## GENERAL DESCRIPTION

The CM2839 family is a positive voltage linear regulator developed utilizing CMOS technology featured low quiescent current (30µA typ.), low dropout voltage, and high output voltage accuracy, making them ideal for battery applications. EN input connected to CMOS has low bias current. The space-saving SOT-23-5 package is attractive for “Pocket” and “Hand Held” applications.

These rugged devices have both Thermal Shutdown, and Current limit to prevent device failure under the “Worst” of operating conditions.

In application requiring a low noise, regulated supply, place a 1000pF capacitor between Bypass and Ground.

The CM2839 is stable with a Low ESR output capacitance of 1.0µF or greater.

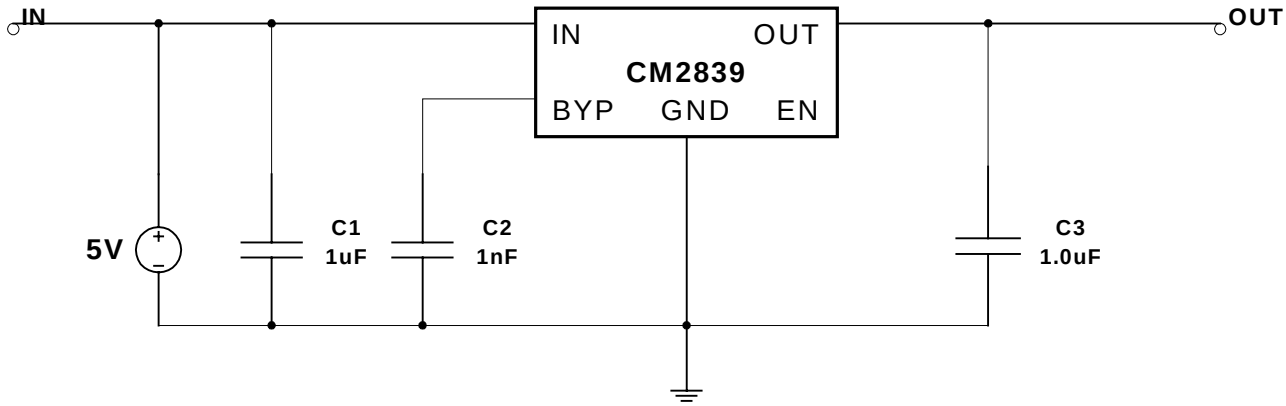
## FEATURES

- Very Low Dropout Voltage
- Low Current Consumption: Typ. 30µA, Max. 35µA
- Output Voltage: 3.3V
- High Accuracy Output Voltage: +/- 1.5%
- Guaranteed 300mA Output
- Input Range up to 7.0V
- Thermal Shutdown
- Current Limiting
- Stability with Low ESR Capacitors
- Compact Package: SOT-23-5
- Factory Pre-set Output Voltages
- Low Temperature Coefficient

## APPLICATIONS

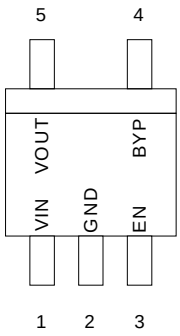
- Battery-powered devices
- Personal communication devices
- Home electric/electronic appliances
- PC peripherals

## TYPICAL APPLICATIONS

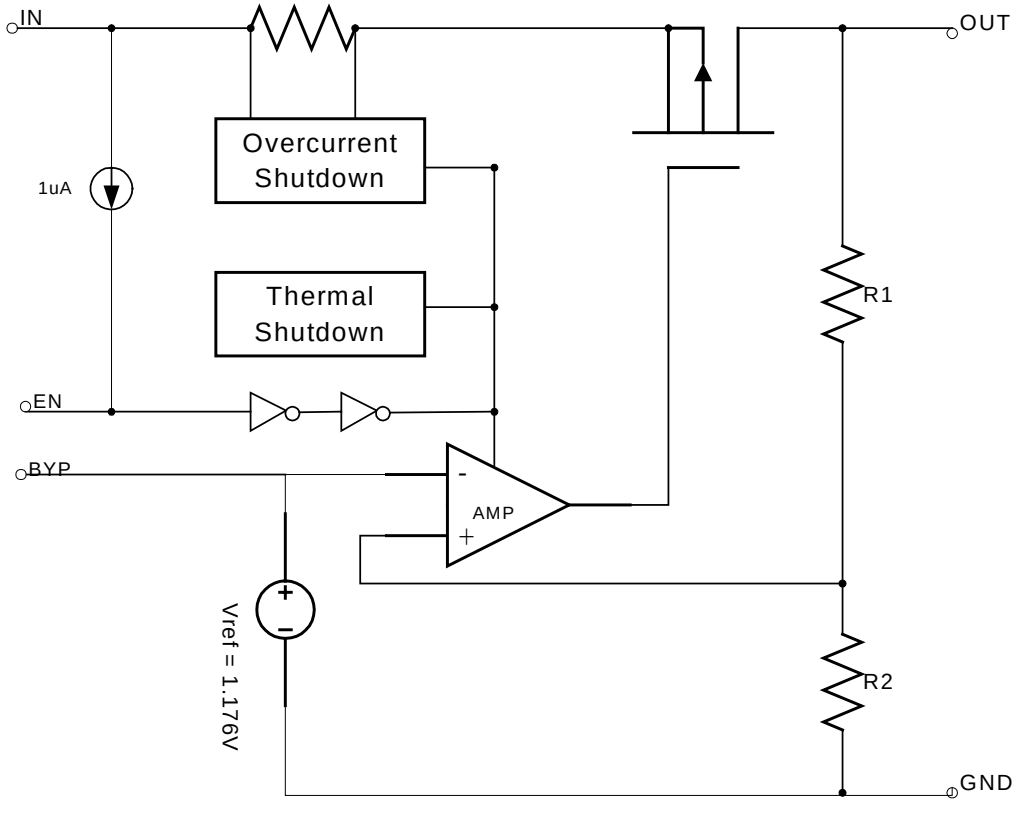


## PIN CONFIGURATION

SOT-23-5
Top View




## BLOCK DIAGRAM



## ORDERING INFORMATION

| Part Number | Output Voltage | Temperature Range | Package |
|---|---|---|---|
| CM2839SIM25 | 3.3V | -40℃ ~ +85℃ | SOT-23-5 |
| CM2839GSIM25 | 3.3V | -40℃ ~ +85℃ | SOT-23-5 |

**Note: For other pre-set output voltage requirements, please contact Champion Sales office.**

## ABSOLUTE MAXIMUM RATINGS

Input Voltage …… +7V
Output Current …… $P_D$ / ($V_{IN}$ - Vo) mA
Output Voltage …… GND-0.3V to $V_{IN}$+0.3V
ESD Classification …… B

## OPERATING RATINGS

Ambient Temperature Range ($T_A$) …….. -40℃ to +85℃
Junction Temperature Range …….. -40℃ to +125℃

## THERMAL INFORMATION

| Parameter | | Maximum | Unit |
|---|---|---|---|
| Thermal Resistance ($\Theta_{jc}$) | SOT-23-5 | 160 | ℃/W |
| Internal Power Dissipation ($P_D$) ($\Delta T$ = 100℃) | SOT-23-5 | 250 | ℃/W |
| Maximum Junction Temperature | | 150 | ℃ |
| Maximum Lead Temperature (10 Sec) | | 300 | ℃ |

Caution: Stress above the listed absolute rating may cause permanent damage to the device.

## ELECTRICAL CHARACTERISTICS

$T_A$ = +25℃; unless otherwise noted

| Parameter | Symbol | Test Conditions | | CM2839 Min. | CM2839 Typ. | CM2839 Max. | Unit |
|---|---|---|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | | | **Note 1** | | 7 | V |
| Output Voltage Accuracy | $V_{OUT}$ | $I_O$ = 1mA to 300mA | | -1.5 | | 1.5 | % |
| Dropout Voltage | $V_{DROPOUT}$ | $I_O$ = 300mA, $V_{OUT}=V_{O(NOM)}$-1.5%, | 1.2V<$V_{O(NOM)}$≤2.0V | | | 1300 | mV |
| | | | 2.0V<$V_{O(NOM)}$≤2.5V | | | 800 | |
| | | | 2.5V<$V_{O(NOM)}$ | | | 300 | |
| Output Current | $I_O$ | $V_{OUT}$ > 1.2V | | 300 | | | mA |
| Current Limit | $I_{LIM}$ | $V_{OUT}$ > 1.2V | | 300 | 450 | | mA |
| Quiescent Current | $I_Q$ | $I_O$ = 0mA | | | 30 | 35 | μA |
| Ground Pin Current | $I_{GND}$ | $I_O$ = 1mA to 300mA | | | 30 | 50 | μA |
| Line Regulation | $REG_{LINE}$ | $I_{OUT}$=5mA, $V_{IN}=V_{OUT}$+1 to $V_{OUT}$+2 | | -0.1 | 0.02 | 0.1 | % |
| Load Regulation | $REG_{LOAD}$ | $I_O$=1mA to 300mA | | | 0.2 | 1 | % |
| Over Temperature Shutdown | OTS | | | | 150 | | ℃ |
| Over Temperature Hysteresis | OTH | | | | 30 | | ℃ |
| $V_{OUT}$ Temperature Coefficient | TC | | | | 40 | | ppm/℃ |
| Power Supply Rejection | PSRR | $I_O$ = 100mA, $C_O$=2.2μF ceramic | f=1kHz | | 60 | | dB |
| | | | f=10kHz | | 50 | | |
| | | | f=100kHz | | 40 | | |
| Power Supply Rejection | PSRR | $I_O$ = 100mA, $C_O$=2.2μF ceramic, $C_{BYP}$=0.01μF | f=1kHz | | 75 | | dB |
| | | | f=10kHz | | 55 | | |
| | | | f=100kHz | | 30 | | |
| Output Voltage Noise | eN | f=10Hz to 100kHz, $I_O$ = 10mA, $C_{BYP}$=0μF | $C_O$=2.2μF | | 30 | | μVrms |
| | | | $C_O$=100μF | | 20 | | |
| Output Voltage Noise | eN | f=10Hz to 100kHz, $I_O$ = 10mA, $C_{BYP}$=0.01μF | $C_O$=2.2μF | | 30 | | μVrms |
| | | | $C_O$=100μF | | 20 | | |
| Shutdown Supply Current | $I_{SD}$ | $V_{IN}$=5.0V, $V_{OUT}$=0V, $V_{EN}$ < $V_{EL}$ | | | 0.2 | 1.0 | μA |
| EN Input Bias Current | $I_{EH}$ | $V_{EN}=V_{IN}$, $V_{IN}$=2.6V to 7V | | | | 0.1 | μA |
| | $I_{EL}$ | $V_{EN}$=0, $V_{IN}$=2.6V to 7V | | | 0.2 | 1.0 | μA |
| EN Input Threshold | $V_{EH}$ | $V_{IN}$=2.6V to 7V | | 2 | | $V_{IN}$ | V |
| | $V_{EL}$ | $V_{IN}$=2.6V to 7V | | 0 | | 0.4 | V |

**Note 1.** $V_{IN(MIN)} = V_{OUT} + V_{DROPOUT}$

## DETAILED DESCRIPTION

The CM2839 family of CMOS regulators contain a PMOS pass transistor, voltage reference, error amplifier, over-current protection, thermal shutdown.

The P-channel pass transistor receives data from the error amplifier, over-current shutdown, short output protection, and thermal protection circuits. During normal operation, the error amplifier compares the output voltage to a precision reference. Over-current and Thermal shutdown circuits become active when the junction temperature exceeds 150℃, or the current exceeds 300mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120℃.

The CM2839 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress.

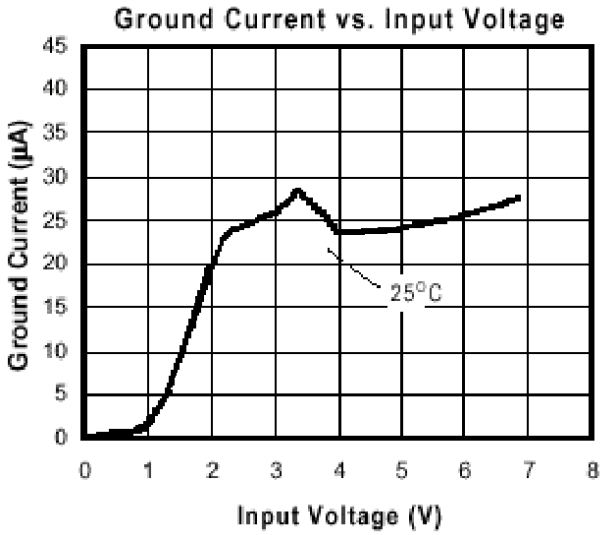
## ENABLE

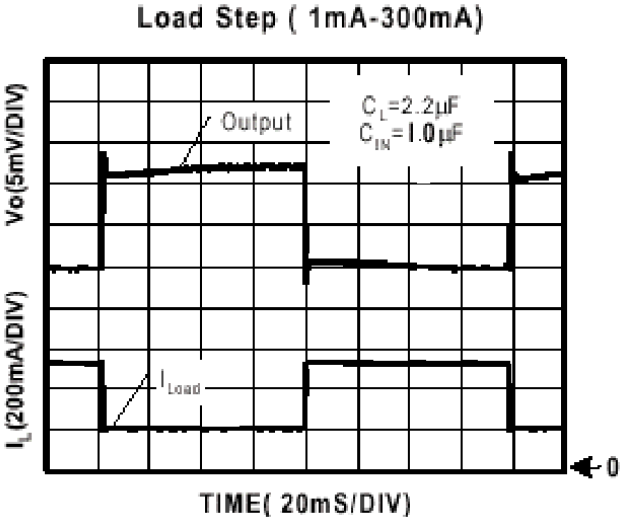
The Enable pin normally floats high. When actively, pulled low, the PMOS pass transistor shut off, and all internal circuits are powered down. In this state, the quiescent current is less than 2μA. This pin behaves much like an electronic switch.

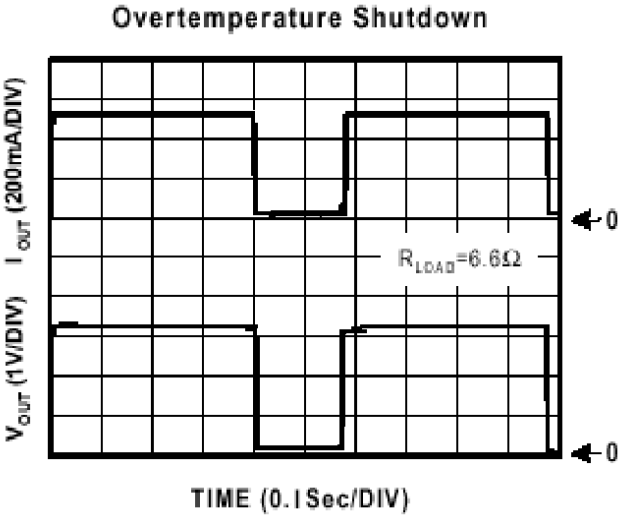
## EXTERNAL CAPACITOR

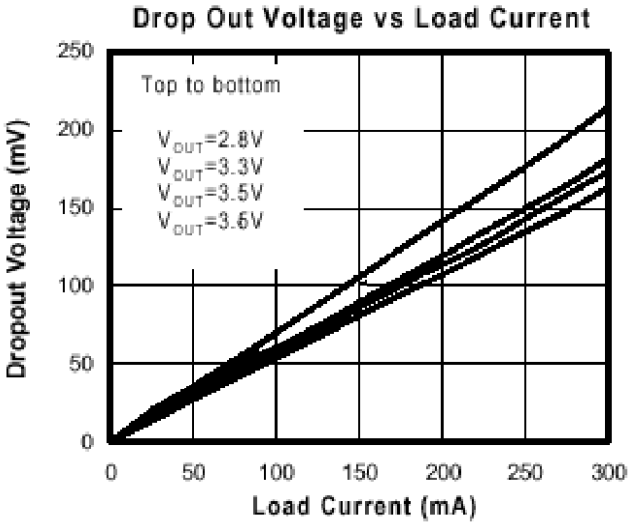
The CM2839 is stable with a Low ESR output capacitor to ground of 1.0μF or greater. It can keep stable even with higher ESR capacitors. A second capacitor is recommended between the input and ground to stabilize VIN. The input capacitor should be larger than 0.1μF to have a beneficial effect. All capacitors should be placed in close proximity to the pins. A “quiet” ground termination is desirable.

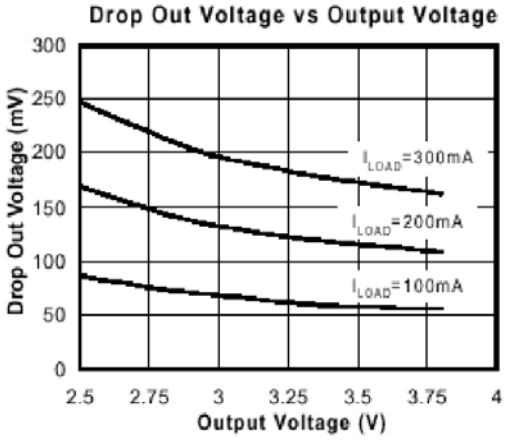
## TYPICAL CHARACTERISTICS

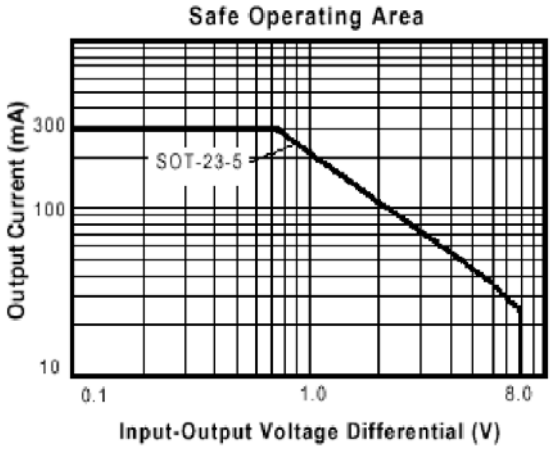


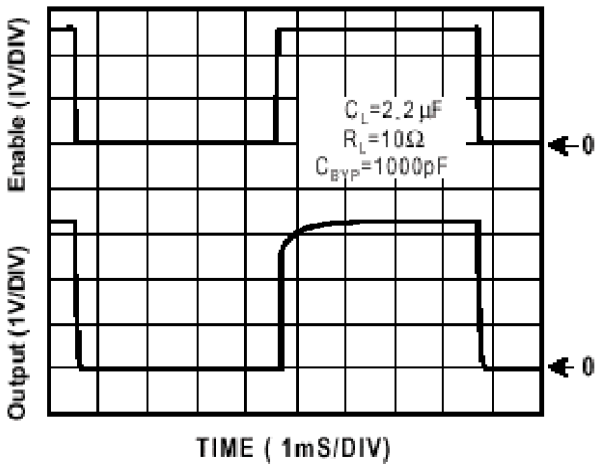



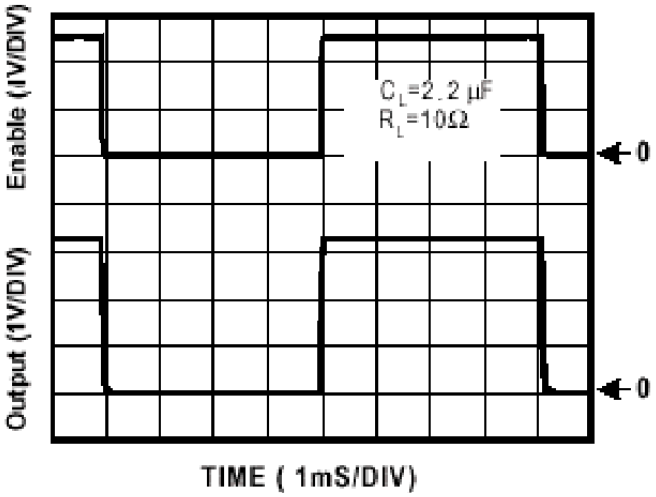



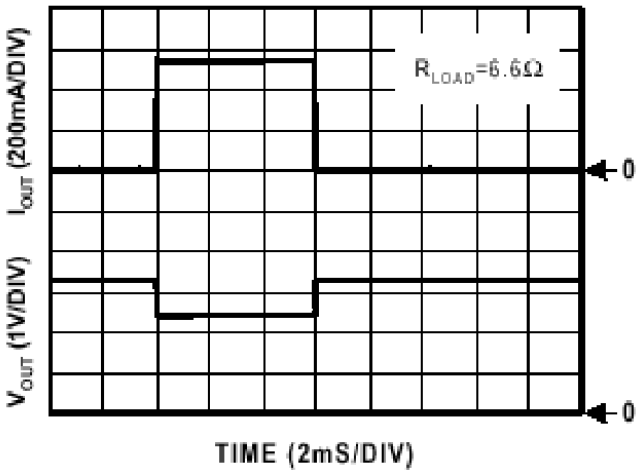
Chip Enable Transient Response




Chip Enable Transient Response

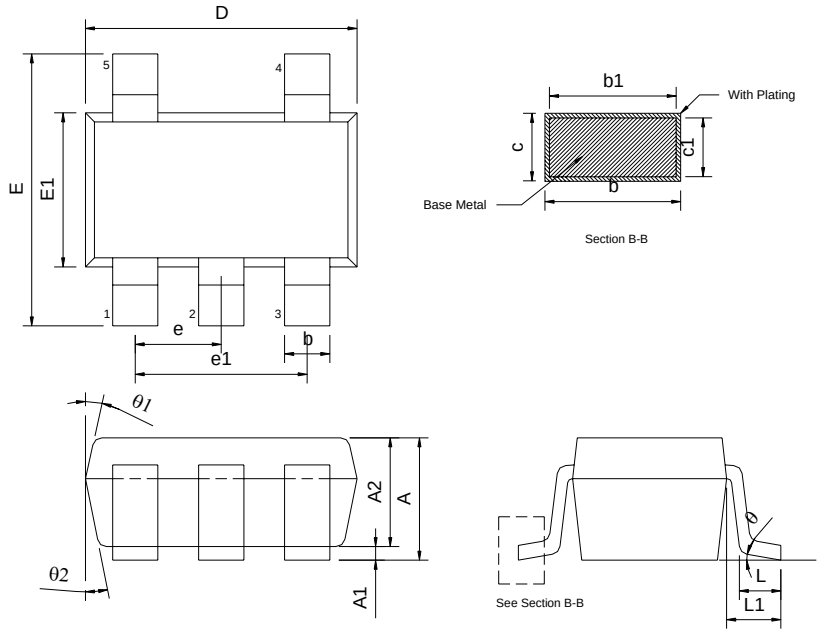



Current Limit Response



## PACKAGE DIMENSION

### SOT-23-5 (M25)




| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHS | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.05 | --- | 1.35 | 0.041 | --- | 0.053 |
| A1 | 0.05 | --- | 0.15 | 0.002 | --- | 0.006 |
| A2 | 1.00 | 1.10 | 1.20 | 0.039 | 0.043 | 0.047 |
| b | 0.25 | --- | 0.50 | 0.010 | --- | 0.020 |
| b1 | 0.25 | 0.40 | 0.45 | 0.010 | 0.016 | 0.018 |
| c | 0.08 | --- | 0.20 | 0.003 | --- | 0.008 |
| c1 | 0.08 | 0.11 | 0.15 | 0.003 | 0.004 | 0.006 |
| D | 2.70 | 2.90 | 3.00 | 0.106 | 0.114 | 0.118 |
| E | 2.60 | 2.80 | 3.00 | 0.102 | 0.110 | 0.118 |
| E1 | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |
| L | 0.35 | 0.45 | 0.55 | 0.014 | 0.018 | 0.022 |
| L1 | 0.60 REF | | | 0.024 REF | | |
| e | 0.95 BSC | | | 0.037 BSC | | |
| e1 | 1.90 BSC | | | 0.075 BSC | | |
| θ | 0° | 5° | 10° | 0° | 5° | 10° |
| θ1 | 3° | 5° | 7° | 3° | 5° | 7° |
| θ2 | 6° | 8° | 10° | 6° | 8° | 10° |
| | | | | | | |
| | | | | | | |

## NUMBERING SCHEME

**Ordering Number**: CM2839**XYZ (note1)**
**Ordering Number**: CM2839**GXYZ (note2)**

**note1**:
CM2839: 300mA CMOS LDO with enable
X : Suffix for voltage output (note 3)
Y : Suffix for Temperature Range (note 4)
Z : Suffix for Package Type (note 5)

**note2**:
CM2839: 300mA CMOS LDO with enable
G : Suffix for Pb Free Product
X : Suffix for voltage output (note 3)
Y : Suffix for Temperature Range (note 4)
Z : Suffix for Package Type (note 5)

**note 3**: see CMOS LDO Voltage Suffix Table
***CM2839 will provide S(3.3V)***

**note 4**:
Y= I : -40℃~+85℃ (only I grade support for all CMOS LDOs)

**note 5:**
Z is single alphabet with or without digits
M25 : SOT-25 (TR only)

**CMOS LDO Voltage Suffix Table**

| Output Voltage | Suffix | Output Voltage | Suffix |
|---|---|---|---|
| 1.5V | A | 3.0V | P |
| 1.6V | B | 3.1V | Q |
| 1.7V | C | 3.2V | R |
| 1.8V | D | 3.3V | S |
| 1.9V | E | 3.4V | T |
| 2.0V | F | 3.5V | U |
| 2.1V | G | 3.6V | V |
| 2.2V | H | 3.7V | W |
| 2.3V | I | 3.8V | X |
| 2.4V | J | 3.9V | Y |
| 2.5V | K | 4.0V | Z |
| 2.6V | L | | |
| 2.7V | M | | |
| 2.8V | N | | |
| 2.9V | O | | |

## IMPORTANT NOTICE

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