## 1A SYNCHRONOUS BUCK SWITCHER WITH FET ON BOARD

**Production Datasheet**

Pb Free Product

## DESCRIPTION

The NX4108-12 is a current mode PWM buck switcher with internal compensation and fixed 1.2V output voltage, can provide up to 1A output current with FET on board. It operates from 2.8V to 5.5V which is ideal for the application with single cell Li-Ion battery as well as other 3.3V input bus supply applications. Switching frequency is fixed 1MHz, small surface mount inductors and capacitors are allowed to use, make it good for portable applications.

NX4108-12 is available in 5-pin SOT23 package.

## FEATURES

- 2.8 to 5.5V Input Voltage
- Fixed 1.2V Output Voltage
- 5-pin SOT23 Package
- 1MHz Fixed Frequency PWM Operation
- Internally-compensated Current Mode Controller
- Peak Current Limit with HICCUP Feature and Over Temperature Protection
- Prebias Start-up Operation
- Pb-free and RoHS Compliant

## APPLICATIONS

- Li-Ion Battery Operated Portable System
- Cellular Phones
- Portable Applications
- USB Devices

## TYPICAL APPLICATION
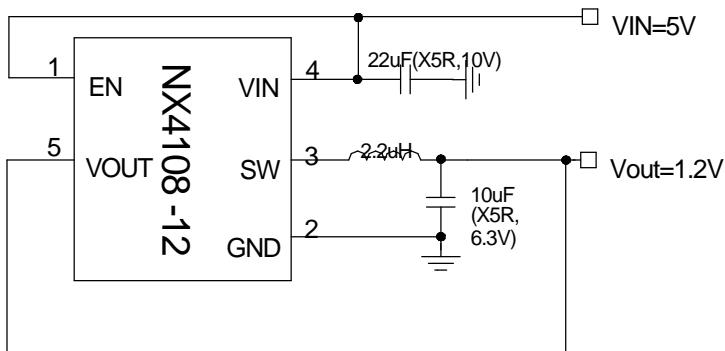


Figure1 - Typical application of NX4108-12

## ORDERING INFORMATION

| Device | Temperature | Package | Pb-Free |
|---|---|---|---|
| NX4108-12CZ1TR | -40°C to 85°C | SOT23-5L | Yes |

Rev. 1.1
06/30/10

*Microsemi*
Analog Mixed Signal Group
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## ABSOLUTE MAXIMUM RATINGS

VIN to GND .............................................................. -0.3V to 6V
SW,VOUT,EN to GND ..................................................... -0.3V to VIN + 0.3V
ESD Susceptibility ............................................... 1kV
Lead Temperature(Soldering,10sec.) ................................. 300°C
Storage Temperature Range .............................................. -55°C to 150°C
Operating Junction Temperature Range ............................... -40°C to 150°C

CAUTION: Stresses above those listed in "ABSOLUTE MAXIMUM RATINGS", may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

## PACKAGE INFORMATION

5-LEAD PLASTIC SOT23

$\theta_{JA} \approx 110°C/W$

| EN | 1 | | 5 | VOUT |
| GND | 2 | | | |
| SW | 3 | | 4 | VIN |
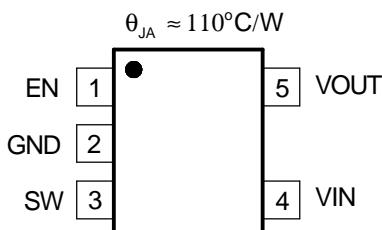
## ELECTRICAL SPECIFICATIONS

$V_{IN}$=3.5V. Typical data refers to $T_A$= 25°C. Unless otherwise specified.

| PARAMETER | SYM | Test Condition | Min | TYP | MAX | Units |
|---|---|---|---|---|---|---|
| **V$_{OUT}$ Voltage** | | | | | | |
| V$_{OUT}$ Voltage | V$_{OUT}$ | | 1.168 | 1.2 | 1.232 | V |
| **Line Regualtion** | | | | | | |
| Line Regulation | | VIN=3V to 5V,IOUT=10mA | | 2 | | mV |
| **VIN UVLO** | | | | | | |
| VIN Rising Threshold | | | 2.3 | 2.5 | 2.8 | V |
| VIN Falling Threshold | | | | 2.3 | | V |
| **Supply Voltage(VIN)** | | | | | | |
| VIN Input Voltage Range | V$_{IN}$ | | 2.8 | | 5.5 | V |
| Shutdown Current | I$_{shutdown}$ | EN=GND | | 1 | 5.0 | uA |
| Quiescent Current | I$_q$ | No Load, switching | | 15 | | mA |
| **Oscillator (Rt)** | | | | | | |
| Frequency | F$_S$ | | 900 | 1000 | 1300 | kHz |
| Max Duty Cycle | | | 78 | 85 | | % |
| Min ON time | | | | 100 | | nS |
| **SS** | | | | | | |
| Soft Start time | Tss | | | 500 | | uS |

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| PARAMETER | SYM | Test Condition | Min | TYP | MAX | Units |
|-----------|-----|----------------|-----|-----|-----|-------|
| **Current Limit** | | | | | | |
| Current Limit Threshold | | | | 1.8 | | A |
| **Thermal Shutdown** | | | | | | |
| Thermal shutdown trip point | | | | 155 | | °C |
| Hysteresis | | | | 15 | | °C |
| **Internal Switch** | | | | | | |
| Rdson of Control FET | | VIN=5V | | 400 | | mohm |
| | | VIN=3.3V | | 480 | | |
| Rdson of Synchronous FET | | VIN=5V | | 300 | | mohm |
| | | VIN=3.3V | | 360 | | |
| **Enable** | | | | | | |
| En low Threshold voltage | | | | | 0.4 | V |
| En high Threshold voltage | | | 2.0 | | | V |

## PIN DESCRIPTIONS

| PIN SYMBOL | PIN DESCRIPTION |
|------------|-----------------|
| SW | SW output. Junction of the internal high-side and low-side power MOSFETs, and output inductor. |
| GND | Ground Connection for Chip. Connect GND with large copper areas to the input and output supply returns, and negative terminals of the input and output capacitors. |
| VOUT | Sense output voltage . |
| VIN | Supply voltage input for switcher. |
| EN | Enable input. Set this pin to GND or less than 0.4V will shut down the regulator. Enable signal can not be high when VIN is low. |

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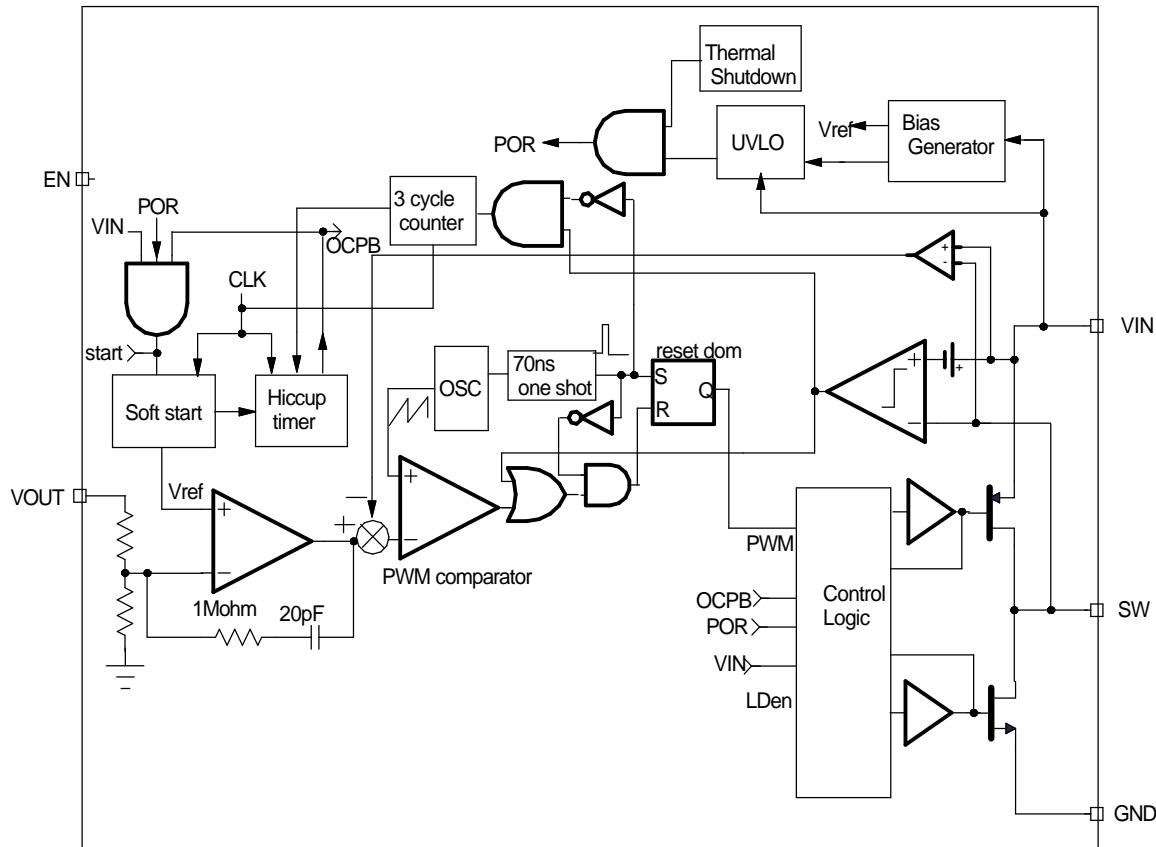
# BLOCK DIAGRAM



Figure 2 - Simplified block diagram of the NX4108-12

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## Typical Operating Characteristics

Normalized frequency vs temperature
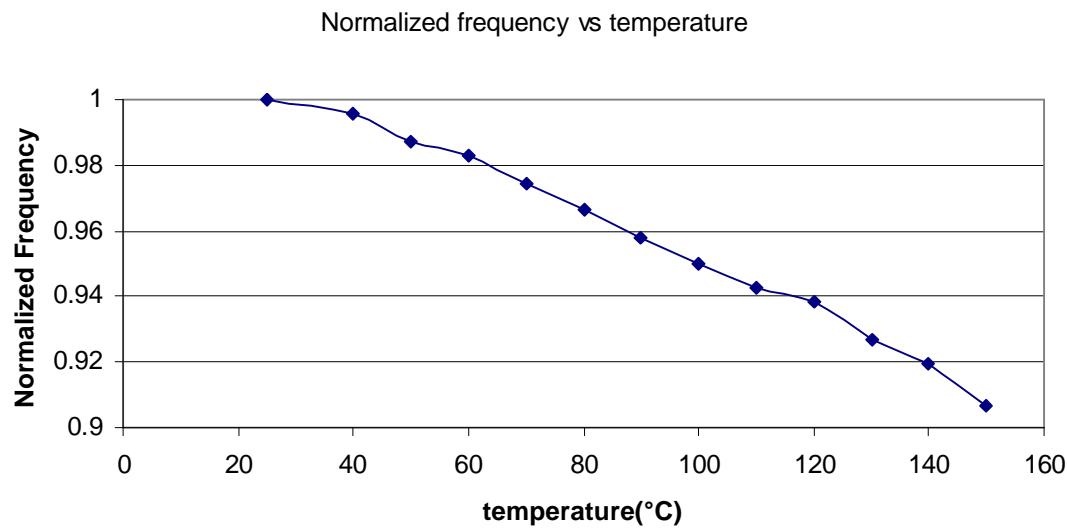


Fig.3- Normalized frequency vs temperature

## VOUT vs. Temperature
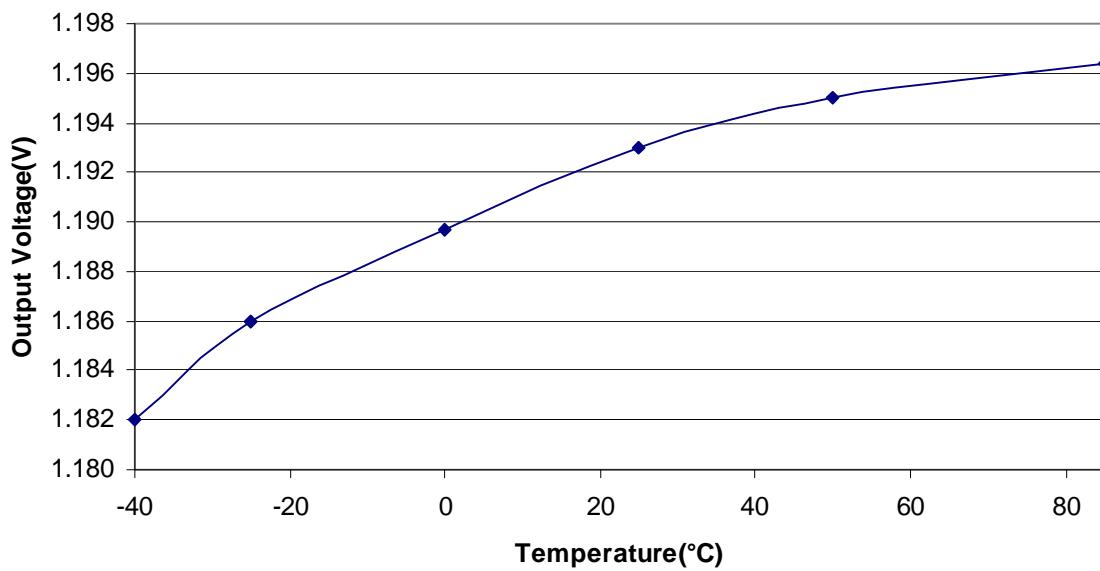


Figure 4 - Output voltage vs temperature(VIN=5V, NO LOAD)

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**Typical Application**
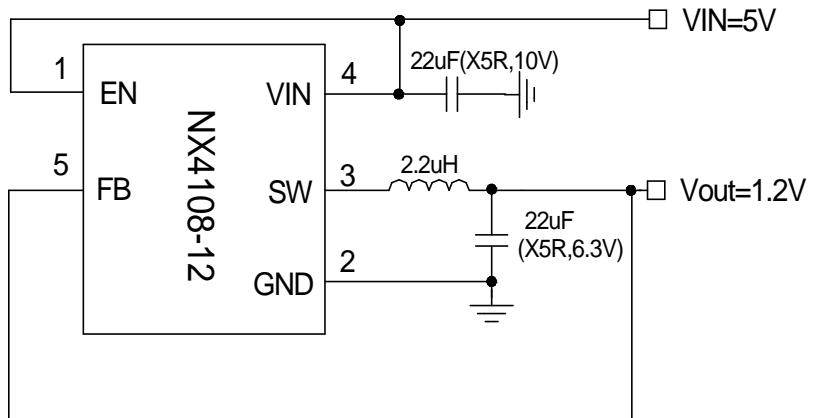


Figure 5 - Demo board schematic
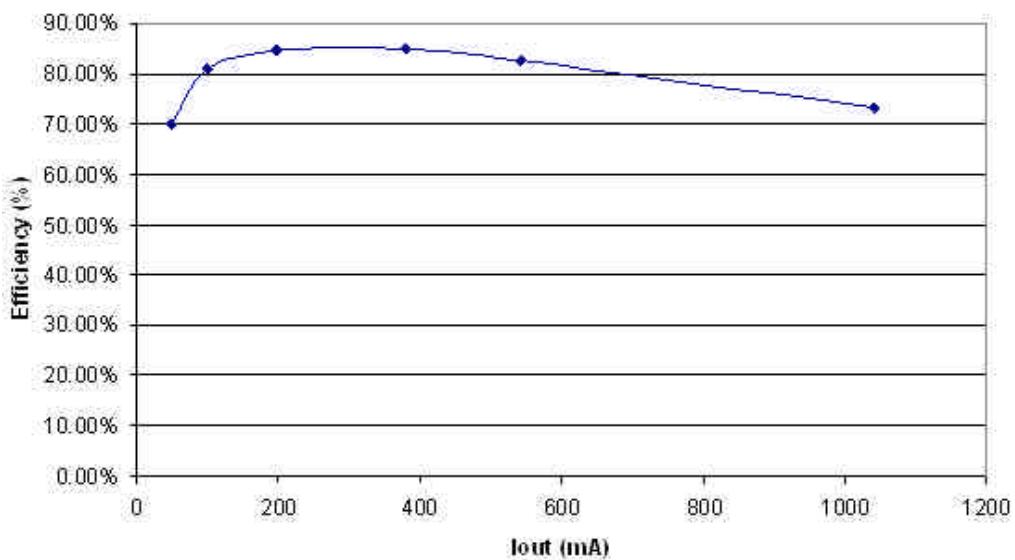


Figure 6 - Efficiency(VIN=5V)

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## Typical Application Waveforms and Efficiency
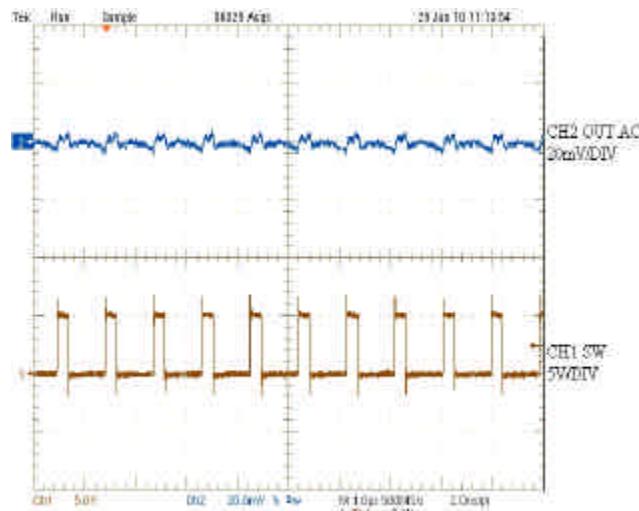


Figure 7 - Output ripple
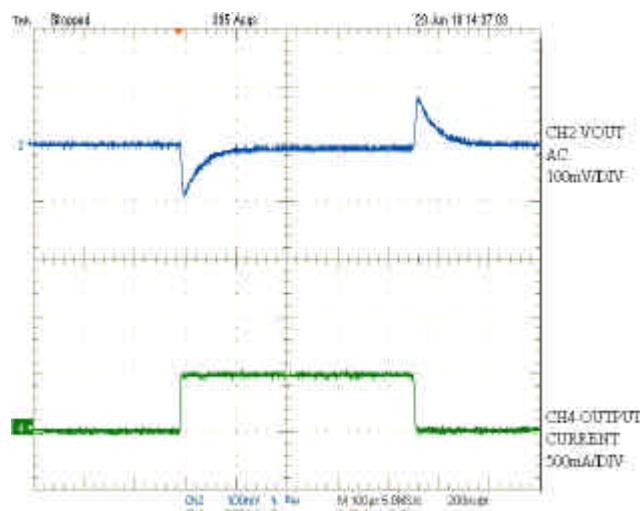


Figure 8 - Transient response
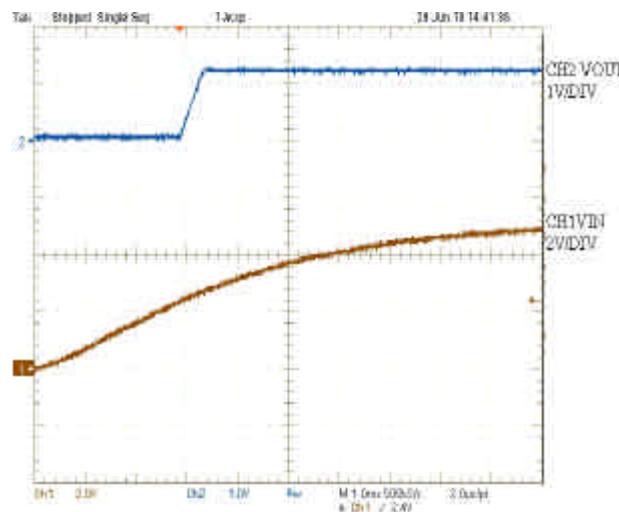


Figure 9 - Startup
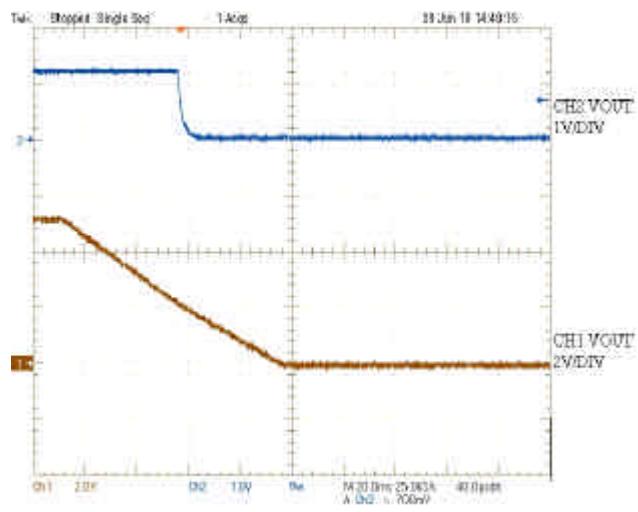


Figure 10 - Shutdown
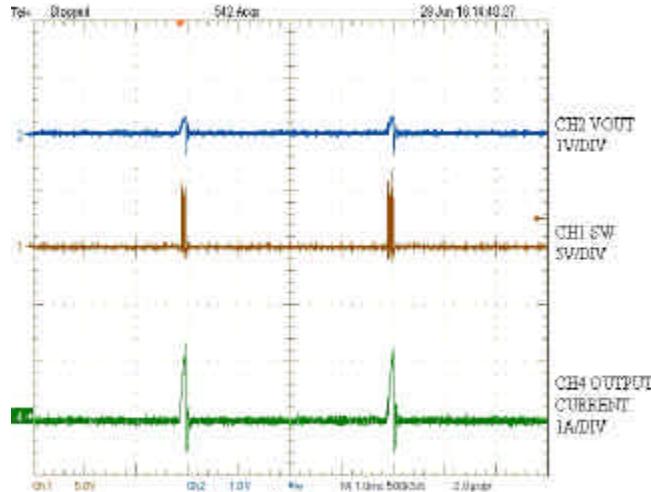


Figure 11 - Output Short

## SOT23-5 Outline Dimensions

2.90±0.100 /3\

0.950
TYP.

0.950
TYP.

1.60±0.100 /3\

2.80±0.200

0.350(MIN)
0.500(MAX)
(6 PLCS)

10° TYP.
(2 plcs)

1.15±0.150

SEATING PLANE

10° TYP.
(2 plcs)

0.05(MIN)
0.15(MAX)

10° TYP.
(2 plcs)

0.127 /3\

10° TYP.
(2 plcs)

0° ~ 3°

0.20 BSC
Gauge Plane

0.45 ±0.10
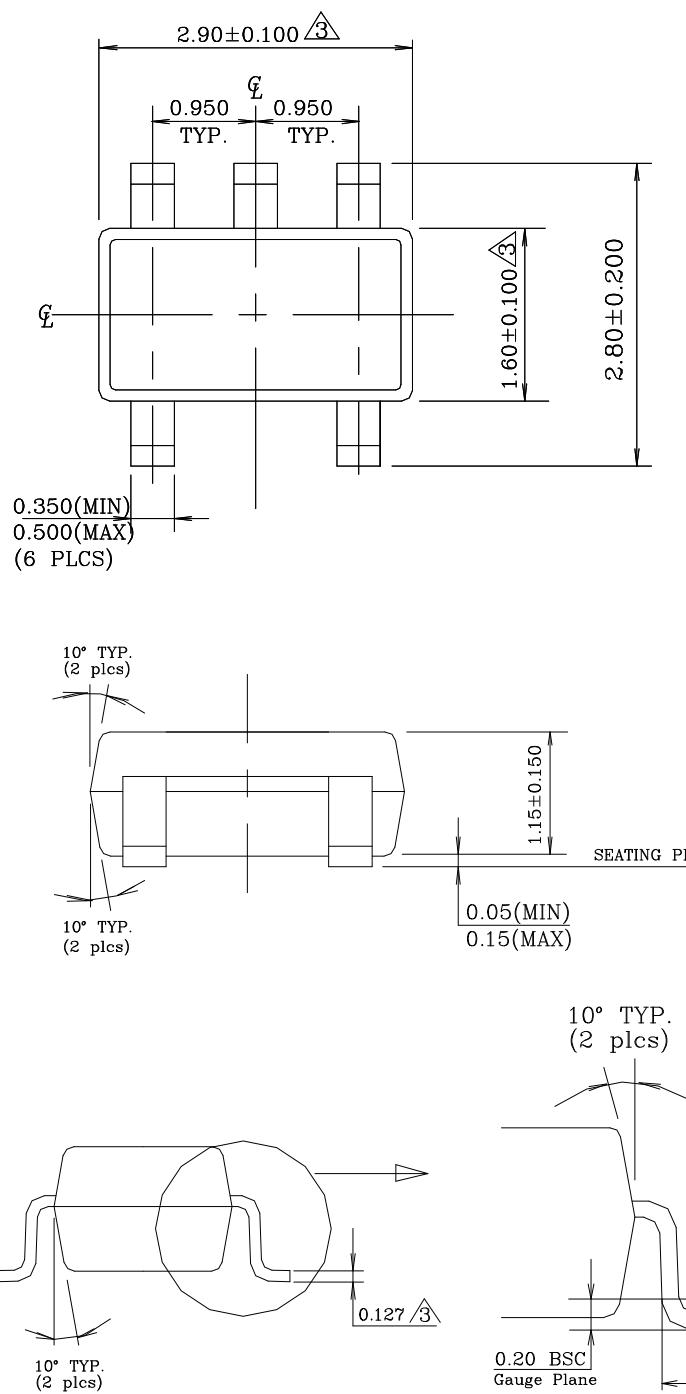
NOTE:
1. Dimensions and tolerances are as per ANSI Y14.5M,1982.
2. Package surface to be matte finish VDI 11~13.

/3\ Dimensions are exclusive of mold flash and gate burr.

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