Pin Configuration

K/KT Package
(SOT-23-6/TSOT-23-6)

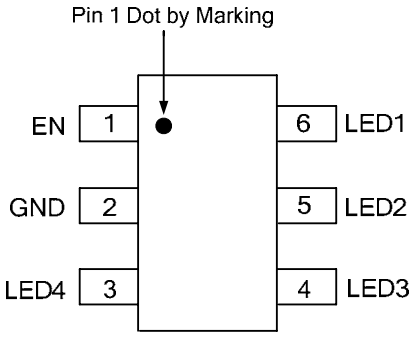


Figure 2. Pin Configuration of AP2502 (Top View)

Pin Descriptions

P in Number	Pin Name	Description
1	EN	Chip enable pin, active high to permit PWM signal input for brightness control by changing duty cycle
2	GND	GND
3, 4, 5, 6	LED4 to LED1	LED cathode terminal for channel number

Functional Block Diagram

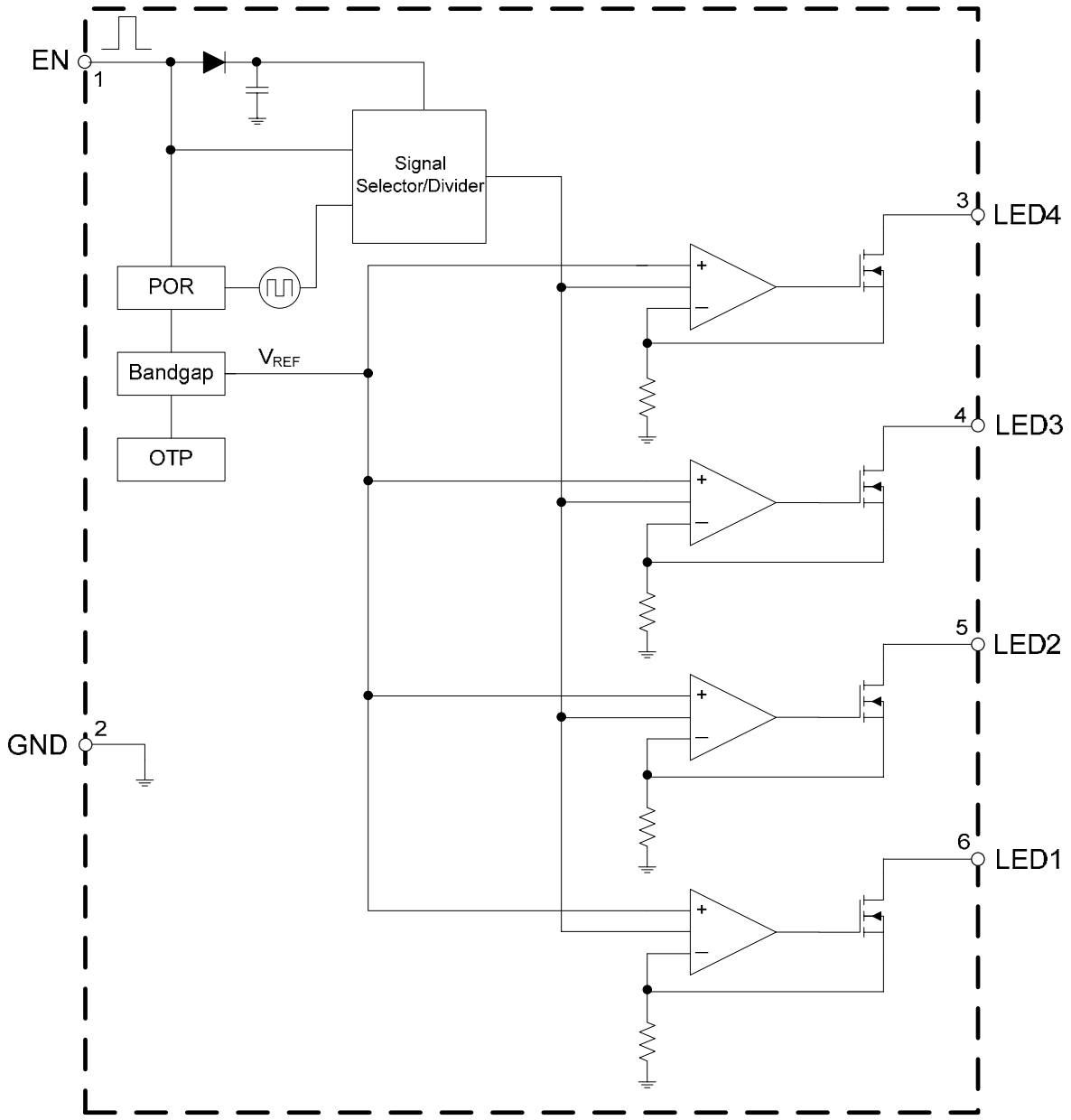
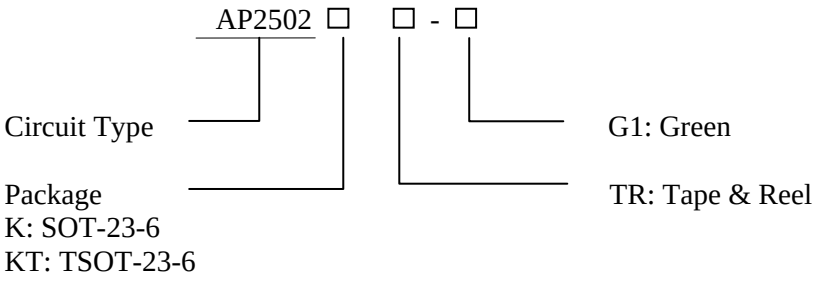


Figure 3. Functional Block Diagram of AP2502

4-CH Linear Constant Current Sink With Matching AP2502

Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing Type
SOT-23-6	-40 to 85°C	AP2502KTR-G1	GEE	Tape & Reel
TSOT-23-6	-40 to 85°C	AP2502KTTR-G1	L7E	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "G1" suffix in the part number, are RoHS compliant and Green.

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Enable Input Voltage	V_{EN}	-0.3 to 6.5	V
Thermal Resistance (Junction to Ambient)	θ_{JA}	250	ºC/W
Operating Junction Temperature Range	T_J	150	ºC
Storage Temperature Range	T_{STG}	-65 to 150	ºC
Lead Temperature (Soldering,10 seconds)	T_{LEAD}	260	ºC
ESD (Machine Model)		600	V
ESD (Human Body Model)		6000	V

Note 1: Stresses greater than those listed under “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 under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Symbol	Value		Unit
		Min	Max	
Enable Input Voltage	V_{EN}	2.0	6.0	V
Operating Temperature Range	T_A	-40	85	°C
Sink Current	I_{LED}		20	mA

Electrical Characteristics

V_{IN}=3.6V, V_{F_LED}=3.2V, T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
LED Dropout Voltage	$V_{DROPOUT}$	I_{SINK} =20mA		65	120	mV
Enable PIN High Voltage	V_{IH}		2		6	V
Enable PIN Low Voltage	V_{IL}		0		0.5	V
LED Maximum Sink Current	$I_{LED(MAX)}$	V_{CC}=3.3 to 6.0V, Enable=V_{CC}	18	20	22	mA
Sink Current Matching Between each Channel	$I_{LED-MATCH}$	V_{LED}=0.4V		0.5	1	%
Quiescent Current	I_Q	I_{LED1}=I_{LED2}=I_{LED3}=I_{LED4}=20mA		125	180	μA
Shutdown Current	$I_{SHUTDOWN}$	Set EN Pin Low		0.1	1	μA
Thermal Resistance (Junction to Case)	θ_{JC}			80		°C/W
PWM Frequency to Adjust Brightness	f_{PWM}				150	kHz
EN Pin Pulse High Time	T_{HIGH}		1			μs
EN Pin Pulse Low Time	T_{LOW}		100			ns
Thermal Shutdown Temperature	T_{OTSD}			150		°C
Thermal Shutdown Hysteresis	T_{HYOTSD}			25		

Typical Performance Characteristics

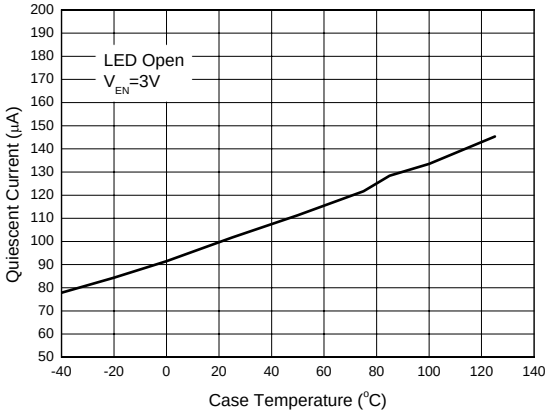


Figure 4. Quiescent Current vs. Case Temperature

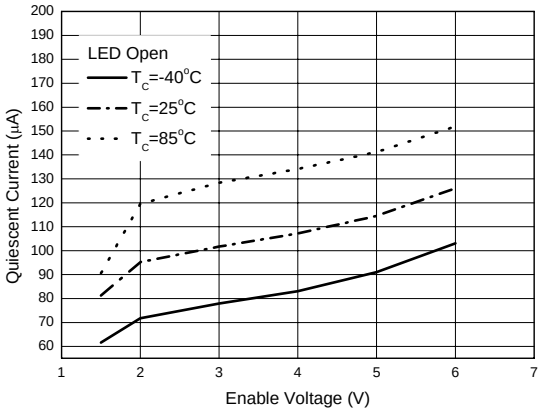


Figure 5. Quiescent Current vs. Enable Voltage

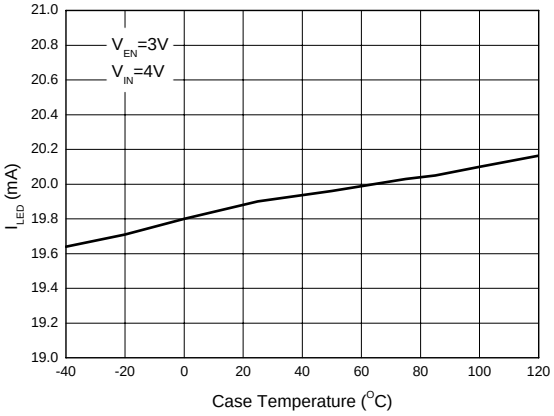


Figure 6. LED Current vs. Case Temperature

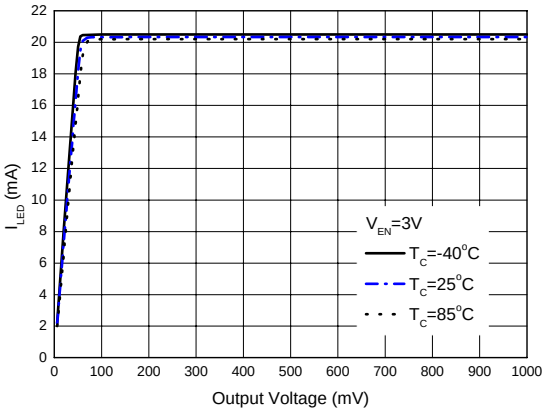


Figure 7. LED Current vs. Output Voltage

Typical Performance Characteristics (Continued)

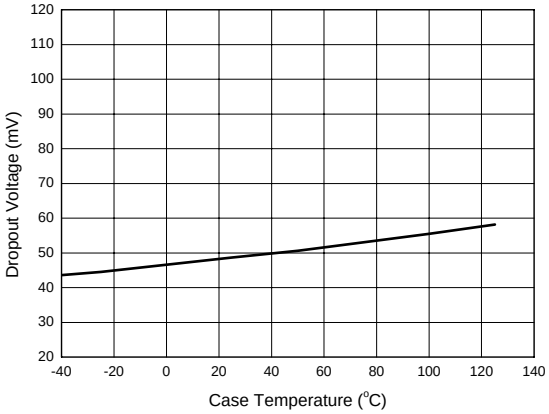


Figure 8. Dropout Voltage vs. Case Temperature

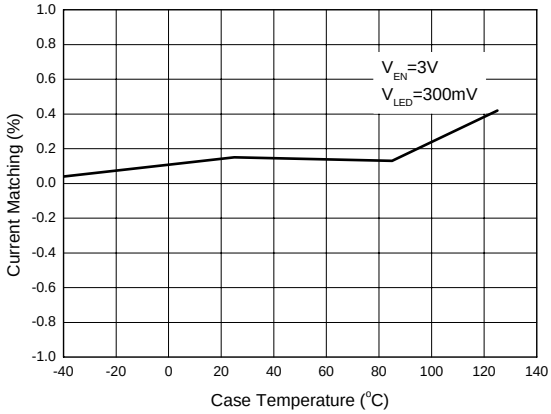


Figure 9. Current Matching vs. Case Temperature

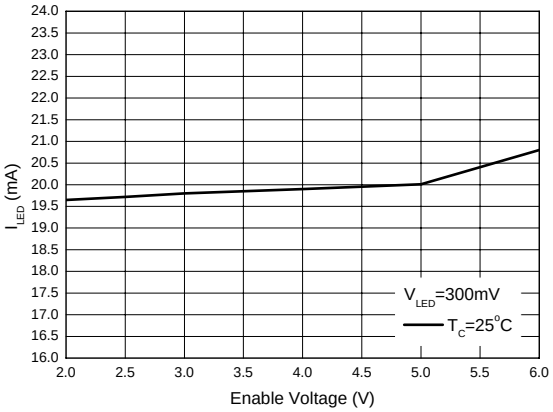


Figure 10. LED Current vs. Enable Voltage

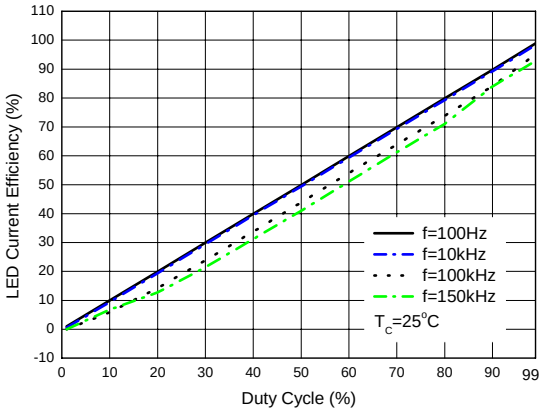


Figure 11. LED Current Efficiency vs. Duty Cycle

Typical Performance Characteristics (Continued)

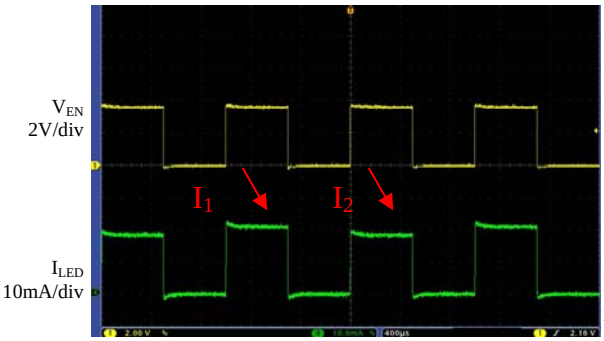


Figure 12. LED Current (Note 2)
(V_{IN}=4V, V_{EN}=0 to 3.6V, Duty cycle=50%, f_{PWM}=1kHz)

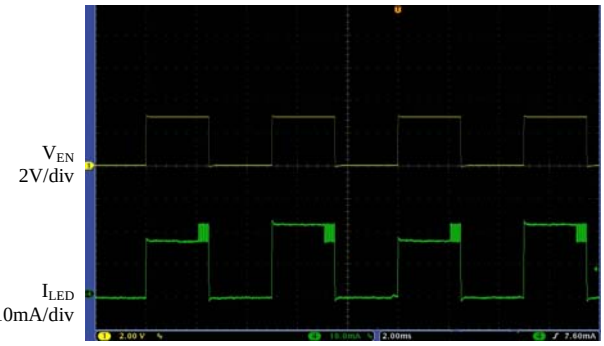


Figure 13. Internal Oscillator Working at Low Frequency
(V_{IN}=4V, V_{EN}=0 to 3.6V, Duty cycle=50%, f_{PWM}=0.1kHz)

Note 2: Chopper offset-canceling technology is adopted to get good current matching, $I_{LED}=[(I_1+I_2)/2]*duty$.

Typical Application

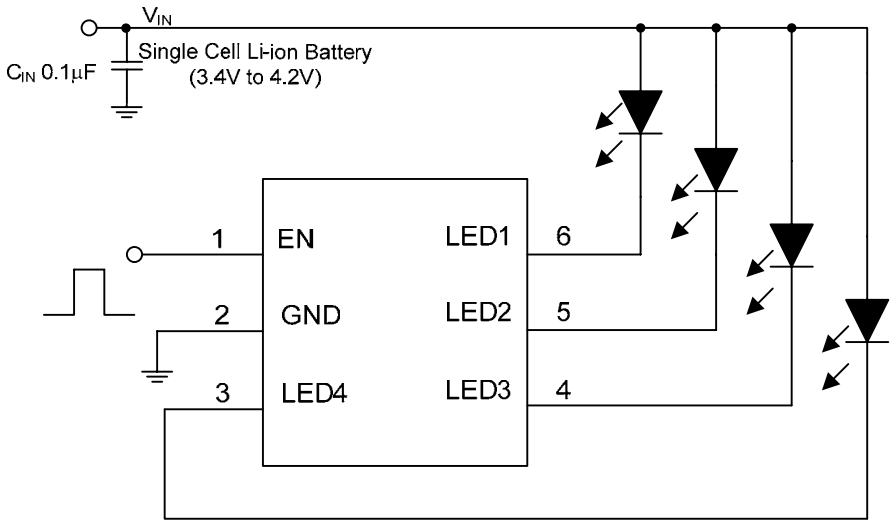
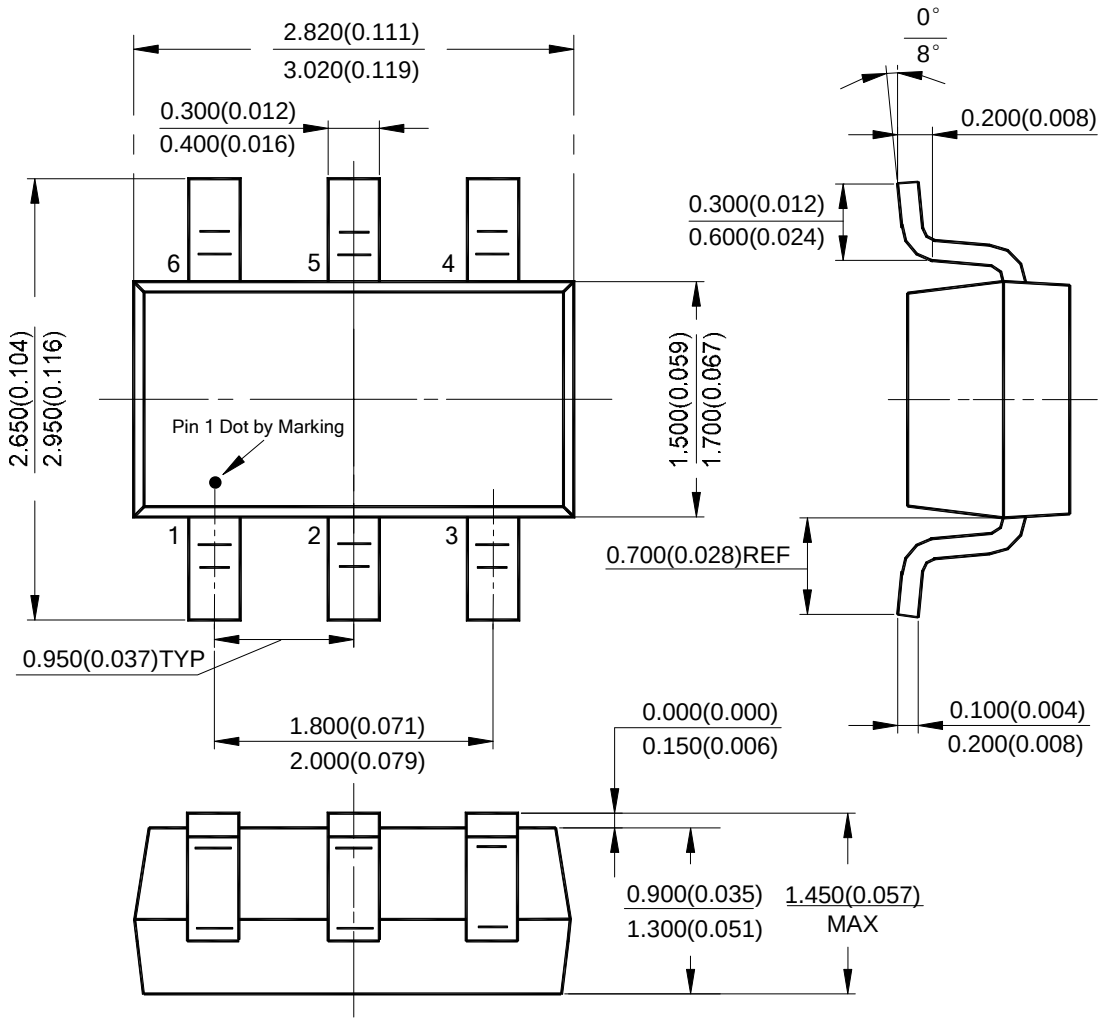


Figure 14. AP2502 Typical Application

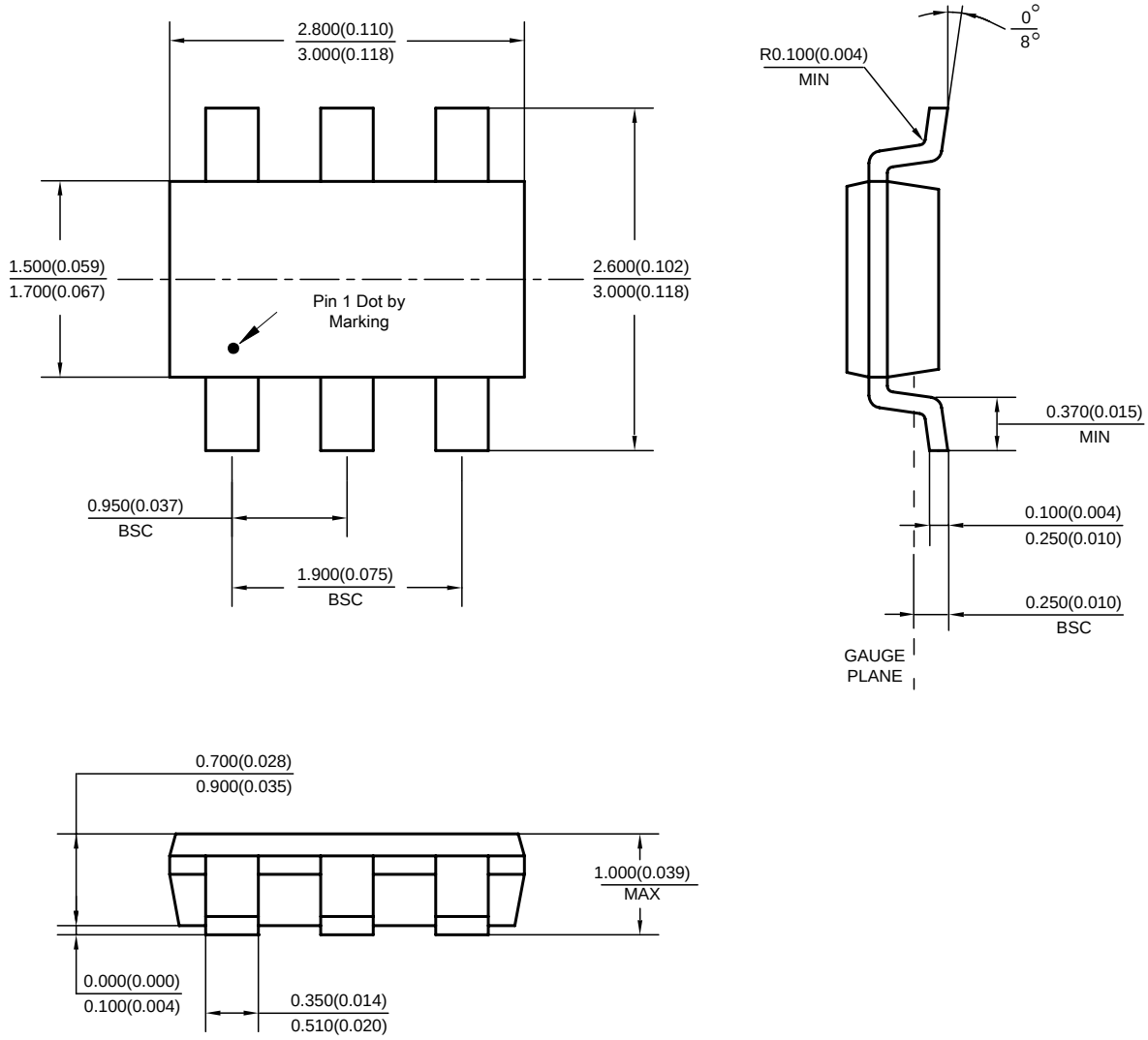
Mechanical Dimensions

SOT-23-6 **Unit: mm(inch)**



Mechanical Dimensions (Continued)

TSOT-23-6 **Unit: mm(inch)**



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