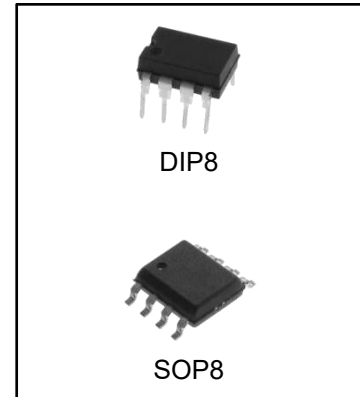


LM567/LM567C Tone Decoder

FEATURES

- 20 to 1 Frequency Range with an External Resistor
- Logic Compatible Output with 100 mA Current Sinking Capability
- Bandwidth Adjustable from 0 to 14%
- High Rejection of Out of Band Signals and Noise
- Immunity to False Signals
- Highly Stable Center Frequency
- Center Frequency Adjustable from 0.01 Hz to 500 kHz



Ordering Information

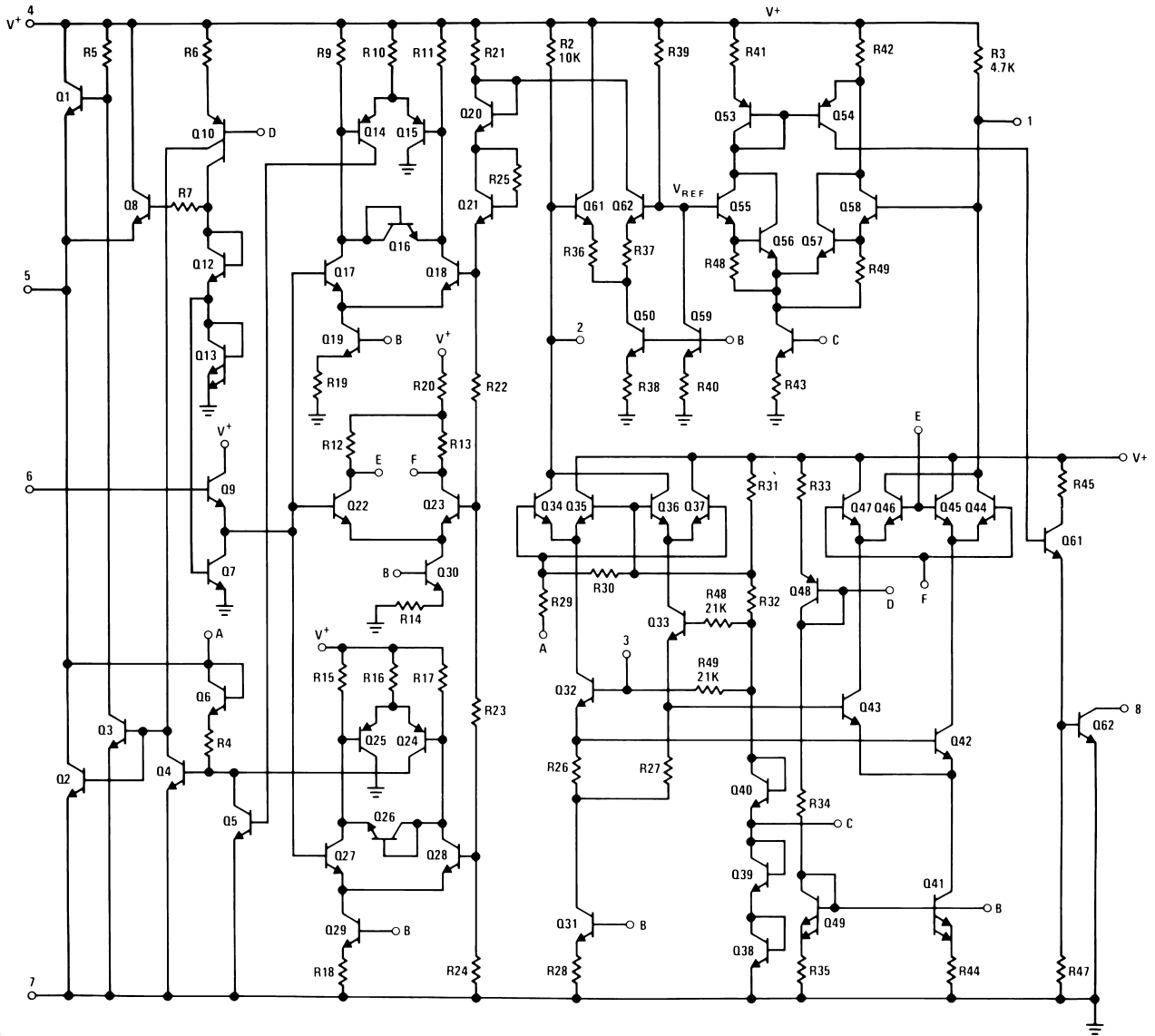
DEVICE	Package Type	MARKING	Packing	Packing Qty
LM567N	DIP8	LM567	TUBE	2000pcs/Box
LM567CN	DIP8	LM567C	TUBE	2000pcs/Box
LM567M/TR	SOP8	LM567	REEL	2500pcs/Reel
LM567CM/TR	SOP8	LM567C	REEL	2500pcs/Reel

ELECTRICAL CHARACTERISTICS

 AC Test Circuit, $T_A = 25^\circ\text{C}$, $V_+ = 5\text{V}$

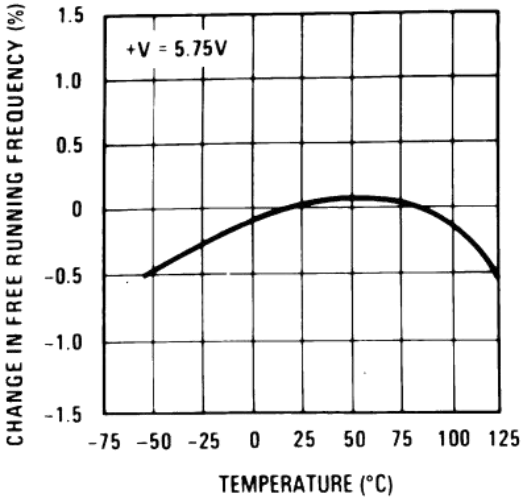
Parameters	Conditions	LM567			LM567C			Units
		Min	Typ	Max	Min	Typ	Max	
Power Supply Voltage Range		4.75	5.0	9.0	4.75	5.0	9.0	V
Power Supply Current Quiescent	$R_L = 20\text{k}$		6	8		7	10	mA
Power Supply Current Activated	$R_L = 20\text{k}$		11	13		12	15	mA
Input Resistance		18	20		15	20		k Ω
Smallest Detectable Input Voltage	$I_L = 100\text{ mA}$, $f_i = f_o$		20	25		20	25	mVrms
Largest No Output Input Voltage	$I_C = 100\text{ mA}$, $f_i = f_o$	10	15		10	15		mVrms
Largest Simultaneous Outband Signal to Inband Signal Ratio			6			6		dB
Minimum Input Signal to Wideband NoiseRatio	$B_n = 140\text{ kHz}$		-6			-6		dB
Largest Detection Bandwidth		12	14	16	10	14	18	% of f_o
Largest Detection Bandwidth Skew			1	2		2	3	% of f_o
Largest Detection Bandwidth Variation with Temperature			± 0.1			± 0.1		%/ $^\circ\text{C}$
Largest Detection Bandwidth Variation with Supply Voltage	4.75–6.75V		± 1	± 2		± 1	± 5	%V
Highest Center Frequency		100	500		100	500		kHz
Center Frequency Stability (4.75–5.75V)	$0 < T_A < 70$ $-55 < T_A < +125$		35 ± 60 35 ± 140			35 ± 60 35 ± 140		ppm/ $^\circ\text{C}$ ppm/ $^\circ\text{C}$
Center Frequency Shift with Supply Voltage	4.75V–6.75V 4.75V–9V		0.5	1.0 2.0		0.4	2.0 2.0	%/V %/V
Fastest ON-OFF Cycling Rate			$f_o/20$			$f_o/20$		
Output Leakage Current	$V_B = 15\text{V}$		0.01	25		0.01	25	μA
Output Saturation Voltage	$e_i = 25\text{ mV}$, $I_B = 30\text{ mA}$ $e_i = 25\text{ mV}$, $I_B = 100\text{ mA}$		0.2 0.6	0.4 1.0		0.2 0.6	0.4 1.0	V
Output Fall Time			30			30		ns
Output Rise Time			150			150		ns

SCHEMATIC DIAGRAM

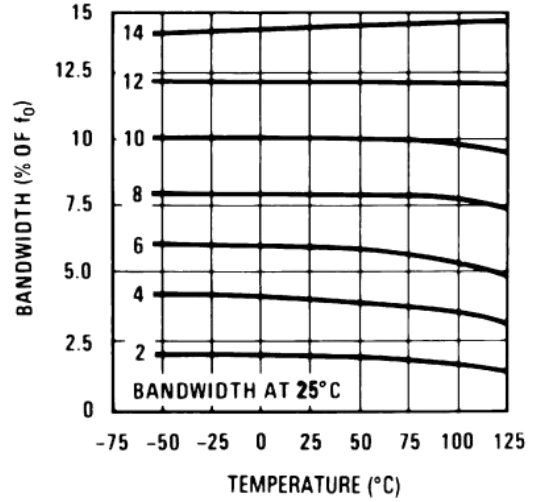


TYPICAL PERFORMANCE CHARACTERISTICS

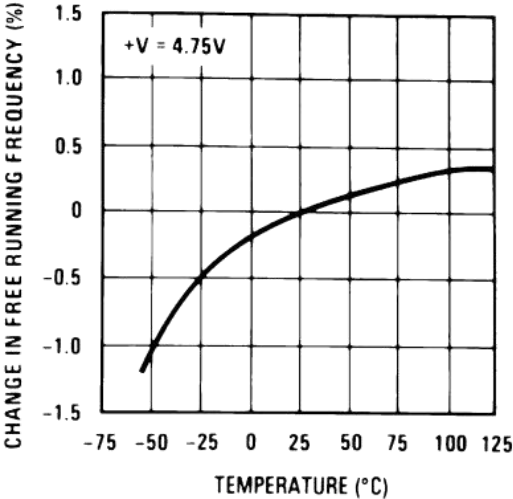
Typical Frequency Drift



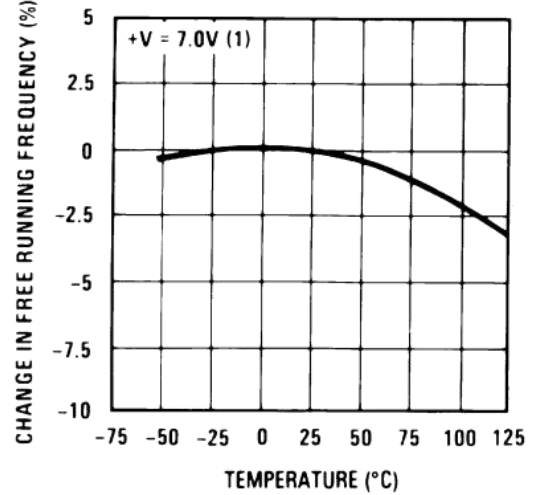
Typical Bandwidth Variation



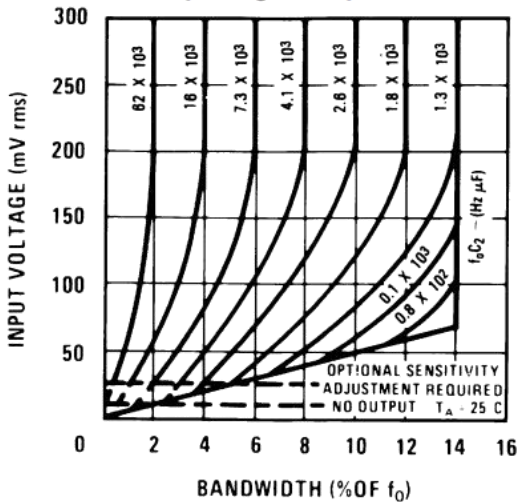
Typical Frequency Drift



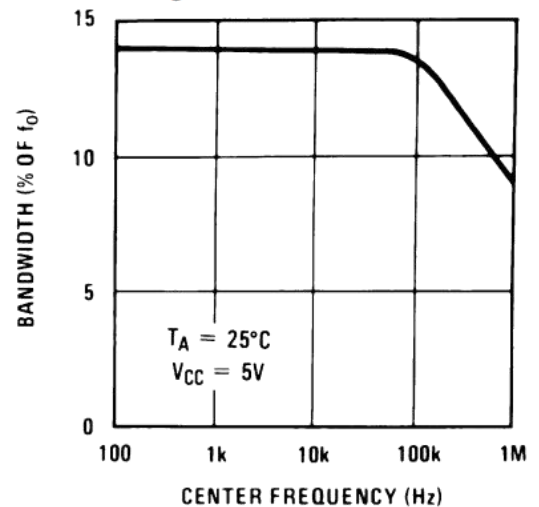
Typical Frequency Drift



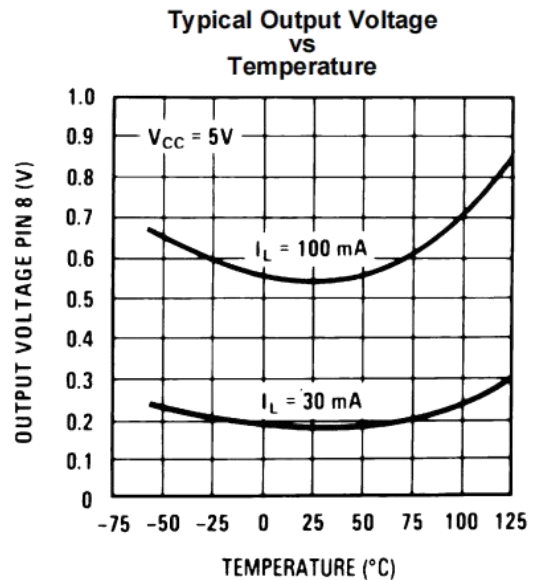
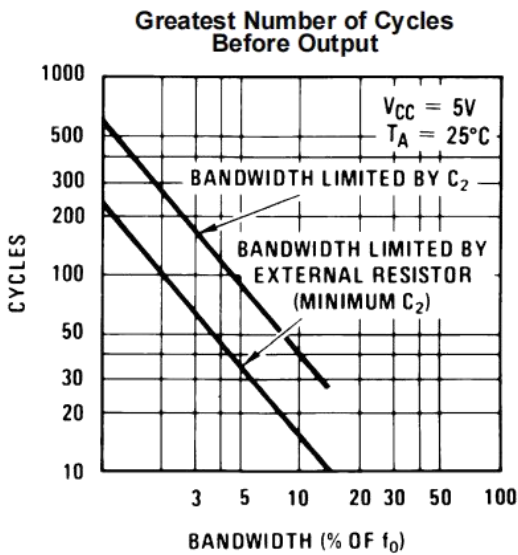
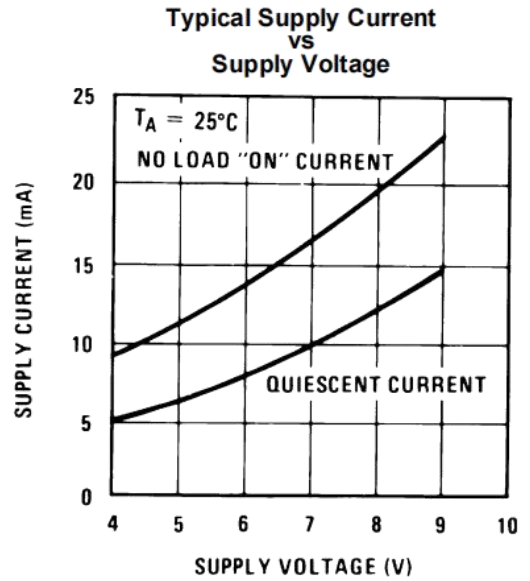
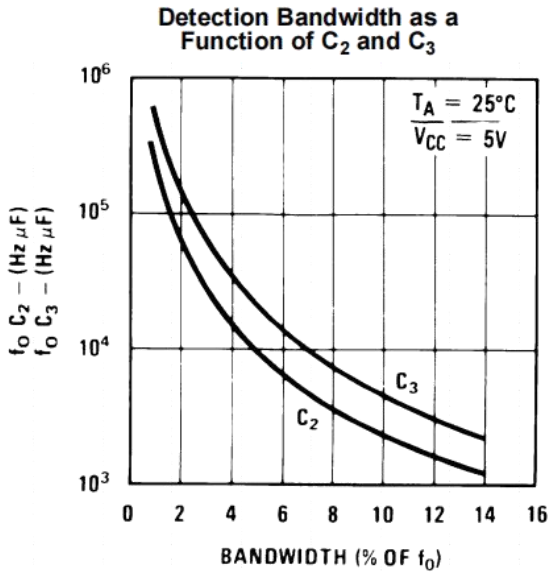
Bandwidth vs Input Signal Amplitude



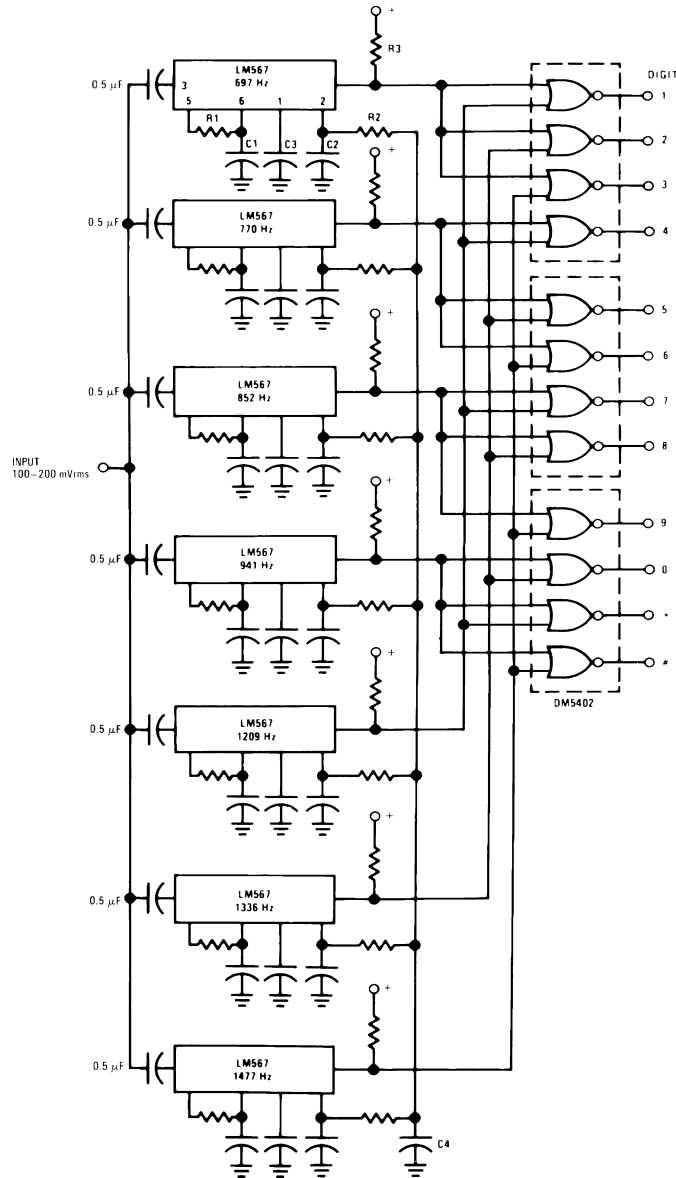
Largest Detection Bandwidth



TYPICAL PERFORMANCE CHARACTERISTICS (continued)



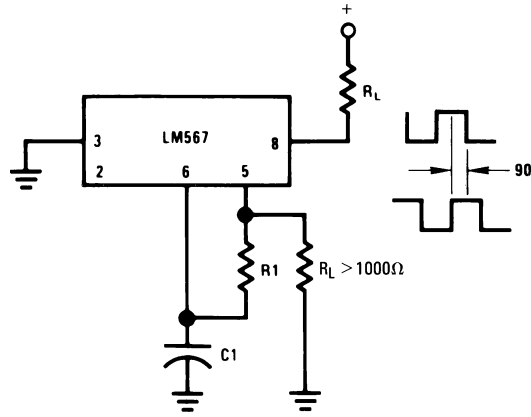
TYPICAL APPLICATIONS



Component values (typ)

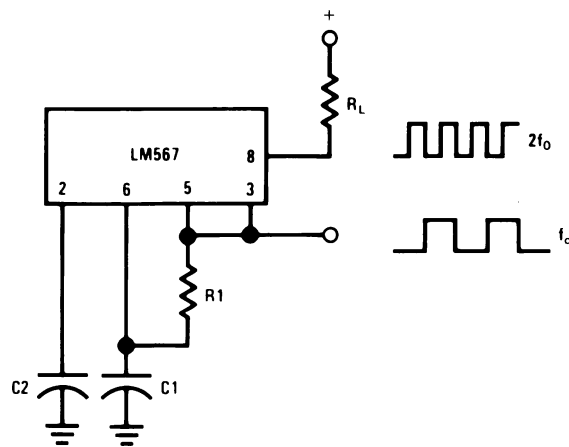
- R1 6.8 to 15k
- R2 4.7k
- R3 20k
- C1 0.10 mfd
- C2 1.0 mfd 6V
- C3 2.2 mfd 6V
- C4 250 mfd 6V

Touch-Tone Decoder

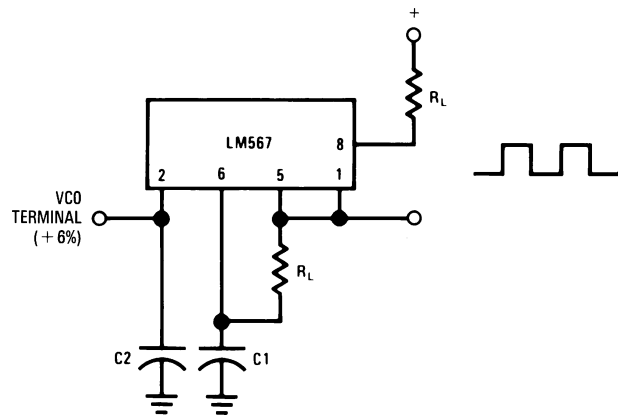


Connect Pin 3 to 2.8V to Invert Output

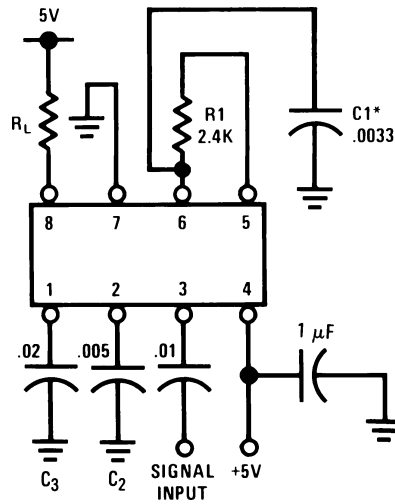
Oscillator with Quadrature Output



Oscillator with Double Frequency Output



Precision Oscillator Drive 100 mA Loads

AC TEST CIRCUIT


$f_i = 100 \text{ kHz} + 5V$

*Note: Adjust for $f_o = 100 \text{ kHz}$.

APPLICATIONS INFORMATION

The center frequency of the tone decoder is equal to the free running frequency of the VCO. This is given by

$$f_o \cong \frac{1}{1.1 R_1 C_1}$$

The bandwidth of the filter may be found from the approximation

$$BW = 1070 \sqrt{\frac{V_i}{f_o C_2}} \text{ in \% of } f_o$$

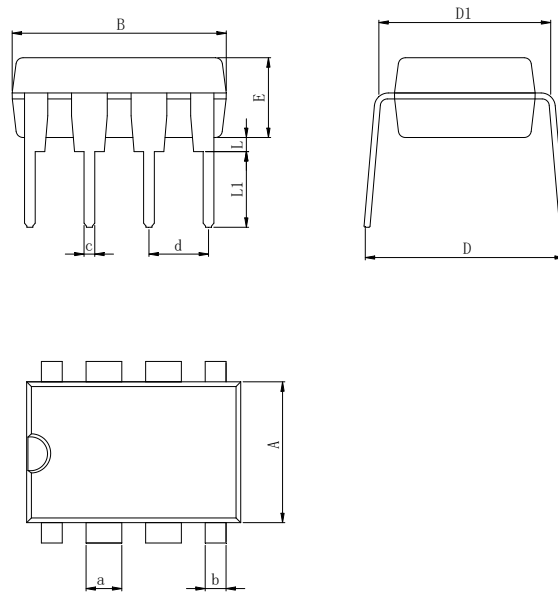
where

V_i = Input voltage (volts rms), $V_i \leq 200\text{mV}$

C_2 = Capacitance at Pin 2(μF)

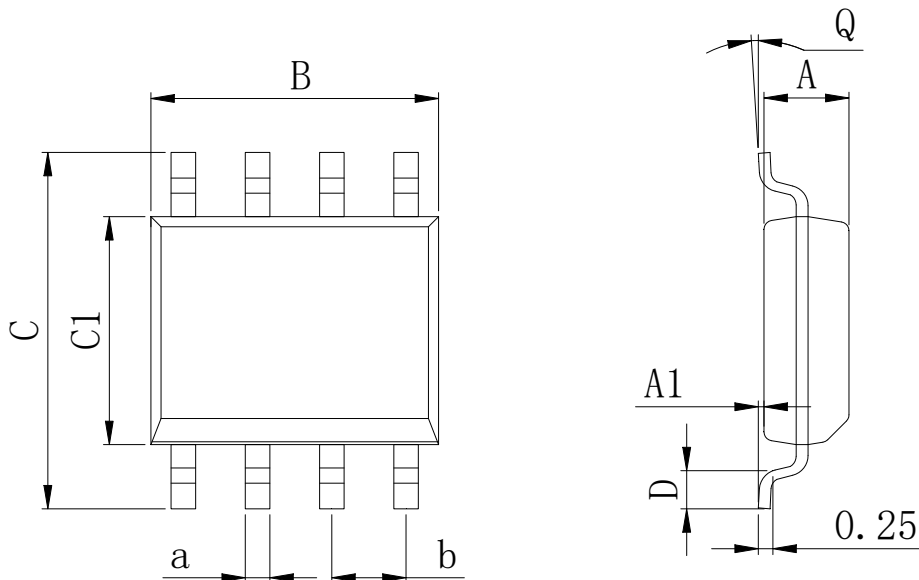
Physical Dimensions

DIP8


Dimensions In Millimeters(DIP8L)

Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	9.00	8.40	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	9.50	9.00	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

SOP8


Dimensions In Millimeters(SOP8)

Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	4.90	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	5.10	6.20	4.00	0.80	8°	0.45	

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