



MC4558

WIDE BANDWIDTH DUAL BIPOLAR OPERATIONAL AMPLIFIER

- INTERNALLY COMPENSATED
- SHORT-CIRCUIT PROTECTION
- GAIN AND PHASE MATCH BETWEEN AMPLIFIER
- LOW POWER CONSUMPTION
- PIN TO PIN COMPATIBLE WITH MC1458/LM358
- GAIN BANDWIDTH PRODUCT (at 100kHz) 5.5MHz

DESCRIPTION

The MC4558 is a high performance monolithic dual operational amplifier.

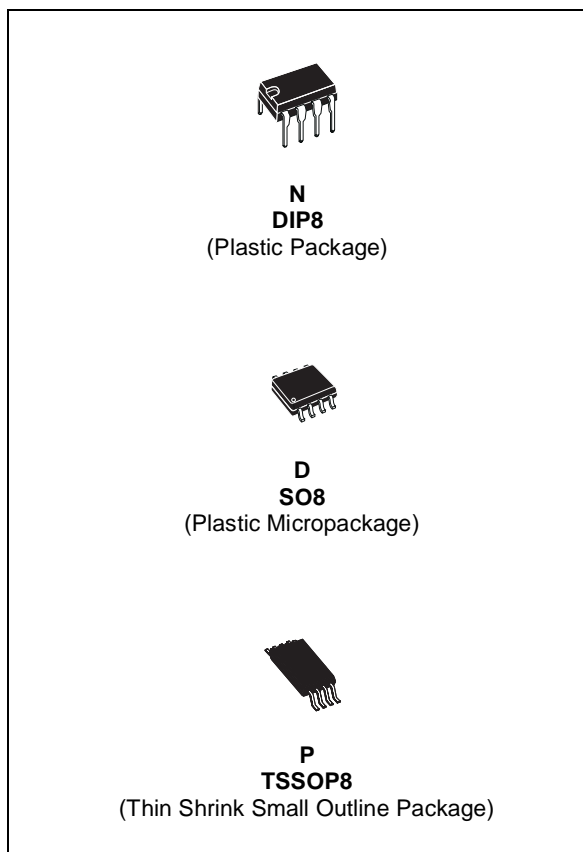
The circuit combines all the outstanding features of the MC1458 and, in addition possesses three times the unity gain bandwidth of the industry standard.

ORDER CODE

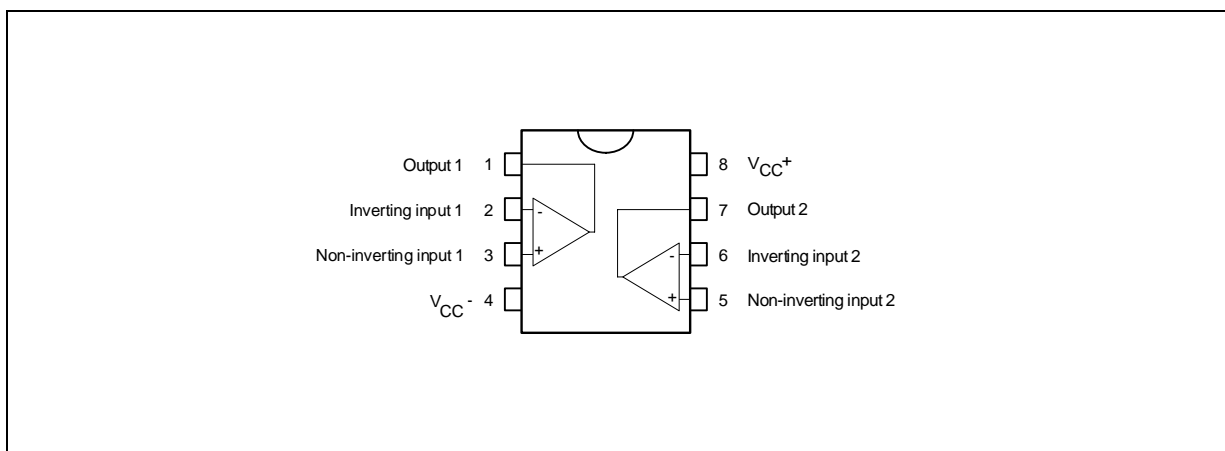
| Part Number | Temperature Range | Package | | |
|-------------|-------------------|---------|---|---|
| | | N | D | P |
| MC4558C | 0°C, +70°C | • | • | • |
| MC4558I | -40°C, +105°C | • | • | • |

Example : MC4558CN

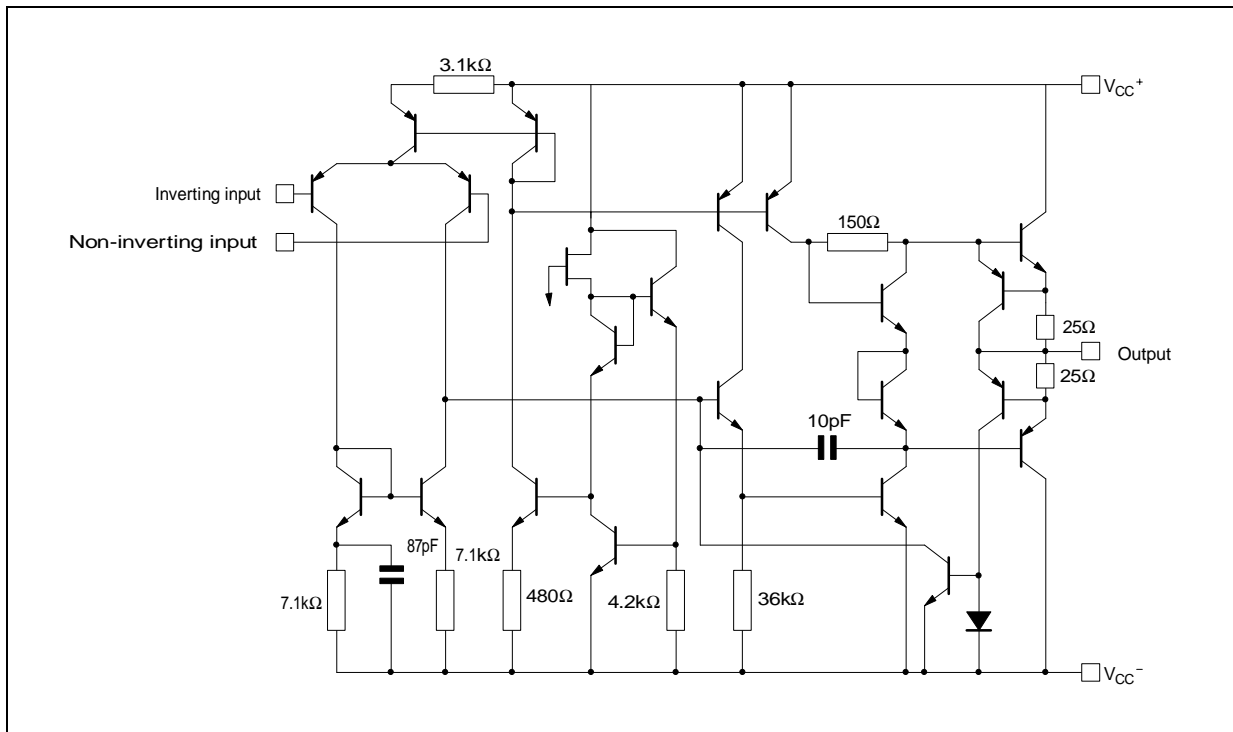
N = Dual in Line Package (DIP)
D = Small Outline Package (SO) - also available in Tape & Reel (DT)
P = Thin Shrink Small Outline Package (TSSOP) - only available in Tape & Reel (PT)



PIN CONNECTIONS (top view)



SCHEMATIC DIAGRAM (1/2 MC4558)



ABSOLUTE MAXIMUM RATINGS

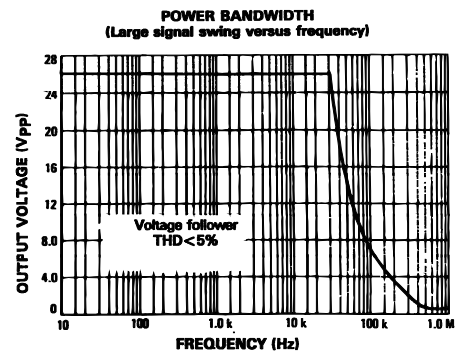
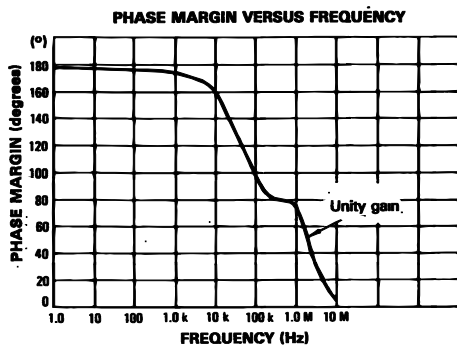
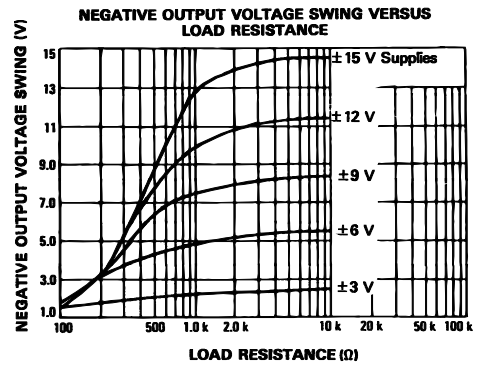
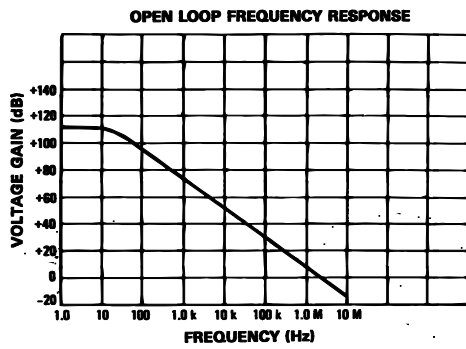
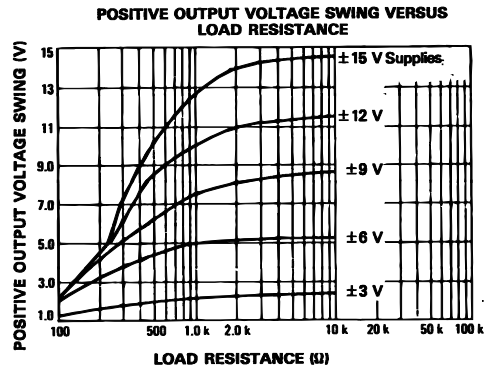
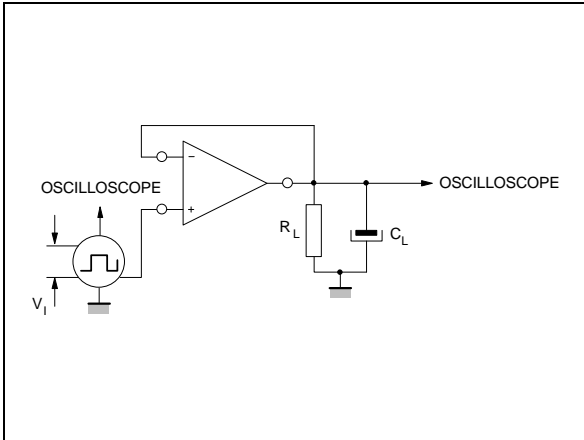
| Symbol | Parameter | MC4558I | MC4558C | Unit |
|------------|--------------------------------------|-------------|----------|------|
| V_{CC} | Supply Voltage | ±22 | | V |
| V_i | Input Voltage | ±30 | | V |
| V_{id} | Differential Input Voltage | ±15 | | V |
| P_{tot} | Power Dissipation ¹⁾ | 680 | | mW |
| | Output Short Circuit Duration | Infinite | | |
| T_{oper} | Operating Free-Air Temperature Range | -40 to +105 | 0 to +70 | °C |
| T_{stg} | Storage Temperature | -65 to +150 | | °C |

1. Power dissipation must be considered to ensure maximum junction temperature (T_j) is not exceeded.

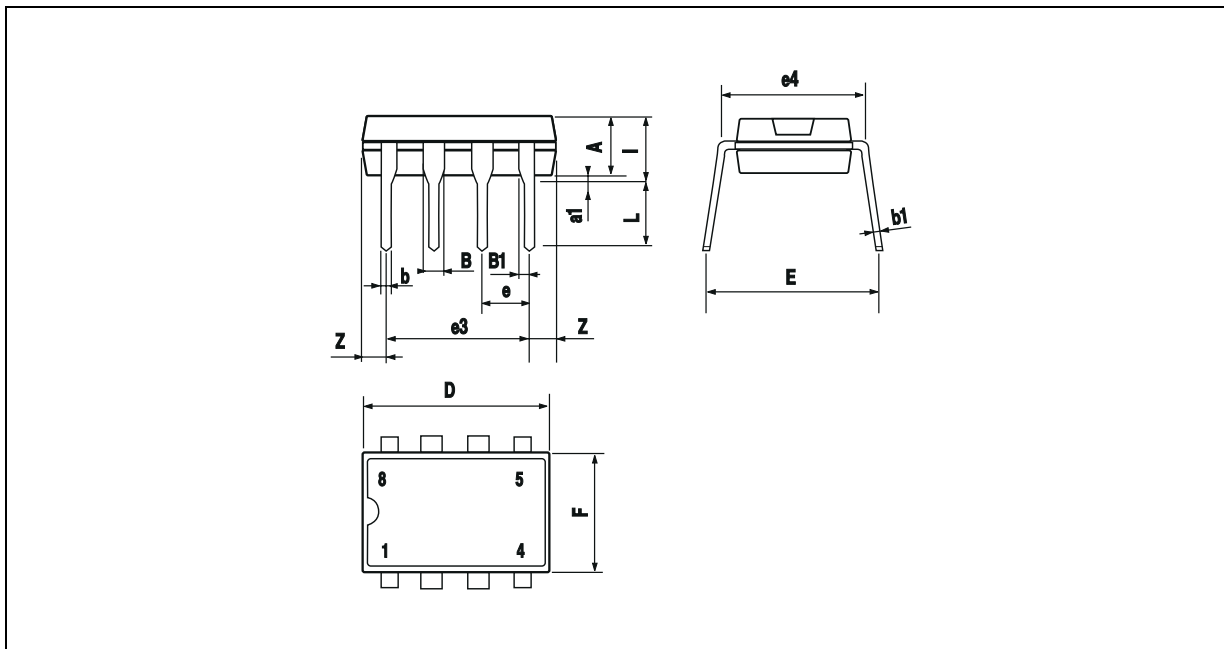
ELECTRICAL CHARACTERISTICS $V_{CC} = \pm 15V$, $T_{amb} = 25^{\circ}C$ (unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|-----------------|---|--|--|----------------------|------------------------|
| V_{io} | Input Offset Voltage ($R_s \leq 10k\Omega$) $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$. | | 1 | 5 6 | mV |
| I_{io} | Input Offset Current $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$. | | 20 | 100 200 | nA |
| I_{ib} | Input Bias Current $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$. | | 50 | 400 500 | nA |
| A_{vd} | Large Signal Voltage Gain ($R_L = 2k\Omega$, $V_o = \pm 10V$) $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$. | 50 25 | 200 | | V/mV |
| SVR | Supply Voltage Rejection Ratio ($R_s \leq 10k\Omega$) $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$. | 77 77 | 90 | | dB |
| I_{CC} | Supply Current, all amplifiers, no load $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$. | | 2.3 | 4.5 6 | mA |
| V_{icm} | Input Common Mode Voltage Range $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$. | ± 12 ± 12 | | | V |
| CMR | Common-mode Rejection Ratio ($R_s \leq 10k\Omega$) $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$. | 70 70 | 90 | | dB |
| I_{os} | Output Short Circuit Current | 10 | 20 | 40 | mA |
| V_o | Output Voltage Swing $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$. | $R_L = 10k\Omega$ $R_L = 2k\Omega$ $R_L = 10k\Omega$ $R_L = 2k\Omega$ | ± 12 ± 10 ± 12 ± 10 | ± 14 ± 13 | V |
| SR | Slew Rate ($V_i = \pm 10$, $R_L = 2k\Omega$, $C_L = 100pF$, $T_{amb} = 25^{\circ}C$, unity gain) | 1.5 | 2.2 | | V/ μs |
| t_r | Rise Time ($V_i = \pm 20mV$, $R_L = 2k\Omega$, $C_L = 100pF$, $T_{amb} = 25^{\circ}C$, unity gain) | | 0.3 | | μs |
| K_{OV} | Overshoot ($V_i = \pm 20mV$, $R_L = 2k\Omega$, $C_L = 100pF$, $T_{amb} = 25^{\circ}C$, unity gain) | | 15 | | % |
| R_i | Input Resistance | 0.3 | 2 | | M Ω |
| C_i | Input Capacitance | | 1.4 | | pF |
| R_o | Output Resistance | | 75 | | Ω |
| B | Unity Gain Bandwidth | | 2.8 | | MHz |
| GBP | Gain Bandwidth Product ($V_i = 10mV$, $R_L = 2k\Omega$, $C_L = 100pF$, $f = 100kHz$, $T_{amb} = 25^{\circ}C$) | | 5.5 | | MHz |
| THD | Total Harmonic Distortion ($f = 1kHz$, $A_v = 20dB$, $R_L = 2k\Omega$, $V_o = 2V_{pp}$, $C_L = 100pF$, $T_{amb} = 25^{\circ}C$) | | 0.008 | | % |
| e_n | Equivalent Input Noise Voltage ($R_s = 100\Omega$, $f = 1kHz$) | | 12 | | $\frac{nV}{\sqrt{Hz}}$ |
| V_{O1}/V_{O2} | Channel Separation | | 120 | | dB |

TRANSIENT RESPONSE TEST CIRCUIT

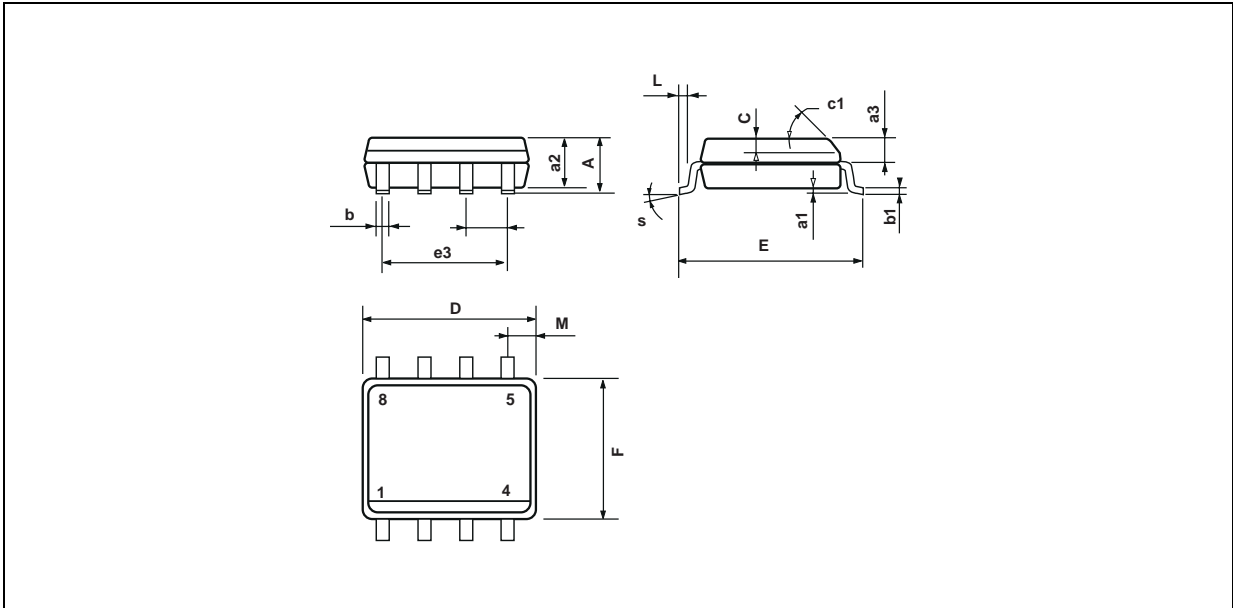


PACKAGE MECHANICAL DATA
8 PINS - PLASTIC DIP



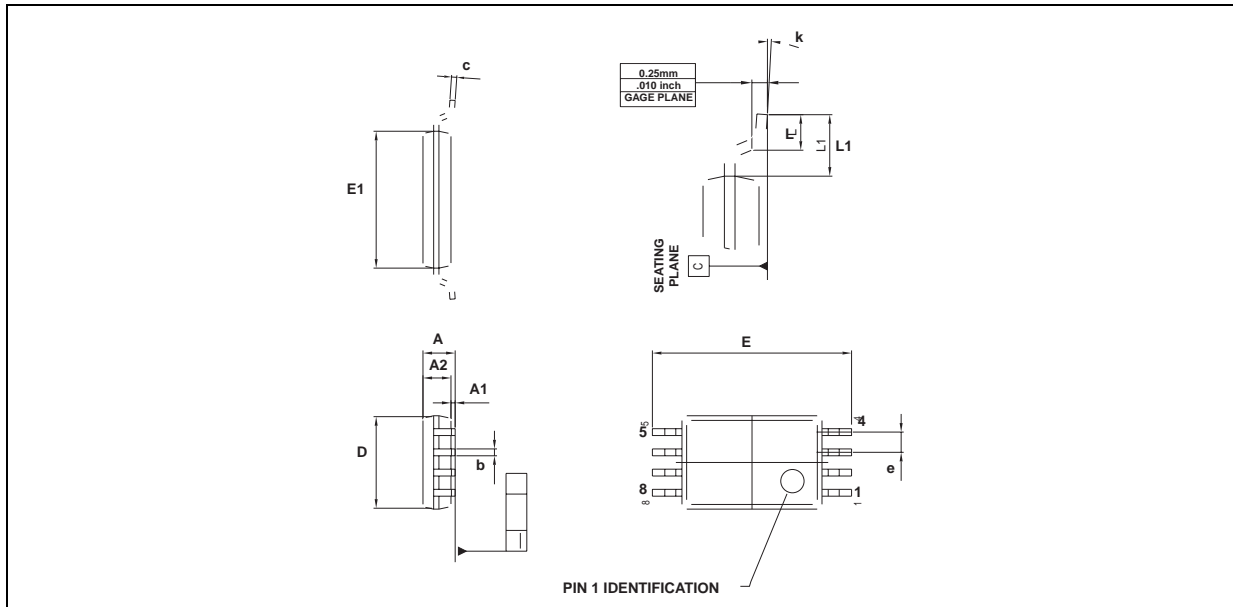
| Dimensions | Millimeters | | | Inches | | |
|------------|-------------|------|-------|--------|-------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | 3.32 | | | 0.131 | |
| a1 | 0.51 | | | 0.020 | | |
| B | 1.15 | | 1.65 | 0.045 | | 0.065 |
| b | 0.356 | | 0.55 | 0.014 | | 0.022 |
| b1 | 0.204 | | 0.304 | 0.008 | | 0.012 |
| D | | | 10.92 | | | 0.430 |
| E | 7.95 | | 9.75 | 0.313 | | 0.384 |
| e | | 2.54 | | | 0.100 | |
| e3 | | 7.62 | | | 0.300 | |
| e4 | | 7.62 | | | 0.300 | |
| F | | | 6.6 | | | 0.260 |
| i | | | 5.08 | | | 0.200 |
| L | 3.18 | | 3.81 | 0.125 | | 0.150 |
| Z | | | 1.52 | | | 0.060 |

PACKAGE MECHANICAL DATA
8 PINS - PLASTIC MICROPACKAGE (SO)



| Dimensions | Millimeters | | | Inches | | |
|------------|-------------|------|------|--------|-------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 1.75 | | | 0.069 |
| a1 | 0.1 | | 0.25 | 0.004 | | 0.010 |
| a2 | | | 1.65 | | | 0.065 |
| a3 | 0.65 | | 0.85 | 0.026 | | 0.033 |
| b | 0.35 | | 0.48 | 0.014 | | 0.019 |
| b1 | 0.19 | | 0.25 | 0.007 | | 0.010 |
| C | 0.25 | | 0.5 | 0.010 | | 0.020 |
| c1 | 45° (typ.) | | | | | |
| D | 4.8 | | 5.0 | 0.189 | | 0.197 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 3.81 | | | 0.150 | |
| F | 3.8 | | 4.0 | 0.150 | | 0.157 |
| L | 0.4 | | 1.27 | 0.016 | | 0.050 |
| M | | | 0.6 | | | 0.024 |
| S | 8° (max.) | | | | | |

PACKAGE MECHANICAL DATA
8 PINS - THIN SHRINK SMALL OUTLINE PACKAGE



| Dimensions | Millimeters | | | Inches | | |
|------------|-------------|-------|------|--------|--------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 1.20 | | | 0.05 |
| A1 | 0.05 | | 0.15 | 0.01 | | 0.006 |
| A2 | 0.80 | 1.00 | 1.05 | 0.031 | 0.039 | 0.041 |
| b | 0.19 | | 0.30 | 0.007 | | 0.15 |
| c | 0.09 | | 0.20 | 0.003 | | 0.012 |
| D | 2.90 | 3.00 | 3.10 | 0.114 | 0.118 | 0.122 |
| E | | 6.40 | | | 0.252 | |
| E1 | 4.30 | 4.40 | 4.50 | 0.169 | 0.173 | 0.177 |
| e | | 0.65 | | | 0.025 | |
| k | 0° | | 8° | 0° | | 8° |
| l | 0.50 | 0.60 | 0.75 | 0.09 | 0.0236 | 0.030 |
| L | 0.45 | 0.600 | 0.75 | 0.018 | 0.024 | 0.030 |
| L1 | | 1.000 | | | 0.039 | |

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