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15V, 1.5W buck converter based on VIPER26K

Introduction

The **STEVAL-VP26K01B** is a 15 V – 1.5 W power supply in buck topology featuring the **VIPER265KDTR** offline high voltage converter, specifically developed for ultra-wide input range solutions.

The evaluation board has the following characteristics:

- Ultra-wide range: 90–600 V_{AC} or 60–870 V_{DC}
- Meets IEC55022 Class B conducted EMI even with a reduced EMI filter, thanks to the frequency jittering feature
- RoHS compliant

Some of the main features of the **VIPER265KDTR** include:

- 1050 V avalanche rugged Power MOSFET
- Embedded HV start-up
- 60 kHz fixed switching frequency with jittering
- Embedded error amplifier internally referenced to 3.3 V
- Current mode PWM controller with drain current limit protection for easy compensation
- Several protection mechanisms:
 - delayed overload protection (OLP)
 - open loop failure protection
 - thermal shutdown with hysteresis

All protections are in auto restart mode

Figure 1. STEVAL-VP26K01B evaluation board top and bottom

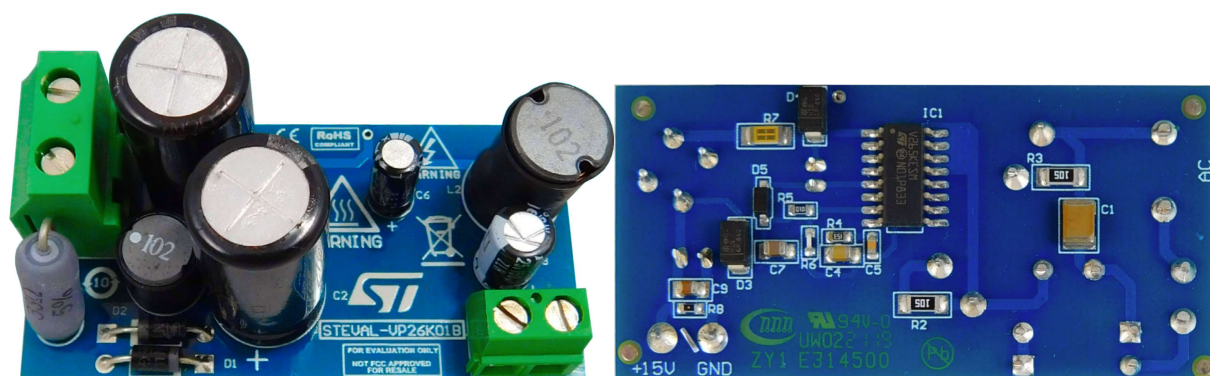


Table 6. Supply section

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
High voltage start-up current source						
V_{VDSS_SU}	Startup breakdown drain-source voltage	$I_D = 1\text{ mA}$, $V_{COMP} = \text{GND}$, $T_J = 25^\circ\text{C}$	1.05			kV
V_{HV_START}	Drain-source start voltage		38		60	V
I_{DDch1}	Charging current during startup	$V_{DRAIN} = 50\text{ V}$ to 1.05 kV, $V_{DD} = 4\text{ V}$	-0.6		-1.8	mA
I_{DDch2}	Charging current in self-supply	$V_{DRAIN} = 50\text{ V}$ to 1.05 kV, $V_{DD} = 9\text{ V}$ falling edge	-7		-13	mA
IC supply and consumptions						
V_{DD}	Operating voltage range		11.5		23.5	V
$V_{DDclamp}$	V_{DD} clamp voltage	$I_{DD} = 15\text{ mA}$	23.5			V
V_{DDon}	V_{DD} start up threshold		12	13	14	V

($T_J = -40$ to 125°C , $V_{DD} = 14\text{V}$; unless otherwise specified.)

Table 5. Power section

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit.
V_{BVDSS}	Breakdown voltage	$I_D = 1\text{ mA}$, $V_{COMP} = \text{GND}$, $T_J = 25^\circ\text{C}$	1.05			kV
I_{DSS}	Drain-source leakage current	$V_{DRAIN} = 1050\text{V}$, $V_{COMP} = \text{GND}$, $T_J = 25^\circ\text{C}$			29	μA
$R_{DS(on)}$	Drain-Source ON state resistance	$I_{DRAIN} = 0.2\text{ A}$; $T_J = 25^\circ\text{C}$			7	Ω
		$I_{DRAIN} = 0.2\text{ A}$; $T_J = 125^\circ\text{C}$			14	

Schematic diagrams

1.1

Figure 2. STEVAL-VP26K01B schematic diagram

