SGS-THOMSON MICROELECTRONICS

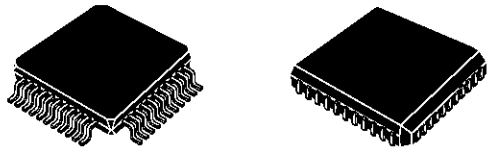
L6451

28 CHANNEL INK JET DRIVER

ADVANCE DATA

- 40V DMOS OUTPUT BREAKDOWN
- PRECISE OUTPUT ENERGY
- ESD OUTPUT PROTECTION WITH CLAMPING DIODES
- VERY LOW QUIESCENT CURRENT
- PLCC44 OR PQFP44 (10 x 10mm)

MULTIPOWER BCD TECHNOLOGY



PQFP44 **PLCC44**

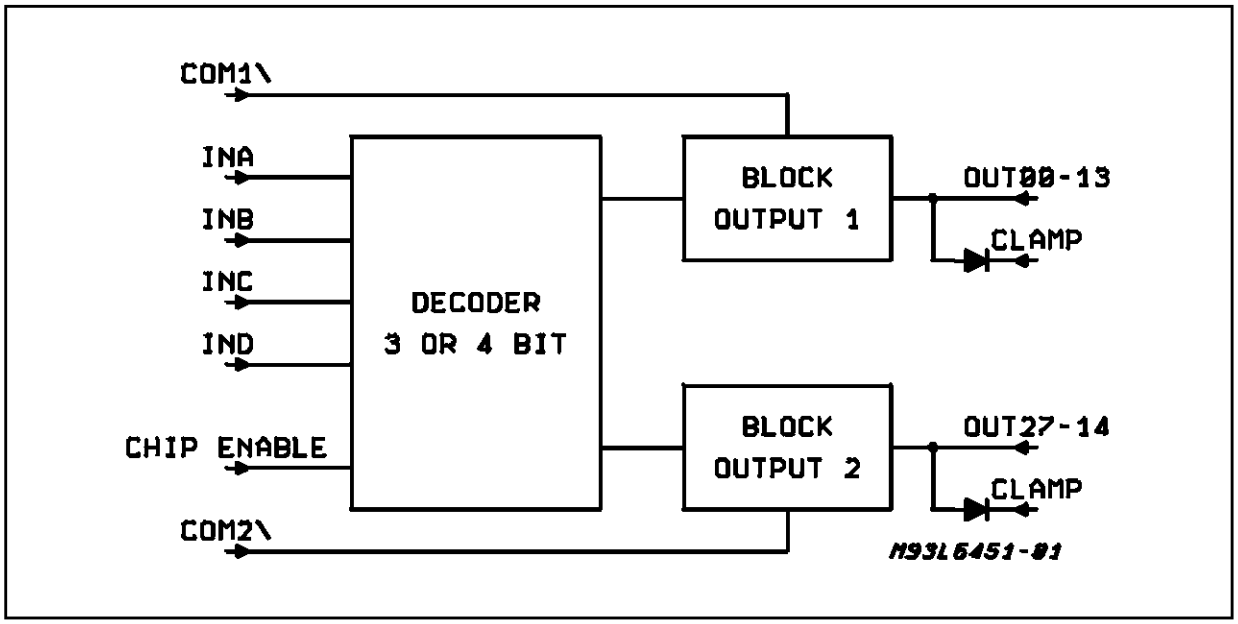
DESCRIPTION

The L6451 is realized in Multipower BCD Technology which combines isolated DMOS power transistors with CMOS and Bipolar circuits on the same IC. By using mixed technology it has been possible to optimize the logic circuitry and the power stage to achieve the best possible performances.

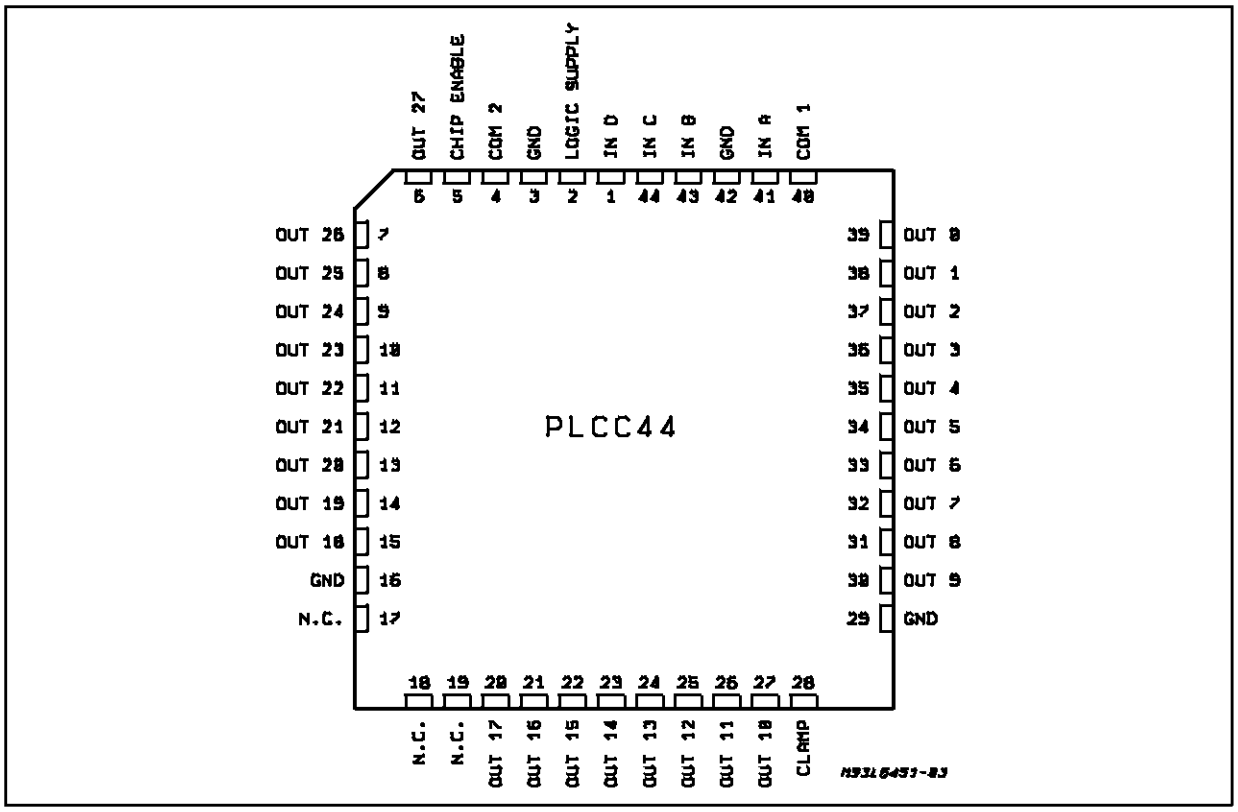
Intended to be used in ink jet Printer Applications as 4 to 28 (2 x 14) lines selectable decoder/driver, the L6451 device driver has the advantages of low power CMOS inputs and logic, with 28 high current and high voltage DMOS outputs capable of sustaining a maximum of 40V.
On system power up the output drivers are locked out using the chip enable function; two enable inputs are available for the different driver banks.

An internal power-on system is implemented in order to avoid wrong output commutation during the supply voltage transients.
Using a mask option during manufacturing allows a different decoding.
Control of the energy delivered to the print head is made by means of a special circuitry.
All driver outputs are capable of withstanding a contact discharge of ±8kV with the IC biased.

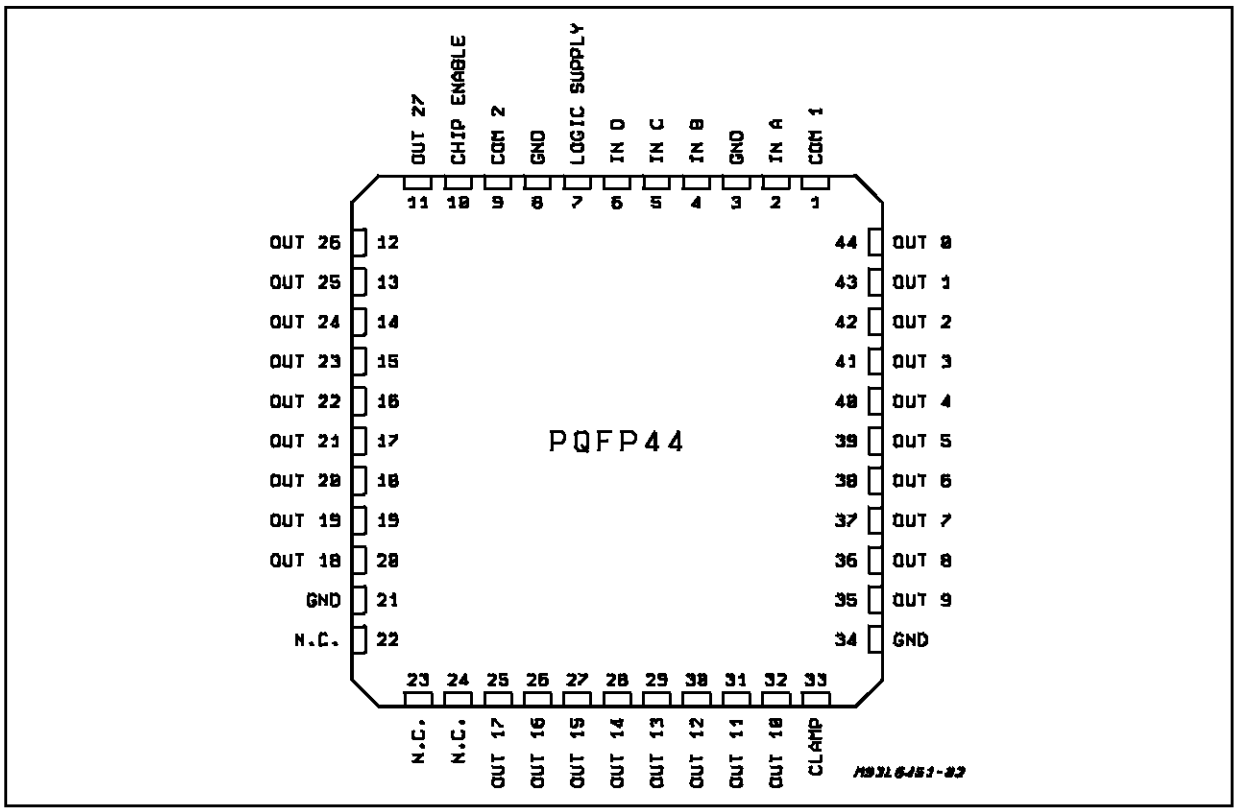
BLOCK DIAGRAM (case of 4 bit)



PLCC44 PIN CONNECTION (Top view)



PQFP44 PIN CONNECTION (Top view)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{OUT}	Output Voltage	40	V
V_{CLAMP}	Output Clamping Voltage	40	V
I_{OUT}	Output Continuous Current	0.8	A
I_{PEAK}	Output Peak Current (with duty cycle = 10% T_{ON} = 4µs)	2	A
T_J	Junction Temperature	150	°C
V_{DD}	Logic Supply Voltage	7	V
V_{IN}	Input Voltage Range	-0.3V to V_S +0.3	V
T_{amb}	Operating Temperature Range	0 to 70	°C
T_{stg}	Storage Temperature Range	-55 to 150	°C

PIN FUNCTIONS

Name	Function
V_{DD}	5V Logic Supply.
GND	Logic and Power Ground.
OUT0 to OUT27	DMOS Outputs.
CLAMP	This pin has to be connected to the power supply voltage of the head resistors. Each of the output DMOS have their drain connected with the anode of a protection diode, all the cathodes of the protection diodes are connected to the clamp pin. In order to have the device supplied, the CLAMP pin needs to be connected to the power..
INA, INB, INC, IND	Decoder inputs.
$\overline{COM1}$, $\overline{COM2}$	A low logic input on these pins enables the outputs selected by the decoder inputs.
CHIP ENABLE	A logic high enable the chip.

THERMAL DATA

Symbol	Parameter		PQFP44	PLCC44	Unit
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-Ambient	Max.	55 (*)	65 (*)	°C/W

(*) device mounted on PCB.

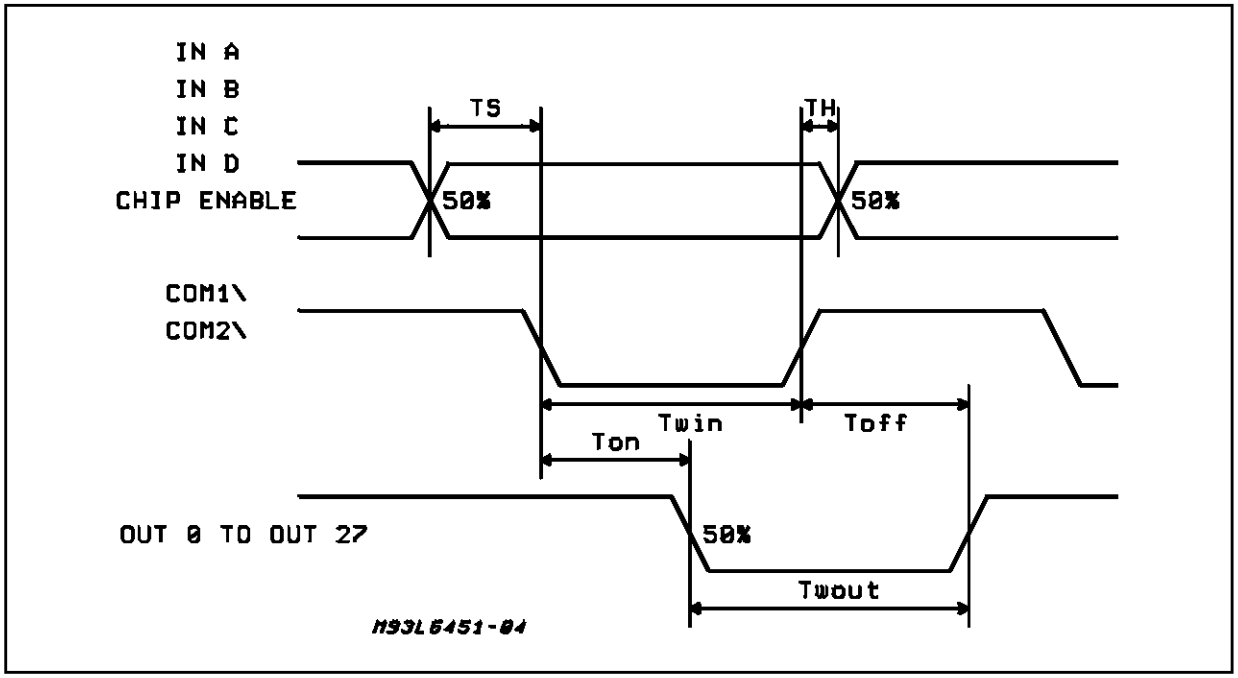
D.C. ELECTRICAL CHARACTERISTICS at T_{amb} = 25°C, V_{DD} = 5V, V_{clamp} = 18V (unless otherwise specified).

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{DD}	Logic Supply Voltage		4.75	5	5.25	V
V_{CLAMP}	Clamping Voltage		9		38	V
V_{IL}	Low Level Input Voltage				1.2	V
V_{IH}	High Level Input Current		V_{DD} -1.2			V
I_{LL}	Low Level Input Current	$V_{IN} = V_{IL}$			-200	µA
I_{LH}	High Level Input Current	$V_{IN} = V_{IH}$			10	µA
I_{DD}	Logic Supply Current	(Independent from the output conditions)			5	mA
V_{OUT}	Output Saturation Voltage	Tj 25 °C D.C. 0.4A Tj 25 °C D.C. 0.5A Tj 90 °C D.C. 0.4A Tj 90 °C D.C. 0.5A		0.9 1.1 1.4 1.7		V V V V
ΔV_{CE}	Output saturation absolute voltage variation around the typ. values for extended temperature ranges	Tj = 25°C to 90°C D.C.: 0.4A Tj = 25°C to 90°C D.C.: 0.5A			±0.2 ±0.25	V V
R_{DS} ON				2.2		Ω

A.C. ELECTRICAL CHARACTERISTICS at T_{amb} = 25°C, V_{DD} = 5V.

Symbol	Signal Name	Parameter	Test Condition	Min.	Typ.	Max.	Unit
T_S	INA, INB, INC, IND Vs COMn	SET - UP Time		30			ns
T_H	INA, INB, INC, IND Vs COMn	HOLD Time		0			ns
T_{on}	COM1,2,3,4 V_S OUT 0 to N	TURN - ON Time	I_{OUT} = 0.5A, R_L = 39Ω T_j = 25 to 90°C		150		ns
T_{off}	COM1,2,3,4 V_S OUT 0 to N	TURN - OFF Time	I_{OUT} = 0.5A, R_L = 39Ω T_j = 25 to 90°C		150		ns
t_r		Rise Time			100		ns
t_f		Fall Time			100		ns
T_{wout}		Output Pulse Width	T_{win} = 3.5µs R_L = 40Ω I_{OUT} = 0.5A	- 20	T_{win}	+ 80	ns
ΔP_D		Maximum allowable variation of the output power transmitted by each driver to the resistive load	R_L = 39Ω V_{CLAMP} = 18V			±4	%
ΔP_D	Maximum allowable variation of the output power transmitted by each driver to the resistive load	R_L = 40Ω V_{clamp} = 18V			æ4	%	

Figure 1: Timing Waveforms

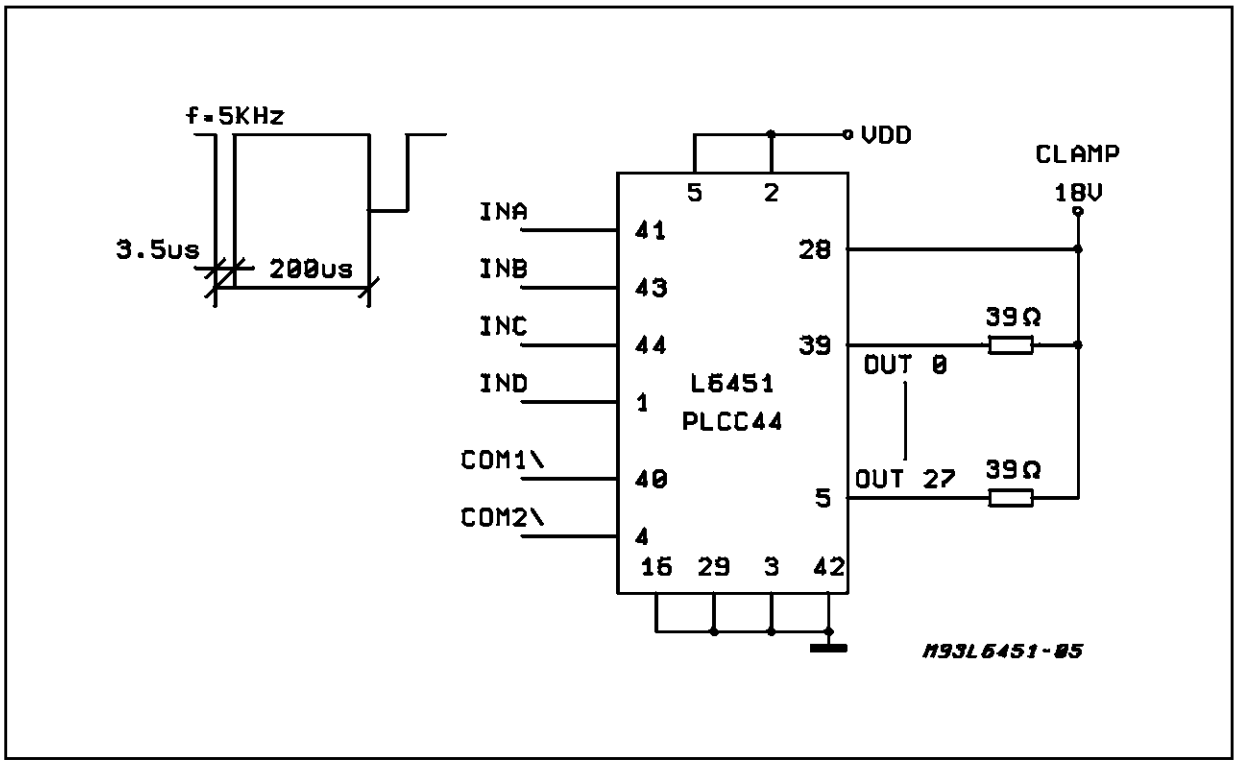


OUTPUT SELECTION

Decoder Truth Table

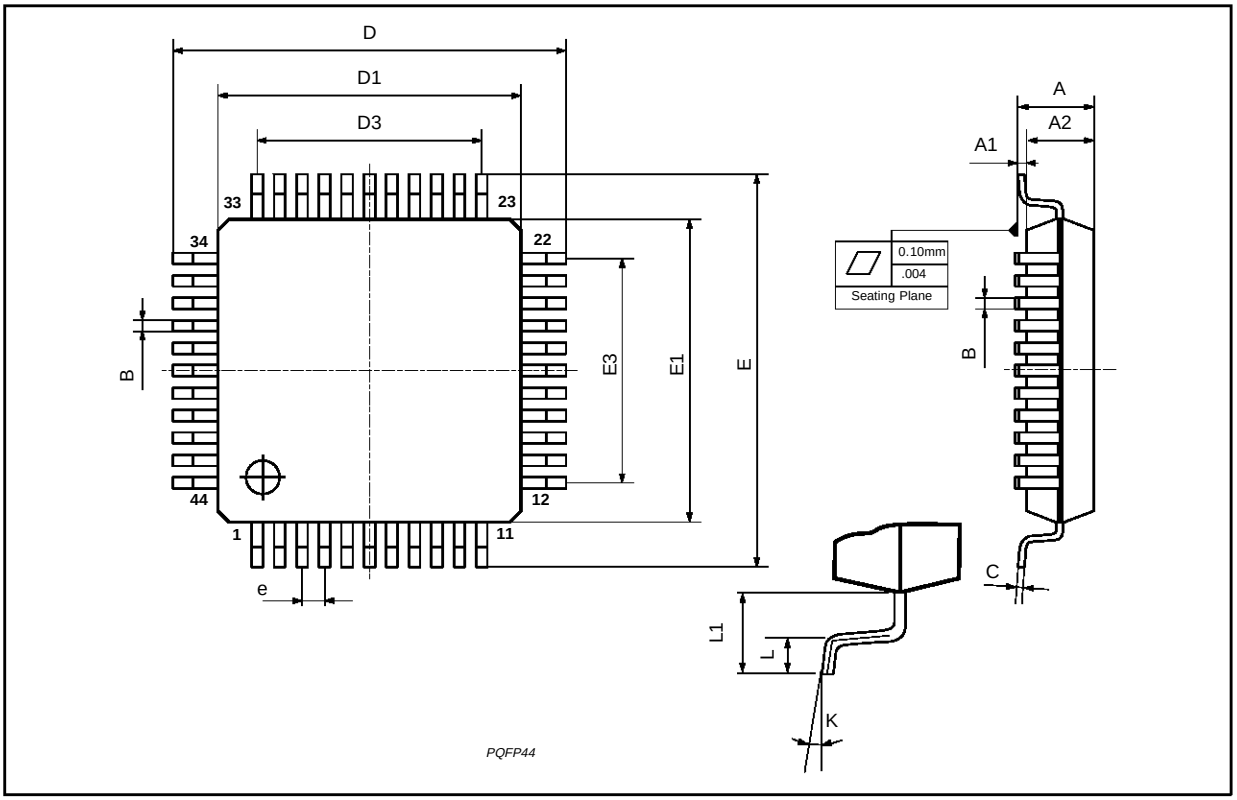
IND	INC	INB	INA (LSB)	OUTPUTS
0	0	0	0	0.27
0	0	0	1	1.26
0	0	1	0	2.25
0	0	1	1	3.24
0	1	0	0	4.23
0	1	0	1	5.22
0	1	1	0	6.21
0	1	1	1	7.20
1	0	0	0	8.19
1	0	0	1	9.18
1	0	1	0	10.17
1	0	1	1	11.16
1	1	0	0	12.15
1	1	0	1	13.14
1	1	1	0	ALL OFF
1	1	1	1	ALL OFF

Figure 2: Application Circuit



PQFP44 (14 x 14) PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			3.40			0.134
A1	0.25			0.0098		
A2	2.55	2.80	3.05	0.100	0.110	0.120
B	0.35		0.50	0.0138		0.0197
C	0.13		0.23	0.005		0.009
D	16.95	17.20	17.45	0.667	0.677	0.687
D1	13.90	14.00	14.10	0.547	0.551	0.555
D3		10.00			0.394	
e		1.00			0.039	
E	16.95	17.20	17.45	0.667	0.677	0.687
E1	13.90	14.00	14.10	0.547	0.551	0.555
E3		10.00			0.394	
L	0.65	0.80	0.95	0.025	0.0315	0.0374
L1		1.60			0.063	
K	0°(min.), 7°(max.)					



PLCC44 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	17.4		17.65	0.685		0.695
B	16.51		16.65	0.650		0.656
C	3.65		3.7	0.144		0.146
D	4.2		4.57	0.165		0.180
d1	2.59		2.74	0.102		0.108
d2		0.68			0.027	
E	14.99		16	0.590		0.630
e		1.27			0.050	
e3		12.7			0.500	
F		0.46			0.018	
F1		0.71			0.028	
G			0.101			0.004
M		1.16			0.046	
M1		1.14			0.045