

HSK5101 Series mil-spec DC-DC converter

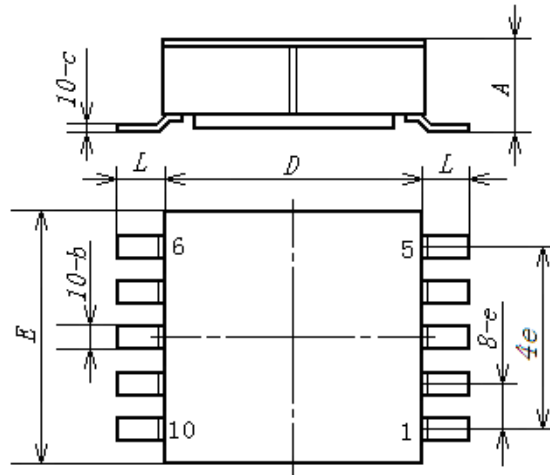
1.1 Absolute maximum rated of mil-spec DC-DC converter

Pulse input voltage V_{INP}	
(Positive pulse width 100ms, positive duty cycle 1%)	... -20V~60V;
Input voltage V_{IN}	..... 26V;
Enable input voltage V_{EN}	.....-0.3V~26V;
Maximum output current	.....3.5A;
Storage temperature T_{stg}	.....-65°C~150°C;
Lead welding temperature (10s) T_h	..... 300°C;
Junction temperature T_j	..... 175°C;
Thermal resistance $R_{(th)J-c}$	.....5.7°C/W;
Power consumption P_D (Without heat sink)	..... 200mW.

1.2 Recommended operating conditions of mil-spec DC-DC converter

Input voltage V_{IN} ($V_{OUT}+1$)V;
Operating temperature T_c	.....-55°C~125°C;
Enable input voltage high level $V_{En(H)}$	..... $\geq 2.4V$;
Enable input voltage low level $V_{En(L)}$	..... $\leq 0.8V$.

1.3 Package Specifications of mil-spec DC-DC converter

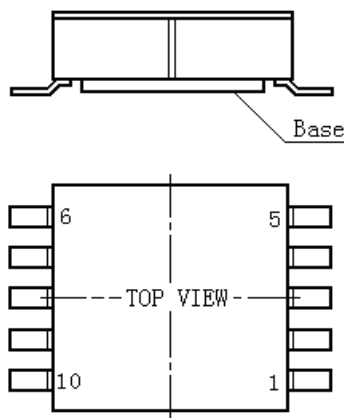


Unit:mm

Symbols	Data		
	Minimum	Typical	Maxim
<i>A</i>	-	-	3.0
<i>D</i>	-	-	6.8
<i>E</i>	-	-	6.8
<i>L</i>	1.0	-	-
<i>b</i>	0.30	0.4	0.5
<i>c</i>	-	0.15	0.25
<i>e</i>	-	1.27	-

Fig 1 HSK5101 Package outline drawing

1.4 Pin Designations of mil-spec DC-DC converter

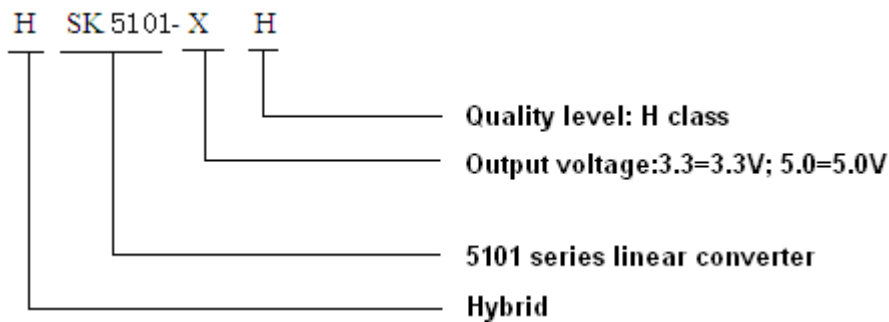


Pin	Symbol	Designation	Pin	Symbol	Designation
1	NC	NC	6	V _{OUT}	Output
2	E _N	Enable	7	V _{OUT}	Output
3	V _{IN}	Input	8	V _{OUT}	Output
4	V _{IN}	Input	9	NC	NC
5	NC	NC	10	Flag	Flag
			Base	GND	GND

图 2 HSK5101 Pin Designations

1.5 Ordering Information of mil-spec DC-DC converter

Part number contains the use of the production process, serial number, output voltage, quality level and other information. As shown below:



1.6 Technical Specifications of mil-spec DC-DC converter

Table 1a HSK5101-3.3 Electrical characteristics

Items	Symbol	Condition (Unless otherwise specified, $V_{En(H)} \geq 2.4V$, $V_{En(L)} \leq 0.8V$, $-55^\circ C \leq T_A \leq 125^\circ C$)	A Group	Limited value		Unit
				Min	Max	
Output voltage	V _{OUT}	$I_{OUT}=1A$, $V_{IN}=4.3V$, $V_{En}=V_{IN}$	1	3.267	3.333	V
			2, 3	3.234	3.366	
Input and output voltage difference	V _{DO}	$T_A=25^\circ C$, $V_{En}=V_{IN}$; $\Delta V_{OUT}=-1\%$; $I_{OUT}=100mA$	1	—	200	mV
				$T_A=25^\circ C$, $V_{En}=V_{IN}$; $\Delta V_{OUT}=-1\%$; $I_{OUT}=1.5A$	—		600
Static (ground) current	I _Q	$T_A=25^\circ C$, $V_{En}=V_{IN}$; $V_{IN}=4.3V$, $I_{OUT}=0.75A$	1	—	20	mA
				$T_A=25^\circ C$, $V_{En}=V_{IN}$; $V_{IN}=4.3V$, $I_{OUT}=1.5A$	—		40
Load regulation	S _I	$I_{OUT}=10mA \rightarrow 1.25A$, $V_{IN}=4.3V$, $V_{En}=V_{IN}$	1	—	1	%
			2, 3	—	2	
Voltage regulation	S _V	$V_{IN}=4.3V \rightarrow 26V$, $I_{OUT}=10mA$, $V_{En}=V_{IN}$	1	—	0.5	%
			2, 3	—	1	
Output noise voltage	V _K	$T_A=25^\circ C$, $V_{En}=V_{IN}$; $C=22\mu F \sim 30\mu F$; $I_{OUT}=10mA$, $f \leq 300KHz$	4	—	250	μV

Shutoff output current	I_{OSD}	$T_A=25^\circ\text{C}; V_{En}=0\text{V}$	4	—	50	μA
Enable input high level	$V_{EN(H)}$	$T_A=25^\circ\text{C}; V_{IN}=4.3\text{V}, I_{OUT}=100\text{mA}$	1	2.4	—	V
Enable input low level	$V_{EN(L)}$	$T_A=25^\circ\text{C}; V_{IN}=4.3\text{V}, I_{OUT}=100\text{mA}$	1	—	0.8	
Enable high level input current	$I_{EN(H)}$	$T_A=25^\circ\text{C}, V_{En}=V_{IN}; V_{IN}=4.3\text{V}, I_{OUT}=100\text{mA}$	1	—	600	μA
Enable low level input current	$I_{EN(L)}$	$T_A=25^\circ\text{C}; V_{En}=0\text{V}; V_{IN}=4.3\text{V}, I_{OUT}=100\text{mA}$	1	—	2	
Flag output turn on voltage	V_{FO}	$T_A=25^\circ\text{C}; V_{IN}=V_{OUT}-1.0\text{V}, I_{OF}\leq 250\mu\text{A};$ output no load	1	—	0.4	V
Flag output turn off current	$I_{F(OFF)}$	$T_A=25^\circ\text{C}; V_{IN}=V_{OUT}+1\text{V};$ output no load	1	—	2	μA
Output current limit	I_{LIM}	$T_A=25^\circ\text{C}; V_{IN}=4.3\text{V}$	4	—	6.5	A

Table 1b HSK5101-5.0 Electrical characteristics

Items	Symbol	Condition (Unless otherwise specified, $V_{EN(H)}\geq 2.4\text{V}$, $V_{EN(L)}\leq 0.8\text{V}$, $-55^\circ\text{C}\leq T_A\leq 125^\circ\text{C}$)	A Group	Limited value		Unit
				Min	Max	
Output voltage	V_{OUT}	$I_{OUT}=1\text{A}, V_{IN}=6.0\text{V}$	1	4.95	5.05	V
			2, 3	4.90	5.10	
Input and output voltage difference	V_{DO}	$T_A=25^\circ\text{C}; \Delta V_{OUT}=-1\%; I_{OUT}=100\text{mA}$	1	—	250	mV
		$T_A=25^\circ\text{C}; \Delta V_{OUT}=-1\%; I_{OUT}=1.5\text{A}$		—	600	
Static (ground) current	I_Q	$T_A=25^\circ\text{C}; V_{IN}=6.0\text{V}, I_{OUT}=0.75\text{A}$	1	—	30	mA
		$T_A=25^\circ\text{C}; V_{IN}=6.0\text{V}, I_{OUT}=1.5\text{A}$		—	40	
Load regulation	S_I	$I_{OUT}=10\text{mA}\rightarrow 1.25\text{A}, V_{IN}=6.0\text{V}$	1	—	1	%
			2, 3	—	2	
Voltage regulation	S_V	$V_{IN}=6.0\text{V}\rightarrow 26\text{V}, I_{OUT}=10\text{mA}$	1	—	0.5	%
			2, 3	—	1	
Output noise voltage	V_N	$T_A=25^\circ\text{C}, V_{En}=V_{IN}; C=22\mu\text{F}\sim 30\mu\text{F};$ $I_{OUT}=10\text{mA}, f\leq 300\text{KHz}$	4	—	350	μV
Shutoff output current	I_{OSD}	$T_A=25^\circ\text{C}; V_{En}=0\text{V}$	4	—	50	μA
Enable input high level	$V_{EN(H)}$	$T_A=25^\circ\text{C}; V_{IN}=6.0\text{V}, I_{OUT}=100\text{mA}$	1	2.4	—	V
Enable input low level	$V_{EN(L)}$	$T_A=25^\circ\text{C}; V_{IN}=6.0\text{V}, I_{OUT}=100\text{mA}$	1	—	0.8	
Enable high level input current	$I_{EN(H)}$	$T_A=25^\circ\text{C}, V_{En}=V_{IN}; V_{IN}=6.0\text{V}, I_{OUT}=100\text{mA}$	1	—	600	μA
Enable low level input current	$I_{EN(L)}$	$T_A=25^\circ\text{C}; V_{En}=0\text{V}; V_{IN}=6.0\text{V}, I_{OUT}=100\text{mA}$	1	—	2	
Flag output turn on voltage	V_{FO}	$T_A=25^\circ\text{C}; V_{IN}=V_{OUT}-2\text{V}, I_{OF}\leq 250\mu\text{A};$ output no load	1	—	0.4	V
Flag output turn off current	$I_{F(OFF)}$	$T_A=25^\circ\text{C}; V_{IN}=V_{OUT}+1\text{V};$ output no load	1	—	2	μA
Output current limit	I_{LIM}	$T_A=25^\circ\text{C}; V_{IN}=6.0\text{V}$	4	—	6.5	A

1.7 Typical Connection Diagram of mil-spec DC-DC converter

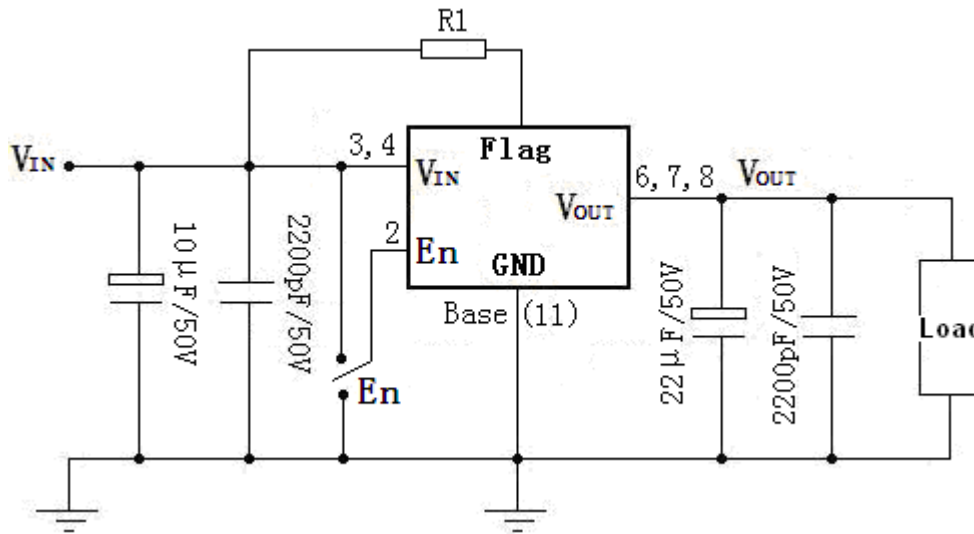


Fig 3 HSK5101 Electrical test line connection diagram

1.8 Application Notes of mil-spec DC-DC converter

- ☆ The electronic inspection point should be kept as close as possible at the root of the pin;
- ☆ It is strictly forbidden to bend the pins;
- ☆ To prevent the application of two or more absolute maximum ratings on the device at the same time;
- ☆ To prevent the device from falling off;
- ☆ To prevent the output and ground short circuit;
- ☆ To prevent the device from being reversed or dislocated;
- ☆ During assembly, the bottom of the product should be attached as close as possible to the circuit board to avoid damage to the pin, take shockproof measures for necessary ;
- ☆ Focus on device power consumption, the power consumption $P_D = I_O(V_{IN} - V_{OUT})$, When the input/output voltage difference ($V_{IN}-V_{OUT}$) is large, output current I_O should be smaller; When the input/output voltage difference ($V_{IN}-V_{OUT}$) is small , output current I_O should be larger; When the device power consumption is large, be sure to configure the appropriate heat sink to prevent the device damaged due to overheating or into the overheating protection status;
- ☆ Both positive and negative terminals of power supply shall be correctly connected when power is applied so as to avoid permanent damage to the device.;
- ☆ Anti-static measures should be taken during storage and transportation.