

# GS75232

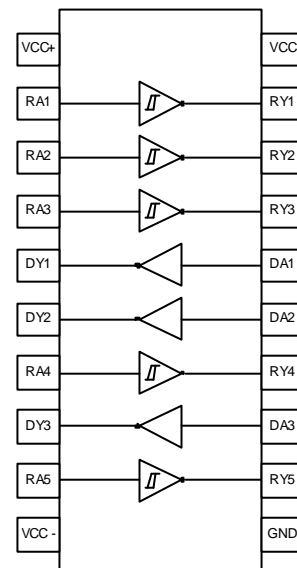
## Multiple RS-232 Drivers & Receivers

### Product Description

The GS75232 are monolithic device containing 3 independent drives and 5 receivers. These are designed to interface between data terminal equipment and data communication equipment as designed by EIA-232-D.

### Features

- Meets standard EIA-232-D (Revision of RS-232-C)
- Drivers
  - Current Limited Output : 10 mA Typical
  - Power-off Output Impedance : 300 Ω Min
  - Slew Rate Control by Load Capacitor
  - Flexible Supply Voltage Range
  - Input Compatible with Most TTL and DTL Circuits
- Receivers
  - Input Resistance : 3 kΩ to 7 kΩ
  - Input Signal Range : ± 30 V
  - Built-in Input Hysteresis (Double Threshold)

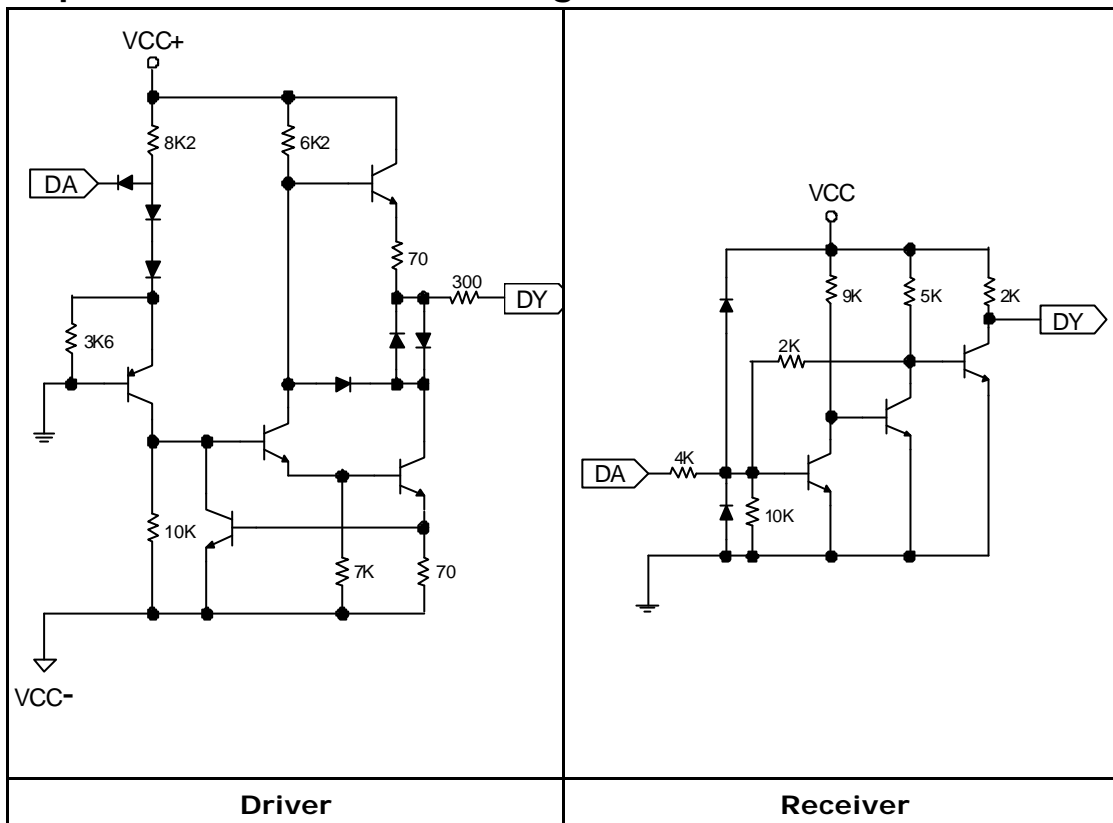


**GS75232**

### Pin Description

Name	Pin No	Function	Name	Pin No	Function
V <sub>CC+</sub>	1	Driver Section Supply +	V <sub>CC-</sub>	10	Driver Section Supply -
DA1	16	Driver Input	DY1	5	Driver Output
DA2	15		DY2	6	
DA3	13		DY3	8	
V <sub>CC</sub>	20		Receiver Section Supply	GND	
RA1	2	Receiver Input	RY1	19	Receiver Output
RA2	3		RY2	18	
RA3	4		RY3	17	
RA4	7		RY4	14	
RA5	9		RY5	12	

**Representative Schematic Diagram**



**Ordering Information**

Device	Package
GS75232S	SOIC-20
GS75232SS	SSOP-20
GS75232TS	TSSOP-20

“F” means Lead Free part.

\*Request for other voltages, please contact factory directly.

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Unit
V <sub>CC+</sub>	Supply Voltage	15	V
V <sub>CC-</sub>	Supply Voltage	-15	V
V <sub>CC</sub>	Supply Voltage	10	V
V <sub>I</sub> (Driver)	Input Voltage	-15 to +7	V
V <sub>I</sub> (Reciver)	Input Voltage	± 30	V
V <sub>O</sub> (Driver)	Output Voltage	-15 to +15	V
PT	Continuous Power Dissipation (Below 25 °C)	1.0	W
T <sub>STG</sub>	Storage Temperature	-65 to +175	°C
Top	Operating Temperature	0 to +75	°C

## Electrical Characteristics

### Supply Current ( $V_{CC} = 5V$ , $T_A = 25^\circ C$ )

Symbol	Parameter	Test Condition		Min	Max	Unit
$I_{CC+}$	Supply Current from $V_{CC+}$	$V_{CC+} = 9V$	$V_{IN} = 1.9V$	-	15	mA
		No Load	$V_{IN} = 0.8V$	-	4.5	
		$V_{CC+} = 12V$	$V_{IN} = 1.9V$	-	19	
		No Load	$V_{IN} = 0.8V$	-	5.5	
		$V_{CC+} = 15V$	$V_{IN} = 1.9V$	-	25	
		No Load	$V_{IN} = 0.8V$	-	9	
$I_{CC-}$	Supply Current from $V_{CC-}$	$V_{CC-} = -9V$	$V_{IN} = 1.9V$	-	-15	mA
		No Load	$V_{IN} = 0.8V$	-	-3.2	
		$V_{CC-} = -12V$	$V_{IN} = 1.9V$	-	-19	
		No Load	$V_{IN} = 0.8V$	-	-3.2	
		$V_{CC-} = -15V$	$V_{IN} = 1.9V$	-	-25	
		No Load	$V_{IN} = 0.8V$	-	-3.2	
$I_{CC}$	Supply Current from $V_{CC}$	$V_{CC} = 5V$	$V_{IN} = 5.0V$	-	30	mA

### Receiver Section

Symbol	Parameter	Test Conditions	Min	Max	Unit
$V_{T+}$	Positive-Going Threshold Voltage		1.75	2.25	V
$V_{T-}$	Negative-Going Threshold Voltage		0.75	1.25	V
$V_{OH}$	High Level Output Voltage	$V_I = 0.75V$ , $I_{OL} = -0.5mA$	2.6	5	V
		Input Open, $I_{OL} = -0.5mA$	2.6	5	
$V_{OL}$	Low Level Output Voltage	$V_I = 3V$ , $I_{OL} = 10mA$	-	0.45	V
$I_{IH}$	High-Level Input Current	$V_I = 25V$	3.6	8.3	mA
		$V_I = 3V$	0.43	-	
$I_{IL}$	Low-Level Input Current	$V_I = -25V$	-3.6	-8.3	mA
		$V_I = -3V$	-0.43	-	
$I_{OS}$	Short-Circuit Output Current		-3 (tip)		mA

### Receiver Switching Characteristic ( $V_{CC} = 5V$ )

Symbol	Parameter	Test Conditions	Min	Max	Unit
$t_{PLH}$	Propagation Delay Time, Low-To-High-Level Output	$C_L = 15\mu F$ $R_L = 3.9k\Omega$	-	150	ns
$t_{PHL}$	Propagation Delay Time, High -To- Low -Level Output	$C_L = 15\mu F$ $R_L = 390k\Omega$	-	50	ns
$t_{TLH}$	Transition Time, Low-To-High-Level Output	$C_L = 15\mu F$ $R_L = 3.9k\Omega$	-	175	ns
$t_{THL}$	Transition Time, High -To- Low -Level Output	$C_L = 15\mu F$ $R_L = 390k\Omega$	-	20	ns

**Driver Section**

Symbol	Parameter	Test Conditions	Min	Max	Unit	
$V_{IH}$	High Level Input Voltage	$V_{CC+} = 9\text{ V}$ $V_{CC-} = -9\text{ V}$	1.9	-	V	
$V_{IL}$	Low Level Input Voltage		-	0.8	V	
$V_{OH}$	High Level Output Voltage	$V_{IL} = 0.8\text{ V}$ $R_L = 3\text{ k}\Omega$	$V_{CC+} = 9\text{ V}$ $V_{CC-} = -9\text{ V}$	6	-	V
			$V_{CC+} = 13.2\text{ V}$ $V_{CC-} = -13.2\text{ V}$	9	-	
$V_{OL}$	Low Level Output Voltage	$V_{IH} = 1.9\text{ V}$ $R_L = 3\text{ k}\Omega$	$V_{CC+} = 9\text{ V}$ $V_{CC-} = -9\text{ V}$	-	-6	V
			$V_{CC+} = 13.2\text{ V}$ $V_{CC-} = -13.2\text{ V}$	-	-9	
$I_{IH}$	High Level Input Current	$V_I = 5\text{ V}$	-	10	$\mu\text{A}$	
$I_{IL}$	Low Level Input Current	$V_I = 0$	-	-1.6	mA	
$I_{OS(H)}$	Short Circuit Output Current at High Level	$V_I = 0.8\text{ V}$ $V_O = 0$	-6	-12	mA	
$I_{OS(L)}$	Short Circuit Output Current at Low Level	$V_I = 1.9\text{ V}$ $V_O = 0$	6	12	mA	
$R_O$	Output Resistance, Power Off	$V_{CC+} = 0, V_{CC-} = 0$ $V_O = -2\text{ V to } 2\text{ V}$	300	-	$\Omega$	

**Driver Switching Characteristic** ( $V_{CC+} = 9\text{ V}, V_{CC-} = -9\text{ V}, T_A = 25\text{ }^\circ\text{C}$ )

Symbol	Parameter	Test Conditions	Min	Max	Unit
$t_{PLH}$	Propagation Delay Time, Low-To-High-Level Output	$R_L = 3\text{ k}\Omega$ $CL = 15\text{ }\mu\text{F}$ See Figure 1	-	500	ns
$t_{PHL}$	Propagation Delay Time, High -To- Low -Level Output		-	175	ns
$t_{TLH}$	Transition Time, Low-To-High-Level Output *		-	100	ns
$t_{THL}$	Transition Time, High -To- Low -Level Output*		-	75	ns
$t_{TLH}$	Transition Time, Low-To-High-Level Output**	$R_L = 3\text{ k}\Omega\text{ to } 7\text{ k}\Omega$ $CL = 2500\text{ pF}$ See Figure 1	2.5 (tip)		$\mu\text{s}$
$t_{THL}$	Transition Time, High-To-Low -Level Output**		3.0 (tip)		$\mu\text{s}$

\* - Measured between 10 % and 90 % Points of Output Waveform

\*\* - Measured between +3V and -3V Points on the Output Waveform (EIA-232-D Condition)

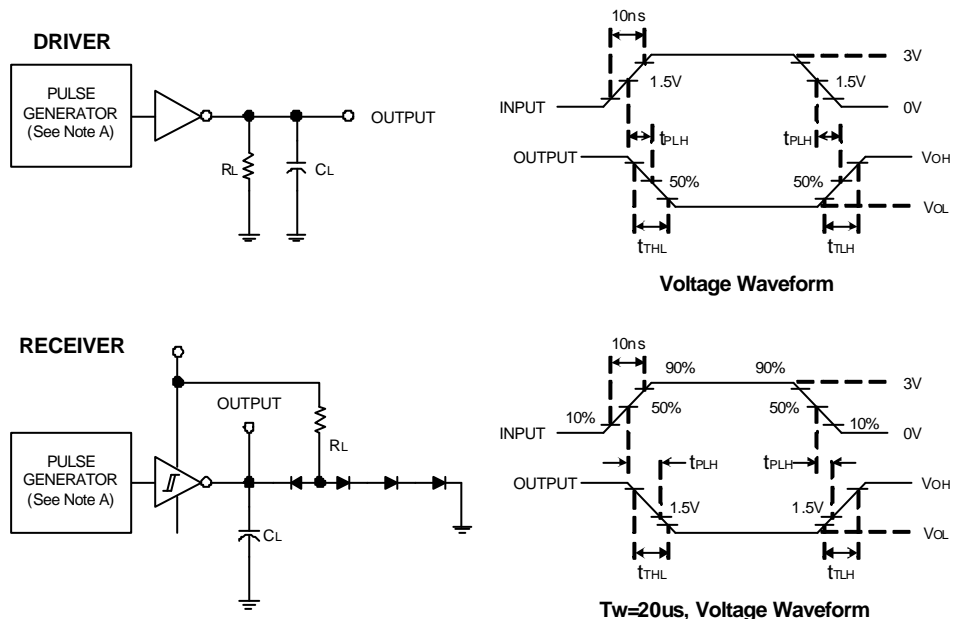
**Receiver Section**

Symbol	Parameter	Test Conditions	Min	Max	Unit
$V_{T+}$	Positive-Going Threshold Voltage		1.75	2.25	V
$V_{T-}$	Negative-Going Threshold Voltage		0.75	1.25	V
$V_{OH}$	High Level Output Voltage	$V_I = 0.75V, I_{OL} = -0.5mA$	2.6	5	V
		Input Open, $I_{OL} = -0.5 mA$	2.6	5	
$V_{OL}$	Low Level Output Voltage	$V_I = 3V, I_{OL} = 10 mA$	-	0.45	V
$I_{IH}$	High-Level Input Current	$V_I = 25V$	3.6	8.3	mA
		$V_I = 3V$	0.43	-	
$I_{IL}$	Low-Level Input Current	$V_I = -25V$	-3.6	-8.3	mA
		$V_I = -3V$	-0.43	-	
$I_{OS}$	Short-Circuit Output Current		-3 (tip)		mA

**Receiver Switching Characteristic ( $V_{CC} = 5V$ )**

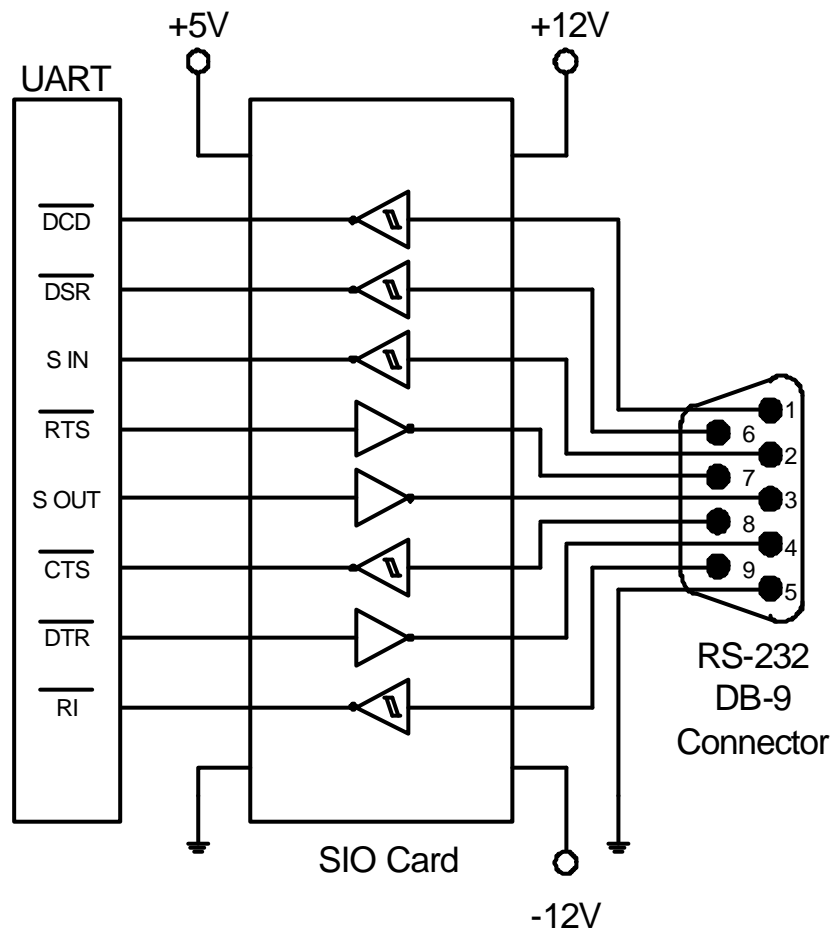
Symbol	Parameter	Test Conditions	Min	Max	Unit
$t_{PLH}$	Propagation Delay Time, Low-To-High-Level Output	$C_L = 15 \mu F, R_L = 3.9 k\Omega$	-	150	ns
$t_{PHL}$	Propagation Delay Time, High -To- Low -Level Output	$C_L = 15 \mu F, R_L = 390 k\Omega$	-	50	ns
$t_{TLH}$	Transition Time, Low-To-High-Level Output	$C_L = 15 \mu F, R_L = 3.9 k\Omega$	-	175	ns
$t_{THL}$	Transition Time, High -To- Low -Level Output	$C_L = 15 \mu F, R_L = 390 k\Omega$	-	20	ns

**Typical Performance Characteristics**



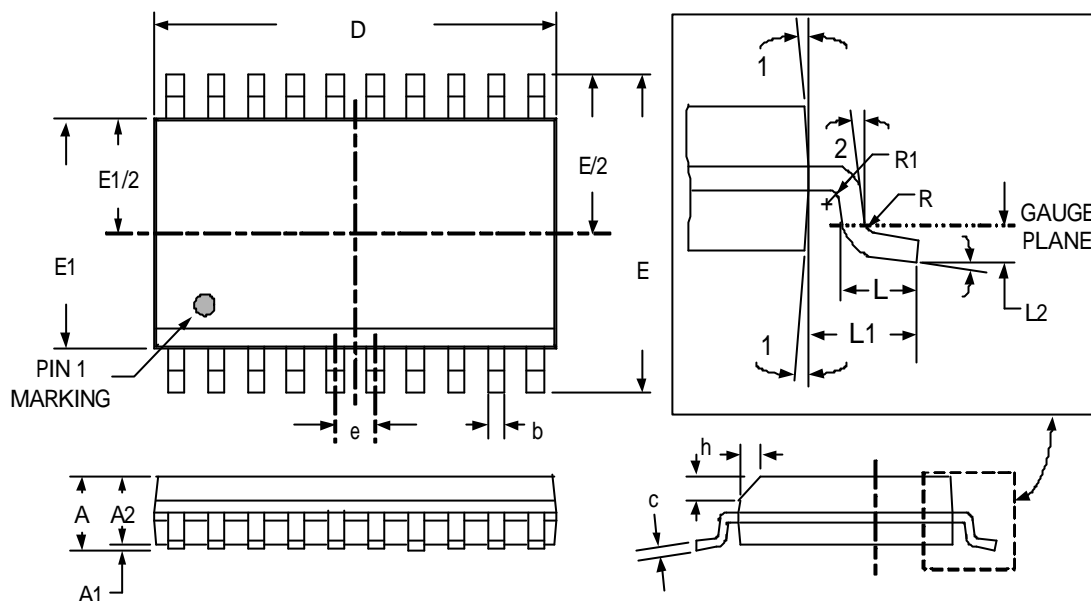
Note A. The pulse generator has the following characteristics.  $f = 200 KHz, Z_0 = 50 \Omega$   
 B. C included probe and jig capacitance.  
 C. All diodes are 1N3064 or equivalent.  
 Fig1. Propagation and Transition Times

### Applications Information



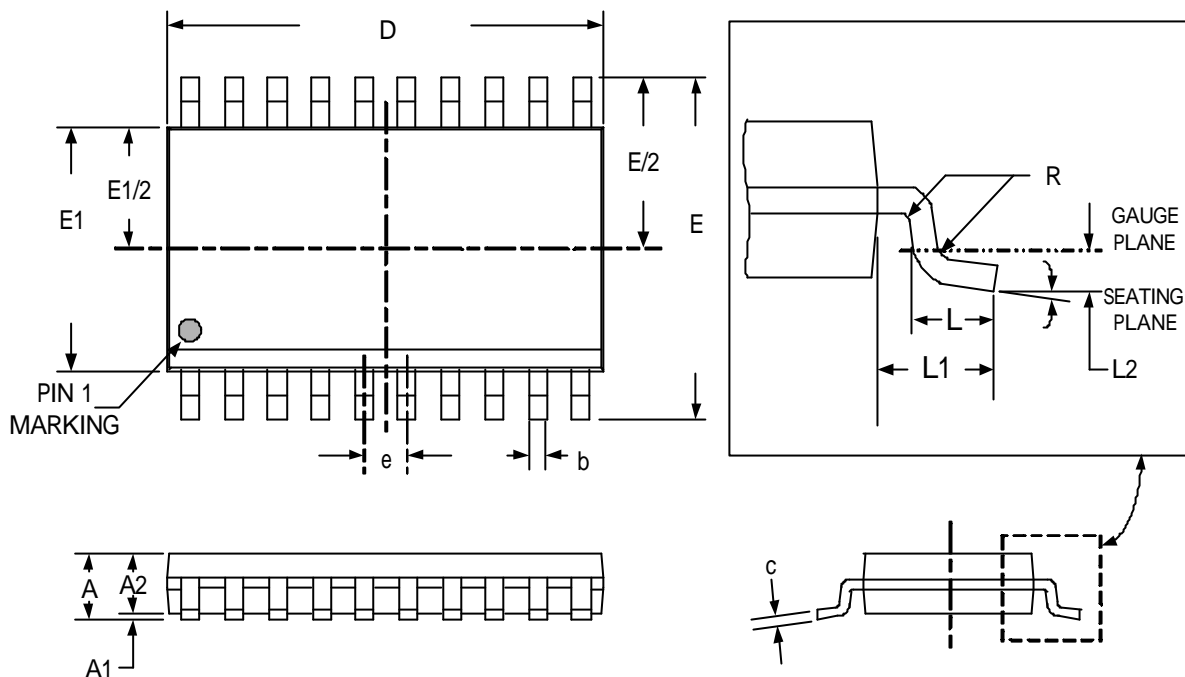
Package Dimensions

SOIC-20L



Dimensions			
SYMBOL	Millimeters		
	MIN	TYP	MAX
A	2.35	-	2.65
A1	0.10	-	0.30
A2	2.05	-	2.55
b	0.31	-	0.51
b1	0.27	-	0.48
c	0.20	-	0.33
D	-	12.80	-
E	-	10.30	-
E1	-	7.50	-
e	-	1.27	-
L	0.40	-	1.27
L1	-	1.40	-
L2	-	0.25	-
R	0.07	-	-
R1	0.07	-	-
h	0.25	-	0.75
$\theta$	0°	-	8°
$\theta1$	5°	-	15°
$\theta2$	0°	-	-

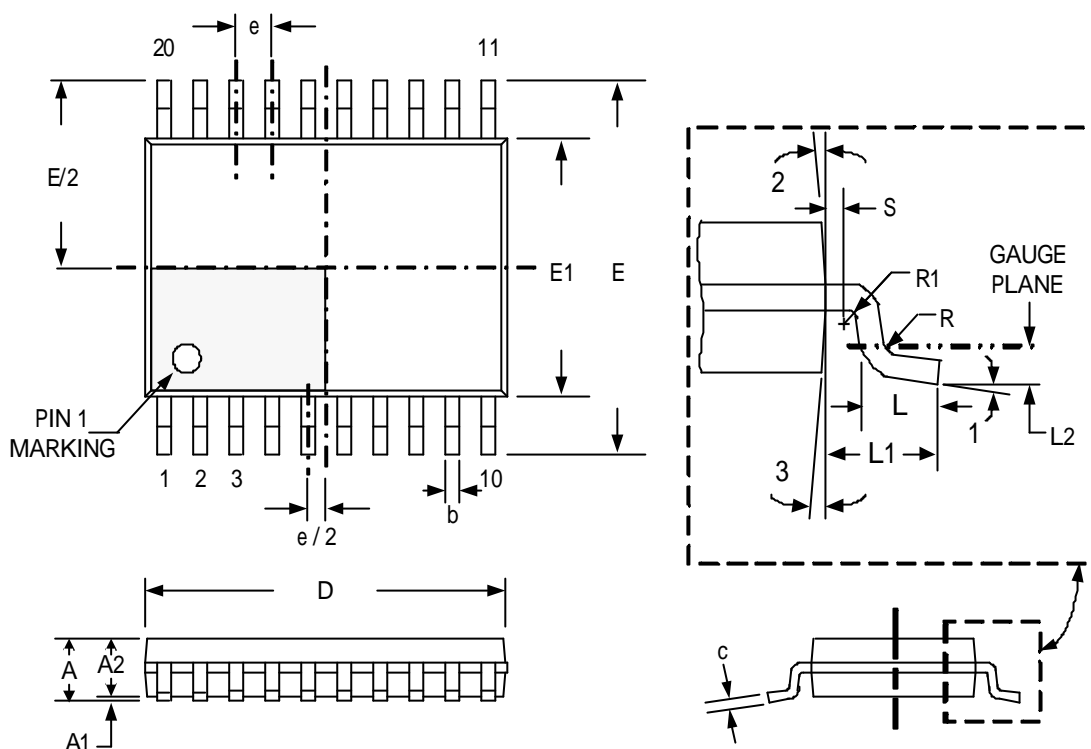
SSOP-20L



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	-	2.0	-	.078
A1	0.05	-	.002	-
A2	1.65	1.85	.065	.073
b	0.22	0.38	.008	.015
c	0.09	0.25	.003	.010
D	6.90	7.50	.271	.295
E	7.40	8.20	.290	.323
E1	5.00	5.60	.197	.220
e	0.65 (TYP)		.026 (TYP)	
L	0.55	0.95	.021	.037
L1	1.25 (TYP)		.050 (TYP)	
L2	0.25 (TYP)		.010 (TYP)	
R	0.09	-	.003	-
θ	0°	8°	0°	8°



TSSOP-20L



Dimensions			
SYMBOL	Millimeters		
	MIN	TYP	MAX
A	-	-	1.20
A1	0.05	-	0.15
A2	0.80	1.00	1.05
b	0.19	-	0.30
b1	0.19	0.22	0.25
c	0.09	-	0.20
D	6.40	6.50	6.60
E	-	6.40	-
E1	4.30	4.40	4.50
e	-	0.65	-
L	0.45	0.60	0.75
L1	-	1.00	-
R	0.09	-	-
R1	0.09	-	-
S	0.20	-	-
$\theta 1$	0°	-	8°
$\theta 2$	-	12°	-
$\theta 3$	-	12°	-

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