Application Note AN-1096

IRS218(1,14) and IR218(1,14) Comparison

By Jason Nguyen, Min Fang, David New

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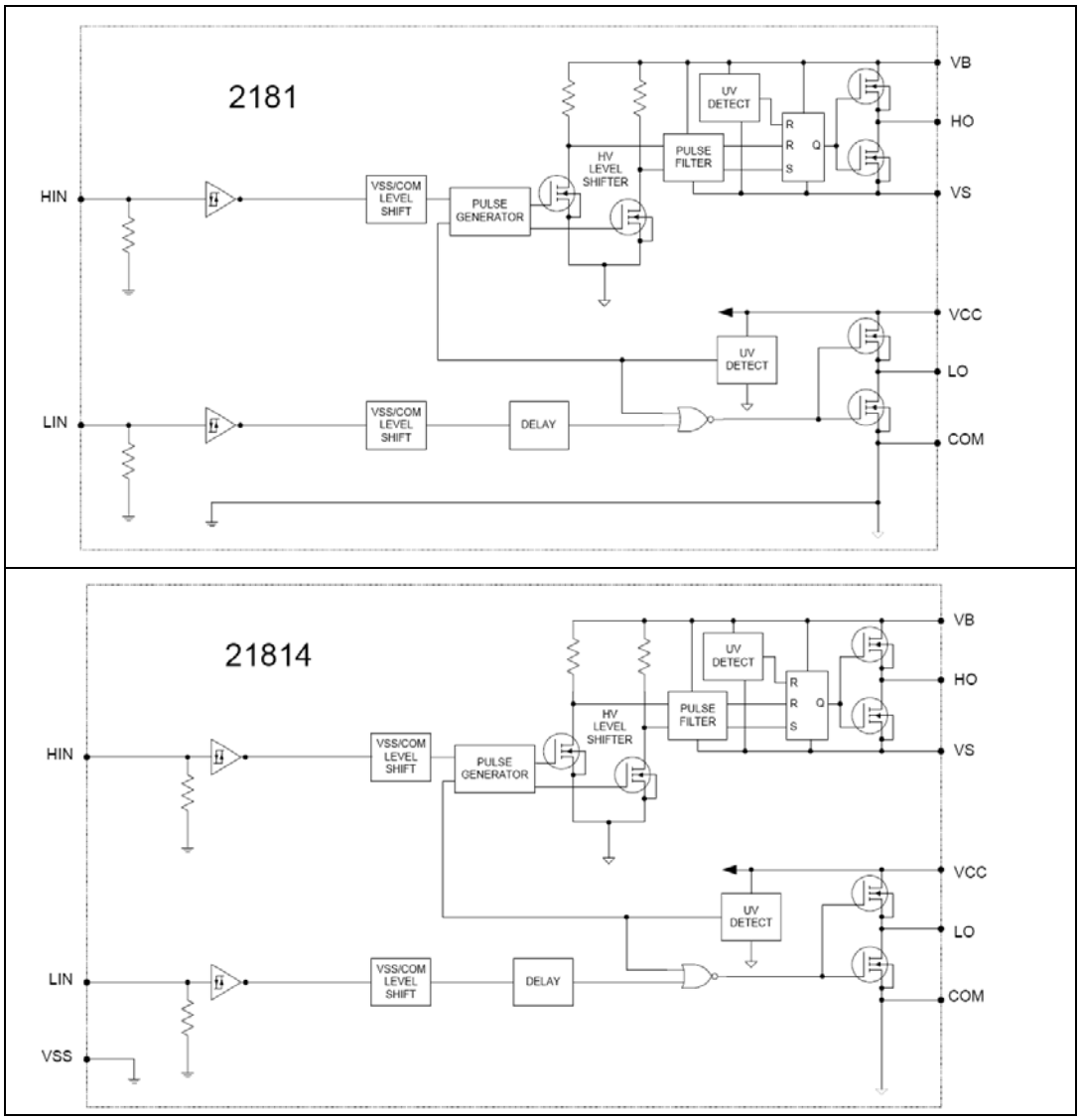
Introduction

The IRS218(1,14) are new HVIC products that replace the IR218(1,14) HVICs and are pin-to-pin compatible with their 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 IRS218(1,14) and the IR218(1,14) HVICs.

The IRS218(1,14) are 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 outputs, down to 3.3 V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver crossconduction. 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.

There are no functional changes between IRS218(1,14) and the IR218(1,14), however the IRS218(1,14) design has eliminated the input zener clamp diode.

Block Diagrams



The IRS2181 and the IR2181 share the same block diagram. The IRS21814 and the IR21814 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

Parameter		IR218(1,14)		IRS218(1,14)		Units
Symbol	Definition	min	max	min	max	
V_B	High side floating absolute voltage	-0.3	625	-0.3	620 (Note1)	V
V_S	High side floating supply offset voltage	V_B - 25	V_B + 0.3	V_B - 20	V_B + 0.3	
V_{CC}	Low side fixed supply voltage	-0.3	25	-0.3	20 (Note1)	
V_{IN}	Logic input voltage (HIN & LIN)	V_{SS} - 0.3	V_{SS} + 10	V_{SS} - 0.3	V_{CC} + 0.3	
V_{SS}	Logic ground (21814 only)	V_{CC} - 25	V_{CC} + 0.3	V_{CC} - 20	V_{CC} + 0.3	

Note1: In the IRS218(1,14), all supplies are fully tested at 25 V and an internal 20 V clamp exists for each supply. The 20 V, internal clamp improves the IC survivability against supply transient spikes but at the same time reduces the absolute maximum rating to 20 V.

In the IRS218(1,14), the input pins are no longer internally clamped with 5.2 V zener diodes, therefore the maximum absolute rating for V_{IN} is increased to V_{CC}+0.3 V. In IR218(1,14) applications where the 5.2 V clamp is used to protect the microcontroller output, an external clamp is needed when the IR218(1,14) is replaced by the IRS218(1,14).

Recommended Operating Conditions

Parameter		IR218(1,14)		IRS218(1,14)		Units
Symbol	Definition	min	max	min	max	
V_{IN}	Logic input voltage	V_{SS} - 0.3	V_{SS} + 5	V_{SS} - 0.3	V_{CC}	V

In the IRS218(1,14), the input pins are no longer internally clamped with 5.2 V zener diodes, therefore the recommended operating condition for V_{IN} is increased to V_{CC}.

Dynamic Electrical Characteristics

There are no changes in the Dynamic Electrical Characteristics.

Static Electrical Characteristics

Parameter		IR218(1,14)			IRS218(1,14)			Units
Symbol	Definition	min	typ	max	min	typ	max	
V_{IH}	Logic "1" input voltage (V_{CC} = 10 V to 20 V)	2.7	-	-	2.5	-	-	V
V_{IL}	Logic "0" input voltage (V_{CC} = 10 V to 20 V)	-	-	0.8	-	-	0.8	
V_{OH}	High level output voltage, V_{BIAS} - V_O	-	-	1.2	-	-	1.2	
		Io = 0 mA			Io = 0 mA			
V_{OL}	Low level output voltage, V_O	-	-	0.1	-	-	0.2	
		Io = 0 mA			Io = 20 mA			

With the IRS218(1,14),

1. The V_{IH} is reduced to 2.5V for better 3.3V logic compatibility.
2. The V_{OL} is tested using a new standardized test condition of Io= 20 mA.

Figures

This figures shown in this section compare figures shown in the IR218(1,14) (left column) and IRS218(1,14) (right column) datasheets. Illustrations that have not changed between the two datasheets have not been included in this section.

IR218(1,14)	IRS218(1,14)

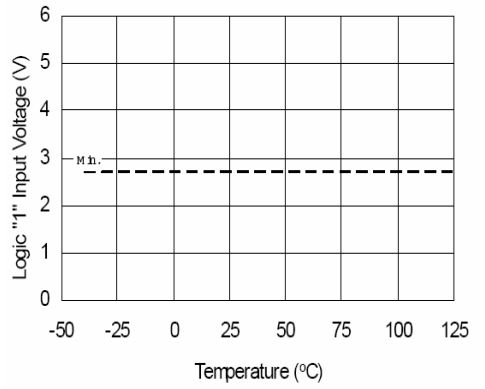
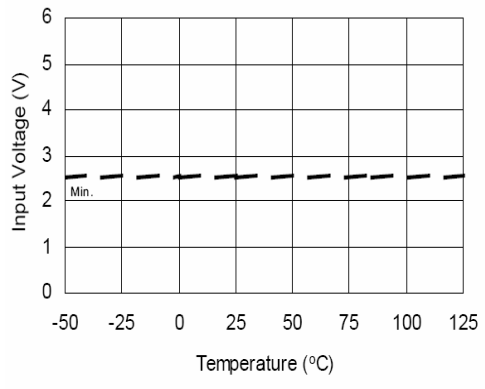

	

Figure 8A. Logic "1" Input Voltage vs. Temperature	Figure 8A. Logic "1" Input Voltage vs. Temperature

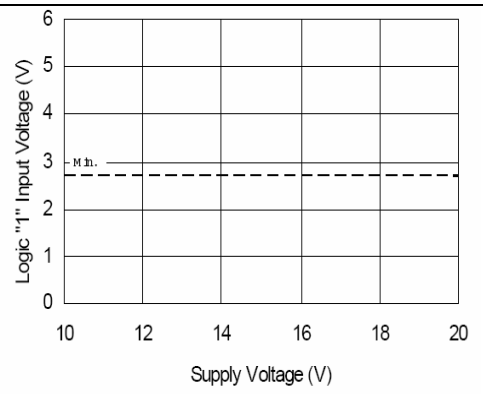
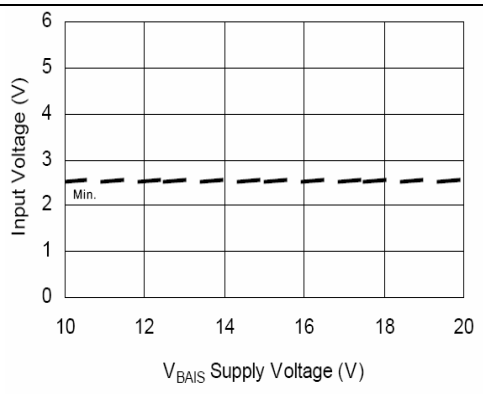


Figure 8B. Logic "1" Input Voltage vs. Supply Voltage



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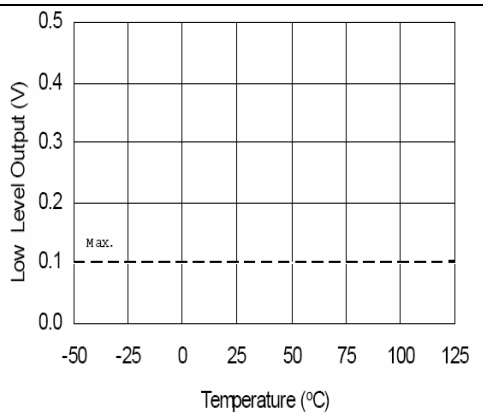
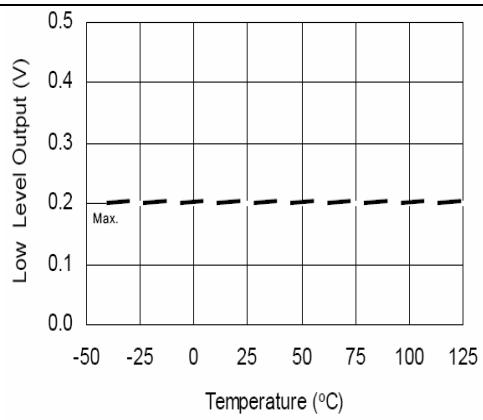


Figure 11A. Low Level Output vs. Temperature



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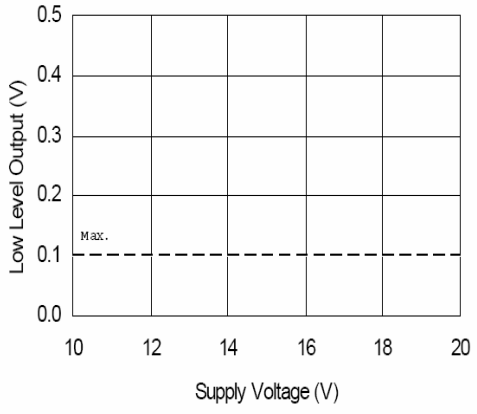

Figure 11B. Low Level Output vs. Supply Voltage

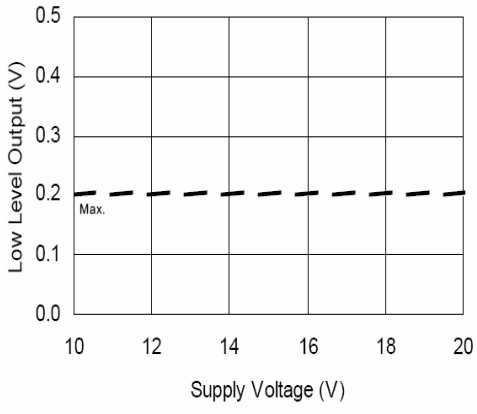

Figure 11B. Low Level Output vs. Supply Voltage

Summary

As shown by this document, the IRS218(1,14) and the IR218(1,14) are very similar except that the IRS218(1,14) does not have the input Zener clamp.