

1.0 V LOW DROPOUT LINEAR REGULATOR

FEATURES

- Low Input Voltage Operation (Single Battery Cell)
- Internal PNP Transistor
- Built-In Shutdown Control (Off Current, 10 μ A Typ)
- Low Dropout Voltage (30 mV Typ)
- High Speed ON/OFF Transient, (15 μ s Typ)
- Very Small Surface Mount Package (SOT-25)

APPLICATIONS

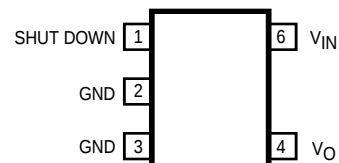
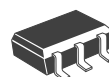
- Pagers
- Personal Communication Equipment
- Portable Consumer Equipment
- Radio Control Systems
- Single Battery Cell Systems

DESCRIPTION

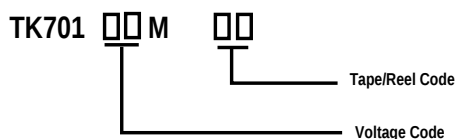
The TK701xx is a very low dropout, low input voltage operation regulator suitable for single battery cell applications. This regulator provides 1.0 V output with a dropout voltage of only 30 mV. The active low control provides on/off switching of the output. In the off mode, the standby supply current is 10 μ A, thus extending battery life.

The TK701xx is available in a very small plastic surface mount package (SOT-25).

TK701xx



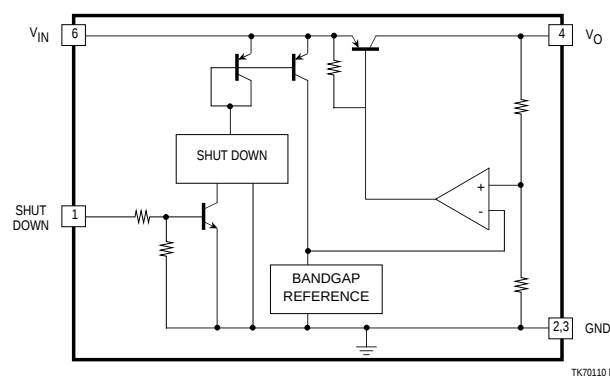
ORDERING INFORMATION



VOLTAGE CODE
10 = 1.0 V

TAPE/REEL CODE
BX : Bulk/Bag
TL : Tape Left

BLOCK DIAGRAM



TK701xx

ABSOLUTE MAXIMUM RATINGS

Input Voltage 6 V
Power Dissipation 150 mW
Operating Voltage Range 0.9 to 5.0 V
Junction Temperature 150 °C

Storage Temperature Range -50 to +150 °C
Operating Temperature Range 0 to +80 °C
Lead Soldering Temp. (10 sec.) 240 °C

Tk70110 ELECTRICAL CHARACTERISTICS

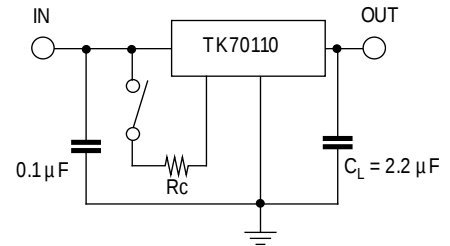
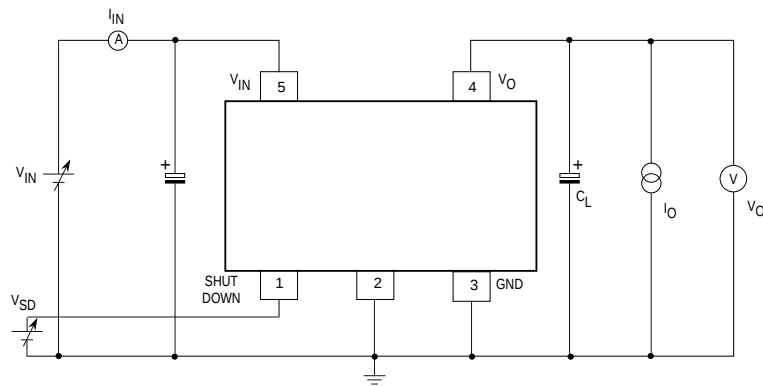
Test Conditions: $V_{IN} = 1.2 \text{ V}$, $T_A = 25 \text{ °C}$, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{IN}	Supply Current	$I_O = 0 \text{ mA}$, $V_{IN} = 1.2 \text{ V}$		190		μA
I_{STBY}	Standby Current	$V_{IN} = 1.2 \text{ V}$, Output off		10		μA
V_O	Output Voltage		0.95	1.0	1.05	V
V_{DROP}	Dropout Voltage	$I_O = 2 \text{ mA}$		30		mV
I_O	Output Current		20			mA
Line Reg	Line Regulation	$V_O + 1.2 \text{ V} \leq V_{IN} \leq 2.2 \text{ V}$			50	mV
Load Reg	Load Regulation	$I_O = 0 \rightarrow 2 \text{ mA}$		2	10	mV
		$I_O = 0 \rightarrow 10 \text{ mA}$		5	25	mV
RR	Ripple Rejection	$C_L = 3.3 \mu\text{F}$, 400 Hz		36		dB
$\Delta V_O / \Delta T_A$	Output Voltage Temperature Dependency	$0 \leq T_A \leq 60 \text{ °C}$		0.05		dB
Control Terminal Specification						
I_{CONT}	Control Current	$V_{CONT} = 1.0 \text{ V}$, $R_C = 0$, Note 2		22	50	μA
V_{CONT}	Control Voltage	Output On	-0.05		0.4	V
		Output Off	1.0			V

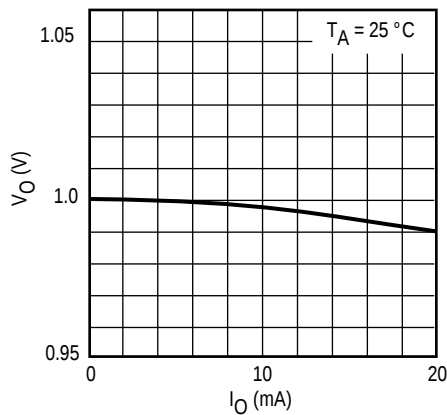
Note 1: Must be used within the power dissipation curve. Power dissipation is 350 mW when mounted as recommended.

Note 2: Control current may be decreased by connecting a series resistor to control pin.

TEST CIRCUIT

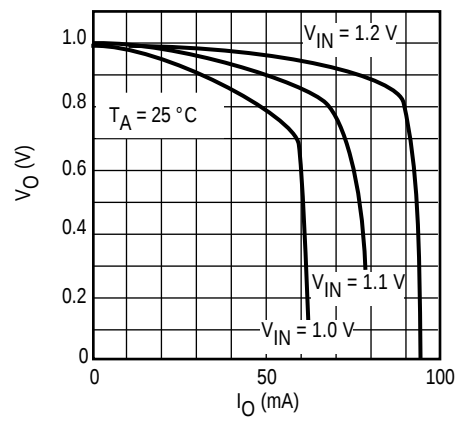


TYPICAL PERFORMANCE CHARACTERISTICS

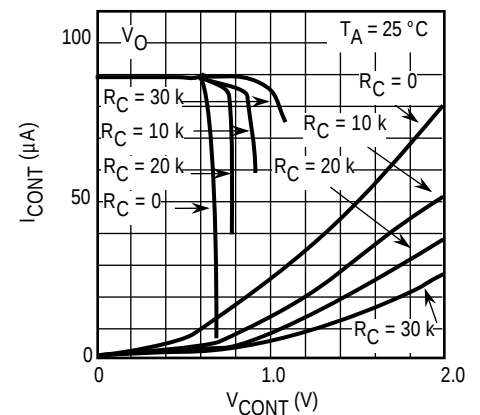
OUTPUT VOLTAGE vs.
OUTPUT CURRENT

1

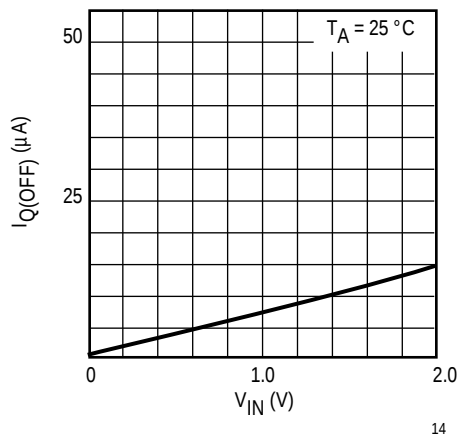
SHORT CIRCUIT CURRENT



12

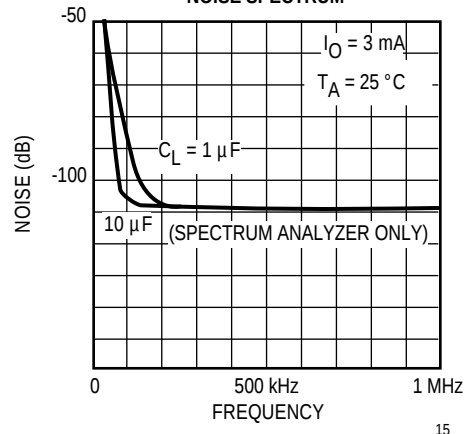
ON/OFF CONTROL TERMINAL
(SERIES RESISTOR R_C)

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QUIESCENT CURRENT vs.
INPUT VOLTAGE

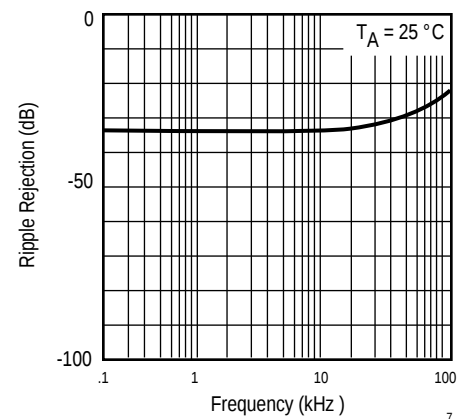
14

NOISE SPECTRUM



15

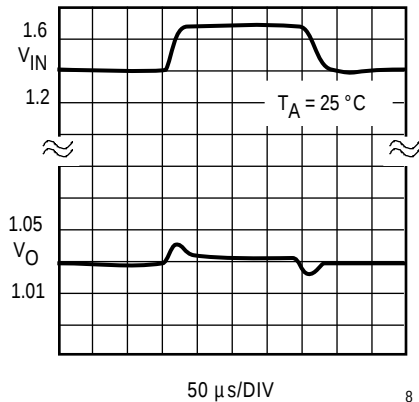
RIPPLE REJECTION



7

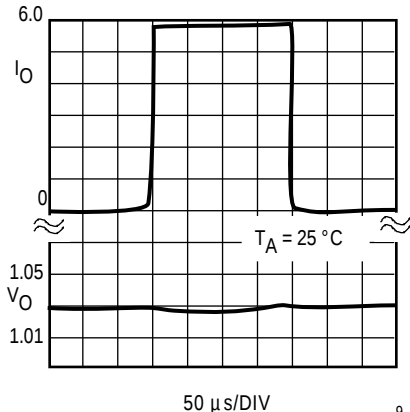
TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

LINE TRANSIENT RESPONSE



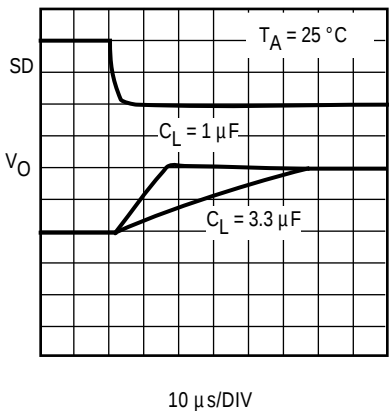
8

LOAD TRANSIENT RESPONSE



9

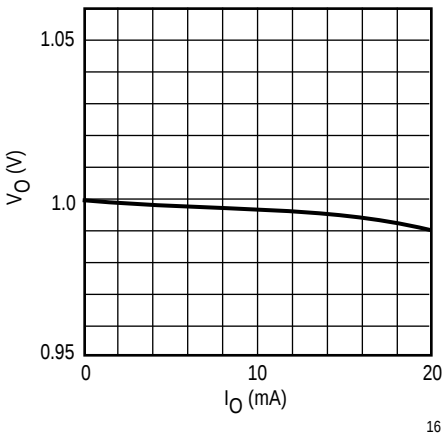
OUTPUT (ON/OFF) CONTROL RESPONSE



10

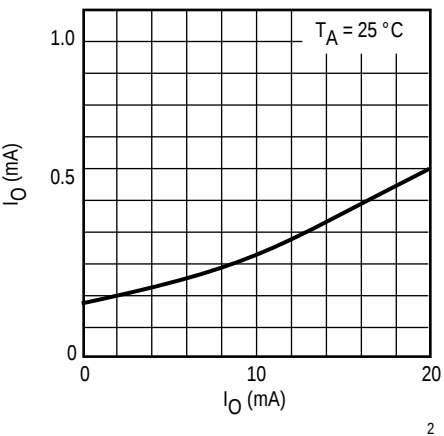
TK70110

OUTPUT VOLTAGE vs. OUTPUT CURRENT



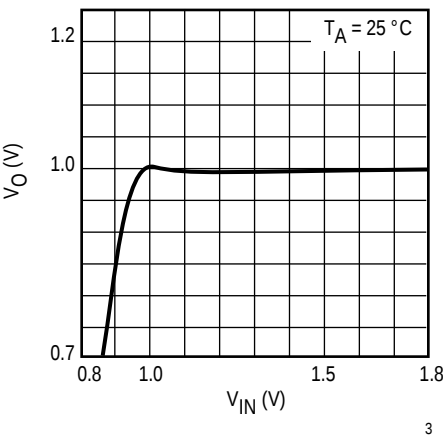
16

QUIESCENT CURRENT vs. OUTPUT CURRENT



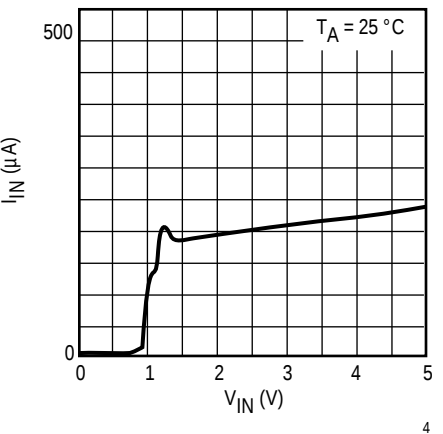
2

OUTPUT VOLTAGE vs. SUPPLY VOLTAGE



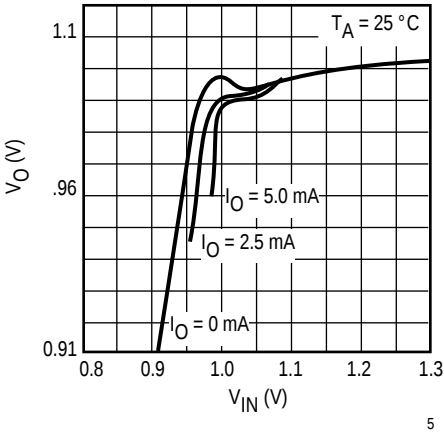
3

INPUT CURRENT (NO LOAD) vs. INPUT VOLTAGE



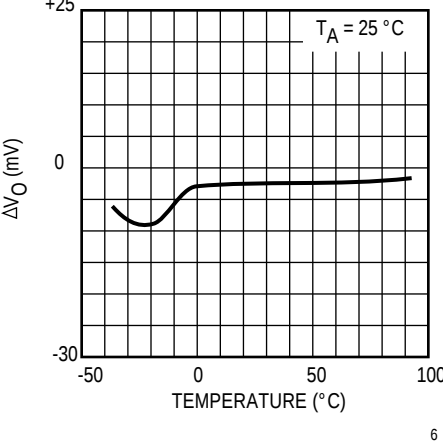
4

OUTPUT VOLTAGE vs. SUPPLY VOLTAGE



5

OUTPUT VOLTAGE DRIFT vs. TEMPERATURE

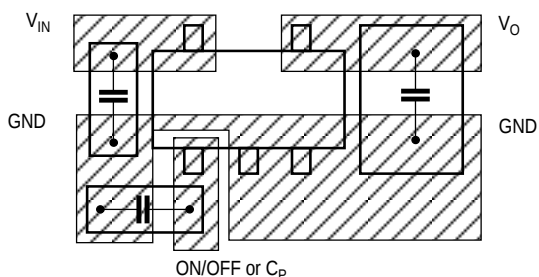


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APPLICATION NOTES

RECOMMENDED MOUNTING

Optimum performance can only be achieved when the IC is mounted on a PC board according to the diagram below. This is because of the extremely small package and limited power dissipation. Shape the metal portion of the PCB as shown in the following drawing.



Use a large bypass capacitor and connect it in a place near GND of the IC. Pay attention to temperature characteristics of the capacitor, especially the increase of ESR and decrease of capacitance in low temperatures. Oscillation, reduction of ripple rejection and increased noise may occur in some cases if the proper capacitor is not used. An output capacitor more than $1.0\ \mu\text{F}$ is required to maintain stability. The standard test condition is $3.3\ \mu\text{F}$ ($T_A = 25\ ^\circ\text{C}$).

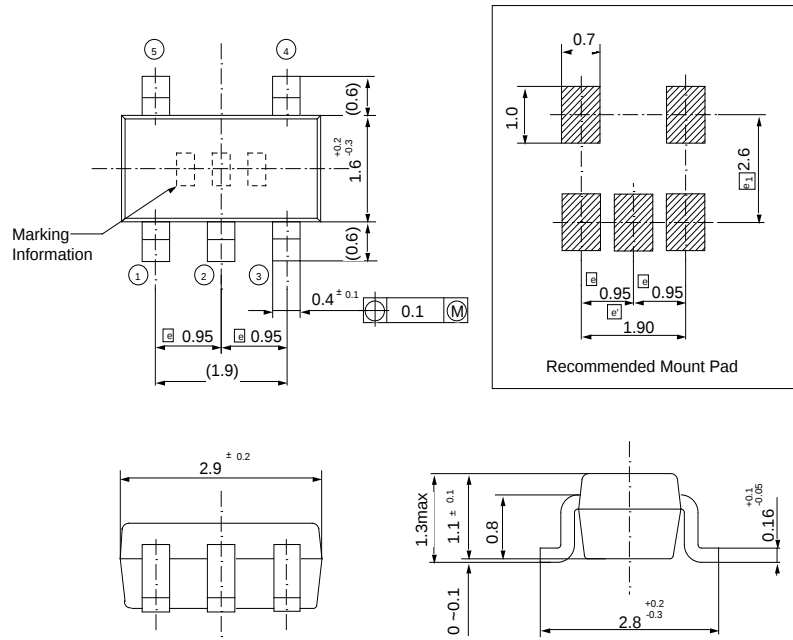
DROPOUT VOLTAGE

Dropout voltage is the voltage difference between the input voltage and the output voltage where the output voltage decreases to 100 mV below the nominal output voltage as the input voltage is decreased.

To measure dropout voltage, set the input voltage to the nominal output voltage +1 V and measure the output voltage. Reduce the input voltage to the point where the output is 100 mV below the previously measured value. The dropout voltage is the difference between the input and output voltage at this point. This voltage depends on the load current and ambient temperature.

PACKAGE OUTLINE

SOT-25



Unit:mm

Marking Information

TK70110 K10

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