GS75232S6F

RS-232 Transceivers

Product Description

The GS75232S6F consists of two drivers, two receivers, and a dual charge-pump circuit with ±12kV IEC 61000-4-2 Contact Discharge ESD protection.

The GS75232S6F meets the requirements of TIA/EIA-232-F and provides the electrical interface between an asynchronous communication controller and the serial-port connector. The charge pump and four small external capacitors allow operation from a single 3V to 5.5V supply. The device operates at data signaling rates up to 250 kbps.

Features

- ESD protection for RS-232 Bus Pins
  - ±12kV (IEC 61000-4-2, Contact Discharge)
  - ±15kV (IEC 61000-4-2, Air-Gap Discharge)
- Meets the Requirements of TIA/EIA-232-F standard
- Wide Power Supply Range: Single +3V to +5.5V
- Operates up to 250kbps
- Two Drivers and Two Receivers
- External Capacitores: 4 x 0.1 uF
- Accepts 5V Logic Input With 3.3V Supply
- RoHS Compliant and Halogen Free

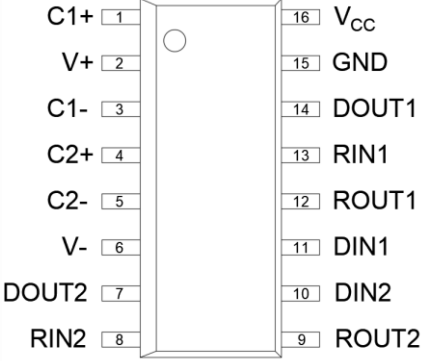### Applications

- Battery-Powered Equipment
- Industry Human Machine Interface
- Notebook, Computers
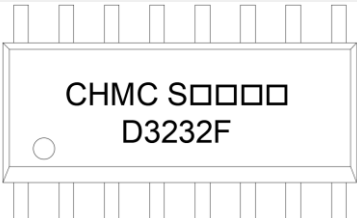- Printers

Functional Block Diagram

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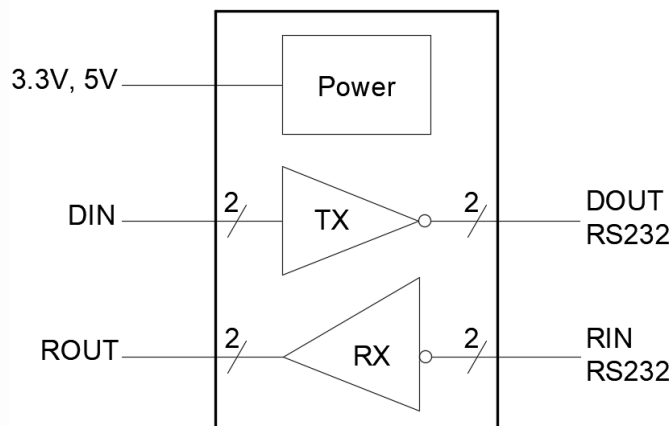
Packages & Pin Assignments

GS75232S6F(SOP-16L)		Pin No.	Symbol	Type
C1+ [1] · · · [16] V_{CC}		1	C+	-
V+ [2] · · · [15] GND		2	V+	O
C1- [3] · · · [14] DOUT1		3	C1-	-
C2+ [4] · · · [13] RIN1		4	C2+	-
C2- [5] · · · [12] ROUT1		5	C2-	-
V- [6] · · · [11] DIN1		6	V-	O
DOUT2 [7] · · · [10] DIN2		7	DOUT2	O
RIN2 [8] · · · [9] ROUT2		8	RIN2	I
Top View		9	ROUT2	O
		10	DIN2	I
		11	DIN1	I
		12	DOUT1	O
		13	RIN1	I
		14	DOUT1	O
		15	GND	-
		16	V_{CC}	-

Pin Name	Description
C+	Positive lead of C 1 capacitor
V+	Positive charge pump output for storage capacitor only
C1-	Negative lead of C 1 capacitor
C2+	Positive lead of C 2 capacitor
C2-	Negative lead of C 2 capacitor
V-	Negative charge pump output for storage capacitor only
DOUT2	RS 232 Driver Output
RIN2	RS 232 Receiver Input
ROUT2	TTL/ CMOS Receiver Output
DIN2	TTL/ CMOS Driver Input
DIN1	TTL/ CMOS Driver Input
DOUT1	TTL/ CMOS Receiver Output
RIN1	RS 232 Receiver Input
DOUT1	RS 232 Driver Output
GND	Ground
V_{CC}	Supply Voltage

GS75232S6F

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Ordering and Marking Information

Ordering Information			
Part Number	**Package**	**Part Marking**	**Quantity / Reel**
GS75232S6F	SOP-16L	CHMC S☐☐☐☐ D3232F	4,000 PCS

GS75232 1 2

- **Product Code:**
  GS75232

- **Package Code:**
  1 is **S6** for SOP-16L

- **Green Level:**
  2 is **F** for RoHS Compliant and Halogen Free

Marking Information

CHMC S☐☐☐☐
D3232F

- **Product Code:**
  CHMC
  D3232F

- **GS Code:**
  S☐☐☐☐

GS75232S6F

Absolute Maximum Ratings

Symbol	Parameter		Min.	Max.	Unit
V_{CC}	Supply voltage		-0.3	6	V
V+	Positive output supply voltage		-0.3	7	V
V–	Negative output supply voltage		0.3	-7	V
V+ – V–	Supply voltage difference			13	V
V_I	Input voltage	Drivers	-0.3	6	V
		Receivers	-25	25	V
V_O	Output voltage	Drivers	-13.2	13.2	V
		Receivers	-0.3	V_{CC} + 0.3	V
T_J	Operating virtual junction temperature			150	°C
T_{stg}	Storage temperature		-65	150	°C

Note：

1. Stresses beyond 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 net implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Recommended Operating Conditions

(Test conditions: C1 - C4= 0.1 uF at V_{CC} = 3.3V ± 0.3V；C1=0.047 μF, C2 – C4 =0.33 μF at V_{CC} =5V ± 0.5V)

Symbol	Item			Min.	Typ.	Max.	Unit
Vcc	Supply voltage			3	3.3	3.6	V
				4.5	5	5.5	
V_{IH}	Driver high-level input voltage	DIN	V_{CC}= 3.3V	2		5.5	V
			V_{CC}= 5.0V	2.4		5.5	
V_{IL}	Driver low-level input voltage	DIN		0		0.8	V
V_I	Receiver input voltage	RIN		-25		25	V
T_A	Operating free-air temperature			-40		125	°C

Electrical Characteristics

(Test conditions：C1 – C4 = 0.1 μF at V_{CC} = 3.3V ± 0.3V; C1 =0.047 μF, C2 – C4=0.33 μF at V_{CC} =5V±0.5V，
T_A = - 40 ~ 125 ℃, unless otherwise noted. Typical values are at T_A =+25℃.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CC}	Supply current	No load, V_{CC} = 3.3 V to 5 V		1.5		m A
Driver						
V_{OH}	High-level output voltage	DOUT at R_L = 3 kΩ to GND, D_{IN} = GND	5	5.4		V
V_{OL}	Low-level output voltage	DOUT at R_L = 3 kΩ to GND, D_{IN} = V_{CC}	-5	-5.4		V
I_{IH}	High-level input current	VI = V_{CC}		± 0.1	± 1	μA
I_{IL}	Low-level input current	VI at GND		± 0.01	± 1	μA
I_{OS}	Short-circuit output current	V_{CC} =3.6V, V_O = 0 V		± 30	± 60	mA
		V_{CC} =5.5V, V_O = 0 V				
r_O	Output resistance	V_{CC} = 0 V, V+ = 0 V, and V– = 0 V, V_O = ±2 V	300	10 M		Ω
Receiver						
V_{OH}	High-level output voltage	I_{OH} = -1 mA	V_{CC}-0.6	V_{CC} -0.1		V
V_{OL}	Low-level output voltage	I_{OL} = 1.6 mA			0.4	V
V_{IT+}	Positive-going input threshold voltage	V_{CC} = 3.3 V		1.5	2.4	V
		V_{CC} = 5 V		2.0	2.4	
V_{IT-}	Negative-going input threshold voltage	V_{CC} = 3.3 V	0.6	1.1		V
		V_{CC} = 5 V	0.8	1.5		
V_{hys}	Input hysteresis (V_{IT}+ - VIT-)			0.4		V
r_I	Input resistance	VI =±3 V to ±25 V	3	5	7	kΩ

Note：

2. Short-circuit durations should be controlled to prevent exceeding the device absolute power dissipation ratings, and not more than one output should be shorted at a time.

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Switching Characteristics

(Test conditions：C1–C4 = 0.1µF at V_{CC} = 3.3 V ± 0.3 V; C1 = 0.047 µF, C2–C4 = 0.33 µF at V_{CC} = 5 V ± 0.5 V, T_A = - 40 ~ 125 ℃, unless otherwise noted. Typical values are at T_A =+25℃.)

Symbol	Parameter	Conditions		Min.	Typ.	Max.	Unit
Maximum data rate		R_L = 3kΩ , C_L = 1000 pF, One D_{OUT} switching		250			kbps
$t_{sk(p)}$	Driver Pulse skew	R_L = 3 kΩ to 7 kΩ, C_L = 150 to 2500 pF (see Figure1)			100		ns
SR(tr)	Driver Slew rate, transition region	R_L = 3 kΩ to 7 kΩ,V_{CC} = 5 V	C_L = 150 to 1000 pF	6		30	V/µs
			C_L = 150 to 2500 pF	4		30	
t_{PLH}	Receiver Propagation delay time, low-to high-level output	C_L = 150pF (see Figure2)			150		ns
t_{PHL}	Receiver Propagation delay time, high-to low-level output				150		ns
$t_{sk(p)}$	Receiver Pulse skew				60		ns

Note：

3. Pulse skew is defined as ($t_{PLH} - t_{PHL}$) of each channel of the same device.
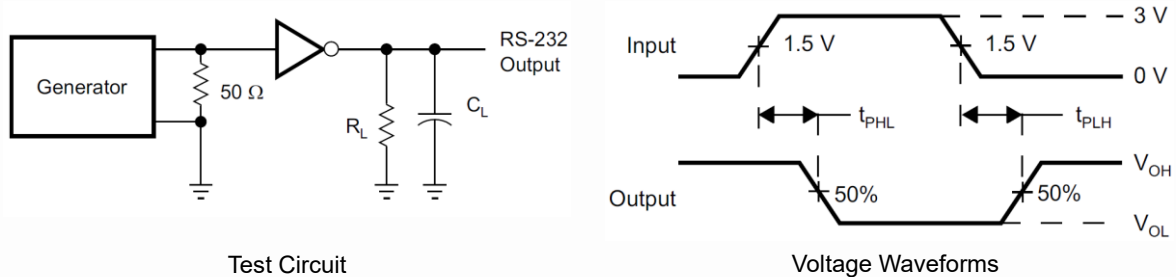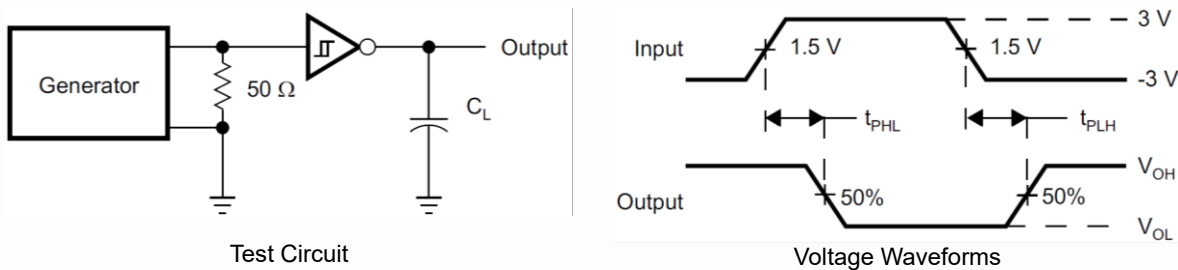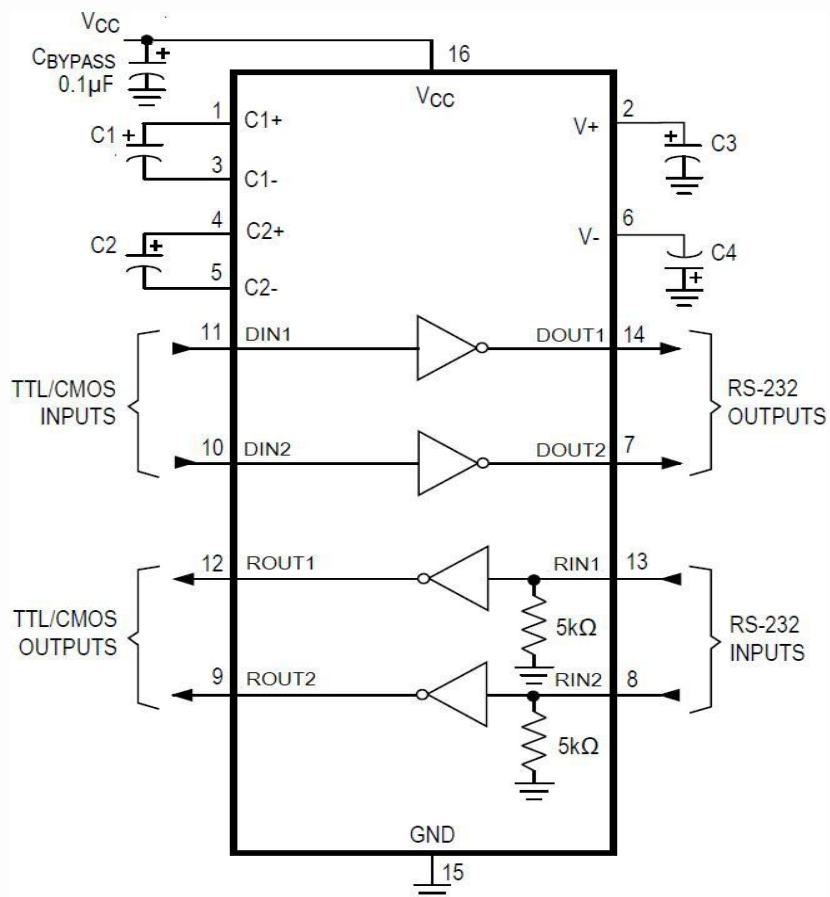

Figure 1. Driver Pulse Skew

Figure 2. Receiver Propagation Delay Times

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Application Information

Typical Operating Circuit

Nonpolarized ceramic capacitors are acceptable. If polarized tantalum or electrolytic capacitors are used, they must be connected as shown.
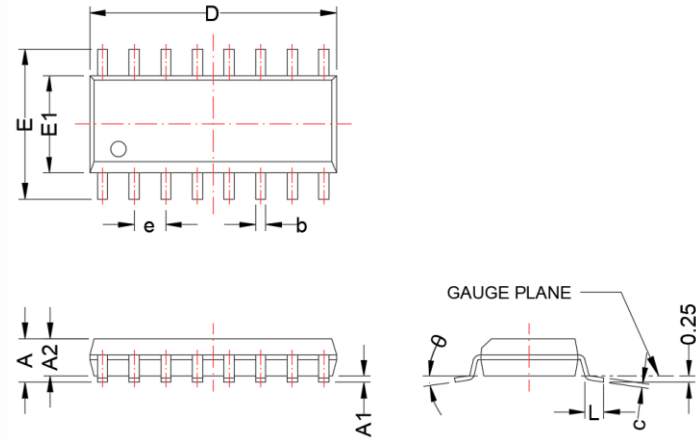
■ **Design Requirements**
  - Recommended V_{CC} is 3.3 V or 5 V
    – 3 V to 5.5 V is also possible
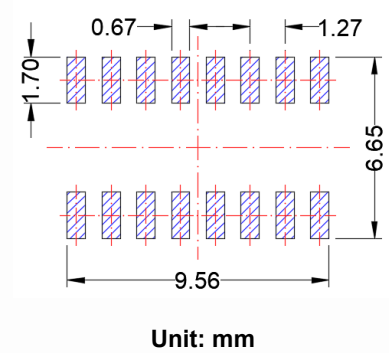 - The maximum recommended bit rate is 250 kbites

V_{CC}	C1	C2, C3, C4
3.3V ± 0.3V	0.1µF	0.1µF
5V ± 0.5V	0.047µF	0.33µF
3V to 5.5V	0.1µF	0.47µF

SOP-16L

Package Dimension

Recommended Land Pattern

Unit: mm

Symbol	Millimeters		Inches	
	MIN	**MAX**	**MIN**	**MAX**
A	---	1.75	---	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	---	0.049	---
b	0.31	0.51	0.012	0.020
c	0.10	0.25	0.004	0.010
D	9.80	10.20	0.386	0.402
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
L	0.4	1.27	0.016	0.050
θ	0°	8°	0°	8°

Table title: Dimensions

NOTE:

Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

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