

## **700MHz Slew-Enhanced VFAs**

The EL5104, EL5105, EL5204, EL5205, and EL5304 represent high speed voltage feedback amplifiers based on the current feedback amplifier 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. This family is available in single, dual, and triple versions, with 200MHz, 400MHz, and 700MHz versions. This family operates on single 5V or  $\pm 5V$  supplies from minimum supply current. The EL5104 and EL5204 also feature an output enable function, which can be used to put the output in to a high-impedance mode. This enables the outputs of multiple amplifiers to be tied together for use in multiplexing applications.

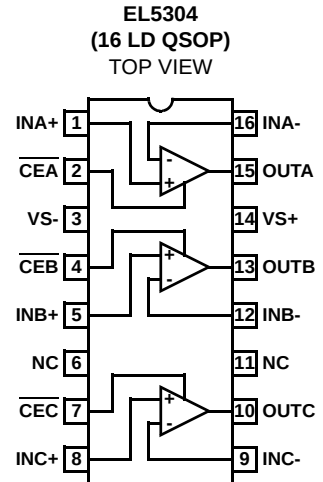
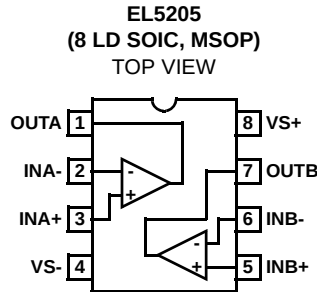
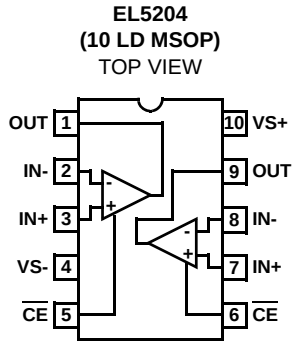
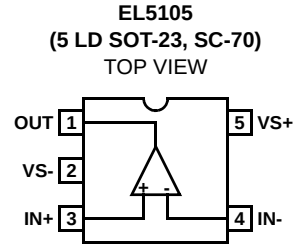
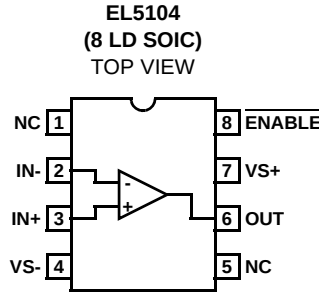
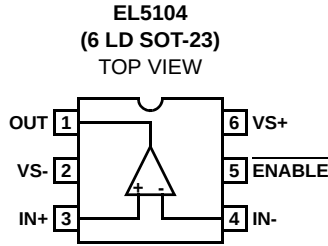
## **Features**

- Specified for 5V or  $\pm 5V$  applications
- Power-down to 17 $\mu A$
- -3dB bandwidth = 700MHz
- $\pm 0.1$ dB bandwidth = 45MHz
- Low supply current = 9.5mA
- Slew rate = 7000V/ $\mu s$
- Low offset voltage = 10mV max
- Output current = 160mA
- $A_{VOL} = 1400$
- Diff gain/phase = 0.01%/0.02°
- Pb-free plus anneal available (RoHS compliant)

## **Applications**

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

## Pinouts



## Ordering Information

| PART NUMBER          | PART MARKING | TAPE & REEL  | PACKAGE                       | PKG. DWG. # |
|----------------------|--------------|--------------|-------------------------------|-------------|
| EL5104IS             | 5104IS       | -            | 8 Ld SOIC (150 mil)           | MDP0027     |
| EL5104IS-T7          | 5104IS       | 7"           | 8 Ld SOIC (150 mil)           | MDP0027     |
| EL5104IS-T13         | 5104IS       | 13"          | 8 Ld SOIC (150 mil)           | MDP0027     |
| EL5104ISZ (Note)     | 5104ISZ      | -            | 8 Ld SOIC (150 mil) (Pb-Free) | MDP0027     |
| EL5104ISZ-T7 (Note)  | 5104ISZ      | 7"           | 8 Ld SOIC (150 mil) (Pb-Free) | MDP0027     |
| EL5104ISZ-T13 (Note) | 5104ISZ      | 13"          | 8 Ld SOIC (150 mil) (Pb-Free) | MDP0027     |
| EL5104IW-T7          | n            | 7" (3k pcs)  | 6 Ld SOT-23                   | MDP0038     |
| EL5104IW-T7A         | n            | 7" (250 pcs) | 6 Ld SOT-23                   | MDP0038     |
| EL5104IWZ-T7 (Note)  | BAEA         | 7" (3k pcs)  | 6 Ld SOT-23 (Pb-Free)         | MDP0038     |
| EL5104IWZ-T7A (Note) | BAEA         | 7" (250 pcs) | 6 Ld SOT-23 (Pb-Free)         | MDP0038     |
| EL5105IC             | C            | -            | 5 Ld SC-70 (1.25mm)           | P5.049      |
| EL5105IC-T7          | C            | 7" (3k pcs)  | 5 Ld SC-70 (1.25mm)           | P5.049      |
| EL5105IC-T7A         | C            | 7" (250 pcs) | 5 Ld SC-70 (1.25mm)           | P5.049      |
| EL5105IW-T7          | f            | 7" (3k pcs)  | 5 Ld SOT-23                   | MDP0038     |
| EL5105IW-T7A         | f            | 7" (250 pcs) | 5 Ld SOT-23                   | MDP0038     |
| EL5105IWZ-T7 (Note)  | BBMA         | 7" (3k pcs)  | 5 Ld SOT-23 (Pb-Free)         | MDP0038     |

**Ordering Information** (Continued)

| PART NUMBER          | PART MARKING | TAPE & REEL  | PACKAGE                        | PKG. DWG. # |
|----------------------|--------------|--------------|--------------------------------|-------------|
| EL5105IWZ-T7A (Note) | BBMA         | 7" (250 pcs) | 5 Ld SOT-23 (Pb-Free)          | MDP0038     |
| EL5204IY             | BTAAA        | -            | 10 Ld MSOP (3.0mm)             | MDP0043     |
| EL5204IY-T7          | BTAAA        | 7"           | 10 Ld MSOP (3.0mm)             | MDP0043     |
| EL5204IY-T13         | BTAAA        | 13"          | 10 Ld MSOP (3.0mm)             | MDP0043     |
| EL5204IYZ (Note)     | BAAAF        | -            | 10 Ld MSOP (3.0mm) (Pb-Free)   | MDP0043     |
| EL5204IYZ-T7 (Note)  | BAAAF        | 7"           | 10 Ld MSOP (3.0mm) (Pb-Free)   | MDP0043     |
| EL5204IYZ-T13 (Note) | BAAAF        | 13"          | 10 Ld MSOP (3.0mm) (Pb-Free)   | MDP0043     |
| EL5205IS             | 5205IS       | -            | 8 Ld SOIC (150 mil)            | MDP0027     |
| EL5205IS-T7          | 5205IS       | 7"           | 8 Ld SOIC (150 mil)            | MDP0027     |
| EL5205IS-T13         | 5205IS       | 13"          | 8 Ld SOIC (150 mil)            | MDP0027     |
| EL5205ISZ (Note)     | 5205ISZ      | -            | 8 Ld SOIC (150 mil) (Pb-Free)  | MDP0027     |
| EL5205ISZ-T7 (Note)  | 5205ISZ      | 7"           | 8 Ld SOIC (150 mil) (Pb-Free)  | MDP0027     |
| EL5205ISZ-T13 (Note) | 5205ISZ      | 13"          | 8 Ld SOIC (150 mil) (Pb-Free)  | MDP0027     |
| EL5205IY             | BVAAA        | -            | 8 Ld MSOP (3.0mm)              | MDP0043     |
| EL5205IY-T7          | BVAAA        | 7"           | 8 Ld MSOP (3.0mm)              | MDP0043     |
| EL5205IY-T13         | BVAAA        | 13"          | 8 Ld MSOP (3.0mm)              | MDP0043     |
| EL5205IYZ (Note)     | BAAAG        | -            | 8 Ld MSOP (3.0mm) (Pb-free)    | MDP0043     |
| EL5205IYZ-T7 (Note)  | BAAAG        | 7"           | 8 Ld MSOP (3.0mm) (Pb-free)    | MDP0043     |
| EL5205IYZ-T13 (Note) | BAAAG        | 13"          | 8 Ld MSOP (3.0mm) (Pb-free)    | MDP0043     |
| EL5304IU             | 5304IU       | -            | 16 Ld QSOP (150 mil)           | MDP0040     |
| EL5304IU-T7          | 5304IU       | 7"           | 16 Ld QSOP (150 mil)           | MDP0040     |
| EL5304IU-T13         | 5304IU       | 13"          | 16 Ld QSOP (150 mil)           | MDP0040     |
| EL5304IUZ (Note)     | 5304IUZ      | -            | 16 Ld QSOP (150 mil) (Pb-Free) | MDP0040     |
| EL5304IUZ-T7 (Note)  | 5304IUZ      | 7"           | 16 Ld QSOP (150 mil) (Pb-Free) | MDP0040     |
| EL5304IUZ-T13 (Note) | 5304IUZ      | 13"          | 16 Ld QSOP (150 mil) (Pb-Free) | MDP0040     |

NOTE: Intersil Pb-free plus anneal products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which are 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.

### Absolute Maximum Ratings ( $T_A = +25^\circ\text{C}$ )

Supply Voltage between  $V_{S+}$  and GND. . . . . 13.2V  
 Input Voltage . . . . .  $\pm V_S$   
 Differential Input Voltage . . . . .  $\pm 4\text{V}$   
 Maximum Output Current. . . . . 80mA  
 $V_{S+}$  to  $V_{S-}$  Maximum Slew Rate . . . . . 1V/ $\mu\text{s}$

### Thermal Information

Storage Temperature Range . . . . .  $-65^\circ\text{C}$  to  $+150^\circ\text{C}$   
 Ambient Operating Temperature Range . . . . .  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$   
 Operating Junction Temperature . . . . .  $+150^\circ\text{C}$   
 Pb-free reflow profile . . . . . see link below  
<http://www.intersil.com/pbfree/Pb-FreeReflow.asp>

*CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.*

*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 $V_S = \pm 5\text{V}$ , $\text{GND} = 0\text{V}$ , $T_A = +25^\circ\text{C}$ , $V_{CM} = 0\text{V}$ , $V_{OUT} = 0\text{V}$ , $V_{ENABLE} = \text{GND or OPEN}$ , Unless Otherwise Specified.

| PARAMETER   | DESCRIPTION                                | CONDITIONS                           | MIN              | TYP       | MAX              | UNIT                         |
|-------------|--------------------------------------------|--------------------------------------|------------------|-----------|------------------|------------------------------|
| $V_{OS}$    | Offset Voltage                             | EL5104, EL5105, EL5204, EL5205       | -10              | 3         | 10               | mV                           |
|             |                                            | EL5304                               | -18              | 5         | 18               | mV                           |
| $TCV_{OS}$  | Offset Voltage Temperature Coefficient     | Measured from $T_{MIN}$ to $T_{MAX}$ |                  | 10        |                  | $\mu\text{V}/^\circ\text{C}$ |
| $I_B$       | Input Bias Current                         | $V_{IN} = 0\text{V}$                 |                  | 8         | 30               | $\mu\text{A}$                |
| $I_{OS}$    | Input Offset Current                       | $V_{IN} = 0\text{V}$                 |                  | 4         | 15               | $\mu\text{A}$                |
| $TCI_{OS}$  | Input Bias Current Temperature Coefficient | Measured from $T_{MIN}$ to $T_{MAX}$ |                  | 50        |                  | $\text{nA}/^\circ\text{C}$   |
| PSRR        | Power Supply Rejection Ratio               |                                      | 60               | 70        |                  | dB                           |
| CMRR        | Common Mode Rejection Ratio                | $V_{CM}$ from -3V to +3V             | 56               | 62        |                  | dB                           |
| CMIR        | Common Mode Input Range                    | Guaranteed by CMRR test              | -3               |           | +3               | V                            |
| $R_{IN}$    | Input Resistance                           | Common mode                          | 50               | 120       |                  | $\text{k}\Omega$             |
| $C_{IN}$    | Input Capacitance                          | SO package                           |                  | 1         |                  | pF                           |
| $I_{S,ON}$  | Supply Current - Enabled                   | Per amplifier                        | 8.5              | 9.5       | 11               | mA                           |
| $I_{S,OFF}$ | Supply Current - Shut Down                 | $V_{S+}$ , per amplifier             | +1               | 0         | +25              | $\mu\text{A}$                |
|             |                                            | $V_{S-}$ , per amplifier             | -25              | 17        | -1               | $\mu\text{A}$                |
| PSOR        | Power Supply Operating Range               |                                      | 4                |           | 13.2             | V                            |
| AVOL        | Open Loop Gain                             | $R_L = 1\text{k}\Omega$ to GND       | 55               | 65        |                  | dB                           |
|             |                                            | $R_L = 150\Omega$ to GND             |                  | 60        |                  | dB                           |
| $V_{OP}$    | Positive Output Voltage Swing              | $R_L = 150\Omega$ to 0V              | 3.6              | 3.8       |                  | V                            |
| $V_{ON}$    | Negative Output Voltage Swing              | $R_L = 150\Omega$ to 0V              |                  | -3.8      | -3.6             | V                            |
| $I_{OUT}$   | Output Current                             | $R_L = 10\Omega$ to 0V               | $\pm 90$         | $\pm 160$ |                  | mA                           |
| $V_{IH-EN}$ | ENABLE Pin Voltage for Power Up            |                                      | $(V_{S+})$<br>-5 |           | $(V_{S+})$<br>-3 | V                            |
| $V_{IL-EN}$ | ENABLE Pin Voltage for Shut Down           |                                      | $(V_{S+})$<br>-1 |           | $V_{S+}$         | V                            |

**Closed Loop AC Electrical Specifications**  $V_S = +5V$ ,  $GND = 0V$ ,  $T_A = +25^\circ C$ ,  $V_{CM} = +1.5V$ ,  $V_{OUT} = +1.5V$ ,  $V_{CLAMP} = +5V$ ,  
 $V_{ENABLE} = 0V$ ,  $A_V = +1$ ,  $R_F = 0\Omega$ ,  $R_L = 150\Omega$  to GND pin, unless otherwise specified.

| PARAMETER     | DESCRIPTION                                | CONDITIONS                                                            | MIN  | TYP  | MAX  | UNIT            |
|---------------|--------------------------------------------|-----------------------------------------------------------------------|------|------|------|-----------------|
| BW            | -3dB Bandwidth ( $V_{OUT} = 200mV_{P-P}$ ) | $V_S = \pm 5V$ , $A_V = 1$ , $R_F = 0\Omega$                          |      | 700  |      | MHz             |
| SR            | Slew Rate                                  | $R_L = 100\Omega$ , $V_{OUT} = -3V$ to $+3V$                          | 2000 | 3000 | 7000 | V/ $\mu s$      |
| $t_R$ , $t_F$ | Rise Time, Fall Time                       | $\pm 0.1V$ step                                                       |      | 0.4  |      | ns              |
| OS            | Overshoot                                  | $\pm 0.1V$ step                                                       |      | 10   |      | %               |
| $t_{PD}$      | Propagation Delay                          | $\pm 0.1V$ step                                                       |      | 0.4  |      | ns              |
| $t_S$         | 0.1% Settling Time                         | $V_S = \pm 5V$ , $R_L = 500\Omega$ , $A_V = 1$ , $V_{OUT} = \pm 2.5V$ |      | 7    |      | ns              |
| dG            | Differential Gain                          | $A_V = 2$ , $R_L = 150\Omega$ , $V_{INDC} = -1$ to $+1V$              |      | 0.01 |      | %               |
| dP            | Differential Phase                         | $A_V = 2$ , $R_L = 150\Omega$ , $V_{INDC} = -1$ to $+1V$              |      | 0.02 |      | °               |
| $e_N$         | Input Noise Voltage                        | $f = 10kHz$                                                           |      | 10   |      | nV/ $\sqrt{Hz}$ |
| $i_N$         | Input Noise Current                        | $f = 10kHz$                                                           |      | 54   |      | pA/ $\sqrt{Hz}$ |
| $t_{DIS}$     | Disable Time                               |                                                                       |      | 180  |      | ns              |
| $t_{EN}$      | Enable Time                                |                                                                       |      | 650  |      | ns              |
| $I_{EN}$      | Enable Pin Current                         | Enabled, $V_{EN} = 0V$                                                | -1   |      | 1    | $\mu A$         |
|               |                                            | Disabled, $V_{EN} = 5V$                                               | 1    |      | 25   | $\mu A$         |

## Typical Performance Curves

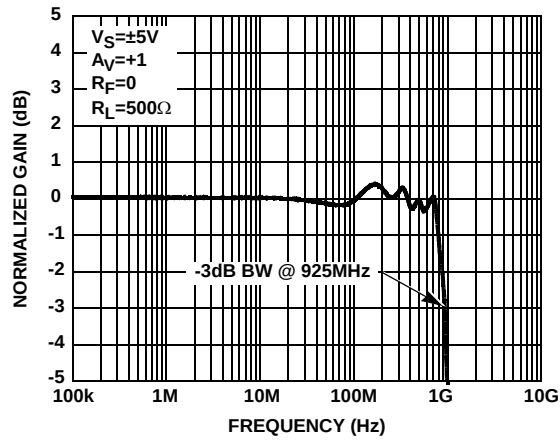


FIGURE 1. GAIN vs FREQUENCY (-3dB BANDWIDTH)

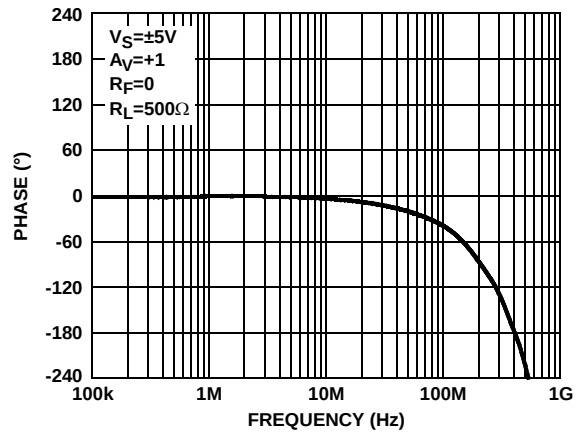


FIGURE 2. PHASE vs FREQUENCY

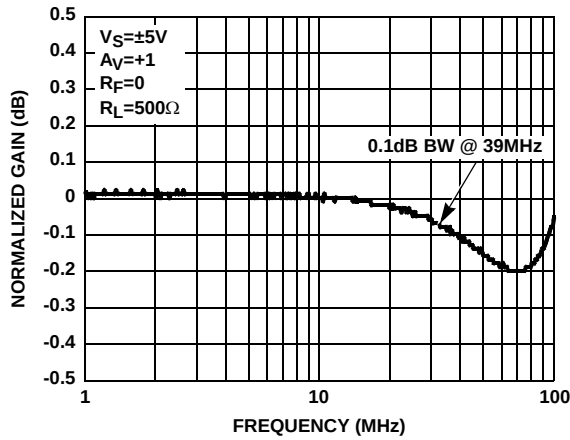


FIGURE 3. 0.1dB BANDWIDTH

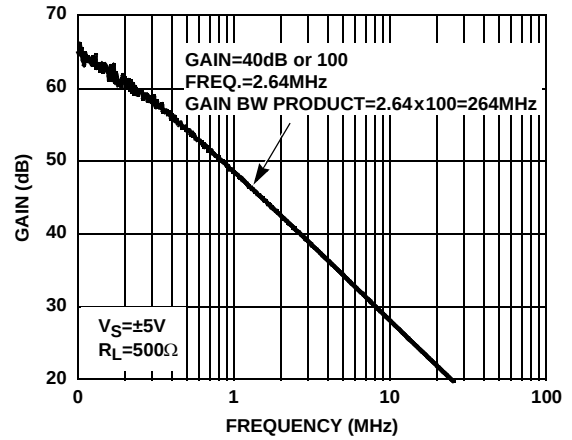


FIGURE 4. GAIN BANDWIDTH PRODUCT

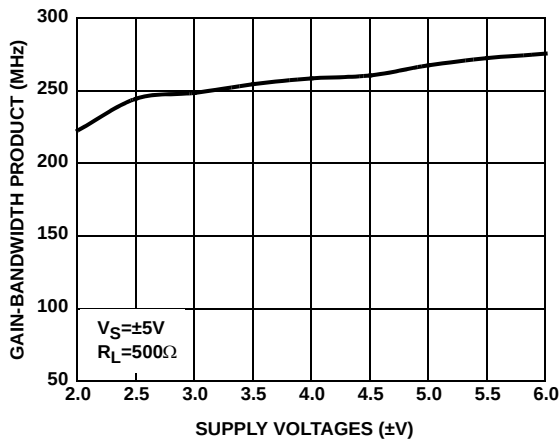


FIGURE 5. GAIN BANDWIDTH PRODUCT vs SUPPLY VOLTAGES

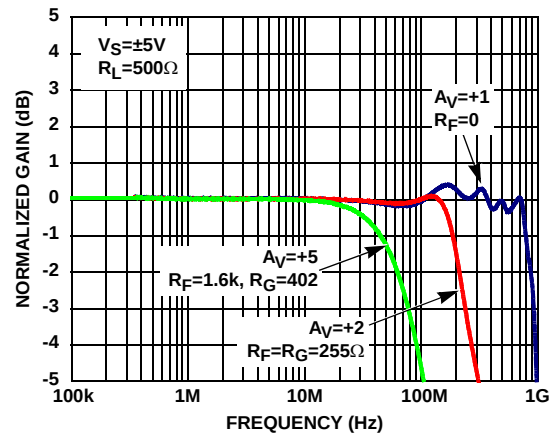


FIGURE 6. GAIN vs FREQUENCY FOR VARIOUS  $+A_V$

Typical Performance Curves (Continued)

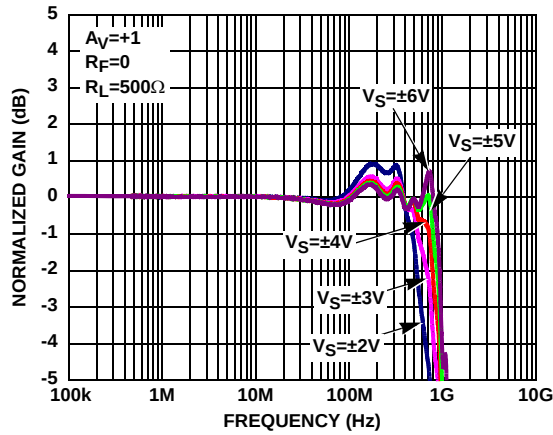


FIGURE 7. GAIN vs FREQUENCY FOR VARIOUS  $\pm V_S$

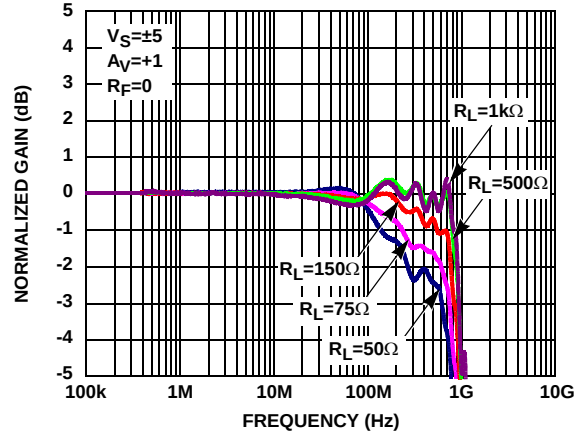


FIGURE 8. GAIN vs FREQUENCY FOR VARIOUS  $R_L$  ( $A_V = +1$ )

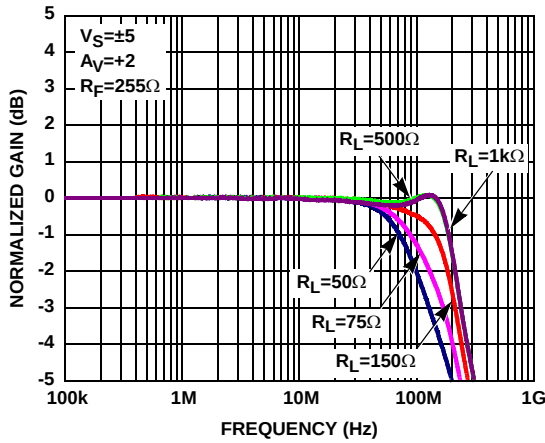


FIGURE 9. GAIN vs FREQUENCY FOR VARIOUS  $R_L$  ( $A_V = +2$ )

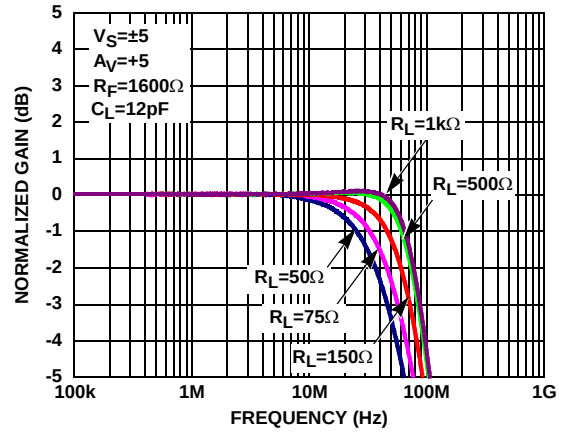


FIGURE 10. GAIN vs FREQUENCY FOR VARIOUS  $R_L$  ( $A_V = +5$ )

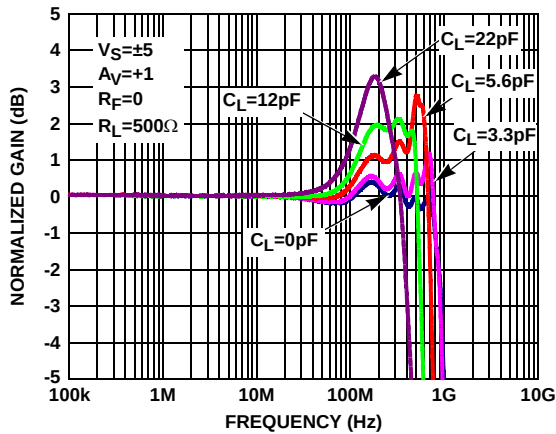


FIGURE 11. GAIN vs FREQUENCY FOR VARIOUS  $C_L$  ( $A_V = +1$ )

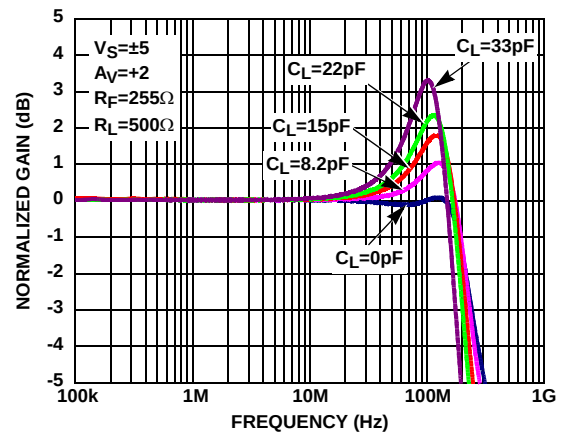


FIGURE 12. GAIN vs FREQUENCY FOR VARIOUS  $C_L$  ( $A_V = +2$ )

Typical Performance Curves (Continued)

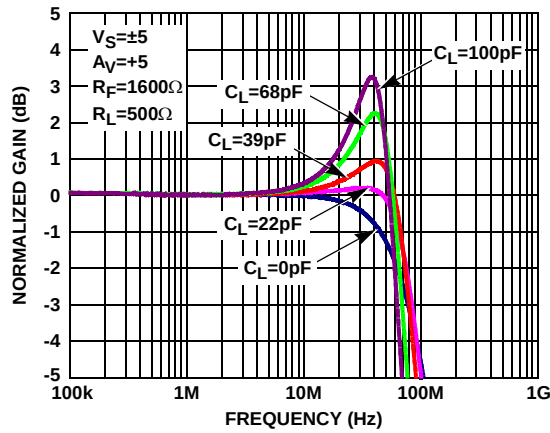


FIGURE 13. GAIN vs FREQUENCY FOR VARIOUS  $C_L$  ( $A_V = +5$ )

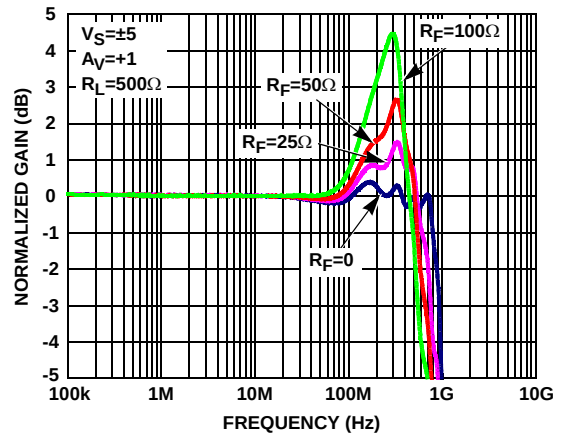


FIGURE 14. GAIN vs FREQUENCY FOR VARIOUS  $R_F$  ( $A_V = +1$ )

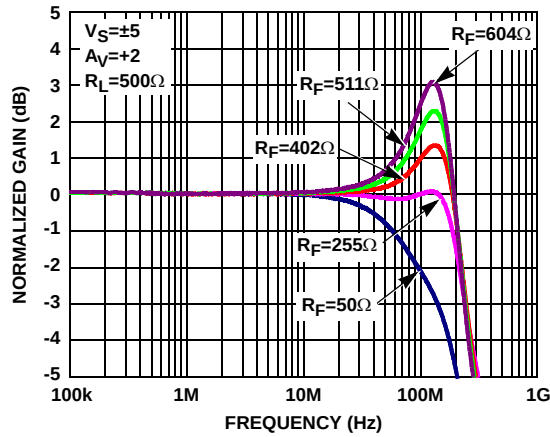


FIGURE 15. GAIN vs FREQUENCY FOR VARIOUS  $R_F$  ( $A_V = +2$ )

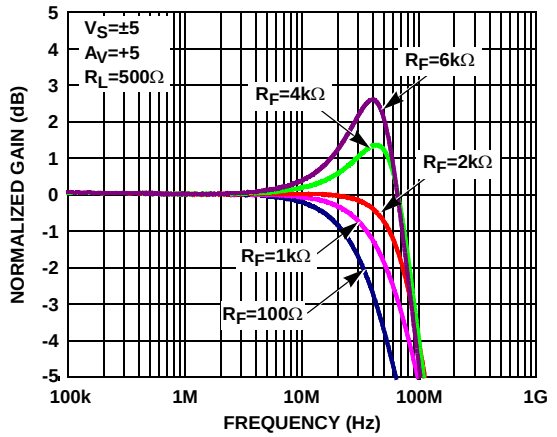


FIGURE 16. GAIN vs FREQUENCY FOR VARIOUS  $R_F$  ( $A_V = +5$ )

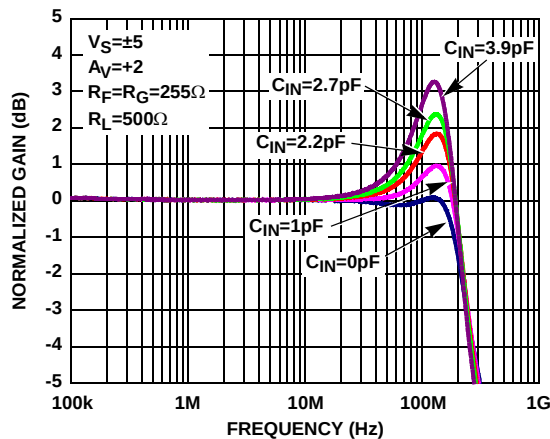


FIGURE 17. GAIN vs FREQUENCY FOR VARIOUS  $C_{IN(-)}$  ( $A_V = +2$ )

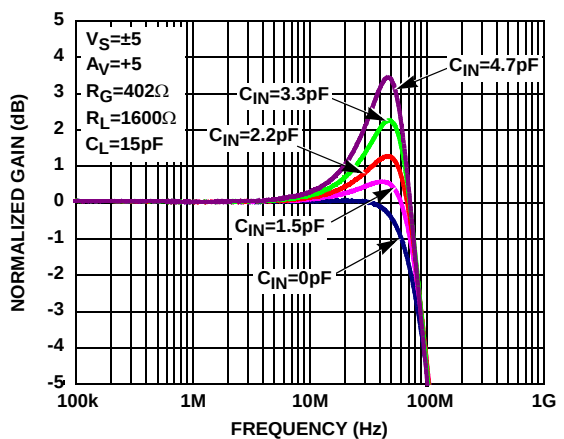


FIGURE 18. GAIN vs FREQUENCY FOR VARIOUS  $C_{IN(-)}$  ( $A_V = +5$ )

Typical Performance Curves (Continued)

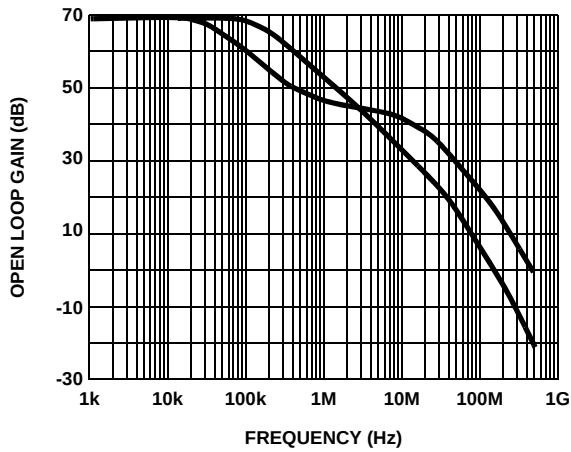


FIGURE 19. OPEN LOOP GAIN AND PHASE vs FREQUENCY

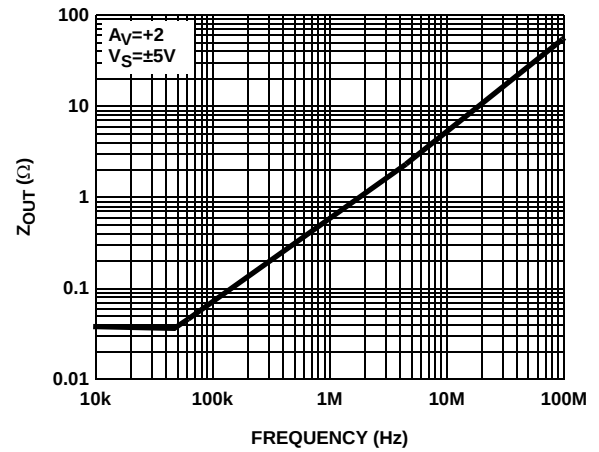


FIGURE 20.  $Z_{OUT}$  vs FREQUENCY

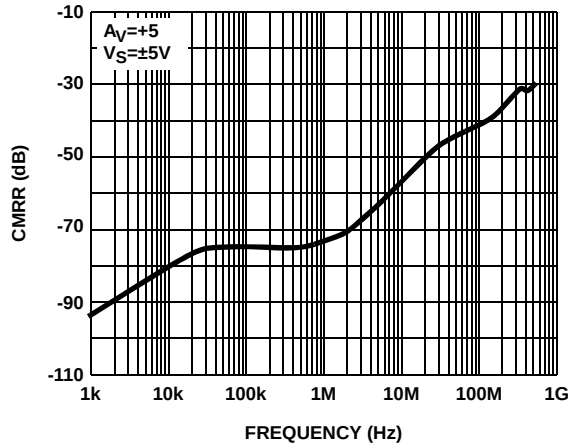


FIGURE 21. CMRR vs FREQUENCY

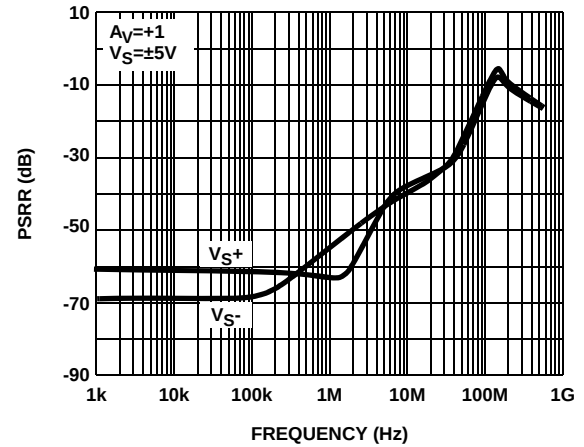


FIGURE 22. PSRR vs FREQUENCY

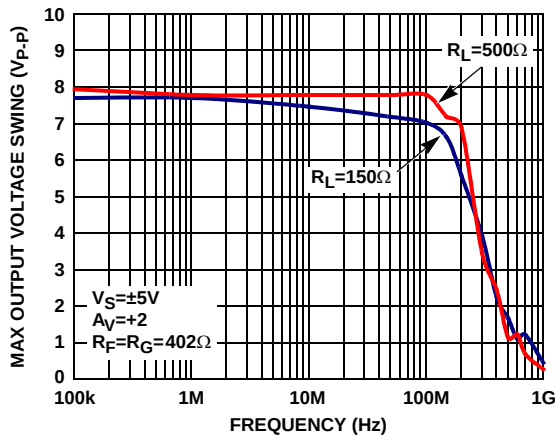


FIGURE 23. MAX OUTPUT VOLTAGE SWING vs FREQUENCY

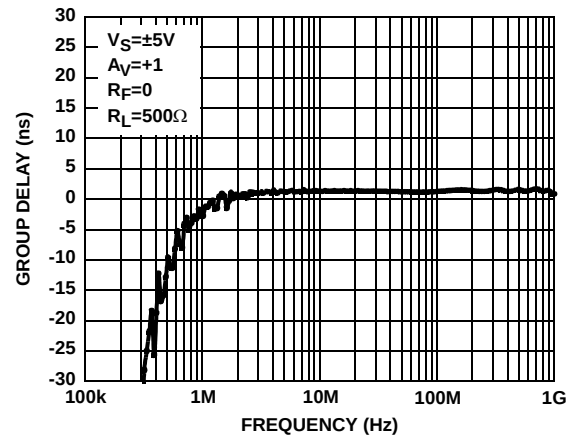


FIGURE 24. GROUP DELAY vs FREQUENCY

Typical Performance Curves (Continued)

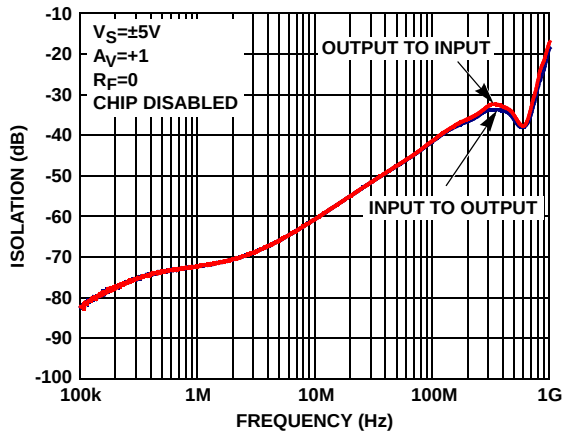


FIGURE 25. INPUT AND OUTPUT ISOLATION

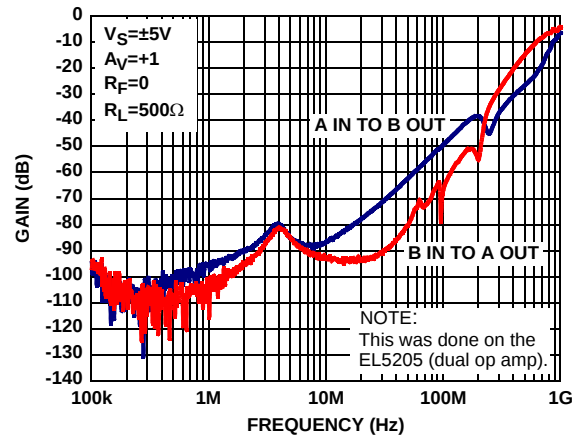


FIGURE 26. CHANNEL TO CHANNEL ISOLATION

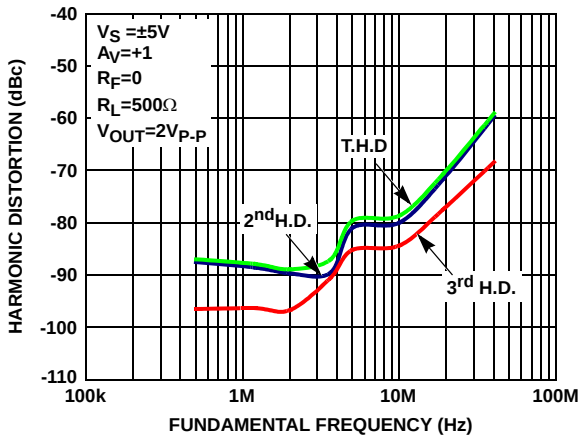


FIGURE 27. HARMONIC DISTORTION vs FREQUENCY

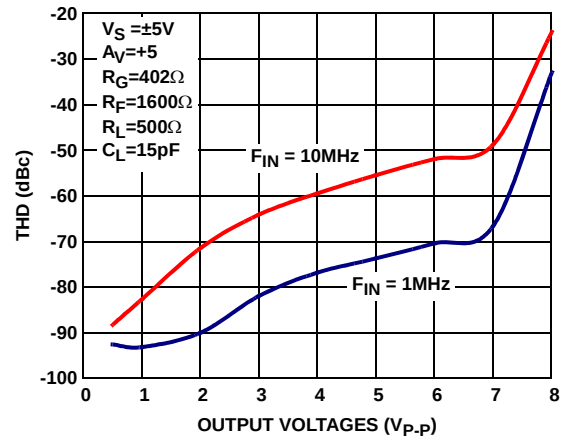


FIGURE 28. TOTAL HARMONIC DISTORTION vs OUTPUT VOLTAGES

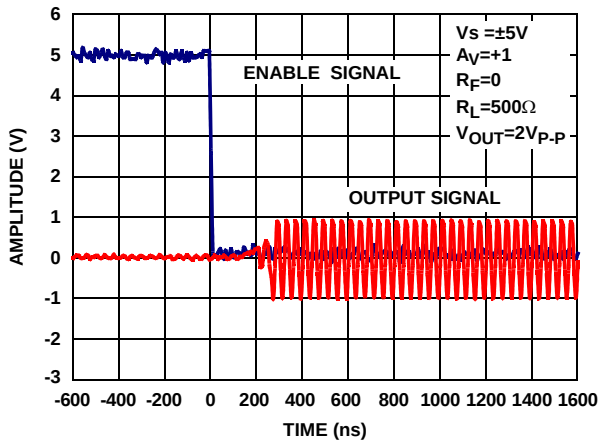


FIGURE 29. TURN-ON TIME

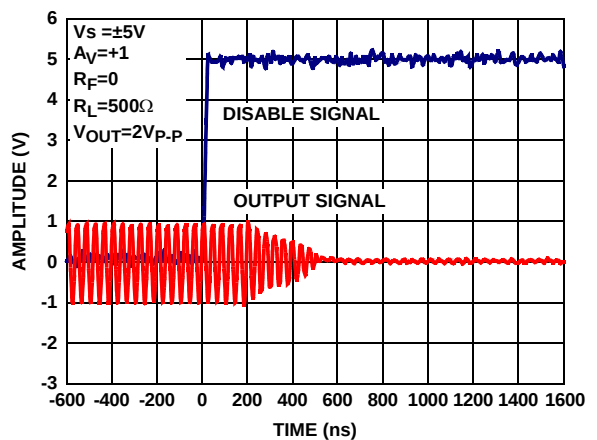


FIGURE 30. TURN-OFF TIME

Typical Performance Curves (Continued)

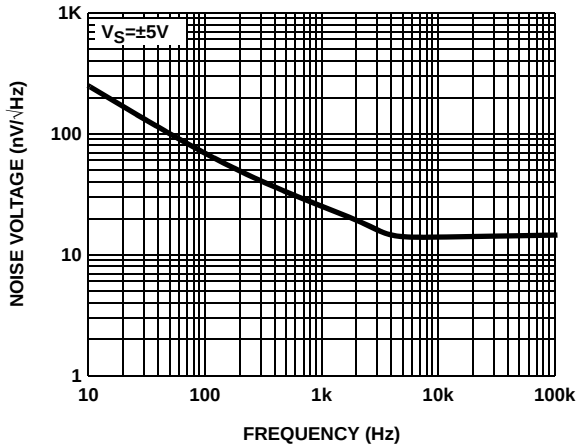


FIGURE 31. EQUIVALENT NOISE VOLTAGE vs FREQUENCY

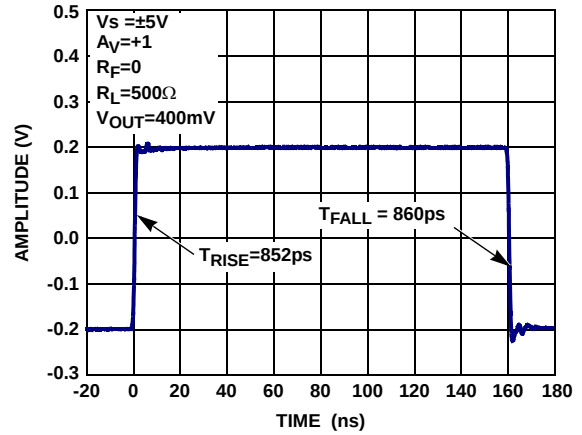


FIGURE 32. SMALL SIGNAL STEP RESPONSE\_RISE & FALL TIME

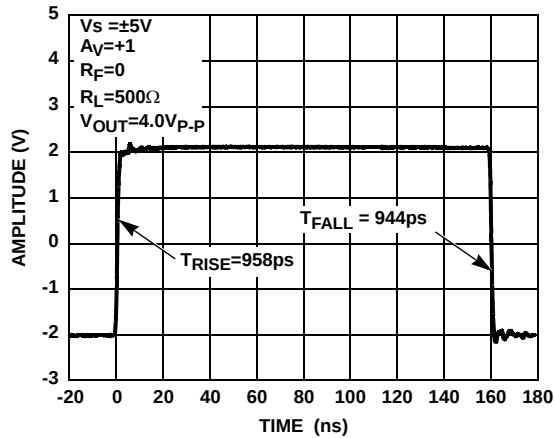


FIGURE 33. LARGE SIGNAL STEP RESPONSE\_RISE & FALL TIME

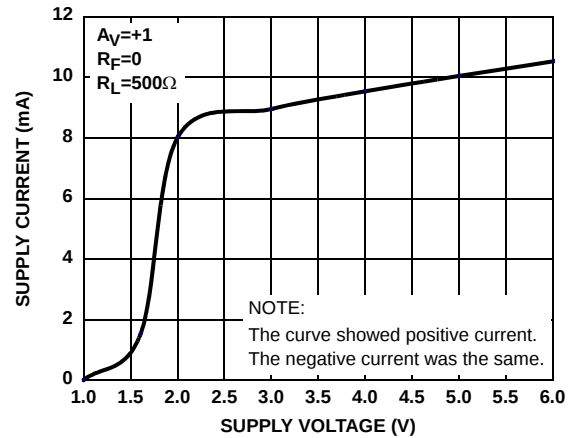


FIGURE 34. SUPPLY CURRENT vs SUPPLY VOLTAGE

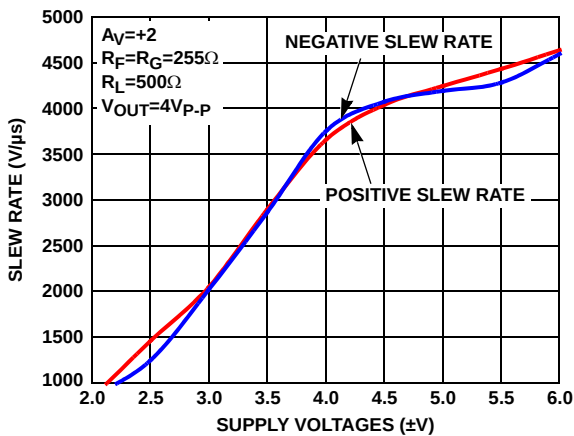


FIGURE 35. SLEW RATE vs SUPPLY VOLTAGES

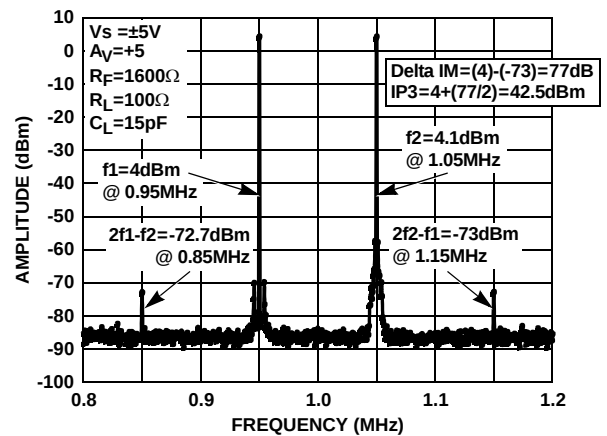


FIGURE 36. THIRD ORDER IMD INTERCEPT (IP3)

# Typical Performance Curves (Continued)

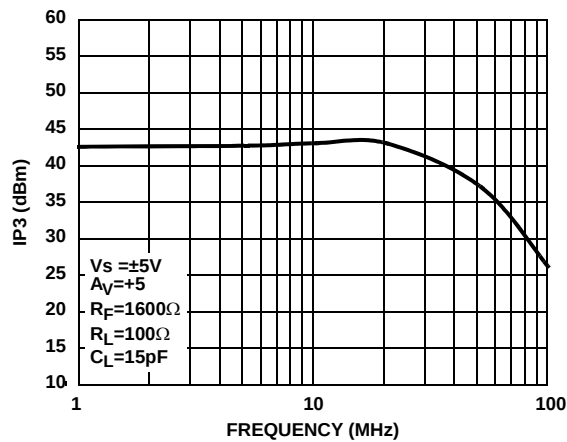


FIGURE 37. THIRD ORDER IMD INTERCEPT vs FREQUENCY

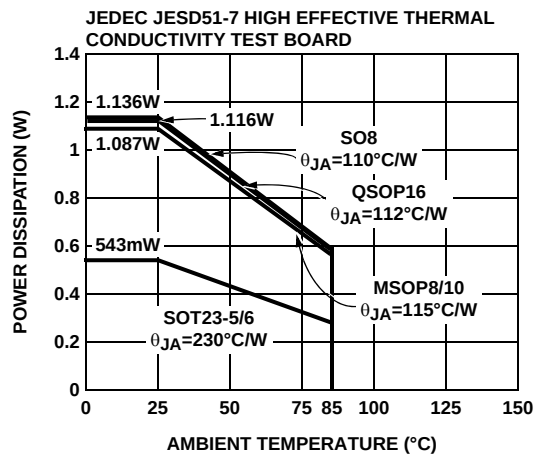


FIGURE 38. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE

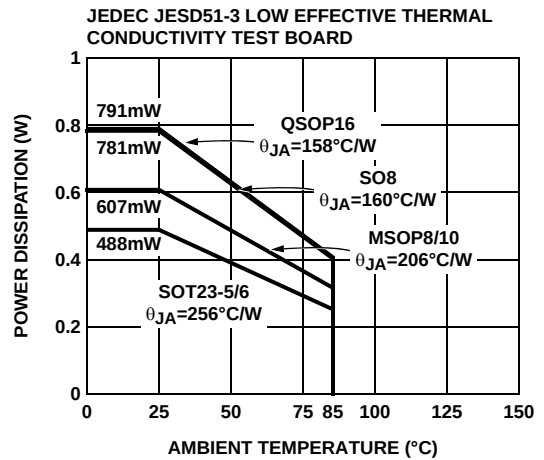
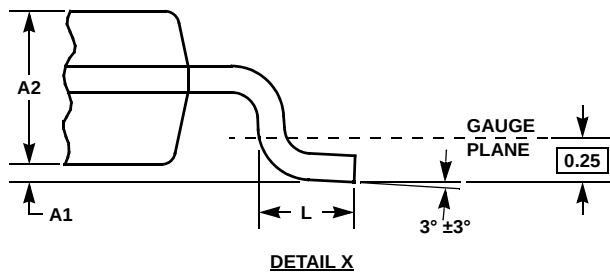
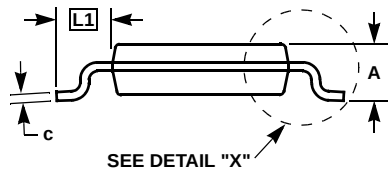
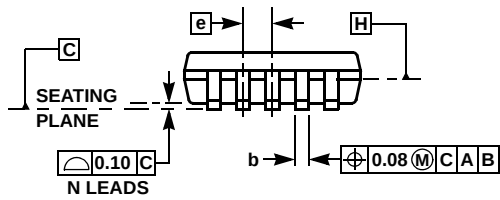
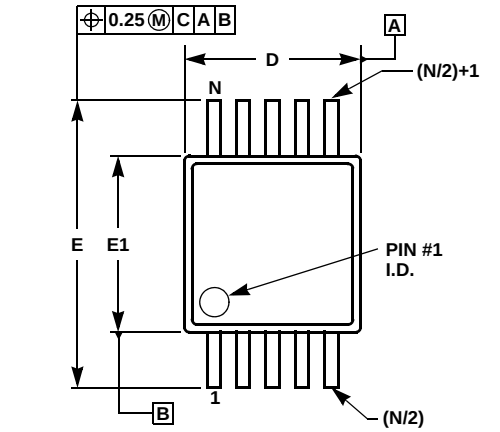


FIGURE 39. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE

## Mini SO Package Family (MSOP)



## MDP0043

### MINI SO PACKAGE FAMILY

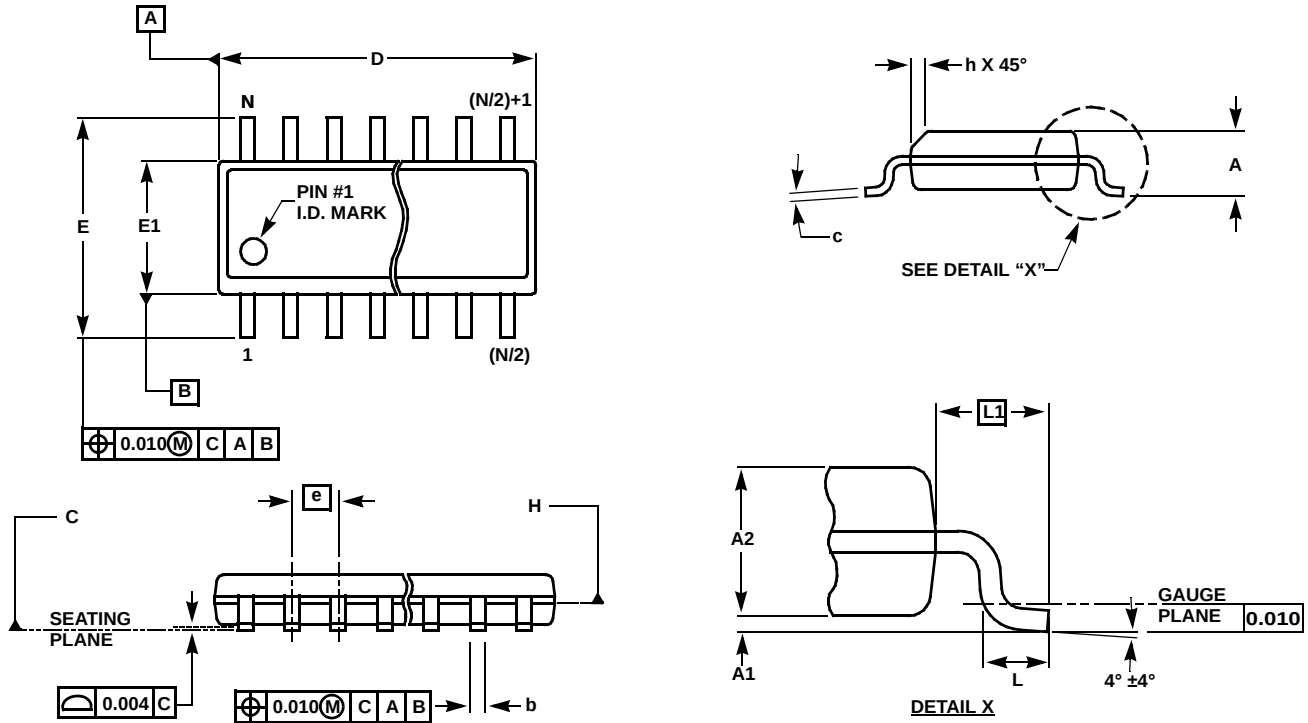
| SYMBOL | MILLIMETERS |        | TOLERANCE   | NOTES |
|--------|-------------|--------|-------------|-------|
|        | MSOP8       | MSOP10 |             |       |
| A      | 1.10        | 1.10   | Max.        | -     |
| A1     | 0.10        | 0.10   | ±0.05       | -     |
| A2     | 0.86        | 0.86   | ±0.09       | -     |
| b      | 0.33        | 0.23   | +0.07/-0.08 | -     |
| c      | 0.18        | 0.18   | ±0.05       | -     |
| D      | 3.00        | 3.00   | ±0.10       | 1, 3  |
| E      | 4.90        | 4.90   | ±0.15       | -     |
| E1     | 3.00        | 3.00   | ±0.10       | 2, 3  |
| e      | 0.65        | 0.50   | Basic       | -     |
| L      | 0.55        | 0.55   | ±0.15       | -     |
| L1     | 0.95        | 0.95   | Basic       | -     |
| N      | 8           | 10     | Reference   | -     |

Rev. D 2/07

#### NOTES:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25mm maximum per side are not included.
3. Dimensions "D" and "E1" are measured at Datum Plane "H".
4. Dimensioning and tolerancing per ASME Y14.5M-1994.

## Small Outline Package Family (SO)



### MDP0027

#### SMALL OUTLINE PACKAGE FAMILY (SO)

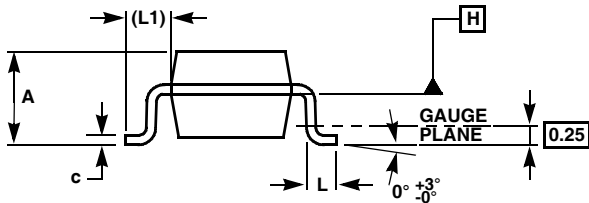
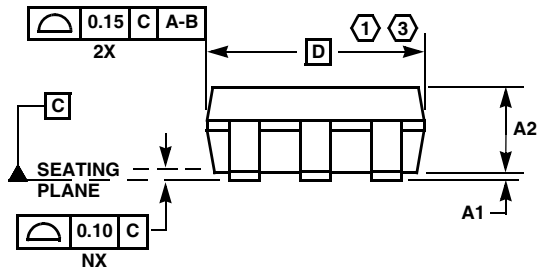
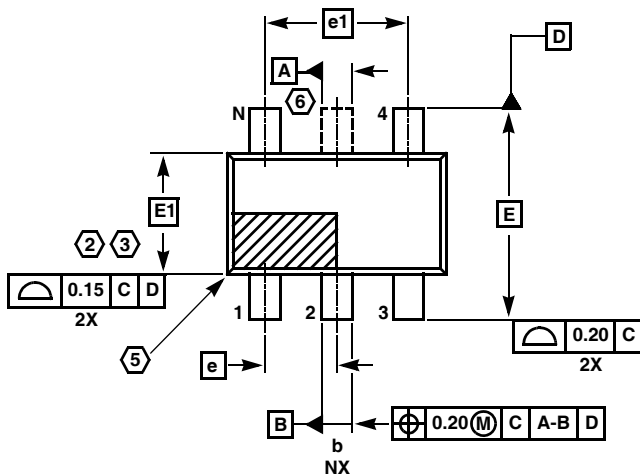
| SYMBOL | INCHES |       |                  |                           |                  |                  |                  | TOLERANCE | NOTES |
|--------|--------|-------|------------------|---------------------------|------------------|------------------|------------------|-----------|-------|
|        | SO-8   | SO-14 | SO16<br>(0.150") | SO16 (0.300")<br>(SOL-16) | SO20<br>(SOL-20) | SO24<br>(SOL-24) | SO28<br>(SOL-28) |           |       |
| A      | 0.068  | 0.068 | 0.068            | 0.104                     | 0.104            | 0.104            | 0.104            | MAX       | -     |
| A1     | 0.006  | 0.006 | 0.006            | 0.007                     | 0.007            | 0.007            | 0.007            | ±0.003    | -     |
| A2     | 0.057  | 0.057 | 0.057            | 0.092                     | 0.092            | 0.092            | 0.092            | ±0.002    | -     |
| b      | 0.017  | 0.017 | 0.017            | 0.017                     | 0.017            | 0.017            | 0.017            | ±0.003    | -     |
| c      | 0.009  | 0.009 | 0.009            | 0.011                     | 0.011            | 0.011            | 0.011            | ±0.001    | -     |
| D      | 0.193  | 0.341 | 0.390            | 0.406                     | 0.504            | 0.606            | 0.704            | ±0.004    | 1, 3  |
| E      | 0.236  | 0.236 | 0.236            | 0.406                     | 0.406            | 0.406            | 0.406            | ±0.008    | -     |
| E1     | 0.154  | 0.154 | 0.154            | 0.295                     | 0.295            | 0.295            | 0.295            | ±0.004    | 2, 3  |
| e      | 0.050  | 0.050 | 0.050            | 0.050                     | 0.050            | 0.050            | 0.050            | Basic     | -     |
| L      | 0.025  | 0.025 | 0.025            | 0.030                     | 0.030            | 0.030            | 0.030            | ±0.009    | -     |
| L1     | 0.041  | 0.041 | 0.041            | 0.056                     | 0.056            | 0.056            | 0.056            | Basic     | -     |
| h      | 0.013  | 0.013 | 0.013            | 0.020                     | 0.020            | 0.020            | 0.020            | Reference | -     |
| N      | 8      | 14    | 16               | 16                        | 20               | 24               | 28               | Reference | -     |

Rev. M 2/07

#### NOTES:

1. Plastic or metal protrusions of 0.006" maximum per side are not included.
2. Plastic interlead protrusions of 0.010" maximum per side are not included.
3. Dimensions "D" and "E1" are measured at Datum Plane "H".
4. Dimensioning and tolerancing per ASME Y14.5M-1994

## SOT-23 Package Family



### MDP0038

#### SOT-23 PACKAGE FAMILY

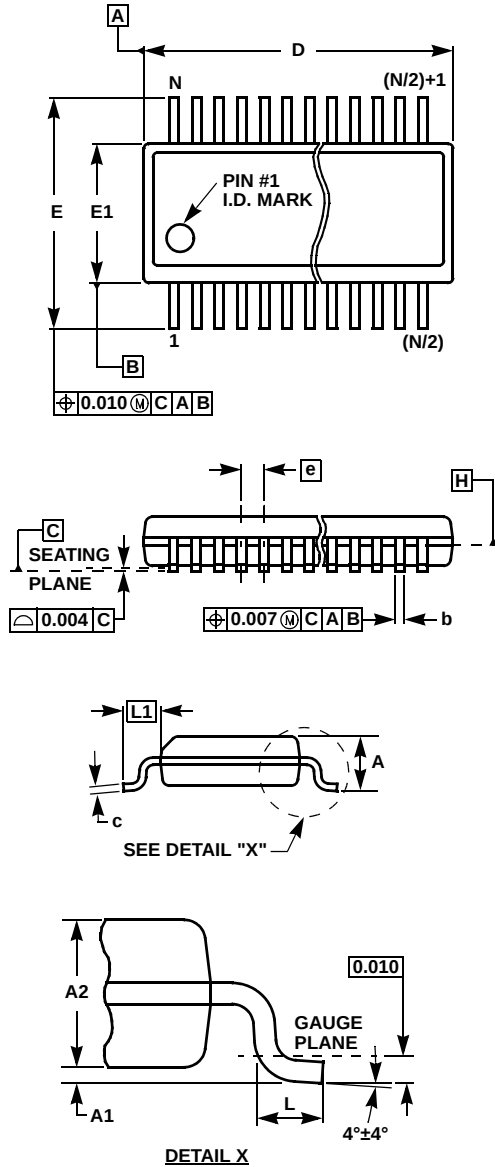
| SYMBOL | MILLIMETERS |         | TOLERANCE |
|--------|-------------|---------|-----------|
|        | SOT23-5     | SOT23-6 |           |
| A      | 1.45        | 1.45    | MAX       |
| A1     | 0.10        | 0.10    | ±0.05     |
| A2     | 1.14        | 1.14    | ±0.15     |
| b      | 0.40        | 0.40    | ±0.05     |
| c      | 0.14        | 0.14    | ±0.06     |
| D      | 2.90        | 2.90    | Basic     |
| E      | 2.80        | 2.80    | Basic     |
| E1     | 1.60        | 1.60    | Basic     |
| e      | 0.95        | 0.95    | Basic     |
| e1     | 1.90        | 1.90    | Basic     |
| L      | 0.45        | 0.45    | ±0.10     |
| L1     | 0.60        | 0.60    | Reference |
| N      | 5           | 6       | Reference |

Rev. F 2/07

#### NOTES:

1. Plastic or metal protrusions of 0.25mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25mm maximum per side are not included.
3. This dimension is measured at Datum Plane "H".
4. Dimensioning and tolerancing per ASME Y14.5M-1994.
5. Index area - Pin #1 I.D. will be located within the indicated zone (SOT23-6 only).
6. SOT23-5 version has no center lead (shown as a dashed line).

## Quarter Size Outline Plastic Packages Family (QSOP)



### MDP0040

#### QUARTER SIZE OUTLINE PLASTIC PACKAGES FAMILY

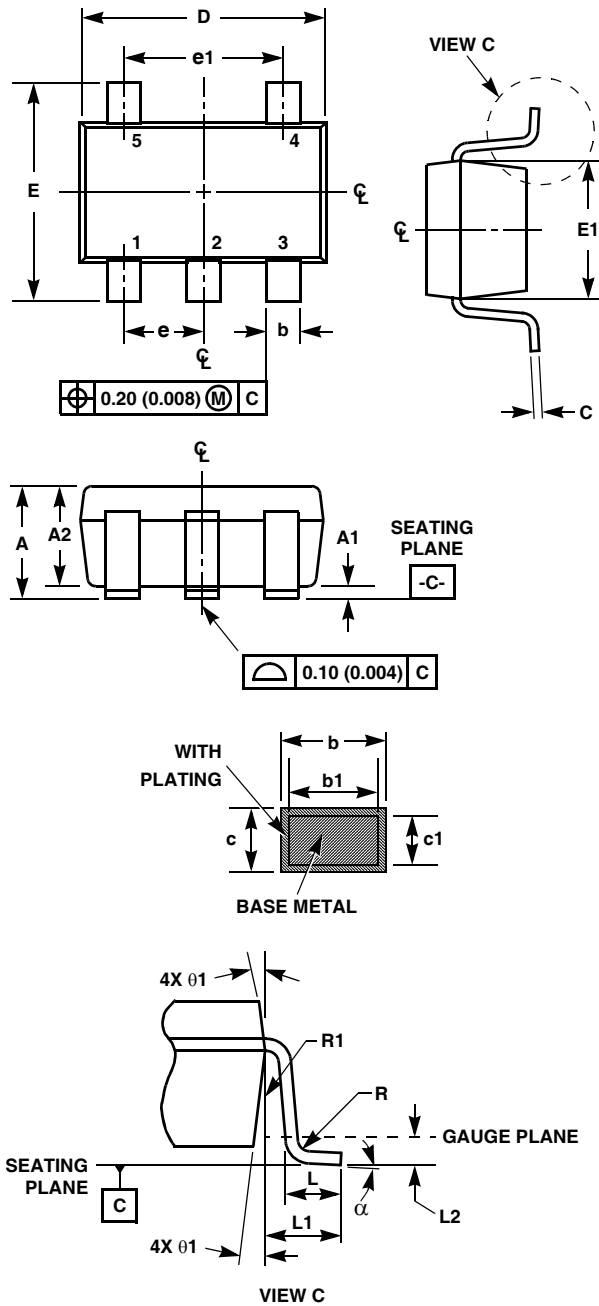
| SYMBOL | INCHES |        |        | TOLERANCE | NOTES |
|--------|--------|--------|--------|-----------|-------|
|        | QSOP16 | QSOP24 | QSOP28 |           |       |
| A      | 0.068  | 0.068  | 0.068  | Max.      | -     |
| A1     | 0.006  | 0.006  | 0.006  | ±0.002    | -     |
| A2     | 0.056  | 0.056  | 0.056  | ±0.004    | -     |
| b      | 0.010  | 0.010  | 0.010  | ±0.002    | -     |
| c      | 0.008  | 0.008  | 0.008  | ±0.001    | -     |
| D      | 0.193  | 0.341  | 0.390  | ±0.004    | 1, 3  |
| E      | 0.236  | 0.236  | 0.236  | ±0.008    | -     |
| E1     | 0.154  | 0.154  | 0.154  | ±0.004    | 2, 3  |
| e      | 0.025  | 0.025  | 0.025  | Basic     | -     |
| L      | 0.025  | 0.025  | 0.025  | ±0.009    | -     |
| L1     | 0.041  | 0.041  | 0.041  | Basic     | -     |
| N      | 16     | 24     | 28     | Reference | -     |

Rev. F 2/07

#### NOTES:

1. Plastic or metal protrusions of 0.006" maximum per side are not included.
2. Plastic interlead protrusions of 0.010" maximum per side are not included.
3. Dimensions "D" and "E1" are measured at Datum Plane "H".
4. Dimensioning and tolerancing per ASME Y14.5M-1994.

## Small Outline Transistor Plastic Packages (SC70-5)



## P5.049

## 5 LEAD SMALL OUTLINE TRANSISTOR PLASTIC PACKAGE

| SYMBOL | INCHES     |       | MILLIMETERS |      | NOTES |
|--------|------------|-------|-------------|------|-------|
|        | MIN        | MAX   | MIN         | MAX  |       |
| A      | 0.031      | 0.043 | 0.80        | 1.10 | -     |
| A1     | 0.000      | 0.004 | 0.00        | 0.10 | -     |
| A2     | 0.031      | 0.039 | 0.80        | 1.00 | -     |
| b      | 0.006      | 0.012 | 0.15        | 0.30 | -     |
| b1     | 0.006      | 0.010 | 0.15        | 0.25 | -     |
| c      | 0.003      | 0.009 | 0.08        | 0.22 | 6     |
| c1     | 0.003      | 0.009 | 0.08        | 0.20 | 6     |
| D      | 0.073      | 0.085 | 1.85        | 2.15 | 3     |
| E      | 0.071      | 0.094 | 1.80        | 2.40 | -     |
| E1     | 0.045      | 0.053 | 1.15        | 1.35 | 3     |
| e      | 0.0256 Ref |       | 0.65 Ref    |      | -     |
| e1     | 0.0512 Ref |       | 1.30 Ref    |      | -     |
| L      | 0.010      | 0.018 | 0.26        | 0.46 | 4     |
| L1     | 0.017 Ref. |       | 0.420 Ref.  |      | -     |
| L2     | 0.006 BSC  |       | 0.15 BSC    |      | -     |
| α      | 0°         | 8°    | 0°          | 8°   | -     |
| N      | 5          |       | 5           |      | 5     |
| R      | 0.004      | -     | 0.10        | -    | -     |
| R1     | 0.004      | 0.010 | 0.15        | 0.25 | -     |

Rev. 2 9/03

## NOTES:

1. Dimensioning and tolerances per ASME Y14.5M-1994.
2. Package conforms to EIAJ SC70 and JEDEC MO-203AA.
3. Dimensions D and E1 are exclusive of mold flash, protrusions, or gate burrs.
4. Footlength L measured at reference to gauge plane.
5. "N" is the number of terminal positions.
6. These Dimensions apply to the flat section of the lead between 0.08mm and 0.15mm from the lead tip.
7. Controlling dimension: MILLIMETER. Converted inch dimensions are for reference only.

All Intersil U.S. products are manufactured, assembled and tested utilizing ISO9000 quality systems.

Intersil Corporation's quality certifications can be viewed at [www.intersil.com/design/quality](http://www.intersil.com/design/quality)

Intersil products are sold by description only. Intersil Corporation reserves the right to make changes in circuit design, software and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that data sheets are current before placing orders. Information furnished by Intersil is believed to be accurate and reliable. However, no responsibility is assumed by Intersil or its subsidiaries for its use; nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Intersil or its subsidiaries.

For information regarding Intersil Corporation and its products, see [www.intersil.com](http://www.intersil.com)



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

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.