MULTIPLE RS-232 DRIVERS AND RECEIVERS AZ75232

General Description

The AZ75232 combines three drivers and five receivers, which conform to the EIA/TIA-232-F and ITU v.28 standards. Each receiver converts EIA/TIA-232-F inputs to 5-V TTL/CMOS levels and each driver converts TTL/CMOS input levels into EIA/TIA-232-F levels.

The flow-through pinout facilitates simple non-cross-over board layout. The AZ75232 provides a one-chip solution for the common 9-pin serial RS-232 interface between data terminal and data communications equipment.

The AZ75232 is available in SOIC-20, SSOP-20 and TSSOP-20 packages.

Features

- Single Chip with Easy Interface between UART and Serial-Port Connector
- Meet the Requirement of EIA/TIA-232-F and ITU v.28 Standards
- Designed to Support Data Rates up to 120kbit/s
- 3 Drivers and 5 Receivers
- Flow-Through Pinout

Applications

- Mother Board
- Peripheral Equipment

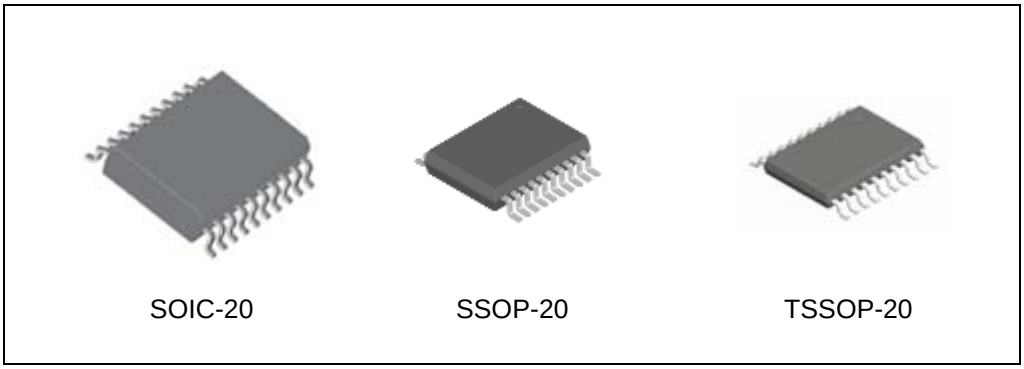


Figure 1. Package Types of AZ75232

Pin Configuration

M/GS/G Package
(SOIC-20/SSOP-20/TSSOP-20)

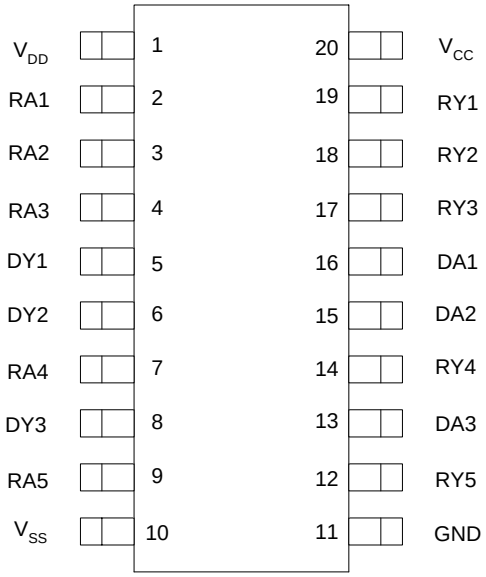


Figure 2. Pin Configuration of AZ75232 (Top View)

Pin Description

Pin Number	Pin Name	Function	Pin Number	Pin Name	Function
1	V_{DD}	Positive Supply Voltage for Driver	11	GND	Ground
2	RA1	Receiver Input	12	RY5	Receiver Output
3	RA2	Receiver Input	13	DA3	Driver Input
4	RA3	Receiver Input	14	RY4	Receiver Output
5	DY1	Driver Output	15	DA2	Driver Input
6	DY2	Driver Output	16	DA1	Driver Input
7	RA4	Receiver Input	17	RY3	Receiver Output
8	DY3	Driver Output	18	RY2	Receiver Output
9	RA5	Receiver Input	19	RY1	Receiver Output
10	V_{SS}	Negative Supply Voltage for Driver	20	V_{CC}	Supply Voltage for Receiver

Functional Block Diagram

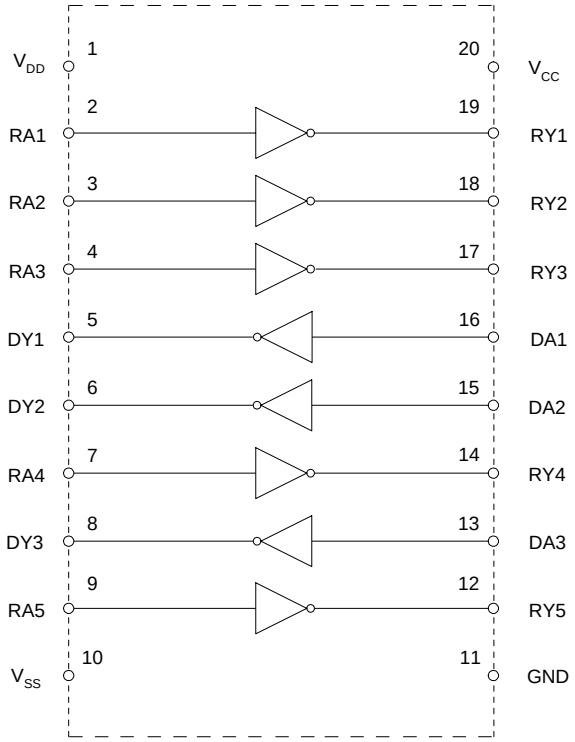


Figure 3. Functional Block Diagram of AZ75232

Ordering Information

AZ75232 □□ - □

Circuit Type

Package
M: SOIC-20
GS: SSOP-20
G: TSSOP-20

E1: Lead Free
Blank: Tin Lead

TR: Tape and Reel
Blank: Tube

Package	Temperature Range	Part Number		Marking ID		Packing Type
		Tin Lead	Lead Free	Tin Lead	Lead Free	
SOIC-20	-40 to 85°C	AZ75232M	AZ75232M-E1	AZ75232M	AZ75232M-E1	Tube
		AZ75232MTR	AZ75232MTR-E1	AZ75232M	AZ75232M-E1	Tape & Reel
SSOP-20	-40 to 85°C		AZ75232GS-E1		AZ75232GS-E1	Tube
			AZ75232GSTR-E1		AZ75232GS-E1	Tape & Reel
TSSOP-20	-40 to 85°C		AZ75232G-E1		232GE	Tube
			AZ75232GTR-E1		232GE	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant.

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value		Unit
Supply Voltage	V_{DD}	15		V
	V_{SS}	-15		
	V_{CC}	7		
Input Voltage Range	V_I	Driver	-15 to 7	V
		Receiver	-30 to 30	
Power Dissipation (TA=25°C)	P_D	SOIC-20	1340	mW
		SSOP-20	1210	
		TSSOP-20	1100	
Driver Output Voltage Range	V_O	-15 to 15		V
Receiver Low-Level Output Current	I_{OL}	20		mA
Operating Junction Temperature	T_J	150		°C
Storage Temperature Range	T_{STG}	-65 to 150		°C
Lead Temperature (Soldering, 10sec)	T_{LEAD}	260		°C

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	Min	Max	Unit
Supply Voltage		V_{DD}	7.5	15	V
		V_{SS}	-15	-7.5	
		V_{CC}	4.5	5.5	
High-Level Input Voltage (Driver Only)		V_{IH}	1.9		V
Low-Level Input Voltage (Driver Only)		V_{IL}		0.8	V
High-Level Output Current	Driver	I_{OH}		-6	mA
	Receiver			-0.5	
Low-Level Output Current	Driver	I_{OL}		6	mA
	Receiver			16	
Operating Temperature Range		T_A	-40	85	°C

Electrical Characteristics

(T_A=25°C, unless otherwise specified.)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
VOLTAGE SUPPLY SECTION (V_{CC}=5V, V_{DD}=9V, V_{SS}=-9V, unless otherwise specified)							
Supply Current from V_{DD}	I_{DD}	All inputs at 1.9V, no load	V_{DD}=9V, V_{SS}=-9V			15	mA
			V_{DD}=12V, V_{SS}=-12V			19	
			V_{DD}=15V, V_{SS}=-15V			25	
		All inputs at 0.8V, no load	V_{DD}=9V, V_{SS}=-9V			4.5	
			V_{DD}=12V, V_{SS}=-12V			5.5	
			V_{DD}=15V, V_{SS}=-15V			9	
Supply Current from V_{SS}	I_{SS}	All inputs at 1.9V, no load	V_{DD}=9V, V_{SS}=-9V			-15	mA
			V_{DD}=12V, V_{SS}=-12V			-19	
			V_{DD}=15V, V_{SS}=-15V			-25	
		All inputs at 0.8V, no load	V_{DD}=9V, V_{SS}=-9V			-3.2	
			V_{DD}=12V, V_{SS}=-12V			-3.2	
			V_{DD}=15V, V_{SS}=-15V			-3.2	
Supply Current from V_{CC}	I_{CC}	All inputs at 5V, no load, V_{CC}=5V				30	mA
DRIVER SECTION (V_{CC}=5V, V_{DD}=9V, V_{SS}=-9V, unless otherwise specified)							
High-Level Output Voltage	V_{OH}	V_{IL}=0.8V, R_L=3kΩ		6	7.5		V
Low-Level Output Voltage	V_{OL}	V_{IH}=1.9V, R_L=3kΩ			-7.5	-6	V
High-Level Input Current	I_{IH}	V_I=5V				10	μA
Low-Level Input Current	I_{IL}	V_I=0V				-1.6	mA
High-Level Short-Circuit Output Current	$I_{OS(H)}$	V_{IL}=0.8V, V_O=0V		-4.5	-12	-19.5	mA
Low-Level Short-Circuit Output Current	$I_{OS(L)}$	V_{IH}=2V, V_O=0V		4.5	12	19.5	mA
Output Resistance	r_O	V_{CC}=V_{DD}=V_{SS}=0, V_O=-2Vto 2V		300			Ω
DRIVER SECTION (V_{CC}=5V, V_{DD}=12V, V_{SS}=-12V, unless otherwise specified)							
Propagation Delay Time Low to High Level Output	t_{PLH}	R_L=3kΩ to 7kΩ, C_L=15pF			315	500	ns
Propagation Delay Time High to Low Level Output	t_{PHL}	R_L=3kΩ to 7kΩ, C_L=15pF			75	175	ns
Transition Time Low to High Level Output	t_{TLH}	R_L=3kΩ to 7kΩ	C_L=15pF		60	100	ns
			C_L=2500pF (Note 2)		1.7	2.5	μs
Transition Time High to Low Level Output	t_{THL}	R_L=3kΩ to 7kΩ	C_L=15pF		40	75	ns
			C_L=2500pF (Note 2)		1.5	2.5	μs

Electrical Characteristics (Continued)

(T_A=25°C, unless otherwise specified.)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
RECEIVER SECTION (V_{CC}=5V, V_{DD}=9V, V_{SS}=-9V, unless otherwise specified)							
Positive-Going Input Threshold Voltage	V_{IT+}			1.75	1.9	2.3	V
		T_A = -40 to 85 °C		1.55		2.3	V
Negative-Going Input Threshold Voltage	V_{IT-}			0.75	0.97	1.25	V
Input Hysteresis Voltage	V_{HYS}			0.5			V
High-Level Output Voltage	V_{OH}	I_{OH}=-0.5mA	V_{IH}=0.75V	2.6	4	5	V
			Input Open	2.6			
Low-Level Output Voltage	V_{OL}	I_{OL}=10mA, V_I=3V			0.2	0.45	V
High-Level Input Current	I_{IH}	V_I=25V		3.6		8.3	mA
		V_I=3V		0.43			
Low-Level Input Current	I_{IL}	V_I=-25V		-3.6		-8.3	mA
		V_I=-3V		-0.43			
Short-Circuit Output Current	I_{OS}	V_I=0.8V			-3.4	-12	mA
RECEIVER SECTION (V_{CC}=5V, V_{DD}=12V, V_{SS}=-12V, unless otherwise specified)							
Propagation Delay Time Low to High Level Output	t_{PLH}	R_L=5kΩ, C_L=50pF			105	250	ns
		R_L=1.5kΩ, C_L=15pF			100	160	
Propagation Delay Time High to Low Level Output	t_{PHL}	R_L=5kΩ, C_L=50pF			60	150	ns
		R_L=1.5kΩ, C_L=15pF			42	100	
Transition Time Low to High Level Output	t_{TLH}	R_L=5kΩ, C_L=50pF			170	350	ns
		R_L=1.5kΩ, C_L=15pF			90	175	
Transition Time High to Low Level Output	t_{THL}	R_L=5kΩ, C_L=50pF			16	60	ns
		R_L=1.5kΩ, C_L=15pF			15	50	

Note 2: Measured between -3V and 3V points of the output waveform (EIA/TIA-232-F conditions); all unused inputs are tied either high or low.

Typical Performance Characteristics

Driver Section

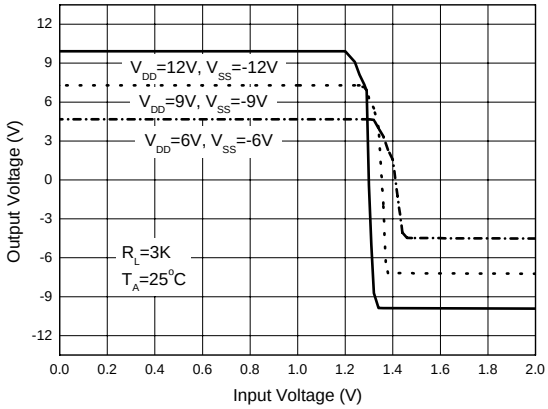


Figure 4. Voltage Transfer Characteristics

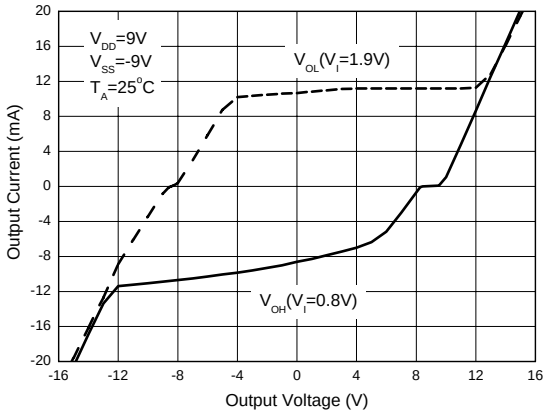


Figure 5. Output Current vs. Output Voltage

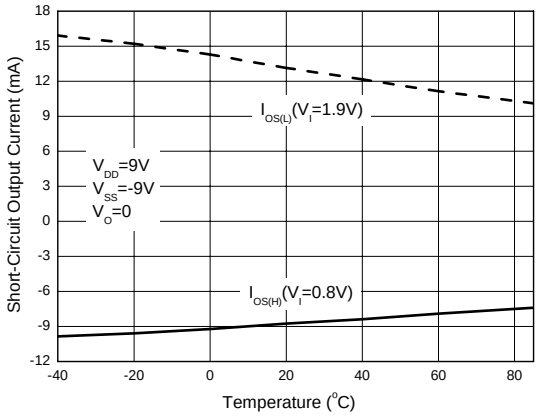


Figure 6. Short-Circuit Output Current vs. Temperature

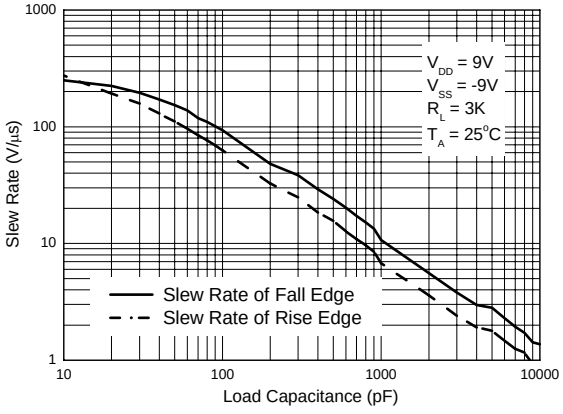


Figure 7. Slew Rate vs. Load Capacitance

Typical Performance Characteristics (Continued)

Receiver Section

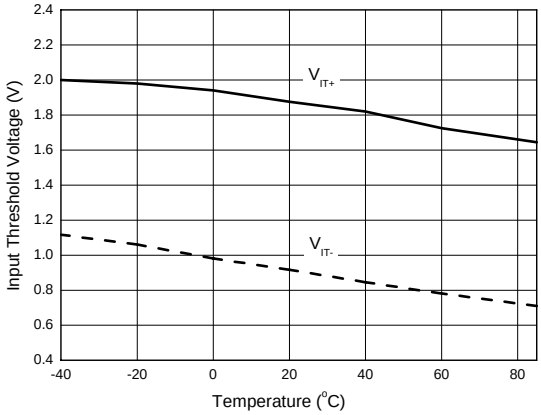


Figure 8. Input Threshold Voltage vs. Temperature

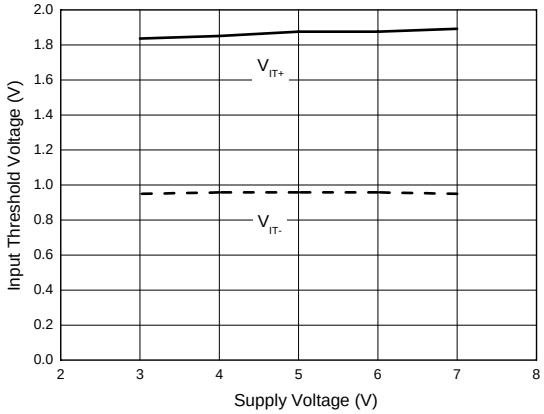


Figure 9. Input Threshold Voltage vs. Supply Voltage

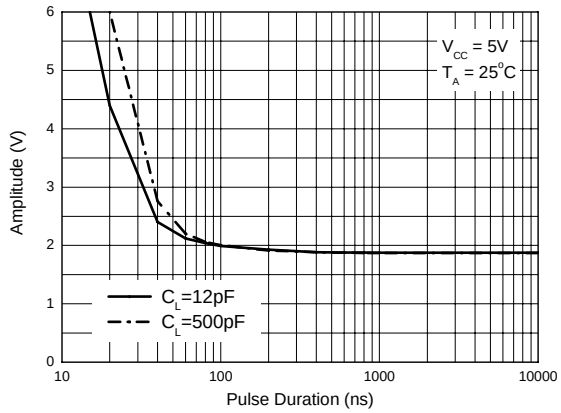


Figure 10. Noise Rejection

Typical Application

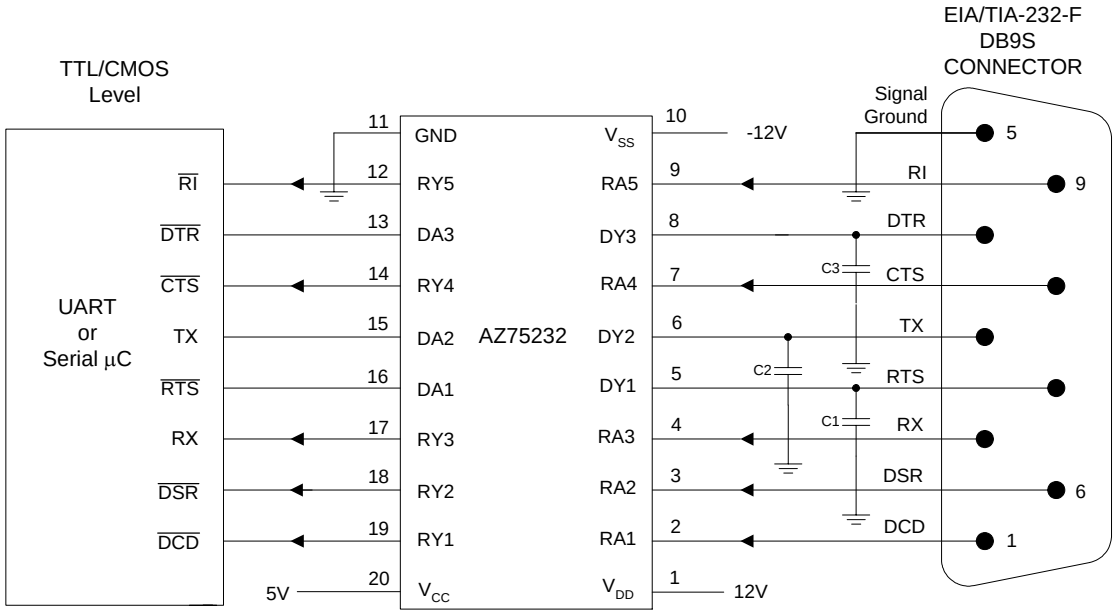
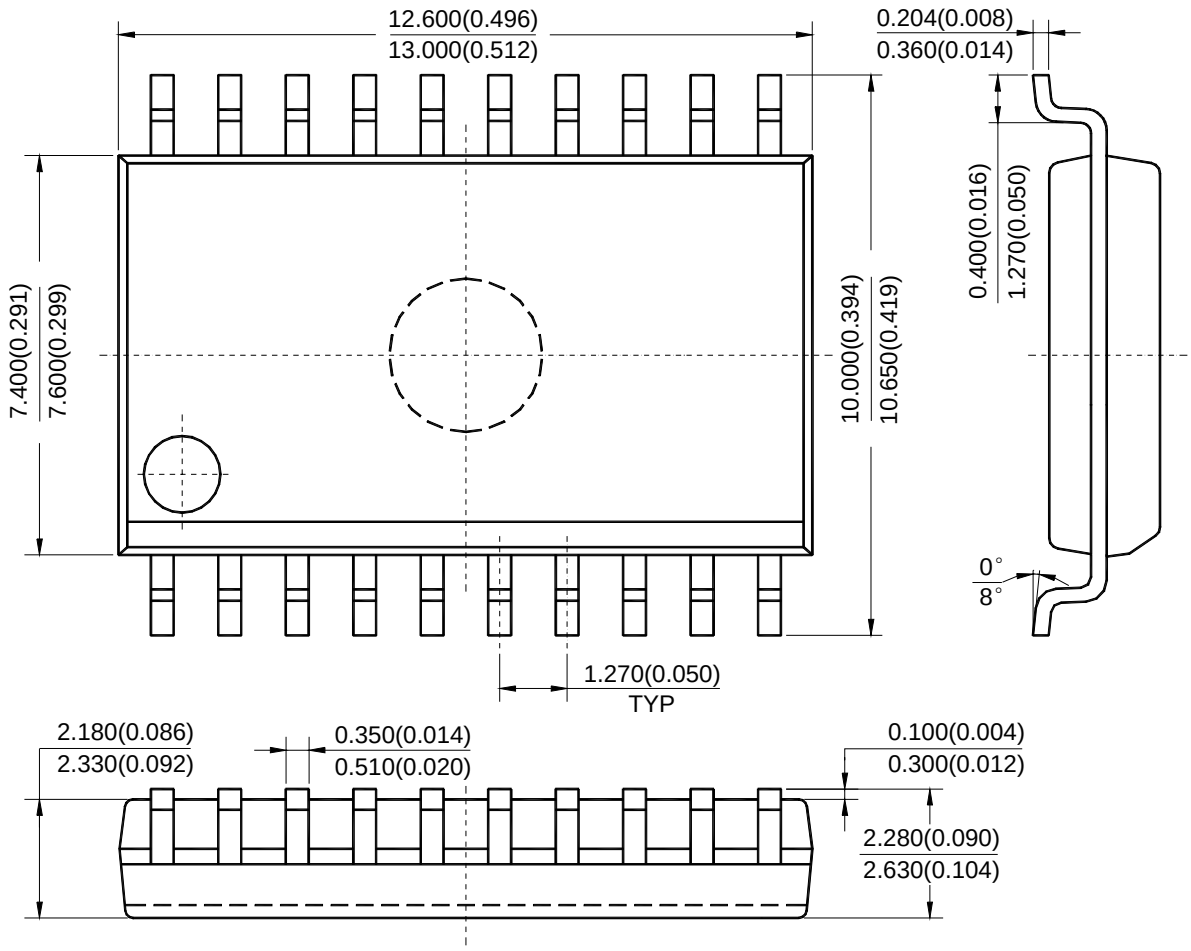


Figure 11. Typical Application of AZ75232

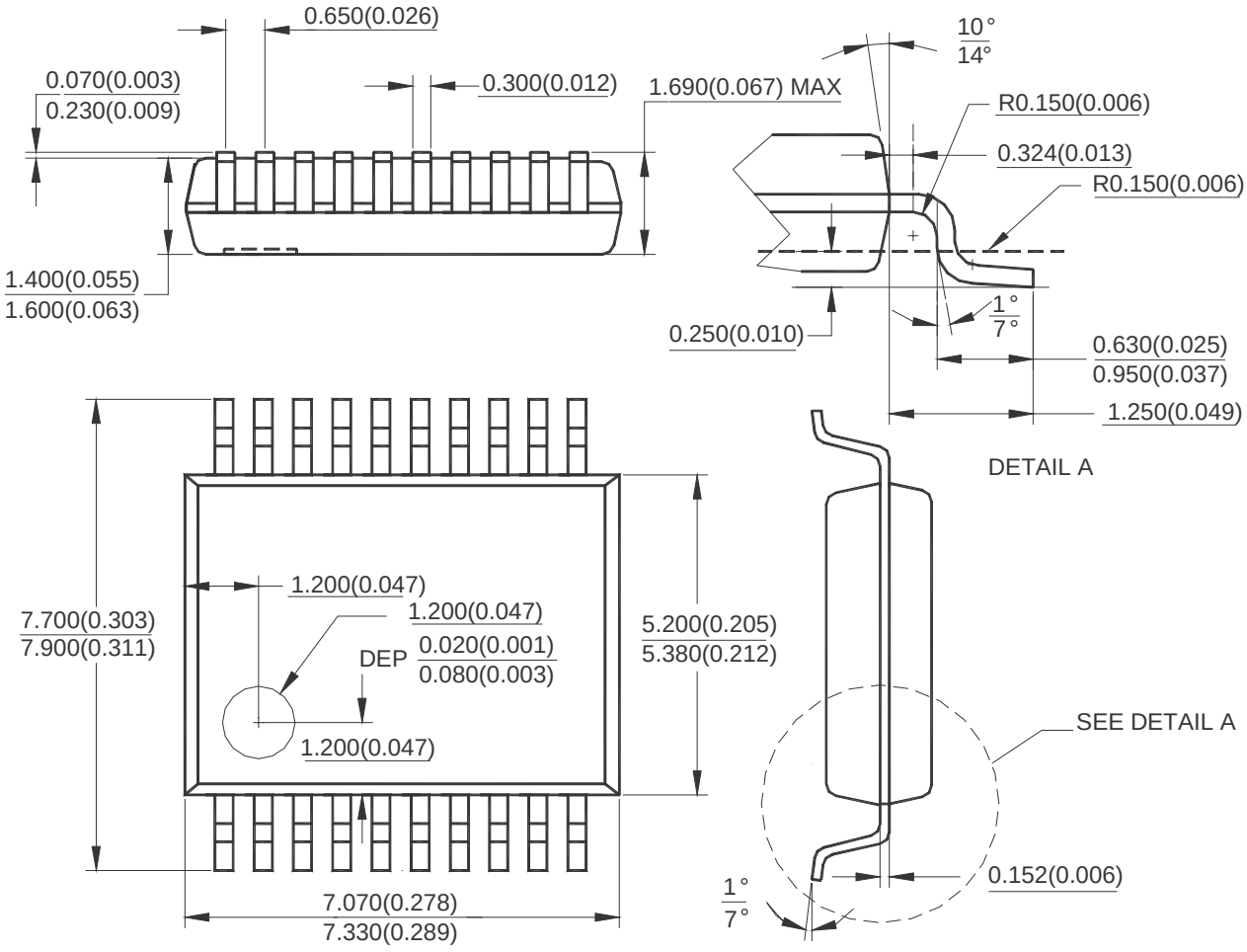
Mechanical Dimensions

SOIC-20 **Unit: mm(inch)**



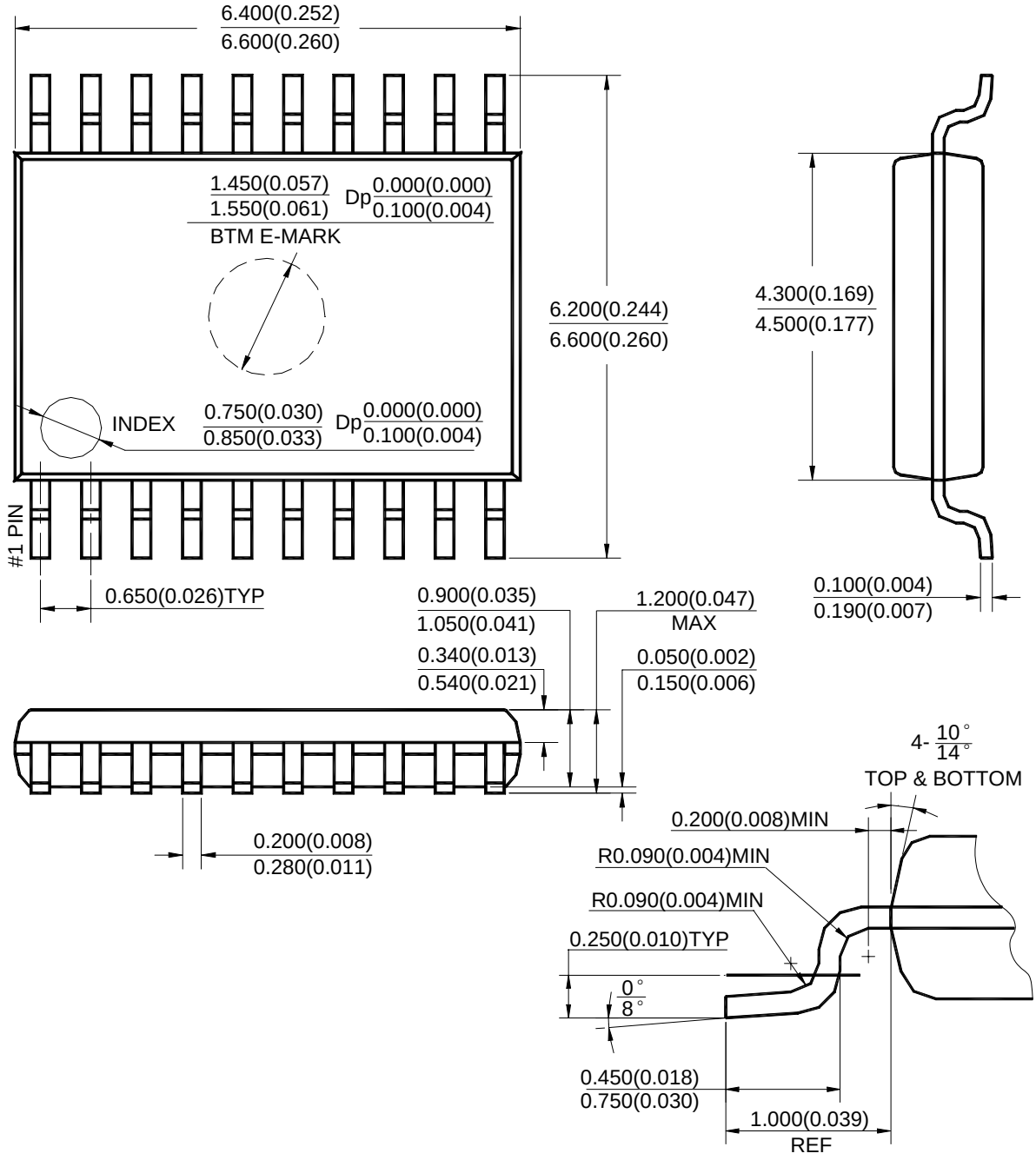
Mechanical Dimensions (Continued)

SSOP-20 **Unit: mm(inch)**



Mechanical Dimensions

TSSOP-20 **Unit: mm(inch)**



BCD Semiconductor Manufacturing Limited

http://www.bcdsemi.com

IMPORTANT NOTICE

BCD Semiconductor Manufacturing Limited reserves the right to make changes without further notice to any products or specifications herein. BCD Semiconductor Manufacturing Limited does not assume any responsibility for use of any its products for any particular purpose, nor does BCD Semiconductor Manufacturing Limited assume any liability arising out of the application or use of any its products or circuits. BCD Semiconductor Manufacturing Limited does not convey any license under its patent rights or other rights nor the rights of others.

MAIN SITE

BCD Semiconductor Manufacturing Limited
- Wafer Fab
Shanghai SIM-BCD Semiconductor Manufacturing Limited
800, Yi Shan Road, Shanghai 200233, China
Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

BCD Semiconductor Manufacturing Limited
- IC Design Group
Advanced Analog Circuits (Shanghai) Corporation
8F, Zone B, 900, Yi Shan Road, Shanghai 200233, China
Tel: +86-21-6495 9539, Fax: +86-21-6485 9673

REGIONAL SALES OFFICE

Shenzhen Office
Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd. Shenzhen Office
Advanced Analog Circuits (Shanghai) Corporation Shenzhen Office
27B, Tower C, 2070, Middle Shen Nan Road, Shenzhen 518031, China
Tel: +86-755-8368 3987, Fax: +86-755-8368 3166

Taiwan Office
BCD Semiconductor (Taiwan) Company Limited
4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei, Taiwan
Tel: +886-2-2656 2808, Fax: +886-2-2656 2806

USA Office
BCD Semiconductor Corporation
3170 De La Cruz Blvd., Suite 105, Santa Clara, CA 95054-2411, U.S.A
Tel: +1-408-988 6388, Fax: +1-408-988 6386