

General Description

The SGM2019-3.0Y N5G/TR series are a group of low-dropout (LDO)voltage regulators offering the benefits of wide input voltage range from 1.2V to 5.5V, low dropout voltage, low power consumption, and miniaturized packaging.

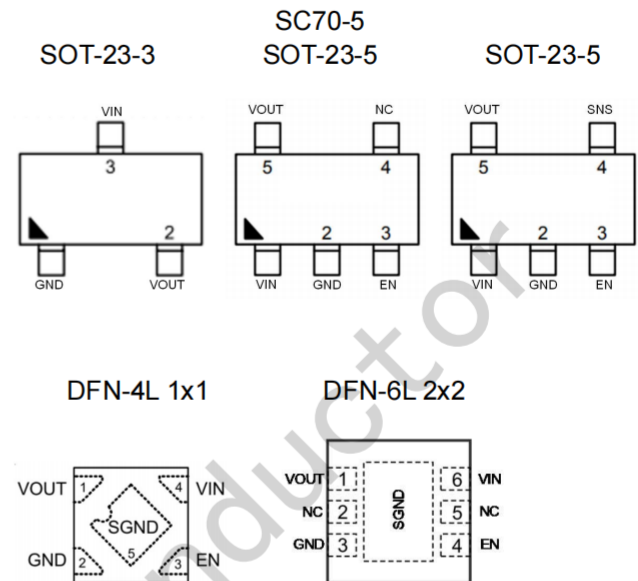
Quiescent current of only 2 μ A makes these devices ideal for powering the battery-powered, always-on systems that require very little idle-state power dissipation to a longer service life. There is an option of shutdown mode by selecting the parts with the EN pin and pulling it low. The shutdown current in this mode goes down to only 10nA (typical).

The SGM2019-3.0Y N5G/TR series of linear regulators are stable with the ceramic output capacitor over its wide input range from 1.2V to 5.5V and the entire range of output load current (0mA to 300mA).

Features

- 2 μ A Ground Current at no Load
- \pm 2% Output Accuracy
- 300mA Output Current
- 10nA Disable Current (by option)
- Wide Operating Input Voltage Range: 1.2V to 5.5V
- Dropout Voltage: 0.16V at 300mA/ VOUT 3.3V
- Support Fixed Output Voltage 0.8V, 0.9V, 1.2V, 1.5V, 1.6V, 1.8V, 2.5V, 2.8V, 3.0V, 3.3V
- Adjustable Output Voltage Available by Specific Application
- Stable with Ceramic or Tantalum Capacitor
- Current Limit Protection
- Over-Temperature Protection
- SOT-23-3, SOT-23-5, DFN-4L 1x1 and DFN-6L 2x2 Packages Available

Pin Configurations



Applications

- Portable, Battery Powered Equipment
- Low Power Microcontrollers
- Laptop, Palmtops and PDAs
- Wireless Communication Equipment
- Audio/Video Equipment
- Car Navigation Systems

Description of Functional Pins

SGM2019-3.0Y N5G/TR

| Pin No | | | | Pin Name | Pin Function |
|----------|----------|-------------|-------------|----------|--|
| SOT-23-3 | SOT-23-5 | DFN-1X1 | DFN-2X2 | | |
| 1 | 2 | 2 | 3 | GND | Ground |
| 2 | 5 | 1 | 1 | VOUT | Output of the Regulator |
| 3 | 1 | 4 | 6 | VIN | Input of Supply Voltage. |
| | 3 | 3 | 4 | EN | Enable Control Input. |
| | 4 | | 2,5 | NC | No internal connection |
| | | Exposed Pad | Exposed Pad | SGND | Substrate of Chip. Leave floating or tie to GND. |

SGM2019-3.0YN5G/TRN (For SOT-23-5 with SNS pin)

| Pin No | Pin Name | Pin Function |
|----------|----------|--------------------------|
| SOT-23-5 | | |
| 2 | GND | Ground |
| 5 | VOUT | Output of the Regulator |
| 1 | VIN | Input of Supply Voltage. |
| 3 | EN | Enable Control Input. |
| 4 | SNS | Sense of Output Voltage. |

Typical Application Circuit

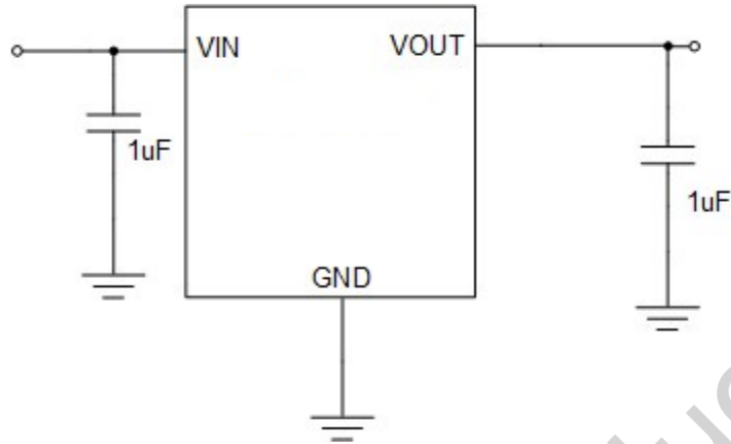


Figure 1: Application circuit of Fixed V_{OUT} LDO

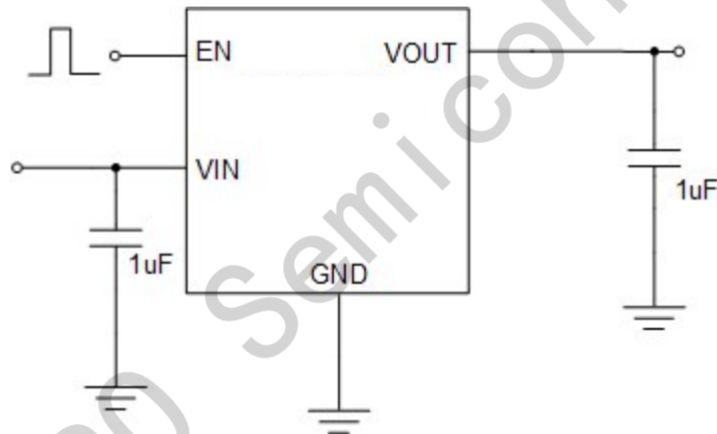


Figure 2: Application circuit of Fixed V_{OUT} LDO with enable function

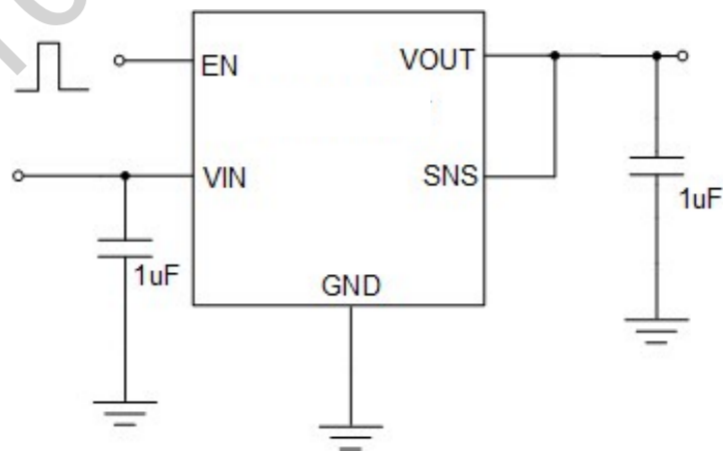


Figure 3: Application circuit of Fixed V_{OUT} LDO with enable and sense functions

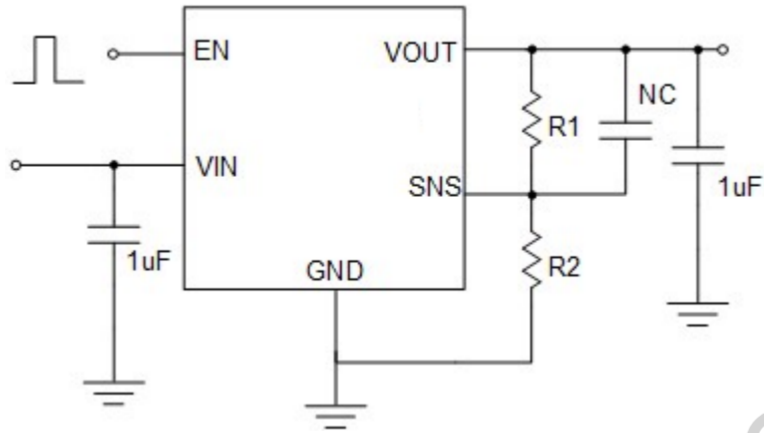
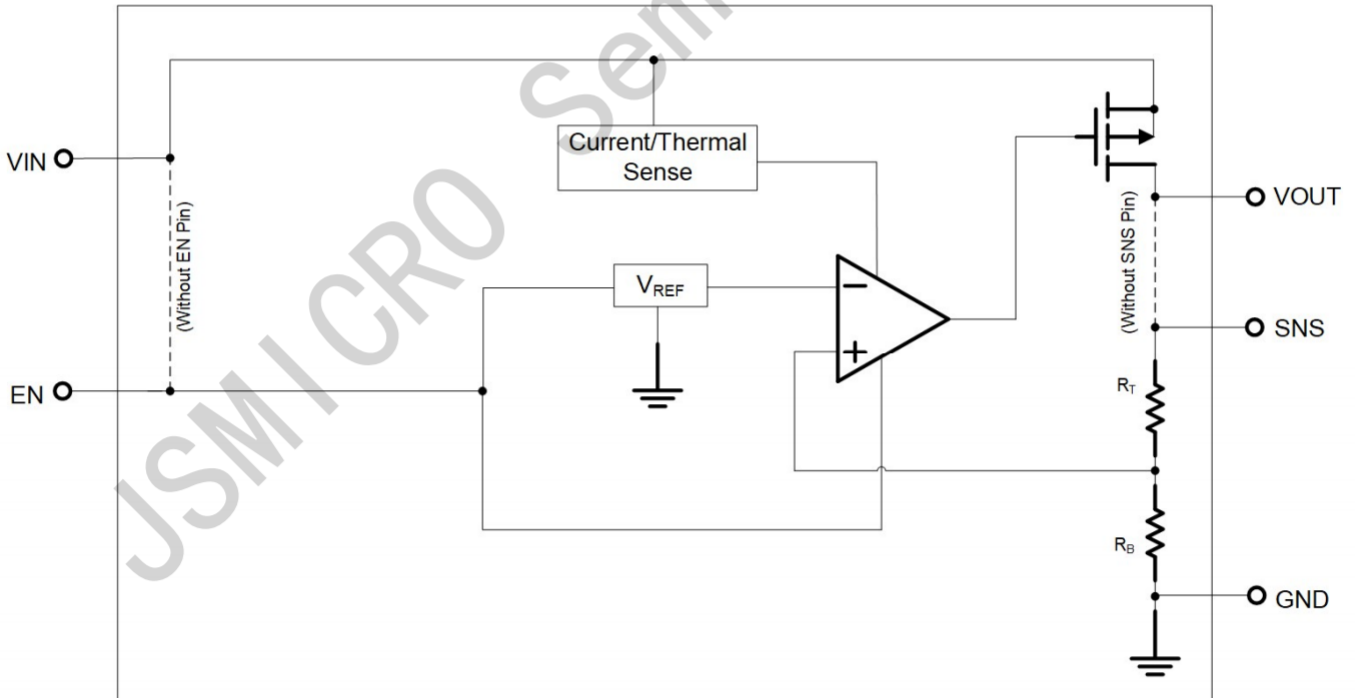


Figure 4: Adjustable output voltage LDO application circuit by SGM2019-3.0YN5G/TR

Function Block Diagram



Absolute Maximum Ratings (Note 1)

| | | |
|---------------------------------------|-------|------------------|
| VIN to GND | ----- | -0.3V to 6.5V |
| VOUT, EN, SNS to GND | ----- | -0.3V to 6V |
| VOUT to VIN | ----- | -6V to 0.3V |
| Package Thermal Resistance (Note 2) | | |
| SOT-23-5, SOT-23-3, θ_{JA} | ----- | 200 °C /W |
| DFN-4L 1x1, θ_{JA} | ----- | 130 °C /W |
| DFN-6L 2x2, θ_{JA} | ----- | 95 °C /W |
| Lead Temperature (Soldering, 10 sec.) | ----- | 260 °C |
| Junction Temperature | ----- | 150 °C |
| Storage Temperature Range | ----- | -60 °C to 150 °C |
| ESD Susceptibility | | |
| HBM | ----- | 2KV |
| MM | ----- | 200V |
| CDM | ----- | 2KV |

Recommended Operating Conditions

| | | |
|----------------------------|-------|------------------|
| Input Voltage VIN | ----- | 1.2V to 5.5V |
| Junction Temperature Range | ----- | -40 °C to 125 °C |
| Ambient Temperature Range | ----- | -40 °C to 85 °C |

Electrical Characteristics

($V_{IN} = 5V$, $V_{EN} = 5V$ $T_A = 25^\circ C$ unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|---|------------------|--|------------------|------|-----|------------|---------------|
| Supply Voltage | V_{IN} | | 1.2 | -- | 5.5 | V | |
| DC Output Voltage Accuracy | | $I_{LOAD} = 0.1mA$ | -2 | | 2 | % | |
| Dropout Voltage ($I_{LOAD} = 300mA$) (Note 3) | V_{DROP_3V} | $V_{OUT} \geq 3V$ | -- | 0.16 | | V | |
| | $V_{DROP_2.8V}$ | $V_{OUT} = 2.8V$ | | 0.18 | | | |
| | $V_{DROP_2.5V}$ | $V_{OUT} = 2.5V$ | | 0.2 | | | |
| | $V_{DROP_1.8V}$ | $V_{OUT} = 1.8V$ | | 0.25 | | | |
| | $V_{DROP_1.5V}$ | $V_{OUT} = 1.5V$ | | 0.31 | | | |
| | $V_{DROP_1.2V}$ | $V_{OUT} = 1.2V$ | | 0.41 | | | |
| | $V_{DROP_0.9V}$ | $V_{OUT} = 0.9V$ | | 0.61 | | | |
| Ground Current | I_Q | $I_{LOAD} = 0mA$ | | 2 | | μA | |
| Shutdown Ground Current | I_{SD} | $V_{EN} = 0V$, | | 0.01 | 0.5 | μA | |
| V_{OUT} Shutdown Leakage Current | I_{LEAK} | $V_{OUT} = 0V$ | | 0.01 | 0.5 | | |
| SNS Input Current | I_{SNS} | $SNS = V_{OUT}$ | | 0.7 | | μA | |
| Enable Threshold Voltage | V_{IH} | EN Rising | | | 2 | V | |
| | V_{IL} | EN Falling | 0.6 | | | | |
| EN Input Current | I_{EN} | $V_{EN} = 5V$ | | 10 | 100 | nA | |
| Line Regulation | $\Delta LINE$ | $I_{LOAD} = 30mA$, $1.5V \leq V_{IN} \leq 5.5V$ or $(V_{OUT} + 0.2V) \leq V_{IN} \leq 5.5V$ | | 0.2 | | % | |
| Load Regulation | $\Delta LOAD$ | $10mA \leq I_{LOAD} \leq 0.3A$ | | 0.2 | | % | |
| Output Current Limit | I_{LIM} | $V_{OUT} = 0$ | 301 | 600 | | mA | |
| Power Supply Rejection Ratio ($I_{LOAD} = 5mA$) | PSRR | $V_{OUT} = 1.2V$, | $f = 100Hz$ | -- | 80 | -- | dB |
| | | $V_{IN} = 2V$ | $f = 1kHz$ | -- | 75 | -- | |
| Output Voltage Noise (BW = 10Hz to 100kHz, $C_{OUT} = 1\mu F$.) | | $V_{IN} = 3.5V$ | $V_{OUT} = 0.9V$ | -- | 40 | -- | μV_{RMS} |
| | | $I_{LOAD} = 0.1A$ | $V_{OUT} = 2.8V$ | -- | 50 | -- | |
| Thermal Shutdown Temperature | T_{SD} | $I_{LOAD} = 10mA$ | -- | 155 | -- | $^\circ C$ | |
| Thermal Shutdown Hysteresis | ΔT_{SD} | | -- | 15 | -- | $^\circ C$ | |

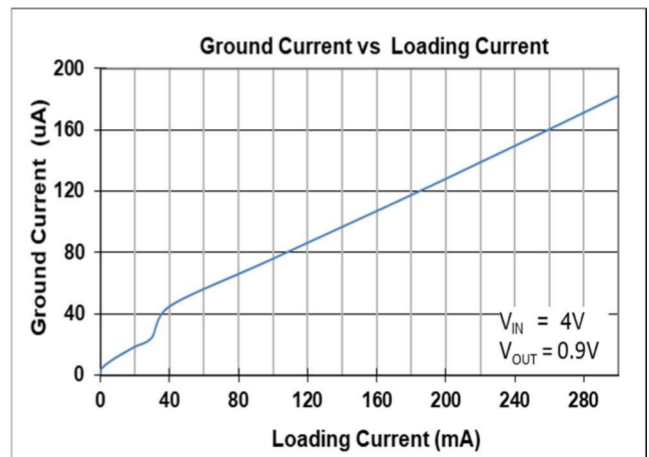
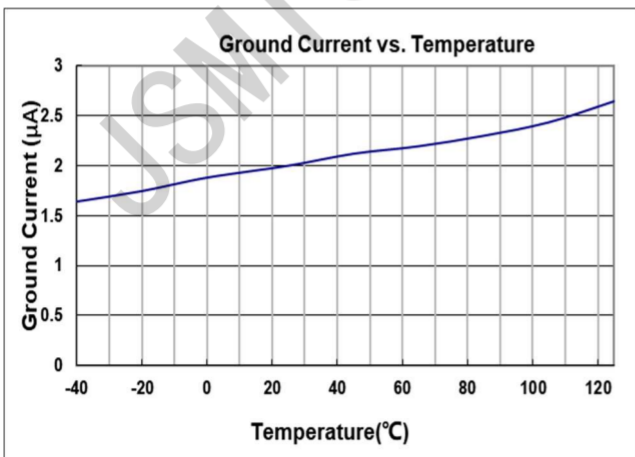
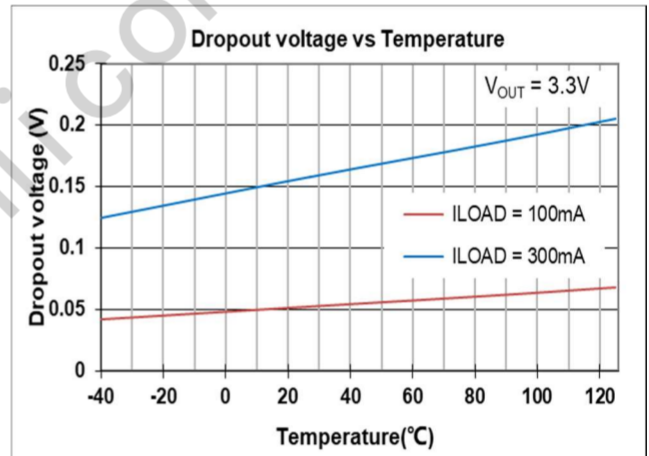
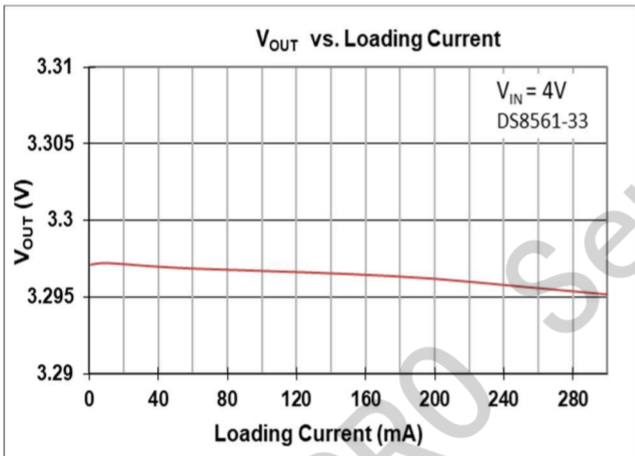
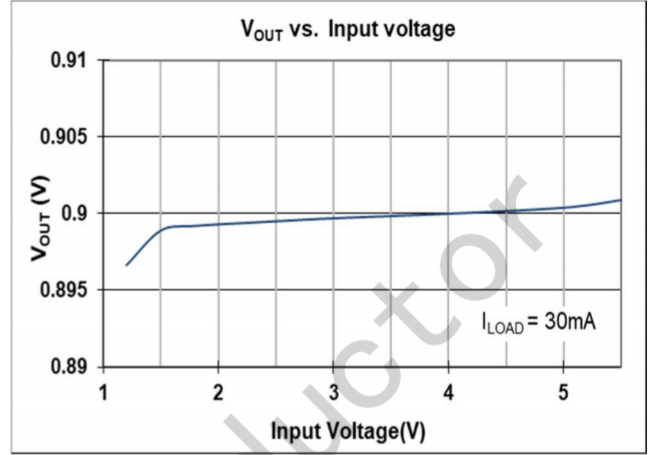
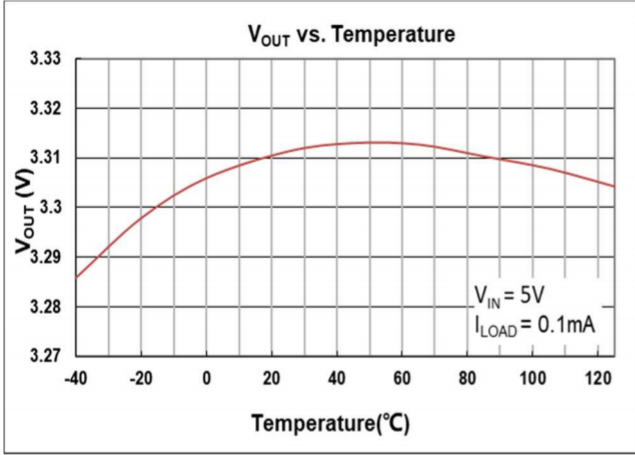
Note 1. Stresses beyond those listed “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions may affect device reliability.

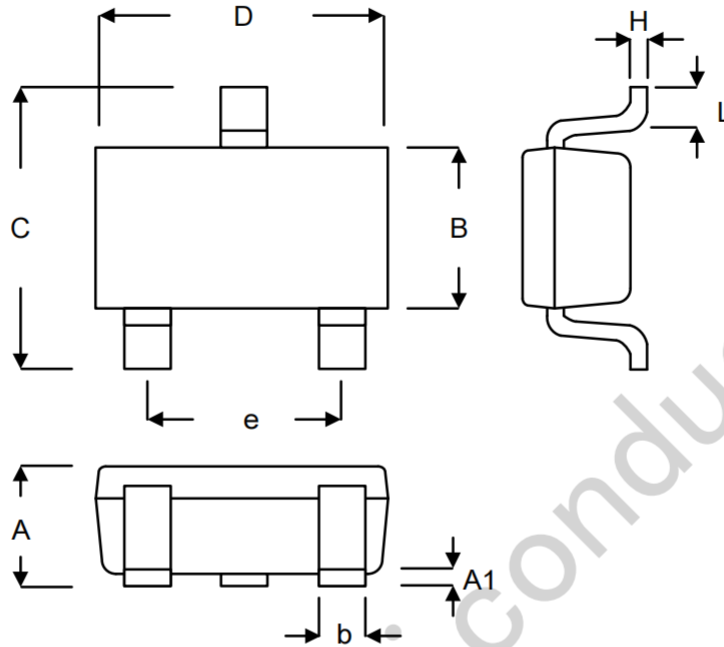
Note 2. θ_{JA} is measured at $T_A = 25^\circ\text{C}$ on a DSTECH EVB board.

Note 3. $V_{DROP} = V_{IN} - V_{OUT}$ when the V_{OUT} is 98% of its target value.

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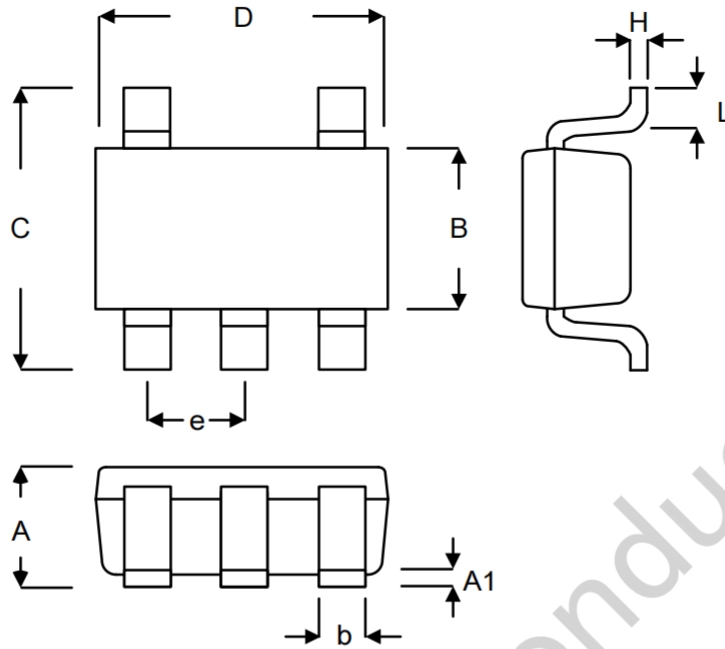
Typical Characteristics



Package Information:


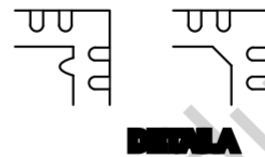
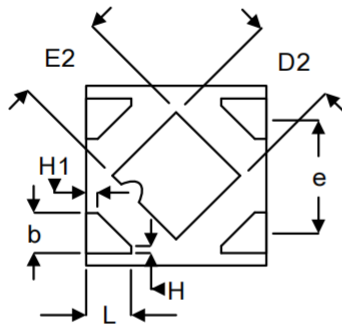
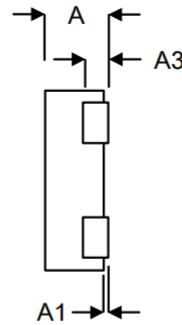
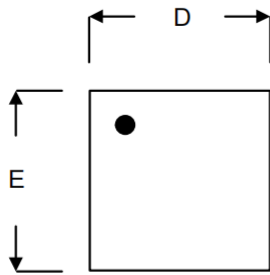
| Symbol | Millimeters | | Inches | |
|--------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.889 | 1.295 | 0.035 | 0.051 |
| A1 | 0.000 | 0.152 | 0.000 | 0.006 |
| B | 1.397 | 1.803 | 0.055 | 0.071 |
| b | 0.250 | 0.560 | 0.010 | 0.022 |
| C | 2.591 | 2.997 | 0.102 | 0.118 |
| D | 2.692 | 3.099 | 0.106 | 0.122 |
| e | 1.803 | 2.007 | 0.071 | 0.079 |
| H | 0.080 | 0.254 | 0.003 | 0.010 |
| L | 0.300 | 0.610 | 0.012 | 0.024 |

SOT-23-3L



| Symbol | Millimeters | | Inches | |
|--------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.889 | 1.295 | 0.035 | 0.051 |
| A1 | 0.000 | 0.152 | 0.000 | 0.006 |
| B | 1.397 | 1.803 | 0.055 | 0.071 |
| b | 0.250 | 0.560 | 0.010 | 0.022 |
| C | 2.591 | 2.997 | 0.102 | 0.118 |
| D | 2.692 | 3.099 | 0.106 | 0.122 |
| e | 0.838 | 1.041 | 0.033 | 0.041 |
| H | 0.080 | 0.254 | 0.003 | 0.010 |
| L | 0.300 | 0.610 | 0.012 | 0.024 |

SOT-23-5L

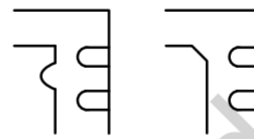
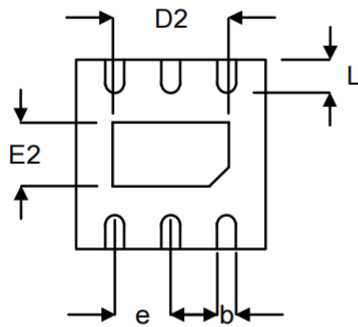
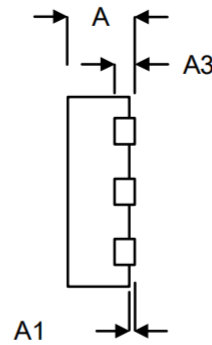
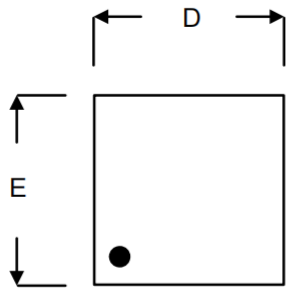


PIN #1 ID and Tie Bar Mark Options

Note : The configuration of the Pin #1 identifier is optional, but must be located within the zone indicated.

| Symbol | Millimeters | | Inches | |
|--------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.300 | 0.400 | 0.012 | 0.016 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| A3 | 0.117 | 0.162 | 0.005 | 0.006 |
| b | 0.175 | 0.280 | 0.007 | 0.011 |
| D | 0.900 | 1.100 | 0.035 | 0.043 |
| D2 | 0.430 | 0.550 | 0.017 | 0.022 |
| E | 0.900 | 1.100 | 0.035 | 0.043 |
| E2 | 0.430 | 0.550 | 0.017 | 0.022 |
| e | 0.650 | | 0.026 | |
| L | 0.200 | 0.300 | 0.008 | 0.012 |
| H | 0.039 | | 0.002 | |
| H1 | 0.064 | | 0.003 | |

DFN-1X1-4L


DFN

PIN #1 ID and Tie Bar Mark Options
 Note : The configuration of the Pin #1 identifier is optional, but must be located within the zone indicated.

| Symbol | Millimeters | | Inches | |
|--------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.700 | 0.800 | 0.028 | 0.031 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| A3 | 0.175 | 0.250 | 0.007 | 0.010 |
| b | 0.200 | 0.350 | 0.008 | 0.014 |
| D | 1.950 | 2.050 | 0.077 | 0.081 |
| D2 | 1.000 | 1.450 | 0.039 | 0.057 |
| E | 1.950 | 2.050 | 0.077 | 0.081 |
| E2 | 0.500 | 0.850 | 0.020 | 0.033 |
| e | 0.650 | | 0.026 | |
| L | 0.300 | 0.400 | 0.012 | 0.016 |

DFN-2X2-6L

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