

- **1/2  $V_I$  Virtual Ground for Analog Systems**
- **Self-Contained 3-terminal TO-226AA Package**
- **Micropower Operation . . . 170  $\mu$ A Typ,  $V_I = 5$  V**
- **Wide  $V_I$  Range . . . 4 V to 40 V**
- **High Output-Current Capability**
  - Source . . . 20 mA Typ
  - Sink . . . 20 mA Typ

- **Excellent Output Regulation**
  - $-45 \mu$ V Typ at  $I_O = 0$  to  $-10$  mA
  - $+15 \mu$ V Typ at  $I_O = 0$  to  $+10$  mA
- **Low-Impedance Output . . . 0.0075  $\Omega$  Typ**
- **Noise Reduction Pin (D, JG, and P Packages Only)**

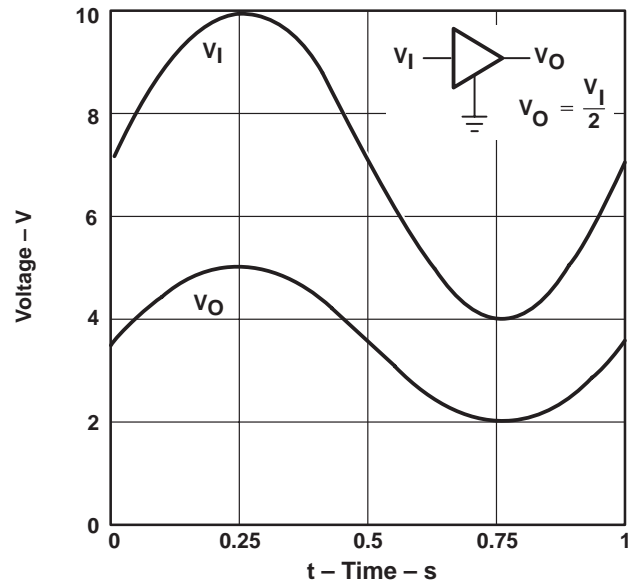
## description

In signal-conditioning applications utilizing a single power source, a reference voltage equal to one-half the supply voltage is required for termination of all analog signal grounds. Texas Instruments presents a precision virtual ground whose output voltage is always equal to one-half the input voltage, the TLE2426 "rail splitter."

The unique combination of a high-performance, micropower operational amplifier and a precision-trimmed divider on a single silicon chip results in a precise  $V_O/V_I$  ratio of 0.5 while sinking and sourcing current. The TLE2426 provides a low-impedance output with 20 mA of sink and source capability while drawing less than 280  $\mu$ A of supply current over the full input range of 4 V to 40 V. A designer need not pay the price in terms of board space for a conventional signal ground consisting of resistors, capacitors, operational amplifiers, and voltage references. The performance and precision of the TLE2426 is available in an easy-to-use, space saving, 3-terminal LP package. For increased performance, the optional 8-pin packages provide a noise-reduction pin. With the addition of an external capacitor ( $C_{NR}$ ), peak-to-peak noise is reduced while line ripple rejection is improved.

Initial output tolerance for a single 5-V or 12-V system is better than 1% with 3.6% over the full 40-V input range. Ripple rejection exceeds 12 bits of accuracy. Whether the application is for a data acquisition front end, analog signal termination, or simply a precision voltage reference, the TLE2426 eliminates a major source of system error.

**INPUT/OUTPUT TRANSFER CHARACTERISTICS**



## AVAILABLE OPTIONS

PACKAGED DEVICES					CHIP FORM (Y)
$T_A$	SMALL OUTLINE (D)	CERAMIC DIP (JG)	PLASTIC (LP)	PLASTIC DIP (P)	
0°C to 70°C	TLE2426CD	—	TLE2426CLP	TLE2426CP	TLE2426Y
-40°C to 85°C	TLE2426ID	—	TLE2426ILP	TLE2426IP	
-55°C to 125°C	TLE2426MD	TLE2426MJG	TLE2426MLP	TLE2426MP	

The D and LP packages are available taped and reeled in the commercial temperature range only. Add R suffix to the device type (e. g., TLC2426CDR). Chips are tested at 25°C.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS  
INSTRUMENTS**

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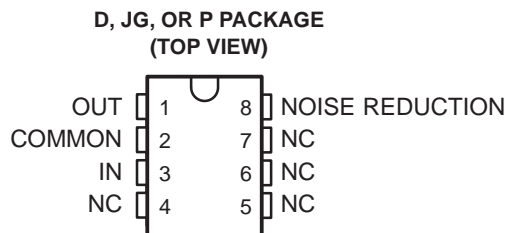
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# TLE2426, TLE2426Y THE "RAIL SPLITTER" PRECISION VIRTUAL GROUND

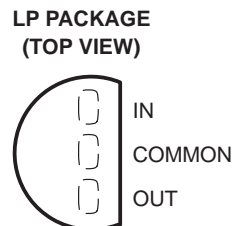
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## description (continued)

The C-suffix devices are characterized for operation from 0°C to 70°C. The I suffix devices are characterized for operation from –40°C to 85°C. The M suffix devices are characterized over the full military temperature range of –55°C to 125°C.

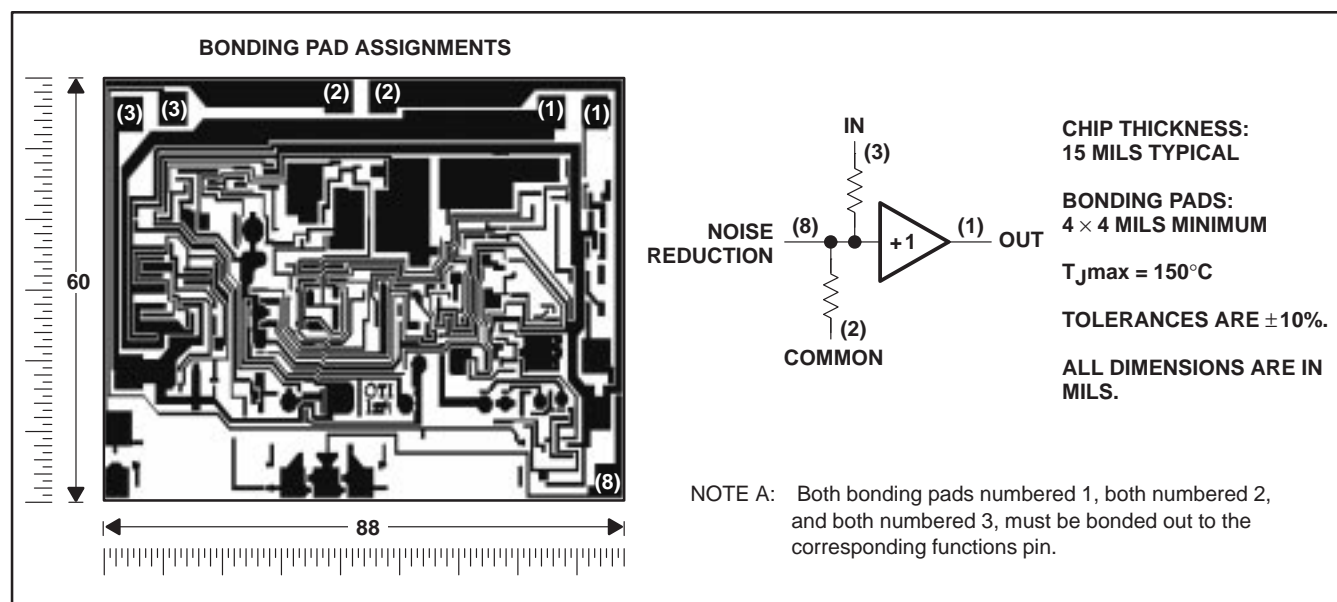


NC – No internal connection



## TLE2426Y chip information

This chip, properly assembled, displays characteristics similar to the TLE2426C. Thermal compression or ultrasonic bonding may be used on the doped aluminum bonding pads. The chips may be mounted with conductive epoxy or a gold-silicon preform.



**absolute maximum ratings over operating free-air temperature (unless otherwise noted)†**

Continuous input voltage, $V_I$	40 V
Continuous filter trap voltage	40 V
Output current, $I_O$	±80 mA
Duration of short-circuit current at (or below) 25°C (see Note 1)	unlimited
Continuous total power dissipation	See Dissipation Rating Table
Operating free-air temperature range, $T_A$ : C suffix	0°C to 70°C
I suffix	–40°C to 85°C
M suffix	–55°C to 125°C
Storage temperature range, $T_{stg}$	–65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: D or P package	260°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: JG or LP package	300°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.

NOTE 1: The output may be shorted to either supply. Temperature and/or supply voltages must be limited to ensure that the maximum dissipation rating is not exceeded.

**DISSIPATION RATING TABLE**

PACKAGE	$T_A \leq 25^\circ\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING	$T_A = 85^\circ\text{C}$ POWER RATING	$T_A = 125^\circ\text{C}$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW	377 mW	145 mW
JG	1050 mW	8.4 mW/°C	672 mW	546 mW	210 mW
LP	775 mW	6.2 mW/°C	496 mW	403 mW	155 mW
P	1000 mW	8.0 mW/°C	640 mW	520 mW	200 mW

**recommended operating conditions**

	C SUFFIX		I SUFFIX		M SUFFIX		UNIT
	MIN	MAX	MIN	MAX	MIN	MAX	
Input voltage, $V_I$	4	40	4	40	4	40	V
Operating free-air temperature, $T_A$	0	70	–40	85	–55	125	°C

# TLE2426, TLE2426Y

## THE "RAIL SPLITTER"

### PRECISION VIRTUAL GROUND

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electrical characteristics at specified free-air temperature,  $V_I = 5\text{ V}$ ,  $I_O = 0$  (unless otherwise noted)

PARAMETER	TEST CONDITIONS		$T_A^\dagger$	TLE2426C			UNIT
				MIN	TYP	MAX	
Output voltage	$V_I = 4\text{ V}$		25°C	1.98	2	2.02	V
	$V_I = 5\text{ V}$			2.48	2.5	2.52	
	$V_I = 40\text{ V}$			19.8	20	20.2	
	$V_I = 5\text{ V}$		Full range	2.475		2.525	
Temperature coefficient of output voltage			Full range		25		ppm/°C
Supply current	No load	$V_I = 5\text{ V}$	25°C		170	300	$\mu\text{A}$
		$V_I = 4\text{ to }40\text{ V}$	Full range			400	
Output voltage regulation (sourcing current) $^\ddagger$	$I_O = 0\text{ to }-10\text{ mA}$		25°C		-45	$\pm 160$	$\mu\text{V}$
			Full range			$\pm 250$	
	$I_O = 0\text{ to }-20\text{ mA}$		25°C		-150	$\pm 450$	
Output voltage regulation (sinking current) $^\ddagger$	$I_O = 0\text{ to }10\text{ mA}$		25°C		15	$\pm 160$	$\mu\text{V}$
			Full range			$\pm 250$	
	$I_O = 0\text{ to }20\text{ mA}$		25°C		65	$\pm 235$	
Output impedance			25°C		7.5	22.5	$\text{m}\Omega$
Noise-reduction impedance			25°C		110		$\text{k}\Omega$
Short-circuit current	Sinking current,	$V_O = 5\text{ V}$	25°C		26		mA
	Sourcing current,	$V_O = 0$			-47		
Output noise voltage, rms	$f = 10\text{ Hz to }10\text{ kHz}$	$\text{CNR} = 0$	25°C		120		$\mu\text{V}$
		$\text{CNR} = 1\text{ }\mu\text{F}$			30		
Output voltage current step response	$V_O\text{ to }0.1\%, I_O = \pm 10\text{ mA}$	$C_L = 0$	25°C		290		$\mu\text{s}$
		$C_L = 100\text{ pF}$			275		
	$V_O\text{ to }0.01\%, I_O = \pm 10\text{ mA}$	$C_L = 0$	25°C		400		
		$C_L = 100\text{ pF}$			390		
Step response	$V_I = 0\text{ to }5\text{ V}, V_O\text{ to }0.1\%$	$C_L = 100\text{ pF}$	25°C		20		$\mu\text{s}$
	$V_I = 0\text{ to }5\text{ V}, V_O\text{ to }0.01\%$				160		

$^\dagger$  Full range is 0°C to 70°C.

$^\ddagger$  The listed values are not production tested.

**electrical characteristics at specified free-air temperature,  $V_I = 12\text{ V}$ ,  $I_O = 0$  (unless otherwise noted)**

PARAMETER	TEST CONDITIONS		$T_A^\dagger$	TLE2426C			UNIT
				MIN	TYP	MAX	
Output voltage	$V_I = 4\text{ V}$		$25^\circ\text{C}$	1.98	2	2.02	V
	$V_I = 12\text{ V}$			5.95	6	6.05	
	$V_I = 40\text{ V}$			19.8	20	20.2	
	$V_I = 12\text{ V}$		Full range	5.945		6.055	
Temperature coefficient of output voltage			Full range		35		ppm/ $^\circ\text{C}$
Supply current	No load	$V_I = 12\text{ V}$	$25^\circ\text{C}$		195	300	$\mu\text{A}$
		$V_I = 4\text{ to }40\text{ V}$	Full range			400	
Output voltage regulation (sourcing current) $^\ddagger$	$I_O = 0\text{ to }-10\text{ mA}$		$25^\circ\text{C}$		-45	$\pm 160$	$\mu\text{V}$
			Full range			$\pm 250$	
	$I_O = 0\text{ to }-20\text{ mA}$		$25^\circ\text{C}$		-150	$\pm 450$	
Output voltage regulation (sinking current) $^\ddagger$	$I_O = 0\text{ to }10\text{ mA}$		$25^\circ\text{C}$		15	$\pm 160$	$\mu\text{V}$
			Full range			$\pm 250$	
	$I_O = 0\text{ to }20\text{ mA}$		$25^\circ\text{C}$		65	$\pm 235$	
Output impedance			$25^\circ\text{C}$		7.5	22.5	$\text{m}\Omega$
Noise-reduction impedance			$25^\circ\text{C}$		110		$\text{k}\Omega$
Short-circuit current	Sinking current,	$V_O = 12\text{ V}$	$25^\circ\text{C}$		31		mA
	Sourcing current,	$V_O = 0$			-70		
Output noise voltage, rms	$f = 10\text{ Hz to }10\text{ kHz}$	$C_{NR} = 0$	$25^\circ\text{C}$		120		$\mu\text{V}$
		$C_{NR} = 1\text{ }\mu\text{F}$			30		
Output voltage current step response	$V_O\text{ to }0.1\%,\ I_O = \pm 10\text{ mA}$	$C_L = 0$	$25^\circ\text{C}$		290		$\mu\text{s}$
		$C_L = 100\text{ pF}$			275		
	$V_O\text{ to }0.01\%,\ I_O = \pm 10\text{ mA}$	$C_L = 0$	$25^\circ\text{C}$		400		
		$C_L = 100\text{ pF}$			390		
Step response	$V_I = 0\text{ to }12\text{ V},\ V_O\text{ to }0.1\%$	$C_L = 100\text{ pF}$	$25^\circ\text{C}$		20		$\mu\text{s}$
	$V_I = 0\text{ to }12\text{ V},\ V_O\text{ to }0.01\%$				120		

$^\dagger$  Full range is  $0^\circ\text{C}$  to  $70^\circ\text{C}$ .

$^\ddagger$  The listed values are not production tested.

# TLE2426, TLE2426Y

## THE "RAIL SPLITTER"

### PRECISION VIRTUAL GROUND

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electrical characteristics at specified free-air temperature,  $V_I = 5\text{ V}$ ,  $I_O = 0$  (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T <sub>A</sub> <sup>†</sup>	TLE2426I			UNIT
				MIN	TYP	MAX	
Output voltage	V <sub>I</sub> = 4 V		25°C	1.98	2	2.02	V
	V <sub>I</sub> = 5 V			2.48	2.5	2.52	
	V <sub>I</sub> = 40 V			19.8	20	20.2	
	V <sub>I</sub> = 5 V		Full range		2.47	2.53	
Temperature coefficient of output voltage			Full range	25			ppm/°C
Supply current	No load	V <sub>I</sub> = 5 V	25°C	170	300	μA	
		V <sub>I</sub> = 4 to 40 V	Full range	400			
Output voltage regulation (sourcing current) <sup>‡</sup>	I <sub>O</sub> = 0 to −10 mA		25°C	−45	±160	μV	
			Full range	±250			
	I <sub>O</sub> = 0 to −20 mA		25°C	−150	±450		
Output voltage regulation (sinking current) <sup>‡</sup>	I <sub>O</sub> = 0 to 10 mA		25°C	15	±160	μV	
	I <sub>O</sub> = 0 to 8 mA		Full range	±250			
	I <sub>O</sub> = 0 to 20 mA		25°C	65	±235		
Output impedance			25°C	7.5	22.5	mΩ	
Noise-reduction impedance			25°C	110		kΩ	
Short-circuit current	Sinking current,	V <sub>O</sub> = 5 V	25°C	26		mA	
	Sourcing current,	V <sub>O</sub> = 0		−47			
Output noise voltage, rms	f = 10 Hz to 10 kHz	C <sub>NR</sub> = 0	25°C	120		μV	
		C <sub>NR</sub> = 1 μF		30			
Output voltage current step response	V <sub>O</sub> to 0.1%, I <sub>O</sub> = ±10 mA	C <sub>L</sub> = 0	25°C	290		μs	
		C <sub>L</sub> = 100 pF		275			
	V <sub>O</sub> to 0.01%, I <sub>O</sub> = ±10 mA	C <sub>L</sub> = 0	25°C	400			
		C <sub>L</sub> = 100 pF		390			
Step response	V <sub>I</sub> = 0 to 5 V, V <sub>O</sub> to 0.1%	C <sub>L</sub> = 100 pF	25°C	20		μs	
	V <sub>I</sub> = 0 to 5 V, V <sub>O</sub> to 0.01%			160			

$^\dagger$  Full range is -40°C to 85°C.

$^\ddagger$  The listed values are not production tested.

**electrical characteristics at specified free-air temperature,  $V_I = 12\text{ V}$ ,  $I_O = 0$  (unless otherwise noted)**

PARAMETER	TEST CONDITIONS		$T_A^\dagger$	TLE2426I			UNIT
				MIN	TYP	MAX	
Output voltage	$V_I = 4\text{ V}$		25°C	1.98	2	2.02	V
	$V_I = 12\text{ V}$			5.95	6	6.05	
	$V_I = 40\text{ V}$			19.8	20	20.2	
	$V_I = 12\text{ V}$		Full range	5.935		6.065	
Temperature coefficient of output voltage			Full range		35		ppm/°C
Supply current	No load	$V_I = 12\text{ V}$	25°C		195	300	μA
		$V_I = 4\text{ to }40\text{ V}$	Full range			400	
Output voltage regulation (sourcing current) $^\ddagger$	$I_O = 0\text{ to }-10\text{ mA}$		25°C		-45	±160	μV
			Full range			±250	
	$I_O = 0\text{ to }-20\text{ mA}$		25°C		-150	±450	
Output voltage regulation (sinking current) $^\ddagger$	$I_O = 0\text{ to }10\text{ mA}$		25°C		15	±160	μV
	$I_O = 0\text{ to }8\text{ mA}$		Full range			±250	
	$I_O = 0\text{ to }20\text{ mA}$		25°C		65	±235	
Output impedance			25°C		7.5	22.5	mΩ
Noise-reduction impedance			25°C		110		kΩ
Short-circuit current	Sinking current,	$V_O = 12\text{ V}$	25°C		31		mA
	Sourcing current,	$V_O = 0$			-70		
Output noise voltage, rms	$f = 10\text{ Hz to }10\text{ kHz}$	$C_{NR} = 0$	25°C		120		μV
		$C_{NR} = 1\text{ μF}$			30		
Output voltage current step response	$V_O\text{ to }0.1\%, I_O = \pm 10\text{ mA}$	$C_L = 0$	25°C		290		μs
		$C_L = 100\text{ pF}$			275		
	$V_O\text{ to }0.01\%, I_O = \pm 10\text{ mA}$	$C_L = 0$	25°C		400		
		$C_L = 100\text{ pF}$			390		
Step response	$V_I = 0\text{ to }12\text{ V}, V_O\text{ to }0.1\%$	$C_L = 100\text{ pF}$	25°C		20		μs
	$V_I = 0\text{ to }12\text{ V}, V_O\text{ to }0.01\%$				120		

$^\dagger$  Full range is -40°C to 85°C.

$^\ddagger$  The listed values are not production tested.

# TLE2426, TLE2426Y

## THE "RAIL SPLITTER"

### PRECISION VIRTUAL GROUND

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electrical characteristics at specified free-air temperature,  $V_I = 5\text{ V}$ ,  $I_O = 0$  (unless otherwise noted)

PARAMETER	TEST CONDITIONS		$T_A^\dagger$	TLE2426M			UNIT
				MIN	TYP	MAX	
Output voltage	$V_I = 4\text{ V}$		25°C	1.98	2	2.02	V
	$V_I = 5\text{ V}$			2.48	2.5	2.52	
	$V_I = 40\text{ V}$			19.8	20	20.2	
	$V_I = 5\text{ V}$		Full range	2.465		2.535	
Temperature coefficient of output voltage			Full range		25		ppm/°C
Supply current	No load	$V_I = 5\text{ V}$	25°C		170	300	μA
		$V_I = 4\text{ to }40\text{ V}$	Full range			400	
Output voltage regulation (sourcing current) $^\ddagger$	$I_O = 0\text{ to }-10\text{ mA}$		25°C		-45	±160	μV
			Full range			±250	
	$I_O = 0\text{ to }-20\text{ mA}$		25°C		-150	±450	
Output voltage regulation (sinking current) $^\ddagger$	$I_O = 0\text{ to }10\text{ mA}$		25°C		15	±160	μV
	$I_O = 0\text{ to }3\text{ mA}$		Full range			±250	
	$I_O = 0\text{ to }20\text{ mA}$		25°C		65	±235	
Output impedance			25°C		7.5	22.5	mΩ
Noise-reduction impedance			25°C		110		kΩ
Short-circuit current	Sinking current,	$V_O = 5\text{ V}$	25°C		26		mA
	Sourcing current,	$V_O = 0$			-47		
Output noise voltage, rms	$f = 10\text{ Hz to }10\text{ kHz}$	$C_{NR} = 0$	25°C		120		μV
		$C_{NR} = 1\text{ μF}$			30		
Output voltage current step response	$V_O\text{ to }0.1\%, I_O = \pm 10\text{ mA}$	$C_L = 0$	25°C		290		μs
		$C_L = 100\text{ pF}$			275		
	$V_O\text{ to }0.01\%, I_O = \pm 10\text{ mA}$	$C_L = 0$	25°C		400		
		$C_L = 100\text{ pF}$			390		
Step response	$V_I = 0\text{ to }5\text{ V}, V_O\text{ to }0.1\%$	$C_L = 100\text{ pF}$	25°C		20		μs
	$V_I = 0\text{ to }5\text{ V}, V_O\text{ to }0.01\%$				120		

$^\dagger$  Full range is -55°C to 125°C.

$^\ddagger$  The listed values are not production tested.

**electrical characteristics at specified free-air temperature,  $V_I = 12\text{ V}$ ,  $I_O = 0$  (unless otherwise noted)**

PARAMETER	TEST CONDITIONS		$T_A^\dagger$	TLE2426M			UNIT
				MIN	TYP	MAX	
Output voltage	$V_I = 4\text{ V}$		$25^\circ\text{C}$	1.98	2	2.02	V
	$V_I = 12\text{ V}$			5.95	6	6.05	
	$V_I = 40\text{ V}$			19.8	20	20.2	
	$V_I = 12\text{ V}$		Full range	5.925		6.075	
Temperature coefficient of output voltage			Full range		35		ppm/ $^\circ\text{C}$
Supply current	No load	$V_I = 12\text{ V}$	$25^\circ\text{C}$		195	250	$\mu\text{A}$
		$V_I = 4\text{ to }40\text{ V}$	Full range			350	
Output voltage regulation (sourcing current) $^\ddagger$	$I_O = 0\text{ to }-10\text{ mA}$		$25^\circ\text{C}$		-45	$\pm 160$	$\mu\text{V}$
			Full range			$\pm 250$	
	$I_O = 0\text{ to }-20\text{ mA}$		$25^\circ\text{C}$		-150	$\pm 450$	
Output voltage regulation (sinking current) $^\ddagger$	$I_O = 0\text{ to }10\text{ mA}$		$25^\circ\text{C}$		15	$\pm 160$	$\mu\text{V}$
	$I_O = 0\text{ to }8\text{ mA}$		Full range			$\pm 250$	
	$I_O = 0\text{ to }20\text{ mA}$		$25^\circ\text{C}$		65	$\pm 235$	
Output impedance			$25^\circ\text{C}$		7.5	22.5	$\text{m}\Omega$
Noise-reduction impedance			$25^\circ\text{C}$		110		$\text{k}\Omega$
Short-circuit current	Sinking current,	$V_O = 12\text{ V}$	$25^\circ\text{C}$		31		mA
	Sourcing current,	$V_O = 0$			-70		
Output noise voltage, rms	$f = 10\text{ Hz to }10\text{ kHz}$	$\text{CNR} = 0$	$25^\circ\text{C}$		120		$\mu\text{V}$
		$\text{CNR} = 1\text{ }\mu\text{F}$			30		
Output voltage current step response	$V_O\text{ to }0.1\%,\ I_O = \pm 10\text{ mA}$	$C_L = 0$	$25^\circ\text{C}$		290		$\mu\text{s}$
		$C_L = 100\text{ pF}$			275		
	$V_O\text{ to }0.01\%,\ I_O = \pm 10\text{ mA}$	$C_L = 0$	$25^\circ\text{C}$		400		
		$C_L = 100\text{ pF}$			390		
Step response	$V_I = 0\text{ to }12\text{ V},\ V_O\text{ to }0.1\%$	$C_L = 100\text{ pF}$	$25^\circ\text{C}$		12		$\mu\text{s}$
	$V_I = 0\text{ to }12\text{ V},\ V_O\text{ to }0.01\%$				120		

$^\dagger$  Full range is  $-55^\circ\text{C}$  to  $125^\circ\text{C}$ .

$^\ddagger$  The listed values are not production tested.

**TLE2426, TLE2426Y**  
**THE "RAIL SPLITTER"**  
**PRECISION VIRTUAL GROUND**  
 SLOS098D – AUGUST 1991 – REVISED MAY 1998

**electrical characteristics at specified free-air temperature,  $V_I = 5\text{ V}$ ,  $I_O = 0$ ,  $T_A = 25^\circ\text{C}$  (unless otherwise noted)**

PARAMETER	TEST CONDITIONS	TLE2426Y			UNIT
		MIN	TYP	MAX	
Output voltage	$V_I = 5\text{ V}$		2.5		V
Supply current	No load		170		$\mu\text{A}$
Output voltage regulation (sourcing current) <sup>†</sup>	$I_O = 0$ to $-10\text{ mA}$		-45		$\mu\text{V}$
	$I_O = 0$ to $-20\text{ mA}$		-150		
Output voltage regulation (sinking current) <sup>†</sup>	$I_O = 0$ to $10\text{ mA}$		15		$\mu\text{V}$
	$I_O = 0$ to $20\text{ mA}$		65		
Output impedance			7.5		$\text{m}\Omega$
Noise-reduction impedance			110		$\text{k}\Omega$
Short-circuit current	Sinking current, $V_O = 5\text{ V}$		26		mA
	Sourcing current, $V_O = 0$		-47		
Output noise voltage, rms	$f = 10\text{ Hz to }10\text{ kHz}$	$C_{NR} = 0$	120		$\mu\text{V}$
		$C_{NR} = 1\text{ }\mu\text{F}$	30		
Output voltage current step response	$V_O$ to 0.1%, $I_O = \pm 10\text{ mA}$	$C_L = 0$	290		$\mu\text{s}$
		$C_L = 100\text{ pF}$	275		
	$V_O$ to 0.01%, $I_O = \pm 10\text{ mA}$	$C_L = 0$	400		
		$C_L = 100\text{ pF}$	390		
Step response	$V_I = 0$ to $5\text{ V}$ , $V_O$ to 0.1%	$C_L = 100\text{ pF}$	20		$\mu\text{s}$
	$V_I = 0$ to $5\text{ V}$ , $V_O$ to 0.01%		160		

<sup>†</sup> The listed values are not production tested.

**electrical characteristics at specified free-air temperature,  $V_I = 12\text{ V}$ ,  $I_O = 0$ ,  $T_A = 25^\circ\text{C}$  (unless otherwise noted)**

PARAMETER	TEST CONDITIONS	TLE2426Y			UNIT
		MIN	TYP	MAX	
Output voltage	$V_I = 12\text{ V}$		6		V
Supply current	No load		195		$\mu\text{A}$
Output voltage regulation (sourcing current) <sup>†</sup>	$I_O = 0$ to $-10\text{ mA}$		-45		$\mu\text{V}$
	$I_O = 0$ to $-20\text{ mA}$		-150		
Output voltage regulation (sinking current) <sup>†</sup>	$I_O = 0$ to $3\text{ mA}$		15		$\mu\text{V}$
	$I_O = 0$ to $20\text{ mA}$		65		
Output impedance			7.5		$\text{m}\Omega$
Noise-reduction impedance			110		$\text{k}\Omega$
Short-circuit current	Sinking current, $V_O = 12\text{ V}$		31		mA
	Sourcing current, $V_O = 0$		-70		
Output noise voltage, rms	$f = 10\text{ Hz to }10\text{ kHz}$	$C_{NR} = 0$	120		$\mu\text{V}$
		$C_{NR} = 1\text{ }\mu\text{F}$	30		
Output voltage current, step response	$V_O$ to 0.1%, $I_O = \pm 10\text{ mA}$	$C_L = 0$	290		$\mu\text{s}$
		$C_L = 100\text{ pF}$	275		
	$V_O$ to 0.01%, $I_O = \pm 10\text{ mA}$	$C_L = 0$	400		
		$C_L = 100\text{ pF}$	390		
Step response	$V_I = 0$ to $12\text{ V}$ , $V_O$ to 0.1%	$C_L = 100\text{ pF}$	12		$\mu\text{s}$
	$V_I = 0$ to $12\text{ V}$ , $V_O$ to 0.01%		120		

<sup>†</sup> The listed values are not production tested.



## TYPICAL CHARACTERISTICS

Table Of Graphs

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Output voltage change	vs Free-air temperature	3
Output voltage error	vs Input voltage	4
Input bias current	vs Input voltage	5
	vs Free-air temperature	6
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Output impedance	vs Frequency	8
Short-circuit output current	vs Input voltage	9,10
	vs Free-air temperature	11,12
Ripple rejection	vs Frequency	13
Spectral noise voltage density	vs Frequency	14
Output voltage response to output current step	vs Time	15
Output voltage power-up response	vs Time	16
Output current	vs Load capacitance	17

## TYPICAL CHARACTERISTICS†

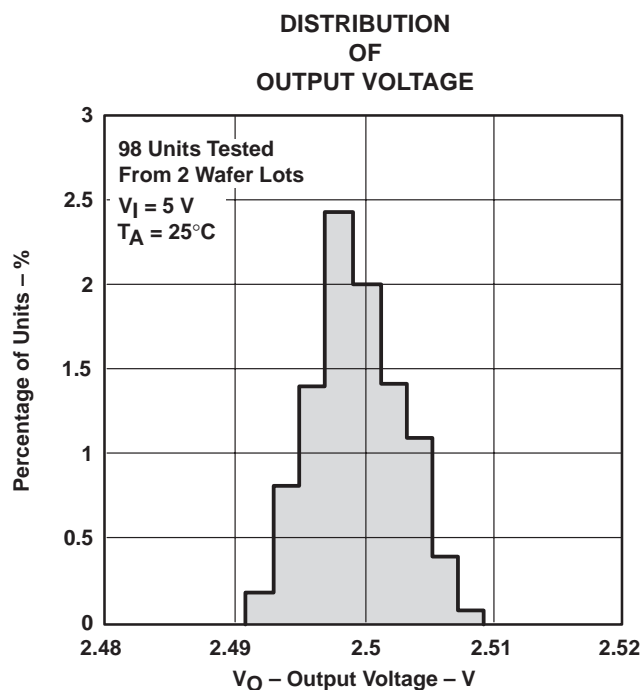


Figure 1

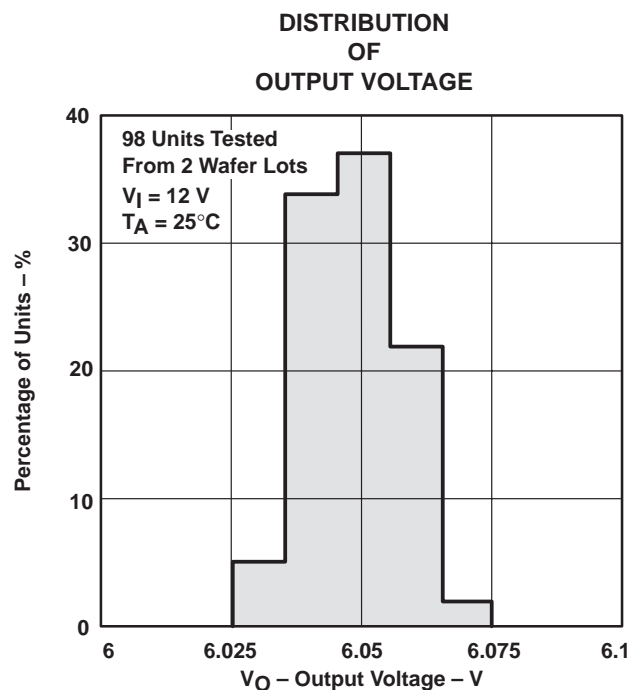


Figure 2

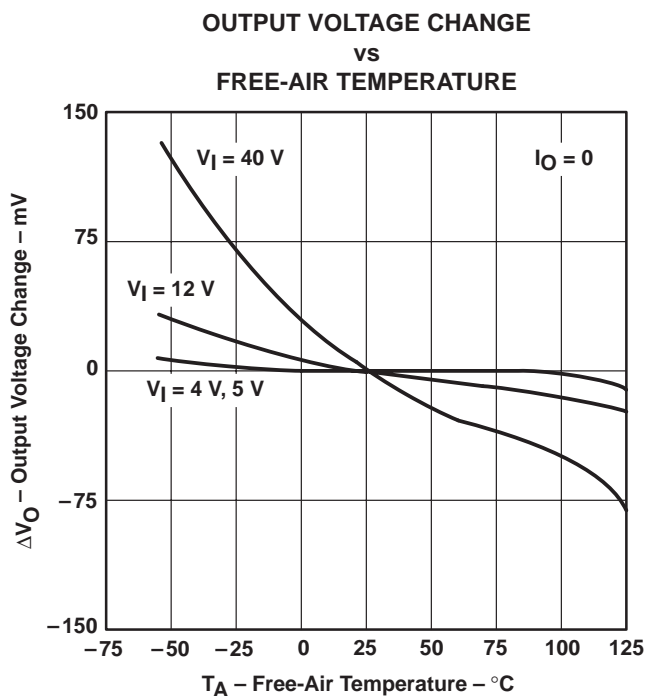


Figure 3

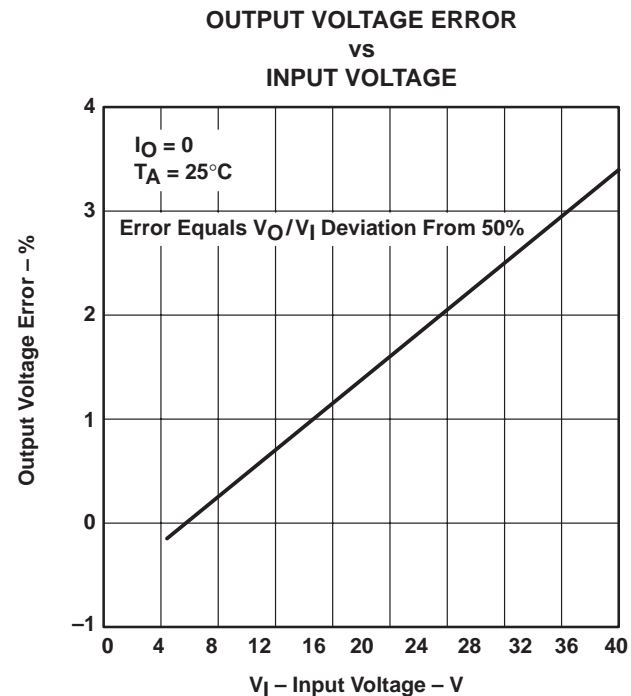


Figure 4

† Data at high and low temperatures are applicable within the rated operating free-air temperature ranges of the various devices.

# TYPICAL CHARACTERISTICS†

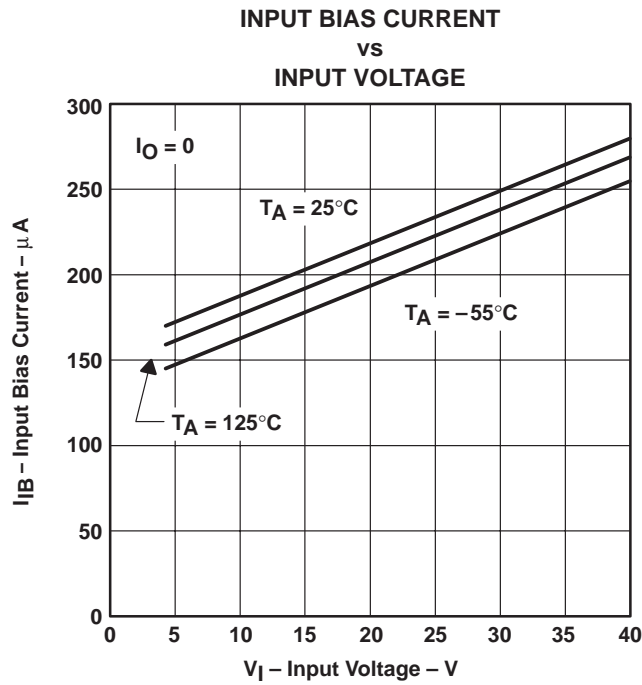


Figure 5

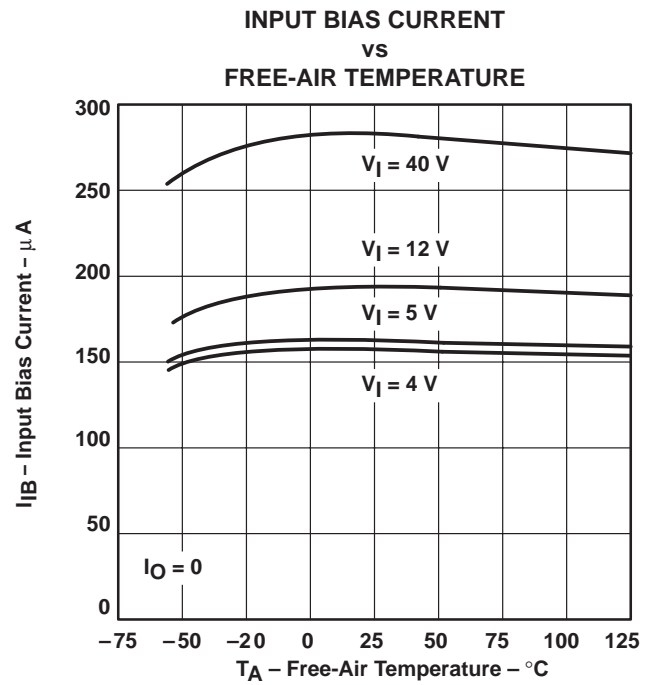


Figure 6

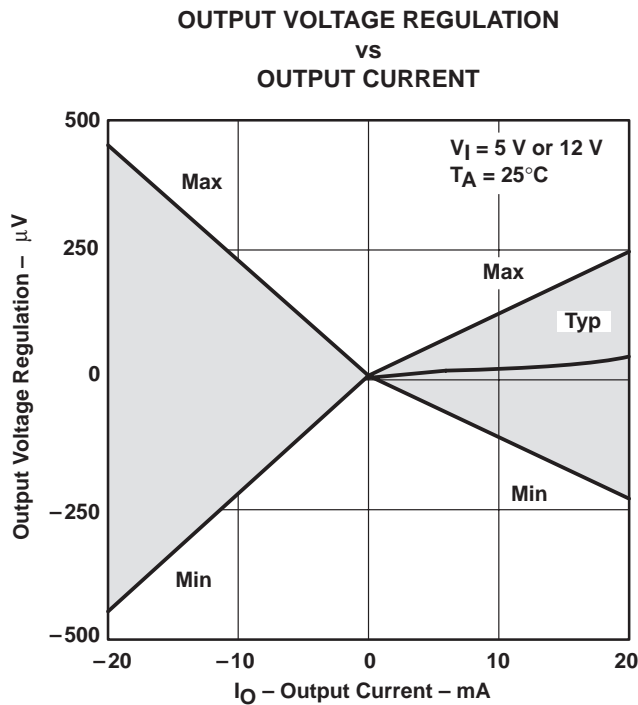


Figure 7

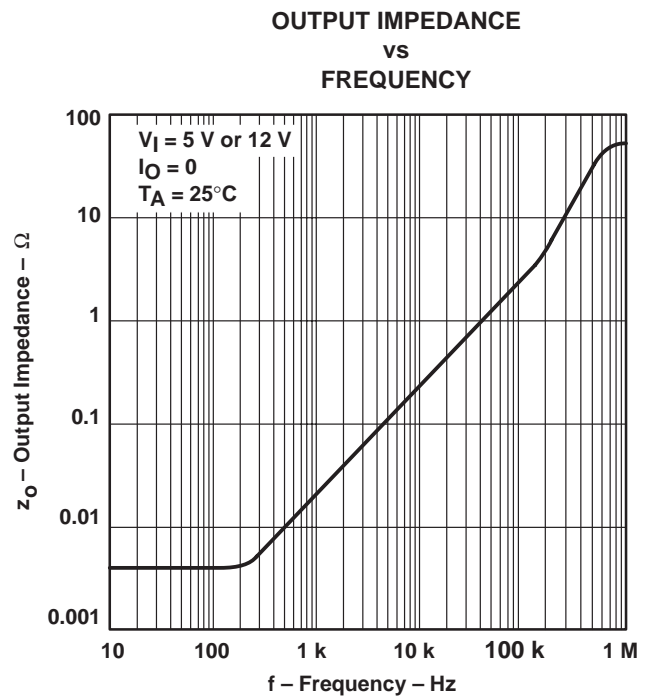


Figure 8

† Data at high and low temperatures are applicable within the rated operating free-air temperature ranges of the various devices.

## TYPICAL CHARACTERISTICS†

SHORT-CIRCUIT OUTPUT CURRENT  
vs  
INPUT VOLTAGE

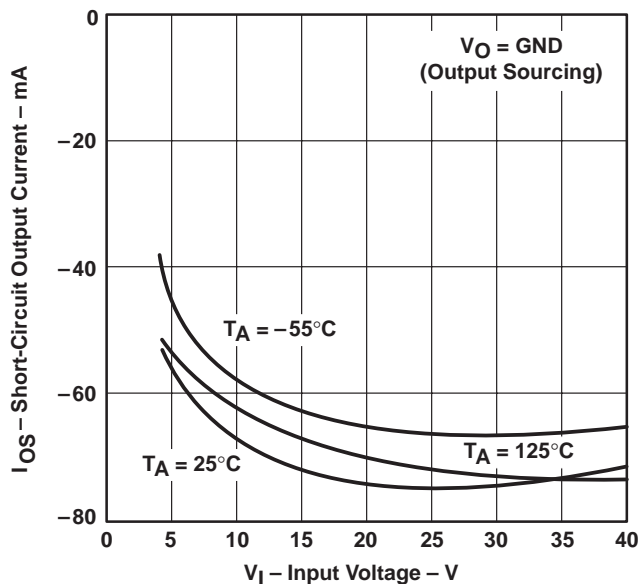


Figure 9

SHORT-CIRCUIT OUTPUT CURRENT  
vs  
INPUT VOLTAGE

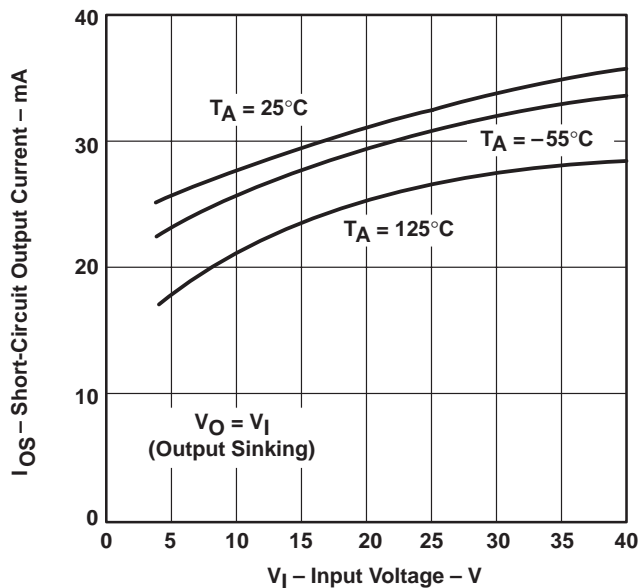


Figure 10

SHORT-CIRCUIT OUTPUT CURRENT  
vs  
FREE-AIR TEMPERATURE

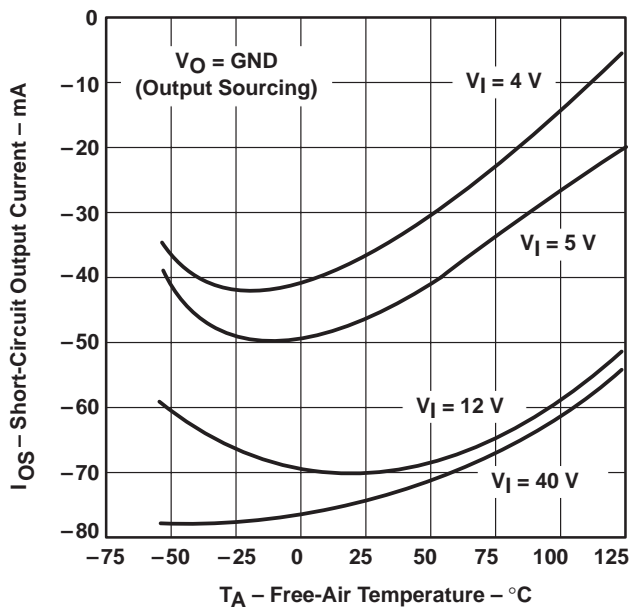


Figure 11

SHORT-CIRCUIT OUTPUT CURRENT  
vs  
FREE-AIR TEMPERATURE

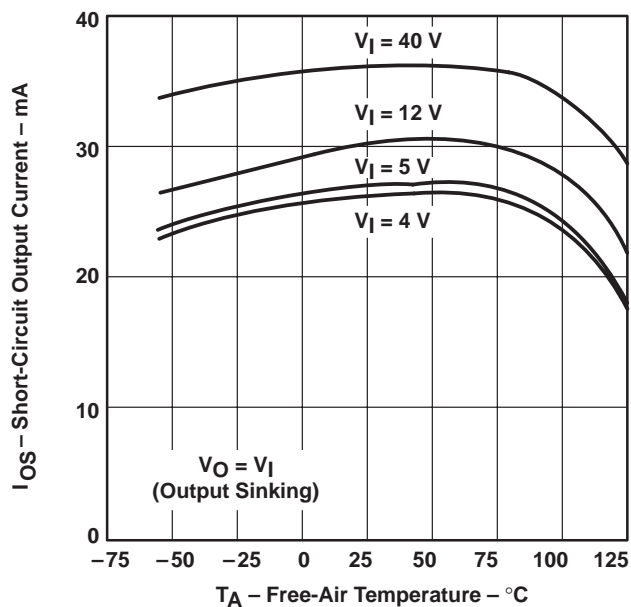


Figure 12

† Data at high and low temperatures are applicable within the rated operating free-air temperature ranges of the various devices.

## TYPICAL CHARACTERISTICS

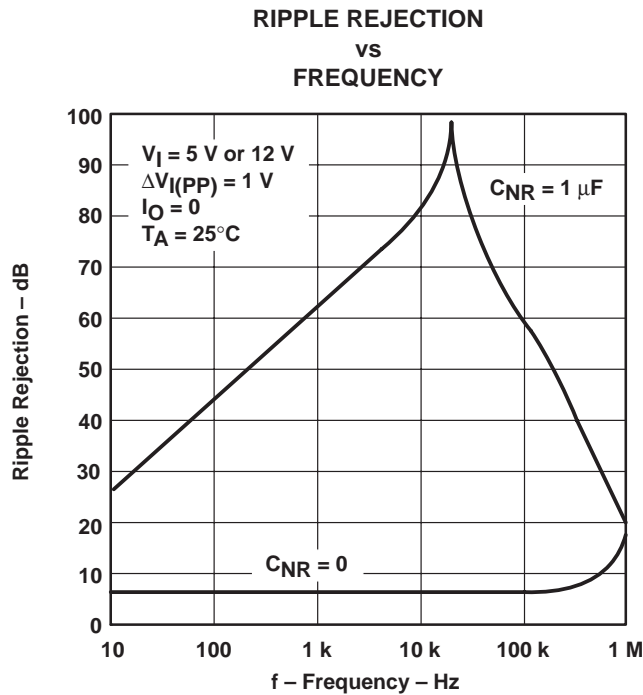


Figure 13

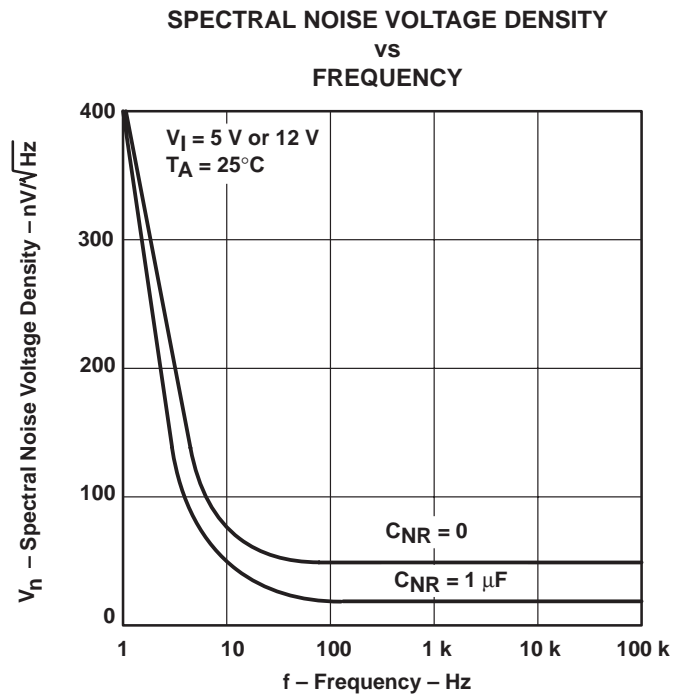


Figure 14

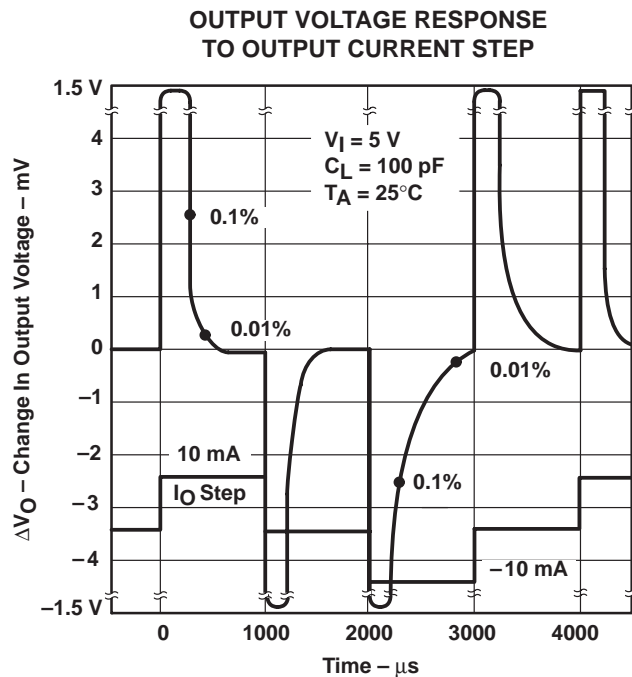


Figure 15

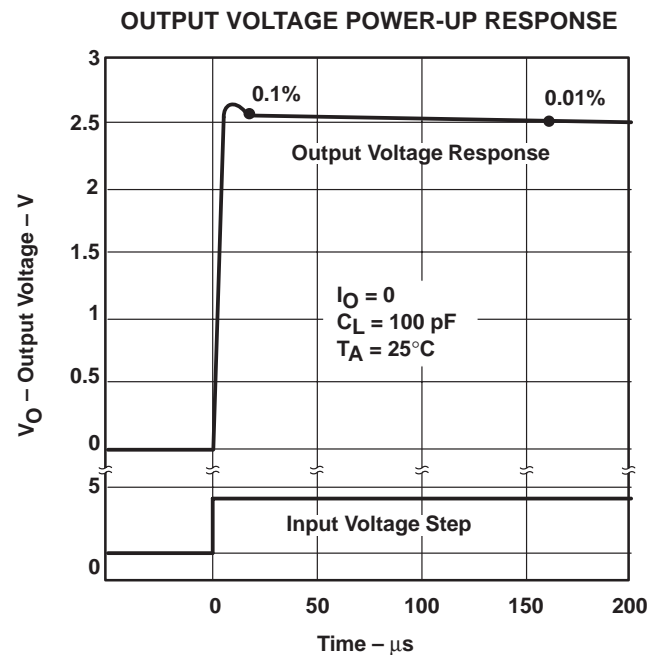


Figure 16

## TYPICAL CHARACTERISTICS

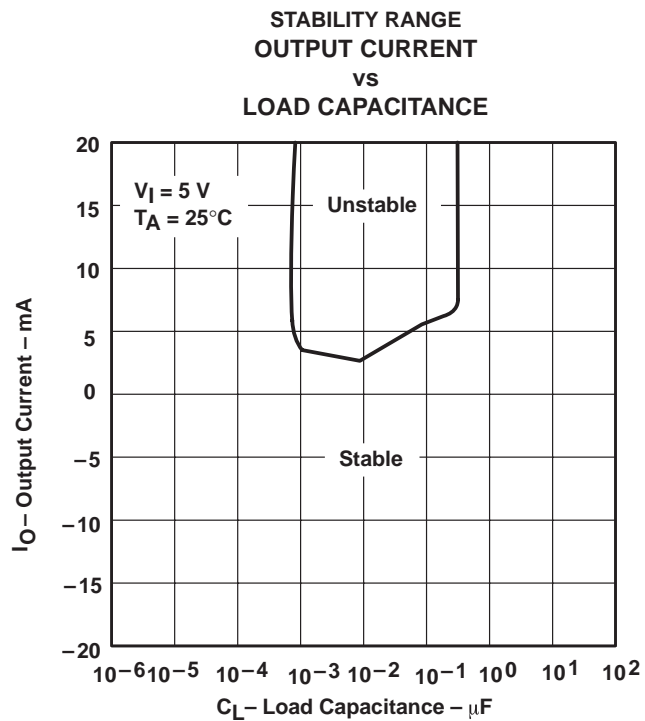


Figure 17

## MACROMODEL INFORMATION

```
* TLE2426 OPERATIONAL AMPLIFIER "MACROMODEL" SUBCIRCUIT
* CREATED USING PARTS RELEASE 4.03 ON 08/21/90 AT 13:51
* REV (N/A) SUPPLY VOLTAGE: 5 V
* CONNECTIONS: FILTER
```

```

*      CONNECTIONS:      FILTER
*                          |      INPUT
*                          |      COMMON
*                          |      OUTPUT
*                          |
.SUBCKT  TLE2426         1      3      4      5

```

```

C1      11 12 21.66E-12
C2      6  7 30.00E-12
C3      87 0 10.64E-9
CPSR    85 86 15.9E-9
DCM+    81 82 DX
DCM-    83 81 DX
DC       5 53 DX
DE      54  5 DX
DLP     90 91 DX
DLN     92 90 DX
DP       4  3 DX
ECMR    84 99 (2,99) 1
EGND    99  0 POLY(2) (3,0) (4,0) 0 .5 .5
EPSR    85 0 POLY(1) (3,4) -16.22E-6 3.24E-6
ENSE    89 2 POLY(1) (88,0) 120E-6 1
FB       7 99 POLY(6) VB VC VE VLP VLN VPSR 0 74.8E6 -10E6 10E6 10E6 -10E6 74E6
GA       6  0 11 12 320.4E-6
GCM      0  6 10 99 1.013E-9
GPSR    85 86 (85,86) 100E-6
GRC1     4 11 (4,11) 3.204E-4
GRC2     4 12 (4,12) 3.204E-4
GRE1    13 10 (13,10) 1.038E-3
GRE2    14 10 (14,10) 1.038E-3
HLIM    90  0 VLIM 1K
HCMR    80  1 POLY(2) VCM+ VCM- 0 1E2 1E2
IRP      3  4 146E-6
IEE      3 10 DC 24.05E-6
IIO      2  0 .2E-9
I1      88  0 1E-21
Q1      11 89 13 QX
Q2      12 80 14 QX
R2       6  9 100.0E3
RCM     84 81 1K
REE     10 99 8.316E6
RN1     87  0 2.55E8
RN2     87 88 11.67E3
RO1      8  5 63
RO2      7 99 62
VCM+    82 99 1.0
VCM-    83 99 -2.3
VB       9  0 DC 0
VC       3 53 DC 1.400
VE      54  4 DC 1.400
VLIM     7  8 DC 0
VLP     91  0 DC 30
VLN      0 92 DC 30
VPSR     0 86 DC 0
RFB      5  2 1K
RIN1     3  1 220K
RIN2     1  4 220K
.MODEL DX D(IS=800.OE-18)
.MODEL QX PNP(IS=800.OE-18 BF=480)
.ENDS

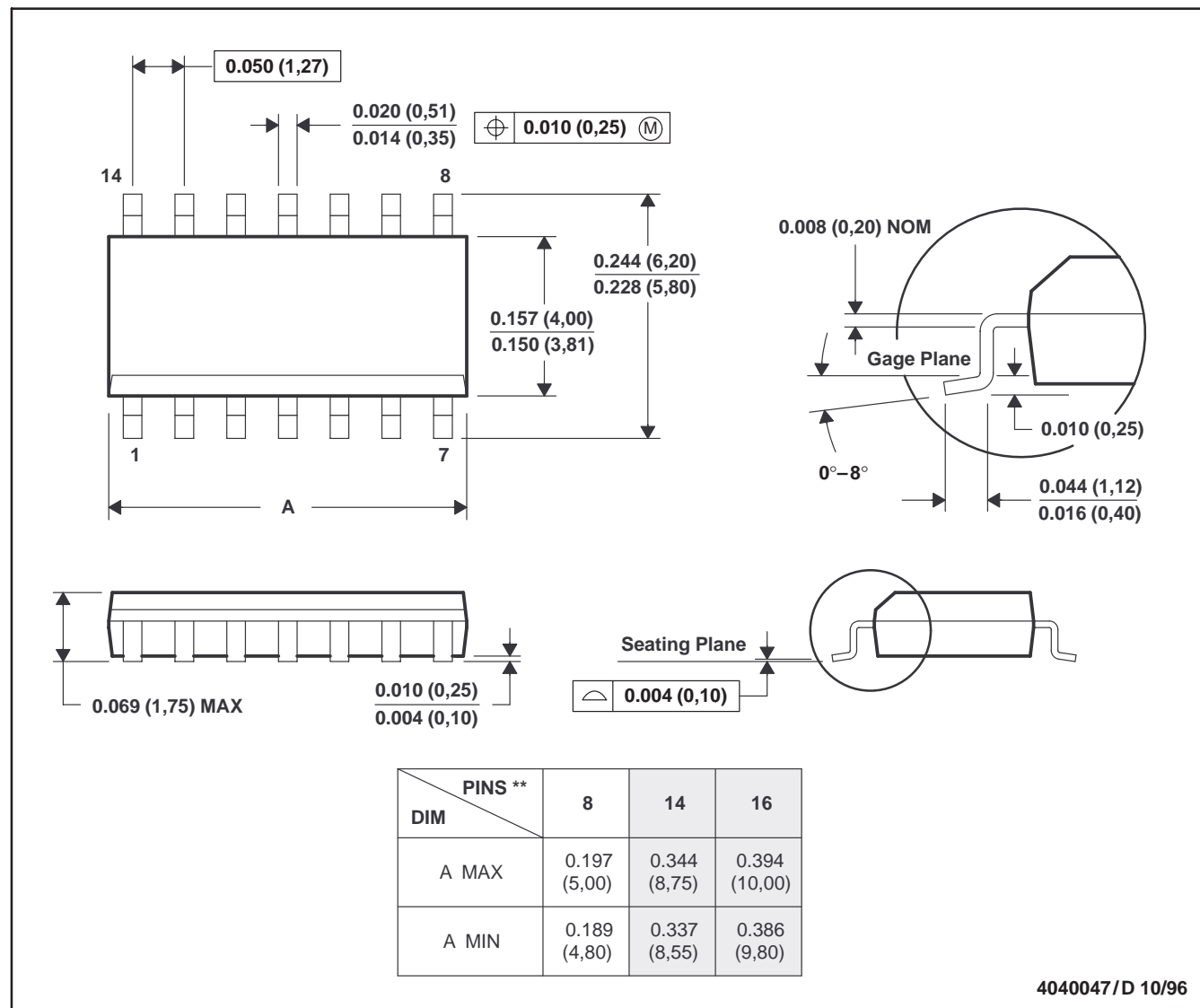
```

## MECHANICAL INFORMATION

**D (R-PDSO-G\*\*)**

**PLASTIC SMALL-OUTLINE PACKAGE**

14 PIN SHOWN

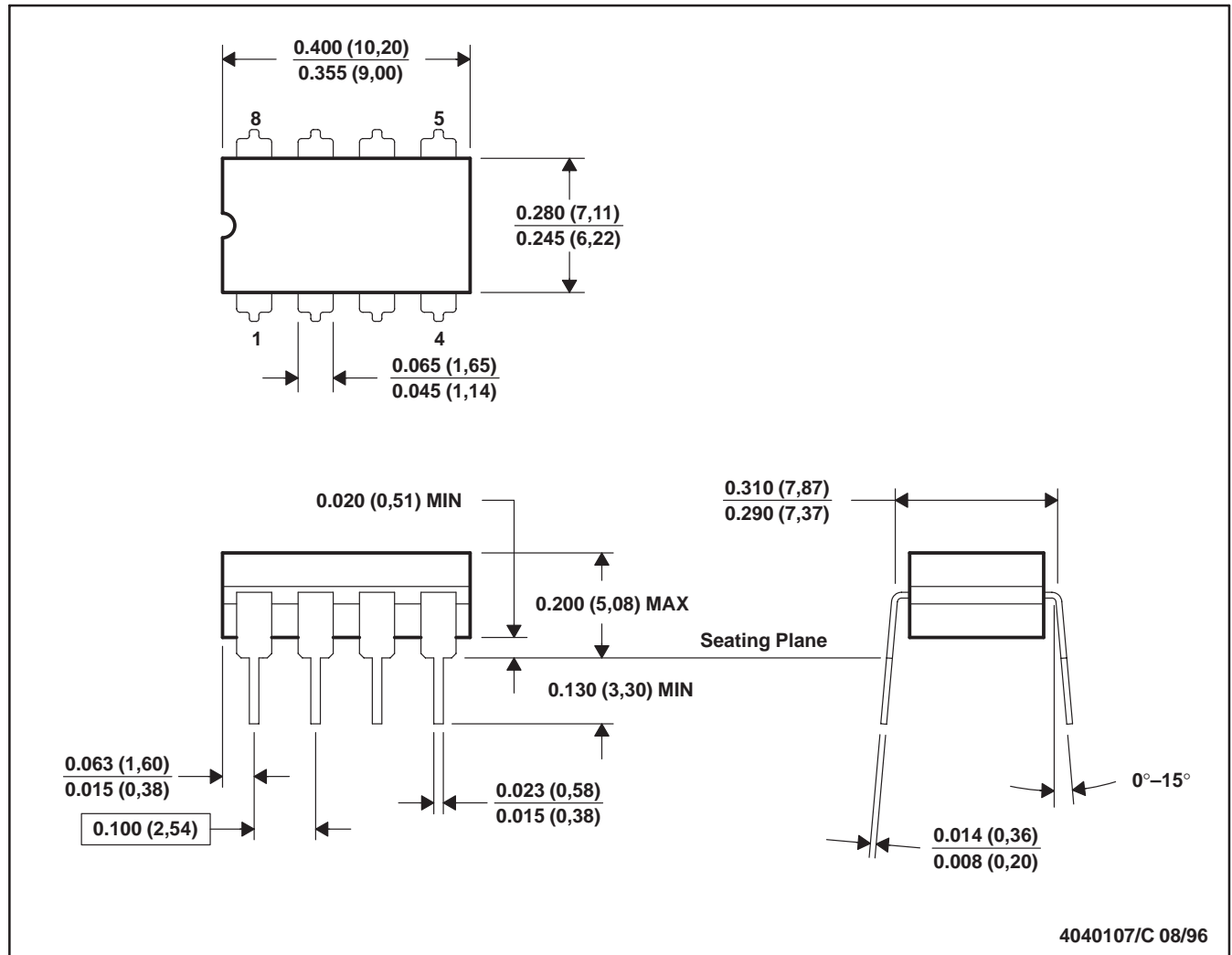


- NOTES: A. All linear dimensions are in inches (millimeters).  
B. This drawing is subject to change without notice.  
C. Body dimensions do not include mold flash or protrusion, not to exceed 0.006 (0,15).  
D. Falls within JEDEC MS-012

## MECHANICAL INFORMATION

JG (R-GDIP-T8)

CERAMIC DUAL-IN-LINE PACKAGE

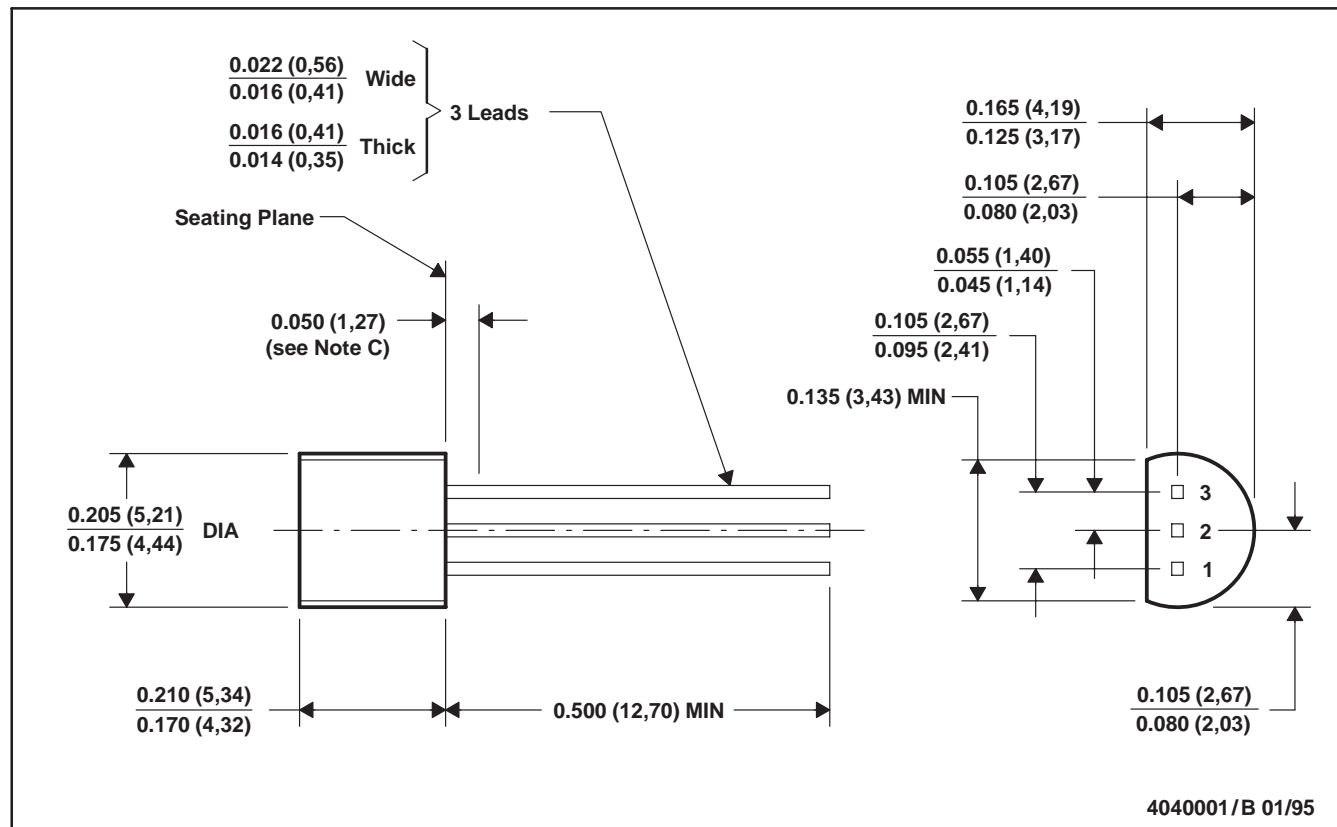


- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package can be hermetically sealed with a ceramic lid using glass frit.
  - Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
  - Falls within MIL-STD-1835 GDIP1-T8

## MECHANICAL INFORMATION

LP (O-PBCY-W3)

PLASTIC CYLINDRICAL PACKAGE

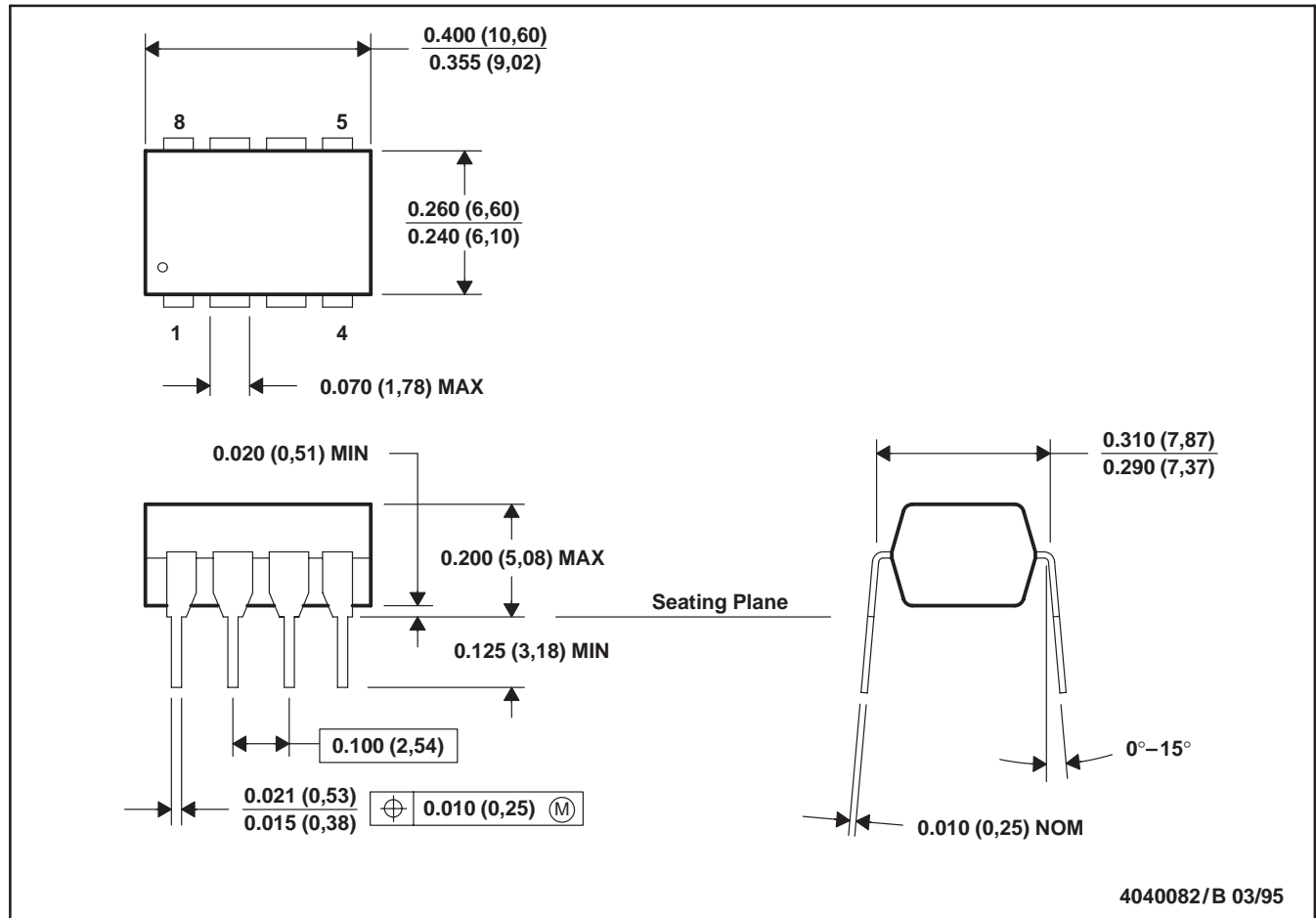


- NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. Lead dimensions are not controlled within this area.  
 D. Falls within JEDEC TO-226AA (TO-226AA replaces TO-92)

## MECHANICAL INFORMATION

P (R-PDIP-T8)

PLASTIC DUAL-IN-LINE PACKAGE



- NOTES: A. All linear dimensions are in inches (millimeters).  
B. This drawing is subject to change without notice.  
C. Falls within JEDEC MS-001

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