1S7BE_6U series

1W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

DC-DC Converter 1 Watt

- High efficiency up to 86%
- 6000VDC isolation
- SIP package
- Low ripple and noise
- Operating temperature: -40°C to +85°C
- International standard pinout
- EMI complies with EN55032 Class B

UL-60950-1 (E347551)

The 1S7BE_6U series meets reinforced insulation requirements. They are specially designed for applications where require compact size, high isolation, low isolation capacitor and low leakage current power. They are widely used in electricity, IGBT drivers and so on.

These products apply to:
1) Where the voltage of the input power supply is fixed (voltage variation ≤ ±10%)
2) Where isolation is necessary between input and output (isolation voltage 6000VDC)
3) Where do not has high requirement of line regulation and the ripple & noise of the output voltage;

Such as: Collection and isolation, High voltage collection circuit, IGBT-driven circuits, etc.

Common specifications

Short circuit protection:	1 sec. MAX
Cooling:	Nature convection
Operation temperature range:	-40°C – +85°C
Storage temperature range:	-40°C – +125°C
Case temperature:	100°C MAX
Lead temperature:	260°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
MTBF (MIL-HDBK-217F@25°C):	>1,121 Mhours
Safety standards/approvals:	UL/cUL 60950-1, IEC/EN 60950-1
Case material:	Plastic [UL94-V0]
Weight:	2.3g
Dimensions:	19.3x6.1x9.9mm

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input voltage range				±10	%
Input surge voltage (1sec. max.)	• 3.3V input • 5VDC input • 12VDC input • 15VDC input • 24VDC input • 48VDC input			6 7 15 18 28 54	VDC VDC VDC VDC VDC VDC
Reflected Ripple Current*			20		mApk-pk
Input filter	Capacitor				

* Reflected ripple current measured with a simulated source inductance of 12µH and a source capacitor Cin(47µF, ESR<1.0Ω at 100KHz).

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute	6000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance			60		pF

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy				±3	%
Line regulation	For Vin change of ±1%			±1.2	%
Load regulation	20% to 100% load • 3.3V output • Others			 20 10	 % %
Temperature coefficient	100% full load		±0.02		%/°C
Ripple & Noise	20MHz Bandwidth			75	mVp-p
Switching frequency	Full load, nominal input		80		KHz

EMC specifications

EMI	CE*	EN55032	CLASS B
EMI	RE	EN55032	CLASS B
EMS	ESD	IEC/EN61000-4-2	perf. Criteria A
EMS	RS	IEC/EN61000-4-3	perf. Criteria A
EMS	EFT**	IEC/EN61000-4-4	perf. Criteria A
EMS	Surge**	IEC/EN61000-4-5	perf. Criteria A
EMS	CS	IEC/EN61000-4-6	perf. Criteria A
EMS	PFMF	IEC/EN61000-4-8	perf. Criteria A

* Input filter components are required to help meet conducted emissions Class B, also see section EMI filter on page 4.
** An external filter capacitor is required if the module has to meet IEC61000-4-4/ IEC61000-4-5, also see section EFT/Surge filter on page 4.

Example:
1S7BE_0505D6U
1 = 1Watt; S7 = SIP7; B = Pinning; E = Cost effective; 5Vin; 5Vout; D = Dual Output; 6 = 6kVDC; U = Unregulated Output

GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

1S7BE_6U series

1W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

Single Output

Part Number	Input Voltage [V]	Output Voltage [VDC]	Input current No load [mA, max]	Input current Full load [mA, typ]	Output current [mA]	Capacitive load [µF, max]	Efficiency [%, typ]
1S7BE_0303S6U	3.3	3.3	28	399	303	220	76
1S7BE_0305S6U	3.3	5	22	389	200	220	78
1S7BE_0309S6U	3.3	9	35	379	111	220	80
1S7BE_0315S6U	3.3	15	30	389	67	220	78
1S7BE_0324S6U	3.3	24	30	415	42	220	73
1S7BE_0503S6U	5	3.3	15	256	303	220	78
1S7BE_0505S6U	5	5	17	247	200	220	81
1S7BE_0509S6U	5	9	15	244	111	220	82
1S7BE_0512S6U	5	12	17	253	83	220	79
1S7BE_0515S6U	5	15	17	233	67	220	86
1S7BE_0524S6U	5	24	20	244	42	220	82
1S7BE_1203S6U	12	3.3	12	111	303	220	75
1S7BE_1205S6U	12	5	14	105	200	220	79
1S7BE_1209S6U	12	9	9	104	111	220	80
1S7BE_1212S6U	12	12	13	105	83	220	79
1S7BE_1215S6U	12	15	10	102	67	220	82
1S7BE_1224S6U	12	24	20	110	42	220	76
1S7BE_1503S6U	15	3.3	10	83	303	220	80
1S7BE_1505S6U	15	5	7	82	200	220	81
1S7BE_1509S6U	15	9	10	85	111	220	78
1S7BE_1512S6U	15	12	8	83	83	220	80
1S7BE_1515S6U	15	15	12	84	67	220	79
1S7BE_1524S6U	15	24	5	80	42	220	83
1S7BE_2403S6U	24	3.3	8	56	303	220	74
1S7BE_2405S6U	24	5	6	54	200	220	77
1S7BE_2409S6U	24	9	6	55	111	220	76
1S7BE_2412S6U	24	12	6	53	83	220	78
1S7BE_2415S6U	24	15	5	52	67	220	80
1S7BE_2424S6U	24	24	8	52	42	220	80
1S7BE_4803S6U	48	3.3	5	29	303	220	73
1S7BE_4805S6U	48	5	5	29	200	220	73
1S7BE_4809S6U	48	9	5	27	111	220	76
1S7BE_4812S6U	48	12	5	27	83	220	76
1S7BE_4815S6U	48	15	5	27	67	220	77
1S7BE_4824S6U	48	24	6	27	42	220	76

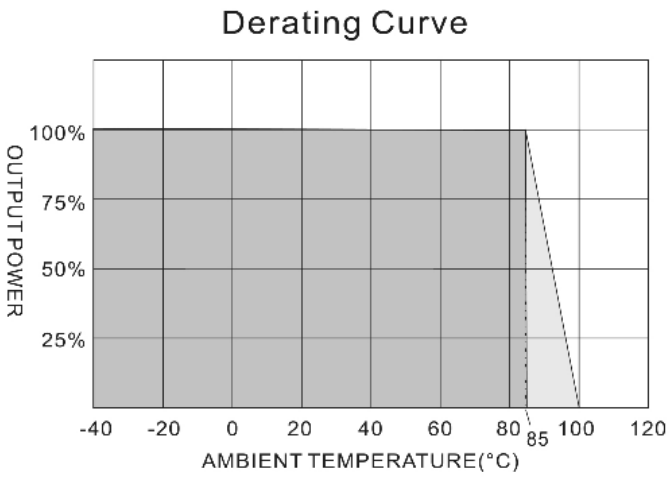
1S7BE_6U series

1W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

Dual Output

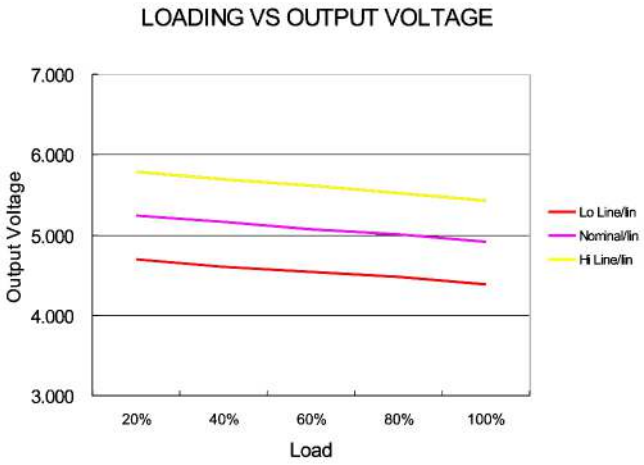
Part Number	Input Voltage [V]	Output Voltage [VDC]	Input current No load [mA, max]	Input current Full load [mA, typ]	Output current [mA]	Capacitive load [µF, max]	Efficiency [%, typ]
1S7BE_0303D6U	3.3	±3.3	30	459	±152	±100	66
1S7BE_0305D6U	3.3	±5	30	433	±100	±100	70
1S7BE_0309D6U	3.3	±9	26	404	±56	±100	75
1S7BE_0312D6U	3.3	±12	30	394	±42	±100	77
1S7BE_0315D6U	3.3	±15	25	389	±33	±100	78
1S7BE_0324D6U	3.3	±24	25	404	±21	±100	75
1S7BE_0503D6U	5	±3.3	20	299	±152	±100	67
1S7BE_0505D6U	5	±5	20	270	±100	±100	74
1S7BE_0509D6U	5	±9	15	247	±56	±100	81
1S7BE_0512D6U	5	±12	20	250	±42	±100	80
1S7BE_0515D6U	5	±15	20	244	±33	±100	82
1S7BE_0524D6U	5	±24	22	247	±21	±100	81
1S7BE_1203D6U	12	±3.3	13	123	±152	±100	68
1S7BE_1205D6U	12	±5	10	123	±100	±100	74
1S7BE_1209D6U	12	±9	13	110	±56	±100	78
1S7BE_1212D6U	12	±12	10	102	±42	±100	82
1S7BE_1215D6U	12	±15	10	102	±33	±100	82
1S7BE_1224D6U	12	±24	20	111	±21	±100	75
1S7BE_1503D6U	15	±3.3	20	89	±152	±100	75
1S7BE_1505D6U	15	±5	20	89	±100	±100	75
1S7BE_1509D6U	15	±9	18	87	±56	±100	77
1S7BE_1512D6U	15	±12	20	87	±42	±100	77
1S7BE_1515D6U	15	±15	20	87	±33	±100	77
1S7BE_1524D6U	15	±24	15	89	±21	±100	75
1S7BE_2403D6U	24	±3.3	7	62	±152	±100	67
1S7BE_2405D6U	24	±5	6	56	±100	±100	74
1S7BE_2409D6U	24	±9	7	56	±56	±100	78
1S7BE_2412D6U	24	±12	6	52	±42	±100	80
1S7BE_2415D6U	24	±15	8	52	±33	±100	80
1S7BE_2424D6U	24	±24	8	51	±21	±100	82
1S7BE_4803D6U	48	±3.3	6	34	±152	±100	62
1S7BE_4805D6U	48	±5	5	31	±100	±100	68
1S7BE_4809D6U	48	±9	5	29	±56	±100	73
1S7BE_4812D6U	48	±12	6	28	±42	±100	74
1S7BE_4815D6U	48	±15	5	27	±33	±100	77
1S7BE_4824D6U	48	±24	6	28	±21	±100	74

Typical characteristics

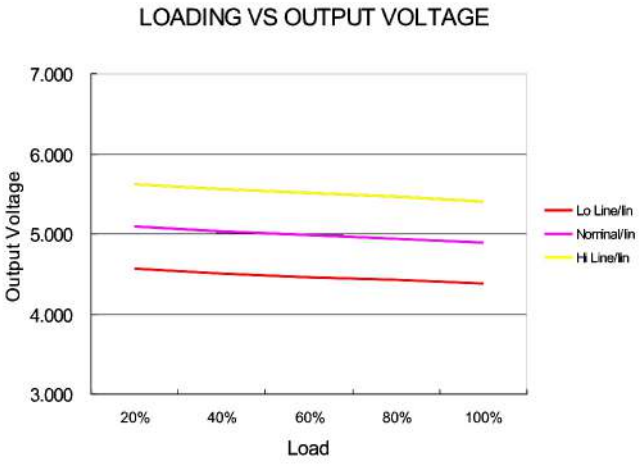


Input voltage	Slow burning fuses
3.3 Vin	800mA
5 Vin	500mA
12, 15, 24 Vin	300mA

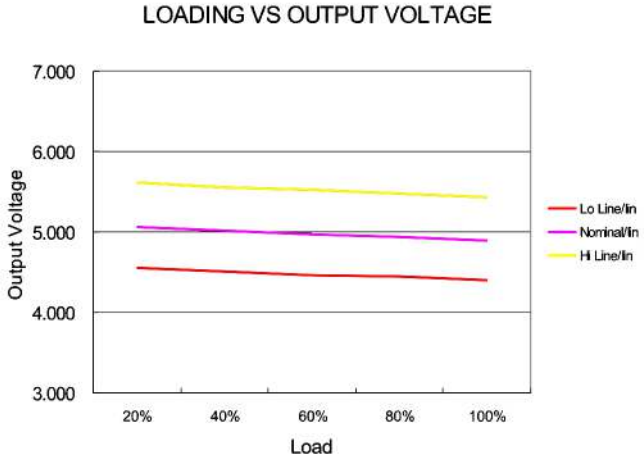
Loading vs. output



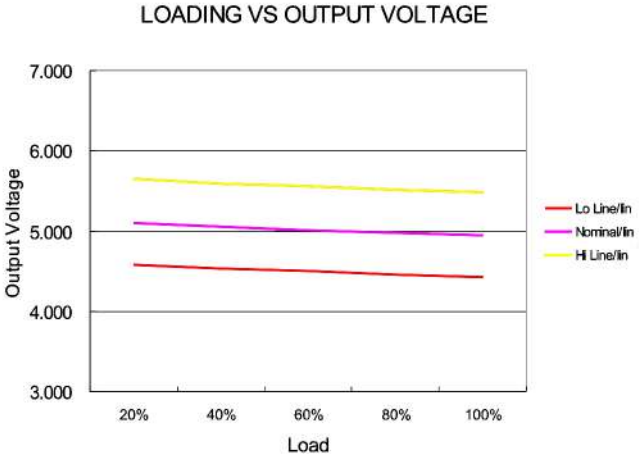
1S7BE_05yy type



1S7BE_12yy type

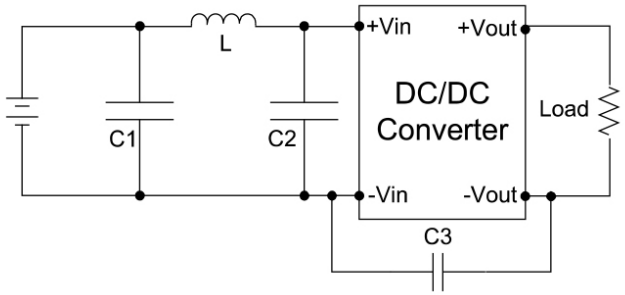


1S7BE_24yy type



1S7BE_48yy type

EMI filter

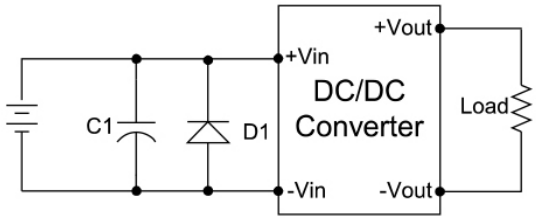


Model	C1	L	C2	C3
1S7BE_03xx6U	1210, 2.2µF/100V	18µH		
1S7BE_05xx6U	1210, 2.2µF/100V	18µH		
1S7BE_12xx6U	1210, 2.2µF/100V	18µH		
1S7BE_15xx6U	1210, 2.2µF/100V	18µH		
1S7BE_24xx6U	1210, 2.2µF/100V	18µH	1210, 2.2µF/100V	1206, 470pF/2KV
1S7BE_48xx6U	Electrolytic capacitor, 10µF/100V	18µH	1210, 2.2µF/100V	1206, 470pF/2KV

Input filter components (C1, L, C2, C3) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

EFT/surge filter

Input filter components (C1, D1) are used to help meet IEC 61000-4-4 and IEC 61000-4-5.

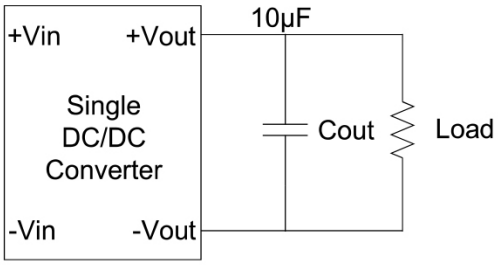


SIP models

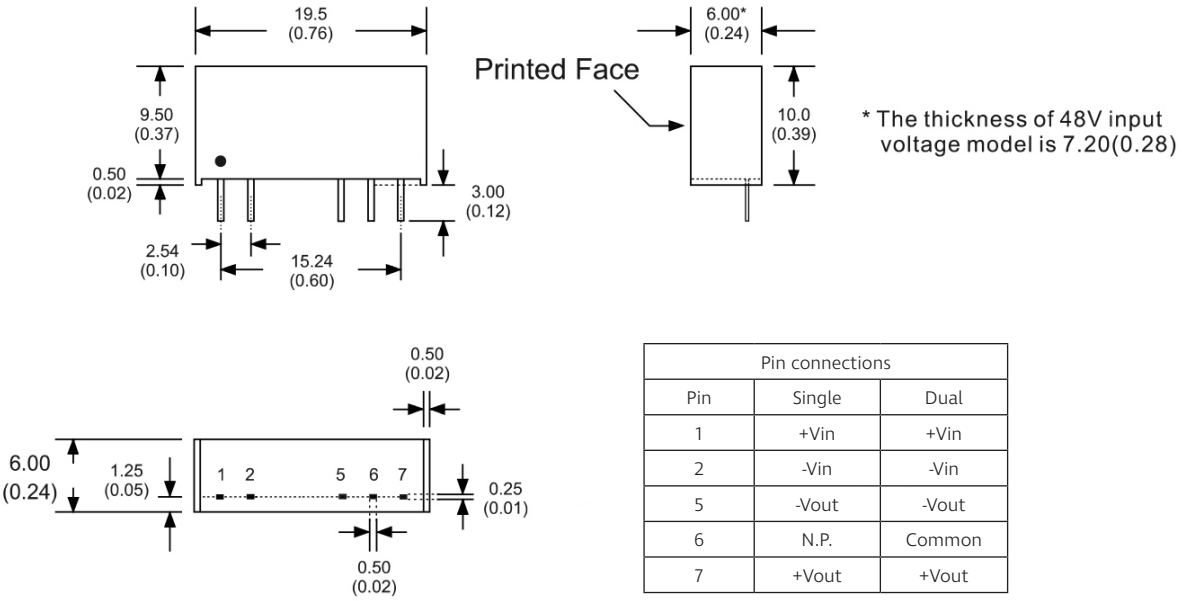
SIP	C1	D1
1S7BE_03xx6U	2200µF/100V	SMAJ5A
1S7BE_05xx6U	2200µF/100V	SMAJ6.5A
1S7BE_12xx6U	2200µF/100V	SMAJ14A
1S7BE_15xx6U	2200µF/100V	SMAJ18A
1S7BE_24xx6U	2200µF/100V	SMAJ26A

Output ripple & noise reduction

To reduce ripple and noise, it is recommended to use a 10µF electrolytic capacitor at the output.



Mechanical dimensions



Pin connections		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
5	-Vout	-Vout
6	N.P.	Common
7	+Vout	+Vout

All dimensions are typical in mm (inch)
Pin diameter: 0.5 ±0.05 (0.02 ±0.002)
Pin pitch and length tolerance: ±0.35 (±0.014)
Case tolerance: ±0.5 (±0.02)