Application Note AN-1114

IRS2302 and IR2302 Comparison

By Jason Nguyen, Min Fang, David New

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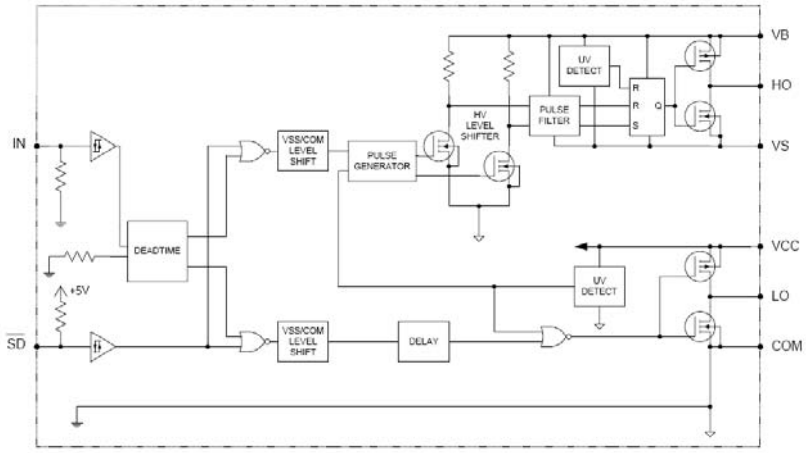
Introduction

The IRS2302 is a new HVIC product that replaces the IR2302 HVICs and is pin-to-pin compatible with its corresponding predecessor. In many cases, little or no change is necessary to use the new products. This application note describes the various differences between the IRS2302 and the IR2302 HVICs.

The IRS2302 is a high voltage, high speed power MOSFET and IGBT drivers with independent high and low side referenced output channels. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The logic input is compatible with standard CMOS or LSTTL output, down to 3.3 V logic. The output driver features a high pulse current buffer stage designed for minimum driver cross-conduction. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high side configuration which operates up to 600 V.

Block Diagrams



The IRS2302 and IR2302 share the same block diagram. There are no functional changes between corresponding part numbers.

Electrical Characteristic Differences

All measurement conditions remain unchanged unless noted. Parameters not mentioned in this document have not changed.

Absolute Maximum Ratings

There are no changes in the Absolute Maximum Ratings.

Recommended Operating Conditions

There are no changes in the Recommended Operating Conditions.

Dynamic Electrical Characteristics

Parameter		IR2302		IRS2302		Units
Symbol	Definition	typ	max	typ	max	
t_r	Turn-on rise time (Vs = 0 V)	130	220	100	220	ns
t_f	Turn-off fall time (Vs = 0 V)	50	80	35	80	

The IRS2302 has faster rise and fall times when compared to the IR2302.

Static Electrical Characteristics

Parameter		IR2302			IRS2302			Units
Symbol	Definition	min	typ	max	min	typ	max	
V_{IH}	Logic "1" input voltage	2.9	-	-	2.5	-	-	V
V_{IL}	Logic "0" input voltage	-	-	0.8	-	-	0.8	
$V_{SD,TH+}$	!SD input positive going threshold	2.9	-	-	2.5	-	-	
$V_{SD,TH-}$	!SD input negative going threshold	-	-	0.8	-	-	0.8	
V_{OH}	High level output voltage, V_{BIAS} - V_O	-	0.8	1.4	-	0.05	0.2	
		Io = 20 mA			Io = 2 mA			
V_{OL}	Low level output voltage, V_O	-	0.3	0.6	-	0.02	0.1	
		Io = 20 mA			Io = 2 mA			
I_{O+}	Output high short circuit pulsed current (V_O = 0 V, VIN=Logic "1", PW <= 10us)	120	200	-	120	290	-	mA
I_{O-}	Output low short circuit pulsed current (V_O = 15 V, VIN = Logic "0", PW <= 10us)	250	350	-	250	600	-	

With the IRS2302,

1. The V_{IH} and $V_{SD,TH+}$ has been reduced to 2.5 V for better 3.3 V logic compatibility.
2. The V_{OH} and V_{OL} are tested using a new standardized test condition of I_O=2 mA. The output driver's on resistance is slightly lower for IRS2302.
3. The typical values for I_{O+} and I_{O-} are marginally higher, which allows faster switching.

Figures

This figures shown in this section compare figures shown in the IR2302 (left column) and IRS2302 (right column) datasheets. Illustrations that have not changed between the two datasheets have not been included in this section.

IR2302	IRS2302

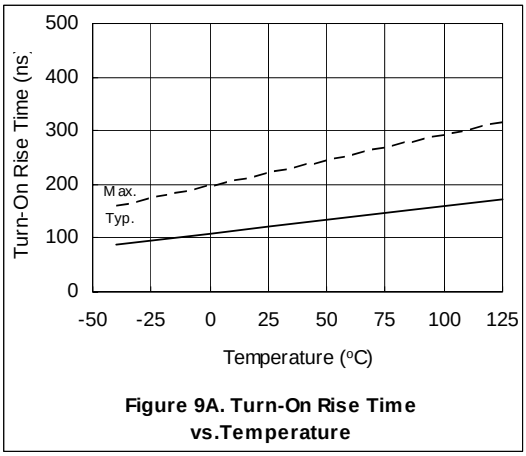


Figure 9A. Turn-On Rise Time vs.Temperature

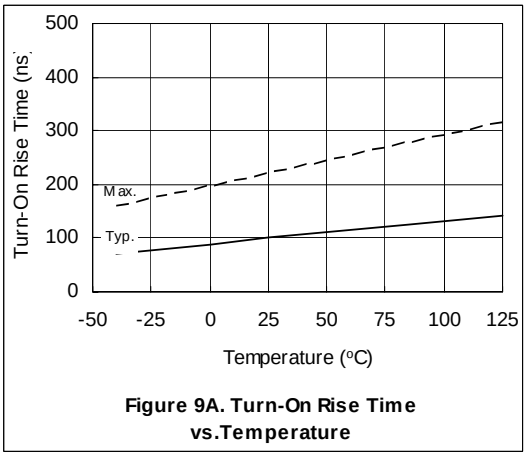


Figure 9A. Turn-On Rise Time vs.Temperature

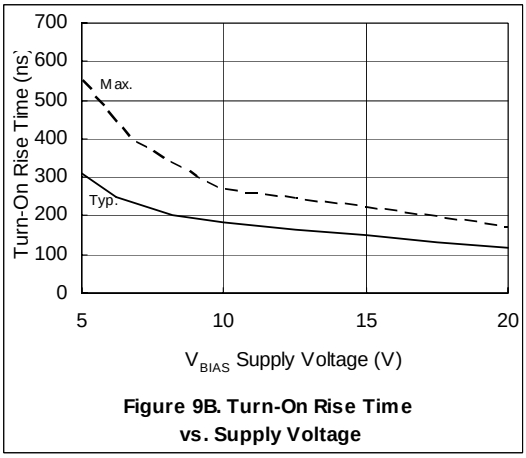


Figure 9B. Turn-On Rise Time vs. Supply Voltage

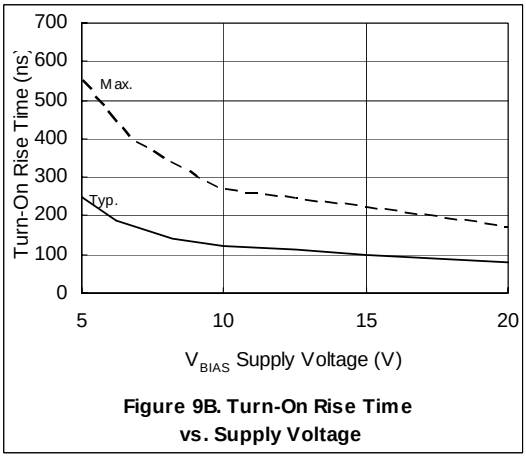


Figure 9B. Turn-On Rise Time vs. Supply Voltage

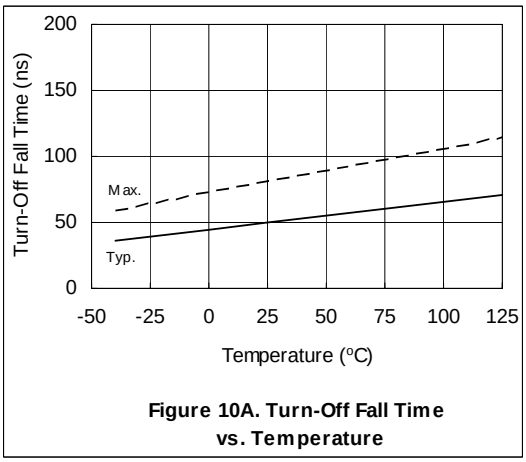


Figure 10A. Turn-Off Fall Time vs. Temperature

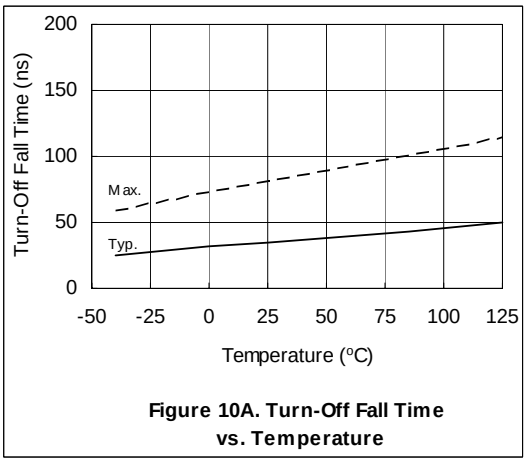


Figure 10A. Turn-Off Fall Time vs. Temperature

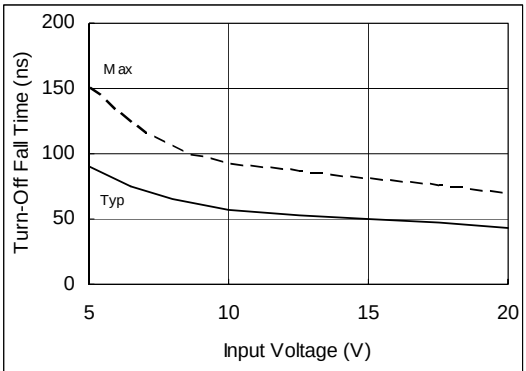
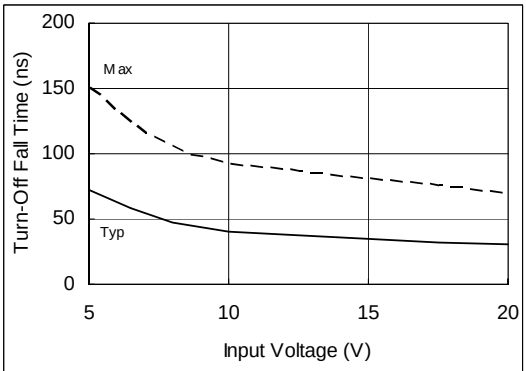


Figure 10B. Turn-Off Fall Time vs. Input voltage



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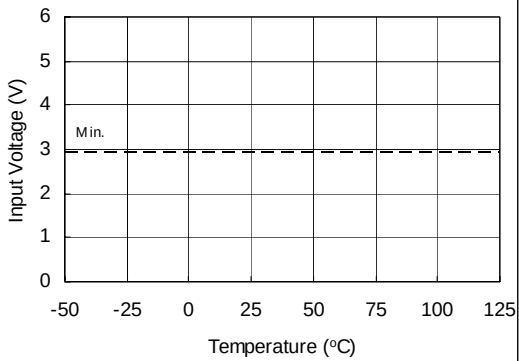
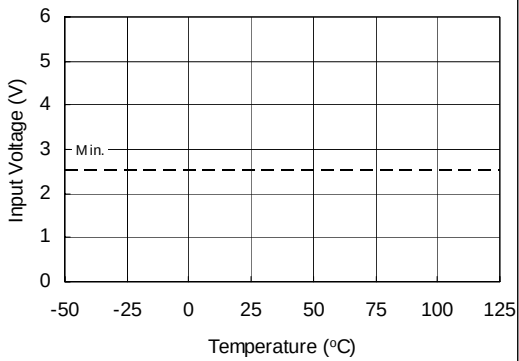


Figure 12A. Logic "1" Input Voltage vs. Temperature



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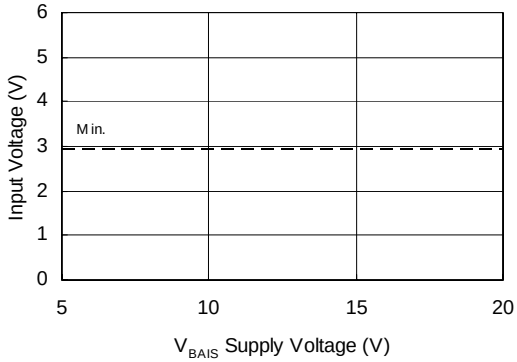
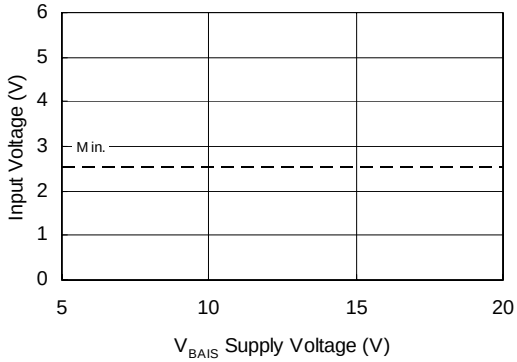


Figure 12B. Logic "1" Input Voltage vs. Supply Voltage



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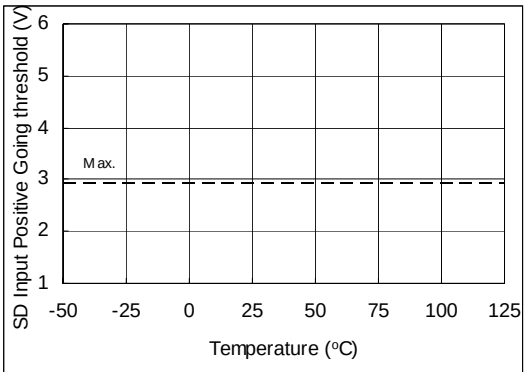


Figure 14A. SD Input Positive Going Threshold vs. Temperature

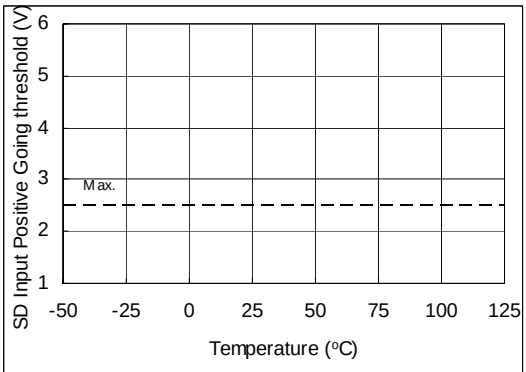


Figure 14A. SD Input Positive Going Threshold vs. Temperature

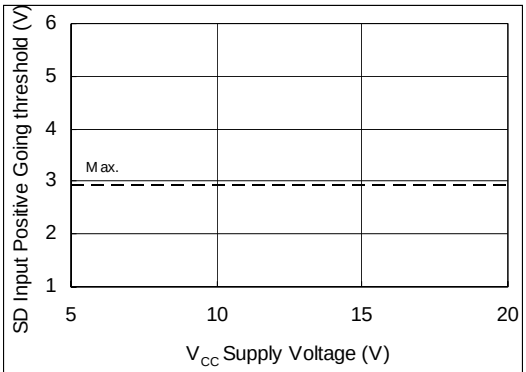


Figure 14B. SD Input Positive Going Threshold vs. Supply

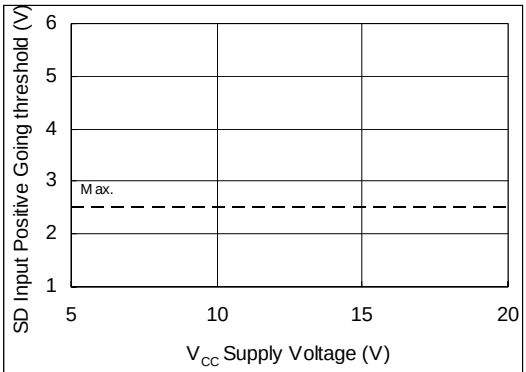


Figure 14B. SD Input Positive Going Threshold vs. Supply

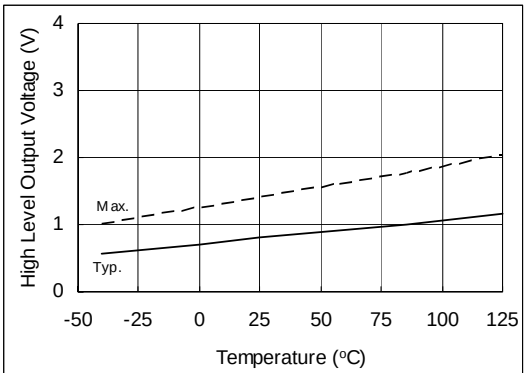


Figure 16A. High Level Output Voltage vs. Temperature (Io = 20mA)

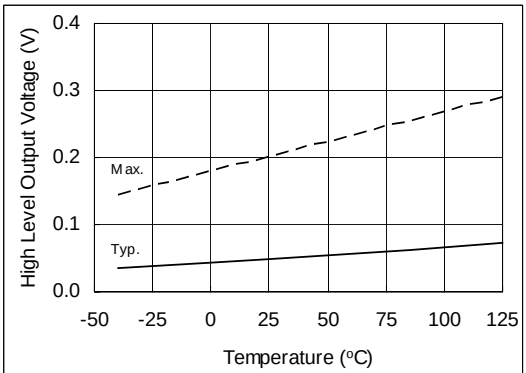


Figure 16A. High Level Output Voltage vs. Temperature (Io = 2mA)

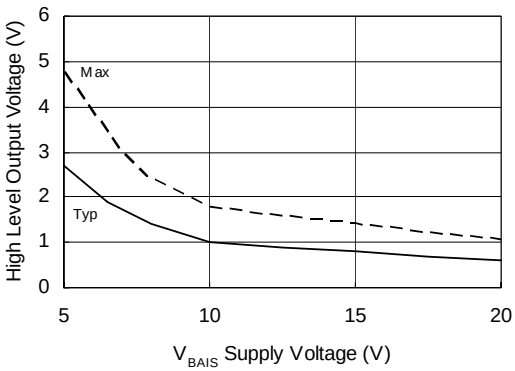


Figure 16B. High Level Output Voltage vs. Supply Voltage (Io = 20mA)

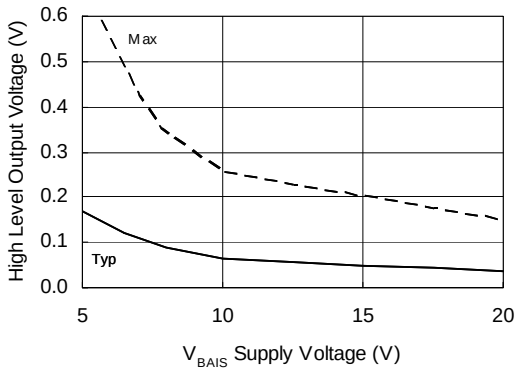


Figure 16B. High Level Output Voltage vs. Supply Voltage (Io = 2mA)

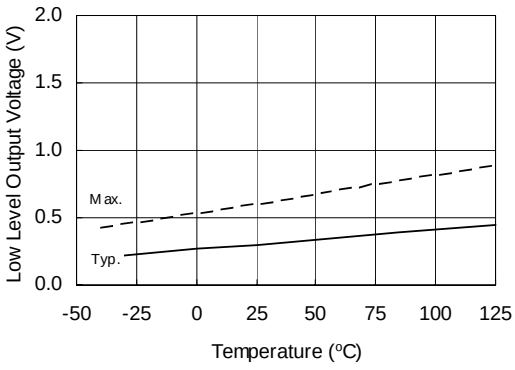
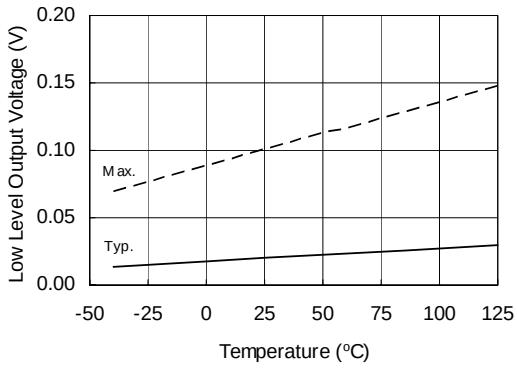


Figure 17A. Low Level Output Voltage vs.Temperature (Io = 20mA)



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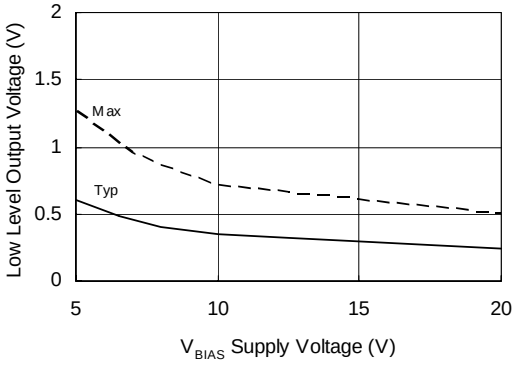

Figure 17B. Low Level Output vs. Supply Voltage (Io = 20mA)

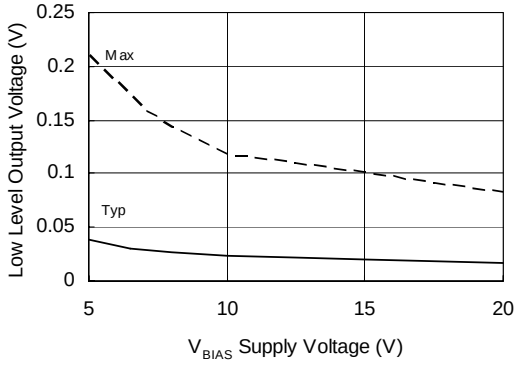

Figure 17B. Low Level Output vs. Supply Voltage (Io = 2mA)

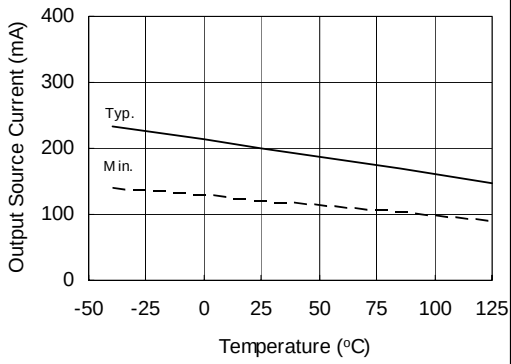

Figure 25A. Output Source Current vs. Temperature

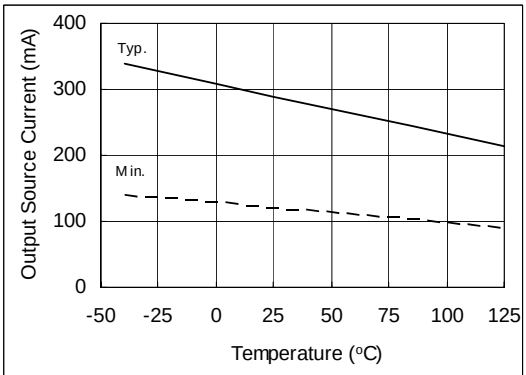

Figure 25A. Output Source Current vs. Temperature

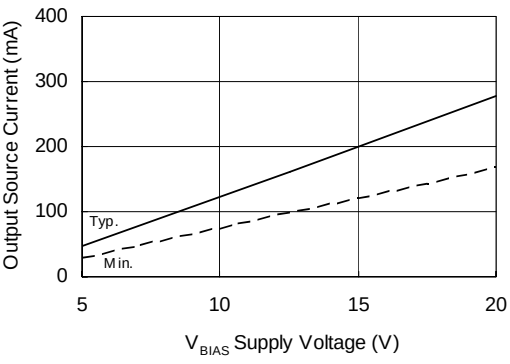

Figure 25B. Output Source Current vs. Supply Voltage

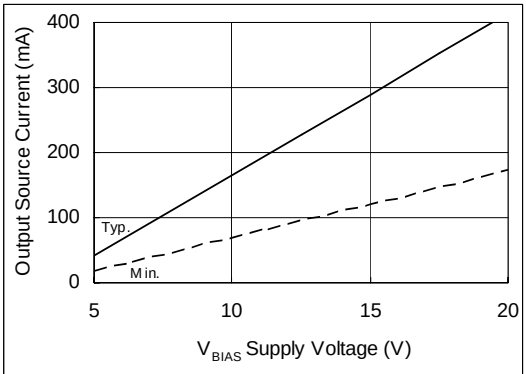

Figure 25B. Output Source Current vs. Supply Voltage

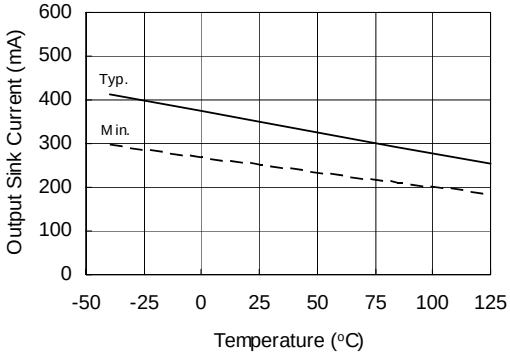

Figure 26A. Output Sink Current vs.Temperature

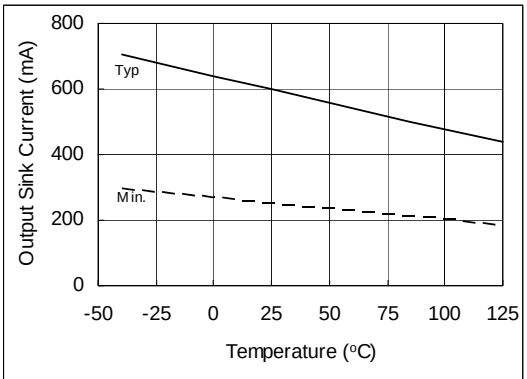

Figure 26A. Output Sink Current vs.Temperature

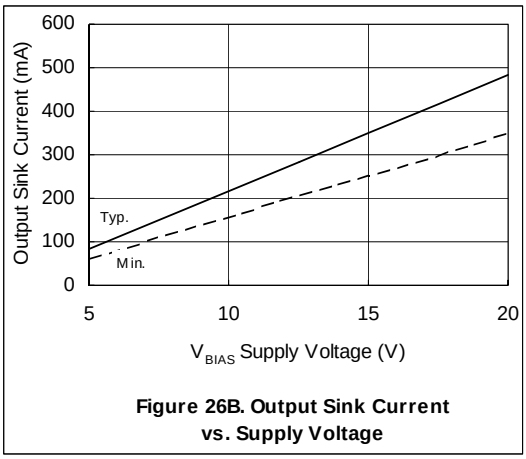

Figure 26B. Output Sink Current vs. Supply Voltage

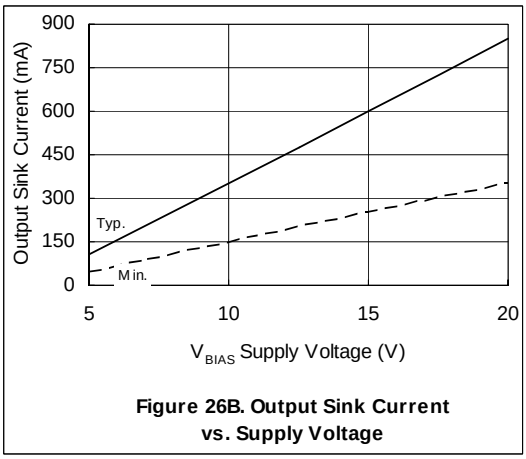

Figure 26B. Output Sink Current vs. Supply Voltage

Summary

As shown by this document, the IRS2302 and the IR2302 are very similar with only a few parametric differences.