

SCD4485

Dual RS485 Interface Transceiver Radiation Tolerant

DRS4485

Features

- Radiation Performance
 - Total dose ≥ 100 krad (Si)
- Designed for RS485 and RS422 Interface Applications
- Single +5V supply
- +5V to -7V Bus common mode range source output
- Driver maintains high impedance in three-state or with the power off
- Combined Impedance of a driver output and receiver allows up to 32 transceivers on the bus
- 200 mV typical input hysteresis
- Serial data rate 500KHz maximum
- Voltage source output
- Receiver output Hi for V_{IN} Diff = 0V
- < 5ns skew between BUS and BUSN complementary outputs
- Monolithic construction
- Designed for commercial, industrial and aerospace applications
- Plainview is a Class H & K MIL-PRF-38534 manufacturer
- Packaging – Hermetic Flat Package
 - 18-lead, 0.63”sq x 0.125”Ht
 - Weight – 3.50 grams max
- CAES Plainview’s Radiation Hardness Assurance Plan is DLA Certified to MIL-PRF-38534, Appendix G

Description

The CAES-Plainview DRS4485 is a monolithic dual bus/line transceiver designed for multi-point data transmission standard RS485 applications. The DRS4485 meets TIA/ETA-485 requirements. The receiver has a fail-safe feature, which guarantees a high output state when the BUS is open or shorted.

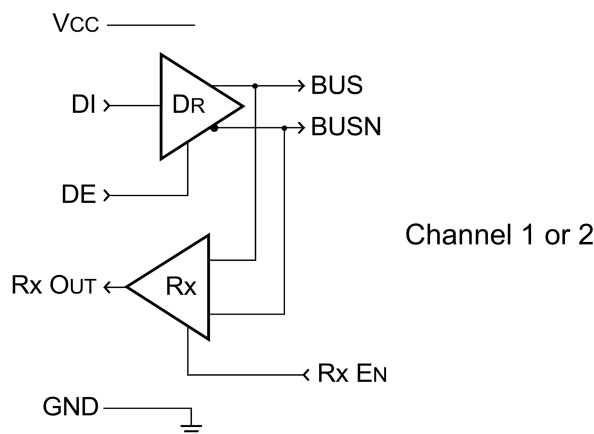


FIGURE 1 – SCHEMATIC

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ABSOLUTE MAXIMUM RATINGS

Parameter	Range
Operating Case Temperature	-55°C to +125°C
Storage Case Temperature	-65°C to +150°C
Power Supply Voltages (V _{CC})	+12V _{DC}
Control Input Voltage	-0.5 V _{DC} to V _{CC} + 0.5 V _{DC}
Driver Input Voltage	-0.5 V _{DC} to V _{CC} + 0.5 V _{DC}
Driver Output Voltage	±5V
Receiver Input Voltage	±5V
Receiver Output Voltages	-0.5 V _{DC} to V _{CC} + 0.5 V _{DC}

NOTICE: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress rating only; functional operation beyond the "Operation Conditions" is not recommended and extended exposure beyond the "Operating Conditions" may effect device reliability.

ELECTRICAL CHARACTERISTICS 2/ 4/

PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
Differential driver output voltage (unloaded)	I _O = 0	V _{OD1}	2.5	3.0	5	Vp-p
Differential driver output voltage (with load) <u>1/</u>	See Figure 2	V _{OD2}	2.5	3.0	5	Vp-p
Change in magnitude of driver differential output Voltage for complementary states		ΔV _{OD}	-	-	0.2	Vp-p
Driver common mode output voltage		V _{OC}	-	2.55	3	V
Change in magnitude of driver common-mode output Voltage for complementary states		Δ V _{OC}	-	-	0.2	V
Input high voltage		DE, DI, RE	V _{IH}	2.4	-	-
Input low voltage	V _{IL}			-	0.8	V
Input current <u>1/</u>	V _{IN}			±1	±2	μA
Differential input threshold voltage for receiver	-6.5V ≤ V _{CM} ≤ +5V	V _{TH}	-0.5	-0.2	-0.1	V
Receiver input hysteresis <u>3/</u>	V _{CM} = 0	ΔV _{TH}	-	160	400	mV
Receiver output high voltage <u>1/</u>	I _O = -0.4mA	V _{OH}	4.0	-	-	V
Receiver output low voltage <u>1/</u>	I _O = 0.4mA	V _{OL}	-	-	0.5	V
Receiver input differential resistance <u>3/</u>	-	R _{INDIFF}	30K	-	-	Ω
Receiver input common-mode resistance <u>3/</u>	-	R _{INCM}	8K	-	-	Ω
Driver short-circuit current <u>1/</u>	-	I _{OS}	50	80	140	mA
Receiver short-circuit current <u>1/</u>	V _{OH} to GND or V _{OL} to V _{CC}	I _{OSR}	7	50	85	mA

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STATIC DC POWER SUPPLY CURRENTS 2/

Input Conditions			Driver Output Conditions		Sym	Min	Typ	Max	Unit	Channel Conditions			
										Channel 1		Channel 2	
DE	DI	RE	Output State	Output Load						Driver	Receiver	Driver	Receiver
0V	X	5V	HiZ	X	I _{CC1} 1/	-	10	16	mA	Disabled	Disabled	Disabled	Disabled
5V	X	0V	LoZ	NL	I _{CC2} 1/	-	29	40	mA	Enabled	Enabled	Disabled	Disabled
5V	X	0V	LoZ	60 W	I _{CC3}	-	50	65	mA	Enabled	Enabled	Disabled	Disabled

DE=Driver En, DI=Driver In, RE=Receiver En, X=HiLo, 0V=GND, 5V=V_{cc}, HiZ=High impedance, LoZ=Low impedance L=Load

SWITCHING CHARACTERISTICS 2/ 4/

PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
Driver input to output delay	R _{DIFF} = 60Ω See test ckt Figure 2	t _{PLH}	-	125	200	nS
Driver input to output delay		t _{PHL}	-	80	150	nS
Driver output to output delay		t _{SKEW}	-	4	15	nS
Driver rise or fall time		t _r , t _f	-	100	150	nS
Driver Output enable delay		t _{ZH}	-	160	250	nS
Driver Output disable delay		t _{LZ}	-	220	350	nS
Receiver input to output delay	I _o = 0 See test ckt Figure 2 C _L = 15pF	t _{PLH}	-	80	150	nS
Receiver input to output delay		t _{PHL}	-	90	150	nS
Receiver rise or fall time		t _r , t _f	-	26	50	nS
Receiver enable delay		t _{ZL}	-	90	150	nS
Receiver disable delay		t _{ZH}	-	120	150	nS

NOTES:

- 1/ The active element that makes up the device has been tested to 200krad(Si) to assure RHA designator level "R" (100krad(Si)) of method 1019, Condition A of MIL-STD-883 at +25°C for these parameters. The element will be retested after design or process changes that can affect RHA response of this element. Post Radiation test limits for the input current (I_{IN}) test, is Max = ±3uA.
- 2/ Current measurements are for both channels.
- 3/ Not tested, guaranteed by design to the specified limits.
- 4/ Min/Max values are for V_{CC} = +5V ±5%, T_C = -55°C to +125°C. Typical values are measured at V_{CC} = +5V and T_C = +25°C

DRIVER FUNCTION TABLE

INPUTS		OUTPUTS	
DI	DE	BUS	BUS _N
H	H/OPEN	K	L
L	H/OPEN	L	H
X	L	OFF HiZ	OFF HiZ

RECEIVER FUNCTION TABLE

DIFF Input	DE	Output
> -100mV	L	H
> -500mV	L	L
X	H/OPEN	H
OPEN	X	H
SHORT	X	H

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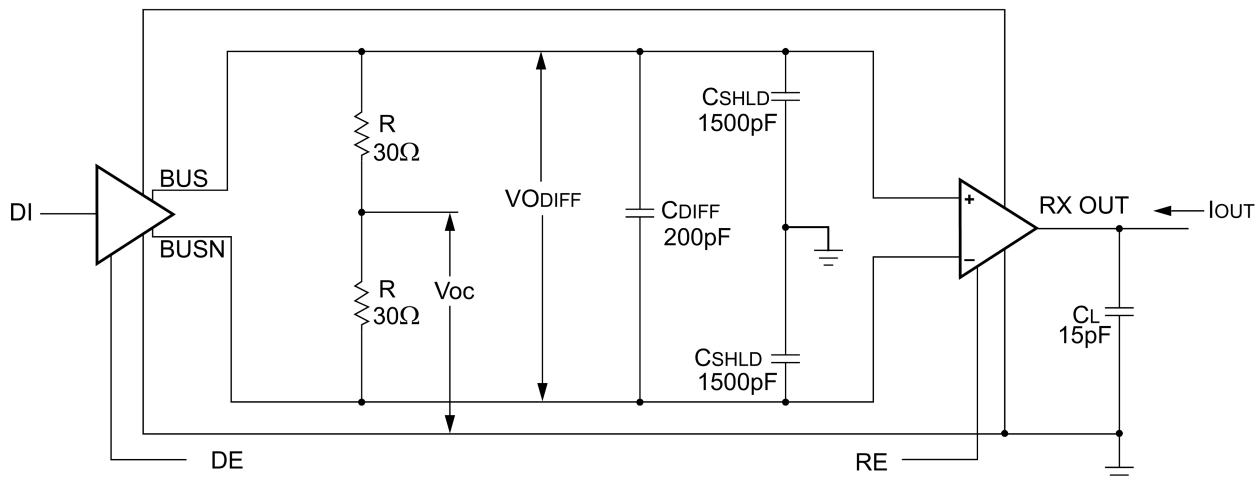


FIGURE 2 – DRIVER/RECEIVER TIMING TEST CIRCUIT (CHANNEL 1 OR 2)

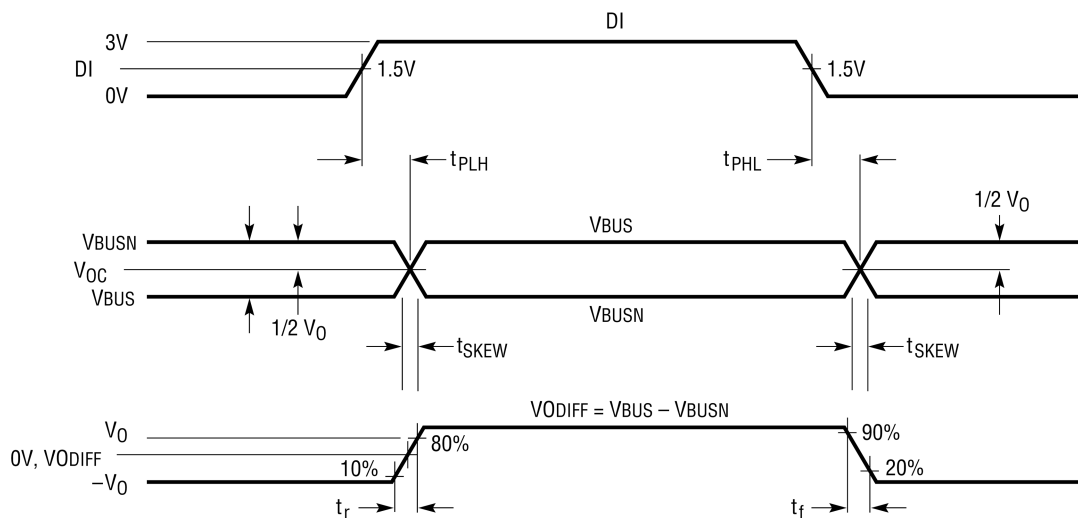


FIGURE 3 – DRIVER SWITCHING WAVEFORMS

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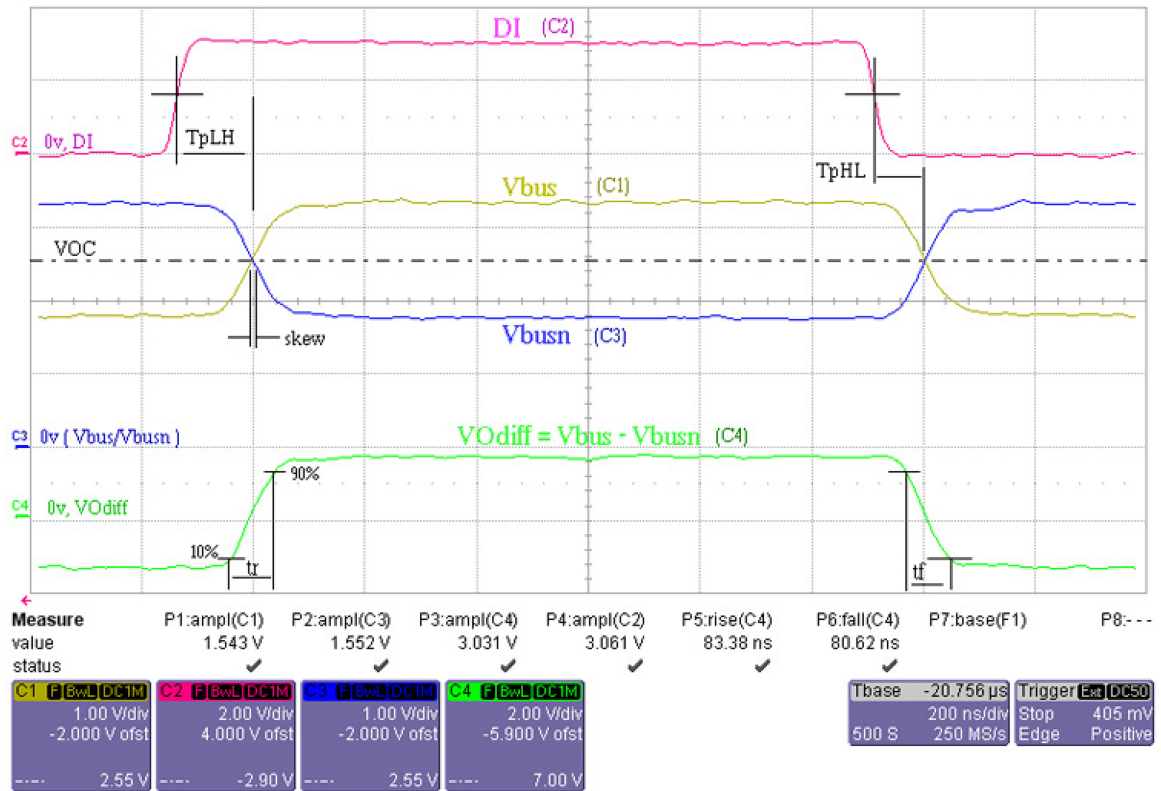


FIGURE 3A – TYPICAL DRIVER OUTPUTS

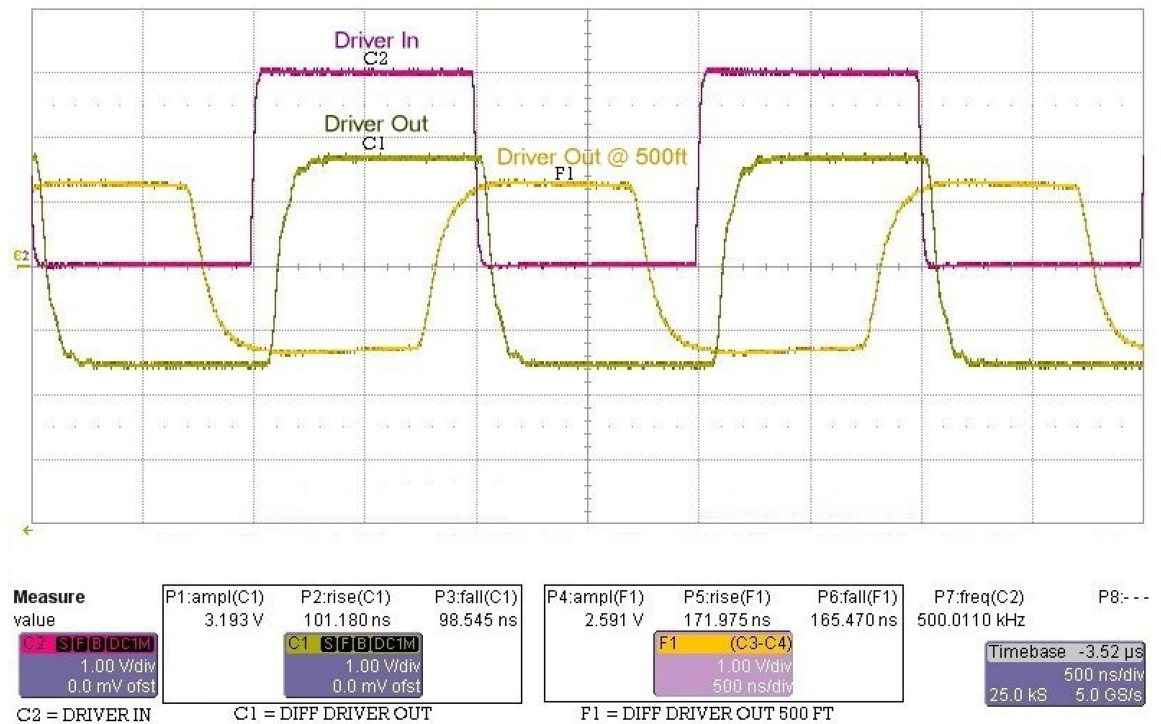


FIGURE 3B – DRS4485 DRIVING 500FT OF BELDEN 3105A, 120Ω CABLE

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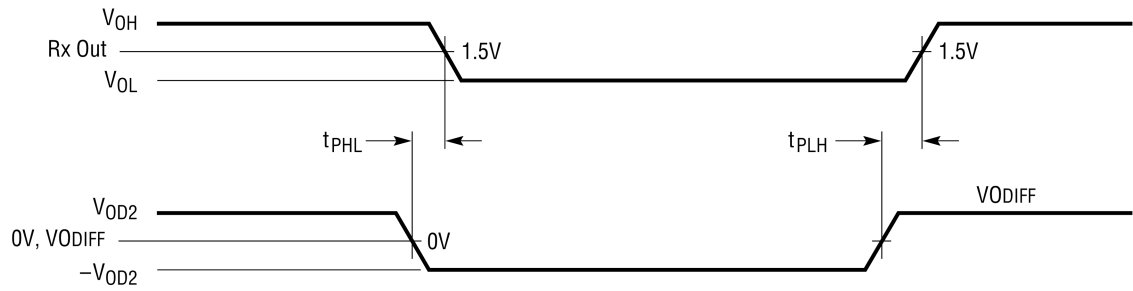


FIGURE 4 – RECEIVER SWITCHING WAVEFORMS

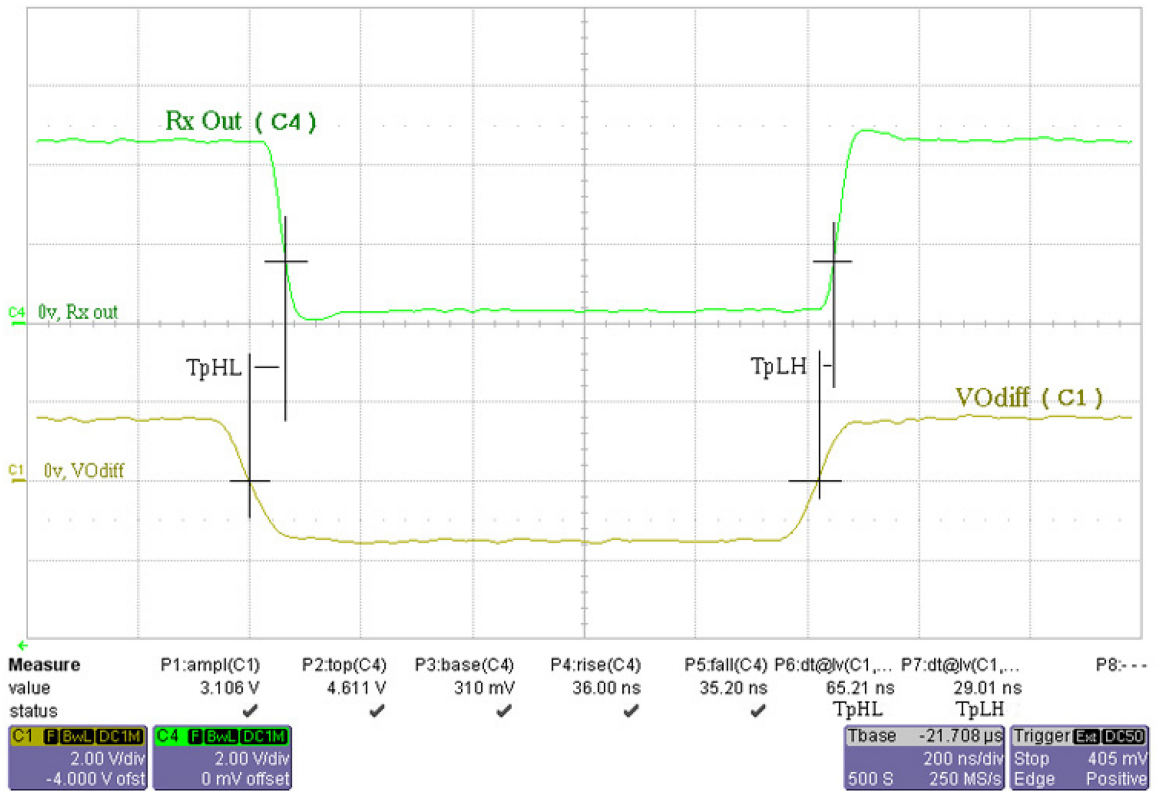


FIGURE 4A – TYPICAL RECEIVER OUTPUTS

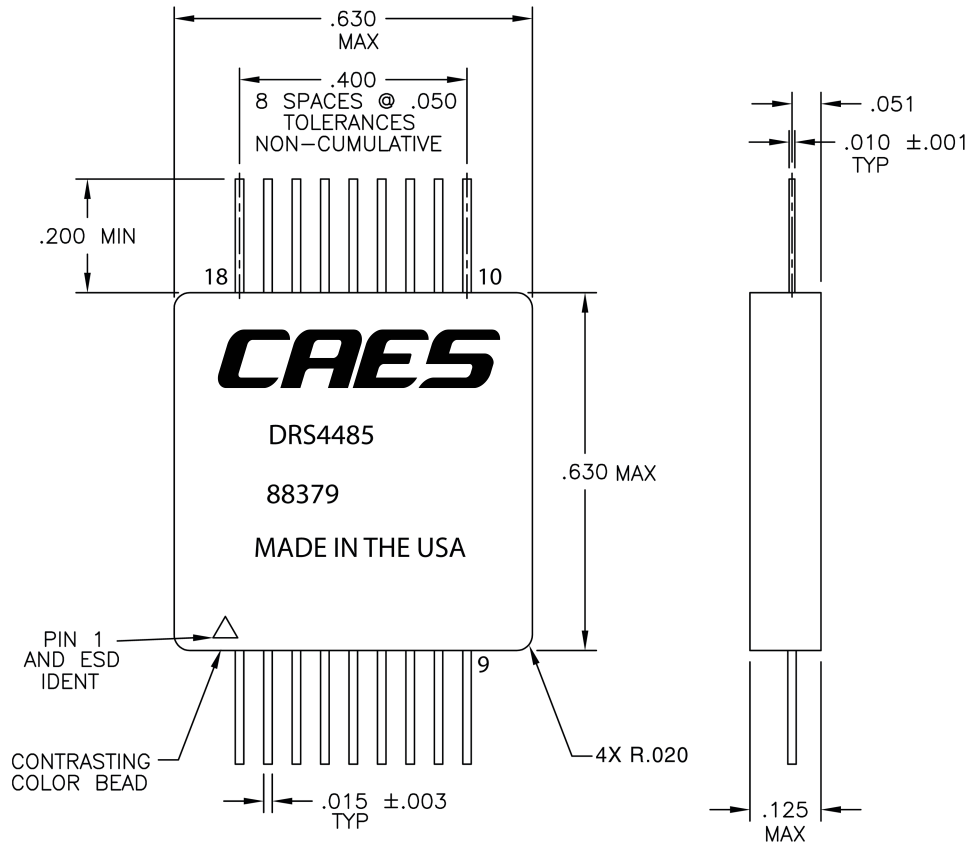
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PIN # vs FUNCTION TABLE

PIN #	FUNCTION	PIN #	FUNCTION
1	DRIVER ENABLE 1	10	VCC
2	RECEIVER ENABLE 1	11	GROUND
3	RECEIVER OUT 1	12	BUS 2
4	CASE_GND	13	BUSN 2
5	DRIVER IN 1	14	DRIVER IN 2
6	BUSN 1	15	NC_GND
7	BUS 1	16	RECEIVER OUT 2
8	GROUND	17	RECEIVER ENABLE 2
9	VCC	18	DRIVER ENABLE 2



PACKAGE CONFIGURATION OUTLINE

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Ordering Information

Model	DLA SMD #	Screening	Case
DRS4485-7	-	Commercial Flow, +25°C testing only	Flat Pack
DRS4485-S	-	Military Temperature, -55°C to +125°C Screened in accordance with the individual Test Methods of MIL-STD-883 for Space Applications	
DRS4485-201-S	5962-0922601KXC	In accordance with DLA SMD	
DRS4485-201-2S	5962-0922601KXA		
DRS4485-901-S	5962R0922601KXC	In accordance with DLA Certified RHA Program Plan to RHA Level "R", 100krad(Si)	
DRS4485-901-2S	5962R0922601KXA		

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Datasheet Definitions

	DEFINITION
Advanced Datasheet	CAES reserves the right to make changes to any products and services described herein at any time without notice. The product is still in the development stage and the datasheet is subject to change . Specifications can be TBD and the part package and pinout are not final .
Preliminary Datasheet	CAES reserves the right to make changes to any products and services described herein at any time without notice. The product is in the characterization stage and prototypes are available.
Datasheet	Product is in production and any changes to the product and services described herein will follow a formal customer notification process for form, fit or function changes.

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