

## 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

## DESCRIPTION

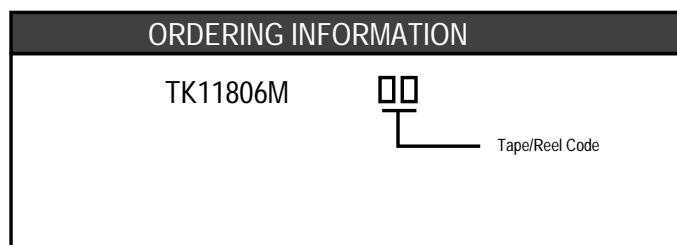
The TK11806 is a low power, low input voltage DC-DC converter.

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).

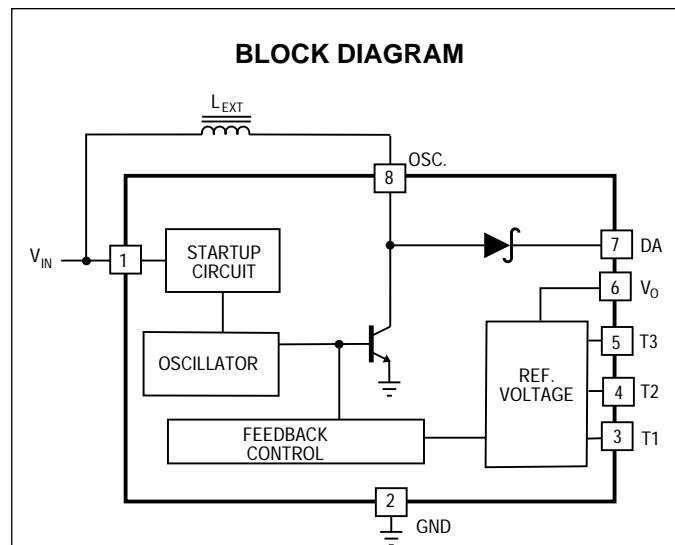
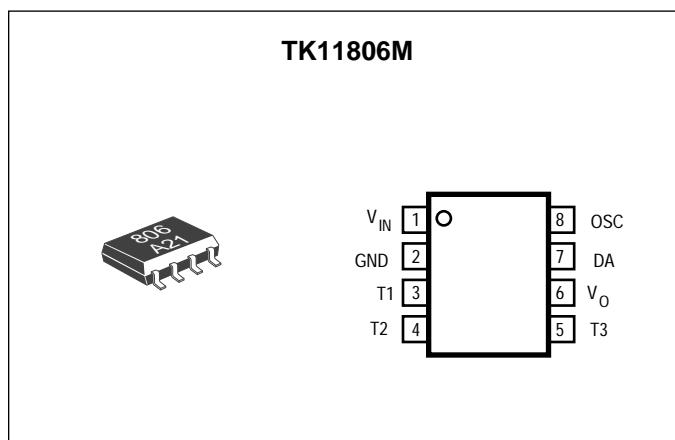
External inductive components are also available from TOKO.



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

## 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



# TK11806

## 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	$1.1 \leq V_{IN} \leq 18.0$ V, Note 2	30	32.0	34	V
$V_{O2}$	Output Voltage	$1.1 \leq V_{IN} \leq 18.0$ V, Note 2	26	28	30	V
$V_{O3}$	Output Voltage	$1.1 \leq V_{IN} \leq 18.0$ V, Note 2	22.0	24.0	26.0	V
$V_{O4}$	Output Voltage	$1.1 \leq V_{IN} \leq 18.0$ V, Note 2	15.5	16.8	18.0	V
$V_{O5}$	Output Voltage	$1.1 \leq V_{IN} \leq 18.0$ V, Note 2	11.0	12.8	14.5	V
$V_{O6}$	Output Voltage	$1.1 \leq V_{IN} \leq 18.0$ 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

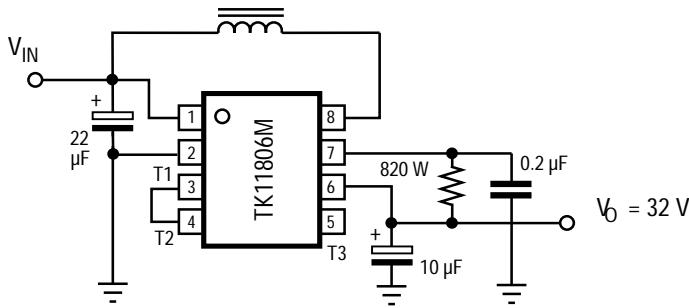
Note 1: Power dissipation must be derated at the rate of 3 mW/°C for operation at  $T_A = 25$  °C and above.

Note 2: Connect  $T_1$  through  $T_3$  as specified.

Note 3: Use inductor as specified.

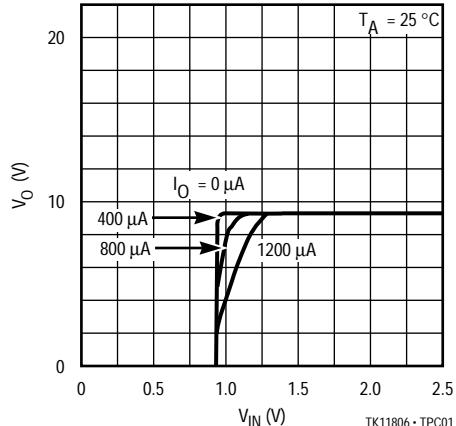
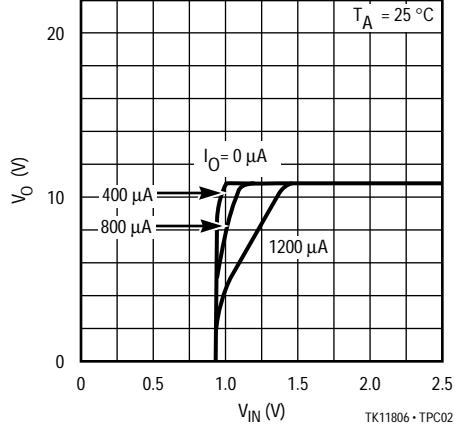
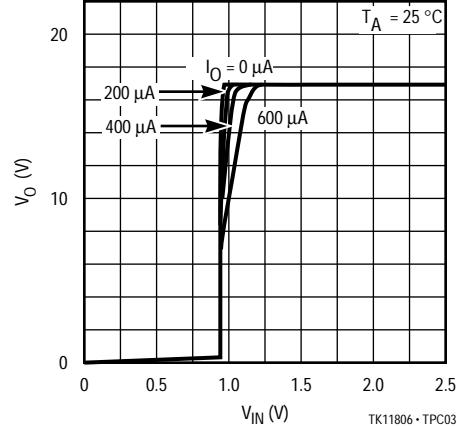
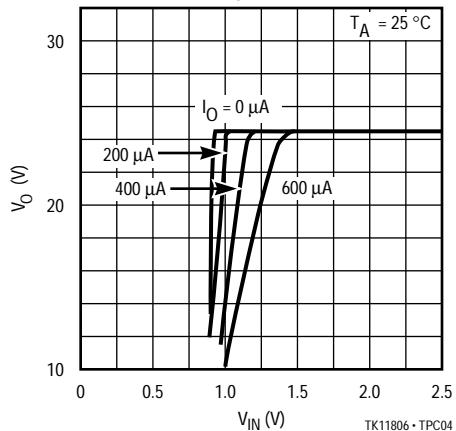
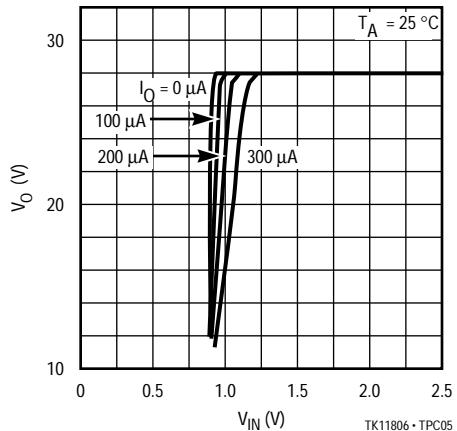
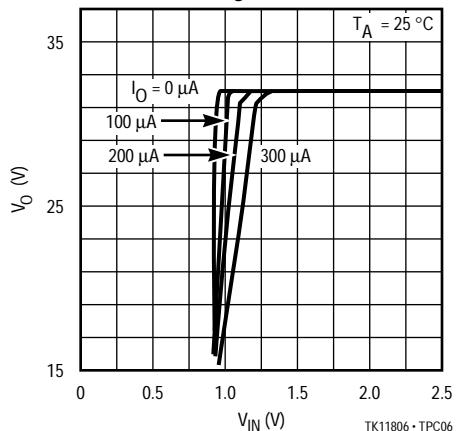
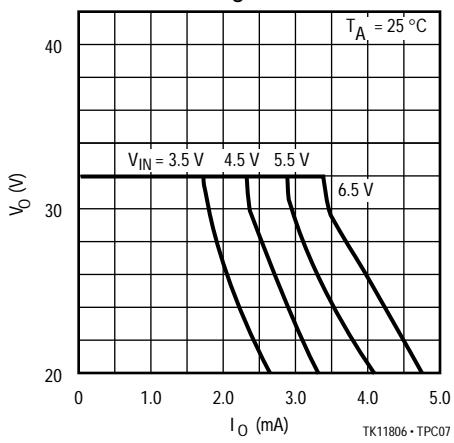
### TEST CIRCUIT

TOKO P/N : 395AN-0091B  
1.2 mH

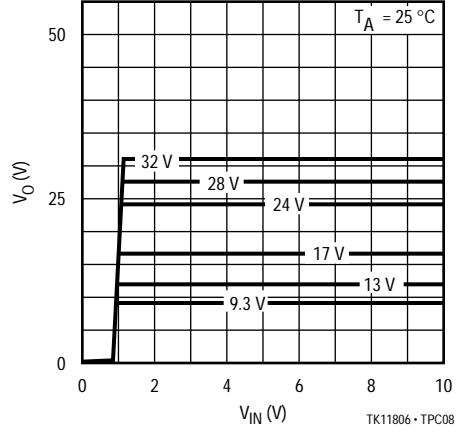
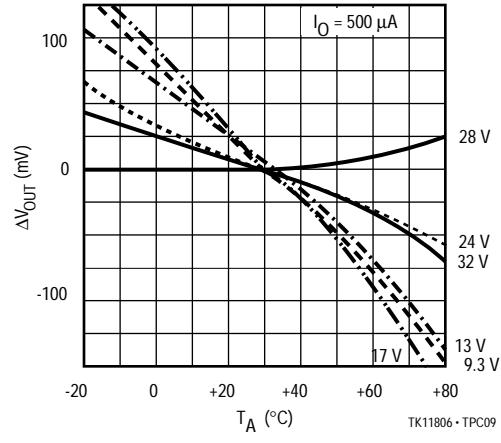


OUTPUT VOLTAGE (V)	CONNECTION
32	$T_1-T_2$
28	$T_1-T_3$
24	$T_1-T_2-T_3$
17	$T_1-T_2, T_3-V_O$
13	$T_1-V_O$
9.3	$T_1-T_2-V_O$

## TYPICAL PERFORMANCE CHARACTERISTICS

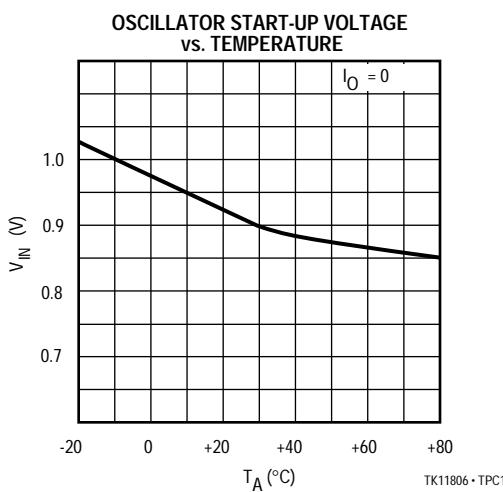
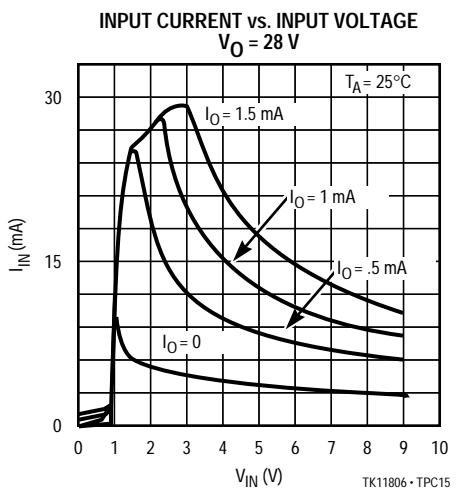
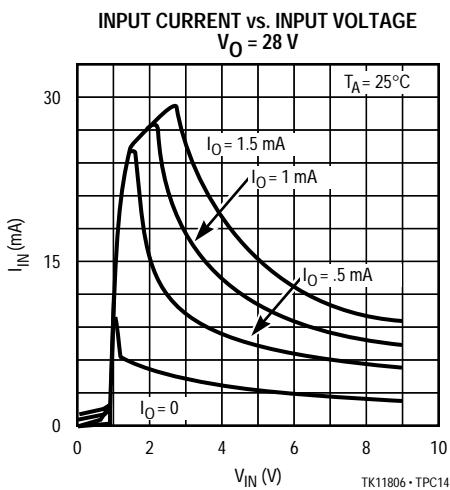
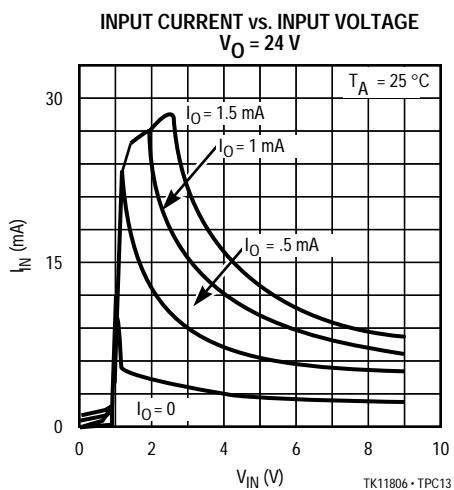
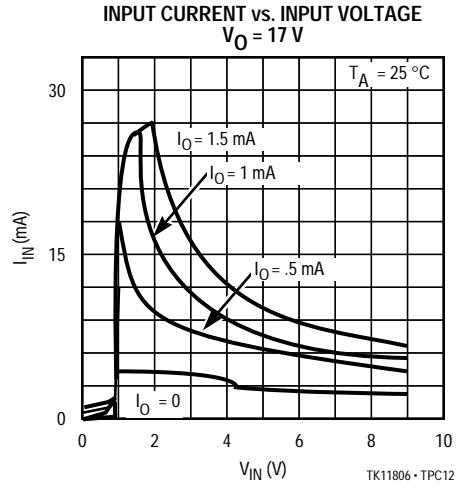
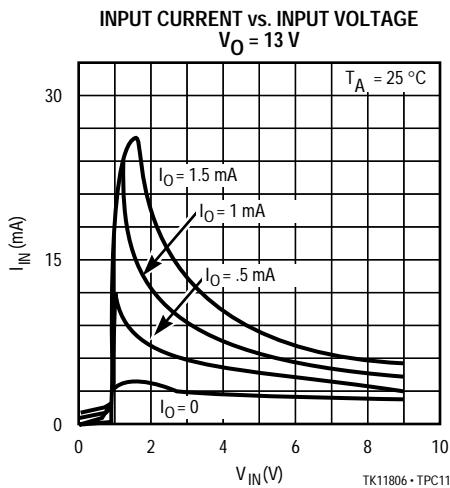
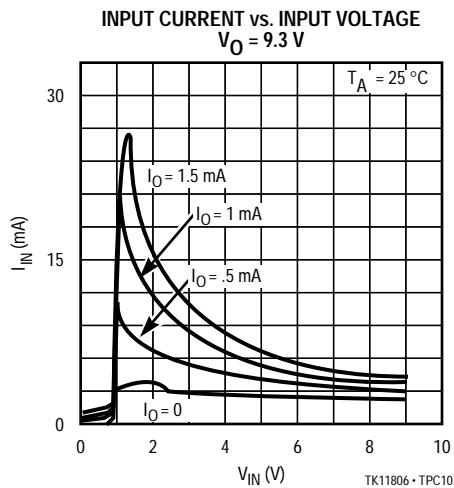
OUTPUT VOLTAGE vs. INPUT VOLTAGE  
 $V_O = 9.3 \text{ V}$ OUTPUT VOLTAGE vs. INPUT VOLTAGE  
 $V_O = 13 \text{ V}$ OUTPUT VOLTAGE vs. INPUT VOLTAGE  
 $V_O = 17 \text{ V}$ OUTPUT VOLTAGE vs. INPUT VOLTAGE  
 $V_O = 24 \text{ V}$ OUTPUT VOLTAGE vs. INPUT VOLTAGE  
 $V_O = 28 \text{ V}$ OUTPUT VOLTAGE vs. INPUT VOLTAGE  
 $V_O = 32 \text{ V}$ OUTPUT VOLTAGE vs. OUTPUT CURRENT  
 $V_O = 32 \text{ V}$ 

OUTPUT VOLTAGE vs. INPUT VOLTAGE

OUTPUT VOLTAGE DRIFT vs.  
TEMPERATURE

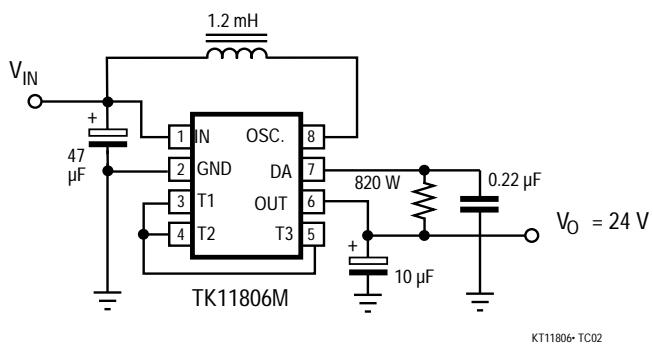
# TK11806

## TYPICAL PERFORMANCE CHARACTERISTICS

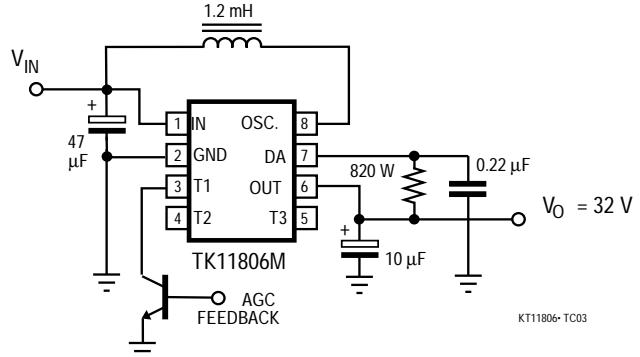


## TYPICAL APPLICATIONS

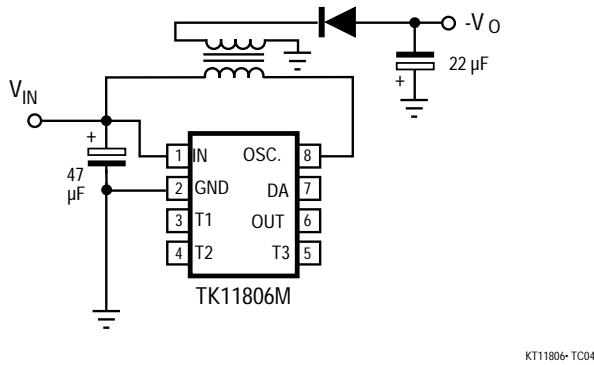
### VARIABLE CAPACITANCE DIODE BIAS CIRCUIT



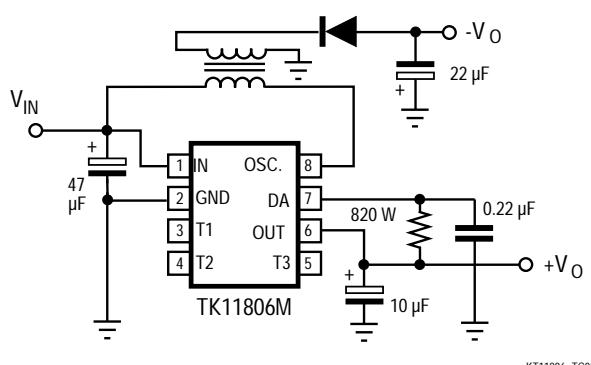
### AVALANCHE PHOTODIODE BIAS WITH AGC



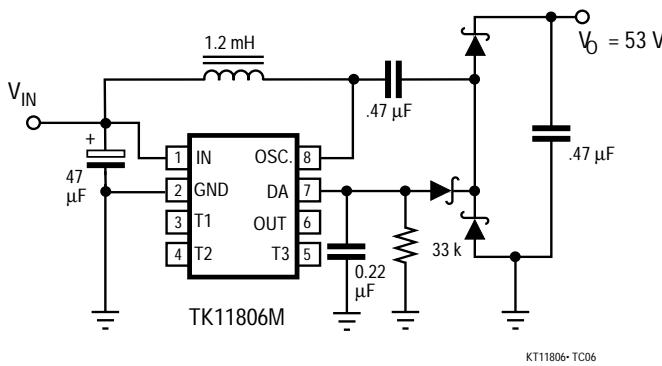
### NEGATIVE OUTPUT



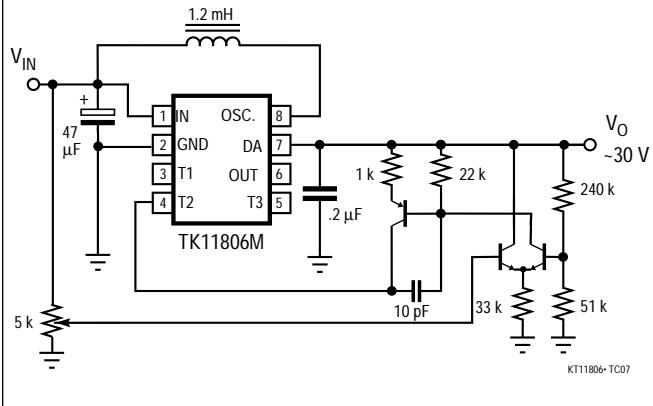
### POSITIVE AND NEGATIVE OUTPUTS



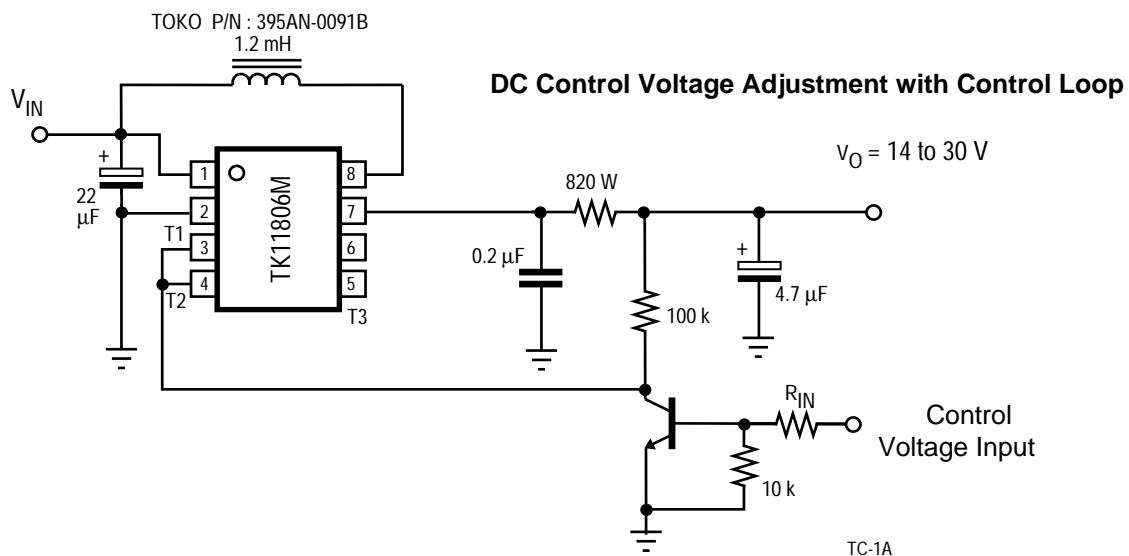
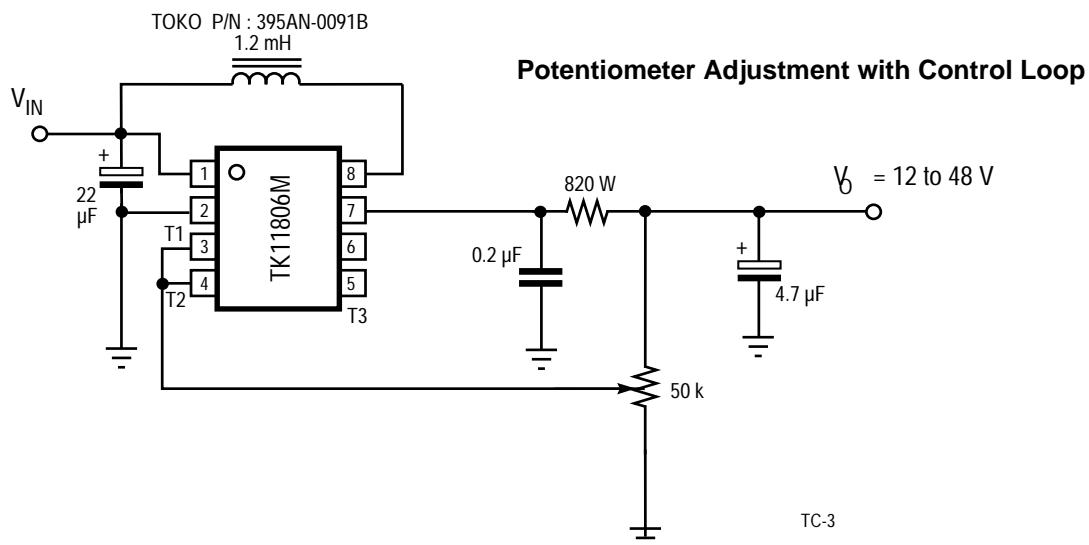
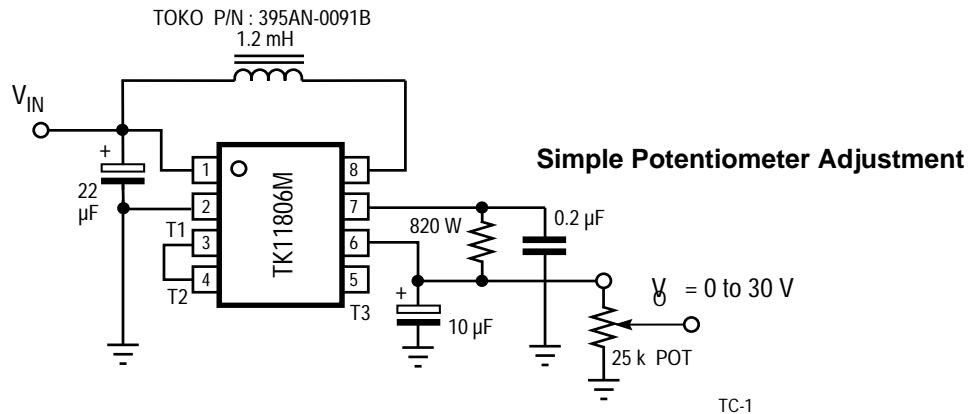
### VOLTAGE BOOST CIRCUIT



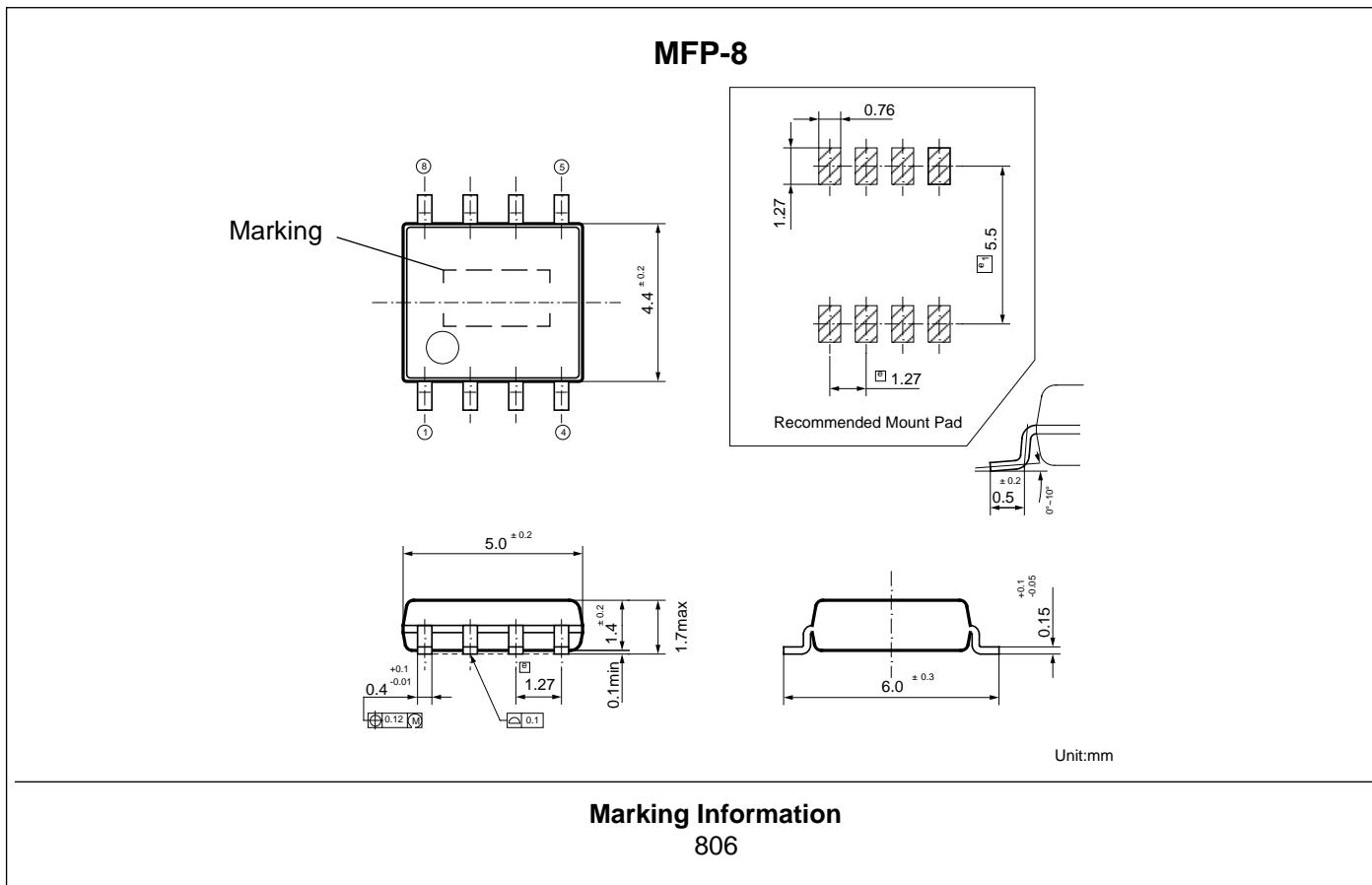
### VARIABLE BIAS SOURCE



## METHODS FOR VARIABLE OUTPUT CONTROL



## PACKAGE OUTLINES



The information furnished by TOKO, Inc. is believed to be accurate and reliable. However, TOKO reserves the right to make changes or improvements in the design, specification or manufacture of its products without further notice. TOKO does not assume any liability arising from the application or use of any product or circuit described herein, nor for any infringements of patents or other rights of third parties which may result from the use of its products. No license is granted by implication or otherwise under any patent or patent rights of TOKO, Inc.



## YOUR LOCAL REPRESENTATIVE IS:

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