



# SGM2078

## 300mA, 1.2V Logic, Low Power and Low Dropout RF Linear Regulator

---

### GENERAL DESCRIPTION

The SGM2078 is a low input voltage, low noise, 1.2V logic supporting and low dropout voltage linear regulator. It is capable of supplying 300mA output current with typical dropout voltage of only 190mV. The operating input voltage range is from 1.6V to 5.5V. The output voltage range is from 0.8V to 3.3V in fixed output versions. For adjustable output version, the output voltage can be adjusted from 0.8V to 5.0V by using external resistors.

Other features include 1.2V logic-controlled shutdown mode, short-circuit current limit and thermal shutdown protection. The SGM2078 has automatic discharge function to quickly discharge  $V_{OUT}$  in the disabled status.

The SGM2078 is available in Green XTDFN-1×1-4L, SOT-23-5 and SC70-5 packages. It operates over an operating temperature range of -40°C to +125°C.

### FEATURES

- **Operating Input Voltage Range: 1.6V to 5.5V**
- **Enable Pin Accept Voltages Higher than the Supply Voltage and up to 5.5V**
- **Fixed Output from 0.8V to 3.3V**
- **Adjustable Output from 0.8V to 5.0V**
- **300mA Output Current**
- **Low Supply Pin Current: 37µA (TYP)**
- **Low Dropout Voltage:  
190mV (TYP) at 300mA,  $V_{OUT} = 3.0V$**
- **Shutdown Supply Current: 0.75µA (TYP)**
- **Current Limiting and Thermal Protection**
- **Excellent Load and Line Transient Responses**
- **Short Start-Up Time**
- **1.2V Logic Level Enable Control**
- **With Output Automatic Discharge**
- **Stable with Small Case Size Ceramic Capacitors**
- **-40°C to +125°C Operating Temperature Range**
- **Available in Green XTDFN-1×1-4L, SOT-23-5 and SC70-5 Packages**

### APPLICATIONS

Modems  
Cellular Telephones  
PCMCIA Cards  
Palmtop Computers  
Portable Electronics

## PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM2078-0.8	SOT-23-5	-40°C to +125°C	SGM2078-0.8XN5G/TR	0OFXX	Tape and Reel, 3000
SGM2078-0.9	SOT-23-5	-40°C to +125°C	SGM2078-0.9XN5G/TR	17MXX	Tape and Reel, 3000
SGM2078-1.1	SOT-23-5	-40°C to +125°C	SGM2078-1.1XN5G/TR	0OGXX	Tape and Reel, 3000
SGM2078-1.2	SOT-23-5	-40°C to +125°C	SGM2078-1.2XN5G/TR	0LOXX	Tape and Reel, 3000
SGM2078-1.5	SOT-23-5	-40°C to +125°C	SGM2078-1.5XN5G/TR	0LUXX	Tape and Reel, 3000
SGM2078-1.8	SOT-23-5	-40°C to +125°C	SGM2078-1.8XN5G/TR	0LPXX	Tape and Reel, 3000
SGM2078-2.5	SOT-23-5	-40°C to +125°C	SGM2078-2.5XN5G/TR	0OHXX	Tape and Reel, 3000
SGM2078-2.8	SOT-23-5	-40°C to +125°C	SGM2078-2.8XN5G/TR	0J7XX	Tape and Reel, 3000
SGM2078-2.9	SOT-23-5	-40°C to +125°C	SGM2078-2.9XN5G/TR	0OIXX	Tape and Reel, 3000
SGM2078-3.0	SOT-23-5	-40°C to +125°C	SGM2078-3.0XN5G/TR	0LTXX	Tape and Reel, 3000
SGM2078-3.3	SOT-23-5	-40°C to +125°C	SGM2078-3.3XN5G/TR	0E0XX	Tape and Reel, 3000
SGM2078-ADJ	SOT-23-5	-40°C to +125°C	SGM2078-ADJXN5G/TR	0OJXX	Tape and Reel, 3000
SGM2078-0.8	SC70-5	-40°C to +125°C	SGM2078-0.8XC5G/TR	0OKXX	Tape and Reel, 3000
SGM2078-0.9	SC70-5	-40°C to +125°C	SGM2078-0.9XC5G/TR	17LXX	Tape and Reel, 3000
SGM2078-1.1	SC70-5	-40°C to +125°C	SGM2078-1.1XC5G/TR	0OLXX	Tape and Reel, 3000
SGM2078-1.2	SC70-5	-40°C to +125°C	SGM2078-1.2XC5G/TR	0LQXX	Tape and Reel, 3000
SGM2078-1.5	SC70-5	-40°C to +125°C	SGM2078-1.5XC5G/TR	0LVXX	Tape and Reel, 3000
SGM2078-1.8	SC70-5	-40°C to +125°C	SGM2078-1.8XC5G/TR	0LRXX	Tape and Reel, 3000
SGM2078-2.5	SC70-5	-40°C to +125°C	SGM2078-2.5XC5G/TR	0OMXX	Tape and Reel, 3000
SGM2078-2.8	SC70-5	-40°C to +125°C	SGM2078-2.8XC5G/TR	0J6XX	Tape and Reel, 3000
SGM2078-2.9	SC70-5	-40°C to +125°C	SGM2078-2.9XC5G/TR	0ONXX	Tape and Reel, 3000
SGM2078-3.0	SC70-5	-40°C to +125°C	SGM2078-3.0XC5G/TR	0LSXX	Tape and Reel, 3000
SGM2078-3.3	SC70-5	-40°C to +125°C	SGM2078-3.3XC5G/TR	0DZXX	Tape and Reel, 3000
SGM2078-ADJ	SC70-5	-40°C to +125°C	SGM2078-ADJXC5G/TR	0OPXX	Tape and Reel, 3000
SGM2078-0.8	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-0.8XXDH4G/TR	2R	Tape and Reel, 10000
SGM2078-0.9	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-0.9XXDH4G/TR	35	Tape and Reel, 10000
SGM2078-1.1	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-1.1XXDH4G/TR	2S	Tape and Reel, 10000
SGM2078-1.2	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-1.2XXDH4G/TR	1W	Tape and Reel, 10000
SGM2078-1.5	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-1.5XXDH4G/TR	2F	Tape and Reel, 10000
SGM2078-1.8	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-1.8XXDH4G/TR	1S	Tape and Reel, 10000

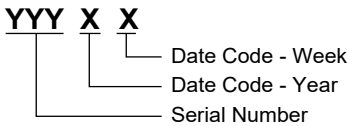
**PACKAGE/ORDERING INFORMATION (continued)**

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM2078-2.5	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-2.5XXDH4G/TR	2T	Tape and Reel, 10000
SGM2078-2.8	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-2.8XXDH4G/TR	1T	Tape and Reel, 10000
SGM2078-2.9	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-2.9XXDH4G/TR	2U	Tape and Reel, 10000
SGM2078-3.0	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-3.0XXDH4G/TR	1U	Tape and Reel, 10000
SGM2078-3.3	XTDFN-1×1-4L	-40°C to +125°C	SGM2078-3.3XXDH4G/TR	1V	Tape and Reel, 10000

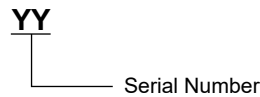
**MARKING INFORMATION**

NOTE: XX = Date Code.

**SOT-23-5/SC70-5**



**XTDFN-1×1-4L**



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

**ABSOLUTE MAXIMUM RATINGS**

IN, EN to GND .....	-0.3V to 6V
OUT, BP/FB to GND .....	-0.3V to Min((V <sub>IN</sub> + 0.3V), 6V)
Package Thermal Resistance	
XTDFN-1×1-4L, $\theta_{JA}$ .....	187.3°C/W
XTDFN-1×1-4L, $\theta_{JB}$ .....	133.2°C/W
XTDFN-1×1-4L, $\theta_{JC}$ .....	150.7°C/W
XTDFN-1×1-4L, $\theta_{JC-BOT}$ .....	120.1°C/W
SOT-23-5, $\theta_{JA}$ .....	178.2°C/W
SOT-23-5, $\theta_{JB}$ .....	92.6°C/W
SOT-23-5, $\theta_{JC}$ .....	125°C/W
SC70-5, $\theta_{JA}$ .....	188°C/W
SC70-5, $\theta_{JB}$ .....	55.4°C/W
SC70-5, $\theta_{JC}$ .....	103.2°C/W
Junction Temperature .....	+150°C
Storage Temperature Range.....	-65°C to +150°C
Lead Temperature (Soldering, 10s) .....	+260°C
ESD Susceptibility	
HBM.....	5000V
CDM .....	1000V

**RECOMMENDED OPERATING CONDITIONS**

Operating Input Voltage Range .....	1.6V to 5.5V
Enable Input Voltage Range .....	0V to 5.5V
Input Effective Capacitance, C <sub>IN</sub> .....	0.5µF (MIN)
Output Effective Capacitance, C <sub>OUT</sub> .....	0.5µF to 10µF
Operating Junction Temperature Range .....	-40°C to +125°C

**OVERSTRESS CAUTION**

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

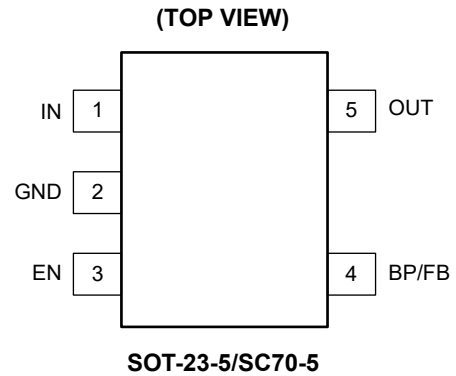
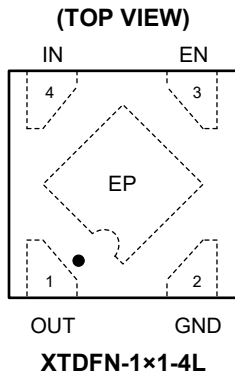
**ESD SENSITIVITY CAUTION**

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

**DISCLAIMER**

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATIONS

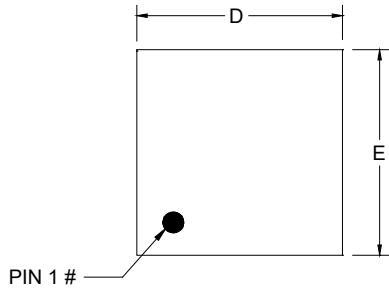


PIN DESCRIPTION

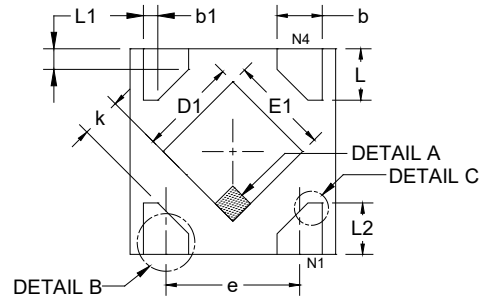
PIN		NAME	FUNCTION
XTDFN-1x1-4L	SOT-23-5/SC70-5		
1	5	OUT	Regulator Output Pin. It is recommended to use a ceramic capacitor with effective capacitance in the range of 0.5μF to 10μF to ensure stability. This ceramic capacitor should be placed as close as possible to OUT pin.
2	2	GND	Ground.
3	3	EN	Enable Pin. Drive EN high to turn on the regulator. Drive EN low to turn off the regulator. This pin must be pulled high by an external resistor connected to IN pin if EN pin is not used.
4	1	IN	Input Voltage Supply Pin. It is recommended to use a 1μF or larger ceramic capacitor from IN pin to ground to get good power supply decoupling. This ceramic capacitor should be placed as close as possible to IN pin.
-	4	BP	Reference-Noise Bypass Pin (fixed voltage version only). Bypass with an external capacitor C <sub>BP</sub> can reduce output noise. The capacitor is recommended to be placed very close to the pin for high PSRR.
		FB	Feedback Voltage Input Pin (adjustable voltage version only). Connect this pin to the midpoint of an external resistor divider to adjust the output voltage. Place the resistors as close as possible to this pin.
Exposed Pad	-	-	Exposed Pad. Connect it to a large ground plane to maximize thermal performance. This pad is not an electrical connection point.

PACKAGE OUTLINE DIMENSIONS

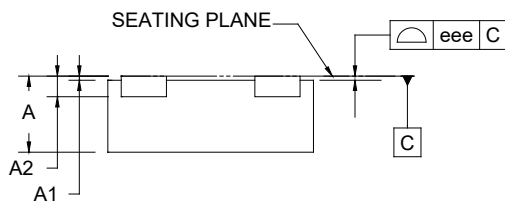
XTDFN-1x1-4L



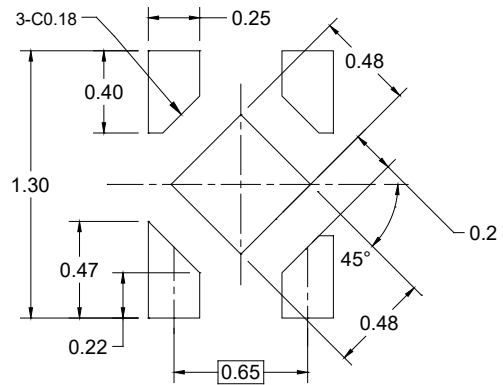
TOP VIEW



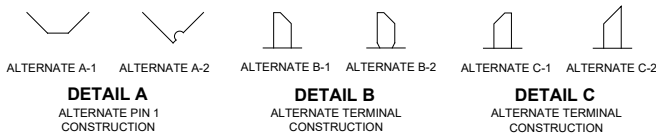
BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

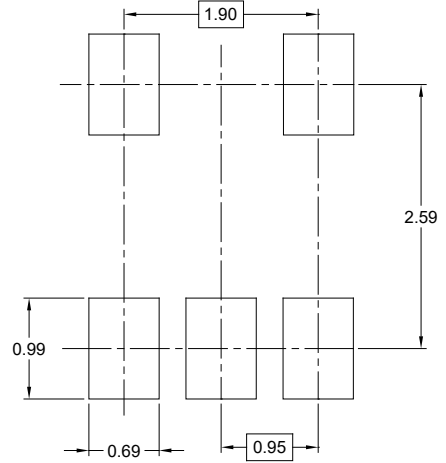
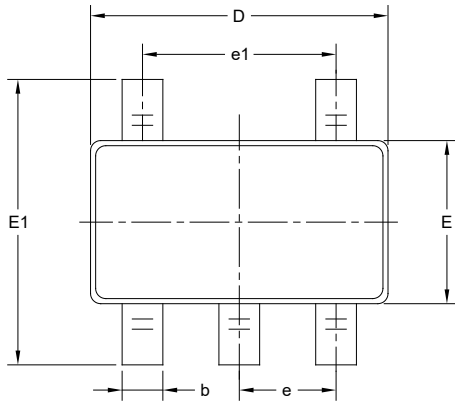


Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.340	0.370	0.400
A1	0.000	0.020	0.050
A2	0.100 REF		
b	0.170	-	0.300
b1	0.068 REF		
D	0.950	1.000	1.050
E	0.950	1.000	1.050
D1	0.430	0.480	0.530
E1	0.430	0.480	0.530
L	0.200	0.250	0.300
L1	0.093 REF		
L2	0.200	-	0.370
e	0.650 BSC		
k	0.150	-	-
eee	-	0.050	-

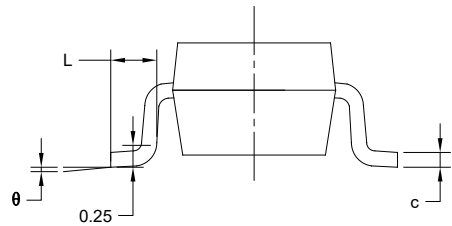
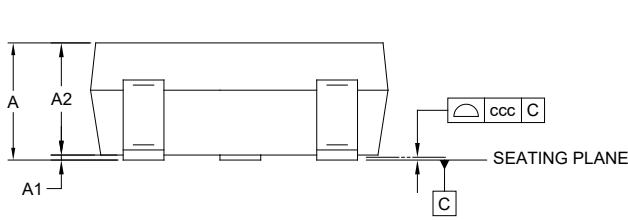
NOTE: This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

SOT-23-5



RECOMMENDED LAND PATTERN (Unit: mm)



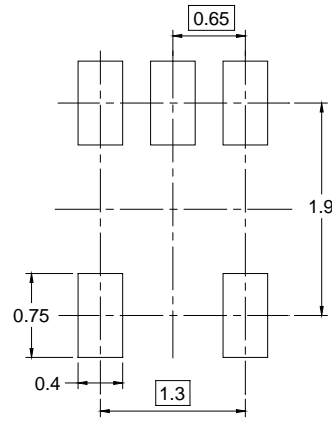
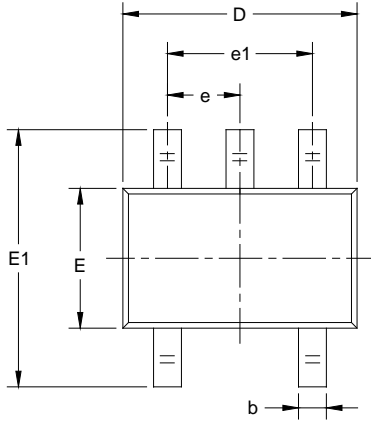
Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	-	-	1.450
A1	0.000	-	0.150
A2	0.900	-	1.300
b	0.300	-	0.500
c	0.080	-	0.220
D	2.750	-	3.050
E	1.450	-	1.750
E1	2.600	-	3.000
e	0.950 BSC		
e1	1.900 BSC		
L	0.300	-	0.600
θ	0°	-	8°
ccc	0.100		

NOTES:

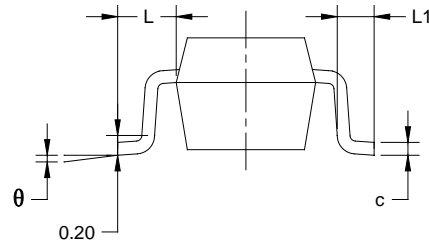
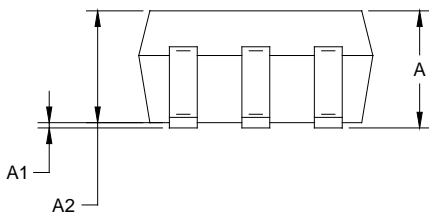
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-178.

PACKAGE OUTLINE DIMENSIONS

SC70-5



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.800	1.100	0.031	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.220	0.003	0.009
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.65 TYP		0.026 TYP	
e1	1.300 BSC		0.051 BSC	
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

NOTES:

1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

### KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
XTDFN-1×1-4L	7"	9.5	1.16	1.16	0.50	4.0	2.0	2.0	8.0	Q1
SOT-23-5	7"	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3
SC70-5	7"	9.5	2.40	2.50	1.20	4.0	4.0	2.0	8.0	Q3

DD0001



# PACKAGE INFORMATION

## CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

## KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7" (Option)	368	227	224	8
7"	442	410	224	18

DD0002