SGM2206
Dual Low Noise Low Dropout Regulator with Enable

GENERAL DESCRIPTION

The SGM2206 is a dual low dropout CMOS regulator with low $R_{DS(ON)}$, high PSRR, low output noise and low quiescent current.

Each of the two regulators includes an error amplifier, current limit circuit and an enable input to turn on/off output. With the integrated resistor network, fixed output voltage versions can be delivered. With its low power consumption and fast line and load transient response, the SGM2206 is well suited for low power handheld communication equipment.

The SGM2206 is packaged in Green UTDFN-1.2×1.2-6AL package, and allows for small footprint and dense PCB layout.

FEATURES

- **Wide V_{IN} Range: 1.7V to 7.5V**
- **Output Current: 150mA**
- **Ripple Rejection: 60dB at 1kHz**
- **Low Output Noise: 70μV_{RMS} from 10Hz to 100kHz**
- **Low Quiescent Current: 35μA**
- **Fixed Outputs of 1.2V to 3.6V**
- **-40℃ to +85℃ Operating Temperature Range**
- **Available in Green UTDFN-1.2×1.2-6AL Package**

APPLICATIONS

Fingerprint Modular
Smart Phone/PAD
RF Supply
USB Interface Power
Cameras
Portable Video
Portable Media Player
Wireless Adapter
Wireless Communication

TYPICAL APPLICATION

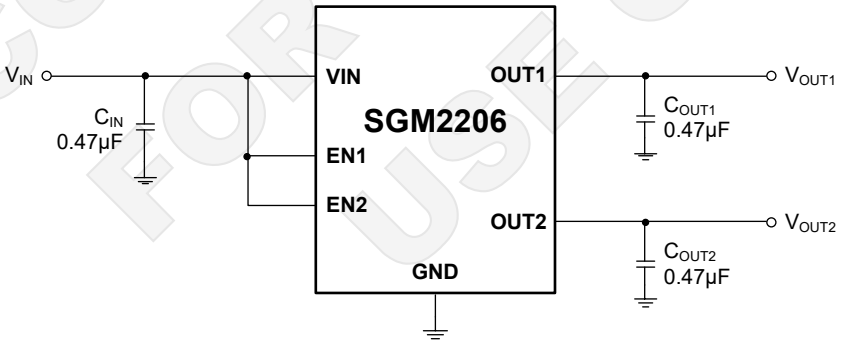

Figure 1. Typical Application Circuit

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PACKAGE/ORDERING INFORMATION

ORDERING NUMBER	V_{OUT1}	V_{OUT2}	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	PACKAGE MARKING	PACKING OPTION
SGM2206-AYUDX6G/TR	3.3V	1.8V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	9F XX	Tape and Reel, 5000
SGM2206-BYUDX6G/TR	1.2V	1.8V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	A0 XX	Tape and Reel, 5000
SGM2206-CYUDX6G/TR	1.5V	2.8V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	A1 XX	Tape and Reel, 5000
SGM2206-DYUDX6G/TR	1.8V	1.5V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	A2 XX	Tape and Reel, 5000
SGM2206-EYUDX6G/TR	1.8V	1.8V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	A3 XX	Tape and Reel, 5000
SGM2206-FYUDX6G/TR	1.8V	2.8V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	A4 XX	Tape and Reel, 5000
SGM2206-GYUDX6G/TR	1.8V	3.3V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	A5 XX	Tape and Reel, 5000
SGM2206-HYUDX6G/TR	2.5V	1.8V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	A6 XX	Tape and Reel, 5000
SGM2206-IYUDX6G/TR	2.8V	1.2V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	A7 XX	Tape and Reel, 5000
SGM2206-JYUDX6G/TR	2.8V	1.8V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	A8 XX	Tape and Reel, 5000
SGM2206-KYUDX6G/TR	2.8V	2.5V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	A9 XX	Tape and Reel, 5000
SGM2206-LYUDX6G/TR	2.8V	3.3V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	AA XX	Tape and Reel, 5000
SGM2206-MYUDX6G/TR	3.0V	1.8V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	AB XX	Tape and Reel, 5000
SGM2206-NYUDX6G/TR	3.0V	2.8V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	AC XX	Tape and Reel, 5000
SGM2206-OYUDX6G/TR	3.0V	3.0V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	AD XX	Tape and Reel, 5000
SGM2206-PYUDX6G/TR	3.3V	2.8V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	AE XX	Tape and Reel, 5000
SGM2206-QYUDX6G/TR	3.3V	3.0V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	AF XX	Tape and Reel, 5000
SGM2206-RYUDX6G/TR	3.3V	3.3V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	B0 XX	Tape and Reel, 5000
SGM2206-SYUDX6G/TR	3.6V	1.2V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	B1 XX	Tape and Reel, 5000
SGM2206-TYUDX6G/TR	5.0V	4.4V	UTDFN-1.2×1.2-6AL	-40℃ to +85℃	B2 XX	Tape and Reel, 5000

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.

MARKING INFORMATION

YY — Chip I.D.
X X
— Date Code - Week
— Date Code - Year

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ABSOLUTE MAXIMUM RATINGS

Input Voltage 8V
Input Voltage at EN Pins ..... -0.3V to 6V
Output Voltage, V_{OUT} ..... -0.3V to 6V
Output Current, I_{OUT} 200mA
Junction Temperature ..... +150°C
Storage Temperature Range ..... -65°C to +150°C
Lead Temperature (Soldering, 10s) ..... +260°C

RECOMMENDED OPERATING CONDITIONS

Input Voltage Range ..... 1.7V to 7.5V
Output Current ..... 0mA to 150mA
Operating Temperature Range ..... -40°C to +85°C

OVERSTRESS CAUTION

Stresses beyond those listed may cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational section of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

ESD SENSITIVITY CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. 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 very small parametric changes could cause the device not to meet its published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time.

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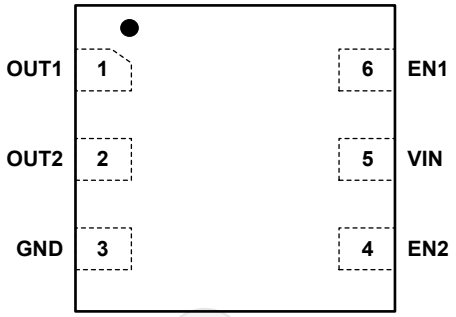
PIN CONFIGURATION

(TOP VIEW)



UTDFN-1.2×1.2-6AL

PIN DESCRIPTION

PIN	NAME	FUNCTION
1	OUT1	Channel 1 Output Voltage Pin.
2	OUT2	Channel 2 Output Voltage Pin.
3	GND	Ground.
4	EN2	Channel 2 Enable Pin. This pin should be driven either high or low and must not be floating. Driving this pin high enables channel 2 output, while pulling it low puts channel 2 regulator into shutdown mode.
5	VIN	Power Input Pin.
6	EN1	Channel 1 Enable Pin. This pin should be driven either high or low and must not be floating. Driving this pin high enables channel 1 output, while pulling it low puts channel 1 regulator into shutdown mode.

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ELECTRICAL CHARACTERISTICS

(T_A = +25℃, V_{IN} = V_{OUT} + 1V (V_{OUT} > 1.5V) or V_{IN} = 2.5V (V_{OUT} ≤ 1.5V), I_{OUT} = 1mA, C_{IN} = C_{OUT} = 1μF, unless otherwise specified.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Input Voltage	V_{IN}	T_A = -40°C to +85°C		1.7		7.5	V
Maximum Output Current					150		mA
Ground Pin Current (1)	I_Q	EN1 = High, EN2 = Low, or EN2 = High, EN1 = Low, No Load			35		μA
		EN1 or EN2 = High, No Load			70		
Shutdown Supply Current	$I_{STANDBY}$	EN1 or EN2 = Low, No Load			0.5		μA
Fold-Back Short Current (2)		V_{OUT} Short to Ground			55		mA
Power Supply Rejection Rate	PSRR	f = 1kHz, V_{IN} = V_{OUT} + 1V, ΔV_{RIPPLE} = 0.2V_{P-P} V_{OUT} ≥ 1.8V, I_{OUT} = 30mA			60		dB
Output Noise Voltage		BW = 10Hz to 100kHz, I_{OUT} = 30mA			70		μV_{RMS}
Dropout Voltage (3)		I_{OUT} = 150mA	1.7V < V_{OUT} ≤ 2.1V		0.25		V
			3.0V < V_{OUT} ≤ 3.6V		0.16		
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	V_{IN} = (V_{OUT_NOM} + 1V) to 7.5V, I_{OUT} = 1mA			0.02		%/V
Load Regulation	$\frac{\Delta V_{OUT}}{\Delta I_{LOAD} \times V_{OUT}}$	V_{IN} = V_{OUT_NOM} + 1V, I_{OUT} = 1mA to 150mA			5		mV
Output Voltage Temperature Coefficient		I_{OUT} = 30mA, T_A = -40°C to +85°C			±30		ppm/℃
EN Input Low Voltage						0.4	V
EN Input High Voltage				1.6			V
EN Input Leakage					0.1		μA
Over-Current Protection	OCP				200		mA
On-Resistance of N-Channel for Auto-Discharge		V_{IN} = 4.0V, V_{EN} = 0V, Disabled, Channel 1 & Channel 2			80		Ω

NOTES:

1. Ground current defined here is the difference in current between the input and the output.
2. Short circuit current is measured with V_{OUT} pulled to GND.
3. Dropout voltage is the voltage difference between the input and the output at which the output voltage drops 2% below its nominal value.

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FUNCTIONAL BLOCK DIAGRAM

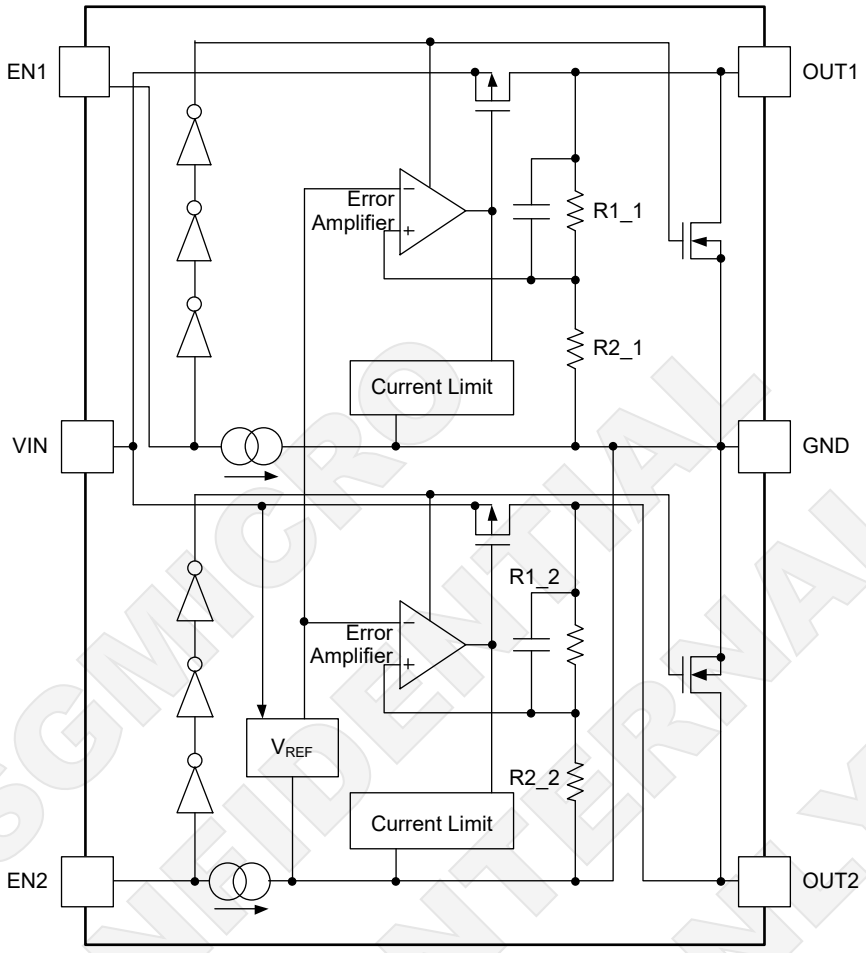

Figure 2. Block Diagram

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APPLICATION INFORMATION

Output Capacitor (C_{OUT})

An output capacitor is required to improve transient response and maintain stability. The SGM2206 is stable with very small ceramic output capacitors. If the application has large load variations, it is recommended to use low-ESR bulk capacitors. It is recommended to place ceramic capacitors as close as possible to the output pin and the GND pin, and care should be taken to reduce the impedance in the layout.

Input Capacitor (C_{IN})

To prevent the input voltage from dropping during load steps, it is recommended to use an input capacitor. A minimum 0.47μF ceramic capacitor is recommended between V_{IN} and GND pin to decouple input power supply glitch. This input capacitor must be located as close as possible to the device to ensure input stability and reduce noise. For PCB layout, a wide copper trace is required for both V_{IN} and GND pin.

Enable Control

The SGM2206 is turned on by setting the EN pins high, and is turned off by pulling it low. If this feature is not used, the EN pins should be tied to voltage up to 5V to keep the regulator outputs on at all time. To ensure proper operation, the signal source used to drive the EN pins must be able to swing above and below the specified turn-on/off voltage thresholds listed in the Electrical Characteristics section.

Short-Circuit Protection

When OUT pins are short-circuited to GND, short circuit protection will be triggered and clamp the output current to approximately 55mA. This feature protects the regulator from over-current and damage due to overheating.

Layout Considerations

For good stability, the input and output capacitors should be located close to the input, output, and GND pins of the device. The regulator GND pin should be connected to the external circuit ground to reduce voltage drop caused by trace impedance. Ground plane is generally used to reduce trace impedance. Wide trace should be used for large current paths from V_{IN} to V_{OUT}, and to load circuit.

ESR vs. Output Current

Ceramic output capacitor is recommended for this device; however, other types of output capacitors with low ESR also can be used.

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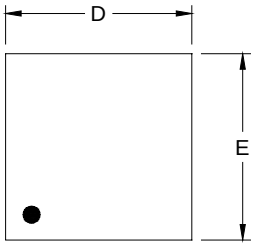
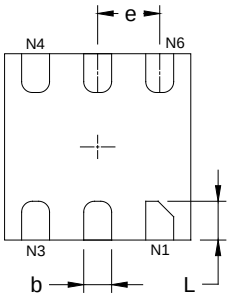
PACKAGE OUTLINE DIMENSIONS

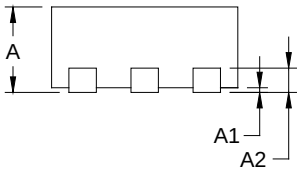
UTDFN-1.2×1.2-6AL



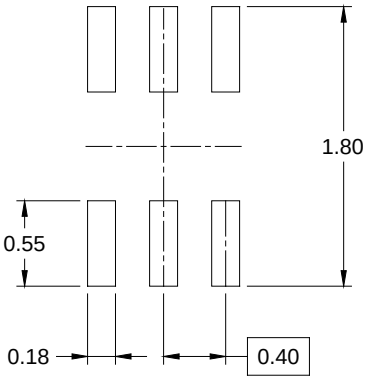
TOP VIEW



BOTTOM VIEW



SIDE VIEW

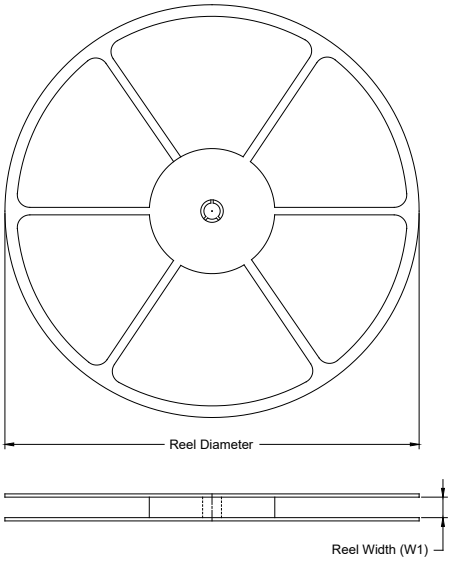


RECOMMENDED LAND PATTERN (Unit: mm)

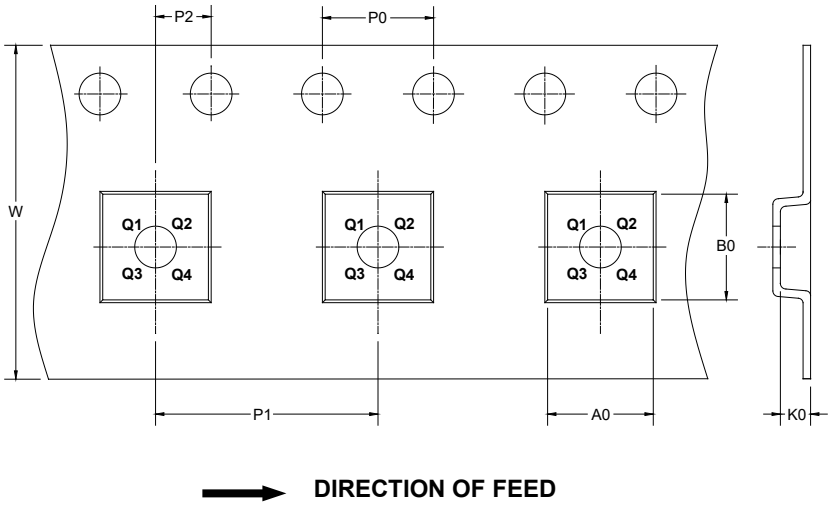
Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.500	0.550	0.600
A1			0.050
A2	0.152 REF		
e	0.400 BSC		
D	1.150	1.200	1.250
E	1.150	1.200	1.250
b	0.130	0.180	0.230
L	0.200	0.250	0.300

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



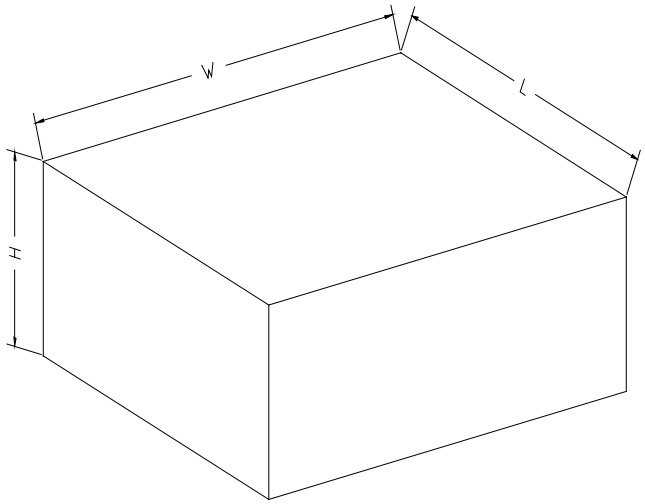
NOTE: The picture is only for reference. Please make the object as the standard.

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
UTDFN-1.2×1.2-6AL	7″	9.0	1.35	1.35	0.73	4.0	4.0	2.0	8.0	Q1

DD0001

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