EL5202, EL5203

400MHz Slew Enhanced VFAs

FN7331
Rev 9.00
January 17, 2014

The EL5202 and EL5203 are dual, high-speed VFAs based on a CFA architecture. This gives the typical high slew rate benefits of a CFA family along with the stability and ease of use associated with the VFA type architecture. With slew rates of 3500V/µs, these devices enable the use of voltage feedback amplifiers in a space where the only alternative has been current feedback amplifiers. This family also includes single, dual, and triple versions with 750MHz bandwidths; please see the EL5104 through EL5304 data sheet for details.

Both devices operate on single 5V or ±5V supplies from minimum supply current. The EL5202 also features an output enable function, which can be used to put the output in to a high-impedance mode. This allows the outputs of multiple amplifiers to be tied together for use in multiplexing applications.

Typical applications for these families include cable driving, filtering, A/D and D/A buffering, multiplexing and summing within video, communications, and instrumentation designs.

Features

- Operates off 3V, 5V, or ±5V supplies
- Power-down to 13µA (EL5202)
- -3dB bandwidth = 400MHz
- ±0.1dB bandwidth = 35MHz
- Low supply current = 5mA per amplifier
- Slew rate = 3500V/µs
- Low offset voltage = 5mV max
- Output current = 150mA
- A_{VOL} = 2000
- Differential gain/phase = 0.01%/0.01°
- Pb-free (RoHS compliant)

Applications

- Video amplifiers
- PCMCIA applications
- A/D drivers
- Line drivers
- Portable computers
- High speed communications
- RGB applications
- Broadcast equipment
- Active filtering

Ordering Information

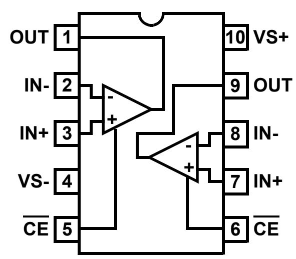
PART NUMBER (Note 3)	PART MARKING	TEMP RANGE (°C)	PACKAGE (Pb-free)	PKG DWG. #
EL5202IYZ (Note 2)	BAAAD	-40 to +85	10 Ld MSOP (3.0mm)	M10.118A
EL5202IYZ-T7 (Notes 1, 2)	BAAAD	-40 to +85	10 Ld MSOP (3.0mm)	M10.118A
EL5202IYZ-T13 (Notes 1, 2)	BAAAD	-40 to +85	10 Ld MSOP (3.0mm)	M10.118A
EL5203ISZ (Note 2)	5203ISZ	-40 to +85	8 Ld SOIC (150 mil)	M8.15E
EL5203ISZ-T7 (Notes 1, 2)	5203ISZ	-40 to +85	8 Ld SOIC (150 mil)	M8.15E
EL5203ISZ-T13 (Notes 1, 2)	5203ISZ	-40 to +85	8 Ld SOIC (150 mil)	M8.15E
EL5203IYZ (Note 2)	BAAAE	-40 to +85	8 Ld MSOP (3.0mm)	M8.118A
EL5203IYZ-T7 (Notes 1, 2)	BAAAE	-40 to +85	8 Ld MSOP (3.0mm)	M8.118A
EL5203IYZ-T13 (Notes 1, 2)	BAAAE	-40 to +85	8 Ld MSOP (3.0mm)	M8.118A

NOTES:

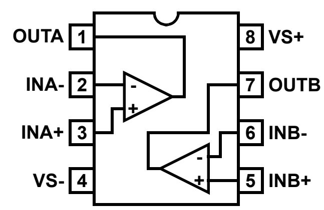
1. Please refer to TB347 for details on reel specifications.
2. These Intersil Pb-free plastic packaged products employ special Pb-free material sets, molding compounds/die attach materials, and 100% matte tin plate plus anneal (e3 termination finish, which is RoHS compliant and compatible with both SnPb and Pb-free soldering operations). Intersil Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020.
3. For Moisture Sensitivity Level (MSL), please see product information page for EL5202, EL5203 . For more information on MSL, please see tech brief TB363.

Pin Configurations

EL5202
(10 LD MSOP)
TOP VIEW



EL5203
(8 LD SOIC, MSOP)
TOP VIEW



Absolute Maximum Ratings (T_A = +25°C)

Supply Voltage between V_S+ and V_S- 13.2V
Maximum Supply Slew Rate between V_S+ and V_S- 1V/µs
Input Voltage . . . . ±V_S
Differential Input Voltage . . . . ±4V
Maximum Continuous Output Current 80mA
Maximum Current into I_N+, I_N-, $\overline{CE}$ . . . . ±5mA

Thermal Information

Thermal Resistance (Typical)	θ_{JA} (°C/W)	θ_{JC} (°C/W)
10 Ld MSOP Package (Notes 4, 5)	160	75
8 Ld SOIC Package (Notes 4, 5)	125	75
8 Ld MSOP Package (Notes 4, 5)	170	80

Storage Temperature Range . . . . -65°C to +150°C
Ambient Operating Temperature Range . . . . -40°C to +85°C
Operating Junction Temperature . . . . +150°C
Pb-Free Reflow Profile . . . . see link below
http://www.intersil.com/pbfree/Pb-FreeReflow.asp

CAUTION: Do not operate at or near the maximum ratings listed for extended periods of time. Exposure to such conditions may adversely impact product reliability and result in failures not covered by warranty.

NOTES:

4. θ_{JA} is measured with the component mounted on a high effective thermal conductivity test board in free air. See Tech Brief TB379 for details.
5. For θ_{JC}, the "case temp" location is taken at the package top center.

IMPORTANT NOTE: All parameters having Min/Max specifications are guaranteed. Typical values are for information purposes only. Unless otherwise noted, all tests are at the specified temperature and are pulsed tests, therefore: $T_J = T_C = T_A$

DC Electrical Specifications

MV_S+ = +5V, V_S- = -5V, T_A = +25°C, R_L = 500Ω, $V_{\overline{CE}}$ = 0V, Unless Otherwise Specified.

PARAMETER	DESCRIPTION	CONDITIONS	MIN (Note 9)	TYP	MAX (Note 9)	UNIT
V_{OS}	Offset Voltage			1	5	mV
TCV_{OS}	Offset Voltage Temperature Coefficient	Measured from T_{MIN} to T_{MAX}		10		µV/°C
IB	Input Bias Current	V_{IN} = 0V	-12	2	12	µA
I_{OS}	Input Offset Current	V_{IN} = 0V	-8	1	8	µA
TCI_{OS}	Input Bias Current Temperature Coefficient	Measured from T_{MIN} to T_{MAX}		50		nA/°C
PSRR	Power Supply Rejection Ratio	V_S = ±4.75V to ±5.25V	-70	-80		dB
CMRR	Common Mode Rejection Ratio	V_{CM} = -3V to 3.0V	-60	-80		dB
CMIR	Common Mode Input Range	Guaranteed by CMRR test	-3	±3.3	3	V
R_{IN}	Input Resistance	Common mode	200	400		kΩ
C_{IN}	Input Capacitance	SO package		1		pF
$I_{S,ON}$	Supply Current - Enabled, Per Amplifier		4.6	5.2	5.8	mA
$I_{S,OFF}$	Supply Current - Shut-down, Per Amplifier	V_S+	+1	+9	+25	µA
		V_S-	-25	-13	-1	µA
AVOL	Open Loop Gain	V_{OUT} = ±2.5V, R_L = 1kΩ to GND	58	66		dB
		V_{OUT} = ±2.5V, R_L = 150Ω to GND		60		dB
V_{OUT}	Output Voltage Swing	R_L = 1kΩ to GND	±3.5	±3.9		V
		R_L = 150Ω to GND	±3.4	±3.7		V
I_{OUT}	Output Current	A_V = 1, R_L = 10Ω to 0V	±80	±150		mA
$V_{\overline{CE}}$-ON	$\overline{CE}$ Pin Voltage for Power-up		(V_S+) -5		(V_S+) -3	V
$V_{\overline{CE}}$-OFF	$\overline{CE}$ Pin Voltage for Shut-down		(V_S+) -1		V_S+	V
$I_{\overline{CE}}$-ON	$\overline{CE}$ Pin Current - Enabled	$\overline{CE}$ = 0V	-1	0	+1	µA
$I_{\overline{CE}}$-OFF	$\overline{CE}$ Pin Current - Disabled	$\overline{CE}$ = +5V	1	14	25	µA

Closed Loop AC Electrical Specifications

V_S+ = +5V, V_S- = -5V, T_A = +25°C, $V_{\overline{CE}}$ = 0V, A_V = +1, R_F = 0Ω, R_L = 150Ω to GND, Unless Otherwise Specified. (Note 6)

PARAMETER	DESCRIPTION	CONDITIONS	MIN (Note 9)	TYP	MAX (Note 9)	UNIT
BW	-3dB Bandwidth (V_{OUT} = 400mV_{P-P})	A_V = 1, R_F = 0Ω		400		MHz
SR	Slew Rate	A_V = +2, R_L = 100Ω, V_{OUT} = -3V to +3V	1100	2200	5000	V/µs
		R_L = 500Ω, V_{OUT} = -3V to +3V		4000		V/µs
t_R,t_F	Rise Time, Fall Time	±0.1V step		2.8		ns
OS	Overshoot	±0.1V step		10		%
t_S	0.1% Settling Time	V_S = ±5V, R_L = 500Ω, A_V = 1, V_{OUT} = ±3V		20		ns
dG	Differential Gain (Note 7)	A_V = 2, R_F = 1kΩ		0.01		%
dP	Differential Phase (Note 7)	A_V = 2, R_F = 1kΩ		0.01		°
e_N	Input Noise Voltage	f = 10kHz		12		nV/√Hz
i_N	Input Noise Current	f = 10kHz		11		pA/√Hz
t_{DIS}	Disable Time (Note 8)			50		ns
t_{EN}	Enable Time (Note 8)			25		ns

NOTES:

6. All AC tests are performed on a “warmed up” part, except slew rate, which is pulse tested.
7. Standard NTSC signal = 286mV_{P-P}, f = 3.58MHz, as V_{IN} is swept from 0.6V to 1.314V.R_L is DC coupled.
8. Disable/Enable time is defined as the time from when the logic signal is applied to the $\overline{CE}$ pin to when the supply current has reached half its final value.
9. Compliance to datasheet limits is assured by one or more methods: production test, characterization and/or design.

Typical Performance Curves

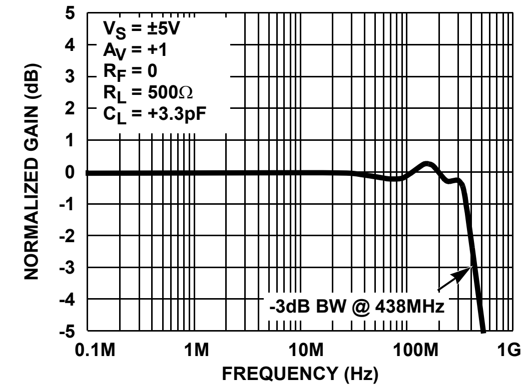


FIGURE 1. GAIN vs FREQUENCY (-3dB BANDWIDTH)

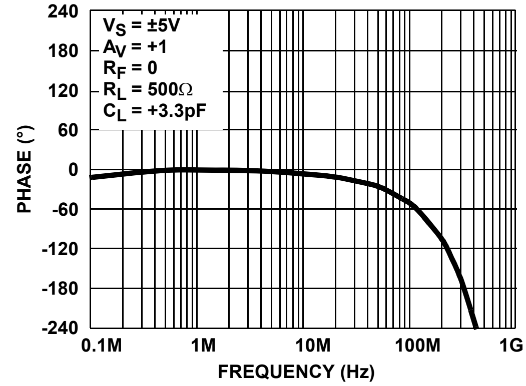


FIGURE 2. PHASE vs FREQUENCY

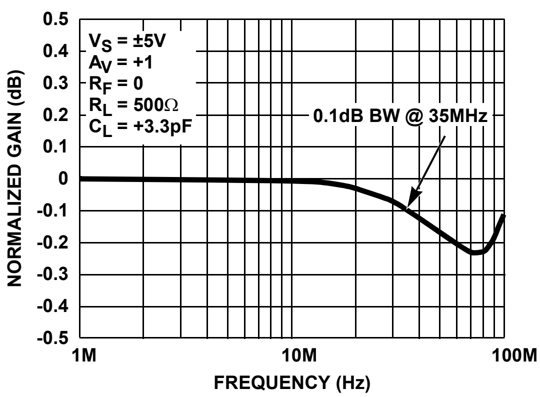


FIGURE 3. 0.1dB BANDWIDTH

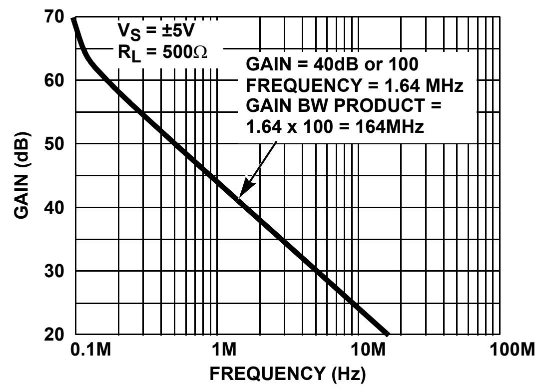


FIGURE 4. GAIN BANDWIDTH PRODUCT

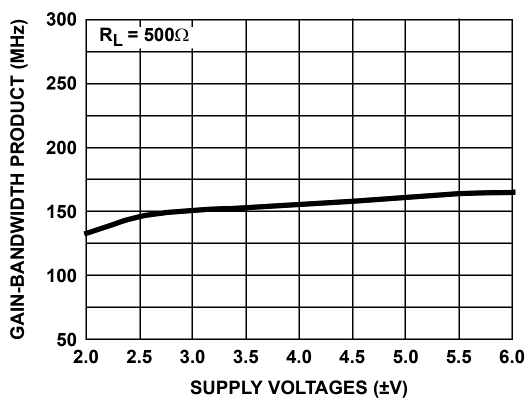


FIGURE 5. GAIN BANDWIDTH PRODUCT vs SUPPLY VOLTAGES

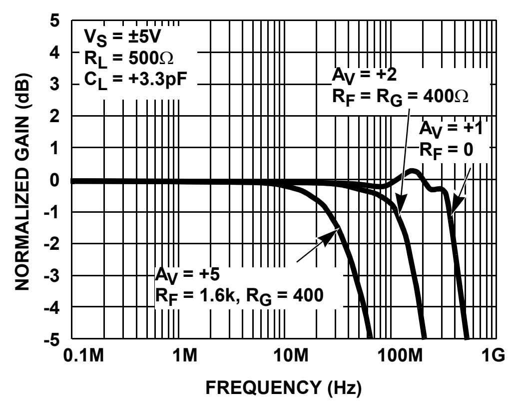


FIGURE 6. GAIN vs FREQUENCY FOR VARIOUS $+A_V$

Typical Performance Curves (Continued)

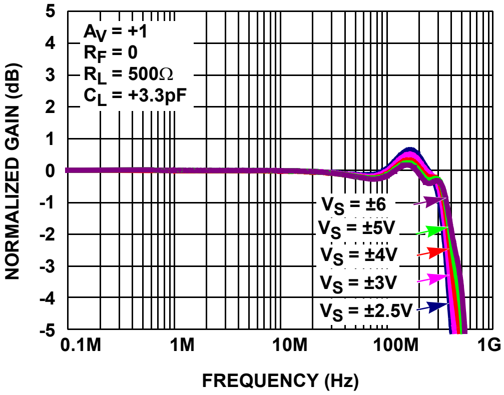


FIGURE 7. GAIN vs FREQUENCY FOR VARIOUS $\pm V_S$

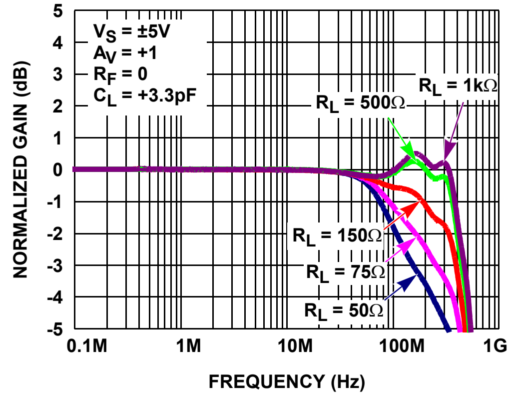


FIGURE 8. GAIN vs FREQUENCY FOR VARIOUS R_{LOAD} (A_V = +1)

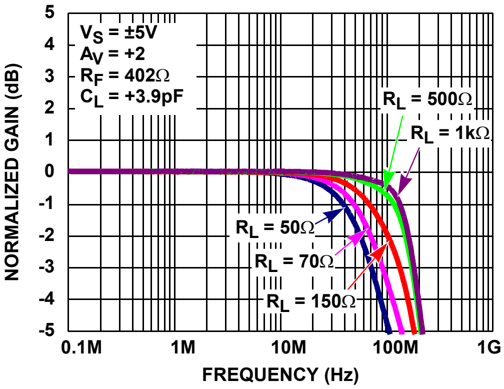


FIGURE 9. GAIN vs FREQUENCY FOR VARIOUS R_{LOAD} (A_V = +2)

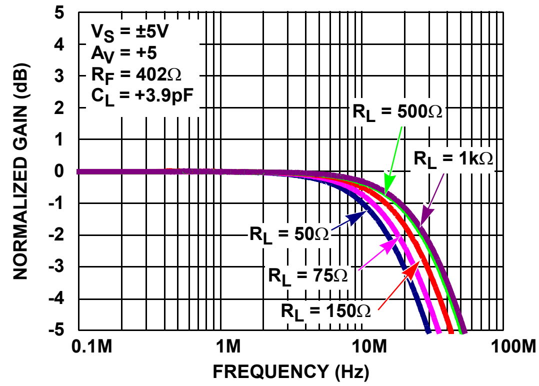


FIGURE 10. GAIN vs FREQUENCY FOR VARIOUS R_{LOAD} (A_V = +5)

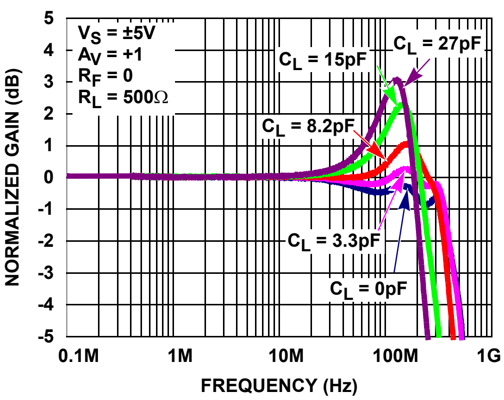


FIGURE 11. GAIN vs FREQUENCY FOR VARIOUS C_{LOAD} (A_V = +1)

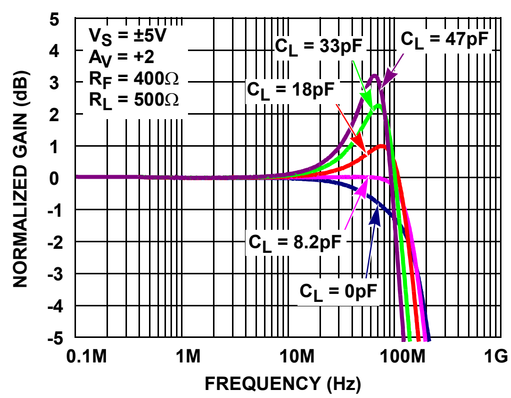


FIGURE 12. GAIN vs FREQUENCY FOR VARIOUS C_{LOAD} (A_V = +2)

Typical Performance Curves (Continued)

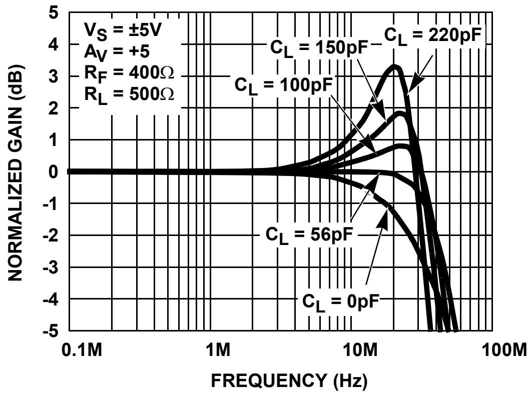


FIGURE 13. GAIN vs FREQUENCY FOR VARIOUS C_{LOAD} (A_V = +5)

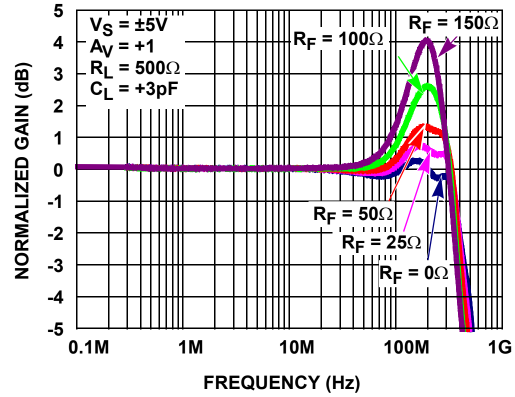


FIGURE 14. GAIN vs FREQUENCY FOR VARIOUS R_F (A_V = +1)

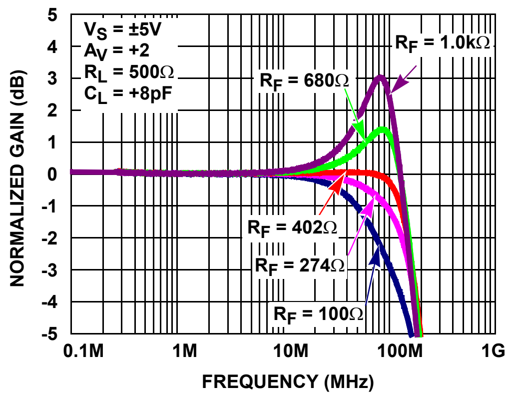


FIGURE 15. GAIN vs FREQUENCY FOR VARIOUS R_F (A_V = +2)

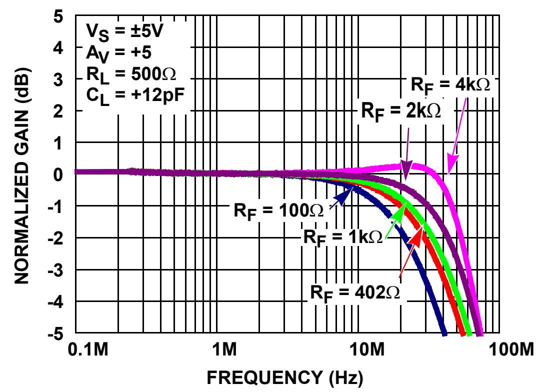


FIGURE 16. GAIN vs FREQUENCY FOR VARIOUS R_F (A_V = +5)

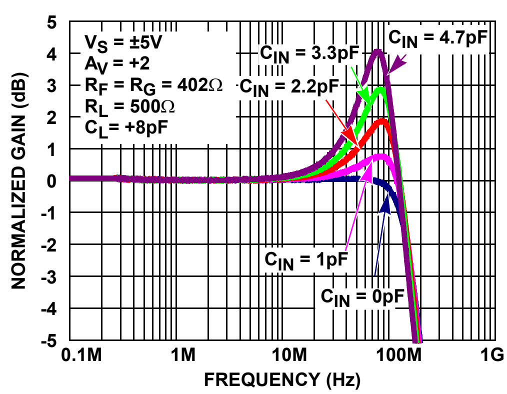


FIGURE 17. GAIN vs FREQUENCY FOR VARIOUS C_{IN}(-) (A_V = +2)

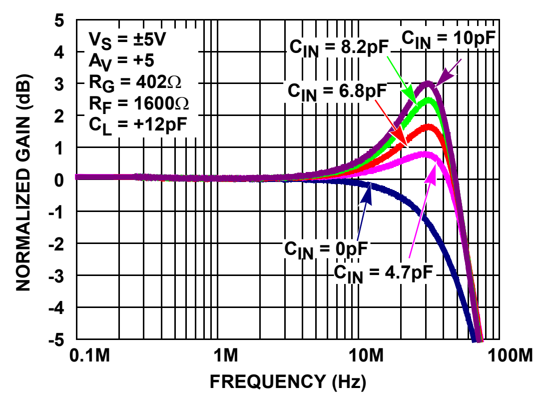


FIGURE 18. GAIN vs FREQUENCY FOR VARIOUS C_{IN}(-) (A_V = +5)

Typical Performance Curves (Continued)

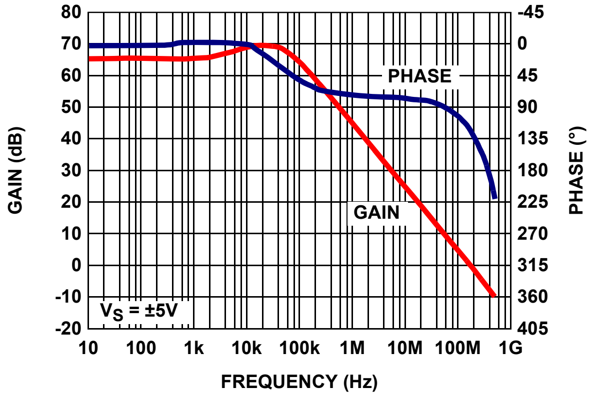


FIGURE 19. OPEN LOOP GAIN AND PHASE vs FREQUENCY

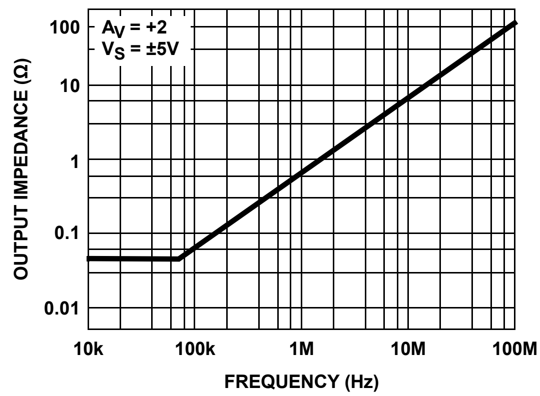


FIGURE 20. OUTPUT IMPEDANCE vs FREQUENCY

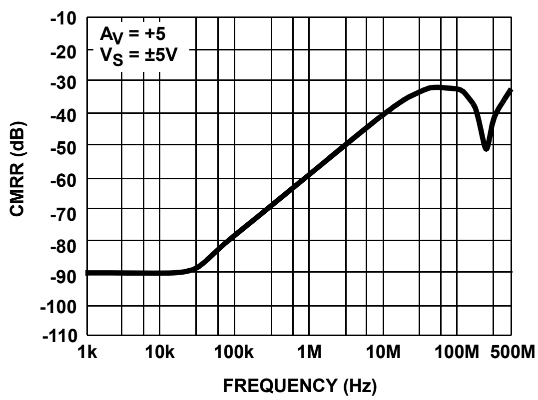


FIGURE 21. CMRR vs FREQUENCY

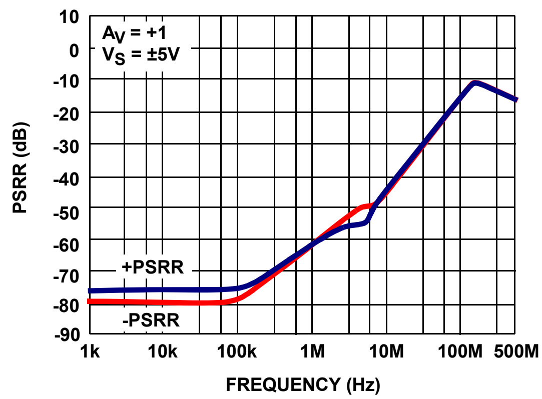


FIGURE 22. PSRR vs FREQUENCY

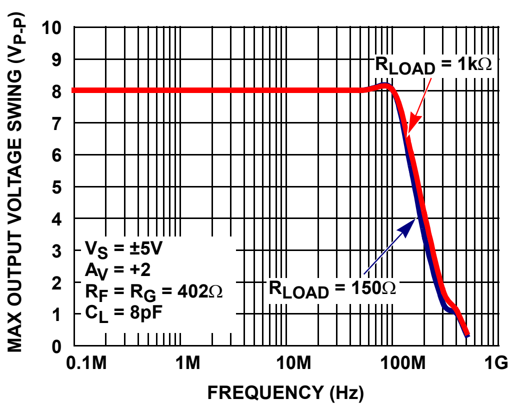


FIGURE 23. MAX OUTPUT VOLTAGE SWING vs FREQUENCY

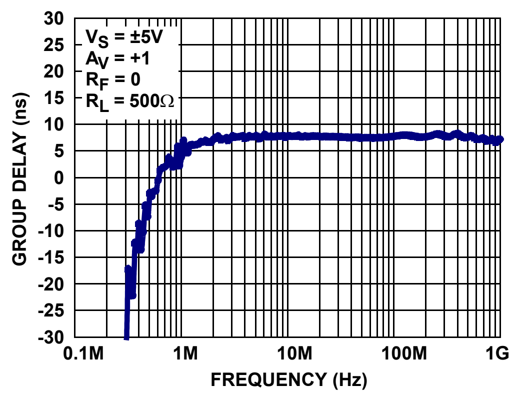


FIGURE 24. GROUP DELAY vs FREQUENCY

Typical Performance Curves (Continued)

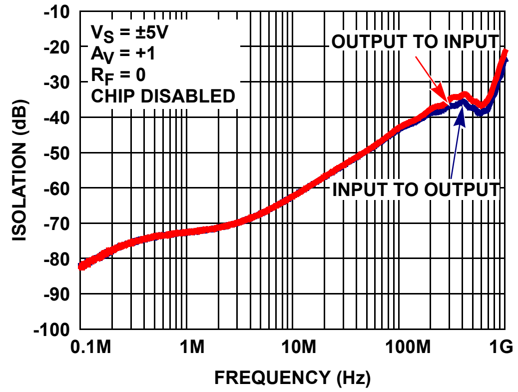


FIGURE 25. INPUT AND OUTPUT ISOLATION

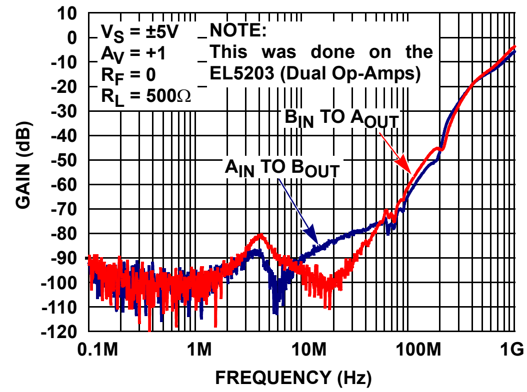


FIGURE 26. CHANNEL-TO-CHANNEL ISOLATION

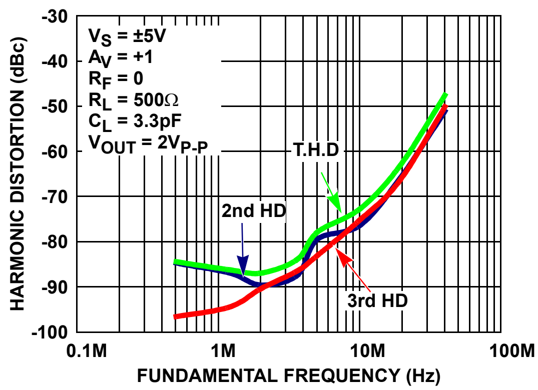


FIGURE 27. HARMONIC DISTORTION vs FREQUENCY

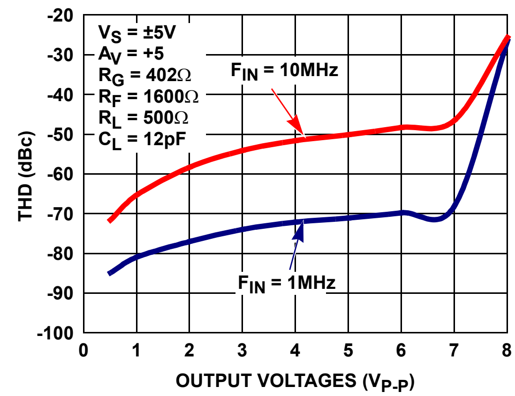


FIGURE 28. TOTAL HARMONIC DISTORTION vs OUTPUT VOLTAGES

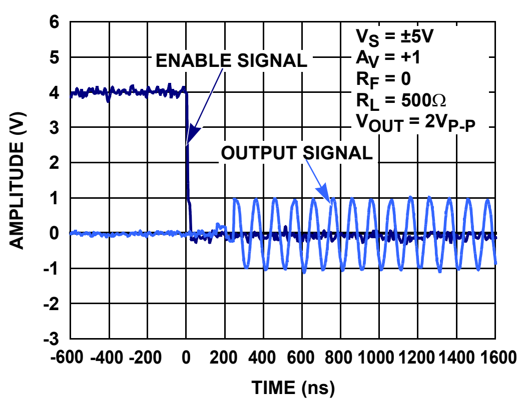


FIGURE 29. TURN-ON TIME

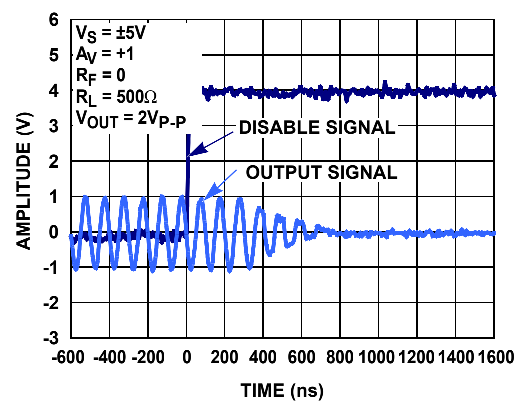


FIGURE 30. TURN-OFF TIME

Typical Performance Curves (Continued)

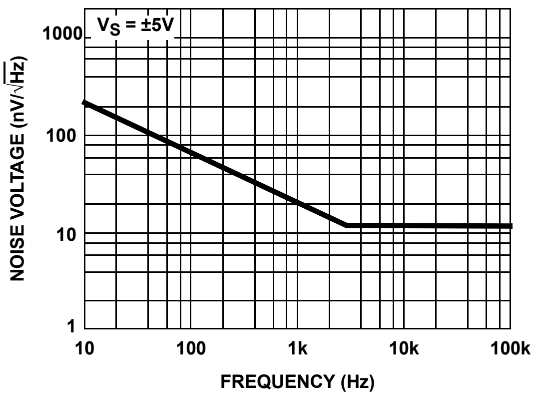


FIGURE 31. EQUIVALENT NOISE VOLTAGE vs FREQUENCY

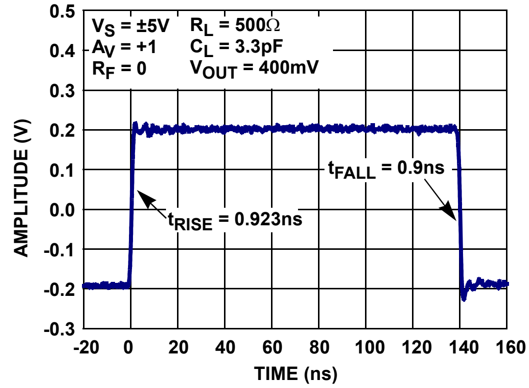


FIGURE 32. SMALL SIGNAL STEP RESPONSE RISE AND FALL TIME

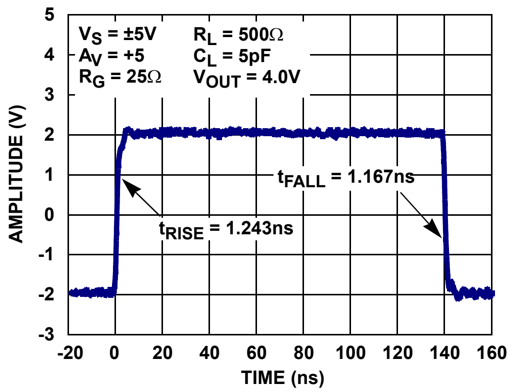


FIGURE 33. LARGE SIGNAL STEP RESPONSE RISE AND FALL TIME

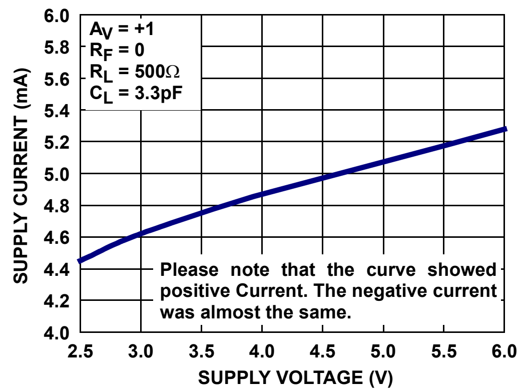


FIGURE 34. SUPPLY CURRENT vs SUPPLY VOLTAGE

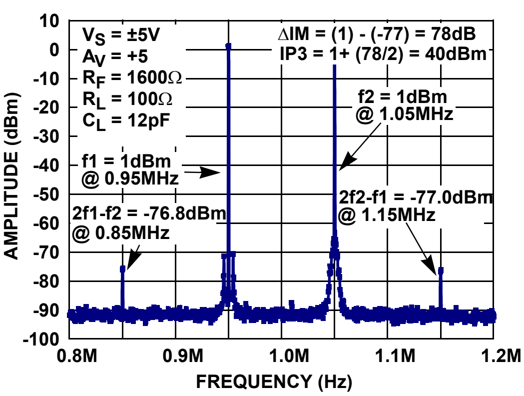


FIGURE 35. THIRD ORDER IMD INTERCEPT (IP3)

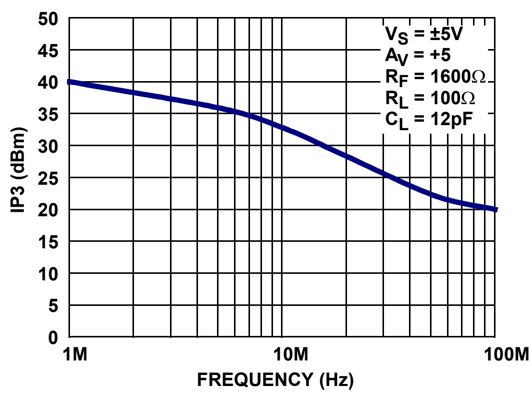
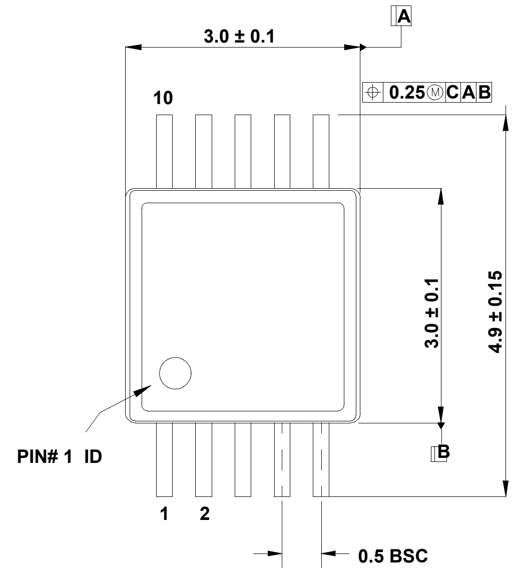


FIGURE 36. THIRD ORDER IMD INTERCEPT vs FREQUENCY

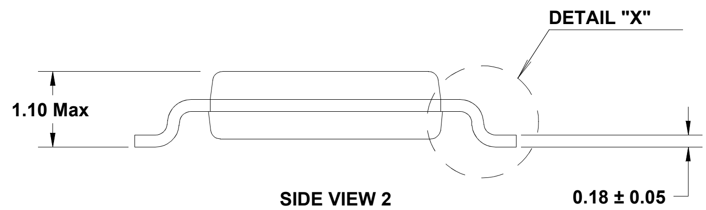
Package Outline Drawing

M10.118A (JEDEC MO-187-BA)

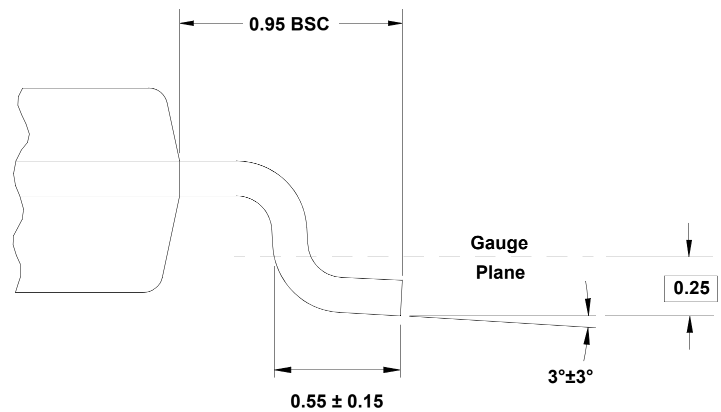
10 LEAD MINI SMALL OUTLINE PLASTIC PACKAGE (MSOP)
Rev 0, 9/09



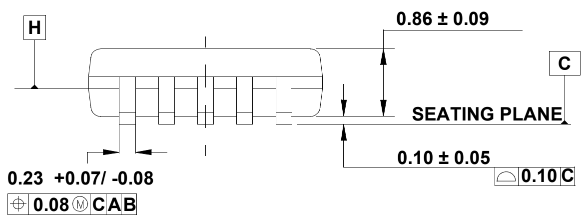
TOP VIEW



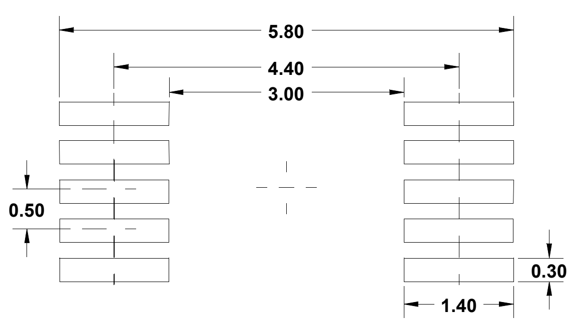
SIDE VIEW 2



DETAIL "X"



SIDE VIEW 1



TYPICAL RECOMMENDED LAND PATTERN

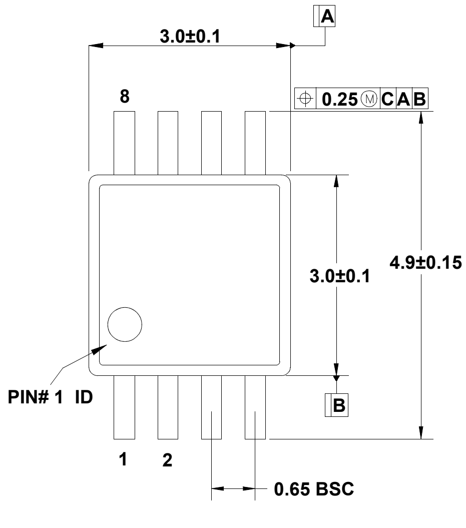
NOTES:

1. Dimensions are in millimeters.
2. Dimensioning and tolerancing conform to AMSE Y14.5m-1994.
3. Plastic or metal protrusions of 0.15mm max per side are not included.
4. Plastic interlead protrusions of 0.25mm max per side are not included.
5. Dimensions “D” and “E1” are measured at Datum Plane “H”.
6. This replaces existing drawing # MDP0043 MSOP10L.

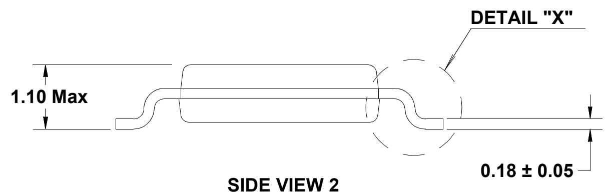
Package Outline Drawing

M8.118A

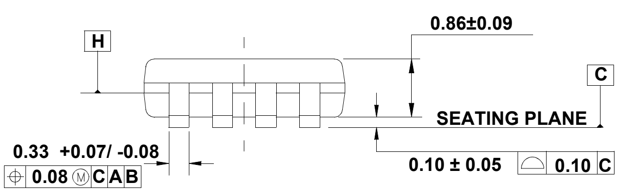
8 LEAD MINI SMALL OUTLINE PLASTIC PACKAGE (MSOP)
Rev 0, 9/09



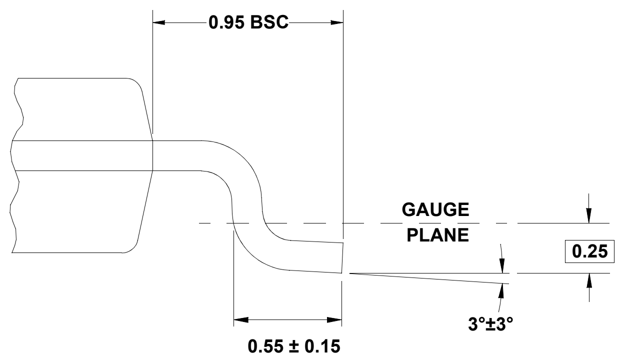
TOP VIEW



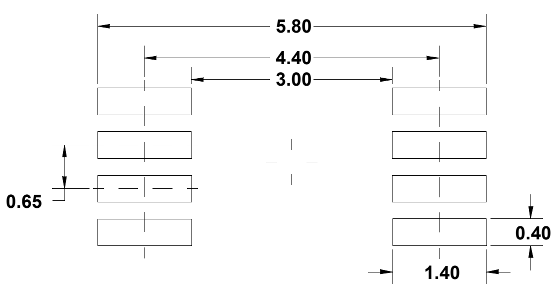
SIDE VIEW 2



SIDE VIEW 1



DETAIL "X"



TYPICAL RECOMMENDED LAND PATTERN

NOTES:

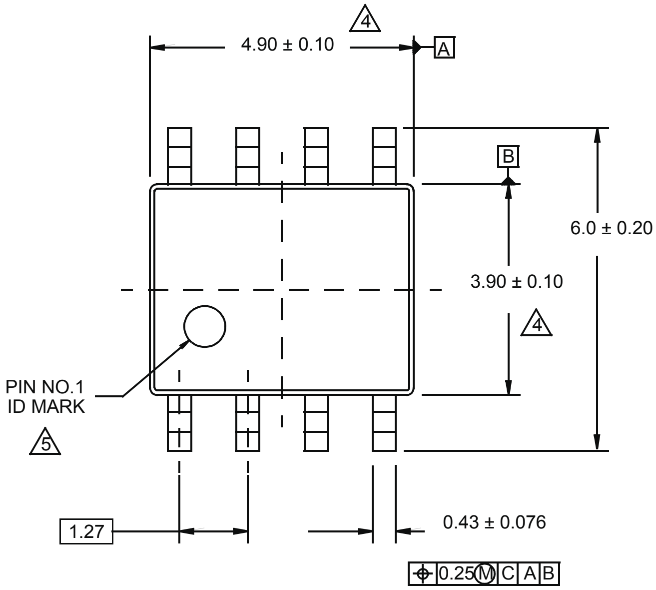
1. Dimensions are in millimeters.
2. Dimensioning and tolerancing conform to JEDEC MO-187-AA and AMSE Y14.5m-1994.
3. Plastic or metal protrusions of 0.15mm max per side are not included.
4. Plastic interlead protrusions of 0.25mm max per side are not included.
5. Dimensions “D” and “E1” are measured at Datum Plane “H”.
6. This replaces existing drawing # MDP0043 MSOP 8L.

Package Outline Drawing

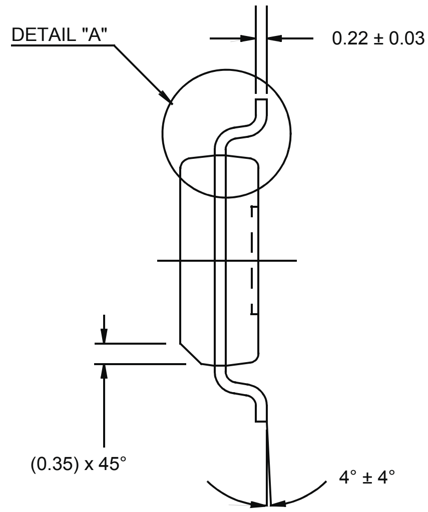
M8.15E

8 LEAD NARROW BODY SMALL OUTLINE PLASTIC PACKAGE

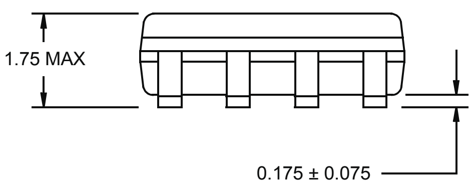
Rev 0, 08/09



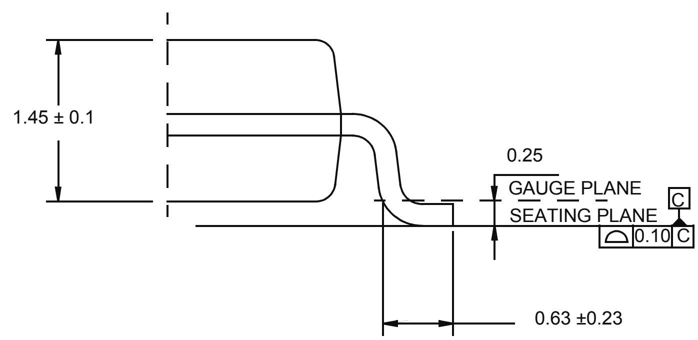
TOP VIEW



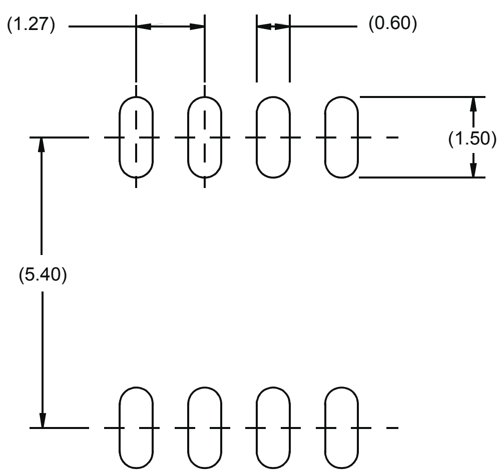
SIDE VIEW “B”



SIDE VIEW “A



DETAIL "A"



TYPICAL RECOMMENDED LAND PATTERN

NOTES:

1. Dimensions are in millimeters.
   Dimensions in ( ) for Reference Only.
2. Dimensioning and tolerancing conform to AMSE Y14.5m-1994.
3. Unless otherwise specified, tolerance : Decimal ± 0.05
4. Dimension does not include interlead flash or protrusions.
   Interlead flash or protrusions shall not exceed 0.25mm per side.
5. The pin #1 identifier may be either a mold or mark feature.
6. Reference to JEDEC MS-012.

OCEAN CHIPS

Океан Электроники

Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения **«JONHON»**, а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов **«FORSTAR»**.

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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