DC-DC CONVERTER

FEATURES

- **Very Low Noise**
- **Very Small Size**
- **Few External Components**
- **Wide Supply Voltage Range (0.9 to 10 V)**
- **Sinewave Oscillator**
- **Selectable Output Voltages**

APPLICATIONS

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

DESCRIPTION

The TK11821 is a low power, low input voltage DC-DC converter. The device has been optimized for variable capacitance diode and PIN photodiode bias applications. It generates 10 Vdc and 24 Vdc output voltages from an input voltage as low as 0.9 V.

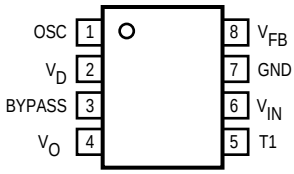
Since the built-in high frequency oscillator generates sinewaves, the TK11821 produces very low RF interference noise. The internal oscillator is capable of operation at frequencies as high as 6-8 MHz, therefore, interference filtering is simple and effective. This unique feature makes the TK11821 ideally suitable for RF and fiber optic receiver applications.

The device is capable of operation in the 0.9 to 10 V power supply voltage range.

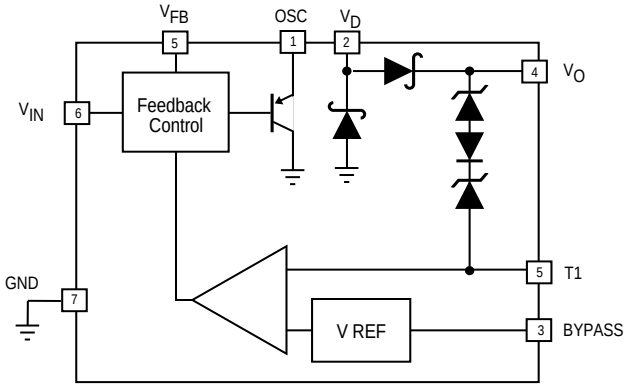
The output voltage is 24 V when T1 is not connected. When T1 is connected to V_O, the output voltage is set to 10 V.

The TK11821 is available in an 8-pin plastic surface mount (MFP-8) package. External inductive components are also available.

TK11821M



BLOCK DIAGRAM



ORDERING INFORMATION

TK11821M □□

Tape/Reel Code

TAPE/REEL CODE

BX: Bulk/Bag
TL: Tape Left
MG: Magazine

ABSOLUTE MAXIMUM RATINGS

Input Voltage ..... 10 V
Output Voltage ..... 26 V
Output Current ..... 0.5 mA
Operating Voltage Range ..... 0.9 to 10 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.) ..... 260 °C

ELECTRICAL CHARACTERISTICS

Test conditions: V_{IN} = 0.9 V → 2.0 V

Operating Conditions: V_{IN} = 1.1 V, T_A = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC}	Input Current	I_O = 0 , V_O = 10 V		3.5	7.0	mA
		I_O = 50 µA, V_O = 10 V		5.5	9.0	mA
V_O	Output Voltage	I_O = 0 µA, 1.6 V ≤ V_{IN} ≤ 2.0 V	22.5	24.0	25.5	V
		V_O - T1 shorted, I_O = 50 µA	9.6	10.0	10.4	V
I_O	Output Current	V_O - T1 shorted	90	100		µA
Load Reg	Load Regulation	Note 2		0.1	0.35	%
$\Delta V_O/T_A$	Output Voltage Temperature Dependency	V_O = 24 V, I_O = 50 µA		+2.3		mV/°C
		V_O = 10 V, I_O = 50 µA		-1.5		mV/°C
V_{OSC-S}	Oscillation Starting Voltage	I_O = 0 µA	0.75			V
f_{OSC}	Oscillation Frequency	I_O = 0 µA, Note 2		4.0		MHz

ELECTRICAL CHARACTERISTICS

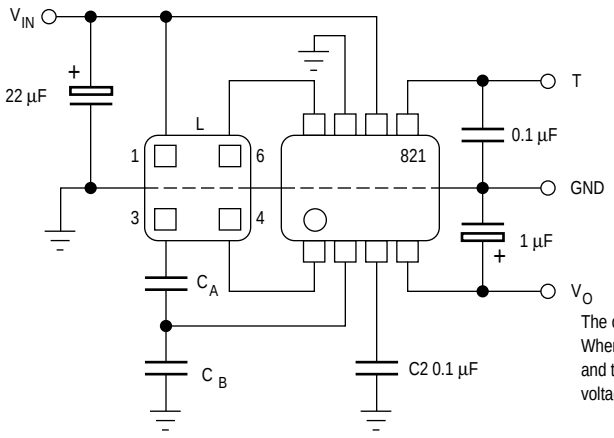
Test conditions: V_{IN} = 1.8 V → 10.0 V

Operating Conditions: V_{IN} = 3.0 V, T_A = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC}	Input Current	I_O = 0 , V_O = 10 V		3.5	7.0	mA
		I_O = 50 µA, V_O = 10 V		5.5	9.0	mA
V_O	Output Voltage	I_O = 0 µA, 1.6 V ≤ V_{IN} ≤ 2.0 V	22.5	24.0	25.5	V
		V_O - T1 shorted, I_O = 50 µA	9.6	10.0	10.4	V
I_O	Output Current	V_O - T1 shorted	90	100		µA
Load Reg	Load Regulation	Note 2		0.1	0.35	%
$\Delta V_O/T_A$	Output Voltage Temperature Dependency	V_O = 24 V, I_O = 50 µA		+2.3		mV/°C
		V_O = 10 V, I_O = 50 µA		-1.5		mV/°C
V_{OSC-S}	Oscillation Starting Voltage	I_O = 0 µA	1.5			V
f_{OSC}	Oscillation Frequency	I_O = 0 µA, Note 2		3.5		MHz

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: Use the same value for L that was used in the measurement circuit.
Note 3: Output Voltage Variation = ($\Delta V_{O1}/V_{O1}$) X 100 (%), ΔV_{O1} = V_{O1} (no load) - V_{O1} (I_O = 50 µA).
Note 4: The circuit constants will be changed by the input voltage at the 0.9 V to 2.0 V range and 1.8 V to 10 V range.

TEST CIRCUIT



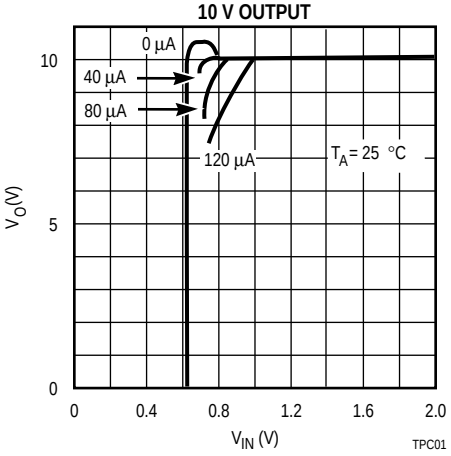
The value of the circuit constants against the input voltage.

INPUT VOLTAGE	C_A	C_B	TOKO COIL PART NUMBER
0.9 V to 2 V	33 pF	10 pF	PS5CDLN-1250
1.8 V to 10 V	820 pF	33 pF	PS5CDLN-1303

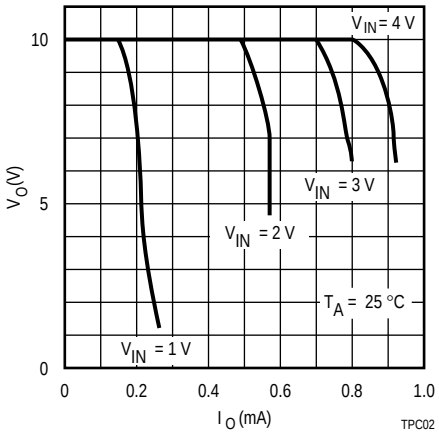
The output voltage is 24 V. When connected between the V_O and the T terminal, the output voltage will be 10 V.

TYPICAL PERFORMANCE CHARACTERISTICS

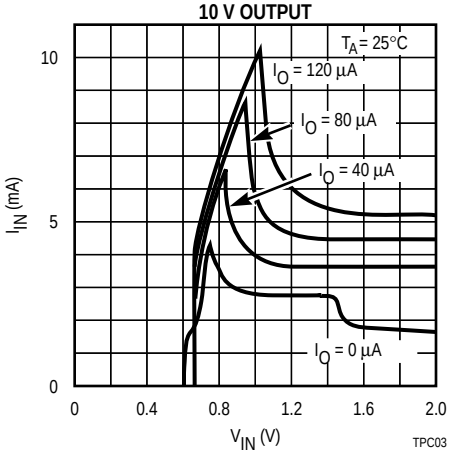
OUTPUT VOLTAGE vs. INPUT VOLTAGE 10 V OUTPUT



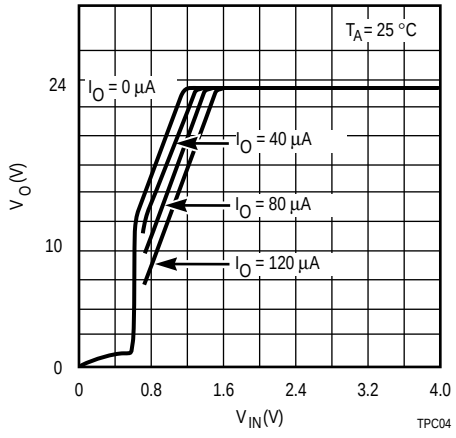
OUTPUT VOLTAGE vs. OUTPUT CURRENT 10 V OUTPUT



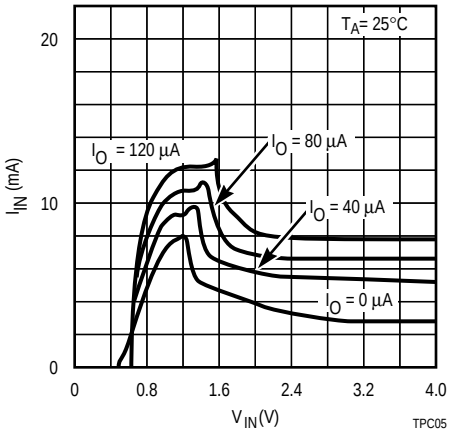
INPUT CURRENT vs. INPUT VOLTAGE 10 V OUTPUT



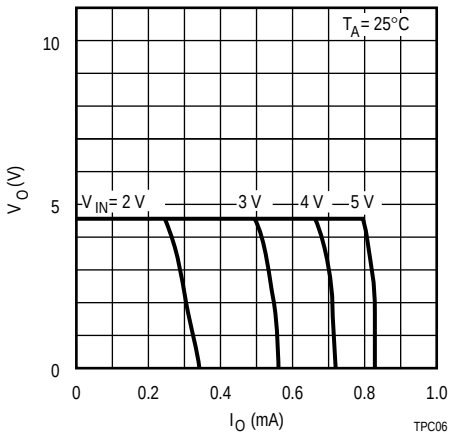
OUTPUT VOLTAGE vs. INPUT VOLTAGE 24 V OUTPUT



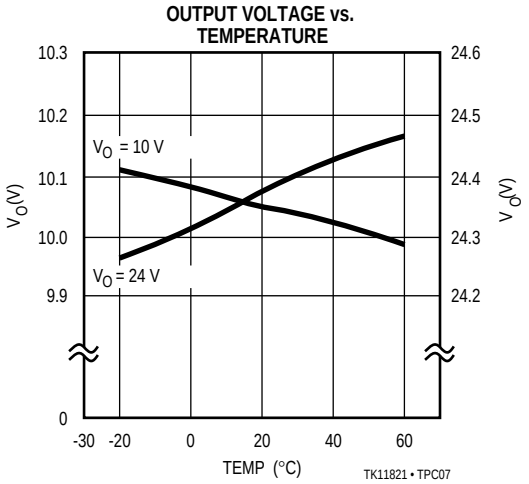
INPUT CURRENT vs. INPUT VOLTAGE 24 V OUTPUT



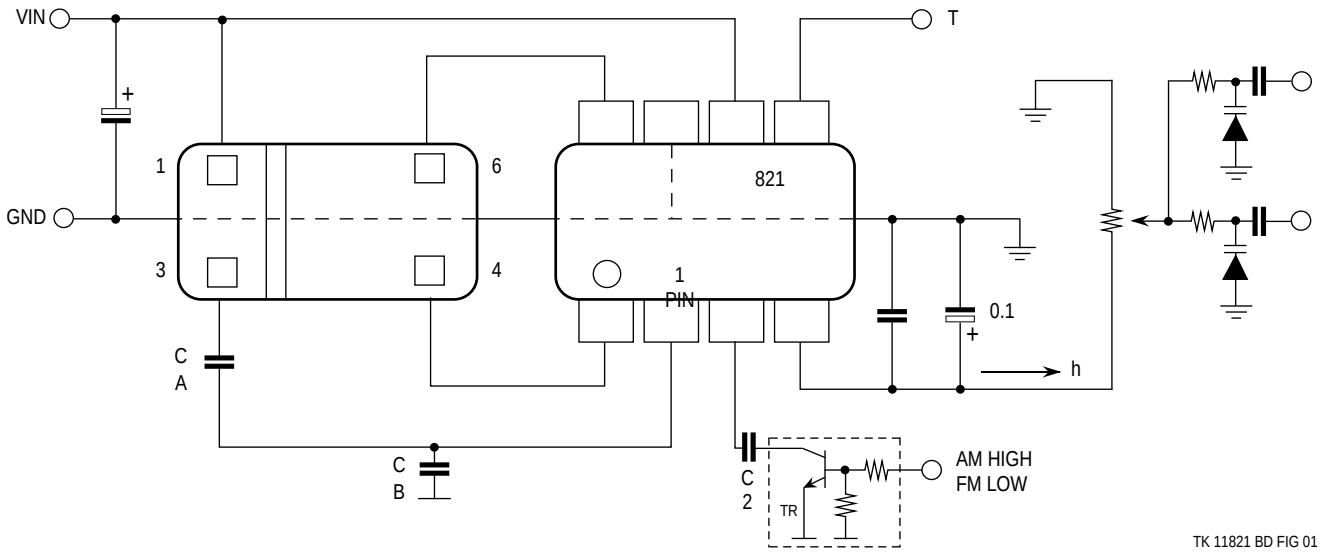
OUTPUT VOLTAGE vs. OUTPUT CURRENT 24 V OUTPUT



TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

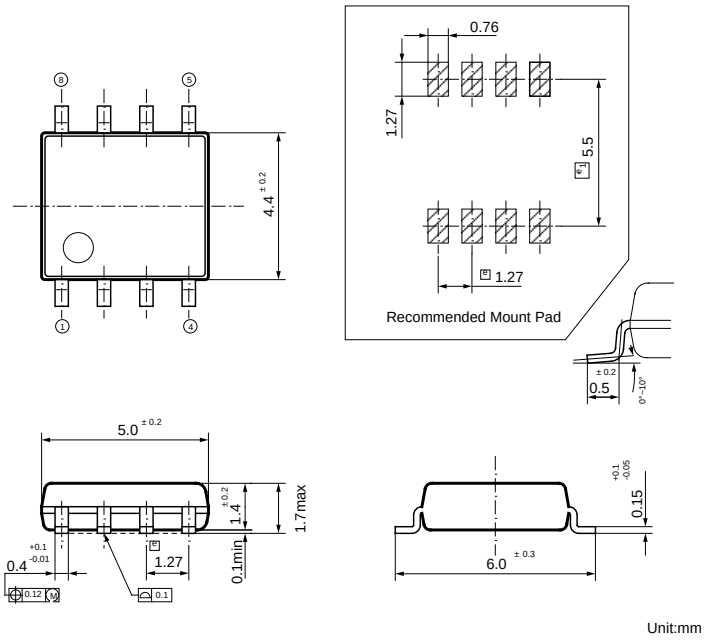


TYPICAL AM/FM VARACTOR DIODE BIAS CIRCUIT



PACKAGE OUTLINES

MFP-8



Unit:mm

Marking Information
821

TOKO

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

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