DC-DC CONVERTER

FEATURES

- **Very Small Size**
- **Few External Components**
- **Wide Input Supply Voltage Range (1.1 to 18 V)**
- **Six Selectable Output Voltages up to 32 V**
- **Single Battery Cell Operation**

APPLICATIONS

- **Variable Capacitance and PIN Diode Bias**
- **Portable Instrumentation**
- **Radio Control Systems**
- **Mobile Radios**
- **Cellular Telephones**
- **Cordless Telephones**
- **Fiberoptic Receivers**
- **Local Area Network (LAN) Receivers**
- **Battery Operated Equipment**

DESCRIPTION

The TK11806 is a low power, low input voltage DC-DC converter.

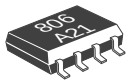
The device has been optimized for variable capacitance diode and PIN diode bias applications. It generates DC output voltages ranging from 9.3 V to 32 V in six steps. The desired output voltage may be selected by simple wire connections between control pins. The input DC voltage can be as low as 1.1 V or as high as 18 V.

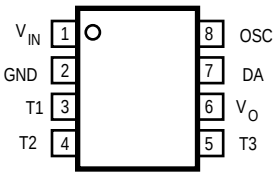
The device has a built-in relaxation oscillator. The frequency of oscillation is determined by external component values. The TK11806 has built-in voltage reference and an array of temperature compensated zener diodes in order to generate various output voltages with minimum external part count.

The device is available in an 8-lead plastic surface mount package (MFP-8).

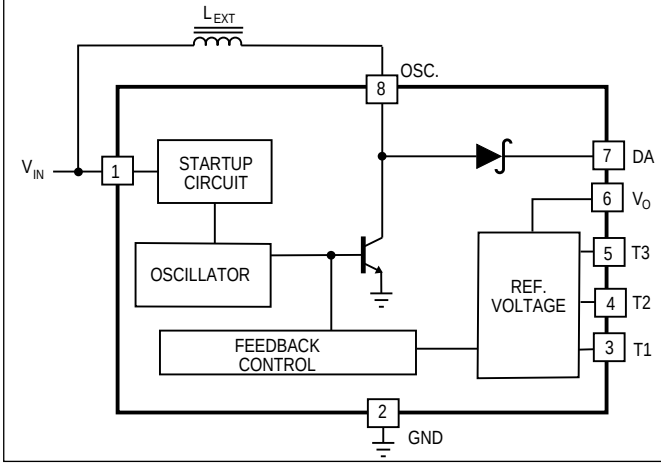
External inductive components are also available from TOKO.

TK11806M





BLOCK DIAGRAM



ORDERING INFORMATION

TK11806M □□

Tape/Reel Code

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

ABSOLUTE MAXIMUM RATINGS

Input Voltage ..... 20 V
Output Voltage ..... 35 V
Power Dissipation (Note 1) ..... 350 mW
Junction Temperature ..... 150 °C
Storage Temperature Range ..... -55 to +150 °C
Operating Temperature Range ..... -20 to +70 °C
Lead Soldering Temp. (10 sec.) M-Package ..... 260 °C

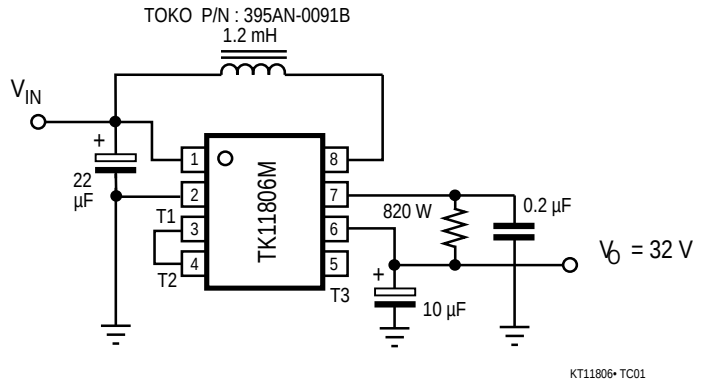
ELECTRICAL CHARACTERISTICS

Test conditions: V_{IN} = 5.0 V, V_O = 32.0 V, T_A = 25 °C, I_O = 0 µA, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Supply Voltage Range		1.1		18	mA
I_{IN}	Supply Current	I_O = 0.1 mA		4.7	90	mA
		I_O = 0.1 mA		12.1	19	µA
V_{O1}	Output Voltage	1.1 V≤V_{IN}≤18.0 V, Note 2	30	32.0	34	V
V_{O2}	Output Voltage	1.1 V≤V_{IN}≤18.0 V, Note 2	26	28	30	V
V_{O3}	Output Voltage	1.1 V≤V_{IN}≤18.0 V, Note 2	22.0	24.0	26.0	V
V_{O4}	Output Voltage	1.1 V≤V_{IN}≤18.0 V, Note 2	15.5	16.8	18.0	V
V_{O5}	Output Voltage	1.1 V≤V_{IN}≤18.0 V, Note 2	11.0	12.8	14.5	V
V_{O6}	Output Voltage	1.1 V≤V_{IN}≤18.0 V, Note 2	8.0	9.3	10.5	V
I_O	Output Current	Note 3	1.8	2.4		mA
Load Reg	Load Regulation	I_O = 0.0 mA → 1.0 mA		.24	0.5	%
$\Delta V_O/\Delta T_A$	Output Voltage Temperature Dependency	I_O = 0.1 mA		0.25		mV/ °C
V_{OSC}	Oscillator Start-up Voltage	I_O = 0 mA		0.9	1.1	V

Note 1: Power dissipation must be derated at the rate of 3 mW/°C for operation at T_A = 25 °C and above.
Note 2: Connect T_1 through T_3 as specified.
Note 3: Use inductor as specified.

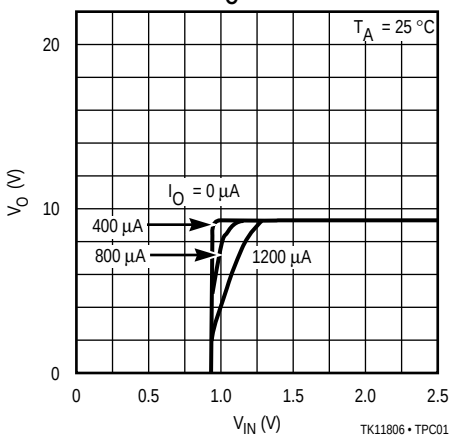
TEST CIRCUIT



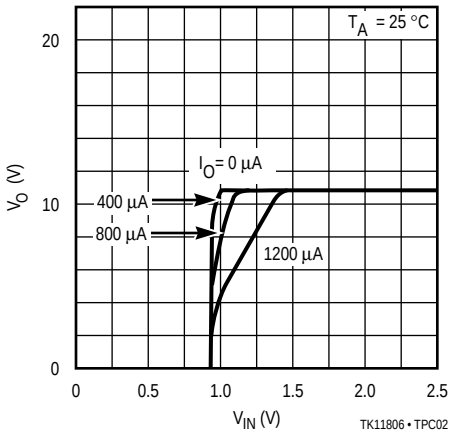
OUTPUT VOLTAGE (V)	CONNECTION
32	T_1-T_2
28	T_1-T_3
24	T_1-T_2-T_3
17	T_1-T_2 , T_3-V_O
13	T_1-V_O
9.3	T_1-T_2-V_O

TYPICAL PERFORMANCE CHARACTERISTICS

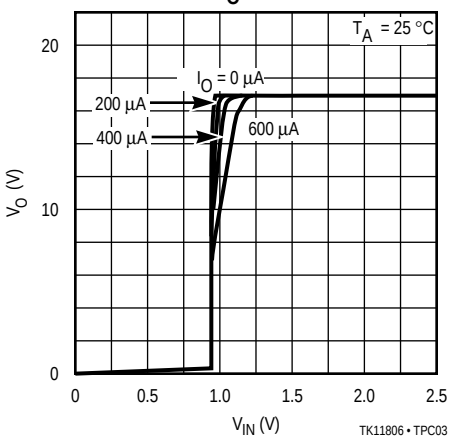
OUTPUT VOLTAGE vs. INPUT VOLTAGE
V_O = 9.3 V



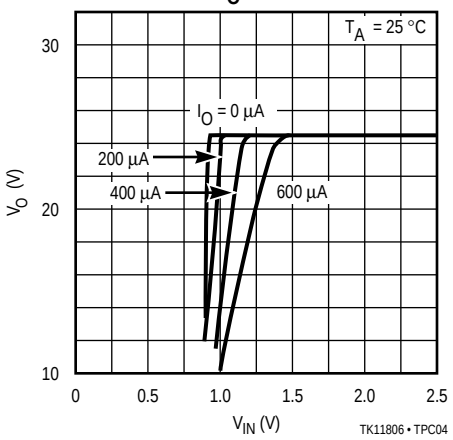
OUTPUT VOLTAGE vs. INPUT VOLTAGE
V_O = 13 V



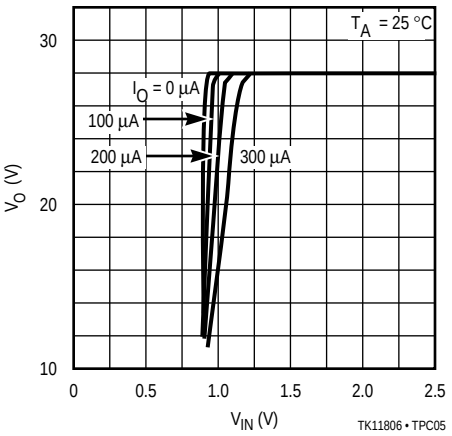
OUTPUT VOLTAGE vs. INPUT VOLTAGE
V_O = 17 V



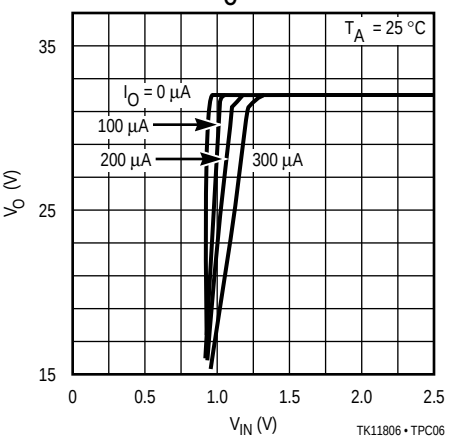
OUTPUT VOLTAGE vs. INPUT VOLTAGE
V_O = 24 V



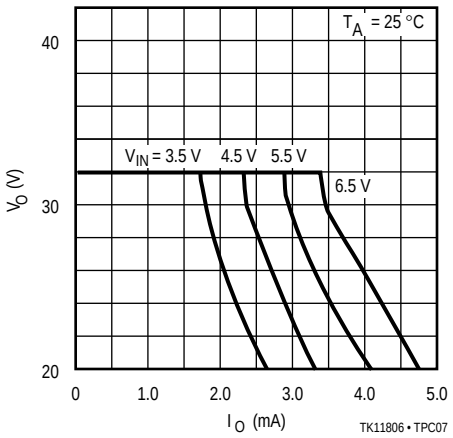
OUTPUT VOLTAGE vs. INPUT VOLTAGE
V_O = 28 V



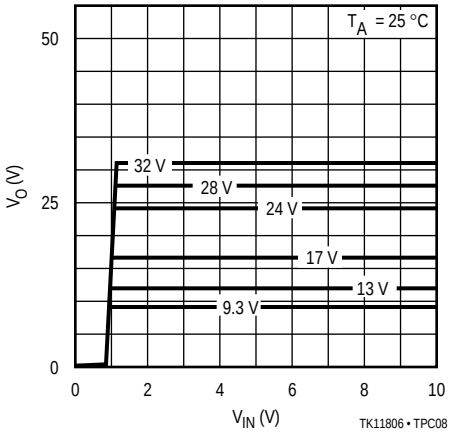
OUTPUT VOLTAGE vs. INPUT VOLTAGE
V_O = 32 V



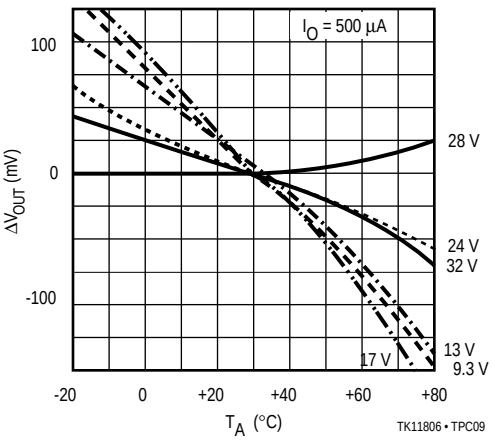
OUTPUT VOLTAGE vs. OUTPUT CURRENT
V_O = 32 V



OUTPUT VOLTAGE vs. INPUT VOLTAGE

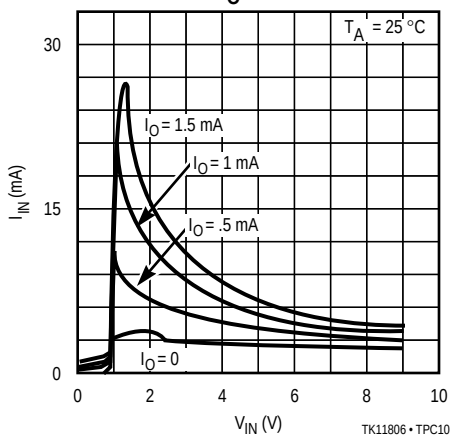


OUTPUT VOLTAGE DRIFT vs. TEMPERATURE



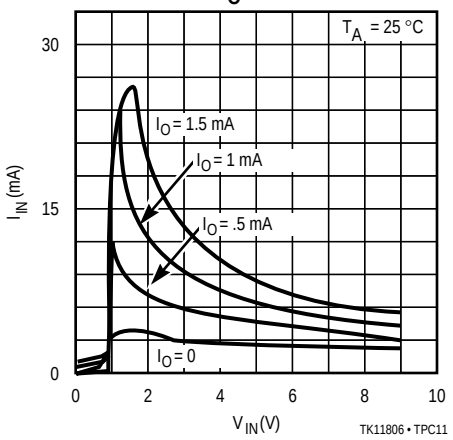
TYPICAL PERFORMANCE CHARACTERISTICS

INPUT CURRENT vs. INPUT VOLTAGE
V_O = 9.3 V



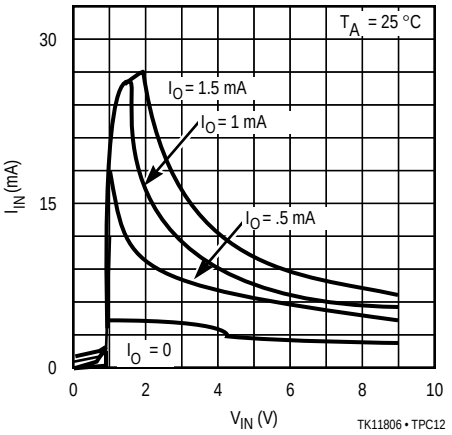
TK11806 • TPC10

INPUT CURRENT vs. INPUT VOLTAGE
V_O = 13 V



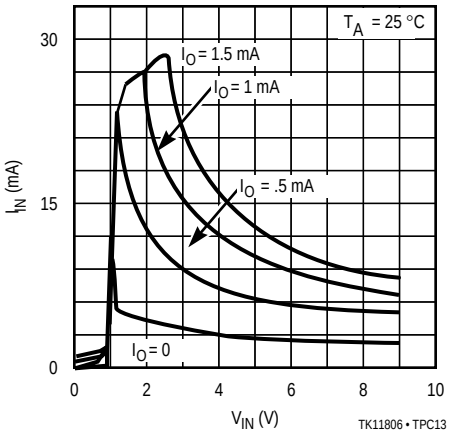
TK11806 • TPC11

INPUT CURRENT vs. INPUT VOLTAGE
V_O = 17 V



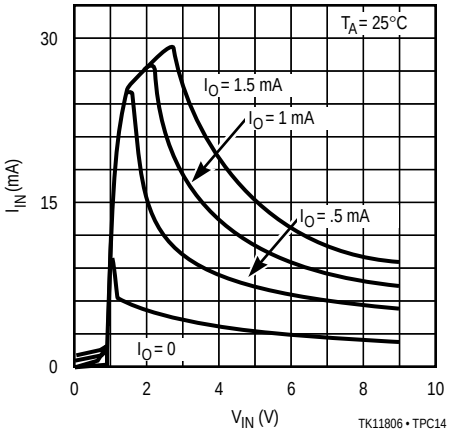
TK11806 • TPC12

INPUT CURRENT vs. INPUT VOLTAGE
V_O = 24 V



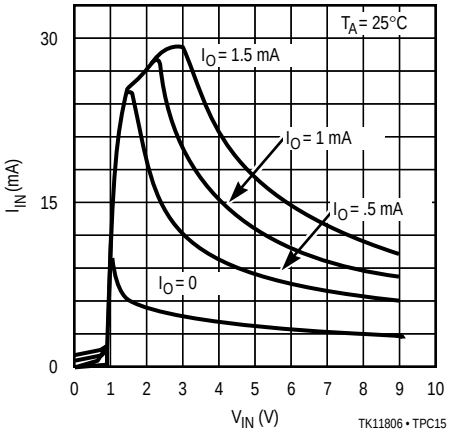
TK11806 • TPC13

INPUT CURRENT vs. INPUT VOLTAGE
V_O = 28 V



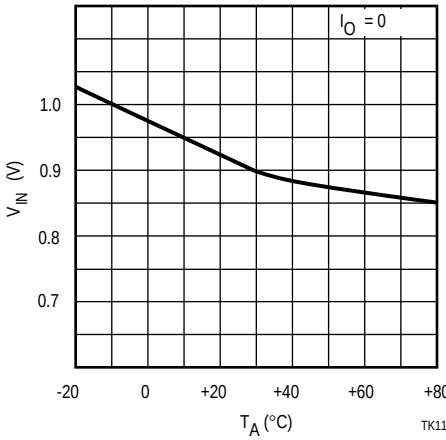
TK11806 • TPC14

INPUT CURRENT vs. INPUT VOLTAGE
V_O = 28 V



TK11806 • TPC15

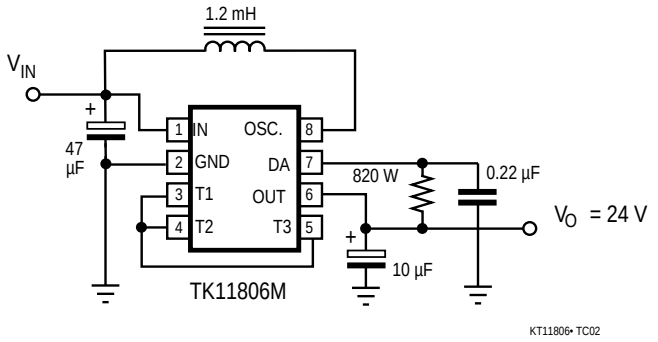
OSCILLATOR START-UP VOLTAGE
vs. TEMPERATURE



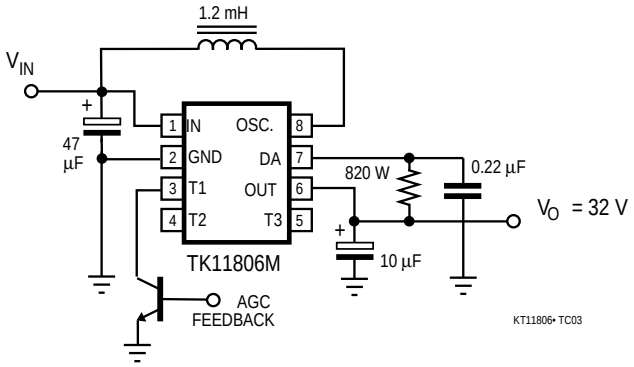
TK11806 • TPC16

TYPICAL APPLICATIONS

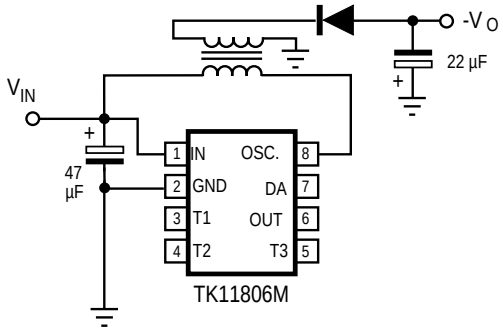
VARIABLE CAPACITANCE DIODE BIAS CIRCUIT



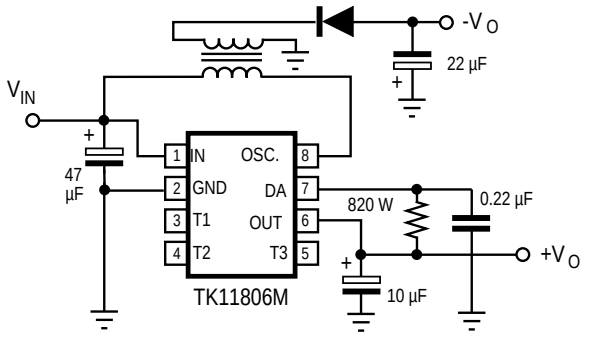
AVALANCHE PHOTODIODE BIAS WITH AGC



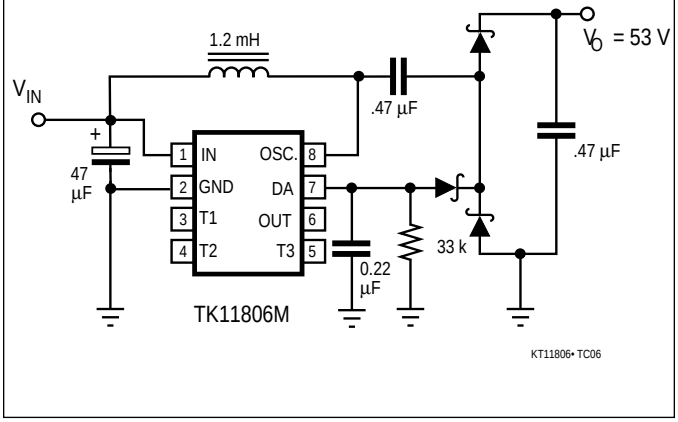
NEGATIVE OUTPUT



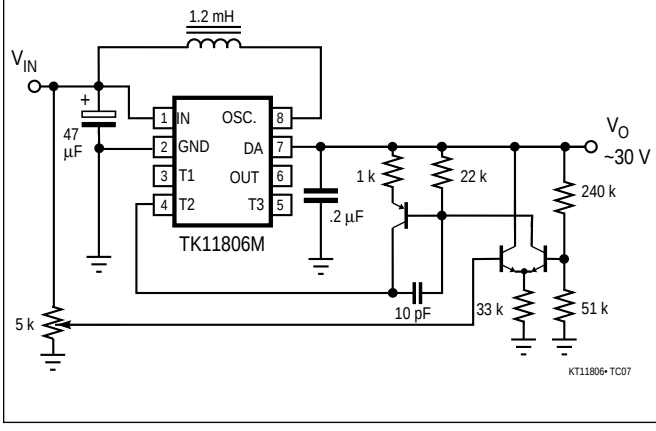
POSITIVE AND NEGATIVE OUTPUTS



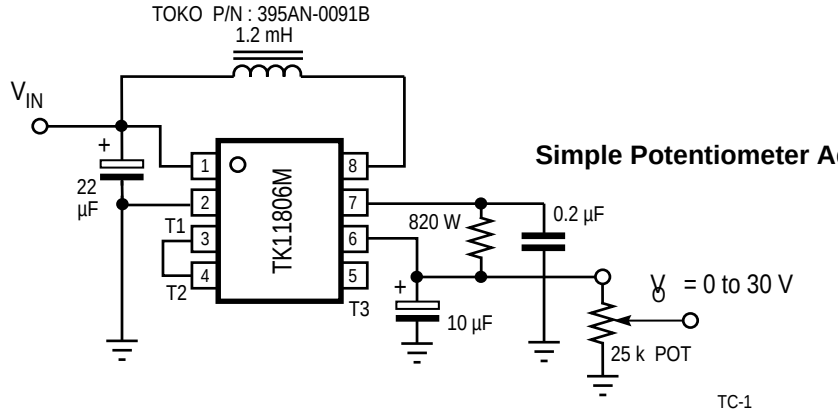
VOLTAGE BOOST CIRCUIT



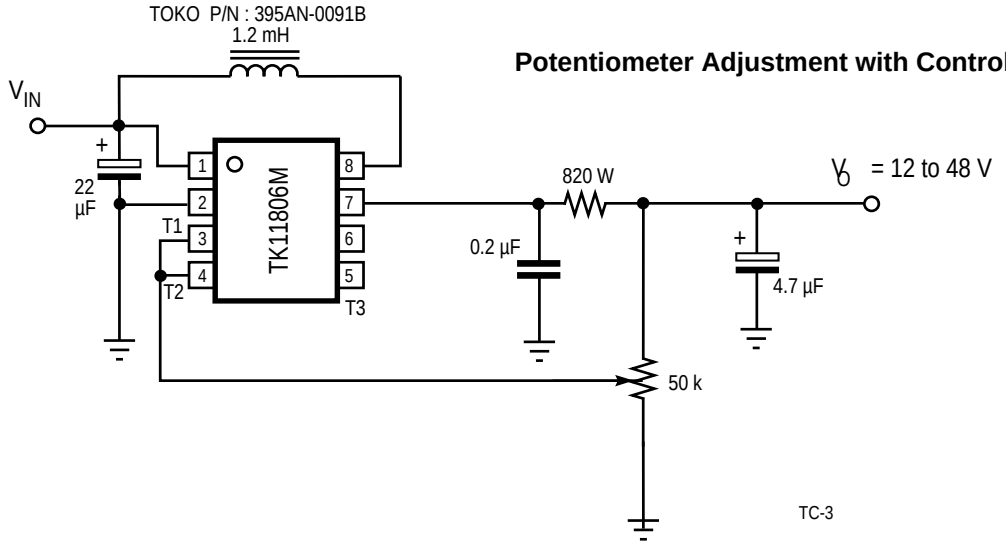
VARIABLE BIAS SOURCE



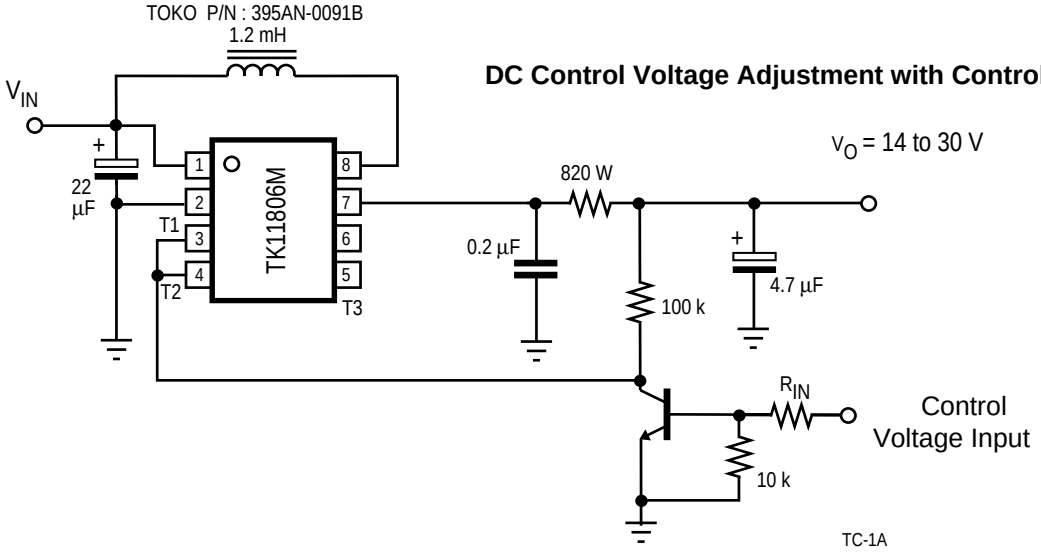
METHODS FOR VARIABLE OUTPUT CONTROL



Simple Potentiometer Adjustment



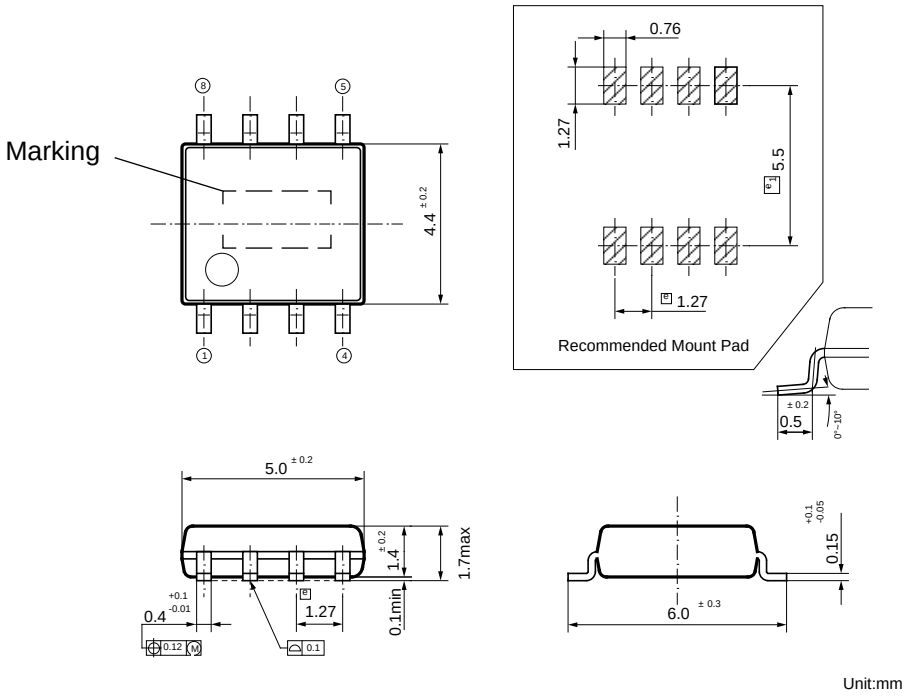
Potentiometer Adjustment with Control Loop



DC Control Voltage Adjustment with Control Loop

PACKAGE OUTLINES

MFP-8



Unit:mm

Marking Information

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YOUR LOCAL REPRESENTATIVE IS:

TOKO America, Inc.
1250 Feehanville, Dr.
Mt. Prospect, IL 60056
Tel: 1(800) PIK-TOKO
Fax: 1(847) 699-1194

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