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T-58-11-13

THOMSON SEMICONDUCTORS

TEA7034

ADVANCE INFORMATION

LOW DROP-OUT 5-V VOLTAGE REGULATOR

TEA7034 is a 5 volt regulator with low dropout voltage designed to operate in unfavourable automotive environments. The circuit also features a highly efficient protection function against micro-interruptions of the supply voltage.

TEA7034 includes also short-circuit and thermal protections.

- Output voltage : +5 V ±2.5%.
- Output current : ⩾500 mA.
- Typical dropout voltage : 0.6 V @ 500 mA.
- Input surge voltage : +80 V.

LOW DROP-OUT 5-V
VOLTAGE REGULATOR

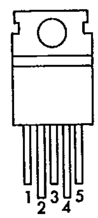
CASE CB-360

SP5-2 SUFFIX
PLASTIC PACKAGE

ORDERING INFORMATION

PART NUMBER	PACKAGE SP5-2
TEA7034	•
Examples : TEA7034SP5-2	

PIN ASSIGNMENT
(Front view)



1 - Input voltage
2 - Reset output
3 - Ground, substrate, heat sink
4 - Delay capacitor, drive to auxiliary series transistor
5 - Output

Réf. 00360

THOMSON SEMICONDUCTORS
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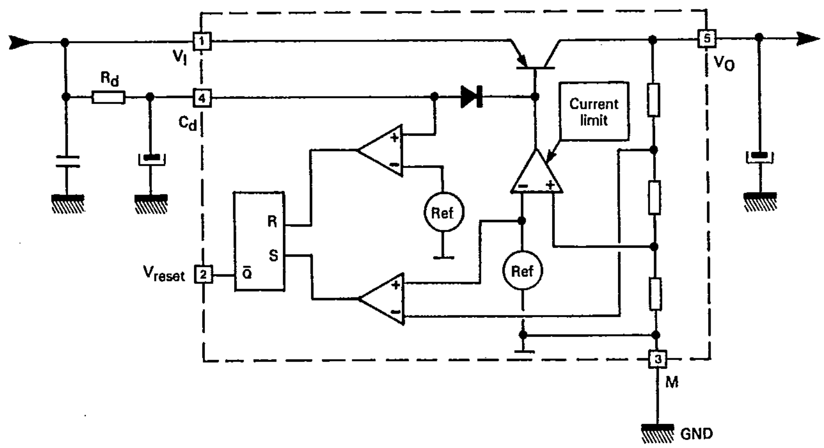
THOMSON COMPONENTS

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Input voltage – continuous – transitory τ=300 ms	V_I	 30 80	V
Continuous inverse input voltage	$V_{I(R)}$	– 18	V
Junction temperature	T_j	+ 150	°C
Storage temperature range	T_{stg}	– 55 to + 150	°C

SCHEMATIC DIAGRAM



1 - Input supply voltage.
2 - Reset output.
3 - Ground, substrate, heat sink.
4 - Delay capacitor, drive to auxiliary series transistor.
5 - Output.

ELECTRICAL CHARACTERISTICS
$V_I = +14.4$ V, $T_{amb} = +25°C$
(Unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit
Output voltage (I_O = 5 to 500 mA)	V_O	4.8	5	5.2	V
Input supply voltage	V_I	–	–	28	V
Supply current I_O = 0 mA I_O = 150 mA I_O = 500 mA	I_{CC}	 – – –	 5 20 100	 – – –	mA
Line regulation (V_I = +6 to +26 V, I_O = 5 mA)	K_{VI}	–	5	–	mV
Load regulation (I_O = 5 to 500 mA)	K_{VO}	–	15	–	mV
Dropout voltage I_O = 500 mA I_O = 150 mA	$V_I - V_O$	 – –	 0.6 0.18	 – –	V
Output voltage drift	$\left\| \frac{\Delta V_O}{\Delta T} \right\|$	–	0.5	–	mV/°C
Supply voltage rejection (I_O = 350 mA, f = 120 Hz, C_O = 10 μF, V_I = +12 V ±5)	SVR	–	60	–	dB
Short-circuit output current	I_{OS}	–	0.8	–	A
Reset voltage (I_2 = 16 mA, $V_O \leq$ +4.75 V)	V_{reset}	–	–	0.80	V
Reset output leakage current (normal regulation)	I_{reset}	–	–	1	μA
Reset pulse duration (Application n° 1) (C_d = 2.2 μF, R_d = 33 kΩ)	t_{d1}	–	30	–	ms
Reset pulse duration (Application n° 2) (C_d = 47 μF, R_d = 1.5 kΩ)	t_{d1}	–	30	–	ms
Reset lower threshold level	$V_{thL(reset)}$	4.75	V_O – 0.05	–	V
Reset upper threshold level	$V_{thH(reset)}$	–	6	–	V
Autonomy time (C_d = 47 μF, R_d = 1.5 kΩ, I_O = 150 mA)	t_{aut}	–	2.5	–	ms
Quiescent current (normal regulation)	$I_{(4)}$	–	–10	–	μA

TEA7034 voltage regulator is particularly intented to provide a stable and clean power supply to microprocessor-based systems operating in harsh environments encountered in automotive applications. The regulated output voltage is efficiently maintained constant under following conditions :

- On ignition switch-on, where supply voltage could drop to as low as 5 V.
- Battery disconnection "Load Dump" resulting in positive voltage transients.
- Input voltage interruption or short polarity reversals.

In addition, the regulator provides an initialization signal for microprocessor $\overline{RESET}$ input.

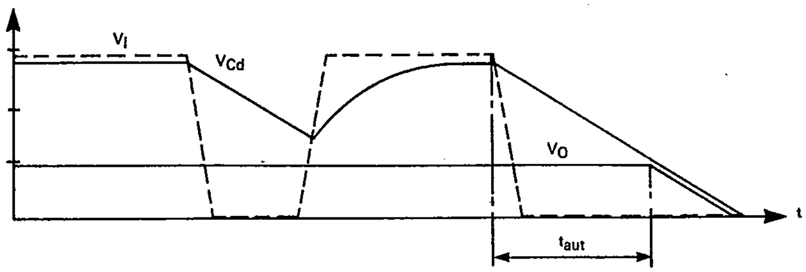
This signal has two distinct functions :

1. Upon initial power on, it maintains the microprocessor in initialization mode for a period long enough so as to stabilize the clock operation.
2. To reinitialize the microprocessor every time the supply voltage falls below the limit required for a reliable operation of the microprocessor.

In order to take full advantage of the remarkable features offered by this regulator, the user is recommended to use the application diagram 2. In this configuration, capacitor C_d is used to provide two functions :

- to determine the duration of the initialization cycle, and
- to act as a storage capacitor providing supply continuity in case of short interruptions of the input voltage.

Under normal operating conditions, capacitor C_d is charged to approximately the value of the input voltage. To guarantee output voltage continuity, as soon as a supply interruption occurs, this capacitor supplies required power to an external pass transistor which replaces in this event the internal series transistor included in the regulation loop.



The autonomy time (t_{aut}) is calculated using the following formula :

$$t_{aut} \cong \frac{R_d\ C_d\ (V_I - V_O)}{I_O}$$

With a storage capacitor value of 47 µF, t_{aut} will be in the order of a few ms and can be increased using higher capacitor values.

Fewer external components are required for configuration given by application diagram 1. However, it does not accomplish output continuity function in case of power supply interruption and on the other hand, initialization function is limited to that discussed in paragraph 1 above.

Under all circumstances, the duration of the initialization period (t_d) is determined by the voltage accross capacitor C_d ; that is, C_d begins charging through R_d - initialization ceases as soon as V_{Cd} reaches 6 V, restarts when V_O drops below +4.75 V.

Upon initial power on :

$$t_{d1} = R_d\ C_d \log \frac{V_I}{V_I - V_{thH(reset)}}$$

While operating, if V_O falls below $V_{thL(reset)}$ then :

$$t_{d2} = R_d\ C_d \log \frac{V_I - V_{thL(reset)}}{V_I - V_{thH(reset)}}$$

For a +14.4 V battery :

$t_{d1} = 0.54\ R_d\ C_d$
$t_{d2} = 0.17\ R_d\ C_d$

Note that in above given formulae factors such as pin 4 quiescent current and reverse current across the series transistor have not been taken into account. These factors once considered will alter slighty the results-but however, the above formulae can be used to obtain satisfactory results.

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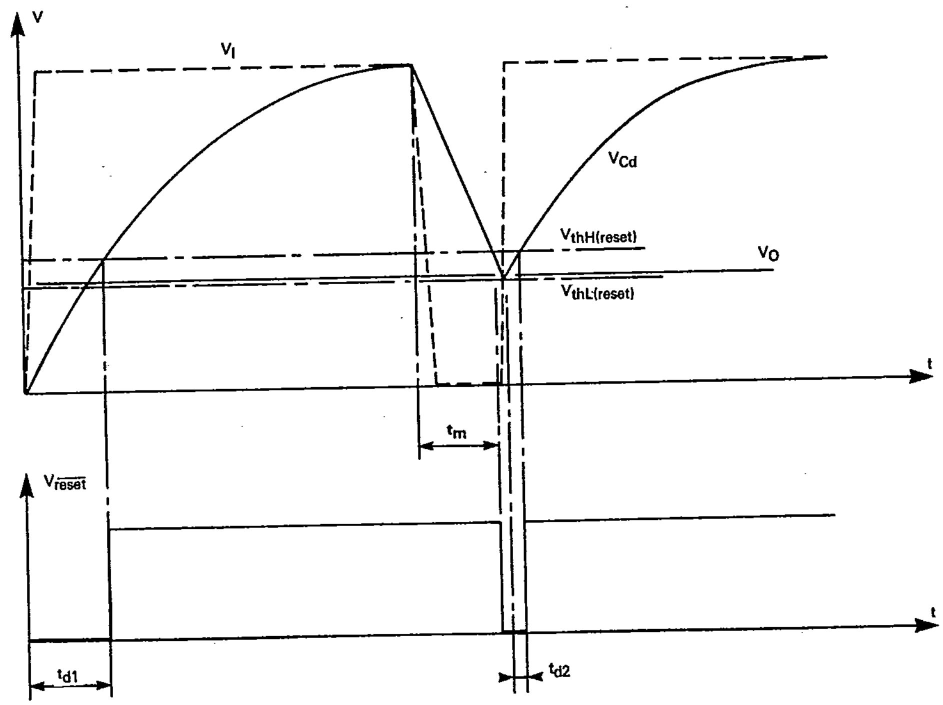
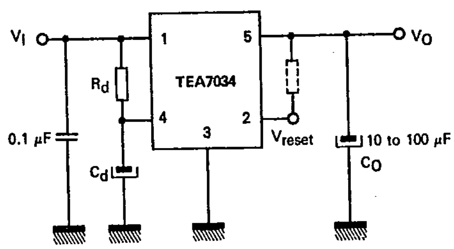
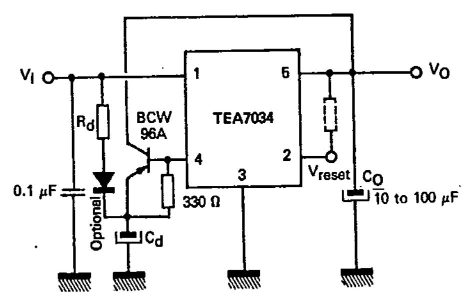
DEFINITION OF RESET PULSE DURATION



APPLICATION DIAGRAMS



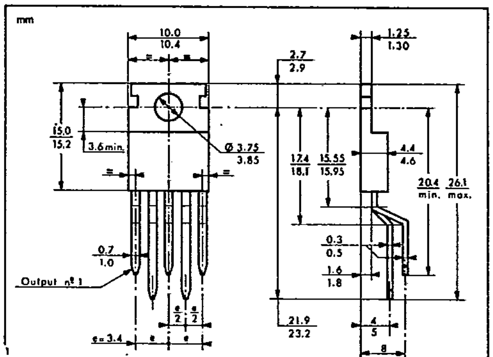
1. Without supply interruption back up



2. With supply interruption back up

CB-360

SP5-2 SUFFIX
PLASTIC PACKAGE



5 pins

DIN				
CEI	D.A.T.A.	JEDEC	SITELESC	CB-360 THOMSON SEMICONDUCTORS

This is advance information and specifications are subject to change without notice.
Please inquire with our sales offices about the availability of the different packages.