MULTIPLE RS-232 DRIVERS AND RECEIVERS TD75232

General Description

The TD75232 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-crossover board layout. The TD75232 provides a one-chip solution for the common 9-pin serial RS-232 interface between data terminal and data communications equipment. The TD75232 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

SOIC-20

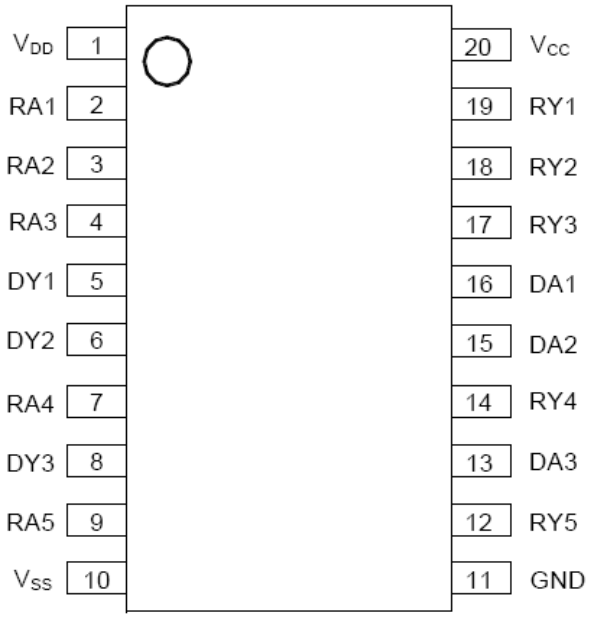
SSOP-20

TSSOP-20

Package Types of TD75232

Pin Configuration

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



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

Ordering Information

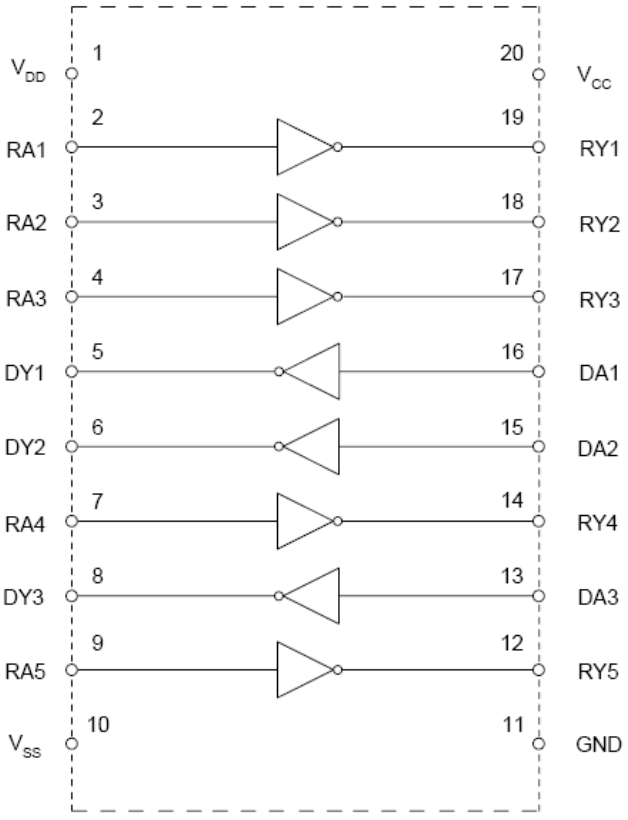
TD75232 □ □

Circuit Type

Packing:
Blank：Tube
R:Type and Reel

Package：
P:SOP20
O:TSSOP20
G:SSOP20

Functional Block Diagram



Functional Block Diagram of TD1722

Absolute Maximum Ratings

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 (T_A=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

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

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

Electrical Characteristics(Cont.)

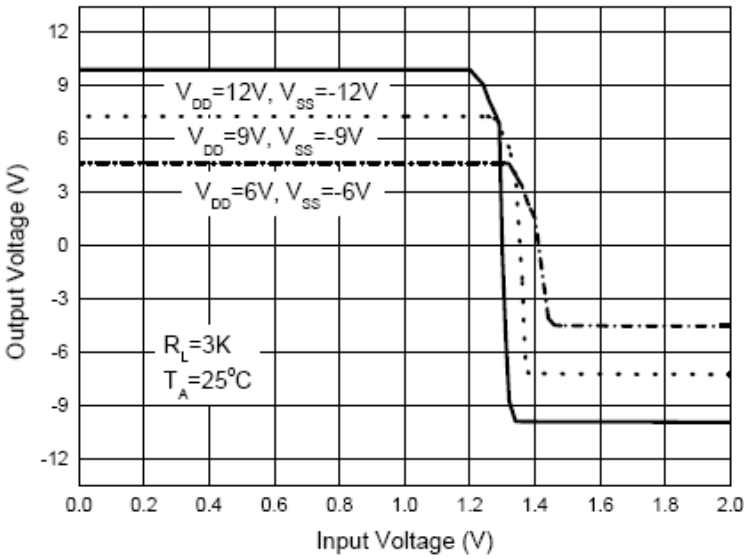
DRIVER SECTION (V_{CC}=5V, V_{DD}=12V, V_{SS}=-12V, unless otherwise specified)							
Propagation Delay Time Low to High Level Output	t_{PLH}	R_L=3kΩ to 7kΩ, C_L=15pF			315	500	ns
Propagation Delay Time High to Low Level Output	t_{PHL}	R_L=3kΩ to 7kΩ, C_L=15pF			75	175	ns
Transition Time Low to High 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

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

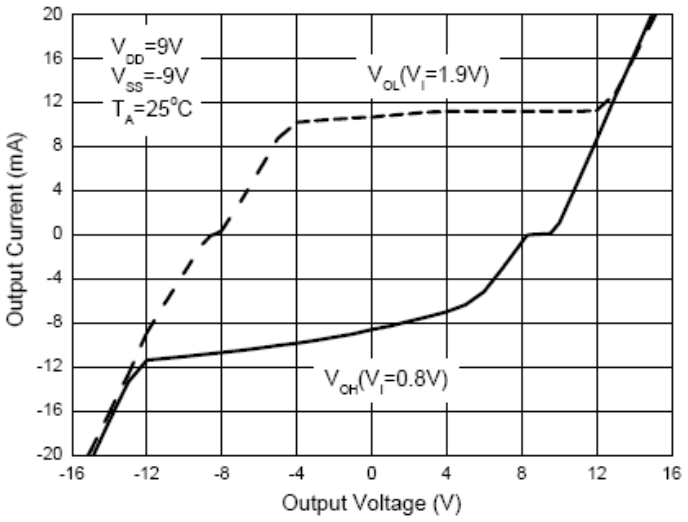
RECEIVER SECTION (V_{CC}=5V, V_{DD}=12V, V_{SS}=-12V, unless otherwise specified)						
Propagation Delay Time Low to High Level Output	t_{PLH}	R_L=5kΩ, C_L=50pF		105	250	ns
		R_L=1.5kΩ, C_L=15pF		100	160	
Propagation Delay Time High to Low Level Output	t_{PHL}	R_L=5kΩ, C_L=50pF		60	150	ns
		R_L=1.5kΩ, 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	

Typical Operating Characteristics

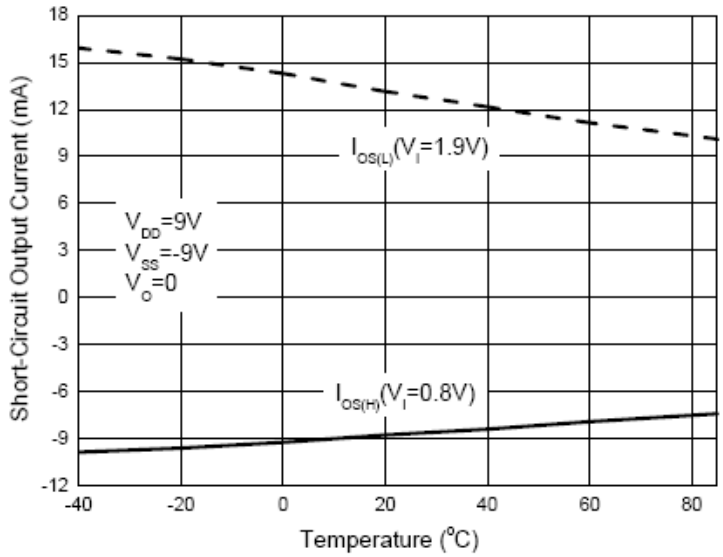
Voltage Transfer sfer Characteristics



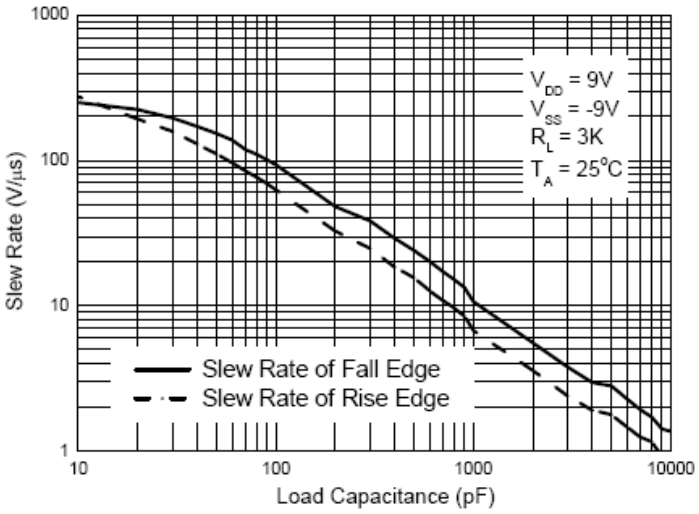
Output Current vs. Output Voltage



Short-Circuit Output Current vs. Temperature

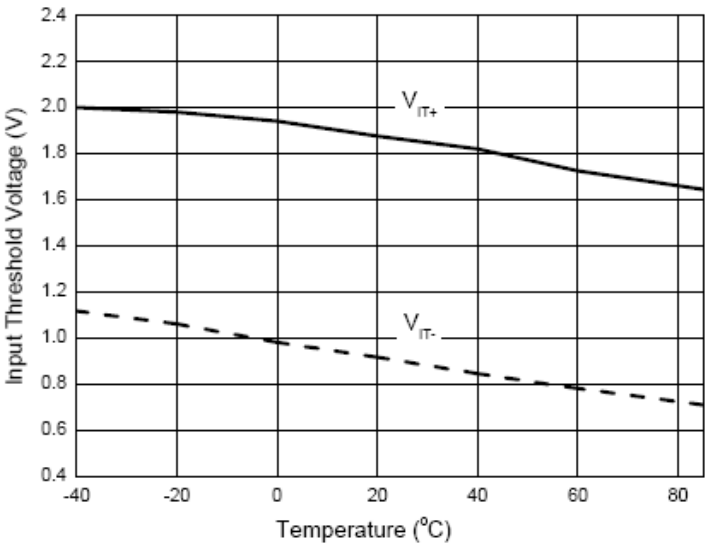


Slew Rate vs. Load Capacitance

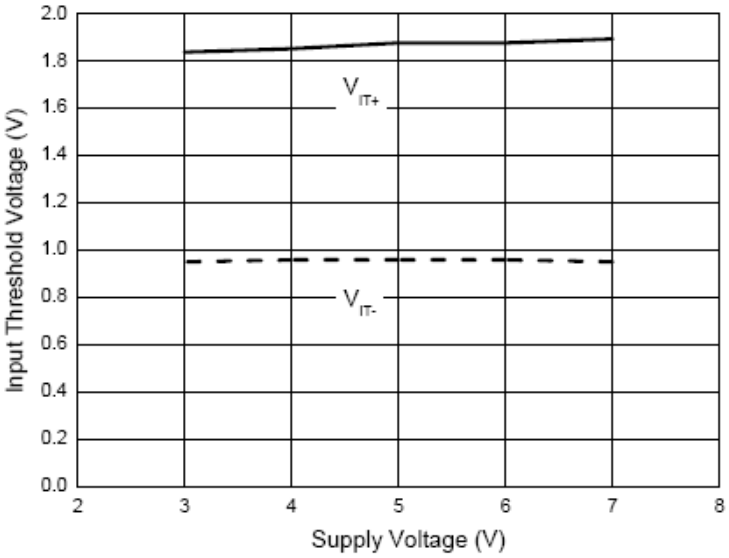


Typical Operating Characteristics(Cont.)

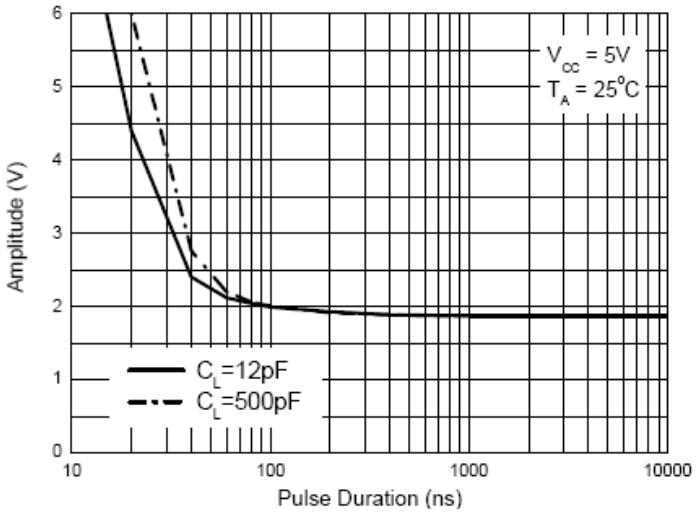
Input Threshold Voltage vs. Temperature



Input Threshold Voltage vs. Supply Voltage

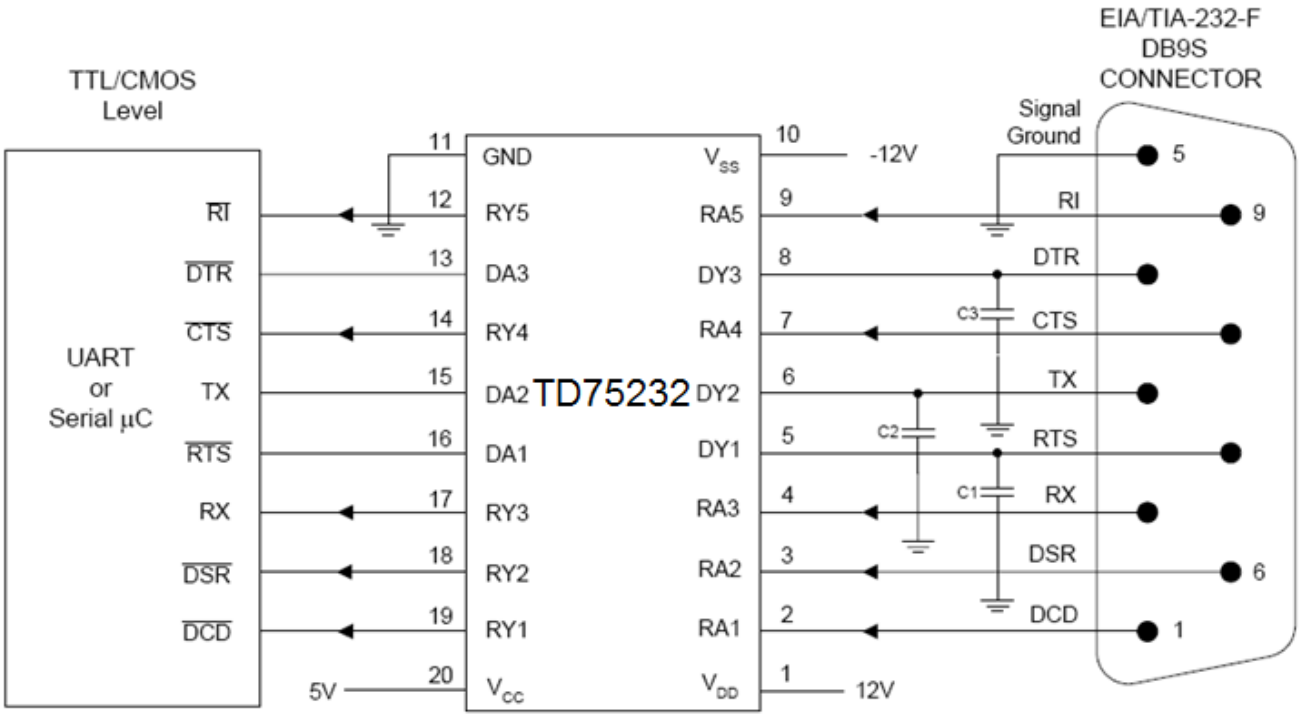


Noise Rejection



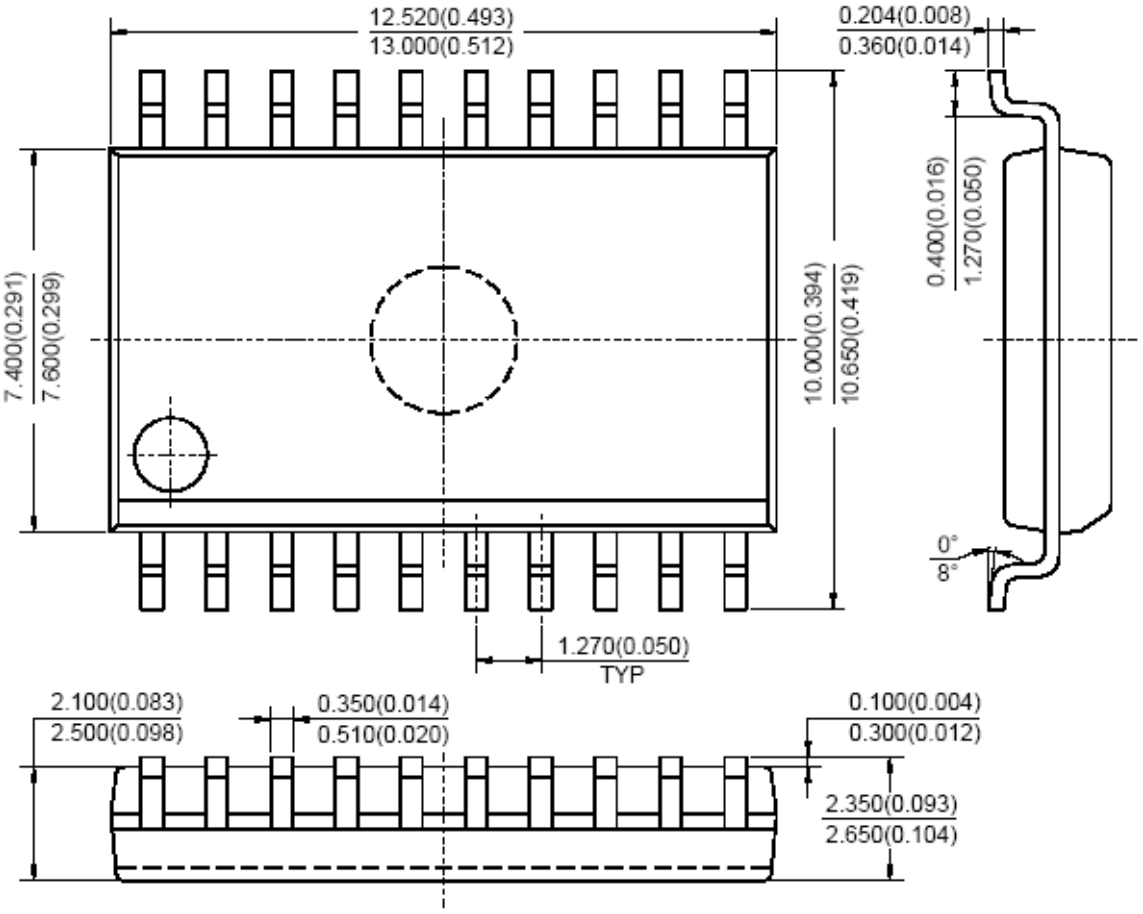
Typical Application Circuit

TD1722 B/C/D Application Circuit



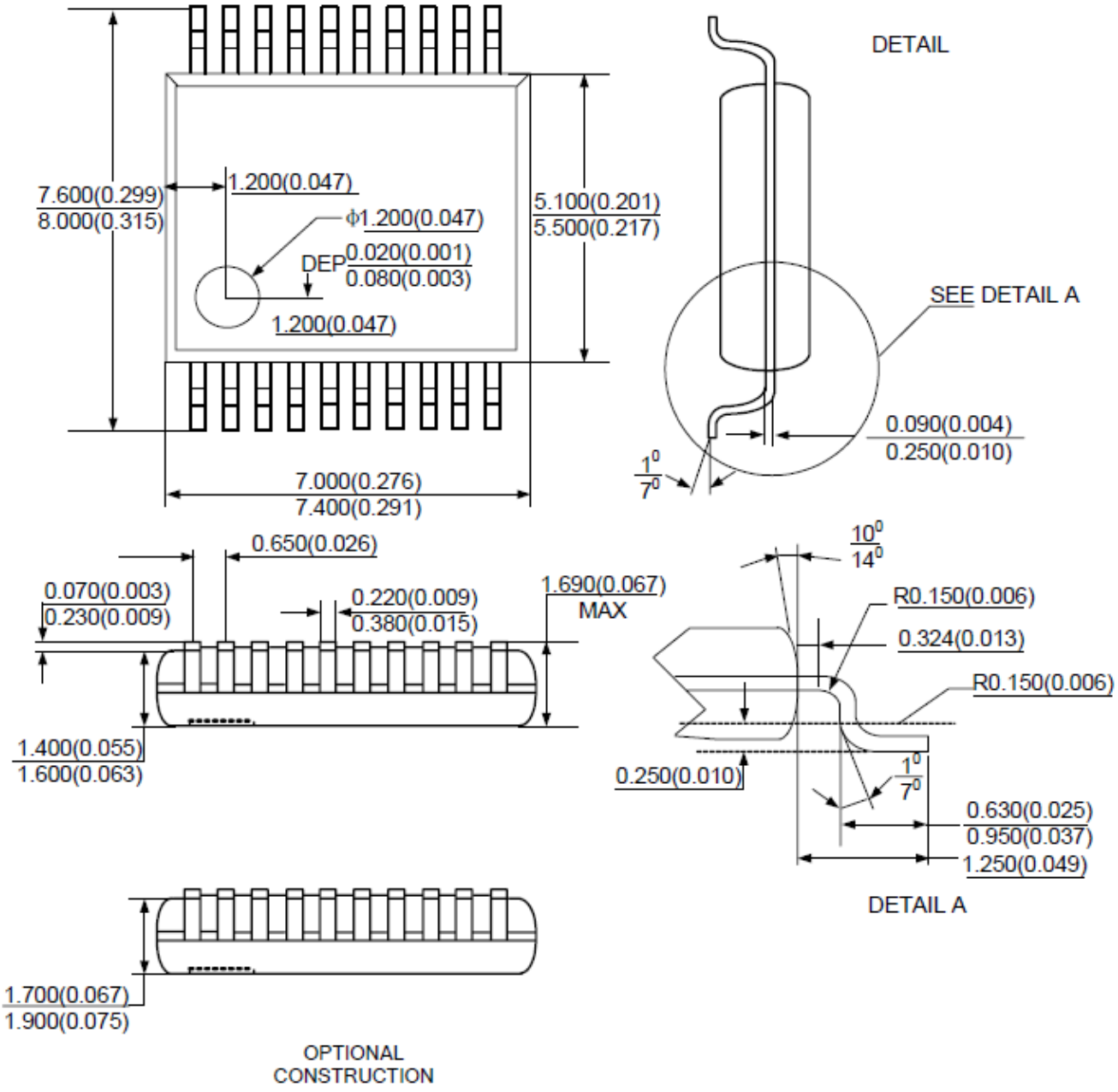
Package Information

SOP20 Package Outline Dimensions(Unit:inch)



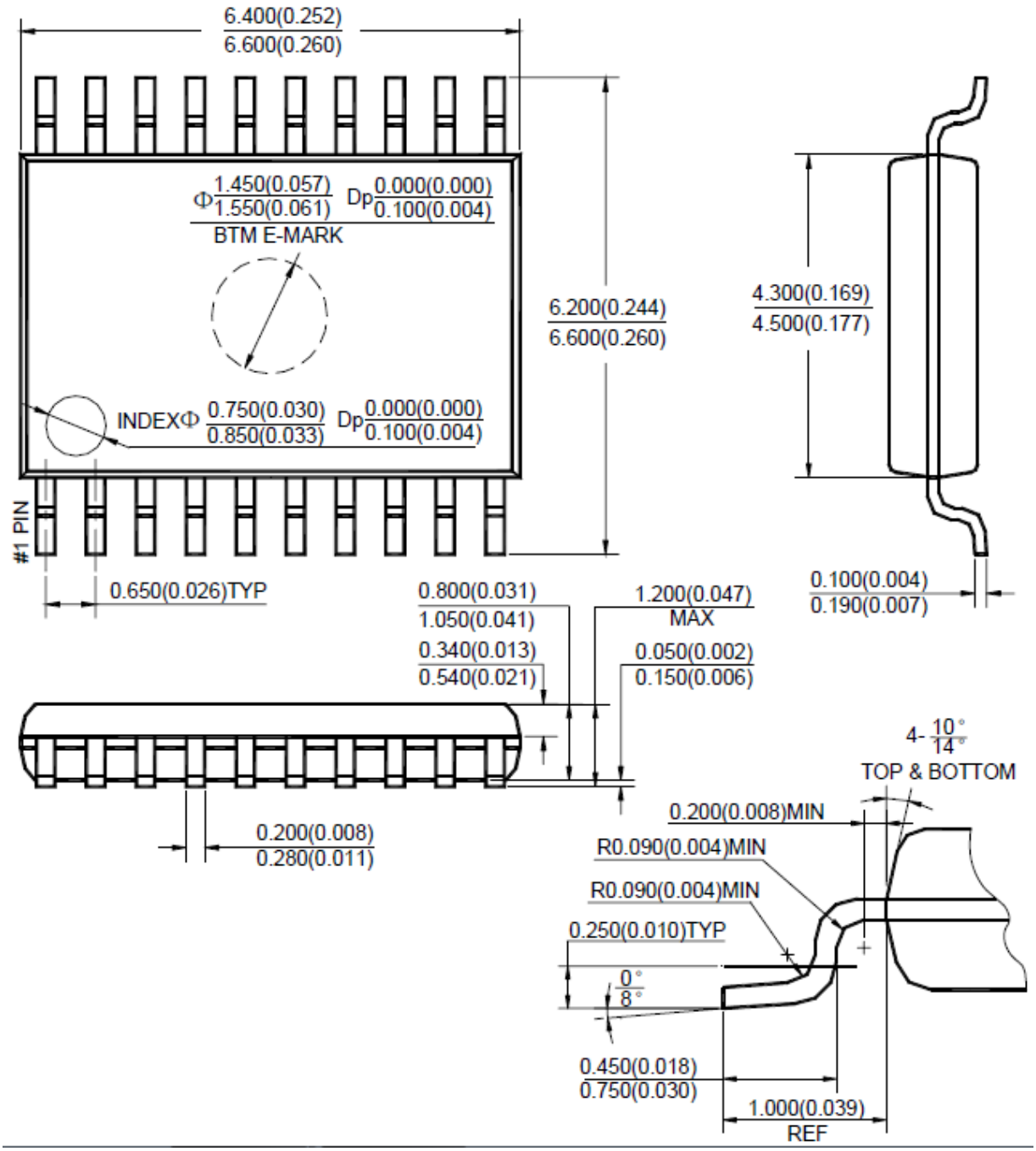
Package Information

SSOP20 Package Outline Dimensions(Unit:inch)



Package Information

TSOP20 Package Outline Dimensions(Unit:inch)



Design Notes