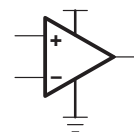


TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625 FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY OPERATIONAL AMPLIFIERS WITH SHUTDOWN

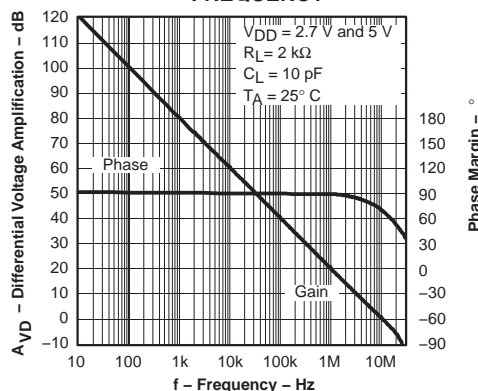
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- CMOS Rail-To-Rail Output
- V_{ICR} Includes Positive Rail
- Wide Bandwidth . . . 11 MHz
- Slew Rate . . . 10 V/ μ s
- Supply Current . . . 800 μ A/Channel
- Input Noise Voltage . . . 27 nV/ $\sqrt{\text{Hz}}$
- Ultralow Power-Down Mode
 - $I_{DD}(\text{SHDN}) = 4 \mu\text{A/Channel}$
- Supply Voltage Range . . . 2.7 V to 5.5 V
- Specified Temperature Range
 - -40 C to 125 C . . . Industrial Grade
- Ultrasmall Packaging
 - 5 or 6 Pin SOT-23 (TLV2620/1)
 - 8 or 10 Pin MSOP (TLV2622/3)
- Universal Opamp EVM (See SLOU060 for More Information)

Operational Amplifier



DIFFERENTIAL VOLTAGE AMPLIFICATION AND PHASE
vs
FREQUENCY



description

The TLV262x single supply operational amplifiers provide rail-to-rail output with an input range that includes the positive rail. The TLV262x takes the minimum operating supply voltage down to 2.7 V over the extended industrial temperature range (-40°C to 125°C) while adding the rail-to-rail output swing feature. The TLV262x also provides 11-MHz bandwidth from only 800 μA of supply current. The maximum recommended supply voltage is 5.5 V, which, when coupled with a 2.7-V minimum, allows the devices to be operated from lithium ion cells.

The combination of wide bandwidth, low noise, and low distortion makes it ideal for high speed and high resolution data converter applications. The positive input range allows it to directly interface to positive rail referred systems.

All members are available in PDIP and SOIC with the singles in the small SOT-23 package, duals in the MSOP, and quads in the TSSOP package.

The 2.7-V operation makes it compatible with Li-Ion powered systems and the operating supply voltage range of many micro-power micro-controllers available today including TI's MSP430.

AMPLIFIER SELECTION TABLE

DEVICE	V_{DD} [V]	I_{DD}/ch [μA]	V_{IO} [μV]	I_{IB} [pA]	V_{ICR} [V]	GBW [MHz]	SLEW RATE [V/ μs]	V_n , 1 kHz [nV/ $\sqrt{\text{Hz}}$]	I_O [mA]	SHUT-DOWN
TLV262x	2.7–5.5	750	250	1	1 V to $V_{DD} + 0.2$	11	10	27	28	Y
TLV263x	2.7–5.5	750	250	1	GND to $V_{DD} - 0.8$	10	9	27	28	Y
TLV278x	1.8–3.6	650	250	2.5	-0.2 to $V_{DD} + 0.2$	8	5	9	10	Y
TLC07x	4.5 – 16	1900	60	1.5	0.5 to $V_{DD} - 0.8$	10	19	7	55	Y
TLC08x	4.5 – 16	1900	60	3	GND to $V_{DD} - 1$	10	19	8.5	55	Y



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
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TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625 FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY OPERATIONAL AMPLIFIERS WITH SHUTDOWN

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TLV2620 and TLV2621 AVAILABLE OPTIONS

T _A	V _{IO} max AT 25°C	PACKAGED DEVICES			
		SMALL OUTLINE (D)†	SOT-23		PLASTIC DIP (P)
			(DBV)‡	SYMBOL	
-40°C to 125°C	3500 µV	TLV2620ID TLV2621ID	TLV2620IDBV TLV2621IDBV	VBAI VBBI	TLV2620IP TLV2621IP

† This package is available taped and reeled. To order this packaging option, add an R suffix to the part number (e.g., TLV2620IDR).

‡ The SOT23 package devices are only available taped and reeled. The R Suffix denotes quantities (3,000 pieces per reel). For smaller quantities (250 pieces per mini-reel), add a T suffix to the part number (e.g. TLV2620IDBVT).

TLV2622 and TLV2623 AVAILABLE OPTIONS

T _A	V _{IO} max AT 25°C	PACKAGED DEVICES						
		SMALL OUTLINE† (D)	MSOP				PLASTIC DIP (N)	PLASTIC DIP (P)
			(DGK)†	SYMBOL	(DGS)†	SYMBOL		
-40°C to 125°C	3500 µV	TLV2622ID TLV2623ID	TLV2622IDGK —	xxTIAKM —	— TLV2623IDGS	— xxTIALC	— TLV2623IN	TLV2622IP —

† This package is available taped and reeled. To order this packaging option, add an R suffix to the part number (e.g., TLV2622IDR).

TLV2624 and TLV2625 AVAILABLE OPTIONS

T _A	V _{IO} max AT 25°C	PACKAGED DEVICES		
		SMALL OUTLINE (D)†	PLASTIC DIP (N)	TSSOP (PW)
-40°C to 125°C	3500 µV	TLV2624ID TLV2625ID	TLV2624IN TLV2625IN	TLV2624IPW TLV2625IPW

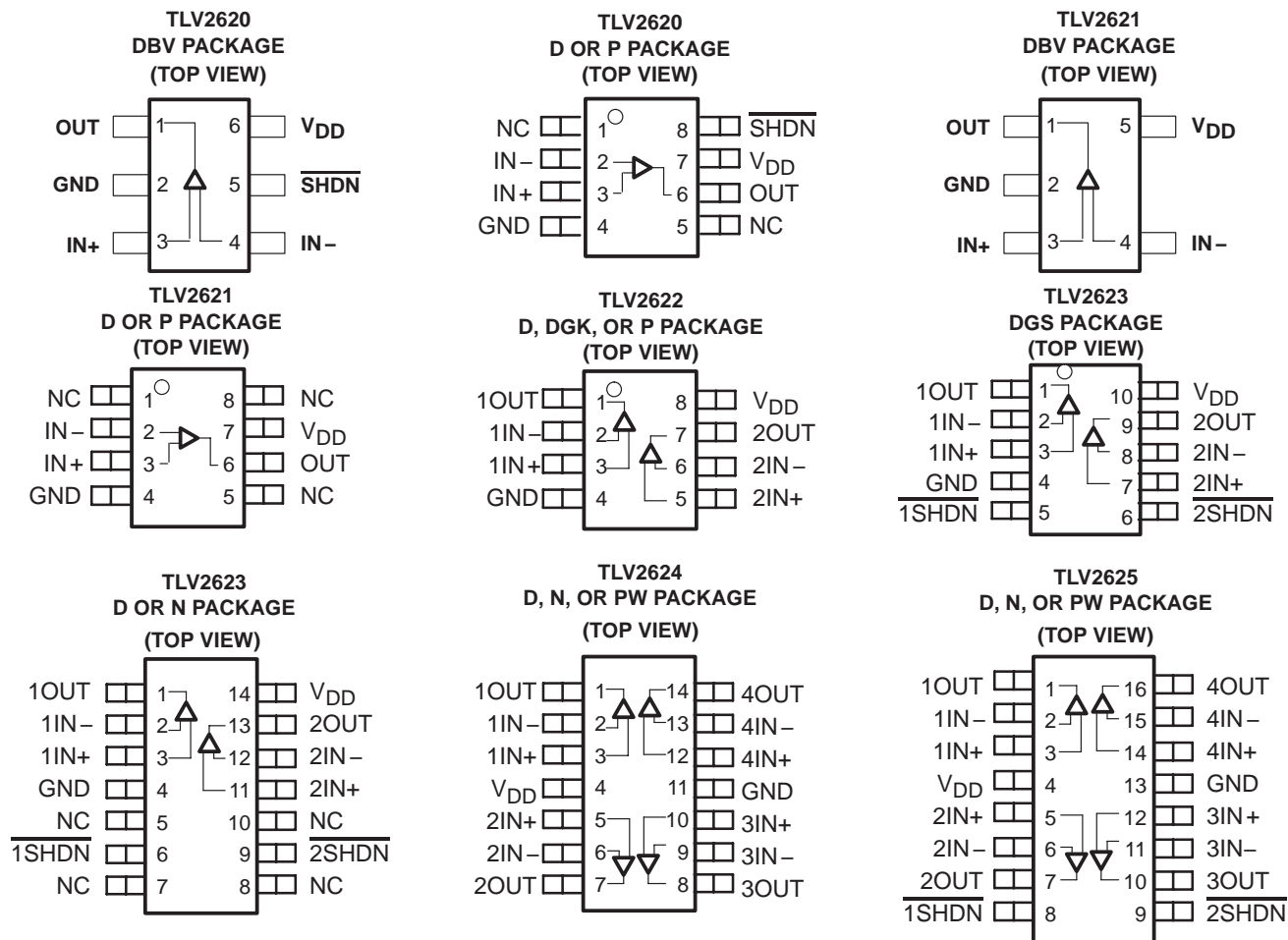
† This package is available taped and reeled. To order this packaging option, add an R suffix to the part number (e.g., TLV2624IDR).



TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625 FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY OPERATIONAL AMPLIFIERS WITH SHUTDOWN

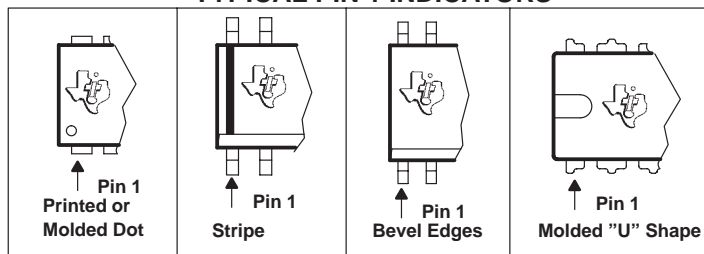
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TLV262x PACKAGE PINOUTS(1)



NC – No internal connection
 (1) SOT-23 may or may not be indicated

TYPICAL PIN 1 INDICATORS



TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625 FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY OPERATIONAL AMPLIFIERS WITH SHUTDOWN

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

Supply voltage, V_{DD} (see Note 1)	6 V
Differential input voltage, V_{ID}	$\pm V_{DD}$
Input voltage range, V_I (see Note 1)	1 to $V_{DD} + 0.2$ V
Input current, I_I (any input)	± 10 mA
Output current, I_O	± 40 mA
Continuous total power dissipation	See Dissipation Rating Table
Operating free-air temperature range, T_A : I suffix	-40°C to 125°C
Maximum junction temperature, T_J	150°C
Storage temperature range, T_{stg}	-65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°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: All voltage values, except differential voltages, are with respect to GND.

DISSIPATION RATING TABLE

PACKAGE	θ_{JC} ($^\circ\text{C}/\text{W}$)	θ_{JA} ($^\circ\text{C}/\text{W}$)	$T_A \leq 25^\circ\text{C}$ POWER RATING	$T_A = 125^\circ\text{C}$ POWER RATING
D (8)	38.3	176	710 mW	142 mW
D (14)	26.9	122.3	1022 mW	204.4 mW
D (16)	25.7	114.7	1090 mW	218 mW
DBV (5)	55	324.1	385 mW	77.1 mW
DBV (6)	55	294.3	425 mW	85 mW
DGK (8)	54.2	259.9	481 mW	96.1 mW
DGS (10)	54.1	259.7	485 mW	97 mW
N (14, 16)	32	78	1600 mW	320.5 mW
P (8)	41	104	1200 mW	240.4 mW
PW (14)	29.3	173.6	720 mW	144 mW
PW (16)	28.7	161.4	774 mW	154.9 mW

recommended operating conditions

		MIN	MAX	UNIT
Supply voltage, V_{DD}	Single supply	2.7	5.5	V
	Split supply	± 1.35	± 2.75	
Common-mode input voltage range, V_{ICR}		1	$V_{DD} + 0.2$	V
Operating free-air temperature, T_A	I-suffix	-40	125	$^\circ\text{C}$
Shutdown on/off voltage level‡	V_{IL}		0.4	V
	V_{IH}	2		

‡ Relative to GND.



TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625
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OPERATIONAL AMPLIFIERS WITH SHUTDOWN

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electrical characteristics at specified free-air temperature, $V_{DD} = 2.7\text{ V}, 5\text{ V}$ (unless otherwise noted)

dc performance

PARAMETER		TEST CONDITIONS	T_A	MIN	TYP	MAX	UNIT
V_{IO} Input offset voltage		$V_{IC} = V_{DD}/2, V_O = V_{DD}/2,$ $R_S = 50\ \Omega$	25°C		250	3500	μV
			Full range			4500	
α_{VIO} Temperature coefficient of input offset voltage			25°C		3		$\mu\text{V}/^\circ\text{C}$
CMRR Common-mode rejection ratio		$V_{IC} = 1\text{ to }V_{DD},$ $R_S = 50\ \Omega$	$V_{DD} = 2.7\text{ V}$	25°C	77	98	dB
				Full range		63	
			$V_{DD} = 5\text{ V}$	25°C	78	99	
				Full range		75	
A_{VD} Large-signal differential voltage amplification			25°C	$V_{DD} = 2.7\text{ V}, R_L = 2\text{ k}\Omega,$ $V_{O(PP)} = 1.7\text{ V}$	90	100	dB
				Full range		82	
			$V_{DD} = 5\text{ V}, R_L = 2\text{ k}\Omega,$ $V_{O(PP)} = 4\text{ V}$	25°C	95	100	
				Full range		90	

input characteristics

PARAMETER		TEST CONDITIONS	T_A^\dagger	MIN	TYP	MAX	UNIT
I_{IO} Input offset current		$V_{IC} = V_{DD}/2, V_O = V_{DD}/2,$ $R_S = 50\ \Omega$	25°C		2	50	pA
			Full range			100	
I_{IB} Input bias current			25°C		2	50	
			Full range			200	
$r_{i(d)}$ Differential input resistance			25°C		100		$\text{G}\Omega$
$C_{i(c)}$ Common-mode input capacitance		$f = 1\text{ kHz}$	25°C		8		pF

† Full range is -40°C to 125°C for the I suffix.



TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625
FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY
OPERATIONAL AMPLIFIERS WITH SHUTDOWN

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electrical characteristics at specified free-air temperature, $V_{DD} = 2.7\text{ V}, 5\text{ V}$ (unless otherwise noted)
 (continued)

output characteristics

PARAMETER	TEST CONDITIONS	T_A †	MIN	TYP	MAX	UNIT
V_{OH} High-level output voltage	$V_{IC} = V_{DD}/2, I_{OH} = -1\text{ mA}$	$V_{DD} = 2.7\text{ V}$	25°C	2.6	2.67	V
			Full range	2.55		
		$V_{DD} = 5\text{ V}$	25°C	4.95	4.98	
			Full range	4.9		
	$V_{IC} = V_{DD}/2, I_{OH} = -10\text{ mA}$	$V_{DD} = 2.7\text{ V}$	25°C	2.3	2.43	
			Full range	2.2		
		$V_{DD} = 5\text{ V}$	25°C	4.7	4.8	
			Full range	4.6		
V_{OL} Low-level output voltage	$V_{IC} = V_{DD}/2, I_{OL} = 1\text{ mA}$	$V_{DD} = 2.7\text{ V}$	25°C	0.03	0.1	mV
			Full range		0.15	
		$V_{DD} = 5\text{ V}$	25°C	0.025	0.05	
			Full range		0.1	
	$V_{IC} = V_{DD}/2, I_{OL} = 10\text{ mA}$	$V_{DD} = 2.7\text{ V}$	25°C	0.26	0.4	
			Full range		0.45	
		$V_{DD} = 5\text{ V}$	25°C	0.2	0.25	
			Full range		0.35	
I_O Output current	$V_{DD} = 2.7\text{ V},$ $V_O = 0.5\text{ V}$ from rail	Sourcing	25°C	14	mA	
		Sinking		19		
	$V_{DD} = 5\text{ V},$ $V_O = 0.5\text{ V}$ from rail	Sourcing		28		
		Sinking		28		
I_{OS} Short-circuit output current	Sourcing	$V_{DD} = 2.7\text{ V}$	25°C	50	mA	
		$V_{DD} = 5\text{ V}$		95		
	Sinking	$V_{DD} = 2.7\text{ V}$		50		
		$V_{DD} = 5\text{ V}$		95		

† Full range is -40°C to 125°C for the I suffix.

power supply

PARAMETER	TEST CONDITIONS	T_A †	MIN	TYP	MAX	UNIT
I_{DD} Supply current (per channel)	$V_O = V_{DD}/2, \overline{\text{SHDN}} = V_{DD}$	25°C	800	1000	μA	
		Full range		1300		
PSRR Supply voltage rejection ratio ($\Delta V_{DD} / \Delta V_{IO}$)	$V_{DD} = 2.7\text{ V}$ to $3.3\text{ V},$ $V_{IC} = V_{DD}/2$	No load	25°C	80	98	dB
			Full range	75		
	$V_{DD} = 2.7\text{ V}$ to $5\text{ V},$ $V_{IC} = V_{DD}/2$	25°C	75	90		
		Full range	70			

† Full range is -40°C to 125°C for the I suffix.



TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625
FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY
OPERATIONAL AMPLIFIERS WITH SHUTDOWN

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electrical characteristics at specified free-air temperature, $V_{DD} = 2.7\text{ V}, 5\text{ V}$ (unless otherwise noted)
 (continued)

dynamic performance

PARAMETER		TEST CONDITIONS		T_A †	MIN	TYP	MAX	UNIT
UGBW	Unity gain bandwidth	$R_L = 2\text{ k}\Omega$,	$C_L = 10\text{ pF}$	25°C		11		MHz
SR+	Positive slew rate at unity gain	$R_L = 2\text{ k}\Omega$, $C_L = 50\text{ pF}$	$V_{DD} = 2.7\text{ V}$, $V_{O(PP)} = 1.7\text{ V}$	25°C	3.5	4.5		V/ μ s
				Full range	2.7			
				25°C	5.4	7		
				Full Range	3.4			
SR-	Negative slew rate at unity gain	$R_L = 2\text{ k}\Omega$, $C_L = 50\text{ pF}$	$V_{DD} = 2.7\text{ V}$, $V_{O(PP)} = 1.7\text{ V}$	25°C	2.7	5		V/ μ s
				Full range	2.3			
				25°C	4.5	6		
				Full range	3.2			
ϕ_m	Phase margin	$R_L = 2\text{ k}\Omega$,	$C_L = 10\text{ pF}$	25°C	63°			
	Gain margin				8		dB	

† Full range is -40°C to 125°C for the I suffix.

noise/distortion performance

PARAMETER		TEST CONDITIONS		T_A	MIN	TYP	MAX	UNIT
THD + N	Total harmonic distortion plus noise	$V_{O(PP)} = V_{DD}/2$, $R_L = 2\text{ k}\Omega$, $f = 10\text{ kHz}$	$A_V = 1$	25°C	0.002%			
			$A_V = 10$		0.019%			
			$A_V = 100$		0.095%			
V_n	Equivalent input noise voltage	$f = 1\text{ kHz}$ $f = 10\text{ kHz}$		25°C	53		nV/ $\sqrt{\text{Hz}}$	
					27			
I_n	Equivalent input noise current	$f = 1\text{ kHz}$		25°C	0.9		fA/ $\sqrt{\text{Hz}}$	

shutdown characteristics

PARAMETER		TEST CONDITIONS		T_A †	MIN	TYP	MAX	UNIT
$I_{DD(SHDN)}$	Supply current, per channel in shut-down mode (TLV2620, TLV2623, TLV2625)	$\overline{\text{SHDN}} = 0.4\text{ V}$		25°C	4	11		μA
				Full range	13			
$t_{(on)}$	Amplifier turnon time‡	$R_L = 2\text{ k}\Omega$	$V_{DD} = 2.7\text{ V}$	25°C	4.5			μs
			$V_{DD} = 5\text{ V}$		1.5			
$t_{(off)}$	Amplifier turnoff time‡				200			ns

† Full range is -40°C to 125°C for the I suffix.

‡ Disable time and enable time are defined as the interval between application of the logic signal to $\overline{\text{SHDN}}$ and the point at which the supply current has reached half its final value.



TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625
FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY
OPERATIONAL AMPLIFIERS WITH SHUTDOWN

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TYPICAL CHARACTERISTICS

Table of Graphs

			FIGURE
V_{IO}	Input offset voltage	vs Common-mode input voltage	1, 2
CMRR	Common-mode rejection ratio	vs Frequency	3
V_{OH}	High-level output voltage	vs High-level output current	4, 6
V_{OL}	Low-level output voltage	vs Low-level output current	5, 7
I_{DD}	Supply current	vs Supply voltage	8
I_{DD}	Supply current	vs Free-air temperature	9
PSRR	Power supply rejection ratio	vs Frequency	10
A_{VD}	Differential voltage amplification & phase	vs Frequency	11
	Gain-bandwidth product	vs Free-air temperature	12
SR	Slew rate	vs Supply voltage	13
		vs Free-air temperature	14, 15
ϕ_m	Phase margin	vs Load capacitance	16
V_n	Equivalent input noise voltage	vs Frequency	17
	Voltage-follower large-signal pulse response		18
	Voltage-follower small-signal pulse response		19
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$I_{DD(SHDN)}$	Shutdown supply current	vs Free-air temperature	21
$I_{DD(SHDN)}$	Shutdown supply current	vs Supply voltage	22
$I_{DD(SHDN)}$	Shutdown supply current/output voltage	vs Time	23



TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625 FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY OPERATIONAL AMPLIFIERS WITH SHUTDOWN

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TYPICAL CHARACTERISTICS

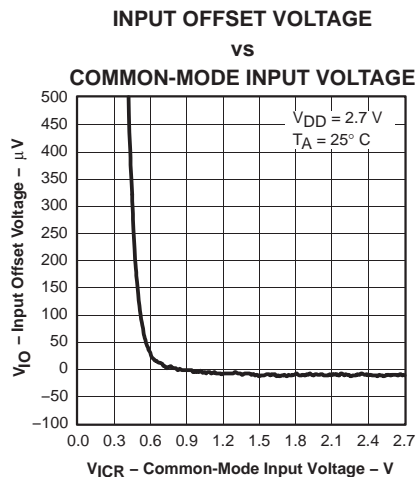


Figure 1

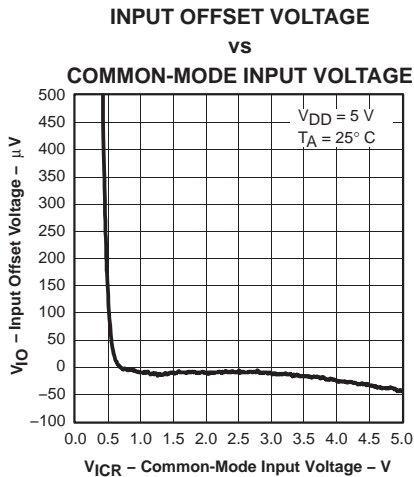


Figure 2

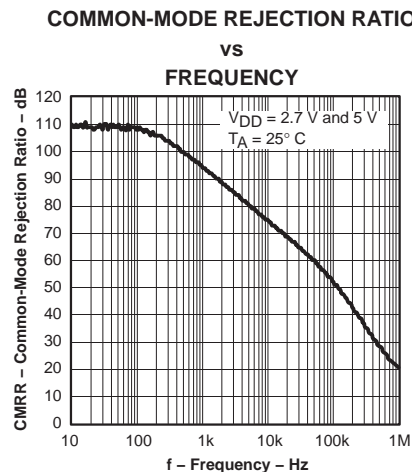


Figure 3

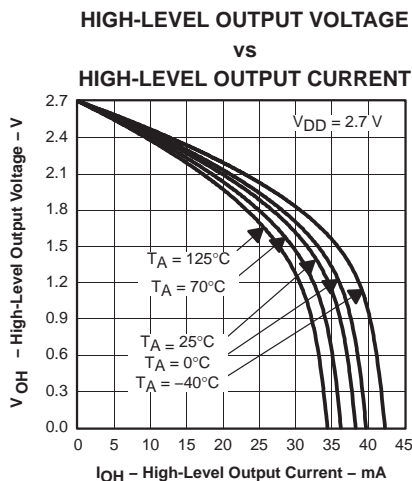


Figure 4

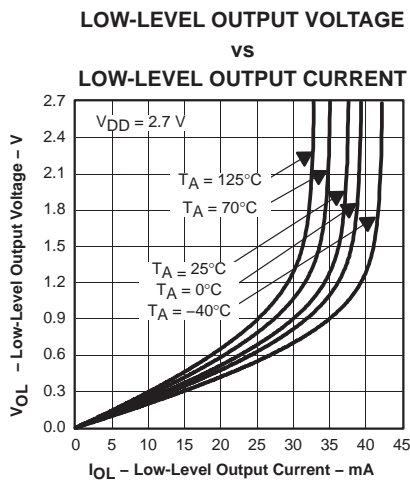


Figure 5

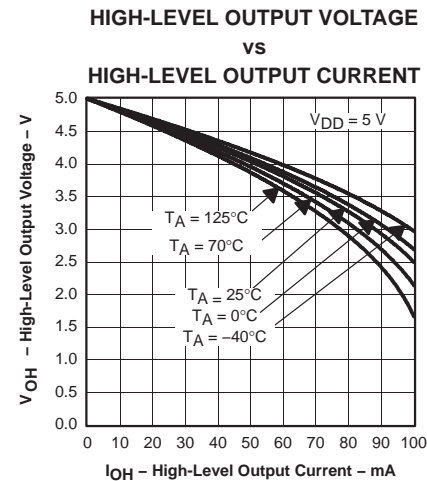


Figure 6

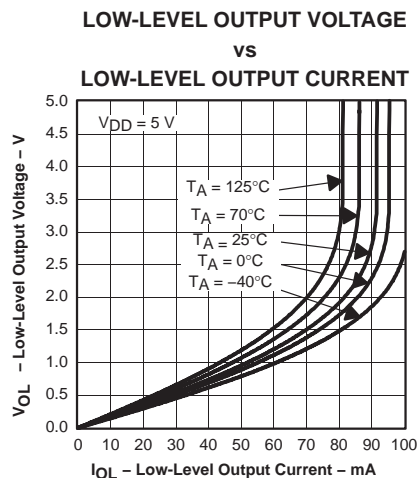


Figure 7

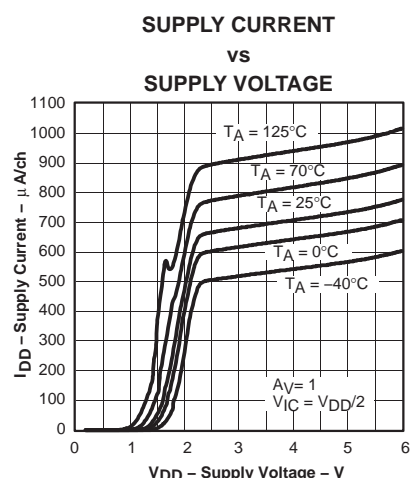


Figure 8

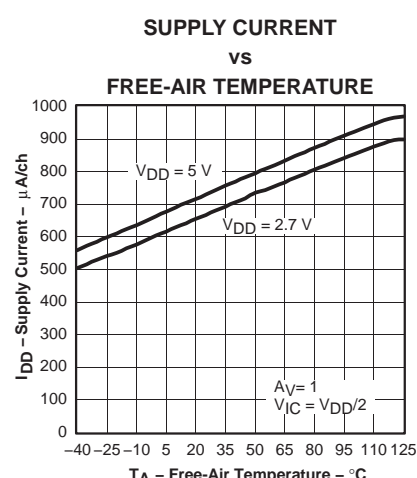


Figure 9

TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625 FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY OPERATIONAL AMPLIFIERS WITH SHUTDOWN

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TYPICAL CHARACTERISTICS

POWER SUPPLY REJECTION RATIO

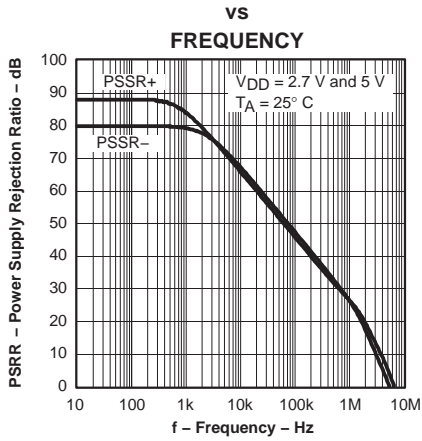


Figure 10

DIFFERENTIAL VOLTAGE AMPLIFICATION AND PHASE

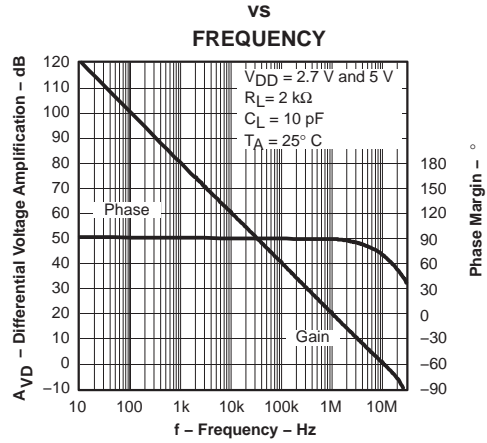


Figure 11

GAIN-BANDWIDTH PRODUCT

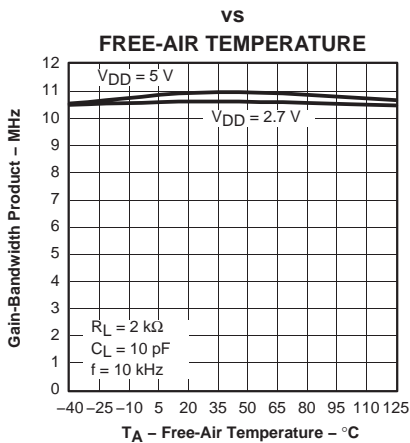


Figure 12

SLEW RATE

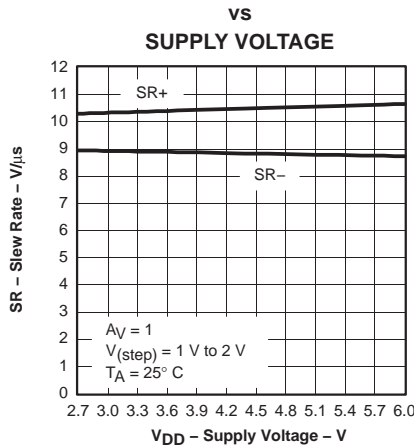


Figure 13

SLEW RATE

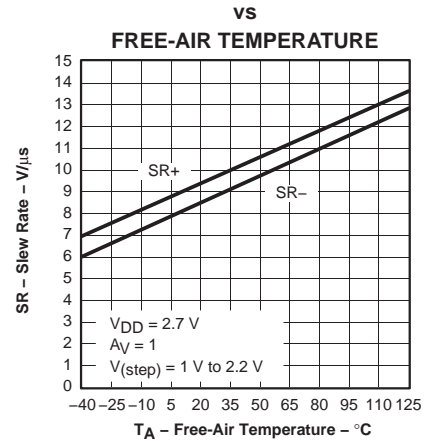


Figure 14

SLEW RATE

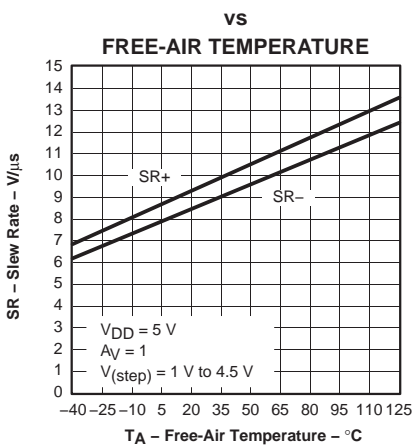


Figure 15

PHASE MARGIN

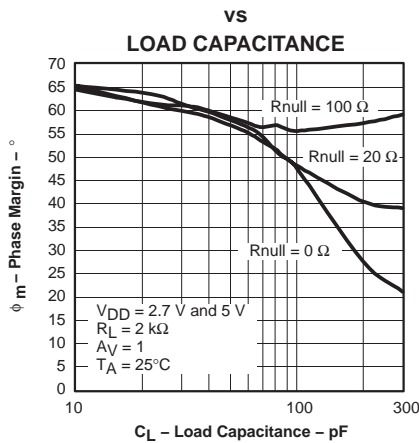


Figure 16

EQUIVALENT INPUT NOISE VOLTAGE

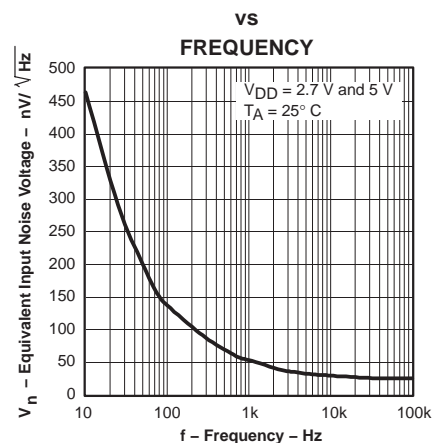


Figure 17



TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625 FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY OPERATIONAL AMPLIFIERS WITH SHUTDOWN

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TYPICAL CHARACTERISTICS

VOLTAGE-FOLLOWER LARGE-SIGNAL PULSE RESPONSE

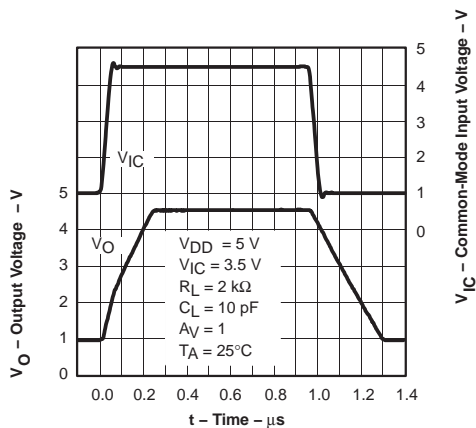


Figure 18

VOLTAGE-FOLLOWER SMALL-SIGNAL PULSE RESPONSE

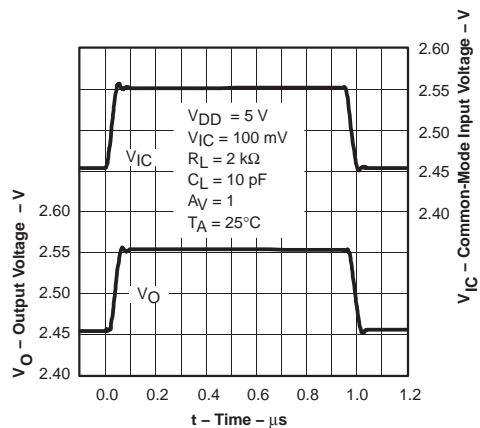


Figure 19

CROSSTALK
VS
FREQUENCY

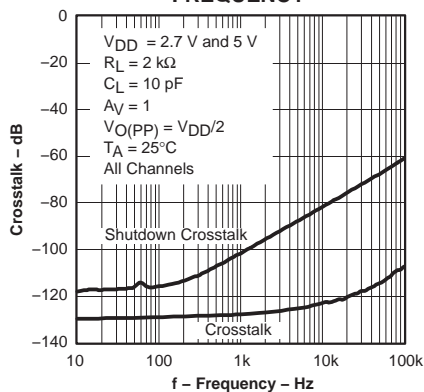


Figure 20

SHUTDOWN SUPPLY CURRENT
VS
FREE-AIR TEMPERATURE

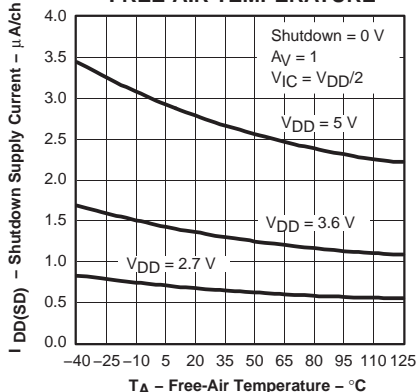


Figure 21

SHUTDOWN SUPPLY CURRENT
VS
SUPPLY VOLTAGE

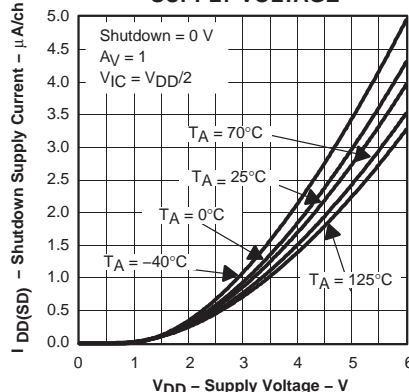


Figure 22

TLV2620, TLV2621, TLV2622, TLV2623, TLV2624, TLV2625 FAMILY OF LOW-POWER WIDE BANDWIDTH SINGLE SUPPLY OPERATIONAL AMPLIFIERS WITH SHUTDOWN

SLOS251C – DECEMBER 2000 – REVISED DECEMBER 2003

TYPICAL CHARACTERISTICS

SHUTDOWN SUPPLY CURRENT / OUTPUT VOLTAGE vs TIME

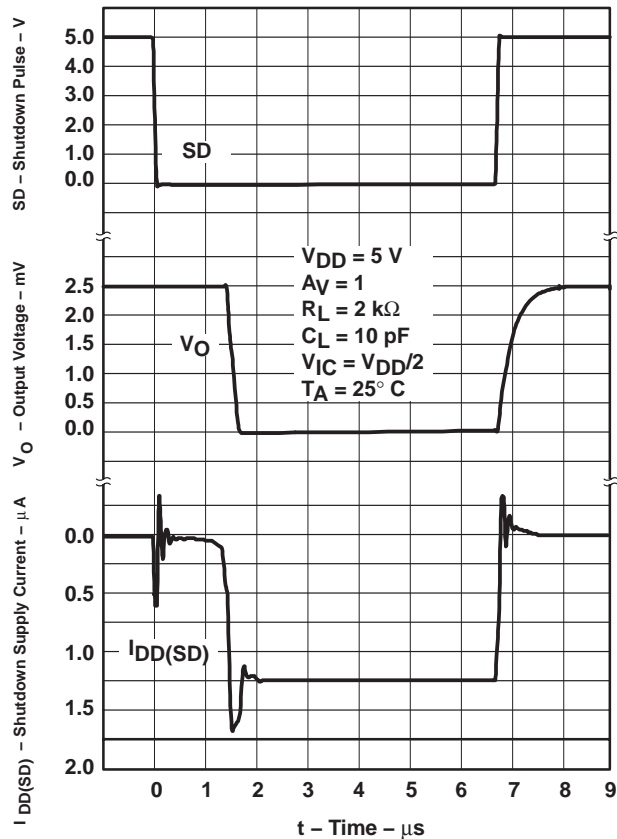
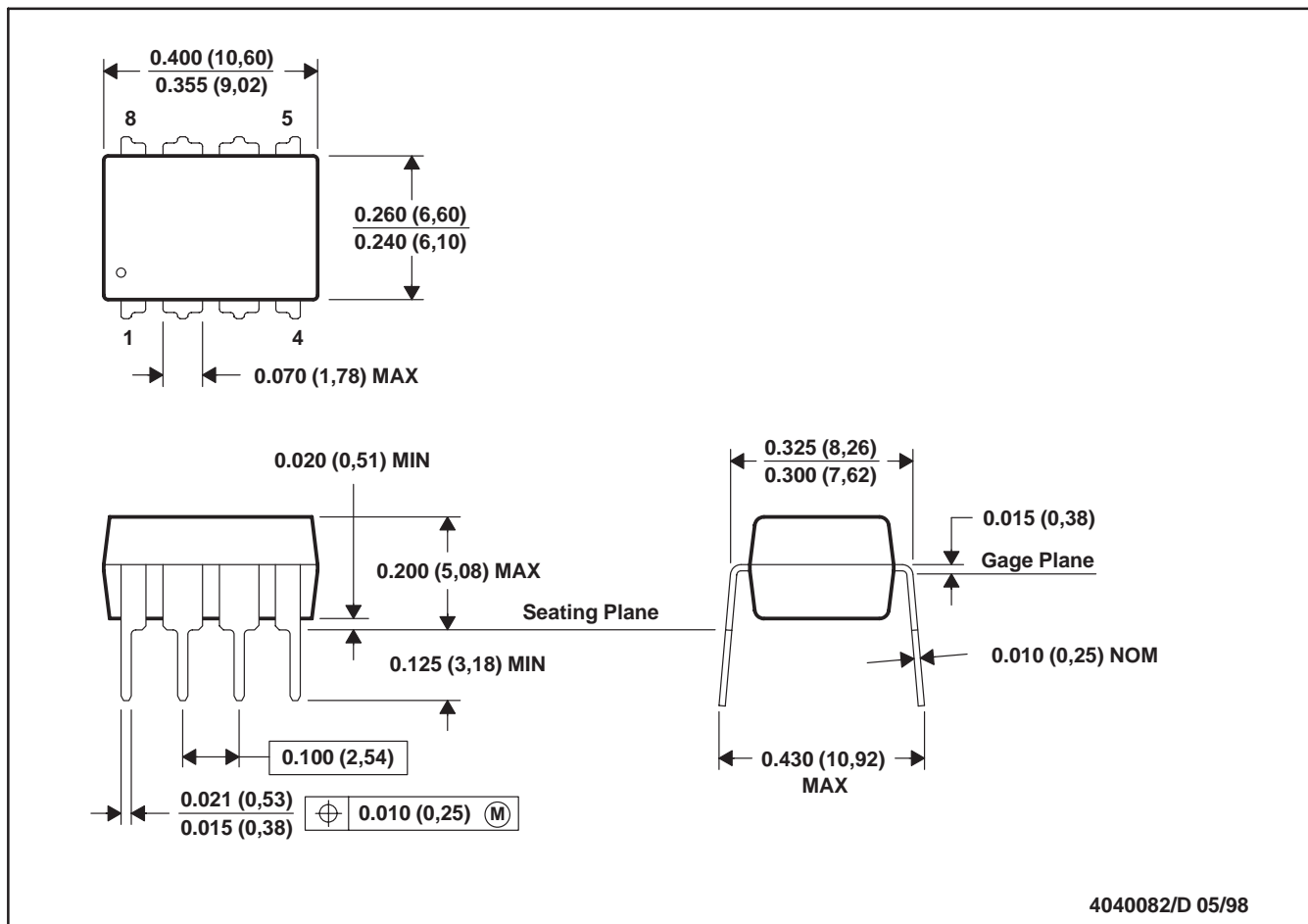


Figure 23

P (R-PDIP-T8)

PLASTIC DUAL-IN-LINE



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

For the latest package information, go to http://www.ti.com/sc/docs/package/pkg_info.htm

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

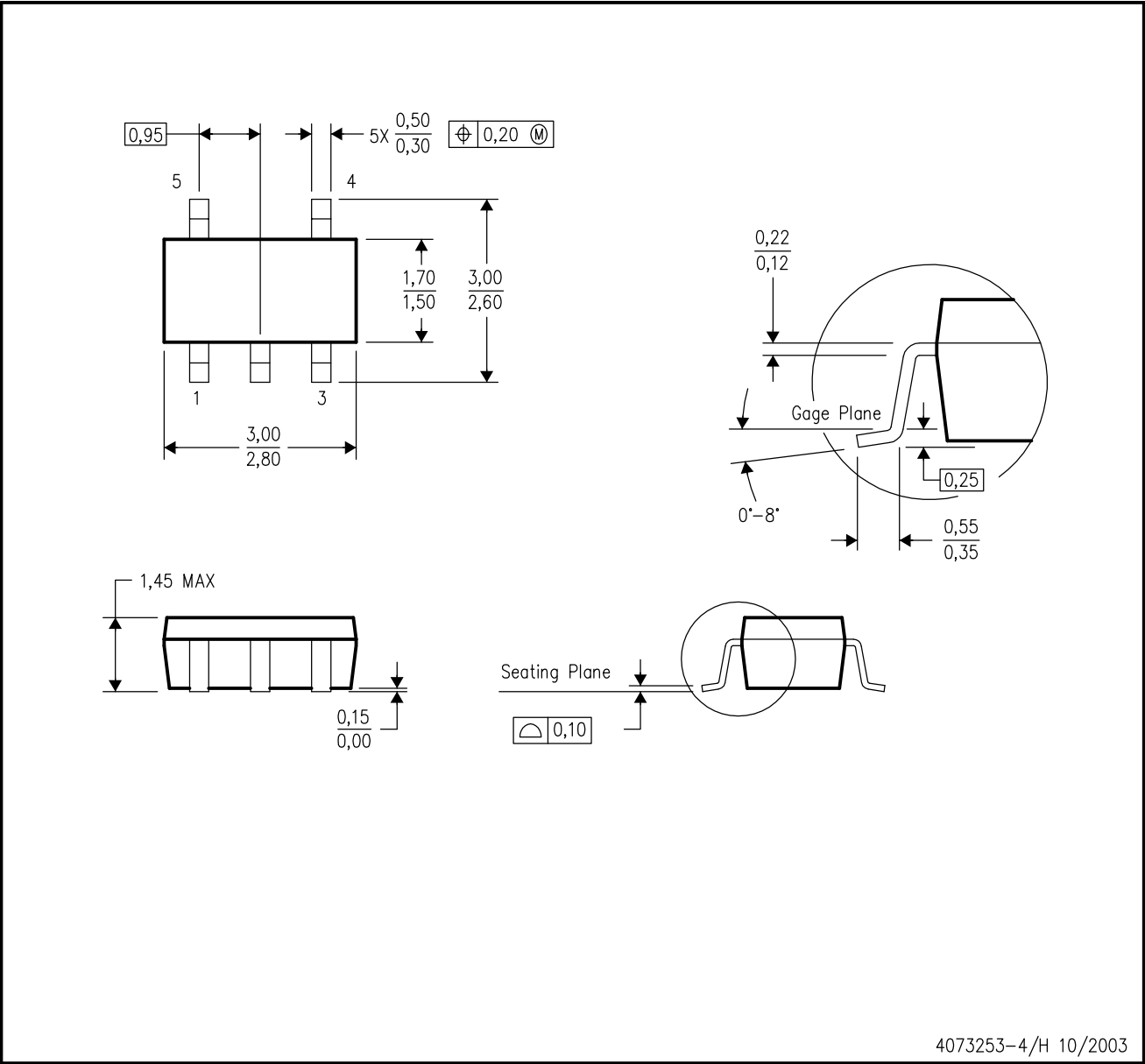
16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - The 20 pin end lead shoulder width is a vendor option, either half or full width.

DBV (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE

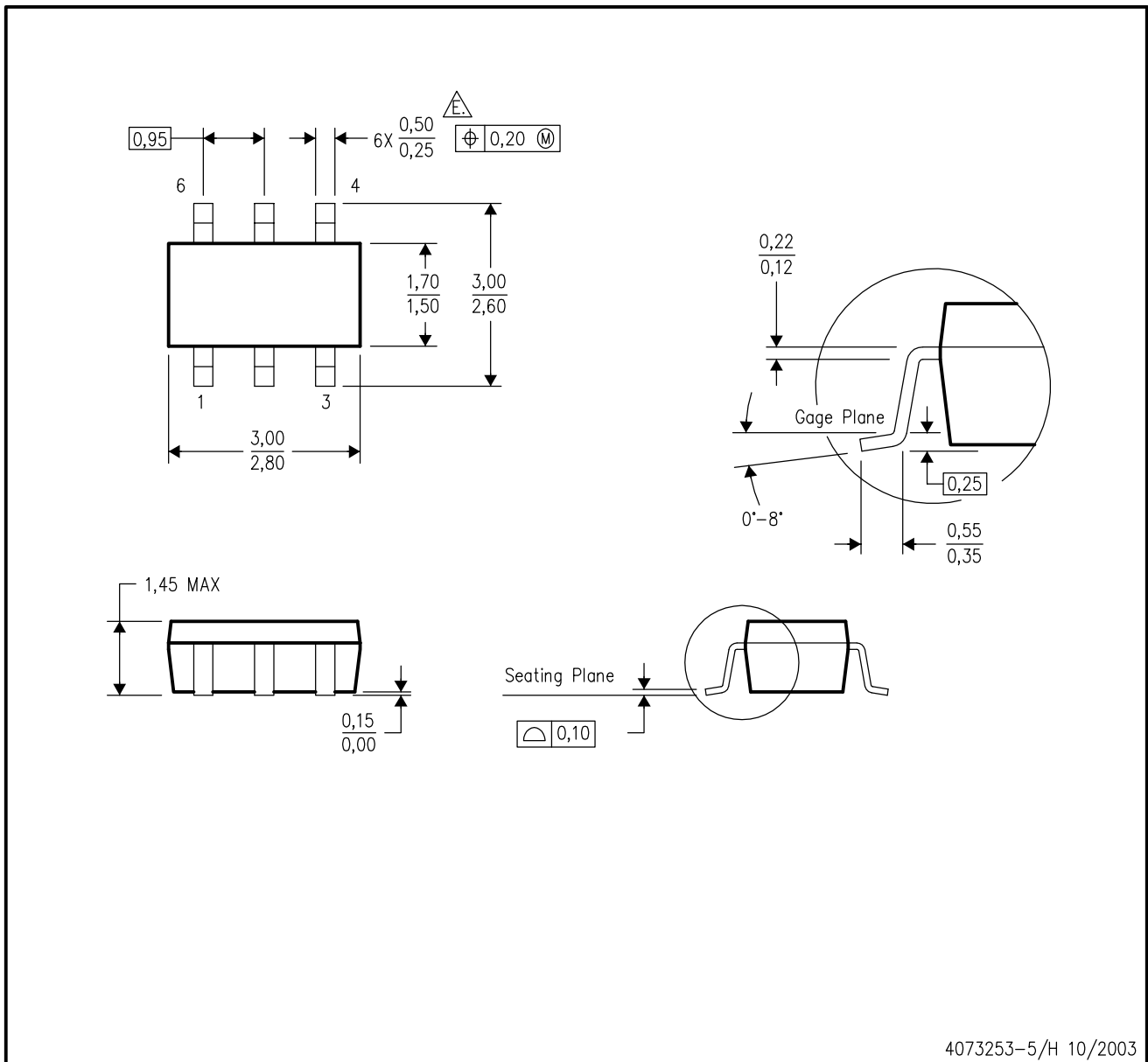


4073253-4/H 10/2003


- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion.
 - D. Falls within JEDEC MO-178 Variation AA.

DBV (R-PDSO-G6)

PLASTIC SMALL-OUTLINE PACKAGE

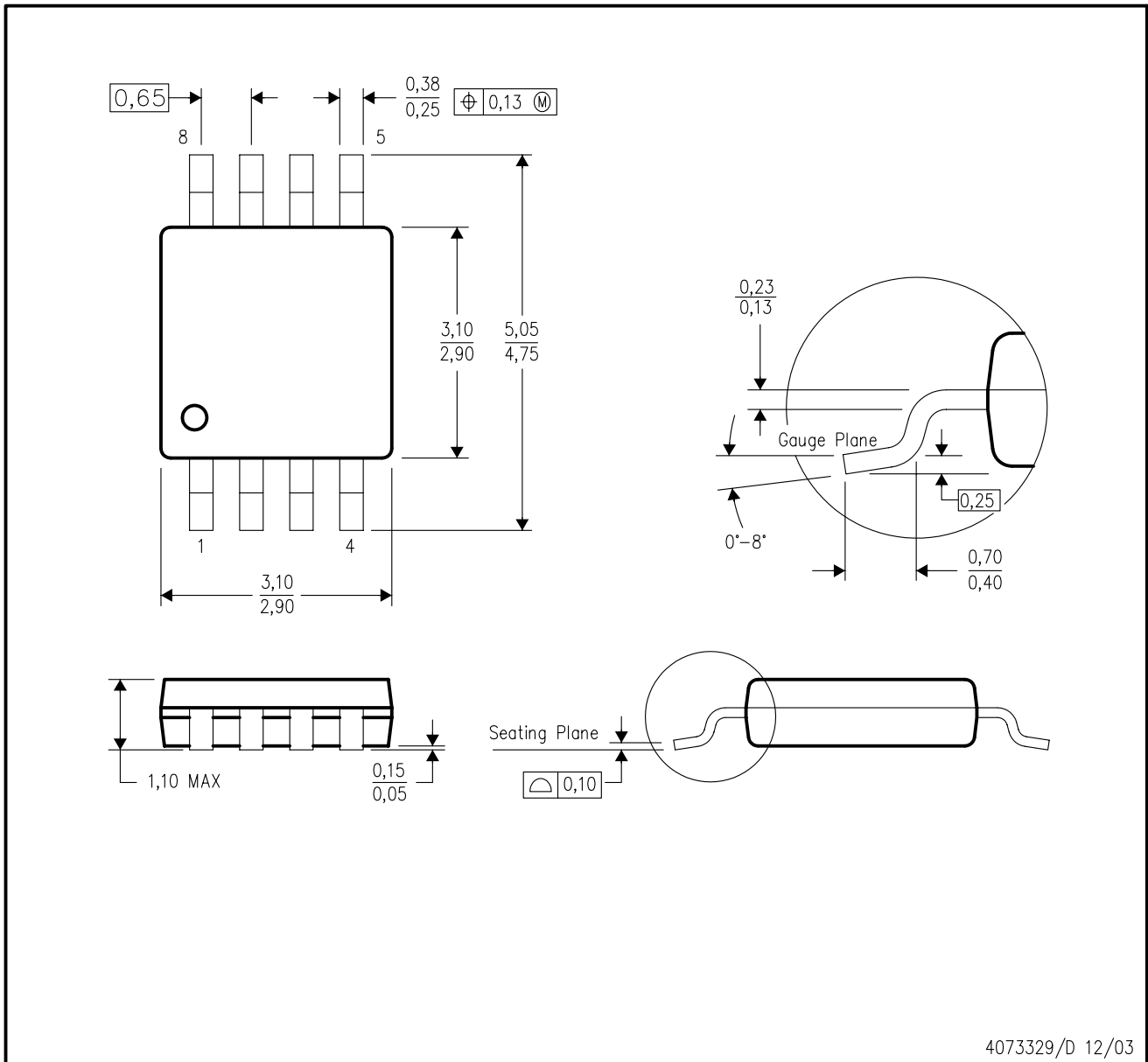


4073253-5/H 10/2003

- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion.
 - D. Leads 1,2,3 may be wider than leads 4,5,6 for package orientation.
-  Falls within JEDEC MO-178 Variation AB, except minimum lead width.

DGK (S-PDSO-G8)

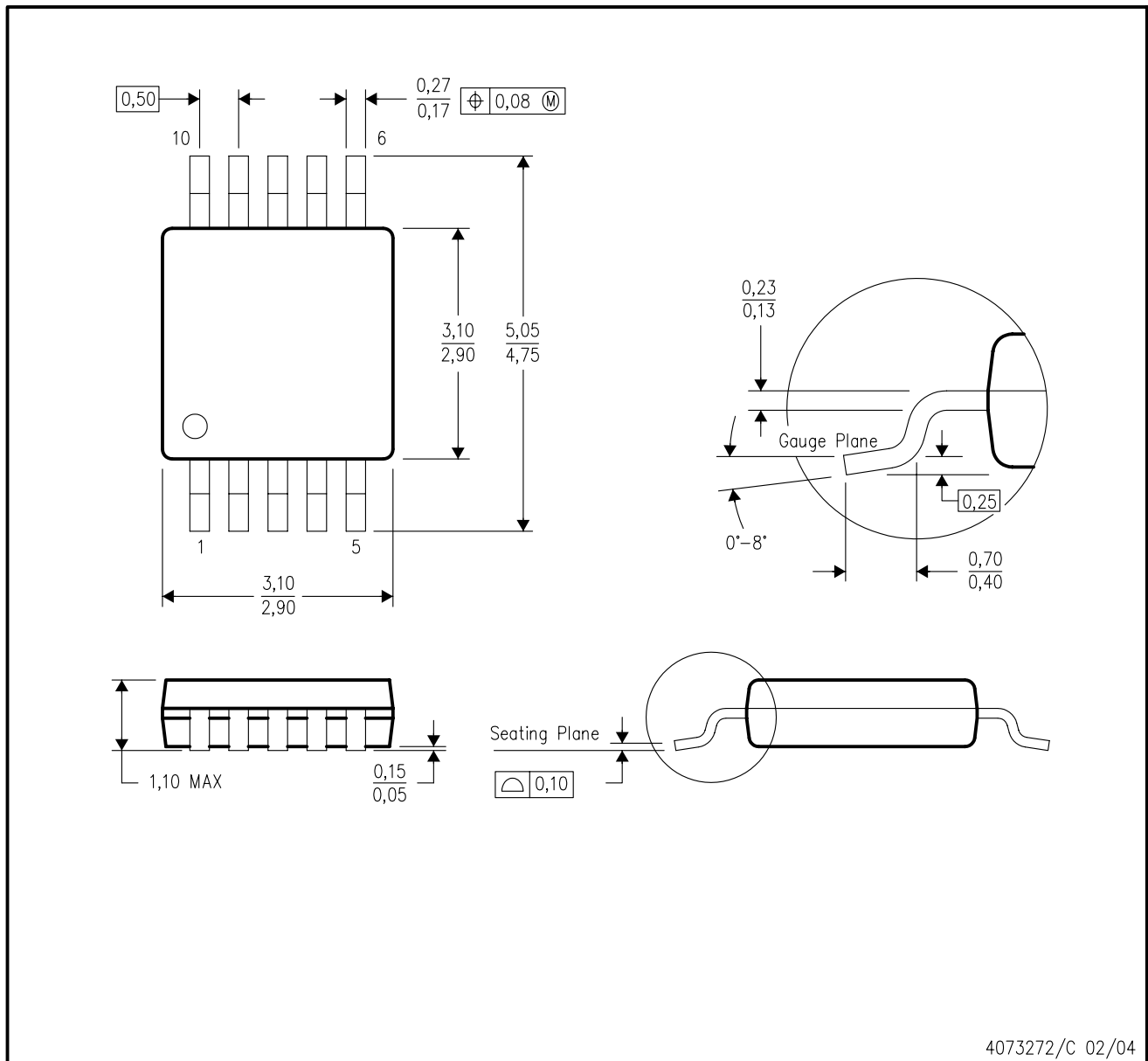
PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion.
 - D. Falls within JEDEC MO-187 variation AA.

DGS (S-PDSO-G10)

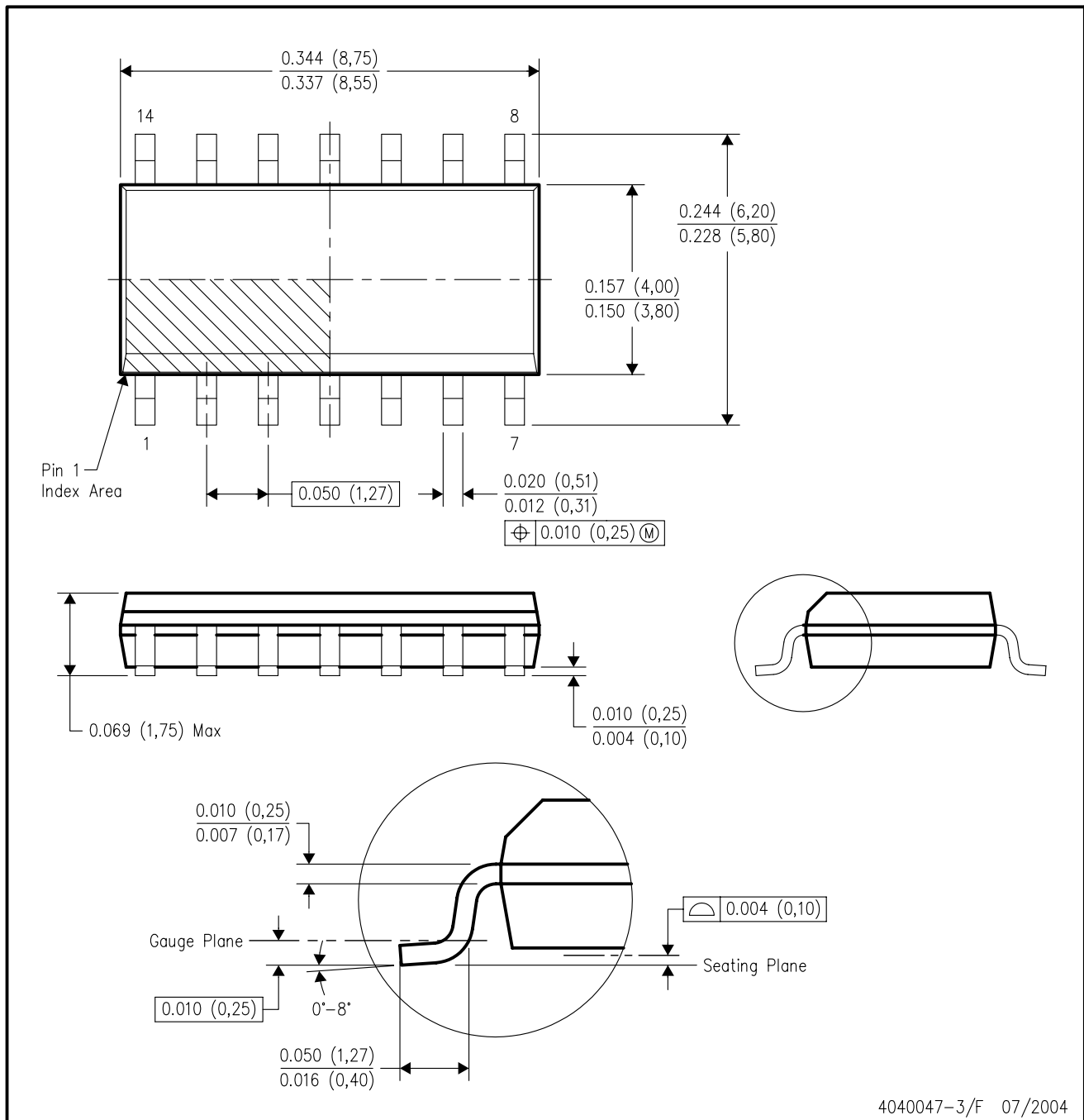
PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion.
 - D. Falls within JEDEC MO-187 variation BA.

D (R-PDSO-G14)

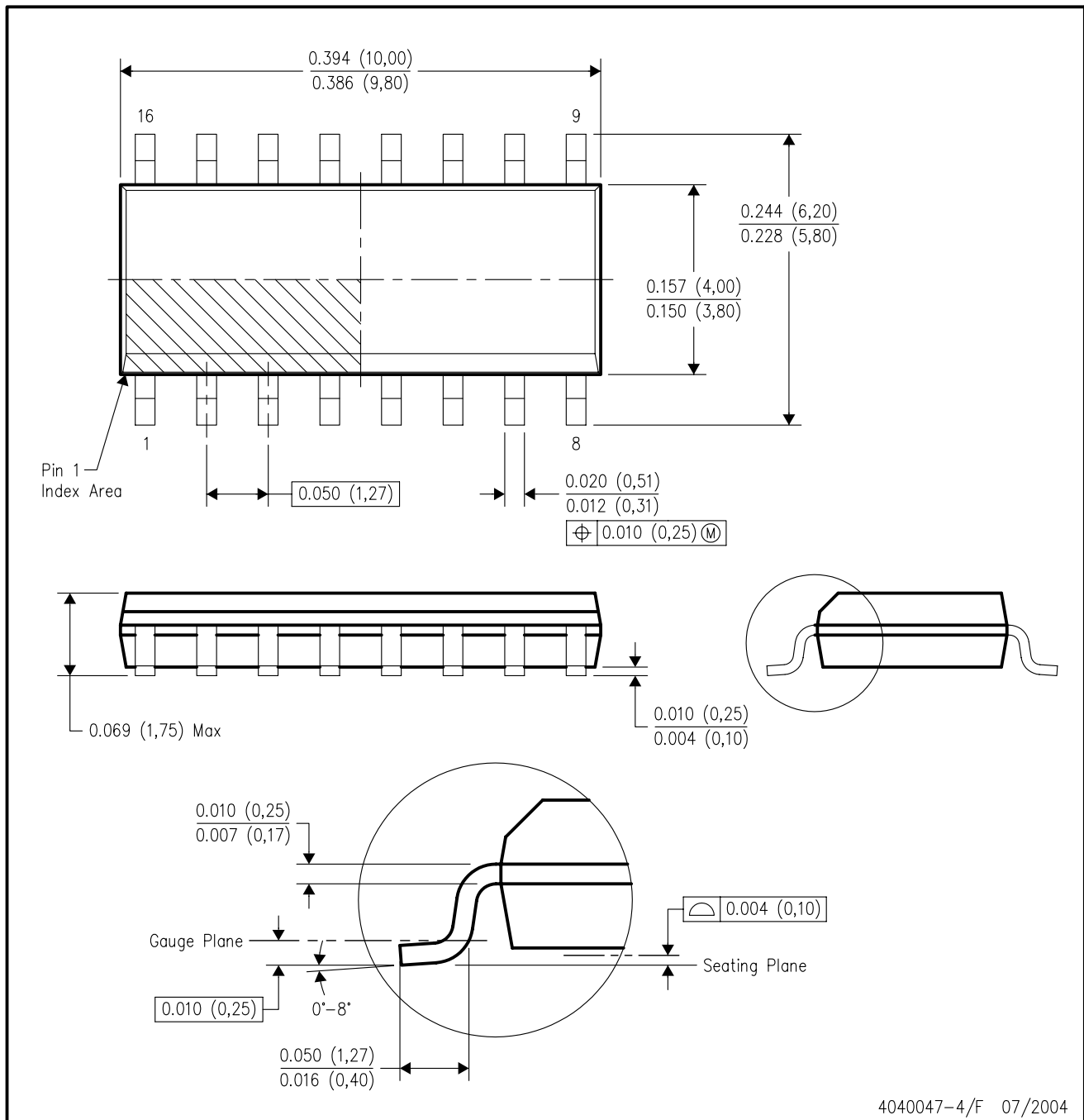
PLASTIC SMALL-OUTLINE PACKAGE



- 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 variation AB.

D (R-PDSO-G16)

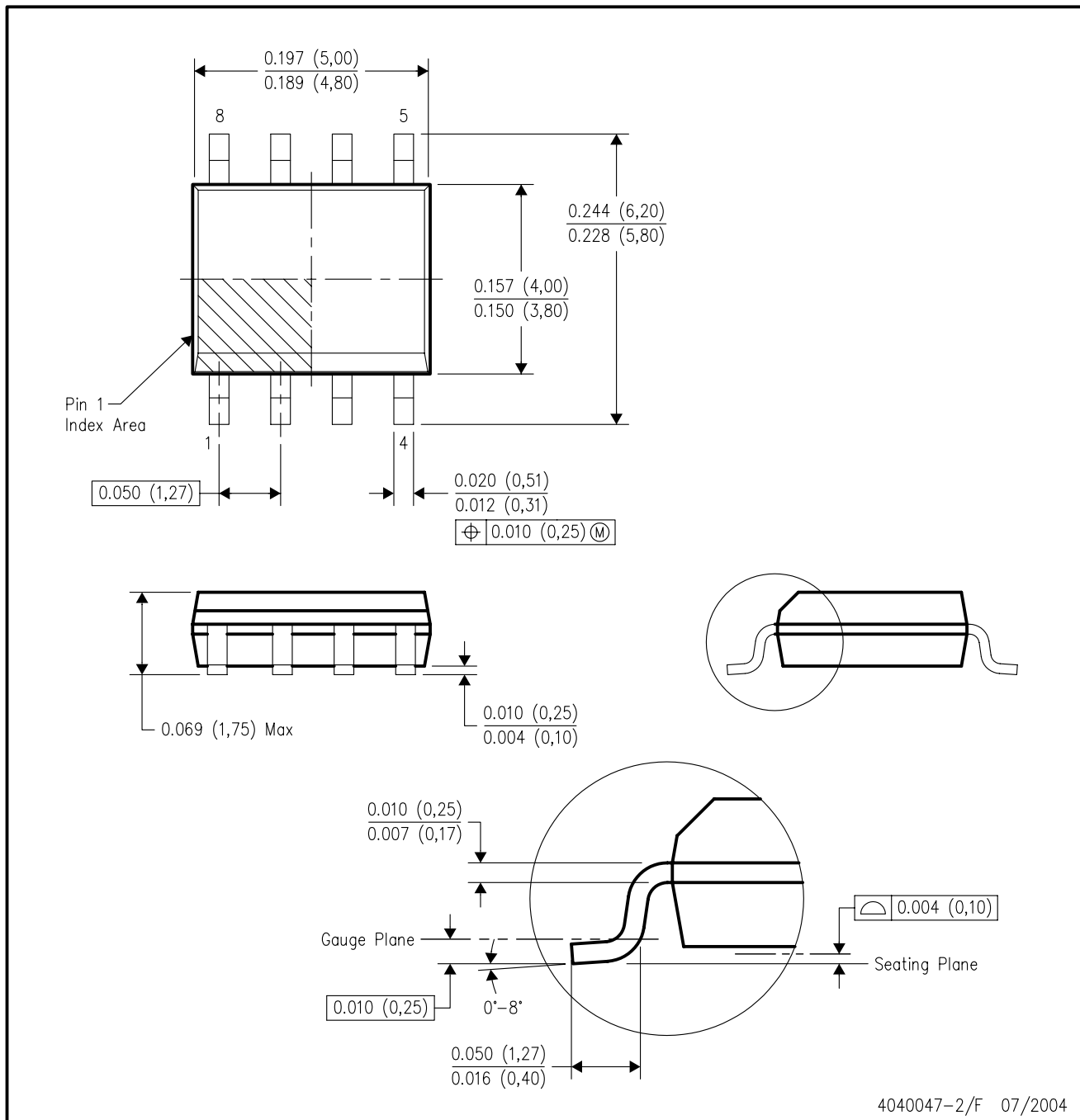
PLASTIC SMALL-OUTLINE PACKAGE



- 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 variation AC.

D (R-PDSO-G8)

PLASTIC SMALL-OUTLINE PACKAGE



- 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 variation AA.

PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



4040064/F 01/97

- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
 D. Falls within JEDEC MO-153

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