

Low Power Single Buffer (Open-drain)**GENERAL DESCRIPTION**

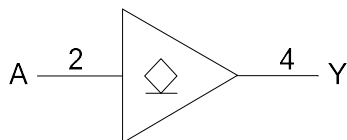
The W74AUP1G07 provides the single non-inverting buffer with open-drain output. The output of the device is an open drain and can be connected to other open-drain outputs to implement active-LOW wire-OR active-HIGH wire-AND functions.

This device ensures a very low static and dynamic power consumption across the entire VCC range from 0.8V to 3.6V.

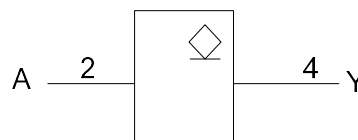
This device has power-down protective circuit, preventing device destruction when it is powered down.

FEATURES

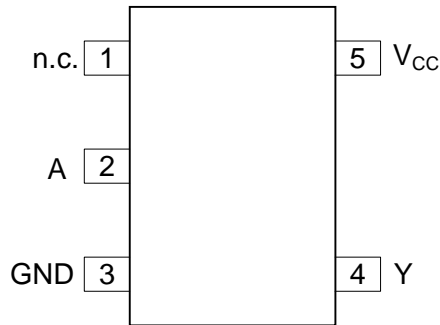
- Wide supply voltage range from 0.8V to 3.6V
- Inputs accept voltages up to 3.6V
- I_{OFF} supports partial-power-down mode
- Low static power consumption; $I_{CC}=0.5\mu A$ (Max.)
- Optimized for 3.3V Operation
- Packaging information: SOT-23-5/SOT-353

BLOCK DIAGRAM

Logic symbol



IEC logic symbol

PIN CONFIGURATION

PIN DESCRIPTION

	PIN NO		PIN NAME	PIN DESCRIPTION
	SOT-23-5 SOT-353	X2DFN0808-4 X1DFN1010-6		
1	1	1, 5	N.C	No Connected
2	2	2	A	Input
3	-	3	GND	Ground
4	3	4	Y	Output
5	4	6	V _{CC}	Supply Voltage
-	Exposed Pad	-	GND	Connect exposed pad to GND

FUNCTION TABLE (each gate)

INPUT (A)	OUTPUT (Y)
L	L
H	Z

Note: H: HIGH voltage level; L: LOW voltage level; Z: high impedance state.

Low Power Single Buffer (Open-drain)
ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +4.6	V
Input Voltage	V_{IN}		-0.5 ~ +4.6	V
Output Voltage	V_{OUT}	Output in the high or low state	-0.5 ~ $V_{CC} + 0.5$	V
		Output in the power-off state	-0.5 ~ +4.6	V
Continuous V_{CC} or GND Current	I_{CC}		±50	mA
Continuous Output Current	I_{OUT}	$V_{OUT}=0 \sim V_{CC}$	±20	mA
Input Clamp Current	I_{IK}	$V_{IN}<0$	-50	mA
Output Clamp Current	I_{OK}	$V_{OUT} > V_{CC}$ or $V_{OUT}<0$	-50	mA
Storage Temperature Range	T_{STG}		-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	0.8		3.6	V
Input Voltage	V_{IN}		0		3.6	V
Output Voltage	V_{OUT}	High or low state	0		V_{CC}	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=0.8V \sim 3.6V$			200	ns/V
Operating Temperature	T_A		-40		+125	°C

STATIC CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
HIGH-level Input Voltage	V_{IH}	$V_{CC}=0.8V$	V_{CC}			V	
		$V_{CC}=0.9V \sim 1.95V$	$0.65 \times V_{CC}$			V	
		$V_{CC}=2.3V \sim 2.7V$	1.6			V	
		$V_{CC}=3V \sim 3.6V$	2.0			V	
LOW-level Input Voltage	V_{IL}	$V_{CC}=0.8V$			0	V	
		$V_{CC}=0.9V \sim 1.95V$			$0.35 \times V_{CC}$	V	
		$V_{CC}=2.3V \sim 2.7V$			0.7	V	
		$V_{CC}=3V \text{ to } 3.6V$			0.9	V	
Low-Level Output Voltage	V_{OL}	$V_{CC}=0.8V \sim 3.6V, I_{OL}=20\mu A$			0.1	V	
		$V_{CC}=1.1V, I_{OL}=1.1mA$			$0.3 \times V_{CC}$	V	
		$V_{CC}=1.4V, I_{OL}=1.7mA$			0.31	V	
		$V_{CC}=1.65V, I_{OL}=1.9mA$			0.31	V	
		$V_{CC}=2.3V$	$I_{OL}=2.3mA$			0.31	V
			$I_{OL}=3.1mA$			0.44	V
		$V_{CC}=3V$	$I_{OL}=2.7mA$			0.31	V
	$I_{OL}=4mA$			0.44	V		
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0V \sim 3.6V, V_{IN}=V_{CC}$ or GND			±0.1	μA	
OFF-State Output Current	I_{OZ}	$V_{CC}=0V \sim 3.6V, V_{IN}=V_{IH}, V_O=0V \sim 3.6V$			±0.1	μA	
Power OFF Leakage Current	I_{OFF}	$V_{CC}=0V, V_{IN}$ or $V_O=0V \sim 3.6V$			±0.2	μA	
Additional Power-off Leakage Current	ΔI_{OFF}	$V_{CC}=0V \sim 0.2V, V_{IN}$ or $V_O=0V \sim 3.6V$			±0.2	μA	
Quiescent Supply Current	I_{CC}	$V_{CC}=0.8V \sim 3.6V, V_{IN}=V_{CC}$ or GND $I_{OUT}=0$			0.5	μA	

Low Power Single Buffer (Open-drain)
STATIC CHARACTERISTICS (Cont.)

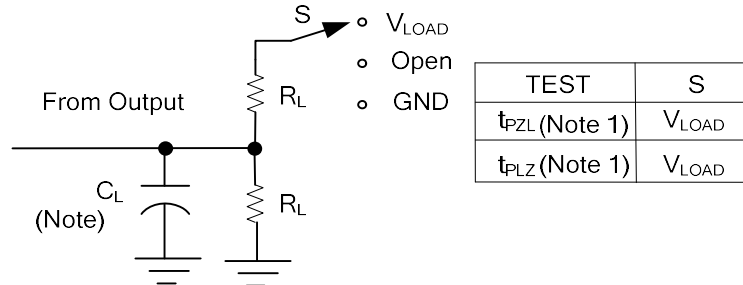
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Additional Quiescent Supply Current	ΔI_{CC}	$V_{CC}=3.3V$, One input at $V_{CC}-0.6V$, Other inputs at V_{CC} or GND			40	μA
Input Capacitance	C_{IN}	$V_{CC}=0V$, $V_{IN}=V_{CC}$ or GND		1.5		pF
		$V_{CC}=3.6V$, $V_{IN}=V_{CC}$ or GND		1.7		pF
Output Capacitance	C_{OUT}	$V_{CC}=0V$, $V_{OUT}=GND$		1.7		pF

DYNAMIC CHARACTERISTICS ($T_A=25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
Propagation Delay From Input (A) to Output (Y)	t_{PD}	$C_L=5pF$, $R_L=5K\Omega$	$V_{CC}=0.8V$		12.2		ns	
			$V_{CC}=1.2V\pm 0.1V$	2.1	5.1		ns	
			$V_{CC}=1.5V\pm 0.1V$	1.6	3.6		ns	
			$V_{CC}=1.8V\pm 0.15V$	1.6	3.1		ns	
			$V_{CC}=2.5V\pm 0.2V$	1.1	2.1		ns	
				$V_{CC}=3.3V\pm 0.3V$	1.4	2.2		ns
		$C_L=10pF$, $R_L=5K\Omega$	$V_{CC}=0.8V$			15		ns
			$V_{CC}=1.2V\pm 0.1V$	3	6.2		ns	
			$V_{CC}=1.5V\pm 0.1V$	2.3	4.4		ns	
			$V_{CC}=1.8V\pm 0.15V$	2.4	3.9		ns	
			$V_{CC}=2.5V\pm 0.2V$	1.7	2.8		ns	
				$V_{CC}=3.3V\pm 0.3V$	2.2	3.0		ns
		$C_L=15pF$, $R_L=5K\Omega$	$V_{CC}=0.8V$			18.2		ns
			$V_{CC}=1.2V\pm 0.1V$	3.5	7.3		ns	
			$V_{CC}=1.5V\pm 0.1V$	3	5.2		ns	
			$V_{CC}=1.8V\pm 0.15V$	2.8	4.8		ns	
			$V_{CC}=2.5V\pm 0.2V$	2.4	3.4		ns	
				$V_{CC}=3.3V\pm 0.3V$	2.2	3.7		ns
		$C_L=30pF$, $R_L=5K\Omega$	$V_{CC}=0.8V$			26.5		ns
			$V_{CC}=1.2V\pm 0.1V$	4.8	10.7		ns	
$V_{CC}=1.5V\pm 0.1V$	4.1		7.7		ns			
$V_{CC}=1.8V\pm 0.15V$	3.8		7.5		ns			
$V_{CC}=2.5V\pm 0.2V$	3.7		5.4		ns			
		$V_{CC}=3.3V\pm 0.3V$	3.6	6.3		ns		

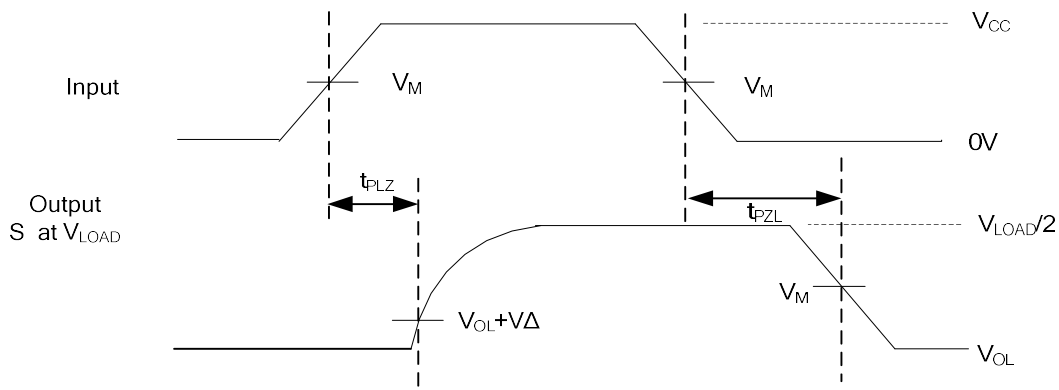
OPERATING CHARACTERISTICS ($f=1\text{ MHz}$; $V_I=V_{CC}$ or GND, $T_A=25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$V_{CC}=0.8V$		1.0		pF
		$V_{CC}=1.2V\pm 0.1V$		1.0		pF
		$V_{CC}=1.5V\pm 0.1V$		1.0		pF
		$V_{CC}=1.8V\pm 0.15V$		1.0		pF
		$V_{CC}=2.5V\pm 0.2V$		1.0		pF
		$V_{CC}=3.3V\pm 0.3V$		1.0		pF

TEST CIRCUIT AND WAVEFORMS


Note: Since this device has open drain outputs, the t_{PLZ} and t_{PZL} is the same as t_{PLH} and t_{PHL} .

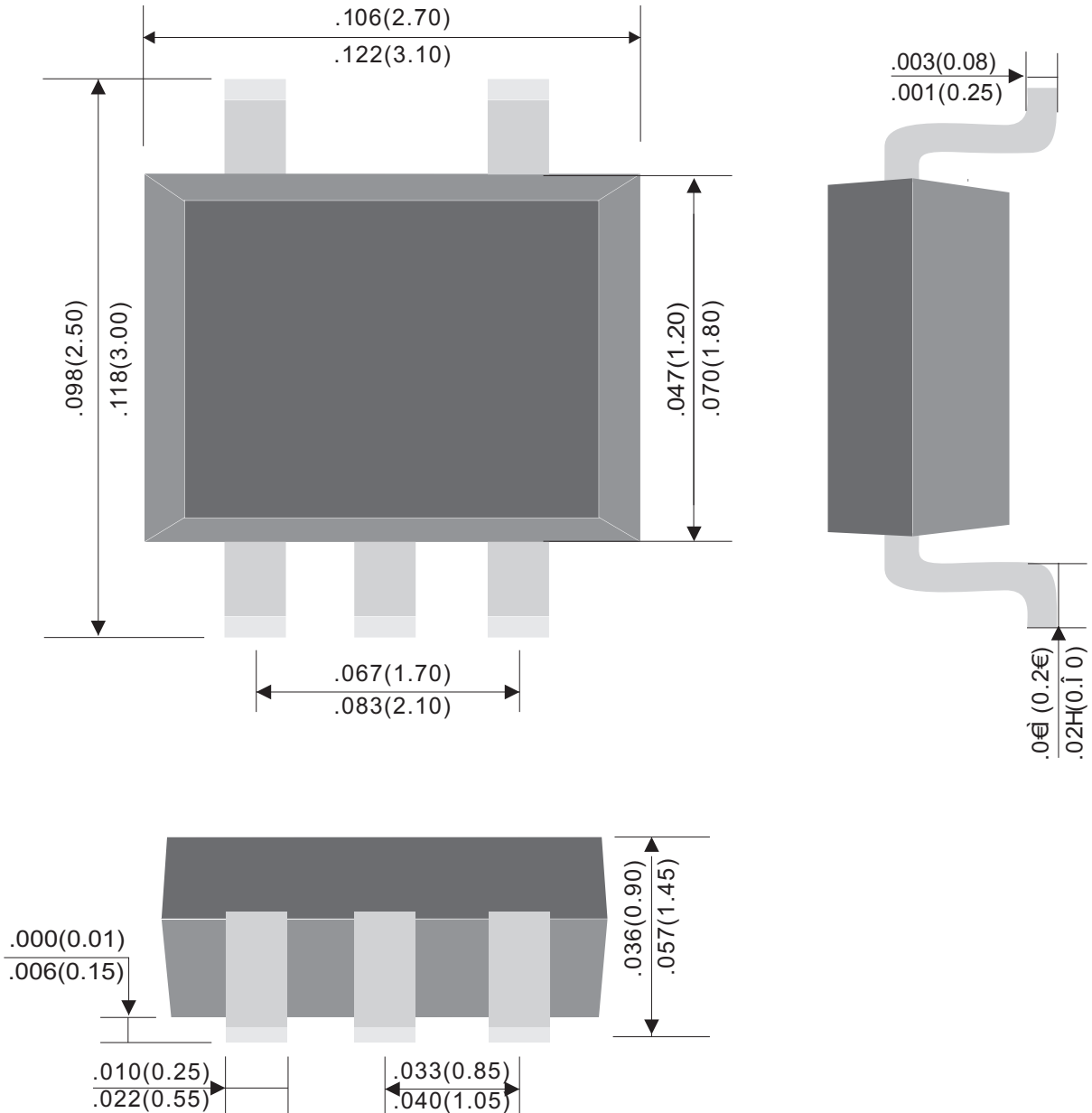
V_{CC}	V_{IN}	t_R / t_F	V_M	V_{LOAD}	C_L	R_L	V_{Δ}
0.8	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.1V
$1.2 \pm 0.1V$	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.1V
$1.5 \pm 0.1V$	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.1V
$1.8 \pm 0.15V$	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.15V
$2.5 \pm 0.2V$	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.15V
$3.3 \pm 0.3V$	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.3V





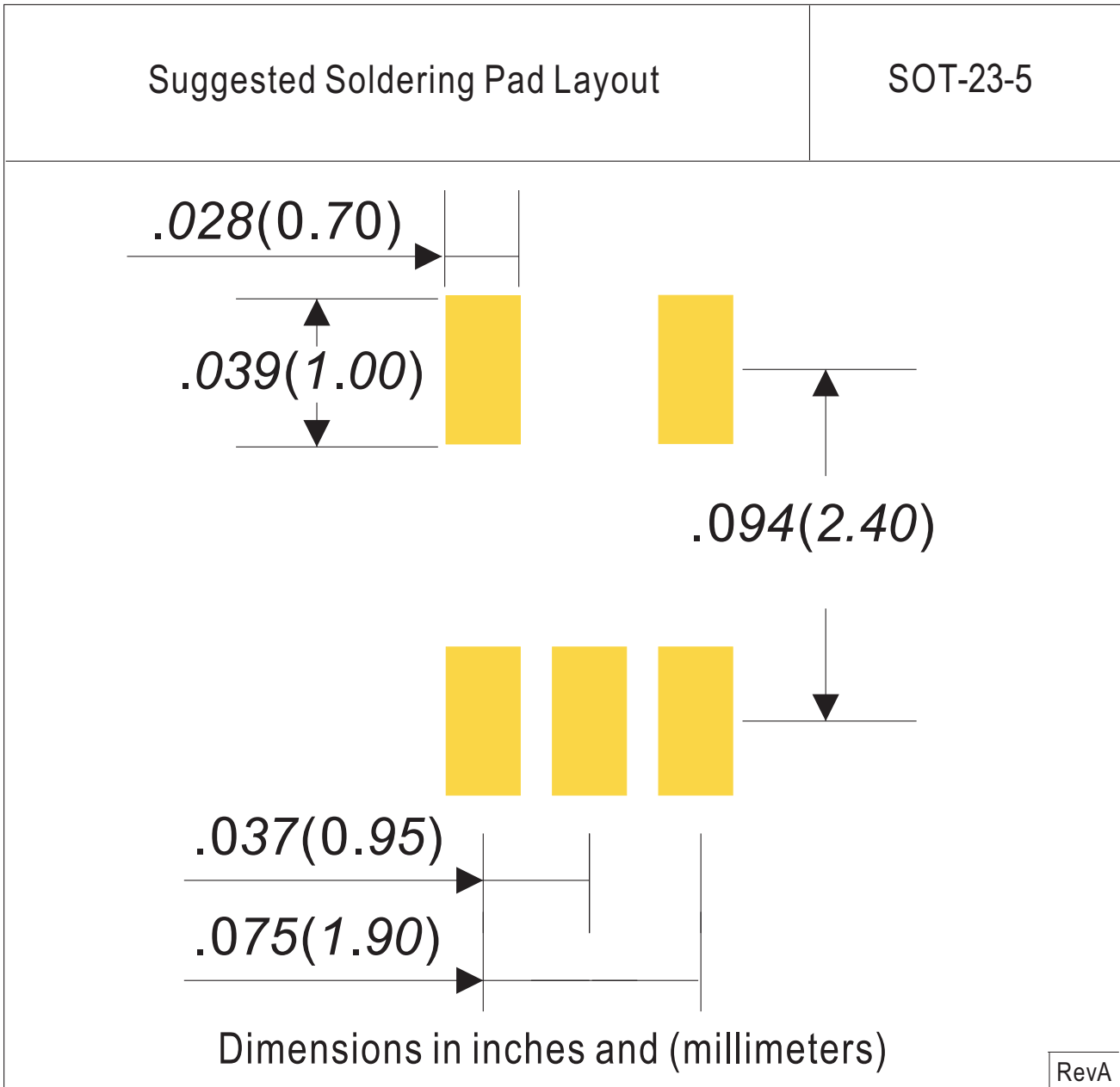
Outline Drawing

SOT-23-5



Dimensions in inches and (millimeters)

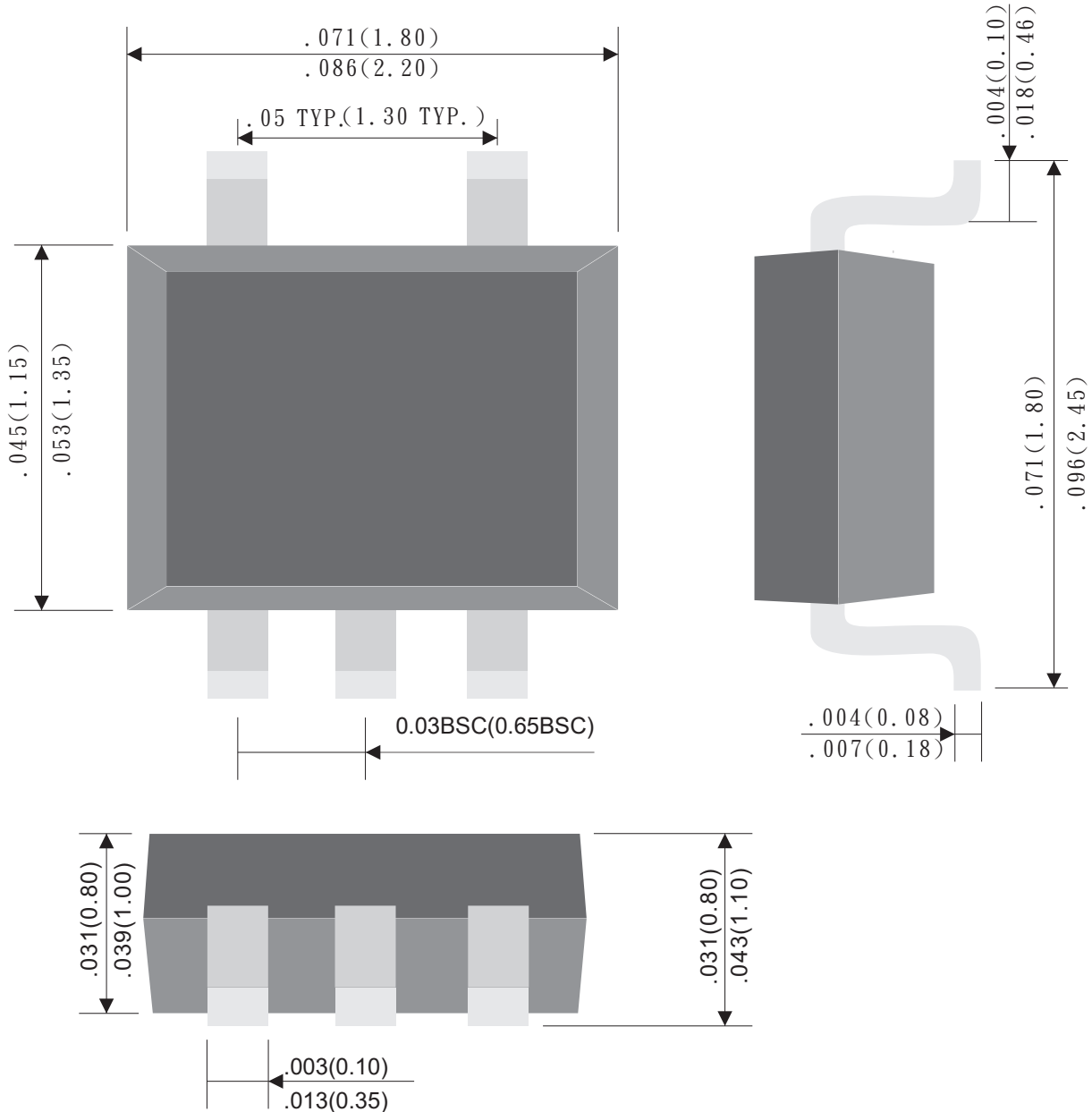
Rev.E





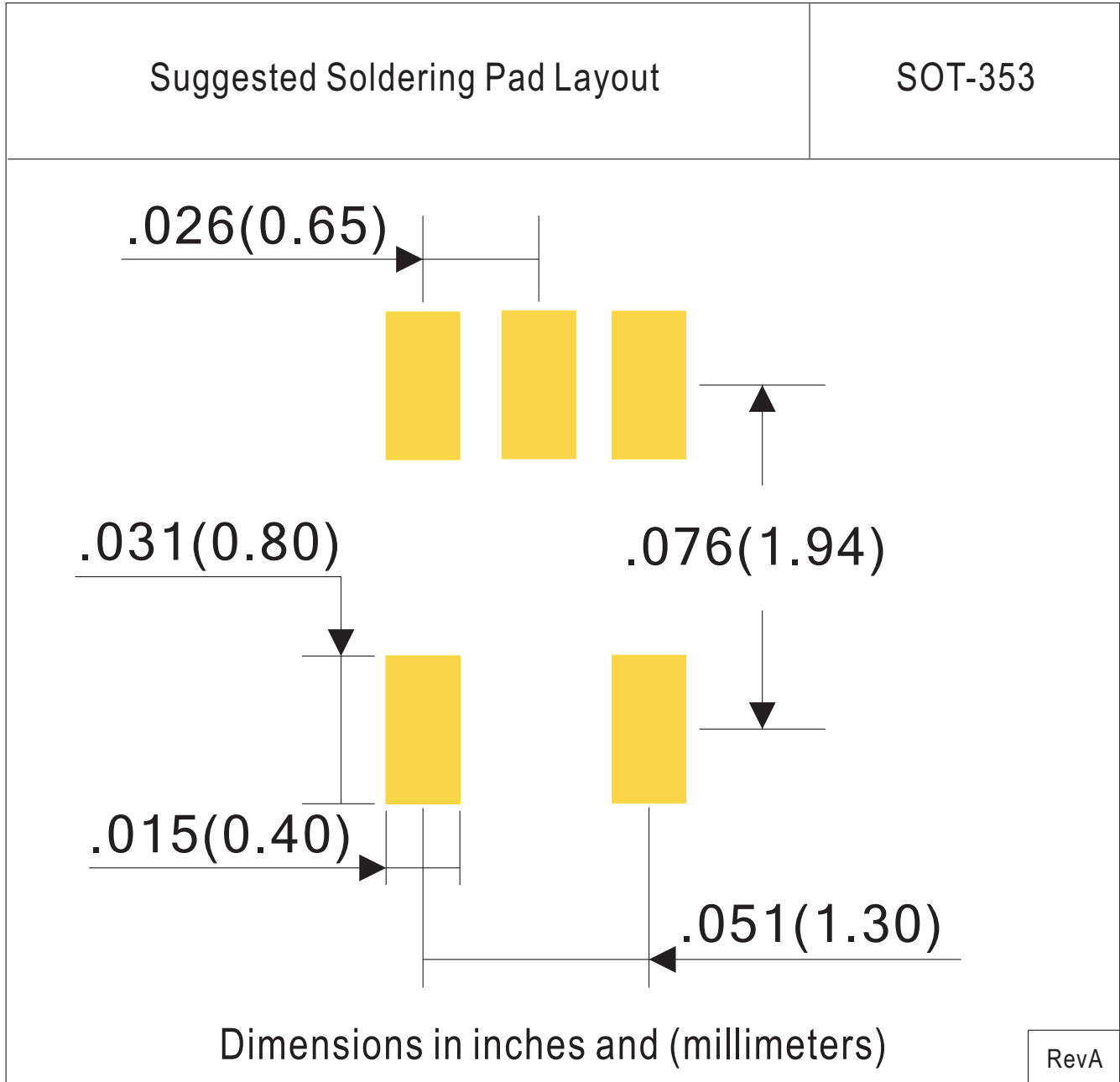
Outline Drawing

SOT-353



Dimensions in inches and (millimeters)

Rev.C



Ordering Information:

Device PN	Marking	Packing
W74AUP1G07M5 ⁽⁴⁾ -T ⁽¹⁾ H ⁽²⁾ -WS ⁽³⁾	P07	Tape&Reel: 3 Kpcs/Reel
W74AUP1G07K ⁽⁴⁾ -T ⁽¹⁾ H ⁽²⁾ -WS ⁽³⁾	P07	Tape&Reel: 3 Kpcs/Reel

Note: (1) Packing code, Tape & Reel Packing

(2) Halogen free product for packing code suffix "H"

(3) Willas brand abbreviation, Label Type does not display

(4) K: SOT-353 , M5 : SOT-23-5

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