

GS5810

SUPER-SMALL PACKAGE PWM CONTROL STEP-UP SWITCHING REGULATOR

Product Description

The GS5810 is a compact, high efficiency, and low voltage step-up DC/DC converter with an Adaptive Current Mode PWM control loop, includes an error amplifier, ramp generator, comparator, switch pass element and driver in which providing a stable and high efficient operation over a wide range of load currents. It operates in stable waveforms without external compensation.

The low start-up input voltage below 1V makes GS5810 suitable for 1 to 4 battery cells applications of providing up to 300mA output current. The 450KHz high switching rate minimized the size of external components. Besides, the 17 μ A low quiescent current together with high efficiency maintains long battery lifetime.

The output voltage is set with two external resistors. Both internal 2A switch and driver for driving external power devices (NMOS or NPN) are provided.

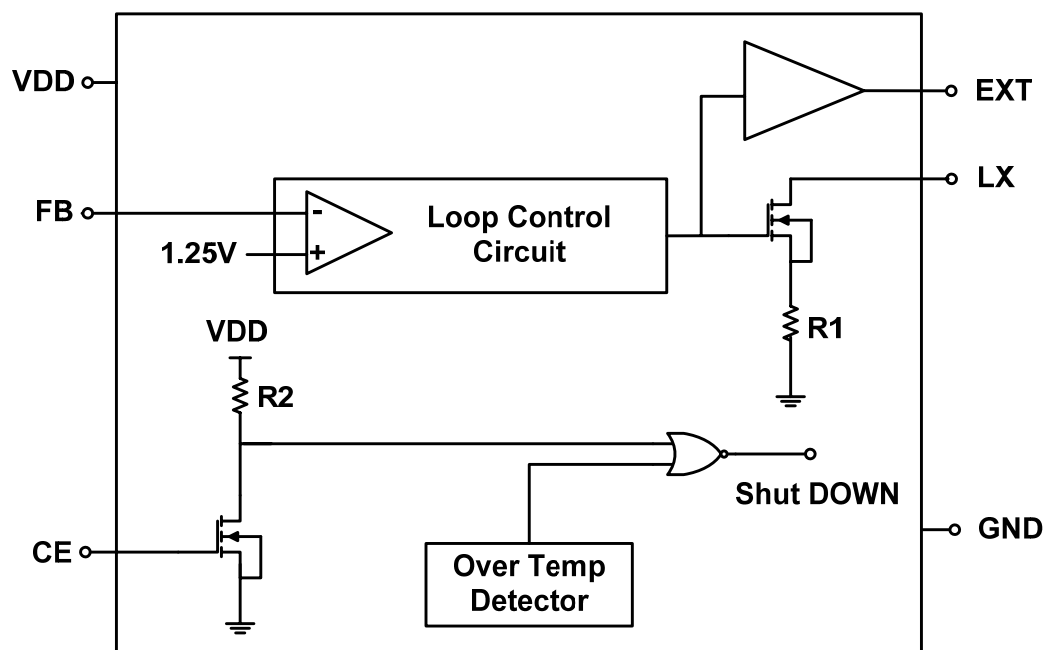
Features

- 1.0V Low Start-up Input Voltage
- High Supply Capability to Deliver 3.3V 100mA with 1 Alkaline Cell
- 17 μ A Quiescent (Switch-off) Supply Current
- Zero Shutdown Mode Supply Current
- 90% Efficiency
- 450kHz Fixed Switching Frequency
- Providing Flexibility for Using Internal and External Power Switches
- Small SOT-26, SOT89-5L Package

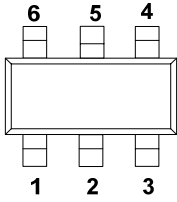
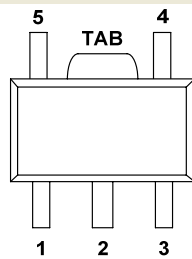
Applications

- PDA MP3
- DSC
- LCD Panel
- RF-Tags
- Portable Instrument
- Wireless Equipment

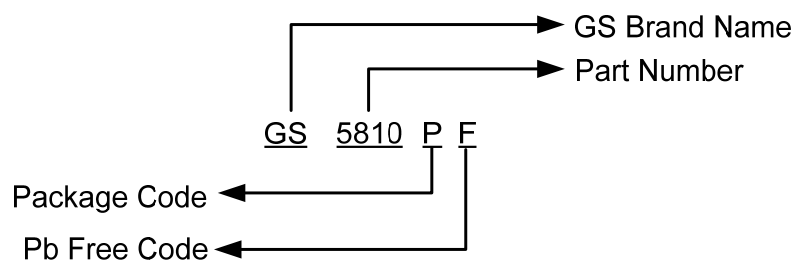
Block Diagram



Packages & Pin Assignments

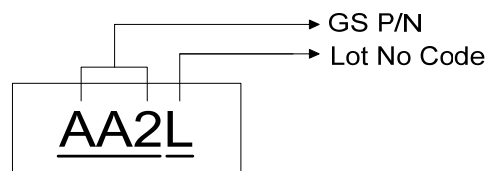
GS5810RF SOT-23-6L(Top View)		GS5810YF SOT-89-5L(Top View) Fixed Version	
			
Pin Name	Pin(SOT-23-6L)	Pin(SOT-89-5L)	Function
CE	1	1	Chip enable
EXT	2	-	Output pin for driving external NMOS
GND	3	5	Ground
LX	4	4	Pin for switching
VDD	5	2	Input positive power pin of GS5810
FB	6	3	Feedback input pin

Ordering Information



Part Number	Package	Quantity Reel
GS5810RF	SOT-23-6L	3000 PCS
GS5810YF	SOT-89-5L	1000 PCS

Marking Information



Absolute Maximum Ratings

T_A=25°C Unless otherwise noted

Symbol	Parameter	Max		Units
V _{IN}	Input Voltage	V _{SS} -0.3 ~ V _{SS} +10		V
V _{OUT}	Output Voltage	V _{SS} -0.3 ~ V _{SS} +10		
V _{LX}		V _{SS} -0.3 ~ V _{SS} +10		
I _{EXT}	EXT pin Driver Current	200		mA
I _{LX}	LX pin Switch Current	2.5		A
P _D	Power Dissipation	SOT-23-6L	150	mW
		SOT-89-5L	500	
T _A	Operating Ambient Temperature Range	-40 to 80		°C
T _{STG}	Storage Temperature Range	-40 to 125		°C

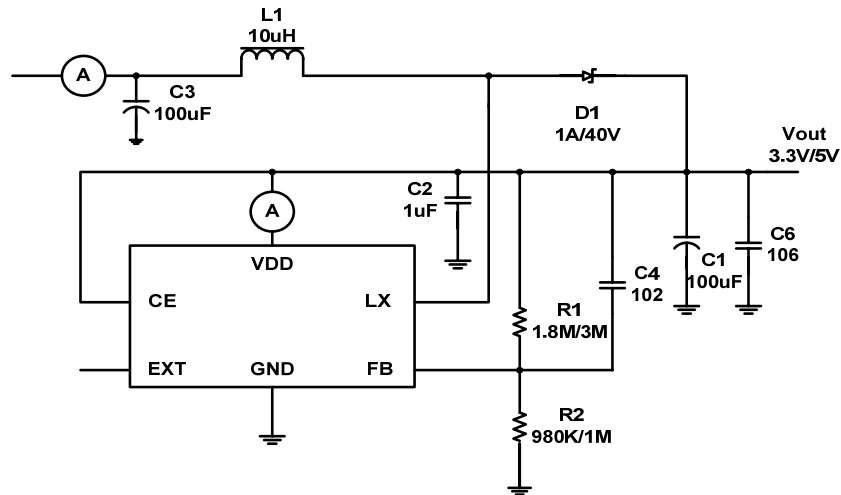
Caution The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

Electrical Characteristics

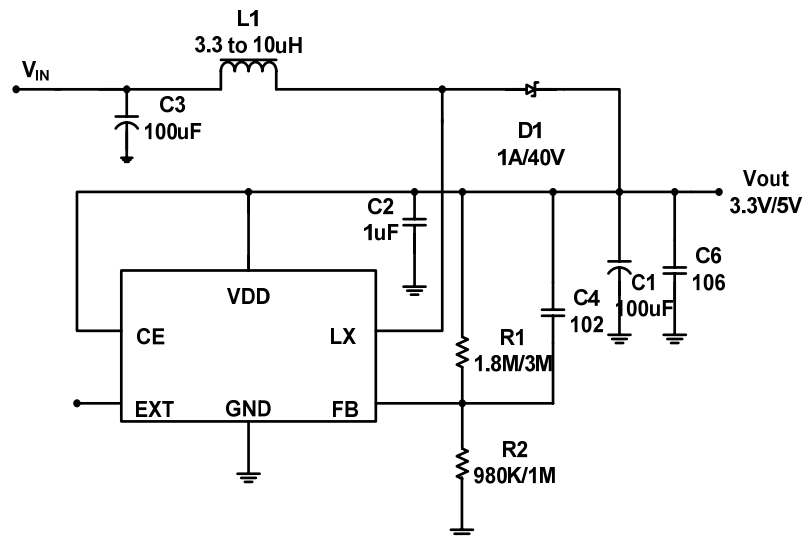
T_A=25°C Unless otherwise noted

Symbol	Parameter	Test Conditions	Min	TYP	Max	Units
V _{OUT}	Output Voltage	-	V _{OUT} X0.98		V _{OUT} X1.02	V
V _{IN}	Input Voltage	-	-	-	10	
V _{ST}	Operation Start Voltage	I _{OUT} =1mA	-	0.95	1.05	
V _{ST2}	OSC Start Voltage	No external parts, Voltage applied to V _{OUT} , CONT pin pulled up to V _{OUT} via 300 Ω resistor	-	-	0.8	
I _{OFF}	Shut Down Current	CE=0V, V _{IN} =4.5V	-	0.01	1	uA
I _{SWITCH-OFF}	Switch-Off Current	V _{IN} =6V	-	17	25	uA
I _{SWITCH}	Continuous Switching Current	V _{IN} =CE=3.3V, V _{FB} =GND	180	250	400	uA
I _{NO-LOAD}	No Load Current	V _{IN} =1.5V, V _{OUT} =3.3V	-	70	-	
V _{REF}	Feedback Reference Voltage	Close Loop V _{DD} =3.3V	1.225	1.25	1.275	V
F _S	Switching Frequency	V _{DD} =3.3V	380	450	520	KHz
D _{MAX}	Maximum Duty	V _{DD} =3.3V	85	95	-	%
	LX On Resistance	V _{DD} =3.3V	-	0.3	1.1	Ω
I _{LIMIT}	Current Limit Setting	V _{DD} =3.3V	1.6	2	2.6	A
	EXT On Resistance to V _{DD}	V _{DD} =3.3V	-	5	8.5	Ω
	EXT On Resistance to GND	V _{DD} =3.3V	-	5	8.5	Ω
REG _{LINE}	Line Regulation	V _{IN} =3.5V to 6V, I _{OUT} =1mA	-	1.5	10	mV/ V
REG _{LOAD}	Load Regulation	V _{IN} =2.5V, I _{OUT} =1 to 100mA	-	0.25	-	mV/ mA
	CE Pin Trip Level	V _{DD} =3.3V	0.4	0.8	1.2	V
T _S	Temperature Stability For Vout		-	50	-	ppm/ °C
Δ T _{SD}	Thermal Shut Down Hysteresis		-	10	-	°C

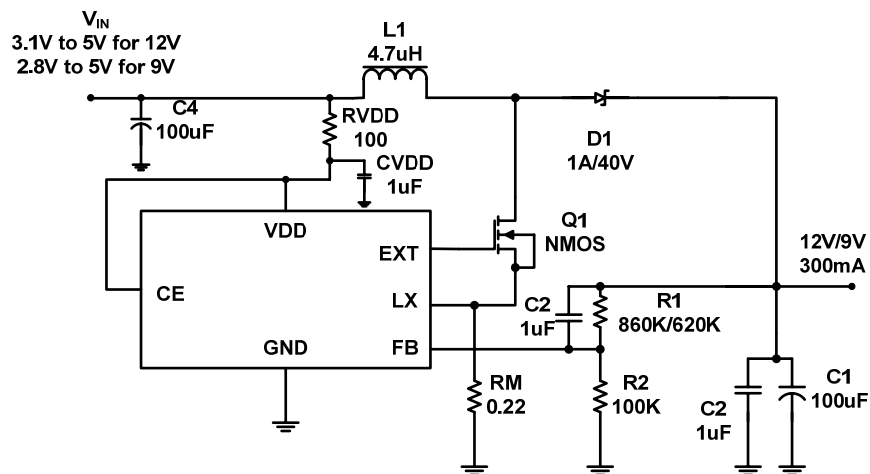
Test Circuits



Typical Application Circuit

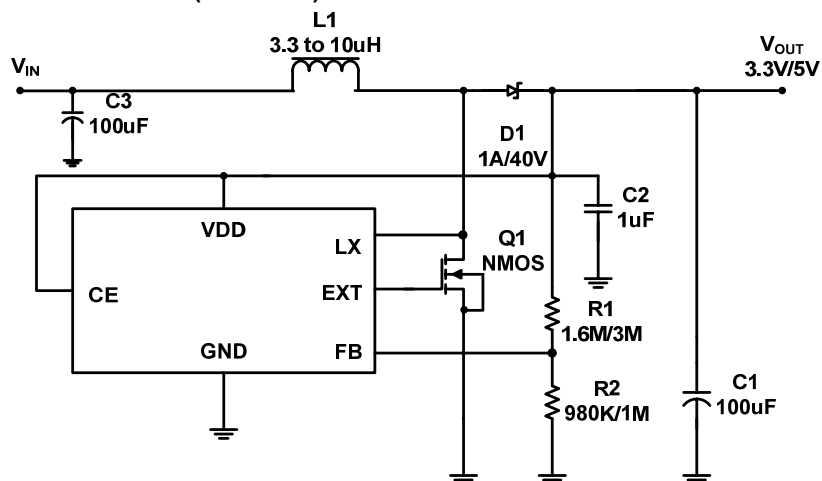


GS5810 Typical Application for Portable Instruments

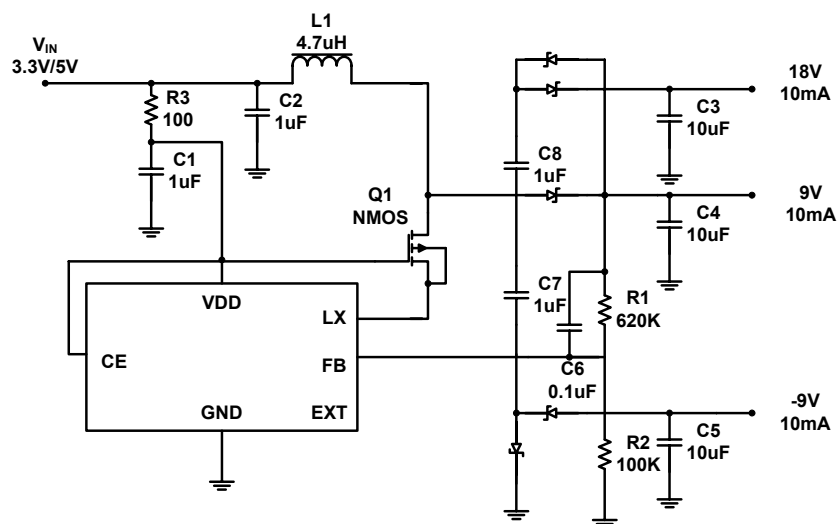


GS5810 High Voltage Application

Typical Application Circuit(contunie)



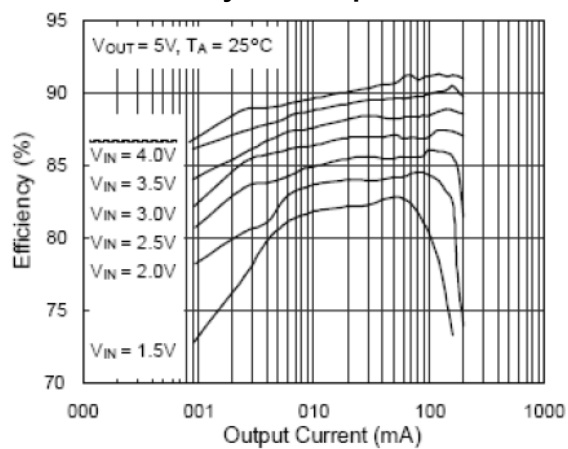
GS5810 High Current Application



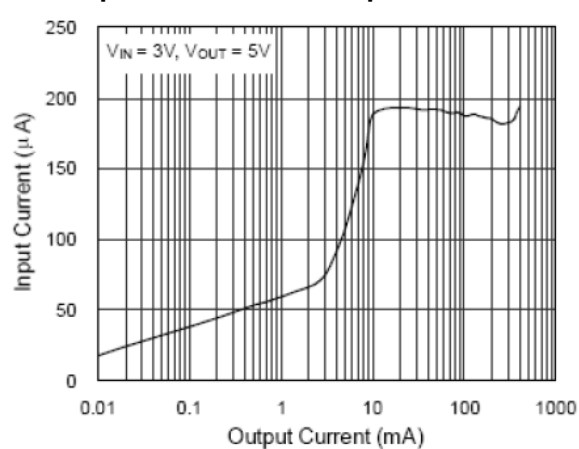
GS5810 Multi-Output Application

Typical Performance Characteristics

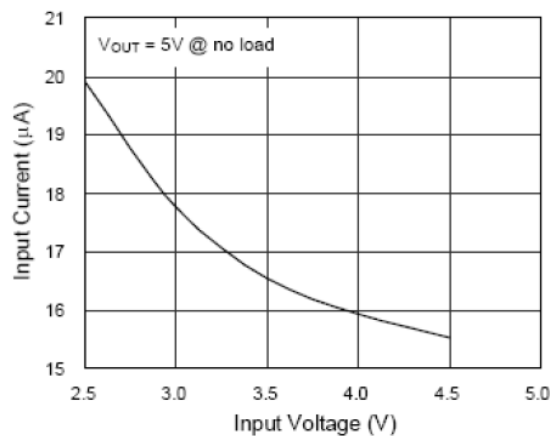
Efficiency V.S. Output Current



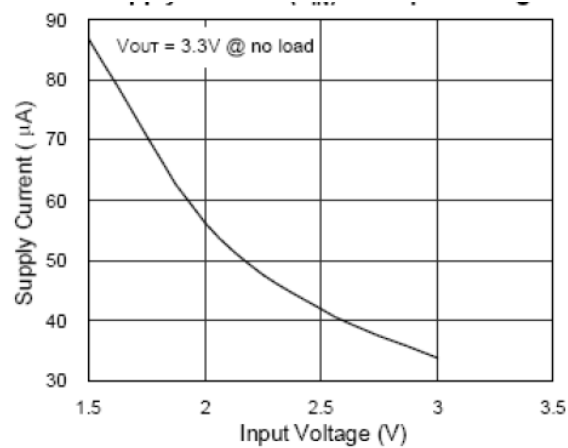
Input Current V.S. Output Current



Input Current V.S. Input Voltage

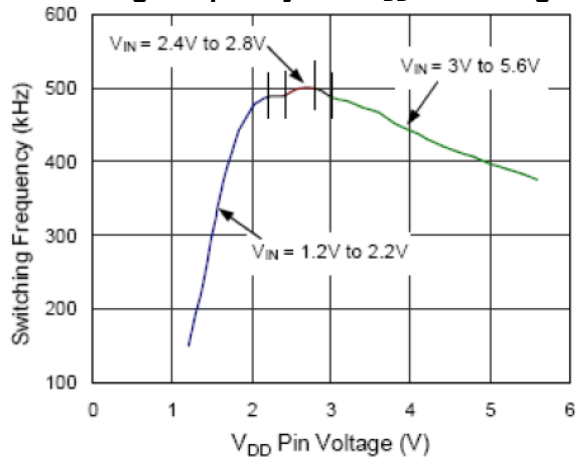


Supply Current V.S. Input Voltage

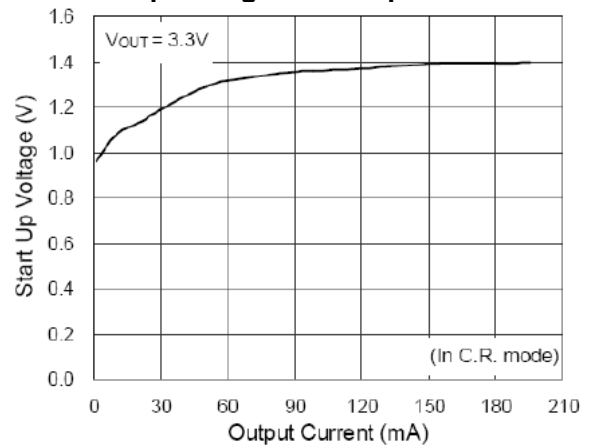


Typical Performance Characteristics(contunie)

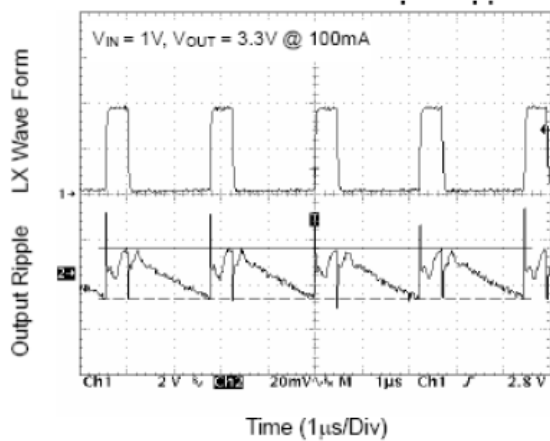
Switching Frequency V.S. V_{DD} Pin Voltage



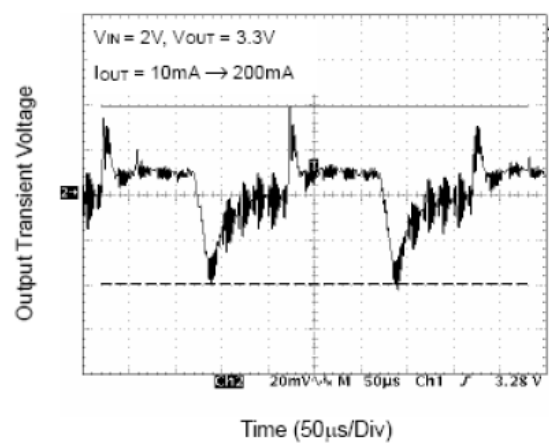
Start Up Voltage V.S. Output Current



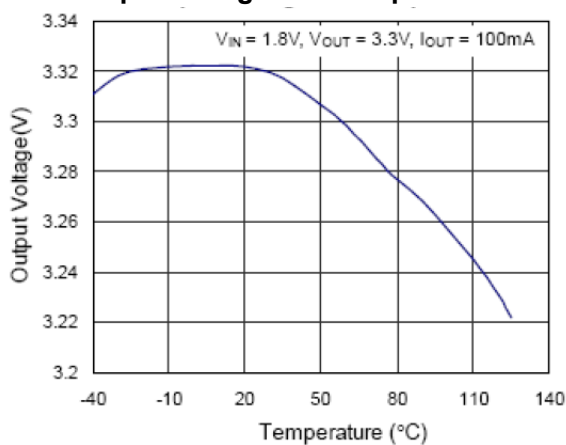
LX Wave Form & Output Ripple



Transient Response

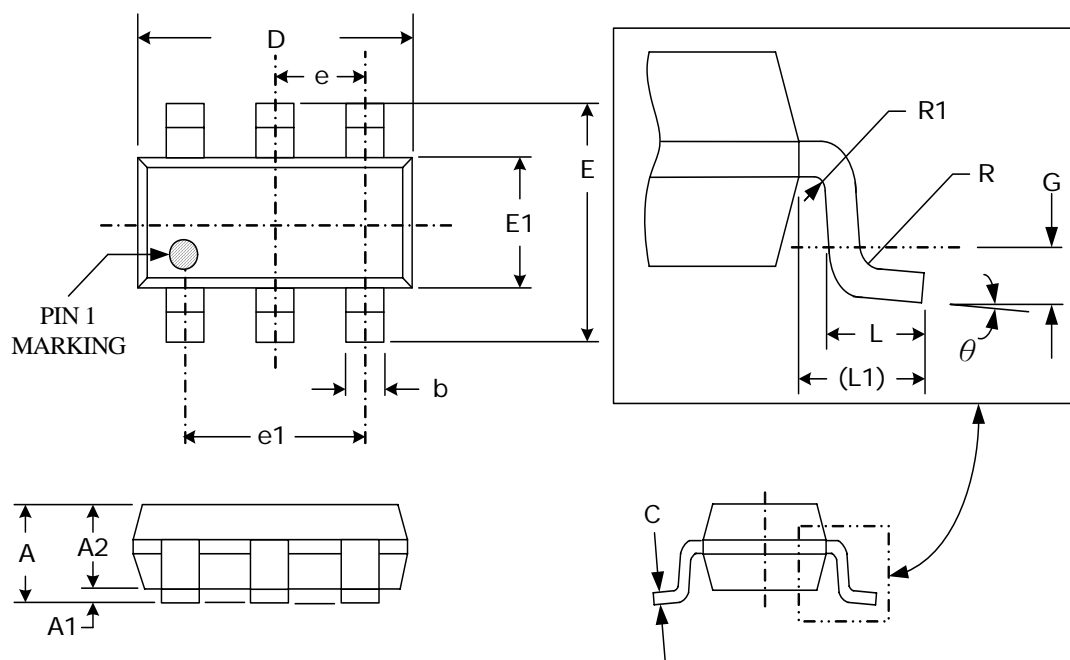


Output Voltage V.S. Temperature



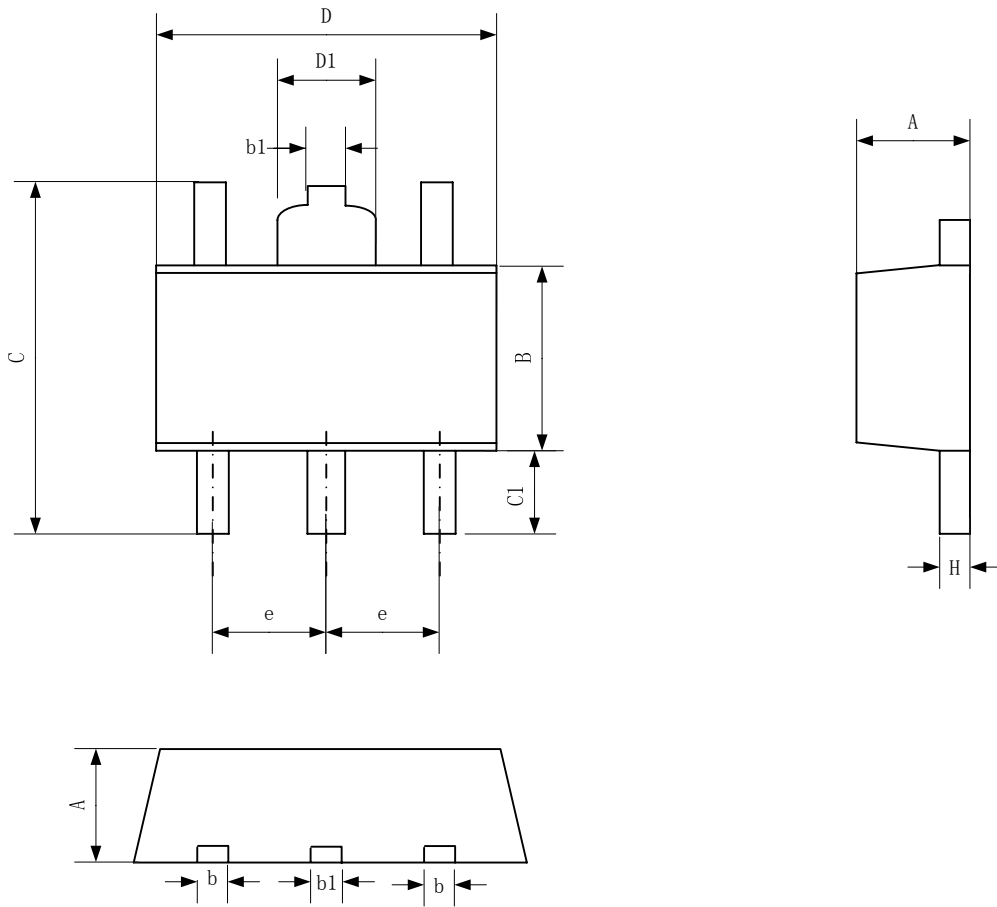
Package Dimension

(SOT-23-6L)



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	-	1.10	-	0.043
A1	0.00	0.10	0	0.004
A2	0.70	1.00	0.028	0.039
b	0.30	0.50	0.012	0.020
c	0.08	0.20	0.003	0.008
D	2.90 (TYP)		0.114 (TYP)	
E	2.80 (TYP)		0.110 (TYP)	
E1	1.60 (TYP)		0.063 (TYP)	
e	0.95 (TYP)		0.037 (TYP)	
e1	1.90 (TYP)		0.075 (TYP)	
L	0.30	0.60	0.014	0.022
L1	0.60 (TYP)		0.024 (TYP)	
R	0.10	-	0.004	-
R1	0.10	0.25	0.004	0.010
G	0.25 (TYP)		.010 (TYP)	
θ	0°	8°	0°	8°

SOT-89-5L







Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	1.400	1.600	0.055	0.063
b	0.360	0.520	0.014	0.020
B1	2.400	2.600	0.094	0.102
b1	0.406	0.533	0.016	0.021
C	-	4.250	-	0.167
C1	0.800	-	0.031	-
D	4.400	4.600	0.173	0.181
D1	-	1.700	-	0.067
e	1.400	1.600	0.055	0.063
H	0.380	0.430	0.014	0.017



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