

GS75232

Multiple RS-232 Drivers & Receivers

JAN. 2010

Product Description

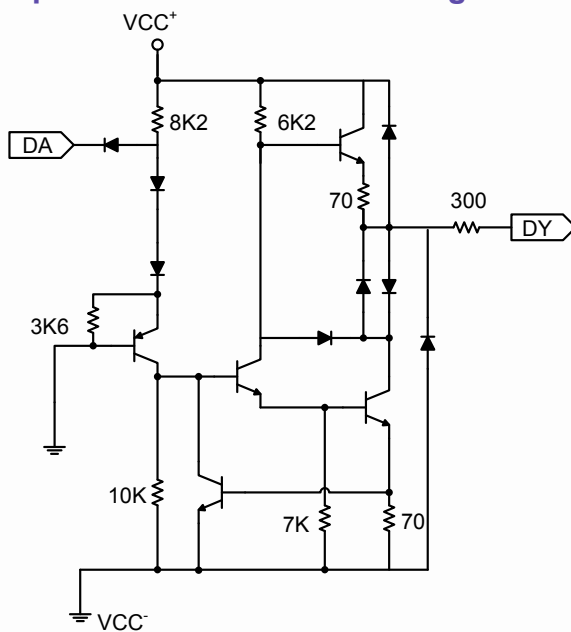
The GS75232 are monolithic device containing 3 independent drives and 5 receivers.

These are designed to interface between data terminal equipment and data communication equipment as designed by EIA-232-D.

Features

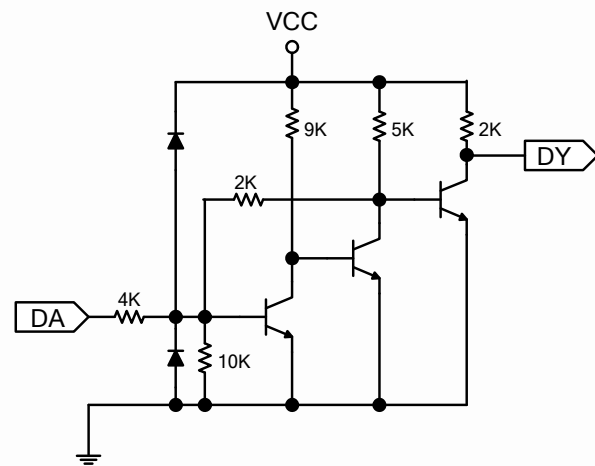
- Meets standard EIA-232-D(Revision of RS-232-C)
- Drivers
 - Current Limited Output : 10 mA Typical
 - Power-off Output Impedance : 300Ω Min
 - Slew Rate Control by Load Capacitor
 - Flexible Supply Voltage Range
 - Input Compatible with Most TTL and DTL Circuits
- Receivers
 - Input Resistance : 3 kΩ to 7 kΩ
 - Input Signal Range : ±30 V
 - Built-in Input Hysteresis (Double Threshold)
- RoHS Compliant, 100% Pb & Halogen Free

Representative Schematic Diagram



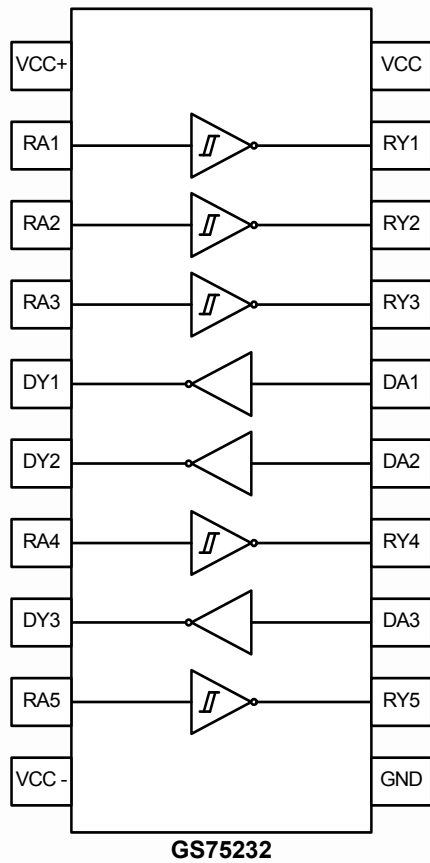
Resistor values shown are nominal

Driver



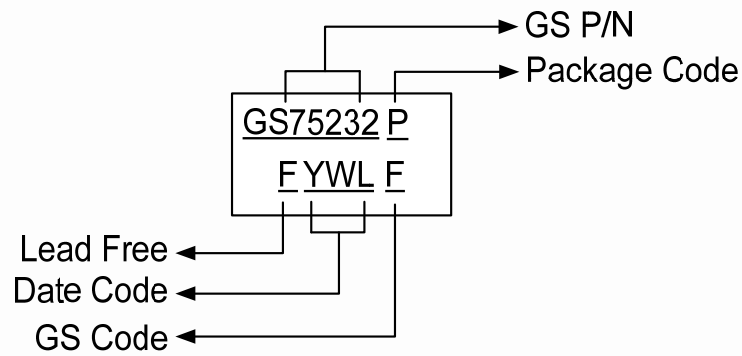
Receiver

Packages & Pin Assignments



Name	Pin No	Function
VCC ⁺	1	Driver Section Supply +
DA1	16	Driver Input
DA2	15	
DA3	13	
VCC	20	Receiver Section Supply
RA1	2	Receiver Input
RA2	3	
RA3	4	
RA4	7	
RA5	9	
VCC ⁻	10	Driver Section Supply -
DY1	5	Driver Output
DY2	6	
DY3	8	
GND	11	Ground
RY1	19	Receiver Output
RY2	18	
RY3	17	
RY4	14	
RY5	12	

Ordering Information



Device	Package
GS75232SF	SOIC-20
GS75232SSF	SSOP-20
GS75232TSSF	TSSOP-20

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V _{CC+}	Supply Voltage	15	V
V _{CC-}	Supply Voltage	-15	V
V _{CC}	Supply Voltage	10	V
V _{IN} (Driver)	Input Voltage	-15 to +7	V
V _{IN} (Receiver)	Input Voltage	±30	V
V _{OUT} (Driver)	Output Voltage	-15 to +15	V
P _D	Continuous Power Dissipation (Below 25 °C)	1.0	W
T _{STG}	Storage Temperature	-65 to +175	°C
Top	Operating Temperature	0 to +75	°C
ESD	ESD Rating	1.5	KV

Electrical Characteristics

Supply Current (V_{CC} = 5V, T_A = 25 °C)

Symbol	Parameter	Test Condition		Min	Max	Unit
I _{CC+}	Supply Current from V _{CC+}	V _{CC+} = 9 V	V _{IN} = 1.9V	-	15	mA
		No Load	V _{IN} = 0.8V		4.5	
		V _{CC+} = 12 V	V _{IN} = 1.9V	-	19	
		No Load	V _{IN} = 0.8V		5.5	
		V _{CC+} = 15 V	V _{IN} = 1.9V	-	25	
		No Load	V _{IN} = 0.8V		9	
I _{CC-}	Supply Current from V _{CC-}	V _{CC-} = -9 V	V _{IN} = 1.9V	-	-15	mA
		No Load	V _{IN} = 0.8V		-3.2	
		V _{CC-} = -12 V	V _{IN} = 1.9V	-	-19	
		No Load	V _{IN} = 0.8V		-3.2	
		V _{CC-} = -15 V	V _{IN} = 1.9V	-	-25	
		No Load	V _{IN} = 0.8V		-3.2	
I _{CC}	Supply Current from V _{CC}	V _{CC} = 5 V	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} = -0.5 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	$C_L = 15 \text{ pF}$ $R_L = 3.9 \text{ k}\Omega$	-	150	ns
T_{PHL}	Propagation Delay Time, High -To- Low -Level Output	$C_L = 15 \text{ pF}$ $R_L = 390 \text{ k}\Omega$	-	50	ns
T_{TLH}	Transition Time, Low-To-High-Level Output	$C_L = 15 \text{ pF}$ $R_L = 3.9 \text{ k}\Omega$	-	175	ns
T_{THL}	Transition Time, High -To- Low -Level Output	$C_L = 15 \text{ pF}$ $R_L = 390 \text{ k}\Omega$	-	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	$V_{IL}=0.8V$ $R_L=3 \text{ k}\Omega$	$V_{CC+} = 9 \text{ V}$ $V_{CC-} = -9 \text{ V}$	6	-	V
			$V_{CC+} = 13.2 \text{ V}$ $V_{CC-} = -13.2 \text{ V}$	9	-	V
V_{OL}	Low Level Output Voltage	$V_{IH}=1.9V$ $R_L=3 \text{ k}\Omega$	$V_{CC+} = 9 \text{ V}$ $V_{CC-} = -9 \text{ V}$	-	-6	V
			$V_{CC+} = 13.2 \text{ V}$ $V_{CC-} = -13.2 \text{ V}$	-	-9	V

Electrical Characteristics (Continue)

Symbol	Parameter	Test Conditions	Min	Max	Unit
I_{IH}	High Level Input Current	$V_I = 5V$	-	10	μA
I_{IL}	Low Level Input Current	$V_I = 0$	-	-1.6	mA
$I_{OS(H)}$	Short Circuit Output Current at High Level	$V_I = 0.8V$ $V_O = 0$	-6	-12	mA
$I_{OS(L)}$	Short Circuit Output Current at Low Level	$V_I = 1.9V$ $V_O = 0$	6	12	mA
R_O	Output Resistance, Power Off	$V_{CC+} = 0, V_{CC-} = 0$ $V_O = -2V$ to $2V$	300	-	Ω

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

Symbol	Parameter	Test Conditions	Min	Max	Unit
T_{PLH}	Propagation Delay Time, Low-To-High-Level Output	$R_L = 3\text{ k}\Omega$ $C_L = 15\text{ }\mu F$ (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**	$R_L = 3\text{ k}\Omega$ to $7\text{ k}\Omega$ $C_L = 2500\text{ pF}$ (See Figure 1)	2.5 (tip)		μs
T_{THL}	Transition Time, High-To-Low -Level Output**		3.0 (tip)		μs

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

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

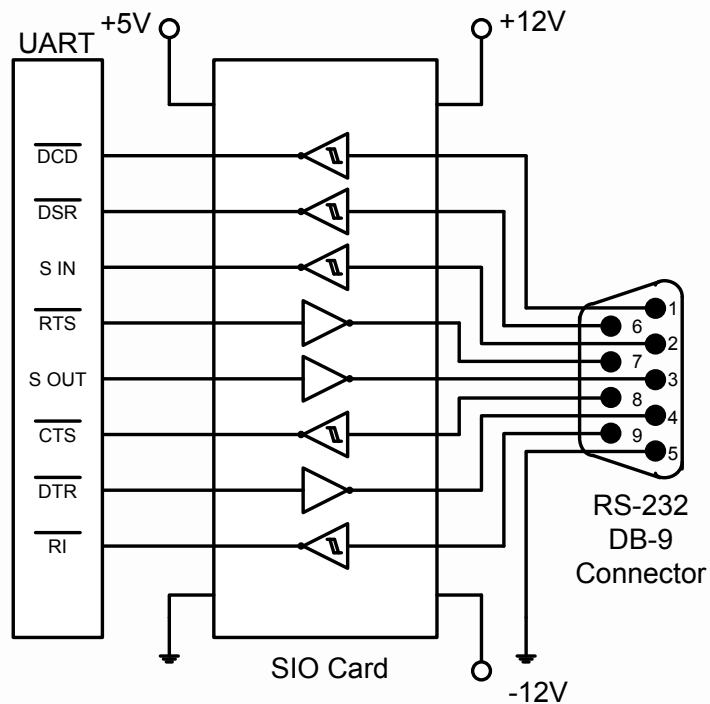
Receiver Section

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, $I_{OL} = -0.5\text{ mA}$	2.6	5	
V_{OL}	Low Level Output Voltage	$V_I = 3V, I_{OL} = 10\text{ mA}$	-	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

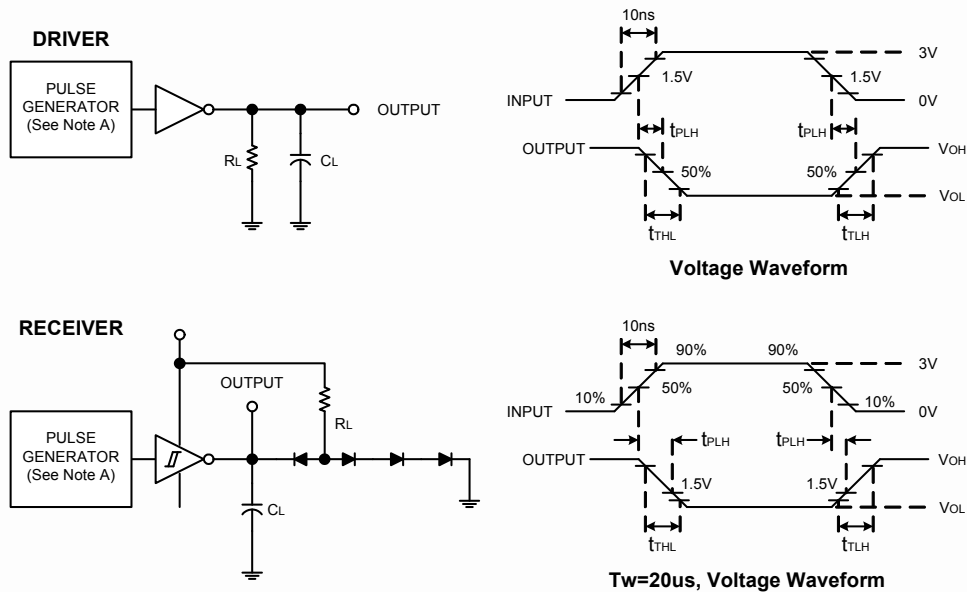
Receiver Switching Characteristic ($V_{CC} = 5V$)

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

Typical Applications



Typical Performance Characteristics

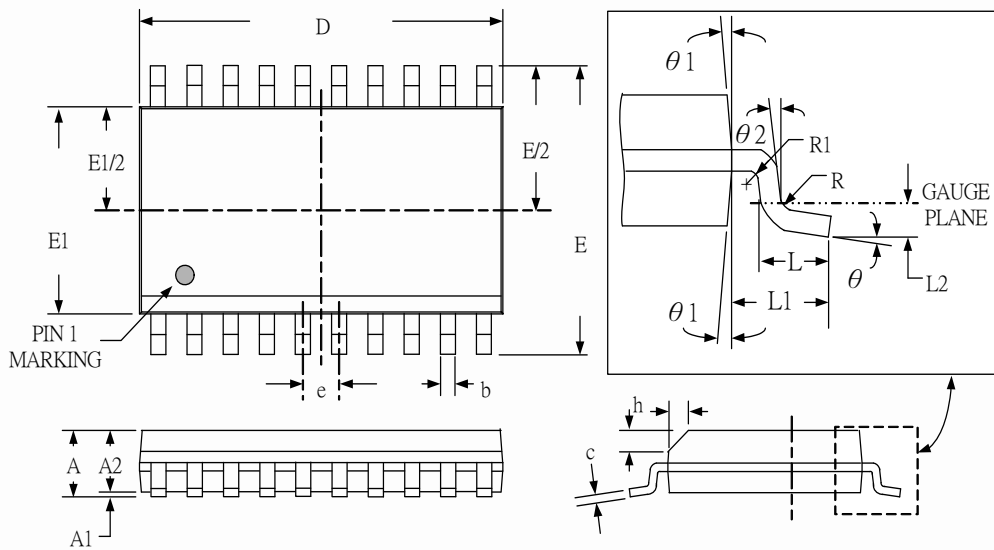


- Note:
- A. The pulse generator has the following characteristics. $f = 200 \text{ KHz}$, $Z_o = 50 \Omega$
 - B. C included probe and jig capacitance.
 - C. All diodes are 1N3064 or equivalent.

Fig1. Propagation and Transition Times

Package Dimension

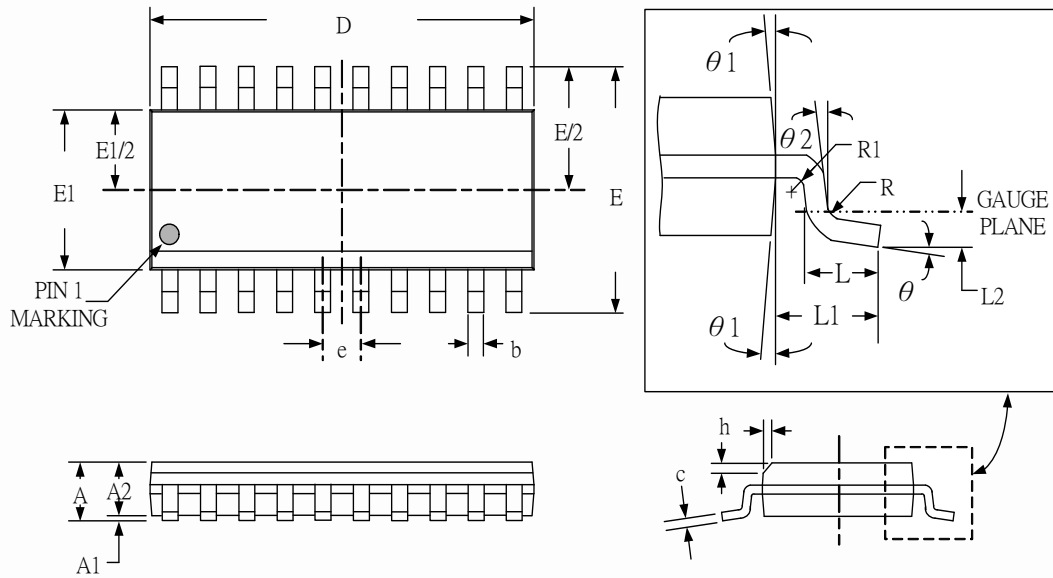
SOIC-20



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
θ	0°	-	8°
$\theta1$	5°	-	15°
$\theta2$	0°	-	-

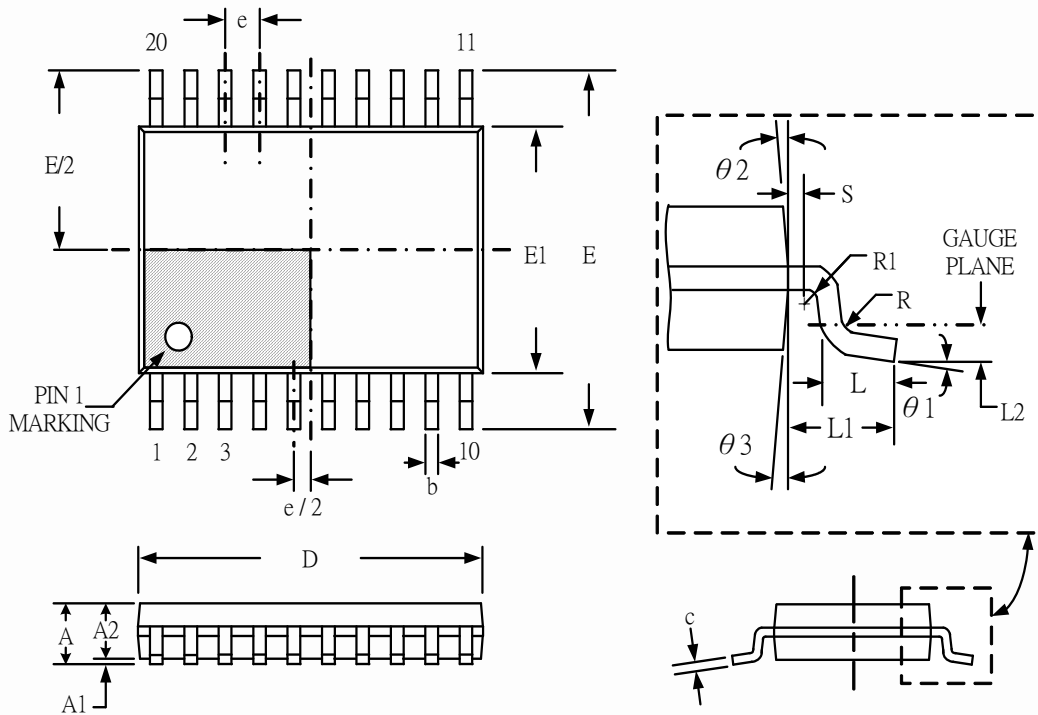
SSOP-20



Dimensions

SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	1.35	1.75	.053	.069
A1	0.10	0.25	.004	.010
A2	1.25	1.65	.049	.065
b	0.20	0.30	.008	.012
c	0.15	0.25	.006	.010
D	8.66 (TYP)		.341 (TYP)	
E	6.00 (TYP)		.236 (TYP)	
E1	3.90 (TYP)		.154 (TYP)	
e	0.64 (TYP)		.025 (TYP)	
L	0.40	1.27	.016	.050
L1	1.04 (TYP)		.041 (TYP)	
L2	0.25 (TYP)		.010 (TYP)	
R	0.07	-	.003	-
R1	0.07	-	.003	-
h	0.25	0.50	.010	.020
θ	0°	8°	0°	8°
$\theta1$	5°	15°	5°	15°
$\theta2$	0°	-	0°	-

TSSOP-20







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	-	-
$\theta1$	0°	-	8°
$\theta2$	-	12°	-
$\theta3$	-	12°	-



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