

TLE208x and TLE208xA Excalibur High-Speed Operational Amplifiers

1 Features

- Direct upgrades to TL05x, TL07x, and TL08x operational amplifiers
- Greater than twice the bandwidth (10MHz) than TL08x
- Wider supply rails increase dynamic signal range to $\pm 19V$

2 Applications

- [AC charging \(pile\) station](#)
- [AC drive power stage module](#)
- [Electricity meter](#)
- [Digital multimeter \(DMM\)](#)
- [Flight control unit](#)
- [Oscilloscopes and digitizers](#)
- High speed data acquisition
- Low-power audio processing
- Portable and battery-powered devices

3 Description

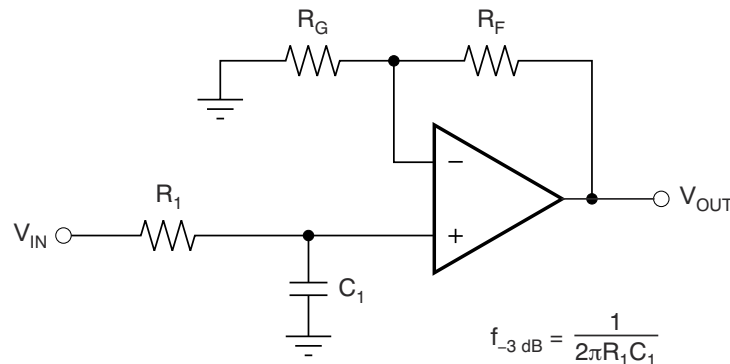
The TLE208x and TLE208xA family is a family of high voltage amplifiers which offer excellent DC precision and AC performance. This includes low noise floor and high slew rate, making TLE208x and TLE208xA family a flexible, high-performance amplifier.

The TLE208xA family is offered in a range of package options and temperature ranges, coming in a single, dual or quad package, with a maximum temperature range of $-55^{\circ}C$ to $125^{\circ}C$. For more information, see [Section 10](#).

Product Information

PART NUMBER	PACKAGE ⁽¹⁾	PACKAGE SIZE ⁽²⁾
TLE2081	P (PDIP, 8)	9.81mm × 9.43mm
	D (SOIC, 8)	4.9mm × 6.0mm
TLE2082	P (PDIP, 8)	9.81mm × 9.43mm
	D (SOIC, 8)	4.9mm × 6.0mm
TLE2084	N (PDIP, 14)	19.3mm × 9.4mm
	DW (SOIC, 16)	10.3mm × 10.3mm
TLE2081A	P (PDIP, 8)	9.81mm × 9.43mm
	D (SOIC, 8)	4.9mm × 6.0mm
TLE2082A	P (PDIP, 8)	9.81mm × 9.43mm
	D (SOIC, 8)	4.9mm × 6.0mm
TLE2084A	N (PDIP, 14)	19.3mm × 9.4mm
	DW (SOIC, 16)	10.3mm × 10.3mm

- (1) For more information, see the [Mechanical, Packaging, and Orderable Information](#).
- (2) The package size (length × width) is a nominal value and includes pins, where applicable.



$$\frac{V_{OUT}}{V_{IN}} = \left(1 + \frac{R_F}{R_G}\right) \left(\frac{1}{1 + sR_1 C_1}\right)$$

TLE208X and TLE208XA in a Single-Pole, Low-Pass Filter



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4 TLE208x Package Comparison Tables

Table 4-1. TLE2081 Available Options

T_A	V_{IO-max} at 25°C	PACKAGED DEVICES	
		SMALL OUTLINE (D) ⁽¹⁾	PLASTIC DIP (P)
0°C to 70°C	3mV	TLE2081ACD	TLE2081ACP
	6mV	TLE2081CD	TLE2081CP
–40°C to 85°C	3mV	TLE2081AID	TLE2081AIP
	6mV	TLE2081ID	TLE2081IP

(1) The D packages are available taped and reeled. Add R suffix to device type (for example, TLE2081ACDR).

Table 4-2. TLE2082 Available Options

T_A	V_{IO-max} at 25°C	PACKAGED DEVICES	
		SMALL OUTLINE (D) ⁽¹⁾	PLASTIC DIP (P)
0°C to 70°C	4mV	TLE2082ACD	TLE2082ACP
	7mV	TLE2082CD	TLE2082CP
– 40°C to 85°C	4mV	TLE2082AID	TLE2082AIP
	7mV	TLE2082ID	TLE2082IP

(1) The D packages are available taped and reeled. Add R suffix to device type (for example, TLE2082ACDR).

Table 4-3. TLE2084 Available Options

T_A	V_{IOmax} at 25°C	PACKAGED DEVICES	
		SMALL OUTLINE (DW) ⁽¹⁾	PLASTIC DIP (N)
0°C to 70°C	4mV	TLE2084ACDW	TLE2084ACN
	7mV	TLE2084CDW	TLE2084CN

(1) The DW packages are available taped and reeled. Add R suffix to device type (for example, TLE2084ACDWR).

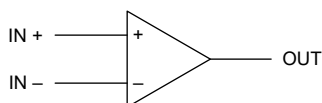


Figure 4-1. Symbol

5 Pin Configuration and Functions

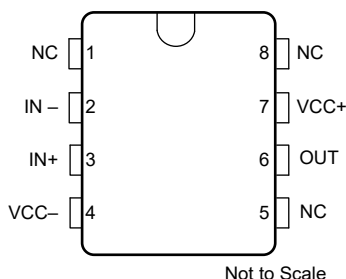


**Figure 5-1. TLE2081D, OR P PACKAGE
(TOP VIEW)**

Table 5-1. Pin Functions TLE2081D, OR P PACKAGE

PIN		TYPE	DESCRIPTION
NAME	NO.		
NC	1	—	Do not connect
IN–	2	Input	Inverting Input
IN+	3	Input	Non Inverting Input
VCC–	4	—	Power supply negative
NC	5	—	Do not connect
OUT	6	Output	Output
VCC+	7	—	Power supply positive
NC	8	—	Do not connect

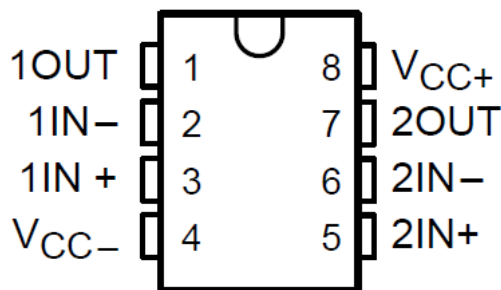


**Figure 5-2. TLE2082D OR P PACKAGE
(TOP VIEW)**

Table 5-2. Pin Functions TLE2082D OR P PACKAGE

PIN		TYPE	DESCRIPTION
NAME	NO.		
1OUT	1	Output	Output Channel 1
1IN–	2	Input	Inverting input, channel 1
1IN+	3	Input	Non-inverting input, channel 1
VCC–	4	—	Power supply negative
2IN+	5	Input	Non-inverting input, channel 2
2IN–	6	Input	Inverting input, channel 2
2OUT	7	Output	Output Channel 2
VCC+	8	—	Power supply positive

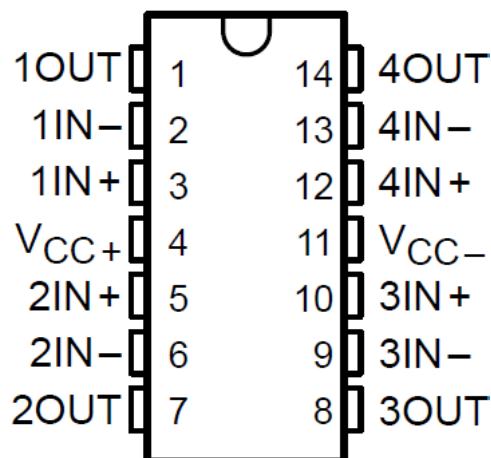


**Figure 5-3. TLE2084N PACKAGE
(TOP VIEW)**

Table 5-3. Pin Functions TLE2084N PACKAGE

PIN		TYPE	DESCRIPTION
NAME	NO.		
1OUT	1	Output	Output channel 1
1IN–	2	Input	Inverting input, channel 1
1IN+	3	Input	Non-inverting input, channel 1
VCC+	4	—	Power supply positive
2IN+	5	Input	Non-inverting input, channel 2
2IN–	6	Input	Inverting input, channel 2
2OUT	7	Output	Output channel 2
3OUT	8	Output	Output channel 3
3IN–	9	Input	Inverting input, channel 3
3IN+	10	Input	Non-inverting input, channel 3
VCC–	11	—	Power supply negative
4IN+	12	Input	Non-inverting input, channel 4
4IN–	13	Input	Inverting input, channel 4
4OUT	14	Output	Output channel 4

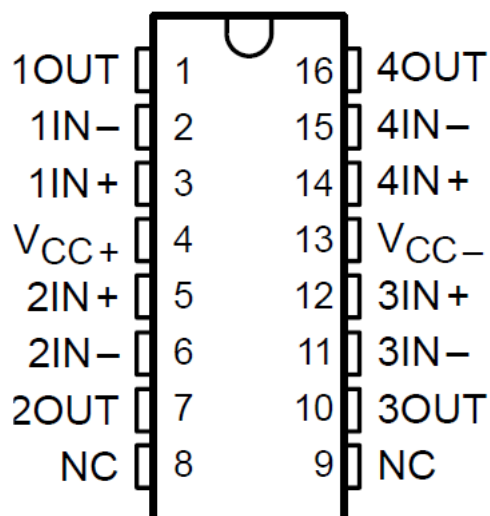


**Figure 5-4. TLE2084 DW PACKAGE
(TOP VIEW)**

Table 5-4. Pin Functions TLE2084 DW PACKAGE

PIN		TYPE	DESCRIPTION
NAME	NO.		
1OUT	1	Output	Output channel 1
1IN-	2	Input	Inverting input, channel 1
1IN+	3	Input	Non-inverting input, channel 1
VCC+	4	—	Power supply positive
2IN+	5	Input	Non-inverting input, channel 2
2IN-	6	Input	Inverting input, channel 2
2OUT	7	Output	Output channel 2
NC	8	—	Do not connect
NC	9	—	Do not connect
3OUT	10	Output	Output channel 3
3IN-	11	Input	Inverting input, channel 3
3IN+	12	Input	Non-inverting input, channel 3
VCC-	13	—	Power supply negative
4IN+	14	Input	Non-inverting input, channel 4
4IN-	15	Input	Inverting input, channel 4
4OUT	16	Output	Output channel 4

6 Specifications

6.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

			MIN	MAX	UNIT
V _{CC+}	Supply voltage ⁽²⁾ V _S = (V ₊) – (V _–)			38	V
V _{ID}	Differential input voltage range ⁽³⁾			V _S + 0.2	
V _I	Input voltage range		(V _–) – 0.5	(V ₊) + 0.5	V
I _I	Input current			±1	mA
I _O	Output current			Continuous	mA
	Duration of short-circuit current at (or below) 25°C ⁽⁴⁾			Unlimited	
	Continuous total dissipation		See Section 6.2		
T _A	Operating free-air temperature range	C suffix	0	70	°C
		I suffix	–40	85	
T _{stg}	Storage temperature		65	150	°C
	Lead temperature 1.6mm (1/16 inch) from case for 10 seconds	DW package		260	°C
		N package			

- (1) Operation outside the *Absolute Maximum Ratings* may cause permanent device damage. *Absolute Maximum Ratings* do not imply functional operation of the device at these or any other conditions beyond those listed under *Recommended Operating Conditions*. If used outside the *Recommended Operating Conditions* but within the *Absolute Maximum Ratings*, the device may not be fully functional, and this may affect device reliability, functionality, performance, and shorten the device lifetime.
- (2) All voltage values are with respect to network ground terminal GND.
- (3) Differential voltages are at IN₊ with respect to IN_–.
- (4) The output can be shorted to either supply. Temperatures and/or supply voltages must be limited to make sure that the maximum dissipation rate is not exceeded.

6.2 Dissipation Rating Table

PACKAGE	T _A ≤ 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	725mW	5.8mW/°C	464mW	377mW	145mW
DW	1025mW	8.2mW/°C	656mW	533mW	205mW
N	1150mW	9.2mW/°C	736mW	598mW	230mW
P	1000mW	8.0mW/°C	640mW	344mW	200mW

6.3 Recommended Operating Conditions

			C SUFFIX		I SUFFIX		M SUFFIX		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
V _{CC±}	Supply voltage		±2.25	±19	±2.25	±19	±2.25	±19	V
V _{IC}	Common-mode input voltage,	V _{CC±} = ± 5V	–0.9	5	–0.8	5	–0.8	5	V
		V _{CC±} = ±15V	–10.9	15	–10.8	15	–10.8	15	
T _A	Operating free-air temperature		0	70	–40	85	–55	125	°C

6.4 TLE2081C Electrical Characteristics

at specified free-air temperature, V_{CC±} = ± 5V (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A ⁽¹⁾	TLE2081C			TLE2081AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{IO}	Input offset voltage	V _{IC} = 0, R _S = 50Ω	V _O = 0	25°C	0.34		6	0.3		3	mV
				Full range			8			5	
α _{VIO}	Temperature coefficient of input offset voltage			Full range	3.2		29	3.2		29	μV/°C
I _{IO}	Input offset current	V _{IC} = 0	V _O = 0	25°C	5		100	5		100	nA
				Full range			1.4			1.4	
I _{IB}	Input bias current			25°C	15		175	15		175	nA
				Full range			5			5	
V _{ICR}	Common-mode input voltage range	R _S = 50Ω		25°C	5 to −1	5 to −1.9		5 to −1	5 to −1.9		V
				Full range	5 to −0.9		5 to −0.9				
V _{OM+}	Maximum positive peak output voltage swing	I _O = −200μA		25°C	3.8	4.985		3.8	4.985		V
		I _O = −2mA		25°C	3.5	4.925		3.5	4.925		
		I _O = −20mA		25°C	1.5	4.5		1.5	4.5		
V _{OM−}	Maximum negative peak output voltage swing	I _O = 200μA		25°C	−3.5	−4.985		−3.5	−4.985		V
		I _O = 2mA		25°C	−3.7	−4.925		−3.7	−4.925		
		I _O = 20mA		25°C	−1.5	−4.5		−1.5	−4.5		
A _{VD}	Large-signal differential voltage amplification	R _L = 600Ω		25°C	80	91		80	91		dB
		R _L = 2kΩ		25°C	90	100		90	100		
		R _L = 10kΩ		25°C	95	106		95	106		
r _i	Input resistance	V _{IC} = 0	Common mode	25°C	100			100			MΩ
			Differential		6			6			TΩ
c _i	Input capacitance	V _{IC} = 0	Common mode	25°C	1			1			pF
			Differential	25°C	9			9			
z _o	Open-loop output impedance	I _O = 0A		25°C	See Figure 6-17			See Figure 6-17			Ω
CMRR	Common-mode rejection ratio	V _{IC} = V _{ICRmin} , V _O = 0	R _S = 50Ω	25°C	85			85			dB
k _{SVR}	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO})	V _{CC±} = ± 5V to ± 15V		25°C	82	99		82	99		dB
		V _O = 0	R _S = 50Ω	Full range	80			80			
I _{CC}	Supply current	V _O = 0	No load	25°C	2.48		2.92	2.48		2.92	mA

6.4 TLE2081C Electrical Characteristics (continued)

at specified free-air temperature, $V_{CC\pm} = \pm 5V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T_A ⁽¹⁾	TLE2081C			TLE2081AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
I_{SC}	Short-circuit output current			25°C		±65			±65		mA

(1) Full range is 0°C to 70°C.

6.5 TLE2081C Operating Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 5V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T_A	TLE2081C			TLE2081AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate	$V_{O(PP)} = \pm 2.3V$, $A_{VD} = -1$, $C_L = 20pF$ $R_L = 2k\Omega$		25°C		32			32		V/ μs
t_s	Settling time	$A_{VD} = -1$, 2V step	To 10mV	25°C		0.25			0.25		μs
			To 1mV			0.4			0.4		
V_n	Equivalent input noise voltage	$R_S = 20\Omega$	$f = 1kHz$	25°C		28			28		nV/ $\sqrt{Hz}$
			$f = 10kHz$			11.6			11.6		
E_N	Peak-to-peak equivalent input noise voltage	$R_S = 20\Omega$	$f = 0.1Hz$ to 10Hz	25°C		2.77			2.77		μV_{PP}
I_n	Equivalent input noise current	$V_{IC} = 0$	$f = 1kHz$	25°C		60			60		fA/ $\sqrt{Hz}$
THD + N	Total harmonic distortion plus noise	$V_O = 3V_{RMS}$, $G = 1$, $f = 1kHz$, $R_L = 10k\Omega$		25°C		0.0032			0.0032		%
						90			90		dB
B_1	Unity-gain bandwidth			25°C		10.6			10.6		MHz
B_{OM}	Maximum output-swing bandwidth		$A_{VD} = -1$, $C_L = 25pF$	25°C		300			300		kHz
ϕ_m	Phase margin at unity gain	$V_I = 10mV$, $C_L = 25pF$	$R_L = 2k\Omega$	25°C		56°			56°		

6.6 TLE2081C Electrical Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 15V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A ⁽¹⁾	TLE2081C			TLE2081AC			UNIT		
					MIN	TYP	MAX	MIN	TYP	MAX			
V _{IO}	Input offset voltage	V _{IC} = 0, R _S = 50Ω	V _O = 0	25°C	0.49		6	0.47		3	mV		
				Full range			8			5			
a _{VIO}	Temperature coefficient of input offset voltage			Full range	3.2		29	3.2		29	μV/°C		
I _{IO}	Input offset current	V _{IC} = 0	V _O = 0	25°C	6		100	6		100	nA		
				Full range			1.4			1.4			
I _{IB}	Input bias current					25°C	20		175	20		175	nA
						Full range			5			5	

6.6 TLE2081C Electrical Characteristics (continued)

at specified free-air temperature, $V_{CC\pm} = \pm 15V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A ⁽¹⁾	TLE2081C			TLE2081AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{ICR}	Common-mode input voltage range	R _S = 50Ω		25°C	15 to – 11	15 to – 11.9		15 to – 11	15 to – 11.9		V
				Full range	15 to –10.9		15 to –10.9				
V _{OM+}	Maximum positive peak output voltage swing	I _O = – 200μA		25°C	13.8	14.985		13.8	14.985		V
		I _O = – 2mA		25°C	13.5	14.925		13.5	14.925		
		I _O = – 20mA		25°C	11.5	14.5		11.5	14.5		
V _{OM–}	Maximum negative peak output voltage swing	I _O = 200μA		25°C	–13.8	– 14.985		–13.8	– 14.985		V
		I _O = 2mA		25°C	–13.5	– 14.925		–13.5	– 14.925		
		I _O = 20mA		25°C	–11.5	–14.5		–11.5	–14.5		
A _{VD}	Large-signal differential voltage amplification	R _L = 600Ω		25°C	80	96		80	96		dB
		R _L = 2kΩ		25°C	90	109		90	109		
		R _L = 10kΩ		25°C	95	118		95	118		
r _i	Input resistance	V _{IC} = 0	Common mode	25°C	100			100			MΩ
			Differential		6			6			TΩ
c _i	Input capacitance	V _{IC} = 0	Common mode	25°C	1			1			pF
			Differential	25°C	9			9			
z _o	Open-loop output impedance	I _O = 0A		25°C	See Figure 6-17			See Figure 6-17			Ω
CMRR	Common-mode rejection ratio	V _{IC} = V _{ICRmin} , V _O = 0	R _S = 50Ω	25°C	85			85			dB
k _{SVR}	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO})	V _{CC±} = ± 5V to ± 15V		25°C	82	99		82	99		dB
		V _O = 0	R _S = 50Ω	Full range	80			81			
I _{CC}	Supply current (per amplifier)	V _O = 0	No load	25°C	2.48 2.92			2.48 2.92			mA
I _{SC}	Short-circuit output current			25°C	±65			±65			mA

(1) Full range is 0°C to 70°C.

6.7 TLE2081C Operating Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 15V$

PARAMETER		TEST CONDITIONS		T _A	TLE2081C			TLE2081AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate	V _{O(PP)} = ± 2.3V, A _{VD} = − 1, C _L = 20pF R _L = 2kΩ		25°C	32			32			V/μs
t _s	Settling time	A _{VD} = − 1, 10V step	To 10mV	25°C	0.4			0.4			μs
			To 1mV		1.5			1.5			

at specified free-air temperature, $V_{CC\pm} = \pm 15V$

PARAMETER		TEST CONDITIONS		T_A	TLE2081C			TLE2081AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V_n	Equivalent input noise voltage	$R_S = 20\Omega$	$f = 1\text{kHz}$	25°C		7			7		$\text{nV}/\sqrt{\text{Hz}}$
			$f = 10\text{kHz}$			4.4			4.4		
E_N	Peak-to-peak equivalent input noise voltage		$f = 0.1\text{Hz}$ to: 10Hz	25°C		2.77			2.77		μV_{pp}
I_n	Equivalent input noise current	$V_{IC} = 0$	$f = 1\text{kHz}$	25°C		60			60		$\text{fA}/\sqrt{\text{Hz}}$
THD + N	Total harmonic distortion plus noise	$V_O = 3V_{\text{RMS}}$, $G = 1$, $f = 1\text{kHz}$, $R_L = 10\text{k}\Omega$		25°C		0.0032			0.0032		%
						90			90		dB
B_1	Unity-gain bandwidth			25°C		10.6			10.6		MHz
B_{OM}	Maximum output-swing bandwidth		$A_{\text{VD}} = -1$, $C_L = 25\text{pF}$	25°C		300			300		kHz
ϕ_m	Phase margin at unity gain	$V_I = 10\text{mV}$, $C_L = 25\text{pF}$	$R_L = 2\text{k}\Omega$	25°C		57°			57°		

6.8 TLE2081I Electrical Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 5V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A ⁽¹⁾	TLE2081I			TLE2081AI			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{IO}	Input offset voltage	V _{IC} = 0, R _S = 50Ω	V _O = 0	25°C	0.34		6	0.3		3	mV
				Full range	7.6		5.6				
a _{VIO}	Temperature coefficient of input offset voltage			Full range	3.2		29	3.2		29	μV/°C
I _{IO}	Input offset current	V _{IC} = 0	V _O = 0	25°C	5	100	5		100	pA	
				Full range	5		5		nA		
I _{IB}	Input bias current			25°C	15	175	15		175	pA	
				Full range	10		10		nA		
V _{ICR}	Common-mode input voltage range	R _S = 50Ω		25°C	5 to −1	5 to −1.9	5 to −1		5 to −1.9	V	
				Full range	5 to −0.8	5 to −0.8					
V _{OM+}	Maximum positive peak output voltage swing	I _O = −200μA		25°C	3.8	4.985	3.8		4.985	V	
		I _O = −2mA		25°C	3.5	4.925	3.5		4.925		
		I _O = −20mA		25°C	1.5	4.5	1.5		4.5		
V _{OM−}	Maximum negative peak output voltage swing	I _O = 200μA		25°C	−3.8	−4.985	−3.5		−4.985	V	
		I _O = 2mA		25°C	−3.5	−4.925	−3.7		−4.925		
		I _O = 20mA		25°C	−1.5	−4.5	−1.5		−4.5		
A _{VD}	Large-signal differential voltage amplification	±2.3V	R _L = 600Ω	25°C	80	91	80		91	dB	
			R _L = 2kΩ	25°C	90	100	90		100		
			R _L = 10kΩ	25°C	95	106	95		106		
r _i	Input resistance	V _{IC} = 0	Common mode	25°C	100		100		MΩ		
			Differential		6		6		TΩ		
c _i	Input capacitance	V _{IC} = 0	Common mode	25°C	1		1		pF		
			Differential		9		9				
z _o	Open-loop output impedance	I _O = 0A		25°C	See Figure 6-17			See Figure 6-17		Ω	
CMRR	Common-mode rejection ratio	V _{IC} = V _{ICRmin} , V _O = 0	R _S = 50Ω	25°C	85		85		dB		
k _{SVR}	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO})	V _{CC±} = ± 5V to ± 15V		25°C	82	99	82		99	dB	
		V _O = 0	R _S = 50Ω	Full range	80		80				
I _{CC}	Supply current (per amplifier)	V _O = 0	No load	25°C	2.48		2.92	2.48		2.92	mA
I _{SC}	Short-circuit output current			25°C	±65		±65		mA		

(1) Full range is $-40^\circ C$ to $85^\circ C$.

6.9 TLE2081I Operating Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 5V$

PARAMETER		TEST CONDITIONS		T_A ⁽¹⁾	TLE2081I			TLE2081AI			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate	$V_{O(PP)} = \pm 2.3V$, $A_{VD} = -1$, $C_L = 20pF$ $R_L = 2k\Omega$		25°C		32			32		V/ μs
t_s	Settling time	$A_{VD} = -1$, 2V step	To 10mV	25°C		0.25			0.25		μs
			To 1mV			0.4			0.4		
V_n	Equivalent input noise voltage	$R_S = 20\Omega$	f = 1kHz	25°C		7			7		nV/ $\sqrt{Hz}$
			f = 10kHz			4.4			4.4		
E_N	Peak-to-peak equivalent input noise voltage		f = 0.1Hz to 10Hz	25°C		2.77			2.77		μV_{PP}
I_n	Equivalent input noise current	$V_{IC} = 0$	f = 1kHz	25°C		60			60		fA/ $\sqrt{Hz}$
THD + N	Total harmonic distortion plus noise	$V_O = 3V_{RMS}$, G=1, f = 1kHz, $R_L = 10k\Omega$		25°C		0.0032			0.0032		%
						90			90		dB
B_1	Unity-gain bandwidth			25°C		10.6			10.6		MHz
B_{OM}	Maximum output-swing bandwidth		$A_{VD} = -1$, $C_L = 25pF$	25°C		300			300		kHz
ϕ_m	Phase margin at unity gain	$V_I = 10mV$, $C_L = 25pF$	$R_L = 2k\Omega$	25°C		56°			56°		

(1) Full range is -40°C to 85°C.

6.10 TLE2081I Electrical Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 15V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A	TLE2081I			TLE2081AI			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{IO}	Input offset voltage	V _{IC} = 0, R _S = 50Ω	V _O = 0	25°C	0.49		6	0.47		3	mV
				Full range			8			5	
a _{VIO}	Temperature coefficient of input offset voltage			Full range	3.2		29	3.2		29	μV/°C
I _{IO}	Input offset current	V _{IC} = 0	V _O = 0	25°C	6		100	6		100	nA
				Full range			1.4			1.4	
I _{IB}	Input bias current			25°C	20		175	20		175	nA
				Full range			5			5	
V _{ICR}	Common-mode input voltage range	R _S = 50Ω		25°C	15 to −11		15 to −11.9	15 to −11		15 to −11.9	V
				Full range	15 to −10.9		15 to −10.9				
V _{OM+}	Maximum positive peak output voltage swing	I _O = −200μA		25°C	13.8		14.985	13.8		14.985	V
		I _O = −2mA		25°C	13.5		14.925	13.5		14.925	
		I _O = −20mA		25°C	11.5		14.5	11.5		14.5	
V _{OM−}	Maximum negative peak output voltage swing	I _O = 200μA		25°C	−13.8		−14.985	−13.8		−14.985	V
		I _O = 2mA		25°C	−13.5		−14.925	−13.5		−14.925	
		I _O = 20mA		25°C	−11.5		−14.5	−11.5		−14.5	
A _{VD}	Large-signal differential voltage amplification		R _L = 600Ω	25°C	80		96	80		96	dB
			R _L = 2kΩ	25°C	90		109	90		109	
			R _L = 10kΩ	25°C	95		118	95		118	
r _i	Input resistance	V _{IC} = 0	Common mode	25°C	100		100				MΩ
			Differential		6		6				TΩ
c _i	Input capacitance	V _{IC} = 0	Common mode	25°C	1		1				pF
			Differential	25°C	9		9				
z _o	Open-loop output impedance	I _O = 0A		25°C	80		80				Ω
CMRR	Common-mode rejection ratio	V _{IC} = V _{ICRmin} , V _O = 0	R _S = 50Ω	25°C	85		85				dB
k _{SVR}	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO})	V _{CC±} = ±5V to ±15V		25°C	82		99	82		99	dB
		V _O = 0	R _S = 50Ω	Full range	80		81				
I _{CC}	Supply current	V _O = 0	No load	25°C	2.48		2.92	2.48		2.92	mA
I _{SC}	Short-circuit output current			25°C	±65		±65				mA

6.11 TLE2081I Operating Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 15V$

PARAMETER		TEST CONDITIONS		T_A	TLE2081I			TLE2081AI			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate	$V_{O(PP)} = \pm 2.3V$, $A_{VD} = -1$, $C_L = 20pF$ $R_L = 2k\Omega$		25°C		32			32		V/ μs
t_s	Settling time	$A_{VD} = -1$, 2V step	To 10mV	25°C		0.4			0.4		μs
			To 1mV			1.5			1.5		
V_n	Equivalent input noise voltage	$R_S = 20\Omega$	f = 1kHz	25°C		28			28		nV/ $\sqrt{Hz}$
			f = 10kHz			11.6			11.6		
E_N	Peak-to-peak equivalent input noise voltage	$R_S = 20\Omega$	f = 0.1Hz to 10Hz	25°C		2.77			2.77		μV_{PP}
I_n	Equivalent input noise current	$V_{IC} = 0$	f = 1kHz	25°C		60			60		fA/ $\sqrt{Hz}$
THD + N	Total harmonic distortion plus noise	$V_O = 3V_{RMS}$, G = 1, f = 1kHz, $R_L = 10k\Omega$		25°C		0.0032			0.0032		%
						90			90		dB
B_1	Unity-gain bandwidth			25°C		10.6			10.6		MHz
B_{OM}	Maximum output-swing bandwidth		$A_{VD} = -1$, $C_L = 25pF$	25°C		300			300		kHz
ϕ_m	Phase margin at unity gain	$V_I = 10mV$, $C_L = 25pF$	$R_L = 2k\Omega$	25°C		57°			57°		

6.12 TLE2082C Electrical Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 5V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A ⁽¹⁾	TLE2082C			TLE2082AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{IO}	Input offset voltage	V _{IC} = 0, R _S = 50Ω	V _O = 0	25°C	0.9		6	0.65		4	mV
				Full range	8.1		5.1				
a _{VIO}	Temperature coefficient of input offset voltage			Full range	2.3		25	2.3		25	μV/°C
I _{IO}	Input offset current	V _{IC} = 0	V _O = 0	25°C	5		100	5		100	pA
				Full range	1.4		1.4		nA		
I _{IB}	Input bias current			25°C	15		175	15		175	pA
				Full range	5		5		nA		
V _{ICR}	Common-mode input voltage range	R _S = 50Ω		25°C	5 to −1	5 to −1.9		5 to −1	5 to −1.9		V
				Full range	5 to −0.9		5 to −0.9				
V _{OM+}	Maximum positive peak output voltage swing	I _O = − 200μA		25°C	3.8	4.985		3.8	4.985		V
		I _O = − 2mA		25°C	3.5	4.925		3.5	4.925		
		I _O = − 20mA		25°C	1.5	4.5		1.5	4.5		
V _{OM−}	Maximum negative peak output voltage swing	I _O = 200μA		25°C	−3.8	− 4.985		−3.8	− 4.985		V
		I _O = 2mA		25°C	−3.5	− 4.925		−3.5	− 4.925		
		I _O = 20mA		25°C	−1.5	−4.5		−1.5	−4.5		
A _{vd}	Large-signal differential voltage amplification		R _L = 600Ω	25°C	80	91		80	91		dB
			R _L = 2kΩ	25°C	90	100		90	100		
			R _L = 10kΩ	25°C	95	106		95	106		
r _i	Input resistance	V _{IC} = 0	Common mode	25°C	100		100			MΩ	
			Differential		6		6		TΩ		
C _i	Input capacitance	V _{IC} = 0	Common mode	25°C	1		1			pF	
			Differential		9		9				
Z _o	Open-loop output impedance	I _O = 0A		25°C	See Figure 6-17			See Figure 6-17			Ω
CMRR	Common-mode rejection ratio	V _{IC} = V _{ICRmin} , V _O = 0	R _S = 50Ω	25°C	85			85			dB
k _{SVR}	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO})	V _{CC±} = ± 5V to ± 15V		25°C	82	99		82	99		dB
		V _O = 0	R _S = 50Ω	Full range	80		80				
I _{CC}	Supply current (per amplifier)	V _O = 0	No load	25°C	2.4		2.8	2.4		2.8	mA
	Crosstalk attenuation	V _{IC} = 0	R _L = 2kΩ	25°C	120			120			dB
I _{OS}	Short-circuit output current			25°C	±65			±65			mA

(1) Full range is 0°C to 70°C.

6.13 TLE2082C Operating Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 5V$

PARAMETER		TEST CONDITIONS		T_A ⁽¹⁾	TLE2082C			TLE2082AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate	$V_{O(PP)} = \pm 2.3V$, $A_{VD} = -1$, $C_L = 20pF$ $R_L = 2k\Omega$		25°C		32			32		V/ μs
t_s	Settling time	$A_{VD} = -1$, 2V step	To 10mV	25°C		0.25			0.25		μs
			To 1mV			0.4			0.4		
V_n	Equivalent input noise voltage	$R_S = 20\Omega$	$f = 10Hz$	25°C		28			28		nV/ $\sqrt{Hz}$
			$f = 10kHz$			11.6			11.6		
E_N	Peak-to-peak equivalent input noise voltage	$R_S = 20\Omega$	$f = 0.1Hz$ to 10Hz	25°C		2.77			2.77		μV_{PP}
I_n	Equivalent input noise current	$V_{IC} = 0$	$f = 1kHz$	25°C		60			60		fA/ $\sqrt{Hz}$
THD + N	Total harmonic distortion plus noise	$V_O = 3V_{RMS}$, $G = 1$, $f = 1kHz$, $R_L = 10k\Omega$		25°C		0.0032			0.0032		%
						90			90		dB
B_1	Unity-gain bandwidth			25°C		10.6			10.6		MHz
B_{OM}	Maximum output-swing bandwidth		$A_{VD} = -1$, $C_L = 25pF$	25°C		300			300		kHz
ϕ_m	Phase margin at unity gain	$V_I = 10mV$, $C_L = 25pF$	$R_L = 2k\Omega$	25°C		56°			56°		

(1) Full range is 0°C to 70°C.

6.14 TLE2082C Electrical Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 15V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A ⁽¹⁾	TLE2082C			TLE2082AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{IO}	Input offset voltage	V _{IC} = 0, R _S = 50Ω	V _O = 0	25°C	0.49		6	0.47		3	mV
				Full range			8			5	
a _{VIO}	Temperature coefficient of input offset voltage			Full range	3.2		29	3.2		29	μV/°C
I _{IO}	Input offset current	V _{IC} = 0	V _O = 0	25°C	6		100	6		100	nA
				Full range			1.4			1.4	
I _{IB}	Input bias current			25°C	20		175	20		175	nA
				Full range			5			5	
V _{ICR}	Common-mode input voltage range	R _S = 50Ω		25°C	15 to −11	15 to −11.9		15 to −11	15 to −11.9		V
				Full range	15 to −10.9		15 to −10.9				
V _{OM+}	Maximum positive peak output voltage swing	I _O = −200μA		25°C	13.8	14.985		13.8	14.985		V
		I _O = −2mA		25°C	13.5	14.925		13.5	14.925		
		I _O = −20mA		25°C	11.5	14.5		11.5	14.5		
V _{OM−}	Maximum negative peak output voltage swing	I _O = 200μA		25°C	−13.8	−14.985		−13.8	−14.985		V
		I _O = 2mA		25°C	−13.5	−14.925		−13.5	−14.925		
		I _O = 20mA		25°C	−11.5	−14.5		−11.5	−14.5		
A _{VD}	Large-signal differential voltage amplification		R _L = 600Ω	25°C	80	96		80	96		dB
			R _L = 2kΩ	25°C	90	109		90	109		
			R _L = 10kΩ	25°C	95	118		95	118		
r _i	Input resistance	V _{IC} = 0	Common mode	25°C	100			100			MΩ
			Differential		6			6			TΩ
c _i	Input capacitance	V _{IC} = 0	Common mode	25°C	1			1			pF
			Differential	25°C	9			9			
Z _o	Open-loop output impedance	I _O = 0A		25°C	See Figure 6-17			See Figure 6-17			Ω
CMRR	Common-mode rejection ratio	V _{IC} = V _{ICRmin} , V _O = 0	R _S = 50Ω	25°C	85			85			dB
k _{SVR}	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO})	V _{CC±} = ±5V to ±15V		25°C	82	99		82	99		dB
		V _O = 0	R _S = 50Ω	Full range	80			81			
I _{CC}	Supply current (Per amplifier)	V _O = 0	No load	25°C	2.4		2.8	2.4		2.8	mA
I _{SC}	Short-circuit output current			25°C	±65			±65			mA

6.15 TLE2082C Operating Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 15V$

PARAMETER		TEST CONDITIONS		T_A	TLE2082C			TLE2082AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate	$V_{O(PP)} = \pm 2.3V$, $A_{VD} = -1$, $C_L = 20pF$ $R_L = 2k\Omega$		25°C		32			32		V/ μs
t_s	Settling time	$A_{VD} = -1$, 2V step	To 10mV	25°C		0.4			0.4		μs
			To 1mV			1.5			1.5		
V_n	Equivalent input noise voltage	$R_S = 20\Omega$	f = 1kHz	25°C		28			28		nV/ $\sqrt{Hz}$
			f = 10kHz			11.6			11.6		
E_N	Peak-to-peak equivalent input noise voltage	$R_S = 20\Omega$	f = 0.1Hz to 10Hz	25°C		2.77			2.77		μV_{PP}
I_n	Equivalent input noise current	$V_{IC} = 0$	f = 1kHz	25°C		60			60		fA/ $\sqrt{Hz}$
THD + N	Total harmonic distortion plus noise	$V_O = 3V_{RMS}$, G = 1, f = 1kHz, $R_L = 10k\Omega$		25°C		0.0032			0.0032		%
						90			90		dB
B_1	Unity-gain bandwidth			25°C		10.6			10.6		MHz
B_{OM}	Maximum output-swing bandwidth		$A_{VD} = -1$, $C_L = 25pF$	25°C		300			300		kHz
ϕ_m	Phase margin at unity gain	$V_I = 10mV$, $C_L = 25pF$	$R_L = 2k\Omega$	25°C		57°			57°		

6.16 TLE2082I Electrical Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 5V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A ⁽¹⁾	TLE2082I			TLE2082AI			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{IO}	Input offset voltage	V _{IC} = 0, R _S = 50Ω	V _O = 0	25°C	0.34		6	0.3		3	mV
				Full range			8			5	
a _{VIO}	Temperature coefficient of input offset voltage			Full range	3.2		29	3.2		29	μV/°C
I _{IO}	Input offset current	V _{IC} = 0	V _O = 0	25°C	5	100	5		100	nA	
				Full range			1.4				1.4
I _{IB}	Input bias current			25°C	15	175	15		175	nA	
				Full range			5				5
V _{ICR}	Common-mode input voltage range	R _S = 50Ω		25°C	5 to -1	5 to -1.9	5 to -1		5 to -1.9	V	
			Full range	5 to -0.9			5 to -0.9				
V _{OM+}	Maximum positive peak output voltage swing	I _O = - 200μA		25°C	3.8	4.985	3.8		4.985	V	
		I _O = - 2mA		25°C	3.5	4.925	3.5		4.925		
		I _O = - 20mA		25°C	1.5	4.5	1.5		4.5		
V _{OM-}	Maximum negative peak output voltage swing	I _O = 200μA		25°C	-3.5	-4.985	-3.5		-4.985	V	
		I _O = 2mA		25°C	-3.7	-4.925	-3.7		-4.925		
		I _O = 20mA		25°C	-1.5	-4.5	-1.5		-4.5		
A _{VD}	Large-signal differential voltage amplification		R _L = 600Ω	25°C	80	91	80		91	dB	
			R _L = 2kΩ	25°C	90	100	90		100		
			R _L = 10kΩ	25°C	95	106	95		106		
r _i	Input resistance	V _{IC} = 0	Common mode	25°C	100		100		MΩ		
			Differential		6		6		TΩ		
c _i	Input capacitance	V _{IC} = 0	Common mode	25°C	1		1		pF		
			Differential	25°C	9		9				
z _o	Open-loop output impedance	I _O = 0A		25°C	See Figure 6-17			See Figure 6-17		Ω	
CMRR	Common-mode rejection ratio	V _{IC} = V _{ICRmin} , V _O = 0	R _S = 50Ω	25°C	85			85		dB	
k _{SVR}	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO})	V _{CC±} = ± 5V to ± 15V		25°C	82	99	82		99	dB	
		V _O = 0	R _S = 50Ω	Full range	80		80				
I _{CC}	Supply current (Per amplifier)	V _O = 0	No load	25°C	2.4		2.8	2.4		2.8	mA
I _{SC}	Short-circuit output current			25°C	±65			±65		mA	

6.17 TLE2082I Operating Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 5V$

PARAMETER		TEST CONDITIONS		T_A	TLE2082I			TLE2082AI			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate	$V_{O(PP)} = \pm 2.3V$, $A_{VD} = -1$, $C_L = 20pF$ $R_L = 2k\Omega$		25°C		32			32		V/ μs
t_s	Settling time	$A_{VD} = -1$, 2V step	To 10mV	25°C		0.25			0.25		μs
			To 1mV			0.4			0.4		
V_n	Equivalent input noise voltage	$R_S = 20\Omega$	f = 1kHz	25°C		28			28		nV/ $\sqrt{Hz}$
			f = 10kHz			11.6			11.6		
E_N	Peak-to-peak equivalent input noise voltage	$R_S = 20\Omega$	f = 0.1Hz to 10Hz	25°C		2.77			2.77		μV_{PP}
I_n	Equivalent input noise current	$V_{IC} = 0$	f = 1kHz	25°C		60			60		fA/ $\sqrt{Hz}$
THD + N	Total harmonic distortion plus noise	$V_O = 3V_{RMS}$, G = 1, f = 1kHz, $R_L = 10k\Omega$		25°C		0.0032			0.0032		%
						90			90		dB
B_1	Unity-gain bandwidth			25°C		10.6			10.6		MHz
B_{OM}	Maximum output-swing bandwidth		$A_{VD} = -1$, $C_L = 25pF$	25°C		300			300		kHz
ϕ_m	Phase margin at unity gain	$V_I = 10mV$, $C_L = 25pF$	$R_L = 2k\Omega$	25°C		56°			56°		

6.18 TLE2082I Electrical Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 15V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A ⁽¹⁾	TLE2082I			TLE2082AI			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{IO}	Input offset voltage	V _{IC} = 0, R _S = 50Ω	V _O = 0	25°C	0.49		6	0.47		3	mV
a _{VIO}	Temperature coefficient of input offset voltage			Full range			8			5	
I _{IO}	Input offset current	V _{IC} = 0	V _O = 0	25°C	6		100	6		100	nA
I _{IB}	Input bias current			Full range			1.4			1.4	
				25°C	20		175	20		175	nA
				Full range			5			5	
V _{ICR}	Common-mode input voltage range	R _S = 50Ω		25°C	15 to –11	15 to –11.9		15 to –11	15 to –11.9		V
				Full range	15 to –10.9			15 to –10.9			
V _{OM+}	Maximum positive peak output voltage swing	I _O = –200μA		25°C	13.8	14.985		13.8	14.985		V
		I _O = –2mA		25°C	13.5	14.925		13.5	14.925		
		I _O = –20mA		25°C	11.5	14.5		11.5	14.5		
V _{OM–}	Maximum negative peak output voltage swing	I _O = 200μA		25°C	–13.8	–14.985		–13.8	–14.985		V
		I _O = 2mA		25°C	–13.5	–14.925		–13.5	–14.925		
		I _O = 20mA		25°C	–11.5	–14.5		–11.5	–14.5		
A _{VD}	Large-signal differential voltage amplification		R _L = 600Ω	25°C	80	96		80	96		dB
			R _L = 2kΩ	25°C	90	109		90	109		
			R _L = 10kΩ	25°C	95	118		95	118		
r _i	Input resistance	V _{IC} = 0	Common mode	25°C	100			100			MΩ
			Differential		6			6			TΩ
c _i	Input capacitance	V _{IC} = 0	Common mode	25°C	1			1			pF
			Differential	25°C	9			9			
Z _o	Open-loop output impedance	I _O = 0A		25°C	See Figure 6-17			See Figure 6-17			Ω
CMRR	Common-mode rejection ratio	V _{IC} = V _{ICRmin} , V _O = 0	R _S = 50Ω	25°C	85			85			dB
k _{SVR}	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO})	V _{CC±} = ±5V to ±15V		25°C	82	99		82	99		dB
		V _O = 0	R _S = 50Ω	Full range	80			81			
I _{CC}	Supply current (Per amplifier)	V _O = 0	No load	25°C	2.4		2.8	2.4		2.8	mA
I _{SC}	Short-circuit output current			25°C	±65			±65			mA

6.19 TLE2082I Operating Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 15V$

PARAMETER		TEST CONDITIONS		T_A	TLE2082I			TLE2082AI			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate	$V_{O(PP)} = \pm 10V$, $A_{VD} = -1$, $C_L = 20pF$ $R_L = 2k\Omega$		25°C		32			32		V/ μs
t_s	Settling time	$R_L = 1k\Omega$, $C_L = 100pF$	To 10mV	25°C		0.4			0.4		μs
			To 1mV			1.5			1.5		
V_n	Equivalent input noise voltage	$R_S = 20\Omega$	$f = 1kHz$	25°C		28			28		nV/ $\sqrt{Hz}$
			$f = 10kHz$			11.6			11.6		
E_N	Peak-to-peak equivalent input noise voltage	$R_S = 20\Omega$	$f = 0.1Hz$ to 10Hz	25°C		2.77			2.77		μV_{PP}
I_n	Equivalent input noise current	$V_{IC} = 0$	$f = 1kHz$	25°C		60			60		fA/ $\sqrt{Hz}$
THD + N	Total harmonic distortion plus noise	$V_O = 3V_{RMS}$, $G=1$, $f = 1kHz$, $R_L = 10k\Omega$		25°C		0.0032			0.0032		%
						90			90		dB
B_1	Unity-gain bandwidth			25°C		10.6			10.6		MHz
B_{OM}	Maximum output-swing bandwidth		$A_{VD} = -1$, $C_L = 25pF$	25°C		300			300		kHz
ϕ_m	Phase margin at unity gain	$V_I = 10mV$, $C_L = 25pF$	$R_L = 2k\Omega$	25°C		57°			57°		

6.20 TLE2084C Electrical Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 5V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A ⁽¹⁾	TLE2084C			TLE2084AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{IO}	Input offset voltage	V _{IC} = 0, R _S = 50Ω	V _O = 0	25°C	−1.6		7	−0.5		4	mV
a _{VIO}	Temperature coefficient of input offset voltage			Full range	9.1		6.1				
I _{IO}	Input offset current	V _{IC} = 0	V _O = 0	25°C	15		100	15		100	pA
				Full range	1.4		1.4		nA		
I _{IB}	Input bias current			25°C	20		175	20		175	pA
				Full range	5		5		nA		
V _{ICR}	Common-mode input voltage range	R _S = 50Ω		25°C	5 to −1	5 to −1.9		5 to −1	5 to −1.9		V
				Full range	5 to −0.9		5 to −0.9				
V _{OM+}	Maximum positive peak output voltage swing	I _O = − 200μA		25°C	3.8	4.985		3.8	4.985		V
		I _O = − 2mA		25°C	3.5	4.925		3.5	4.925		
		I _O = − 20mA		25°C	1.5	4.5		1.5	4.5		
V _{OM−}	Maximum negative peak output voltage swing	I _O = 200μA		25°C	−3.5	−4.985		−3.5	−4.985		V
		I _O = 2mA		25°C	−3.7	−4.925		−3.7	−4.925		
		I _O = 20mA		25°C	−1.5	−4.5		−1.5	−4.5		
A _{VD}	Large-signal differential voltage amplification		R _L = 600Ω	25°C	80	91		80	91		dB
			R _L = 2kΩ	25°C	90	100		90	100		
			R _L = 10kΩ	25°C	95	106		95	106		
				Full range	94		94				
r _i	Input resistance	V _{IC} = 0	Common mode	25°C	100			100			MΩ
			Differential		6			6		TΩ	
c _i	Input capacitance	V _{IC} = 0	Common mode	25°C	1			1			pF
			Differential	25°C	9			9			
z _o	Open-loop output impedance	I _O = 0A		25°C	See Figure 6-17			See Figure 6-17			Ω
CMRR	Common-mode rejection ratio	V _{IC} = V _{ICRmin} , V _O = 0	R _S = 50Ω	25°C	70	89		70	89		dB
				Full range	68		68				
k _{SVR}	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO})	V _{CC±} = ± 5V to ± 15V		25°C	82	99		82	99		dB
		V _O = 0	R _S = 50Ω	Full range	80		80				
I _{CC}	Supply current (Per amplifier)	V _O = 0	No load	25°C	2.4		2.8	2.4		2.8	mA
a _x	Crosstalk attenuation	V _{IC} = 0	R _L = 2kΩ	25°C	120			120			dB
I _{SC}	Short-circuit output current			25°C	±65			±65			mA

(1) Full range is 0°C to 70°C.

6.21 TLE2084C Operating Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 5V$

PARAMETER		TEST CONDITIONS		T_A	TLE2084C			TLE2084AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate	$V_{O(PP)} = \pm 2.3V$, $A_{VD} = -1$, $C_L = 20pF$ $R_L = 2k\Omega$		25°C		32			32		V/ μs
t_s	Settling time	$A_{VD} = -1$, 2V step	To 10mV	25°C		0.25			0.25		μs
			To 1mV			0.4			0.4		
V_n	Equivalent input noise voltage	$R_S = 20\Omega$	f = 1kHz	25°C		28			28		nV/ $\sqrt{Hz}$
			f = 10kHz			11.6			11.6		
E_N	Peak-to-peak equivalent input noise voltage	$R_S = 20\Omega$	f = 0.1Hz to 10Hz	25°C		2.77			2.77		μV_{PP}
I_n	Equivalent input noise current	$V_{IC} = 0$	f = 1kHz	25°C		60			60		fA/ $\sqrt{Hz}$
THD + N	Total harmonic distortion plus noise	$V_O = 3V_{RMS}$, G = 1, f = 1kHz, $R_L = 10k\Omega$		25°C		0.0032			0.0032		%
						90			90		dB
B_1	Unity-gain bandwidth			25°C		10.6			10.6		MHz
B_{OM}	Maximum output-swing bandwidth		$A_{VD} = -1$, $C_L = 25pF$	25°C		300			300		kHz
ϕ_m	Phase margin at unity gain	$V_I = 10mV$, $C_L = 25pF$	$R_L = 2k\Omega$	25°C		56°			56°		

6.22 TLE2084C Electrical Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 15V$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T _A ⁽¹⁾	TLE2084C			TLE2084AC			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{IO}	Input offset voltage	V _{IC} = 0, R _S = 50Ω	V _O = 0	25°C	–1.6		7	–0.5		4	mV
				Full range			9.1			6.1	
a _{VIO}	Temperature coefficient of input offset voltage			Full range	10.1		30	10.1		30	μV/°C
I _{IO}	Input offset current	V _{IC} = 0	V _O = 0	25°C	15		100	15		100	pA
				Full range			1.4			1.4	nA
I _{IB}	Input bias current			25°C	25		175	25		175	pA
				Full range			5			5	nA
V _{ICR}	Common-mode input voltage range	R _S = 50Ω		25°C	15 to – 11	15 to – 11.9		15 to – 11	15 to – 11.9		V
				Full range	15 to –10.9		15 to –10.9				
V _{OM+}	Maximum positive peak output voltage swing	I _O = – 200μA		25°C	13.8	14.985		13.8	14.985		V
		I _O = –2mA		25°C	13.5	14.925		13.5	14.925		
		I _O = –20mA		25°C	11.5	14.5		11.5	14.5		
V _{OM–}	Maximum negative peak output voltage swing	I _O = 200μA		25°C	–13.8	– 14.985		–13.8	– 14.985		V
		I _O = 2mA		25°C	–13.5	– 14.925		–13.5	– 14.925		
		I _O = 20mA		25°C	–11.5	–14.5		–11.5	–14.5		
A _{VD}	Large-signal differential voltage amplification		R _L = 600Ω	25°C	80	96		80	96		dB
			R _L = 2kΩ	25°C	90	109		90	109		
			R _L = 10kΩ	25°C	95	118		95	118		
r _i	Input resistance	V _{IC} = 0	Common mode	25°C	100			100			MΩ
			Differential		6			6			TΩ
c _i	Input capacitance	V _{IC} = 0	Common mode	25°C	1			1			pF
			Differential	25°C	9			9			
z _o	Open-loop output impedance	I _O = 0A		25°C	See Figure 6-17			See Figure 6-17			Ω
CMRR	Common-mode rejection ratio	V _{IC} = V _{ICRmin} , V _O = 0	R _S = 50Ω	25°C	80	98		80	98		dB
				Full range	79			79			
k _{SVR}	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO})	V _{CC±} = ± 5V to ± 15V		25°C	82	99		82	99		dB
		V _O = 0	R _S = 50Ω	Full range	81			81			
I _{CC}	Supply current (Per amplifier)	V _O = 0	No load	25°C	2.4		2.8	2.4		2.8	mA
a _x	Crosstalk attenuation	V _{IC} = 0	R _L = 2kΩ	25°C	120			120			dB
I _{SC}	Short-circuit output current			25°C	±65			±65			mA

(1) Full range is 0°C to 70°C..

6.23 TLE2084C Operating Characteristics

at specified free-air temperature, $V_{CC\pm} = \pm 15V$

PARAMETER		TEST CONDITIONS		T_A	TLE2082I			TLE2082AI			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate	$V_{O(PP)} = \pm 10V$, $A_{VD} = -1$, $C_L = 20pF$ $R_L = 2k\Omega$		25°C		32			32		V/ μs
t_s	Settling time	$R_L = 1k\Omega$, $C_L = 100pF$	To 10mV	25°C		0.4			0.4		μs
			To 1mV			1.5			1.5		
V_n	Equivalent input noise voltage	$R_S = 20\Omega$	$f = 1kHz$	25°C		28			28		nV/ $\sqrt{Hz}$
			$f = 10kHz$			11.6			11.6		
E_N	Peak-to-peak equivalent input noise voltage	$R_S = 20\Omega$	$f = 0.1Hz$ to 10Hz	25°C		2.77			2.77		μV_{PP}
I_n	Equivalent input noise current	$V_{IC} = 0$	$f = 1kHz$	25°C		60			60		fA/ $\sqrt{Hz}$
THD + N	Total harmonic distortion plus noise	$V_O = 3V_{RMS}$, $G=1$, $f = 1kHz$, $R_L = 10k\Omega$		25°C		0.0032			0.0032		%
						90			90		dB
B_1	Unity-gain bandwidth			25°C		10.6			10.6		MHz
B_{OM}	Maximum output-swing bandwidth		$A_{VD} = -1$, $C_L = 25pF$	25°C		300			300		kHz
ϕ_m	Phase margin at unity gain	$V_I = 10mV$, $C_L = 25pF$	$R_L = 2k\Omega$	25°C		57°			57°		

6.24 Typical Characteristics

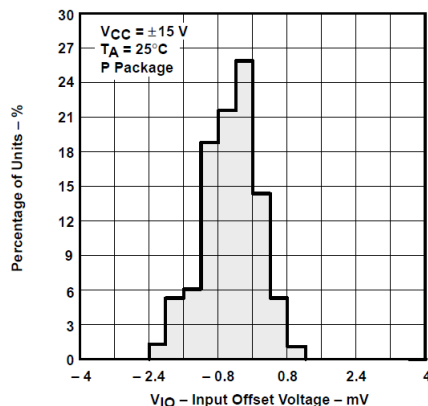


Figure 6-1. Distribution of TLE2081 Input Offset Voltage

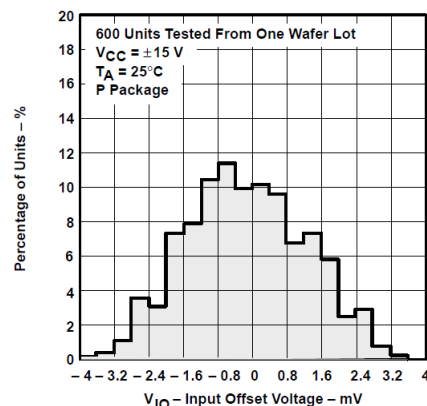


Figure 6-2. Distribution of TLE2082 Input Offset Voltage

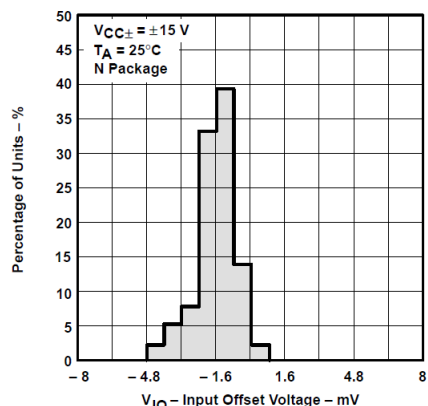


Figure 6-3. Distribution of TLE2084 Input Offset Voltage

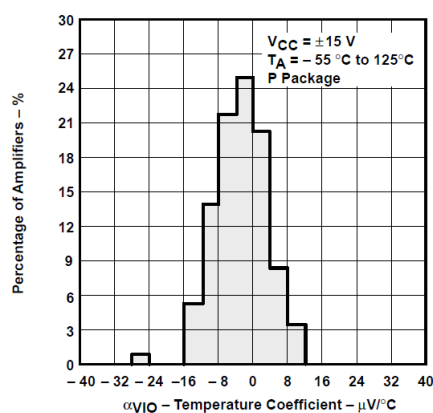


Figure 6-4. Distribution of TLE2081 Input Offset Voltage Temperature Coefficient

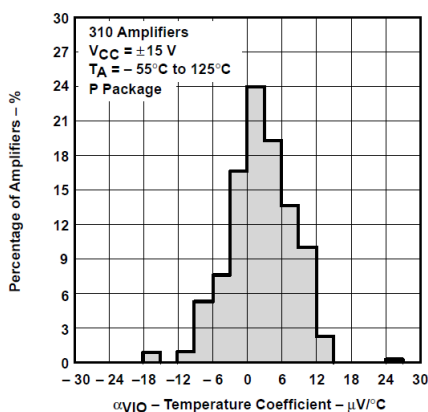


Figure 6-5. Distribution of TLE2082 Input Offset Voltage Temperature Coefficient

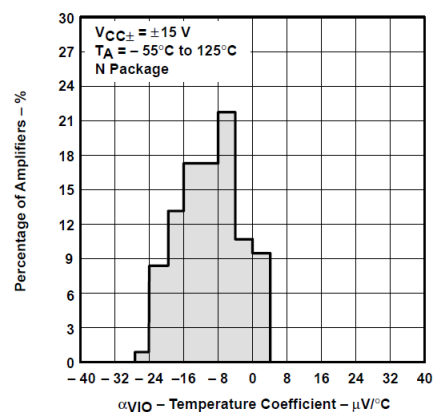


Figure 6-6. Distribution of TLE2084 Input Offset Voltage Temperature Coefficient

6.24 Typical Characteristics (continued)

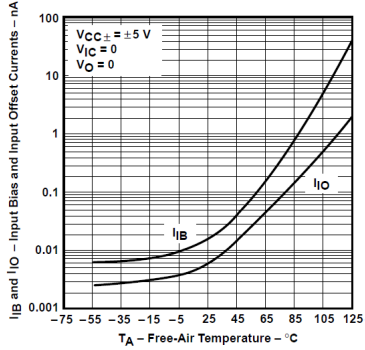


Figure 6-7. TLE2081 and TLE2082 Input Bias Current and Input Offset Current vs Free-Air Temperature

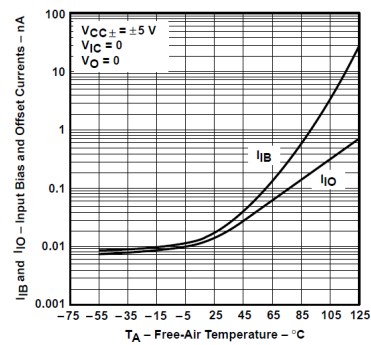


Figure 6-8. TLE2084 Input Bias Current and Input Offset Current vs Free-Air Temperature

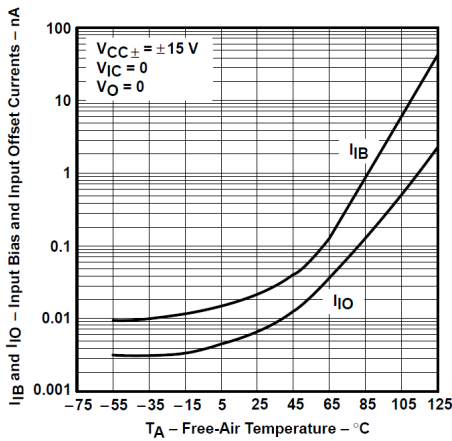


Figure 6-9. TLE2081 and TLE2082 Input Bias Current and Input Offset Current vs Free-Air Temperature

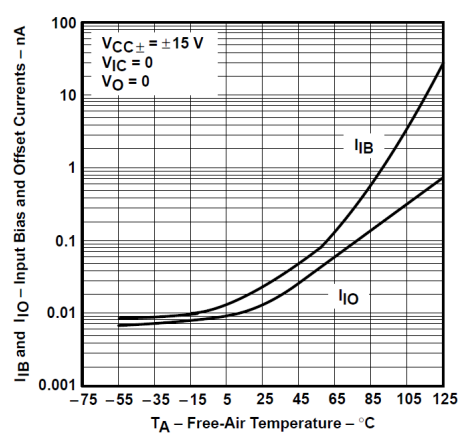


Figure 6-10. TLE2084 Input Bias Current and Input Offset Current vs Free-Air Temperature

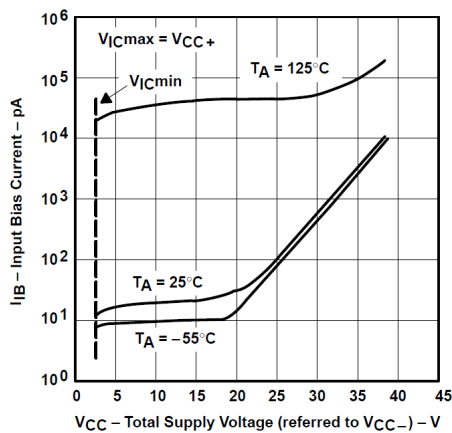


Figure 6-11. Input Bias Current vs Total Supply Voltage

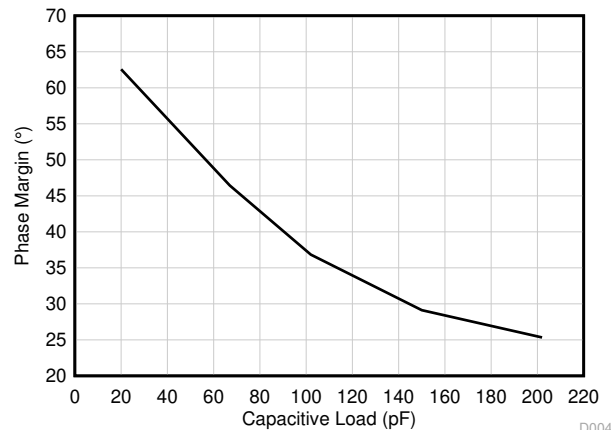
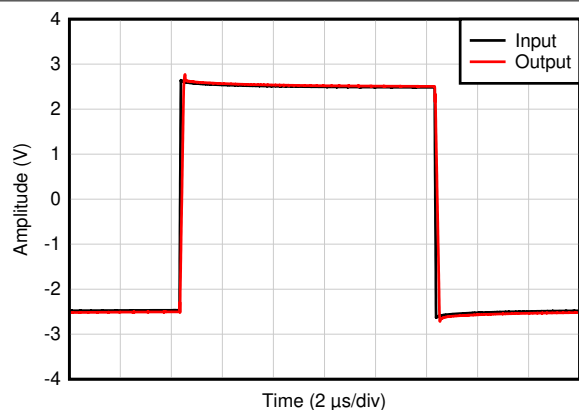


Figure 6-12. Phase Margin vs Load Capacitance

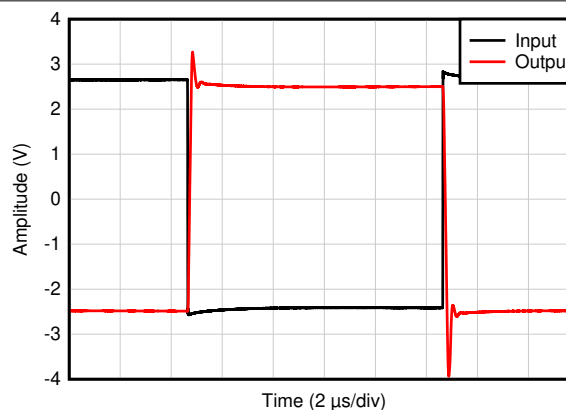
D004

6.24 Typical Characteristics (continued)



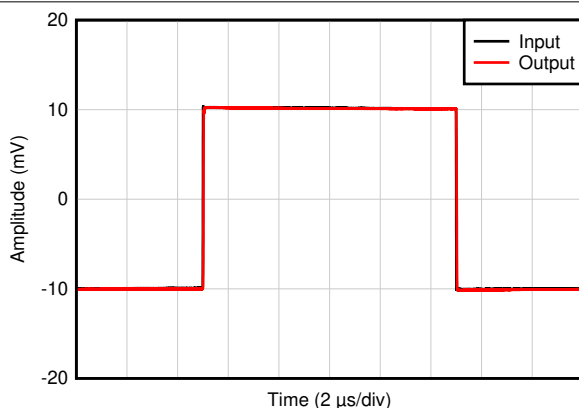
D034

Figure 6-13. Non-inverting Large-Signal Pulse Response



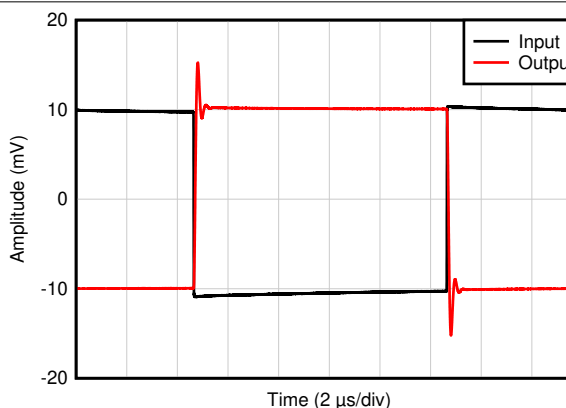
D055

Figure 6-14. Non-inverting Large-Signal Pulse Response



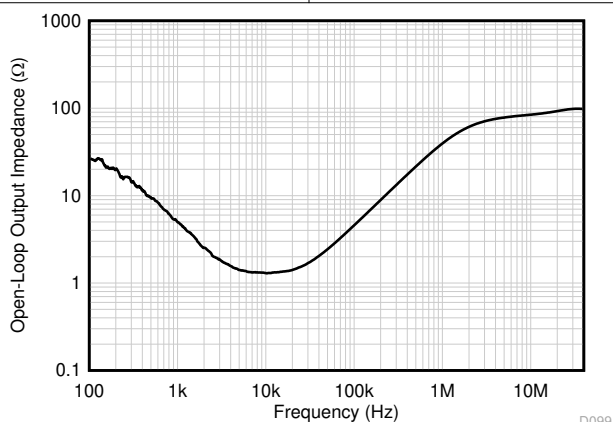
D033

Figure 6-15. Small-Signal Pulse Response



D054

Figure 6-16. Small-Signal Pulse Response



D099

Figure 6-17. Open-Loop Output Impedance vs Frequency

7 Application and Implementation

Note

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes, as well as validating and testing their design implementation to confirm system functionality.

7.1 Application Information

7.1.1 Input Characteristics

The TLE208x and TLE208xA are specified with a minimum and a maximum input voltage that, if exceeded at either input, can cause the device to malfunction. Because of the extremely high input impedance and resulting low bias current requirements, the TLE208x and TLE208xA are an excellent choice for low-level signal processing. However, leakage currents on printed-circuit boards and sockets can easily exceed bias current requirements and cause degradation in system performance. Including guard rings around inputs (see [Figure 7-1](#)) is a good practice. These guards can be driven from a low-impedance source at the same voltage level as the common-mode input.

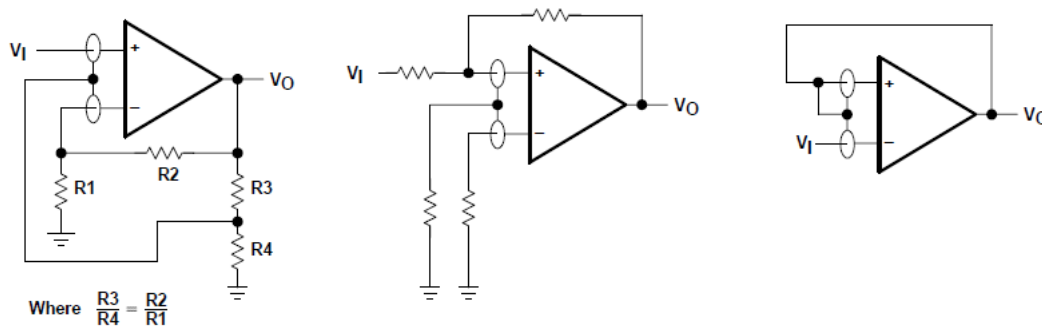


Figure 7-1. Use of Guard Rings

8 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

8.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

8.2 Support Resources

TI E2E™ support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

8.3 Trademarks

TI E2E™ is a trademark of Texas Instruments.

All trademarks are the property of their respective owners.

8.4 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.5 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

9 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision B (June 2001) to Revision C (March 2026)	Page
• Updated the numbering format for tables, figures, and cross-references throughout the document.....	1
• Deleted BiFET, Slew rate details in Features.....	1
• Deleted point "On-chip offset voltage trimming" in Features.....	1
• Added Applications section.....	1
• Changed Description section.....	1
• Added TLE208X and TLE208XA in a Single-Pole, Low-Pass Filter figure.....	1
• Added Product Information table.....	1
• Deleted CHIP CARRIER (FK), CERAMIC DIP (JG), CHIP FORM (Y) Columns from available options table...	3
• Deleted –55°C to 125°C row values from available options table.....	3
• Updated OffsetN1 and OffsetN2 pin to NC in TLE2081D, OR P PACKAGE.....	4
• Deleted TLE2081 TLE2082 TLE2084 FK package.....	4
• Deleted J package from TLE2084	4
• Deleted JG package from TLE2081 and TLE2082	4
• Added Pin Functions TLE2081D, OR P PACKAGE table.....	4
• Added Pin Functions TLE2082D OR P PACKAGE table.....	4
• Added Pin Functions TLE2084N PACKAGE table.....	4
• Added Pin Functions TLE2084 DW PACKAGE table.....	4
• Deleted TLE2081Y, TLE2082Y, and TLE2084Y chip information.....	4
• Deleted Equivalent Schematic (Each Channel) figure.....	4

• Deleted Actual Device Component Count table.....	4
• Changed specifications in the Absolute Maximum Ratings table.....	7
• Deleted rows for FK, J, and JG packages.....	7
• Changed specifications in TLE2081C Electrical Characteristics 5V section.....	8
• Changed specifications in TLE2081C Operating Characteristics 5V section.....	9
• Changed specifications in TLE2081C Electrical Characteristics 15V section.....	9
• Changed specifications in TLE2081C Electrical Characteristics 15V section.....	10
• Changed specifications in TLE2081I Electrical Characteristics 5V section.....	12
• Changed specifications in TLE2081I Operating Characteristics 5V section.....	13
• Changed specifications in TLE2081I Electrical Characteristics 15V section.....	14
• Changed specifications in TLE2081I Operating Characteristics 15V section.....	15
• Changed specifications in TLE2082C Electrical Characteristics 5V section.....	16
• Changed specifications in TLE2082C Operating Characteristics 5V section.....	17
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• Changed specifications in TLE2082I Electrical Characteristics 5V section.....	20
• Changed specifications in TLE2082I Operating Characteristics 5V section.....	21
• Changed specifications in TLE2082I Electrical Characteristics 15V section.....	22
• Changed specifications in TLE2082I Operating Characteristics 15V section.....	23
• Changed specifications in TLE2084C Electrical Characteristics 5V section.....	24
• Changed specifications in TLE2084C Operating Characteristics 5V section.....	25
• Changed specifications in TLE2084C Electrical Characteristics 15V section.....	26
• Changed specifications in TLE2084C Operating Characteristics 15V section.....	27
• Deleted table of graphs.....	28
• Deleted Figure 14 through Figure 73.....	28
• Added Figure 6-12 through Figure 6-17	28
• Deleted TLE2081 input offset voltage nulling section.....	31
• Deleted macromodel information section.....	31

10 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

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)
TLE2081ACD	Obsolete	Production	SOIC (D) 8	-	-	Call TI	Call TI	0 to 70	2081AC
TLE2081ACDR	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	2081AC
TLE2081ACDR.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	2081AC
TLE2081ACP	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2081AC
TLE2081ACP.A	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2081AC
TLE2081AID	Active	Production	SOIC (D) 8	75 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2081AI
TLE2081AID.A	Active	Production	SOIC (D) 8	75 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2081AI
TLE2081AIP	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2081AI
TLE2081AIP.A	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2081AI
TLE2081CD	Obsolete	Production	SOIC (D) 8	-	-	Call TI	Call TI	0 to 70	2081C
TLE2081CDR	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	2081C
TLE2081CDR.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	2081C
TLE2081CP	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	TLE2081CP
TLE2081CP.A	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	TLE2081CP
TLE2081ID	Obsolete	Production	SOIC (D) 8	-	-	Call TI	Call TI	-40 to 85	2081I
TLE2081IDR	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-	2081I
TLE2081IDR.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2081I
TLE2081IP	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-	TLE2081IP
TLE2081IP.A	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2081IP
TLE2082ACD	Obsolete	Production	SOIC (D) 8	-	-	Call TI	Call TI	0 to 70	2082AC
TLE2082ACDR	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082AC
TLE2082ACDR.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082AC
TLE2082ACP	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2082AC
TLE2082ACP.A	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2082AC
TLE2082AID	Obsolete	Production	SOIC (D) 8	-	-	Call TI	Call TI	-40 to 85	2082AI
TLE2082AIDR	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082AI
TLE2082AIDR.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082AI
TLE2082AIDRG4	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082AI
TLE2082AIDRG4.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082AI

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)
TLE2082AIP	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2082AI
TLE2082AIP.A	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2082AI
TLE2082CD	Obsolete	Production	SOIC (D) 8	-	-	Call TI	Call TI	0 to 70	2082C
TLE2082CDR	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082C
TLE2082CDR.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082C
TLE2082CP	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2082CP
TLE2082CP.A	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2082CP
TLE2082CPE4	Active	Production	PDIP (P) 8	50 TUBE	-	Call TI	Call TI	-40 to 85	
TLE2082ID	Obsolete	Production	SOIC (D) 8	-	-	Call TI	Call TI	-40 to 85	2082I
TLE2082IDR	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082I
TLE2082IDR.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082I
TLE2082IDRG4	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082I
TLE2082IDRG4.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2082I
TLE2082IP	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2082IP
TLE2082IP.A	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2082IP
TLE2084ACDW	Active	Production	SOIC (DW) 16	40 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	TLE2084AC
TLE2084ACDW.A	Active	Production	SOIC (DW) 16	40 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	TLE2084AC
TLE2084ACN	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	TLE2084ACN
TLE2084ACN.A	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	TLE2084ACN
TLE2084CDW	Active	Production	SOIC (DW) 16	40 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	TLE2084C
TLE2084CDW.A	Active	Production	SOIC (DW) 16	40 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	TLE2084C
TLE2084CDWR	Active	Production	SOIC (DW) 16	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-	TLE2084C
TLE2084CDWR.A	Active	Production	SOIC (DW) 16	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	TLE2084C
TLE2084CN	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	-	TLE2084CN
TLE2084CN.A	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLE2084CN
TLE2084IDW	Active	Production	SOIC (DW) 16	40 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	TLE2084I
TLE2084IDW.A	Active	Production	SOIC (DW) 16	40 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	TLE2084I

⁽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.

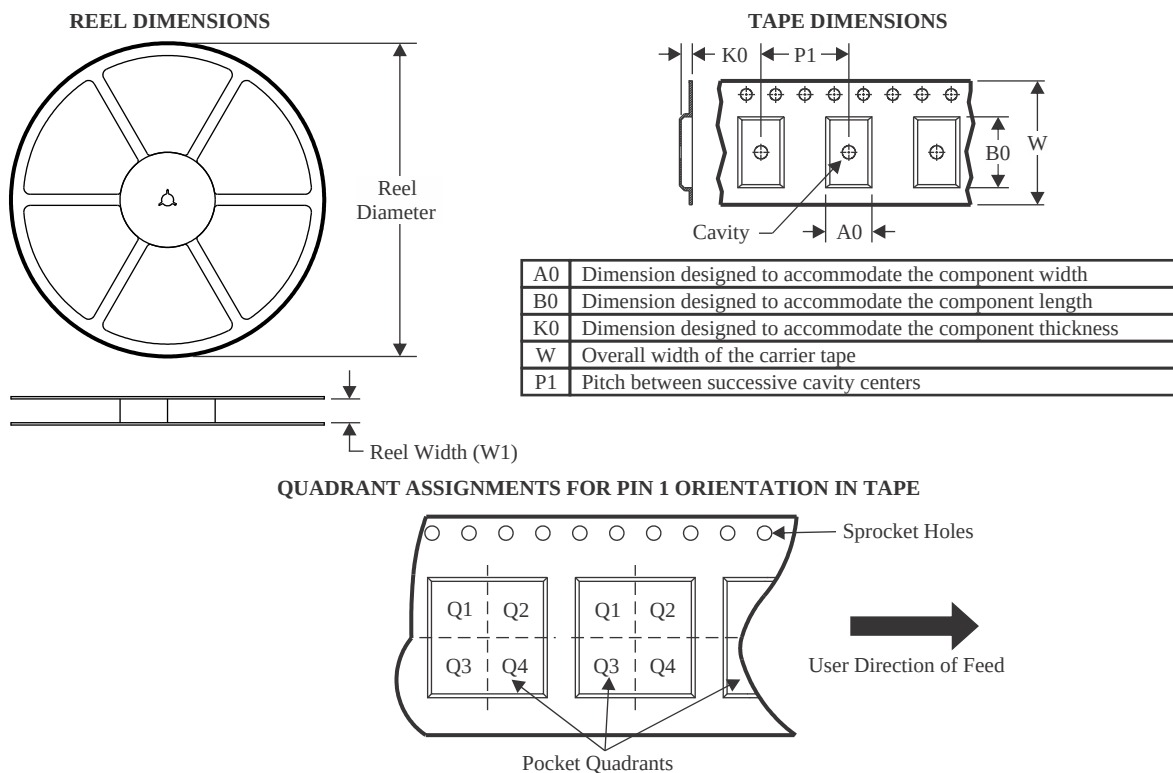
⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

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.

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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.

TAPE AND REEL INFORMATION

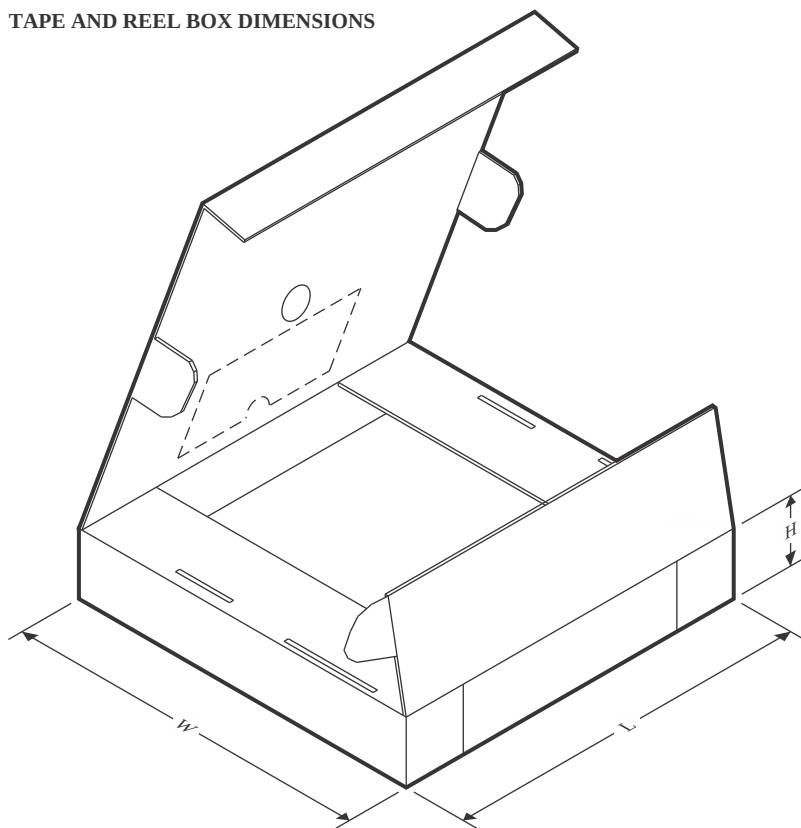


*All dimensions are nominal

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
TLE2081ACDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2081ACDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2081CDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2081CDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2081IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2081IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2082ACDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2082ACDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2082AIDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2082AIDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2082AIDRG4	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2082CDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2082CDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2082IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2082IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLE2082IDRG4	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1

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
TLE2084CDWR	SOIC	DW	16	2000	330.0	16.4	10.75	10.7	2.7	12.0	16.0	Q1

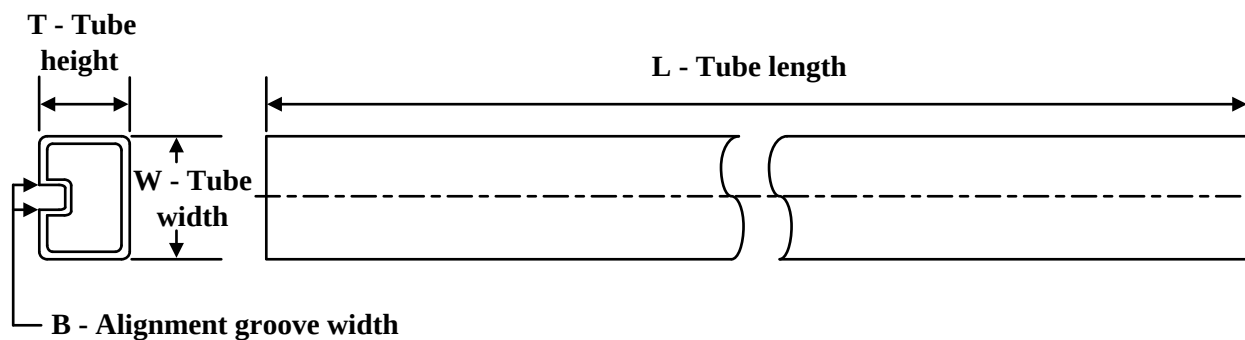
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TLE2081ACDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2081ACDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2081CDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2081CDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2081IDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2081IDR	SOIC	D	8	2500	340.5	338.1	20.6
TLE2082ACDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2082ACDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2082AIDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2082AIDR	SOIC	D	8	2500	340.5	338.1	20.6
TLE2082AIDRG4	SOIC	D	8	2500	353.0	353.0	32.0
TLE2082CDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2082CDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2082IDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2082IDR	SOIC	D	8	2500	353.0	353.0	32.0
TLE2082IDRG4	SOIC	D	8	2500	353.0	353.0	32.0
TLE2084CDWR	SOIC	DW	16	2000	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)
TLE2081ACP	P	PDIP	8	50	506	13.97	11230	4.32
TLE2081ACP.A	P	PDIP	8	50	506	13.97	11230	4.32
TLE2081AID	D	SOIC	8	75	507	8	3940	4.32
TLE2081AID	D	SOIC	8	75	505.46	6.76	3810	4
TLE2081AID.A	D	SOIC	8	75	507	8	3940	4.32
TLE2081AID.A	D	SOIC	8	75	505.46	6.76	3810	4
TLE2081AIP	P	PDIP	8	50	506	13.97	11230	4.32
TLE2081AIP.A	P	PDIP	8	50	506	13.97	11230	4.32
TLE2081CP	P	PDIP	8	50	506	13.97	11230	4.32
TLE2081CP.A	P	PDIP	8	50	506	13.97	11230	4.32
TLE2081IP	P	PDIP	8	50	506	13.97	11230	4.32
TLE2081IP.A	P	PDIP	8	50	506	13.97	11230	4.32
TLE2082ACP	P	PDIP	8	50	506	13.97	11230	4.32
TLE2082ACP.A	P	PDIP	8	50	506	13.97	11230	4.32
TLE2082AIP	P	PDIP	8	50	506	13.97	11230	4.32
TLE2082AIP.A	P	PDIP	8	50	506	13.97	11230	4.32
TLE2082CP	P	PDIP	8	50	506	13.97	11230	4.32
TLE2082CP.A	P	PDIP	8	50	506	13.97	11230	4.32
TLE2082IP	P	PDIP	8	50	506	13.97	11230	4.32
TLE2082IP.A	P	PDIP	8	50	506	13.97	11230	4.32
TLE2084ACDW	DW	SOIC	16	40	506.98	12.7	4826	6.6
TLE2084ACDW.A	DW	SOIC	16	40	506.98	12.7	4826	6.6
TLE2084ACN	N	PDIP	14	25	506	13.97	11230	4.32
TLE2084ACN.A	N	PDIP	14	25	506	13.97	11230	4.32
TLE2084CDW	DW	SOIC	16	40	506.98	12.7	4826	6.6
TLE2084CDW.A	DW	SOIC	16	40	506.98	12.7	4826	6.6
TLE2084CN	N	PDIP	14	25	506	13.97	11230	4.32
TLE2084CN.A	N	PDIP	14	25	506	13.97	11230	4.32
TLE2084IDW	DW	SOIC	16	40	506.98	12.7	4826	6.6

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
TLE2084IDW.A	DW	SOIC	16	40	506.98	12.7	4826	6.6

GENERIC PACKAGE VIEW

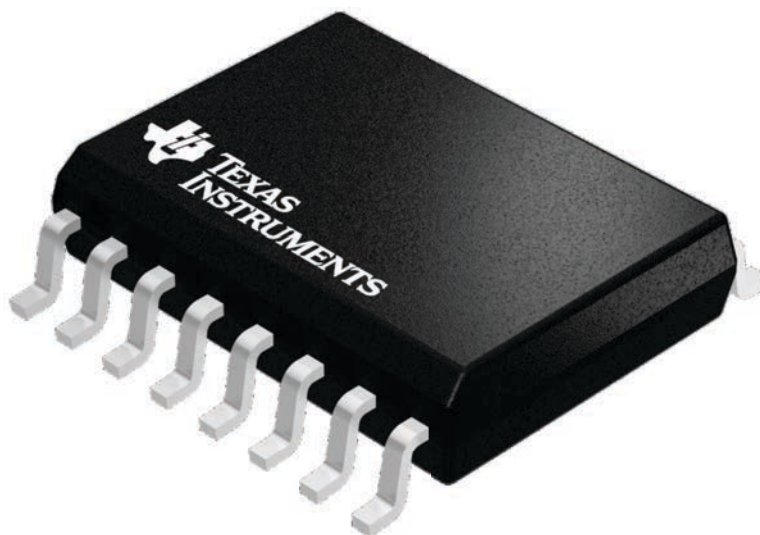
DW 16

SOIC - 2.65 mm max height

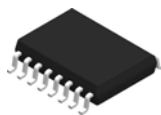
7.5 x 10.3, 1.27 mm pitch

SMALL OUTLINE INTEGRATED CIRCUIT

This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.



4224780/A

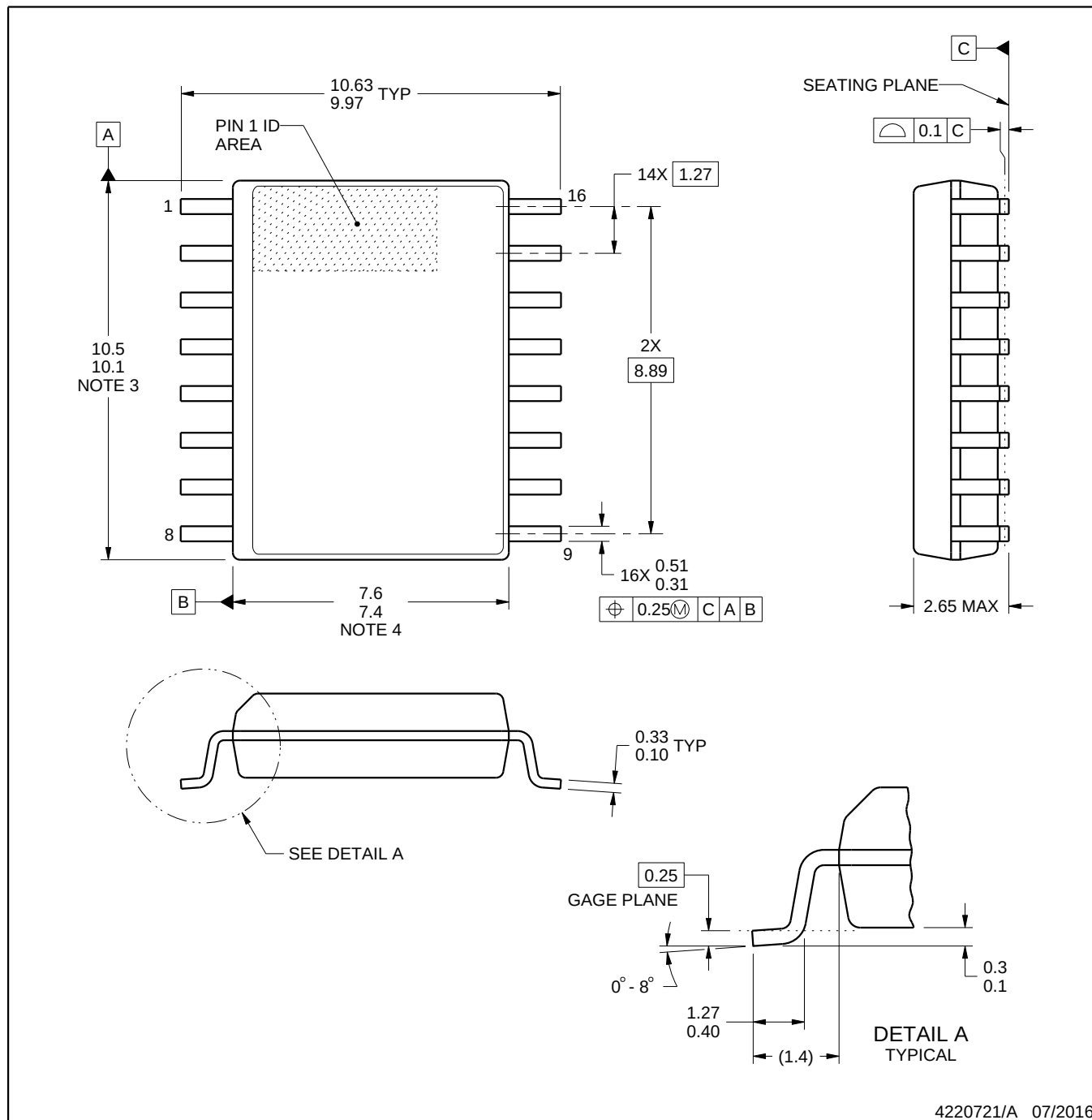


DW0016A

PACKAGE OUTLINE

SOIC - 2.65 mm max height

SOIC



4220721/A 07/2016

NOTES:

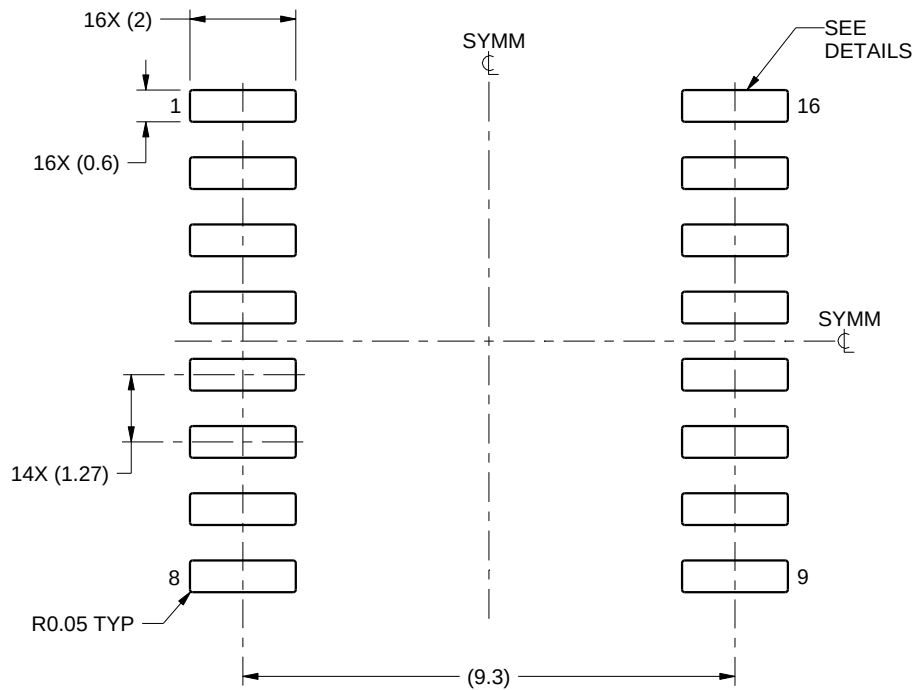
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm, per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm, per side.
5. Reference JEDEC registration MS-013.

EXAMPLE BOARD LAYOUT

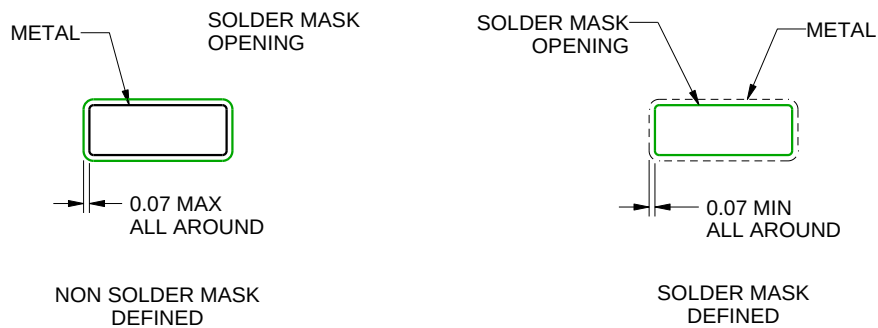
DW0016A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE
SCALE:7X



SOLDER MASK DETAILS

4220721/A 07/2016

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

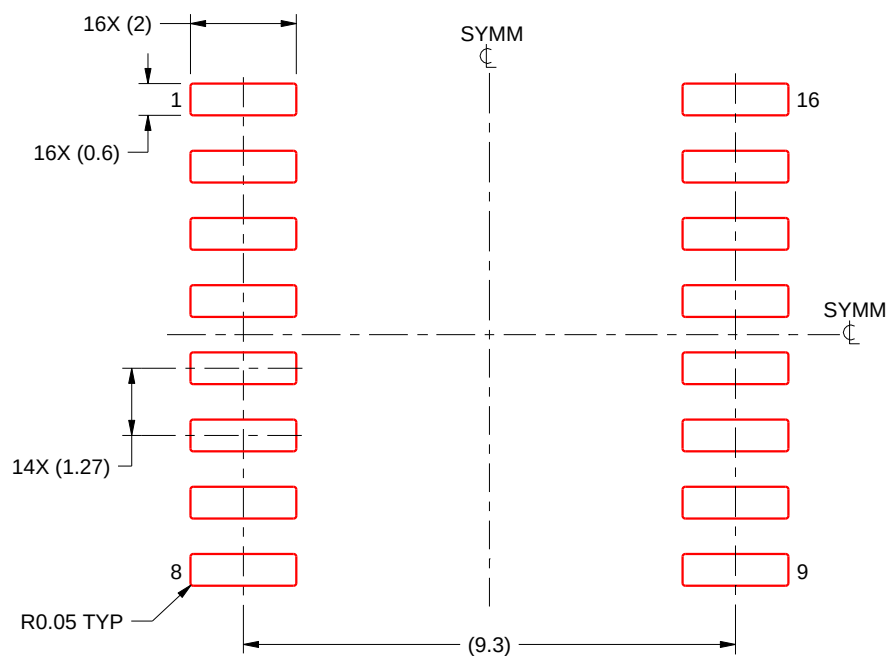
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DW0016A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:7X

4220721/A 07/2016

NOTES: (continued)

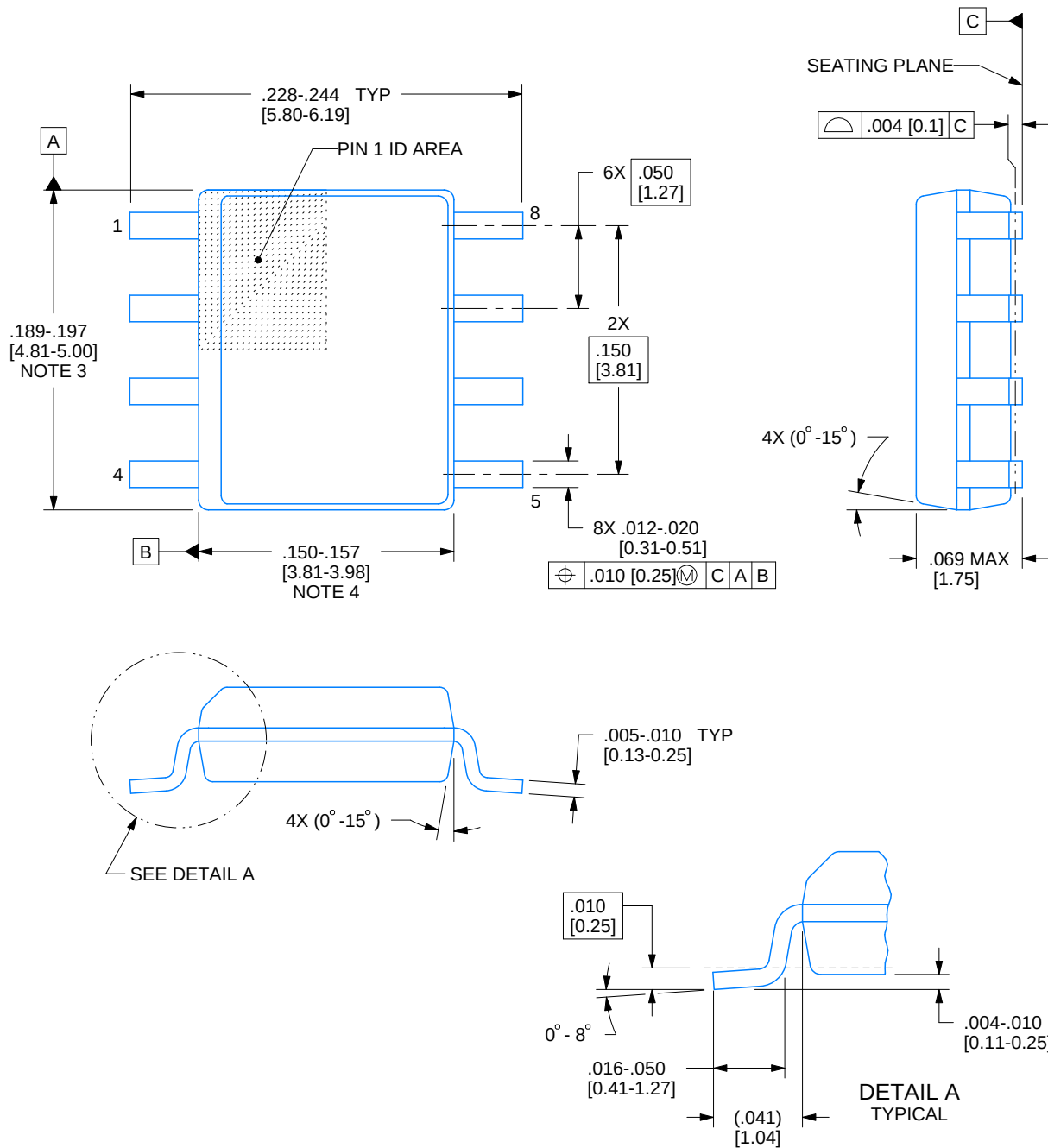
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

D0008A

PACKAGE OUTLINE

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



4214825/C 02/2019

NOTES:

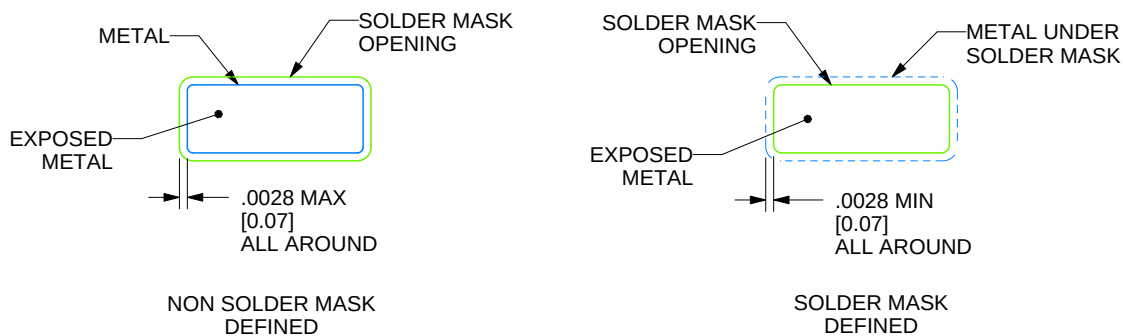
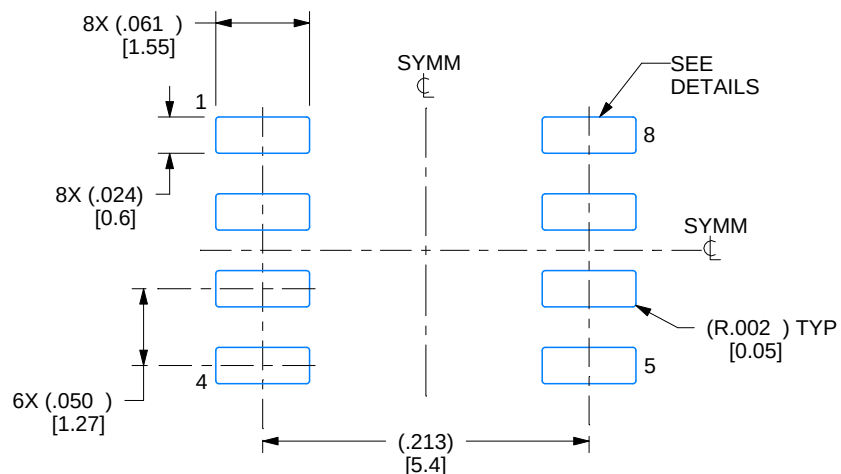
1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate 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.

EXAMPLE BOARD LAYOUT

D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



4214825/C 02/2019

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

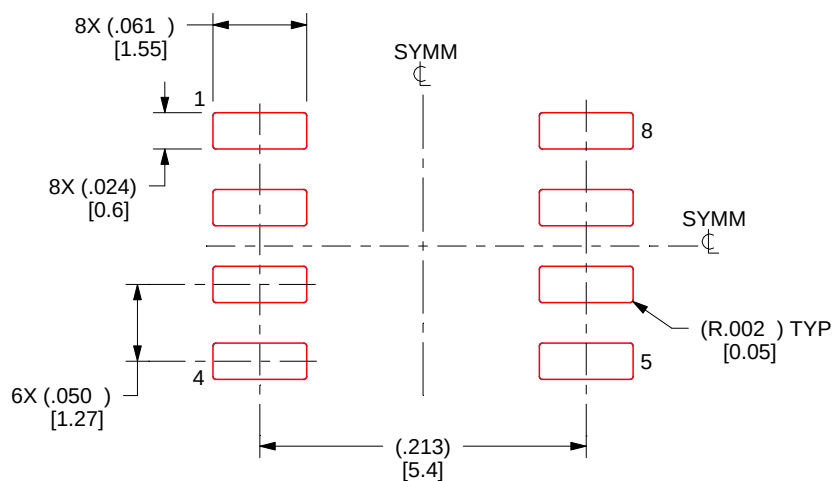
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

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

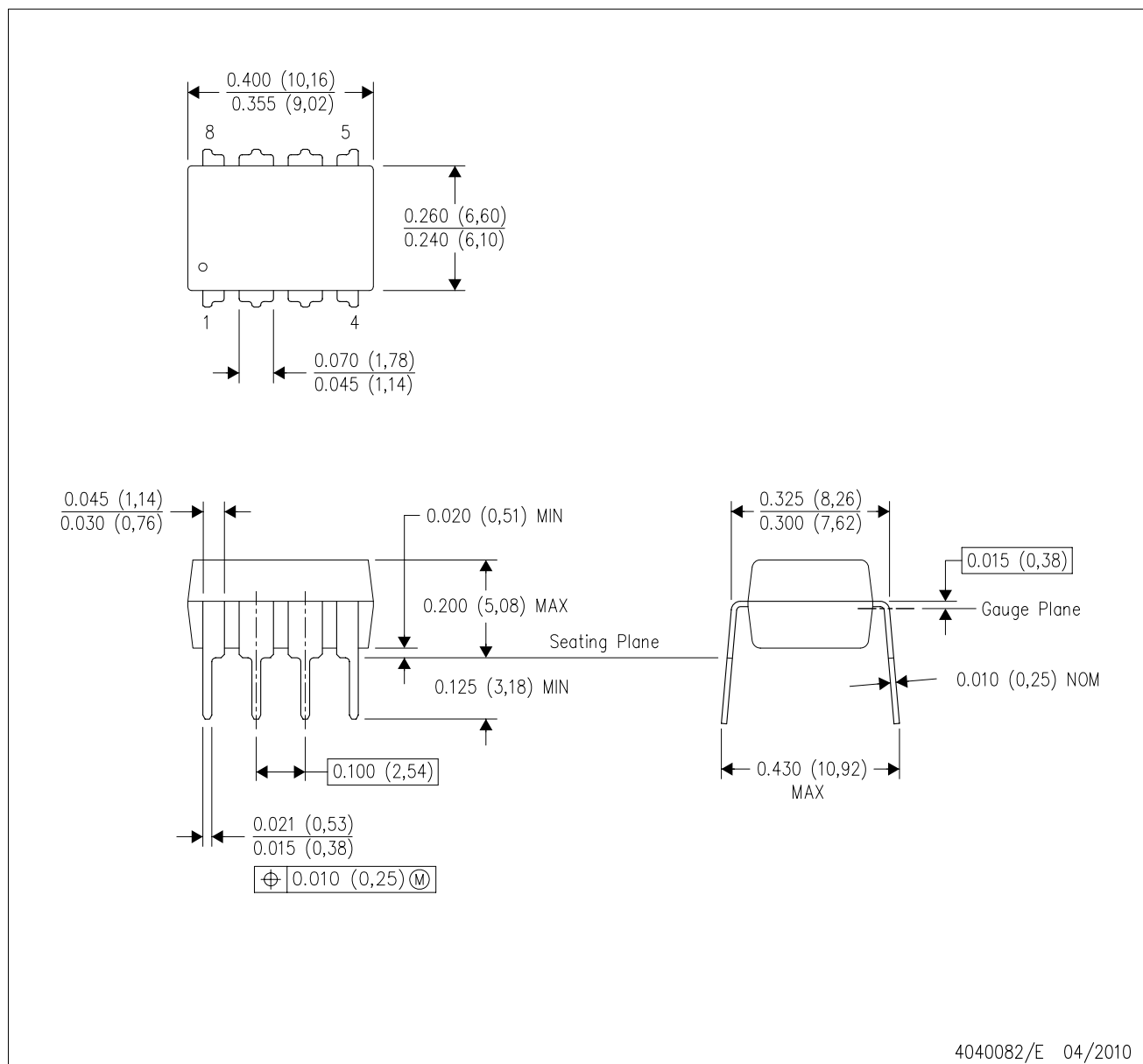
4214825/C 02/2019

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.

P (R-PDIP-T8)

PLASTIC DUAL-IN-LINE PACKAGE

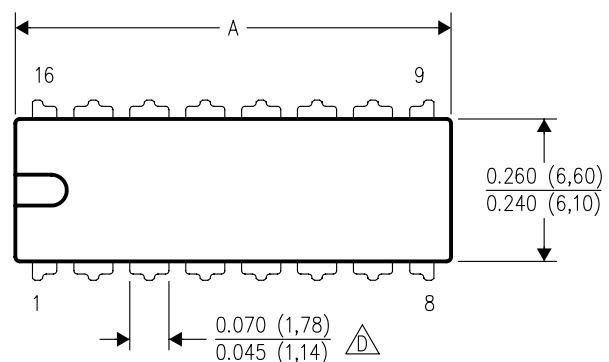


- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Falls within JEDEC MS-001 variation BA.

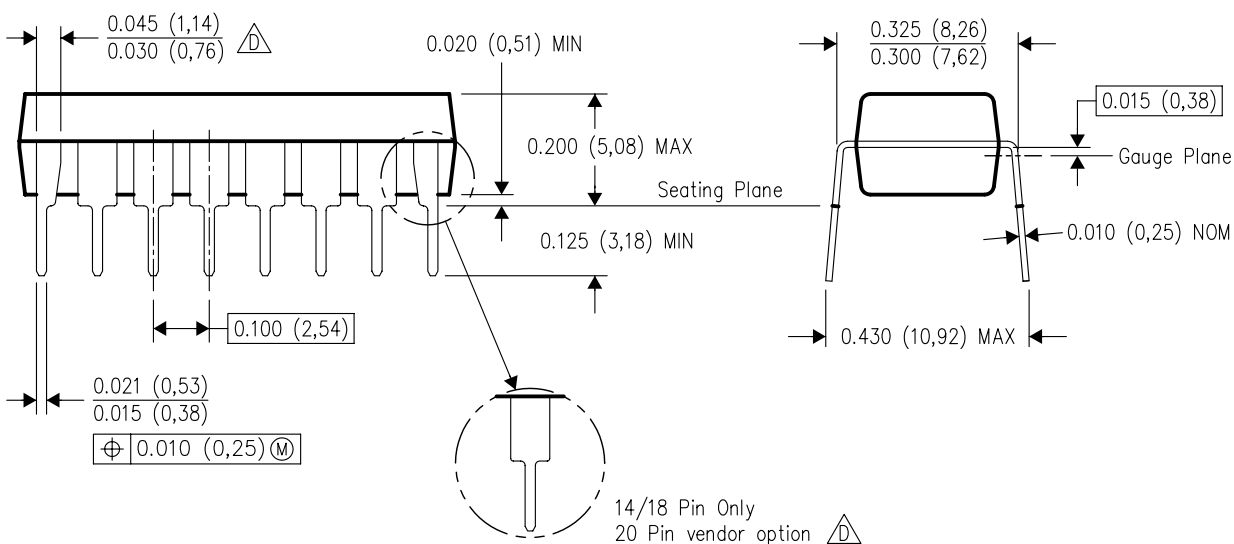
N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



PINS ** DIM	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS-001 VARIATION	AA	BB	AC	AD



4040049/E 12/2002

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.

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