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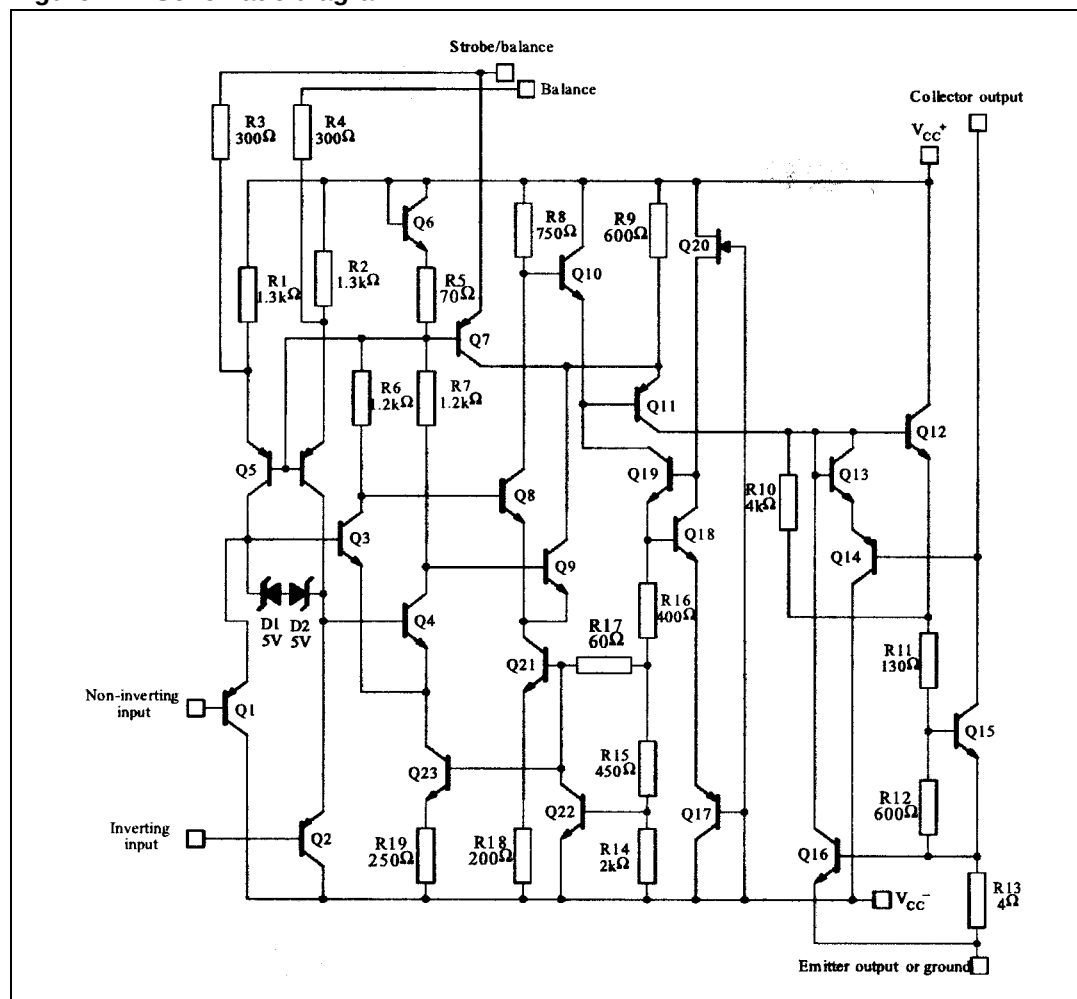
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1 Schematic diagram

Figure 1. Schematic diagram



2 Absolute maximum ratings & operating conditions

Table 1. Absolute maximum ratings (AMR)

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage	36	V
V_{id}	Differential input voltage	± 30	V
V_i	Input voltage ⁽¹⁾	± 15	V
$V_{(1-4)}$	Ground to negative supply voltage	30	V
$V_{(7-4)}$	Output to negative supply voltage		
	LM111-LM211	50	V
	LM311	40	
	Output short-circuit duration	10	s
	Voltage at strobe pin	$V_{CC}^+ - 5$	V
P_d	Power dissipation ⁽²⁾		
	DIP8	1250	mW
	SO-8	710	
T_j	Junction temperature	+150	°C
T_{stg}	Storage temperature range	-65 to +150	°C

1. This rating applies for $\pm 15V$ supplies. The positive input voltage limit is 30V above the negative. The negative input voltage is equal to the negative supply voltage or 30V below the positive supply, whichever is less.
2. P_d is calculated with $T_{amb} = +25^\circ C$, $T_j = +150^\circ C$ and $R_{thja} = 100^\circ C/W$ for the DIP8 package, and $R_{thja} = 175^\circ C/W$ for the SO-8 package.

Table 2. Operating conditions

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage	5 to ± 15	V
T_{oper}	Operating free-air temperature range		
	LM111	-55 to +125	°C
	LM211	-40 to +105	
	LM311	0 to +70	

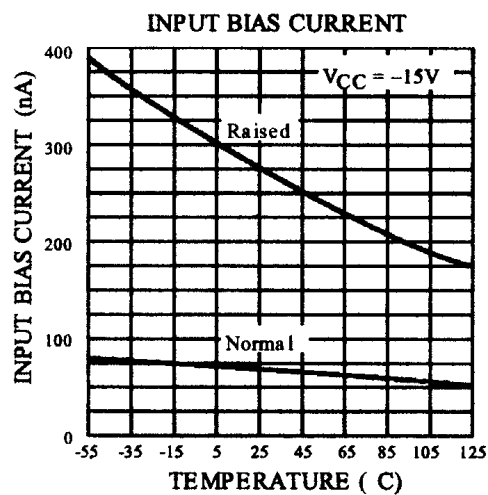
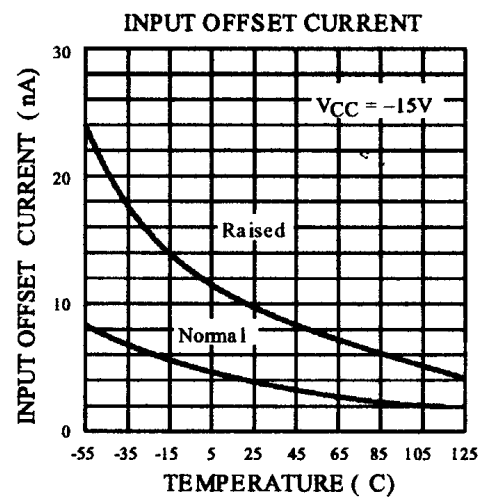
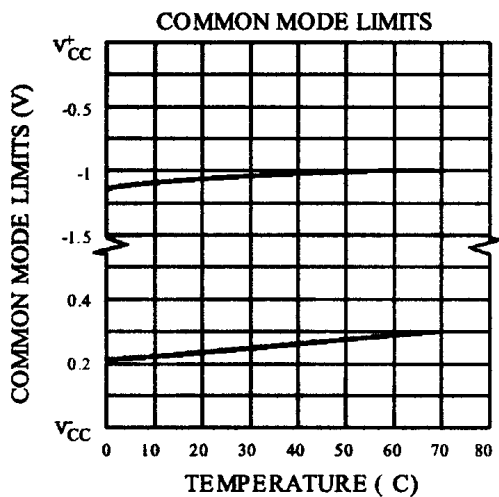
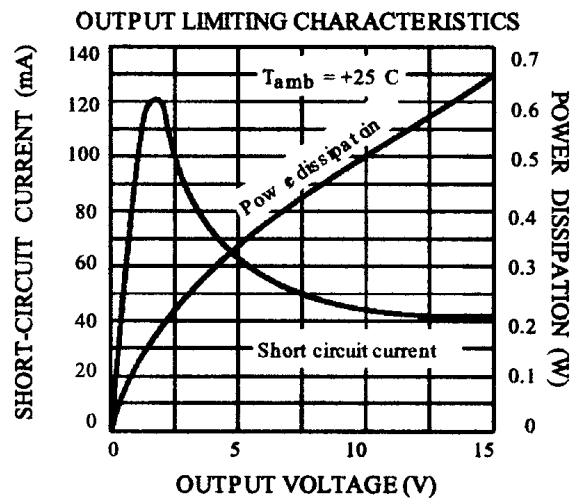
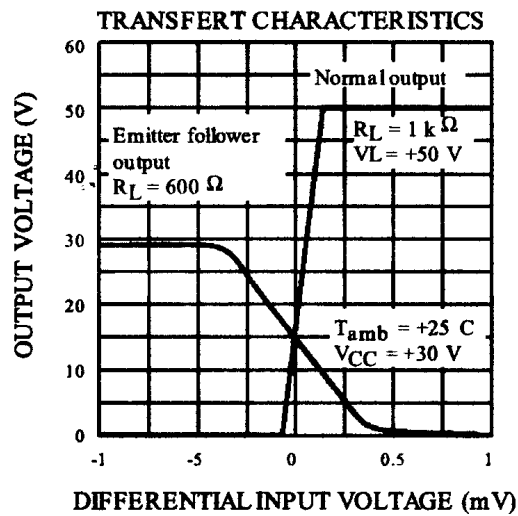
3 Electrical characteristics

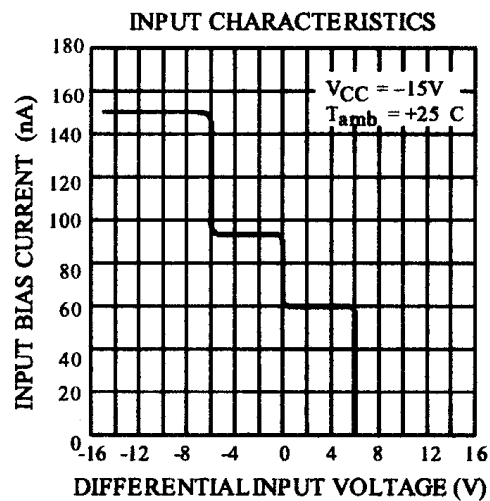
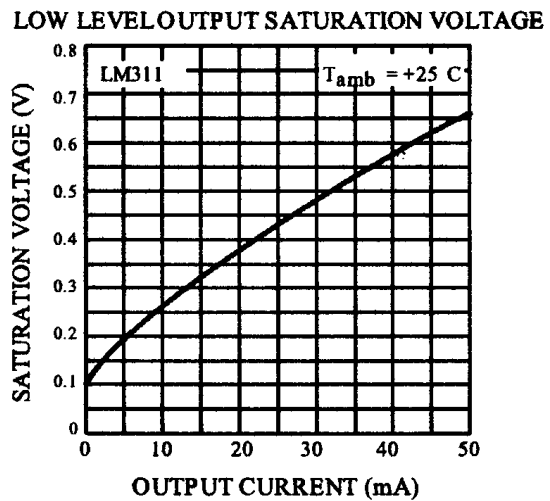
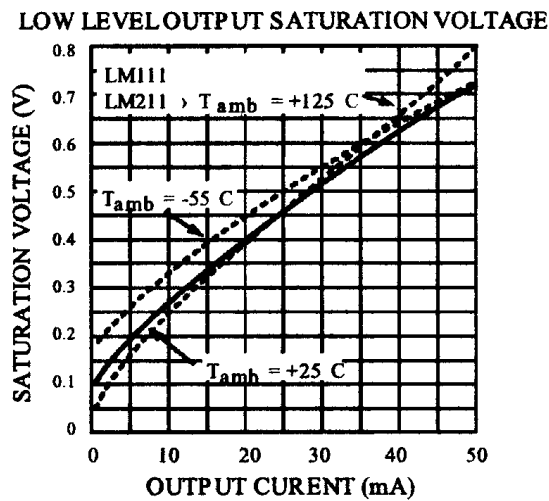
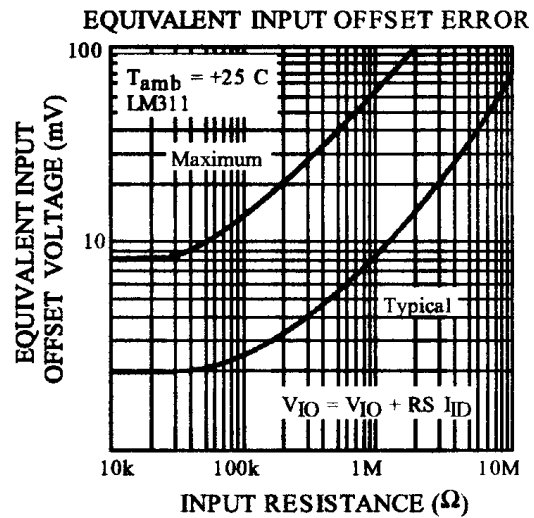
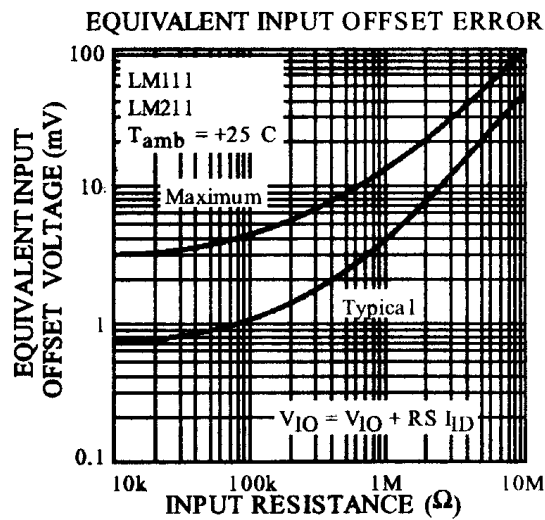
Table 3. $V_{CC}^+ = \pm 15V$, $T_{amb} = +25^\circ C$ (unless otherwise specified)

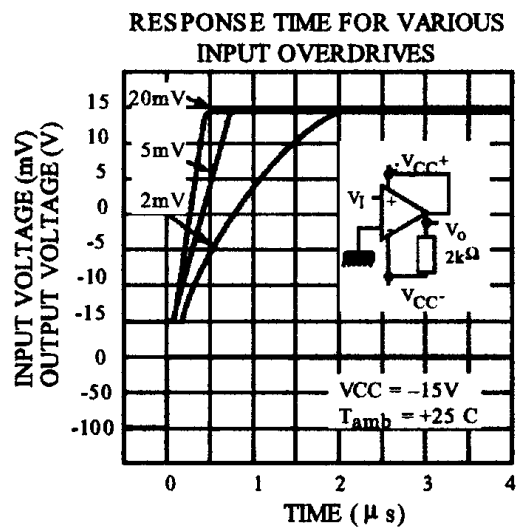
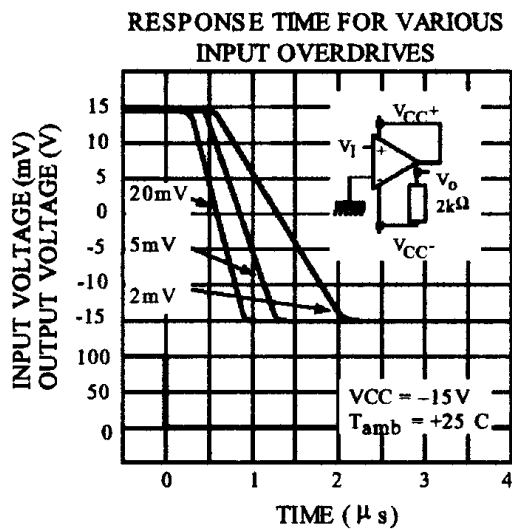
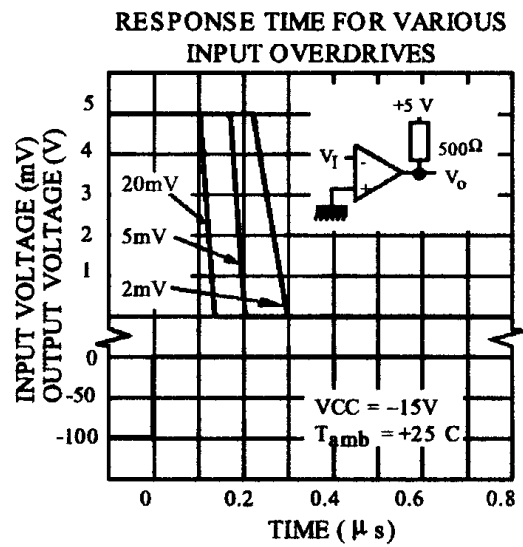
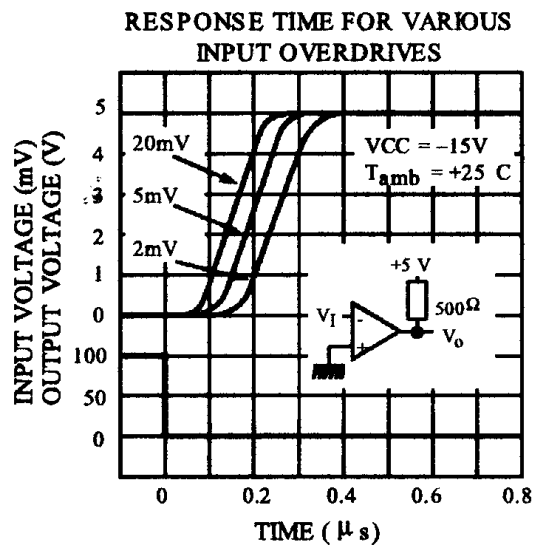
Symbol	Parameter	Conditions	LM111 - LM211			LM311			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
V_{io}	Input offset voltage ⁽¹⁾	$R_S \leq 50k\Omega$ $T_{amb} = +25^\circ C$ $T_{min} \leq T_{amb} \leq T_{max}$		0.7	3 4		2	7.5 10	mV
I_{io}	Input offset current ⁽¹⁾	$T_{amb} = +25^\circ C$ $T_{min} \leq T_{amb} \leq T_{max}$		4	10 20		6	50 70	nA
I_{ib}	Input bias current ⁽¹⁾	$T_{amb} = +25^\circ C$ $T_{min} \leq T_{amb} \leq T_{max}$		60	100 150		100	250 300	nA
A_{vd}	Large signal voltage gain		40	200		40	200		V/mV
I_{CC}^+ I_{CC}^-	Supply currents	Positive Negative		5.1 4.1	6 5		5.1 4.1	7.5 5	mA
V_{icm}	Input common mode voltage range	$T_{min} \leq T_{amb} \leq T_{max}$	-14.5	+13.8 -14.7	+13	-14.5	+13.8 -14.7	+13	V
V_{OL}	Low level output voltage	$T_{amb} = +25^\circ C$, $I_O = 50mA$, $V_i \leq -5mV$		0.75	1.5				V
		$T_{amb} = +25^\circ C$, $I_O = 50mA$, $V_i \leq -10mV$					0.75	1.5	
		$T_{min} \leq T_{amb} \leq T_{max}$ $V_{CC}^+ \geq +4.5V$, $V_{CC}^- = 0$ $I_O = 8mA$, $V_i \leq -6mV$		0.23	0.4				
		$T_{min} \leq T_{amb} \leq T_{max}$ $V_{CC}^+ \geq +4.5V$, $V_{CC}^- = 0$ $I_O = 8mA$, $V_i \leq -10mV$					0.23	0.4	
I_{OH}	High level output current	$T_{amb} = +25^\circ C$ $V_i \geq +5mV$, $V_O = +35V$		0.2	10				nA
		$T_{amb} = +25^\circ C$ $V_i \geq +10mV$, $V_O = +35V$					0.2	50	nA
		$T_{min} \leq T_{amb} \leq T_{max}$ $V_i \geq +5mV$, $V_O = +35V$		0.1	0.5				μA
I_{strobe}	Strobe current			3			3		mA
t_{re}	Response time ⁽²⁾			200			200		ns

1. The offset voltage, offset current and bias current specifications apply for any supply voltage from a single +5V supply up to $\pm 15V$ supplies. The offset voltages and offset currents given are the maximum values required to drive the output down to +1V or up to +14V with a 1mA load current. Thus, these parameters define an error band and take into account the worst-case of voltage gain and input impedance.

2. The response time specified is for a 100mV input step with 5mV overdrive.



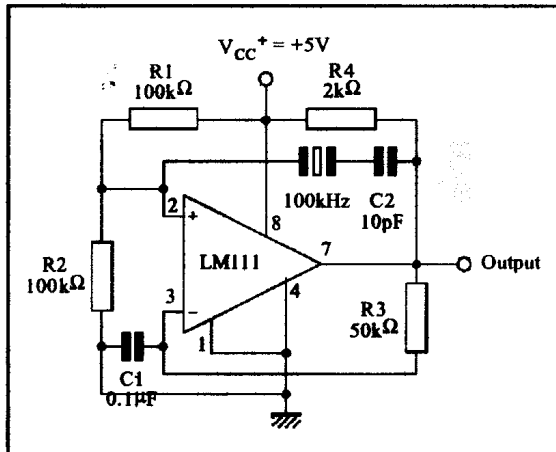




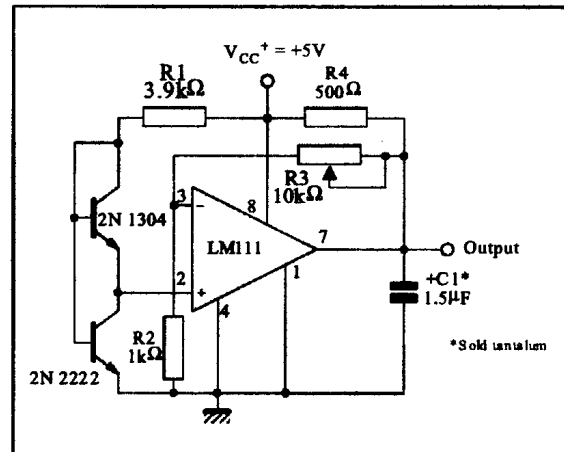
4 Typical application schematics

TYPICAL APPLICATIONS

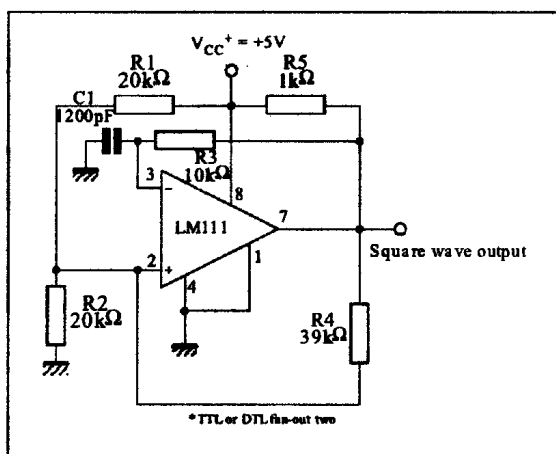
CRYSTAL OSCILLATOR



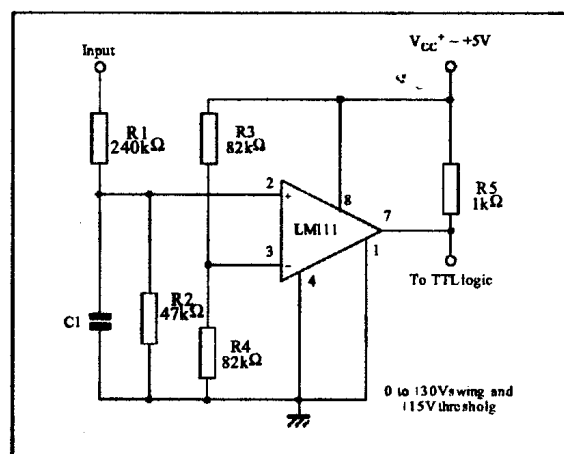
LOW VOLTAGE ADJUSTABLE REFERENCE SUPPLY



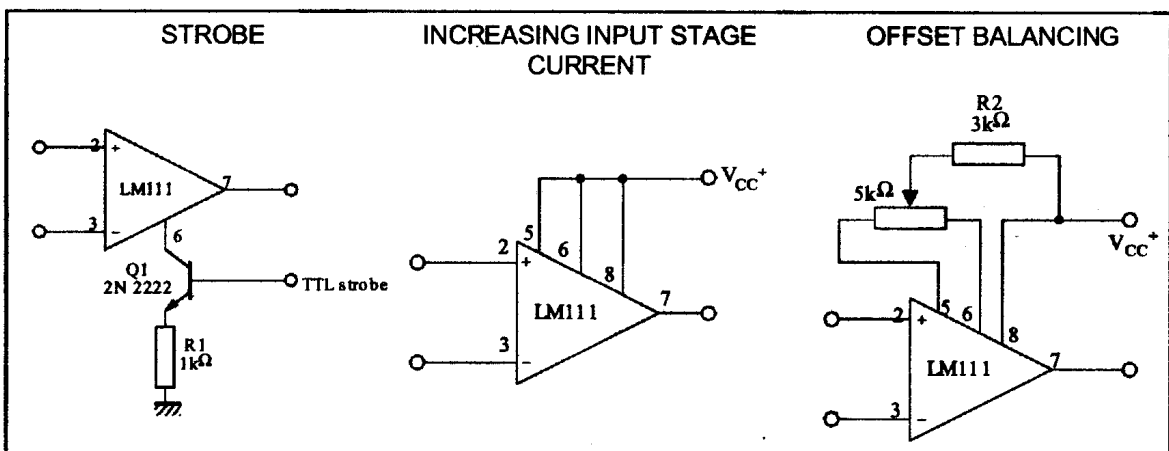
100KHz FREE RUNNING MULTIVIBRATOR



TTL INTERFACE WITH HIGH LEVEL LOGIC



AUXILIARY CIRCUITS



5 Package mechanical data

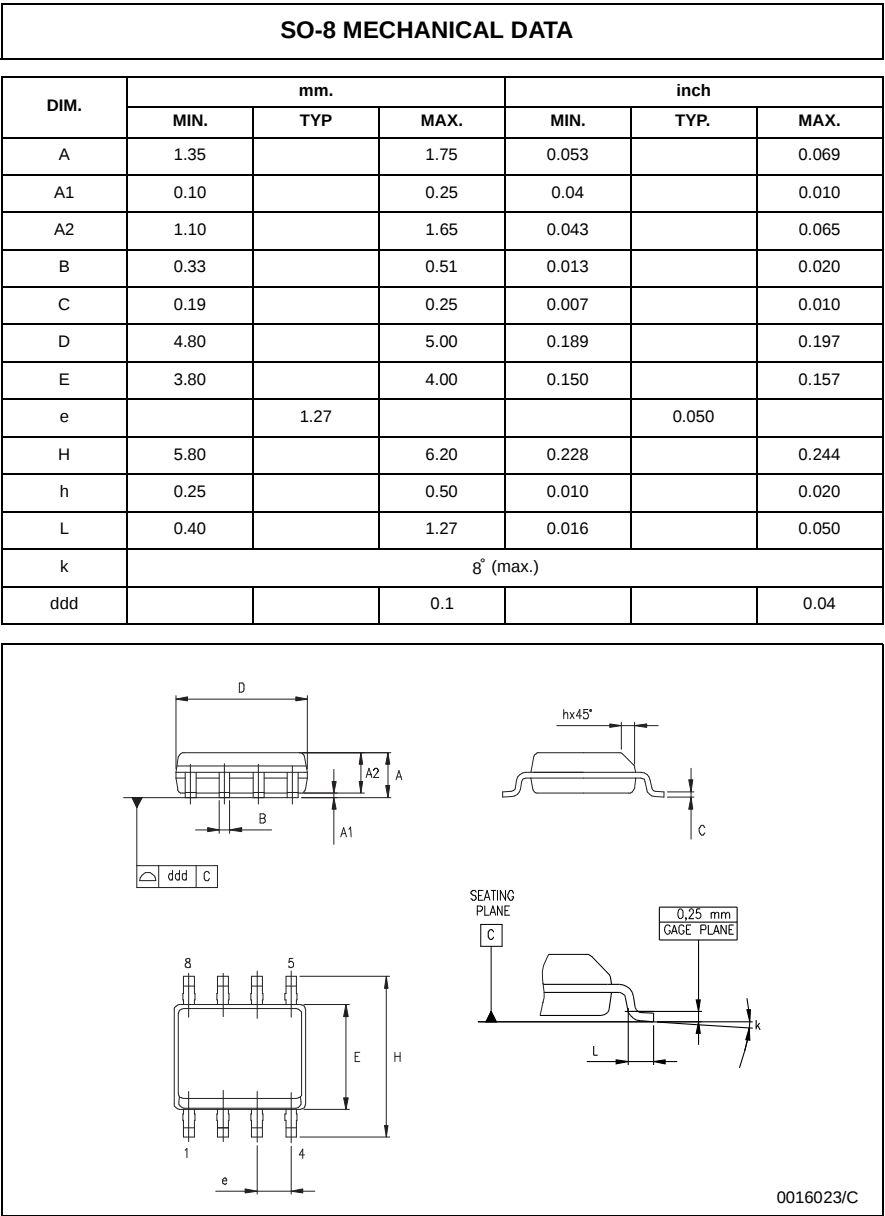
In order to meet environmental requirements, STMicroelectronics offers these devices in ECOPACK[®] packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an STMicroelectronics trademark. ECOPACK specifications are available at: www.st.com.

5.1 DIP8 package

Plastic DIP-8 MECHANICAL DATA						
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A		3.3			0.130	
a1	0.7			0.028		
B	1.39		1.65	0.055		0.065
B1	0.91		1.04	0.036		0.041
b		0.5			0.020	
b1	0.38		0.5	0.015		0.020
D			9.8			0.386
E		8.8			0.346	
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			7.1			0.280
I			4.8			0.189
L		3.3			0.130	
Z	0.44		1.6	0.017		0.063

The diagram illustrates the mechanical specifications of a Plastic DIP-8 package through three views: top, side, and bottom. The top view shows the package body with pins extending from the sides, labeled with dimensions A, a1, B, B1, b, b1, D, e, e3, e4, F, I, L, and Z. The side view shows the profile of the package, highlighting dimensions E and b1. The bottom view shows the underside of the package, with pins labeled 1, 4, 5, and 8, and dimensions D and L. The package is identified by the code P001F.

5.2 SO-8 package



6 Revision history

Date	Revision	Changes
1-Jun-02	1	Initial release.
2-Jan-06	2	Table 3. on page 5 updated. Formatting changes throughout.
1-Mar-06	3	Pin connections updated on page 1.
26-Sep-06	4	Corrected description under title on cover page.

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