General-Purpose Low-Voltage Open-Drain Output Comparator

DESCRIPTION

The LMV331 and LMV393 is the single and dual comparator version, the LMV339 is quad comparator version, and both are open-drain output comparators for maximum flexibility. It can operate from 1.8V to 5.5V, and have low power consuming 60μA(TYP) per channel.

The LMV331, LMV393 and LMV339 are the most cost-effective solutions for applications where low voltage operation, low power and space saving are the primary specifications in circuit design for portable consumer products.

The LMV331, LMV393 and LMV339 are available in Green SOT23-5, SOP8, and SOP14 packages. It operates over an ambient temperature range of -40°C to +85°C.

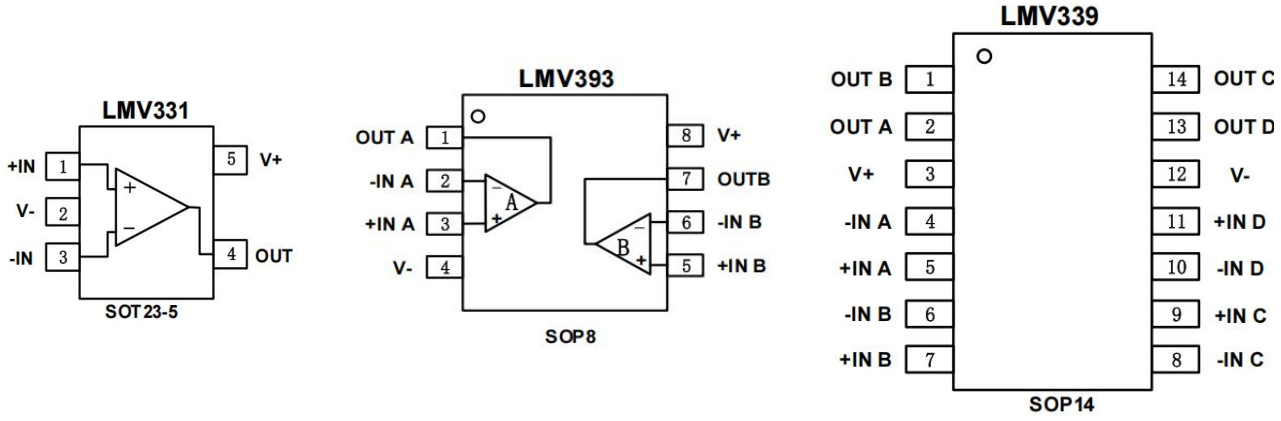
FEATURES

- SupplyRange: +2.0V to +5.5V
- Low Supply Current: 60μA per channel
- Input Common-Mode Voltage Range Includes Ground
- Low Output Saturation Voltage 150mV
- Open-Drain Output for Maximum Flexibility
- Operating Range: -40℃ to +85℃

APPLICATIONS

- HysteresisComparators
- Oscillators
- WindowComparators
- Industrial Equipment
- Test and Measurement

Pin Configuration



Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted) (1)

PARAMETER	MIN	MAX	UNIT
Supply Voltage, Vs=(V+) - (V-)		6	V
Input Pin Terminal Voltage(2)	(V-)-0.3	(V+)+0.3	V
Signal Output Pin Terminal Voltage(2)	(V-)-0.3	(V+)+0.3	V
Input Terminal Current(2)	-10	+10	mA
Signal Output Current	-55	+55	mA
Maximum Junction Temperature		+150	℃
Storage Temperature Range	-65	+150	℃

Note 1: Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

Note 2: Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.3V beyond the supply rails should be current-limited to 10mA or less.

ESD Ratings

SYMBOL	PARAMETER		VALUE	UNIT
V(ESD)	Electrostatic discharge	Human-body model (HBM)	±2000	V

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

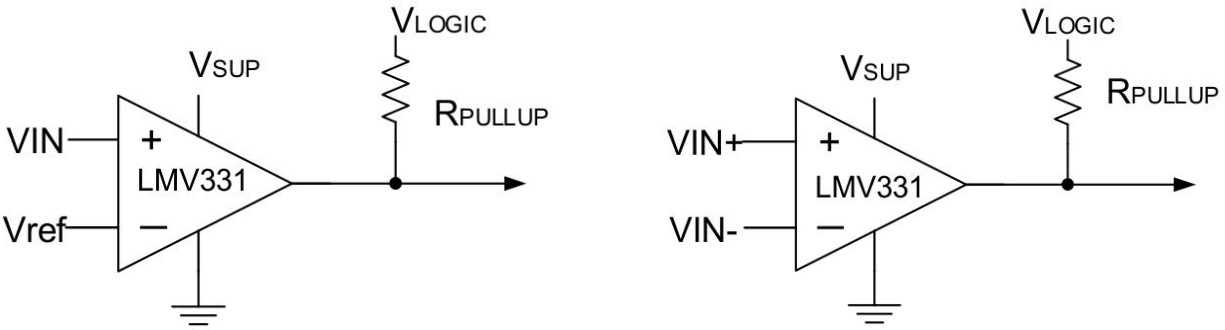
PARAMETER		MIN	TYP	MAX	UNIT
Supply Voltage, Vs=(V+) - (V-)	Signal-supply	2		5.5	V
	Dual-supply	±1.0		±2.75	V
Operating Temperature Range		-40	+25	+85	℃

ELECTRICAL CHARACTERISTICS

(At T_A=+25℃, V_S=5V, V_{CM}=V_S/2, R_{PU} = 10kΩ, C_L = 15pF, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
POWER SUPPLY						
Operating Voltage Range	V_S		2.0		5.5	V
Quiescent Current/per channel	I_Q			60	100	μA
Power-Supply Rejection Ratio	PSRR	Vs=2.0V to 5.5V, V_{CM}=0V		70		dB
INPUT						
Input Offset Voltage	V_{OS}		-3.5	±1	±3.5	mV
Input Offset Voltage Average Drift	dV_{OS}/dT			0.5		μV/℃
Input Bias Current	I_B			1	10	pA
Input Offset Current	I_{OS}			1	10	pA
Common-Mode Voltage Range	V_{CM}	T_A=-25℃ to +85℃	(V-)-0.1		(V+)+0.1	V
Common-Mode Rejection Ratio	CMRR	V_{CM} =-0.1 to 5.6V		70		dB
OUTPUT						
Saturation Voltage	V_{SAT}	I_O≤4mA		150	350	mV
Output Pull-up Voltage Range	V_{OH}				5.6	V
Output Current(sinking)	I_O	V_O≤1.5V		35		mA
Output Leakage Current	I_{LEAK}			0.01	10	nA
SWITCHING						
Propagation Delay H To L	T_{PHL}	R_{PU}=5.1KΩ,Overdrive= 10mV		205		ns
		R_{PU}=5.1KΩ,Overdrive= 100mV		185		
Propagation Delay L To H	T_{PLH}	R_{PU}=5.1KΩ,Overdrive= 10mV		660		
		R_{PU}=5.1KΩ,Overdrive= 100mV		700		
Fall Time	T_F	R_{PU}=5.1KΩ,Overdrive= 100mV		42		ns

Typical Application

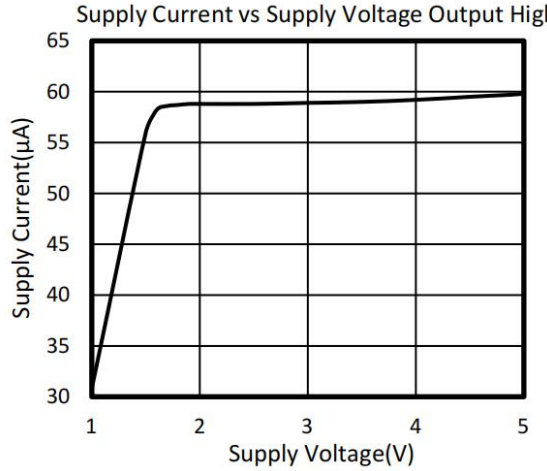


Typical Application Schematic

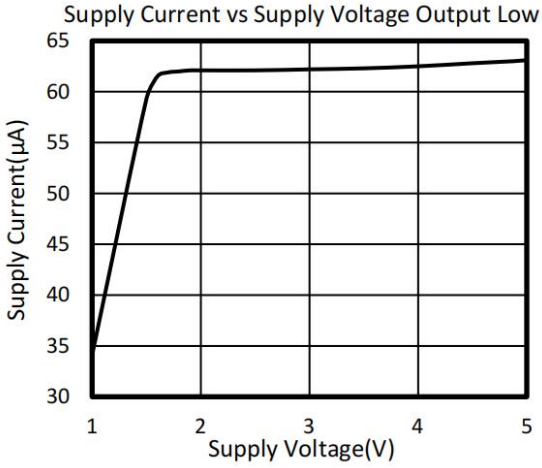
TYPICAL CHARACTERISTICS

(At T_A=+25℃, V_S=5V , V_{CM} = V_S/2, C_L = 15pF, unless otherwise noted.)

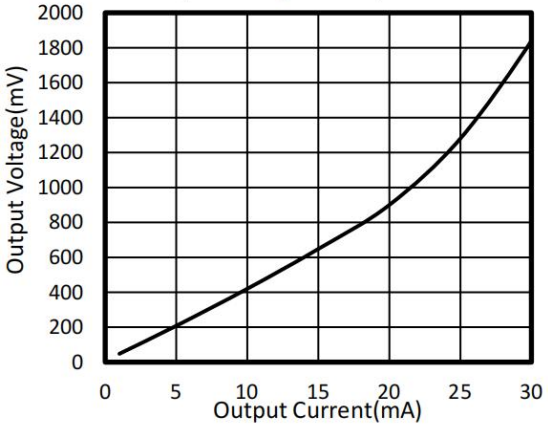
Supply Current vs Supply Voltage Output High



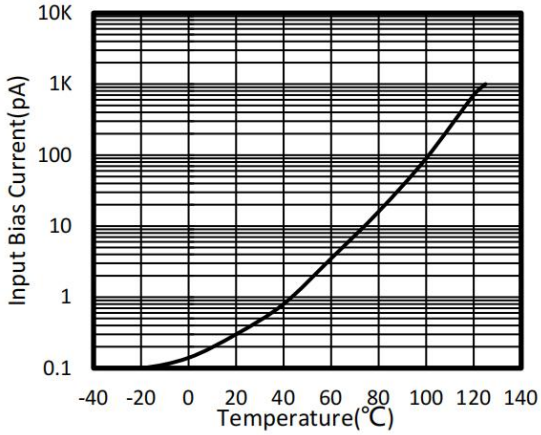
Supply Current vs Supply Voltage Output Low



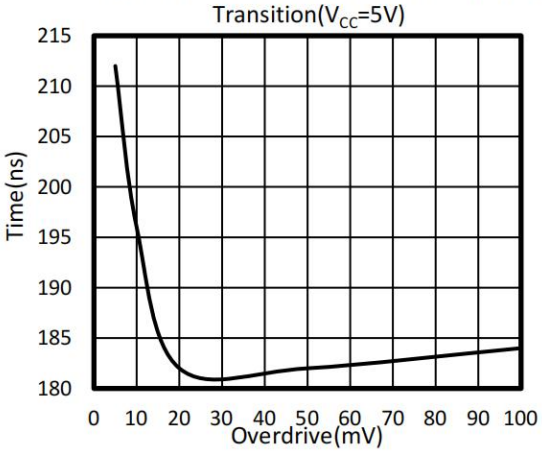
Output Voltage vs Output Current



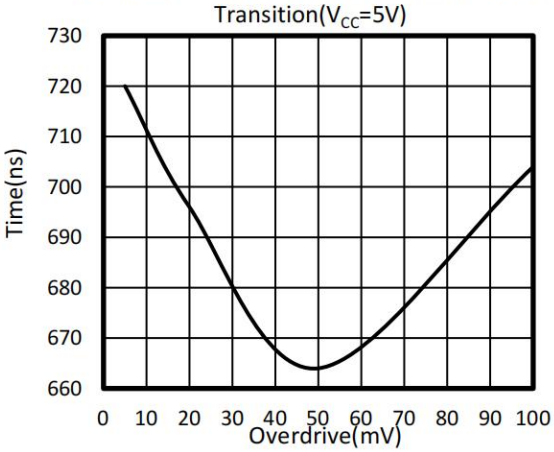
INPUT BIAS CURRENT vs TEMPERATURE



Response Time vs Input Overdrives Negative Transition(V_{CC}=5V)

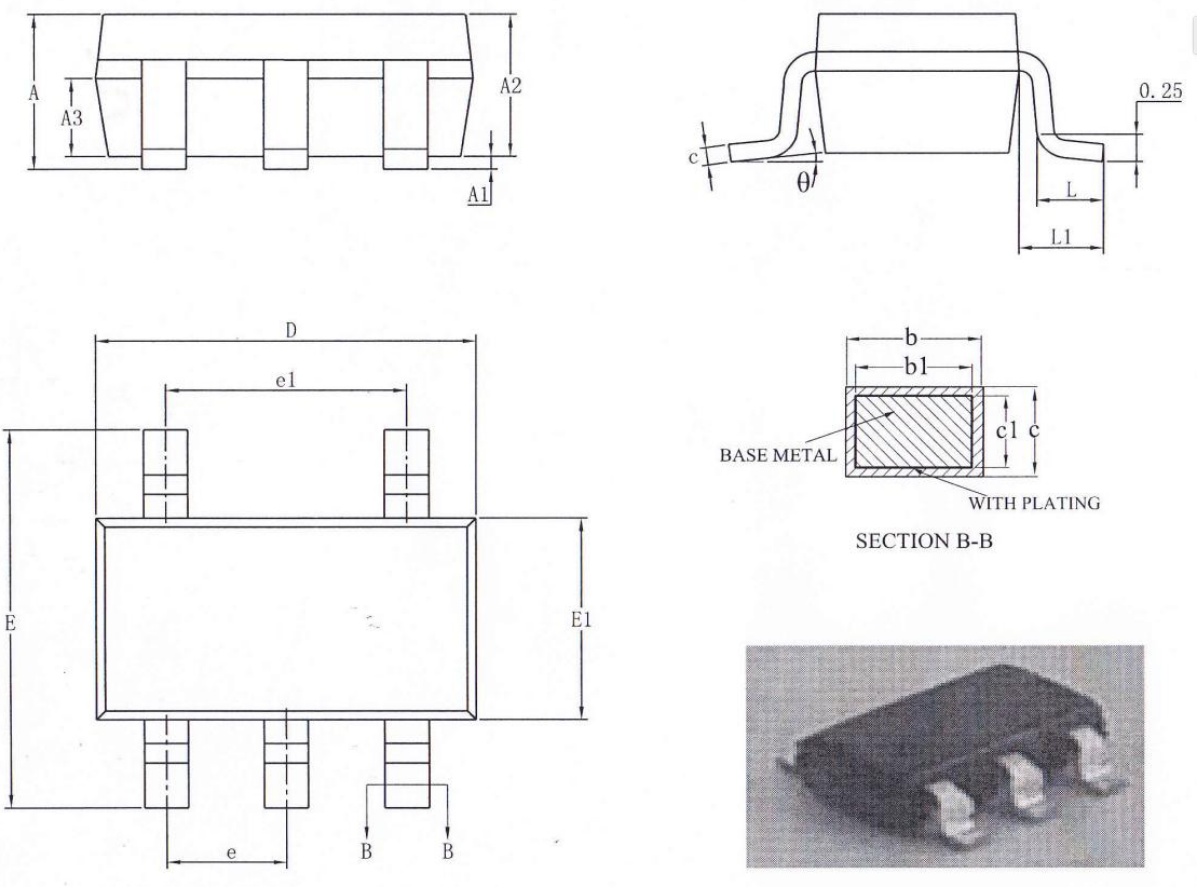


Response Time vs Input Overdrives Positive Transition(V_{CC}=5V)



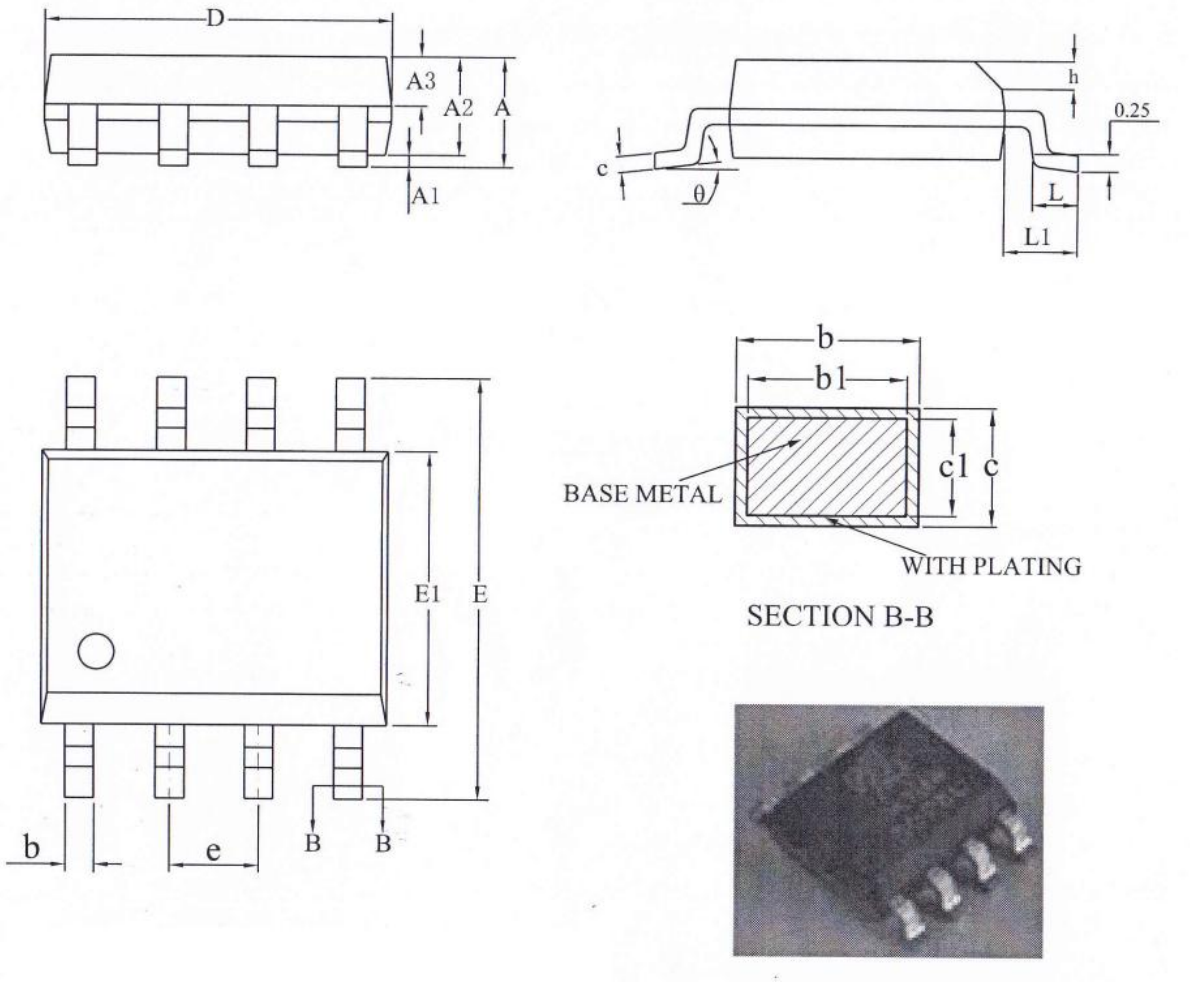
PACKAGE OUTLINE DIMENSIONS

SOT23-5



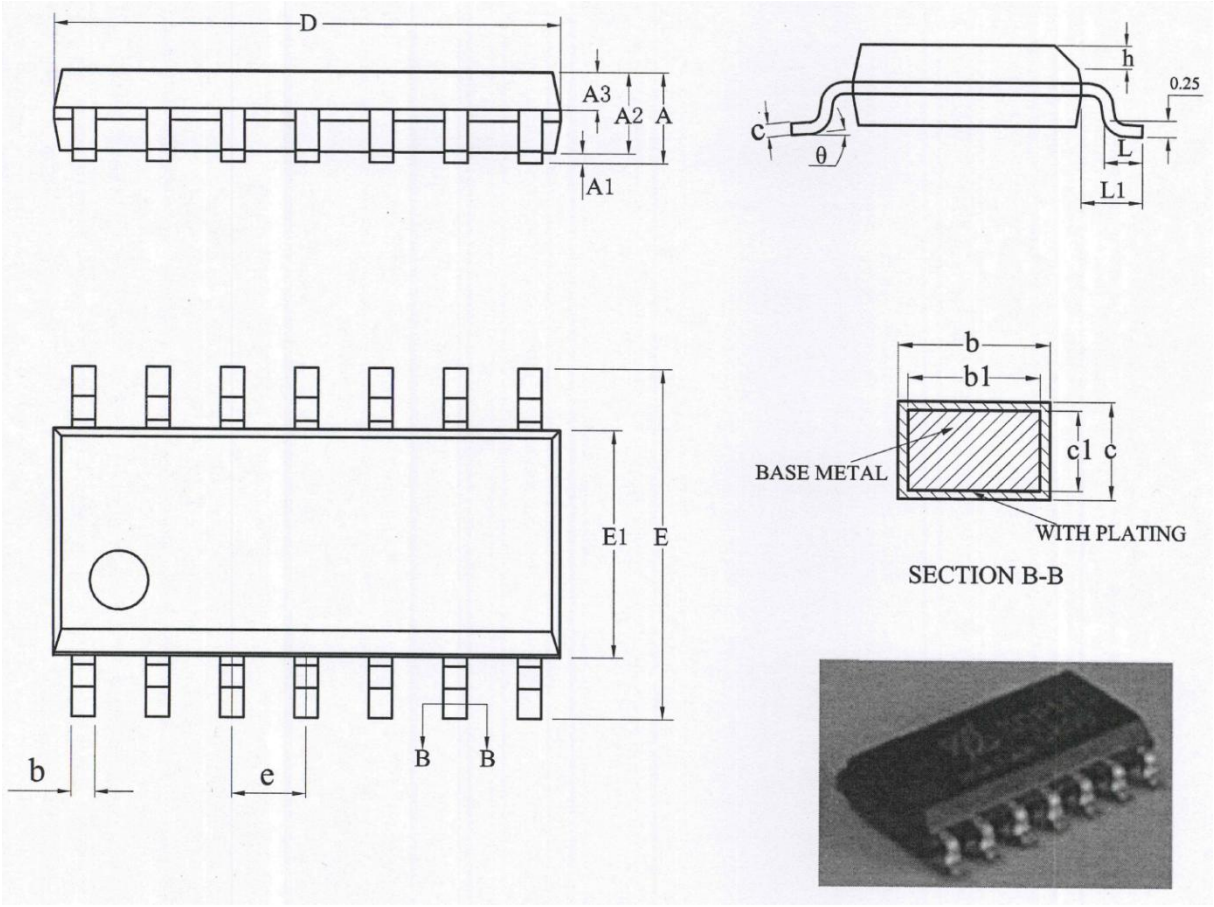
SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.25
A1	0.04	—	0.10
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.33	—	0.41
b1	0.32	0.35	0.38
C	0.15	—	0.19
c1	0.14	0.15	0.16
D	2.82	2.92	3.02
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
e	0.95BSC		
e1	1.90BSC		
L	0.30	—	0.60
L1		0.60REF	
θ	0	—	8°

SOP8



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	—	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	—	0.47
b1	0.38	0.41	0.44
c	0.20	—	0.24
c1	0.19	0.20	0.21
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27BSC		
h	0.25	—	0.5
L	0.50	—	0.8
L1	1.05REF		
θ	0	—	8°

SOP14



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	—	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	—	0.47
b1	0.38	0.41	0.44
C	0.20	—	0.24
c1	0.19	0.20	0.21
D	8.55	8.65	8.75
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
E	1.27BSC		
h	0.25	—	0.5
L	0.50	—	0.8
L1	1.05REF		
θ	0	—	8°