A(PACKAGE "A" For REMOTE CONTROL)

EP**_**_*****-3K(Isolation Voltage For 3000VDC)

¹³ NOMINAL INPUT VOLTAGE.

¹⁴ NOMINAL INPUT VOLTAGE, FULL LOAD.

Mechanical Dimensions & Recommended Footprint Details



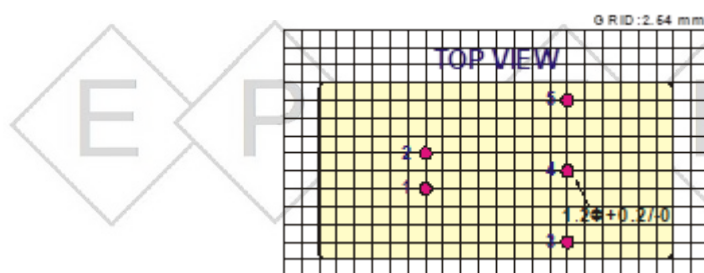
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	NO PIN	Common
5	-Vout	-Vout

NOTE: Pin Size is Tolerance $0.6\Phi \pm 0.05\text{mm}$

All Dimensions In mm(Inches)

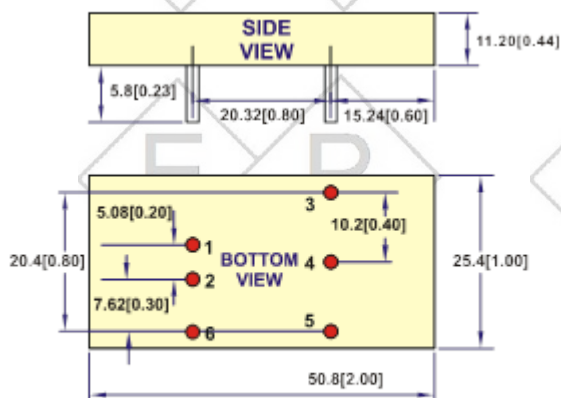
Tolerance .X or .XX= $\pm 0.5\text{mm}$

All dimensions are in millimeters[inches]



Mechanical Dimensions & Recommended Footprint Details

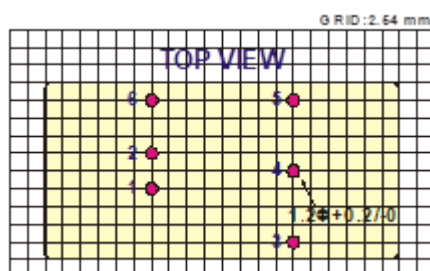
REMOTE CONTROL (Standard Models) PACKAGE "A"



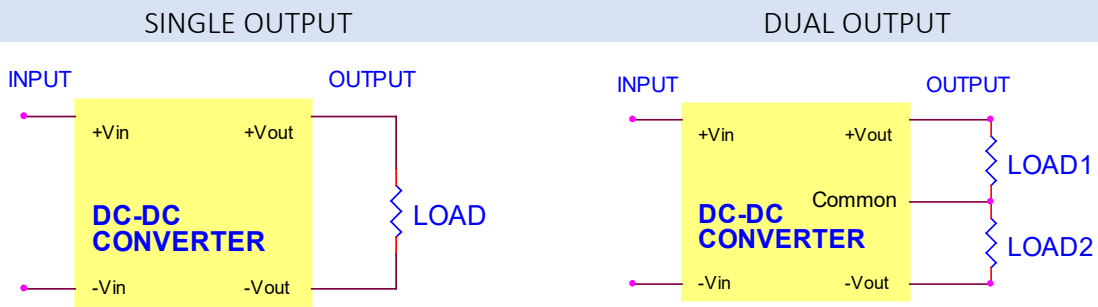
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	NO PIN	Common
5	-Vout	-Vout

6 Remote ON/OFF
NOTE: Pin Size is Tolerance $1.00\Phi \pm 0.10\text{mm}$
All dimensions are in millimeters [inches]
Tolerance .X or .XX= $\pm 0.80\text{mm}$

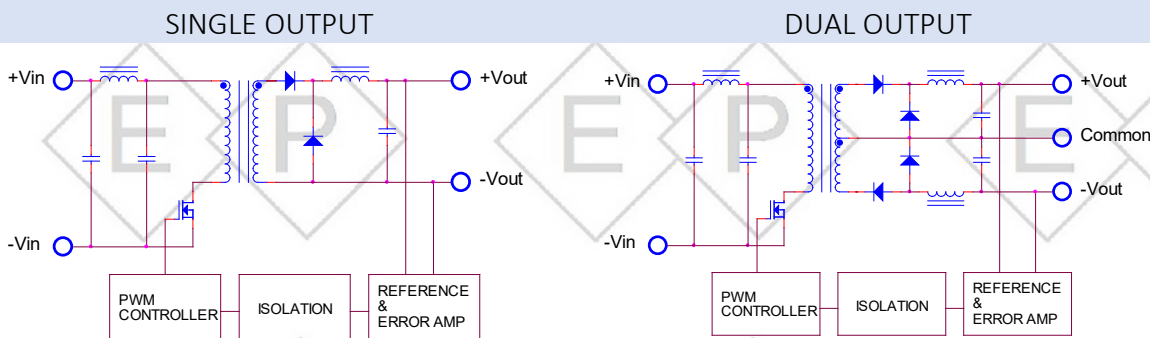
All dimensions are in millimeters[inches]



Typical Applications



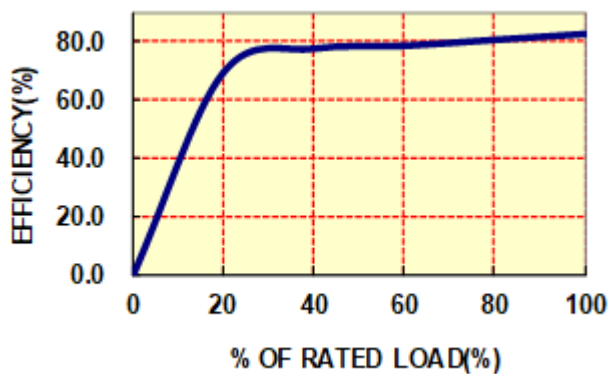
Simplified Schematic



Typical Performance Curves

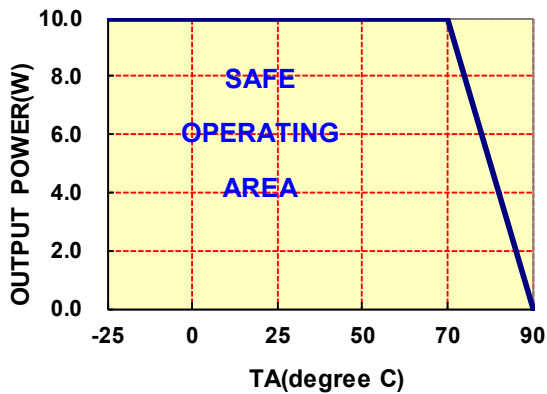
Specifications typical at $T_a=25^\circ\text{C}$, nominal input voltage, rated output current unless otherwise specified.

OUTPUT LOAD VS EFFICIENCY

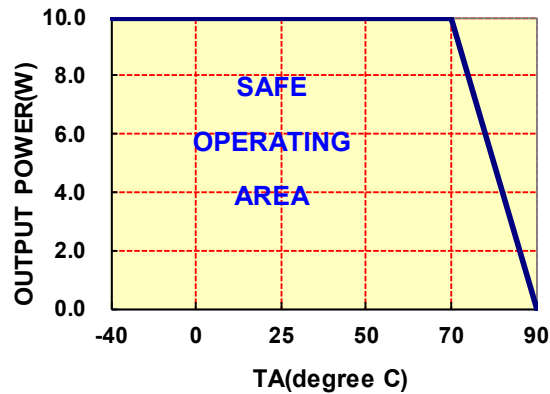


Temperature Derating

STANDARD MODEL

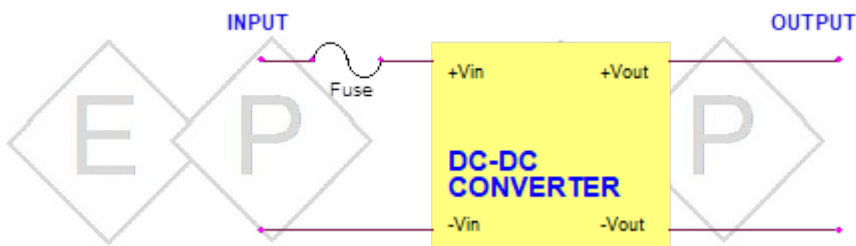


SUFFIX "G", "T" MODELS



Input Fuse Selection Guide

4.7-7.25V	9-18V or 9-27V or 9-36V	18-36V or 18-54V or 18-72V	36-72V
INPUT VOLTAGE(VDC)	INPUT VOLTAGE(VDC)	INPUT VOLTAGE(VDC)	INPUT VOLTAGE(VDC)
3800mA Slow-Blow Type	2000mA Slow-Blow Type	900mA Slow-Blow Type	450mA Slow-Blow Type



Note: Certain applications may require the installation of external fuse in front of the input

EP 10 Watt Series Application Notes:

EXTERNAL CAPACITANCE REQUIREMENTS:

No external capacitance is required for operation of the EP10W series.

To meet the reflected ripple requirements of the converter, an input impedance of less than 0.5 ohm from DC to 220KHz is required.

External output capacitance is not required for operation, however it is recommended that 10uF tantalum and 0.1uF ceramic capacitance be selected for reduced system noise.

Additional output capacitance may be added for increased filtering, but should not exceed 1000uF.

We Can Offer EMC-Filter According To EN55011/22 Class B.

Negative Outputs:

A negative output voltage may be obtained by connecting the +OUT to circuit ground and connecting -OUT as the negative output.

Spezifikationen können sich ohne Vorankündigung ändern.

Für etwaige fehlerhafte Angaben oder unvollständige Bezeichnungen kann keine Haftung übernommen werden.