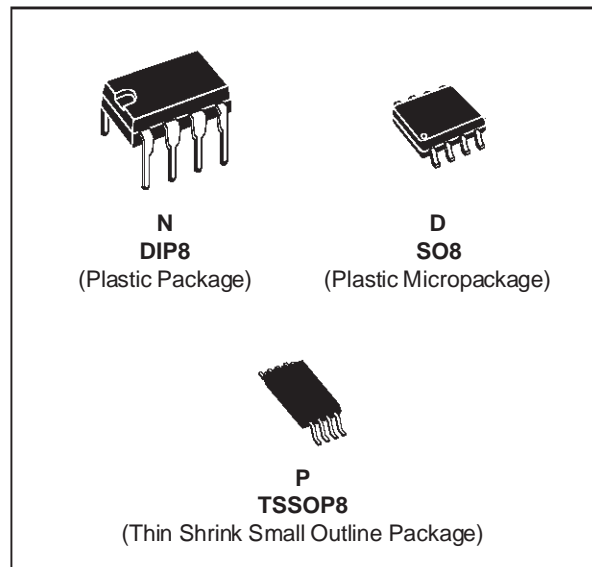




# MC4558

## WIDE BANDWIDTH DUAL BIPOLAR OPERATIONAL AMPLIFIERS

- INTERNALLY COMPENSATED
- SHORT-CIRCUIT PROTECTION
- GAIN AND PHASE MATCH BETWEEN AMPLIFIERS
- 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.

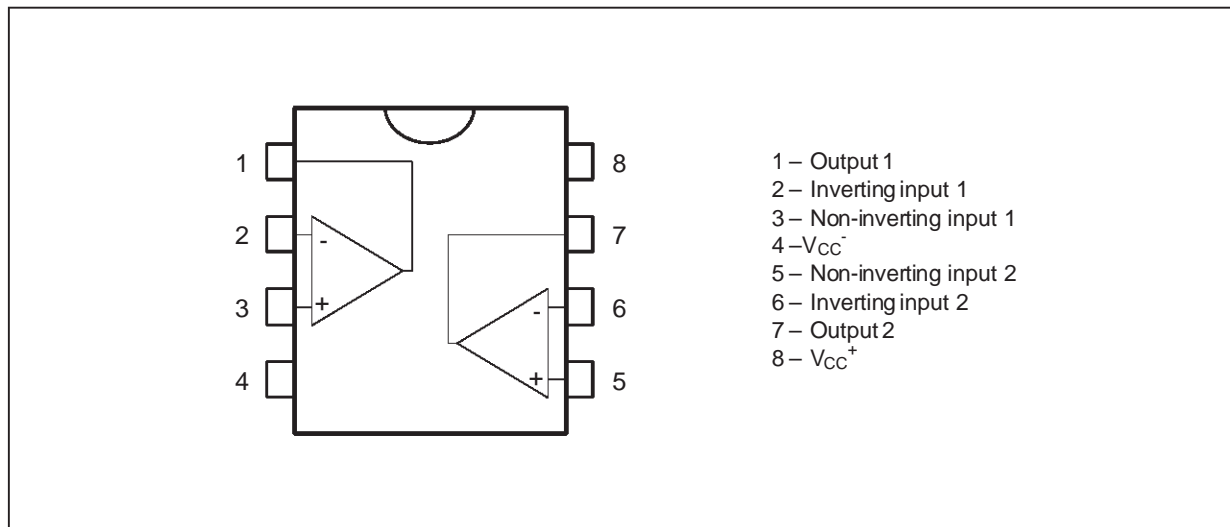
The circuit combines all the outstanding features of the MC1458 and, in addition, possesses three times the unity gain bandwidth of the industry standard.

### ORDER CODES

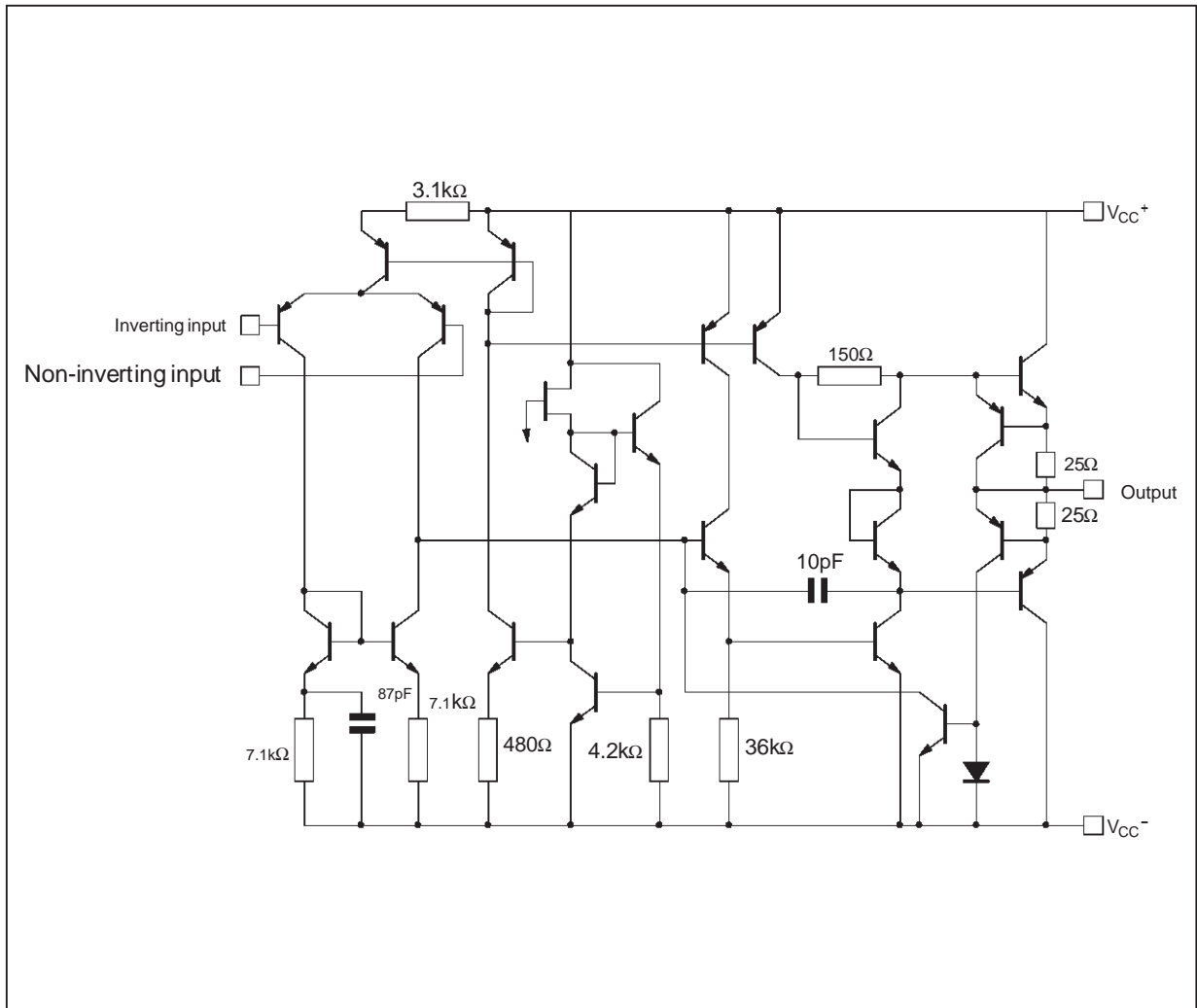
Part Number	Temperature Range	Package		
		N	D	P
MC4558C	0°C, +70°C	•	•	•
MC4558I	-40°C, +105°C	•	•	•

**Example** : MC4558CN

### PIN CONNECTIONS (top view)



SCHMATIC DIAGRAM (1/2 MC4558)



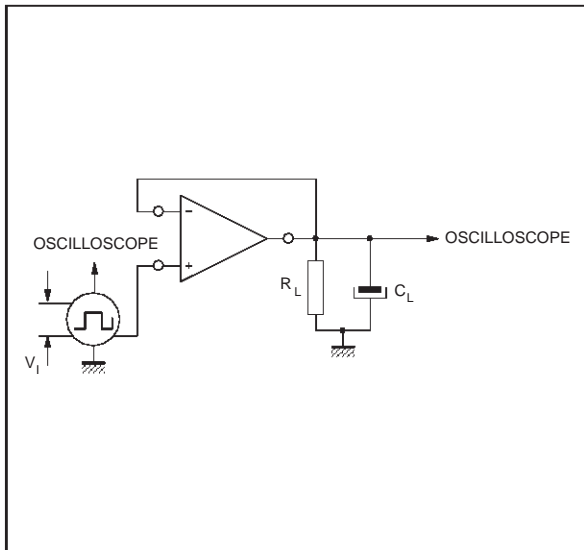
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	MC4558I	MC4558C	Unit
V <sub>CC</sub>	Supply Voltage	±22	±22	V
V <sub>i</sub>	Input Voltage	±15	±15	V
V <sub>id</sub>	Differential Input Voltage	±30	±30	V
P <sub>tot</sub>	Power Dissipation	680	680	mW
	Output Short-circuit Duration	Infinite		
T <sub>oper</sub>	Operating Free-air Temperature Range	-40 to +105	0 to +70	°C
T <sub>stg</sub>	Storage Temperature Range	-65 to +150	-65 to +150	°C

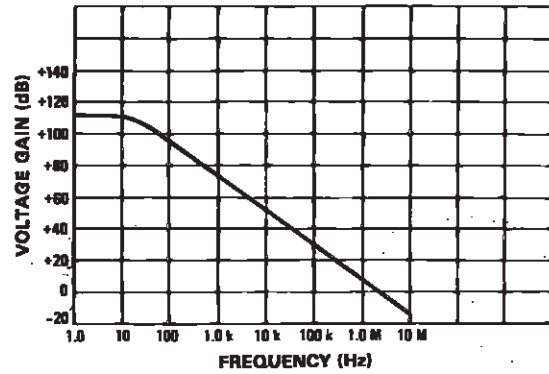
**ELECTRICAL CHARACTERISTICS**
 $V_{CC} = \pm 15V$ ,  $T_{amb} = 25^{\circ}C$  (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{io}$	Input Offset Voltage ( $R_S \leq 10\text{ k}\Omega$ ) $T_{amb} = 25^{\circ}C$ $T_{min.} \leq T_{amb} \leq T_{max.}$		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 ( $V_O = \pm 10V$ , $R_L = 2\text{ k}\Omega$ ) $T_{amb} = 25^{\circ}C$ $T_{min.} \leq T_{amb} \leq T_{max.}$	50 25	200		V/mV
SVR	Supply Voltage Rejection Ratio ( $R_S \leq 10\text{ k}\Omega$ ) $T_{amb} = 25^{\circ}C$ $T_{min.} \leq T_{amb} \leq T_{max.}$	77 77	90		dB
$I_{CC}$	Supply Current, all Amp, 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 ( $R_S \leq 10\text{ k}\Omega$ ) $T_{amb} = 25^{\circ}C$ $T_{min.} \leq T_{amb} \leq T_{max.}$	70 70	90		dB
$I_{os}$	Output Short-circuit Current	10	20	40	mA
$V_o$	Output Voltage Swing $T_{amb} = 25^{\circ}C$ $T_{min.} \leq T_{amb} \leq T_{max.}$	$\pm 12$ $\pm 10$ $\pm 12$ $\pm 10$	$\pm 14$ $\pm 13$		V
SR	Slew Rate ( $V_I = \pm 10V$ , $R_L = 2\text{ k}\Omega$ , $C_L = 100\text{ pF}$ , $T_{amb} = 25^{\circ}C$ , unity gain)	1.5	2.2		V/ $\mu$ s
$t_r$	Rise Time ( $V_I = \pm 20\text{ mV}$ , $R_L = 2\text{ k}\Omega$ , $C_L = 100\text{ pF}$ , $T_{amb} = 25^{\circ}C$ , unity gain)		0.3		$\mu$ s
$K_{OV}$	Overshoot ( $V_I = \pm 20\text{ mV}$ , $R_L = 2\text{ k}\Omega$ , $C_L = 100\text{ pF}$ , $T_{amb} = 25^{\circ}C$ , 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 ( $V_I = 10\text{ mV}$ , $R_L = 2\text{ k}\Omega$ , $C_L = 100\text{ pF}$ , $f = 100\text{ kHz}$ , $T_{amb} = 25^{\circ}C$ )		5.5		MHz
THD	Total Harmonic Distortion ( $f = 1\text{ kHz}$ , $A_v = 20\text{ dB}$ , $R_L = 2\text{ k}\Omega$ , $V_o = 2V_{pp}$ , $C_L = 100\text{ pF}$ , $T_{amb} = 25^{\circ}C$ )		0.008		%
$e_n$	Equivalent Input Noise Voltage ( $f = 1\text{ kHz}$ , $R_s = 100\Omega$ )		12		$\frac{nV}{\sqrt{Hz}}$
$V_{O1}/V_{O2}$	Channel Separation		120		dB

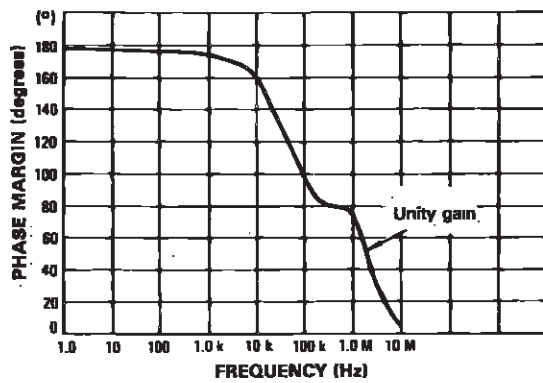
TRANSIENT RESPONSE TEST CIRCUIT



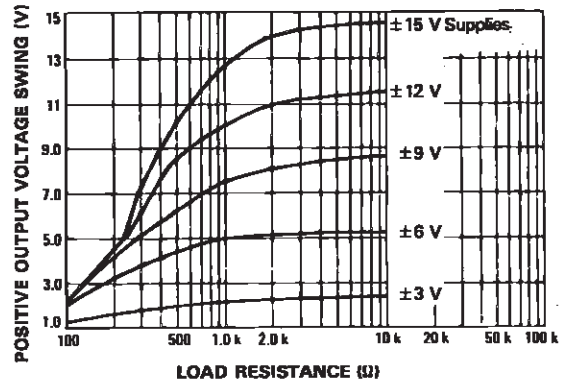
OPEN LOOP FREQUENCY RESPONSE



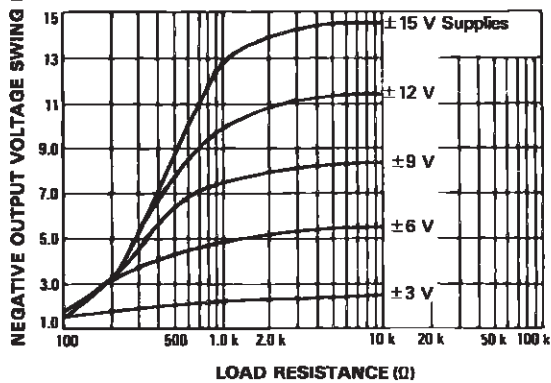
PHASE MARGIN VERSUS FREQUENCY



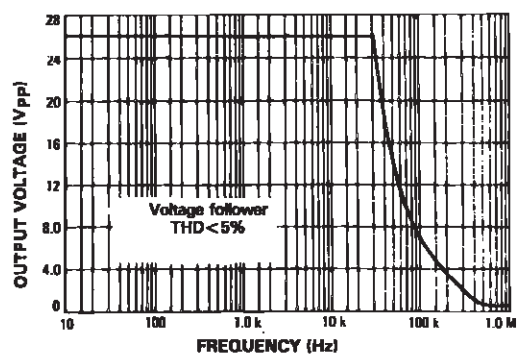
POSITIVE OUTPUT VOLTAGE SWING VERSUS LOAD RESISTANCE



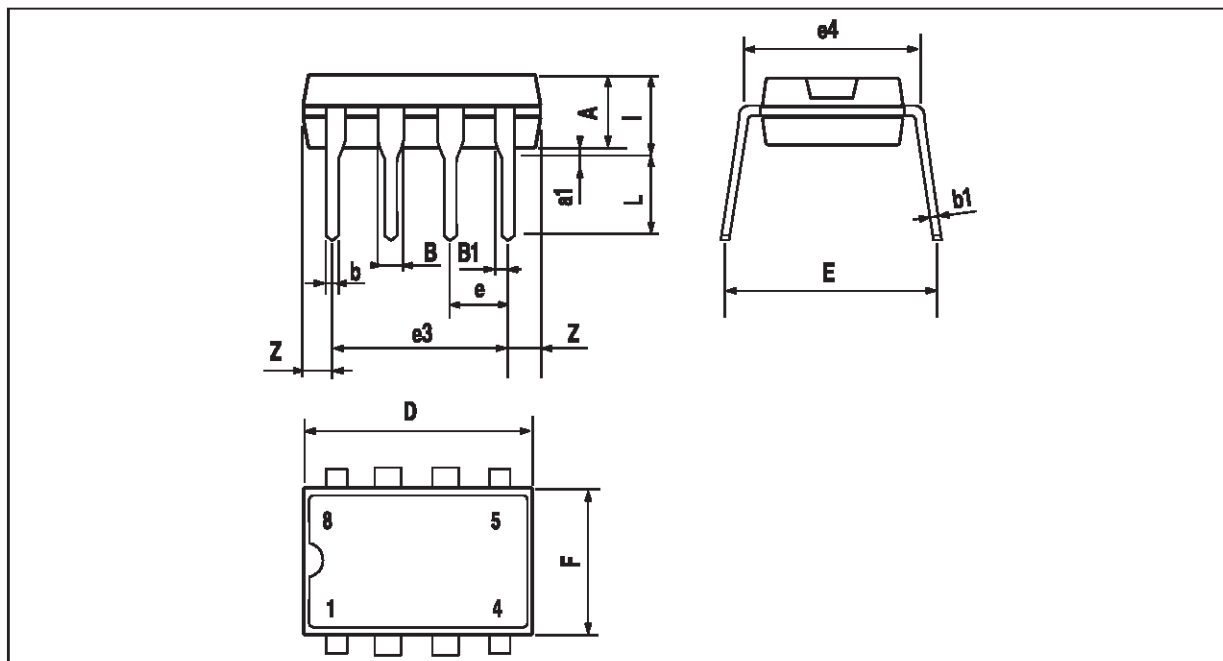
NEGATIVE OUTPUT VOLTAGE SWING VERSUS LOAD RESISTANCE



POWER BANDWIDTH (Large signal swing versus frequency)



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



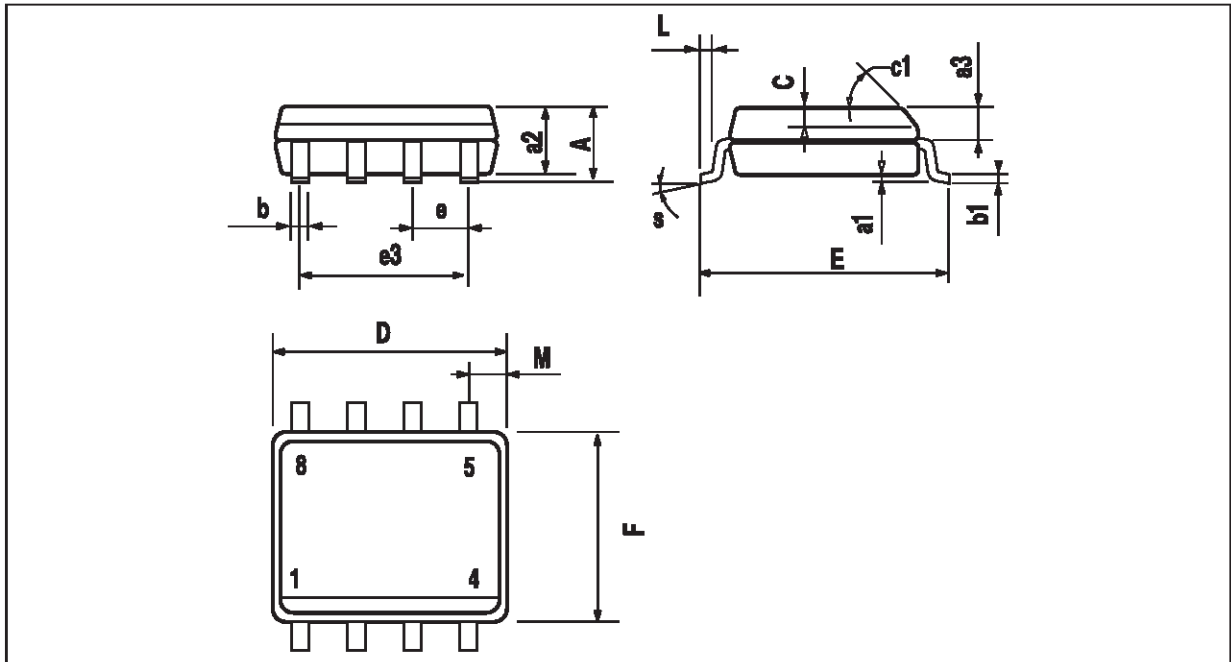
PM-DIP8EFS

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

DIP8.TBL

# MC4558

## PACKAGE MECHANICAL DATA 8 PINS – PLASTIC MICROPACKAGE (SO)



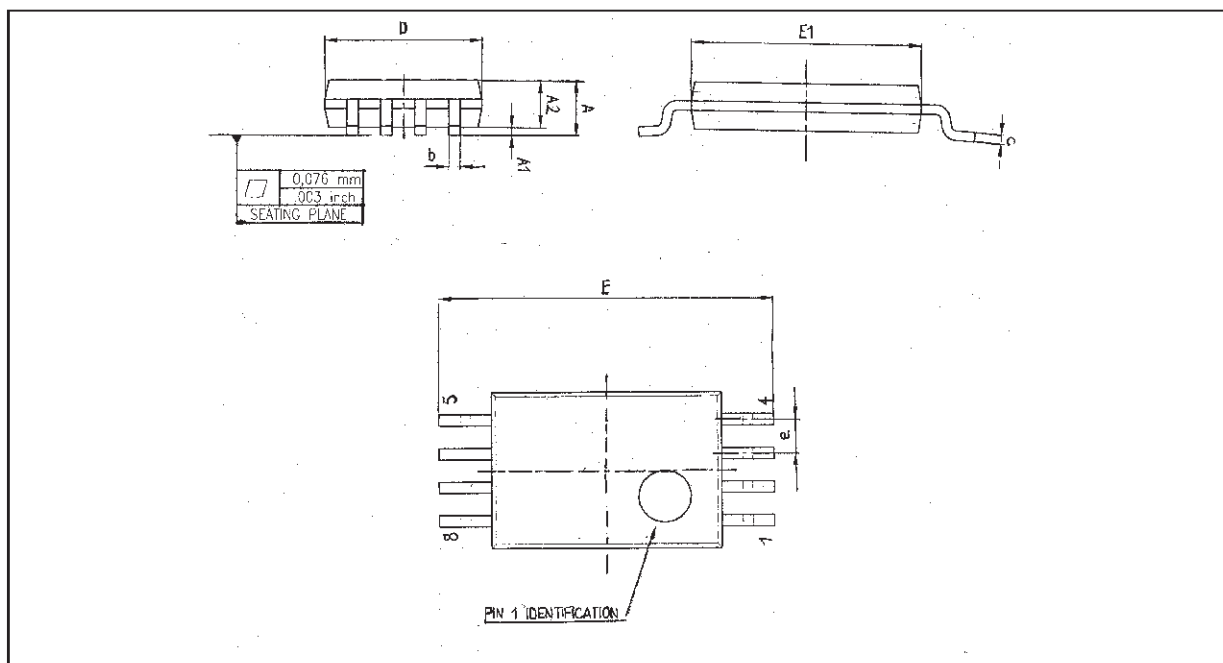
PM-SC08.EPS

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.)					

SO8.TBL

## PACKAGE MECHANICAL DATA

## 8 PINS – THIN SHRINK SMALL OUTLINE PACKAGE



Dim.	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

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