



FULLY INTEGRATED POWER SUPPLY FIPS™

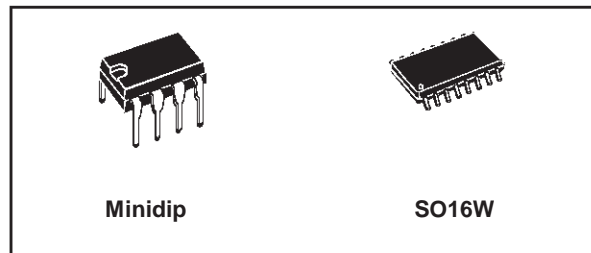
PRODUCT PREVIEW

Features

- WIDE-RANGE MAINS OPERATION
- "ON-CHIP" 700V BVDSS POWER MOS
- 65kHz INTERNAL OSCILLATOR
- 2.5V \pm 2% INTERNAL REFERENCE
- STANDBY MODE FOR HIGH EFFICIENCY AT LIGHT LOAD
- OVERCURRENT AND LATCHED OVERVOLTAGE PROTECTION
- NON DISSIPATIVE BUILT-IN START-UP CIRCUIT
- ON-CHIP SOFT START AND THERMAL SHUTDOWN

Main Applications

- WALL PLUG POWER SUPPLY UP TO 15W
- AC-DC ADAPTORS
- AUXILIARY POWER SUPPLY:
 - MONITORS (BLUE ANGEL)
 - DESKTOPS/SERVERS
 - FAX, TV, LASER PRINTERS
 - HOME APPLIANCES/LIGHTING
- LINE CARD, DC-DC CONVERTERS



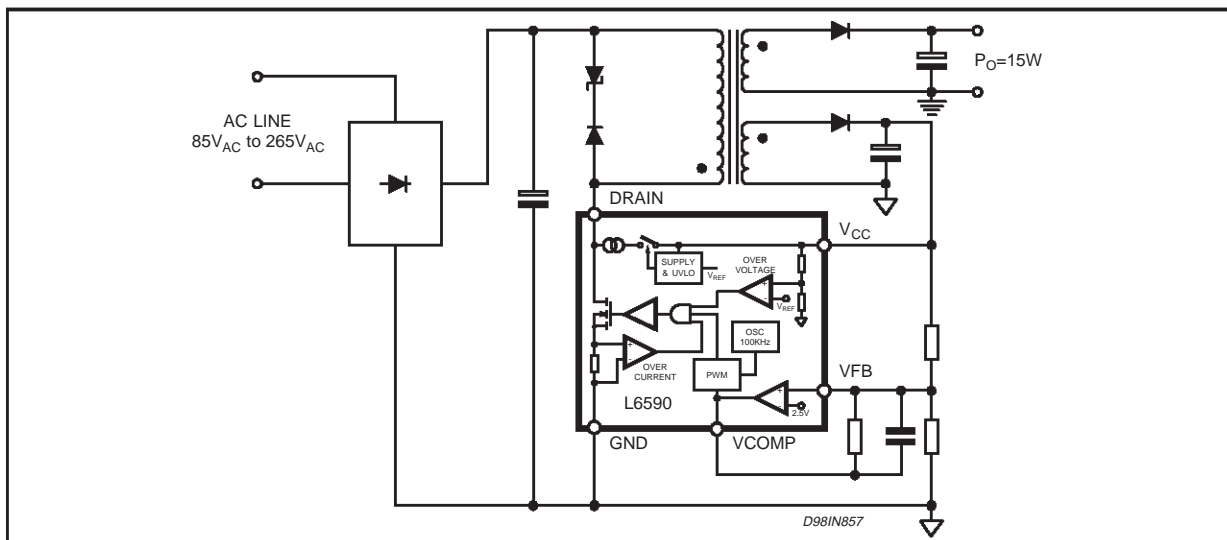
DESCRIPTION

The L6590 is a monolithic switching regulator designed in BCD OFF-LINE technology, able to operate with wide range input voltage and delivering an output power up to 13W. The internal switch is implemented by a lateral high voltage power Mosfet with an $R_{ds(on)}$ of 13Ω and a BVD_{ss} of 700V. The internal fixed oscillator frequency, non dissipative start up and the internal soft start system allow to minimize the components count. A 2.5V \pm 2% internal reference in addition to a high gain error amplifier make the device suitable for low cost applications with primary control.

Internal protections like cycle by cycle current limiting, output overvoltage protection and thermal shutdown generate a 'robust' design solution.

The device automatically reduces the frequency from 65KHz to 22KHz under light load conditions improving the efficiency.

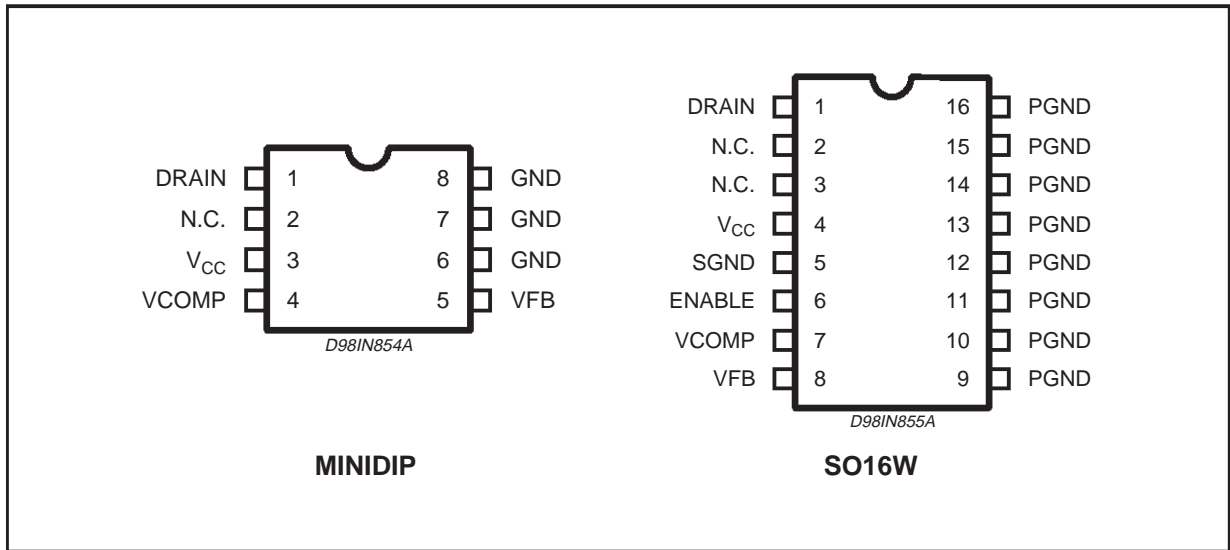
TYPICAL APPLICATION CIRCUIT



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{ds}	Drain Source Voltage	700	V
I_d	Drain Current	0.7	A
V_{cc}	Supply Voltage	18	V
	Error Amplifier Output Sink Current	3	mA
P_{tot}	Power Dissipation at $T_{amb} < 50^{\circ}C$ (Minidip)	1	W
T_j	Junction Operating Temperature Range	-40 to 150	$^{\circ}C$
T_{stg}	Storage Temperature	-40 to 150	$^{\circ}C$

PINS CONNECTION (Top views)



THERMAL DATA

Symbol	Parameter	Minidip	SO16W	Unit
$R_{th\ j-amb}$	Thermal Resistance Junction to Ambient Free Air	60	-	$^{\circ}C/W$
$R_{th\ j-amb}$	Thermal Resistance Junction to Ambient (*)	35 to 60	35 to 60	$^{\circ}C/W$

(*) Value depending from PCB copper areas and thickness.

ELECTRICAL CHARACTERISTICS ($T_j = 0$ to $105^{\circ}C$, $V_{cc} = 10V$)

Power Section

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{dss}	Drain Source Voltage	$I_d = 500\mu A$	700			V
I_{dss}	Off State Drain Current	$V_{ds} = 560V$			500	μA
R_{dson}	Drain Source on state Resistance	$I_d = 25mA$; $T_j = 25^{\circ}C$		13	17	Ω
		$T_j = 125^{\circ}C$		26	35	Ω

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
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Error Amp Section

V _{fb}	Input Voltage	T _j = 25°C	2.45	2.5	2.55	V
		T _j = 125°C	2.43	2.5	2.57	V
I _b	Input Bias Current			-0.3	-1	μA
	A _{vol}		60			dB
B	Unity Gain Bandwidth		0.7	1		MHz
SVR	Supply Voltage Rejection			70		dB
I _{source}	Output Source Current	V _{comp} = 3.5V	0.5	1		mA
V _{oh}	V _{out} High	I _{source} = 0.5mA V _{fb} = 2V	3.8	4.5		V
V _{ol}	V _{out} Low	I _{sink} = 1mA V _{fb} = 3V			1.0	V

Oscillator Section

F _{osc}	Oscillator Frequency	T _j = 25°C	58	65	72	KHz
			56	65	74	KHz
D _{min}	Min. Duty Cycle	V _{comp} = 1V			0	%
D _{max}	Max. Duty Cycle		66	70	74	%

Device Operation Section

I _{op}	Operating Supply Current			6	8	mA
I _{psc}	Peak Start up Current	V _{cc} = 0V	5	10	15	mA
V _z	Zener Voltage		17	17.5	18	V
V _{ddon}	Start Threshold Voltage		14	14.5	15	V
V _{ddoff}	Min Operating Voltage After Turn on		7	7.5	8	V

Soft Start

V _{ccss}	Soft Start Threshold Voltage		12	12.5	13	V
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Circuit Protections

I _{lim}	Pulse by Pulse Current Limit	di/dt = 0.2A/μs	500	625	700	mA
OVP	Over Voltage Protection		15	15.5	16	V
t _m	Internal Masking Time			120		ns

Stand by Section

I _{pksb}	Current Threshold for Stand-By Operation	Transition from 65KHz to 22KHz		70		mA
F _{stb}	Stand by Frequency	T _j = 25°C	19	23	27	KHz
I _{pknor}	Current Threshold for Normal Operation	Transition from 22KHz to 65KHz		170		mA
	Stand by current	f _{sw} = f _{stand-by}		5	7.5	mA

PN/OFF/BROWN-OUT

V _{th on}	Threshold Voltage (Device on)		2.425	2.5	2.575	V
I _{Hyst}	Source Current	V _{pin} = 3V	30	50	70	μA
I _{off}	Supply Current in Off Condition	V _{pin} = 2V		0.5		mA
I _p	Source Current	V _{pin} = 2V		5		mA
V _{CL}	On/Off Clamp Pull-Up Voltage	I _{sink} = 0.5mA	5	5.5	6	V

THERMAL SHUTDOWN (*)

	Thermal Shutdown		150	165		°C
	Hysteresis			40		°C

(*) Parameter not tested in production.

APPLICATION EXAMPLES

Figure 1. AC-DC Adaptor, Auxiliary P.S. (Isolated bias winding feedback)

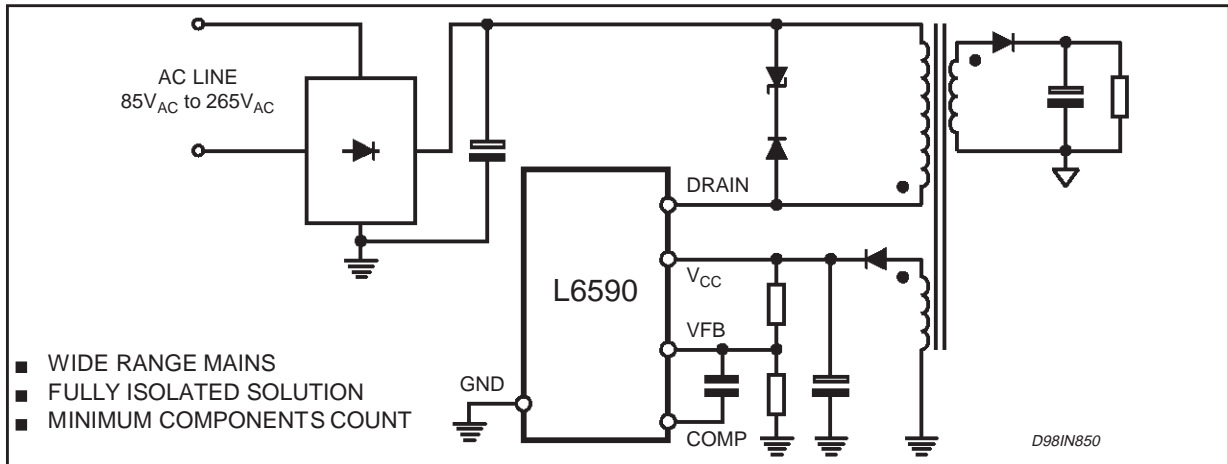


Figure 2. High Performance AC-DC Converter. (Secondary referenced optocoupler feedback)

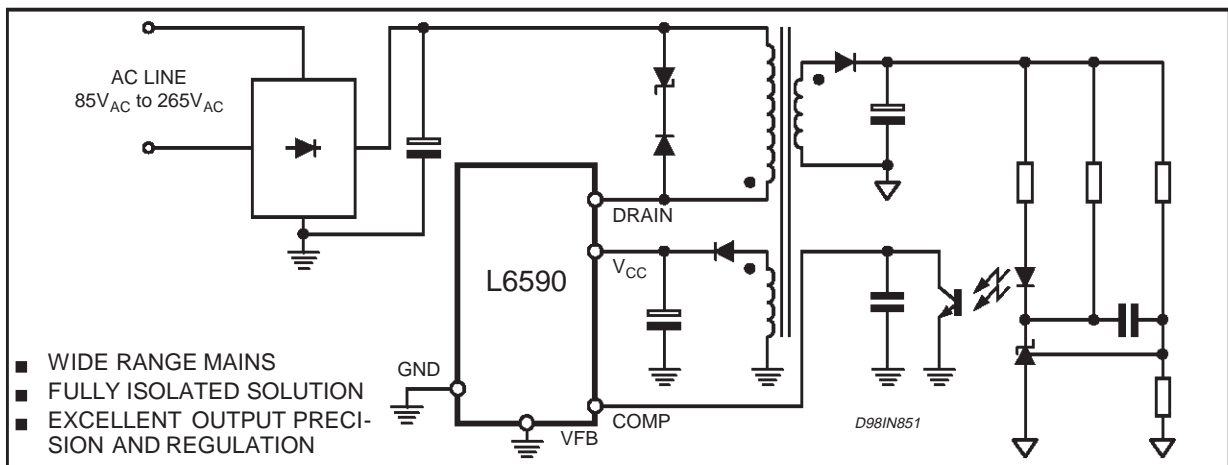
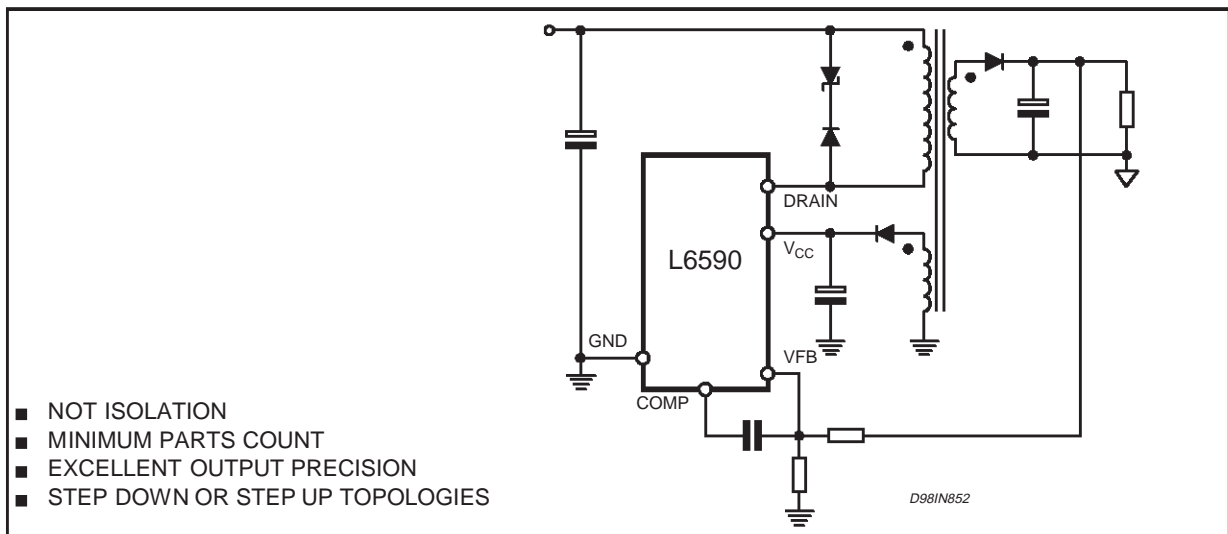
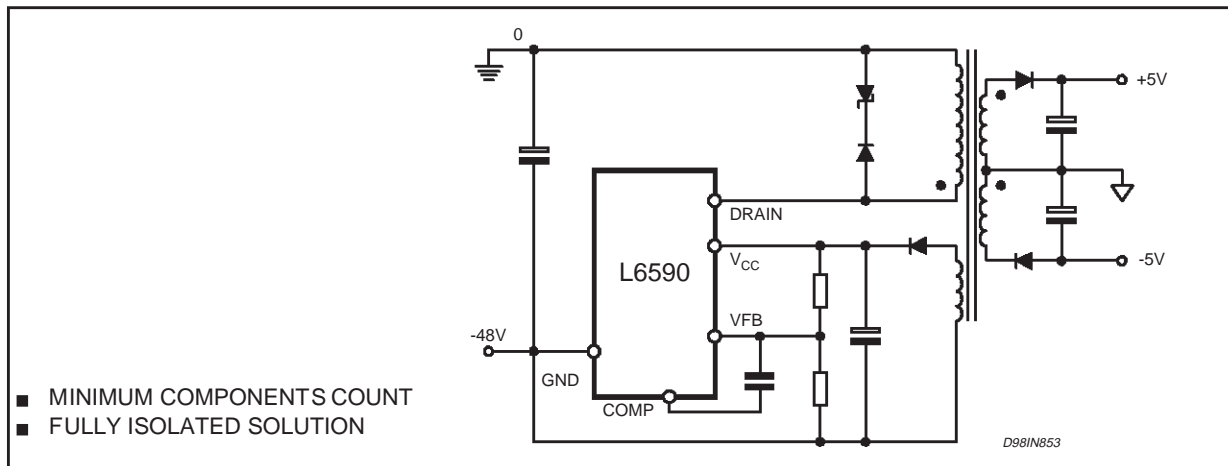


Figure 3. High Voltage DC-DC Converter.



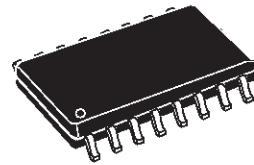
APPLICATION EXAMPLE (continued)

Figure 4. Line Card Application. (Isolated bias winding feedback)

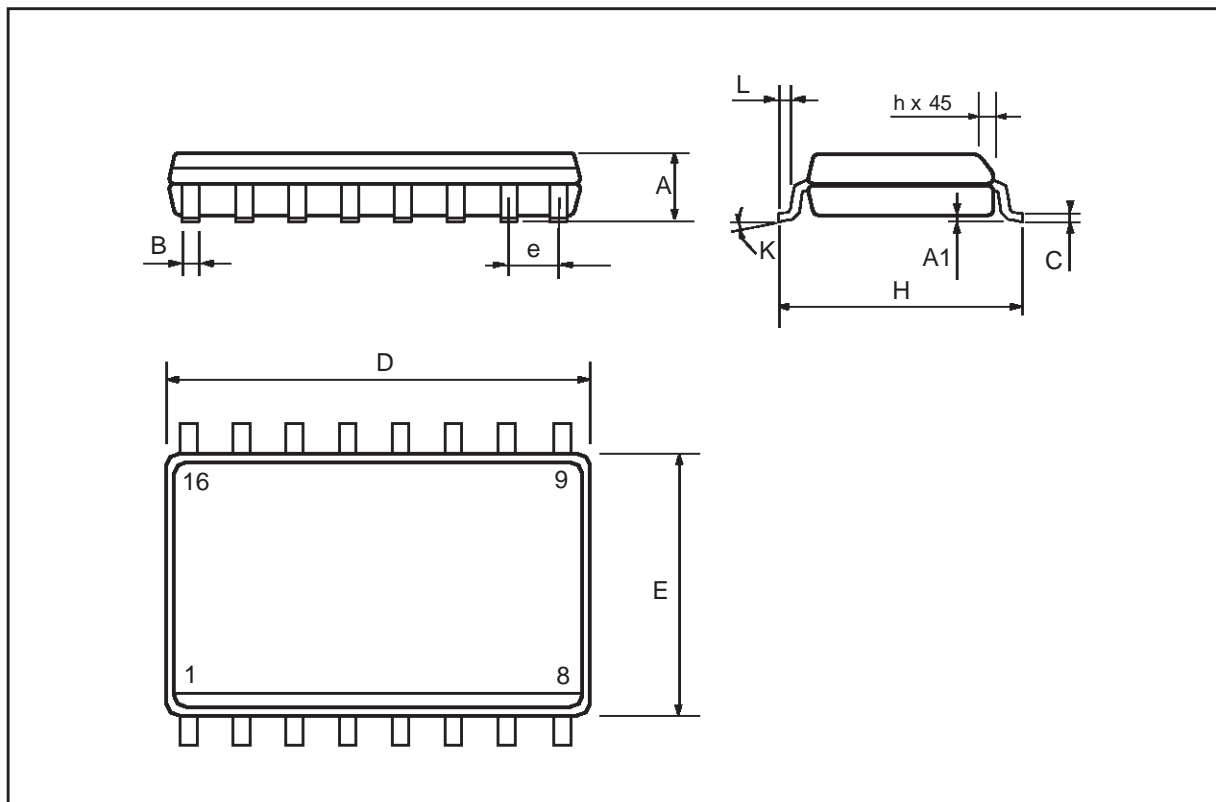


DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.35		2.65	0.093		0.104
A1	0.1		0.3	0.004		0.012
B	0.33		0.51	0.013		0.020
C	0.23		0.32	0.009		0.013
D	10.1		10.5	0.398		0.413
E	7.4		7.6	0.291		0.299
e		1.27			0.050	
H	10		10.65	0.394		0.419
h	0.25		0.75	0.010		0.030
L	0.4		1.27	0.016		0.050
K	0° (min.)8° (max.)					

OUTLINE AND MECHANICAL DATA

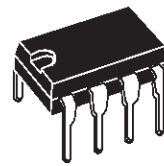


SO16 Wide

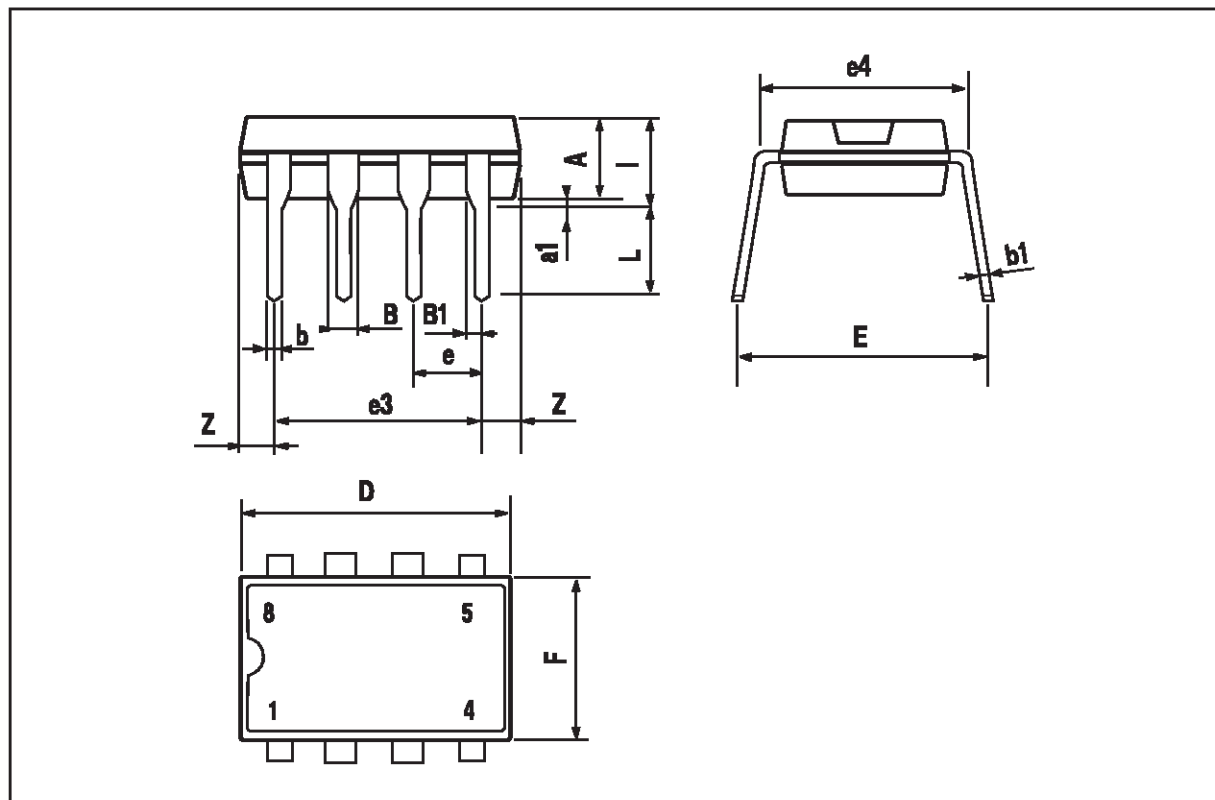


DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
I			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

OUTLINE AND MECHANICAL DATA



Minidip



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