

1. General Description

The EM74AUP1G17 is a single buffer with Schmitt-trigger input. This device ensures very low static and dynamic power consumption across the entire V_{CC} range from 0.8 V to 3.6 V. This device is fully specified for partial power down applications using IOFF. The IOFF circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

2. Features and Benefits

- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- Low static power consumption; $I_{CC} = 0.9 \mu A$ (maximum)
- Low noise overshoot and undershoot < 10 % of V_{CC}
- Overvoltage tolerant inputs to 3.6 V
- IOFF circuitry provides partial Power-down mode operation
- Latch-up performance exceeds 100 mA
- Complies with JEDEC standard:
 - JESD8-12 (0.8 V to 1.3 V)
 - JESD8-11 (0.9 V to 1.65 V)
 - JESD8-7 (1.2 V to 1.95 V)
 - JESD8-5 (1.8 V to 2.7 V)
 - JESD8-B (2.7 V to 3.6 V)
- ESD protection:
 - HBM ANSI/ESDA/JEDEC JS-001 Class 3A exceeds 5000 V
 - CDM ANSI/ESDA/JEDEC JS-002 Class C3 exceeds 1000 V
- Multiple package options

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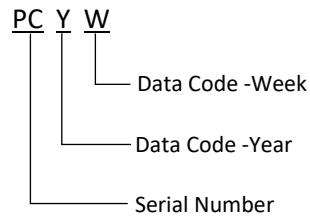
3. Ordering Information

Table 1. Ordering information

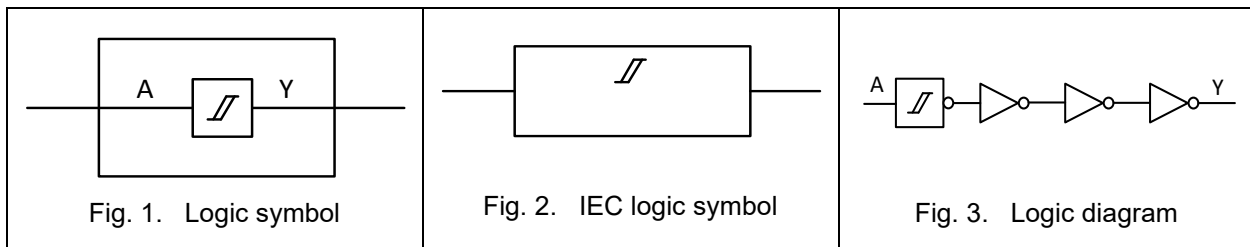
Type number	Topside marking	Package		
		Name	Description	Quantity
EM74AUP1G17GV	PCYW	SOT23-5L	SOT23 package, 5 pins 2.92 mm × 1.6 mm; 1.25 mm (Max) height	3000
EM74AUP1G17GW	PCYW	SOT353	SOT353 package, 5 pins 2.1 mm × 1.25 mm; 1.1 mm (Max) height	3000
EM74AUP1G17GS	PC	DFN1x1-6L	DFN1×1 package, 6 pins 1 mm × 1 mm; 0.42 mm (Max) height	3000
EM74AUP1G17GM	PCYW	DFN1x1.45-6L	DFN1.45×1 package, 6 pins 1.45 mm × 1 mm; 0.6 mm (Max) height	3000

MARKING INFORMATION

NOTE: YW = Data Code.

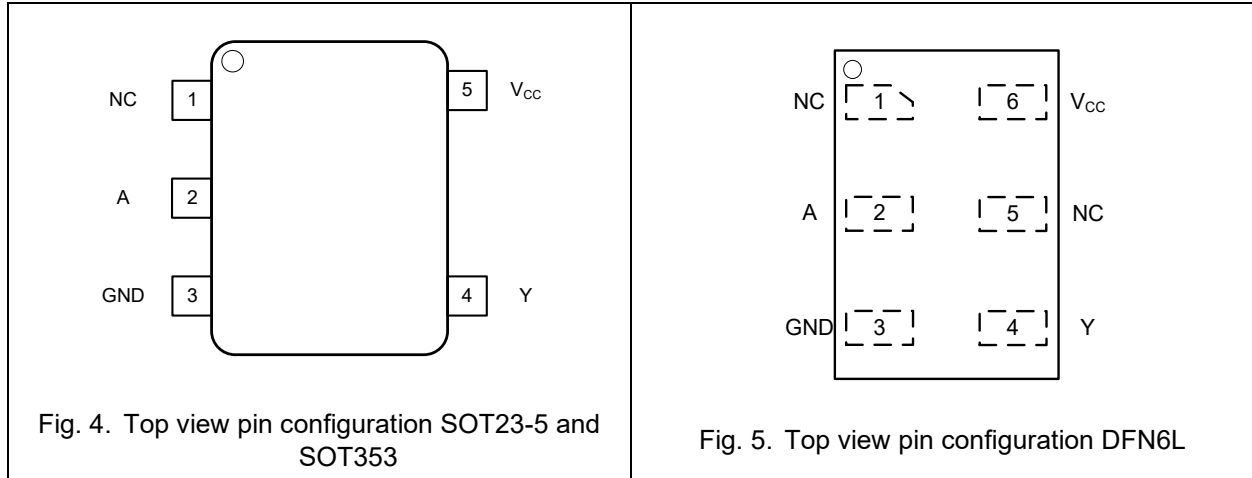


4. Function Diagram



5. Pinning Information

5.1. Pinning



5.2. Pin description

Table 2. Pin description

Symbol	Pin		Description
	SOT23-5,SOT353	DFN6L	
NC	1	1,5	not connected
A	2	2	data input
GND	3	3	ground(0V)
Y	4	4	data output
Vcc	5	6	supply voltage

6. Functional Description

Table 3. Function table

H = HIGH voltage level; L = LOW voltage level.

Input	Output
A	Y
H	H
L	L

7. Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Table 4. Absolute Maximum Ratings

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND.

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	supply voltage		-0.5	4.6	V
I_{IK}	input clamping current	$V_I < 0$ V	-50		mA
V_I	input voltage	[1]	-0.5	4.6	V
I_{OK}	output clamping current	$V_O < 0$ V	-50		mA
V_O	output voltage	Active mode [1]	-0.5	4.6	V
		Power-down mode; $V_{CC} = 0$ V [1]	-0.5	4.6	V
I_O	output current	$V_O = 0$ V to V_{CC}		± 20	mA
I_{CC}	supply current			50	mA
I_{GND}	ground current		-50		mA
P_{tot}	total power dissipation	$T_{amb} = -40$ °C to $+125$ °C		250	mW
T_{stg}	storage temperature		-65	150	°C

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

8. Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. EnergyMath does not recommend exceeding them or designing to Absolute Maximum Ratings.

Table 5. Recommended Operating Conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC}	supply voltage		0.8		3.6	V
V_I	input voltage		0		3.6	V
V_O	output voltage	Active mode	0		V_{CC}	V
		Power-down mode; $V_{CC} = 0$ V	0		3.6	V
T_{amb}	ambient temperature		-40		125	°C
$\Delta t/\Delta V$	Input transition rise and fall rate	$V_{CC} = 0.8$ V to 3.6 V			200	ns/V

9.Static Characteristics

Table 6. Static characteristics

At recommended operating conditions. Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
V _{OH}	HIGH-level output voltage	V _I = V _{T+} or V _{T-}						
		I _O = -20µA; V _{CC} = 0.8 V to 3.6 V	V _{CC} - 0.1			V _{CC} - 0.11		V
		I _O = -1.1 mA; V _{CC} = 1.1 V	0.7V _{CC}			0.6V _{CC}		V
		I _O = -1.7 mA; V _{CC} = 1.4 V	1.03			0.93		V
		I _O = -1.9 mA; V _{CC} = 1.65 V	1.30			1.17		V
		I _O = -2.3 mA; V _{CC} = 2.3 V	1.97			1.77		V
		I _O = -3.1 mA; V _{CC} = 2.3 V	1.85			1.67		V
		I _O = -2.7 mA; V _{CC} = 3.0 V	2.67			2.40		V
		I _O = -4.0 mA; V _{CC} = 3.0 V	2.55			2.30		V
V _{OL}	LOW-level output voltage	V _I = V _{T+} or V _{T-}						
		I _O = 20µA; V _{CC} = 0.8 V to 3.6 V			0.10		0.11	V
		I _O = 1.1 mA; V _{CC} = 1.1 V			0.3V _{CC}		0.33V _{CC}	V
		I _O = 1.7 mA; V _{CC} = 1.4 V			0.37		0.41	V
		I _O = 1.9 mA; V _{CC} = 1.65 V			0.35		0.39	V
		I _O = 2.3 mA; V _{CC} = 2.3 V			0.33		0.36	V
		I _O = 3.1 mA; V _{CC} = 2.3 V			0.45		0.50	V
		I _O = 2.7 mA; V _{CC} = 3.0 V			0.33		0.36	V
		I _O = 4.0 mA; V _{CC} = 3.0 V			0.45		0.50	V
I _I	input leakage current	V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V			±0.5		±0.75	µA
I _{OFF}	power-off leakage current	V _{CC} = 0 V; V _I or V _O = 0V to 3.6 V			±0.5		±0.75	µA
ΔI _{OFF}	additional power-off leakage current	V _{CC} = 0 V to 0.2 V; V _I or V _O = 0V to 3.6 V			±0.6		±0.75	µA
I _{CC}	supply current	V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 0.8 V to 3.6 V			0.9		1.4	µA

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Low-power Schmitt trigger

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
ΔI_{CC}	additional supply current	per pin ; $V_{CC} = 3.3 \text{ V}$; $V_I = V_{CC} - 0.6 \text{ V}$; $I_O = 0 \text{ A}$			50		75	μA
C_i	input capacitance	$V_{CC} = 0 \text{ V to } 3.6 \text{ V}$; $V_I = \text{GND or } V_{CC}$		2.0				pF
C_o	output capacitance	$V_O = 0 \text{ V to } 3.6 \text{ V}$; $V_{CC} = 0 \text{ V}$		4.1				pF

[1]All typical values are measured at $T_{amb} = 25^\circ\text{C}$.

10. Dynamic Characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 7.

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
C _L = 5 pF								
t _{pd}	propagation delay	A to Y; see Fig. 6 [2]						
		V _{CC} = 0.8 V		69.8				ns
		V _{CC} = 1.1 V to 1.3 V	2.8	9.4	19.2	2.8	20.2	ns
		V _{CC} = 1.4 V to 1.6 V	2.2	6.2	9.4	2.2	11.4	ns
		V _{CC} = 1.65 V to 1.95 V	1.8	3.8	7.4	1.8	8.6	ns
		V _{CC} = 2.3 V to 2.7 V	1.4	2.8	4.3	1.4	5.1	ns
		V _{CC} = 3.0 V to 3.6 V	1.2	2.3	3.4	1.2	4.4	ns
C _L = 10 pF								
t _{pd}	propagation delay	A to Y; see Fig. 6 [2]						
		V _{CC} = 0.8 V		73.4				ns
		V _{CC} = 1.1 V to 1.3 V	3.3	11.2	20.7	3.3	21.5	ns
		V _{CC} = 1.4 V to 1.6 V	2.6	6.9	10.2	2.6	12.2	ns
		V _{CC} = 1.65 V to 1.95 V	2.1	4.3	7.9	2.1	9.0	ns
		V _{CC} = 2.3 V to 2.7 V	1.7	3.1	4.6	1.7	5.4	ns
		V _{CC} = 3.0 V to 3.6 V	1.5	2.6	3.7	1.5	4.5	ns
C _L = 15 pF								
t _{pd}	propagation delay	A to Y; see Fig. 6 [2]						
		V _{CC} = 0.8 V		73.6				ns
		V _{CC} = 1.1 V to 1.3 V	3.6	12.4	22.2	3.6	22.8	ns
		V _{CC} = 1.4 V to 1.6 V	2.9	7.4	11.0	2.9	13.0	ns
		V _{CC} = 1.65 V to 1.95 V	2.4	4.8	8.4	2.4	9.4	ns
		V _{CC} = 2.3 V to 2.7 V	2.0	3.5	4.9	2.0	5.7	ns
		V _{CC} = 3.0 V to 3.6 V	1.8	2.7	4.0	1.8	4.6	ns

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Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
C _L = 30 pF								
t _{pd}	propagation delay	A to Y; see Fig. 6 [2]						
		V _{CC} = 0.8 V		92.4				ns
		V _{CC} = 1.1 V to 1.3 V	4.8	16.0	26.6	4.8	26.1	ns
		V _{CC} = 1.4 V to 1.6 V	3.8	99.2	13.4	3.8	14.0	ns
		V _{CC} = 1.65 V to 1.95 V	3.2	6.5	10.1	3.2	10.6	ns
		V _{CC} = 2.3 V to 2.7 V	2.8	4.2	5.7	2.8	6.3	ns
		V _{CC} = 3.0 V to 3.6 V	2.5	3.6	4.9	2.5	5.2	ns
C _L = 5 pF, 10 pF, 15 pF and 30 pF								
C _{PD}	power dissipation capacitance	f _i = 1 MHz; V _I = GND to V _{CC} [3]						
		V _{CC} = 0.8 V		5.1				pF
		V _{CC} = 1.1 V to 1.3 V		5.2				pF
		V _{CC} = 1.4 V to 1.6 V		5.3				pF
		V _{CC} = 1.65 V to 1.95 V		5.4				pF
		V _{CC} = 2.3 V to 2.7 V		5.8				pF
		V _{CC} = 3.0 V to 3.6 V		7.3				pF

[1] Typical values are measured at nominal V_{CC} and at T_{amb} = 25 °C.

[2] t_{pd} is the same as t_{PLH} and t_{PHL}.

[3] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

P_D = C_{PD} × V_{CC}² × f_i × N + Σ(C_L × V_{CC}² × f_o) where:

f_i = input frequency in MHz;

f_o = output frequency in MHz;

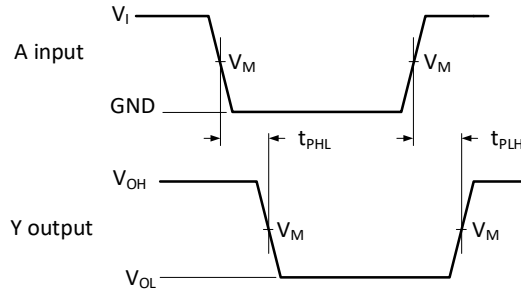
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

Σ(C_L × V_{CC}² × f_o) = sum of outputs.

10.1. Waveforms and test circuit



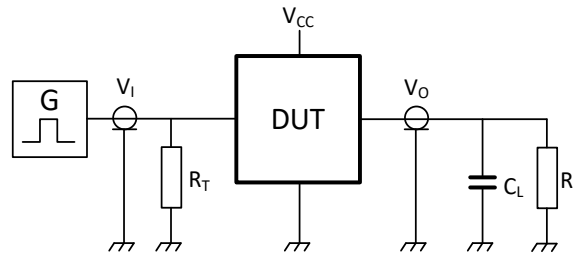
Measurement points are given in Table 8.

V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Fig. 6. Input A to output Y propagation delays

Table 8. Measurement points

Supply Voltage	Input	Output
V_{CC}	V_M	V_M
0.8 V to 3.6 V	$0.5V_{CC}$	$0.5V_{CC}$



Test data is given in Table 9.

Definitions for test circuit:

R_L = Load resistance.

C_L = Load capacitance including jig and probe capacitance.

R_T = Termination resistance should be equal to the output impedance Z_o of the pulse generator.

Fig. 7. Test circuit for measuring switching times

Table 9. Test data

Supply voltage	Input		Load	
V_{CC}	V_I	$t_r = t_f$	C_L	R_L
0.8 V to 3.6 V	V_{CC}	≤ 2.0 ns	5 pF, 10 pF, 15 pF and 30 pF	1 M Ω

11. Transfer Characteristics

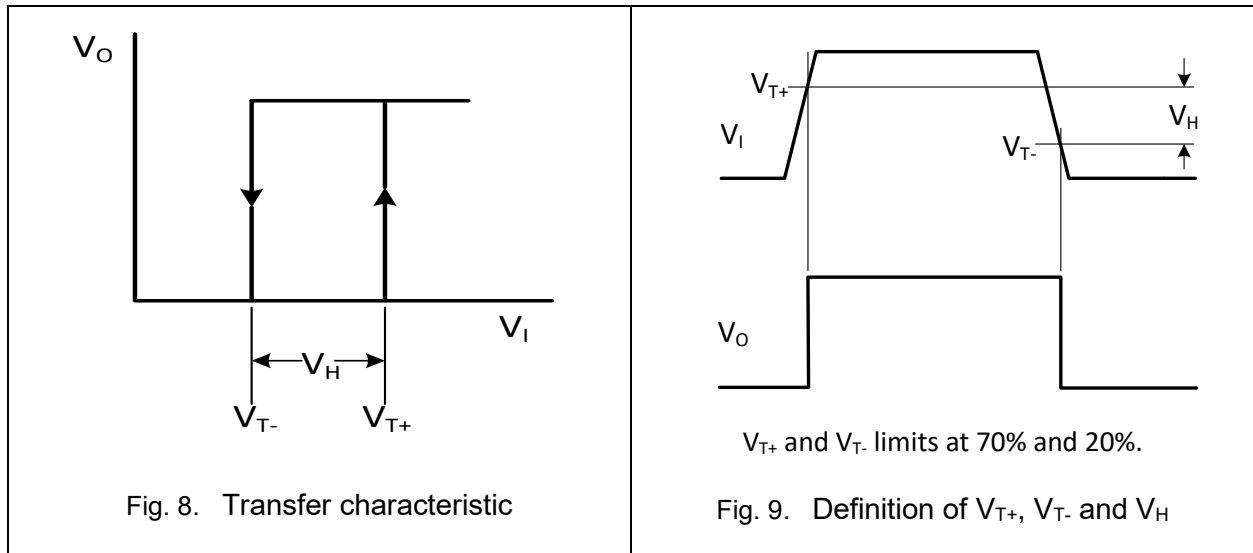
Table 10. Transfer characteristics

At recommended operating conditions. Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
V_{T+}	propagation delay	see Fig. 8 and Fig. 9						
		$V_{CC} = 0.8 \text{ V}$	0.30	0.54	0.60	0.30	0.62	V
		$V_{CC} = 1.1 \text{ V}$	0.53	0.74	0.90	0.53	0.92	V
		$V_{CC} = 1.4 \text{ V}$	0.74	0.96	1.11	0.74	1.13	V
		$V_{CC} = 1.65 \text{ V}$	0.91	1.14	1.29	0.91	1.31	V
		$V_{CC} = 2.3 \text{ V}$	1.37	1.63	1.77	1.37	1.80	V
		$V_{CC} = 3.0 \text{ V}$	1.88	2.13	2.29	1.88	2.32	V
V_{T-}	propagation delay	see Fig. 8 and Fig. 9						
		$V_{CC} = 0.8 \text{ V}$	0.10	0.32	0.60	0.10	0.60	V
		$V_{CC} = 1.1 \text{ V}$	0.26	0.43	0.65	0.26	0.65	V
		$V_{CC} = 1.4 \text{ V}$	0.39	0.54	0.75	0.39	0.75	V
		$V_{CC} = 1.65 \text{ V}$	0.47	0.62	0.84	0.47	0.84	V
		$V_{CC} = 2.3 \text{ V}$	0.69	0.87	1.04	0.69	1.04	V
		$V_{CC} = 3.0 \text{ V}$	0.88	1.15	1.24	0.88	1.24	V
V_H	propagation delay	see Fig. 8 and Fig. 9						
		$V_{CC} = 0.8 \text{ V}$	0.07	0.22	0.5	0.07	0.5	V
		$V_{CC} = 1.1 \text{ V}$	0.08	0.31	0.46	0.08	0.46	V
		$V_{CC} = 1.4 \text{ V}$	0.18	0.42	0.56	0.18	0.56	V
		$V_{CC} = 1.65 \text{ V}$	0.27	0.52	0.66	0.27	0.66	V
		$V_{CC} = 2.3 \text{ V}$	0.53	0.76	0.92	0.53	0.92	V
		$V_{CC} = 3.0 \text{ V}$	0.79	0.98	1.31	0.79	1.31	V

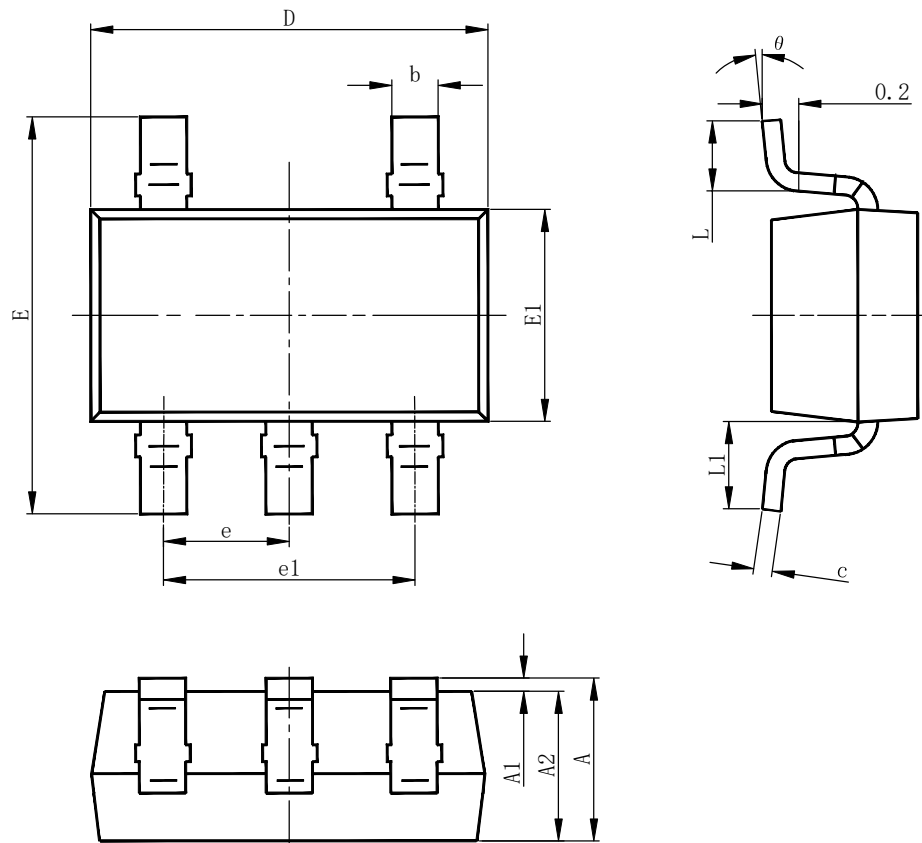
[1] Typical values are measured at nominal V_{CC} and at $T_{amb} = 25 \text{ °C}$.

11.1. Waveforms transfer characteristics



12. Package Outline

SOT23-5L

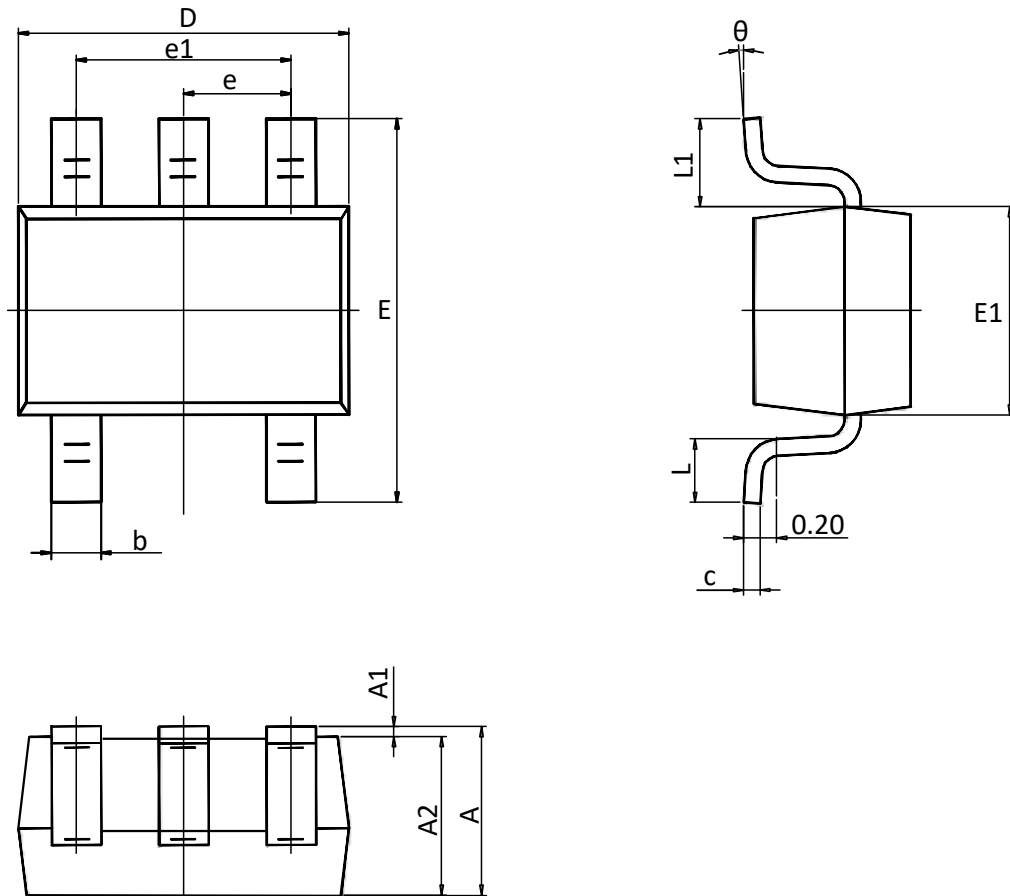


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
L1	0.600REF.		0.024REF.	
θ	0°	8°	0°	8°

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Low-power Schmitt trigger

SOT353

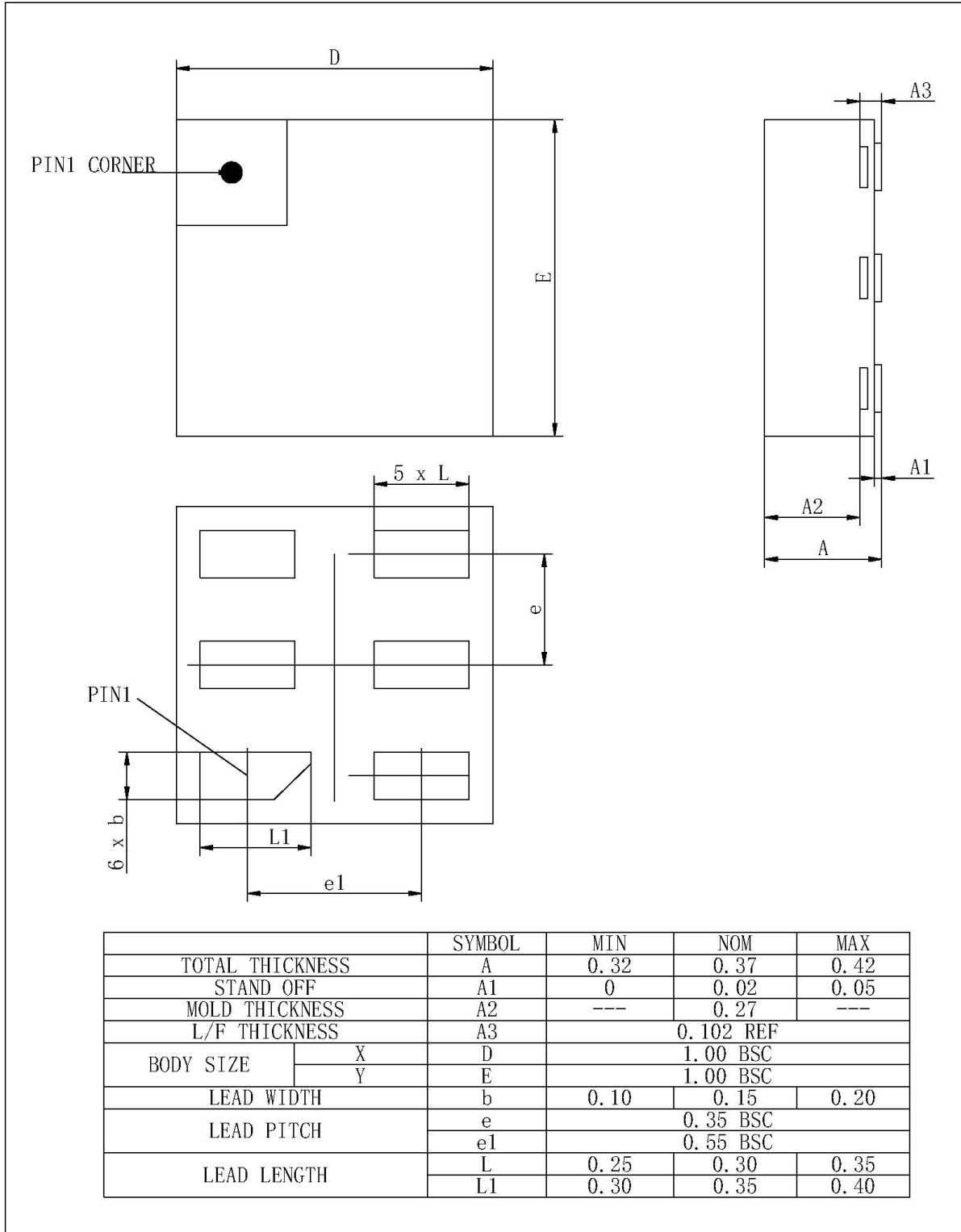


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.110	0.175	0.004	0.007
D	2.000	2.200	0.079	0.087
E	2.150	2.450	0.085	0.096
E1	1.150	1.350	0.045	0.053
e	0.650 TYP.		0.026 TYP.	
e1	1.200	1.400	0.047	0.055
L	0.260	0.460	0.010	0.018
L1	0.525 REF.		0.021 REF.	
θ	0°	8°	0°	8°

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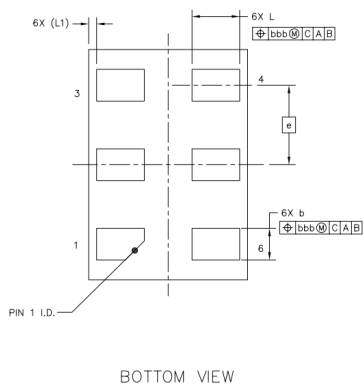
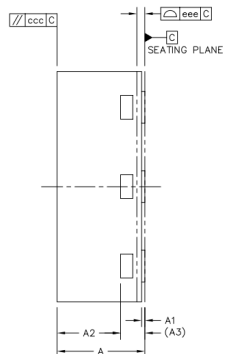
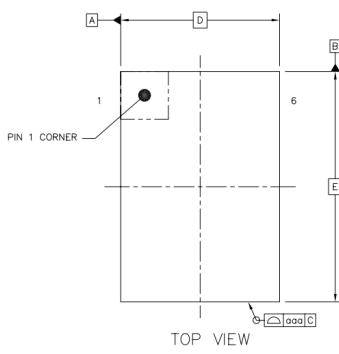
DFN1x1-6L



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Low-power Schmitt trigger

DFN1x1.45-6L



		SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS		A	0.5	0.55	0.6
STAND OFF		A1	0	0.02	0.05
MOLD THICKNESS		A2	---	0.4	---
L/F THICKNESS		A3	0.152 REF		
LEAD WIDTH		b	0.15	0.2	0.25
BODY SIZE	X	D	1 BSC		
	Y	E	1.45 BSC		
LEAD PITCH		e	0.5 BSC		
LEAD LENGTH	L	0.25	0.3	0.35	
	L1	0.05 REF			
PACKAGE EDGE TOLERANCE		aaa	0.1		
MOLD FLATNESS		ccc	0.1		
COPLANARITY		eee	0.05		
LEAD OFFSET		bbb	0.1		

NOTES

- 1.REFER TO JEDEC MO-220;
- 2.COPLANARITY APPLIES TO LEADS, CORNER LEADS AND DIE ATTACH PAD;
- 3.BAN TO USE THE LEVEL 1 ENVIRONMENT-RELATED SUBSTANCES OF JCTC PRESCRIBING;
- 4.FINISH: Cu/EP • Sn8~20s

13. Abbreviations

Table 11. Abbreviations

Acronym	Description
CMOS	Complementary Metal-Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
CDM	Charged Device Model
TTL	Transistor-Transistor Logic

14. Revision History

Table 12. Revision history

Document ID	Release Date	Data sheet status	Change notice	Supersedes
EM74AUP1G17 Rev. 1.0	Oct 18, 2025	Product datasheet		