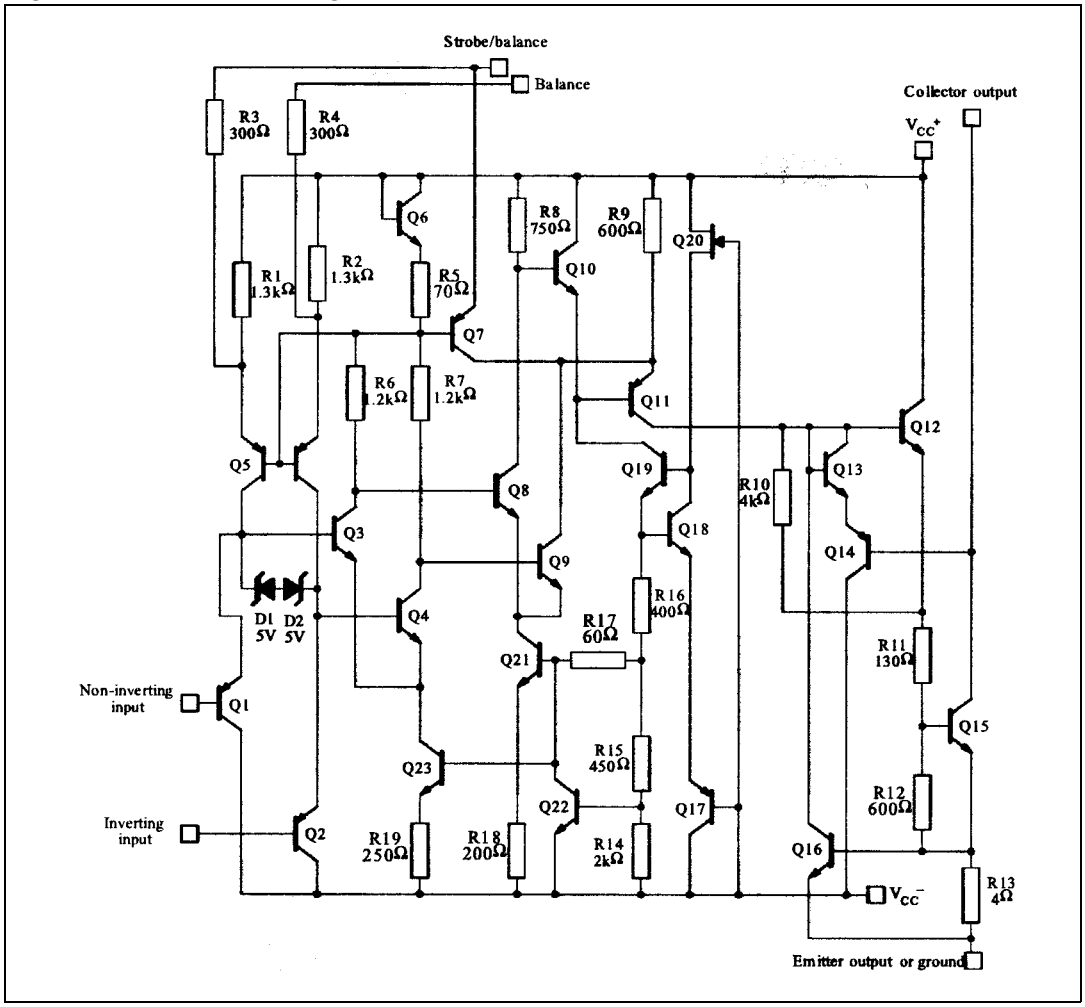
Contents

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 LM311	 50 40	V
	Output short-circuit duration	10	s
	Voltage at strobe pin	V_{CC}^+ -5	V
p_d	Power dissipation (2) DIP8 SO-8	 1250 710	mW
T_j	Junction temperature	+150	°C
T_{stg}	Storage temperature range	-65 to +150	°C

1. This rating applies for ±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°C, T_j = +150°C and R_{thja} = 100°C/W for the DIP8 package, and R_{thja} = 175°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 LM211 LM311	 -55 to +125 -40 to +105 0 to +70	°C

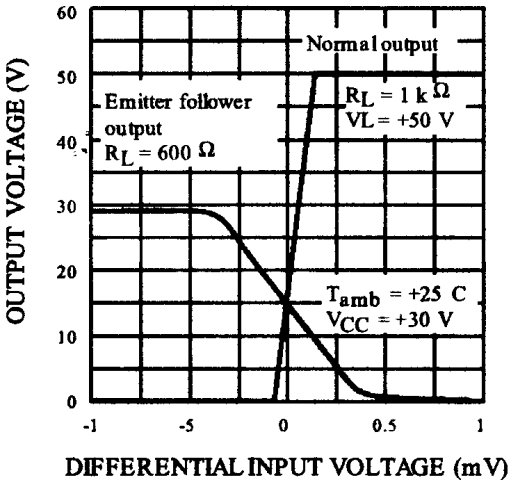
3 Electrical characteristics

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

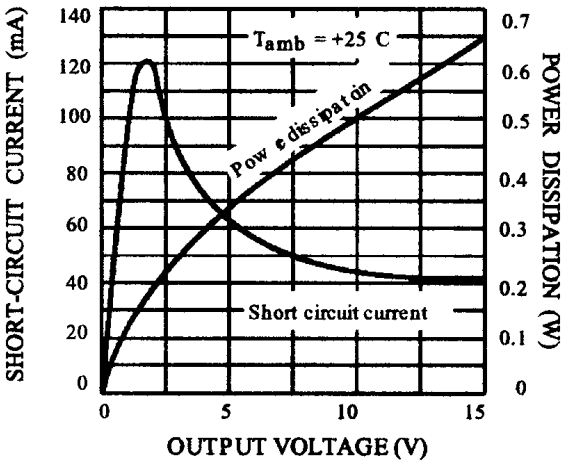
Symbol	Parameter	Conditions	LM111 - LM211			LM311			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
V_{io}	Input offset voltage (1)	$R_S \leq 50k\Omega$ $T_{amb} = +25°C$ $T_{min} \leq T_{amb} \leq T_{max}$		0.7	3 4		2	7.5 10	mV
I_{io}	Input offset current (1)	$T_{amb} = +25°C$ $T_{min} \leq T_{amb} \leq T_{max}$		4	10 20		6	50 70	nA
I_{ib}	Input bias current (1)	$T_{amb} = +25°C$ $T_{min} \leq T_{amb} \leq T_{max}$		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	$T_{amb} = +25°C$, $I_O = 50mA$, $V_i \leq -5mV$		0.75	1.5				V
		$T_{amb} = +25°C$, $I_O = 50mA$, $V_i \leq -10mV$					0.75	1.5	
		$T_{min} \leq T_{amb} \leq T_{max}$ $V_{CC}^+ \geq +4.5V$, $V_{CC}^- = 0$ $I_O = 8mA$, $V_i \leq -6m$		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	$T_{amb} = +25°C$ $Vi \geq +5mV$, $V_O = +35V$		0.2	10				nA
		$T_{amb} = +25°C$ $Vi \geq +10mV$, $V_O = +35V$					0.2	50	nA
		$T_{min} \leq T_{amb} \leq T_{max}$ $Vi \geq +5mV$, $V_O = +35V$		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 ±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.

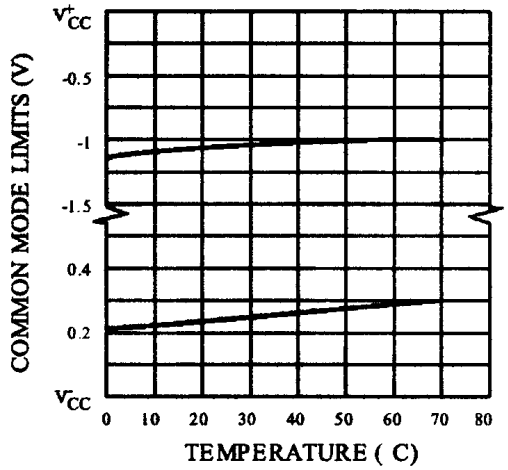
TRANSFERT CHARACTERISTICS



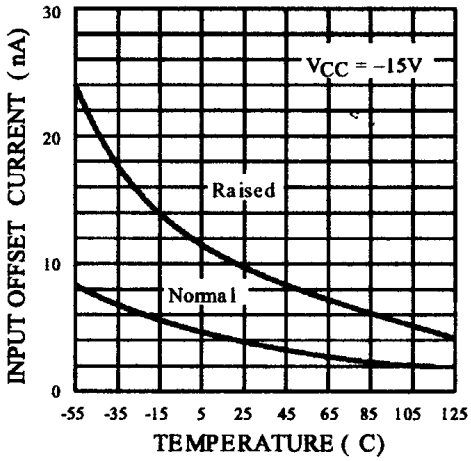
OUTPUT LIMITING CHARACTERISTICS



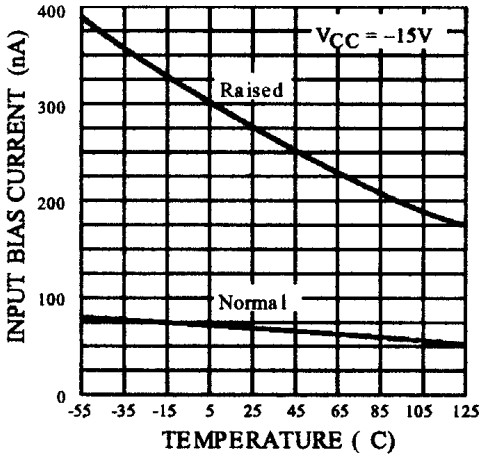
COMMON MODE LIMITS



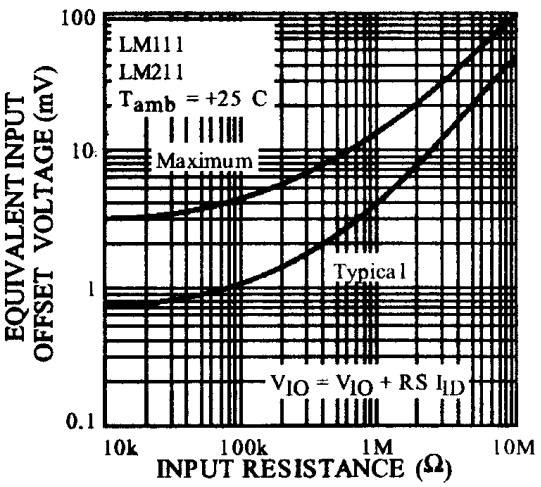
INPUT OFFSET CURRENT



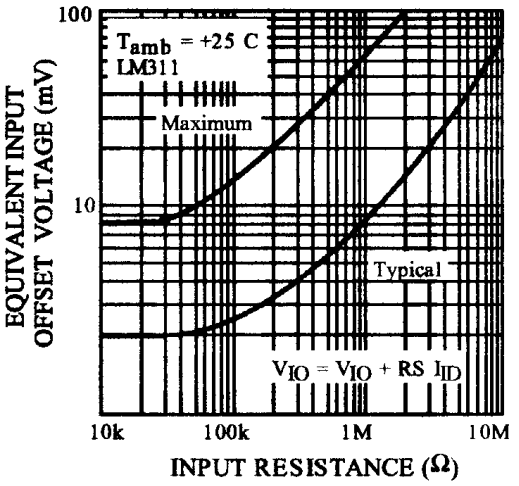
INPUT BIAS CURRENT



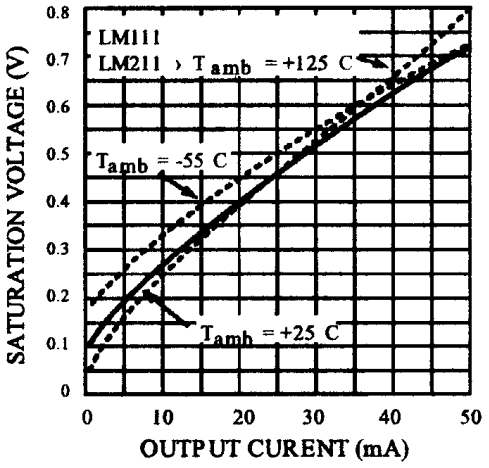
EQUIVALENT INPUT OFFSET ERROR



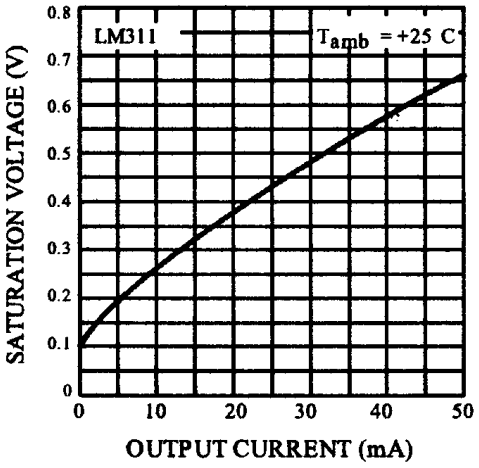
EQUIVALENT INPUT OFFSET ERROR



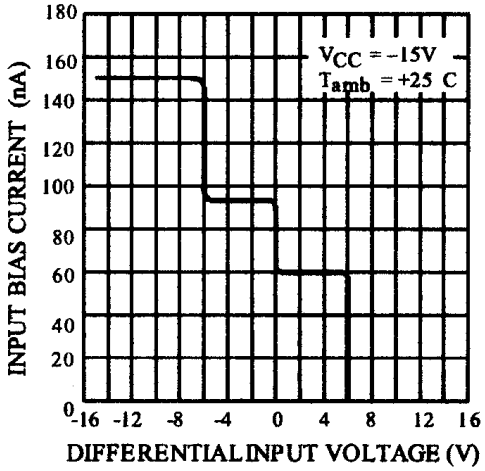
LOW LEVEL OUTPUT SATURATION VOLTAGE



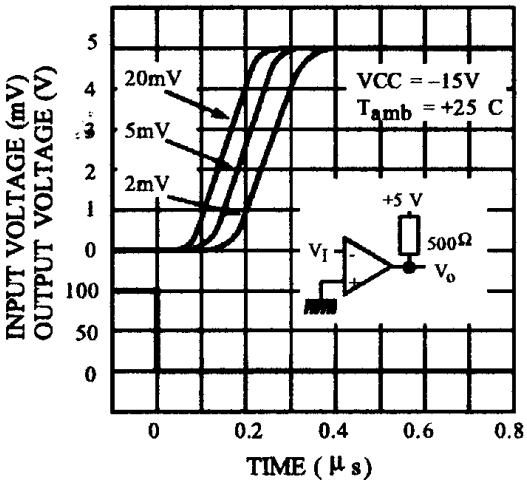
LOW LEVEL OUTPUT SATURATION VOLTAGE



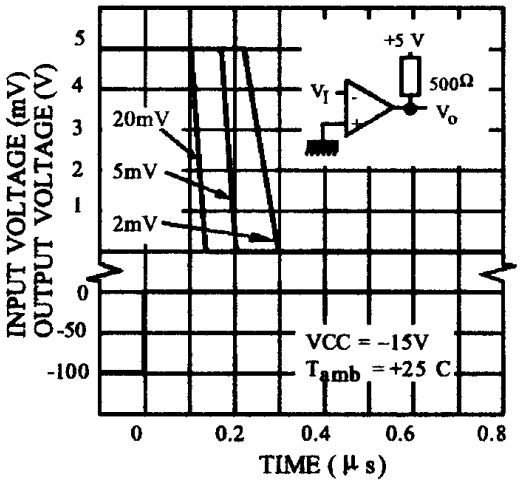
INPUT CHARACTERISTICS



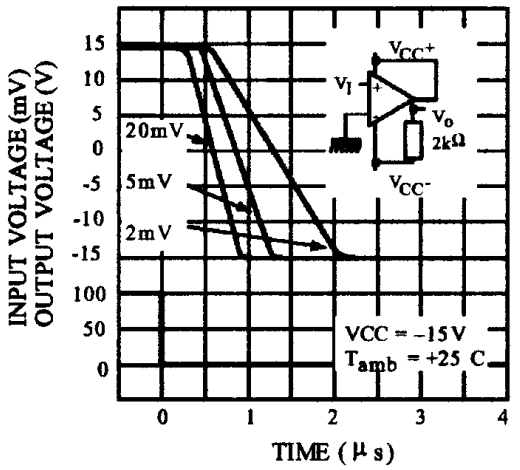
RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES



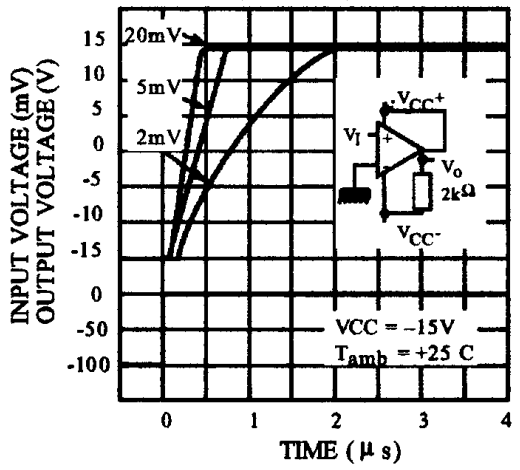
RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES



RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES



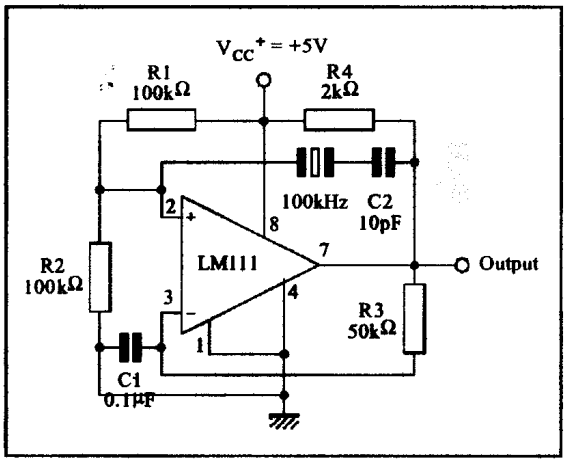
RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES



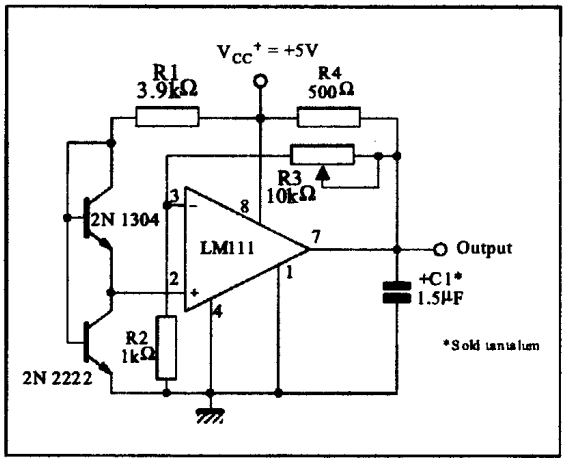
4 Typical application schematics

TYPICAL APPLICATIONS

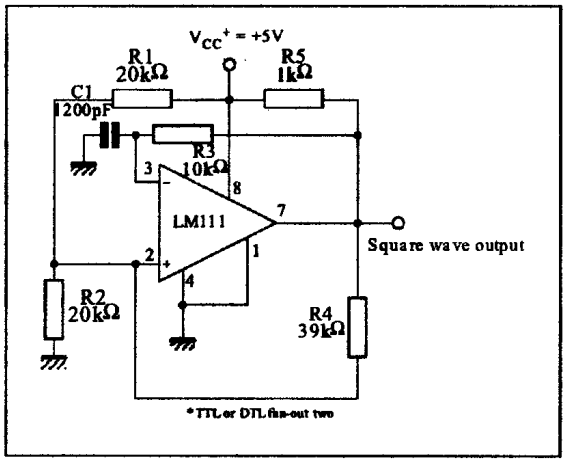
CRYSTAL OSCILLATOR



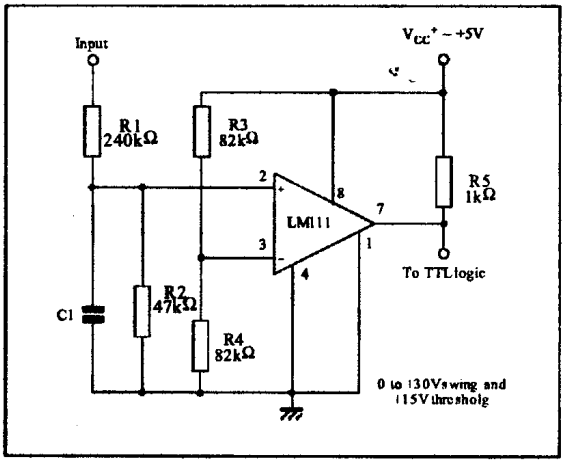
LOW VOLTAGE ADJUSTABLE REFERENCE SUPPLY



100KHz FREE RUNNING MULTIVIBRATOR

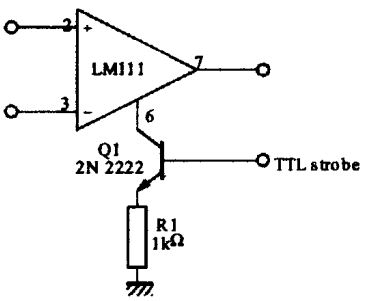


TTL INTERFACE WITH HIGH LEVEL LOGIC

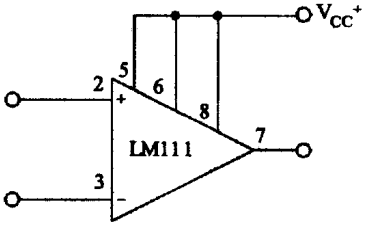


AUXILIARY CIRCUITS

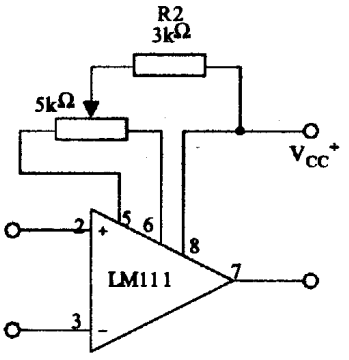
STROBE



INCREASING INPUT STAGE CURRENT



OFFSET BALANCING

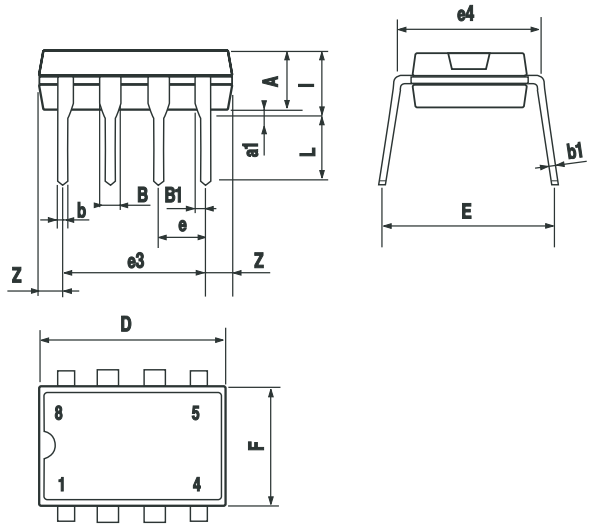


5 Package mechanical data

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

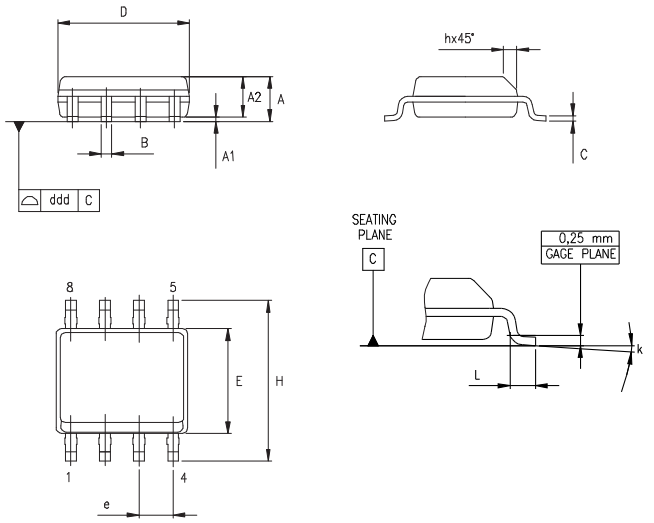


P001F

5.2 SO-8 package

SO-8 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	1.35		1.75	0.053		0.069
A1	0.10		0.25	0.04		0.010
A2	1.10		1.65	0.043		0.065
B	0.33		0.51	0.013		0.020
C	0.19		0.25	0.007		0.010
D	4.80		5.00	0.189		0.197
E	3.80		4.00	0.150		0.157
e		1.27			0.050	
H	5.80		6.20	0.228		0.244
h	0.25		0.50	0.010		0.020
L	0.40		1.27	0.016		0.050
k	8° (max.)					
ddd			0.1			0.04



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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