



# 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

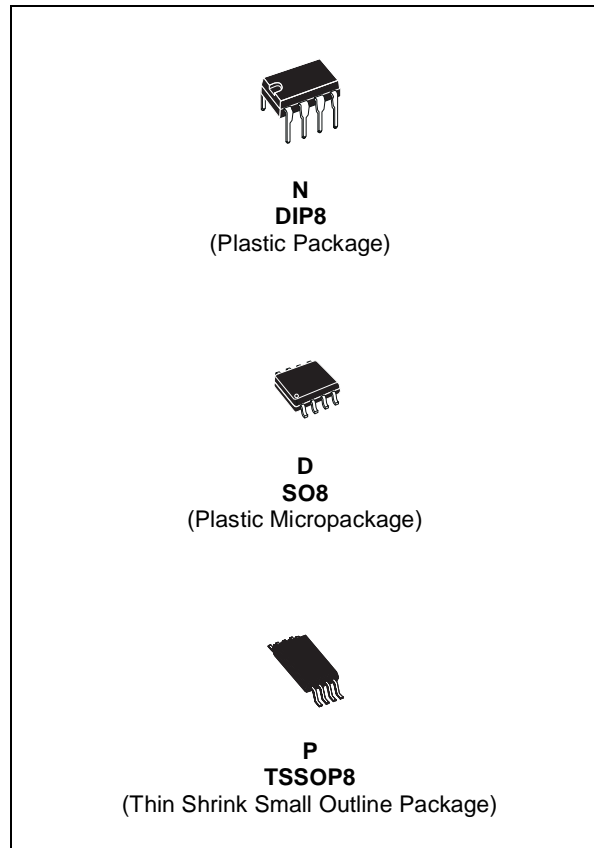
Part Number	Temperature Range	Package		
		N	D	P
MC4558C	0°C, +70°C	•	•	•
MC4558I	-40°C, +105°C	•	•	•

**Example :** MC4558CN

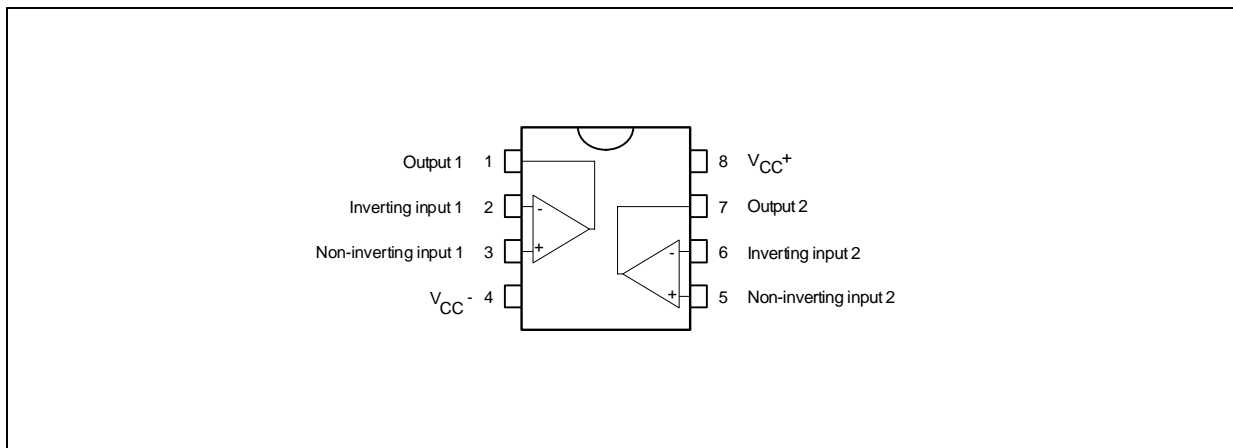
**N** = Dual in Line Package (DIP)

**D** = Small Outline Package (SO) - also available in Tape & Reel (DT)

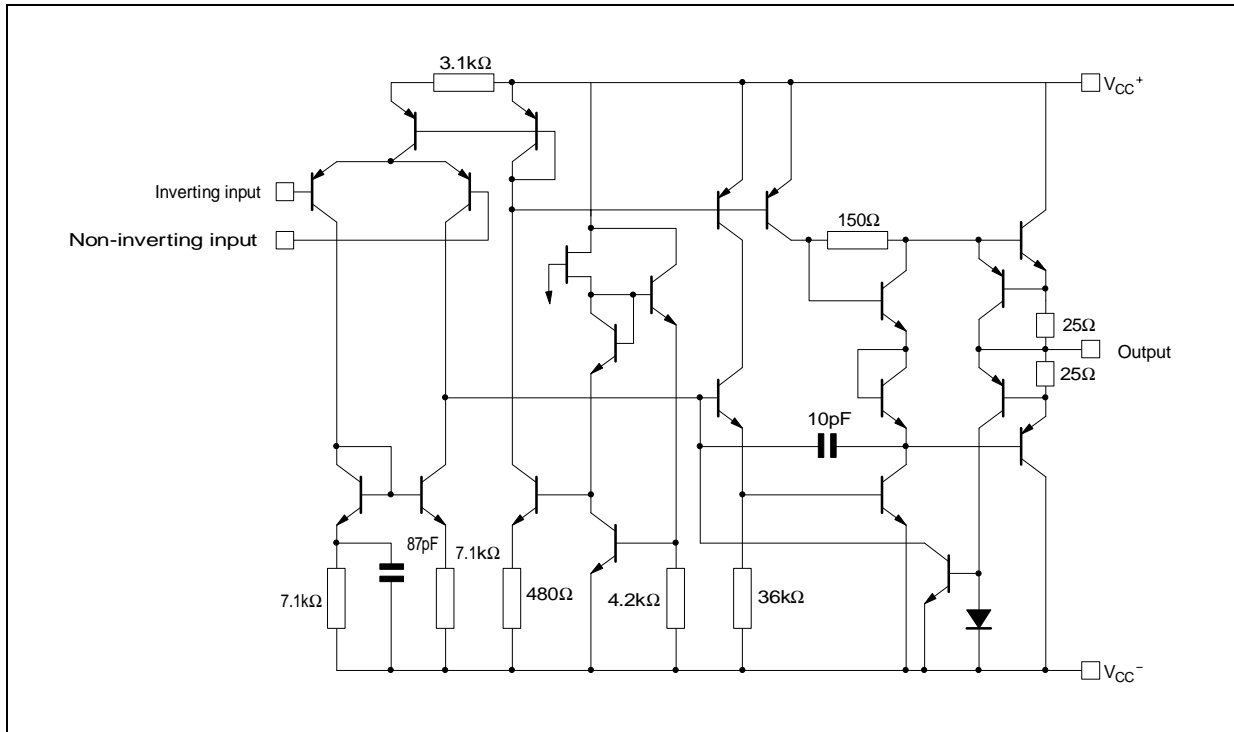
**P** = Thin Shrink Small Outline Package (TSSOP) - only available in Tape & Reel (PT)



### PIN CONNECTIONS (top view)



SCHEMATIC DIAGRAM (1/2 MC4558)



ABSOLUTE MAXIMUM RATINGS

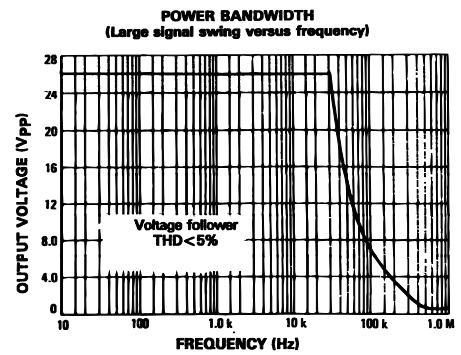
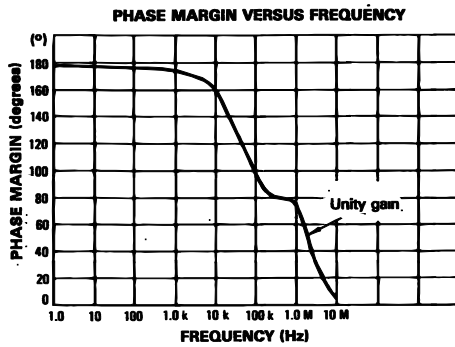
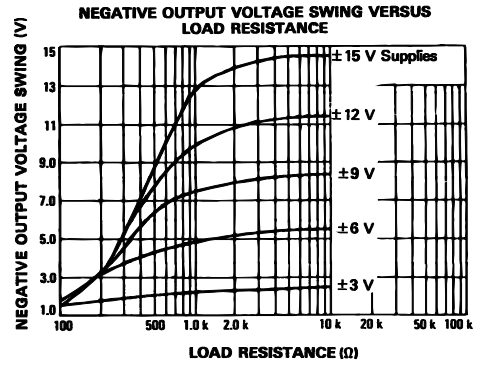
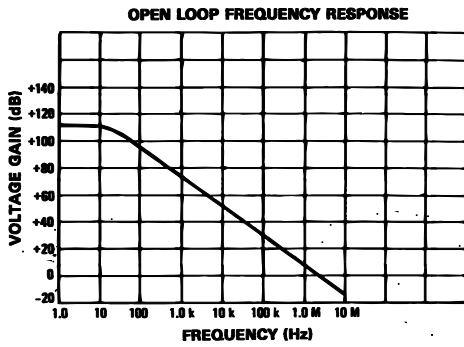
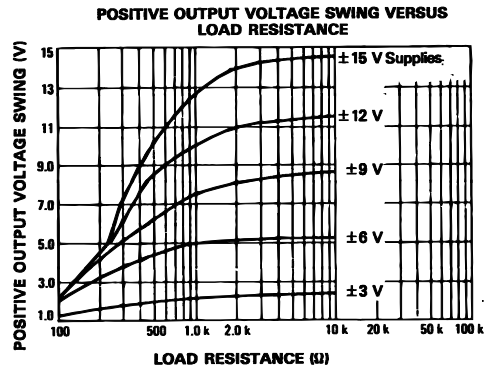
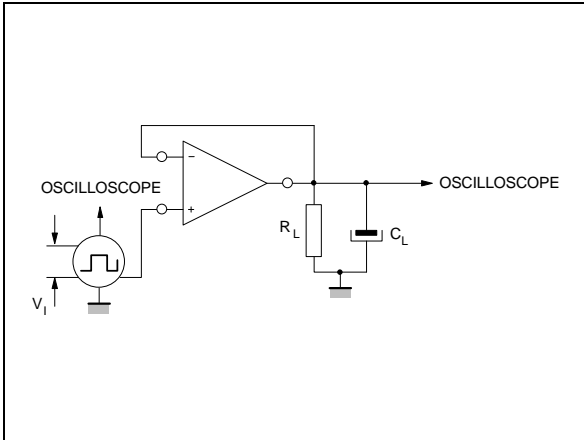
Symbol	Parameter	MC4558I	MC4558C	Unit
$V_{CC}$	Supply Voltage	±22		V
$V_i$	Input Voltage	±30		V
$V_{id}$	Differential Input Voltage	±15		V
$P_{tot}$	Power Dissipation <sup>1)</sup>	680		mW
	Output Short Circuit Duration	Infinite		
$T_{oper}$	Operating Free-Air Temperature Range	-40 to +105	0 to +70	°C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

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

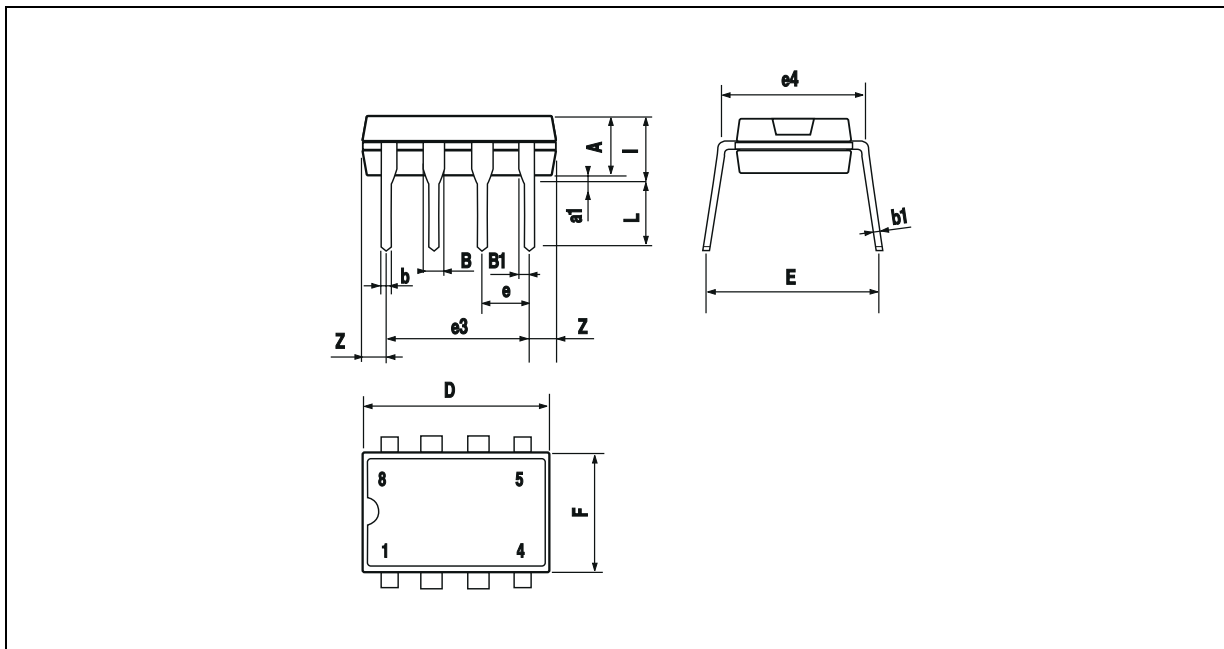
**ELECTRICAL CHARACTERISTICS** $V_{CC} = \pm 15V$ ,  $T_{amb} = 25^{\circ}C$  (unless otherwise specified)

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 $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$ .	$\pm 12$ $\pm 12$			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 $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$ .	$R_L = 10k\Omega$ $R_L = 2k\Omega$ $R_L = 10k\Omega$ $R_L = 2k\Omega$	$\pm 12$ $\pm 10$ $\pm 12$ $\pm 10$	$\pm 14$ $\pm 13$	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/ $\mu s$
$t_r$	Rise Time ( $V_i = \pm 20mV$ , $R_L = 2k\Omega$ , $C_L = 100pF$ , $T_{amb} = 25^{\circ}C$ , unity gain)		0.3		$\mu s$
$K_{OV}$	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 $\Omega$
$C_i$	Input Capacitance		1.4		pF
$R_o$	Output Resistance		75		$\Omega$
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

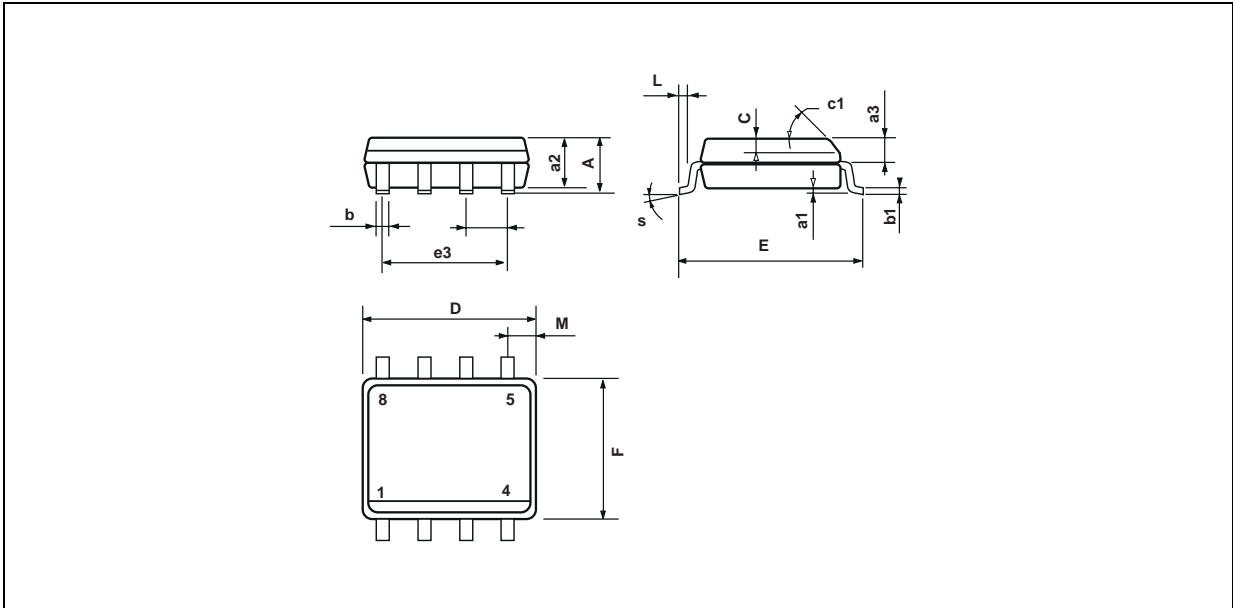


**PACKAGE MECHANICAL DATA**  
8 PINS - PLASTIC DIP



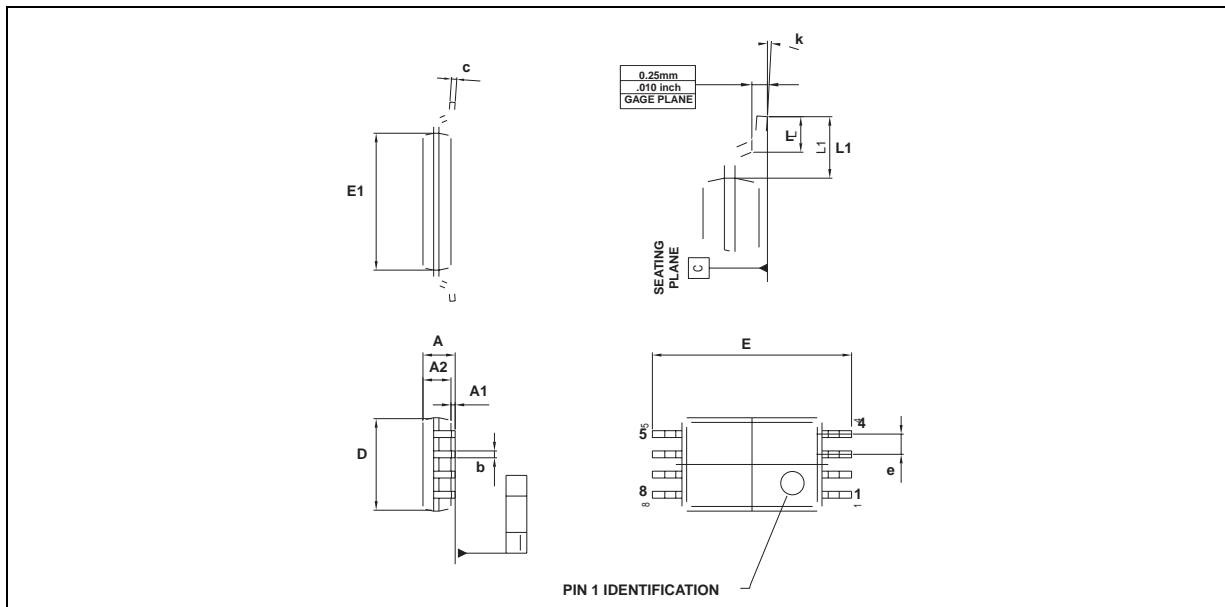
Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
i			5.08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