Application Note AN-1100

IRS211(0,3) and IR211(0,3) Comparison

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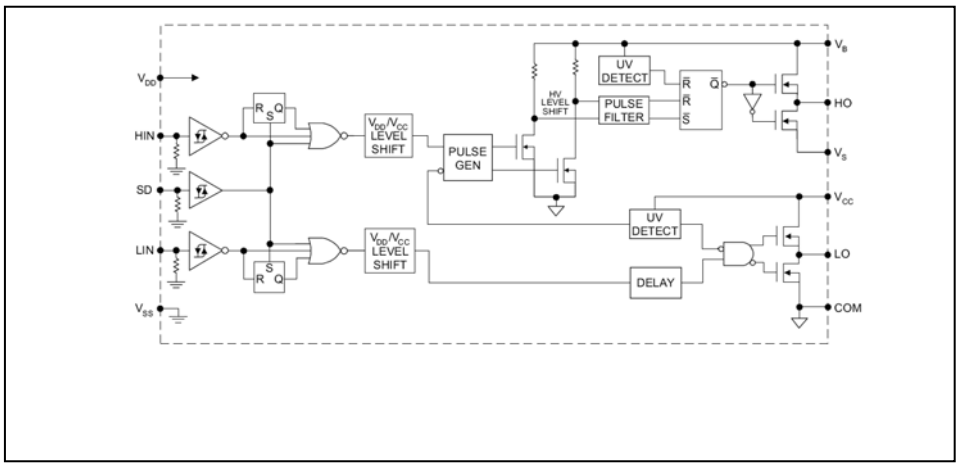
Introduction

The IRS211(0,3) are new HVIC products that replace the IR211(0,3) 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 next and previous generation.

The IR211(0,3) 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. Logic inputs are 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 cross-conduction. Propagation delays are matched to simplify its use in high frequency applications. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high side configuration which operates up to 500 V or 600 V.

Block Diagram



The IRS211(0,3) and the IR211(0,3) 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			IR2110/2113		IRS2110/2113		Units
Symbol	Definition		min	max	min	max	
V_B	High side floating supply voltage	(IR2110/IRS2110)	-0.3	525	-0.3	520 (Note1)	V
		(IR2113/IRS2113)	-0.3	625	-0.3	620 (Note1)	
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_{DD}	Logic supply voltage		-0.3	V_{SS} + 25	-0.3	V_{SS} - 20 (Note1)	
V_{SS}	Logic supply offset voltage		V_{CC} - 25	V_{CC} + 0.3	V_{CC} - 20	V_{CC} + 0.3	

Note1: In IRS211(0,3), 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.

For applications that require recovery from an output short-circuit to negative bus, do not allow V_{BS} ≥25 V for more than 1 µs in such a short-circuit recovery event. To help ensure this parameter corresponds to the datasheet DC condition limit, consider:

1. decreasing the di/dt by increasing $R_{g,OFF}$,
2. decreasing the V_S to COM distance on the PCB,
3. reducing the short-circuit current level,
4. adding R_B in series with C_B,
5. or increasing the size of C_B.

Recommended Operating Conditions

There are no changes in the Recommended Operating Conditions.

Dynamic Electrical Characteristics

Parameter		IR2110/2113		IRS2110/2113		Units
Symbol	Definition	typ	max	typ	max	
t_{on}	Turn-on propagation delay (Vs = 0 V)	120	150	130	160	ns
t_{off}	Turn-off propagation delay (Vs = 500 V / 600 V)	94	125	120	150	
t_{sd}	Shutdown propagation delay (Vs = 500 V / 600 V)	110	140	130	160	

There is a small difference in propagation delays between the IRS211(0,3) and the IR211(0,3).

Static Electrical Characteristics

Parameter		IR2110/2113			IRS2110/2113			Units
Symbol	Definition	min	typ	max	min	typ	max	
V_{OH}	High level output voltage, V_{BIAS} - V_O	-	-	1.2 (Io=0mA)	-	-	1.2 (Io=0mA)	V
V_{OL}	Low level output voltage, V_O	-	-	0.1 (Io=0mA)	-	-	0.15 (Io=20mA)	

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 IR211(0,3) (left column) and IRS211(0,3) (right column) datasheets. Illustrations that have not changed between the two datasheets have not been included in this section.

IR211(0,3)	IRS211(0,3)

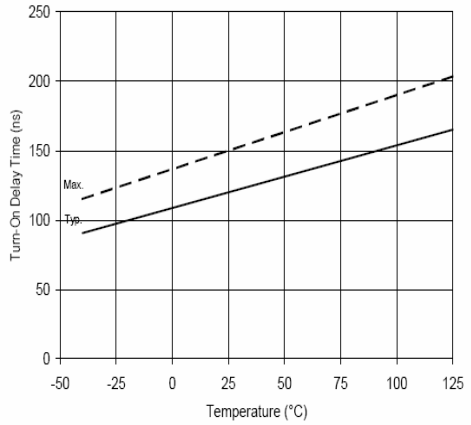
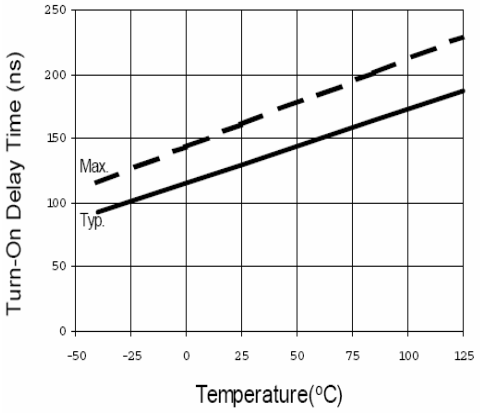

	

Figure 7A. Turn-On Time vs. Temperature	**Figure 7A. Turn-On Time vs. Temperature**

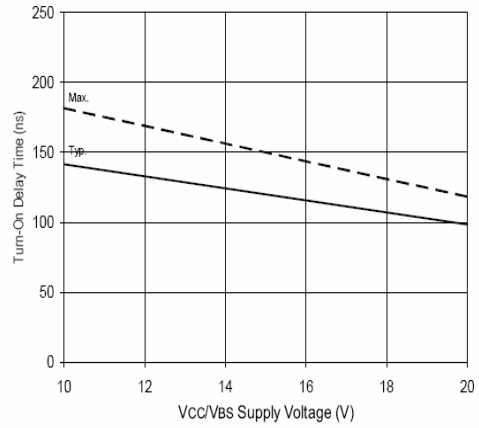
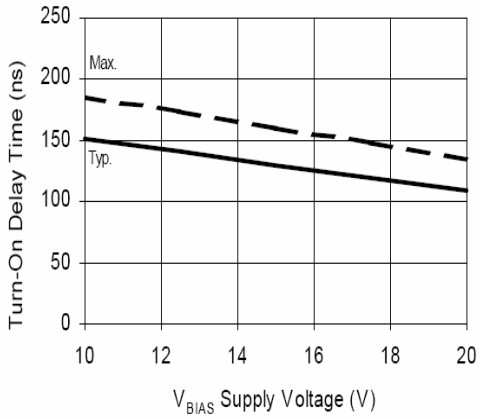

	

Figure 7B. Turn-On Time vs. VCC/VBS Supply Voltage	**Figure 7B. Turn-On Time vs. Supply Voltage**

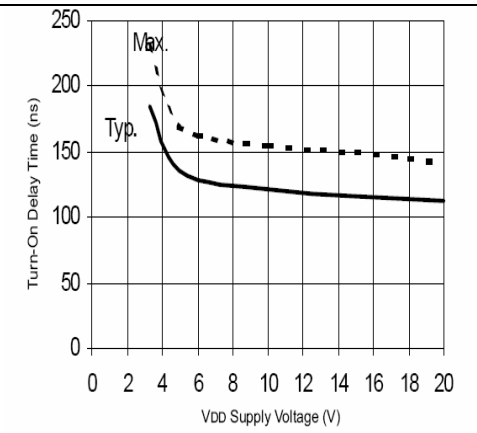
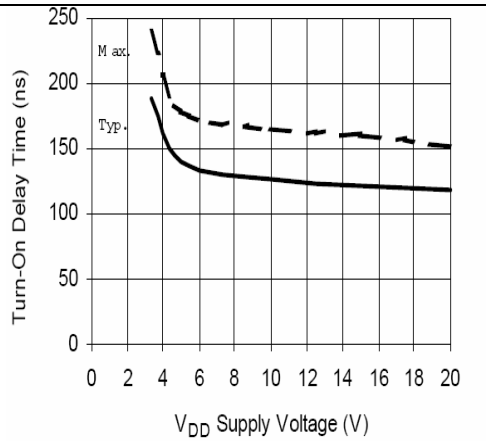

	

Figure 7C. Turn-On Time vs. VDD Supply Voltage	**Figure 7C. Turn-On Time vs. V_{DD} Supply Voltage**

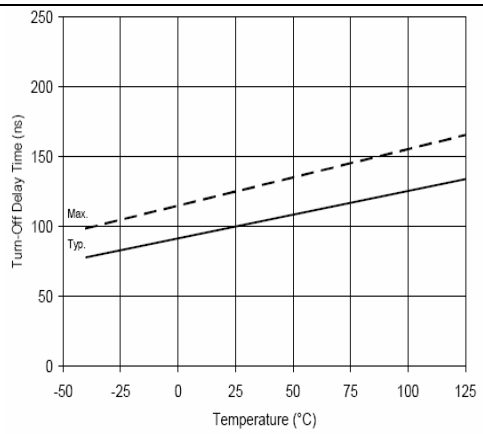
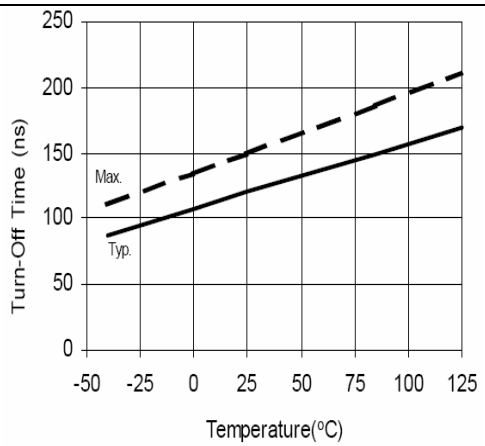


Figure 8A. Turn-Off Time vs. Temperature



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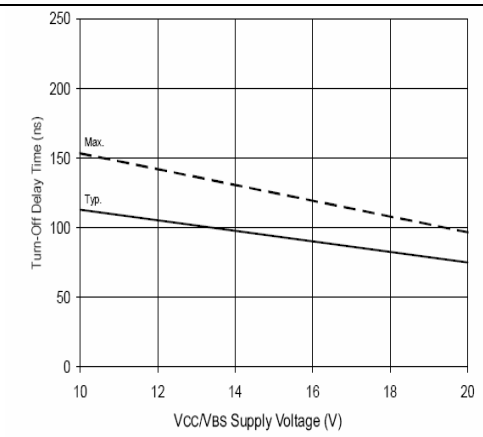


Figure 8B. Turn-Off Time vs. VCC/VBS Supply Voltage

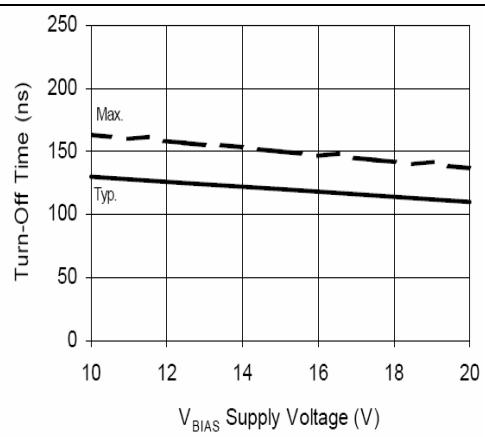


Figure 8B. Turn-Off Time vs. Supply Voltage

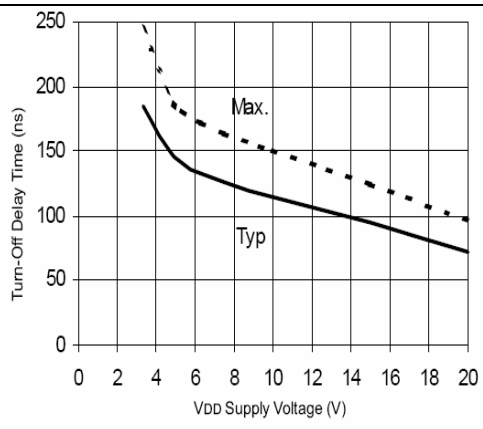
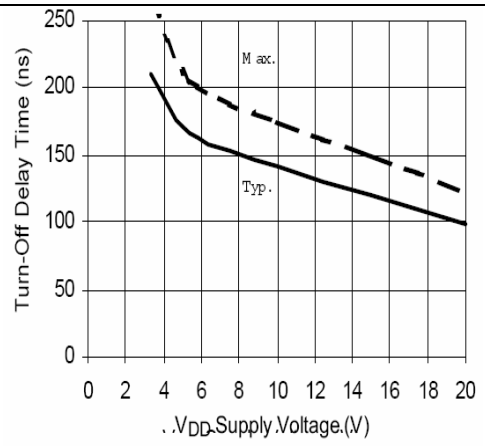


Figure 8C. Turn-Off Time vs. VDD Supply Voltage



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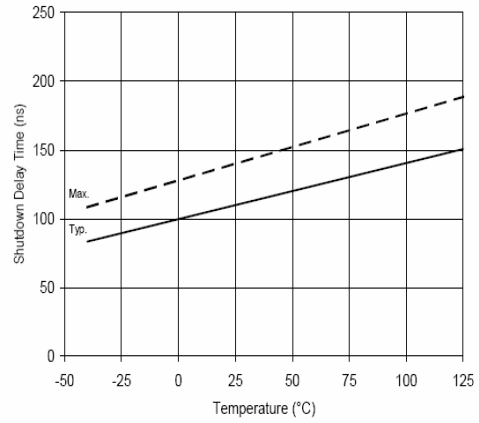
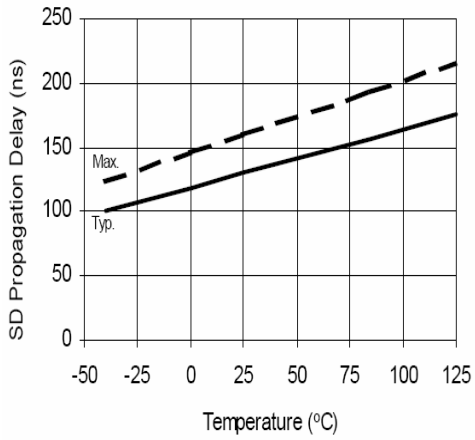


Figure 9A. Shutdown Time vs. Temperature



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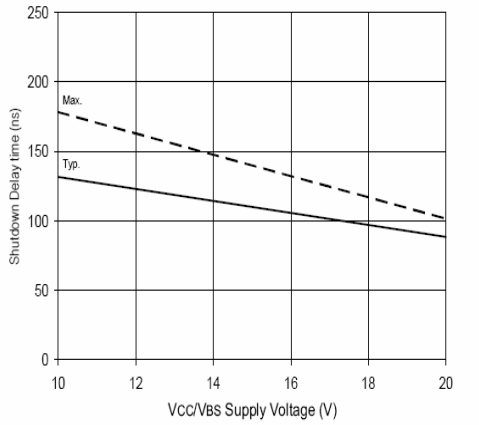


Figure 9B. Shutdown Time vs. Vcc/VBS Supply Voltage

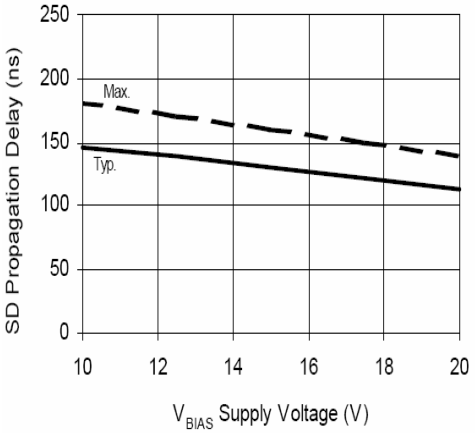


Figure 9B. Shutdown Time vs. Supply Voltage

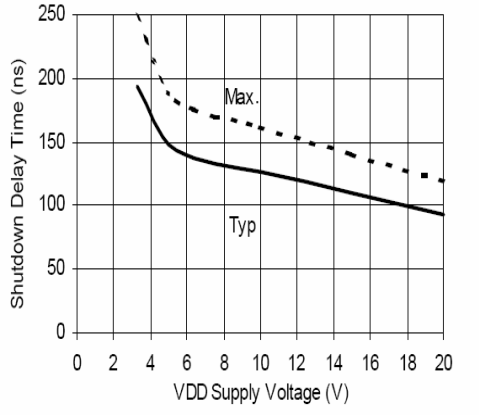
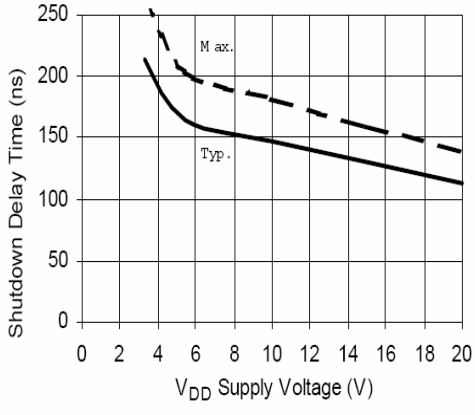


Figure 9C. Shutdown Time vs. VDD Supply Voltage



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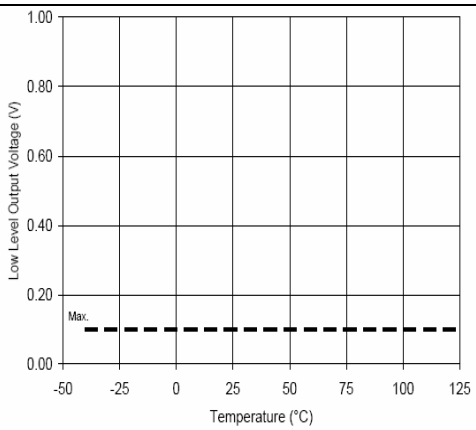
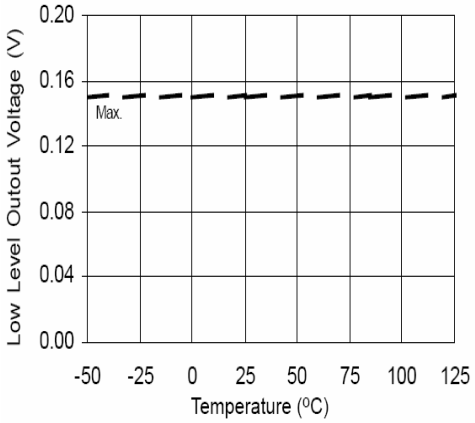


Figure 15A. Low Level Output vs. Temperature



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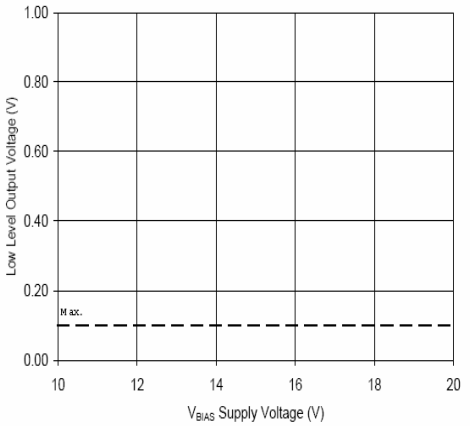

Figure 15B. Low Level Output vs. Voltage

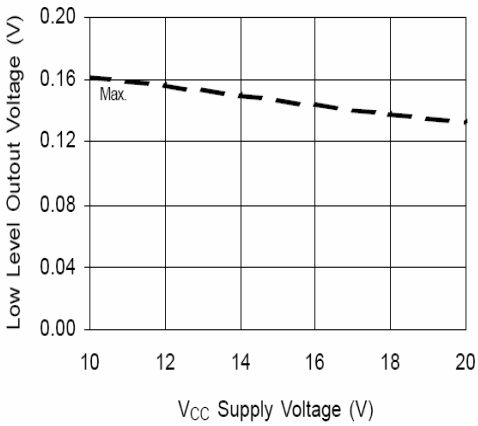

Figure 15B. Low Level Output vs. Supply Voltage

Summary

As shown by this document, the IRS211(0,3) and the IR211(0,3) are very similar with only a few negligible parametric differences.