OCTAVE REMOTE RESISTOR-PROGRAMMABLE TEMPERATURE SWITCHES

Description

The AP2602 is a fully integrated, resistor programmable octave remote temperature switch with selectable external/internal trigger voltages setting. The thresholds are set by external resistors and thermistors with negative temperature coefficient.

The AP2602 provides four open-drain, active-low, overtemperature outputs for each of the two sensors. These switches operate with a 2.7V to 5.5V single supply.

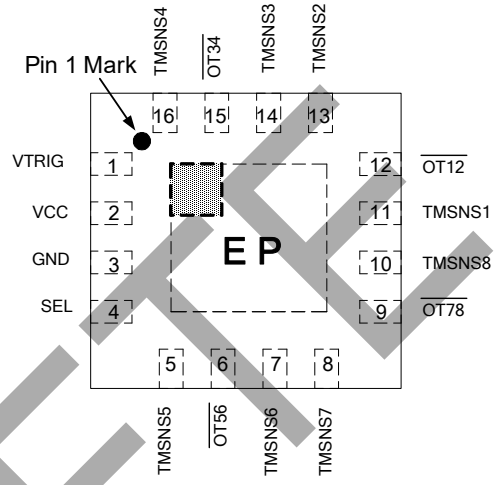
The AP2602 is available in the 16-pin QFN-3x3-16 package.

Features

- 8 Remote Temperature Switches Set by Thermistor and External Resistors
- 4 Open-Drain Active-Low Output Stages for Each of the 2 Temperature Switches
- Selectable External/Internal Trigger Voltage Setting
- Built-in Hysteresis Temperature When Using Internal Setting Trigger Voltage
- Guaranteed Output Signal Valid to V_{CC} = 0.8V
- QFN-3x3-16 Package

Description

(Top View)



QFN-3x3-16

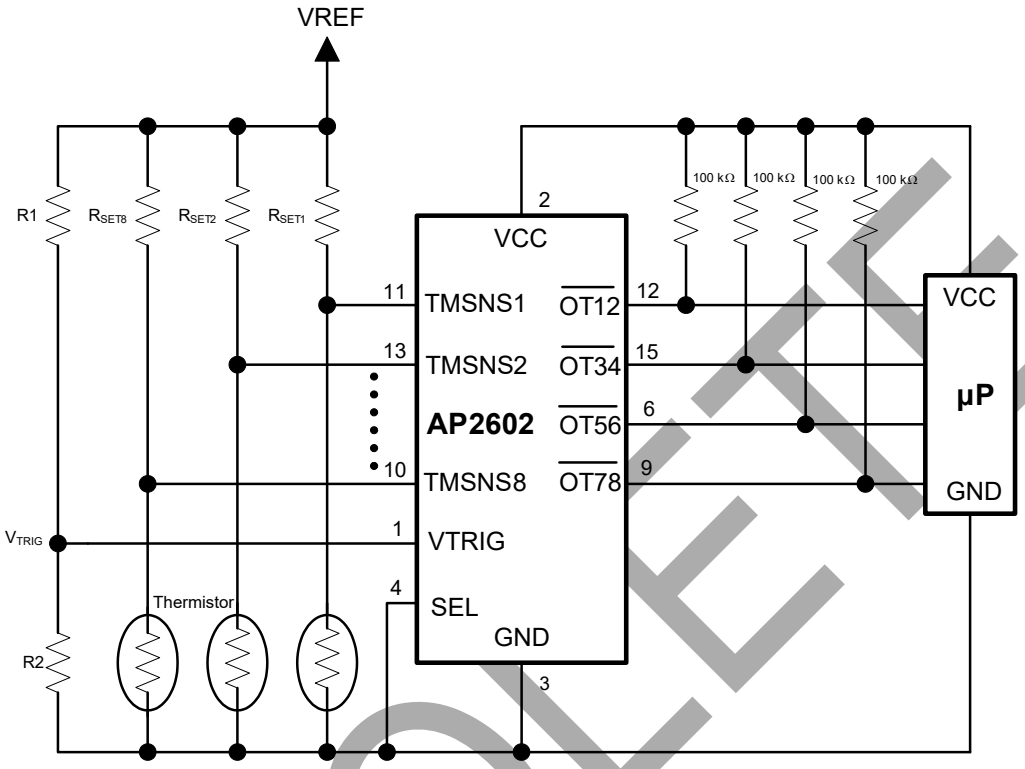
Note 1: Recommend connecting the thermal pad to GND for excellent power dissipation.

Applications

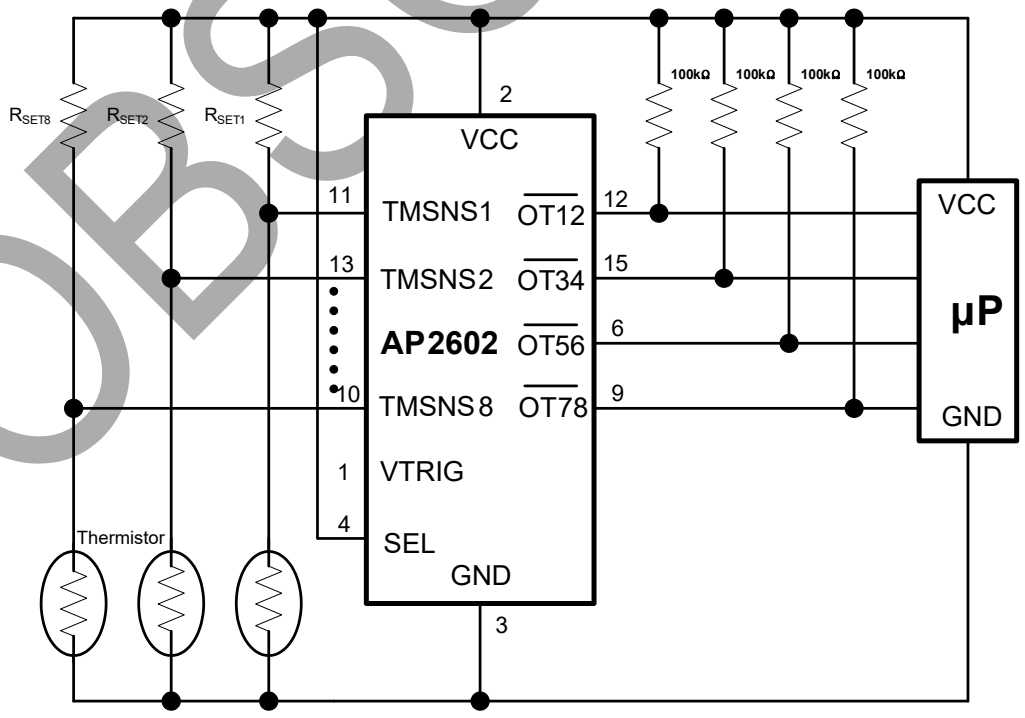
- µP temperature-monitoring high-speed computers
- Temperature controls
- Temperature alarms
- Fan controls
- Automotive applications

Typical Applications Circuit

Mode A



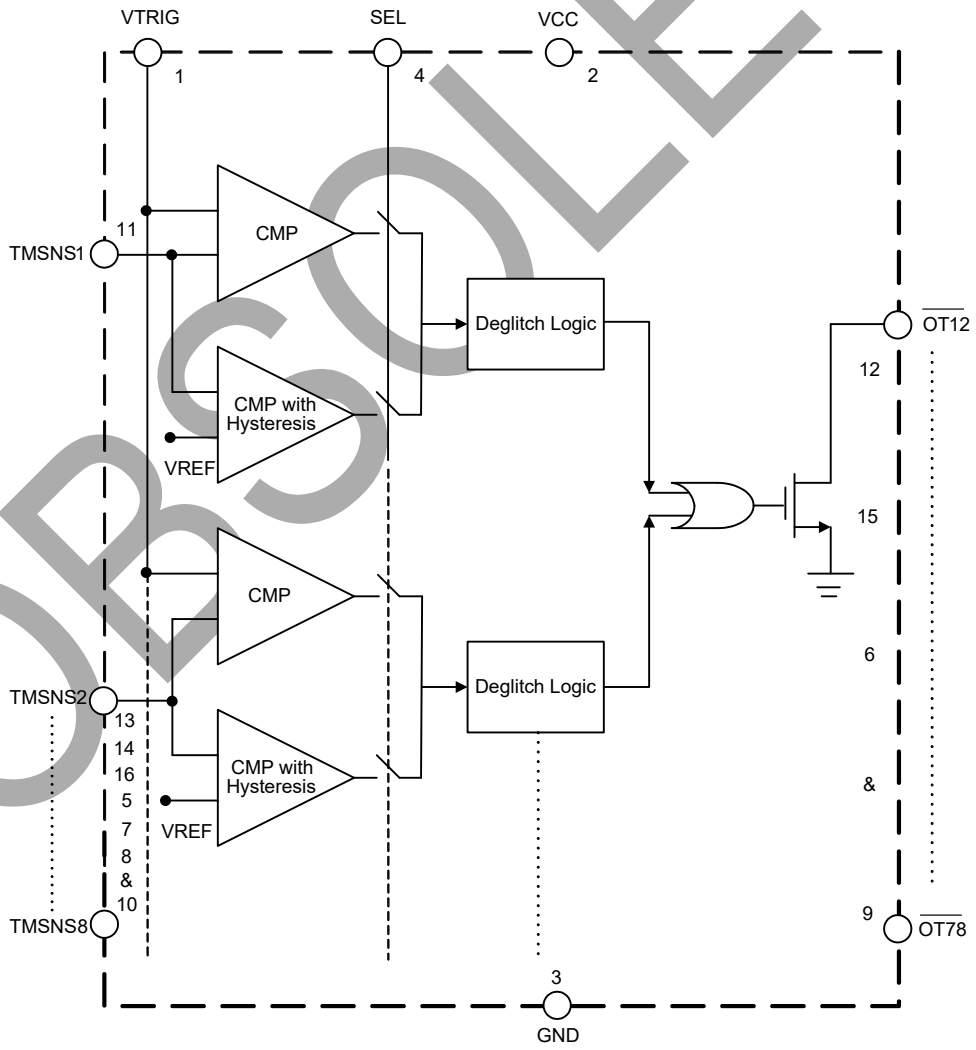
Mode B



Pin Description

Pin Number	Pin Name	Function
1	VTRIG	Input of external setting trigger voltage
2	VCC	Power supply input
3	GND	Ground
4	SEL	Connect SEL to GND to select external trigger voltage, while connecting SEL to VCC to select internal trigger voltage. Don't leave the pin floating.
5, 7, 8, 10, 11, 13, 14, 16	TMSNSX	Connect an external 1% resistor from TMSNSX to GND to set trigger point of remote temperature sensor X
6, 9, 12, 15	$\overline{\text{OTXY}}$	Open-drain, active low, over-temperature output for sensor 1, 2, sensor 3, 4, sensor 5, 6, sensor 7, 8 respectively. The $\overline{\text{OTXY}}$ outputs are the wire-or results of sensor X and sensor Y.

Functional Block Diagram



Absolute Maximum Ratings (Note 2)

Symbol	Parameter	Rating		Unit
V_{CC}	Supply Voltage	-0.3 to 6		V
V_{OT}	$\overline{OTXY}$ Voltage	-0.3 to 6		V
V_{TMSNSX}, V_{TRIG}	TMSNSX, VTRIG Voltage	-0.3 to V_{CC}+0.3		V
V_{SEL}	SEL Voltage	-0.3 to 6		V
—	Output Current (All Pins)	20		mA
—	Input Current (All Pins)	20		mA
T_J	Operating Junction Temperature	+150		°C
T_{STG}	Storage Temperature Range	-65 to +150		°C
T_{LEAD}	Lead Temperature (Soldering, 10 Seconds)	+260		°C
θ_{JA}	Thermal Resistance	QFN-3x3-16	68	°C/W
—	ESD (Machine Model)	200		V
—	ESD (Human Body Model)	2000		V

Note 2: 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

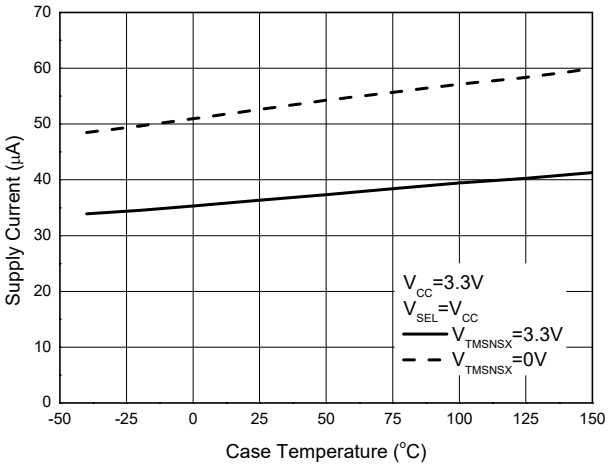
Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply Voltage	2.7	5.5	V
T_A	Operating Ambient Temperature Range	-40	+125	°C

Electrical Characteristics (@V_{CC} = 2.7V to 5.5V, T_A = -40°C to +125°C, unless otherwise specified. Typical values are at T_A = +25°C.)

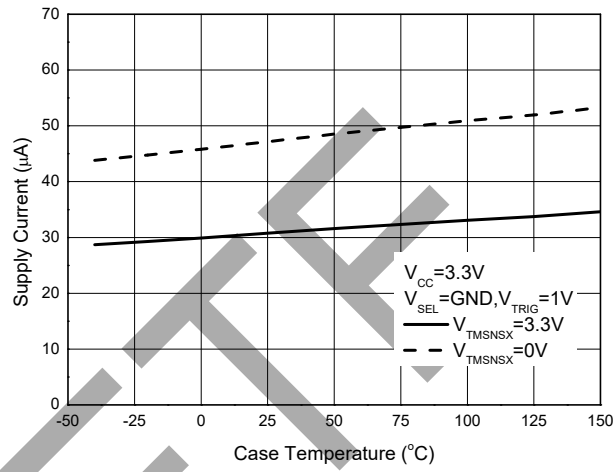
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CC}	Supply Voltage	—		2.7	—	5.5	V
I_{CC}	Supply Current	V_{CC} = 3.3V, $\overline{OTXY}$ Float	V_{TMSNSX} = V_{CC}	—	40	100	µA
			V_{TMSNSX} = GND	—	55	110	
V_{TH}/V_{CC}	TMSNSX Input Threshold	V_{CC} = 5V, V_{SEL} = V_{CC}, V_{TH}/V_{CC}		0.244	0.25	0.256	V/V
		V_{CC} = 3.3V, V_{SEL} = V_{CC}, V_{TH}/V_{CC}		0.24	0.25	0.26	
V_{TRIG}	VTRIG Input Range	0 < V_{TRIG} < 0.4×V_{CC}		0.5	—	0.4×V_{CC}	V
V_{OS}	Offset Voltage between VTRIG and TMSNSX	V_{CC} = 5V, V_{SEL} = GND		-15	—	15	mV
V_{IH}	SEL Input Voltage	V_{CC} = 5V		2	—	—	V
V_{IL}		V_{CC} = 5V		—	—	1	V
I_{SINK}	Open-drain $\overline{OTXY}$ Output Sink Current	V_{OT} = 0.3V, V_{TMSNSX} = 0V		3	4.5	—	mA
$I_{LEAK-OT}$	Open-drain $\overline{OTXY}$ Output Leakage Current	V_{OT} = V_{CC}, V_{TMSNSX} = 5V		—	—	1	µA
θ_{JC}	Thermal Resistance	QFN-3x3-16		—	4.2	—	°C/W

Performance Characteristics

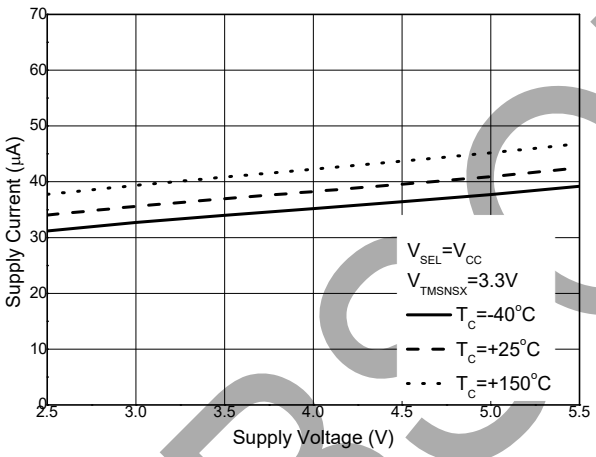
Supply Current vs. Case Temperature



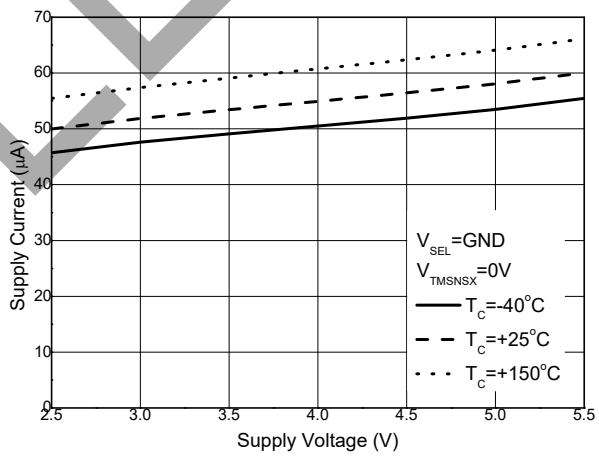
Supply Current vs. Case Temperature



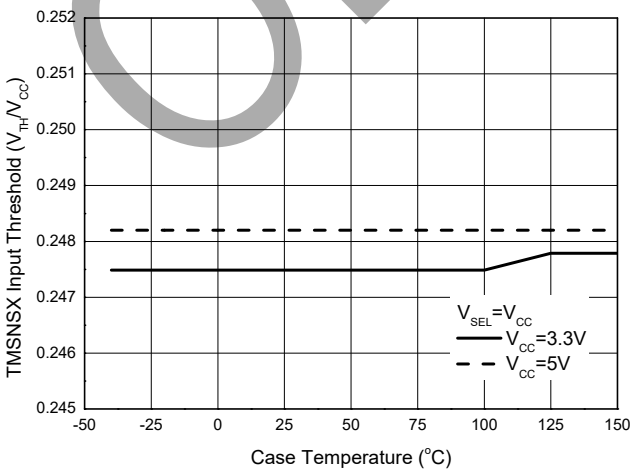
Supply Current vs. Supply Voltage



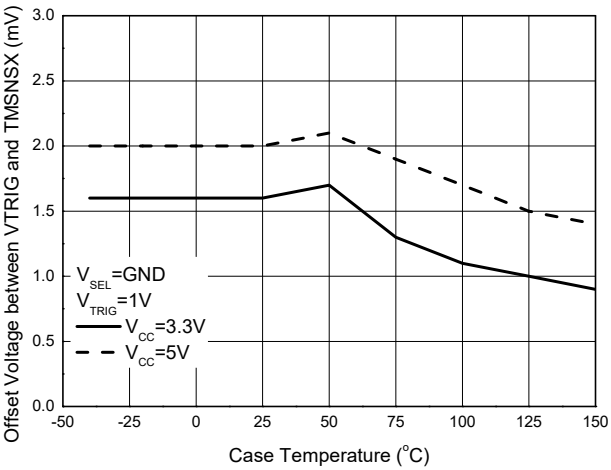
Supply Current vs. Supply Voltage



TMSNSX Input Threshold (V_{TH}/V_{CC}) vs. Case Temperature

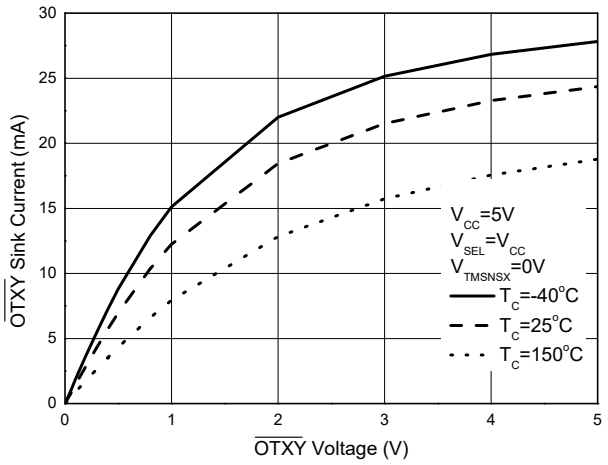


Offset Voltage between VTRIG and TMSNSX vs. Case Temperature

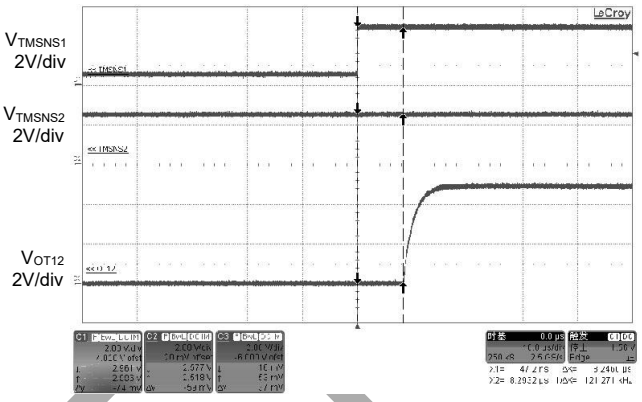


Performance Characteristics (Cont.)

Open-drain $\overline{OTXY}$ Output Sink Current vs. $\overline{OTXY}$ Voltage

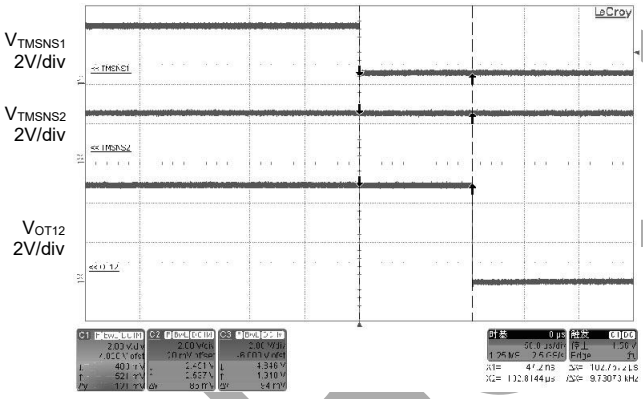


Deglitch Time to OT High (V_{SEL}=V_{CC}) (Conditions: V_{CC}=5V, V_{TMSNS1}=0.5V to 3V, V_{TMSNS2}=2.5V)



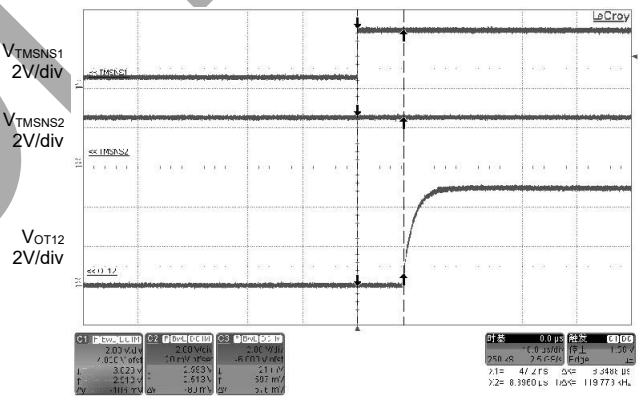
Time (10µs/div)

Deglitch Time to OT Low (V_{SEL}=V_{CC}) (Conditions: V_{CC}=5V, V_{TMSNS1}=0.5V to 3V, V_{TMSNS2}=2.5V)



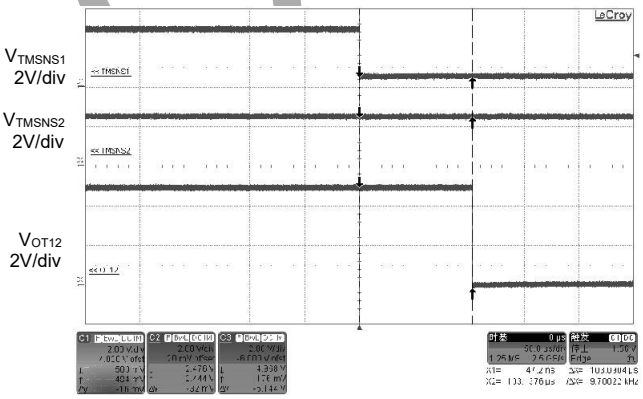
Time (50µs/div)

Deglitch Time to OT High (V_{SEL}=GND) (Conditions: V_{CC}=5V, V_{TMSNS1}=0.5V to 3V, V_{TMSNS2}=2.5V, V_{TRIG}=1V)



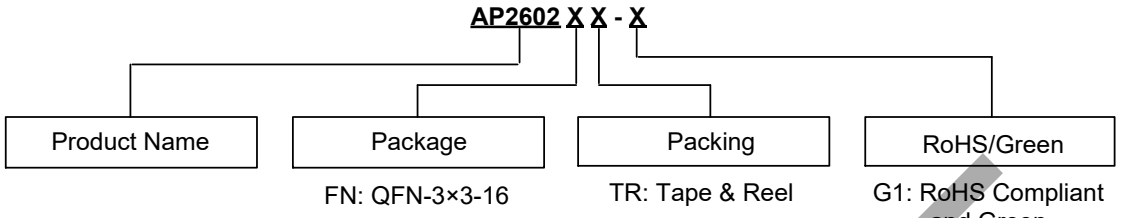
Time (10µs/div)

Deglitch Time to OT Low (V_{SEL}=GND) (Conditions: V_{CC} =5V, V_{TMSNS1}=0.5V to 3V, V_{TMSNS2}=2.5V, V_{TRIG}=1V)



Time (50µs/div)

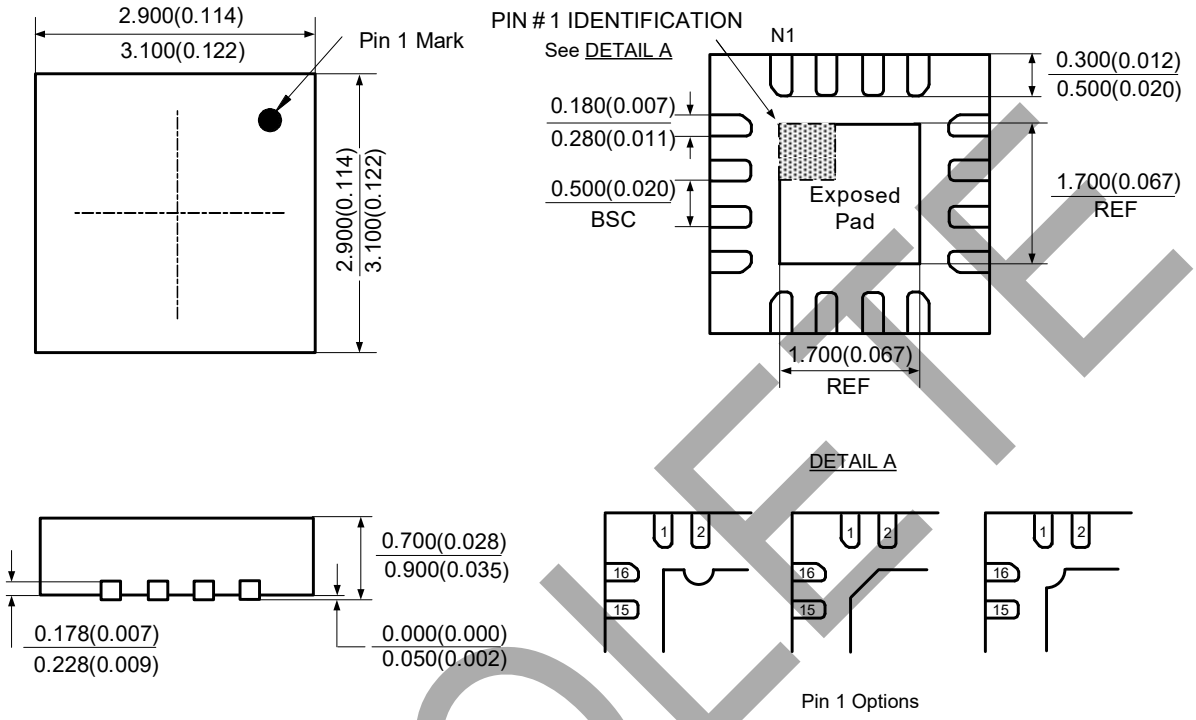
Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing
QFN-3x3-16	-40 to +125°C	AP2602FNTR-G1	B2E	Tape & Reel

Package Outline Dimensions (All dimensions in mm(inch).)

(1) Package Type: QFN-3x3-16



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