Application Note AN-1129

IRS20954S and IRS20955S Comparison

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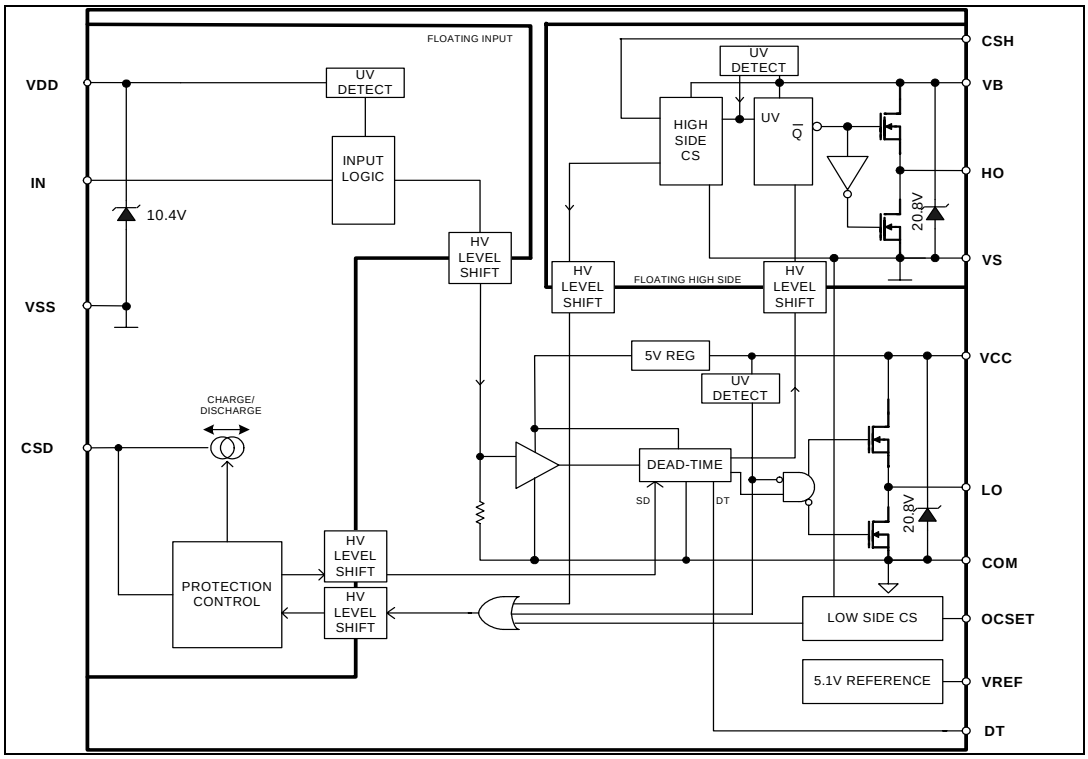
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Introduction

The IRS20955S is a high voltage, high speed MOSFET driver with a floating PWM input designed for Class D audio amplifier applications. The IRS20955S is an improved version of the IRS20954S. This application note describes the differences between the IRS20954S and IRS20955S.

Block Diagram



The IRS20954S and the IRS20955S share the same functional structure. In normal operating condition, there are no functional changes between corresponding part numbers.

Electrical Characteristic Differences

All measurement conditions are the same for both the IRS20954S and IRS20955S.

Absolute Maximum Ratings

There are no changes in the Dynamic Electrical Characteristics.

Recommended Operating Conditions

There are no changes in the Recommended Operating Conditions.

Dynamic Electrical Characteristics

There are no changes in the Dynamic Electrical Characteristics.

Static Electrical Characteristics

The zener clamp voltages and high level output voltage are different for the IRS20954S and IRS20955S.

		IRS20954S			IRS20955S			
Symbol	**Definition**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Units**
V_{CLAMPL}	Low-side zener diode clamp voltage	19.8	20.8	21.8	19.6	20.4	21.6	V
V_{CLAMPH}	High-side zener diode clamp voltage	19.8	20.8	21.8	19.6	20.4	21.6	
V_{CLAMPM}	Floating Input zener diode clamp voltage	9.9	10.4	10.9	9.8	10.2	10.8	
V_{OH}	High level output voltage, VCC – LO, VB – HO	-	-	1.2	-	-	1.4	

Static Electrical Characteristics (Cont'd)

		IRS20954S			IRS20955S			
Symbol	**Definition**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Units**
V_{REF}	Reference output voltage	4.6	5.1	5.6	4.8	5.1	5.4	V
$V_{th,OCL}$	Low-side OC threshold in Vs	1	1.2	1.4	1.1	1.2	1.3	
$V_{th,OCH}$	High-side OC threshold in V_{CSH}	1.0+ V_s	1.2+ V_s	1.4+ V_s	1.1+ V_s	1.2+ V_s	1.3+ V_s	
I_{CSD+}	CSD pin discharge current	50	100	150	70	100	130	µA
I_{CSD-}	CSD pin charge current	50	100	150	70	100	130	
t_{SD}	Shutdown propagation delay from V_{CSD} > V_{SS} + Vth_{OCH} to shutdown	-	200	500	-	-	250	ns
t_{OCH}	Propagation delay time from V_{CSH} > Vth_{OCH} to shutdown	-	-	600	-	-	500	
t_{OCL}	Propagation delay time from Vs> Vth_{OCL} to shutdown	-	-	600	-	-	500	

The minimum and maximum limits for V_{REF}, $V_{th,OCL}$ and $V_{th,OCH}$ are tightened in the IRS20955S for improved over-current threshold accuracy.

The minimum and maximum limits for I_{CSD+} and I_{CSD-} are tightened in the IRS20955S for improved protection control timer accuracy.

The minimum and maximum limits for t_{SD}, t_{OCH} and t_{OCL} are shortened in the IRS20955S for faster OCP reaction time.

Logic Status Differences

Initial 0utput Logic Status

In the IRS20954S, the order in which power is supplied to the IC can affect the output logic states of LO and HO. When power is supplied to V_{DD} before power is supplied to V_{CC}, the logic states of LO and HO are opposite but independent from the input until the first logic transition occurs at the input.

In the IRS20955S, the logic states of HO and LO correspond to the input of the IC after shutdown release to ensure switching action is not affected by the power up sequence.

HO Logic at Initial Startup

In the IRS20954S, the initial state of HO could be low or high when V_{BS} is powered up before V_{CC}, i.e. HO logic is unknown during startup if V_{BS} reaches the UV threshold before V_{CC} does.

In the 20955S, HO stays low in the same scenario.

Table 1 Summary of Logic Status Differences between the IRS20954S and the IRS20955S

Issue Addressed	Condition	IRS20954S	IRS20955S
Initial Output Logic Status	Power is supplied to V_{DD} before power is supplied to V_{CC}.	- HO = $\overline{LO}$ - The output logic states of HO and LO are unknown until the first logic transition at the input of the IC occurs.	- HO = $\overline{LO}$ - The output logic states of HO and LO corresponds to the logic input to the IC.
HO Logic at Initial Startup	$V_{CC} < UV_{CC}$ and $V_{BS} > UV_{BS}$ during start up	The logic status of HO is unknown.	HO = low

Summary

The IRS20955S is an improved version of the IRS20954S in terms of over-current protection accuracy. Applications using a self-oscillating PWM topology that includes the gate driver IC should use the IRS20955S.