

GENERAL DESCRIPTION

The SGM2216 is a high voltage, low noise, high current and low dropout voltage linear regulator. It is capable of supplying 3A output current. The operating input voltage range is from 2.3V to 26V and output voltage range is from 1.24V to 25V.

Other features include under-voltage lockout, current limit, logic-controlled shutdown mode and thermal shutdown protection.

The SGM2216 is available in Green TO-263-3A, TO-263-5B and TQFN-5×5-20L packages. It operates over an operating temperature range of -40°C to +125°C.

APPLICATIONS

Server Power
Industrial Power Supply
Instruments and Apparatuses
Linear Power Supply Equipment

FEATURES

- Operating Input Voltage Range: 2.3V to 26V
- Enable Pin Accept Voltages Higher than the Supply Voltage and up to 26V
- Fixed Output from 1.8V to 12V
- Adjustable Output from 1.24V to 25V
- 3A Output Current
- Output Voltage Accuracy: $\pm 1\%$ at +25°C
- Low Dropout: 340mV (TYP) at 3A
- Low Noise: $37\mu V_{RMS}$ (TYP) at $V_{OUT(NOM)} = 1.24V$
- Shutdown Supply Current: 1.6 μA (TYP)
- Current Limiting and Thermal Protection
- UVLO with Hysteresis
- Reverse-Battery Protection
- Load Dump Protection
- Error Flag Signals Output Out-of-Regulation
- Protection Against Over-Current Faults, Reversed Input Polarity, Reversed Lead Insertion, Over-Temperature Operation, and Positive and Negative Transient Voltage Spikes
- -40°C to +125°C Operating Temperature Range
- Available in Green TO-263-3A, TO-263-5B and TQFN-5×5-20L Packages

TYPICAL APPLICATION CIRCUITS

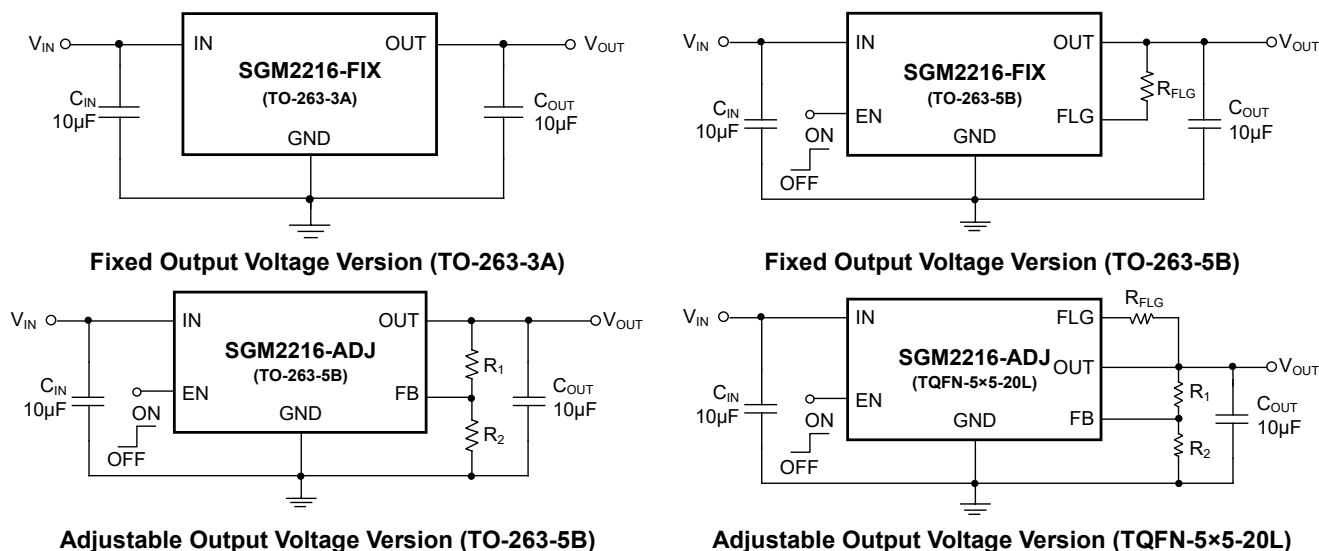


Figure 1. Typical Application Circuits

PACKAGE/ORDERING INFORMATION

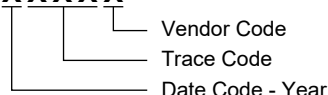
MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM2216-1.8	TO-263-3A	-40°C to +125°C	SGM2216-1.8XOA3G/TR	SGM112 XOA3 XXXXX	Tape and Reel, 800
	TO-263-5B	-40°C to +125°C	SGM2216-1.8XO5G/TR	SGM118 XO5 XXXXX	Tape and Reel, 800
SGM2216-2.5	TO-263-3A	-40°C to +125°C	SGM2216-2.5XOA3G/TR	SGM113 XOA3 XXXXX	Tape and Reel, 800
	TO-263-5B	-40°C to +125°C	SGM2216-2.5XO5G/TR	SGM119 XO5 XXXXX	Tape and Reel, 800
SGM2216-3.3	TO-263-3A	-40°C to +125°C	SGM2216-3.3XOA3G/TR	SGM114 XOA3 XXXXX	Tape and Reel, 800
	TO-263-5B	-40°C to +125°C	SGM2216-3.3XO5G/TR	SGM11A XO5 XXXXX	Tape and Reel, 800
SGM2216-4.2	TO-263-3A	-40°C to +125°C	SGM2216-4.2XOA3G/TR	SGM115 XOA3 XXXXX	Tape and Reel, 800
	TO-263-5B	-40°C to +125°C	SGM2216-4.2XO5G/TR	SGM11B XO5 XXXXX	Tape and Reel, 800
SGM2216-5.0	TO-263-3A	-40°C to +125°C	SGM2216-5.0XOA3G/TR	SGM116 XOA3 XXXXX	Tape and Reel, 800
	TO-263-5B	-40°C to +125°C	SGM2216-5.0XO5G/TR	SGM11C XO5 XXXXX	Tape and Reel, 800
SGM2216-12	TO-263-3A	-40°C to +125°C	SGM2216-12XOA3G/TR	SGM117 XOA3 XXXXX	Tape and Reel, 800
	TO-263-5B	-40°C to +125°C	SGM2216-12XO5G/TR	SGM11D XO5 XXXXX	Tape and Reel, 800
SGM2216-ADJ	TO-263-5B	-40°C to +125°C	SGM2216-ADJXO5G/TR	SGM11E XO5 XXXXX	Tape and Reel, 800
SGM2216-ADJ	TQFN-5×5-20L	-40°C to +125°C	SGM2216-ADJXTRM20G/TR	SGM1RZ XTRM20 XXXXX	Tape and Reel, 5000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code.

TO-263-3A/TO-263-5B/TQFN-5×5-20L

XXXXX



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 ⁽¹⁾	-26V to 60V
OUT, FB to GND	-26V to 30V
FLG to GND	-0.3V to 30V
EN, OUT, FB to IN	-26V to 26V
Package Thermal Resistance	
TQFN-5×5-20L, θ_{JA}	26.2°C/W
TQFN-5×5-20L, θ_{JB}	7.7°C/W
TQFN-5×5-20L, $\theta_{JC(TOP)}$	17.7°C/W
TQFN-5×5-20L, $\theta_{JC(BOT)}$	1.1°C/W
TO-263-3A, θ_{JA}	21.2°C/W
TO-263-3A, θ_{JB}	5.9°C/W
TO-263-3A, $\theta_{JC(TOP)}$	30.3°C/W
TO-263-3A, $\theta_{JC(BOT)}$	1.3°C/W
TO-263-5B, θ_{JA}	18.8°C/W
TO-263-5B, θ_{JB}	5.1°C/W
TO-263-5B, $\theta_{JC(TOP)}$	32.1°C/W
TO-263-5B, $\theta_{JC(BOT)}$	1.7°C/W
Junction Temperature	+150°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility ^{(2) (3)}	
HBM	±3000V
CDM	±1000V

NOTES:

1. If the maximum positive supply voltage is 60V, the duration must be limited to less than 100ms and the duty cycle must not exceed 1%. The maximum continuous operating voltage is 30V, beyond which the device may be damaged.
2. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.
3. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

Input Voltage Range	2.3V to 26V
Enable Input Voltage Range	0V to 26V
Input Effective Capacitance, C_{IN}	4.7μF (MIN)
Output Effective Capacitance, C_{OUT}	4.7μF to 5mF
FLG Pull-Up Resistance	10kΩ to 100kΩ
Operating Ambient Temperature Range	-40°C to +125°C
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.

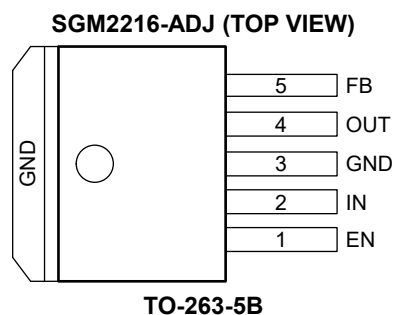
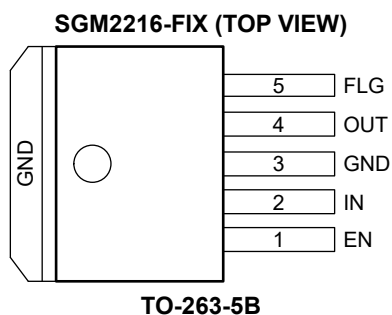
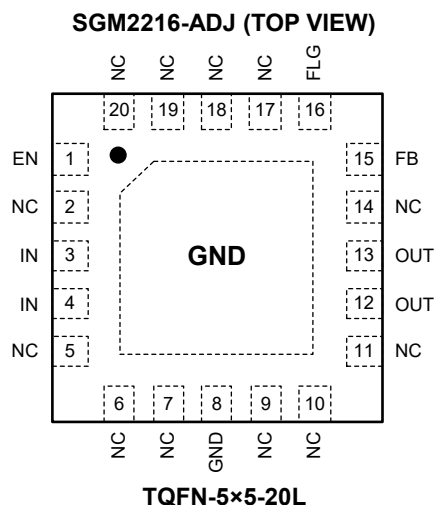
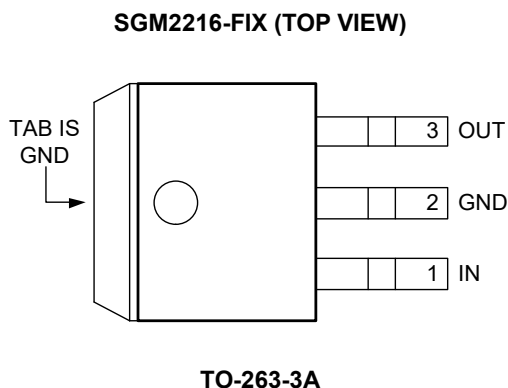
ESD SENSITIVITY CAUTION

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
TO-263-3A	TO-263-5B	TQFN-5x5-20L		
—	1	1	EN	Enable Pin. Drive EN high to turn on the regulator. Drive EN low to turn off the regulator.
1	2	3, 4	IN	Input Supply Voltage Pin. It is recommended to use a 10μF 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.
2	3, TAB	8	GND	Ground Pin.
3	4	12, 13	OUT	Regulator Output Pin.
—	5	15	FB	Feedback Voltage Input Pin (SGM2216-ADJ 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.
		16	FLG	Active Low Error Flag (SGM2216-ADJ version of TQFN-5x5-20L package and SGM2216-FIX version of TO-263-5B package). It is used to indicate the output fault status.
—	—	2, 5, 6, 7, 9, 10, 11, 14, 17, 18, 19, 20	NC	No Connection.
—	—	Exposed Pad	GND	Exposed Pad. Connect it to GND internally. Connect it to a large ground plane to maximize thermal performance. This pad is not an electrical connection point.

FUNCTIONAL BLOCK DIAGRAMS

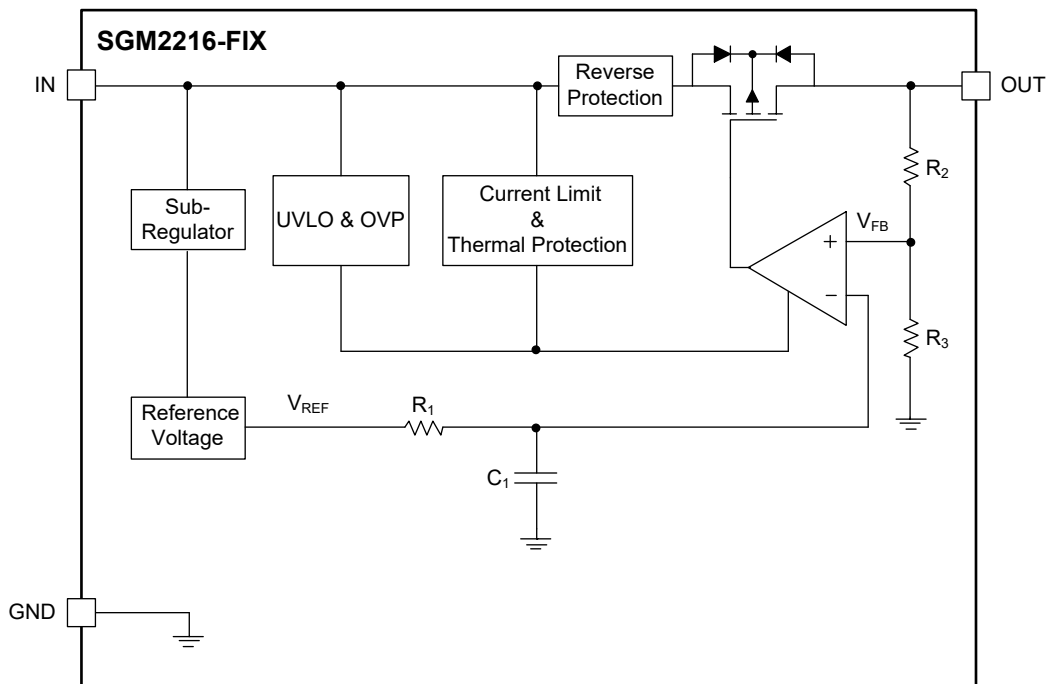


Figure 2. Internal Block Diagram of Fixed Output Voltage (TO-263-3A Version)

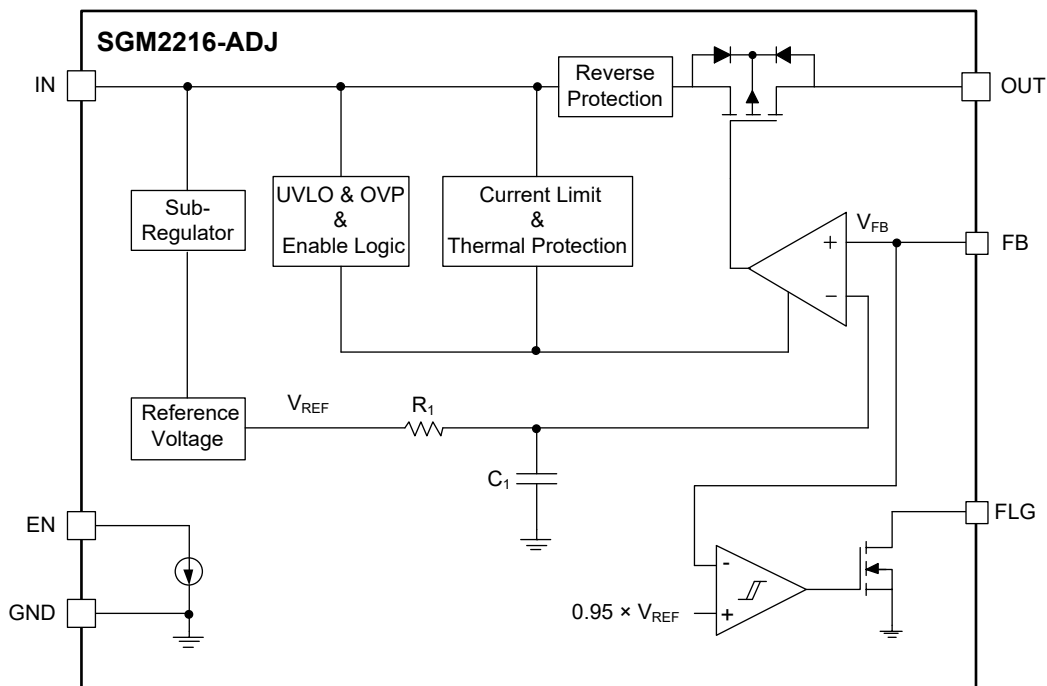


Figure 3. Internal Block Diagram of Adjustable Output Voltage (TQFN-5x5-20L Version)

FUNCTIONAL BLOCK DIAGRAMS (continued)

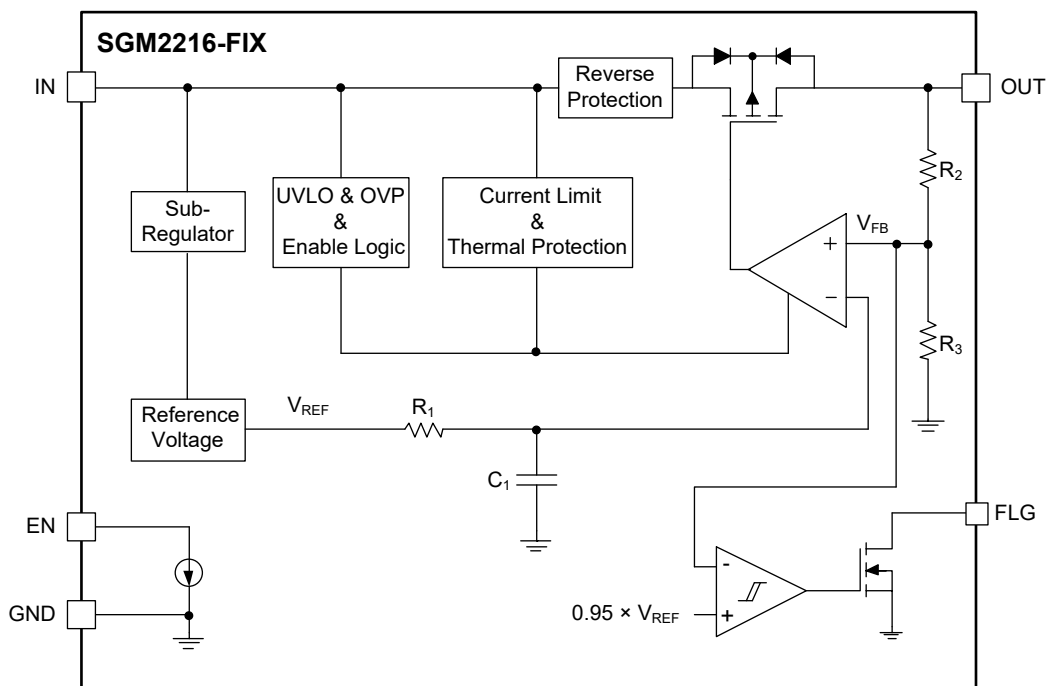


Figure 4. Internal Block Diagram of Fixed Output Voltage (TO-263-5B Version)

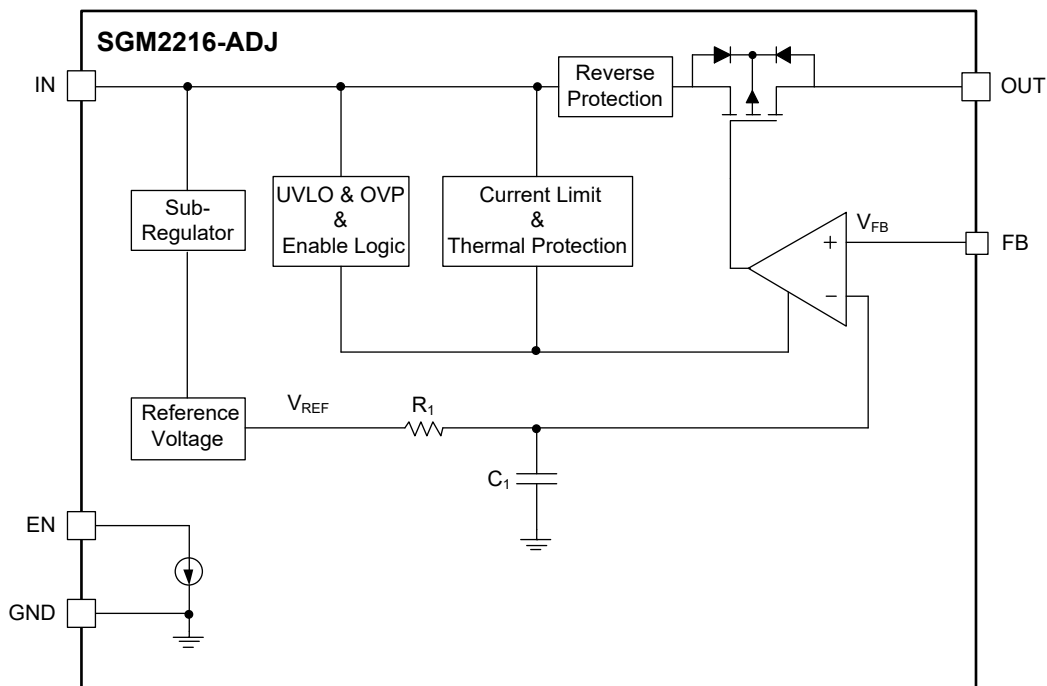
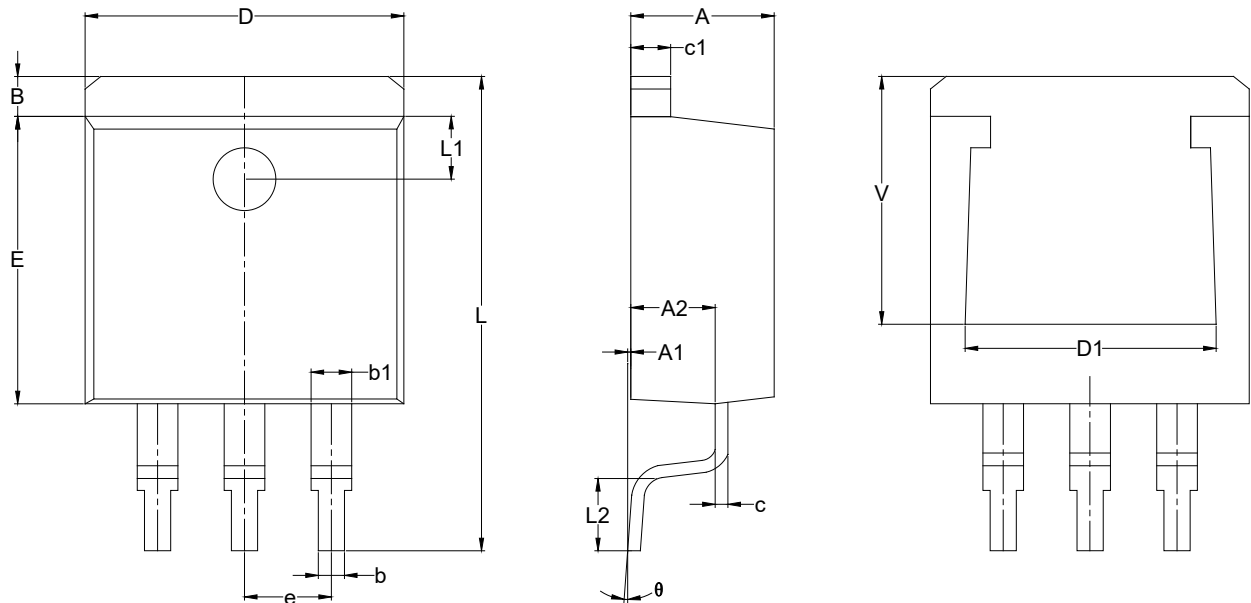


Figure 5. Internal Block Diagram of Adjustable Output Voltage (TO-263-5B Version)

PACKAGE OUTLINE DIMENSIONS

TO-263-3A



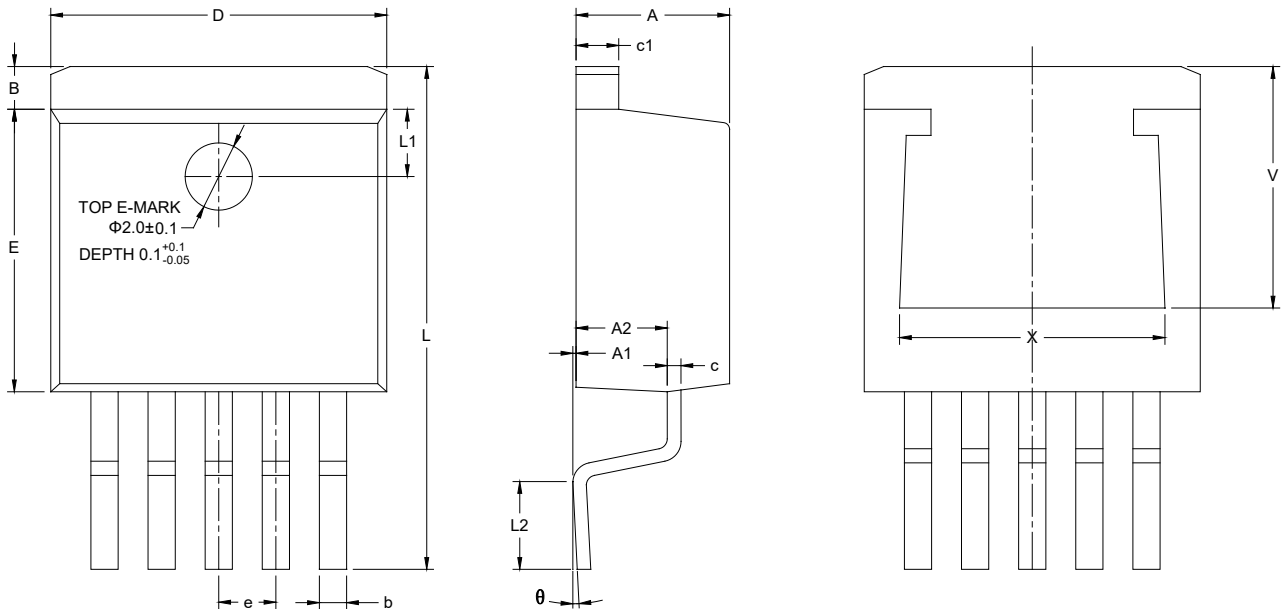
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	4.400	4.570	4.700
A1	0.000	0.100	0.250
A2	2.590	2.690	2.790
B	1.170	1.270	1.400
b	0.770	-	0.900
b1	1.230	-	1.360
c	0.340	-	0.470
c1	1.220	-	1.320
D	10.060	10.160	10.260
D1	7.800	-	8.200
E	9.050	9.150	9.250
e	2.540 BSC		
L	14.700	15.100	15.500
L1	2.000 REF		
L2	2.000	2.300	2.600
V	6.600	-	-
θ	0°		8°

NOTES:

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

PACKAGE OUTLINE DIMENSIONS

TO-263-5B



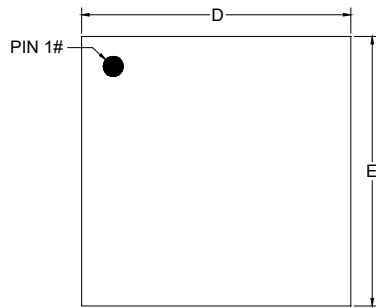
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	4.40	4.57	4.70
A1	0	0.10	0.25
A2	2.59	2.69	2.79
b	0.77	-	0.90
c	0.34	-	0.47
c1	1.22	-	1.32
e	1.70 BSC		
D	10.06	10.16	10.26
E	9.05	9.15	9.25
B	1.17	1.27	1.40
V	6.86	-	7.50
X	7.50	-	8.30
L	14.70	15.10	15.50
L1	2.00 REF		
L2	2.00	2.30	2.60
θ	0°	-	8°

NOTES:

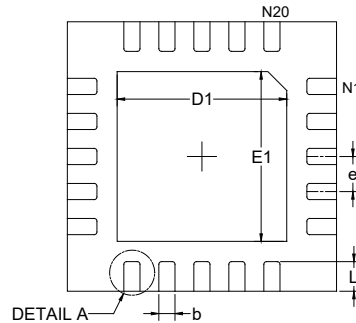
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

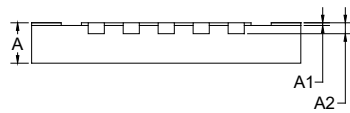
TQFN-5×5-20L



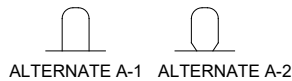
TOP VIEW



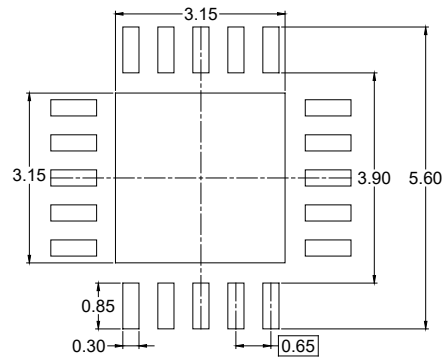
BOTTOM VIEW



SIDE VIEW



DETAIL A
ALTERNATE TERMINAL
CONSTRUCTION



RECOMMENDED LAND PATTERN (Unit: mm)

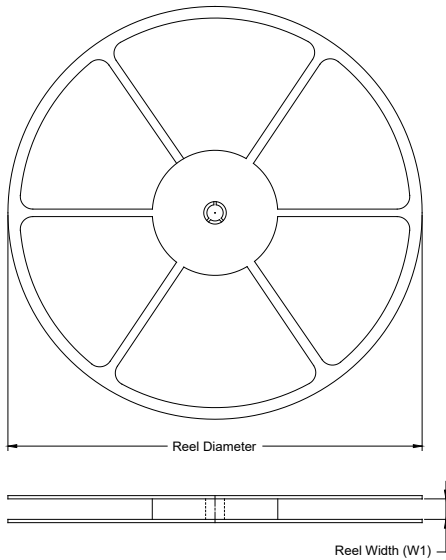
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.700	0.750	0.800
A1	0.000	-	0.050
A2	0.203 REF		
D	4.950	5.000	5.050
D1	3.100	3.150	3.200
E	4.950	5.000	5.050
E1	3.100	3.150	3.200
b	0.250	0.300	0.350
e	0.650 BSC		
L	0.500	0.550	0.600

NOTE: This drawing is subject to change without notice.

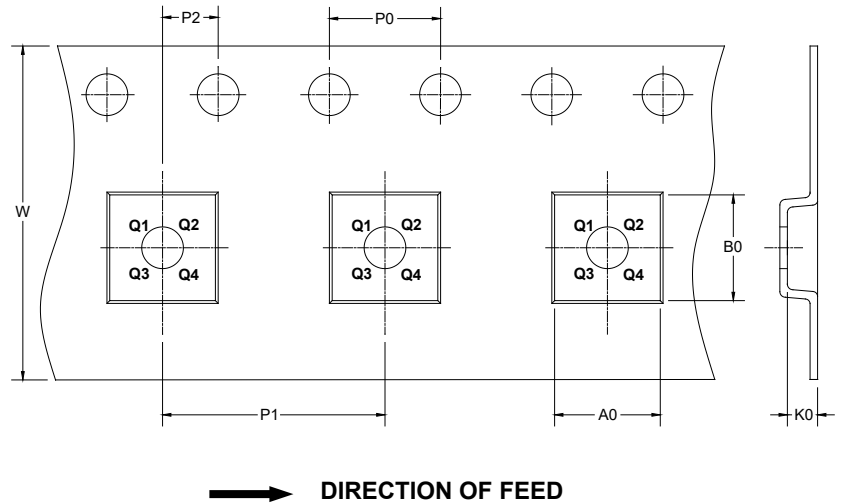
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

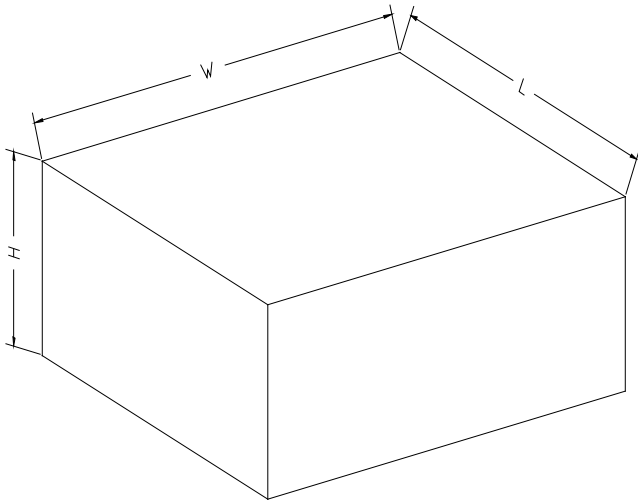
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TO-263-3A	13"	24.4	10.80	16.30	5.11	4.0	16.0	2.0	24.0	
TO-263-5B	13"	24.4	10.80	16.30	5.11	4.0	16.0	2.0	24.0	
TQFN-5×5-20L	13"	12.4	5.30	5.30	1.10	4.0	8.0	2.0	12.0	Q2

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
13"	386	280	370	5

DD0002