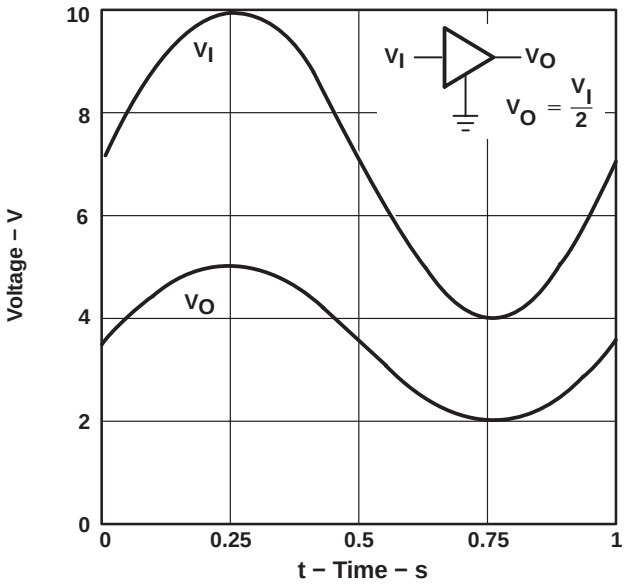
- **1/2 V_I Virtual Ground for Analog Systems**
- **Self-Contained 3-terminal TO-226AA Package**
- **Micropower Operation . . . 170 μA Typ, V_I = 5 V**
- **Wide V_I Range . . . 4 V to 40 V**
- **High Output-Current Capability**
  - **Source . . . 20 mA Typ**
  - **Sink . . . 20 mA Typ**
- **Excellent Output Regulation**
  - **−45 μV Typ at I_O = 0 to −10 mA**
  - **+15 μV Typ at I_O = 0 to +10 mA**
- **Low-Impedance Output . . . 0.0075 Ω Typ**
- **Noise Reduction Pin (D, JG, and P Packages Only)**

INPUT/OUTPUT TRANSFER CHARACTERISTICS



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 μA 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.

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	

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.

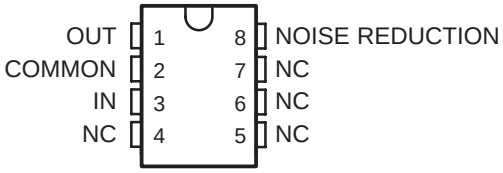
−40°C to 85°C	TLE2426ID	—	TLE2426ILP	TLE2426IP	TLE2426Y
−55°C to 125°C	TLE2426MD	TLE2426MJG	TLE2426MLP	TLE2426MP	

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.

description (continued)

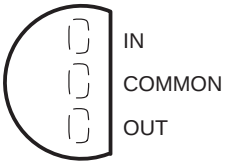
The C-suffix devices are characterized for operation from 0°C to 70°C. The I suffix devices are characterized for operation from −40°C to 85°C. The M suffix devices are characterized over the full military temperature range of −55°C to 125°C.

D, JG, OR P PACKAGE
(TOP VIEW)



NC − No internal connection

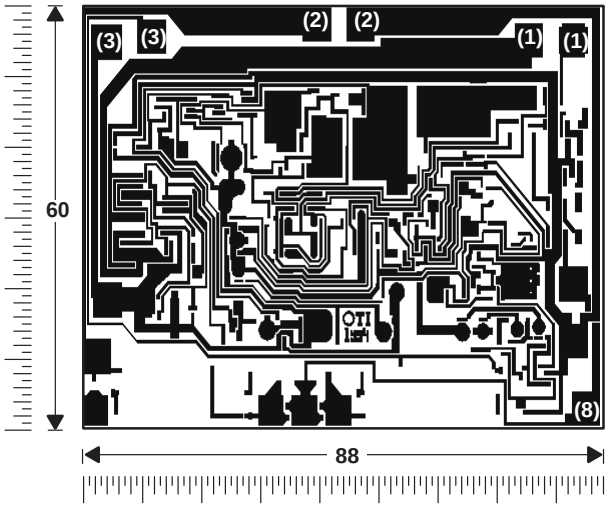
LP PACKAGE
(TOP VIEW)

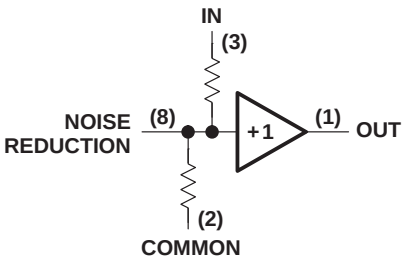


TLE2426Y chip information

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.

BONDING PAD ASSIGNMENTS





CHIP THICKNESS:
15 MILS TYPICAL

BONDING PADS:
4 × 4 MILS MINIMUM

$T_J$max = 150°C

TOLERANCES ARE ±10%.

ALL DIMENSIONS ARE IN MILS.

NOTE A: Both bonding pads numbered 1, both numbered 2, and both numbered 3, must be bonded out to the corresponding functions pin.

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	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING	$T_A = 85°C$ POWER RATING	$T_A = 125°C$ POWER RATING
D	725 mV	5.8 mW/°C	464 mW	377 mW	145 mW
JG	1050 mV	8.4 mW/°C	672 mW	546 mW	210 mW
LP	775 mV	6.2 mW/°C	496 mW	403 mW	155 mW
P	1000 mV	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

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

PARAMETER	TEST CONDITIONS		T_A†	TLE2426C			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = 4 V		25°C	1.98	2	2.02	V
	V_I = 5 V			2.48	2.5	2.52	
	V_I = 40 V			19.8	20	20.2	
	V_I = 5 V		Full range	2.475		2.525	
Temperature coefficient of output voltage			Full range		25		ppm/°C
Supply current	No load	V_I = 5 V	25°C		170	300	µA
		V_I = 4 to 40 V	Full range			400	
Output voltage regulation (sourcing current)‡	I_O = 0 to −10 mA		25°C		−45	±160	µV
			Full range			±250	
	I_O = 0 to −20 mA		25°C		−150	±450	
Output voltage regulation (sinking current)‡	I_O = 0 to 10 mA		25°C		15	±160	µV
			Full range			±250	
	I_O = 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_O = 5 V	25°C		26		mA
	Sourcing current,	V_O = 0			−47		
Output noise voltage, rms	f = 10 Hz to 10 kHz	C_{NR} = 0	25°C		120		µV
		C_{NR} = 1 µF			30		
Output voltage current step response	V_O to 0.1%, I_O = ±10 mA	C_L = 0	25°C		290		µs
		C_L = 100 pF			275		
	V_O to 0.01%, I_O = ±10 mA	C_L = 0	25°C		400		
		C_L = 100 pF			390		
Step response	V_I = 0 to 5 V, V_O to 0.1%	C_L = 100 pF	25°C		20		µs
	V_I = 0 to 5 V, V_O to 0.01%				160		

† Full range is 0°C to 70°C.
‡ The listed values are not production tested.

electrical characteristics at specified free-air temperature, V_I = 12 V, I_O = 0 (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_A†	TLE2426C			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = 4 V		25°C	1.98	2	2.02	V
	V_I = 12 V			5.95	6	6.05	
	V_I = 40 V			19.8	20	20.2	
	V_I = 12 V		Full range	5.945		6.055	
Temperature coefficient of output voltage			Full range		35		ppm/°C
Supply current	No load	V_I = 12 V	25°C		195	300	µA
		V_I = 4 to 40 V	Full range			400	
Output voltage regulation (sourcing current)‡	I_O = 0 to −10 mA		25°C		−45	±160	µV
			Full range			±250	
	I_O = 0 to −20 mA		25°C		−150	±450	
Output voltage regulation (sinking current)‡	I_O = 0 to 10 mA		25°C		15	±160	µV
			Full range			±250	
	I_O = 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_O = 12 V	25°C		31		mA
	Sourcing current,	V_O = 0			−70		
Output noise voltage, rms	f = 10 Hz to 10 kHz	C_{NR} = 0	25°C		120		µV
		C_{NR} = 1 µF			30		
Output voltage current step response	V_O to 0.1%, I_O = ±10 mA	C_L = 0	25°C		290		µs
		C_L = 100 pF			275		
	V_O to 0.01%, I_O = ±10 mA	C_L = 0	25°C		400		
		C_L = 100 pF			390		
Step response	V_I = 0 to 12 V, V_O to 0.1%	C_L = 100 pF	25°C		20		µs
	V_I = 0 to 12 V, V_O to 0.01%				120		

† Full range is 0°C to 70°C.
‡ The listed values are not production tested.

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

PARAMETER	TEST CONDITIONS		T_A†	TLE2426I			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = 4 V		25°C	1.98	2	2.02	V
	V_I = 5 V			2.48	2.5	2.52	
	V_I = 40 V			19.8	20	20.2	
	V_I = 5 V		Full range	2.47		2.53	
Temperature coefficient of output voltage			Full range		25		ppm/°C
Supply current	No load	V_I = 5 V	25°C		170	300	µA
		V_I = 4 to 40 V	Full range			400	
Output voltage regulation (sourcing current)‡	I_O = 0 to −10 mA		25°C		−45	±160	µV
			Full range			±250	
	I_O = 0 to −20 mA		25°C		−150	±450	
Output voltage regulation (sinking current)‡	I_O = 0 to 10 mA		25°C		15	±160	µV
	I_O = 0 to 8 mA		Full range			±250	
	I_O = 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_O = 5 V	25°C		26		mA
	Sourcing current,	V_O = 0			−47		
Output noise voltage, rms	f = 10 Hz to 10 kHz	C_{NR} = 0	25°C		120		µV
		C_{NR} = 1 µF			30		
Output voltage current step response	V_O to 0.1%, I_O = ±10 mA	C_L = 0	25°C		290		µs
		C_L = 100 pF			275		
	V_O to 0.01%, I_O = ±10 mA	C_L = 0	25°C		400		
		C_L = 100 pF			390		
Step response	V_I = 0 to 5 V, V_O to 0.1%	C_L = 100 pF	25°C		20		µs
	V_I = 0 to 5 V, V_O to 0.01%				160		

† Full range is −40°C to 85°C.
‡ The listed values are not production tested.

electrical characteristics at specified free-air temperature, V_I = 12 V, I_O = 0 (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_A†	TLE2426I			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = 4 V		25°C	1.98	2	2.02	V
	V_I = 12 V			5.95	6	6.05	
	V_I = 40 V			19.8	20	20.2	
	V_I = 12 V		Full range	5.935		6.065	
Temperature coefficient of output voltage			Full range		35		ppm/°C
Supply current	No load	V_I = 12 V	25°C		195	300	µA
		V_I = 4 to 40 V	Full range			400	
Output voltage regulation (sourcing current)‡	I_O = 0 to −10 mA		25°C		−45	±160	µV
			Full range			±250	
	I_O = 0 to −20 mA		25°C		−150	±450	
Output voltage regulation (sinking current)‡	I_O = 0 to 10 mA		25°C		15	±160	µV
	I_O = 0 to 8 mA		Full range			±250	
	I_O = 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_O = 12 V	25°C		31		mA
	Sourcing current,	V_O = 0			−70		
Output noise voltage, rms	f = 10 Hz to 10 kHz	C_{NR} = 0	25°C		120		µV
		C_{NR} = 1 µF			30		
Output voltage current step response	V_O to 0.1%, I_O = ±10 mA	C_L = 0	25°C		290		µs
		C_L = 100 pF			275		
	V_O to 0.01%, I_O = ±10 mA	C_L = 0	25°C		400		
		C_L = 100 pF			390		
Step response	V_I = 0 to 12 V, V_O to 0.1%	C_L = 100 pF	25°C		20		µs
	V_I = 0 to 12 V, V_O to 0.01%				120		

† Full range is −40°C to 85°C.
‡ The listed values are not production tested.

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

PARAMETER	TEST CONDITIONS		T_A†	TLE2426M			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = 4 V		25°C	1.98	2	2.02	V
	V_I = 5 V			2.48	2.5	2.52	
	V_I = 40 V			19.8	20	20.2	
	V_I = 5 V		Full range	2.465		2.535	
Temperature coefficient of output voltage			Full range		25		ppm/°C
Supply current	No load	V_I = 5 V	25°C		170	300	μA
		V_I = 4 to 40 V	Full range			400	
Output voltage regulation (sourcing current)‡	I_O = 0 to −10 mA		25°C		−45	±160	μV
			Full range			±250	
	I_O = 0 to −20 mA		25°C		−150	±450	
Output voltage regulation (sinking current)‡	I_O = 0 to 10 mA		25°C		15	±160	μV
	I_O = 0 to 3 mA		Full range			±250	
	I_O = 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_O = 5 V	25°C		26		mA
	Sourcing current,	V_O = 0			−47		
Output noise voltage, rms	f = 10 Hz to 10 kHz	C_{NR} = 0	25°C		120		μV
		C_{NR} = 1 μF			30		
Output voltage current step response	V_O to 0.1%, I_O = ±10 mA	C_L = 0	25°C		290		μs
		C_L = 100 pF			275		
	V_O to 0.01%, I_O = ±10 mA	C_L = 0	25°C		400		
		C_L = 100 pF			390		
Step response	V_I = 0 to 5 V, V_O to 0.1%	C_L = 100 pF	25°C		20		μs
	V_I = 0 to 5 V, V_O to 0.01%				120		

† Full range is −55°C to 125°C.
‡ The listed values are not production tested.

electrical characteristics at specified free-air temperature, V_I = 12 V, I_O = 0 (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_A†	TLE2426M			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = 4 V		25°C	1.98	2	2.02	V
	V_I = 12 V			5.95	6	6.05	
	V_I = 40 V			19.8	20	20.2	
	V_I = 12 V		Full range	5.925		6.075	
Temperature coefficient of output voltage			Full range		35		ppm/°C
Supply current	No load	V_I = 12 V	25°C		195	250	µA
		V_I = 4 to 40 V	Full range			350	
Output voltage regulation (sourcing current)‡	I_O = 0 to −10 mA		25°C		−45	±160	µV
			Full range			±250	
	I_O = 0 to −20 mA		25°C		−150	±450	
Output voltage regulation (sinking current)‡	I_O = 0 to 10 mA		25°C		15	±160	µV
	I_O = 0 to 8 mA		Full range			±250	
	I_O = 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_O = 12 V	25°C		31		mA
	Sourcing current,	V_O = 0			−70		
Output noise voltage, rms	f = 10 Hz to 10 kHz	C_{NR} = 0	25°C		120		µV
		C_{NR} = 1 µF			30		
Output voltage current step response	V_O to 0.1%, I_O = ±10 mA	C_L = 0	25°C		290		µs
		C_L = 100 pF			275		
	V_O to 0.01%, I_O = ±10 mA	C_L = 0	25°C		400		
		C_L = 100 pF			390		
Step response	V_I = 0 to 12 V, V_O to 0.1%	C_L = 100 pF	25°C		12		µs
	V_I = 0 to 12 V, V_O to 0.01%				120		

† Full range is −55°C to 125°C.
‡ The listed values are not production tested.

electrical characteristics at specified free-air temperature, V_I = 5 V, I_O = 0, T_A = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS		TLE2426Y			UNIT
			MIN	TYP	MAX	
Output voltage	V_I = 5 V			2.5		V
Supply current	No load			170		µA
Output voltage regulation (sourcing current)†	I_O = 0 to −10 mA			−45		µV
	I_O = 0 to −20 mA			−150		
Output voltage regulation (sinking current)†	I_O = 0 to 10 mA			15		µV
	I_O = 0 to 20 mA			65		
Output impedance				7.5		mΩ
Noise-reduction impedance				110		kΩ
Short-circuit current	Sinking current,	V_O = 5 V		26		mA
	Sourcing current,	V_O = 0		−47		
Output noise voltage, rms	f = 10 Hz to 10 kHz	C_{NR} = 0		120		µV
		C_{NR} = 1 µF		30		
Output voltage current step response	V_O to 0.1%, I_O = ±10 mA	C_L = 0		290		µs
		C_L = 100 pF		275		
	V_O to 0.01%, I_O = ±10 mA	C_L = 0		400		
		C_L = 100 pF		390		
Step response	V_I = 0 to 5 V, V_O to 0.1%	C_L = 100 pF		20		µs
	V_I = 0 to 5 V, V_O to 0.01%			160		

† The listed values are not production tested.

electrical characteristics at specified free-air temperature, V_I = 12 V, I_O = 0, T_A = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS		TLE2426Y			UNIT
			MIN	TYP	MAX	
Output voltage	V_I = 12 V			6		V
Supply current	No load			195		µA
Output voltage regulation (sourcing current)†	I_O = 0 to −10 mA			−45		µV
	I_O = 0 to −20 mA			−150		
Output voltage regulation (sinking current)†	I_O = 0 to 3 mA			15		µV
	I_O = 0 to 20 mA			65		
Output impedance				7.5		mΩ
Noise-reduction impedance				110		kΩ
Short-circuit current	Sinking current,	V_O = 12 V		31		mA
	Sourcing current,	V_O = 0		−70		
Output noise voltage, rms	f = 10 Hz to 10 kHZ	C_{NR} = 0		120		µV
		C_{NR} = 1 µF		30		
Output voltage current, step response	V_O to 0.1%, I_O = ±10 mA	C_L = 0		290		µs
		C_L = 100 pF		275		
	V_O to 0.01%, I_O = ±10 mA	C_L = 0		400		
		C_L = 100 pF		390		
Step response	V_I = 0 to 12 V, V_O to 0.1%	C_L = 100 pF		12		µs
	V_I = 0 to 12 V, V_O to 0.01%			120		

† The listed values are not production tested.

TYPICAL CHARACTERISTICS

Table Of Graphs

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Output voltage power-up response	vs Time	16
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TYPICAL CHARACTERISTICS†

DISTRIBUTION OF OUTPUT VOLTAGE

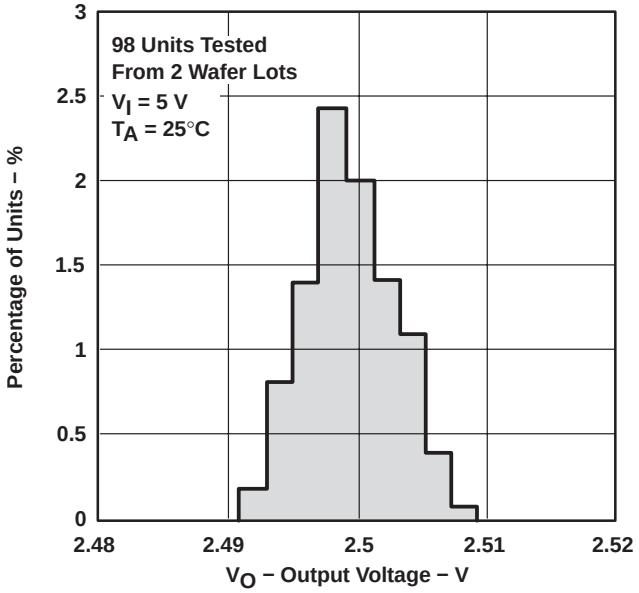


Figure 1

DISTRIBUTION OF OUTPUT VOLTAGE

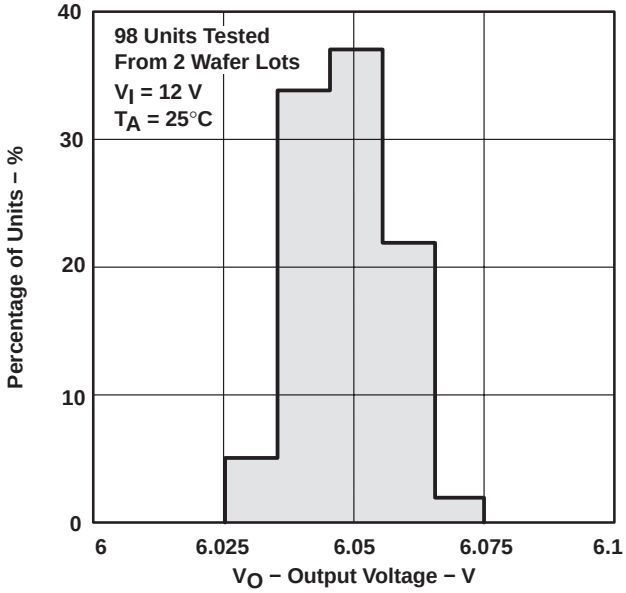


Figure 2

OUTPUT VOLTAGE CHANGE vs FREE-AIR TEMPERATURE

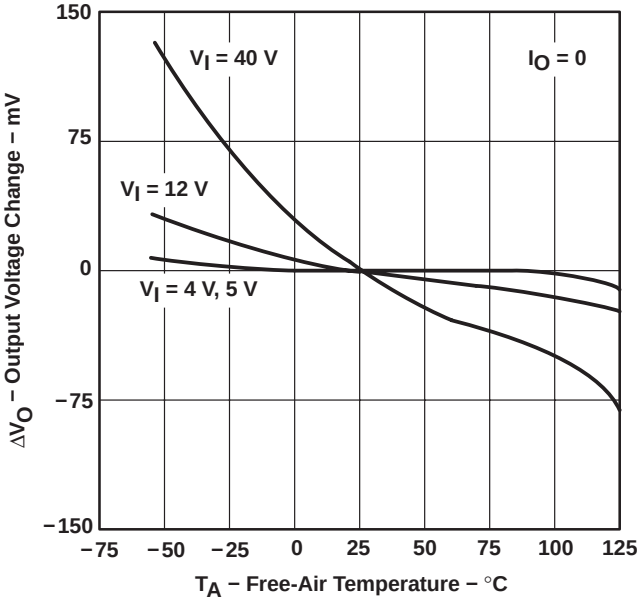


Figure 3

OUTPUT VOLTAGE ERROR vs INPUT VOLTAGE

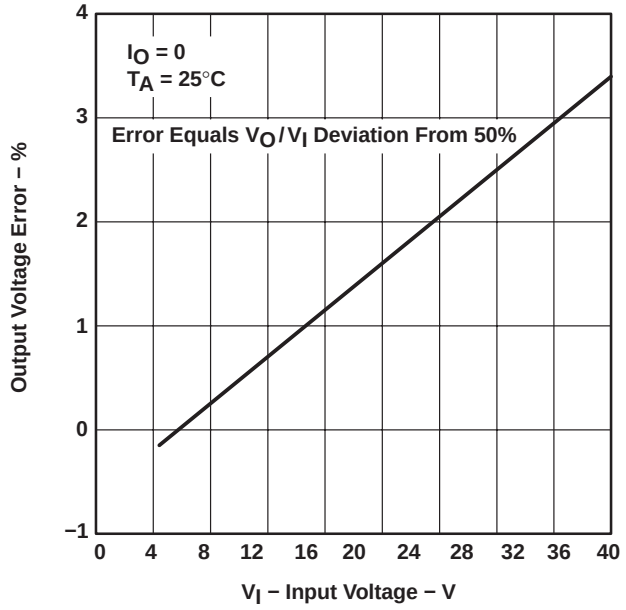


Figure 4

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

TYPICAL CHARACTERISTICS†

INPUT BIAS CURRENT vs INPUT VOLTAGE

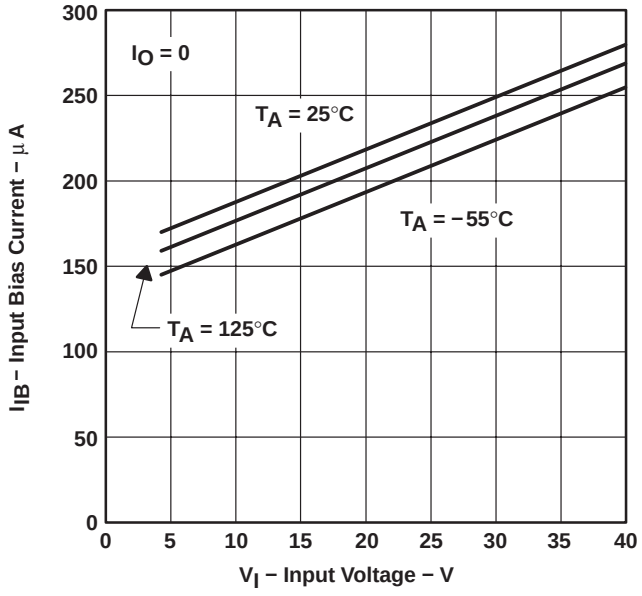


Figure 5

INPUT BIAS CURRENT vs FREE-AIR TEMPERATURE

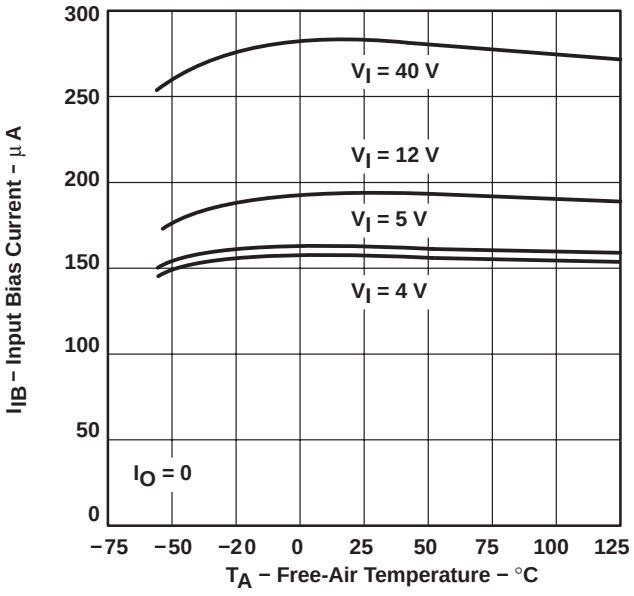


Figure 6

OUTPUT VOLTAGE REGULATION vs OUTPUT CURRENT

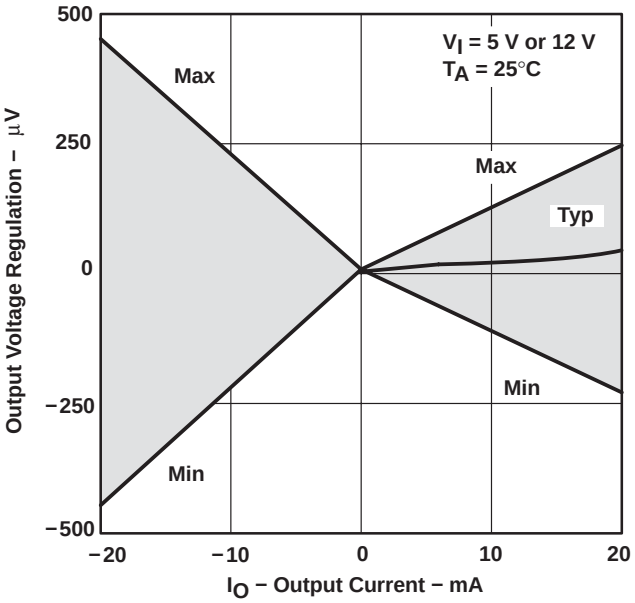


Figure 7

OUTPUT IMPEDANCE vs FREQUENCY

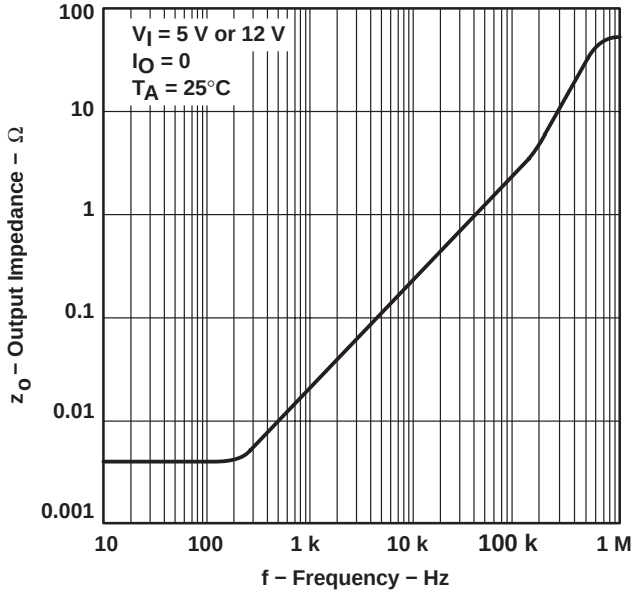


Figure 8

† 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

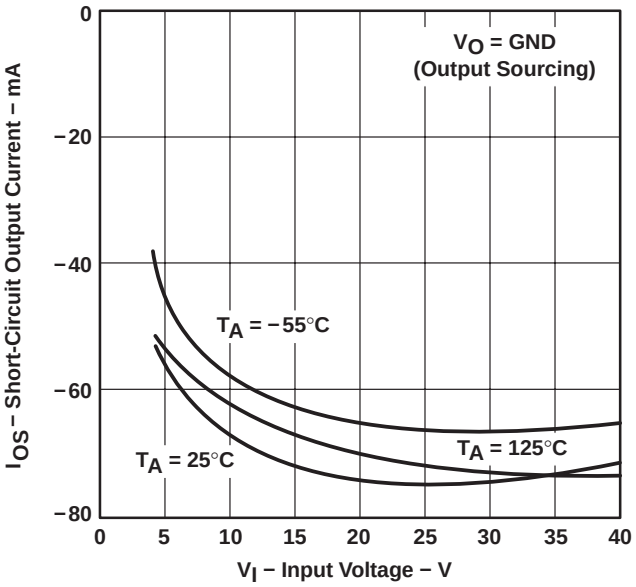


Figure 9

SHORT-CIRCUIT OUTPUT CURRENT vs INPUT VOLTAGE

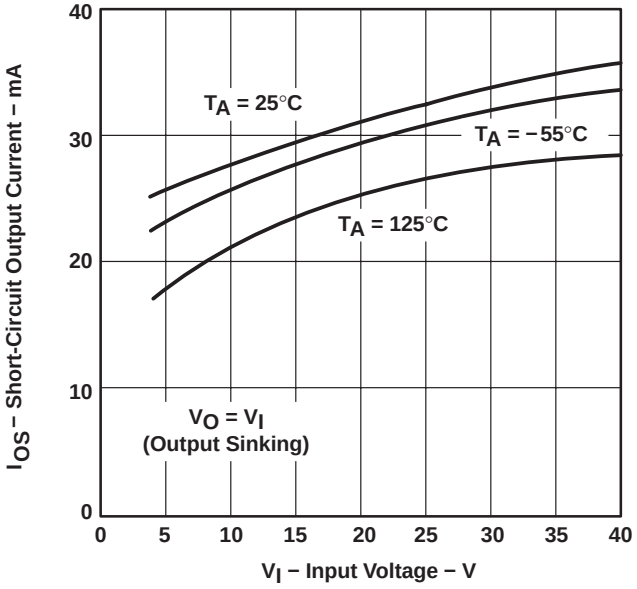


Figure 10

SHORT-CIRCUIT OUTPUT CURRENT vs FREE-AIR TEMPERATURE

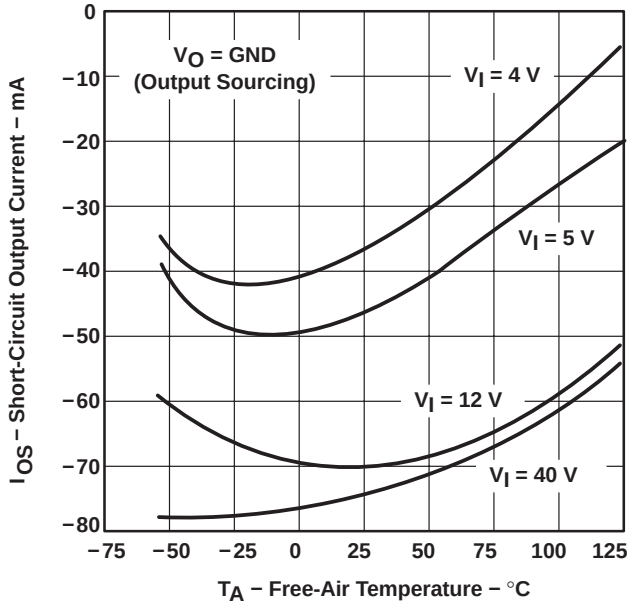


Figure 11

SHORT-CIRCUIT OUTPUT CURRENT vs FREE-AIR TEMPERATURE

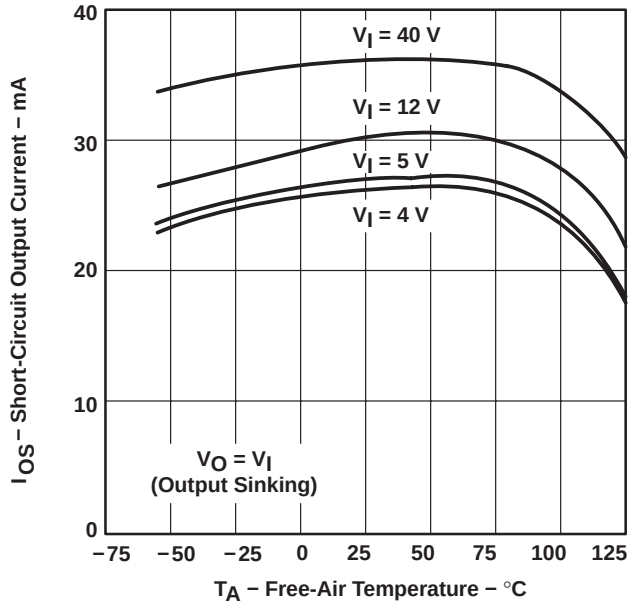


Figure 12

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

TYPICAL CHARACTERISTICS

RIPPLE REJECTION vs FREQUENCY

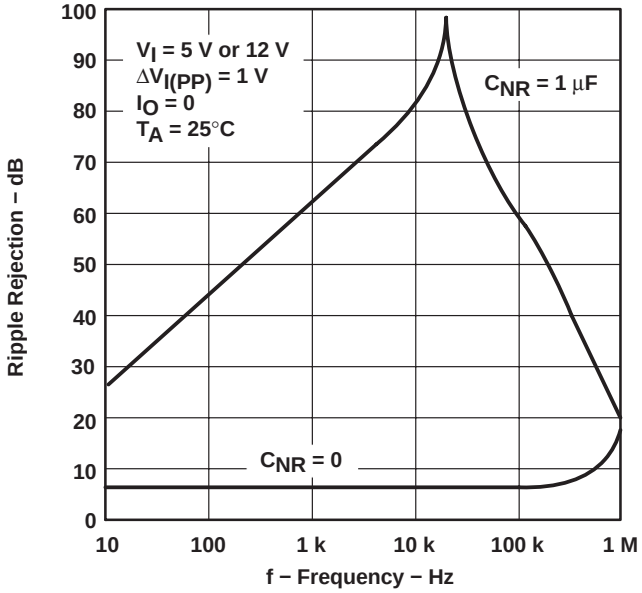


Figure 13

SPECTRAL NOISE VOLTAGE DENSITY vs FREQUENCY

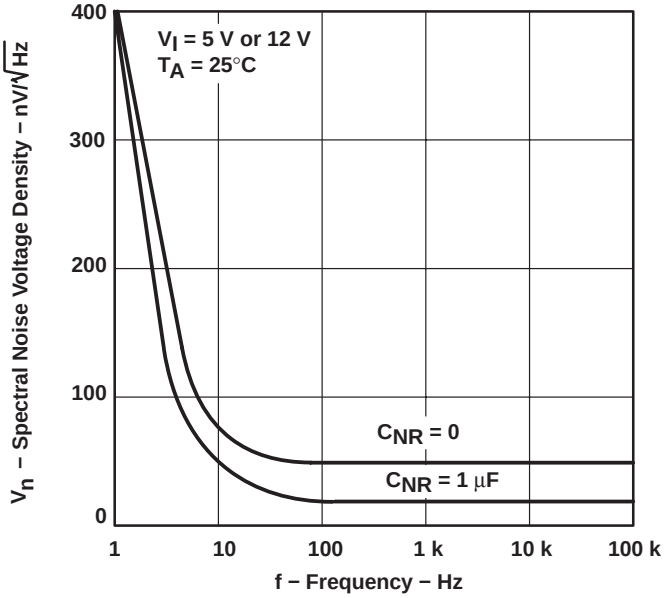


Figure 14

OUTPUT VOLTAGE RESPONSE TO OUTPUT CURRENT STEP

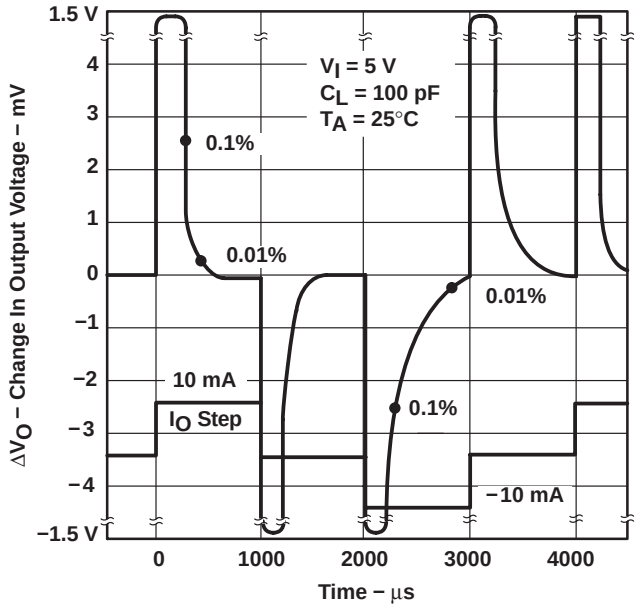


Figure 15

OUTPUT VOLTAGE POWER-UP RESPONSE

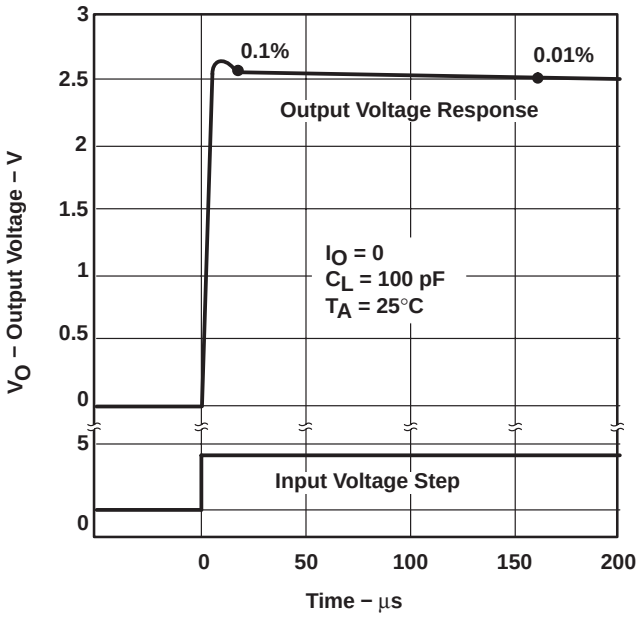


Figure 16

TYPICAL CHARACTERISTICS

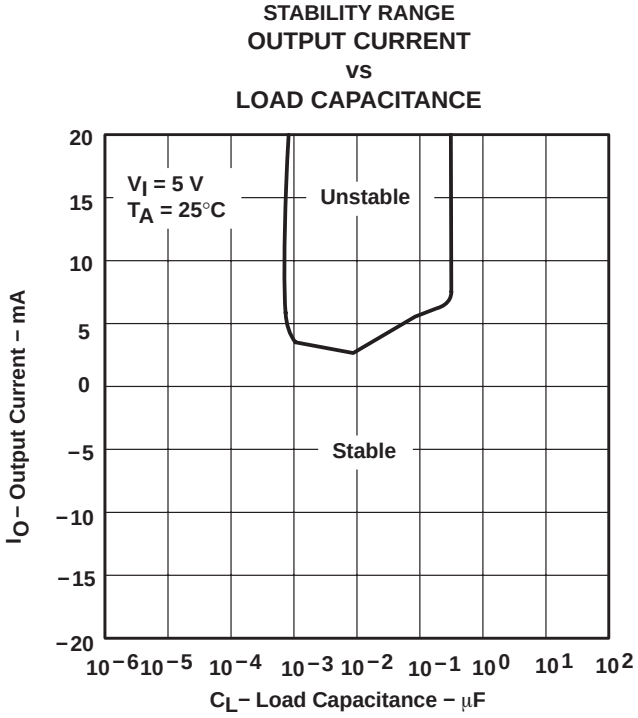


Figure 17

MACROMODEL INFORMATION

```
*   TLE2426 OPERATIONAL AMPLIFIER “MACROMODEL” SUBCIRCUIT
*   CREATED USING PARTS RELEASE 4.03 0N 08/21/90 AT 13:51
*   REV (N/A)     SUPPLY VOLTAGE: 5 V
*   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
```

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
TLE2426CD	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-	2426C
TLE2426CD.A	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	2426C
TLE2426CDG4	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	See TLE2426CD	2426C
TLE2426CDR	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-	2426C
TLE2426CDR.A	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	2426C
TLE2426CLP	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	-	2426C
TLE2426CLP.A	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	-55 to 125	2426C
TLE2426CLPE3	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	See TLE2426CLP	2426C
TLE2426CLPR	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	-	2426C
TLE2426CLPR.A	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	-55 to 125	2426C
TLE2426CP	Active	Production	PDIP (P) | 8	50 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-	TLE2426CP
TLE2426CP.A	Active	Production	PDIP (P) | 8	50 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	TLE2426CP
TLE2426ID	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-	2426I
TLE2426ID.A	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	2426I
TLE2426IDG4	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	See TLE2426ID	2426I
TLE2426IDR	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-	2426I
TLE2426IDR.A	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	2426I
TLE2426ILP	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	-	2426I
TLE2426ILP.A	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	-55 to 125	2426I
TLE2426ILPR	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	-	2426I
TLE2426ILPR.A	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	-55 to 125	2426I
TLE2426IP	Active	Production	PDIP (P) | 8	50 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-	TLE2426IP
TLE2426IP.A	Active	Production	PDIP (P) | 8	50 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	TLE2426IP
TLE2426IPE4	Active	Production	PDIP (P) | 8	50 | TUBE	Yes	NIPDAU	N/A for Pkg Type	See TLE2426IP	TLE2426IP
TLE2426MD	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	2426M
TLE2426MD.A	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	2426M

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF TLE2426 :

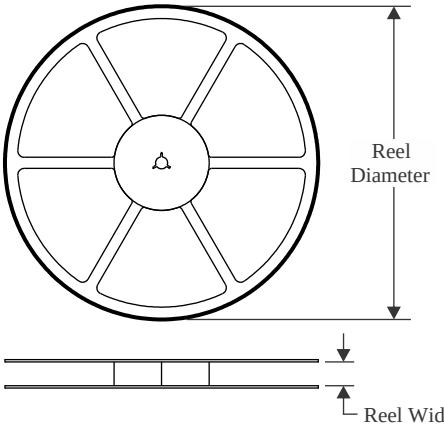
- Automotive : TLE2426-Q1
- Enhanced Product : TLE2426-EP

NOTE: Qualified Version Definitions:

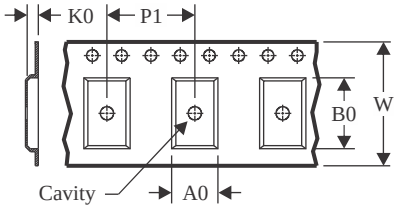
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

TAPE AND REEL INFORMATION

REEL DIMENSIONS

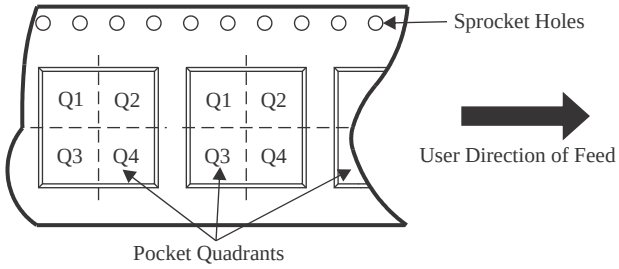


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

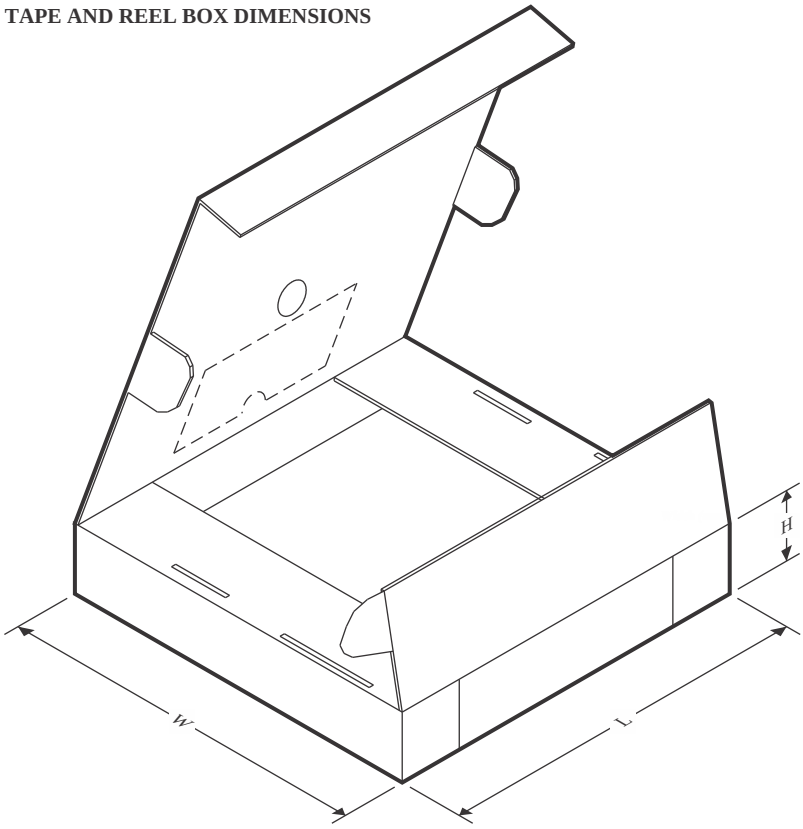
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TLE2426CDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2426IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1

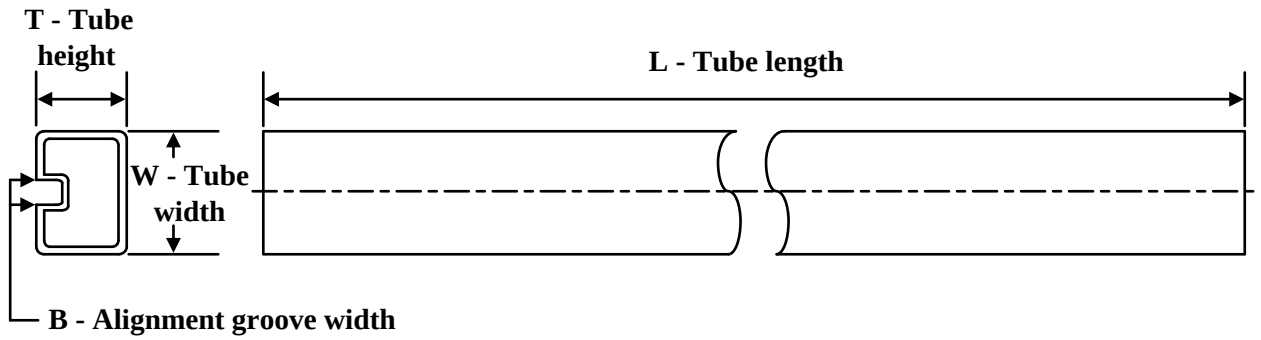
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

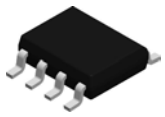
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TLE2426CDR	SOIC	D	8	2500	350.0	350.0	43.0
TLE2426IDR	SOIC	D	8	2500	350.0	350.0	43.0

TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
TLE2426CD	D	SOIC	8	75	505.46	6.76	3810	4
TLE2426CD.A	D	SOIC	8	75	505.46	6.76	3810	4
TLE2426CDG4	D	SOIC	8	75	505.46	6.76	3810	4
TLE2426CP	P	PDIP	8	50	506	13.97	11230	4.32
TLE2426CP.A	P	PDIP	8	50	506	13.97	11230	4.32
TLE2426ID	D	SOIC	8	75	505.46	6.76	3810	4
TLE2426ID.A	D	SOIC	8	75	505.46	6.76	3810	4
TLE2426IDG4	D	SOIC	8	75	505.46	6.76	3810	4
TLE2426IP	P	PDIP	8	50	506	13.97	11230	4.32
TLE2426IP.A	P	PDIP	8	50	506	13.97	11230	4.32
TLE2426IPE4	P	PDIP	8	50	506	13.97	11230	4.32
TLE2426MD	D	SOIC	8	75	505.46	6.76	3810	4
TLE2426MD.A	D	SOIC	8	75	505.46	6.76	3810	4

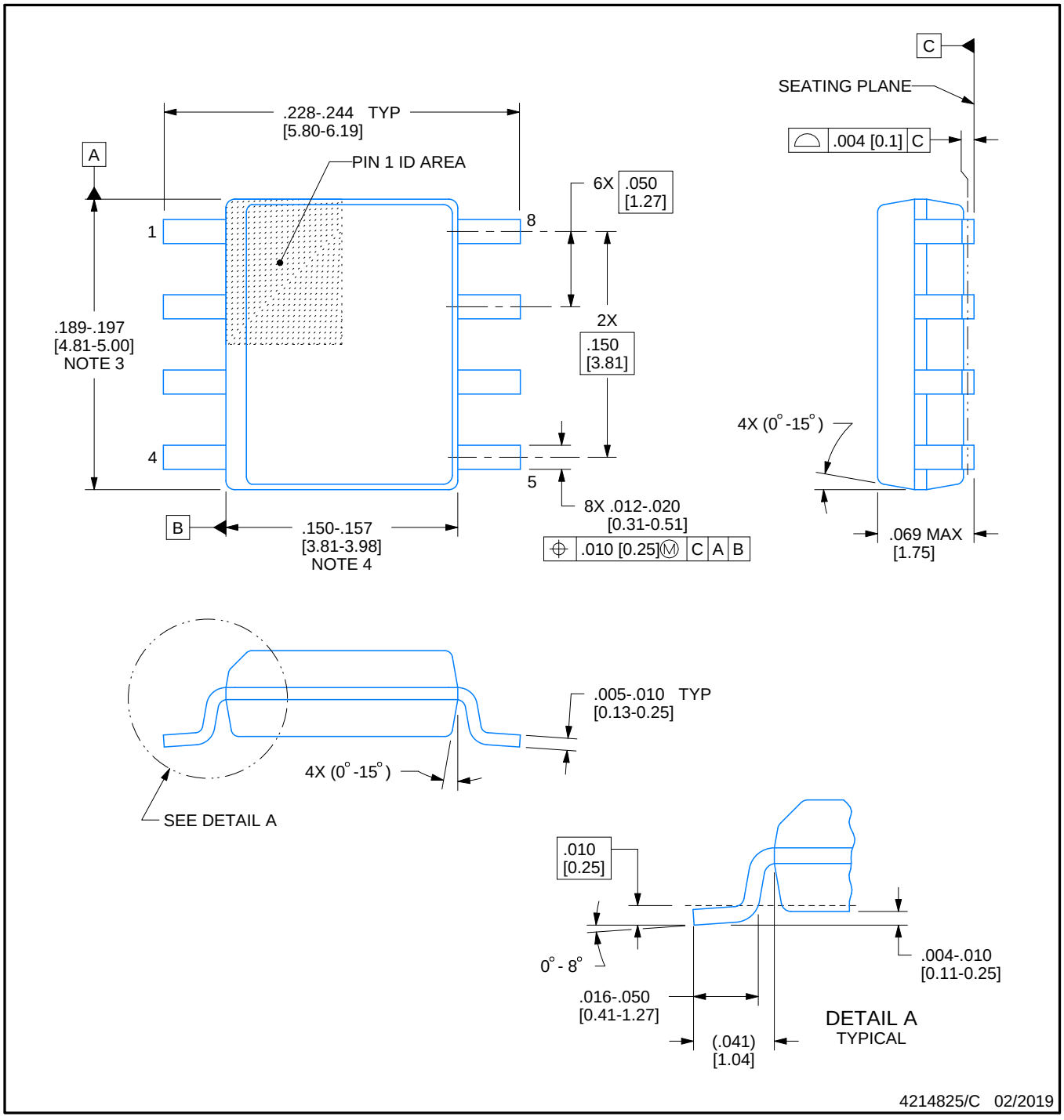


PACKAGE OUTLINE

D0008A

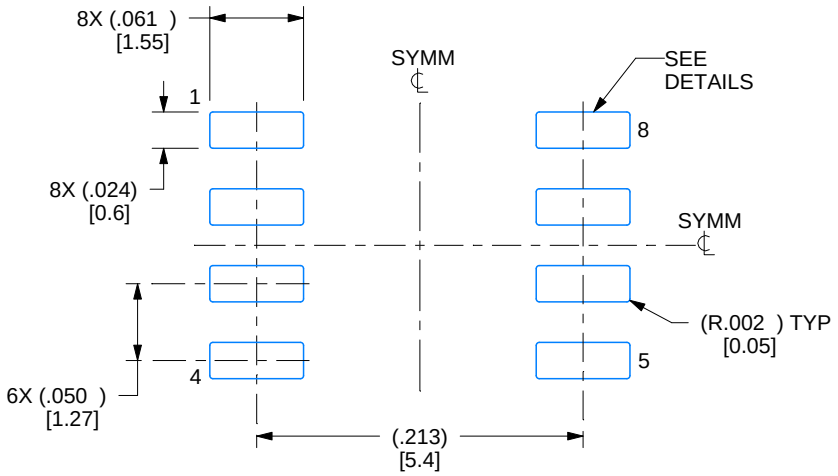
SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT

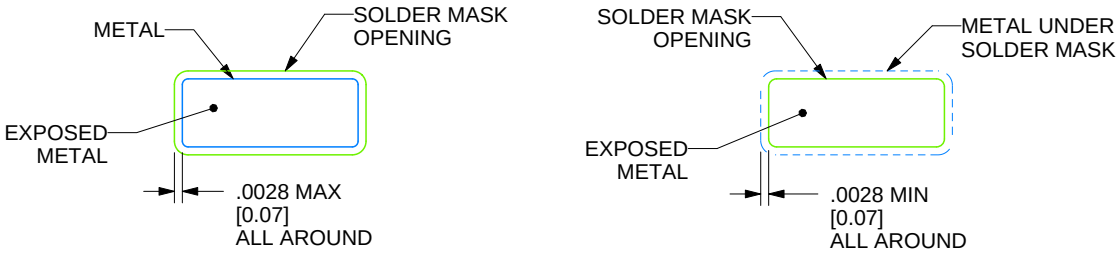


NOTES:

1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 [0.15] per side.
4. This dimension does not include interlead flash.
5. Reference JEDEC registration MS-012, variation AA.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:8X



SOLDER MASK DETAILS

4214825/C 02/2019

NOTES: (continued)

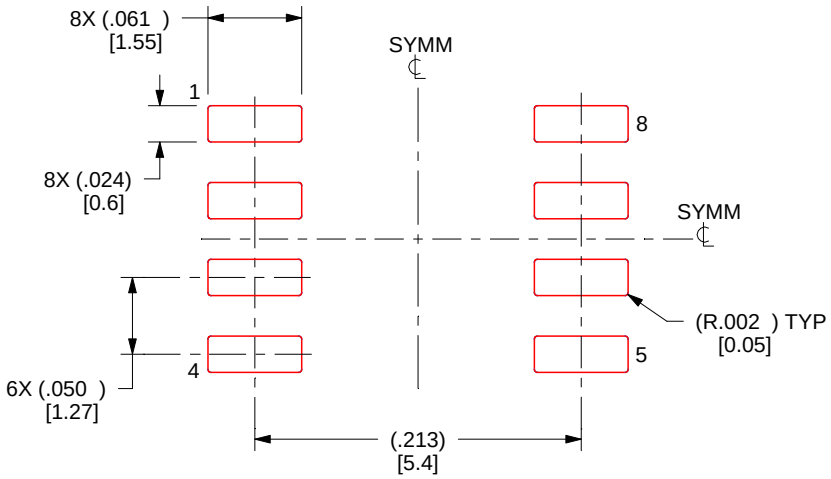
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE
BASED ON .005 INCH [0.125 MM] THICK STENCIL
SCALE:8X

4214825/C 02/2019

NOTES: (continued)

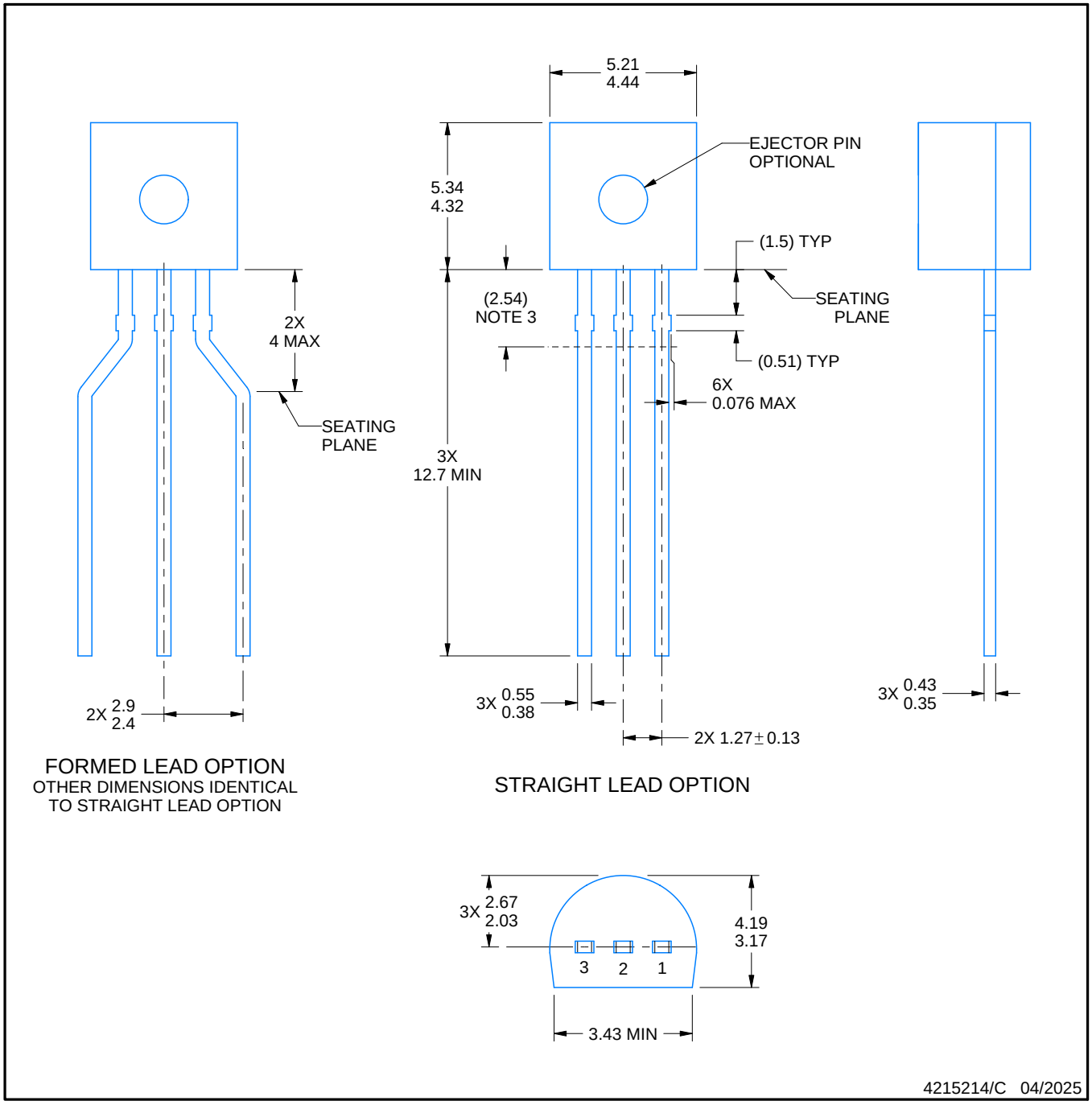
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

LP0003A

PACKAGE OUTLINE

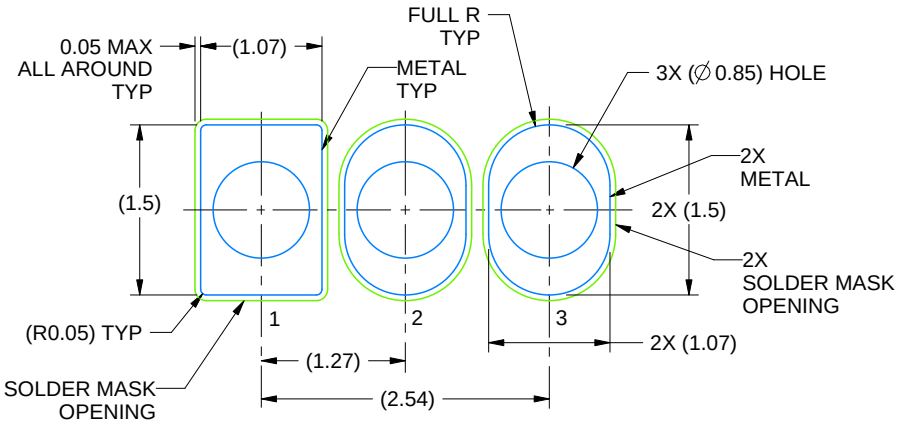
TO-92 - 5.34 mm max height

TO-92

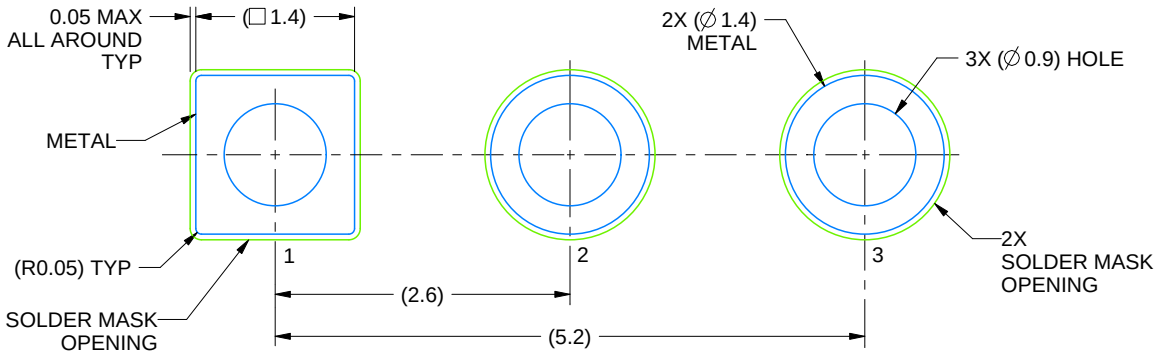


NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Lead dimensions are not controlled within this area.
4. Reference JEDEC TO-226, variation AA.
5. Shipping method:
   a. Straight lead option available in bulk pack only.
   b. Formed lead option available in tape and reel or ammo pack.
   c. Specific products can be offered in limited combinations of shipping medium and lead options.
   d. Consult product folder for more information on available options.



LAND PATTERN EXAMPLE
STRAIGHT LEAD OPTION
NON-SOLDER MASK DEFINED
SCALE:15X



LAND PATTERN EXAMPLE
FORMED LEAD OPTION
NON-SOLDER MASK DEFINED
SCALE:15X

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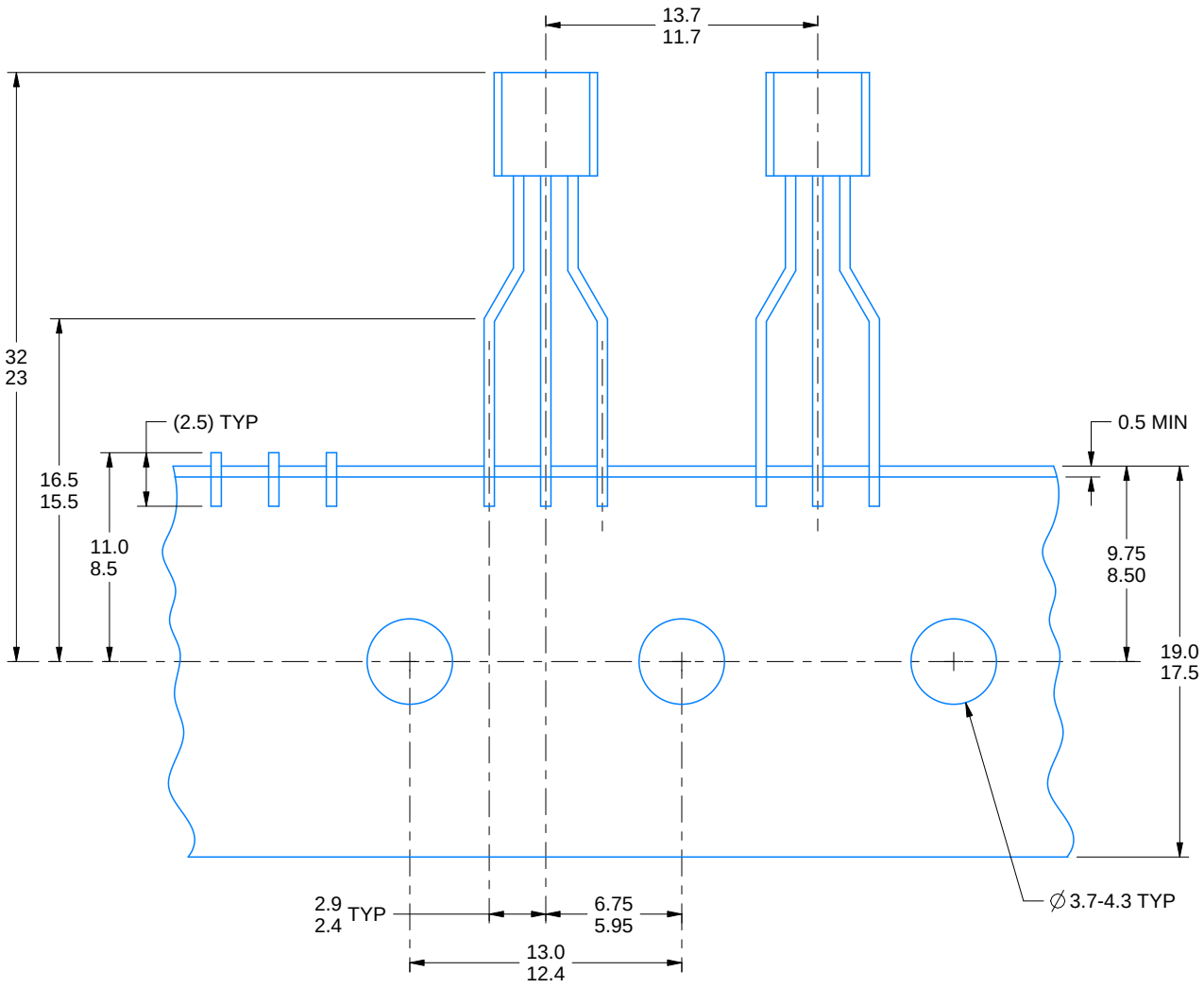
LP0003A

TO-92 - 5.34 mm max height

TO-92



FOR FORMED LEAD OPTION PACKAGE

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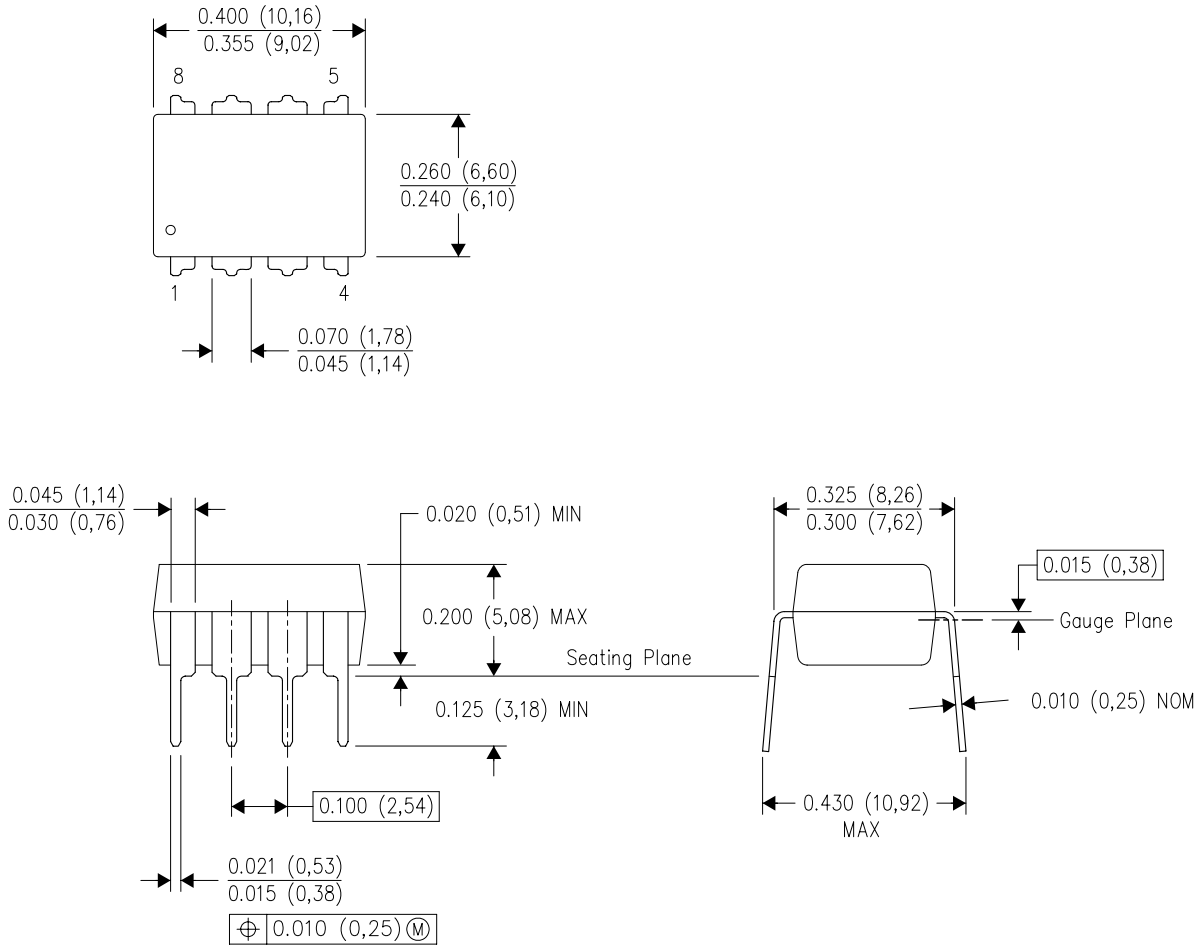
P (R–PDIP–T8) PLASTIC DUAL–IN–LINE PACKAGE



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

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