SGM2206
Dual Low Noise, Low Dropout Regulator with Enable

GENERAL DESCRIPTION

The SGM2206 is a dual low noise, low quiescent current, high accuracy and low dropout voltage linear regulator. It supplies output current of 150mA per channel with typical dropout voltage of only 150mV. The operating input voltage range is from 1.7V to 7.5V and output voltage range is from 1.2V to 5.0V.

Each of regulators includes logic-controlled shutdown mode and over-current protection (OCP).

The SGM2206 is available in a Green UTDFN-1.2×1.2-6AL package. It operates over an operating temperature range of -40℃ to +85℃.

FEATURES

- **Operating Input Voltage Range: 1.7V to 7.5V**
- **Fixed Output Voltage Range: 1.2V to 5.0V**
- **Output Current: 150mA per Channel at +25℃**
- **Output Voltage Accuracy: ±0.8% at +25℃**
- **Low Quiescent Current: 35μA (TYP) per Channel**
- **Low Output Noise: 70μV_{RMS} (TYP)**
- **High PSRR: 60dB (TYP) at 1kHz**
- **Over-Current Protection**
- **With Output Automatic Discharge**
- **Stable with Small Case Size Ceramic Capacitors**
- **-40℃ to +85℃ Operating Temperature Range**
- **Available in a Green UTDFN-1.2×1.2-6AL Package**

APPLICATIONS

Smartphone
PAD
USB Interface
Fingerprint Modular
Radio Frequency Supplies
Portable Electronic Devices
Wireless Network Equipment

TYPICAL APPLICATION

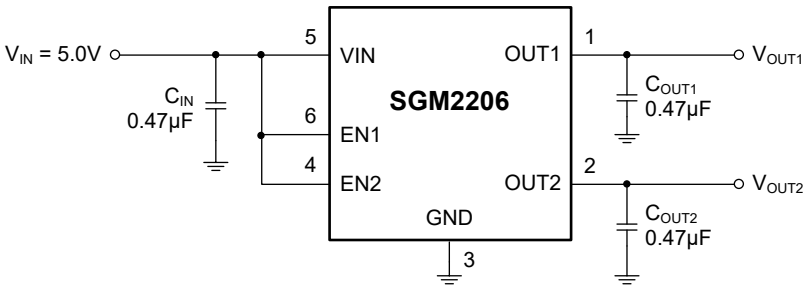


Figure 1. Typical Application Circuit

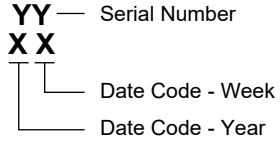
PACKAGE/ORDERING INFORMATION

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

NOTE: XX = Date Code.



ABSOLUTE MAXIMUM RATINGS

VIN to GND 8V
OUT1, OUT2 to GND ..... -0.3V to 6V
EN1, EN2 to GND ..... -0.3V to 6V
Output Current, I_{OUT} 200mA
Package Thermal Resistance
UTDFN-1.2×1.2-6AL, θ_{JA} ..... 148.6℃/W
UTDFN-1.2×1.2-6AL, θ_{JB} ..... 32.1℃/W
UTDFN-1.2×1.2-6AL, θ_{JC} ..... 67.5℃/W
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility
HBM ..... ±5000V
MM ..... ±300V
CDM ..... ±1000V

RECOMMENDED OPERATING CONDITIONS

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

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

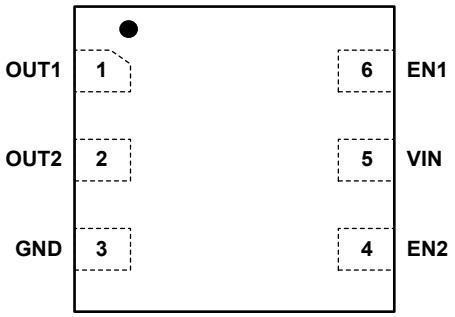
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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 CONFIGURATION

(TOP VIEW)



UTDFN-1.2×1.2-6AL

PIN DESCRIPTION

PIN	NAME	FUNCTION
1	OUT1	Output Pin of Channel 1. It is recommended to use a 0.47μF or larger ceramic capacitor to ensure stability. This ceramic capacitor should be placed as close as possible to OUT1 pin.
2	OUT2	Output Pin of Channel 2. It is recommended to use a 0.47μF or larger ceramic capacitor to ensure stability. This ceramic capacitor should be placed as close as possible to OUT2 pin.
3	GND	Ground.
4	EN2	Enable Control Pin of Channel 2. Drive EN2 high to turn on the channel 2 regulator. Drive EN2 low to turn off the channel 2 regulator. This pin must not be floated.
5	VIN	Input Supply Voltage Pin.
6	EN1	Enable Control Pin of Channel 1. Drive EN1 high to turn on the channel 1 regulator. Drive EN1 low to turn off the channel 1 regulator. This pin must not be floated.

ELECTRICAL CHARACTERISTICS

(T_A = +25℃, V_{IN} = $V_{OUT(NOM)}$ + 1.0V, I_{OUT} = 1mA, C_{IN} = 0.47μF, C_{OUT1} = 0.47μF, C_{OUT2} = 0.47μF, Full = -40℃ to +85℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		TEMP	MIN	TYP	MAX	UNITS
Input Voltage Range	V_{IN}			Full	1.7		7.5	V
Output Voltage Accuracy	V_{OUT}	V_{IN} = ($V_{OUT(NOM)}$ + 1.0V) to 7.5V, I_{OUT} = 1mA to 150mA		+25℃	-0.8		+0.8	%
		V_{IN} = ($V_{OUT(NOM)}$ + 1.0V) to 7.5V, I_{OUT} = 1mA to 140mA		Full	-1.5		+1.5	
Maximum Output Current				+25℃	150			mA
Ground Pin Current	I_Q	EN1 = High, EN2 = Low, or EN2 = High, EN1 = Low, no load		+25℃		35	45	μA
		EN1 and EN2 = High, no load		+25℃		62	75	
Shutdown Supply Current	I_{SHDN}	EN1 and EN2 = Low, no load		+25℃		0.55	0.75	μA
Fold-Back Short Current		V_{OUT} short to GND		+25℃		55		mA
Power Supply Rejection Ratio	PSRR	V_{IN} = $V_{OUT(NOM)}$ + 1.0V, ΔV_{RIPPLE} = 0.2V_{P-P} $V_{OUT(NOM)}$ ≥ 1.8V, I_{OUT} = 30mA, f = 1kHz		+25℃		60		dB
Output Voltage Noise	e_n	I_{OUT} = 30mA, f = 10Hz to 100kHz		+25℃		70		μV_{RMS}
Dropout Voltage (3)	V_{DROP}	I_{OUT} = 150mA	1.7V < $V_{OUT(NOM)}$ ≤ 2.1V	+25℃		250	300	mV
			2.1V < $V_{OUT(NOM)}$ ≤ 2.5V	+25℃		190	220	
			2.5V < $V_{OUT(NOM)}$ ≤ 3.0V	+25℃		160	210	
			3.0V < $V_{OUT(NOM)}$ ≤ 3.6V	+25℃		150	200	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	V_{IN} = ($V_{OUT(NOM)}$ + 1.0V) to 7.5V, I_{OUT} = 1mA		+25℃		0.0015	0.06	%/V
Load Regulation	$\frac{\Delta V_{OUT}}{\Delta I_{LOAD} \times V_{OUT}}$	V_{IN} = $V_{OUT(NOM)}$ + 1.0V, I_{OUT} = 1mA to 150mA		+25℃		2.5	7	mV
Output Voltage Temperature Coefficient		I_{OUT} = 50mA		Full		±25		ppm/℃
Enable Input Low Voltage	V_{IL}			Full			0.3	V
Enable Input High Voltage	V_{IH}			Full	1.3		5.5	V
Enable Input Leakage				+25℃	-1		1	μA
Over-Current Protection	OCP			Full	140	250	360	mA
On-Resistance of N-Channel for Auto-Discharge		V_{IN} = 4.0V, V_{EN} = 0V, disabled, Channel 1 & Channel 2		+25℃		80		Ω

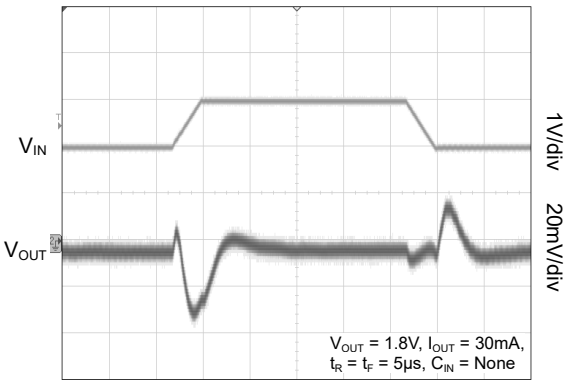
NOTE:

1. The dropout voltage is defined as the difference between V_{IN} and V_{OUT} when V_{OUT} falls to 98% × $V_{OUT(NOM)}$.

TYPICAL PERFORMANCE CHARACTERISTICS

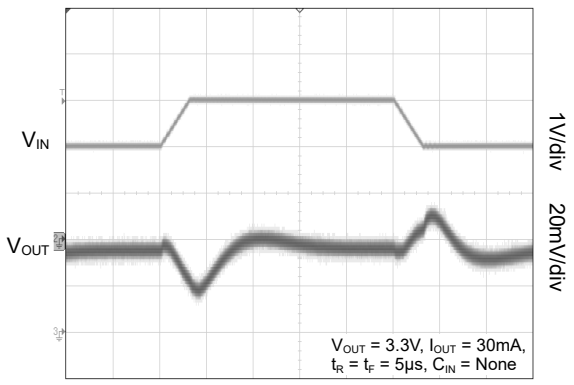
T_A = +25℃, V_{IN} = $V_{OUT(NOM)}$ + 1.0V, C_{IN} = 0.47μF, C_{OUT1} = 0.47μF, C_{OUT2} = 0.47μF, unless otherwise noted.

Line Transient Response



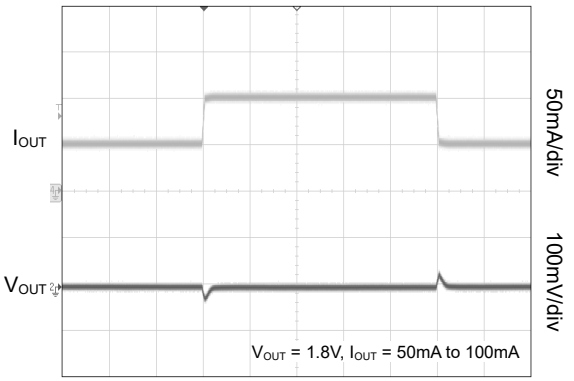
Time (10μs/div)

Line Transient Response



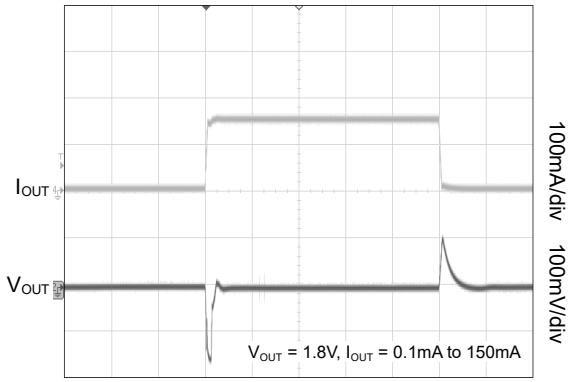
Time (10μs/div)

Load Transient Response



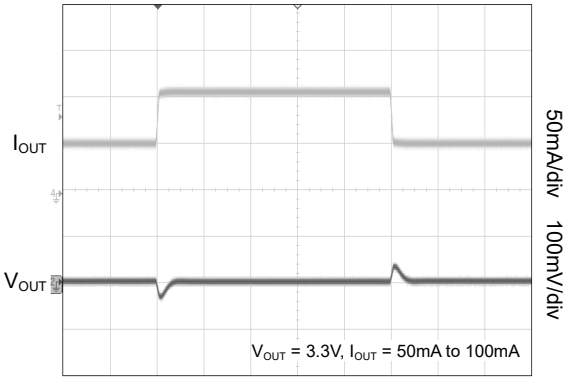
Time (40μs/div)

Load Transient Response



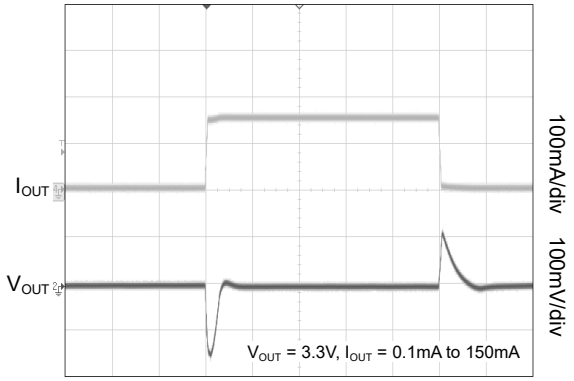
Time (40μs/div)

Load Transient Response



Time (40μs/div)

Load Transient Response

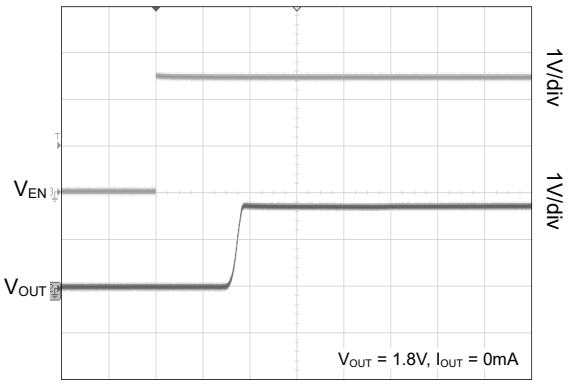


Time (40μs/div)

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

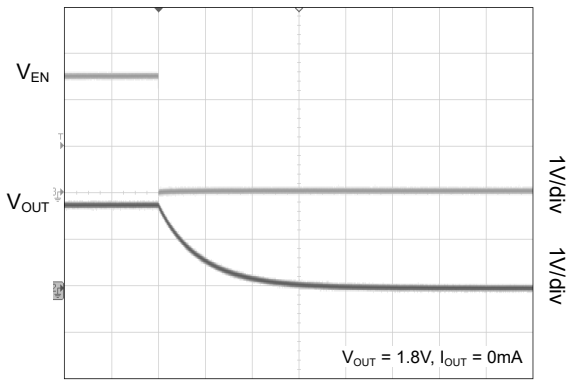
T_A = +25℃, V_{IN} = $V_{OUT(NOM)}$ + 1.0V, C_{IN} = 0.47μF, C_{OUT1} = 0.47μF, C_{OUT2} = 0.47μF, unless otherwise noted.

Turn-On Waveform



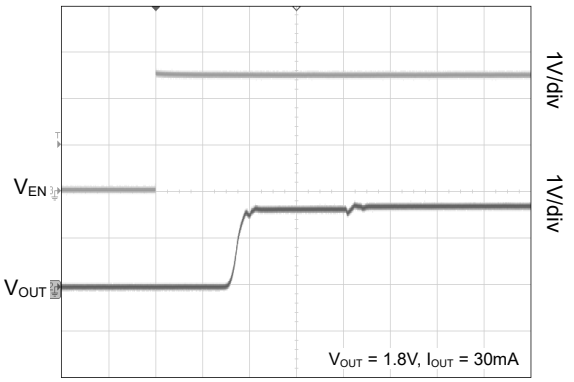
Time (50μs/div)

Turn-Off Waveform



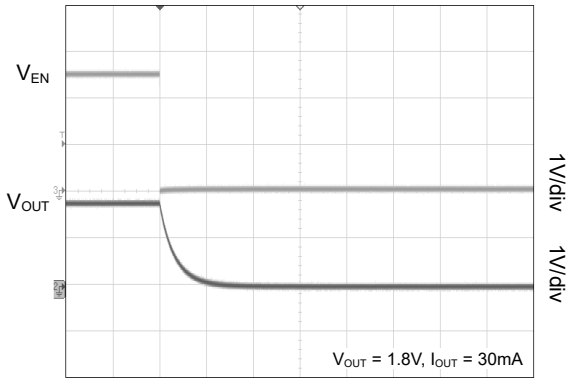
Time (50μs/div)

Turn-On Waveform



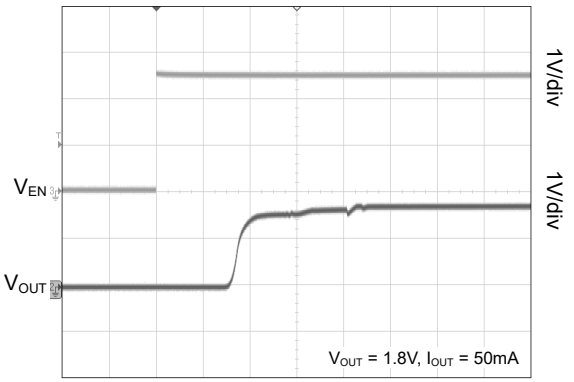
Time (50μs/div)

Turn-Off Waveform



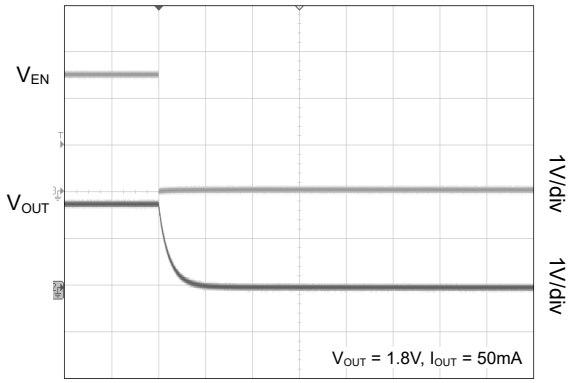
Time (50μs/div)

Turn-On Waveform



Time (50μs/div)

Turn-Off Waveform

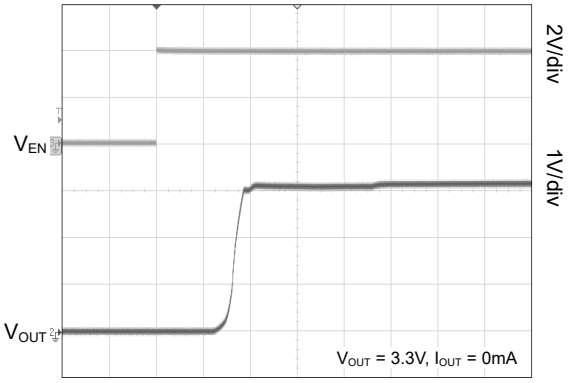


Time (50μs/div)

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

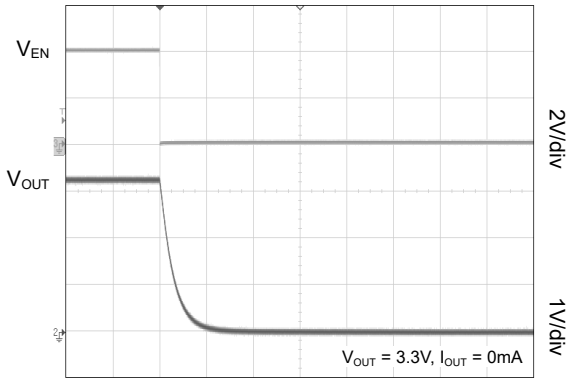
T_A = +25℃, V_{IN} = $V_{OUT(NOM)}$ + 1.0V, C_{IN} = 0.47μF, C_{OUT1} = 0.47μF, C_{OUT2} = 0.47μF, unless otherwise noted.

Turn-On Waveform



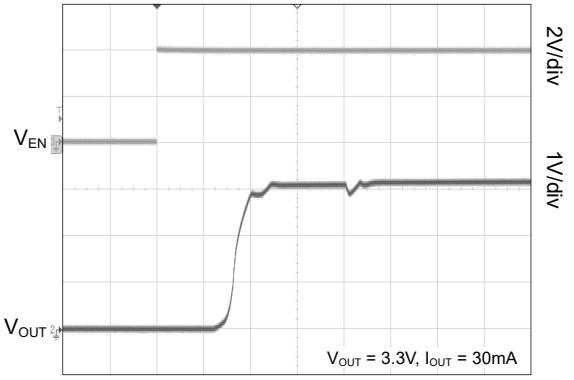
Time (50μs/div)

Turn-Off Waveform



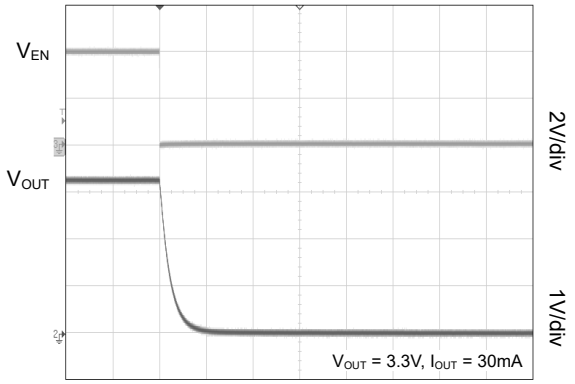
Time (50μs/div)

Turn-On Waveform



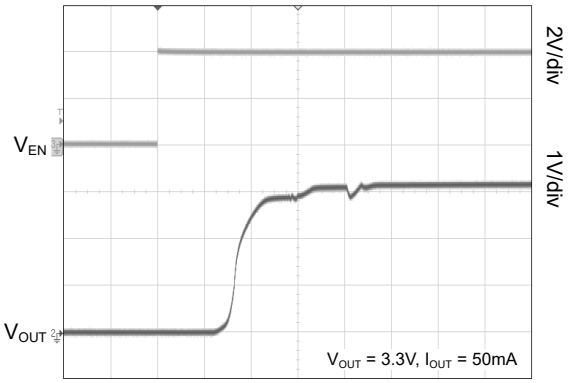
Time (50μs/div)

Turn-Off Waveform



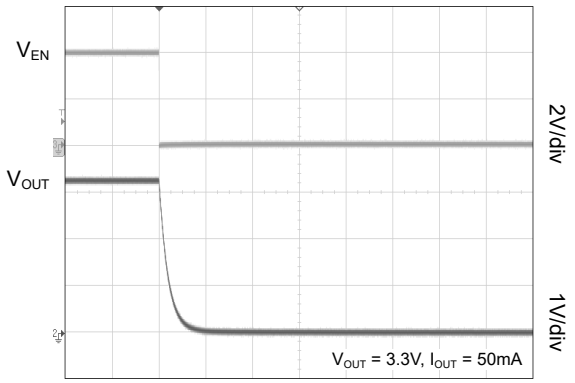
Time (50μs/div)

Turn-On Waveform



Time (50μs/div)

Turn-Off Waveform

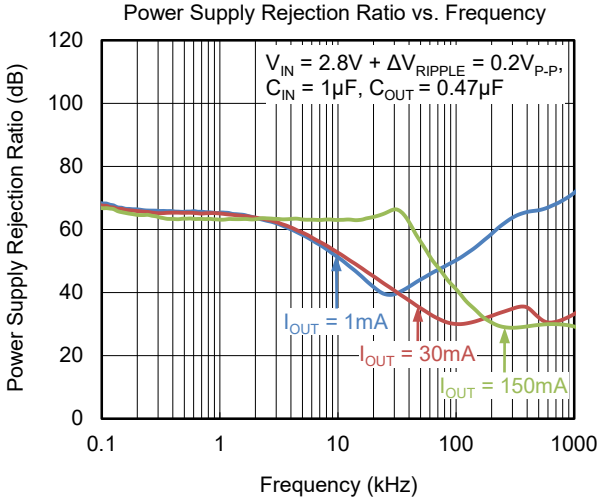


Time (50μs/div)

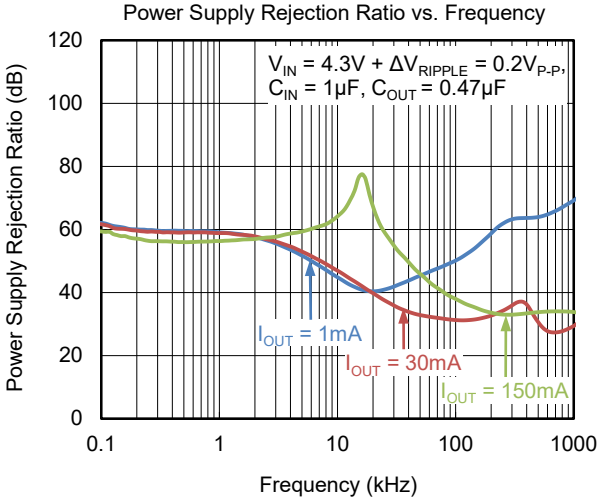
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

T_A = +25℃, C_{IN} = 0.47μF, C_{OUT1} = 0.47μF, C_{OUT2} = 0.47μF, unless otherwise noted.

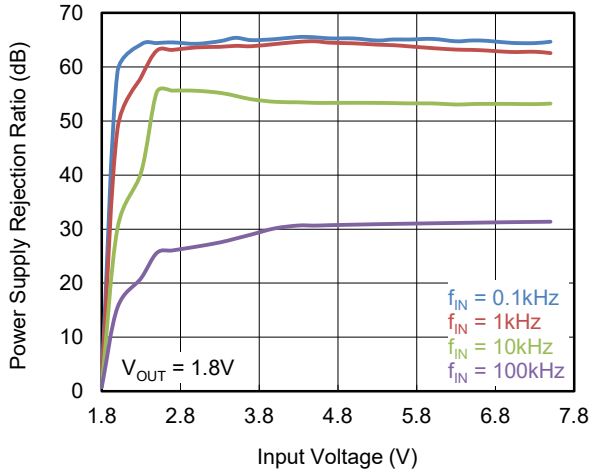
Power Supply Rejection Ratio vs. Frequency



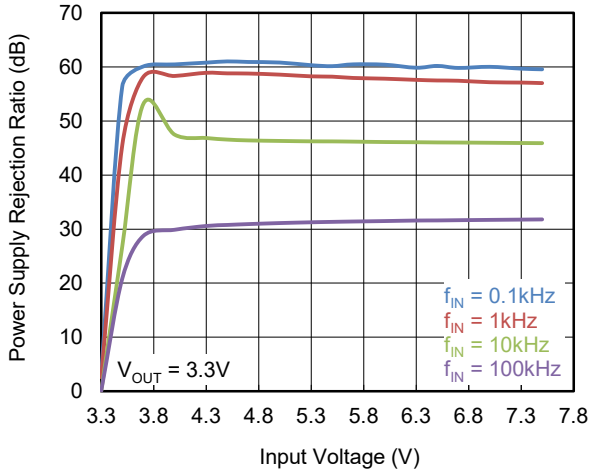
Power Supply Rejection Ratio vs. Frequency



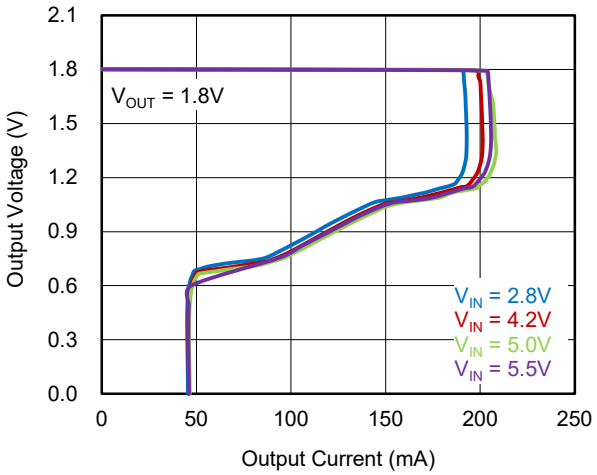
Power Supply Rejection Ratio vs. Input Voltage



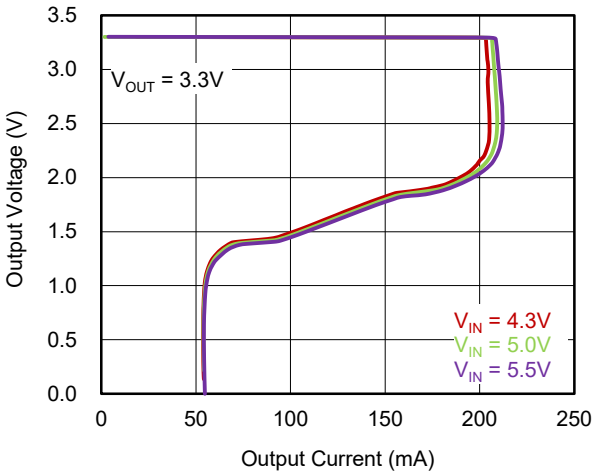
Power Supply Rejection Ratio vs. Input Voltage



Output Voltage vs. Output Current



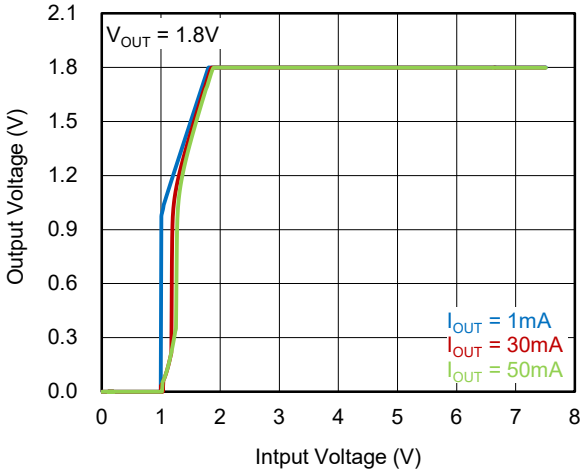
Output Voltage vs. Output Current



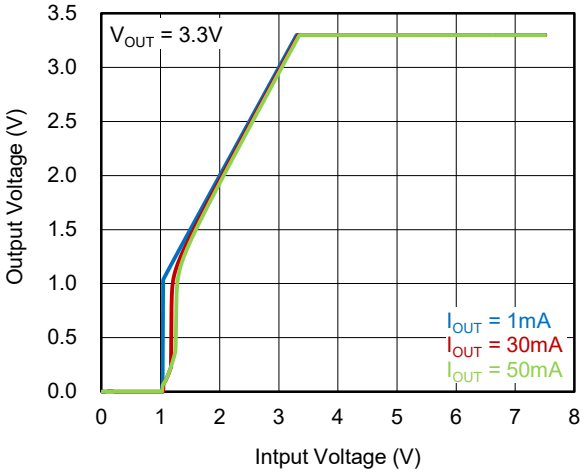
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

T_A = +25℃, C_{IN} = 0.47μF, C_{OUT1} = 0.47μF, C_{OUT2} = 0.47μF, unless otherwise noted.

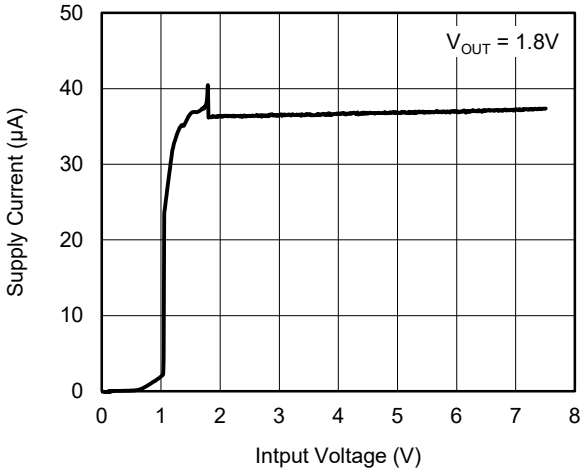
Output Voltage vs. Input Voltage



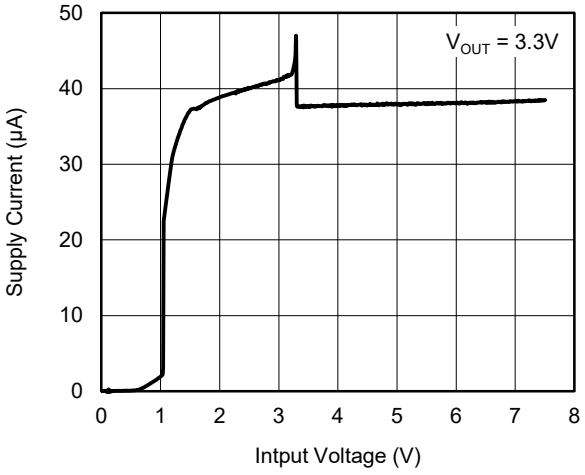
Output Voltage vs. Input Voltage



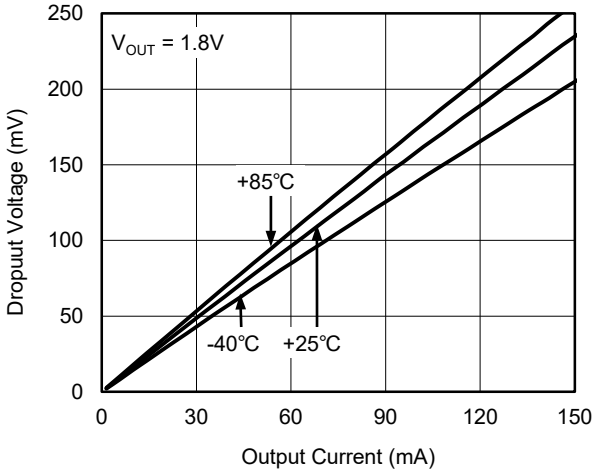
Supply Current vs. Input Voltage



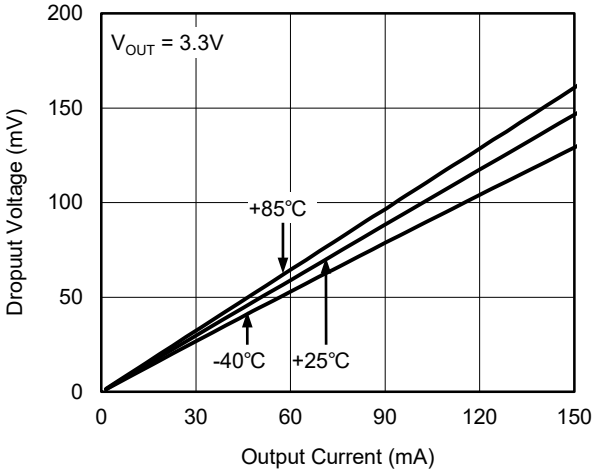
Supply Current vs. Input Voltage



Dropout Voltage vs. Output Current



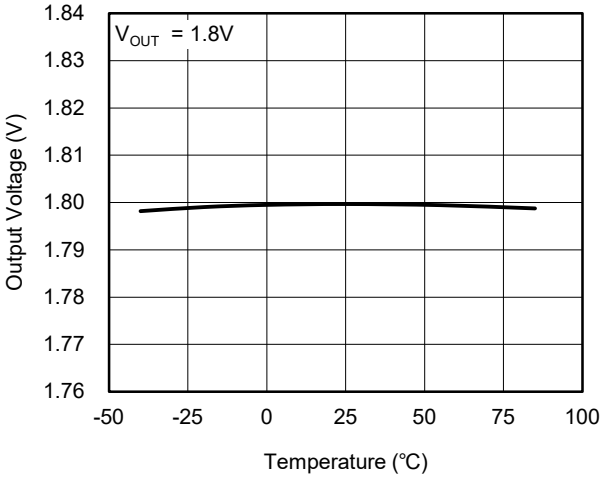
Dropout Voltage vs. Output Current



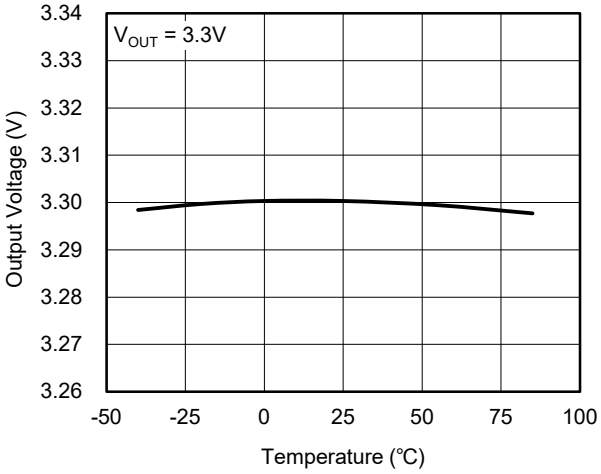
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

T_A = +25℃, C_{IN} = 0.47μF, C_{OUT1} = 0.47μF, C_{OUT2} = 0.47μF, unless otherwise noted.

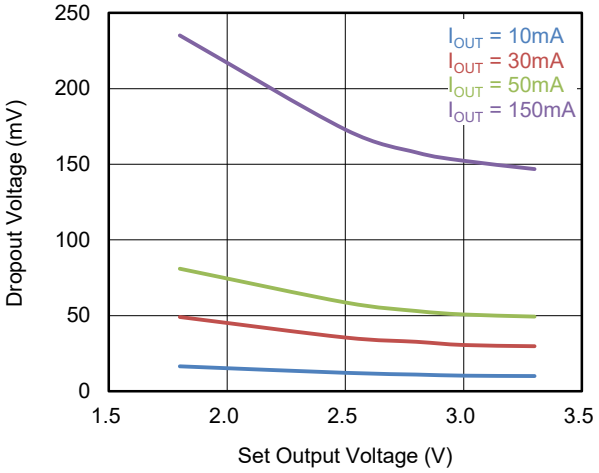
Output Voltage vs. Temperature



Output Voltage vs. Temperature



Dropout Voltage vs. Set Output Voltage



FUNCTIONAL BLOCK DIAGRAM

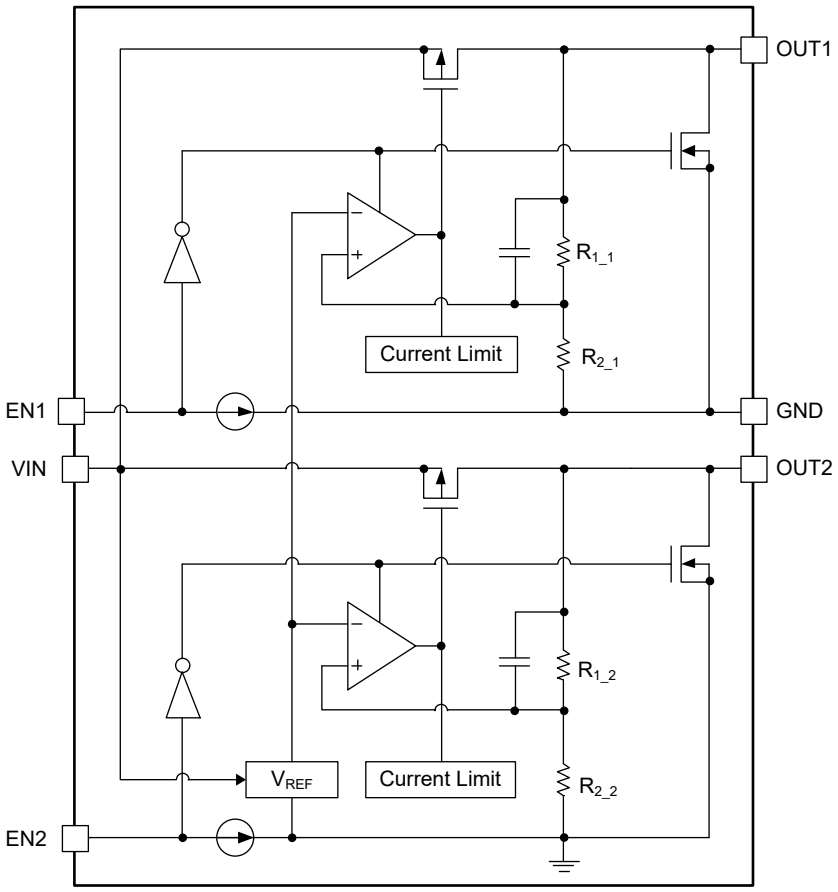


Figure 2. Block Diagram

APPLICATION INFORMATION

Input Capacitor Selection (C_{IN})

The input decoupling capacitor should be placed as close as possible to the IN pin for ensuring the device stability. 0.47μF or larger X7R or X5R ceramic capacitor is selected to get good dynamic performance.

When V_{IN} is required to provide large current instantaneously, a large effective input capacitor is required. Multiple input capacitors can limit the input tracking inductance. Adding more input capacitors is available to restrict the ringing and to keep it below the device absolute maximum ratings. For C_{OUT} with larger capacitance, it is recommended to choose the larger capacitance C_{IN}.

Output Capacitor Selection (C_{OUT1}, C_{OUT2})

The output decoupling capacitors should be placed as close as possible to the OUTx pins. 0.47μF or larger X7R or X5R ceramic capacitors are selected to get good dynamic performance. For ceramic capacitors, temperature, DC bias and package size will change the effective capacitance, so enough margins of C_{OUT1} and C_{OUT2} must be considered in design. Additionally, C_{OUT1} and C_{OUT2} with larger capacitance and lower ESR will help increase the high frequency PSRR and improve the load transient response.

Enable Operation

The ENx pins of the SGM2206 are used to enable/disable the device and to deactivate/activate the output automatic discharge function.

When the ENx pins voltages are low, the device is in shutdown state. There is no current flowing from IN to OUTx pins. When the ENx pins voltages are high, the device is in active state. The output voltage is regulated to the expected value and the automatic discharge transistor is turned off.

Output Current Limit Protection

When overload events happen, the output current is internally limited to 250mA (TYP). When the OUTx pins are shorted to ground, the fold-back short current is 55mA (TYP).

Layout Guidelines

To get good PSRR, low output noise and high transient response performance, the input and output bypass capacitors must be placed as close as possible to the IN pin and OUTx pins separately.

REVISION HISTORY

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

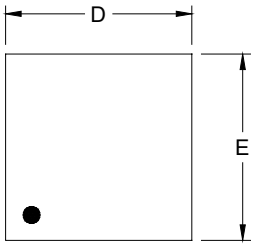
DECEMBER 2025 – REV.A.1 to REV.A.2	Page
Updated Absolute Maximum Ratings section	3
Updated Electrical Characteristics section	5

JULY 2019 – REV.A to REV.A.1	Page
Updated Absolute Maximum Ratings section	3

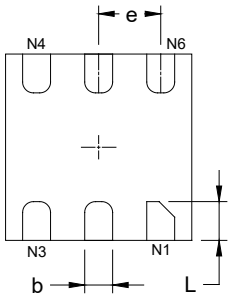
Changes from Original (SEPTEMBER 2018) to REV.A	Page
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

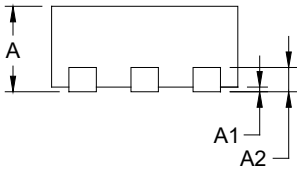
UTDFN-1.2×1.2-6AL



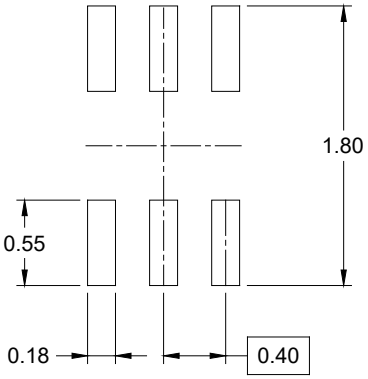
TOP VIEW



BOTTOM VIEW



SIDE VIEW



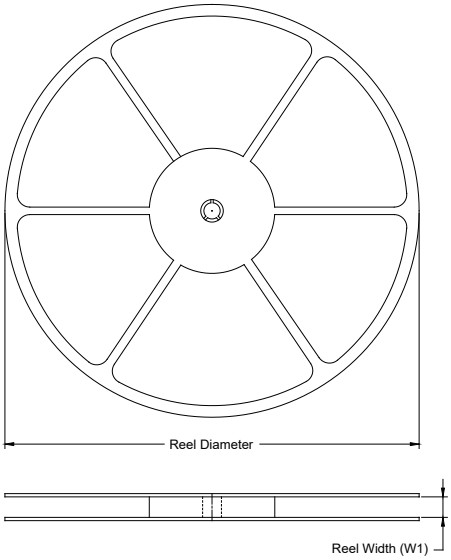
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	NOM	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

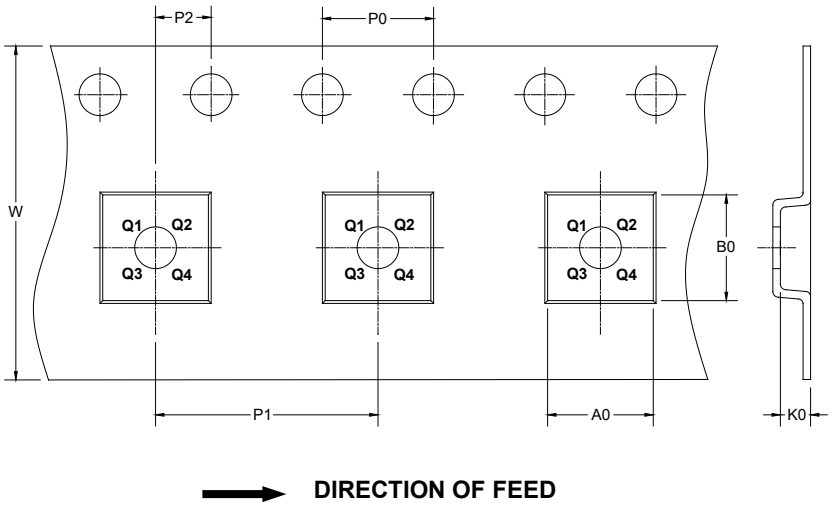
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



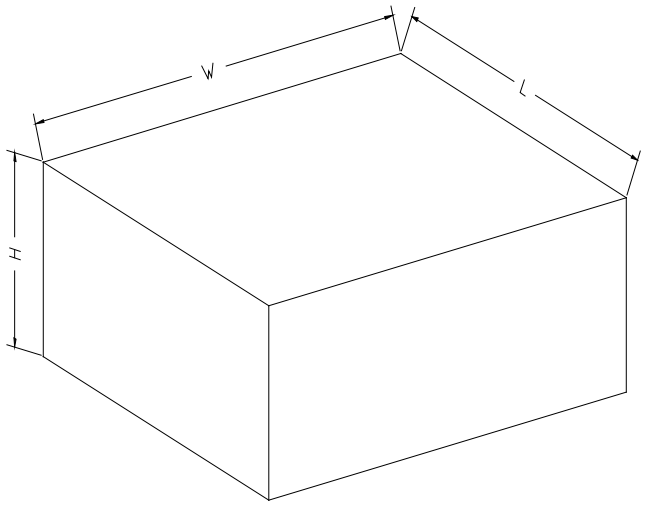
NOTE: The picture is only for reference. Please make the object as the standard.

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