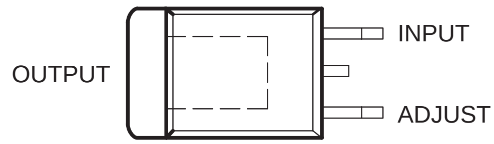
- **Output Voltage Range Adjustable From 1.2 V to 37 V**
- **Output Current Greater Than 500 mA**
- **Internal Short-Circuit Current Limiting**
- **Thermal Overload Protection**
- **Output Safe-Area Compensation**

KTP PACKAGE
(TOP VIEW)



The OUTPUT terminal is in electrical contact with the mounting base.

description

The LM317M device is an adjustable 3-terminal positive voltage regulator capable of supplying more than 500 mA over an output-voltage range of 1.2 V to 37 V. It is exceptionally easy to use and requires only two external resistors to set the output voltage. Further, both line and load regulation are better than standard fixed regulators. The LM317M is packaged in the DPAK/TO-252-equivalent KTP package, which is easy to handle and use.

In addition to higher performance than fixed regulators, the device includes on-chip current limiting, thermal overload protection, and safe operating area protection. All overload protection remains fully functional if the ADJUST terminal is disconnected.

Normally, no capacitors are needed unless the device is more than 6 inches from the input filter capacitors, in which case an input bypass capacitor is needed. An optional output capacitor can be added to improve transient response. The ADJUST terminal can be bypassed to achieve very high ripple-rejection ratios, which are difficult to achieve with standard 3-terminal regulators.

The LM317M is characterized for operation over the virtual junction temperature range of 0°C to 125°C.

absolute maximum ratings over operating temperature range (unless otherwise noted)†

Input-to-output differential voltage, $V_I – V_O$ . . . . . 40 V
Package thermal impedance, θ_{JA} (see Notes 1 and 2) . . . . . 28°C/W
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . . . 260°C
Storage temperature range, T_{stg} . . . . . –65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. Maximum power dissipation is a function of T_J(max), θ_{JA}, and T_A. The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(max) – T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can impact reliability.
2. The package thermal impedance is calculated in accordance with JESD 51.

recommended operating conditions

	MIN	MAX	UNIT
Input-to-output voltage differential, $V_I – V_O$		37	V
Output current, I_O		500	mA
Operating virtual-junction temperature, T_J	0	125	°C

electrical characteristics over recommended operating virtual-junction temperature range, $V_I – V_O$ = 5 V, I_O = 0.1 A (unless otherwise noted)

PARAMETER	TEST CONDITIONS‡		MIN	TYP	MAX	UNIT
Line regulation (see Note 3)	$V_I – V_O$ = 3 V to 40 V	T_J = 25°C		0.01	0.04	%/V
		Full temperature range		0.02	0.07	
Load regulation	I_O = 10 mA to 500 mA	T_J = 25°C		0.1	0.5	%V_O
		Full temperature range		0.3	1.5	
ADJUST terminal current				50	100	µA
ADJUST terminal current change	$V_I – V_O$ = 3 V to 40 V,	I_O = 10 mA to 500 mA		0.2	5	µA
Reference voltage	$V_I – V_O$ = 3 V to 40 V,	I_O = 10 mA to 500 mA	1.2	1.25	1.3	V
Output-voltage temperature stability				0.7%		
Minimum load current to maintain regulation				3.5	10	mA
Maximum output current	$V_I – V_O \leq$ 15 V		500	900		mA
	$V_I – V_O$ = 40 V, $P_d \leq P_{d(max)}$	T_J = 25°C	150	250		
Output noise voltage (% of V_O)	f = 10 Hz to 10 KHz,	T_J = 25°C		0.003%		
Ripple rejection (see Note 4)	V_O = 10 V, f = 120 Hz, T_J = 25°C	C_{ADJ} = 0		65		dB
		C_{ADJ} = 10 µF	66	80		
Long-term stability		T_J = 125°C		0.3	1	%/ 1k Hrs

‡ Pulse-testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

NOTES: 3. Input voltage regulation is expressed here as the percentage change in output voltage per 1-V change at the input.
4. C_{ADJ} is connected between the ADJUST pin and ground.

TYPICAL CHARACTERISTICS

LINE REGULATION
vs
TEMPERATURE

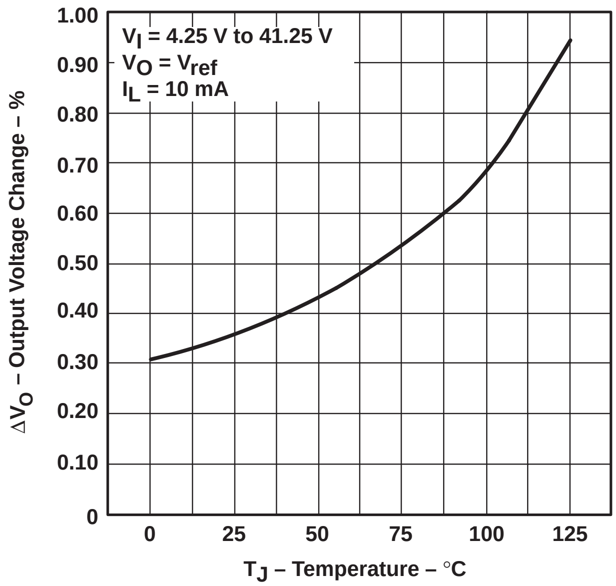


Figure 1

LOAD REGULATION
vs
TEMPERATURE

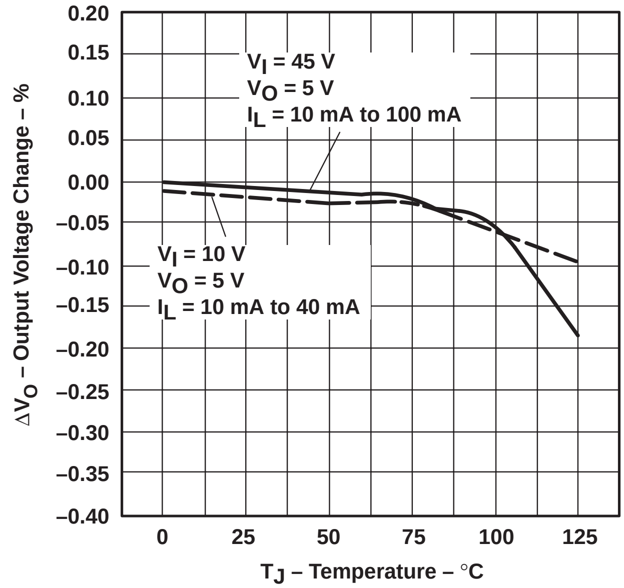


Figure 2

ADJUST TERMINAL CURRENT
vs
TEMPERATURE

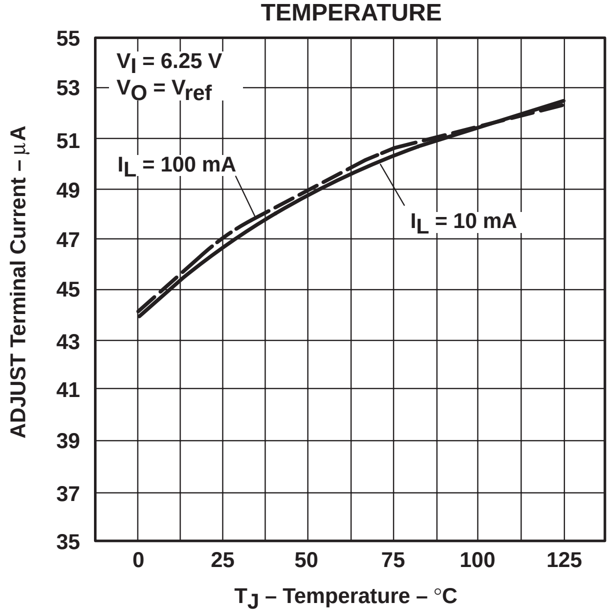


Figure 3

TEMPERATURE STABILITY
vs
TEMPERATURE

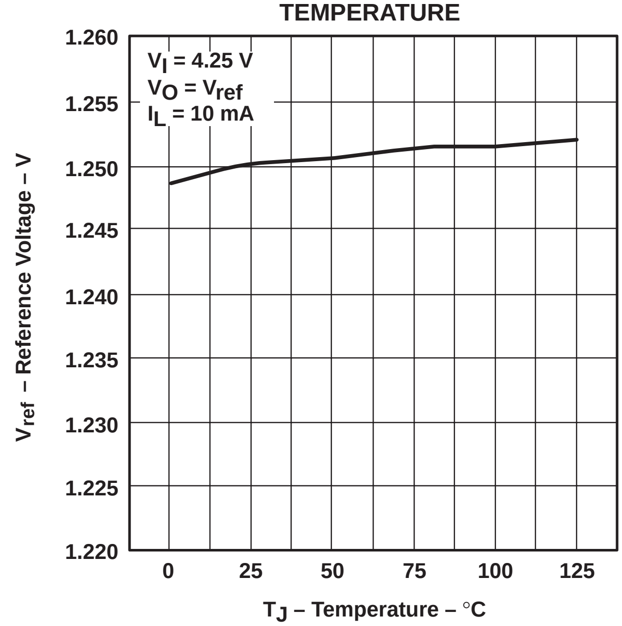


Figure 4

TYPICAL CHARACTERISTICS

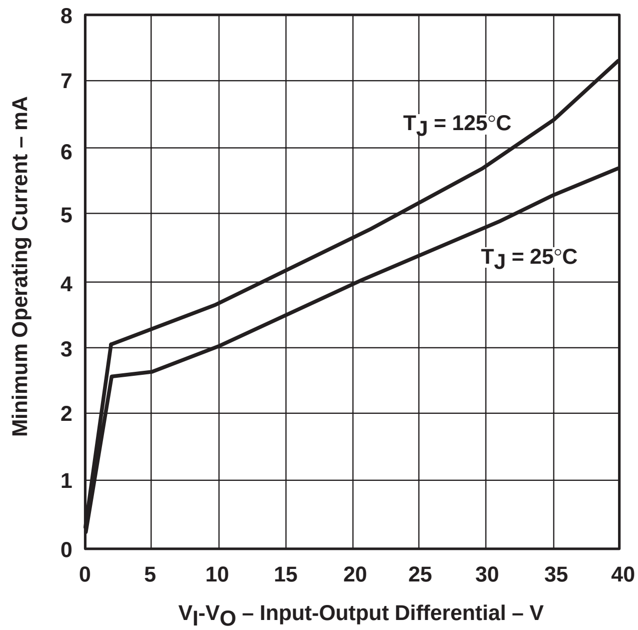


Figure 5

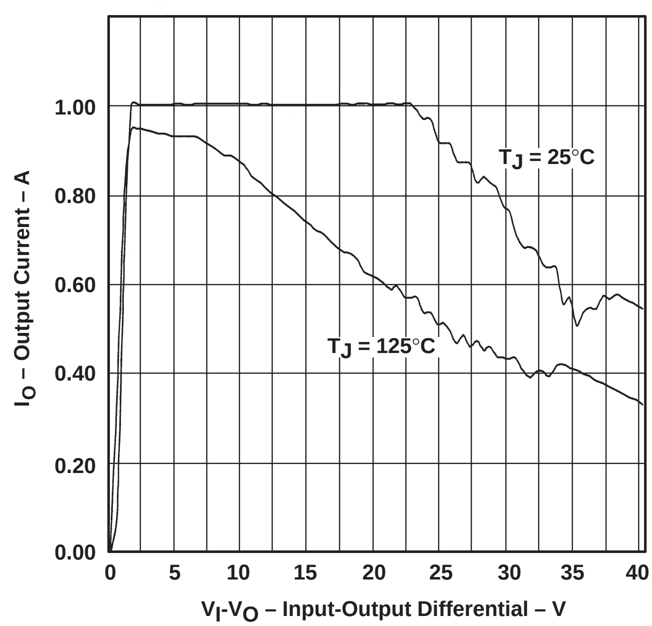


Figure 6

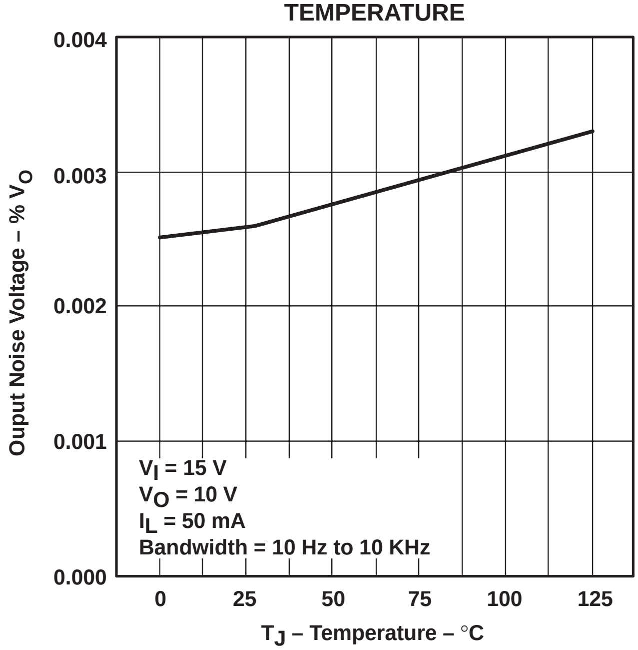


Figure 7

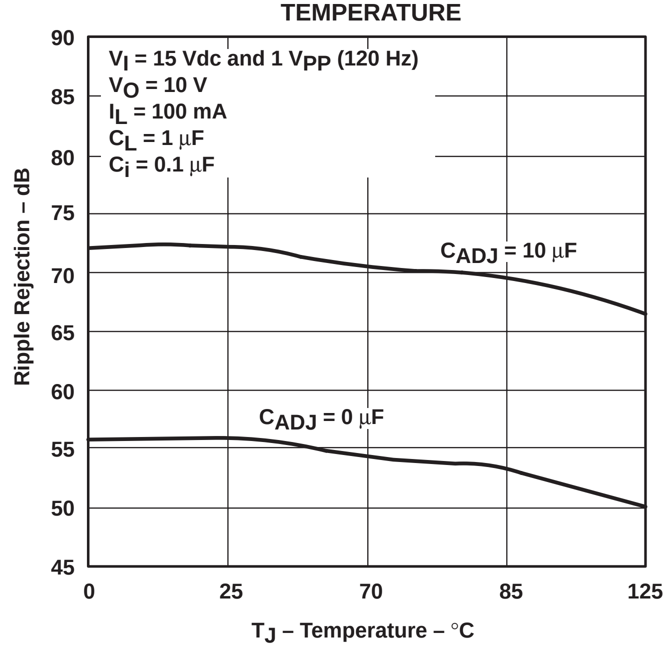


Figure 8

TYPICAL CHARACTERISTICS

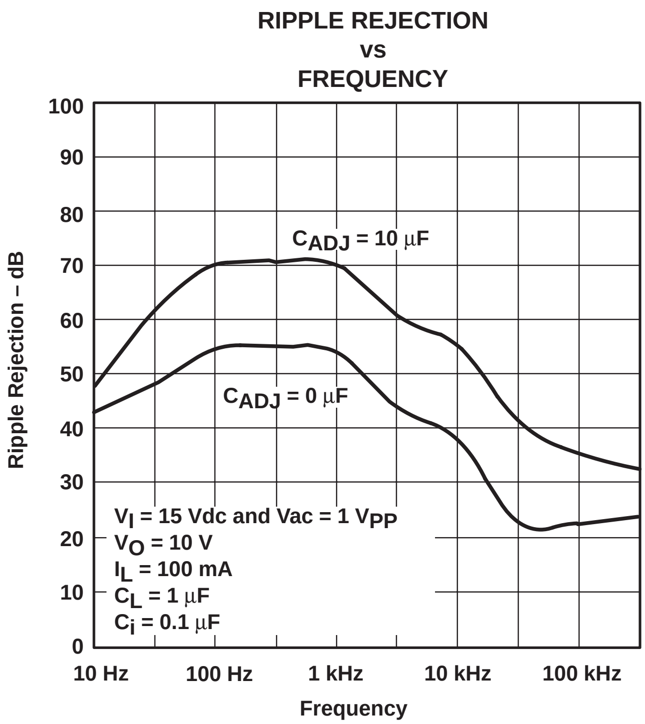


Figure 9

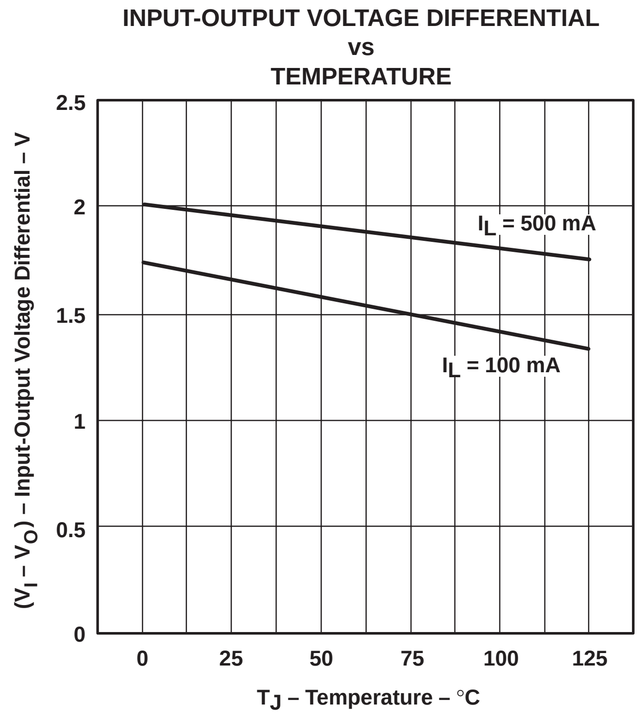


Figure 10

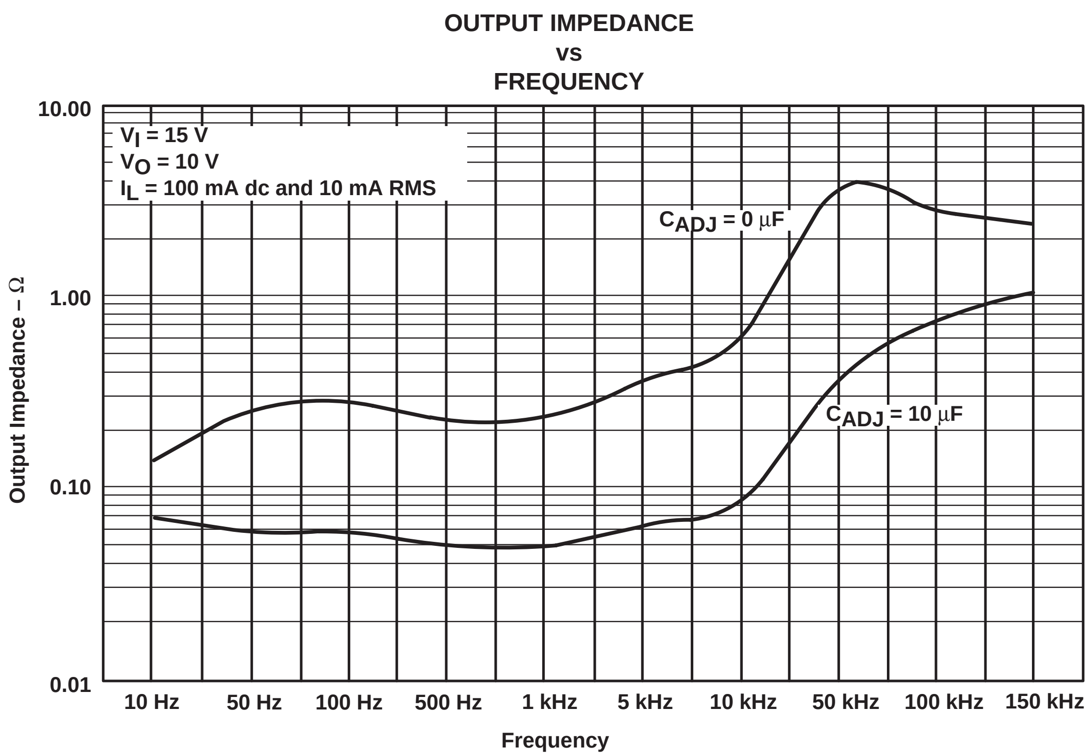


Figure 11

TYPICAL CHARACTERISTICS

LINE TRANSIENT RESPONSE
vs
TIME

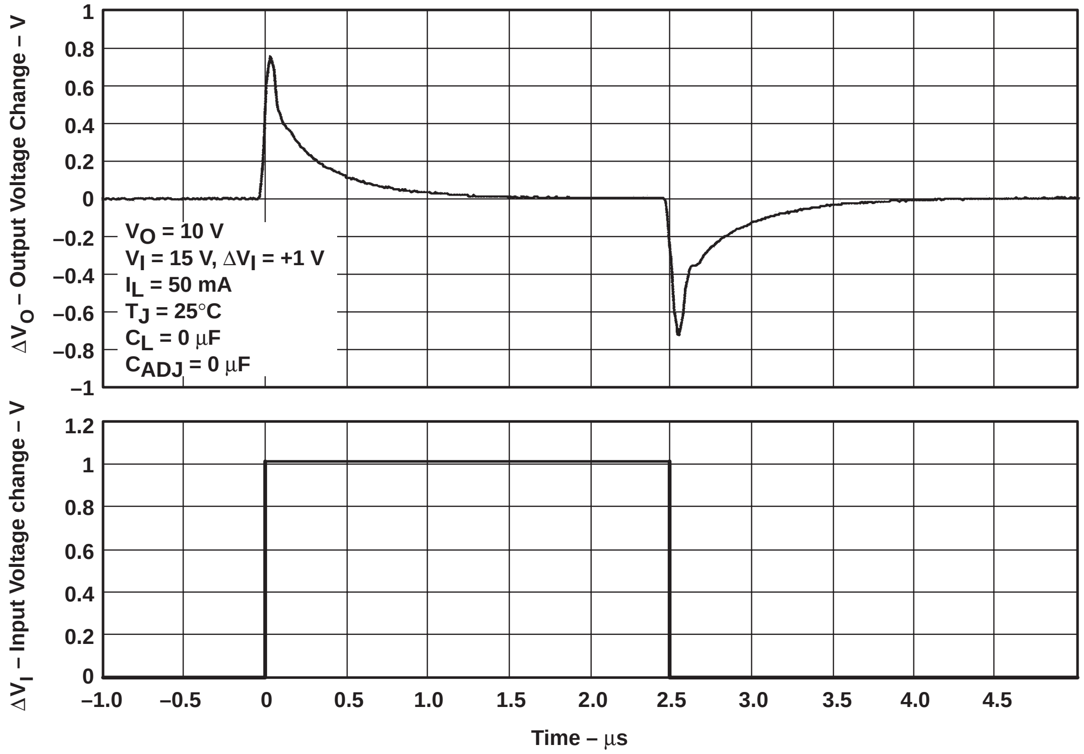


Figure 12

TYPICAL CHARACTERISTICS

**LOAD TRANSIENT RESPONSE
vs
TIME**

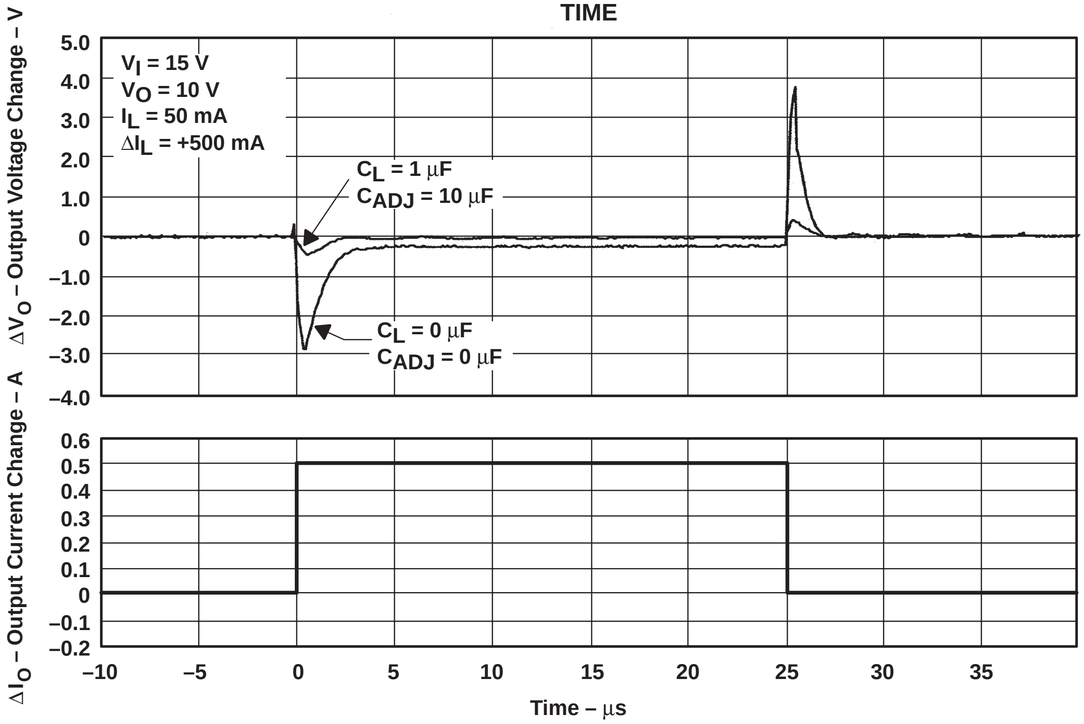


Figure 13