GS75485SF RS-485 Transceivers

Product Description

The GS75485SF is high-speed transceiver for RS-485 communication, which contain one driver and one receiver. The GS75485SF feature fail-safe circuitry, which guarantees a logic-high receiver output when the receiver inputs are open or shorted. This means that the receiver output will be a logic high if all transmitters on a terminated bus are disabled (high impedance).

The GS75485SF driver slew rates are not limited, making transmit speeds up to 10Mbps possible.. And this device has a 1/8-unit-load receiver input impedance that allows up to 256 transceivers on the bus.

Features

- Fail-safe Circuitry
- Low Power Consumption
- Up to 256 Transceivers can be attached to the Bus
- Maximum Transmission Rate: 10Mbps
- ESD: ≥±15kV
- SOP-8 Package

Applications

- RS-485 Communications
- Level Translators
- Security Equipment
- Industrial Control Equipment
- Watt-hour meter

Typical application circuit





Packages & Pin Assignments

	GS75485SF (SOP-8)					
	1 8 2 7 3 6 4 5					
Pin No.	Pin Name	Function Description				
1	RO	Receiver Output, When RE is low and if A- B≥-50mV, RO will be high; if A- B≤-200mV, RO will be low.				
2	2 /RE Receiver Output Enable. Drive RE low to enable RO; RO is high impedance when RE high. Drive RE high and DE low to enter low-power shutdown mode.					
3	DE	Driver Output Enable. Drive DE high to enable driver outputs. These outputs are high impedance when DE is low. Drive RE high and DE low to enter low-power shutdown mode.				
4	DI	Driver Input. With DE high, a low on DI forces non-inverting output low and inverting output high.				
5	GND	Ground				
6	Α	Non-inverting Receiver Input and Non-inverting Driver Output				
7	В	Inverting Receiver Input and Inverting Driver Output				
8	Vcc	Positive Supply				

Ordering and Marking Information

Ordering Information					
Part Number	Package	Part Marking	Quantity / Reel		
GS75485SF	SOP-8	CHMC D3485 S	4,000 PCS		
GS75485 1 2					
- Product Code: GS75485	- Package Co 1 is S for SO	de: - Greer P-8 2 is F ar	 Green Level: is F for RoHS Compliant and Halogen Free 		
	Marking I	nformation			
CHMC D3485 S	le:				



GS75485SF

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
Vcc	Supply Voltage	7	V
Vov	Operating Voltage	3 ~ 5.5	V
V _{IN} (Control)	Control Input Voltage (RE, DE)	-0.3 ~ V _{CC} +0.3	V
V _{IN} (Driver)	Driver Input Voltage (DI)	-0.3 ~ V _{CC} +0.3	V
Vout (Driver)	Driver Output Voltage (A,B)	±13	V
V _{IN} (Receiver)	V _{IN} (Receiver) Receiver Input Voltage (A,B)		V
Vout (Receiver)	Receiver Output Voltage (RO)	-0.3 ~ V _{CC} +0.3	V
TOPR Operating Temperature		-40 to + 125	°C
TsTG Storage Temperature		-65 to + 150	٥C

Function Tables

Transmitting

Inputs			Outj	outs	
/RE	DE	DI	AB		
Х	1	1	1 0		
Х	1	0	0 1		
0	0	Х	High-Z High-Z		
1	0	Х	Shutdown		

Receiving

	Inputs			
/RE	DE	A-B	RO	
0	X	≥-0.05V	1	
0	X	≤-0.2V	0	
0	X	Open / Shorted	1	
1	1	Х	High-Z	
1	0	X	Shutdown	



Symbol	Parameter	Test Co	onditions	Min.	Тур.	Max.	Unit
Vod1	Differential Driver Output (no load)			-	-	Vcc	V
V _{OD2}	Differential Driver Output			1.5	-	-	V
ΔV_{OD}	Change in Magnitude of Differential Output Voltage	R=270 Fig			-	0.2	V
Voc	Driver Common-Mode Output Voltage			1	-	3	V
ΔVoc	Change in Magnitude of Common-Mode Voltage ²			-	-	0.2	V
Vih	Input High Voltage	DE, DI, /RE		2.0	-	-	V
VIL	Input Low Voltage	DE, DI, /RE		-	-	0.8	V
V _{HYS}	DI Input Hysteresis	-		-	100	-	mV
I _{IN1}	Driver Input Current (A and B)	V _{IN} =12V	DE=0V Vcc=5V	-150	-	250	uA
IOSD	Driver Short-Circuit Output Current ³	A and B Sh	ort-Circuit	-100	-	100	mA
V _{TH}	Receiver Differential Threshold	-7V ≤ V _{CM} ≤ 12V		-200	-125	-50	mV
ΔVth	Receiver Input Hysteresis		-	-	40	-	mV
Vон	Receiver Output High Voltage	lo=-8mA		Vcc-1	-	-	V
Vol	Receiver Output Low Voltage	lo=8mA		-	-	0.4	V
lozr	Three-State Output Current at Receiver	Vo=1V		-1	-	1	uA
Rın	Receiver Input Resistance	-7V ≤ V _{CM} ≤	512V	96	-	-	KΩ
I _{OSR}	Receiver Output Short-Circuit Current	$0V \le V_{RO} \le V_{CC}$		±7	-	±100	mA
		DE=Vcc	No Load	-	700	1200	
Icc	Supply Current	DE=GND	/RE=DI= V _{cc} /GND	-	600	1200	uA
I _{SHDN}	Supply Current in Shutdown Mode	DE=GND, / DI=Vcc/GN	RE=Vcc D	-	-	3	uA

DC Electrical Characteristics (V_{CC} = 5V, T_A = 25°C)¹

Note1: All currents into the device are positive; all currents out of the device are negative. All voltages are referred to device ground unless otherwise noted.

Note2: ΔV_{OD} and ΔV_{OC} are the changes in V_{OD} and V_{OC} , respectively, when the DI input changes state.

Note3: Maximum current level applies to peak current just prior to foldback current limiting; minimum current level Applies during current limiting.



Symbol	Parameter	Test Co	onditions	Min.	Тур.	Max.	Unit
Vod1	Differential Driver Output (no load)			-	-	Vcc	V
Vod2	Differential Driver Output			0.9	-	-	V
ΔVod	Change in Magnitude of Differential Output Voltage	R=270 Fig	1	-	-	0.2	V
Voc	Driver Common-Mode Output Voltage	1 (- <u>2</u> / <u>32</u> , 1 ig	, .	1	-	3	V
ΔVoc	Change in Magnitude of Common-Mode Voltage ²			-	-	0.2	V
Vih	Input High Voltage	DE, DI, /RE		1.5	-	-	V
VIL	Input Low Voltage	DE, DI, /RE		-	-	0.6	V
V _{HYS}	DI Input Hysteresis	-		-	100	-	mV
lave	Driver Input Current (A and R)	V _{IN} =12V	DE=0V	-	-	150	
IIN1		V _{IN} =-7V V _{CC} =3V		-150	-	-	UA
losd	Driver Short-Circuit Output Current ³	A and B Sh	ort-Circuit	-100	-	100	mA
V _{TH}	Receiver Differential Threshold Voltage	-7V ≤ V _{CM} ≤ 12V		-200	-	200	mV
ΔV_{TH}	Receiver Input Hysteresis		-	-	40	-	mV
Vон	Receiver Output High Voltage	lo=-8mA		Vcc-1	-	-	V
Vol	Receiver Output Low Voltage	lo=8mA		-	-	0.6	V
lozr	Three-State Output Current at Receiver	Vo=1V		-1	-	1	uA
RIN	Receiver Input Resistance	-7V ≤ V _{СМ} ≤	≦12V	96	-	-	KΩ
I _{OSR}	Receiver Output Short-Circuit Current	$0V \le V_{RO} \le V_{CC}$		±7	-	±100	mA
		DE=Vcc	No Load	-	-	1000	
Icc	Supply Current	DE=GND	/RE=DI= Vcc/GND	-	-	1000	uA
I _{SHDN}	Supply Current in Shutdown Mode	DE=GND, / DI=Vcc/GN	RE=Vcc D	-	-	3	uA

DC Electrical Characteristics (Vcc = 3V, T_A = 25°C)



Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
tr, tr	Driver Rise or Fall Time		-	30	-	ns
tplh, tphl	Driver Input to Output	Fig3 and 5,	-	30	60	ns
tskew	Driver Output Skew	$C_{L1}=C_{L2}=100pF$	-	-	20	ns
t _{LZ} , t _{HZ}	Driver Enable time	Fig4 and 6, C _L =100pF (Receiver enabled)	-	-	70	ns
tlz(shdn), thz(shdn)	Driver Enable time	Fig4 and 6, C∟=100pF (Receiver disabled)	-	1400	3000	ns
tlн, tzl	Driver disable time	Fig4 and 6, C∟=100pF	-	-	70	ns
FMAX	Maximum Data Rate	-	10	-	-	Mbps
t _R , t _F	Receiver Rise or Fall Time		-	20	-	ns
tplh, tphl	Receiver propagation delay time	Fig7	-	90	250	ns
tskD	T _{RPLH} – T _{RPHL} Differential Receiver Skew		-	30	-	ns
tz∟, tzн	Receiver enable time	Fig2 and 8, C _{RL} =15pF (Driver enabled)	-	30	70	ns
tlz(shdn), thz(shdn)	Receiver enable time	Fig2 and 8, C _{RL} =15pF (Driver disabled)	-	1400	3000	ns
t _{LZ} , t _{HZ}	Receiver disable time	Fig2 and 8, C _{RL} =15pF	-	30	70	ns
t SHDN	Time to Shutdown	-	-	230	600	ns

Switching Characteristics (Vcc = 5V, T_A = 25°C)



Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
tr, tr	Driver Rise or Fall Time		-	30	-	ns
tplh, tphl	Driver Input to Output	Fig3 and 5,	-	30	60	ns
tskew	Driver Output Skew	$C_{L1}=C_{L2}=100pF$	-	-	20	ns
t _{LZ} , t _{HZ}	Driver Enable time	Fig4 and 6, C _L =100pF (Receiver enabled)	-	-	70	ns
tlz(shdn), thz(shdn)	Driver Enable time	Fig4 and 6, C∟=100pF (Receiver disabled)	-	1600	3000	ns
tlh, tzl	Driver disable time	Fig4 and 6, C∟=100pF	-	-	70	ns
FMAX	Maximum Data Rate	-	10	-	-	Mbps
t _R , t _F	Receiver Rise or Fall Time		-	20	-	ns
tplh, tphl	Receiver propagation delay time	Fig7	-	90	250	ns
tskD	T _{RPLH} – T _{RPHL} Differential Receiver Skew		-	30	-	ns
tz∟, tzн	Receiver enable time	Fig2 and 8, C _{RL} =15pF (Driver enabled)	-	25	70	ns
tlz(shdn), thz(shdn)	Receiver enable time	Fig2 and 8, C _{RL} =15pF (Driver disabled)	-	1600	3000	ns
t _{LZ} , t _{HZ}	Receiver disable time	Fig2 and 8, C _{RL} =15pF	-	30	70	ns
t SHDN	Time to Shutdown	-	-	230	800	ns

Switching Characteristics (V_{CC} = 3V, T_A = 25°C)



Test Circuit



Figure 1. Driver DC Test Load



Figure 3. Driver Timing Test Circuit



Figure 5. Driver Propagation Delays



Figure 7. Receiver Propagation Delays



Figure 2. Receiver Enable/Disable Timing Test Load



Figure 4. Driver Enable/Disable Timing Test Load



Figure 6. Driver Enable and Disable Times



Figure 8. Receiver Enable and Disable Times



SOP-8

Package Dimension





Recommended Land Pattern



	Dimensions				
	Milli	meters	Inches		
Symbol	MIN	MAX	MIN	MAX	
Α	-	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	4.70	5.10	0.185	0.201	
E	5.80	6.20	0.228	0.244	
E1	3.80	4.00	0.150	0.157	
e	1.2	7 BSC	SC 0.050 BSC		
L	0.4	1.27	0.016	0.050	
θ	0°	8°	0°	8°	

NOTE:

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

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