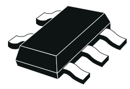
STC2G15

BCMOS VOLTAGE REGULATOR DESIGNED FOR USE WITH VERY LOW ESR AND TANTALUM OUTPUT CAPACITOR

- INPUT VOLTAGE FROM 2.7V TO 5.02V
- STABLE WITH LOW ESR CERAMIC AND TANTALUM CAPACITORS
- VERY LOW QUIESCENT CURRENT (30µA TYP. AT NO LOAD; 2µA IN OFF MODE)
- GUARANTEED OUTPUT CURRENT UP TO 15mA
- OUTPUT VOLTAGE: 1.5V
- LOGIC-CONTROLLED ELECTRONIC SHUTDOWN
- INTERNAL CURRENT LIMIT
- JUNCTION TEMPERATURE RANGE: -40°C TO 95°C



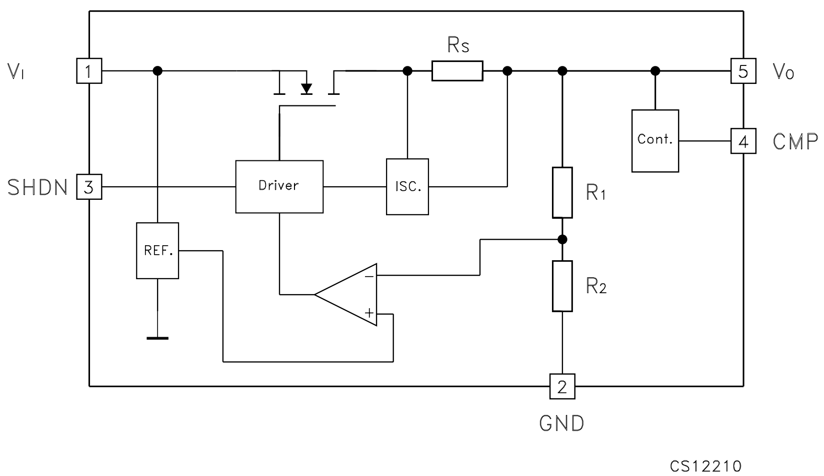
TSOT23-5L

DESCRIPTION

The STC2G15 provides up to 15mA, from 2.5V to 6V input voltage. The low quiescent current makes it suitable for low power applications and in battery powered systems.

Shutdown Logic Control function is available, this means that when the device is used as local regulator, it is possible to put a part of the board in standby, decreasing the total power consumption. The STC2G15 is designed to work with low ESR ceramic and tantalum capacitors. Typical applications are in mobile phone, blue-tooth module and similar battery powered wireless systems.

SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

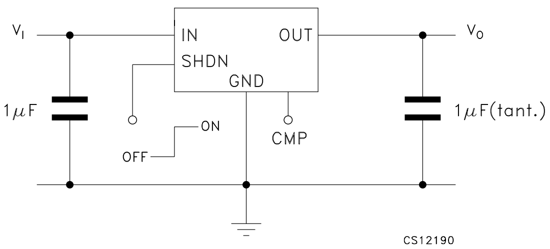
Symbol	Parameter	Value	Unit
V_I	DC Input Voltage	-0.3 to 5.4	V
V_O	DC Output Voltage	-0.3 to V_{IN} +0.3	V
V_{INH}	INHIBIT Input Voltage	-0.3 to V_{IN} +0.3	V
I_O	Output Current	Internally limited	
P_{tot}	Power Dissipation	Internally limited	
T_{stg}	Storage Temperature Range	-55 to +150	°C
T_{op}	Operating Junction Temperature Range	-40 to +95	°C
ESD	Electrostatic Discharge HBM (DH11C)	2	kV

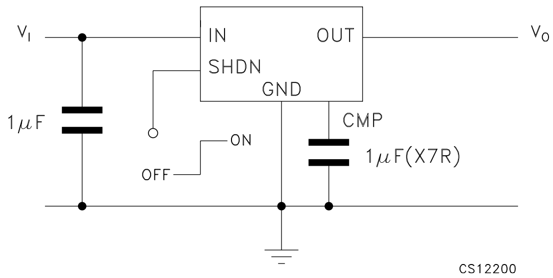
Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

THERMAL DATA

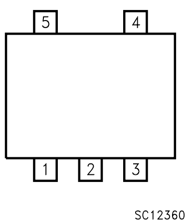
Symbol	Parameter	TSOT23-5L	Unit
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient	225	°C/W
$R_{thj\text{-}case}$	Thermal Resistance Junction-case	81	°C/W

APPLICATION CIRCUITS





CONNECTION DIAGRAM (top view)



PIN DESCRIPTION

Pin N°	Symbol	Name and Function
1	IN	Input Pin
2	GND	Ground Pin
3	SHDN	Shutdown Input: Disables the regulator when < 0.4V. Not internally pulled down.
4	CMP	Compensation Pin: Bypass with a 1μF ceramic X7R capacitor to GND or leave floating if the C_O is connected to OUT pin
5	OUT	Output Pin: Bypass with a 1μF tantalium capacitor to GND if ceramic X7R capacitoror is not used.

ORDERING CODES

TYPE	TSOT23-5L	OUTPUT VOLTAGES
STC2G15	STC2G15R	1.5V

ELECTRICAL CHARACTERISTICS (C_I = 1µF, C_O = 1µF (tantalium connected between OUT pin and GND pin) or C_{CMP} = 1µF (ceramic X7R connected between CMP pin and GND pin) (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_I	Input Voltage		2.7		5.2	V
V_O	Output Voltage	V_I = 2.7 to 5.2V I_O = 0 to 15mA T_J= -40 to 95°C	1.41	1.5	1.59	V
t_{RU}	Output Voltage Ramp-Up Time (Note 1)	I_O = 0 to 15mA		10	15	µs
t_{RD}	Output Voltage Ramp-Down Time (Note 2)	I_O = 0 to 15mA		10	15	µs
I_O	Current Capability		15			mA
I_{min}	Minimum Load Current (Note 3)		0			mA
	Load Regulation (Note 4)			350		µV/mA
	Temperature Drift (Note 4)			100		µV/K
SVR	Supply Voltage Rejection (Note 5)	f = 1KHz	30			dB
I_d	Quiescent Current (ON mode)	I_O = 0		30		µA
		I_O = 0 V_I = 2.7 to 5.2V			60	µA
I_d	Quiescent Current (OFF mode)			2	4	µA
I_{SHDN}	Shutdown Pin Current			2	4	µA
V_{SHDN}	Shutdown Logic Enable Low				0.4	V
V_{SHDN}	Shutdown Logic Disabled High		1.15			V
	Line Transient Response Time (Notes 9, 13)			40		µs
	Load Transient Response Time (Notes 10, 13)			50		µs
	Line Transient Response Peak + (Notes 9)			80		mV
	Line Transient Response Peak - (Notes 10)			60		mV
	Load Transient Response Peak (Notes 11)			50		mV
eN	Output Noise Voltage	B= 1kHz to 1MHz C_O = 1µF		10		mV

Note 1:Time for the output Voltage to rise from 50% to 85% of nominal value.
Note 2: Time for the output Voltage to fall from 85% to 50 of nominal value.
Note 3: Regulator must be able to sustain Regulated Output Voltage without load.
Note 4: Parameters are uncritical as long as the output voltage stays within limits.
Note 5: A sudden voltage rise/drop of 500mV mustn't bring the output Voltage out of limits.
Note 6: Ceramic Capacitors can be used if connected between CMP pin and GNG, instead of V_{OUT} pin and GND.
Note 8: Maximum and minimum values are guaranteed in full temperature range.
Note 9: Line transient is tested when the input voltage changes from 2.7 to 3.2V in 10µs in full load range.
Note 10: Line transient is tested when the input voltage changes from 3.2 to 2.7V in 10µs in full load range.
Note 11: Load transient is tested when the load changes from 0.1 to 15mA in 10µs in all the input range
Note 13: Response time is defined as the time form the load line step until the output reaches a value within specification (1.41V, 1.59V).
Note 14: The maximum power dissipation for the operation depends on the ambient temperature.
For T_J =95°C, T_A=85°C and R_{TJA}=220°C/W the maximum power can be 0.045W. The maximum power dissipation for operation can be increased by 4.5mW each degree below T_A=85°C, and it must be derated by 4.5mW for each degree above 85°C

TYPICAL PERFORMANCE CHARACTERISTICS (unless otherwise specified $C_{IN} = C_{COMP}$ = SMD X5R C_{OUT} = Tant., T_j = 25°C)

Figure 1 : Output Voltage vs Temperature

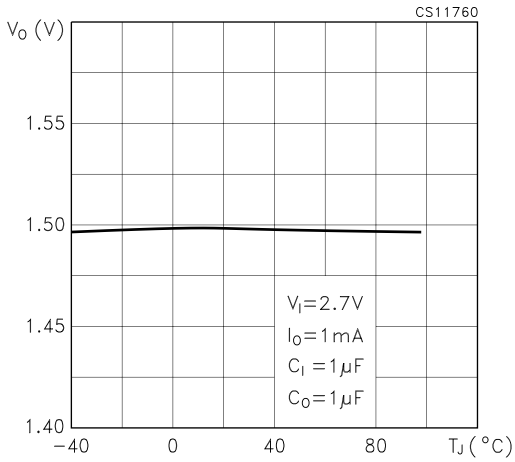


Figure 2 : Output Voltage vs Temperature

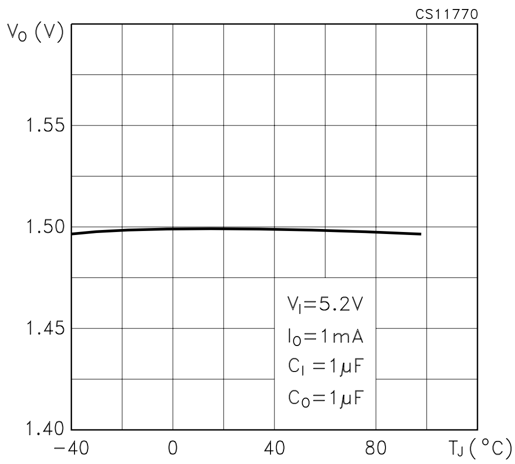


Figure 3 : Output Voltage vs Temperature

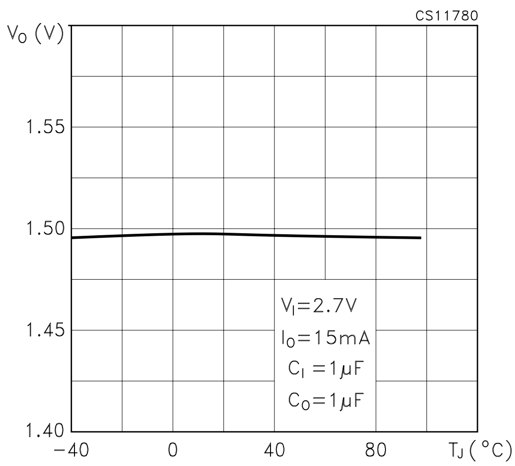


Figure 4 : Output Voltage vs Temperature

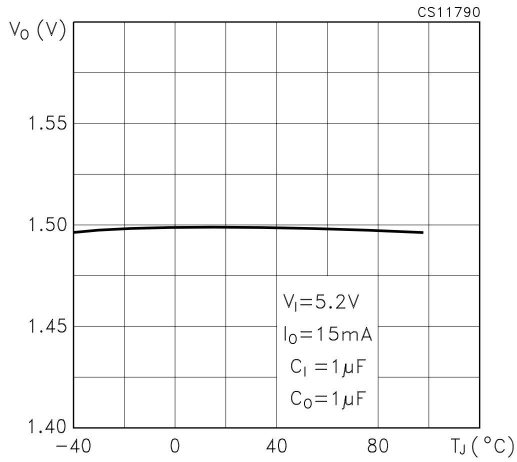


Figure 5 : Line Regulation vs Temperature

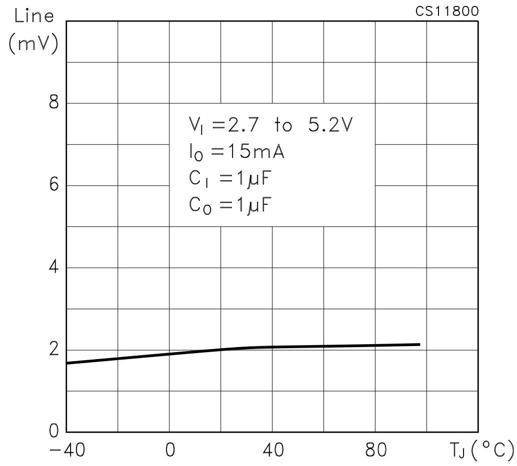


Figure 6 : Load Regulation vs Temperature

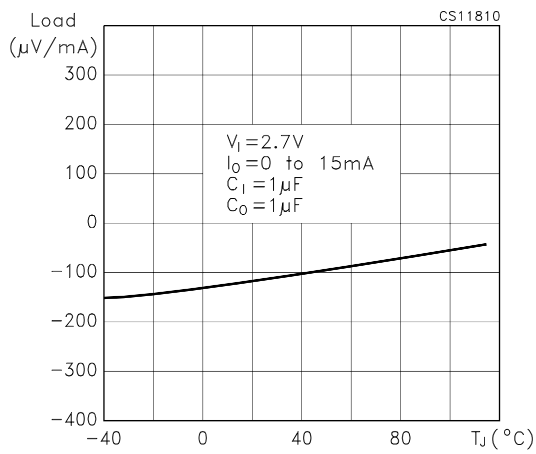


Figure 7 : Inhibit Threshold Voltage vs Temperature

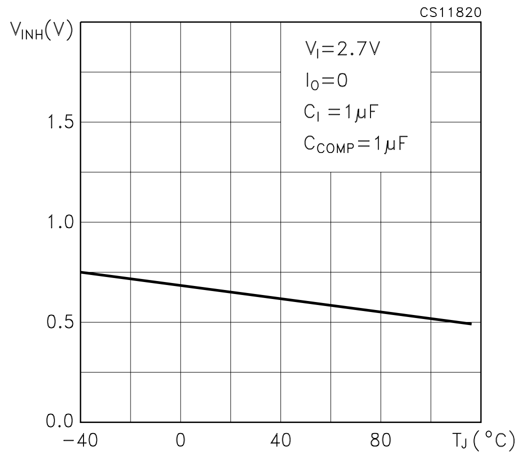


Figure 8 : Quiescent Current vs Temperature

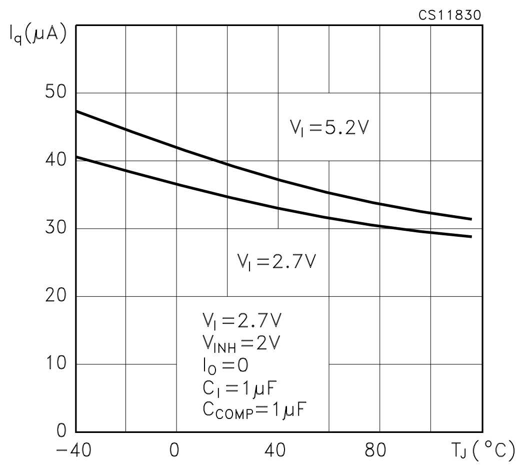


Figure 9 : Supply Voltage Rejection vs Temperature

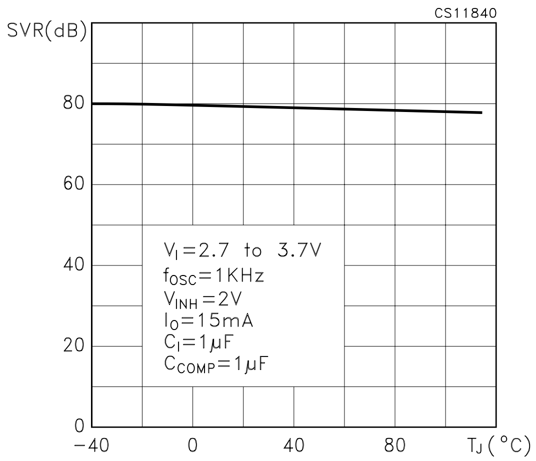


Figure 10 : Supply Voltage Rejection vs Output Current

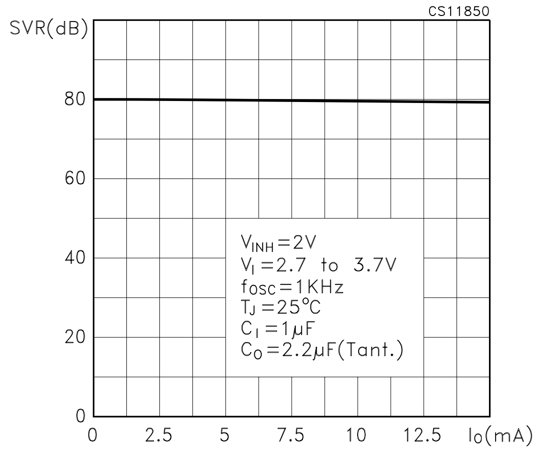
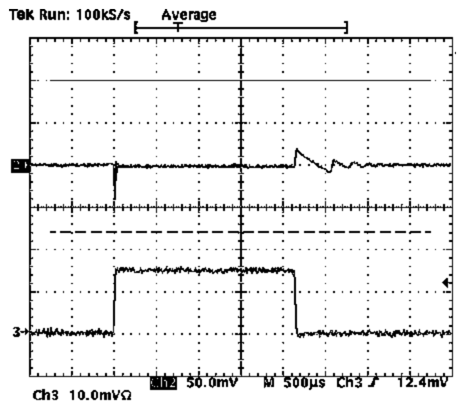
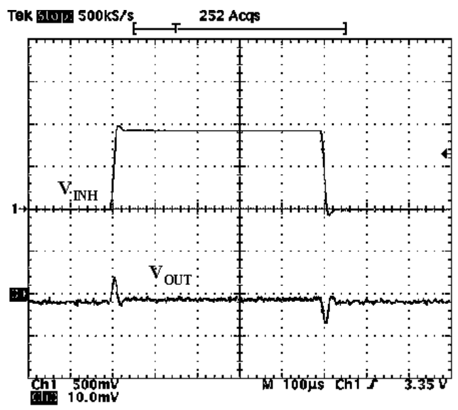


Figure 11 : Dynamic Precharge Mode



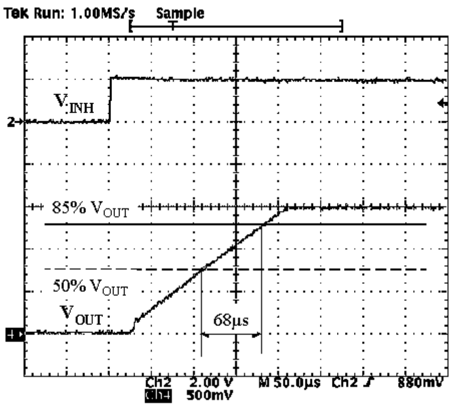
V_I=5V, I_O=0.1 to 15mA, C_I = 1µFSMD X7R, C_O=2.2µF(tant)

Figure 12 : Dynamic Precharge Mode



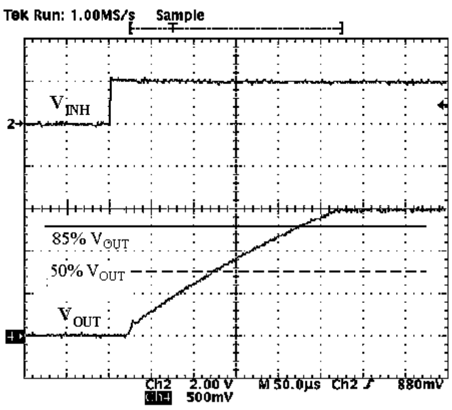
V_I=2.7 to 3.7V, I_O=15mA, C_I = 1µFSMD X7R, C_O=2.2µF(tant), t=1ms

Figure 13 : Dynamic Precharge Mode



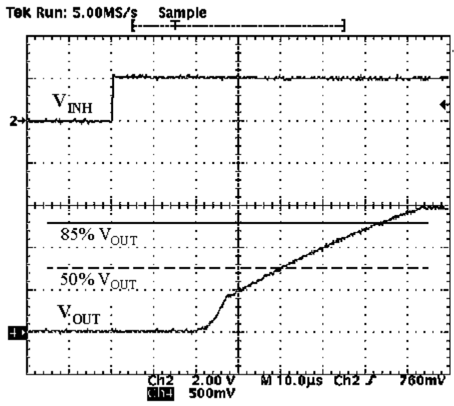
V_{INH}=0 to 2V, No load, C_I = 1µFSMD X7R, C_O=2.2µF(tant)

Figure 14 : Dynamic Precharge Mode



V_{INH}=0 to 2V, I_O=15mA, C_I = 1µFSMD X7R, C_O=2.2µF(tant)

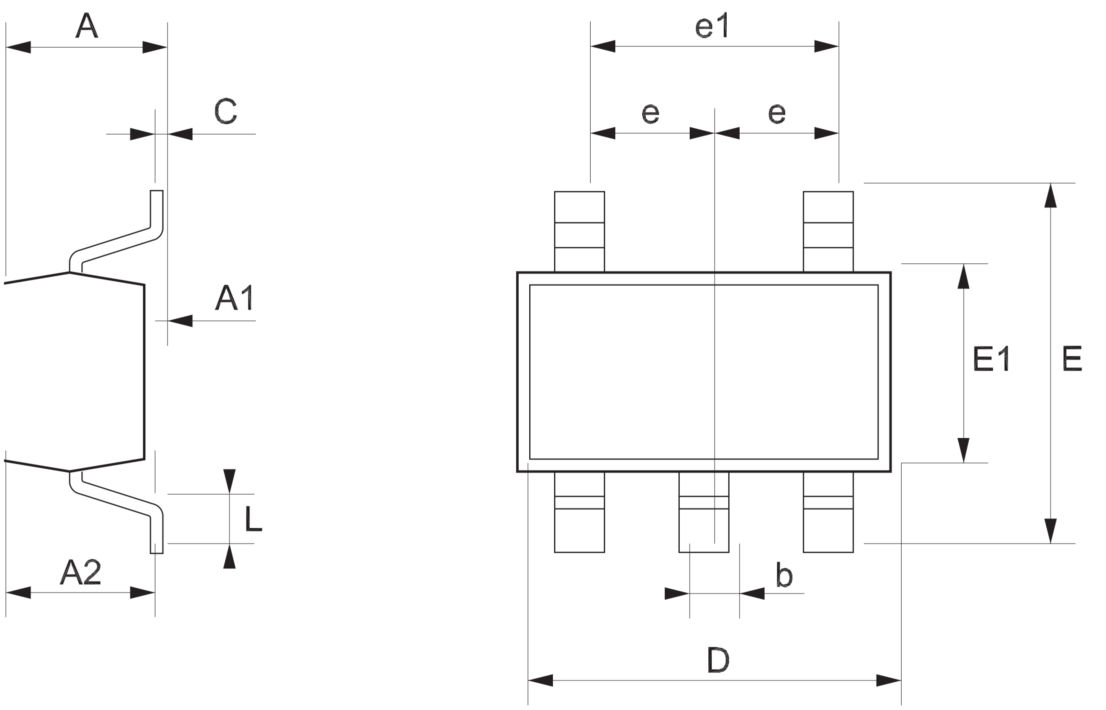
Figure 15 : Dynamic Precharge Mode



V_{INH}=0 to 2V, I_O=15mA, C_I = 1µFSMD X7R, C_O=1µF(tant)

TSOT23-5L MECHANICAL DATA

DIM.	mm.			mils		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.1			43.3
A1	0		0.1			3.9
A2	0.7		1.0	27.6		39.4
b	0.3		0.5	11.8		19.7
C	0.08		0.2	3.1		7.9
D		2.9			114.2	
E		2.8			110.2	
E1		1.6			63.0	
e	0	.95			37.4	
e1		1.9			74.8	
L	0.3		0.6	11.8		23.6



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