Dual/Quad 100V/µs, 85MHz, Rail-to-Rail Input and Output Op Amps

May 2003

FEATURES

- **Slew Rate: 100V/µs**
- **Gain Bandwidth Product: 85MHz**
- **Input Common Mode Range Includes Both Rails**
- **Output Swings Rail-to-Rail**
- **Low Quiescent Current: 3mA Max per Amplifier**
- Large Output Current: 42mA Typ
- Voltage Noise: 21nV/√Hz Typ
- Power Supply Rejection: 90dB Typ
- Open-Loop Gain: 60V/mV Typ
- Operating Temperature Range: –40°C to 85°C
- Dual Available in 8-Lead DFN and SO Packages
- Quad Available in the 14-Pin Narrow SO Package

APPLICATIONS

- Low Voltage, High Frequency Signal Processing
- Driving A/D Converters
- Rail-to-Rail Buffer Amplifiers
- Active Filters
- Video Line Driver

DESCRIPTION

The LT®1804/LT1805 are dual/quad, low power, high speed rail-to-rail input and output operational amplifiers with excellent DC performance. The LT1804/LT1805 feature reduced supply current, lower input offset voltage, lower input bias current and higher DC gain than other devices with comparable bandwidth and slew rate.

Typically, the LT1804/LT1805 have an input offset voltage of 350µV, an input bias current of 125nA and an open-loop gain of 60 thousand.

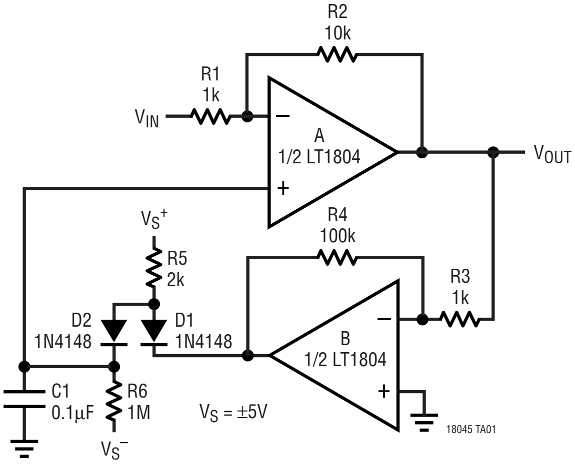
The LT1804/LT1805 have an input range that includes both supply rails and an output that swings within 20mV of either supply rail to maximize the signal dynamic range in low supply applications.

The LT1804/LT1805 maintain their performance for supplies from 2.3V to 12.6V and are specified at 3V, 5V and ±5V supplies. The inputs can be driven beyond the supplies without damage or phase reversal of the output.

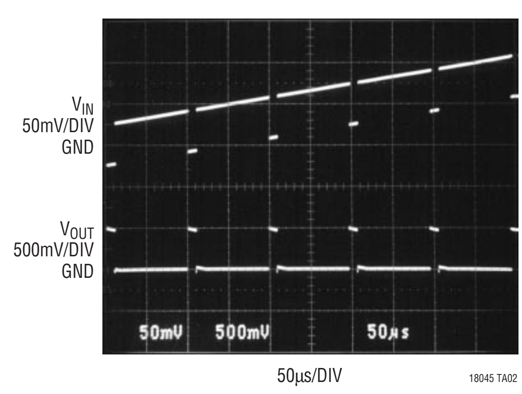
The LT1804 is available in 8-pin DFN and SO packages with the standard op amp pinouts. The LT1805 features the standard quad op amp configuration and is available in a 14-pin plastic SO package.

TYPICAL APPLICATION

Inverting DC Restore



Inverting DC Restore Circuit Response

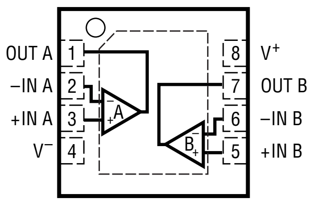


ABSOLUTE MAXIMUM RATINGS (Note 1)

Total Supply Voltage (V_S^+ to V_S^-) 12.6V
Input Current (Note 2) .... ±10mA
Output Short-Circuit Duration (Note 3) .... Indefinite
Operating Temperature Range (Note 4) .. –40°C to 85°C
Specified Temperature Range (Note 5) ... –40°C to 85°C
Maximum Junction Temperature .... 150°C
Maximum Junction Temperature (DD Package) .. 125°C
Storage Temperature Range .... –65°C to 150°C
Storage Temperature Range
(DD Package) .... –65°C to 125°C
Lead Temperature (Soldering, 10 sec) .... 300°C

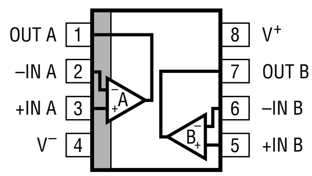
PACKAGE/ORDER INFORMATION

TOP VIEW



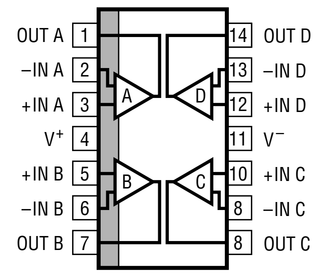
DD PACKAGE
8-LEAD (3mm × 3mm) PLASTIC DFN
T_{JMAX} = 125°C, θ_{JA} = 160°C/W
UNDERSIDE METAL INTERNALLY CONNECTED TO V–
(PCB CONNECTION OPTIONAL)

TOP VIEW



S8 PACKAGE
8-LEAD PLASTIC SO
T_{JMAX} = 150°C, θ_{JA} = 190°C/W

TOP VIEW



S PACKAGE
14-LEAD PLASTIC SO
T_{JMAX} = 150°C, θ_{JA} = 160°C/W

ORDER PART NUMBER	DD PART MARKING*	ORDER PART NUMBER	S8 PART MARKING	ORDER PART NUMBER
LT1804CDD LT1804IDD	LADJ	LT1804CS8 LT1804IS8	1804 1804I	LT1805CS LT1805IS

Consult LTC Marketing for parts specified with wider operating temperature ranges.
*The temperature grades are identified by a label on the shipping container.

ELECTRICAL CHARACTERISTICS

T_A = 25°C; V_S = 5V, 0V; V_S = 3V, 0V; V_{CM} = V_{OUT} = half supply, unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{OS}	Input Offset Voltage	V_{CM} = 0V V_{CM} = 0V (DD) V_{CM} = V_S		0.35 1.00 1.50	2 3 8	mV mV mV
ΔV_{OS}	Input Offset Shift	V_{CM} = 0V to V_S – 2V		0.125	0.50	mV
	Input Offset Voltage Match (Channel-to-Channel) (Note 9)	V_{CM} = 0V V_{CM} = 0V (DD)		0.5 1.0	3.5 5.0	mV mV
I_B	Input Bias Current	V_{CM} = 1V V_{CM} = V_S		125 3	750 5.5	nA µA
	Input Bias Current Match (Channel-to-Channel) (Note 9)	V_{CM} = 1V V_{CM} = V_S		100 100	1250 1500	nA nA
I_{OS}	Input Offset Current	V_{CM} = 1V V_{CM} = V_S		100 50	1000 1000	nA nA
	Input Noise Voltage	0.1Hz to 10Hz		3		μV_{P-P}
e_n	Input Noise Voltage Density	f = 10kHz		21		$nV/\sqrt{Hz}$
i_n	Input Noise Current Density	f = 10kHz		2.5		$pA/\sqrt{Hz}$
C_{IN}	Input Capacitance			2		pF
A_{VOL}	Large-Signal Voltage Gain	V_S = 5V, V_O = 0.5V to 4.5V, R_L = 1k to V_S/2 V_S = 5V, V_O = 1V to 4V, R_L = 100Ω to V_S/2 V_S = 3V, V_O = 0.5V to 2.5V, R_L = 1k to V_S/2	20 2 15	60 4.5 45		V/mV V/mV V/mV
CMRR	Common Mode Rejection Ratio	V_S = 5V, V_{CM} = 0V to 3V V_S = 3V, V_{CM} = 0V to 1V	75 66	96 90		dB dB
	CMRR Match (Channel-to-Channel) (Note 9)	V_S = 5V, V_{CM} = 0V to 3V V_S = 3V, V_{CM} = 0V to 1V	69 60	91 85		dB dB
	Input Common Mode Range		0		V_S	V
PSRR	Power Supply Rejection Ratio	V_S = 2.5V to 10V, V_{CM} = 0V	68	90		dB
	PSRR Match (Channel-to-Channel) (Note 9)	V_S = 2.5V to 10V, V_{CM} = 0V	62	90		dB
	Minimum Supply Voltage (Note 6)			2.3	2.5	V
V_{OL}	Output Voltage Swing Low (Note 7)	No Load I_{SINK} = 5mA I_{SINK} = 15mA		17 80 180	60 150 300	mV mV mV
V_{OH}	Output Voltage Swing High (Note 7)	No Load I_{SOURCE} = 5mA I_{SOURCE} = 15mA		17 125 350	60 250 600	mV mV mV
I_{SC}	Short-Circuit Current (Note 3)	V_S = 5V V_S = 3V	20 18	42 34		mA mA
I_S	Supply Current per Amplifier			2.7	3	mA
GBW	Gain Bandwidth Product	V_S = 5V, Frequency = 2MHz, R_L = 1k to 2.5V	50	85		MHz
SR	Slew Rate	V_S = 5V, A_V = –1, R_L = 1k to V_S/2, V_O = 0.5V to 4.5V Measured at V_O = 1.5V, 3.5V	65	100		V/µs
FPBW	Full Power Bandwidth (Note 10)	V_S = 5V, A_V = –1, V_O = 0.5V to 4.5V, R_L = 1k to V_S/2		8		MHz
HD	Harmonic Distortion	V_S = 5V, A_V = 1, R_L = 1k, V_O = $2V_{P-P}$, f_C = 1MHz		–75		dBc
t_S	Settling Time	0.01%, V_S = 5V, V_{STEP} = 2V, A_V = 1, R_L = 1k		350		ns
ΔG	Differential Gain (NTSC)	V_S = 5V, A_V = 2, R_L = 150Ω		0.15		%
$\Delta\theta$	Differential Phase (NTSC)	V_S = 5V, A_V = 2, R_L = 150Ω		1		Deg

ELECTRICAL CHARACTERISTICS

The ● denotes specifications which apply over the 0°C ≤ T_A ≤ 70°C temperature range. V_S = 5V, 0V; V_S = 3V, 0V; V_{CM} = V_{OUT} = half supply unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
V_{OS}	Input Offset Voltage	V_{CM} = 0V V_{CM} = 0V (DD) V_{CM} = V_S	● ● ●		0.50 1.25 1.60	3.5 5.0 8.5	mV mV mV
ΔV_{OS}	Input Offset Shift	V_{CM} = 0V to V_S – 2V	●		0.05	0.8	mV
	Input Offset Voltage Match (Channel-to-Channel) (Note 9)	V_{CM} = 0V V_{CM} = 0V (DD)	● ●		0.75 1.50	5.5 7.5	mV mV
V_{OS} TC	Input Offset Voltage Drift (Note 8)		●		10	35	µV/°C
I_B	Input Bias Current	V_{CM} = 1V V_{CM} = V_S – 0.2V	● ●		150 3.2	1100 6	nA µA
	Input Bias Current Match (Channel-to-Channel) (Note 9)	V_{CM} = 1V V_{CM} = V_S – 0.2V	● ●		120 120	1500 1800	nA nA
I_{OS}	Input Offset Current	V_{CM} = 1V V_{CM} = V_S – 0.2V	● ●		100 50	1400 1400	nA nA
A_{VOL}	Large-Signal Voltage Gain	V_S = 5V, V_O = 0.5V to 4.5V, R_L = 1k to V_S/2 V_S = 5V, V_O = 1V to 4V, R_L = 100Ω to V_S/2 V_S = 3V, V_O = 0.5V to 2.5V, R_L=1k to V_S/2	● ● ●	15 1.4 10	50 3.7 40		V/mV V/mV V/mV
CMRR	Common Mode Rejection Ratio	V_S = 5V, V_{CM} = 0V to 3V V_S = 3V, V_{CM} = 0V to 1V	● ●	71 61	95 90		dB dB
	CMRR Match (Channel-to-Channel) (Note 9)	V_S = 5V, V_{CM} = 0V to 3V V_S = 3V, V_{CM} = 0V to 1V	● ●	65 55	90 85		dB dB
	Input Common Mode Range		●	0		V_S	V
PSRR	Power Supply Rejection Ratio	V_S = 2.5V to 10V, V_{CM} = 0V	●	65	87		dB
	PSRR Match (Channel-to-Channel) (Note 9)	V_S = 2.5V to 10V, V_{CM} = 0V	●	59	87		dB
	Minimum Supply Voltage (Note 6)		●		2.3	2.5	V
V_{OL}	Output Voltage Swing Low (Note 7)	No Load I_{SINK} = 5mA I_{SINK} = 15mA	● ● ●		19 100 200	80 225 450	mV mV mV
V_{OH}	Output Voltage Swing High (Note 7)	No Load I_{SOURCE} = 5mA I_{SOURCE} = 15mA	● ● ●		19 150 450	80 350 900	mV mV mV
I_{SC}	Short-Circuit Current (Note 3)	V_S = 5V V_S = 3V	● ●	17 15	40 28		mA mA
I_S	Supply Current per Amplifier		●		3	3.75	mA
GBW	Gain Bandwidth Product	V_S = 5V, Frequency = 2MHz, R_L = 1k to 2.5V	●	45	82		MHz
SR	Slew Rate	V_S = 5V, A_V = –1, R_L = 1k to V_S/2, V_O = 0.5V to 4.5V Measured at V_O = 1.5V, 3.5V	●	45	93		V/µs

ELECTRICAL CHARACTERISTICS

The ● denotes specifications which apply over the –40°C ≤ T_A ≤ 85°C temperature range. V_S = 5V, 0V; V_S = 3V, 0V; V_{CM} = V_{OUT} = half supply unless otherwise noted. (Note 5)

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
V_{OS}	Input Offset Voltage	V_{CM} = 0V V_{CM} = 0V (DD) V_{CM} = V_S	● ● ●		0.7 1.5 1.7	4.0 6.5 9.0	mV mV mV
ΔV_{OS}	Input Offset Shift	V_{CM} = 0V to V_S – 2V	●		0.125	1.00	mV
	Input Offset Voltage Match (Channel-to-Channel) (Note 9)	V_{CM} = 0V V_{CM} = 0V (DD)	● ●		1 2	6.5 9.0	mV mV
V_{OS} TC	Input Offset Voltage Drift (Note 8)		●		10	35	µV/°C
I_B	Input Bias Current	V_{CM} = 1V V_{CM} = V_S – 0.2V	● ●		200 3.4	1500 6.5	nA µA
	Input Bias Current Match (Channel-to-Channel) (Note 9)	V_{CM} = 1V V_{CM} = V_S – 0.2V	● ●		150 150	2000 2200	nA nA
I_{OS}	Input Offset Current	V_{CM} = 1V V_{CM} = V_S – 0.2V	● ●		100 50	1600 1600	nA nA
A_{VOL}	Large-Signal Voltage Gain	V_S = 5V, V_O = 0.5V to 4.5V, R_L = 1k to V_S/2 V_S = 5V, V_O = 1.5V to 3.5V, R_L = 100Ω to V_S/2 V_S = 3V, V_O = 0.5V to 2.5V, R_L=1k to V_S/2	● ● ●	12 1.3 8	48 4.8 35		V/mV V/mV V/mV
CMRR	Common Mode Rejection Ratio	V_S = 5V, V_{CM} = 0V to 3V V_S = 3V, V_{CM} = 0V to 1V	● ●	69 60	95 90		dB dB
	CMRR Match (Channel-to-Channel) (Note 9)	V_S = 5V, V_{CM} = 0V to 3V V_S = 3V, V_{CM} = 0V to 1V	● ●	63 54	90 85		dB dB
	Input Common Mode Range		●	0		V_S	V
PSRR	Power Supply Rejection Ratio	V_S = 2.5V to 10V, V_{CM} = 0V	●	64	86		dB
	PSRR Match (Channel-to-Channel) (Note 9)	V_S = 2.5V to 10V, V_{CM} = 0V	●	58	86		dB
	Minimum Supply Voltage (Note 6)		●		2.3	2.5	V
V_{OL}	Output Voltage Swing Low (Note 7)	No Load I_{SINK} = 5mA I_{SINK} = 10mA	● ● ●		20 100 170	90 250 350	mV mV mV
V_{OH}	Output Voltage Swing High (Note 7)	No Load I_{SOURCE} = 5mA I_{SOURCE} = 10mA	● ● ●		20 170 300	90 400 600	mV mV mV
I_{SC}	Short-Circuit Current (Note 3)	V_S = 5V V_S = 3V	● ●	12 11	35 27		mA mA
I_S	Supply Current per Amplifier		●		3.1	4.25	mA
GBW	Gain Bandwidth Product	V_S = 5V, Frequency = 2MHz	●	40	77		MHz
SR	Slew Rate	V_S = 5V, A_V = –1, R_L = 1k to V_S/2, V_O = 0.5V to 4.5V Measured at V_O = 1.5V, 3.5V	●	30	70		V/µs

ELECTRICAL CHARACTERISTICS T_A = 25°C, V_S = ±5V, V_{CM} = 0V, V_{OUT} = 0V, unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{OS}	Input Offset Voltage	V_{CM} = –5V V_{CM} = –5V (DD) V_{CM} = 5V		0.35 1.50 1.50	2.5 3.5 8.0	mV mV mV
ΔV_{OS}	Input Offset Shift	V_{CM} = –5V to 3V		0.3	1	mV
	Input Offset Voltage Match (Channel-to-Channel) (Note 9)	V_{CM} = –5V V_{CM} = –5V (DD)		0.5 1.0	4.0 5.5	mV mV
I_B	Input Bias Current	V_{CM} = –4V V_{CM} = 5V		125 2.5	750 5.5	nA µA
	Input Bias Current Match (Channel-to-Channel) (Note 9)	V_{CM} = –4V V_{CM} = 5V		150 150	1250 1500	nA nA
I_{OS}	Input Offset Current	V_{CM} = –4V V_{CM} = 5V		100 50	1000 1000	nA nA
	Input Noise Voltage	0.1Hz to 10Hz		3		μV_{P-P}
e_n	Input Noise Voltage Density	f = 10kHz		21		$nV/\sqrt{Hz}$
i_n	Input Noise Current Density	f = 10kHz		2.5		$pA/\sqrt{Hz}$
C_{IN}	Input Capacitance	f = 100kHz		2		pF
A_{VOL}	Large-Signal Voltage Gain	V_O = –4V to 4V, R_L = 1k V_O = –1.5V to 1.5V, R_L = 100Ω	20 2	55 5		V/mV V/mV
CMRR	Common Mode Rejection Ratio	V_{CM} = –5V to 3V	78	96		dB
	CMRR Match (Channel-to-Channel) (Note 9)	V_{CM} = –5v to 3V	72	96		dB
	Input Common Mode Range		V_S^-		V_S^+	V
PSRR	Power Supply Rejection Ratio	V_S^+ = 2.5V to 10V, V_S^- = 0V, $V_{OUT} = V_S^+/2$	68	90		dB
	PSRR Match (Channel-to-Channel) (Note 9)	V_S^+ = 2.5V to 10V, V_S^- = 0V, $V_{OUT} = V_S^+/2$	62	90		dB
V_{OL}	Output Voltage Swing Low (Note 7)	No Load I_{SINK} = 5mA I_{SINK} = 15mA		17 85 200	60 150 300	mV mV mV
V_{OH}	Output Voltage Swing High (Note 7)	No Load I_{SOURCE} = 5mA I_{SOURCE} = 15mA		17 125 350	60 250 600	mV mV mV
I_{SC}	Short-Circuit Current (Note 3)		25	50		mA
I_S	Supply Current per Amplifier			2.5	3	mA
GBW	Gain Bandwidth Product	Frequency = 2MHz		83		MHz
SR	Slew Rate	A_V = –1, R_L = 1k, V_O = ±4V Measured at V_O = ±2V		88		V/µs
FPBW	Full Power Bandwidth (Note 10)	$V_O = 8V_{P-P}$		4		MHz
HD	Harmonic Distortion	A_V = 1, R_L = 1k, $V_O = 2V_{P-P}$, f_C = 1MHz		–75		dBc
t_S	Settling Time	0.01%, V_{STEP} = 5V, A_V = 1, R_L = 1k		500		ns
ΔG	Differential Gain (NTSC)	A_V = 2, R_L = 150Ω		0.75		%
Δθ	Differential Phase (NTSC)	A_V = 2, R_L = 150Ω		0.8		Deg

ELECTRICAL CHARACTERISTICS

The ● denotes specifications which apply over the 0°C ≤ T_A ≤ 70°C temperature range. V_S = ±5V, V_{CM} = 0V, V_{OUT} = 0V unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
V_{OS}	Input Offset Voltage	V_{CM} = –5V V_{CM} = –5V (DD) V_{CM} = 5V	● ● ●		0.5 1.5 1.4	3.5 5.0 8.5	mV mV mV
ΔV_{OS}	Input Offset Shift	V_{CM} = –5V to 3V	●		0.35	1.5	mV
	Input Offset Voltage Match (Channel-to-Channel) (Note 9)	V_{CM} = –5V V_{CM} = –5V (DD)	● ●		0.75 1.50	5.5 7.5	mV mV
V_{OS} TC	Input Offset Voltage Drift (Note 8)		●		10	35	µV/°C
I_B	Input Bias Current	V_{CM} = –4V V_{CM} = 4.8V	● ●		175 2.5	1000 6	nA µA
	Input Bias Current Match (Channel-to-Channel) (Note 9)	V_{CM} = –4V V_{CM} = 4.8V	● ●		175 175	1500 1800	nA nA
I_{OS}	Input Offset Current	V_{CM} = –4V V_{CM} = 4.8V	● ●		100 50	1400 1400	nA nA
A_{VOL}	Large-Signal Voltage Gain	V_O = –4V to 4V, R_L = 1k V_O = –1.5V to 1.5V, R_L = 100Ω	● ●	15 1.5	47 4.5		V/mV V/mV
CMRR	Common Mode Rejection Ratio	V_{CM} = –5V to 3V	●	74	95		dB
	CMRR Match (Channel-to-Channel) (Note 9)	V_{CM} = –5V to 3V	●	68	95		dB
	Input Common Mode Range		●	V_S^-		V_S^+	V
PSRR	Power Supply Rejection Ratio	V_S^+ = 2.5V to 10V, V_S^- = 0V, V_{OUT} = $V_S^+/2$	●	65	87		dB
	PSRR Match (Channel-to-Channel) (Note 9)	V_S^+ = 2.5V to 10V, V_S^- = 0V, V_{OUT} = $V_S^+/2$	●	59	87		dB
V_{OL}	Output Voltage Swing Low (Note 7)	No Load I_{SINK} = 5mA I_{SINK} = 15mA	● ● ●		19 100 220	80 225 475	mV mV mV
V_{OH}	Output Voltage Swing High (Note 7)	No Load I_{SOURCE} = 5mA I_{SOURCE} = 15mA	● ● ●		19 150 460	80 350 900	mV mV mV
I_{SC}	Short-Circuit Current (Note 3)		●	20	46		mA
I_S	Supply Current per Amplifier		●		2.8	3.75	mA
GBW	Gain Bandwidth Product	Frequency = 2MHz	●		80		MHz
SR	Slew Rate	A_V = –1, R_L = 1k, V_O = ±4V, Measured at V_O = ±2V	●		84		V/µs

ELECTRICAL CHARACTERISTICS

The ● denotes specifications which apply over the –40°C ≤ T_A ≤ 85°C temperature range. V_S = ±5V, V_{CM} = 0V, V_{OUT} = 0V unless otherwise noted. (Note 5)

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
V_{OS}	Input Offset Voltage	V_{CM} = –5V V_{CM} = –5V (DD) V_{CM} = 5V	● ● ●		1 2 2	4.0 6.5 9.0	mV mV mV
ΔV_{OS}	Input Offset Shift	V_{CM} = –5V to 3V	●		0.4	1.7	mV
	Input Offset Voltage Match (Channel-to-Channel) (Note 9)	V_{CM} = –5V V_{CM} = –5V (DD)	● ●		1 2	6.5 9.0	mV mV
V_{OS} TC	Input Offset Voltage Drift (Note 8)		●		10	35	µV/°C
I_B	Input Bias Current	V_{CM} = –4V V_{CM} = 4.8V	● ●		250 2.5	1200 6.5	nA µA
	Input Bias Current Match (Channel-to-Channel) (Note 9)	V_{CM} = –4V V_{CM} = 4.8V	● ●		200 250	2000 2200	nA nA
I_{OS}	Input Offset Current	V_{CM} = –4V V_{CM} = 4.8V	● ●		100 50	1600 1600	nA nA
A_{VOL}	Large-Signal Voltage Gain	V_O = –4V to 4V, R_L = 1k V_O = –1V to 1V, R_L = 100Ω	● ●	12 1.4	45 5.3		V/mV V/mV
CMRR	Common Mode Rejection Ratio	V_{CM} = –5V to 3V	●	73	95		dB
	CMRR Match (Channel-to-Channel) (Note 9)	V_{CM} = –5V to 3V	●	67	95		dB
	Input Common Mode Range		●	V_S^-		V_S^+	V
PSRR	Power Supply Rejection Ratio	V_S^+ = 2.5V to 10V, V_S^- = 0V, V_{OUT} = $V_S^+/2$	●	64	86		dB
	PSRR Match (Channel-to-Channel) (Note 9)	V_S^+ = 2.5V to 10V, V_S^- = 0V, V_{OUT} = $V_S^+/2$	●	58	86		dB
V_{OL}	Output Voltage Swing Low (Note 7)	No Load I_{SINK} = 5mA I_{SINK} = 10mA	● ● ●		20 110 170	90 250 350	mV mV mV
V_{OH}	Output Voltage Swing High (Note 7)	No Load I_{SOURCE} = 5mA I_{SOURCE} = 10mA	● ● ●		20 170 300	90 400 600	mV mV mV
I_{SC}	Short-Circuit Current (Note 3)		●	12.5	34		mA
I_S	Supply Current per Amplifier		●		2.9	4.25	mA
GBW	Gain Bandwidth Product	Frequency = 2MHz	●		75		MHz
SR	Slew Rate	A_V = –1, R_L = 1k, V_O = ±4V, Measured at V_O = ±2V	●		65		V/µs

Note 1: Absolute Maximium Ratings are those values beyond which the life of the device may be impaired.

Note 2: The inputs are protected by back-to-back diodes. If the differential input voltage exceeds 1.4V, the input current should be limited to less than 10mA.

Note 3: A heat sink may be required to keep the junction temperature below the absolute maximum rating when the output is shorted indefinitely.

Note 4: The LT1804C/LT1804I and LT1805C/LT1805I are guaranteed functional over the temperature range of –40°C and 85°C.

Note 5: The LT1804C/LT1805C are guaranteed to meet specified performance from 0°C to 70°C. The LT1804C/LT1805C are designed, characterized and expected to meet specified performance from –40°C to 85°C but are not tested or QA sampled at these temperatures. The LT1804I/LT1805I are guaranteed to meet specified performance from –40°C to 85°C.

Note 6: Minimum supply voltage is guaranteed by power supply rejection ratio test.

Note 7: Output voltage swings are measured between the output and power supply rails.

Note 8: This parameter is not 100% tested.

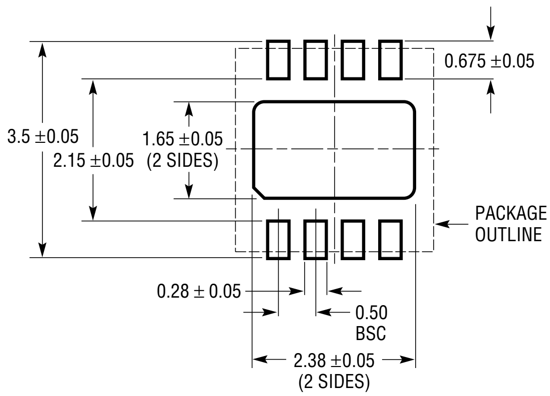
Note 9: Matching parameters are the difference between amplifiers A and D and between B and C on the LT1805; between the two amplifiers on the LT1804.

Note 10: Full power bandwidth is based on slew rate:

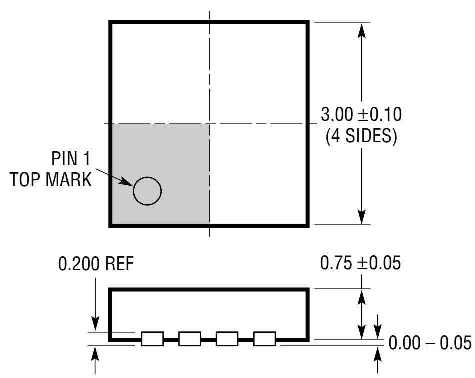
$FPBW = SR/2\pi V_P$

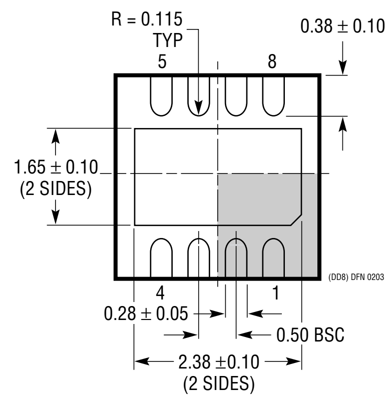
PACKAGE DESCRIPTION

DD Package
8-Lead Plastic DFN (3mm × 3mm)
(Reference LTC DWG # 05-08-1698)



RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS



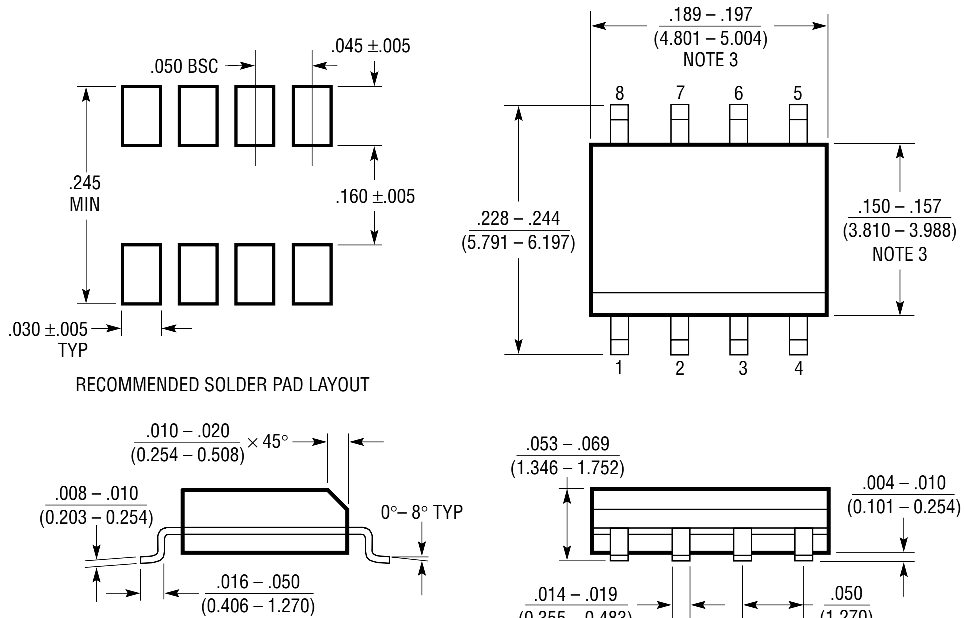


BOTTOM VIEW—EXPOSED PAD

NOTE:
1. DRAWING TO BE MADE A JEDEC PACKAGE OUTLINE M0-229 VARIATION OF (WEED-1)
2. ALL DIMENSIONS ARE IN MILLIMETERS
3. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE
4. EXPOSED PAD SHALL BE SOLDER PLATED

PACKAGE DESCRIPTION

S8 Package
8-Lead Plastic Small Outline (Narrow .150 Inch)
(Reference LTC DWG # 05-08-1610)

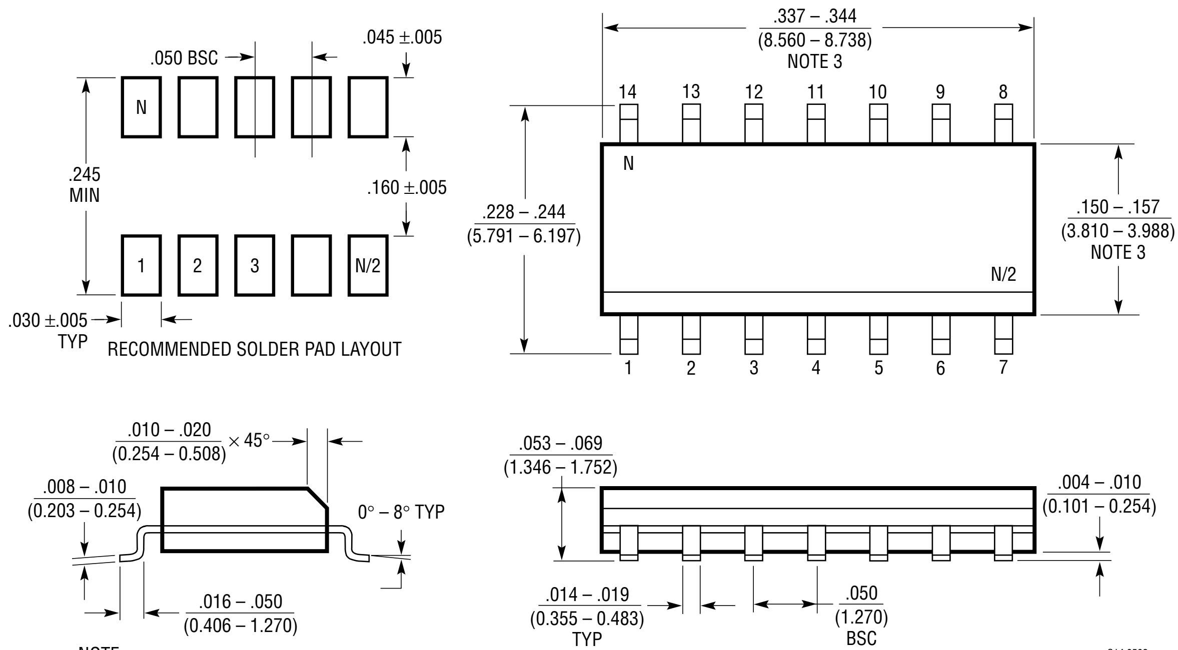


NOTE:
1. DIMENSIONS IN INCHES / (MILLIMETERS)
2. DRAWING NOT TO SCALE
3. THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .006" (0.15mm)

SO8 0303

PACKAGE DESCRIPTION

S Package
14-Lead Plastic Small Outline (Narrow .150 Inch)
(Reference LTC DWG # 05-08-1610)



NOTE:
1. DIMENSIONS IN $\frac{\text{INCHES}}{\text{(MILLIMETERS)}}$
2. DRAWING NOT TO SCALE
3. THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .006" (0.15mm)

RELATED PARTS

PART NUMBER	DESCRIPTION	COMMENTS
LT1399	Triple 300MHz Current Feedback Amplifier	0.1dB Gain Flatness to 150MHz, Shutdown
LT1498/LT1499	Dual/Quad 10MHz, 6Vμs Rail-to-Rail Input and Output C-Load™ Op Amps	High DC Accuracy, 475μV $V_{OS(MAX)}$, 4μV/°C Max Drift, Max Supply Current 2.2mA per Amp
LT1630/LT1631	Dual/Quad 30MHz, 10V/μs Rail-to-Rail Input and Output Op Amps	High DC Accuracy, 525μV $V_{OS(MAX)}$, 70mA Output Current, Max Supply Current 4.4mA per Amplifier
LT1800/LT1801 LT1802	Single/Dual/Quad 80MHz, 25V/μs Low Power Rail-to-Rail Input/Output Precision Op Amps	High DC Accuracy, 350μV $V_{OS(MAX)}$, Max Supply Currrent 2mA per Amplifier
LT1806/LT1807	Single/Dual 325MHz, 140V/μs Rail-to-Rail Input/Output Amps	High DC Accuracy, 550μV $V_{OS(MAX)}$, Low Noise 3.5nV/$\sqrt{Hz}$, Low Distortion –80dB at 5MHz, Power-Down (LT1806)
LT1809/LT1810	Single/Dual 180MHz Rail-to-Rail Input/Output Op Amps	350V/μs Slew Rate, Low Distortion –90dB at 5MHz, Power-Down (LT1809)
LT6202/LT6203 LT6204	Single/Dual/Quad 90MHz, 24V/μs Rail-to-Rail Input/Output, Ultralow 1.9nV/$\sqrt{Hz}$ Noise, Low Power Op Amps	High DC Accuracy, 500μV $V_{OS(MAX)}$, Max Supply Currrent 3mA per Amplifier

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