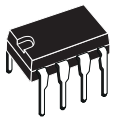
ST763A SERIES

3.3V STEP DOWN CURRENT MODE PWM DC-DC CONVERTERS

- OUTPUT VOLTAGE 3.3V
- SUPPLY VOLTAGE RANGE FROM 3.3V TO 11V
- GUARANTEED OUTPUT CURRENT: 500mA
- TYPICAL OPERATION FREQUENCY: 200KHz
- VERY LOW QUIESCENT CURRENT: 0.6mA ON MODE 0.2µA OFF MODE
- SWITCH ON/OFF CONTROL
- TYPICAL EFFICENCY: 90%
- OPERATING TEMPERATURE RANGE: -40°C TO 85°C
- AVAILABLE IN SO-8 AND DIP-8 PACKAGES



DIP-8

SO-8

DESCRIPTION

The ST763A is a step-down switching regulator . It operates from 3.3V to 11V giving a fixed 3.3V output voltage, delivering up to 500mA. The mainly features are typical efficiency of 90%, quiescent current of 0.6mA, and only 0.2µA in shut-down.

The PWM current mode control provides precise output regulation and very good transient response. Output voltage accuracy is guaranteed to be ±5% over line, load and temperature variations. A minimum number of external components is used and the fixed frequency switching allows easy filtering of output ripple and noise.

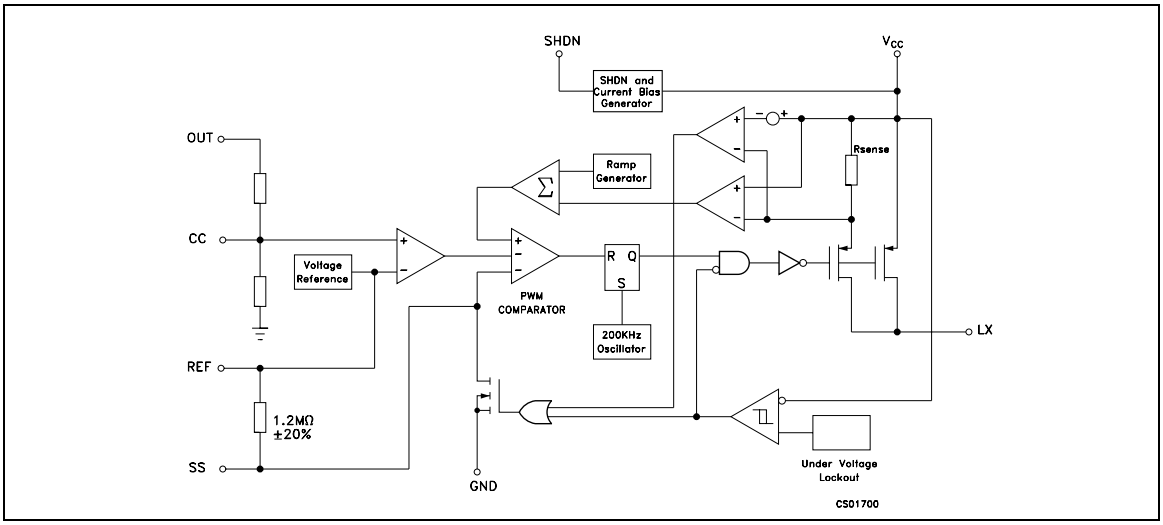
Other features of this ddevice are cycle-by-clicle current limiting, overcurrent limiting, under voltage lockout and programmable soft-start protection.

A 22µH inductor works in most applications, so no sophisticated design is necessary.

Package available are SO-8 and DIP-8.

Typical application are in 5V to 3.3V converters, cellular phones, portable instruments, hand-held computers, and peripherals.

SCHEMATIC DIAGRAM



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ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter[2]	Value	Unit
V_{CC}	DC Input Voltage	-0.3 to 12	V
V_{LX}	Switch Pin Voltage	-0.3 to (V_{CC} + 0.3)	V
V_{SHDN}	Shutdown Voltage (SHDN)	-0.3 to (V_{CC} + 0.3)	V
V_S,V_C	Soft Start (SS) and Compensation Capacitor (CC) Pins Voltage	-0.3 to (V_{CC} + 0.3)	V
I_{LX}	Switching Peak Current	2	A
I_{REF}	Reference Current	2.5	mA
P_{TOT}	Continuous Power Dissipation at T_A=70°C (DIP-8) (SO-8)	550 344	mW mW
T_{stg}	Storage Temperature Range	-40 to +150	°C
T_{op}	Operating Junction Temperature Range (AC series) (AB series)	0 to +70 -40 to +85	°C °C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

THERMAL DATA

Symbol	Parameter	SO-8	DIP-8	Unit
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient (*)	160	100	°C/W

(*) This value depends from thermal design of PCB on which the device is mounted.

ORDERING CODES

TYPE	DIP8	SO-8	SO-8 (T&R)
ST763AB	ST763ABN	ST763ABD	ST763ABDTR
ST763AC	ST763ACN	ST763ACD	ST763ACDTR

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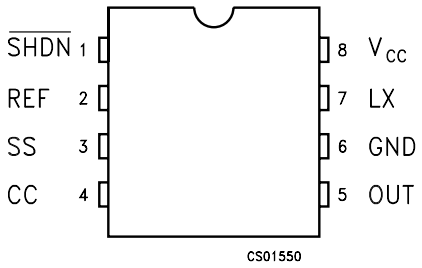
CONNECTION DIAGRAM (top view)



PIN DESCRIPTION

Pin N°	Symbol	Name and Function
1	$\overline{SHDN}$	Shutdown control (active low): If connected to GND the IC is in shutdown. Connect to V_{CC} for normal operation (ON MODE)
2	REF	Reference Output Voltage:(1.25V): Bypass to GND with 47nF capacitor
3	SS	Soft Start: a capacitor between SS and GND provides soft-start and short-circuit protections.
4	CC	Compensation Capacitor Input: externally compensates the outer (voltage) feedback loop. Connect to OUT with 330pF capacitor
5	OUT	Output Voltage Sense Input: provides regulation of feedback sensing. Connect to 3.3V output.
6	GND	Ground
7	LX	Switch Output. Drain of internal P-Channel Power MOSFET
8	V_{CC}	Supply Voltage Input. Bypass to GND with 1µF ceramic capacitance and large value electrolytic capacitor in parallel. The 1µF capacitor must be as close as possible to the GND and V_{CC} pins

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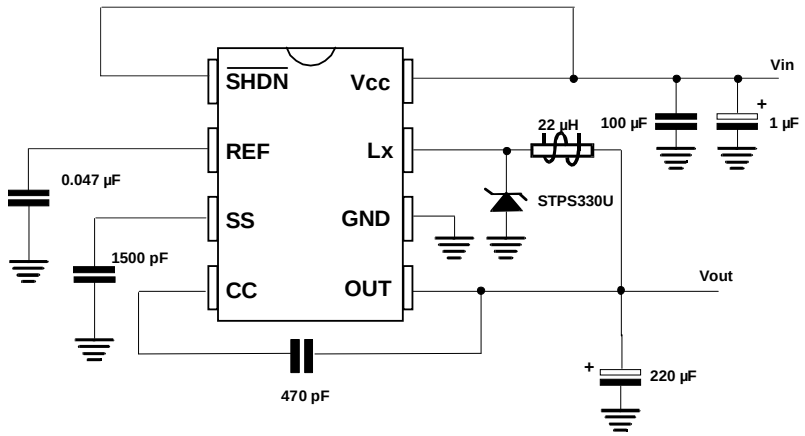
ELECTRICAL CHARACTERISTICS (V_{CC}=5V, I_O = 0mA, $T_A = T_{MIN}$ to T_{MAX}, unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{CC}	Input Voltage		3.3		11	V
V_O	Output Voltage	V_{CC} = 4 to 11V I_O =0 to 300mA V_{CC} = 4.75 to 11V I_O =0 to 500mA	3.135 3.135	3.3 3.3	3.465 3.465	V V
ΔV_O	Line Regulation			0.13		%/V
ΔV_O	Load Regulatio	I_O = 1 to 500mA		0.005		%/mA
η	Power Efficency	I_O =300mA I_O =100mA		88 90		% %
I_{SUPPLY}	Supply Current	ON Mode (Including Switch Current) OFF Mode		0.6 0.2	2.5 100	mA µA
V_{IH}	SHDN Input High Threshold		2			V
V_{IL}	SHDN Input Low Threshold				0.25	V
I_{SHDN}	Shutdown Input Leakage Current				1	µA
V_{LOCK}	Under Voltage Lockout	V_{CC} Falling		2.7	3	V
$R_{DS(on)}$	LX On Resistance	I_{LX}=500mA		1		Ω
I_{LEAK}	LX Leakage Current	V_{CC} = 12V V_{LX} = 0V		10		nA
V_{REF}	Reference Voltage	T_A = 25°C	1.18	1.25	1.32	V
ΔV_{REF}	Temeperature Reference Drift	$T_A = T_{MIN}$ to T_{MAX}		50		ppm/°C
f_{OSC}	Switching Frequency		159	200	212.5	KHz
R_C	Compensation Pin Impedance			7500		Ω

TYPICAL APPLICATION CIRCUIT



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TYPICAL PERFORMANCE CHARACTERISTICS (unless otherwise specified T_j = 25°C

Figure 1 : Output Voltage vs Temperature

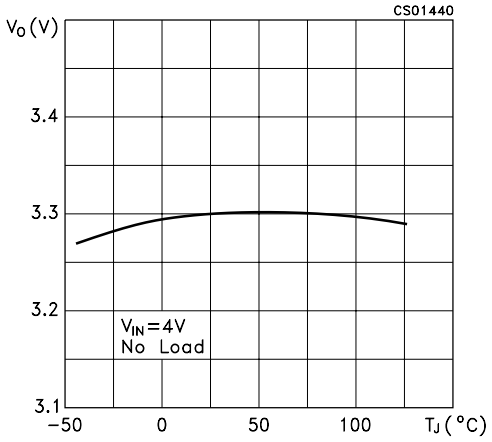

Figure 2 : Output Voltage vs Input Voltage

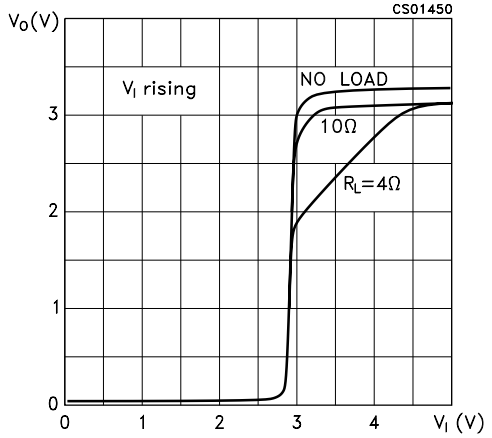

Figure 3 : Reference Voltage vs Temperature

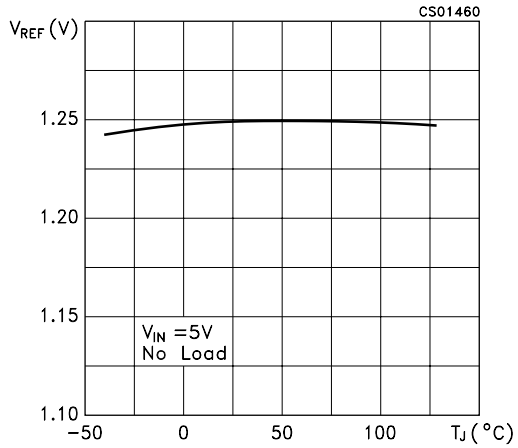

Figure 4 : Efficency vs Temperature

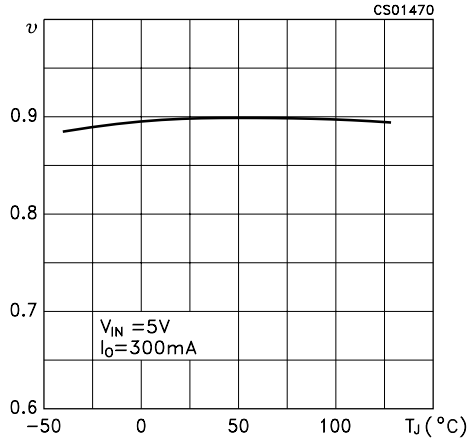

Figure 5 : Efficency vs Output Current

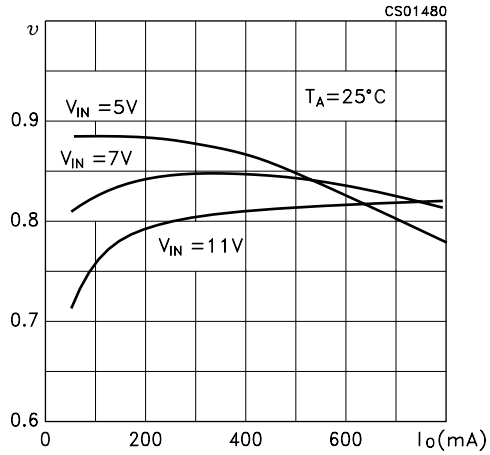

Figure 6 : LX Leakage Current vs Temperature

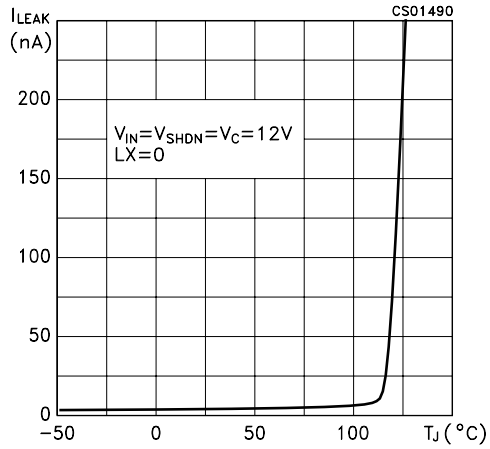

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Figure 7 : LX ON Resistance vs Temperature

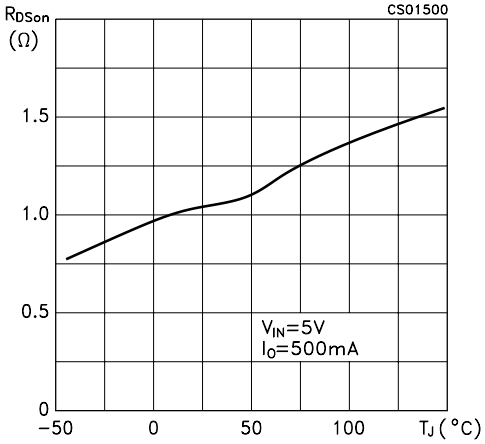


Figure 8 : Shutdown Input Threshold vs Temperature

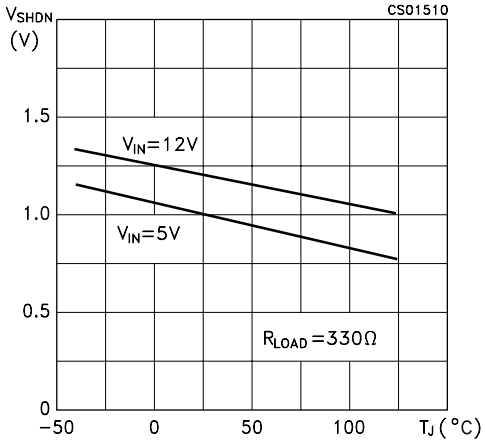


Figure 9 : Shutdown Input Leakage Current vs Temperature

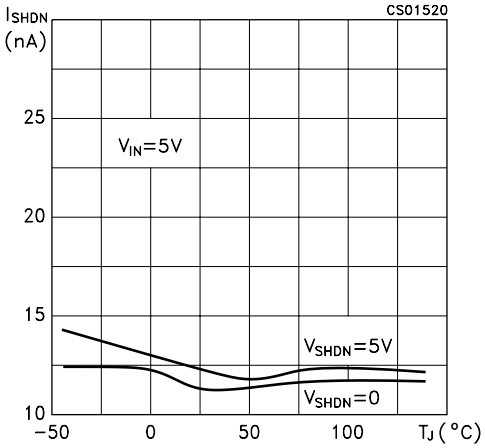


Figure 10 : Oscillator Frequency vs Temperature

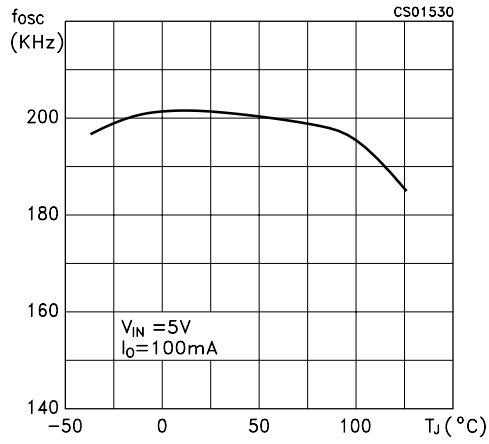


Figure 11 : Oscillator Frequency vs Input Voltage

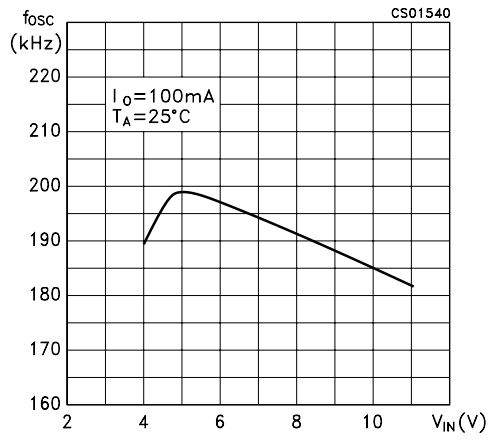
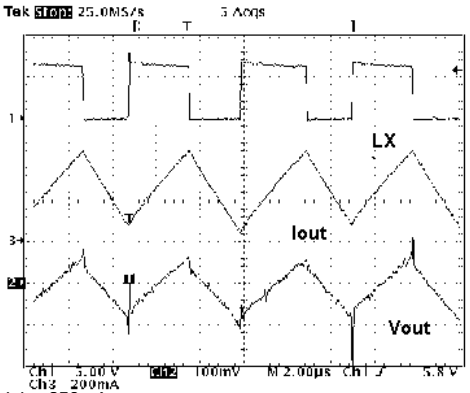


Figure 12 : Switching Waveforms, Continuous Conduction



V_I=6V, I_O=250mA

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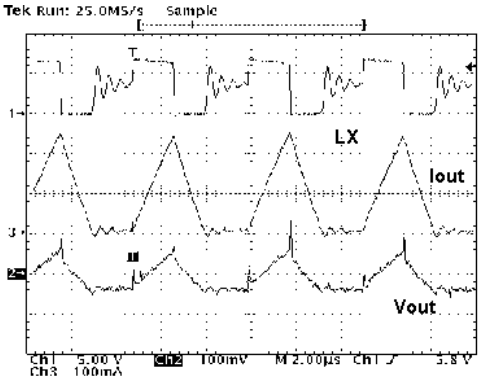
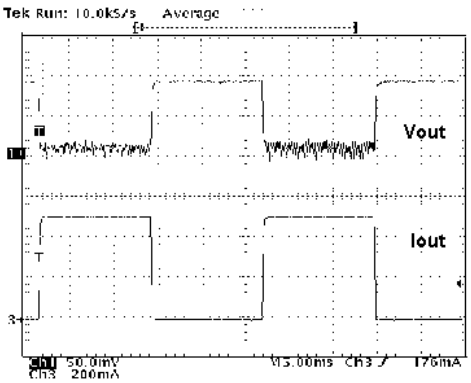
Figure 13 : Switching Waveforms, Discontinuous Conduction



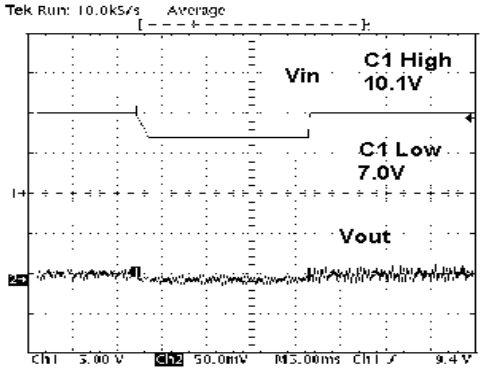
V_I=6V, I_O=75mA

Figure 15 : Load Transient



V_I=5V, I_O=0 to 500mA

Figure 14 : Line Transient



i_O=350mA

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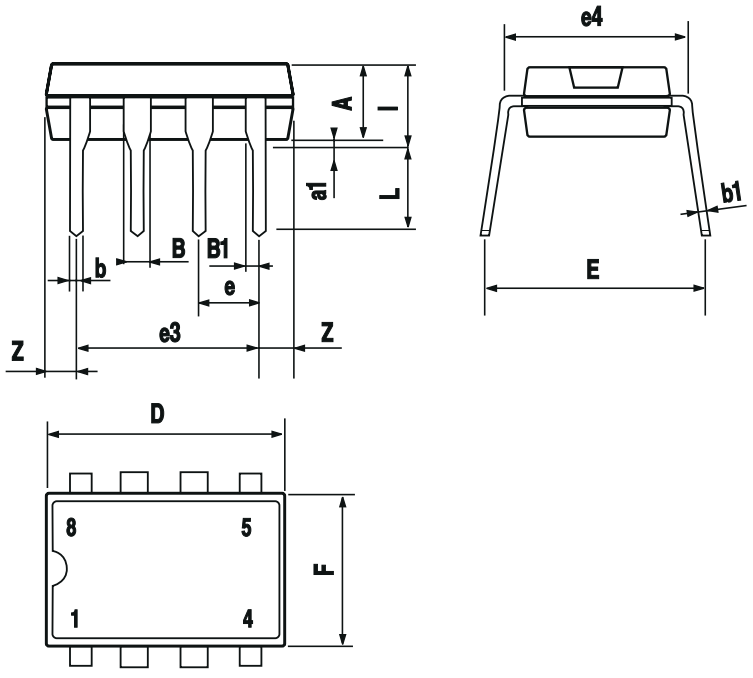
Plastic DIP-8 MECHANICAL DATA

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



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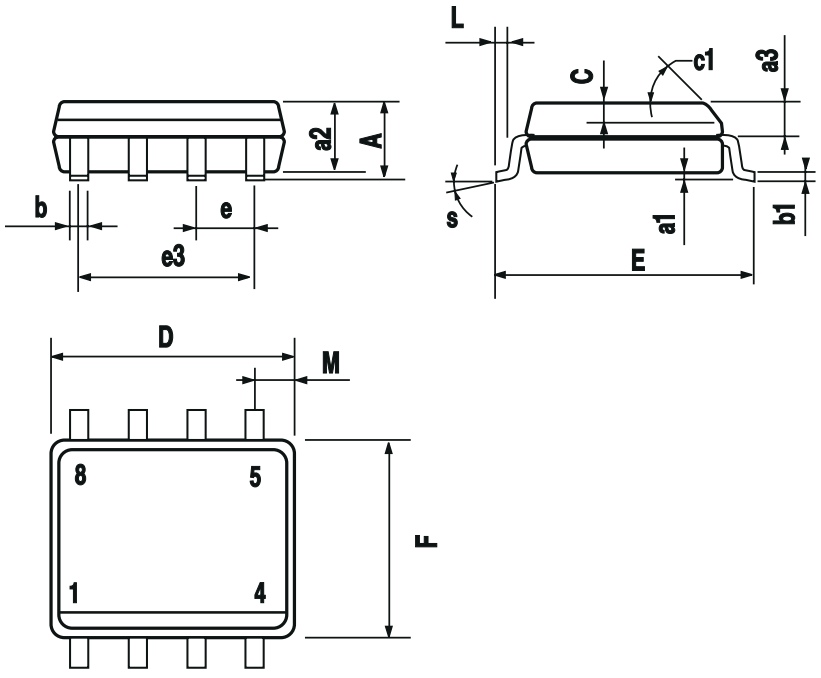
SO-8 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.003		0.009
a2			1.65			0.064
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.013		0.018
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.019
c1	45 (typ.)					
D	4.8		5.0	0.188		0.196
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.14		0.157
L	0.4		1.27	0.015		0.050
M			0.6			0.023
S	8 (max.)					



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