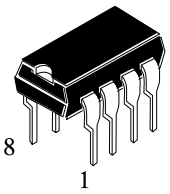
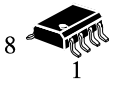
Powerful High-grade FET driver

IL33091A



DIP - 8



SOP - 8

ORDERING INFORMATION

IL33091AN DIP - 8
IL33091AD SOP - 8
T_A = -40° to 125° C
for all packages.

Description of basic functions.

The capability of handling high voltages on power line attributed to transient commutation of loads in conditions of automobile exploitation.
Load of microcircuit is a device on the base of MOS transistors that enables switching high current levels in automobile electrical system. Microcircuit has Fault indication output when there is short circuit in load or when load transistor current level exceeds preset value.

Functions

Microcircuit provides pumping of charge (on output capacity on pin **Gate** of gate control)to drive power MOS transistor. Input **Input ,** compatible with logic levels of CMOS microcircuits ,controls pumping of charge (switch in/switch off).

Check of drain-source voltage is implemented (VDS) on power MOS transistor, detection of shorted load , presentation of error signal on pin **Fault**.

Microcircuit has pin $\mathbf{V_T}$ of timer, that is both input in timer window comparators and output of current square circuit, depending on r m s voltage drain-source on power MOS transistor, as power dissipated in MOS device is proportional to VDS^2.

External resistor R_T and capacitor C_T, connected to timer pin enable programming of timing data necessary for protection of power MOS-device.

Internal circuit of stabilizer diodes with the **total** break down voltage of about 30V provides protection of microcircuit and power MOS transistor from supply voltage value to be exceeded. Activation of microcircuit Zener stabilizer diodes attributed to switching-off MOS transistor for the time when supply voltage value exceeded , in addition pin Fault does not change its logic state .

Features.

- Works with a wide variety of N-channel power field transistors
- Input of control compatible with CMOS logic
- Built in pumping of charge without external components
- Detection and protection from shorted load and current exceeding
- Failure unit reporting a FET overcurrent and shorted load condition
- Possibility to connect induced loads
- Forward overvoltage and battery polarity reverse protection
- Extended range of operating temperatures

Table of Maximum operation ratings and absolute maximum ratings .

Maximum operation ratings and absolute maximum ratings of exploitation

Name of parameter , unit of measurement	Symbol	Maximum operation rating		Absolute maximum rating	
		Standard		Standard	
		min	max	min	max
1	2	3	4	5	6
supply voltage on output V_{CC} (pin 05), V	V_{CC}	7,0	24,0	-0,7	28,0
Consumption current in mode of limiting by protection (input 05), mA DIP package SO-8 package	I_C				 10 1,0
Range of adjusting voltage on input Input (pin 07),V (direct voltage)	**Vin**			-0,7	28,0
ange of voltage, delivered to pin »» (pin 06), V (direct voltage)	V_{OUT}			-0.7	28,0
Temperature of chip, °C	T_J			-65	150
Temperature of storage, °C	T_{STG}			-65	150
operation range of ambient temperatures, °C	T_A	-40	125	-65	150

* Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied.
Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Table of electrical parameters .

Electrical parameters of microcircuits IL33091AN, IL33091AD

Name of parameter, unit of measurement	Symbol	Mode of measurement	standard		note
			min	max	
consumption current, mA	Icc	Vin = 0 V: Vin=5,0 V (Rx=100 kOhm):	-	0,3 6,0	2
Limitation value of supply voltage on pin Vcc (pin 05), V	Vz		29,0	35,0	3
output voltage range on pin »Gate» (pin 04) relatively voltage of power supply source Vcc, V	V_{GS}		8,0	15,0	-
current on pin »Gate» (pin 04), μA	I_G	V_G =Vcc	30	400	-
output voltage of saturation on pin»Gate» (pin 04), V	V_G(sat)	I_G =10μA	0	1,4	-
voltage on pin »Gate» in mode of load short circuit (pin 06), V	V_{GC}		6,4	7,7	4
Threshold voltage on input »Input» (pin 07), V	V_{IL} V_{IH}		- 3,5	1,5 -	-
input current of pin »Input» (pin 07), μA	Iin	Vin=5,0 V	-	250	-
current coefficient of timer (pin 08), μA/V^2	K	Rx=100 kOhm, V_T=0, V_{DC}=1,0 V	0,7	1,5	5
threshold voltage of synchronization (pin 08), V lower level upper level	 V_{TL} V_{TH}		 0,4 4,3	 1,2 5,2	-
current on pin »» (pin 06), μA	I_{OL} I_{OH}	V_F =5,0 V V_F =0	500 -	- 0,1	-
Voltage of saturation on pin»» (pin 06), V	V_{OL}	I_F =500 μA	-	0,8	-

Note

1 .Standards for electrical parameters of table , unless otherwise noted , are given for conditions :

7,0 V ≤ Vcc ≤ 24 V; -40°C ≤ Ta ≤125°C.

2 .Measure total consumption current on pins 02 and 05 of microcircuit (when resistor is Rx=100 kOhm, connected to pin 02, and resistor with the value of 45 kOhm, connected to pin 06).

3 . Protection of device from short-term voltage surge on power line at the expense of internal circuit of semiconductor stabilitrons.

4. Measure voltage relatively pin «SRC» in shorted load mode , when voltage on load approximately will make less than 1В in НУ relatively potential «general». Mode of measurements , residual stress on load of short-circuit mode are to be specified in the course of development basing on the reference dependence reading results for temperature range.

5 Current coefficient of timer is a constant (coefficient)of proportionality of voltage into current conversion, used to check V_{DS} voltage, formed on field transistor.

For microcircuit IL33091AN, arranged in 8-pin plastic DIP-package of MS-001BA type, Rtja is 100 °C/W; For microcircuit IL33091AD – arranged in 8-pin plastic SO-package of MS-012AA MC33091AD type, Rtja is 145 °C/W.

permissible value of static potential value is 2000 V (human body model).

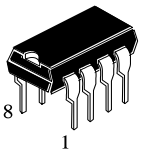
Nominal block diagram and IC connection circuit

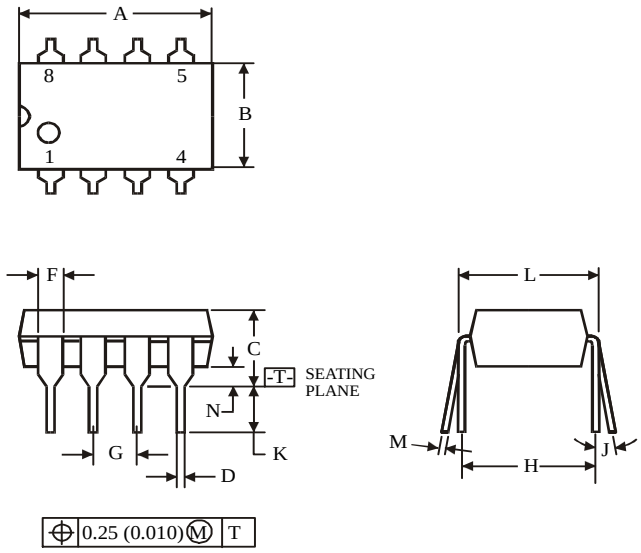
Table of pin purpose.

Table of pin purpose of microcircuits IL33091AN, IL33091AD

№ of pin	Purpose of pin
01	pin of voltage check on load (**SRC**)
02	pin for connection to resistor generating current dependence from voltage on external transistor (**DRN**)
03	general pin (**GND**)
04	pin of external transistor gate control (**Gate**)
05	pin of connection to supply voltage chain (**Vcc**)
06	pin of emergency indication **()**
07	control input (**Input**)
08	pin of timer timesetting circuit (**Vт**)

DIP – 8Package



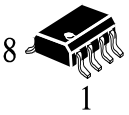


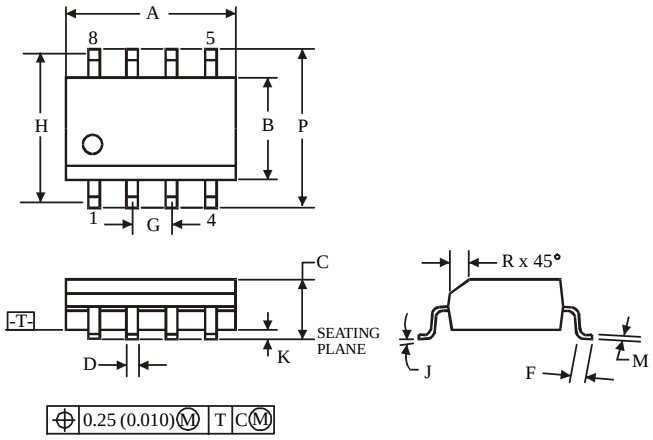
	Dimension, mm	
Symbol	**MIN**	**MAX**
A	8.51	10.16
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

NOTES:

1. Dimensions “A”, “B” do not include mold flash or protrusions.
   Maximum mold flash or protrusions 0.25 mm (0.010) per side.

SOP – 8Package





	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.