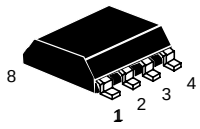
Low-Powered Adjustable Voltage Regulator with low drop-out voltage

KK2931CD

IC KK2931CD is an adjustable voltage regulator of positive polarity with low drop-out voltage.

IC is purposed for formation of temperature-constant voltage of the value set by external resistive divider in the range from 3 to 24 V and used in the supply of electronic equipment.

SO (MS-012AA)



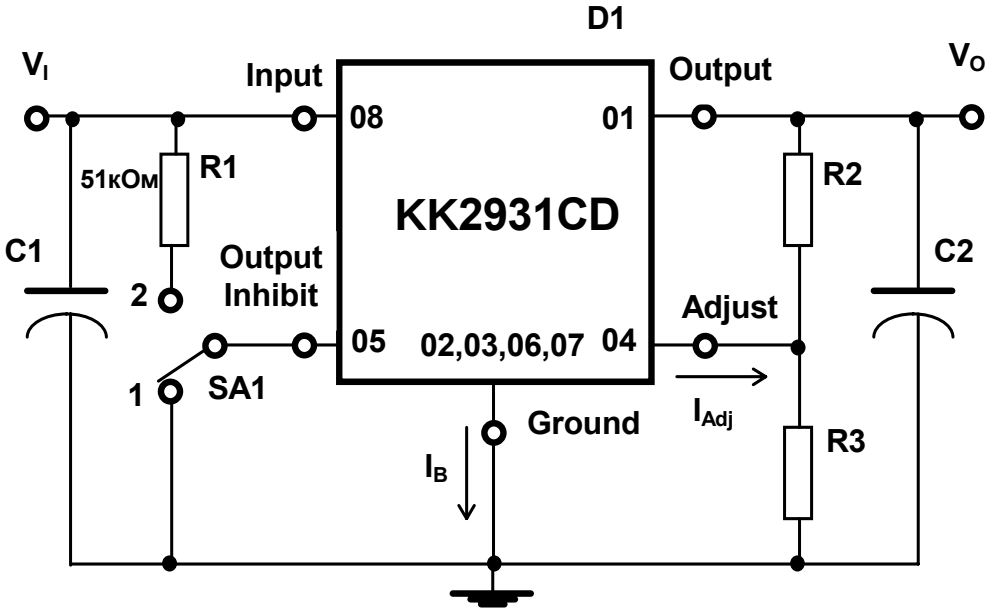
- Output voltage 3-24V.
- Drop-out voltage not less than 0,2V at load current of 10 mA and less than 0,6V at load current of 100 mA.
- Internal limitation of maximum load current.
- Protection against overvoltage of positive and negative polarity
- Temperature protection

Pin No.	Purpose	Name
01	Output	Output
02,03,06,07	Common	Ground
04	Adjustment	Adjust
05	Disconnection output	Output Inhibit
08	Input	Input

Table 1 - pins purpose of IC in 8-pin SO package

Table 2 - Maximum and absolute maximum operation conditions

Parameter	Unit	Maximum mode		Absolute maximum mode	
		min	max	min	max
Junction temperature, T_J	^{O}C	-40	125	-	-
Storage temperature, T_{stg}	^{O}C	-	-	-60	150
Input voltage, U_I	V	U_O+0,6	26	-15	40
Input voltage, $U_{I(\tau)}$, $\tau \leq 100$ ms	V			-50	60
Output current, I_O	mA	-	100	-	100
Resistance junction-case, $R_{\theta JC}$	°C/W	-	25(typ.)	-	25(typ.)
Resistance junction-ambient, $R_{\theta JA}$	°C/W	-	160(typ.)	-	160(typ.)



C1, C2 - input and output capacitance,
D1 - IC,
R1, R2, R3 - resistors,
SA1 - switch (in position 1 - output is «on»,
in position 2 - output is «off»).

Output voltage is defined from formula:

$$V_O = V_{ref}(1 + \frac{R3}{R2}) + I_{Adj}R3, \quad (1)$$

where resistors R2, R3 must meet the following condition:

$$22{,}5\,кОм \geq \frac{R2 \times R3}{R2 + R3}, \quad (2)$$

where V_{ref} - reference voltage,

$R2$, $R3$ - resistors,

I_{Adj} - adjustment current

Figure 1 - Connection circuit of adjustable voltage regulator

Table 3 - Electrical parameters (U_I=14V, U_O = 3,0V, I_O = 10mA, R_2 = 27 kOhm, (unless specified otherwise)

Parameter, unit	Symbol	Test conditions	Rate		Tempe-rature T_J, °C
			min	max	
Reference voltage *, V	U_{ref}	I_O=10mA	1,14	1,26	25±10
		I_O≤100mA	1,08	1,32	-40÷125
Output voltage, V	$U_{O\ range}$	-	3 ÷ 24	-	25±10
Output voltage versus input voltage, mV/V	Regline	(U_O+0,6) V< U_I < 26 V	-	1,5	25±10
Output voltage versus load current, %/V	Regload	5mA < I_O < 100mA	-	1,0	25±10
Consumption current, mA	I_B	I_O=10mA	-	1,0	25±10
		Output is «off» ($U_{th(OI)}$=2,5 V)	-	1,0	25±10
Pulse-smoothing ratio, %/V	RR	f = 120 Hz	0,10	-	25±10
Drop-out voltage, V	U_{ds}	I_O=10mA	-	0.2	25±10
		I_O=100mA	-	0.6	25±10
Maximum input voltage threshold, V	$U_{th\ (OV)}$		26	40	25±10
Output voltage at negative input voltage, V	$-U_O$	U_I = -15 V	-0.3	-	25±10
Voltage threshold of disconnection output, V	$U_{th\ (OI)}$	Output is «on»	-	1,9	25±10
				1,2	-40÷125
		Output is «off»	2,5	-	25±10
			3,25	-	-40÷125
Disconnection output current, mkA	$I_{th\ (OI)}$	$U_{th\ (OI)}$ = 2,5 V	-	50	25±10

Notes:

1. Measurement of electrical parameters is conducted with capacitance C_I =0.1mkF connected on input and C_O =100mkF - on output.
2. *- Reference voltage in adjustable regulator is measured between outputs Output and Adjust on resistance R_2 (figure 1).
3. Parameters stipulated in table 3 are guaranteed for constant junction temperature T_J. Parameters measurement should be performed using pulse equipment.

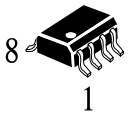
Table 4 - Typical values of electrical parameters (U_I=14В, U_O = 3,0В, I_O = 10мА, R_2 = 27 кОм, unless specified otherwise)

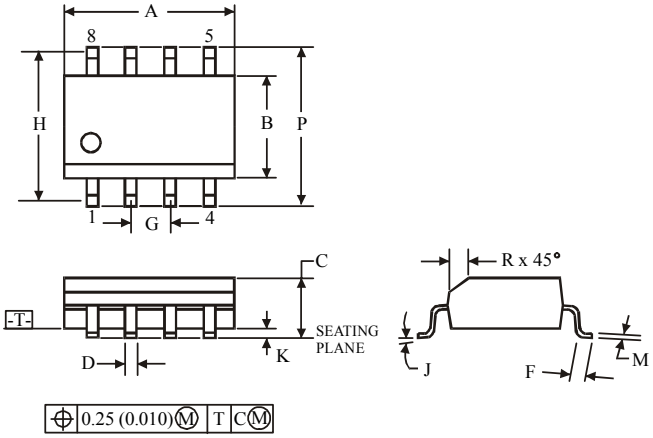
Parameter unit	Symbol	Test conditions	Typical value	Temperature T_J, °C
Output resistance, mOhm/V	Z_O	ΔI_O=1,0mA, f=10Hz÷100kHz	40	25±10
Consumption current, mA	I_B	I_O = 100 mA	6,0	25±10
Adjustment current, mkA	I_{Adj}		0,2	25±10
Noise voltage on output, mV/V	U_n	f=10 Hz÷100 kHz;	140	25±10
Temporary unstability of output voltage, %/1000h	S	-	0,4	25±10

Notes:

Measurement of electrical parameters is conducted with capacitance C_I =0.1mkF connected on input and C_O =100 mkF - on output.

D SUFFIX SOIC
(MS - 012AA)





	Dimension, mm	
Symbol	**MIN**	**MAX**
A	4.8	5
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.72	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5

NOTES:

1. Dimensions A and B do not include mold flash or protrusion.
2. Maximum mold flash or protrusion 0.15 mm (0.006) per side for A; for B – 0.25 mm (0.010) per side.