



[2 YEAR WARRANTY]

- **2:1 input range**
- **UL approved (48V input versions)**
- **Short circuit protection**
- **Efficiency to 82%**
- **No derating to 71°C**
- **Remote on/off control on XC models**
- **OVP on all outputs**
- **Two package sizes available**

The SIP20 series are non-isolated DC/DC converters packaged in a single-in-line footprint (2.5" x 0.24" x 0.55") giving designers a cost effective solution for conversion of 5 VDC to 3.3 VDC and lower voltages. Design flexibility is ensured with local voltage conversion by the SIP20 from existing system voltages by eliminating the need for redesign of existing power architectures. The SIP20 was designed for applications that include distributed power, workstations, computers and file servers. Implementing state of the art surface mount technology and automated manufacturing techniques, the SIP20 offers 3 million hours MTBF, compact size and efficiencies of 90%.

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

OUTPUT SPECIFICATIONS		
Voltage accuracy	5V outputs 12V and 15V outputs	±2.0% ±3.0%
Line regulation	LL-HL, all outputs	±1.0%
Load regulation	All outputs	±5.0%
Ripple and noise	5Hz to 20MHz	10mV rms max. 75mV pk-pk, max.
Temperature coefficient	All outputs	±0.05%/°C, max.
Overvoltage protection (All outputs)	+5V outputs 12V outputs 15V outputs	6.8V 15V 18V
Short circuit protection	Outputs to common, See Note 6	Continuous
INPUT SPECIFICATIONS		
Input voltage range	12VDC 24VDC 48VDC	9 to 18VDC 18 to 6VDC 36 to 72VDC
Input filter See Note 9	XC case MP case	Low ESR capacitor Pi type
No load input current	12VDC 24VDC 48VDC	50mA 40mA 30mA
Remote ON/OFF Logic compatibility E _c -ON E _c -OFF Shutdown idle current Input resistance Control common	Refers to XC package only CMOS or open collector TTL +5.5VDC or open circuit max. 1.8VDC 5mA 0VDC <E _{in} < 9VDC; 100kΩ Referenced to input minus	

GENERAL SPECIFICATIONS		
Efficiency	9 to 18VDC 18 to 36VDC 36 to 72VDC	78% 80% 82%
Isolation voltage	Input/Output	500VDC, min.
Switching frequency	Fixed	100kHz
Approvals and standards	Safety - 48V input models	UL478
Case material	XC case MP case	Black coated metal with non-conductive base Non-conductive black plastic
Material flammability	UL94V-0	
Weight	XC case MP case	170g (6.0oz) 200g (7.1oz)
MTBF	MIL-HDBK-217E	840,000 Hours
ENVIRONMENTAL SPECIFICATIONS		
Thermal performance	Operating ambient Non-operating amb. Case Derating	-25°C to +71°C -55°C to +100°C +95°C, max. None required
Relative humidity	Non-condensing	5% to 95% RH
Altitude	Operating Non operating	10,000 feet max. 40,000 feet max.

International Safety Standard Approvals

 UL478 File No. E131987 (48V input units)

15 Watt Wide input DC/DC converters

INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT (1)	INPUT CURRENT (2)	TYPICAL EFFICIENCY	REGULATION (3)		MODEL NUMBER
					LINE (4)	LOAD (5)	
9-18VDC	5 $\pm$ 12VDC	1500/ $\pm$ 310mA	1.6A	78%	$\pm$ 1.0%	$\pm$ 5.0%	ES12T12/310XC
9-18VDC	5 $\pm$ 15VDC	1500/ $\pm$ 250mA	1.6A	78%	$\pm$ 1.0%	$\pm$ 5.0%	ES12T15/250XC
9-18VDC	+5/+12/-5VDC	1500/+310/500mA	1.6A	78%	$\pm$ 1.0%	$\pm$ 5.0%	ES12T05/500XC
18-36VDC	5 $\pm$ 12VDC	1500/ $\pm$ 310mA	0.78A	80%	$\pm$ 1.0%	$\pm$ 5.0%	ES24T12/310XC
18-36VDC	5 $\pm$ 15VDC	1500/ $\pm$ 250mA	0.78A	80%	$\pm$ 1.0%	$\pm$ 5.0%	ES24T15/250XC
18-36VDC	+5/+12/-5VDC	1500/+310/500mA	0.78A	80%	$\pm$ 1.0%	$\pm$ 5.0%	ES24T05/500XC
18-36VDC	5 $\pm$ 15VDC	1500/ $\pm$ 250mA	0.78A	80%	$\pm$ 1.0%	$\pm$ 5.0%	ES24T15/250MP
36-72VDC	5 $\pm$ 12VDC	1500/ $\pm$ 310mA	0.38A	82%	$\pm$ 1.0%	$\pm$ 5.0%	ES48T12/310XC
36-72VDC	5 $\pm$ 15VDC	1500/ $\pm$ 250mA	0.38A	82%	$\pm$ 1.0%	$\pm$ 5.0%	ES48T15/250XC
36-72VDC	+5/+12/-5VDC	1500/+310/500mA	0.38A	82%	$\pm$ 1.0%	$\pm$ 5.0%	ES48T05/500XC

Notes

- Maximum total power from all outputs is limited to 15 Watts but no output should be allowed to exceed its maximum current.
- Nominal input 12, 24 or 48VDC at full load.
- Maximum.
- Measured from high line to low line.
- Measured from full load to no load.
- Thermal shutdown is provided for long-term short-circuit and overload conditions.
- Minimum current required to maintain specified regulation.
- Overvoltage protection threshold.
- Fixed frequency design provides for easier input filtering and better noise performance.

PIN CONNECTIONS		
PIN	XC CASE	MP CASE
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	Common	Common
5	- Output	-Output
6	+5V Output	Common
7	No Pin	+5V Output
8	Remote On/Off	N/A

OUTPUT LOADING AND PROTECTION TABLE (6)					
OUTPUT	VOLTAGE	AMPS			
		MIN (7)	NOM	MAX (1)	OVP (8)
1	+5	0.250	1.5	2.0	6.8V
2 and 3	+12 or -12	0.100	0.31	0.50	15V
2 and 3	+15 or -15	0.100	0.25	0.50	18V
2 and 3	+12 and -5	0.10/0.10	0.31/0.5	0.5/0.5	15V/6.8V

