DESCRIPTION

A7512A is a current mode PWM step-down DC-DC converter, which has an internal 2A power switch. It has the wide input voltage range of 3.6V to 20V, so it can suit for regulating a wide variety of power source.

A7512A make of a PWM control circuit, a reference voltage unit, an error amplifier, a protection circuit, Chip Enable circuit, and under voltage lockout circuit. A low ripple, high efficiency step-down DC-DC converter can be easily composed of this IC with only several external components, or an inductor, a diode and capacitors. Output Voltage can be adjusted with external resistors.

The A7512A has the cycle-by-cycle current limit circuit; current limiting provides protection against shorted output. The low current (<5uA) shutdown provides complete output disconnect, enabling easy power management in battery powered systems.

The A7512A is available in SOP8 package.

ORDERING INFORMATION

Package Type	Part Number	
SOP8	M8	A7512AM8R
		A7512AM8VR
Note	R: Tape & Reel	
AiT provides all Pb free products Suffix " V " means Green Package		

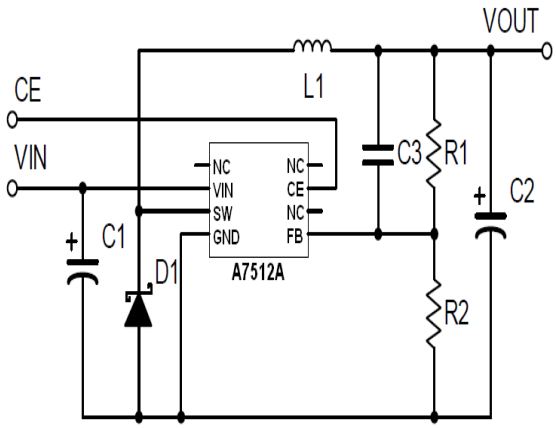
FEATURES

- Range of Input Voltage: 3.6V~20V
- Built-in 90mΩ Power MOSFET
- <5μA Shutdown Current
- Oscillation Frequency: 500KHz
- High efficiency: 90%
- 2.5A Peak Current Limit Cycle by Cycle
- Operating Temperature Range: -40℃~85℃
- Available in SOP8 Package.

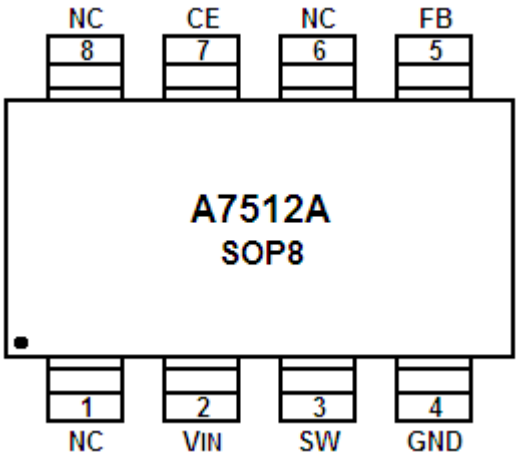
APPLICATION

- Power source for handheld communication equipment, cameras,video instruments such as VCRs,camcorders.
- Power source for battery-powered equipment.
- Power source for household electrical appliance.

TYPICAL APPLICATION



PIN DESCRIPTION



Top View

Pin #	Pin Name	Function
1	NC	No Connected
2	V_{IN}	Power Supply Pin
3	SW	Switching Node: PWM output connection to inductor.
4	GND	Ground Pin
5	FB	Pin for Feedback Voltage
6	NC	No Connected
7	CE	Chip Enable Pin (Active with “H”)
8	NC	No Connected

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	23V
SW Pin Voltage	25V
CE Pin Voltage	-0.3V to V_{IN}+0.3V
FB Pin Voltage	-0.3V to 6V
Operating Ambient Temperature Range	-40°C to 85°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering, 10 sec)	260°C
Thermal resistance: θ_{JA}	150°C/W

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

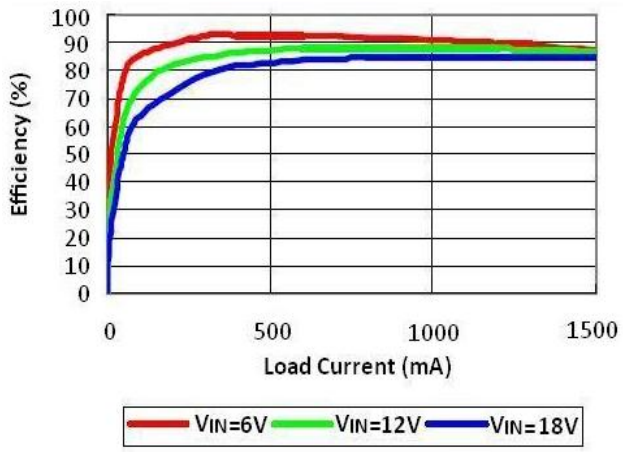
ELECTRICAL CHARACTERISTICS

T_A=25ºC, V_{IN}=12V, unless otherwise specified.

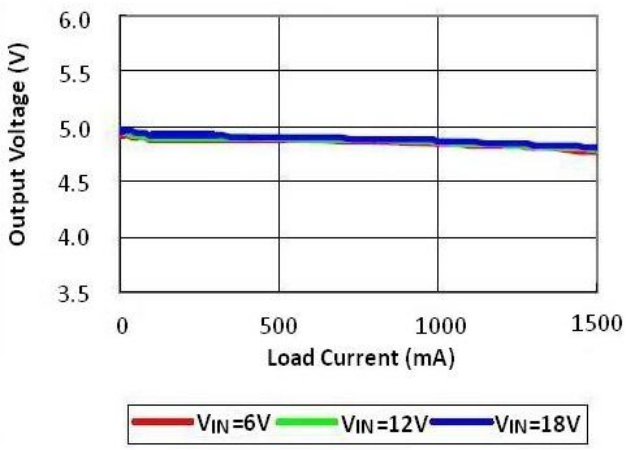
Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Under Voltage Lockout	V_{UVLO}			3.35	3.6	V
Feedback Voltage	V_{FB}		1.225	1.25	1.275	V
FB Pin Bias Current	I_{FB}	V_{FB}=1.25V		150	600	nA
Supply Current	IQ	V_{FB}=1.3V, V_{CE}=V_{IN}		2		mA
Quiescent Current in Shutdown		V_{CE}=0V		2	5	μA
Reference Line Regulation	$\triangle V_{FB}/\triangle V$	V_{IN}=5V to 20V		0.08		%/V
Feedback Voltage Temperature Coefficient	$\triangle V_{FB}/\triangle T$	-40℃ ≤ T_{OPT} ≤ 85℃		±100		ppm/℃
Oscillator Frequency	F_{OSC_MAX}	V_{FB}=1.1V		500		KHz
Frequency Shift Threshold on FB Pin	F_{OSCTH}	FSW=200K		0.44		V
Max Duty Cycle	D_{MAX}			97		%
Switch Current Limit	I_{LIMIT}			2.5		A
Static P-Channel MOSFET On State Resistance	$R_{DS(ON)}$			90*		mΩ
Switch Leakage Current	ISW				1	μA
CE “H” Input Current	I_{CEH}	V_{CE} =3V		6.7	15	μA
CE “L” Input Current	I_{CEL}	V_{CE} = 0V		0.03	0.1	μA
CE “H” Input Voltage	V_{CEH}	V_{IN} = 12V	1.8			V
CE “L” Input Voltage	V_{CEL}	V_{IN} = 12V			0.4	V

TYPICAL PERFORMANCE CHARACTERISTICS

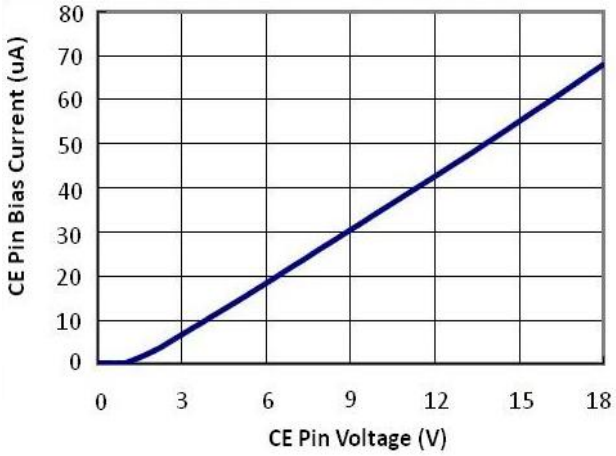
1. Efficiency vs. Load Current
V_{OUT}=5V



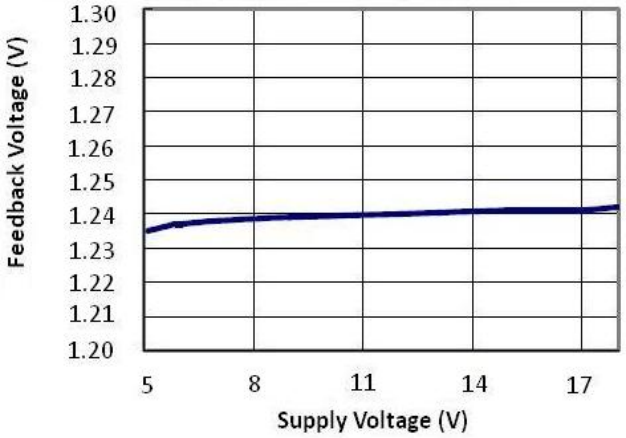
2. Load Regulation
V_{OUT}=5V



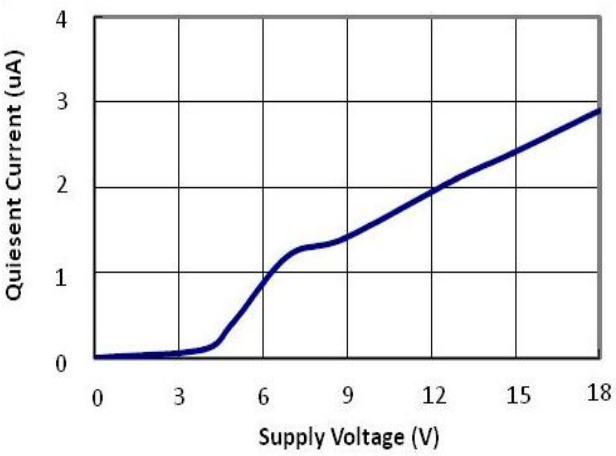
3. CE Pin Bias Current vs. CE Pin Voltage



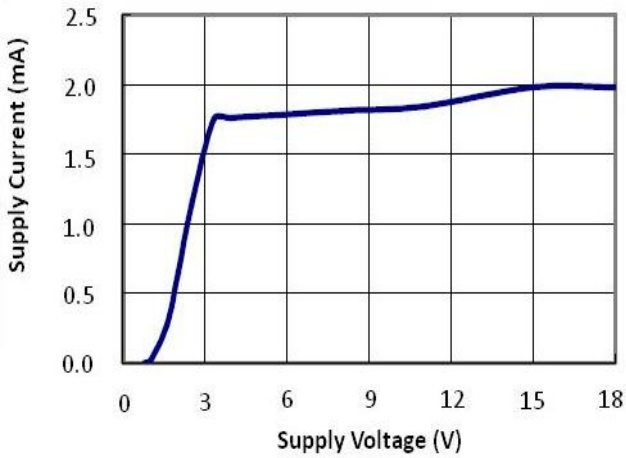
4. Feedback Voltage vs. Supply Voltage



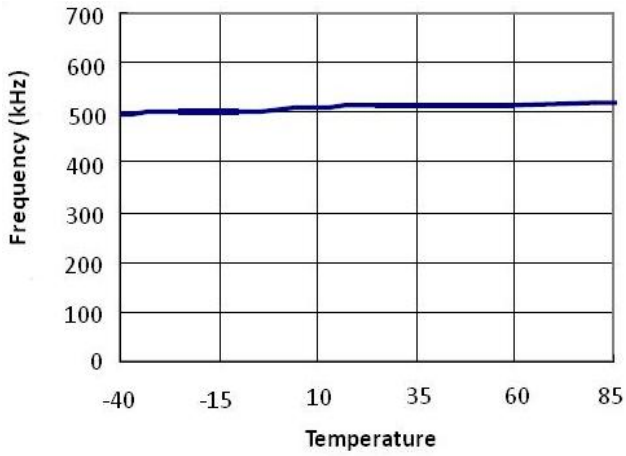
5. Quiescent Current vs. Supply Voltage
V_{CE}=0V



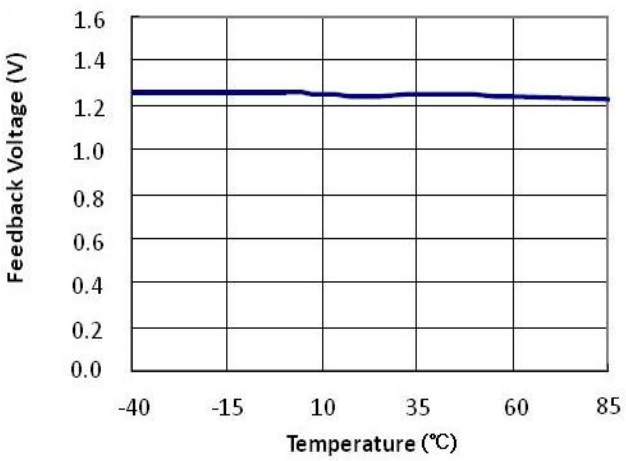
6. Supply Current vs. Supply Voltage
V_{FB}=1.3V,V_{CE}=V_{IN}

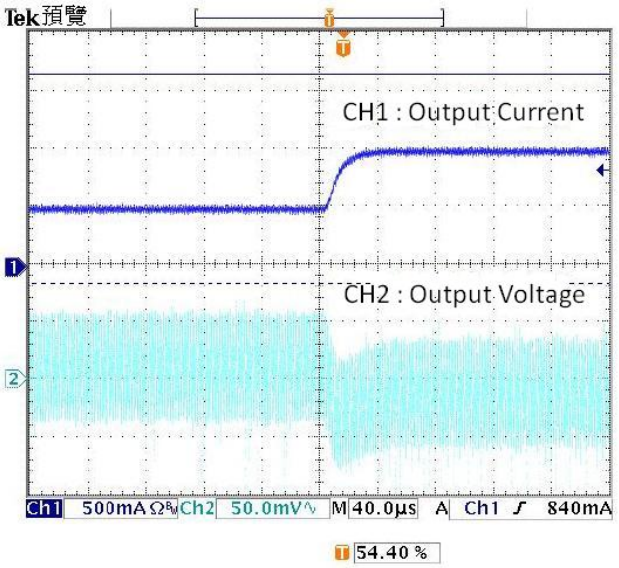


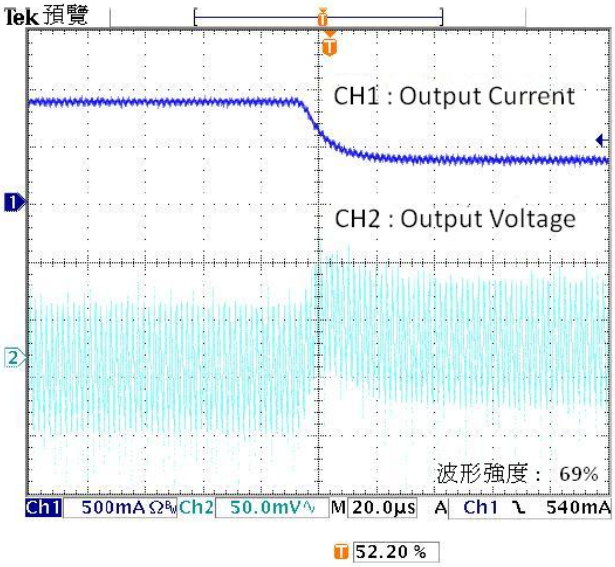
7. Frequency vs. Temperature



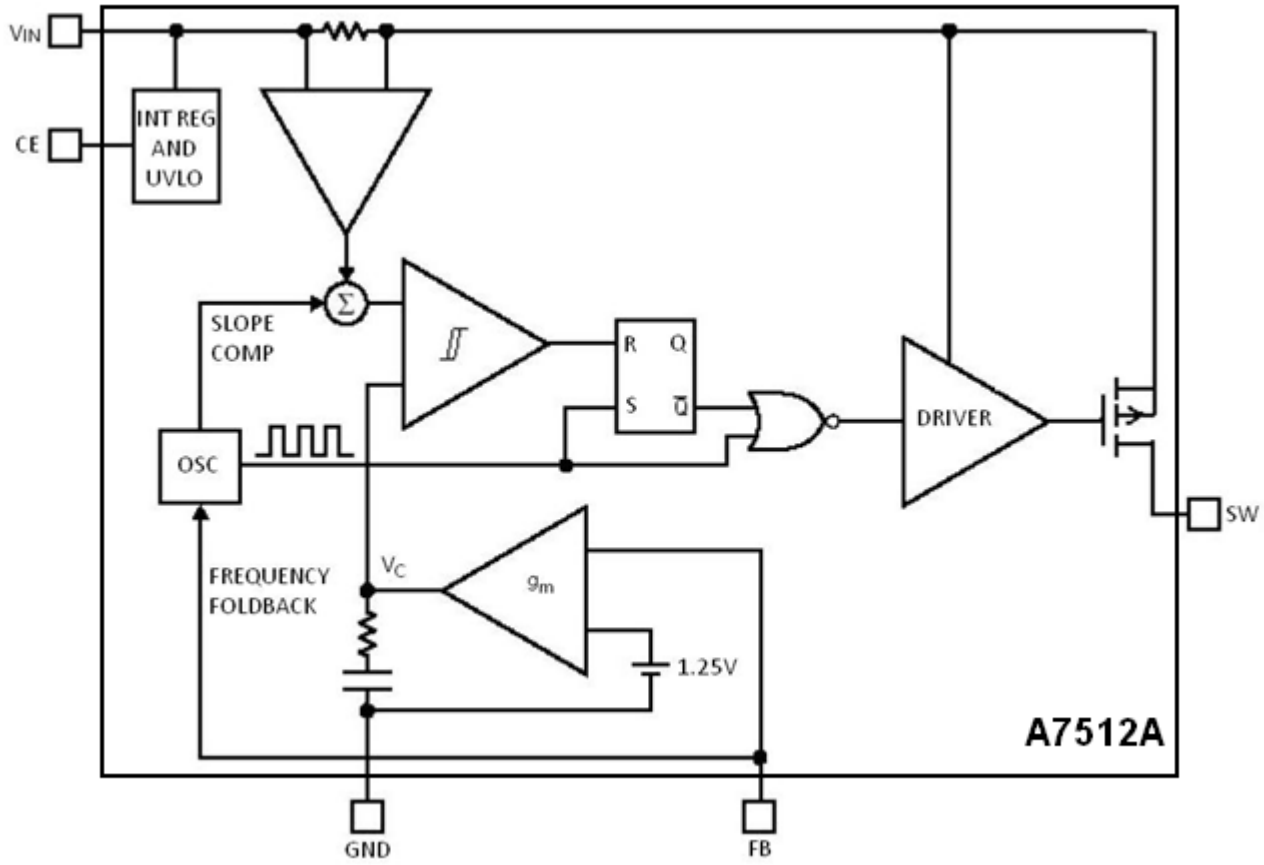
8. Feedback Voltage vs. Temperature







BLOCK DIAGRAM

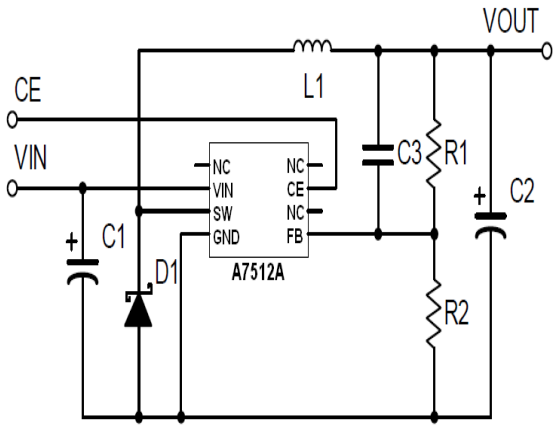


DETAILED INFORMATION

Set external components as close as possible to the IC and minimize the connection between the components and the IC. In particular, the power rails and SW connection should be short. In addition, a ceramic capacitor should be closely connected between LDO and GND pins. Make sufficient grounding and reinforce supplying.

If the difference between input and output voltage is too small, the maximum duty cycle may last long enough to trigger the maximum duty-cycle protection. If input voltage is below 6V, the LDO output may drop below 5V, and the maximum duty cycle may be limited. The accuracy of load regulation may be limited by current capability if output voltage gets close to input voltage.

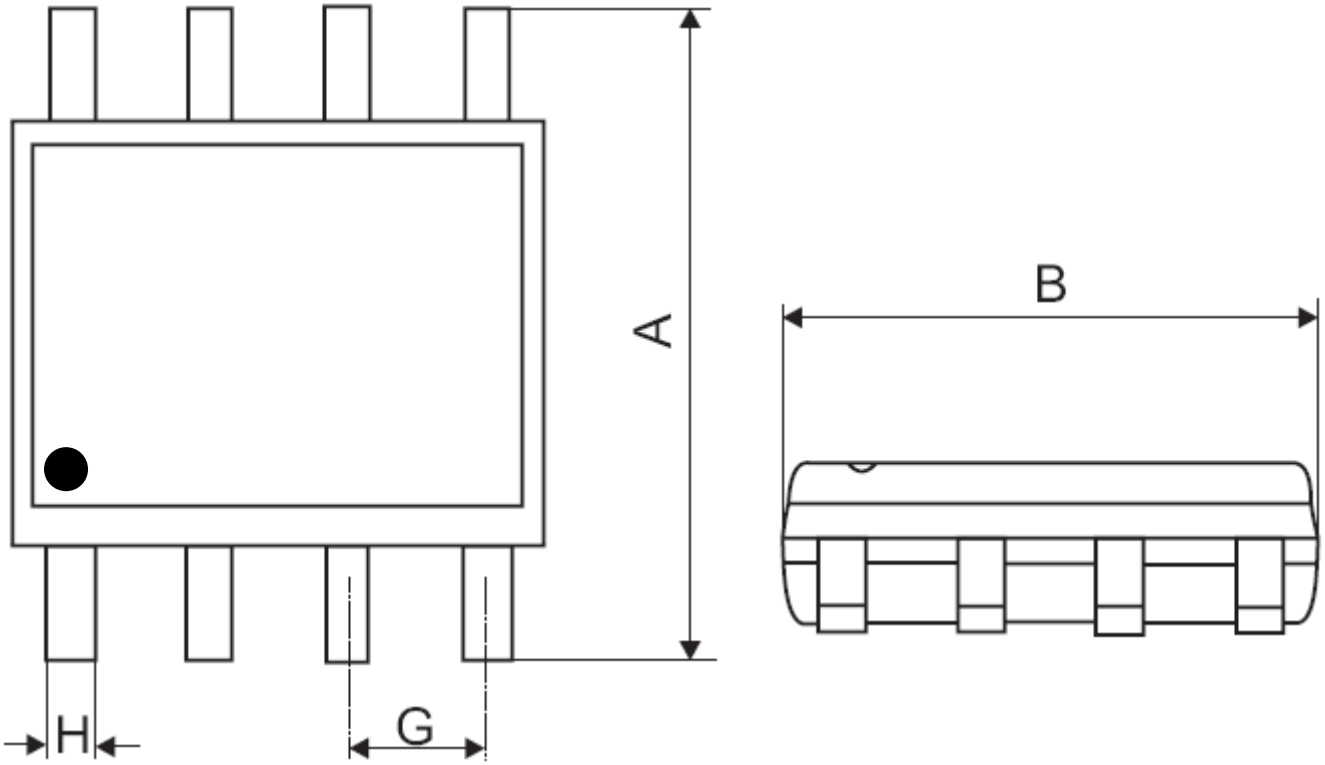
If the duty cycle in PWM mode needs to be less than the minimum duty cycle to go to PFM mode, the IC switches to PFM mode to reduce switching frequency and standby current. However, if the ratio of output voltage vs. input voltage is low enough (for example, V_{IN}>12V and V_{OUT}=1.5V), even if the load current is large, the IC keeps in PFM mode, and the ripple of output voltage may increase.

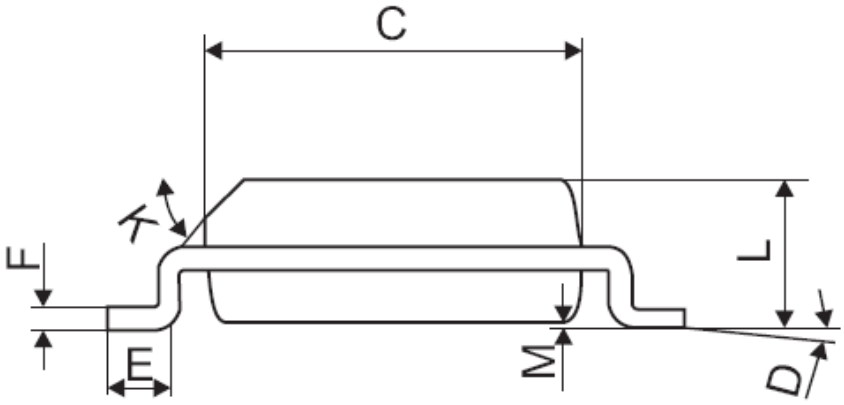


Component	Specification
C_1	MLCC 10uF; SMD 0805
C_2	Tantalum Capacitor; 25V/22uF; SMD
C_3	MLCC 100pF; SMD 0805
D_1	SS34; 40V, 3A; SMD
L_1	22uH; 3A; SMD, Shielding
R_1	SMD 0805; 9.1K ; 1%
R_2	SMD 0805; 3K ; 1%

PACKAGE INFORMATION

Dimension in SOP8 (Unit: mm)





SYMBOL	MIN	TYP	MAX
A	5.80	6.00	6.20
B	4.80	4.90	5.00
C	3.80	3.90	4.00
D	0°	4°	8°
E	0.40	0.65	0.90
F	0.19	0.22	0.25
G	1.27TYP	-	-
H	0.35	0.42	0.49
J	0.375REF	-	-
K	45°	-	-
L	1.35	1.55	1.75
M	0	0.07	0.15

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